

ELECTRICAL REVIEW

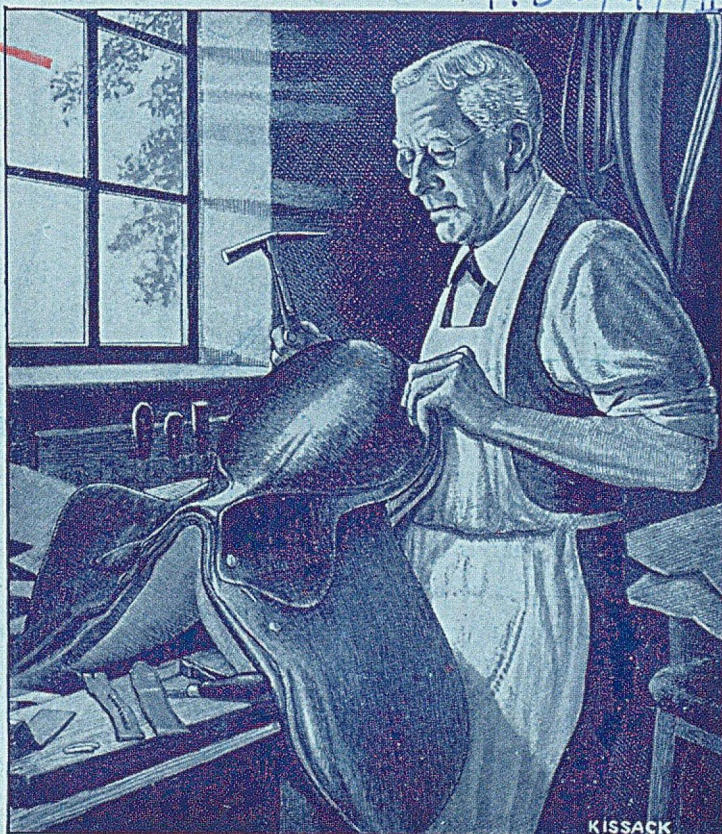
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P. 58/47/II



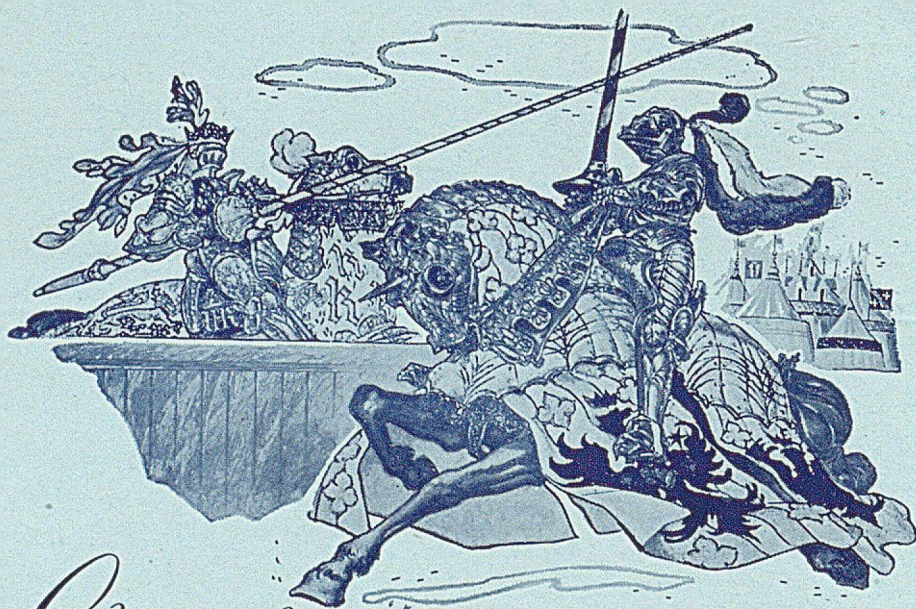
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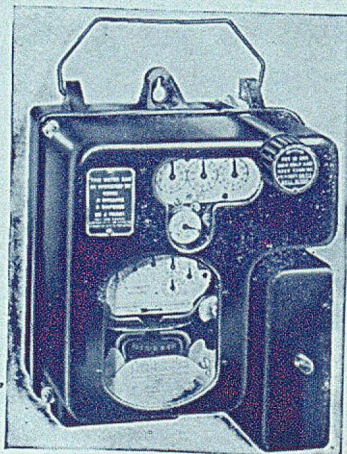


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In olden times, chivalry was a feature of the jousts. In modern business, the spirit of chivalry will not overcome all our supply problems, but courteous and prompt attention to individual requirements will often help to speed deliveries. It is in this spirit of real helpfulness that we are making every effort to meet the present demand for Sangamo Weston electricity meters and time switches. You can rest assured that we shall continue to accord your needs every consideration and that we will do our best to assist you in spite of a difficult supply situation.

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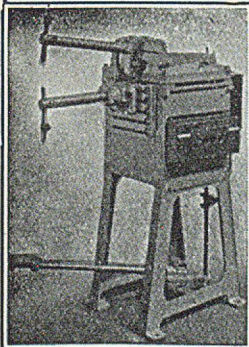
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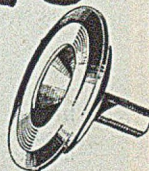
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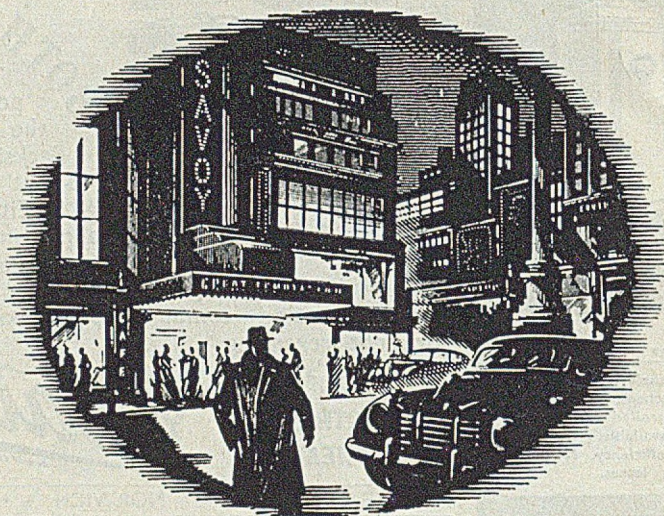
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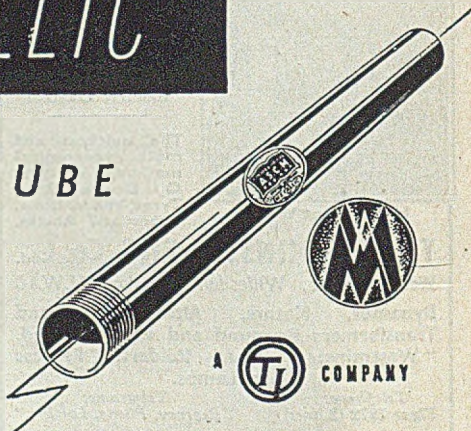
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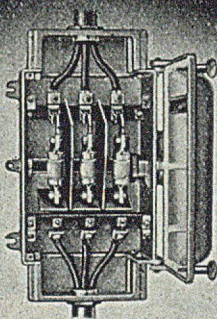
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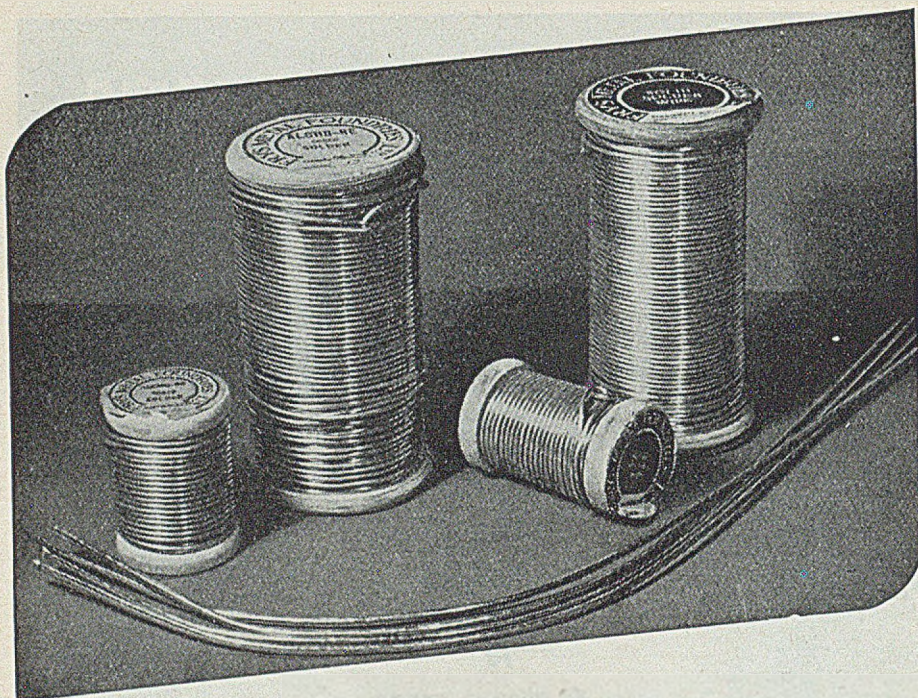
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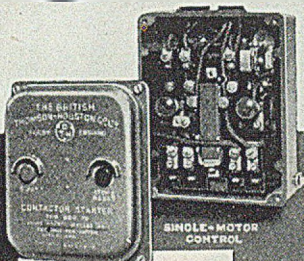
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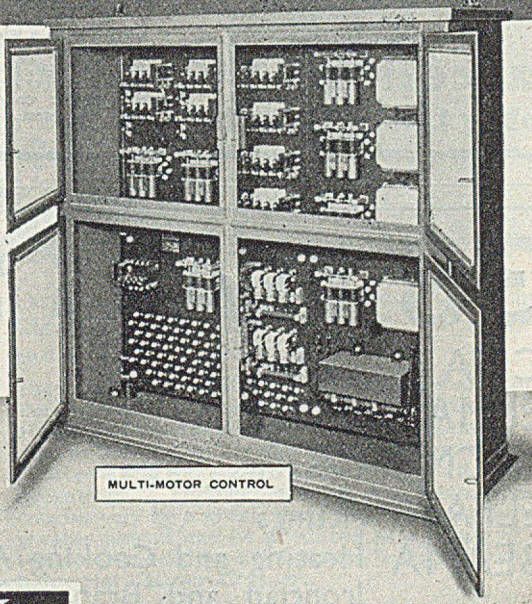


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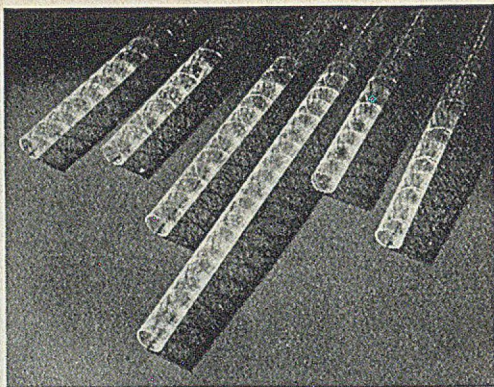
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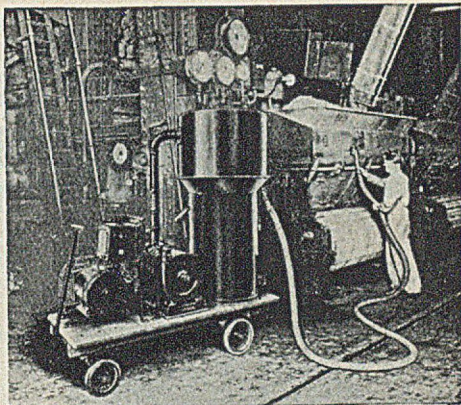
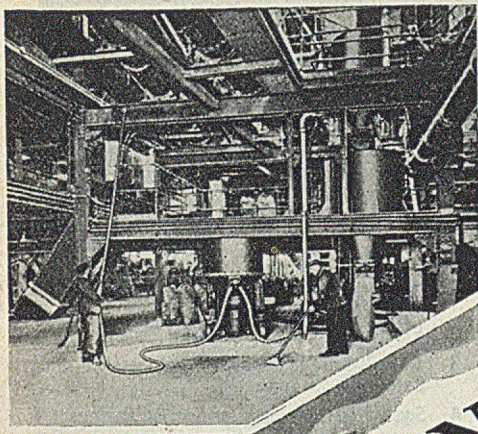
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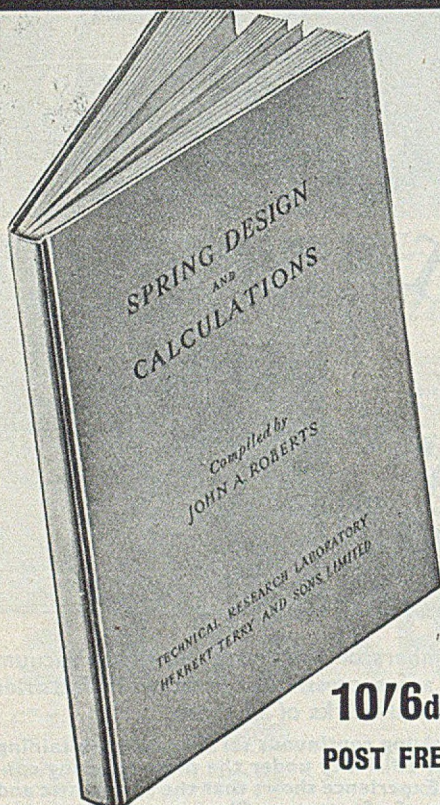


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Helpful Hints when Ordering Springs

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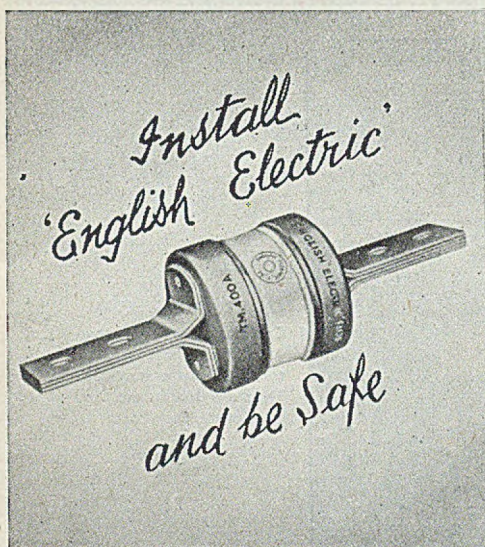
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354	500	TTM 500	450 to 500 Amps.
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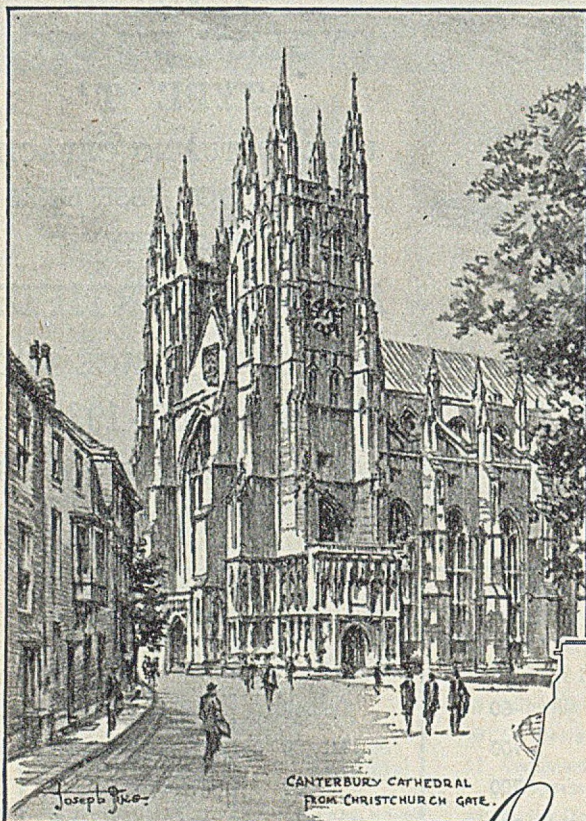
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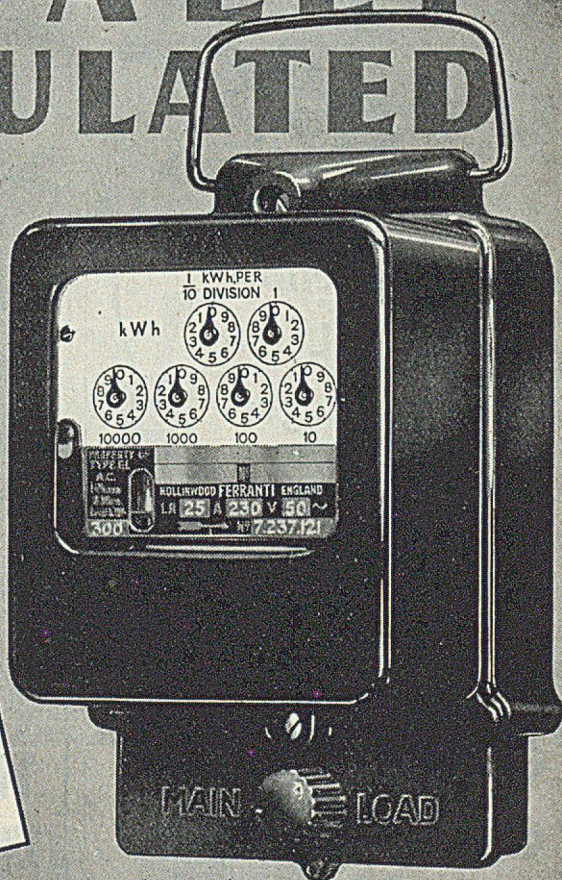
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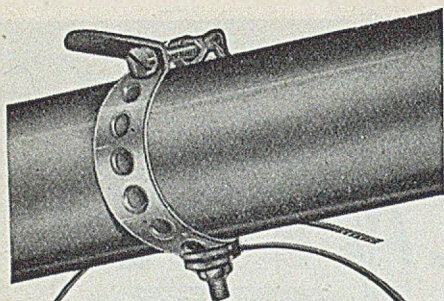
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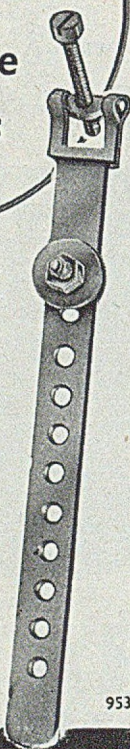
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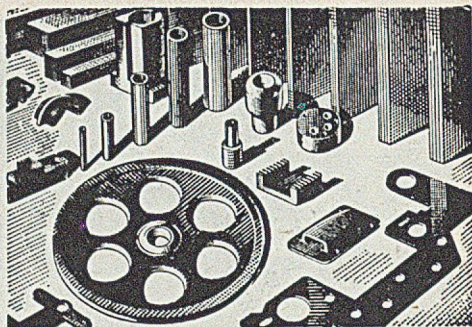
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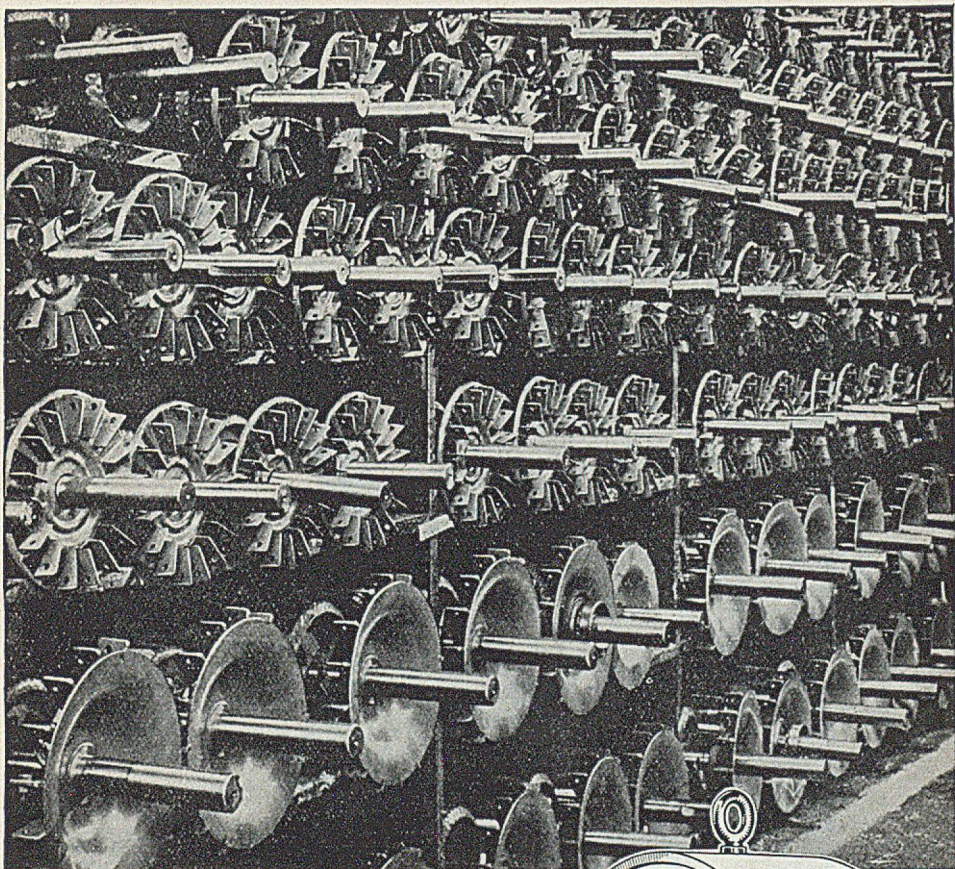
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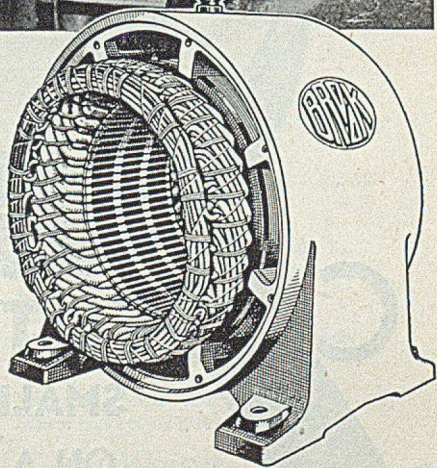


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A MOTOR A MINUTE

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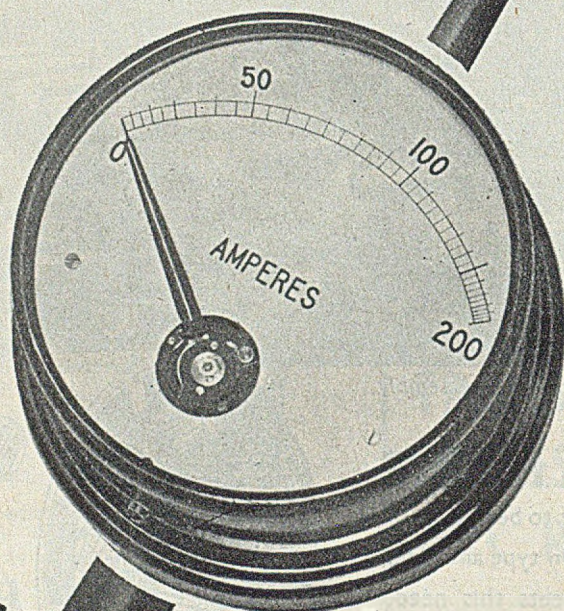
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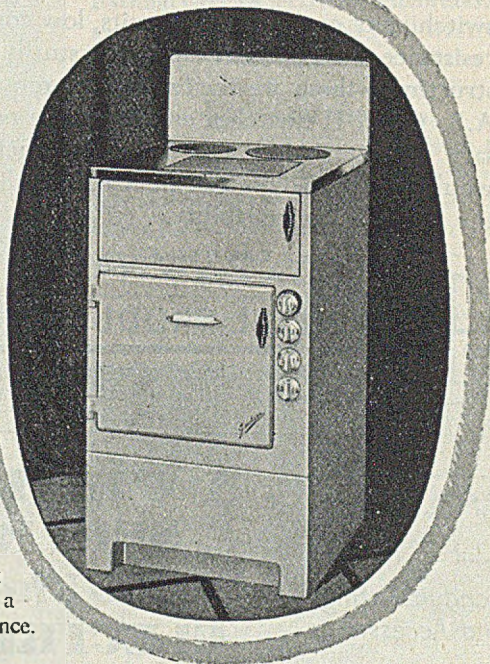
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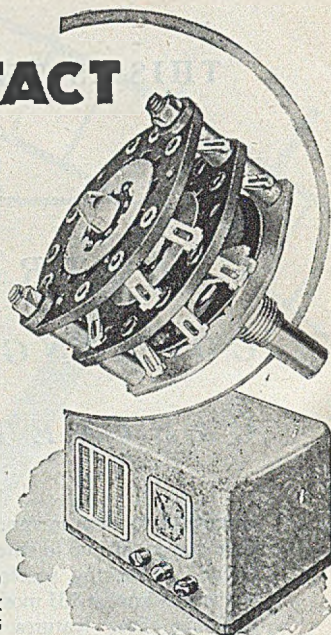
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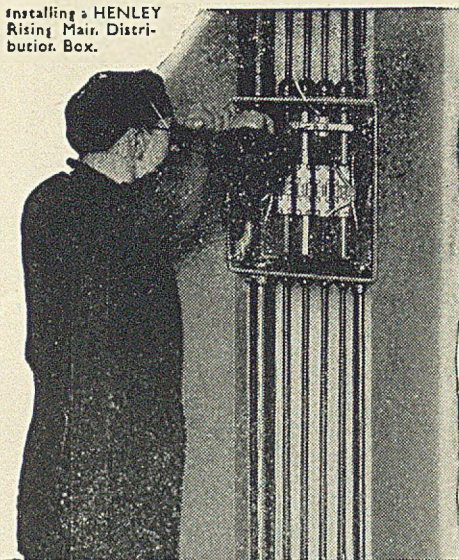


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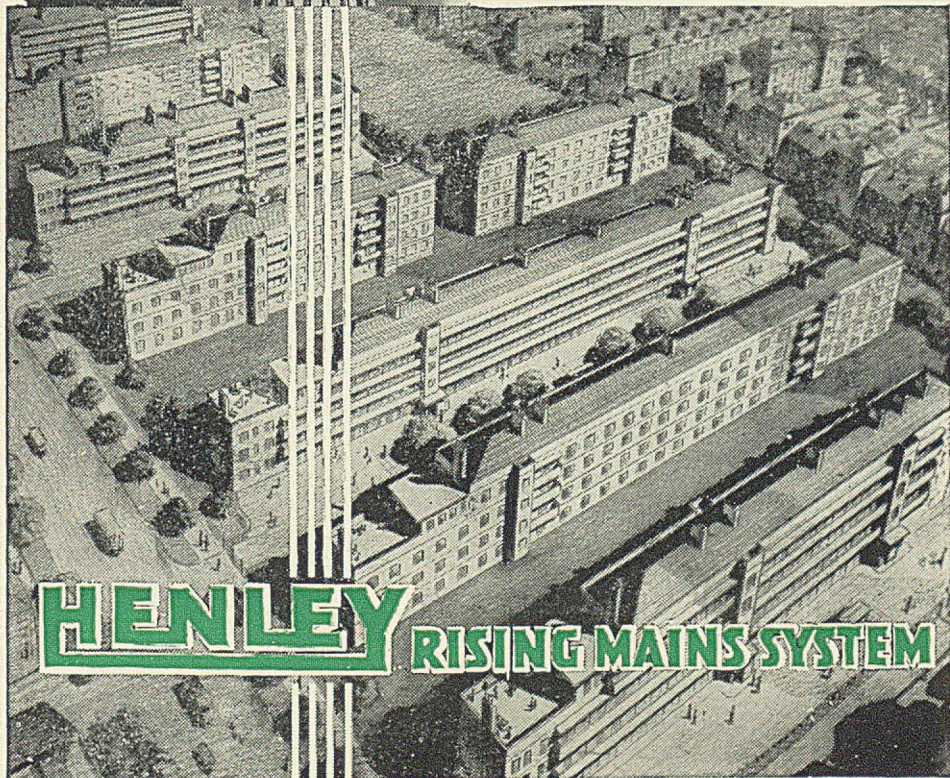


"FLATS GOING UP"

Bethnal Green Electricity Undertaking are installing the HENLEY RISING MAINS SYSTEM in the eight blocks of flats being erected under the new L.C.C. scheme at the Minerva Street site.

Mr. E. E. Jolly, M.I.E.E., A.M.I.Mech.E., the Borough Electrical Engineer, has chosen this system because it is specifically designed for multi-floor buildings of this type.

An artist's impression of the flats on Minerva Street site, Bethnal Green, London, E.2. (Main Contractors: Holland, Hannen & Cubitts Ltd.). These flats were featured in a recent B.B.C. broadcast entitled "Flats going up."

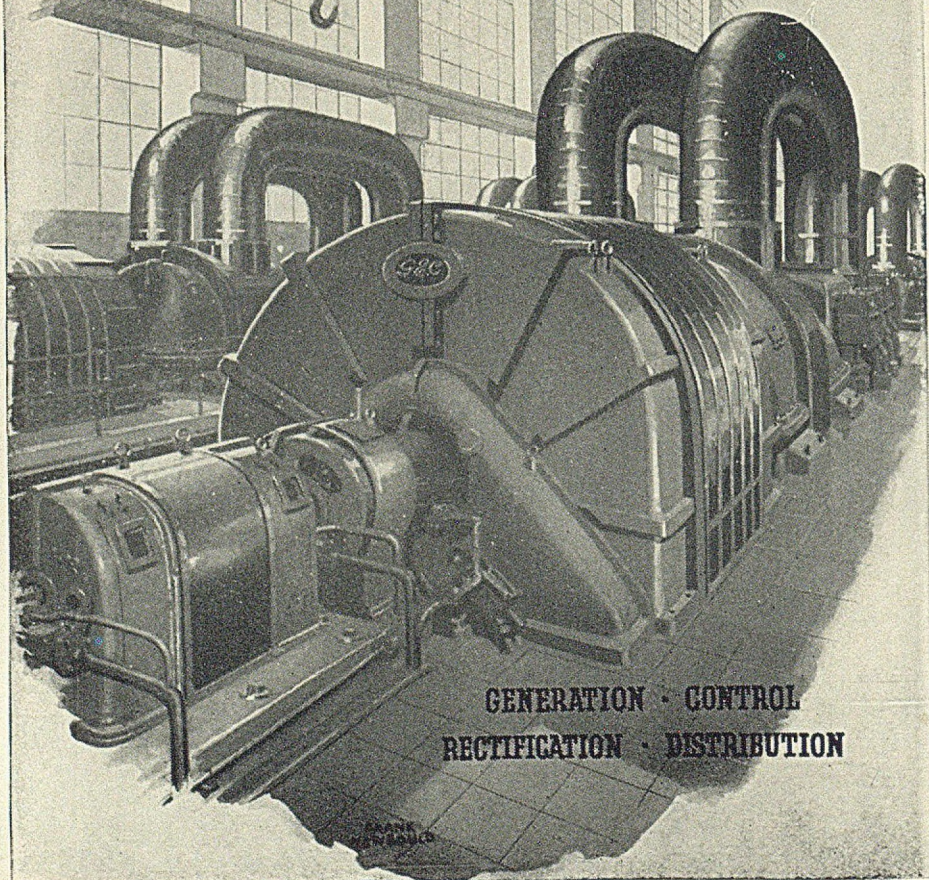


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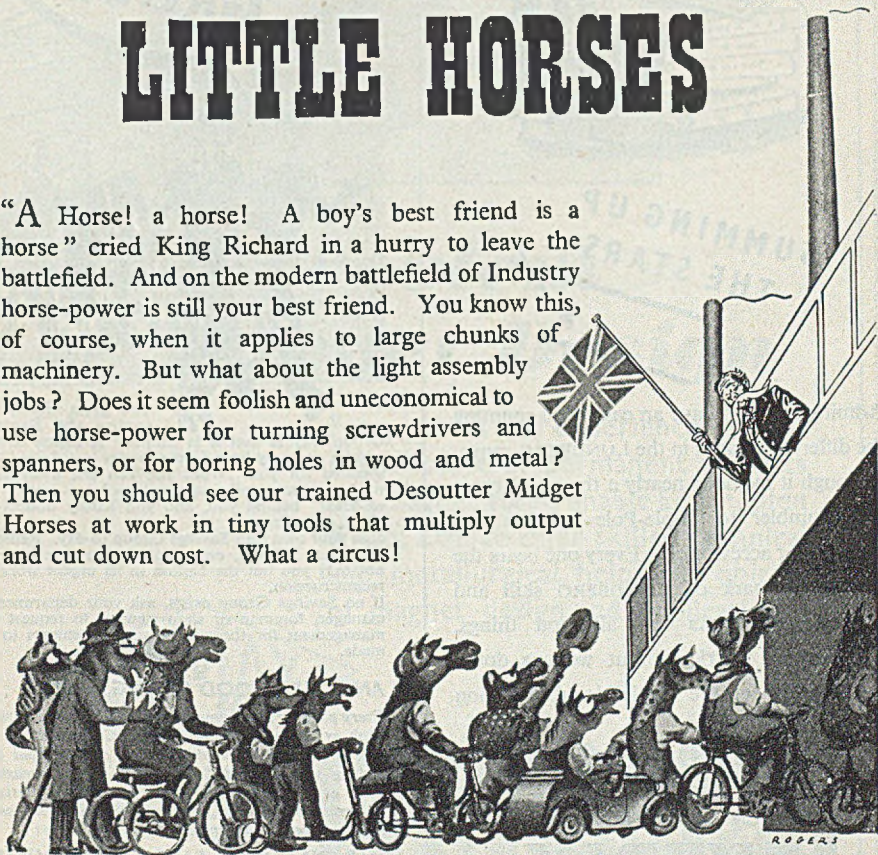
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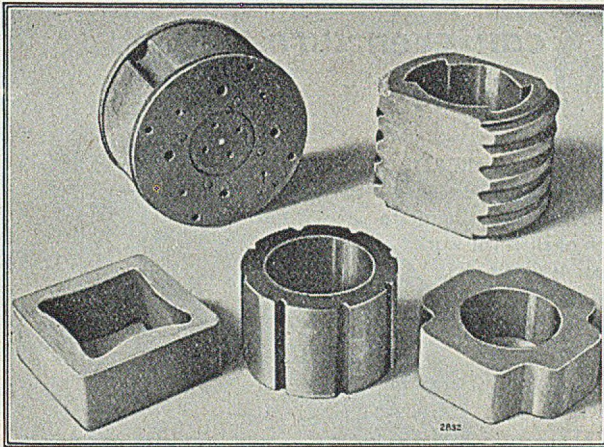
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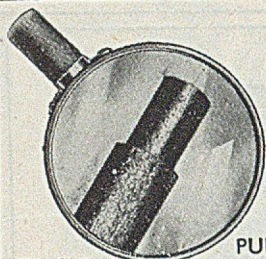
Any Problem of Magnet Design

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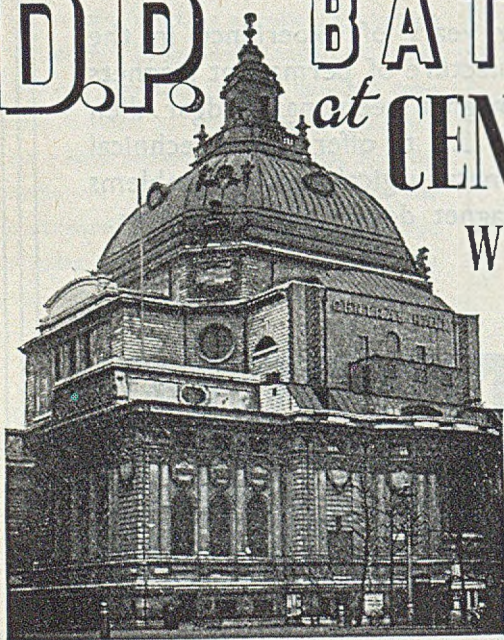
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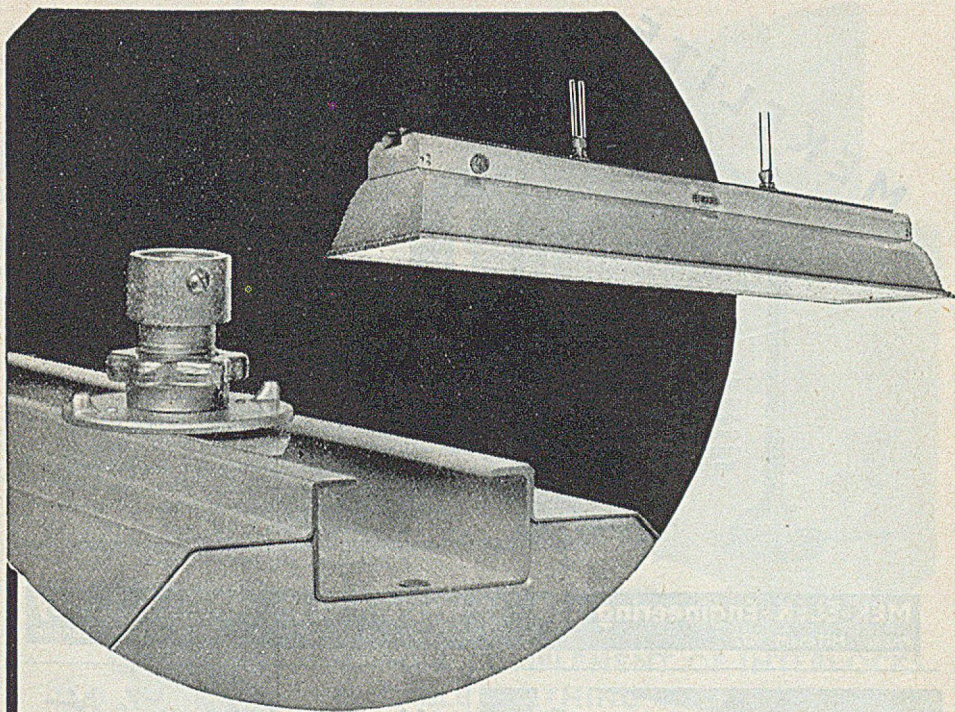
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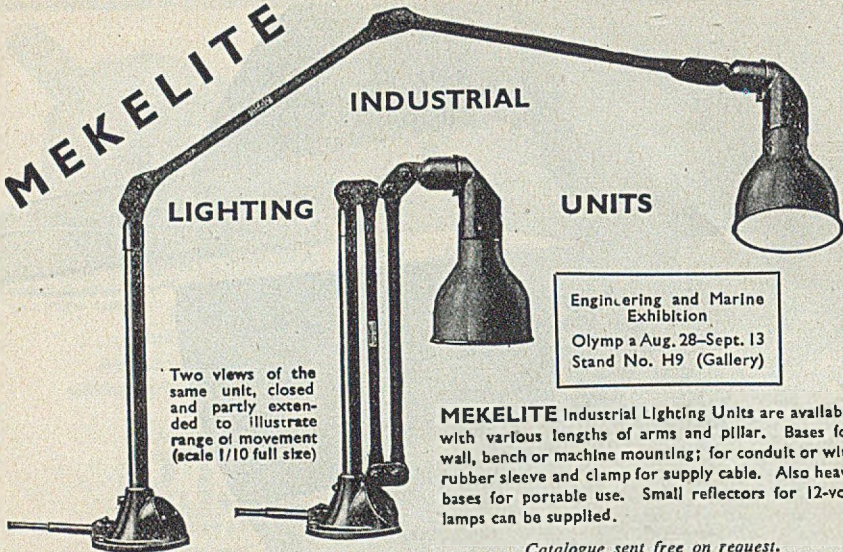
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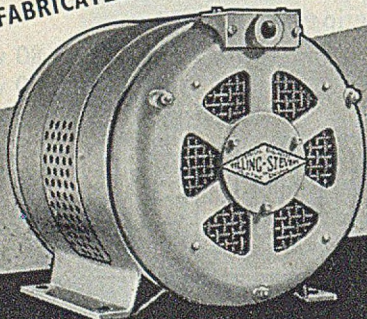
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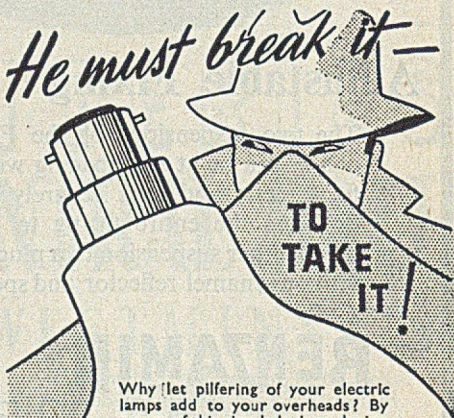
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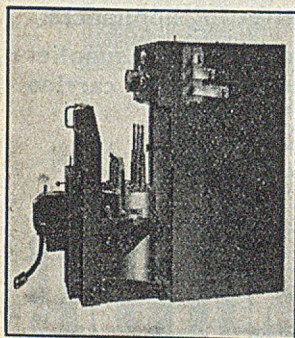
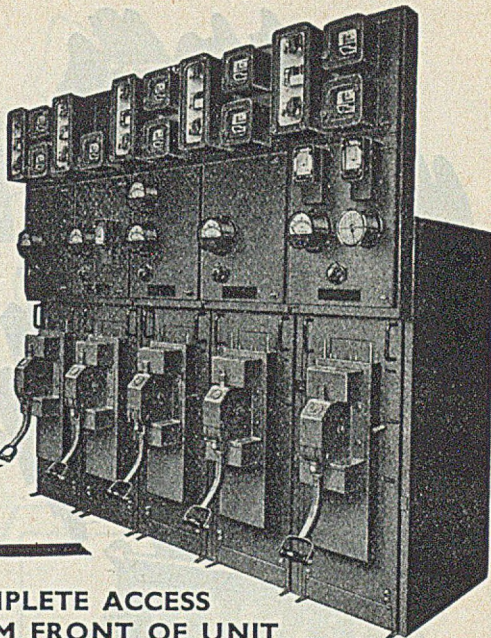
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LOCKS

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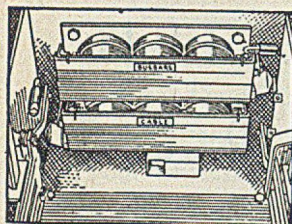
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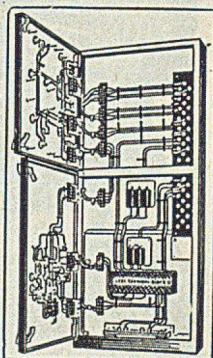


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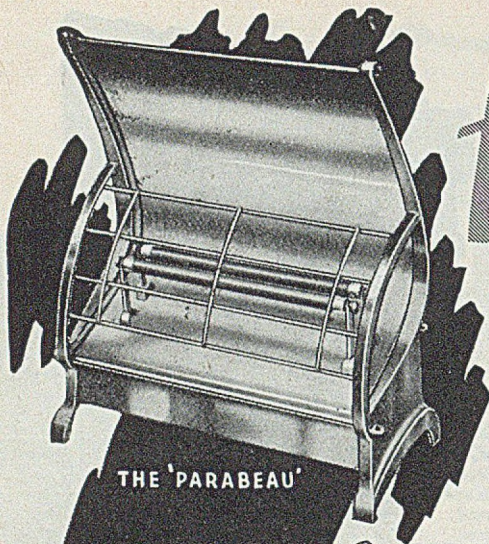
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Telephone: Greenwich 3244 (13 lines).

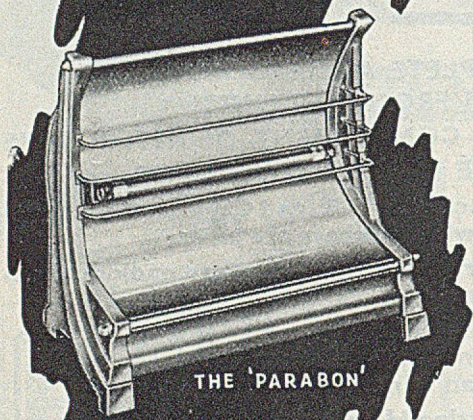
Telegrams: "Juno," Charlton, Kent



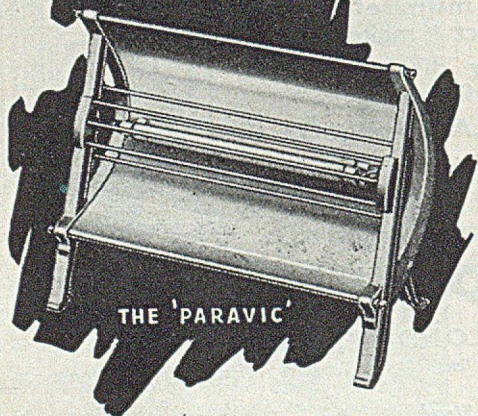
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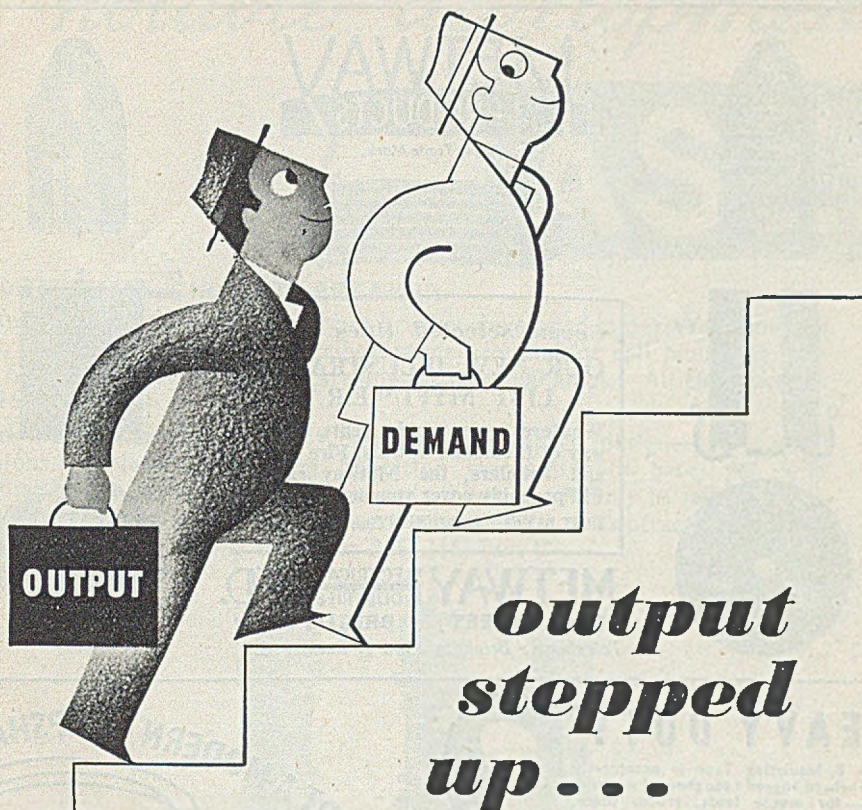
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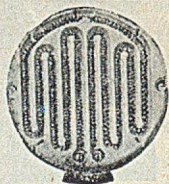
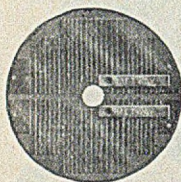
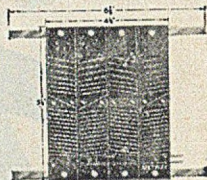
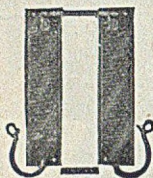
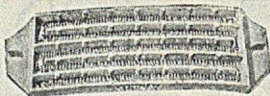
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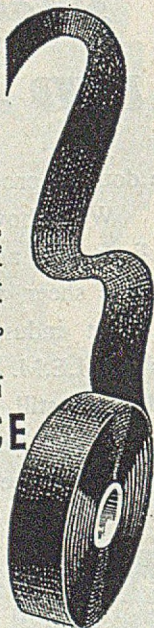
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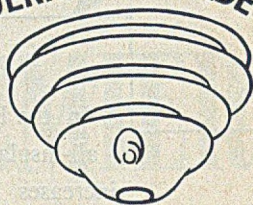
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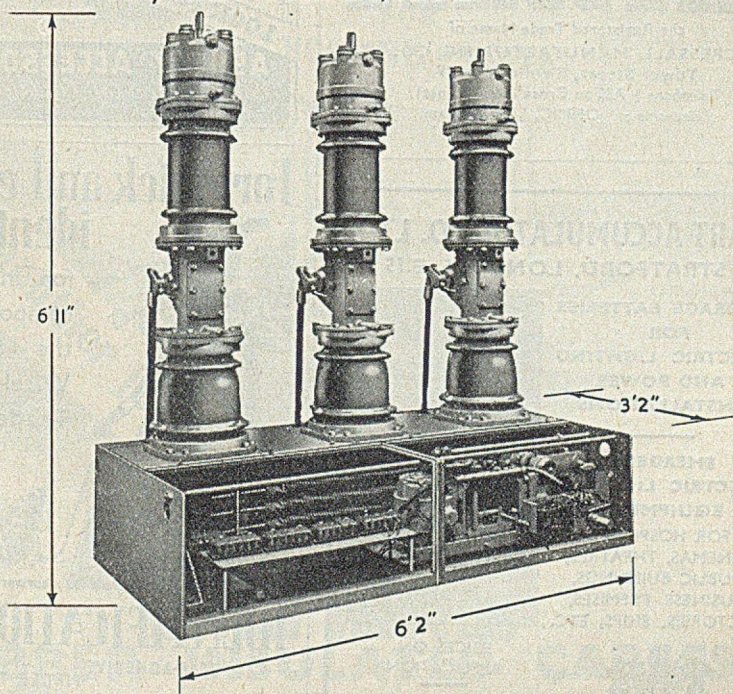
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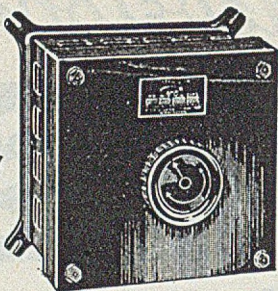
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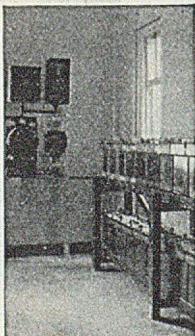
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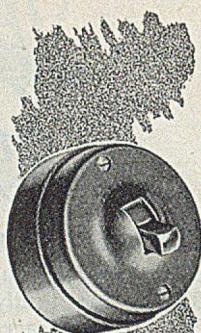


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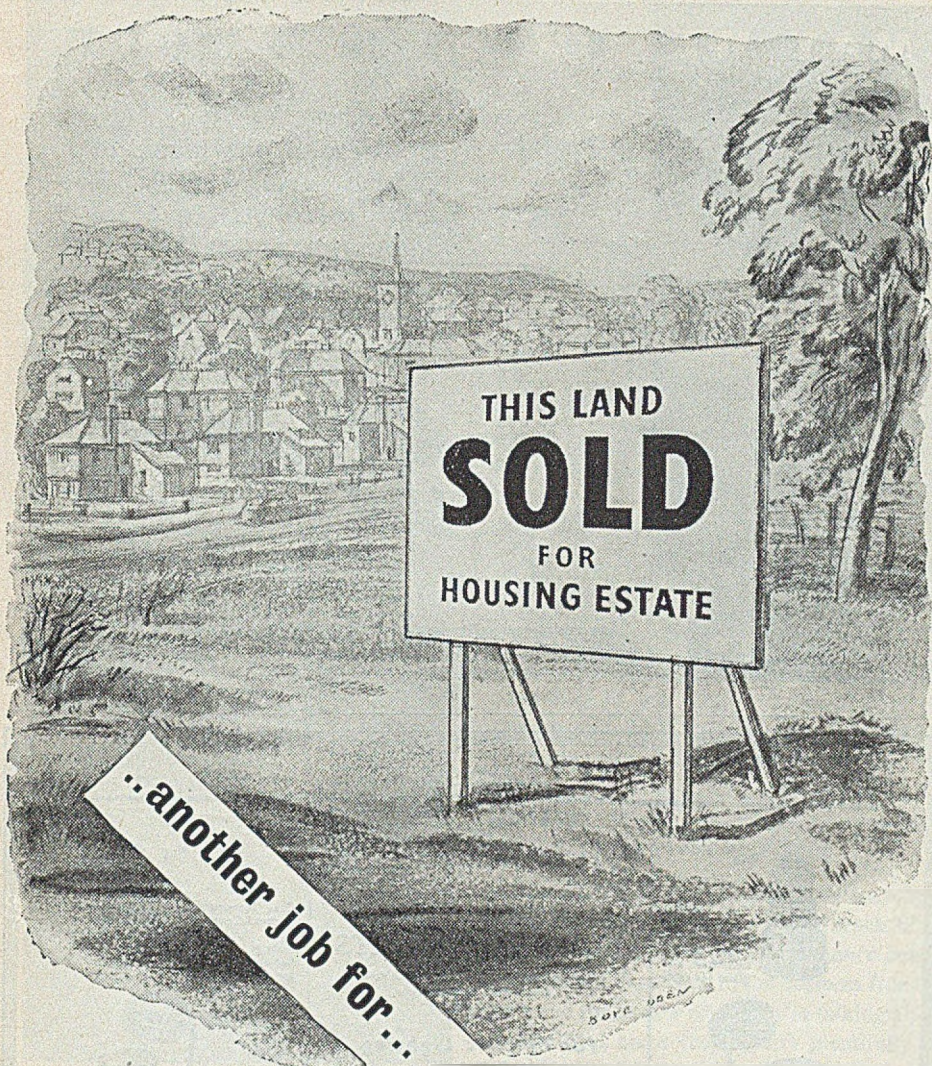
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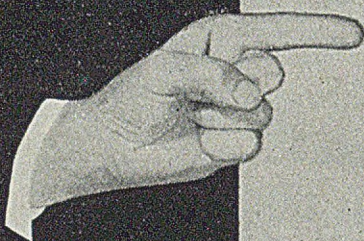


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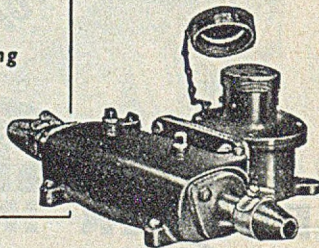
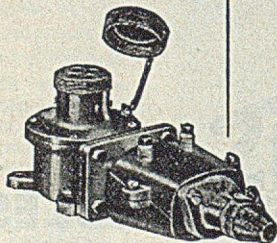
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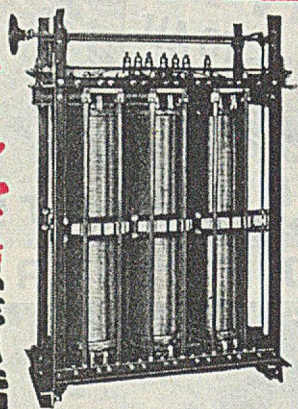
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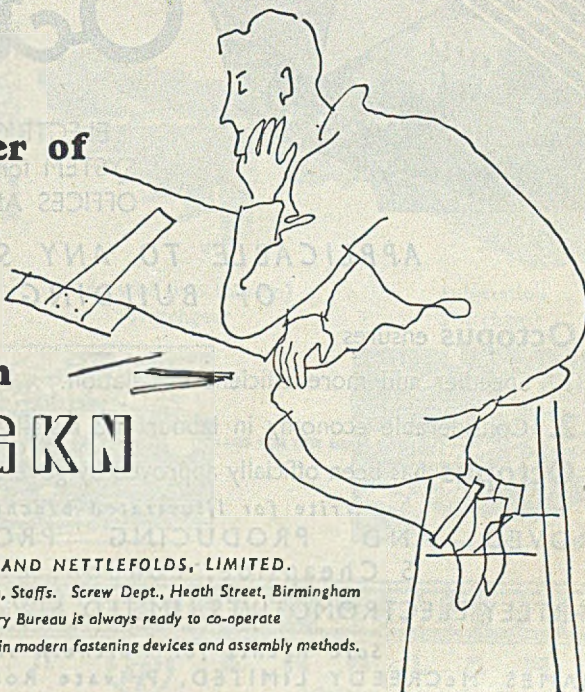
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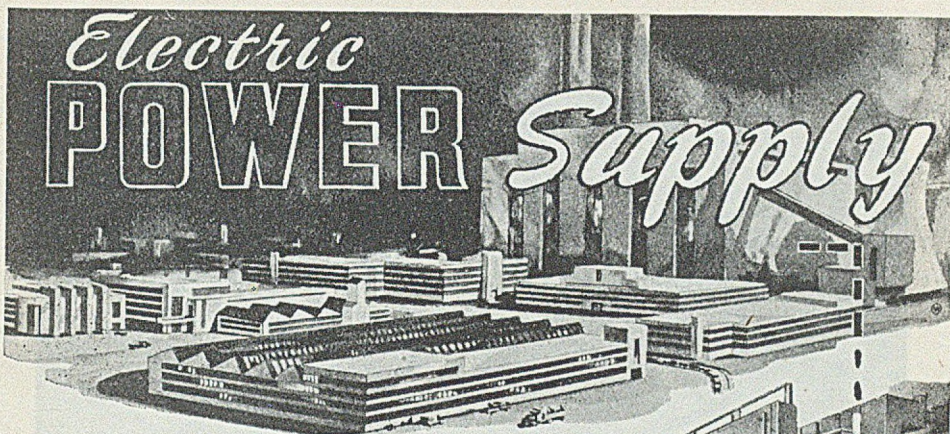
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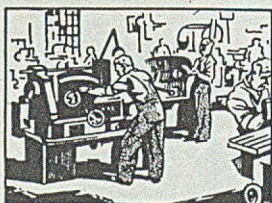
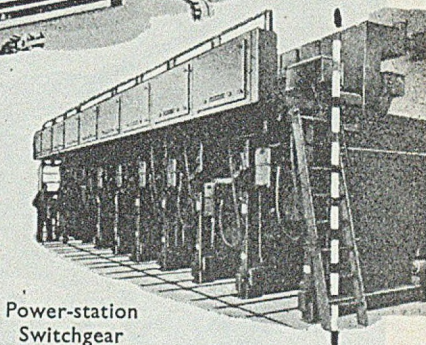
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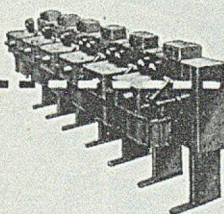


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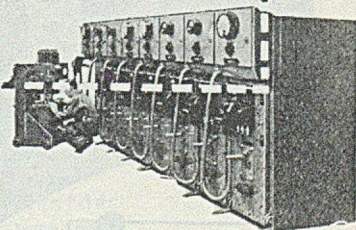
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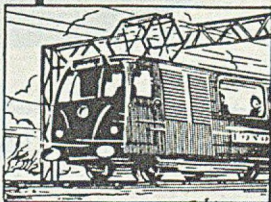
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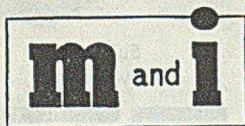
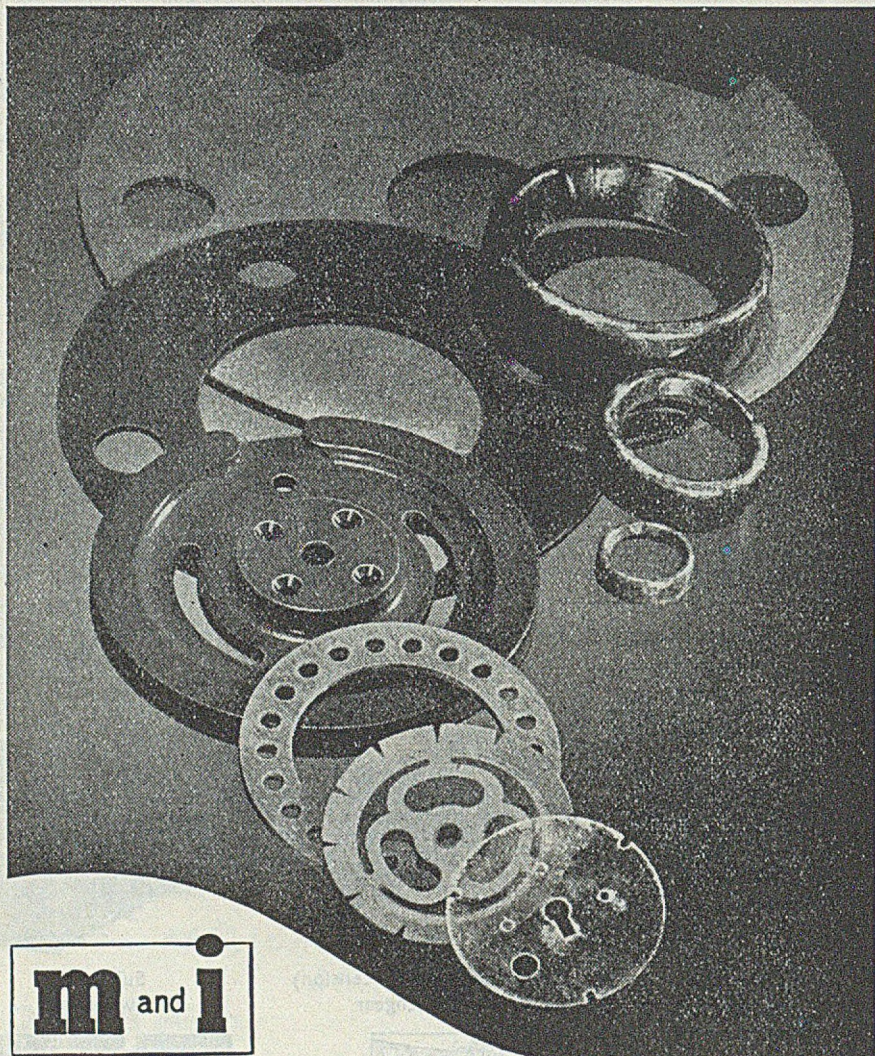
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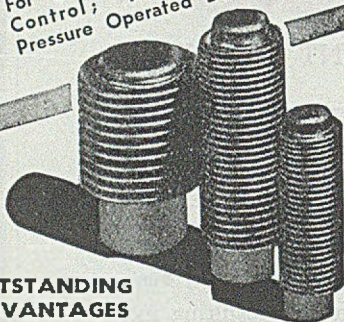
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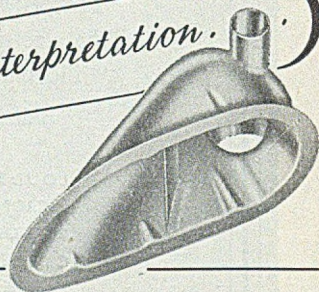


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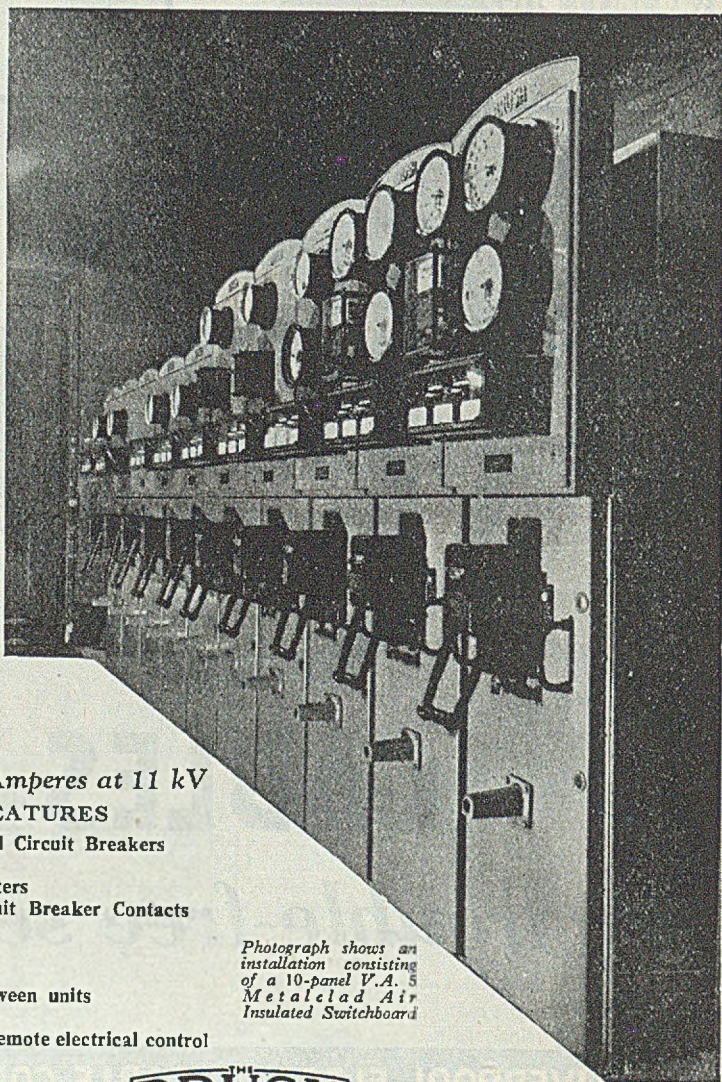
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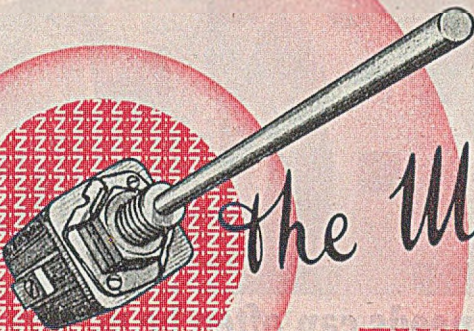
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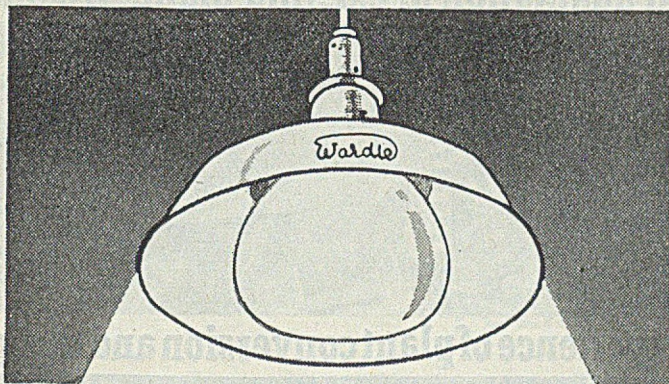
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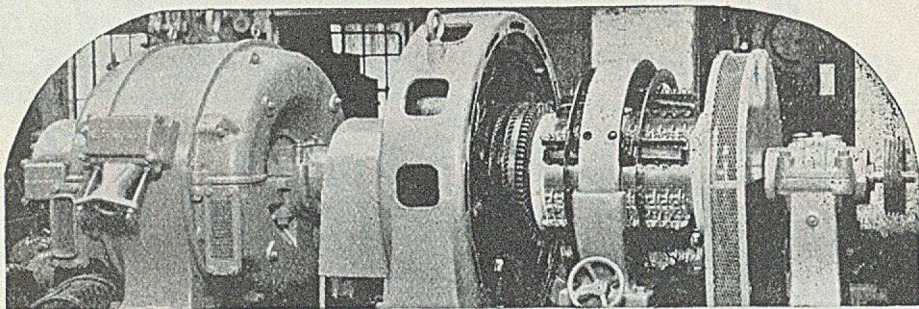
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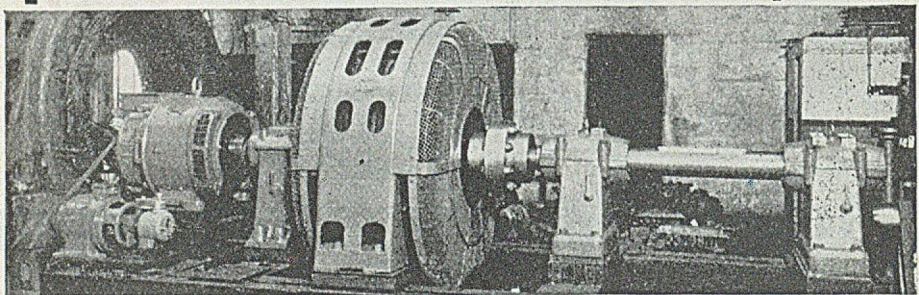
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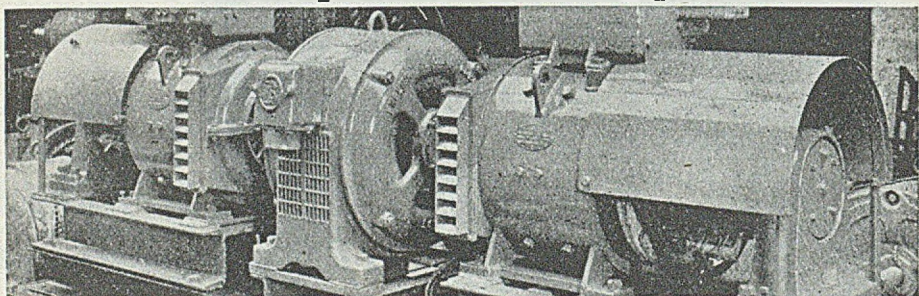
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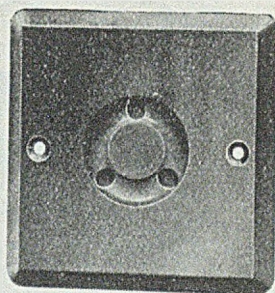
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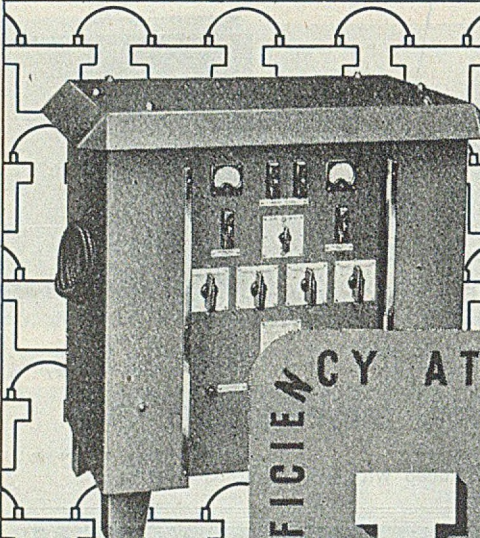
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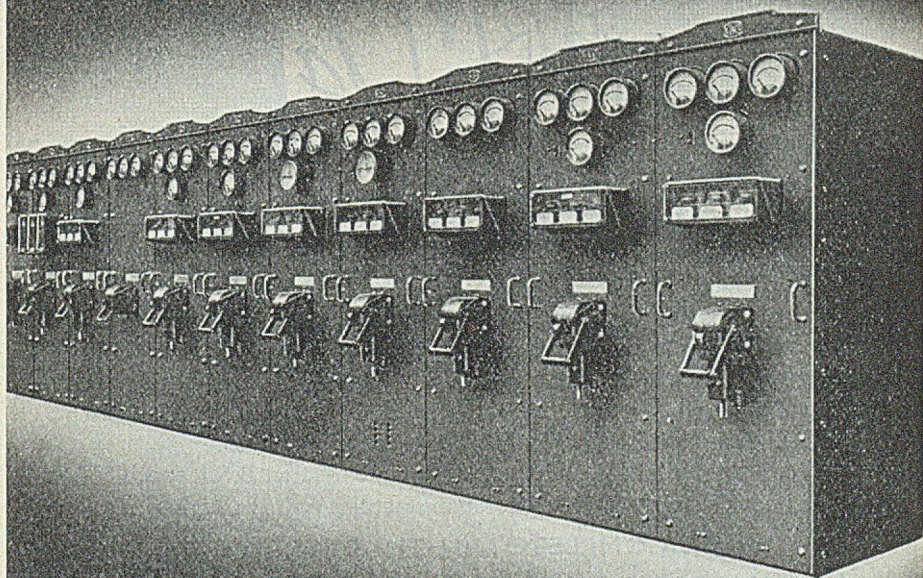
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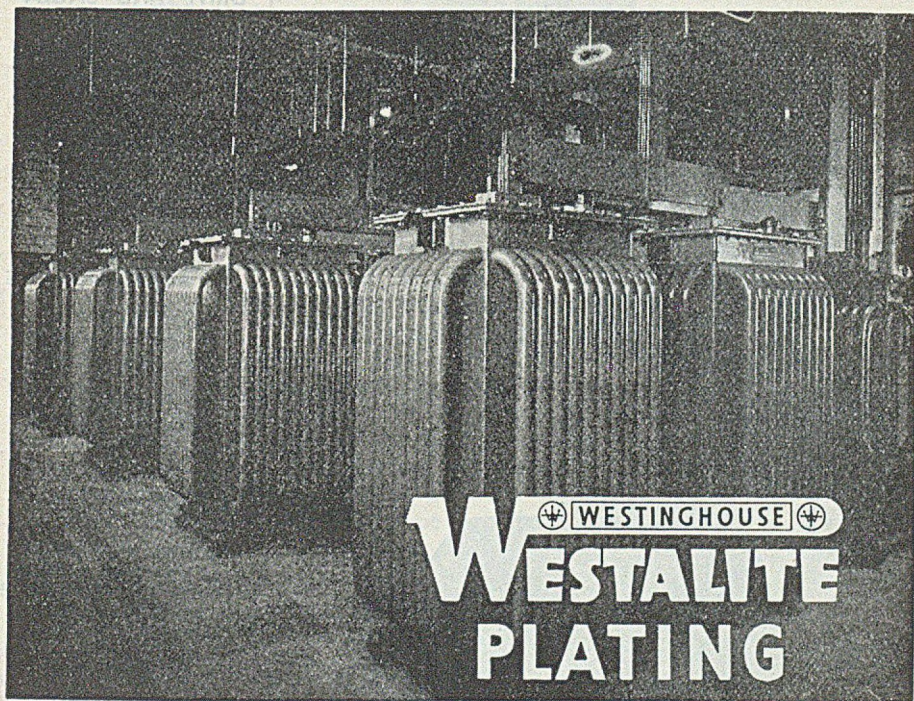
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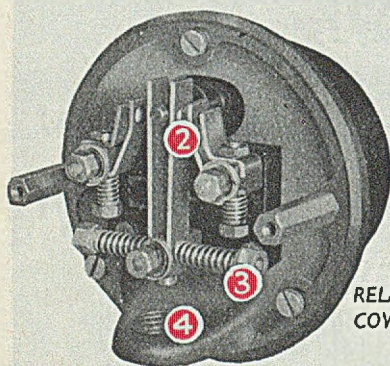
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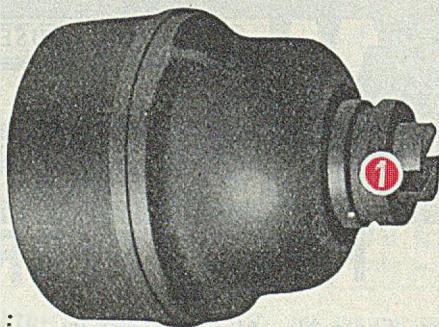
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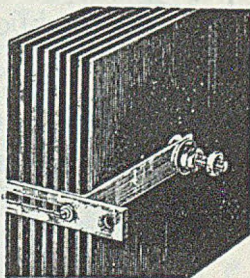
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SEEKING means to illustrate the process of rectification, we sought the help of the dictionary, which tells us that a rectifier is "one

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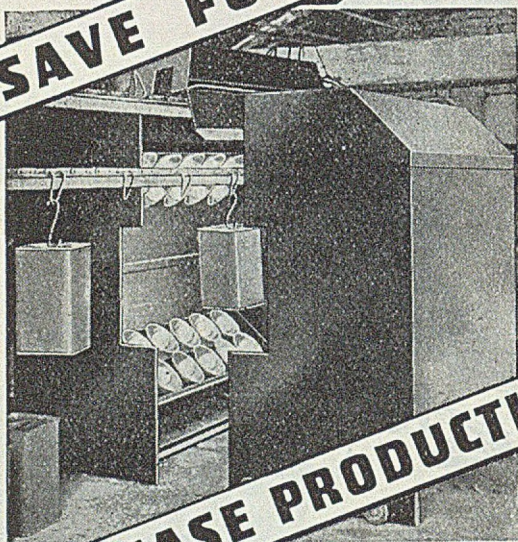
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- It often happens that one part of the surface of an article may require more baking than the rest. Fuel and time can be saved by switching off some of the lamps in the oven. By this means, the amount of the radiant heat striking the general surface is reduced while leaving the full heat to play upon a small area.

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BTH Infra-Red Advisory Service : Bridle Path, Watford, Herts.

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ELECTRICAL REVIEW

August 15, 1947

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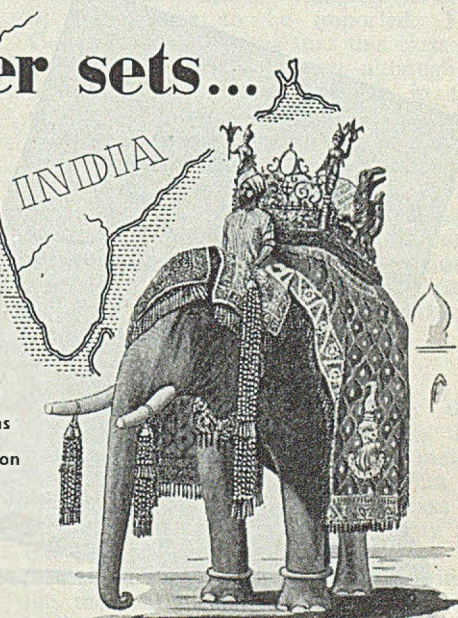
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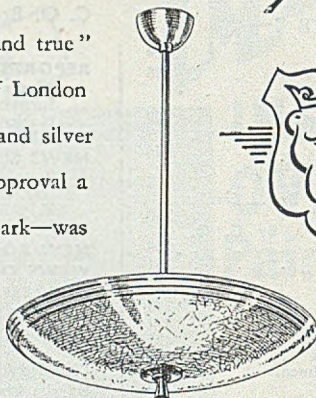
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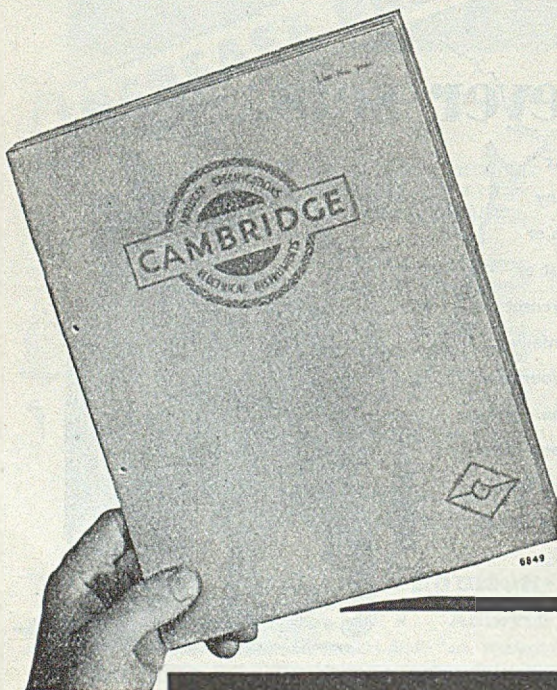
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ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLI. No. 3638

AUGUST 15, 1947

9d. WEEKLY

Paying Our Way

Electrical Industry's Leading Position

GLOOM has been spread over the nation by the revelations made by Ministers in the House of Commons last week and something like exasperation has been engendered by the immediate prospect of even more "austerity." The Government has been criticized for the inadequacy and vagueness of its plans for meeting the situation and restoring the country to a state of economic balance but the most positive Governmental plans can only be implemented by the British people themselves.

Ability Proved

A nation which in two years has more than recovered its pre-war export trade and at the same time has been able to meet a large part of the current and deferred home demand cannot be considered to be down and out. Moreover, there is a substantial reserve of manpower in the Forces and in non-essential services (if the term "services" can be applied to such activities as football pools).

Release of men from the Services is to be accelerated but it seems that nothing definite is to be done about non-productive people. Essential industries are to have their labour forces safeguarded by a Control of Engagement Order, details of which are not yet to hand, and there are hints of the direction of labour to these industries if it is found necessary.

It is not our function to comment in detail upon the general situation and suggest remedies. We are concerned with the part which the electrical industry

must play in rescuing the country from economic disaster.

It is no vain boast to say that if other British industries were as well-organized, well-equipped and well-managed as the electrical industries—supply and manufacturing—the country's position would not be nearly so serious as it is. But goodwill and the most up-to-date factories are of little use if it is impossible to secure raw materials, and unfortunately the bulk of these have to be imported. The Government recognizes that this class of imports cannot be cut down, although it has gone against this principle in the matter of timber and paper. The world shortage of commodities cannot be blamed upon the Government but whether its purchasing efforts have been wholly advantageous has been questioned. Expenditure upon raw material imports is worth while if after adding considerable value to them by design and workmanship we can export them as finished manufactures.

"Priority" Imperative

In the equipment of industry the electrical manufacturers to-day play the leading part. There is virtually no major industrial activity which is independent of electricity. It follows that any increase in production depends upon the ability of the electrical manufacturing industry to produce quickly and in sufficient quantities the motors, switchgear, cables and all kinds of processing apparatus needed, in addition to the power station equipment without which all the rest is useless. To

this tremendous burden is added equipment for export; the electrical industry is a growing exporter of highly-valued machinery and apparatus.

The industry has the strongest possible case for demanding the highest preference in the allocation of materials and manpower. If these are secured it is prepared to continue to contribute more than any other branch to the nation's recovery.

ONLY two of the Lords'

Bill Passed amendments to the Electricity Bill were rejected by the Commons—one seeking to give holding companies the right to be considered outside the scope of the Bill and another providing for the setting-up of an appeal tribunal. With regard to the latter, Mr. Shinwell said that it might be possible at a later stage to appoint a committee to advise the Minister on charges and tariffs. The Bill reached its final stage this week. Already preliminary arrangements for the acquisition of the supply undertakings are being made by the Organizing Committee and the whole industry now awaits the announcement of the vesting date. There appears to be a widely-held idea that this will be January 1st next but during the Committee stage in the House of Lords, the Lord Chancellor told Lord Swinton that he would endeavour to find "some form of words" providing that the vesting date should not be earlier than April 1st of the year in which the industry was taken over.

Earth-Leakage Protection THE use of the simple circuit referred to in our Correspondence section this week would probably have prevented the fatal accident mentioned. The current-carrying and earthing conductors of this circuit, which has been described in our columns by Mr. F. E. Butcher, are in accordance with standard practice. The frame of the tool is earthed in the ordinary way and, in addition, the mid-point of the secondary winding of a transformer feeding the portable tool is connected to earth through a leakage-trip coil. Any earth fault will operate the trip without a heavy fault current flowing, thus avoiding an unsafe voltage between the non-current-carrying metal parts and true earth, which might occur through failure of a leakage trip when inserted in the earth lead.

Avoidance of shock with the possibility of consequential injury is another advantage.

Diesel-Alternators ALTHOUGH orthodox synchrosopes are to be preferred, if and when they are available, our

Correspondence columns have shown during the past few weeks that small a.c. generators driven by Diesels can be paralleled satisfactorily with the aid of more rudimentary devices. Some have found advantages in the dark-lamp method that outweigh the defect of a possible false indication of synchronism, should a filament burn out during the operation, but neither electrical nor mechanical consequences of a bad shot appear to be serious. The experiences recorded should remove any tendency to hanker after d.c. sets because of supposedly easier parallel running, which would hinder a change-over to mains supply if desired later.

Anglo-Russian Trade AMONG the several reasons given in the House of Commons by Mr.

Harold Wilson, Secretary for Overseas Trade, for the breakdown of the Anglo-Russian trade negotiations was the British refusal to give preference to Russia in the delivery of electrical generating equipment and mining machinery. While there is no doubt that Russia badly needs supplies of this kind there are other cases quite as urgent, including our own requirements. With the best will in the world we cannot ignore these for Russia's sake and there is still a chance that the Soviet authorities will recognize our difficulties and be content to take their turn in the waiting list. Much depends upon whether other countries are willing and able to meet the needs.

French Railways WHEN a ten-year programme approved by the Minister of Public Works in France has been completed, 40 per cent of the total S.N.C.F. railways will be electrified. The scheme covers 1,300 miles of track, of which only one-tenth is classed as suburban. With an expected coal saving of 1.4 million tons and an annual consumption of electricity of 1,900 million kWh, the fuel ratio for steam and electric working is closely comparable with British estimates.

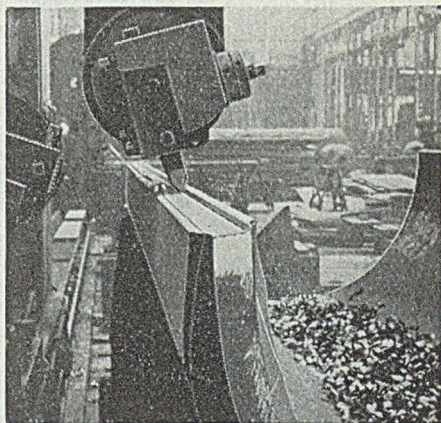
Automatic Fusion Welding

Very-Heavy-Duty Installation

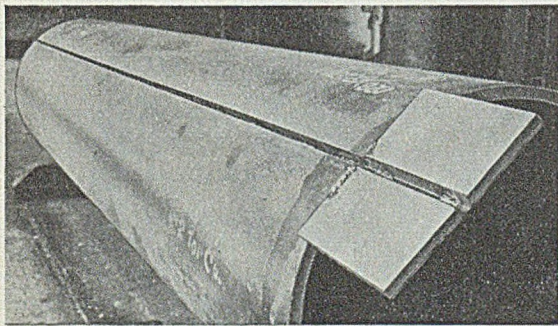
THE very-heavy-duty automatic fusion-welding installation we saw recently at the Renfrew works of Babcock & Wilcox, Ltd., is believed to be the most advanced installation of its kind and for its particular class of work in this country. It is applied to the manufacture of welded pressure vessels—largely steam drums for high-pressure boilers. An important part of the complete welding process is the preparation of the metal plate for the actual deposition, and as this is so closely bound with the actual construction of the vessel we propose briefly to outline the manufacture of, say, a welded high-pressure boiler drum.

The boiler plates are received from the steel manufacturers in sizes of roughly from 1 in. to 4½ in. thick, and in specified widths and lengths, according to the required sizes of the finished products. After undergoing a visual inspection to ensure that there are no manufacturing defects, the plates are marked to size, which leaves them ready for the bending operations. In the marking off

either a horizontal or a vertical hydraulic bending press on which they are shaped to the



The bent plates are edge planed for the preparation of a groove which receives the welding deposition



Above: Test plates are attached to the ends of the shell at the assembly stage, with the grooves aligned for deposition

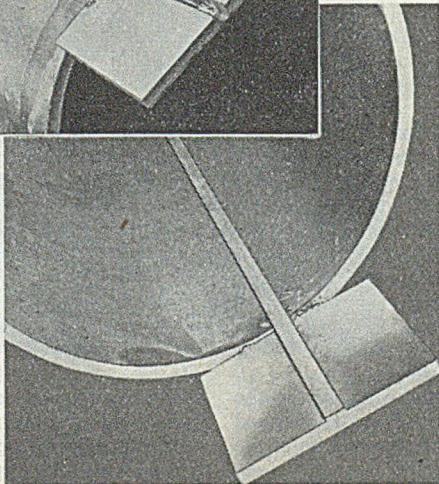
Right: A backing strap is welded in position on the inside of the welding groove

stages a suitable test piece is cut off each plate, and later this is welded up with the shell. For bending, the plates are placed in

required radius of the shell of the boiler.

The majority of plates are bent cold, although some of the thicker plates now required by higher boiler pressures are treated at red heat. Usually this bending results in half shells which have to be welded together longitudinally with two seams, but sometimes with the lighter plates the complete shell is produced in one series of bending operations, and in such cases there is only one seam.

The half shells are then ready for "cutting to height," i.e., removing the surplus material from the plates at the ends of the bend. The bent plates are next edge planed, so that when the plate edges are

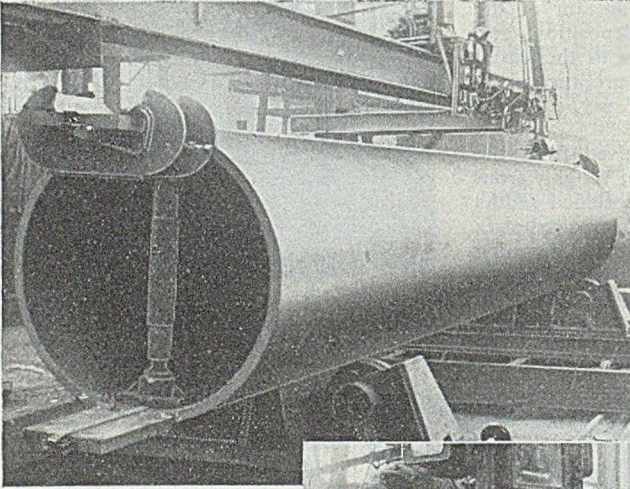


butted together for the welding process, a U-shaped groove is formed to receive the deposited metal. Thereafter the two half-shells are assembled to form the complete unit. The two assembled half-shells are tack welded together, and a backing strap is tack welded in position on the inside of the welding groove, i.e., inside the drum shell. The test plates are attached to the end of the shell at this stage, with the grooves aligned for deposition, and the whole assembly is then ready for the actual process of automatic welding. This may be effected either by the

The welding machine employed is almost completely automatic, except for an electrode adjusting wheel which is manipulated by the operator. The setting of this wheel controls the lateral position of the electrode and so ensures perfect penetration of the weld metal with the side of the groove and with the preceding layers. The electrode is directed downwards through copper guides at a speed which is automatically controlled by the voltage drop across the arc, so that a consistent deposit of metal results.

The welding current is a.c. and the arc voltage is about 35 to 45. The average load is about 350 A. A covered-type electrode is used, the coating being specially selected to suit the particular metal required to be welded. This coating also has the property of giving off a gas which neutralizes an inrush of oxygen to the arc and so prevents oxidation of the weld metal and subsequent porosity.

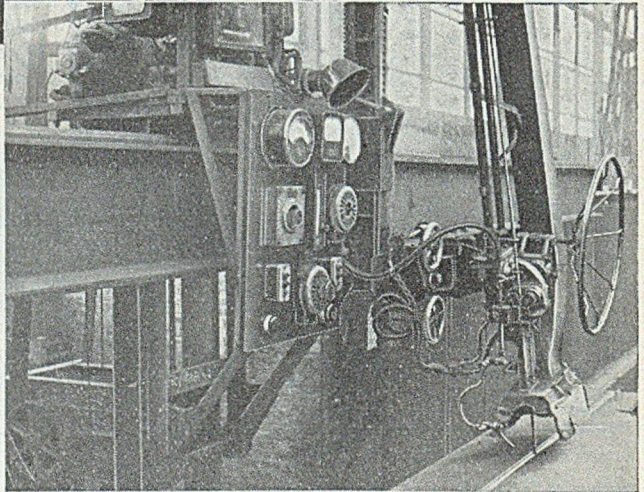
For the welding process the drum is set up by a crane on cradles which support the drum on wheels. The support cradles them-



For longitudinal welding the drum is supported on wheels, but remains stationary; the longitudinal welding head runs on a gantry

multi-layer welding process or by the submerged-arc welding method.

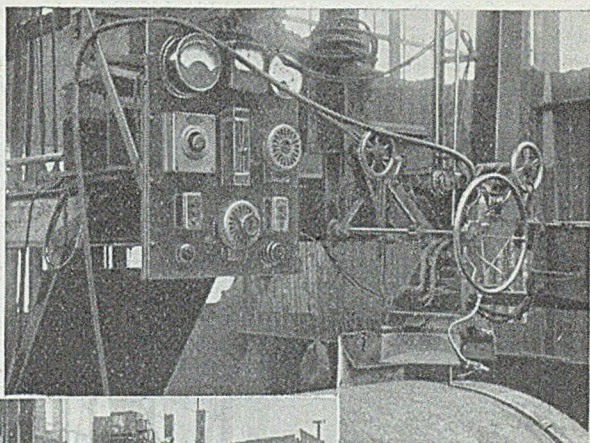
In the first-mentioned process, layer after layer of the welding metal is deposited one upon the other, the layers being staggered in the groove so that there is overlapping of the layers. Each layer has the effect of heat treating and improving the grain structure of that beneath, so a number of additional layers are deposited above the plate surface level and subsequently chipped off so that the completed weld shall be of the desired structure throughout.



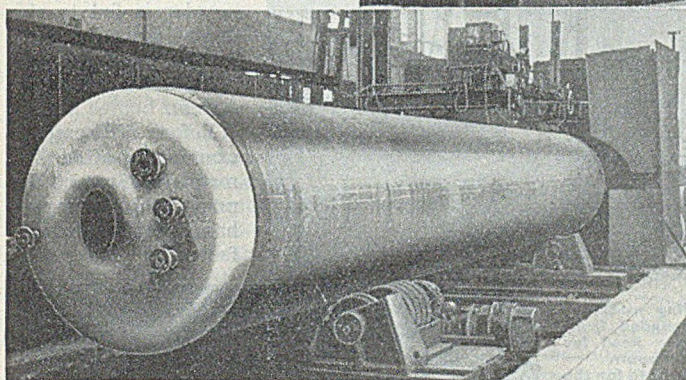
selves run on rails, so that their distance apart can be adjusted to suit any length of drum. Above the drum the welding head runs on a gantry which is carried by two columns, one

at each end, and its height up the columns is variable so as to provide the necessary different working levels demanded by the differences in the diameters of the drums. When longitudinal seams are being welded the drum remains stationary and the welding head runs along the gantry under motor power, and the motor transmits through a very large ratio speed-reduction gearing, so as to afford a welding head speed consistent with the rate of the welding. The welding head carries the electrode at an angle from the vertical which is set by the adjusting wheel, and the electrode is fed down to the work

desired to join two cylindrical shells together, and for this purpose it is also provided with turning gear which is not, of course, used



For circumferential welding the drum is set on motor-driven turning gear; the welding head is a fixture



for longitudinal work.

When the automatic welding process on the shell has been completed the backing strap is removed from the inside of the shell and a groove is cut by a pneumatic chipping tool along the inside

by means of a motor at a rate which can be pre-set according to any required speed of deposition. The supply to the welding head is taken from an external transformer by means of trailing cables. The welding head is completely self-contained with the necessary indicating meters and controls.

For circumferential welding the drum is slowly turned by the supporting wheels which are motor driven through suitable gearing, resulting in a drum speed consistent with the rate of progress of the deposition and controlled from the operator's platform near the welding head. In this case the welding head is a fixture, apart from the feeding of the electrode, and the welding head is at the end of a beam projecting from a single column. Otherwise the head is similar to that employed for longitudinal welding. The longitudinal welding machine can also be used for circumferential welding where it is

of the welded seam. A few layers of hard welding metal are then deposited by hand in this interior groove which ensures perfect fusion throughout the entire weld and thereby eliminates the possibility of lack of penetration at the root of the groove.

The submerged-arc welding process involves the use of copper-covered electrodes in roll form and separate loose powder flux. The electrode is fed down into the welding groove in a somewhat similar manner to that employed in the multi-layer process. The tip of the electrode is submerged in the powder flux and as the arc is struck part of the flux combines with the molten metal, part fuses and forms a refining slag which solidifies on top of the weld deposit, and the remainder of the powder covers the weld and slag, shielding them from atmospheric contamination and retarding the rate of cooling. The unfused flux powder can be

removed from the finished weld and re-used.

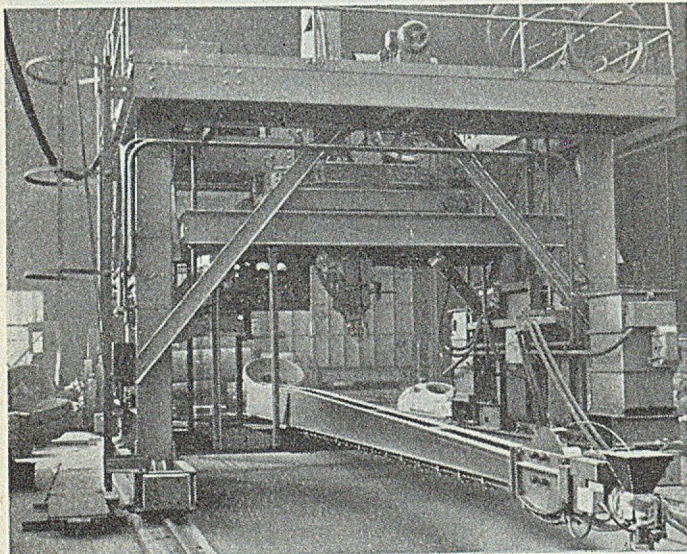
In this method of welding a voltage of 35 to 40 is employed, with a current of between 900 and 1,500 A, dependent on the amount of penetration required. With this high amperage it is possible to deposit a heavy layer of metal and in this way obviate the necessity for repeated passages to be

lowered to suit any diameter of drum and this is effected by a motor under the control of the operator.

In the case of the interior head the positional adjustment is small and is carried out by hand. The weld takes place at the bottom of the drum which is nearly always in the same position, despite the differences in the diameter of the drums.

The supplies to both the interior and the exterior welding heads are taken from welding transformers incorporated in the bridge structure. Both heads are controlled from the same panel near the exterior head, and in both cases the flux powder is fed to the welds from hoppers and is removed and recirculated by a fan system.

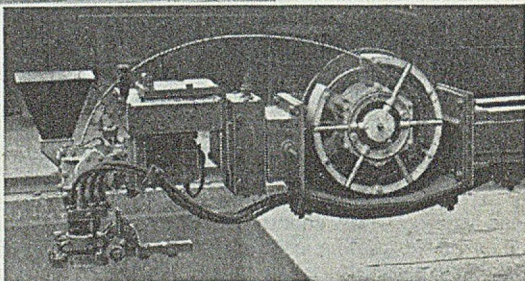
Before radiographic examination all surplus metal is removed by pneumatic chipping hammers and the surfaces of the weld



Above: Submerged-arc welding machine; head for external seam suspended from motor-driven travelling bridge; head for internal seam supported on boom
Right: Submerged-arc welding head for the inner seam

made as in the case of the multi-layer process.

Both inside and outside welding are effected by this process, and it is important that the drum and the welding heads should be set up very accurately, and so exclude the possibility of lack of penetration at the junction of the two heavy layers of deposition. For the submerged-arc welding, which is speedier in that the whole weld is effected in one inner and one outer run, there are two heads, one for the inner seam and one for the outer seam. The inner seam is always deposited first. The head for the inner seam is carried on the end of a boom which is attached to a bogie. The bogie is not self-driven, but is drawn along by the travelling bridge which carries the external welding head. The bridge is motor driven. The exterior welding head can be raised or



are ground flush with the drum plate. The weld is then divided into twelve-inch lengths, and suitable marks are indented on the plate surface adjacent to the weld. The radiographic process which follows is carried out in such a manner as to ensure that no part of the weld is missed during the examination.

The four main types of faults which may be created during the welding process and which are subsequently revealed on the negative are: A, porosity; B, slag inclusion; C, lack of fusion; and D, cracks. These types of faults are actually voids of one kind or another in the weld metal. While weld

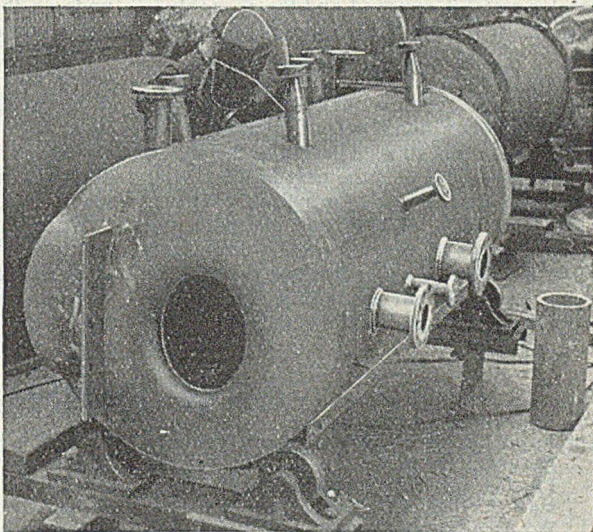
metal absorbs a certain amount of radiation and only allows the highest penetrating part of the beam to reach the film, the voids allow the radiation to pass through the metal more easily in their areas, so that there are corresponding intensifications on the negative. With proper technique, voids having a dimension in the direction of the rays of less than 2 per cent of the plate thickness are clearly shown.

It is important to employ sufficiently high - powered

The circumferential welding having been examined all the nozzles and steam connections are hand welded in position

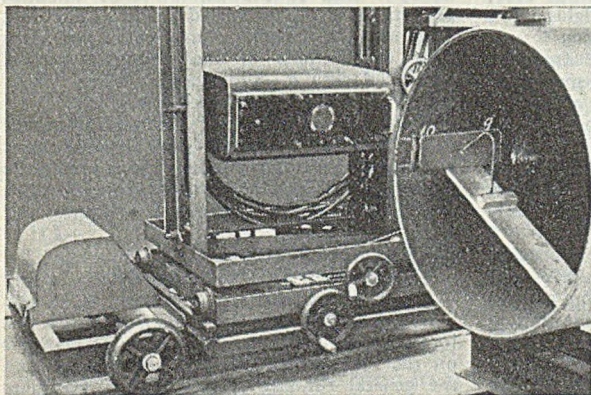
X-ray equipment for this class of work. In actual examination an X-ray film, in its light-tight cassette, is positioned behind the weld on the inside of the shell. After suitable markers relative to their position on the weld are placed in position the X-ray tube is centred over the area required to be examined. It is important that the X-ray beam should be at right angles to the weld and so to the film. A wave length capable of penetrating the particular thickness of metal is selected, and the area is irradiated for pre-determined exposure time. The film is then processed in the normal fashion with

It is important to ensure that markers are placed upon the plate surface adjacent to the weld, so that no part of the weld may be



missed in the examination. Each marked-off area of the weld is subjected to this examination, and so a complete record of the weld is compiled. After scrutiny by the surveyors the films are filed for future reference. For the radiographic examinations there are at present one 220-kV, one 250-kV and one 400-kV X-ray equipments installed, and the last-mentioned one is capable of examining thicknesses of metal up to $4\frac{1}{2}$ in.

The weld having been proved by the X-ray examination to be satisfactory, the shell is subjected to its preliminary stress relief which is carried out to release any stresses built up during the welding process. The shell is heated to the region of 600 to 650 deg C in a specially constructed furnace and then allowed to cool in a draught-free atmosphere. The ends of



It is important that the X-ray beam should be at right angles to the weld and film; X-ray tube on left and film on marked weld on right

developing and fixing solutions, and after washing and drying it is ready for inspection and diagnosis.

the shell are next machined to prepare them for receiving the drum ends which have been previously machined, so that when each end

and the shell are assembled a circular groove is formed ready to receive the deposition metal. After the drum ends are welded on by one of the automatic methods described, the surplus metal is removed and the assembly is marked off for the X-ray examination of the circumferential welds.

After these welds have been X-rayed, all the required nozzles and various steam connections are hand welded in position on the drum. Final stress relieving in the region of 600 to 650 deg C is the next process, after which the vessel is ready for hydraulic testing. This is usually carried out at twice the designed working pressure of the drum, and while the drum is under this test pressure all welds are subjected to careful scrutiny by the surveyors. The drum having been proved

satisfactory by the hydraulic test, it is now ready for the drilling of the tube holes and any subsequent operations required.

After the long-seam welding the test plates undergo the same stress-relieving process as the longitudinal seams which they represent. They are then sent to the Testing Department where they are cut up to enable specimens to be prepared for the following mechanical tests: direct and reverse bend, cross tensile, all-weld tensile, and Izod impact at the top and bottom of the weld. Suitable micro and macro specimens are also made.

We are indebted to Babcock & Wilcox, Ltd., for permission to visit the works and to publish this article, and to the staff of the welding department for their help in collecting the above information.

NEW BOOKS

The Technology of Industrial Fire and Explosion Hazards (2 vols.). By R. Cecil Smart. Pp. 184 and 202; figs. and index. Chapman & Hall, 37, Essex Street, London, W.C.2. Price 16s. each.

The author of these two volumes has had long experience in investigating fires and fire hazards, apparently on behalf of the Fire Offices and other authorities, and here reviews the results of his observations for the use of other persons. The resulting account should be of value to all interested in the subject, provided it is read in a critical manner, for despite its many defects they may find accounts of risks with which they are not familiar.

Unfortunately there is much evidence of hurried writing and inadequate revision or careless proof correction; for example, every one of the six pages devoted to lightning is headed "Hazards due to Lighting" and phrases such as the following are frequent, "In rewiring the switchboard close spacing of the cables was avoided together with a different type of cable to avoid a recurrence of the matter" and there are references to such queer fish as a "potential instrument current transformer." Under the heading of static electricity two explosions are mentioned which are clearly due to earth-leakage current.

On the whole the descriptions of actual fires and risks are informative and useful, but when the writer deals with scientific matters he tends to be obscure and unreliable and at times definitely incorrect as when he attributes the dissipation of static charges in humid atmospheres to increased conductivity of the air instead of to decreased leakage resistance, particularly across surfaces.

The final three chapters of Vol. 2 deal with electrical matters, but if the claim of the title to deal technically with the subject is to be

justified, a more adequate discussion of flame-proof construction and intrinsically safe circuits should have been given together with an account of the research work on which present methods are based.

Finally, since the whole subject matter could easily have been contained in one fairly small volume, and it could have been made shorter by more careful arrangement, its publication in two volumes at 16s. each cannot be justified.—

W.F.C.

Income Tax. By C. N. Beattie, Barrister-at-Law (116 pp.). **Hire-Purchase Law.** By Maurice Share, B.A., Barrister-at-Law (111 pp.). Stevens & Sons, Ltd., 119, Chancery Lane, W.C.2. Price 4s. each.

These are the latest additions to the publishers' handy "This is the Law" series intended primarily for the non-legal reader. The first deals with the elements of income tax and gives clear explanations of the principal matters connected with it—allowances, returns, trades and professions, deeds of covenant, etc.

From the second book the general reader and business man should gain a sound basic knowledge of hire-purchase and credit-sale agreements. The author wisely indicates when resort should be made to legal assistance.

—J.H.C.

The Foreman's Guide, by R. B. Hovey, with a foreword by Sir Donald Somervell. Second edition. Sir Isaac Pitman & Sons. 4s. 6d. net.

In this useful little book the author sets out to advise the foreman, forewoman or manager on the management of men and women and the general running of the works. He gives points for consideration on the selection of a foreman, the management of men, planning production, and deals with costing, buying and selling, precautions against fires and accidents, and many other matters.

Views on the News

Reflections on Current Topics

IN the *Electrical Review's* leading article last week Sir Arthur Street, deputy chairman of the National Coal Board, was quoted as saying that the staffs of the new public corporations would form an "industrial Civil Service." Correspondence in *The Times* leads me to hope that in least one respect these staffs will not be compelled to conform to Civil Service rules: that is the requirement that civil servants shall not publicly express their views upon their own departments—or, indeed, upon any other subject. The electrical industry has always included men whose opinions have been valued and sought after and the industry's success has been largely contributed to by the free interchange of views at Institution and Association meetings as well as at more public gatherings and in the Press. There must be no attempt by the authorities, which the new Electricity Act is setting up, to suppress or "doctor" useful contributions to knowledge and progress on the doubtful grounds of "policy." Reliance should be placed, as heretofore, upon the good sense and discretion of senior officials which are presumably two of the qualifications for their appointment.

* * *

When I read from time to time of a "fatal accident" due to electric shock I often have a feeling of anxiety that perhaps, although the actual receiving of the shock was due to accident, the fatal result may have resulted from negligence or ignorance. I think that every coroner holding such an inquest might satisfy himself on three questions before giving a verdict:—(1) Was artificial respiration applied without delay?; (2) For how long was it continuously applied?; and (3) On whose orders was the attempt to restore animation by artificial respiration abandoned? If it were more generally known how infrequently an electric shock actually causes death, many lives might be saved.

* * *

It would be difficult to deny the railways the increased revenue which will arise from the higher charges to be instituted on October 1st, for the anticipated deficiencies with present rates have to be met. Unfortunately the increased charges again hit

coal, already an expensive mineral, although the railways may claim that their responsibility for the advance in coal prices is small. Present rates are only 25 per cent above the pre-war level, whereas the price of coal has risen in some cases by well over 100 per cent. At present rates the cost of carriage averages 7s. 2d. a ton; under the new rates (55 per cent above pre-war) the figure will rise to 8s. 11d. a ton. In most instances, of course, the consumer's price will be increased by more than 1s. 9d because of the addition of the merchants' percentages.

* * *

It is surprising to learn from the *Electrical World* (New York) that, "depending on local conditions, at least a third, perhaps two-thirds, of individual electric utility revenues derive from this [lighting] service." The prevalence of "all-in" tariffs in this country makes it impossible to sort out the proportion of revenue received from lighting, but I should imagine it falls far short of one-third of the total. The American figures suggest that there are a good many lighting-only consumers and that the standard of illumination is considerably higher than it is in this country. The latter is undoubtedly true so far as public and display lighting is concerned, even ignoring our present restrictions, and this would account for a great deal.

* * *

Indignation is reported from Norwich, Connecticut, where the municipal authority, which runs the power plant, has imposed a monthly surcharge of \$1.26 on consumers who possess television sets. The reason given is that television apparatus imposes an extra burden on the system just at the time of lighting peak and, moreover, lengthens the peak period by keeping people up. Therefore a charge is made for the extra plant which is necessary to meet the higher load. Doubt is expressed regarding the view that the lighting consumption is increased. Some say that the illumination from the screen obviates lighting, while others point out that lights are generally switched off when television is proceeding.

—REFLECTOR.

Cashew Resins

Their Use in the Manufacture of Insulating Varnishes

WITHIN the past few years a new source has been found of synthetic resin for the manufacture of insulating varnishes suitable for most types of electrical insulation. They penetrate well into the closest windings, can be cured even in thick films and have good mechanical and electrical properties when fully cured.

The cashew tree, *Anacardium occidentale*, grows profusely near the equatorial line. Its

By A. E. Williams, F.C.S.

The only difference between

H.512/60 and H.516/60 is in the pH values of the solutions, the lower pH being more suitable for use in varnish incorporating other resins.

Cashew resin is highly soluble in aromatic and paraffinic hydrocarbon and chlorinated hydrocarbon solvents; it is soluble to a high degree in many other solvents, including esters and the higher alcohols. Although the resin solutions gel in one hour at 150 deg C,

the cashew resin requires a minimum of 2½ hours at 150 deg C to effect complete hardening. Correspondingly longer times are required to cure completely at lower temperatures. The schedule below was obtained by stoving 10 grammes of the solution in a 3-in. diameter petri dish.

Cured films have physical properties intermediate between those of the thermo-hardening phenolic resins of the normal

type and of the medium length oleo-resinous varnishes. They are tough, flexible and resistant to mechanical and thermal shock. The resistance of these films to acids, alkalis, solvents and oils of all kinds is unique among organic coating materials. Tests made recently showed that films were intact and had not deteriorated in any way after thirty days' immersion in chemicals and solvents, such as 30 per cent caustic soda, acetone, butanol, butyl acetate, petrol and hot transformer oil. The resin is, however,

fruit consists of a nut surrounded by a thick pulpy casing containing an irritant liquid which burns the skin, the whole being encased in a shell. Natives have used the nut for edible purposes and in recent years it has been exported to the U.S.A. for use in confectionery. The method employed by the natives for recovering the nuts was to burn the fruit until the shell and the pulp with its liquid were destroyed, when the nuts could be safely recovered. It was later discovered that the offensive liquid was phenolic in character and that synthetic resins of the phenol-formaldehyde type could be manufactured from it. This appears to be the only instance yet discovered wherein phenol can be economically obtained from a plant, the alternative main source being coal. The liquid is now used in this country for the manufacture of synthetic resins by British Resin Products, Ltd.

A typical cashew resin is Epok H.512 which is thermo-hardening and is supplied in solution in the following solvents:—60 per cent in white spirit; 70 per cent in xylol; and 60 per cent in pool rubber solvent.

PROPERTIES OF CASHEW RESIN VARNISHES

Types	H.512/60	H.514/60	H.515/70	H.516/60
Solids content	60%	60%	70%	60%
Specific gravity (15 deg C)	0.890	0.900	0.950	0.890
Viscosity (25 deg C)	3-6 poises	8-15	15-25	3-6
Gel time at 150 deg C	1 hr.	1 hr.	1 hr.	1 hr.
Solvent	pool rubber solvent	white spirit	xylol	pool rubber solvent
Sp. gr. of solvent (15 deg C)	0.76	0.79	0.85	0.76
pH of solution	7.5-8.5	6.5-7.5	6.5-7.5	6.5-7.5

CURING TIME OF CASHEW RESINS

Temperature, deg C	100	110	120	130	140	150
Gel time (hours)	—	—	5	2½	1½	1
Curing time (hours)	60	30	15	8	4½	2½

attacked slightly by benzene and carbon tetrachloride.

The dielectric strength of H.512 is high and compares favourably with that of good quality oleo-resinous insulating varnish films. Being soluble in the aliphatic petroleum solvents and hardened by polymerization instead of oxidation, this resin possesses properties which make it superior to the oleo-resinous types as a basis for insulating

varnish. Its physical and chemical properties are also very favourable for such an application. Compared with oleo-resinous varnishes used for oil impregnation, varnishes based on this cashew resin penetrate better into close windings. They harden without bubbling or blistering and have good bridging and bonding properties, do not soften or "throw out" of high speed armatures, are completely resistant to hot transformer oil and protect the windings against the corrosive action of acid vapours and other chemicals. The cashew resin alone can be diluted to a suitable viscosity for use as an insulating varnish, or it can be used in conjunction with other resins and oils, which will modify its properties in a variety of ways.

These varnishes lend themselves readily to all the usual methods of application to electrical equipment by brushing, spraying,

dipping, etc., after a preliminary drying at about 105 deg C. For coating lengths of wire, the latter may be passed continuously through a tubular electric heater capable of raising the wire to a temperature of 100 deg C, or a little more, to remove adhering moisture from its surface; then passed through a bath of the cashew varnish and again put through a tubular heater. The coating of tapes, cords, etc., is done in a similar manner, except that more time is needed to eliminate moisture. So that for the same temperature, the tubular heater must be longer to dry tape efficiently or, alternatively, the passage of the tape through the heater must be slower. When large coils and other intricate equipment have to be coated, use may, with advantage, be made of the vacuum-pressure process to ensure better penetration than a normal dipping can accomplish.

Nationalization of Electricity

Effect on Municipal Undertakings

NATIONALIZATION of the electricity supply industry will create many administrative problems and it is desirable that those concerned with the administration of individual undertakings should consider probable changes. The object of this article is to set out the major problems which may arise in the municipal undertaking.

Services rendered to the electricity undertaking by other departments of a municipality will have to be reviewed, and all whole-time employees will no doubt be transferred to the new authority. Until accommodation can be provided for all transferred employees in the undertaking's premises, the new authority may be required to pay rent and establishment charges to the municipality.

Legal, civil engineering and architectural services are normally rendered to the undertaking by officers who will remain with the municipality, as they form a relatively small part of their duties. These services may be undertaken by the new authority from its inception, but if this cannot be arranged, the present organization could continue for the time being and the appropriate part of the central administrative charges remain in force. Preparation should, however, be made for the title deeds of property, leases, agreements, and contract documents, etc., relating to the electricity undertaking to be

By W. Smith

handed over to the new authority.

The accounts of the undertaking will need to be balanced at the close of the period of municipal control. This will involve, *inter alia*, the preparation of an inventory of actual stocks of materials and other assets. An audit of capital expenditure, similar to that carried out at selected generating stations when control passed to the Central Electricity Board, will be necessary for the remainder of the undertaking.

It is advisable at this stage to assume that the new authority will be ready to take over full financial control, i.e., the control of all funds; the payment of all accounts, salaries and wages; internal audit; and the collection of all revenues, and to make preparations accordingly. In this case also, however, it is not imperative that all these arrangements should be completed by the vesting date. Uniform plans could be made with local authorities through a representative body (e.g., the Institute of Municipal Treasurers and Accountants or a joint committee of that body and the Incorporated Municipal Electrical Association) to continue all or part of their present functions if it is impossible to complete the detailed scheme of operation in time. In fact, this would be a similar arrangement to that operated in certain undertakings where consumers' accounts may be paid at the various local branches of a bank.

Sir Stafford Cripps is reported to have said recently that it was no part of the Government's policy that nationalized industry should not insure in the ordinary market. It therefore seems reasonable to presume that such risks as have been normally covered will continue to be insured. All insurance policies in which the new authority has an interest will require to be endorsed to that effect and the extent of the interest indicated.

Certain comprehensive policies covering the municipality as a whole will need special attention. Examples of such policies are motor vehicle insurance, public liability, and workmen's compensation. It is desirable that separate policies for the electricity undertaking should be obtained if they fall due for renewal in the near future.

It is probable that a valuation of superannuation funds will be required where a relatively large number of employees are affected, and an appropriate sum transferred to the new authority, along with the records of all pensions due to retired employees of the electricity undertaking. Records of present contributors will also be taken over and arrangements made for detailed operation of the superannuation provisions to be continued by the new authority.

It is not anticipated that arrangements will be made for existing employees to remain under the local authority's scheme and for contributions and payments to be continued under the same fund, as was done in the case of local authority transport employees transferred to the London Passenger Transport Board.

Vehicles Used by Undertaking

In municipalities operating a central transport department it is desirable that vehicles used exclusively by the electricity undertaking should be taken over by the new authority. The terms upon which this is arranged will depend on local conditions. If the vehicles were the property of the undertaking on formation of the central transport department and were transferred without charge, they should be returned to the electricity undertaking, together with any renewal fund contributions included in the charges for their use. The drivers of vehicles used regularly by the electricity undertaking should be transferred to the new authority.

The maintenance of public lighting fittings and equipment is usually carried out by the electricity undertaking, and this arrangement will presumably continue to operate within

the new organization. This service is so deeply rooted in the industry that the grade of "public lighting attendant" has been included in the wages agreements of District Joint Industrial Councils for the electricity supply industry for many years.

The electricity undertakings of municipalities with central purchasing schemes in operation should review the position which will arise when their part in the scheme is withdrawn. There is, however, nothing to prevent an electricity undertaking supplying all the municipality's electrical requirements under the new regime.

Generation and Distribution

Separation of the generation and distribution of electricity supply is a far more simple operation than the transfer from municipal control. The way to the change now envisaged has been prepared by transfer of the control of selected generating stations to the Central Electricity Board some years ago. The problems are similar to those outlined earlier in this article, but here it is mainly the services and expenses included in the management charge that come under review.

So far as printing, stationery, telephone service and rent of premises occupied by head office staff are concerned no difficulty will arise. The problem therefore resolves itself into the concentration of all duties relating exclusively to generation in the staff to be transferred to the Central Authority, and it is desirable that they should be located at the generating station.

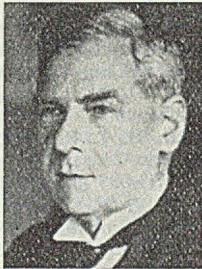
The detailed matters requiring consideration depend on the present organization, but they may be: arrangements for delivery of correspondence direct to the generating station; typing and dispatch of mail; issue of orders for supplies and services; checking and payment of accounts; payment of salaries and wages; personnel and superannuation records; preparation of cost accounts, etc. It is probable that some of these duties, particularly the payment of accounts, salaries and wages, will not be dealt with locally.

It is desirable that an outline of the future policy and organization of the industry should be made known to electricity undertakings at the earliest possible date so that they may prepare for the changes which lie ahead without undue speculation as to what the extremely broad picture drawn in the Bill really means.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Minister of Transport (Mr. Alfred Barnes) has appointed Sir Cyril Hurcomb, G.C.B., K.B.E., chairman of the British Transport Commission set up under the measure for the nationalization of public transport. Sir Cyril is at present secretary of the Ministry of Transport and chairman of the Electricity Commission but is to resign these positions. The other members of the Commission are Lord Ashfield, who has been chairman of the London Passenger Transport Board since its establishment in 1933, after being chairman and managing director of the London Underground Group for many years; Mr. John Benstead, general secretary of the National Union of Railwaymen; Lord Rusholme (formerly Mr. R. A. Palmer), secretary of the Co-operative Union, Ltd.; and Sir William Wood, president of the Executive Committee of the L.M.S. Railway. It is also intended to appoint a part-time member drawn from Scotland.



Sir Cyril Hurcomb

The appointment of Mr. T. D. Martin as joint engineer and manager to Nelson and Colne electricity undertakings has been confirmed by the two Councils. The appointment will run from August 1st, 1947, to March 31st, 1948, the position to be reviewed before that date. The salary for the appointment will be £1,422 per annum, of which £1,010 will be met by Nelson.

Mr. G. E. W. Hird, mains superintendent at Bingley (Yorks) has been selected as Brierfield's new electrical engineer. Before going to Bingley in 1942, Mr. Hird was with Keighley Corporation Electricity Department. He is an associate member of the I.E.E. Mr. L. G. Aston, his predecessor at Brierfield, takes up an appointment at Dorchester in September.

Mr. G. de Nobriga has been elected to the board of the Telephone & General Trust, Ltd.

As from September 1st Mr. W. Best is joining the sales organization of Alliance Wholesale, Ltd.

Mr. Herbert E. Pawson, assistant commercial manager of the Southern Canada Power Co., Ltd., who was recently elected president of the Canadian Electrical Association, is of English birth and received his early training in this country.

Enfield Cables, Ltd., announces the appointment of new area managers; they are Mr. G. J. Moody (Scotland and Northern Ireland, 81,

Mitchell Street, Glasgow, C.1); Mr. G. Jessop (Northern England, 8, York Place, Leeds, 1); Mr. A. J. Betts (Midlands and South-Western Areas, 1, Broad Street Chambers, Birmingham, 1); and Mr. J. C. Colebrooke (London and Southern Areas, Victoria House, Southampton Row, London, W.C.1.)

Mr. W. R. Verdon Smith, B.C.L., M.A., and Mr. C. H. Davy have been appointed directors of Babcock & Wilcox, Ltd. Mr. Verdon Smith is a director of the Bristol Aeroplane Co., Ltd., and is president this year of the Society of British Aircraft Constructors. He is also a member of the Engineering Advisory Council and was last month appointed a member of the Planning Board set up by the Government. Mr. Davy joined the company in 1920. In January, 1932, he was appointed chief research engineer, and on January 1st of this year was appointed chief research and development engineer to the company.

Sir Geoffrey K. Peto and Mr. C. W. Spiers have retired from the board of the Morgan Crucible Co., Ltd., and Mr. J. Walker has been appointed a director.

Mr. H. Burns is being sent from the head office of Thos. W. Ward, Ltd., Sheffield, to open and take charge of a new office in New Zealand. Mr. Burns will be responsible for the complete representation of the company's interests in New Zealand and those of certain associated and subsidiary companies.

Mr. C. Anderson, whose appointment as borough electrical engineer of Douglas, Isle of Man, was reported in our issue of July 11th, has now returned to this country from West Africa, where he has been engineer in charge of construction, Government Electricity Undertakings, Nigeria, and has taken up his appointment at Douglas. At the outbreak of war Mr. Anderson was chief assistant engineer in the Douglas undertaking, and during the war he served with the R.A.O.C. and the R.E.M.E. attaining the rank of lieutenant-colonel. Before joining the Douglas undertaking Mr. Anderson had been associated with the Manchester Corporation Electricity Department, the English Electric Co., Ltd., the Metropolitan-Vickers Electrical Co., Ltd., and Ferguson, Pailin, Ltd. He is an associate member of the Institution of Electrical Engineers.



Mr. C. Anderson

Mr. C. G. H. Hallett has resigned from the board of the Ship Carbon Co. of Great Britain, Ltd.

Mr. W. H. Bowen, who has been appointed senior lecturer in electrical engineering at Canterbury University College, Christchurch, New Zealand, was formerly with the Brush Electrical Engineering Co., Ltd., Loughborough.

As a result of the annual dinner dance held in March, and the annual golf competition held at the Southport and Ainsdale Golf Club on June 5th, the Committee of the Mersey and North Wales Centre of the Institution of Electrical Engineers has been able to hand over £200 for the I.E.E. Homes Fund and £100 for the Benevolent Fund. The chairman, local honorary treasurer and Committee wish to thank the members, friends and business houses for their support and generous donations which have made possible this outstanding achievement.

Appointments Vacant.—Among the positions advertised in this week's issue are the following:—Resident engineer for the Trinidad and Tobago Electricity Commission; chief technical engineer for the Liverpool Electric Supply

Department; deputy chief engineer and three resident district officers for the Burma Electricity Supply Department; assistant power station superintendent for the Lancaster Electricity Department; deputy borough electrical engineer for Erith; and lecturers in electrical engineering for the Manchester Municipal College of Technology and the University of Birmingham.

Wills.—Mr. J. W. Beauchamp, first director of the British Electrical Development Association and later commercial manager of the Central Electricity Board, who died on March 28th last, left £7,101 gross, with net personality £6,898.

Mr. H. T. Rice, late director of the English Electric Co., Ltd., who died on April 21st last, left £31,093 gross, with net personality £30,665.

Mr. F. W. Cawter, M.I.E.E., for many years London manager of the Chloride Electrical Storage Co., who died on March 24th last, left £15,458 gross, with net personality £13,215.

Mr. F. H. Leonard, of Blackheath, London, S.E., electrical engineer, who died on February 19th last, left £10,813 gross, with net personality £10,647.

Voltage Standardization

Procedure for Dealing with Existing Systems

STANDARDIZATION of the low and medium voltages at which energy is supplied to consumers will be mandatory in respect of all new systems brought into use after October 1st, 1947.

There is no intention at present of making all existing systems conform to the 240-V requirement, but agreement has now been reached as the result of discussions which commenced a year ago between the Electricity Commissioners and the Electricity Supply Joint Committee regarding the conditions of change-over of non-standard systems as and when circumstances may permit. Meanwhile, any undertaking which is in a position to proceed with preliminary investigations in order to have everything ready to effect the standardization so soon as materials and labour may become available, can obtain the Electricity Commissioners' consent, subject to certain conditions.

The latter, which have been circulated to all authorized undertakings, apply to changes of a.c. voltage, but are equally suitable, with necessary modifications, for conversion from d.c. to a.c. systems. They relate mainly to an undertaking's liability to carry out alterations at its own expense, provided replacements (lines and apparatus) shall have an estimated residual life not less than that of the equipment replaced. This obligation is subject to the surrender by the consumer, if required, of any lines and apparatus that may be replaced.

The undertaker must pay to the consumer such sum as may be agreed upon, or determined in the manner specified in the conditions, as the reasonable cost to the consumer of himself carrying out the alterations or replacement necessary to render his existing installation suitable for 240 V.

The above liabilities of undertakers are limited in cases in which consumers' existing installations are already provided with means of adjustment to the new voltage, or are suitable for an appropriate range of voltage. They are also limited in respect of additions to consumers' installations after notice has been served of intention to standardize; consumers' claims after the expiration of six months from the date of change-over; and apparatus on hire or on hire-purchase.

Settlement of Disputes

Not less than one month or more than six months' notice of intention to standardize is to be given. In certain cases notice may be by public advertisement in local newspapers. Settlement of disputes, unless otherwise agreed, shall be by an inspector nominated by the Electricity Commissioners; the Commissioners will prescribe the fee to be paid to the inspector while the latter will determine by which of the parties it shall be paid. Both undertaker and consumer have rights of appeal to the Commissioners, whose decision will be final and binding on all parties.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Bower asked the Minister of Fuel and Power if he had investigated a method of utilizing the flow of rivers for the purpose of generating electric power without the use of any fuel, of which he had been given details; and if he was prepared to facilitate its development so that this potential source of power might be fully exploited.

Mr. Shinwell said that numerous schemes for generating electricity by utilizing the water flow of rivers had been received and examined by his Department, but he was unable to identify the scheme to which the hon. member referred. If full details were sent to him he would have this particular method investigated.

Uganda Scheme

Mr. Dodds-Parker asked the Secretary of State for the Colonies whether he would make a statement on the proposed plan for hydro-electric development in Uganda; and whether it was proposed that the Government of Uganda should acquire the interests of the East Africa Power & Lighting Company in that Protectorate. (See *Electrical Review*, July 4th, p. 17.)

Mr. Creech Jones said that the Government of Uganda proposed to construct a hydro-electric power station at the Owen Falls, on the Victoria Nile. It was not expected that this station would be completed before 1952 and as an interim measure, pending the completion of the first stage of the development of the power station, it was proposed to erect two temporary thermal power stations, one at Kampala, the other at Jinja. The answer to the second part of the question was in the affirmative.

Electricity Generated

Colonel Clarke asked the Minister of Fuel and Power if he would inform the House what percentage of the electricity generated in Great Britain in 1946 was produced, respectively, by the agencies of coal and coke, oil, and water; and what were the corresponding figures for the year 1945.

Mr. Shinwell said that the following statistics were the only ones available:—

Electricity generated	1945 per cent	1946 per cent
From steam plant, fired by coal, coke or oil ..	96.68	96.99
.. water power ..	3.07	2.76
.. oil engines ..	0.12	0.13
.. waste heat and refuse steam plant ..	0.13	0.12
	100.00	100.00

Supply of Poles

Mr. Hurd asked the Minister of Fuel and Power if he was aware that the Wessex Electricity Company had applications lodged for licences for 4,000 poles needed to extend its supply, chiefly to farms where it was urgently needed in the interests of food production; and when he expected that his Department would be able to issue the necessary licences and allow the electricity supply companies to proceed with their development programme.

Mr. Shinwell said that the supply of poles was much below the demand, but an allocation recently made to his Department would enable him to deal forthwith with more than half of the priority requirements of the Wessex Electricity Company.

Electricity Bill

Consideration of Lords' Amendments

WHEN the House of Commons considered the Lords' amendments to the Electricity Bill, Mr. Shinwell, Minister of Fuel and Power, said that with two exceptions there was general consent to the amendments, and he suggested it would be for the convenience of the House if they were put "en bloc." Mr. R. S. Hudson supported the suggested procedure.

Sir Frank Soskice, Solicitor-General, moved to disagree with the Lords' amendment which sought to insert a new clause, "Special Provision for Electricity Holding Companies." He said the proposal provided that in the event of a holding company, as described in Clause 13, having extraneous assets or assets not required for the operation of a statutory electricity undertaking, it could opt to remain outside the

scope of the Bill. To accept the amendment would be to create a perfectly impossible position, and would make complete and absolute nonsense of Clause 13.

Mr. Elliot said that the new clause made no infringement of the Stock Exchange basis of compensation, nor did it remove important assets from the ambit of nationalization. There was no reason why the Government should adopt its elaborate mechanism when there was a clause before the House which would achieve what the Government asked for.

The motion to disagree with the Lords' amendment was carried by 260 votes to 103—Government majority, 157.

Mr. Shinwell moved to disagree with the Lords' amendment which sought to insert in

the Bill a new clause, "Setting up of Electricity Appeal Tribunal," to make provision for the creation of an authority to examine tariffs and consider appeals against charges. He said he was in full sympathy with the principle embodied in the amendment, and had sought throughout the proceedings to make adequate provision for the protection of the consumer against inflated charges. Nevertheless it was quite impossible for him to accept the amendment in the form proposed.

He said he would look at the matter again before the Bill was considered in its final form in the House of Lords. If he could find a convenient form of words which would conform to the principles embodied in the Bill he would

make arrangements for their insertion. Should he be unsuccessful, he would ask the House to reject the amendment and allow him, as Minister, to create some form of independent body—not necessarily a tribunal, but of an advisory character—so that in the event of disagreement between the Consultative Councils, Area Boards, and the Central Authority, he would not be the sole person to decide matters affecting tariff rates.

Mr. R. S. Hudson said the Minister had gone a long way to meet the subject matter of the amendment, and had suggested what at first sight seemed to be a useful way out.

The motion to disagree with the Lords' amendment was agreed to.

Industry and the House

Close of the Session

THE sands of another session have run out at Westminster, and Members have gone uneasy and unhappy away. That the House should have risen at all at this time of pressing crisis has caused misgiving to some. There is certainly some merit in the suggestion that Parliament should have set an example to the whole people and, despite the exhausting nature of the session just ended, should have remained on duty while the present situation remains. Conditions are unlikely to improve in the coming months, and the House will return on October 20th to face all the problems it has left.

Yet there is something that the Commons could have achieved had they continued in session—they could have provided the spur and the stimulant that the Government appears so desperately to lack.

The chief criticism of the Labour Administration must be that it came into power with a programme evolved between the two wars, and that this programme, whatever its merits in the long term, has proved quite irrelevant to a short-term situation without parallel in our history. The time of both Houses and of the cream of the Civil Service has been taken up (to the extent sometimes of wearying all-night sittings) by Bills for the nationalization of electricity supply, of coal, of transport, with the result that no-one in the Government seems to have had time to measure the full seriousness of the growing crisis and plan effective measures to deal with it in time. Even during these last few weeks, while the country was wrongly led to believe that a real plan

was at least in preparation, amendments to the Electricity Bill have been passing to and fro between Lords and Commons, and the time and energy of legislators has been dissipated in long-drawn-out discussion of a measure that can do nothing to avert our plunge towards bankruptcy.

Fuel and power lie at the root of our problems. Yet even now is there any clear understanding of what can be done through our own indigenous resources, and of the balance of equipment and materials that must be imported?

The following small but significant example serves also to throw doubt on the way our dollar resources are being expended. At the end of July, Commander Agnew asked why the Government Purchasing Mission to the U.S.A. purchased 240 rock drifter drills in March for use in Scottish hydro-electric schemes, when a substantial number of these machines could have been made in England. The Secretary of State for Scotland replied that "on the information then available" this was considered the only prudent course.

But after discussion with the Advisory Committee on Contractors' Plant, Mr. Westwood went on, it had been arranged that no further purchases for the hydro-electric schemes would be made outside the United Kingdom until the Committee had considered whether the plant could be provided in this country by the date required. But why only now? As Commander Agnew added in a supplementary question, we have already spent 170,000 dollars unnecessarily.

What is true of the failure to plan the

By F. J. Erroll,
M.A., A.M.I.E.E., M.P.

spending of dollars is true also of the saving of dollars. The output of goods for export depends on the availability of industrial fuel and power. What of the plans for staggering the electricity load next winter? A bold scheme is required to ensure that industry gets all the power that can possibly be found for it.

Mr. Attewell recently asked the Minister of Fuel whether firms who have installed plant for generating electricity in emergency will be allowed to use such plant during peak-load periods and operate the normal working hours.

But Mr. Shinwell and his advisers are too busy coping with amendments to the Electricity Bill. His statement of July 22nd, he told Mr. Attewell, referred only to power provided by electricity supply undertakings and was not related to the use of privately owned plant. And as regards working hours, he could not anticipate the schemes that might be agreed by the Regional Boards and their district of local committees.

Perhaps the truth of the matter is that the Government lacks the courage to take decisive action because its most powerful backers, the trade unions, are themselves not united on the vital measures which must

be taken. There is, for example, scarcely any greater need than that for electrical plant, yet Mr. Isaacs has told the Commons that a recent action of the Confederation of Shipbuilding and Engineering Trade Unions will have an effect of "great seriousness" on the production of electrical plant. The decision is a refusal to conclude a national agreement on the employment of Polish workers in the engineering industry or, on the other hand, to take any further action in the matter.

The Minister states that he is now taking the matter up with the individual unions of the Confederation and has asked for an early meeting of the A.E.U. Executive to discuss that Union's decision that all Poles employed in the industry must leave their jobs.

The trade union leaders understand the measure of our economic difficulties clearly enough; they have the difficult task of backing up the Labour Government and at the same time being the spokesmen for their members, who often have a point of view different from official Government policy. It is the need to reconcile these divergences that makes the Government hesitate, and partly explains its dilatoriness at a time when brisk action is essential.

Load-Spreading Plans

One Day a Week Stoppage Favoured

WE reported last week the proposal of the Eastern Regional Board for Industry that industrial concerns in its area should close down, in turn, for one day in five. The Board has arranged for local committees to be set up in each town, including the electrical engineer, a trade unionist and an employer. It will be for these committees to decide upon the best method of securing the necessary reduction of one-third in the peak demand. Night work is not ruled out; it is suggested in cases where firms with a few employees have a heavy electrical load and where testing involving the use of electricity has to be carried out.

The Hull District Committee of the East and West Ridings Regional Board has also suggested the adoption of a one day a week shut-down arrangement by some industries. To counteract the adverse effects of this firms are recommended to get their employees to work longer hours or on Saturday or Sunday. Where it is possible night work may be preferable but the attitude of women employees has to be considered.

The adoption of one power-less day a week by Birmingham's 11,000 industrial users is

also one of three methods suggested by the Midlands Regional Board. In a letter sent to all electricity undertakings in its area the Board states that it is considered more satisfactory if the necessary hours of work are made up in normal working days without recourse to Saturday afternoon or Sunday working. This method is favoured as a basis, but individual firms will be able to adopt their own schemes if these are approved by the Regional Board.

The other alternatives are transfer to night work and dividing factories into two groups, one working from 7 a.m. to 4.30 p.m. and the other from 12.30 to 8 p.m.

At a meeting of representatives of the Cotton Board, employers and trade unions on Monday last in Manchester the trade unionists promised full support for plans to stagger working hours in the cotton spinning mills and weaving sheds.

Mr. George Gibson said in Manchester on Monday that the North-West Regional Board for industry had adopted a resolution calling for compulsory measures to secure a spreading of the load of non-industrial users of electricity in shops and offices.

I.E.E. Officers for 1947-48

Mr. P. Good Elected President

THE new president of the Institution of Electrical Engineers is Mr. P. Good, who is well known both in this country and abroad for his work in connection with the British Standards Institution of which he is Director.

Mr. Good attended the Central Technical College and served for a time at the Thames Ironworks, later becoming superintendent of the Testing Department at Faraday House. His association with the B.S.I. commenced in 1913 when he became assistant secretary of the Institution (then the British Engineering Standards Association). His activities for the Institution took him to New Zealand and Australia in 1938 and following discussions there it was decided to hold the British Commonwealth Standards Conference in 1940. The outbreak of war caused a postponement of the Conference which was eventually held in London in 1946. Included in his many activities for the B.S.I. is his work in connection with the Anglo-American agreement on screw threads.

Mr. Good is especially interested in matters relating to illumination and was largely responsible for the floodlighting arrangements during the International Illumination Congress held in this country in 1931. His work on illumination was recognized in 1938 when he was elected president of the Illuminating Engineering Society. With the outbreak of war he became chairman of the Joint Lighting Committee of the Ministry of Home Security and the Illuminating Engineering Society and in recognition of his work he was awarded the C.B.E. in 1941. Mr. Good became a graduate of the I.E.E. in 1902 and a full member in 1913, first becoming a member of the Council in 1935 and a vice-president in 1942.

To fill the vacancy of vice-president, Mr. D. B. Hoseason, who was recently appointed director of studies at the Administrative Staff College, Henley-on-Thames, has been elected. Mr. E. Leete, a director of the London Electric Wire Co. & Smiths, Ltd., has been re-elected hon. treasurer.

The vacancies on the Council have been filled by the following:—Mr. C. M. Cock (chief electrical engineer, Southern Railway), Mr. T. E. Goldup (director, Mullard Radio Valve Co., Ltd.), Mr. H. L. Kirke (Research Department, B.B.C.), and Mr. J. S. Pickles, B.Sc. Tech.

(Dumfries county electrical engineer). The Associate Member representative is Mr. J. M. Ferguson, B.Sc.(Eng.), (research engineer, English Electric Co., Ltd.).

New elections as officers and as members of the Committees of the various Sections are as follow:—

Installations:—Chairman, Mr. R. H. Rawll; vice-chairman, Mr. H. J. Allcock, M.Sc.; members of Committee, Messrs. C. E. Mills, F. E. Rowland, G. Smith and A. H. Young.

Measurements:—Chairman, Mr. D. C. Gall; vice-chairman, Mr. S. Whitehead, Ph.D., M.A.; members of Committee, Messrs. L. H. Daniel, M.Sc.(Eng.), T. W. Ross, A. Glynne, M.A., G. W. Sutton, Ph.D., B.Sc.,

and A. L. Whiteley, D.Sc.

Radio Section:—Chairman, Mr. C. E. Strong, O.B.E., B.A.I.; vice-chairman, Mr. F. Smith, O.B.E.; members of Committee, Messrs. C. F. Booth, E. L. E. Pawley, M.Sc.(Eng.), H. W. Forshaw, O.B.E., and J. A. Ratcliffe, O.B.E., M.A.

Transmission:—Chairman, Prof. W. J. John, B.Sc.(Eng.); vice-chairman, Mr. C. O. Boyce, B.Sc.(Eng.); members of Committee, Messrs. L. G. Brazier, Ph.D., B.Sc., E. L. Davey, C. M. Cock, L. Drucquer and G. H. Gillam.

The new officers and Committees take office at the end of September when the new session of the Institution begins.

Columbia River Resources

A VAST plan for the development of the resources of the Columbia River for irrigation and power is envisaged in a report presented to the United States Secretary of the Interior by the Bureau of Reclamation. Fulfilment would extend over several decades, states *Electrical West*, and the ultimate cost would be \$5,598,494,000, based on present prices, of which \$1,589,790,000 would be for the hydro-electric transmission system. Development is divided into two stages, the first of which comprises forty-seven projects already authorized for construction, including hydro-electric power installations with an aggregate capacity of 4,331,000 kW. The whole development would, it is estimated, provide 55,500 million kWh of firm energy and 9,100 million kWh of secondary energy annually.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication.

Responsibility cannot be accepted for correspondents' opinions.

Paralleling Diesel Sets

IN reply to "S.L.", I have had considerable experience of running Diesel sets in parallel whilst serving in two Canadian-built ships. The generating plant consisted of one steam turbine of 375 kVA and four Diesel sets each of 175 kVA 60 cycles, all for 460-V three-phase with earthed neutral.

My synchronizing equipment consisted of dark lamps and a synchroscope. The latter was always used except in case of breakdown, but I found that the mechanical shock was not excessive if these machines were paralleled slightly out of phase. On one occasion there was an extremely heavy transient current when we were on 50-cycle shore supply and the 50- and 60-cycle systems were accidentally paralleled, but both the engineer officer and I were surprised to find that no damage was sustained by the Diesel.

Should a synchroscope not be available I therefore suggest dark-lamp synchronizing. Provided the Diesels are securely bedded I don't think there need be any fear about mechanical shocks due to error of judgment.

M. F. K.

Elect. Officer, R.N.V.R.

Armature Drop Testing

CAN any reader please give me some information on what is known as "armature drop testing," the theory of the tests and the interpretation of the readings obtained. I cannot find any publication or books enlarging on this subject.

Wells.

W. GOIRER,

Maintenance Electrician.

Portable Tool Protection

IT is a sad reflection that an employee of sub-contractors engaged in the construction of one of our latest power stations at Meaford should be killed due to a broken earth continuity wire on an electric drill, when adequate equipment for the protection of these tools has been on the market a long time.

I feel it necessary to draw attention to the scheme in your issue of July 11th, 1941, describing earth-leakage protection, which is not expensive when the hazards of portable equipment are considered under the difficult

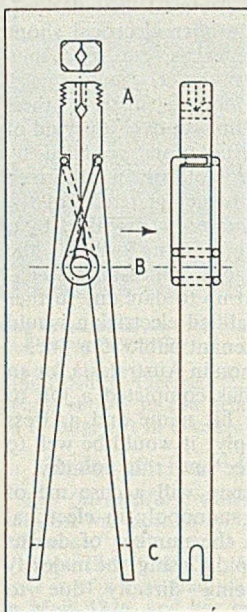
conditions of site construction work. This protection is now being standardized by many first-class concerns and installation contractors should be among them.

London, E.C.4.

P. F. GROVE.

Home-made Special Pliers

YOUR readers may be interested in the pliers illustrated which were devised to



deal with details in deep and narrow places requiring a long thin tool. The pliers, which can easily be made of hard wood, consist of three parts, one being a spring similar to that used for clothes pegs.

Diagram showing construction of special pliers

Each jaw has two 120-deg V-grooves at right angles, making it suitable for hexagon, square or circular nuts and other shapes.

The outside of the jaws may be used to hold parts internally, if a bolt

is inserted into the slots at the other end of the pliers and the necessary tension given. A useful size has an overall length, A to C, of 8 in., with 3 in. between the jaw end and the fulcrum, A to B.

Erith, Kent.

A. W. BOASE.

Safe Installations

JUDGING from the correspondence in recent issues it would seem that a completely safe domestic installation is not possible without a major change-over from present-day wiring systems and voltage values, but whilst the solutions offered are technically sound the cost of making such a change-over would be prohibitive.

In my opinion the real solution lies in eradicating that public menace the "amateur

electrician," which could be achieved by requiring all those engaged in the electrical contracting industry to pass a test set by the local supply authority. This test would comprise questions on I.E.E. Regulations, general electrical knowledge and any special requirements of the particular authority (auxiliary earthing devices, etc.). A certificate of competency would then be issued. Whilst no doubt most electricians would find the test simple it would definitely set a minimum standard of efficiency. Legislation should then be passed prohibiting anyone not possessing a certificate from interfering in any way whatever with electrical installations, and permitting only proper electrical shops to supply fittings, materials, etc., and then only on production of the certificate.

Local authorities should instruct their service electricians to inspect over a period of time all domestic installations supplied by them and where there is old or unauthorized wiring to request the owner or tenant of the building to have it renewed or modified by a competent electrician, failing which the current would be cut off. Once an installation had been brought up to date any further work except by a qualified electrician would render the owner or tenant liable to a fine.

It is I believe common in Australasia for an electrician when he has completed a job to place a card bearing his name and address near the point of supply; it would be well to introduce that practice into this country.

No doubt the layman will accuse me of trying to organize a monopoly in electrical contracting but with the number of deaths from electric shock rapidly rising, the majority of the fatalities being directly due to amateurish work, rigid measures are needed.

Willesden, N.W.10.

D. B. SALTER.

Wasted Man-Power

IN your issue of August 8th "Supervisor's Wife" has brought up an "old sore," and although she has my entire sympathy I am afraid that little can be done to correct this unfortunate matter without a change in human nature.

Anyone who states that a man is too old at 47 or 67, for that matter, is just stating rubbish. Degrees prove that a person has passed through a university or technical school and that technical knowledge has been gained. Degrees, however, do not prove ability to carry out or supervise practical work—such experience must be gained in the "hard school."

A conscientious man or woman of middle age who has been through the "hard school" is bound to have gained experience far greater than that possessed by the youngster of twenty-five who has just left school decorated with honours. Big business magnates (some of them over seventy) do not, however, look at it from that point of view.

Glasgow.

ALEX MILNE, SEN.

Motor Design

IN an article on "Motor Design and Power Factor" in your issue of July 25th, Mr. H. Sparke mentions a construction providing the "same total tooth-top area under the pole face" as the "first consideration for tooth ripple." It is difficult to see how this can be achieved, as an induction motor of any size is almost invariably slotted on both stator and rotor, and not on one member only. This point is dealt with in Say & Pink's "Design of A.C. Machines," Chapter X, Section 6, part of which (dealing with tooth ripple in a salient pole machine) resembles Mr. Sparke's relevant paragraph.

Sheffield, Essex.

J. GRIFFIN.

L.N.E.R. Diesel Electrics

New Locomotives for Anglo-Scottish Expresses

THE L.N.E.R. board has approved plans to construct twenty-five Diesel-electric locomotive units of 1,600 h.p. for the principal Anglo-Scottish expresses. The scheme envisages the operation by Diesel-electric locomotives of about thirty week-day and Sunday expresses over the East Coast main line between London (King's Cross) and Edinburgh (Waverley), representing about $2\frac{1}{2}$ million train miles per annum.

The scheme also represents another great advance in the size of motive power units on the East Coast main line. The modern L.N.E.R. "Pacific" steam engines are each carried on twelve wheels (six of which are "drivers"), weigh 161 tons and exceed 73 ft in length over buffers. The Diesel-electric units, which will work in pairs to form 3,200-h.p. locomotives, operated by multiple unit control, will, between them probably have twenty-four wheels (sixteen of them "drivers"), weigh about 240 tons and measure approximately 114 ft over buffers. They will have an estimated starting tractive effort of 90,000 lb and will be capable of running at 100 m.p.h. The main depot for the Diesel-electric locomotives will probably be situated near Edinburgh (Waverley) with a subsidiary one as close as possible to King's Cross.

COMMERCE and INDUSTRY

Advisory Council and Economic Plans. Building Materials Control.

THE National Joint Advisory Council representing the British Employers' Confederation and the Trades Union Congress met at the Ministry of Labour on August 6th under the chairmanship of the Minister. The Council first discussed the question of the terms and conditions under which the hours provisions of the Factories Act should be relaxed in order to facilitate the staggering of working hours for the redistribution of the electricity load. Later the Minister made to the Council a full statement of the proposals of the Government to deal with the economic situation, which had already been announced by Mr. Attlee in the House of Commons.

After long discussion during which particular attention was given to the control of engagement and the lengthening of hours of work, a resolution was approved to the effect that the Council had taken note of the measures proposed by the Government and pledged its full co-operation in assisting to restore the economic security of the country. For this purpose arrangements are being made for the National Joint Advisory Council and the Joint Consultative Committee to consider the detailed application of the proposals. The Joint Consultative Committee was to meet on Wednesday last.

Philips Lamps' New Title

On September 1st Philips Lamps, Ltd., will change its name to Philips Electrical, Ltd. The reason for the change is that to-day the company's activities range over an ever widening field of electrical development and manufacture, and in addition to lamps and lighting equipment, its products include television and radio receivers, sound amplifying installations and communications equipment, electrodes, arc and resistance welding plant, battery chargers, industrial rectifiers and magnetic filters, X-ray and electro-medical apparatus, high-frequency heating and the electron microscope.

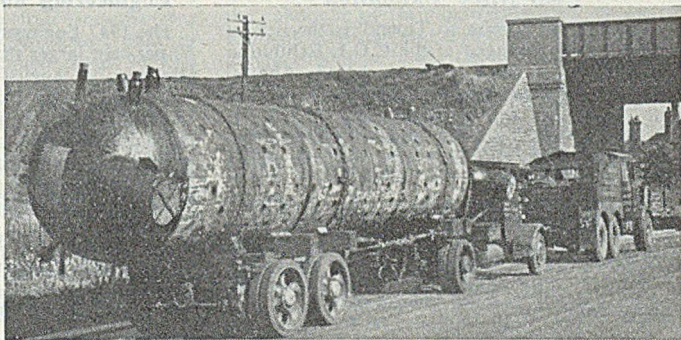
Price Control Marks

To facilitate the fixing of maximum prices for certain goods, the Board of Trade, in consultation with the Central Price Regulation Committee, has adopted two official price control marks. The marks are shown in the Schedule

to the Price Controlled Goods (Price Control Mark) Order, 1947, S.R. & O. 1947 No. 1651, H.M. Stationery Office, price 1d.

Large Boiler Drum for Stourport

One of the largest boiler drums in the country, manufactured by the Stirling Boiler Co., was recently delivered at the Stourport "B" power station of the Shropshire, Worcestershire &



Large boiler drum arriving at the Stourport "B" station of the S.W.S. Electric Power Co.

Staffordshire Electric Power Co. The boiler drum, shown in the accompanying picture, is 36 ft long, 6 ft in diameter and 5 in. thick.

Radar on the "Queen Mary"

The *Queen Mary*, which recently commenced her post-war normal service, is now fitted with "Seascan" radar made by the Metropolitan-Vickers Electrical Co., Ltd. The set on this liner is of a type that was first put into service in May, 1946, and has been installed in thirty-two ships.

Conference on Electron Microscopy

The seventh conference on electron microscopy, organized by the Electron Microscopy Group of the Institute of Physics, will be held at the University of Leeds on September 16th and 17th.

Building Materials Control

Under the Control of Building Materials (No. 1) Order, 1947 (S.R. & O. 1947 No. 1698) which comes into force on September 1st it will be unlawful (a) to acquire or seek to acquire certain equipment for which a priority certificate has been given in excess of the quantities in the priority certificate itself; (b) to supply or offer to supply scheduled goods requested in accordance with the priority certificate in excess of the quantities stated in the priority certificate;

and (c) to supply goods of the same kind as have been ordered under a priority certificate otherwise than to meet that or another priority order so long as these orders have not been met. A month's deferment is granted in so far as (c) is concerned to enable order books to be re-examined.

Among the materials and equipment covered by the Order are metal electrical conduit and boxes, three-pin plugs and sockets up to 15 A, main switches, switch-fuses, domestic fuse-boards up to 60 A, and wall and ceiling switches up to 15 A.

Coal Mine Exhibition

"The Miner Comes to Town" is the title of an exhibition arranged at the C.O.I. Exhibition Centre, Marble Arch, London, by the Central Office of Information for the Ministry of Fuel and Power and the National Coal Board. It will be opened by the Prime Minister on September 11th and will run for six weeks (Sundays included).

Sections will demonstrate the economic importance of coal; the technique of coal getting; the work of the National Coal Board; the miner's life; surface handling and marketing of coal; and old and new conditions underground.

Britannic Cable Co.'s Statement

The Britannic Electric Cable & Construction Co., Ltd., Iver, Bucks, states that it has no connection of any kind, either in this country or in South Africa, with the new African Britannic Cable & Wire Corp'n. (S.A.), Ltd., which was mentioned in our issue of July 25th, and that Mr. E. Martin has had no connection with the Britannic Electric Cable & Construction Co. since he was employed by the company for a short period in 1939-40.

Prague International Fair

Intending visitors to the International Fair which is to be held in Prague from September 5th to 14th can obtain particulars of travelling arrangements, hotel accommodation, etc., from the Director of the Tourist Traffic Department, Czechoslovak Ministry of Foreign Trade, 35, Pont Street, London, S.W.1.

Industrial Accident Prevention

Sir Charles Bartlett, managing director of Vauxhall Motors, Ltd., and Mr. G. P. Barnett, H.M. Chief Inspector of Factories, are amongst those who will speak at the National Safety Congress to be held at Brighton and Hove from October 6th to 10th. The congress is being organized by the Royal Society for the Prevention of Accidents, which this year celebrates its silver jubilee as a national organization.

A session will be devoted to experiments now being made in the safety training of fore-

men and supervisors by means of discussion group methods. By the time the congress is held these experiments will have progressed sufficiently for a report to be made. The more detailed matters to be discussed include noise abatement in industry, floor surfaces and their effect on falling accidents and the guarding of milling machines. The main industrial sessions will begin on October 7th and end on the afternoon of October 9th. Full particulars of times, fees, etc., may be obtained from the Industrial Safety Division, R.S.P.A., 131, Sloane Street, London, S.W.1.

Engineering and Marine Exhibition

The 1947 Engineering and Marine Exhibition, 50 per cent larger than before the war, opens at Olympia on August 28th; it incorporates the Foundry Trades Exhibition and the Welding Exhibition. A number of Associated Iliffe journals, intimately related to many branches of engineering, will be displayed, including the *British Engineering Export Journal*, *Aircraft Production*, *Automobile Engineer*, *Export Trader*, *Electrical Review*, *British Plastics*, *Wireless World*, *Wireless Engineer* and *Yachting World*, together with a wide selection of Iliffe reference books. Publications of the Louis Cassier Co., *Iron and Steel*, *Metal Industry*, *Mechanical Handling*, *Machine Shop Magazine*, *Welding* and the new "Handbook of Industrial Electroplating," will also be available for inspection.

Norwegian Siemens Concern

Det Norske Elektrisitets-aksjeselskap Siemens, Oslo, has since the liberation been under the administration of the Directorate for Enemy Property. From January 1st, 1947, all assets and liabilities have been transferred to Norwegian proprietors. In this connection a new company has been established which will continue the business of the former firm of Siemens in the same way as heretofore under the style of Aksjeselskapet Proton.

Factory Medical Fees

The Minister of Labour and National Service has made an Order (S.R. & O. 1947 No. 1672, H.M. Stationery Office, price 1d.) determining the scales of fees payable by the occupier of a factory to examining surgeons for various services under the Factories Act. The new Order comes into force on October 1st, 1947.

Canadian Trade Fair

More than four times the space originally estimated has already been applied for by Canadian firms intending to exhibit their products in the first Canadian International Trade Fair, to be held in Toronto from May 31st to June 12th next year. Manufacturers and producers totalling 480 from all parts of the world have so far requested reservations for 106,980 sq ft of display space. The closing date for applica-

tions from foreign exhibitors is September 1st. More than 100,000 official invitations to attend the Trade Fair will be distributed in five languages next September to buyers and buying organizations abroad.

Rubber Statistics

In the first four months of this year the estimated production of natural rubber was 405,000 tons as compared with 132,500 tons in the corresponding period of 1946. At the same time the production of synthetic rubber (all but a small proportion by the United States) fell from 255,334 to 247,500 tons. The consumption of natural rubber in the four months was 362,500 tons (against 110,000 tons); that of the synthetic material declined from 337,500 tons to 250,000 tons. The British cable-making industry is reported to have used during the first four months of the year 3,711 tons, only 199 tons being synthetic. In 1946 the industry consumed 9,993 tons, of which 3,052 tons was synthetic. These figures are derived from the *Rubber Statistical Bulletin* for June (2s., from W. H. Smith & Son's branches).

Contract Price Adjustment Formulæ

The latest figures for use in connection with the B.E.A.M.A. contract price adjustment formulæ are as follows:—Rate of pay for adult male labour as at August 9th: 110s. (unchanged). Board of Trade index figure for intermediate products, August 9th: 222.5, the figure for July (against 221.4 for June).

Hydrogen-cooled Motors

There are hydrogen-cooled alternators and outdoor synchronous condensers; particularly in America, and now Westinghouse motors, to be cooled in this manner, are being built for a large oil refinery. They are rated at 2,250 h.p. at 1,800 r.p.m. and are claimed to be the largest explosion-proof squirrel-cage motors to be built. Their size meant that reliance could not be placed on the ability of the motor casing to resist bursting should an explosion occur inside, as is done with smaller motors whose ratio of outer surface to volume is much greater. Hence explosive gases must positively be excluded by maintaining the inert gas internally at slightly above atmospheric pressure. A separate motor-driven oil pump will maintain the tightness of the seals around the shafts when a motor is shut down.

Heating and Ventilating Engineers

The Institution of Heating and Ventilating Engineers celebrates its jubilee this year and to mark the occasion special celebrations have been arranged in October.

The usual autumn meeting of the Council will be held on October 7th and will be followed in the evening by a banquet and dance at the Savoy Hotel, London, W.C.2. On the following day there will be an autumn special meeting of members when a paper on "Air Filtration"

will be read by Mr. C. G. Vokes, which will be followed by a special jubilee paper by Mr. C. G. Carrothers (Kennedy & Donkin) on "District Heating."

Further particulars of the celebrations will be issued later and in the meantime members are asked to notify the secretary of the number of tickets they will require for the banquet and dance.

Library Catalogue Supplement

H. K. Lewis & Co., Ltd., 136, Gower Street, London, W.C.1, have issued a 176-page supplement (January, 1944, to December, 1946) to the catalogue of their comprehensive library of medical, scientific and technical works. Copies are obtainable at 5s. (2s. 6d. to subscribers).

Trade Publications

Sun Electrical Co., Ltd., 118, Charing Cross Road, London, W.C.2.—Illustrated and priced leaflet on decorative pendant fittings and desk lamps.

Hi-Craft Electrical Products, Ltd., 25, Manchester Square, London, W.1.—Illustrated folder on ballast units for 80-W fluorescent lamps, with circuit diagrams.

Crypton Equipment, Ltd., 1, Victoria Street, London, S.W.1.—Illustrated list (A.40, section A) of battery chargers utilizing valve rectifiers, printed in colours.

Dominion Bridge Co., Ltd., Lachine, Quebec, Canada.—Well-illustrated brochures describing the company's Robb "Victory" water-tube boilers and fabricated steelwork ("Platwork for Every Industry.")

Johnson, Matthey & Co., Ltd., 78-83, Hatton Garden, London, E.C.1.—Publication No. 2572, describing the company's vitreous enamels for permanent scales and markings on glass. Illustrated.

Trade Announcements

METROPOLITAN-VICKERS ELECTRICAL CO., LTD.—The Belfast office has been moved to 19, Ormeau Avenue, Belfast.

TAYLOR ELECTRICAL INSTRUMENTS, LTD., 419-424, Montrose Avenue, Slough, inform us that they have arranged to supply retailers with their instruments at trade terms while offering hire-purchase facilities.

ALLIANCE WHOLESALE, LTD., 62-3, Gt. Russell Street, London, W.C.1, have been appointed stockists by S. Wolf & Co., Ltd., for their electric tools and equipment.

Change of Name

Timson Bros. have changed their name to Timson Bros. (England), Ltd.

Annual Holidays

The works and offices of the Electropiant Co., Wembley, Middlesex, will be closed for the annual holidays from to-morrow (Saturday) until August 23rd inclusive.

Lessons from Sweden

Management Conference at Stockholm

LAST month there was held in Stockholm the eighth International Management

By **G. O. McLean, M.Eng.**

Conference. This was a resumption, after a lapse of nine years, of the triennial conferences, covering all aspects of industrial, commercial, agricultural, building, and home management, inaugurated by President Masaryk at Prague in 1924. The Conference was presided over by Mr. William Batt, head of an American firm, of which the parent company is a Swedish concern, the ball-bearing manufacturers, SKF.

In his opening address Mr. Batt set the theme for the whole Conference as the ensuring of permanent peace, by converting it from a "tender flower" into a "hardy annual." This could be done by raising standards of living all over the world by efficient management, interpreting this rather nebulous expression as "More goods for more people at lower costs." Management was greatly helped by a conference of this type, because it provided facilities for exchange of ideas; appraisal of progress; an assay of the most promising fields for further work; the improvement of education for management; the raising of the level of economic thinking; and, finally, the allaying of labour/management difficulties.

Labour and Government Participation

In the latter connection, it is significant to note that though a business chief, Lord Leverhulme, led the British team of over 150, the Trades Union Congress was officially represented by a past chairman, Mr. George Gibson, while the third partner of the production team (the Government) had representatives from several Ministries. This is perhaps a convenient place to mention that the electrical industry (manufacturers, supply and consumers) was ably represented, Sir Clifford Paterson contributing a paper on "Industrial Research," Dame Caroline Haslett acting as the British discussion group leader on Home Management, and Mr. W. Jennett as leader on "Quality Control," while several electrical men contributed to the discussions.

One of the earliest lessons learnt by the 1,500 delegates was the thorough way in which the Swedish Committee had organized the

Conference, and the social engagements connected with it, making good use of over

100 young, eager university students as interpreters, guides and ushers. Another early lesson was that though the seventy official papers bound in two handsome volumes were available to members sometime before the Congress was opened by Prince Bertil, and the rapporteurs of the fourteen sections took less than half-an-hour of each section's time in summing up the papers for that section, the questions they posed for discussion were too numerous and not available sufficiently in advance for the sections to enter into really live discussions or even exchanges of ideas. The British speakers, by holding their own preliminary meetings each morning and going over the questions for the day, did make the best response to the rapporteurs' lead, and one comment at the final British meeting was that "the unseen questions, though a nuisance, had really shown our worth."

Some of the Subjects

Lack of space precludes even summarizing the papers or discussions, but some of the very important problems and answers were:—

(a) "When should education in management questions be commenced?" The theory at an early age in technical schools and colleges, and practice too, soon after a likely candidate enters a firm, with the proviso that management is not "all science" but also an art.

(b) "Have physiological and psychological considerations been neglected in favour of statistical and technical aspects in the study and measurement of work?" In the past, yes; but the present tendency is to stress the former.

(c) "The behaviour of distribution costs (applicable to electrical energy as much as any other commodity—my parentheses) under changes of turnover, prices or buying power." Answers depend on both psychology and statistics, but the latter is a most valuable tool to problems such as predicting point and time of relative saturation or the elasticity of complementary products.

(d) "What means are justified to prevent turnover of labour?" There appear to be

no really effective means in these days of labour shortage, as some firms in Sweden have an annual turnover exceeding 100 per cent, while the large firms who offer the biggest inducements by way of social amenities, cheap modern all-electric housing, liberal holidays, pensions, medical attention, education and recreation, cannot keep their figures below 50 per cent.

(e) "Are co-operative research associations the answer to the research requirements of the small companies?" and "What can be done to make better use of consumer ideas?" Yes, if there is a sufficiently broad contact in the industry as a whole, and between research and production; and secondly, use of retailers and consumer panels.

(f) "Statistical quality control as a factor for analysis and guidance for the management of a firm." Present-day emphasis is on "quality," especially from consumers.

(g) "The merits and defects of public organization." In this connection Prof. C. T. Salfors pointed out that the Swedish Inquiry Commission listed defects as (i) Specialist

staff doing routine work, which could be delegated to subordinates; (ii) Complicated and cumbersome routines for simple jobs; (iii) Unnecessary work (often duplicated between sections) in the form of reports and statistics; (iv) Division of responsibility often incorrectly balanced.

Other questions discussed were making use of employees' suggestions and the dividing up of the working week and day into suitable work and rest periods.

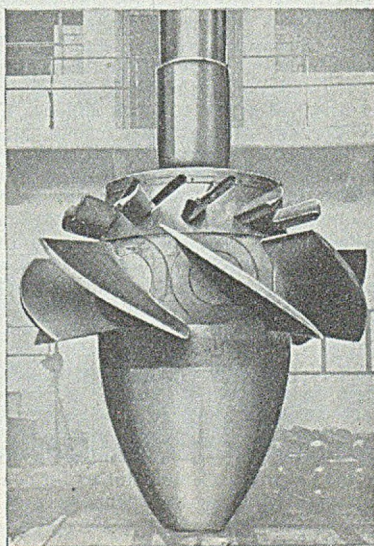
Coincident with the work involved by the problem discussions outlined above were many social functions, the chief of which was a banquet in the Blue Room of Stockholm's famous Town Hall. Visits to various factories in Stockholm were arranged, including Ericsson's, and many of the electrical men made a two-day study tour to Västerås, the headquarters of A.S.E.A. and one of the large peak-load steam stations, where it was claimed that 50,000 kW of load could be carried in twelve minutes starting from a completely cold station, and in three to five minutes if the boiler was banked at working pressure.

Water-Turbine Improvements

AMONG makers of hydro-electric plant in Britain the English Electric Co., Ltd., Stafford, is probably the only concern that both designs and manufactures water turbines as well as the generators which they drive. One of its developments is a propeller runner with mechanism for "feathering" the blades housed entirely within the hub of the runner, thus avoiding the need for complicated connecting gear between the blades and their actuating servo-motor. The latter is cylindrical with slots on the outside in the form of inclined grooves which, when the cylinder moves vertically, causes simple linkage to alter the angle of the moving blades. Access to the internal actuating mechanism is easy, since the hub cover can be lowered inside the draught tube, leaving the runner itself in its normal position.

An anti-racing device is also incorporated, which substantially reduces the danger that may result from excessive runaway speeds. It consists of a number of slanting vanes immediately above the runner hub, which are normally retained flush with its outer circumference by springs, or braking pins within the hub. At some pre-determined speed, usually about 55 per cent above the normal, the vanes are projected simultaneously outward into the water vortex above the runner blading and, in combination with the latter, exercise a powerful braking effect. The water-turbine runner

shown in the accompanying illustration is installed in the River Liffey hydro-electric station of the Electricity Supply Board, Eir.



Water-turbine runner with "feathering" blades and (above) protruding braking vanes

ELECTRICITY SUPPLY

Brighton Rate Relief Decision. New Coventry Station Planned.

Argyll.—EXTENSIONS.—The County Council has received an undertaking from the North of Scotland Hydro-Electric Board that if the Grampian Electricity Co. and Mid-Argyll Electricity Co. cannot provide a supply of electricity to Inverary and Glassary, the Board will make a supply available from its Shira scheme.

Berwick.—STREET LIGHTING.—Discussions are to take place between the Town Council and the Scottish Southern Electric Supply Co., Ltd., regarding the installation of electric street lighting. It is proposed to use mercury-vapour lamps at a cost of £16,653.

Brighton.—HIGHER COST OF NEW STATION.—For the first half of the new power station at Southwick the original estimate called for borrowing powers amounting to £7,550,000. At its last meeting, however, the Council was asked by the Electricity Committee to rescind this resolution in favour of a revised estimate of £8,400,000 owing to higher costs. Councillor P. F. Friend-James protested at such a large increase in price and moved that the Council should not approve the application. The amendment was defeated by 32 votes to 26. The borough treasurer (Mr. R. W. E. Bunn) said that very little of the money was likely to be spent before the vesting date under the nationalization measure and so far as he could see no part of the capital cost or loan charges would fall on the Council.

RATE RELIEF INSTEAD OF REBATE.—By 39 votes to 25 the Council decided to use the £25,373 surplus on the year's trading of the Electricity Department for the relief of the rates instead of returning £23,365 to the consumers by way of a 10 per cent rebate as the Electricity Committee had suggested. The Finance Committee pressed for taking the profits for the rates, the chairman saying it was the last year they would have the opportunity of doing so. Councillor F. G. Field described any proposal to take profits from consumers as unmoral.

Cheltenham.—CONSUMERS' RECORDS.—Because the cost of installing a consumers' central record system might lessen the likelihood of obtaining the annual contribution from surplus revenue to the general rate fund, the Electricity Committee recommended that the question of providing such a system should be deferred for twelve months. The Borough Council, however, at its July meeting referred the recommendation back to the Committee.

THREE-PHASE SUPPLY.—The Council is applying to the Electricity Commissioners for consent to borrow £14,000 for the change-over of the existing single-phase supply in the Battledown area, to three-phase.

Coventry.—PROPOSED POWER STATION.—Subject to satisfactory reports, the Planning

and Re-development Committee has given its approval to the proposal to construct a new generating station on a 100-acre site to the south of the existing Longford station.

Crook and Willington (Co. Durham).—The Urban District Council's electricity undertaking is receiving inquiries from householders and business men in the area asking for the installation of electrical appliances following the cessation of the gas supply through the closing of the works owned by Crook Gas Co., Ltd. The company has had to close, it is stated, through administration difficulties. The Council's electricity undertaking, while trying to help inquirers, has pointed out the difficulties caused by the shortage of electrical goods.

Doncaster.—IMMERSION HEATERS.—Disapproval of the installation for domestic purposes of 4-kW immersion heaters during the present difficult fuel position has been expressed by the Electricity Committee.

Ilkley.—FURTHER DISCOUNT.—Since the decision last year regarding bulk supply charges which resulted in the Council receiving a refund for the period 1939-42, consumers have been given special discounts. In addition to the normal 5 per cent for prompt payment, discounts of 15 and 45 per cent were granted in the December and March quarters. For the June quarter a discount of 25 per cent is announced.

London.—EXTENSIONS.—Schemes reported to the London and Home Counties Joint Electricity Authority at its meeting last week included the following:—33-kV transmission cables from the County of London Co.'s Barking generating station to substations at Chadwell Heath, Gidea Park, Brentwood and Shenfield, and from the Chadwell Heath substation to the existing Barking to Ilford cables; 66-kV gas-pressure cable between the Metropolitan Electric Supply Co.'s substations at Waterloo Road, Uxbridge, and White Hart Road, Chalvey, Bucks (estimated cost £185,000); and extension of the West Ham Corporation's Canning Town power station by the installation of one 30,000-kW set, two 180,000 lb per hr boilers and a 2.8 million gal. per hr cooling tower.

TRANSPORT

Italy.—FURTHER RAILWAY ELECTRIFICATION.—Supplementing the information regarding railway electrification in Italy given in our issue of July 11th last, it is now announced that plans for the electrification of several more lines are being prepared, among them being those from Venice to Turin, Florence to Pisa, Domodossola to Genoa and Padua to Bologna.

Automatic Washers

Mass Production at a Birmingham Factory

LARGE-SCALE manufacture of the Bendix automatic "Home Laundry" in this country is now getting into its stride, production being carried out on behalf of Bendix Home Appliances, Ltd., in a section of Fisher & Ludlow's new 40-acre factory at Castle Bromwich, Birmingham. Although the factory was taken over only at the beginning of the year, the assembly lines are running well and output is steadily increasing, and before long it is hoped to step up to 500 machines per week.

Originally of American design, this machine has had to be partially redesigned to suit the British and Continental markets. For instance, the type of solenoid used for the American 110-V supply is unsuitable for the higher voltage here. Similarly the company's Development Section has had both to modify the timing circuit

and also to evolve a special water valve to meet the restrictions against the mixing of hot and cold water supplies and to compensate for unbalanced pressures. Incidentally, this valve is readily adjustable to suit summer and winter conditions. Special diecast motor ends have been designed for mounting the pump and gear box.

Presswork is undertaken in shops separate from the assembly department: items such as motors, switch and control gear, etc., are obtained from outside sources. The smaller components are kept under lock and key and issued in batches to the operators as required.

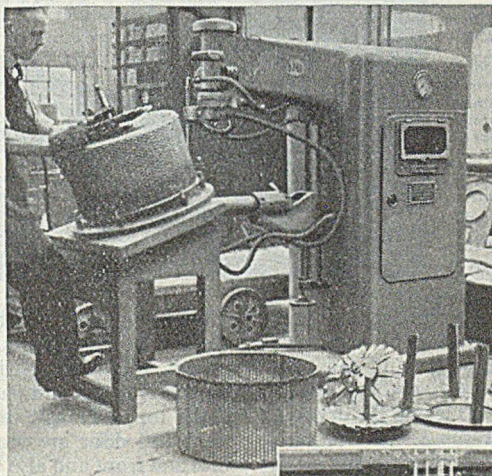
The larger components, however, are accommodated in open racks conveniently placed along the starting end of the assembly lines

which run the full length of the shops.

Assembly of the perforated steel cylinders, in which the clothes are tumbled, progresses in a considerable number of stages. First the various components are welded or riveted together. With the aid of jigs the bearing shaft and reinforcement plate are spot welded on to the cylinder and inside this

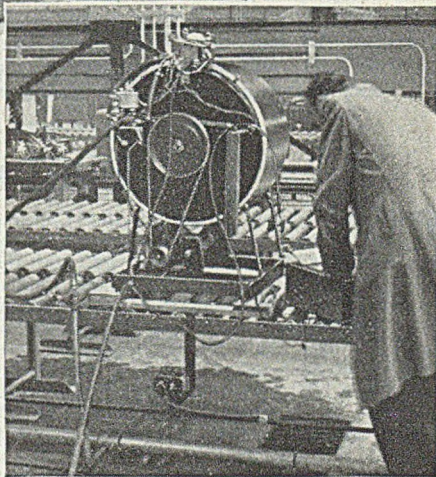
is inserted a sub-assembly consisting of the end plate on to which have been welded baffles for the purpose of agitating the clothes as the cylinder revolves. Spot welding is employed to hold this insertion in position until it has been stitch welded.

The completed cylinders are vitreous enamelled and the complete plant provided for



Above: Welding the bearing shaft and reinforcement plate to the back of the cylinder

Right: Testing the machine before fitting the cabinet work



this process includes a degreasing tank, a mill for making the frit and also a drying tunnel. To prevent any possibility of damage to clothes great care is taken to see that there are no rough edges left inside the cylinders

after the enamelling process. The completed cylinders are then assembled on to the bearing plates, which house the ball bearings, and the units are ready for mounting inside the water tubs which have meanwhile been similarly sub-assembled. On a third sub-assembly line are built up the cradles forming the framework on which are mounted the tub, motor, etc.

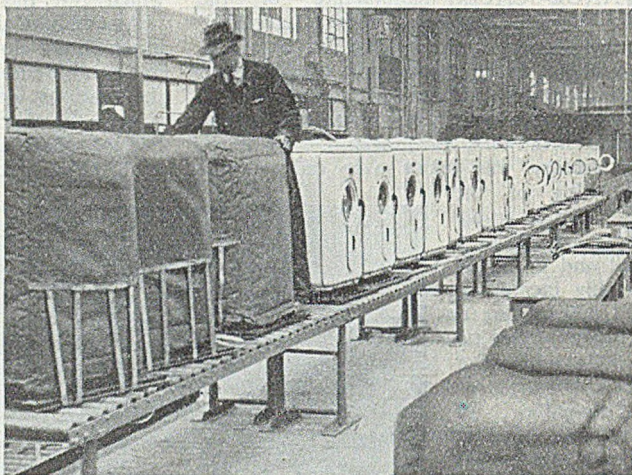
The $\frac{1}{2}$ -h.p. 1,425-r.p.m. motors which drive the machines arrive at the factory complete with driving pulley and two-speed gear

Completed machines coming off the assembly line and being packed in padded containers ready for dispatch

box. Every one is inspected thoroughly and must satisfy the examiners with regard to torque, pump efficiency and consumption. Tests are also undertaken here on the solenoids employed for the automatic operation of the water pump and the two-speed gear change (the tub revolves at 59 r.p.m. for washing and 333 r.p.m. for drying). Other components and sub-assemblies such as the water valves are checked at this stage to reduce the amount of final inspection.

On the final assembly line, which consists of a roller conveyor about 200 ft long the

motor assembly with its spring tension belt drive and resilient noise-free mounting is first fitted to the cradle and then the tub assembly is added, particular attention being paid to ensuring the accuracy of the running of the



cylinders in their two ball races. After the addition of the clothes door, the timer and control apparatus, wiring and water valve, the unit is tested and passed on for the fitting of the top, side and front panels. The top panel and door are vitreous enamelled; the sides and front and also the cradle are sprayed (later they will be dipped) and then dried by means of an infra-red plant. To prevent noise the cabinet work is rubber insulated.

Caroline Haslett Trust

THE first annual report of the Caroline Haslett Trust covers a period rather longer than a calendar year. It deals in part with the college years 1945-46 and 1946-47, but ends at December 31st, 1946. The Trust is administered by a Committee which during the period covered by the report consisted of Mrs. A. Rendell-Baker (E.A.W.), Mr. V. W. Dale (E.D.A.), Miss (now Dame) Caroline Haslett, Mrs. M. B. Jackson (E.A.W.), Mr. L. C. Penwill (E.C.A.), the Hon. J. R. Rea (B.E.A.M.A.), and Mr. O. A. Sherrard (C.E.B.). Miss A. S. Lockhart (Ministry of Education) and Capt. J. M. Donaldson (I.E.E.), were appointed honorary advisers to the Committee.

Referring to the scholarships the report states that for 1945-46 four awards were made and for 1946-47 there were six successful candidates, while a grant was made to Miss

F. Lynton (Manx Technical College, Douglas, Isle of Man). Reference is made in the report to the travelling exhibition, tenable in the U.S.A., which was awarded to Miss Joan Whitgift (Central London Electricity, Ltd.). The Treasury agreed to the expenditure abroad of £50 per month for not more than three months, plus the basic allowance of £75.

Tank Engines for Private Supply

Two 100-h.p. "Valentine" tank engines driving alternators are being installed at the Northbridge Mill, Burnley, of Joseph Lucas, Ltd., to generate a private supply of electricity which will enable them to avoid having to conform with the Government order to "stagger" working hours. The installation is expected to be ready for putting into service by the end of August.

Australian Electrical Trade

Smaller Imports in 1945-46

STATISTICS for 1945-46, by countries, of Australia's overseas trade have just been issued by the Commonwealth Government. The principal items of electrical import trade, with notes of increases or decreases compared with 1944-45, where available, are shown in the accompanying table. On account of changes in classification exact comparison is not in all cases possible but it appears that the only noteworthy increases were in alternators, switchgear and certain telephone material. The total value of all electrical goods imported in 1945-46 was £A5,051,000 against £A6,446,000 in 1944-45.

Imports

Class of Equipment	1945-46 £A(000)	Inc. or dec. on 1944-45 £A(000)
Light and power cable, lead-covered and armoured paper insulated ..	78*	†
Ditto, otherwise insulated ..	52	†
From United Kingdom ..	1	
" Canada ..	40	
" United States ..	11	
Other covered light and power cable ..	304	†
From United Kingdom ..	272	
" United States ..	32	
Telegraph and telephone cable and wire, lead covered and lead armoured and covered ..	17*	†
Other covered telegraph and telephone cable and wire ..	66*	†
Other covered electric cable and wire ..	16*	†
Dry batteries and cells ..	25	†
From United Kingdom ..	2	
" United States ..	23	
Ditto, parts ..	8	†
Storage batteries and parts ..	43	†
From United Kingdom ..	24	
" United States ..	17	
Dynamos for cycle lighting sets ..	15*	†
Dynamos for motor vehicles except magnetos ..	6	†
Magnetos and dynamo-magnetos as one unit ..	59*	†
Starter motors, 24 V and under, for motor vehicles ..	13	†
A.c. generator set units ..	7*	†
D.c. generator set units ..	25	†
From United States ..	22	
Alternators for turbines ..	290	+ 198
From United Kingdom ..	191	+ 129
" United States ..	99	+ 69
Other alternators ..	45*	†
Generators for turbines ..	38	- 341
From United Kingdom ..	22	- 110
" Sweden ..	14	+ 14
Other generators ..	38	†
Other current generating machines ..	54	†
From United Kingdom ..	6	
" Canada ..	27	
" United States ..	19	
Motors under 1 h.p., except as parts of machines ..	102	- 16
From United Kingdom ..	57	- 6
" Canada ..	27	+ 23
" United States ..	18	- 33

* All or mainly from U.K.

Class of Equipment	1945-46 £A(000)	Inc. or dec. on 1944-45 £A(000)
Motors 1 h.p. and over a.c. induction (non-commutator type) ..	84	†
From United Kingdom ..	70	
" Canada ..	4	
" United States ..	10	
Ditto, other ..	28	†
From United Kingdom ..	22	
" United States ..	6	
D.c. motors for gearless lifts (mainly from Canada) ..	3	†
Other d.c. motors ..	13	†
Motors, universal current ..	3	+ 2
Convertors, frequency changers and rotary transformers ..	13	†
From United Kingdom ..	5	
" United States ..	8	
Lamps, filament, automobile ..	31	+ 1
From United Kingdom ..	15	- 4
" United States ..	15	+ 5
Lamps under 20 V, torch and flashlight ..	24	†
From United States ..	15	
" Canada ..	7	†
Other lamps under 20 V ..	42	
Lamps, 20 V and over, gas-filled ..	23	+ 6
From United Kingdom ..	13	+ 5
" United States ..	10	+ 1
Other lamps, 20 V and over ..	28	+ 25
From United Kingdom ..	17	+ 15
" United States ..	11	+ 11
Mercury vapour, etc., tubes ..	12*	†
Heating and cooking appliances ..	45	+ 15
From United Kingdom ..	37	+ 9
" United States ..	6	+ 5
Measuring and recording instruments ..	147	+ 70
From United Kingdom ..	89	+ 36
" United States ..	54	+ 31
" Switzerland ..	3	+ 2
Switch units above 15 kV ..	247*	+ 105
Lightning arresters other than radio ..	22*	- 3
Liquid slip regulators, thrusters, etc. ..	11	+ 10
From United Kingdom ..	6	+ 5
" Switzerland ..	2	+ 2
Switches, cut-outs and choke coils ..	77	†
From United Kingdom ..	47	
" United States ..	28	
Voltage regulators, etc. ..	8	+ 2
From United Kingdom ..	4	- 1
" Switzerland ..	3	+ 3
Regulating and controlling apparatus ..	65	- 42
From United Kingdom ..	35	- 57
" United States ..	30	+ 16
Rectifiers ..	62	+ 41
From United Kingdom ..	48	+ 37
" United States ..	13	+ 3
Static transformers under 66 kV ..	25*	- 39
Static transformers, 66 kV and over ..	50	+ 18
Telegraph instruments and appliances ..	32	- 292
From United Kingdom ..	12	- 38
" United States ..	19	- 253
Telephones ..	172	+ 16
From United Kingdom ..	65	+ 33
" United States ..	106	- 17
Telephone switchboards, automatic ..	274*	†

† Comparable figures not available.

Class of Equipment	1945-46 £A(000)	Inc. or dec. on 1944-45 £A(000)
Telephone and telegraph switchboards & appliances	640	†
From United Kingdom	482	
United States	138	
Electric vacuum tubes	83	+ 67
From United Kingdom	3	+ 1
United States	80	+ 67
Radio valves	235	- 74
From United Kingdom	79	- 35
United States	152	- 48
Canada	3	+ 1
Radio receiving sets	83	- 27
From United Kingdom	12	- 18
United States	70	- 4
Transmitting sets	36	†
From United Kingdom	7	
Canada	16	
United States	13	
Radio parts	448	†
From United Kingdom	256	
United States	166	
Electrical appliances, n.e.i.	255	†
From United Kingdom	177	
United States	74	
Canada	4	

† Comparative figures not available.

Exports

Australian exports of dynamo-electric machinery and appliances in 1945-46 totalled £A489,000 in value, compared with £A282,000 in 1944-45 and only £A173,000 in 1943-44. The following statement reveals the increasing variety of Australia's electrical manufacture and diversity of markets.

Class of Equipment	1945-46 £A(000)	Inc. or dec. on 1944-45 £A(000)
Radio sets	34	+ 16
To Borneo	9	+ 9
India	4	+ 4
Malaya	2	+ 2
New Guinea	4	- 3
New Caledonia	2	- 6
Radio parts	30	+ 9
To New Zealand	13	+ 8
Netherlands East Indies	5	
Turkey	3	+ 3
Radio valves	6	- 17
Telephone and telegraph instruments and appliances	16	†
To New Zealand	13	
Miscellaneous electrical appliances	48	†
To Ceylon	3	
India	8	
Malaya	12	
Alternators, generators and motors for motor vehicles and cycles	13	†
To India	2	
Malaya	2	
Palestine	1	
South Africa	4	
Other current generating machines	27	†
To Malaya	2	
New Zealand	2	
Nauru	3	
South Africa	2	
Electric motors, n.e.i.	9	†
To Malaya	1	
New Zealand	2	
Nauru	3	

† Comparative figures not available.

Furness Water Power

AN investigation of the hydraulic resources of the Furness area is being conducted by Mr. J. E. Shepherd, borough electrical engineer of Barrow. According to the *Manchester Guardian*, Mr. Shepherd considers that there are three possible schemes. The first, on the River Leven, could produce 26 million kWh annually; the second is a modification of the existing hydro-electric station at Coniston, involving the erection of two plants to produce six million kWh; and the third, the largest, scheme is to impound the waters of the Upper Esk in two reservoirs and pipe the water through a power station into a third reservoir on the Upper Duddon supplying another station and passing to a further reservoir on the Duddon for a fourth power station.

Mr. Shepherd estimates that 100 million kWh a year could be generated by this scheme and thus the total potential output of the whole project is 132 million kWh, equivalent to 100,000 tons of coal. Upon completion of the investigations a report will be made to the Electricity Commissioners and the Ministry of Fuel and Power.

The Barrow Electricity Department has been asked by the Electricity Commissioners to investigate the possibilities of the erection of a new thermal power station in the dock district. The station would have an initial installation of 60,000 kW.

Class of Equipment	1945-46 £A(000)	Inc. or dec. on 1944-45 £A(000)
Covered cable and wire, etc.	39	+ 16
To Hong Kong	21	+ 21
Malaya	5	+ 5
New Zealand	5	- 15
Fiji	2	
Transformers and rectifiers, non-rotating	9	†
To Fiji	2	
Nauru	5	
South Africa	1	
Regulating, starting and controlling apparatus	19	†
To Christmas Island	2	
New Zealand	9	
Egypt	2	
Miscellaneous electrical fittings and wiring devices	20	†
To Malaya	2	
New Zealand	10	
Dry batteries and cells	123	+ 117
To Malaya	98	+ 98
New Guinea	10	+ 6
Netherlands East Indies	1	+ 1
Storage batteries and parts	4	+ 3
Filament lamps for lighting and heating	42	†
To Hong Kong	6	
Malaya	25	
New Guinea	3	
New Caledonia	3	
Other electric lamps	6	†
To Malaya	1	
New Zealand	1	
New Guinea	2	
Transmitting sets	29	+ 12
To Christmas Island	3	+ 3
New Zealand	24	+ 24

Municipal Reports

Mill Conversion at Blackburn. Lincoln Extensions Delayed.

Liverpool.—Salient points in the latest annual report of the city electrical engineer (Mr. J. Eccles) are that nearly 8,000 additional consumers were connected during the year and sales of electricity rose by about 13 per cent. The number of consumers at March 31st last was 207,383 compared with 199,412 a year before; total electricity sales within the undertaking amounted to 733.6 million kWh (against 650.6 million). The engineer refers to the increasing appreciation of what electricity can do to provide comfort and diminish toil, especially in the domestic sphere. This is indicated by the fact that applications were received for approximately 4,700 cookers; 6,400 water heaters and 1,200 wash-boilers. In spite of supply difficulties the Department was able to fulfil respectively 2,073, 1,343 and 646 of these orders.

Installed capacity at Clarence Dock remained at 257,000 kW and at Lister Drive 66,000 kW; a second 350,000-lb/hr boiler was put into commission at Clarence Dock in May, 1946. The kWh sent out increased from 1,238.5 million to 1,374.0 million.

Total income of the Department rose by £449,231 to £3,626,507 and working costs by £379,410 to £2,973,581. Loan charges, income tax, etc., reduce the gross profit of £652,925 (£583,105) to a net figure of £195,717 (£126,337). After making adjustments in respect of income tax for previous years and generation expenses, the final surplus is £217,100 (£79,318) of which £100,000 is paid in rate relief. The average price received per kWh sold was 1.083d. (1.079d.).

Blackburn.—The annual report for the past year is an informative document illustrated with examples of local industries changed over to electricity. Referring to the textile industry the borough electrical engineer and manager (Mr. R. H. Harral) states that 72 of the 83 mills in the area now take a supply in some proportion from the undertaking; fifteen are completely electrified for power and lighting and negotiations are in progress for the conversion of ten others.

Apart from the bulk supply to Darwen the undertaking last year sold 98.4 million kWh, an increase of 17 per cent compared with 1945-46; under the domestic rate sales advanced by no less than 47 per cent to a total of 33.3 million kWh. Illustrating the more intensive use of electricity, it is recorded that since 1939 consumption per head of the population (excluding bulk, street lighting and traction supplies) has risen from 307 to 714 kWh, while the average quantity of electricity sold per consumer has increased from 1,357 to 2,532 kWh.

Extensions at the power station were formally inaugurated on March 7th last. During the

year 353.4 million kWh was generated against 230.0 million in the preceding year and only a little over 33 million in 1939. The 40,000-kW set commissioned in December, 1945, was in service for 7,774 hours and generated 261 million kWh.

Total revenue rose from £445,572 to £502,778 and working costs from £350,249 to £423,414. The net profit was much the same as in the previous year at £15,701, but of this amount £13,243 (against £2,278) was required for renewals, etc., out of revenue. The average price per kWh sold fell slightly (from 1.080d. to 1.045d.). The engineer remarks that some tariffs are not carrying a fair proportion of the increased costs.

Lincoln.—The engineer and manager (Mr. F. Newey) states in his annual report that progress with the generating station has not been as satisfactory as desired and it has been necessary to amend the "target" date for the new plant to be in commission. The first machine cannot be ready before the autumn and the second machine and boilers will not be available before 1948. Apart from the bad weather last winter civil work has been delayed by shortage of reinforcement steel, also bricks, and the plant manufacturers have been held up for steel plates and pipework.

In 1946-47 the Department itself generated 18.6 million kWh against 13.1 million in the previous year, with a maximum load of 10,869 kW (10,710 kW). Sales in the area aggregated 56.5 million kWh (51.6 million) at an average price of 1.008d. (1.033d.). Total income amounted to £244,881 (£229,122) and working expenses were £215,434 (£190,024). There was a net profit of £8,037.

Scunthorpe.—Schemes in hand for developing the distribution system represent a total capital expenditure of over £200,000. The 1946-47 report of the borough electrical engineer and manager (Mr. H. Peace) records a further large expansion in industrial power supplies (10 million kWh out of a total increase of nearly 13 million kWh), making the aggregate sales for the year 91.2 million kWh. This compares with little more than 6 million ten years ago. Referring to the growing amount of installation work carried out by the Department, the engineer says that if a separate section were set up to take on any class of installation work it would render a service and assist the Department's revenue.

Gross income amounted to £315,334 (against £289,065), working expenses were £283,910 (£254,747) and the net result after payment of all charges was a profit of £11,557 (£14,496). The average price received per kWh sold was only 0.793d.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Electrical Switchgear & Associated Manufacturers, Ltd., in its report for the year ended March 31st last shows loan interest from subsidiary company of £3,167, plus fees £2. After providing for tax of £1,143, directors' fees and administrative expenses there is a net profit of £1,399 (against £19,087). The subsidiary company, Brookhirst Switchgear, was engaged throughout the year in substantial reorganization of production and shows only a small profit, and has not declared any dividend. In these circumstances, the directors do not recommend any ordinary dividend (against 20 per cent), and after payment of the preference dividend, the balance carried forward is £15,614 (against £17,378 brought in).

Ultra Electric (Holdings), Ltd.—At the annual meeting the chairman, Mr. E. Rosen, said that the production of television receivers had been handicapped by the short supply of certain essential components. This difficulty was now being overcome and production had commenced. Their communication control equipment was in use in many British air liners.

Mirrlees Watson Co., Ltd.—Reviewing the company's activities at the annual meeting, Mr. D. M. Semple (chairman and managing director) said that their condensing and pump departments had contracts in hand for power stations both in this country and abroad; one of particular interest was the pumping plant for the Loch Sloy hydro-electric scheme.

The Mid-Wales Electric Power Co., Ltd., reports income from dividends receivable, etc., in 1946 of £1,740 against £1,687 in 1945. After payment of directors' fees and debenture interest there remains a profit of £49 (£109), and £249 (£200) is carried forward.

Newton Brothers (Derby), Ltd., report a net profit for the year 1946-47 of £16,046, as compared with £14,759 for the preceding year. The dividend for the year is maintained at 17½ per cent and the special bonus of 7½ per cent is repeated.

London Associated Electricity Undertakings, Ltd., has announced an unchanged interim dividend of 2½ per cent.

The Midland Electric Corporation for Power Distribution, Ltd., is paying an interim dividend of 3 per cent (same).

The Greengate & Irwell Rubber Co., Ltd., is maintaining its interim dividend at 7½ per cent.

British Vacuum Cleaner & Engineering Co., Ltd.—We stated in our last issue that the dividend for the year was 26½ per cent. This was due to a misreading of the report which announced a final dividend of 20 per cent. In

the previous year there was an interim dividend of 6½ per cent, although the total for the year was 20 per cent; no interim was paid for 1945-46.

The Globe Telegraph & Trust, Ltd., reports a net revenue for the year ended June 30th last of £197,003, as compared with £215,118 for the previous year. The final ordinary dividend is 2 per cent, again making 5 per cent, tax free, for the year. The balance carried forward is £171,454 (against £151,923 brought in).

James Howden & Co., Ltd., show a net profit for the year ended April 30th last of £257,932, as compared with £180,554 for 1945-46. The final dividend is 22½ per cent, making 30 per cent, less tax, for the year (against 17½ per cent).

Gabriel, Wade & English, Ltd., are increasing the total distribution for the year from 10 to 12½ per cent, including a bonus of 5 per cent (4 per cent). The net profit for the year was £123,487 (against £99,342).

The Ceara Tramway, Light & Power Co., reports a net revenue for the year to June 30th, 1946, of £7,174 (against £9,550). The loss on the year of £10,088 (£13,539) increases the debit carried forward to £32,076.

The Northampton Electric Light & Power Co., Ltd., is paying an unchanged interim dividend of 4 per cent.

The Rushden & District Electric Supply Co., Ltd., has announced an interim dividend of 4 per cent (unchanged).

Falk, Stadelmann & Co., Ltd., are again paying an interim dividend of 10 per cent.

New Companies

James Scott & Co. (Electrical Engineers), Ltd.—Registered in Edinburgh July 28th. Capital, £100,000. To acquire the business of electrical engineers, etc., carried on by James Scott & Co., in Dunfermline, Perth, Edinburgh, Glasgow and elsewhere. Directors: I. Sclar and A. S. Thomson. Regd. office: 97, Campbell Street, Dunfermline.

N. Wallis, Ltd.—Registered July 31st. Capital, £5,000. To acquire the business of an electrical engineer and contractor now carried on by Neville Wallis at 403, High Street, Lincoln, as N. Wallis. Directors: N. Wallis, Margaret D. J. Wallis, H. O. Moss and Dorothy J. W. Moss. Regd. office: 100a and 100b, High Street, Lincoln.

Increases of Capital

South Wales Switchgear, Ltd.—Capital increased by £240,000, in £1 ordinary shares, beyond the registered capital of £10,000. The company was converted from "private" to "public" on June 12th, 1947.

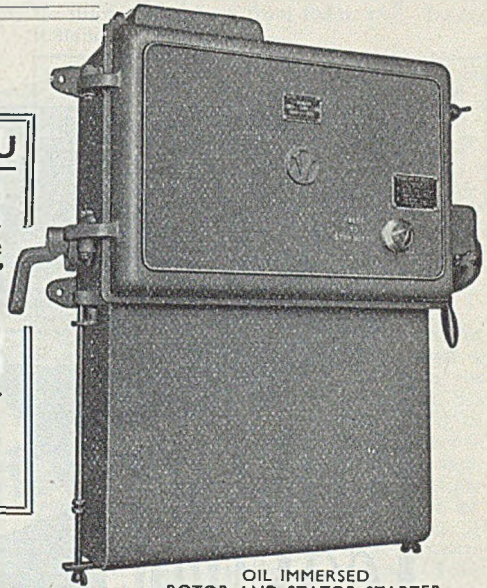
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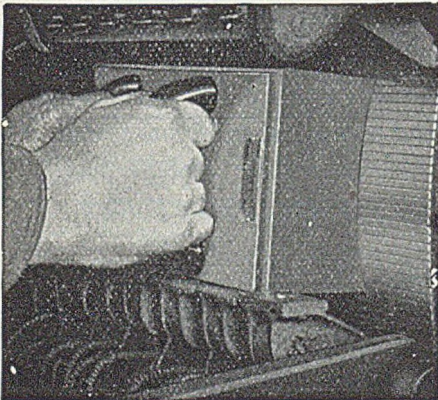
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STOCKS AND SHARES

STOCK Exchange markets are settling down after the disturbances brought about by what is now generally called the "Economic Crisis," when heavy falls occurred in all the leading departments. The Government's plan, as it became unfolded in the Commons debate, failed to bring any material measure of satisfaction, and although a fairly considerable recovery occurred from the lowest prices touched during the Stock Exchange slump, hesitation and caution continue to be felt in regard to the outlook. It is at this season of the year, when business is quiet in the Stock Exchange, that advantage is taken of the opportunity to set out a comparison of current prices with those which obtained at the beginning of the year.

Electrical Equipment

The national importance of increased supplies of electrical generating plant and equipment has helped the shares concerned to give a performance above the average. The following table shows, however, that the losses on the year are fairly substantial, although Associated Electrical Industries stand out as an exception to the general rule :—

Ordinary	Jan.2nd	Aug.8th	Rise or Fall
Assoc. Elec. Ind. ..	74/-	91/3	+ 17/3
B.I. Callender's ..	46/6	42/-	- 4/6
Crompton Parkinson (5s.)	33/-	28/-	- 5/-
English Electric ..	67/-	57/-	- 10/-
Ever Ready (5s.) ..	50/6	37/6	- 13/-
General Electric ..	102/-	87/-	- 15/-
Henley's (5s.) ..	29/-	25/-	- 4/-
Johnson & Phillips ..	85/-	75/-	- 10/-
Siemens ..	38/-	33/9	- 4/3

Extending the scope of comparison a little further, here are other examples of the slump's effect in this group :—

Ordinary	Jan.2nd	Aug.8th	Fall
Automatic Tel. & El. ..	76/3	62/6	13/9
Cossor, A. C. (5s.) ..	34/6	23/-	11/6
Crabtree (10s.) ..	48/-	42/6	5/6
Elec. & Musical (10s.) ..	26/-	21/9	4/3
Elec. Constrn. ..	65/-	55/-	10/-
Enfield Cable ..	53/6	43/3	10/3
Eriasson (5s.) ..	56/3	43/9	12/6
Lancs. Dynamo ..	6	5½	12/6
Mather & Platt ..	58/9	50/-	8/9
Reyrolle ..	80/-	73/9	6/3
Westinghouse Brake ..	80/9	67/6	13/3

Communication Stocks

Cable & Wireless stockholders still await a settlement of the compensation negotiations, and, thereafter, a decision about the future of the Holding Company. As the following table of communication stocks shows, speculative attention has swung, during the interval, towards the ordinary rather than the preference stock. The former has been as high as 184 against the present 155. In February, it dipped to 125. Lively speculation in the Eastern Tele-

graph Company's 3½ per cent preference lifted the price of the stock from 103 to 153. To-day it stands at 114 :—

Stock or Share	Jan.2nd	Aug.8th	Rise or Fall
Anglo-Amer. pref. ..	148½	135½	- 13
Cable & Wireless pref. ..	128½	116	- 12½
Ditto, ord. ..	130	155	+ 25
Great Northern ..	38	34½	- 3½
Marconi Marine ..	33/6	30/-	- 3/6

British Electric Traction deferred stock started this year at 1240. The price has been up to 1425 and now is quoted at about 1215.

Week's Changes

Since the days immediately preceding the big debate, industrial share prices have had a measure of success in pulling out from the previous week's headlong dive, and the list has been relieved here and there by evidences of recovery. Apart from a further modest decline in A.E.I., to 91s. 3d., most of the leading electrical equipment shares have held their ground. Lancashire Dynamos rallied to 53s. 8d. Crompton Parkinsons at 28s. and Cossors, at 23s., are each 1s. better. Among those to record lower levels are Plesseys, at 26s. 3d., Tube Investments, 6½, and Greenwood & Batley, 50s. Arons are down to 55s. 6d., Ever Ready to 37s. 6d., Pye to 25s. and E. K. Cole to 18s. 9d. Electricity supply shares show little change on the week, and L.P.T.B. stocks recovered after having fallen a point or more. Cable & Wireless stocks staged a conspicuous recovery on publication of the annual accounts. Among overseas issues, Calcutta Trams have dropped 5s. to 38s. 6d., and Calcutta Electrics 3s. 3d. to 40s. 6d.

Indian Development Plans

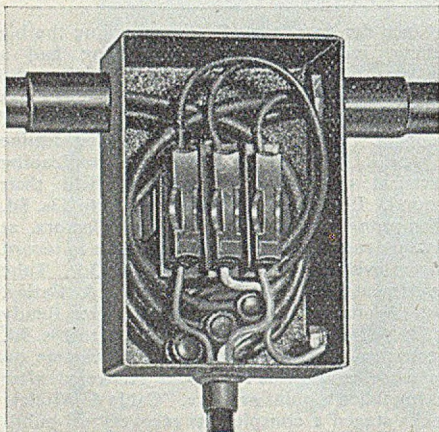
POWER projects both hydro and thermal in India have been reviewed by an Advisory Planning Board. The various electrical projects at present under consideration are expected to increase India's total installed generating capacity (about 1,250,000 kW) by about 950,000 kW in five years. Even if this increase is achieved (which is doubtful) it will, in the Board's opinion, be inadequate. It is considered that more projects should be surveyed and planned as soon as possible, so that later on designing and construction may not be held up. The Board stresses the importance of making adequate arrangements for training young Indian engineers. A feature of the water power developments, particularly in the south, is the high-head installations which they involve. Along the Western Ghats, hydro-electric systems operate under heads ranging from 1,500 to 1,800 ft while in the south there is one installation with a head of no less than 3,000 ft, one of the highest in the world. Along the northern boundaries of India, hydro-electric possibilities are described as immense.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Fused Tee-boxes

A CONDUIT accessory that can be used to facilitate the tapping of power wiring has been introduced by the BOWTHORPE ELECTRIC CO., LTD., Goodtric Works, Brewer Street, Oxford. It is a fused tee-box of pressed steel, with a lid secured by two screws, of light weight and adaptable for wall mounting. It is



Fused tee-box with oil-insulated line taps

drilled for 1 in. main cable entry and exit and 0.75 in. for the tee outlet through a Hellermann tension grommet for two, three, or four core flexible cable, or a gland, a hexagon-headed brass bush and socket being recommended for conduit.

A feature is the insulated line tap (*Electrical Review*, January 10th, 1947, p. 87) for making the tee connection without cutting the line conductors, which is fully shrouded and will accommodate 7/064 to 7/029 in. cables.

Boxes for 5 and 15 A at 250 V measure 6 by 4 by 3 in. and the 30 A at 500 V size is 7 by 5 by 3.75 in.; they contain "Slydlok" rewirable fuse holders with flash barriers between and the largest box can be alternatively supplied with h.r.c. cartridge fuses. An insulating switch is recommended at the outlet terminal of the tee branch.

Miniature Circuit Breaker

A small circuit breaker, the "Klipin," has been introduced by A.E.W., LTD., High Street, Edgware, Middlesex, for protecting lighting circuits, tools and similar small motor-driven appliances. It is operated by a thermal trip on sustained overload, the time delay thus provided preventing actuation by the current

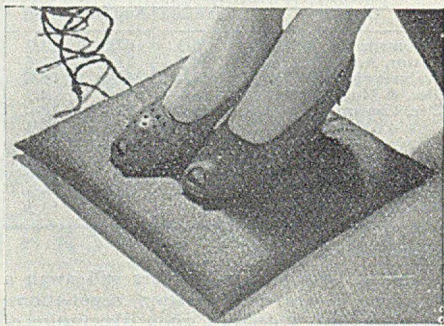
rush at starting. The small mass of the tripping mechanism minimizes the effects of vibration, it cannot be held closed against a fault and must be withdrawn for re-setting.

Standard sizes are for 2½, 5, 10 and 15 A, weighing 4 oz, the dimensions being 3½ by 1½ by 2 in. An "on-off" shutter indicator is visible through an aperture in the moulded casing, which can be supplied for surface or flush mounting.

A three-pin (round) plug and socket outlet incorporating a similar miniature circuit breaker within the same case is also available. Movement of the "loose" handle provides a switch action without needing to withdraw the plug and the self-returning linkage permits the casing to be mounted in any position. The tripping current is adjustable and delayed action can be provided. Models are supplied for 0.25-1 A; 1-3 A; 3-8 A; or 10-15 A (not interlocked) in a wood case with bakelite cover for surface or semi-sunk mounting, or completely iron-clad with screwed conduit entries.

Foot Warmer

A foot warmer for use on mains, which is cushion-like and so may also be useful as a local applicator of heat, is announced by TRUSTFUL PRODUCTS, LTD., 100, St. Martin's Lane, London, W.C.2. Called the "Selectra," it is loaded to 60 W at 200-250 V and has a built-in thermostat with radio-interference suppressor. The element is embedded in glass cloth and the "one-sided" arrangement enables the top surface to reach a temperature of 130 deg F while the bottom remains cool, so avoiding the risk of damaging the floor covering.



"Selectra" foot-warming pad

The soft pad has a plastic leathercloth cover, which is washable and waterproof. The dimensions are 12 by 13 by 12.5 in. and weight 2 lb 2 oz. Coloured models for special voltages can be supplied to order.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1941

J. LUCAS, Ltd., H. C. Gibson and E. A. Watson.—"Means for automatically co-ordinating the movements of separate electrically actuated mechanisms." 2213. February 18th, 1941. (590636.)

1942

General Electric Co., Ltd., and E. Friedlander.—"Systems of high tension conductors." 10738. July 31st, 1942. (590545.)

H. A. H. Boot, J. T. Randall and C. S. Wright.—"High frequency electrical oscillators." 12354. September 2nd, 1942. (590546.)

R. H. V. M. Dawton and C. S. Wright.—"High frequency electrical oscillators." 12628. September 8th, 1942. (590547.)

M. L. E. Oliphant and C. S. Wright.—"High frequency electrical oscillators." 15574. November 4th, 1942. (590549.)

1943

British Thomson-Houston Co., Ltd.—"Coating compositions." 4315. March 25th, 1942. (590680.)

Westinghouse Electric International Co.—"Apparatus for stabilizing a body member pivotally mounted on a supporting structure." 9886. November 23rd, 1940. (590682.) "Driving mechanisms." 9887. September 27th, 1941. (590683.)

Ferranti, Ltd., A. L. Chilcot and W. Bertwistle.—"Mounting of electrode assemblies in electric discharge tubes." 12090. July 24th, 1943. (590550.)

J. D. Cockcroft, W. A. S. Butement, A. E. Kempton, F. J. M. Farley and C. H. Vollum.—"Radio locating apparatus." 14057. August 27th, 1943. (590593.)

C. J. Hirschler and W. G. Campbell.—"Welding electrode coating compositions." 19074. November 16th, 1943. (590726.)

1944

Western Electric Co., Inc.—"Electric discharge apparatus particularly for the generation of high potentials." 3107. February 5th, 1941. (590594.)

Brush Development Co.—"Piezoelectric devices." 10689. January 18th, 1943. (590688.)

Birlec, Ltd. (Kuhlman Electric Co.).—"Electric furnaces." 13671. July 18th, 1944. (590650.)

Svenska Turbinfabriks Aktiebolaget Ljung-

strom.—"Speed regulating device especially for electrical generators driven by steam or gas turbines." 17246. October 30th, 1943. (590731.)

Sperry Gyroscope Co., Inc.—"Ultra-high-frequency discriminator apparatus." 13764. April 2nd, 1943. (590692.)

British Thomson-Houston Co., Ltd.—"Methods of producing organo-silicon compounds." 18520. September 27th, 1943. (590654.)

British Thomson-Houston Co., Ltd., and H. de B. Knight.—"Hermetically sealed spark gaps." 19040. October 4th, 1944. (590656.)

A. West & Co., Ltd., and J. Coupar.—"Variable resistance devices." 19271. October 7th, 1944. (590560.)

British Thomson-Houston Co., Ltd.—"Electric contact elements." 19417. October 8th, 1943. (590561.)

Standard Telephones & Cables, Ltd.—"Radio locating and signalling systems." 21519. November 6th, 1943. (590701.)

Bendix Aviation Corporation.—"Electrical means for reproducing motion." 22219. May 28th, 1943. (590564.)

Veritys, Ltd., and J. W. Forth.—"Fluorescent electric lighting fittings." 22831. November 17th, 1944. (590615.)

General Electric Co., Ltd., H. C. Turner and J. F. Veevers.—"Attenuator devices for signal generators." 25022. December 13th, 1944. (590568.)

Standard Telephones & Cables, Ltd.—"Radio navigational system." 25592. September 6th, 1943. (590620.)

General Electric Co., Ltd., R. L. Breadner, H. G. Jenkins and C. H. Simms.—"Electric discharge lamps." 256324. December 21st, 1944. (5907035.)

Western Electric Co., Inc.—"Signal translating devices." 25828. December 28th, 1943. (590572.)

1945

A. C. Cossor, Ltd., L. H. Bedford, and D. A. Bell.—"Electric tuning apparatus." 109. January 2nd, 1945. (590574.)

British Thomson-Houston Co., Ltd., and F. A. Tuck.—"Automatic arc striking devices for carbon arc lamps." 644. January 8th, 1945. (590710.)

Westinghouse Electric International Co.—"Process of preparing resinous reaction products from polyhydroxy benzenes and formaldehyde." 1041. January 21st, 1944. (590622.)

English Electric Co., Ltd., H. S. Carnegie and H. Dolan.—"Means for controlling the speed of electric motors." 2241. January 29th, 1945. (590576.)

Hazeltine Corporation.—“Wave-signal transmitting and receiving system of the radar type.” 2307. February 19th, 1944. (590711.)

H. D. Wheeler and P. A. H. Mossay.—“Control of electric hoisting motors for hoisting machinery.” 2458. January 31st, 1945. (Cognate application 2892/46.) (590578.)

General Electric Co., Ltd., and J. T. Caldwell.—“X-ray projection apparatus.” 3314. February 9th, 1945. (590580.)

Plessey Co., Ltd. (P. R. Mallory & Co., Inc.).—“Electro-magnetic vibratory interrupters.” 3350. February 9th, 1945. (590581.)

Western Electric Co., Inc.—“Telegraph systems.” 4200. February 21st, 1944. (590631.)

Allmanna Svenska Elektriska Aktiebolaget.—“Rolling mills for rolling strip or wire material.” 4346. March 20th, 1944. (590739.)

Pye, Ltd., and K. N. Hawke.—“Electric pick-ups.” 4695. February 24th, 1945. (590669.)

Marconi's Wireless Telegraph Co., Ltd., and L. G. Watkins.—“Electromagnetic switching devices.” 5051. February 28th, 1945. (590584.)

Landis & Gyr Soc. Anon.—“Apparatus for counting and measuring electric current impulses.” 6732. March 27th, 1944. (590674.)

G. W. B. Electric Furnaces, Ltd., and G. Turner.—“Electric furnaces, kilns and ovens.” 7918. March 29th, 1945. (590675.)

Nelco, Ltd., and R. J. Froud.—“Construction of commutators.” 8600. April 6th, 1945. (590747.)

Plessey Co., Ltd.—“Vibratory electro-magnetic interrupters.” 9416. May 26th, 1944. (590752.)

Pirelli-General Cable Works, Ltd., and H. Barron.—“Manufacture of coils or windings formed from electrically insulated wires.” 9424. April 16th, 1945. (590753.)

Dubilier Condenser Co. (1925), Ltd. (W. Dubilier).—“Electrical condensers.” 9539. April 17th, 1945. (590757.)

Union Special Machine Co.—“Electronic sewing machine.” 9650. September 15th, 1944. (590761.)

Marconi's Wireless Telegraph Co., Ltd.—“Thermionic valve oscillation generators.” 9741. April 19th, 1944. (590764.)

British Electrical & Allied Industries Research Association, A. Butterworth, A. Turney and E. R. A. Patents, Ltd.—“Measurements of magnetic fields.” 9743. April 18th, 1945. (Addition to 562735.) (590678.)

Compagnie de Produits Chimiques et Electro-metallurgiques Alais, Froges & Camargue.—“Electric furnace.” 9962. August 19th, 1941. (590769.)

Westinghouse Electric International Co.—“Control apparatus for a gun or other body pivotally movable about an axis in relation to a mounting.” 18614. November 23rd, 1940. (Divided out of 590681.) (590722.)

Palestine's Overseas Trade

Increased Electrical Imports in 1946

THE accompanying table gives the values of the principal electrical imports into Palestine last year with a note of increases, which occurred throughout, compared with 1945.

Type of Equipment	1946 £P.	Inc. or dec. on 1945 £P.
Electrical machinery for light and power	43,400*	+ 18,400
Parts thereof	211,000*	+ 167,500
Insulated pipes and lead pipes for electric wiring	1,500	+ 1,100
Dry batteries	1,600	+ 1,600
Insulated cable and wire, lead-covered	34,000*	+ 29,400
Insulated cable and wire, other not exceeding 9 sq mm cross section	73,000*	+ 58,600
Ditto, exceeding 9 sq mm cross section	49,700*	+ 40,000
Electric cooking stoves	10,900	+ 10,800
Electric glow lamps exceeding 16 V	132,500	+ 114,900
From United Kingdom	54,000	†
“ Belgium	9,700	†
“ Holland	64,200	†
Electric light fittings	16,100	+ 15,040
Electric lamps not exceeding 16 V	8,100	+ 5,400
Electric meters	23,700	+ 18,300
Electric refrigerators	66,800	+ 66,300
Ditto parts	41,500	+ 15,900
Radio sets	384,200	+ 378,000
From United Kingdom	291,000	†
“ Holland	62,000	†
“ Italy	16,000	†
“ United States	11,200	†
Radio parts	31,300	+ 14,400
Electrical apparatus n.e.s.	152,800	+ 144,300
From United Kingdom	125,000	†
“ Italy	12,000	†
“ United States	8,000	†
Other electrical goods	137,700	+ 99,100

* Mainly from United Kingdom.

† Comparative figures not available.

Palestine's exports of electrical goods in 1946 totalled £P21,700 compared with £P56,700 in 1945, the principal item being “pipes for wiring” valued at £13,000 (£20,000 in 1945).

Export Inquiries

WE have received the undermentioned inquiries from firms and individuals overseas who wish to secure agencies for British electrical equipment and appliances or to import them into their territories. We shall be glad to pass on to them replies received from readers, which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references:—

Iraq.—A Baghdad firm of import agents urgently needs supplies of v.i.r. and lead-covered wire, batten holders, 5-A switches, 10-A fuses, a.c. meters, voltmeters (0-250 V) and ammeters (15-50A.) (X.188).

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Barking.—August 25th. Electricity Department. 10/15-cwt electric vehicle. (August 8th.)

Birkenhead.—September 15th. Electricity Department. One 80-kW mercury arc rectifier equipment. (August 1st.)

Castle Ward.—August 25th. R.D.C. Electrical installations in forty houses at Dinnington; engineer, 7, North Road, Ponteland, Newcastle-on-Tyne.

Cheadle & Gatley.—August 25th. Electricity Department. Two 500-kVA and one 600-kVA oil-cooled transformers. (August 8th.)

Halifax.—September 1st. Electricity Department. Transformers. (August 1st.)

Hull.—August 29th. Electricity Department. Diesel-driven loco shunting crane. (See this issue.)

Iraq.—The Crown Agents for the Colonies invite tenders on behalf of the Iraq Government for 12 Diesel-driven generating sets. (August 1st.)

Middlesbrough.—September 19th. Electricity Department. Transformers, circuit breaker and oil break isolators and substation type distribution feeder panels. (See this issue.)

Newport (Mon.).—August 29th. Corporation. Electrical installations in houses on the Gaer Estate. (See this issue.)

New Zealand.—October 31st. South Canterbury Power Board, Timaru. Peak-load control and metering gear, by superimposed ripple-frequency system or otherwise.

November 4th. Hydro-Electric Department. Turbines and generators for Cobb River power station (Contract 37) and electric travelling crane and motors (Contract 38). Tenders Committee, Wellington.

Norwich.—August 25th. Town Council. Two portable electrically-driven centrifugal pumps; S. N. Kelly, City Hall.

Stoke Newington.—August 25th. Electricity Department. E.h.v. and l.v. cables. (August 8th.)

Stoke-on-Trent.—September 10th. Electricity Department. Four 15,000-kVA transformers. (August 8th.)

Orders Placed

Manchester.—Housing Committee. Accepted. Electrical installation in 12 flats, Greenwood Road.—A. E. Sudlow & Co.

Newcastle-on-Tyne.—Education Committee. Accepted. Installation of electric lighting at "Eastcliffe" (£239).—Robson & Coleman.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashington (Northumberland).—Houses (150); B. Preston, surveyor, U.D.C. Offices.

Bardsey (Leeds).—County primary school (£30,911); West Riding architect, County Hall, Wakefield.

Berwick.—Eighty Airey type houses for the T.C.; borough engineer.

Birkenhead.—Communal factory, Duke Street, for Corporation; A Ernest Shennan, North House, North John Street, Liverpool.

Bishop Auckland.—Houses (96) on the St. Helen's housing site for the U.D.C.; M. C. Robson, architect, Station Chambers.

Technical College; County Education Committee architect, Durham.

Bolton.—Extensions to model bakery, Back-o'-th'-Bank and Hertford Street, Warburton's, Ltd.; George & Beddowes, builders, Valletts Lane.

Cardiff.—Works at Llanishen for Brocklehurst-Whiston Amalgamated, Ltd., Macclesfield; Sir Percy Thomas & Son, 14, Cathedral Road.

Factory, Collingdon Road, for Lionite Specialities, Ltd.; Hayes & Griffiths, 98, Queen Street.

Chester.—Development for houses, Bronygarth Estate, Liverpool Road; Thomas Warrington & Sons, Ltd., 84, Station Road, Ellesmere Port.

Colindale.—Extensions to works of Duple Motor Bodies, Ltd., Edgware Road; Welch & Lander, 38, Gloucester Place, W.1.

Cowdenbeath.—Factory for Disabled Persons Employment Corpn., Ltd.; John Best (Edinburgh) Ltd., Warriston House, Edinburgh.

Cumberland.—Clinic at Egremont for the C.C.; county architect, 4, Alfred Street North, Carlisle.

Deptford.—Foundry at Croft Street; Trafalgar Engineering Co., Ltd., Primus Works, Croft Street.

Dorchester.—Egg packing station, Weymouth Avenue; Co-operative Wholesale Society, Ltd., 99, Leman Street, E.1.

Durham.—Additions to Durham County Hospital; F. W. Goodyear & Son, builders, 60, Claypath.

Two blocks at School, Aycliffe Mental Colony for the C.C. (£34,000); county architect, Shire Hall.

Eastbourne.—Block of 12 flats, Ceylon Place; W. Morley-Park, 40, Lushington Road.

Edinburgh.—New garage & offices (£25,000) for Moir & Baxter, Comely Bank.

Gateshead.—Bus station at the Team Valley; Gordon Durham, Ltd., Boldon Lane, East Boldon, Co. Durham.

Glasgow.—Four tenements, 32 houses, at Deanstown Drive and James Gray Street; George M. & W. Reid.

Factory for Cremola Food Products, Ltd.; T. S. Cordiner, 261, West George Street.

Four-storey bakery at Lancefield Quay and Finnieston Street, for Bilsland Brothers, Ltd.; manager.

Gosforth.—Block of 24 flats in William Street for the U.D.C.; W. Jackson, builder, Audley Road, Gosforth.

Gwyrfa.—Traditional houses (46) and Airey houses (24), for R.D.C.; D. Henry Roberts, housing architect, Cwellyn, Caernarvon.

Hampstead.—Flats (64), Well Walk, for Borough Council; C. Miskin & Son, Ltd., builders, Romeland, St. Albans.

Harrow.—Central depot and garage, Elmgrove Road (£40,490); U.D.C. surveyor, Uxbridge Road, Stanmore.

Easiform houses (180), Elstree Hill, for U.D.C.; J. Laing & Son, Ltd., building contractors, Mill Hill, London, N.W.7.

Hebburn-on-Tyne.—Houses (38), Lambley Crescent, for the U.D.C.; Page, Son & Hill, architects, 75, King Street, South Shields.

Hove.—Extensions to factory for H. J. Green & Co., Ltd., Portland Road; architects, Overton & Massey, 38-39, West Street, Brighton.

Huntingdon.—Factory, St. Peter's Road; Acoustical Manufacturing Co., Ltd., Ermine Street.

Jarrow-on-Tyne.—Pickle factory for Seery & Co.; G. Henderson, Boldon Lane, East Boldon.

New bakery & dairy for Jarrow & Hebburn, Co-operative Society, Ltd., Albert Road.

Extensions to factory for Morgan Crucible Co., Ltd.; Spence & Price, St. Mary's Place, Newcastle-on-Tyne.

Factory for British Crepe Makers & Paper Products, Ltd. (£63,000); Middleton & Co., builders, Blackpool and Darlington.

Keighley.—Extensions to factory for Thos. Wilson (Keighley), Ltd., Low Bridge Mills.

Kidsgrove.—Factory at Talke Cross Roads; G. H. Heath & Co., Ltd., Brook Mill, Sandbach, Cheshire.

Kilmarnock.—Factory in Mill Street (£66,000) for Saxone Shoe Company; manager.

Stores and other buildings (£10,000) for Blackwood, Morton & Sons, Ltd., carpet manufacturers; manager.

Manchester.—Works at Trafford Park for Beck & Pollitzer, Ltd.; W. Hall & Son, Ltd., builders, 60, Christian Street, Liverpool.

Rebuilding warehouse, Mosley Road, Trafford Park, Port of Manchester Warehouses, Ltd.; F. Riley, 284, Corn Exchange Buildings, Manchester.

Cooked meats factory, Hulme; J. H. Dewhurst, Ltd., Smithfield, E.C.1.

Maryport.—Factory for E. J. Peirce (London), Ltd.; West Cumberland Industrial Development Co., Ltd., 30, Roper Street, Whitehaven.

Newburgh (Fife).—Houses (22), for Town Council; L. A. Rolland, architect, Leven, Fifeshire.

Newburn.—Factory for company making glass bulbs; W. Moss & Co., St. Mary's Place, Newcastle.

Newcastle-on-Tyne.—Extensions for Brady & Martin, manufacturing chemists, Northumberland Road; Newcombe & Newcombe, Eldon Square.

Mineral water factory, Tweed Street, for the C.W.S.; C.W.S. Building Department, West Blanford Street.

Permanent brick houses (55), West End; city architect.

Eight houses and shops; Wrethan Place; city architect, 18, Cloth Market.

Block of 18 flats at Gosforth; R. W. Bell & Co., New Mills, Barrack Road.

Large additions in City Road including development and research department for T. Hedley & Co., Ltd., Collingwood Street, Newcastle; own architects.

Pontypridd.—Factory for Steinberg & Co. (London & South Wales), Ltd.; E. Taylor & Co., Ltd., builders, Pontypridd.

Ringwood.—Completion of new buildings at Linford Sanatorium, for Bournemouth Corporation (£141,260); borough architect, Town Hall, Bournemouth.

Saddleworth.—Houses (42), Delph Estate, for U.D.C.; J. H. Tyson & Co., Ltd., builders, Victoria Saw Mills, Oldham.

Seaham Harbour.—Additional classrooms at the senior school; W. Wigham & Son, Ethel Terrace, Castletown, Co. Durham.

Seaton Valley.—Houses (42) at Backworth for the U.D.C.; Tate & Holmes, builders, Benwell.

Shildon (Co. Durham).—Factory for Prescrete, Ltd.; J. Walter Hanson & Son, Northumberland Street, Newcastle-on-Tyne.

Shoreham.—Houses (80), Stoney Lane, Kingston-by-Sea; J. Dunn, U.D.C. surveyor, 31, John Street.

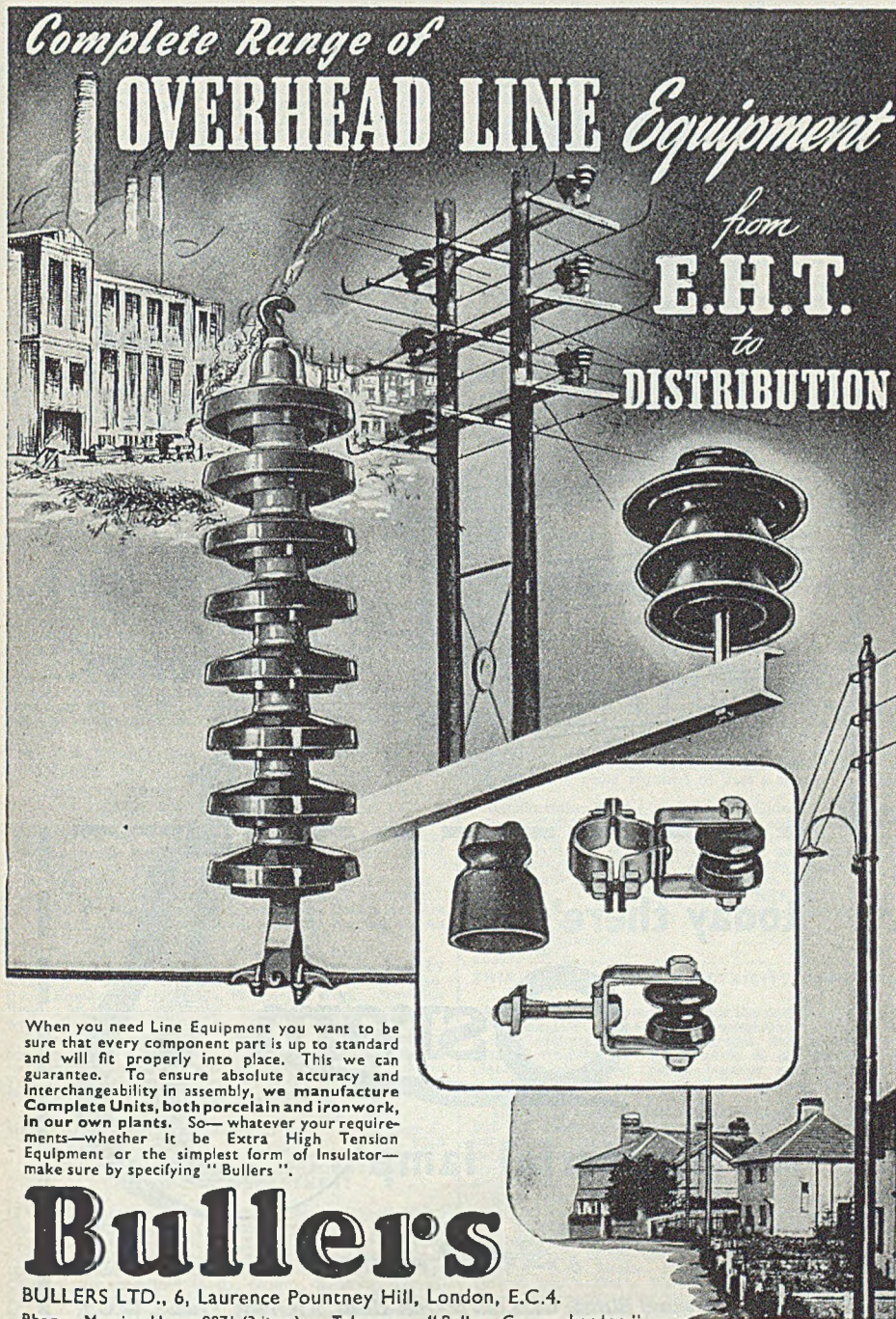
Stretford.—Flats (44), Firs Farm Estate, for T.C.; P. Hamer, Ltd., builders, Swinton.

Wallsend.—Factories on new trading estate for Henderson Brothers, London, W. Moss & Co., Newcastle, Doig Brothers, Newcastle, and Walnut Cabinet Co., Ltd.; Matkin & Hawkins, estate architects, Barclays Chambers, Fawcett Street, Sunderland.



Complete Range of OVERHEAD LINE Equipment

from
E.H.T.
to
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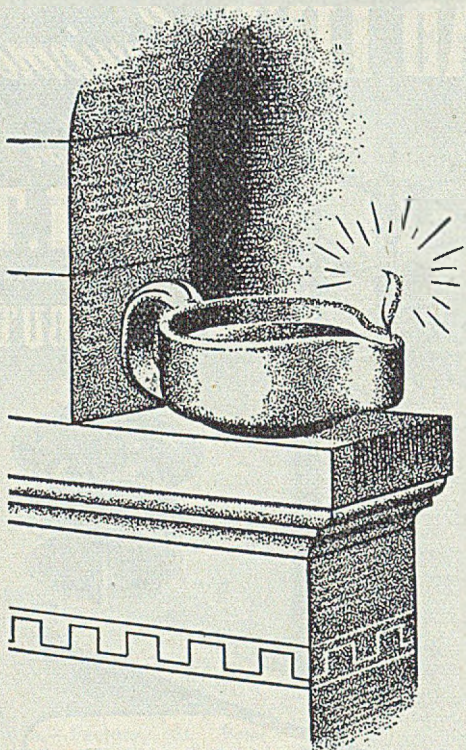
When you need Line Equipment you want to be sure that every component part is up to standard and will fit properly into place. This we can guarantee. To ensure absolute accuracy and interchangeability in assembly, we manufacture Complete Units, both porcelain and ironwork, in our own plants. So—whatever your requirements—whether it be Extra High Tension Equipment or the simplest form of Insulator—make sure by specifying "Bullers".

Bullers

BULLERS LTD., 6, Laurence Pountney Hill, London, E.C.4.

Phone: Mansion House 9971 (3 lines). Telegrams: "Bullers, Cannon, London."

THE MARCH OF LIGHT

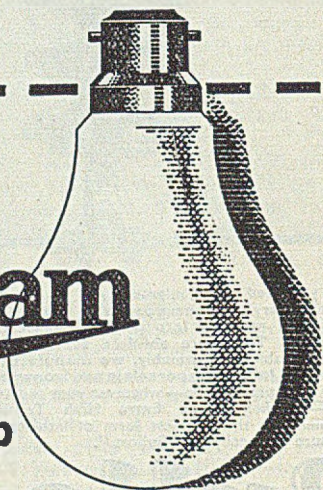


*The Romans
only had
terra-cotta
lamps to light
their houses...*

today there's

Osram

the wonderful lamp



A **S.E.C.** PRODUCT

Advt. of The General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2.

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENTS for insertion in the following Friday's issue are accepted up to **First Post on Monday**, subject to space being available, and should be addressed to Classified Advertisement Department, Dorset House, Stamford Street, London, S.E.1. **THE CHARGE** for advertisements in this section is 2/6 per line (approx. 7 words) per insertion; **ONLY OFFICIAL AND GOVERNMENT ANNOUNCEMENTS CAN NOW BE DISPLAYED**:—35/- per inch. Where the advertisement includes a Box Number this counts as six words and there is an additional charge of 6d. for postage of replies. **SITUATIONS WANTED**.—Three insertions under this heading can be obtained for the price of two if ordered and prepaid with the first insertion.

Original testimonials should not be sent with applications for employment.

OFFICIAL NOTICES, TENDERS, ETC.

COUNTY BOROUGH OF NEWPORT

Tenders for Electrical Installations in Houses on the Gaer Estate, Newport

THE Newport Corporation invite tenders from qualified electrical contractors for the provision of Electrical Installations in 334 houses on the Gaer Estate, Newport, Mon. Copies of the specifications and drawings giving full particulars of the work to be done, and all further information on the matter, can be obtained on application to Mr. T. H. Wood, M.I.Mech.E., A.M.I.E.E., Borough Electrical Engineer and Manager, Electric House, Dock Street, Newport, Mon.

A deposit of £1 ls. is payable for one copy of the specification with drawings, and, provided a bona fide tender has been submitted, this deposit will be returned after the contract has been placed. All cheques should be made payable to the Borough Treasurer, Newport (Mon.) Corporation, and should be crossed.

Tenders and accompanying documents must be enclosed in a sealed cover, which must not bear any name or mark indicating the sender. This cover must be addressed to the undersigned and endorsed in the top left-hand corner "Tender for Electrical Installations, Gaer Estate," and sent through the post so as to be delivered not later than 10 a.m. on the 29th August, 1947. No tender received after that date will be considered, and the Corporation do not bind themselves to accept the lowest or any tender.

T. MERVYN JONES,

Town Hall, Newport, Mon. Town Clerk. 3160
1st August, 1947.

COUNTY BOROUGH OF MIDDLESBROUGH ELECTRICITY DEPARTMENT

TENDERS are invited for the supply and delivery, against the Department's requirements over a period of two years, of:—

- 250-kVA, 3-phase, 11,000-v. Indoor Transformer.
 - 500-kVA, 3-phase, 11,000-v. Indoor Transformer.
 - Oil and compound filled, metal-clad Circuit Breaker and oil break Isolators, suitable for use on an 11,000-volt system.
 - Substation Type Distribution Feeder Panels.
- Specification and form of tender may be obtained by applying to Mr. Harry Haigh, M.I.E.E., Borough Electrical Engineer, Corporation Electricity Works, Snowdon Road, Middlesbrough, stating which specification is required.

Sealed tenders endorsed "Tender for ———," but not bearing any name or mark indicating the sender, should be delivered to the undersigned not later than 9 a.m., Friday, 19th September, 1947. The Corporation does not bind itself to accept the lowest or any tender.

E. C. PARR,

Municipal Buildings, Middlesbrough. Town Clerk. 3113
1st August, 1947.

KINGSTON-UPON-HULL CORPORATION ELECTRICITY DEPARTMENT

THE Corporation are open to purchase a Diesel-driven Loco. Shunting Crane, capable of lifting 5 tons at 16 ft. radius to 14 tons at 35 ft. radius; jib 35 ft.; suitable for operating a Priestman ring discharge single chain operated grab, for handling coal, 34-27 c. ft. capacity. Offers to be submitted to the General Manager, Ferensway, not later than noon on 29th August, 1947, in a plain envelope giving no indication of sender and endorsed "Tender for Loco. Crane." 3152

REPLIES TO advertisements published under a Box Number if not to be delivered to any particular firm or individual should be accompanied by instructions to this effect, addressed to the Manager of the **ELECTRICAL REVIEW**. Letters of applicants in such cases cannot be returned to them. The name of an advertiser using a Box Number will not be disclosed. All replies to Box Numbers should be addressed to the Box Number in the advertisement, c/o **ELECTRICAL REVIEW**, Dorset House, Stamford Street, London, S.E.1. Cheques and Postal Orders should be made payable to **ELECTRICAL REVIEW LTD.** and crossed.

METROPOLITAN BOROUGH OF STOKE NEWINGTON ELECTRICITY DEPT.

TENDERS are invited for the supply and delivery of E.H.T. and L.T. paper-insulated Mains Cables, also for excavation and laying of cables for a period of one year ending 30th September, 1948.

Form of tender, specification and general conditions of contract may be obtained from J. P. Tanner, Esq., A.M.I.E.E., Borough Electrical Engineer, Electricity Department, Edwards Lane, London, N.16.

Tenders, in plain sealed envelopes endorsed "Tender for Cables and Cable Laying" must be delivered to the undersigned not later than noon on Monday, 25th August, 1947. The Council does not bind itself to accept the lowest or any tender.

C. KENT WRIGHT, Town Clerk. 3035
Town Hall, Stoke Newington, N.16.

SITUATIONS VACANT

EAST GRINSTEAD U.D.C. ELECTRICITY DEPT.

Junior Mains Assistant

APPPLICATIONS for the above post are invited from persons having a good general and technical education, and experience in underground mains, high and low tension, and substations, including all repairs.

The appointment will be subject to the N.J.B. Schedule and Conditions of Service, Class B, Grade 8b. The appointment will be terminable by one month's notice on either side, and will be subject to the provisions of the Local Government Superannuation Act, 1937, the successful candidate being required to pass a medical examination.

Applications, to be made in candidate's own handwriting, stating age, married or single, general and technical training, experience, etc., with two copies of recent testimonials, to be delivered to the undersigned in a plain envelope endorsed "Junior Mains Assistant" by the first post on Wednesday, 27th August, 1947.

L. R. BENNETT, Clerk to the Council.

East Court, College Lane, East Grinstead, Sussex. 3162

TRINIDAD & TOBAGO ELECTRICITY COMMISSION

APPPLICATIONS are invited for the position of Resident Engineer to the above Commission. Duties will include supervision of construction and erection programme consisting of the erection of one steam power plant, Diesel power plant, outdoor substations, high voltage transmission lines and low voltage distribution lines.

Applicants must be fully qualified engineers, preferably but not necessarily civil engineers with considerable experience in the construction of power stations, etc., particularly with reference to foundations, concrete constructions, the setting out and erection of large steel buildings and structures. Age limit 40 years.

Basic salary \$4,800 B.W.I. (£1,000) per annum, rising in three years to \$5,520 B.W.I. (£1,150) per annum, plus temporary cost-of-living bonus of \$48 B.W.I. (£10) per month.

Full details of the conditions of appointment may be obtained from Messrs. Preece, Cardew & Rider, 8-10, Queen Anne's Gate, Westminster, London, S.W.1, to whom all applications must be addressed, endorsed "Resident Engineer, Trinidad," and delivered not later than noon on Friday, 12th September, 1947. 3043

CITY OF LIVERPOOL ELECTRIC SUPPLY DEPT.

Chief Technical Engineer

APPPLICATIONS are invited for the appointment of Chief Technical Engineer in the Electric Supply Department. Applicants must have had a sound engineering training, hold a university degree in engineering, and be Corporate Members of the Institution of Electrical Engineers and/or the Institution of Mechanical Engineers. Wide practical experience in the design and construction of modern generating stations and distribution systems, the preparation of plans and specifications, and the handling of large contracts, including commissioning and testing of plant, is essential. The person appointed will be required to pass a medical examination and to reside within the city.

The salary will be in accordance with Grade M3 of the National Joint Board Schedule, the commencing salary at present being £954 rising to £996 per annum.

The appointment will be subject to the Local Government Superannuation Act, 1937, and to the Standing Orders of the City Council, and will be determinable by three calendar months' notice in writing on either side.

Applications, on the appropriate form, which may be obtained from the City Electrical Engineer, 24, Hatton Garden, Liverpool, 3, must be accompanied by a covering letter in the candidate's own handwriting, together with a copy of three recent testimonials, and must be enclosed in a sealed envelope endorsed "Chief Technical Engineer," and forwarded so as to reach the undersigned not later than the first post on 20th September, 1947.

Candidates serving in H.M. Forces abroad need not complete the official form of application, but may submit direct applications within the date specified, giving particulars of age, education, qualifications and experience, and three names as references; the number of applicant's release group and probable date of release should also be stated. Canvassing of members of the City Council, either directly or indirectly, will be a disqualification.

THOMAS ALKER,

Municipal Buildings, Liverpool, 2. Town Clerk. 3164

COUNTY BOROUGH OF PRESTON
ELECTRICITY UNDERTAKING

Appointment of Senior Shift Charge Engineer

APPPLICATIONS are invited from suitably qualified engineers for the position of Senior Shift Charge Engineer (shift duties) at the Ribble Generating Station.

Candidates must have had practical experience in the operation and maintenance of modern high-pressure power station plant, and possess sound technical knowledge. Membership of the Institution of Electrical or Mechanical Engineers will be an added qualification. Salary and conditions of employment will be in accordance with the National Joint Board Schedule, Class J, Grade 7, at present £563 rising to £589 per annum.

The selected candidate will be required to pass a medical examination and contribute to the Council's Superannuation Scheme under the provisions of the Local Government Superannuation Act, 1937.

Applications, stating age and giving full particulars of technical qualifications, training and experience, accompanied by not more than three testimonials, and endorsed "Senior Shift Charge Engineer," should reach the undersigned not later than Saturday, 23rd August, 1947.

G. A. ROBERTSON,
M.Sc.(Tech.), M.I.E.E., M.I.Mech.E.,
Borough Electrical Engineer.

40/41, Lune Street, Preston. 3154

METROPOLITAN BOROUGH OF FULHAM
ELECTRICITY DEPARTMENT

Assistant Planning Engineer (Boiler House)

THE Council invites applications for the position of Assistant Planning Engineer (Boiler House) in their Base Load Power Station from candidates not over 40 years of age, to assist in the planning and inspection of the maintenance of the power station, with particular reference to the boiler house. Education up to Inter-B.Sc. standard required.

Salary in accordance with the National Joint Board Schedule, Class M, Grade 9a, at present £501 18s. p.a.

Forms of application and conditions of appointment may be obtained on sending stamped addressed foolscap envelope to the undersigned, to whom completed applications must be returned not later than noon on the 26th August, 1947.

CYRIL F. THATCHER,

Town Hall, Fulham, S.W.6. Town Clerk. 3123

COUNTY BOROUGH OF STOCKPORT
ELECTRICITY DEPARTMENT

Mains Shift Inspector

APPPLICATIONS are invited for the above position with the Stockport Corporation Electricity Department. Candidates should be well experienced in the installation, operation and maintenance of E.H.T. Switchgear, Transformers and Low Tension Networks, and able to carry out fault location. Possession of the Higher National Certificate or its equivalent would be considered an advantage. The commencing salary will be Class H, Grade 8a, of the National Joint Board Schedule, at present £455 per annum, rising by two biennial increments to £476 per annum.

Applicants must state in their application whether, to their knowledge, they are related to any member of, or the holder of any senior office under the Council. A candidate who fails to do so shall be disqualified for such appointment and, if appointed, shall be liable to dismissal without notice.

The appointment is subject to the provisions of the Local Government Superannuation Acts, and the successful candidate will be required to pass a medical examination.

Applications, together with not more than three recent testimonials, should be enclosed in a plain sealed envelope endorsed "Mains Shift Inspector" and addressed to The Chairman of the Electricity Committee, Electricity Offices and Showrooms, 23, Tiviot Dale, Stockport, to be received not later than first post on Saturday, 23rd August, 1947.

W. R. ALLCOCK, M.I.E.E., M.I.Mech.E.,
23, Tiviot Dale, Borough Electrical Engineer.

Stockport. 3157
31st July, 1947.

STRETFORD AND DISTRICT ELECTRICITY BOARD

Assistant Consumers' Engineer

APPPLICATIONS are invited from persons who have had experience in the Consumers' Department of an Electricity Undertaking and are familiar with the installation and testing of lighting, heating and power on consumers' premises. A sound knowledge of the regulations, domestic appliance maintenance, preparation of specifications and estimates is required. Knowledge and experience of sales organisation, meter installation and testing and consumers' records would be a recommendation. Candidates should have had a good general education, and engineering education up to the standard of the Higher National Certificate, and must be able to deal with correspondence, interview consumers and control staff.

Salary and conditions will be in accordance with Grade 8a, Class H, of the N.J.B. Schedule, carrying a salary commencing at £455 rising to £476 per annum.

The selected candidate will be required to pass a medical examination and contribute to the Board's Superannuation Scheme in accordance with the provisions of the Local Government Superannuation Act, 1937.

Applications in writing, stating full particulars of education, training, qualifications and experience, together with copies of testimonials, should be forwarded to the undersigned not later than 30th August, 1947.

H. G. BELL,
Trafford Power Station, M.Sc.(Tech.), M.I.E.E.,
Trafford Park, Manchester, 17. 3150

METROPOLITAN BOROUGH OF FULHAM
ELECTRICITY DEPARTMENT

Assistant Progress Engineer (Temporary)

THE Council invites applications for the position of Temporary Assistant Progress Engineer in their Base Load Power Station from candidates not over 40 years of age, with a good general engineering knowledge and a proved personal contact with the chief executives of the large manufacturing concerns of this country. The position involves continual travelling.

Salary in accordance with the National Joint Board Schedule, Class M, Grade 10c/10, at present £375 13s./£454 13s. per annum, according to experience and ability.

Forms of application and conditions of appointment may be obtained on sending stamped addressed foolscap envelope to the undersigned, to whom completed applications must be returned not later than noon on Tuesday, 2nd September, 1947.

CYRIL F. THATCHER,

Town Hall, Fulham, S.W.6. Town Clerk. 3173
August, 1947.

GOVERNMENT OF BURMA

APPPLICATIONS are invited from British subjects for the appointments of (a) Deputy Chief Engineer, and (b) Three Resident District Officers in the office of the Burma Electricity Supply Department.

Qualifications, for post (a): University degree in Electrical Engineering or equivalent, Corporate Membership of Institution of Electrical Engineers, extensive practical knowledge of overhead and underground E.H.T. transmission and L.T. distribution, including preparation of specifications, schemes and estimates, and site direction of labour. Experience of hydro-electric, steam and off Diesel generation. Preference given to candidates with knowledge of commercial electricity supply in a tropical country and of rural distribution.

For posts (b): Age preferably not over 40. Higher National Certificate or equivalent qualification in Electrical Engineering, and qualified for Corporate Membership of the Institution of Electrical Engineers; experience of commercial electricity supply, preferably of a large undertaking supplying rural areas, and ability to set up and control district organisation.

Terms (for appointees of non-Asiatic domicile): For post (a): Contract for five years with pay at fixed rate of Rs. 2,000 per mensem. For posts (b): Three-year contract with fixed per mensem rate of pay between Rs. 750 at age 23 and Rs. 1,700 at age 40, according to age on appointment. Free return passages for appointees and their families. Leave. Provident fund. Gratuity.

Further particulars and forms of application on request by postcard, quoting No. 345, from the High Commissioner for India, General Department, India House, Aldwych, London, W.C.2. Last date for receipt of completed applications, 5th September, 1947.

Terms for candidates of Asiatic domicile available on application. 3129

COUNTY BOROUGH OF OLDHAM
ELECTRICITY DEPARTMENT

APPPLICATIONS are invited for the post of Showroom Assistant (Male). Applicants should be over 20 years of age, of good general education, and preferably have some knowledge of electrical salesmanship. Previous experience in an electricity showroom will be an advantage.

Salary according to age and in accordance with the General Division of the scale of the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services, plus current cost-of-living bonus. The appointment will be subject to the provisions of the National Scheme of Conditions of Service, the Local Government Superannuation Act, 1937, and to satisfactory medical examination.

Canvassing in any form will disqualify, and candidates are required to disclose in their applications whether they are related to any member or senior officer of the Council.

Applications, suitably endorsed, stating age, details of education and experience, and accompanied by copies of not more than three recent testimonials, should be addressed to the Chief Engineer and Manager, Corporation Electricity Department, Greenhill Offices, Oldham, and reach him not later than the first post on Monday, the 25th August, 1947.

H. CLARKE,

Deputy Town Clerk.

Town Hall, Oldham.
7th August, 1947.

3100

BOROUGH OF LUTON ELECTRICITY
UNDERTAKING

Cost Clerk

APPPLICATIONS are invited for the position of Cost Clerk at a salary in accordance with the National Joint Council Scale, Clerical Division, commencing at £315 per annum and rising by annual increments to £360 per annum, plus cost-of-living bonus at present £59 16s. per annum.

Applicants should have had considerable experience in costing methods, preferably in the electricity supply industry.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected applicant will be required to pass a medical examination.

Applications, giving age, details of training, experience and present position, accompanied by copies of recent testimonials, to be sent not later than 29th August, 1947, to C. T. Melling, M.Sc. (Tech.), M.I.E.E., M.I.Mech.E., Borough Electrical Engineer, Electricity Offices, St. Mary's Road, Luton, Beds. Canvassing, directly or indirectly, will disqualify.

W. H. ROBINSON,

Town Clerk.

Town Hall,
Luton, Beds.

3137

SHEFFIELD CORPORATION ELECTRICITY DEPT.

Appointment of Junior Technical Assistant

APPPLICATIONS are invited for the position of Junior Technical Assistant. The duties relate principally to communication, control and supervisory equipment, but will also include other work of a technical character. Applicants must have a sound technical training, and preferably possess technical qualifications admitting to corporate membership of the Institution of Electrical Engineers. They should have had experience in technical work relating to electricity supply, including automatic telephone equipment, lines and cables.

The salary will be in accordance with Class M, Grade 9a, of the National Joint Board Schedule, at present commencing at £478 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and candidates must have previous Local Authority service carrying a transfer value within the meaning of the Act, or otherwise be not more than 40 years of age. The selected applicant will be required to undergo a medical examination. The conditions of service will be those of the National Joint Board and the practice ruling in the office of the Sheffield Corporation Electricity Department.

Applications, on a form to be obtained from the undersigned, are to be returned to me not later than the 20th August, 1947. Canvassing or any communication with a member of the Council, either directly or indirectly, is prohibited, and will be a disqualification.

JOHN R. STRUTHERS,

General Manager

Commercial Street,

Sheffield, 1.

August, 1947.

3149

PONTYPRIDD U.D.C. ELECTRICITY DEPT.

APPPLICATIONS are invited for the following appointments:

(a) **TECHNICAL ASSISTANT** who will be responsible for the work entailed in planning and carrying into effect a scheme for the change-over of the main distribution system from D.C. to A.C. Applicants should be fully conversant with all phases of change-over work and should possess a University Degree and/or Corporate Membership of the Institution of Electrical Engineers, or hold an equivalent qualification. The salary will be in accordance with the N.J.B. Scale, Class C, Grade II, at present £483/£509 per annum.

(b) **MAINS FOREMAN** to take charge of all classes of E.H.T. and L.T. underground and overhead mains, and who should also have had experience in erection and maintenance of substation equipment. Applicants should be qualified tradesmen and be able to supervise labour. Wages and conditions as set out in the N.J.B. Schedule for the Electricity (Supply) Industry, rate 2s. 10d. to 3s. per hour according to experience.

Both appointments are subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidates will be required to pass a medical examination.

Applications, stating age, qualifications, experience and appointment at present held, accompanied by copies of two recent testimonials, to be sent to the undersigned not later than Thursday, 4th September, 1947.

H. LEONARD PORCHER,

Clerk of the Council.

Municipal Buildings,

Pontypridd, Glam.

7th August, 1947.

3161

MERSEY POWER COMPANY LIMITED
DISTRIBUTION DEPARTMENT

APPPLICATIONS are invited for the following positions:

(1) **TECHNICAL ASSISTANT** to Mains Engineer. Applicants should be Corporate Members of the Institution of Electrical Engineers and be fully experienced in the design, maintenance and testing of large E.H.T. and L.T. networks, substation switchgear and protective systems. Salary and conditions of employment in accordance with N.J.B. Scale, Class J, Grade 6.

(2) **JUNIOR ASSISTANT** to Mains Engineer. Applicants should be Graduate Members of the Institution of Electrical Engineers (or hold equivalent qualifications) and should have recent experience in the distribution department of an electricity supply undertaking. Salary and conditions of employment in accordance with N.J.B. Scale, Class J, Grade 9.

Applications, stating age, qualifications and particulars of past experience and present position, together with two testimonials, should be received not later than 25th August, 1947.

J. E. NELSON,

Engineer and Manager.

Frodsham,
Cheshire.

3107

CITY OF LANCASTER ELECTRICITY DEPT.**Assistant Power Station Superintendent**

APPPLICATIONS are invited for the appointment of Assistant Power Station Superintendent at Caton Road Generating Station, Lancaster. Candidates must have had a sound technical training and practical experience in the manufacture, erection or maintenance of steam electric generating plant. In addition, they must have considerable experience in the control of skilled workmen, particularly in the more important trades involved in power station maintenance, and must themselves have extensive practical experience of these trades.

The salary will be in accordance with Grade 5 of the National Joint Board Schedule. The station is at present Class H, so that the initial salary is £620 per annum rising to £641 per annum.

Applications in writing, giving full details of the candidate's age, whether single or married, general education, engineering education, practical training and subsequent experience, together with copies of three recent testimonials, should be addressed to the City Electrical Engineer, "Electricity," North Road, Lancaster, not later than Monday, 18th August, 1947. Canvassing, either directly or indirectly, will disqualify the applicant. Applicants should state whether or not they are related to any member or senior officer of the Council.

R. M. MIDDLETON,

Town Hall, Lancaster.

Town Clerk.

24th July, 1947.

2962

**COUNTY BOROUGH OF SOUTHEND-ON-SEA
ELECTRICITY DEPARTMENT**

APPPLICATIONS are invited for the following appointments from persons under 35 years of age. The appointments are subject to the Local Government Superannuation Act, 1937, and the persons selected will be required to pass medical examinations.

(1) **CONSTRUCTIONAL ENGINEER** (Mains and Substations). Salary, Class G, Grade 6 (£540/£550/£561) of the N.J.B. Schedule.

(2) **SENIOR DEMONSTRATOR**. Applicants should hold a Diploma in Domestic Science; the E.A.W. Certificate in Electrical Housecraft will be an advantage. Salary, A.P.T. 2 of the National Scales (£360-£405), plus war bonus, at present £48 2s. per annum.

Further particulars of each of the above appointments and forms of application may be obtained from the Borough Electrical Engineer and Manager, Electric House, London Road, Southend-on-Sea. Applications must be received at that address not later than 26th August, 1947. Canvassing will disqualify.

ARCHIBALD GLEN,

Municipal Buildings,

Town Clerk.

Southend-on-Sea.

3080

**METROPOLITAN BOROUGH OF FULHAM
ELECTRICITY DEPARTMENT****Clerks (Clerical Division)**

APPPLICATIONS are invited for a number of Senior Clerks in the Clerical Division of the National Joint Council Scheme of Conditions of Service, on the established staff of the Electricity Department, the salary scale being as follows:—

Males: Commencing at £335 and rising to a maximum of £380 per annum by three annual increments of £15, plus present cost-of-living bonus of £59 16s. p.a.

Females: Commencing at £268 and rising to a maximum of £304 per annum by three annual increments of £12, plus present cost-of-living bonus of £48 2s. p.a.

Forms of application and conditions of appointment may be obtained on sending stamped addressed foolscap envelope to the undersigned, to whom completed applications must be returned not later than 12 noon on Tuesday, the 26th August, 1947.

C. F. THATCHER,

Town Hall,
Fulham, S.W.6.

Town Clerk.

3124

UNIVERSITY COLLEGE OF SWANSEA

THE Council of the College invites applications for the post of Laboratory Assistant in the Department of Engineering, who will be required to act as Steward in the Engineering Laboratories. Experience in radio construction work would be an advantage. Wages £5 per week rising by annual increments of 5s. per week to a maximum weekly wage of £6.

Applications (stating age and experience), together with copies of two recent testimonials, should be forwarded to the Registrar, University College, Singleton Park, Swansea.

2820

BOROUGH OF ERITH ELECTRICITY DEPT.**Appointment of Deputy Borough Electrical Engineer**

APPPLICATIONS are invited for the position of Deputy Borough Electrical Engineer and Manager at a salary in accordance with Class G, Grade 1, of the National Joint Board Schedule of Salaries, commencing at £875 per annum, plus a car allowance in accordance with the Council's regulations.

Applicants must be Corporate Members of the Institution of Electrical Engineers or equivalent standard and have had a sound technical education, and technical, administrative and commercial experience of a progressive electricity undertaking.

The appointment will be subject to the Local Government Superannuation Act, 1937, and to a satisfactory medical examination.

Applications are to be submitted in the appropriate form, which may be obtained from the Borough Electrical Engineer and Manager, Electricity Offices, Pier Road, Erith, and must be returned, together with three recent testimonials, so as to reach the undersigned not later than Monday, 1st September, 1947. Canvassing will be a disqualification.

J. A. CROMPTON,

Council Offices, Erith, Kent.

Town Clerk.

6th August, 1947.

3151

BOROUGH OF REIGATE ELECTRICITY DEPT.**Assistant Mains Engineer**

APPPLICATIONS are invited for the position of Assistant Mains Engineer. Candidates must have the Higher National Certificate in Electrical Engineering (or equivalent qualification) and possess experience in the installation of L.T., H.T. and E.H.T. cables, transformers and switchgear.

Salary in accordance with Class E, Grade 8a, N.J.B. Schedule, No. 9 Area, at present £387 per annum, plus £30 per annum (car allowance). The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the person appointed will be required to pass a medical examination.

Applications, stating age, training, qualifications and experience, accompanied by three copies of recent testimonials, must reach me by the first post Saturday, 30th August, 1947, and must be endorsed "Assistant Mains Engineer." Canvassing, directly or indirectly, will disqualify.

HEBER DAVIES,

Town Hall, Reigate.

Town Clerk.

1st August, 1947.

3114

**MANCHESTER MUNICIPAL COLLEGE OF
TECHNOLOGY**

(Faculty of Technology in the University of Manchester)

Appointment of Lecturer in Electrical Engineering

THE Governing Body invites applications for a Lectureship in Electrical Engineering, with the title and status of Lecturer in the University of Manchester. Candidates should have had experience of modern radio communication work, and will be expected to initiate and supervise research in this subject.

Present salary scale £550 per annum rising by annual increments of £20 to £725 per annum. Commencing salary according to qualifications.

Conditions of appointment and form of application may be obtained from the Registrar, College of Technology, Manchester, 1. The last day for the receipt of applications is Thursday, 4th September, 1947. Canvassing, either directly or indirectly, will disqualify a candidate for appointment.

J. E. MYERS, Principal of the College.

3096

**BEDFORD CORPORATION ELECTRICITY
UNDERTAKING****Switchboard Attendant**

APPPLICATIONS are invited for the position of Switchboard Attendant at the Council's Selected Generating Station in accordance with the N.J.B. Conditions of Employment at the rate of 2s. 8½d. per hour.

Applications, stating age, giving particulars of training and experience, together with copies of recent testimonials, should be forwarded to the undersigned, suitably endorsed, not later than the 28th August, 1947.

P. G. CAMPING,

Electricity Offices,

Chief Engineer and

Prebend Street, Bedford.

General Manager.

23rd July, 1947.

3003

NORTH-WEST MIDLANDS JOINT ELECTRICITY AUTHORITY

APPPLICATIONS are invited for the following vacancies:
TWO LINESMEN (Overhead Power). Applicants should have had experience in the construction and maintenance of E.H.T. and L.T. overhead lines and service.

TWO FITTERS (Electrical). Applicants should have had experience in the maintenance of E.H.T. oil circuit breakers and transformers.

Conditions of service and rate of pay in accordance with N.J.I.C., Zone A, at present: 29d. per hour (Linesmen); 30d. per hour (Fitters). The appointment will be subject to the passing of a medical examination for the purposes of the superannuation scheme.

Application forms and lists of duties can be obtained from the undersigned on application in writing, and applications must be received not later than first post on Monday, 25th August, 1947.

F. FAVELL,

Chief Engineer and Manager.
 York Chambers,
 Kingsway, Stoke-on-Trent.

31st July, 1947. 3159

CITY OF PETERBOROUGH CORPORATION

Showroom Assistant

APPPLICATIONS are invited for the position of Showroom Assistant (Male or Female). The salary and conditions of service will be in accordance with the General Division of the National Joint Council for Local Authorities. The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating age, details of education, training and experience, and accompanied by copies of two recent testimonials, should be delivered in an envelope endorsed "Showroom Assistant" to the City Electrical Engineer, Albert Meadow, Peterborough, not later than Wednesday, the 20th August, 1947.

ARTHUR J. REEVES,

Town Clerk.
 Town Hall, Peterborough.
 1st August, 1947. 3163

METROPOLITAN BOROUGH OF FULHAM ELECTRICITY DEPARTMENT

Assistant Technical Engineer (Temporary)

THE Council invites applications for the position of Temporary Assistant Technical Engineer in their Base Load Power Station from candidates not over 45 years of age, capable of preparing estimates and designing new layouts of all types of mechanical plants encountered in a generating station.

Salary up to £600 per annum inclusive, according to experience and ability.

Forms of application and conditions of appointment may be obtained on sending stamped addressed foolscap envelope to the undersigned, to whom completed applications must be returned not later than noon on Tuesday, 2nd September, 1947.

CYRIL F. THATCHER,

Town Clerk.
 Town Hall,
 Fulham, S.W.6.
 August, 1947. 3172

LONDON POWER COMPANY LIMITED

Senior Control Room Operator

APPPLICATIONS are invited from men having experience in the control of large electric supply systems and paralleling of large turbo-generators. Applicants must have received a sound technical training and had good general engineering experience.

Salary would be in accordance with the E.P.E.A. Schedule, Grade 9, Class K; the successful candidate would be required to pass a medical examination in order to qualify him for the Company's Pension Scheme.

Applications, stating age, qualifications and experience and enclosing copies of testimonials, should be addressed to: Superintending Engineer, Deptford East Generating Station, London Power Company Limited, Stowage Wharf, Deptford, S.E.8. 3171

RUNWELL HOSPITAL, NR. WICKFORD, ESSEX

MAINTENANCE Electrician required. Must be first-class all-round man, experienced in maintenance of A.C. and D.C. equipment. Age not to exceed 40 years. Appointment subject to the Asylums Officers' Superannuation Act, 1909, and to the Committee's Sick Pay Regulations. Applications to the Resident Engineer. 3099

CITY OF LANCASTER ELECTRICITY DEPT.

Assistant Shift Charge Engineer

APPPLICATIONS are invited for an Assistant Shift Charge Engineer at Clifton Road Generating Station. Salary in accordance with N.J.B. Schedule, at present Grade 9, Class II, £402 per annum.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the selected candidate will be required to pass a medical examination. Experience of operation of large boilers and general power station operation desirable.

Applications, stating age, qualifications and particulars of training and experience, also probable date on which duties can be taken up, together with copies of two testimonials, should be addressed to the City Electrical Engineer, "Electricity," North Road, Lancaster, not later than Monday, 18th August, 1947. Canvassing, either directly or indirectly, will disqualify the applicant.

R. M. MIDDLETON, Town Clerk.

Town Hall, Lancaster. 3083

COUNTY BOROUGH OF ROTHERHAM

APPPLICATIONS are invited for the position of Chemist in the Rotherham Corporation Electricity Department. Salary and terms of employment in accordance with the N.J.B. Schedule, Class J, Grade 7, at present £563 per annum.

Applicants should have experience with high-pressure steam-raising plant as installed in a modern generating station. The position is superannuable and the successful candidate will be required to pass a medical examination.

Applications, stating age, qualifications, training and experience, together with copies of recent testimonials, should reach the undersigned not later than Monday, 25th August, 1947, endorsed "Power Station Chemist." Canvassing members of the Council, whether direct or indirect, will disqualify any candidate.

W. H. DUFFETT,

Engineer and General Manager.
 Prince of Wales Power Station,
 Rawmarsh Rd., Rotherham. 3158

UNIVERSITY OF BIRMINGHAM

Faculty of Science

APPPLICATIONS are invited for the post of Lecturer (Grade IIc) in Electrical Engineering at a salary of £550-600 per annum. Duties to commence 1st October, or as soon as possible thereafter.

It will be advantageous if the qualifications of Candidates include those necessary for the teaching of Electronics.

Further particulars may be obtained from the undersigned, to whom applications (3 copies) with copies of testimonials should be submitted not later than 22nd September.

C. G. BURTON,

Secretary.
 The University,
 Edmund Street, Birmingham, 3.
 August, 1947. 3174

A man with a thorough knowledge of all types of electric cable, capable of handling sales of large quantities of this material. Must have had previous experience with a cable manufacturer.—Box 3105, c/o The Electrical Review.

A Senior Draughtsman experienced in the mechanical design and construction of turbo and engine-driven alternators. Good salary and prospects to suitable men. Please give full particulars of training and experience. Housing accommodation provided. Write—Box No. 354, 8, Serle Street, London, W.C.2. 137

APPPLICATIONS are invited from suitably qualified candidates for the following Middle Eastern area appointments: Electrical Engineer, with extensive theoretical knowledge and practical experience in H.T. and L.T. Diesel-driven generating stations, distribution and switchgear; also drawing office and general administrative practice. The possession of a good honours degree and/or full professional qualifications is an essential. Remuneration would be commensurate with age and qualities. Married applicants should be prepared for some initial period of family separation. Age limit 40. Write, quoting P.L.C.—Box 1847XY, c/o Charles Barker & Sons Ltd., 31, Budge Row, E.C.4. 3071

ARMATURE Winders and Improvers urgently required. Top rates and good conditions.—Box 113, c/o The Electrical Review.

ARMATURE Winders and Improvers urgently required. Top rates and good conditions.—Collins Electrical Ltd., 22, St. Alban's Place, London, N.1. 85

ASSISTANT Electrical Engineer for works in South Wales using plant which is at present mainly D.C. Prospects of promotion. Applicants should be experienced in maintenance and in planning A.C. and D.C. installations and distributing systems. Technical qualifications of at least Higher National Certificate standard are necessary, and the successful candidate will be required to pass a medical examination. Age limits 25-35 years. Applications, giving age and full particulars of training, experience and position now held, should be sent to—Box 756, L.P.E., 110, St. Martin's Lane, W.C.2. 3112

BRITISH Electricity Authority (Organising Committee). Applications are invited for the post of Secretary to the prospective British Electricity Authority. The post will carry a salary commensurate with the responsibilities, and provision will be made for superannuation. Candidates should have held a responsible administrative or executive position in a large-scale organisation, preferably associated with industry, and should state age, qualifications, experience, present salary and personal references. Applications, which will be acknowledged and treated as confidential, should be sent to—The Secretary, Organising Committee for the British Electricity Industry, c/o Ministry of Fuel and Power, 7, Millbank, London, S.W.1. 3148

BRITISH Engine Boiler & Electrical Insurance Co. Ltd., 24, Fennel Street, Manchester, 4. The company has vacancies for Electrical Plant Inspectors. Permanent positions carrying progressive salary scale £400 to £600, and non-contributory pension. Candidates, age not exceeding 33 years, with apprenticeship and experience in the manufacture, repair and industrial use of electrical machinery and technical education to at least Higher National Certificate standard, are invited to apply in own handwriting, stating age, qualifications, experience. 3122

CABLE Estimator with experience in the preparation of paper cable estimates both for home and abroad.—Aberdare Cables Ltd., Aberdare, Glam. 3184

CABLE Sales Representative for East Lancs and North Wales, by C.M.A. manufacturer. Must have held similar post. Applications will be treated in strict confidence. Write giving fullest particulars and experience.—Box 6350, c/o The Electrical Review.

CANADA. Rotating electrical machinery company in Montreal requires two first-class Electro-Mechanical Engineers for project development work. Must be good all-round and experienced engineers capable of investigating problems, developing new projects, doing original design, supervising through production D.O. and production teething troubles to a completed job. Write, giving education, experience in chronological order, age, include photograph, marital state and dependents, salary required, to—Box 2999, c/o The Electrical Review.

CHIEF of Test for organisation specialising in electronic measuring instruments. Sound theoretical training essential and at least three years' experience in technical executive position in telecommunication factory. Write, stating age, experience and salary required, to—Box 3094, c/o The Electrical Review.

CONTRACT Manager, capable of handling turbine and general electrical power plant contracts, by large electrical manufacturers' organisation in the Midlands. Administration ability first importance. Age 35/40. Salary according to qualifications. Particulars to—Box No. 387, 8, Serle Street, London, W.C.2. 2935

CROMPTON Parkinson have immediate vacancies in Yorkshire for Designer-Draftsmen of single-purpose machines for electric lamp and motor manufacture. Applicants should have good practical works and technical training and high-class experience in design of intricate automatic machinery. Exceptional opportunities and conditions for suitable men with initiative. Applications, giving age, full details of training and previous experience, to—Ref. WN, Crompton Parkinson Ltd., Guiseley, N. Leeds. 3116

DE Havilland Propellers Ltd, invite applications for the following vacancy: Draughtsman (design), with good working knowledge of electrical mechanism. Successful applicant will be required to work a 39-hour, 5-day week. Application should be made in writing, stating age, experience and salary required, to—The Personnel Manager, De Havilland Propellers Ltd., Hatfield, Herts. 11

DESIGNER, also Draughtsmen, for development of modern motor-driven domestic appliances. A great opportunity for experienced men of proved ability. Works located in N.W. England. Particulars to—Box 3186, c/o The Electrical Review.

DESIGNER-Draughtsman by West London Company of light engineers, to work in conjunction with development department on small electro-mechanical apparatus. Experienced man with a flair for creative design preferred.—Box 3192, c/o The Electrical Review.

DESIGNER-Draughtsman, Midlands, preferably with furnace experience, capable of initiating special designs. Salary commensurate with experience.—Box 6361, c/o The Electrical Review.

DESIGN Draughtsman required immediately for employment in South-East London area, with experience of high-speed mechanisms. Applications are invited from qualified draughtsmen who are desirous of advancement and willing to accept responsibility. Write, giving full particulars of age, experience, qualifications and present salary, to—Box 149, c/o The Electrical Review.

DESIGNING and Planning Engineer for factory in Cheshire engaged on light electrical winding and assembly. Sound previous experience essential. Reply, stating age, experience and salary to—Box 3104, c/o The Electrical Review.

DRAUGHTSMAN required, North London district. Applicants should have workshop and design experience in manufacture of electrical and scientific instruments. Age between 23 and 30 years. Apply, giving full particulars, to—Box 3060, c/o The Electrical Review.

DRAUGHTSMAN (Junior) required for drawing office, etc., essential. Salary £281 p.a.—General Manager and Chief Engineer, Woking Electric Supply Co. Ltd. 3153

DRAUGHTSMAN with some experience in light electrical engineering for work on prototype equipment in connection with television transmitters. Apply by letter only, stating age, qualifications and experience, to—The Director, Research Laboratories of the General Electric Co. Ltd., North Wembley, Middx. 3110

DRAUGHTSMEN! More heavy electrical plant is as urgent as more coal. Our drive to produce the equipment to generate and distribute more electric power needs Draughtsmen for the following classes of work:—
(a) Steam or Water Turbines. (b) Power Station arrangements. (c) Condensers and Feed Heaters. (d) Diesel Engines. (e) Water, Steam or Diesel Driven Alternators. (f) All types of Heavy Switchgear. (g) Transformers. (h) Rectifiers. (i) Winder and Rolling Mill Control Gear or Motors. Location of work:—
(a) (b) (c) (d) at Rugby. (e) (f) (g) (h) (i) at Stafford. (d) (f) (g) at Liverpool. Drawing office experience of products preferred, but those with good general mechanical and/or electrical D.O. experience are offered the opportunity to gain experience and help in this vital work. Security and good prospects for suitable men. All applications stating preference and full details of experience and technical training to—English Electric Co. Ltd., Queens House, Kingsway, London, W.C.2. 3188

DRAUGHTSMEN required by switchgear engineers. Experienced in contract work, protective gear diagrams or design. Applications in writing, with full particulars, to—Ferguson, Pailin Ltd., Manchester, 11. 86

DRAUGHTSMEN-Designers, by engineering organisation in West London. First-class senior mechanical and electrical design draughtsmen wanted, preferably with experience in radio and radar drafting. Salaries up to £500. A minimum of five years' drafting experience essential. Interesting work and excellent working conditions. Applications will be treated in strict confidence. Apply, giving age, fullest details experience, etc., to Chief Draughtsman.—Box 3133, c/o The Electrical Review.

EAST London Lighting Fittings Manufacturers have the following vacancies:—Foreman for assembly and electrical testing. Must have had experience of handling personnel and of modern production methods. Foreman for spraying and stoving department. Experience of bonderizing processes an advantage. Inspector for sheet metal and press department. A.I.D. experience an advantage. Well paid and permanent positions to the right men. Write, with full particulars and salary required, to—Box 3175, c/o The Electrical Review.

ELECTRIC lamp manufacturers require Representative with knowledge and experience of municipalities in Northern England. Write, with details of past experience, age, etc., to—Box No. A.B.642, c/o Central News, 17, Moorate, London, E.C.2. 3098

ELECTRICAL designer, familiar with aircraft requirements, to take charge of small electrical drawing office and switch, solenoid, etc., development work. Location, south-west town. State experience, age, qualifications and salary required.—Box 6322, c/o The Electrical Review.

ELECTRICIAN for large brickworks in Midlands. Permanent position at slightly more than A.E.U. rates. Apply, with fullest particulars of age, experience, etc., to—Box 6286, c/o The Electrical Review.

ESTIMATING Assistant wanted by prominent electrical contractors in London. Progressive position for ambitious man. Write, giving concise particulars of experience, age and salary required.—Box 3007, c/o The Electrical Review.

ESTIMATING department of industrial furnace manufacturers in Midlands, requires energetic, systematic and reliable Senior Estimator with good general mechanical, electrical and commercial knowledge, to supervise progression of estimates. Salary commensurate with experience.—Box 6362, c/o The Electrical Review.

ELECTRICIANS, skilled men only, used to first-class work. Continuous employment.—C. A. Newton & Co. Ltd., 19, St. James's Street, Derby. 3190

ESTIMATOR required for electrical contracting work. Must have experience of industrial installations.—The Midland Electric Installation Co. Ltd., Cyprus Works, Upper Villiers Street, Wolverhampton. 3032

FACTORY and Plant Layout Draughtsmen, preferably experience of large firm employing medium to heavy machines. Knowledge of electric power distribution, steam generation, normal water, gas and air services. Required in Stafford to handle work relating to above without supervision.—English Electric Co. Ltd., Queens House, Kingsway, W.C.2. 3182

FACTORY planning engineers require the following staff for their Guildford (Surrey) offices:—Circuit Diagram Draughtsmen for work on power station installations. Designer-Draughtsmen with experience of metal-clad switchgear and control gear, senior and junior required. Pleasant working conditions in expanding business.—Box 3195, c/o The Electrical Review.

FIELD Engineer/Agents required immediately for extensive electric distribution contracts in Scotland. Salary £400-£550 according to experience and qualifications, plus living allowance. Full particulars, age, etc., to—Box 3095, c/o The Electrical Review.

FITTINGS Manufacturers require capable Representative. Good scope for live man. Full details age, experience and salary required to—Box 6347, c/o The Electrical Review.

FLUORESCENT. Large manufacturers require Lighting Sales Engineers, about 30 years of age, for Scotland (Edinburgh), Lancashire and London, preferably already domiciled there. Matriculation and National Certificate E.E. preferred; lighting knowledge and sales experience an advantage. British nationality. Please state age, qualifications, experience and salary required to—Box 2921, c/o The Electrical Review.

FOREMAN Joiner. Used to H.T. and L.T. cable plumber-jointing. Good wages and prospects. Apply—R. J. Kemp & Co. Ltd., Coalville, Leicester. 6294

IMPERIAL Chemical Industries Ltd. Applications are invited for the positions of Shift Charge Engineers in the company's power stations in Runcorn and Widnes. Applicants, who should be between 30 and 45 years of age, must have had a sound practical and technical training in mechanical engineering and good experience of the shift operation of modern steam power station equipment, including turbo-alternators and water tube boilers of not less than 10,000 kW and 50,000 lb. steam/hour capacity respectively. Generous commencing salary. Applications, which must give the applicants' date of birth and full details of qualifications and experience, should be addressed to—The Staff Manager, I.C.I. Ltd., General Chemicals Division, Cunard Building, Liverpool. 3013

INSPECTOR required. Manufacture of field and armature coils for traction motors. Reply, stating age, experience and salary required to—Metropolitan-Vickers Electrical Co. Ltd., Attercliffe Common Works, Sheffield, 9. 3180

INSTRUMENT Transformer Engineer with experience in the design and manufacture of high and low tension transformers of all types, for use with instruments and protective gear. State age, experience and salary to—Chamberlain & Hookham Ltd., Solar Works, New Bartholomew Street, Birmingham, 5. 2903

JUNIOR Account Clerk (age 21) for electrical engineers. Write, giving full particulars, to—Box 6340, c/o The Electrical Review.

JUNIOR Draughtsmen, £250-£350, wide variety work. First-class prospects, apply letter only—Mackness & Shipley, Consulting Engineers, Parliament Mansions, Abbey Orchard St., S.W.1. 6365

LARGE manufacturers of domestic electrical appliances and lighting fittings have a vacancy for an experienced Executive to take charge of their sales head office located in Lancashire. Applicants, who must have sound commercial experience and organising ability, should apply (in confidence), giving full details of age, experience, present employment, etc., to—Box 3101, c/o The Electrical Review.

MANAGER, Switchgear Department. Applications are invited for the above appointment from engineers of superior qualifications and standing, who have had considerable experience in this branch of electrical engineering. The successful applicant will be responsible for the design, development and manufacture of the L.T. and H.T. switchgear products of the company. In view of the company's widespread home and export business, the appointment is one which offers considerable scope. Every assistance will be afforded in respect of any problems of change-over, such as housing. Applications, stating age, qualifications, experience and salary required, will be treated in strictest confidence, and should be addressed to the—Managing Director, Johnson & Phillips Ltd., Charlton, London, S.E.7. 3165

LONDON Passenger Transport Board. Applications are invited for a post as High Tension Mains Assistant from engineers who have had practical experience and theoretical training in the installation, maintenance, testing and fault location of 11-kV and 22-kV power cables and low tension multicore control cables. Preference will be given to candidates holding recognised qualifications. The successful applicant should reside within easy reach of the Board's railway system. The salary will be up to £550 per annum, according to age, experience and qualifications. The successful candidate will be required to pass a medical examination and to serve satisfactorily a probationary period. Canvassing, either directly or indirectly, will disqualify. Applications, giving full particulars of education, technical experience, professional or other qualifications, present remuneration and age, should be sent to the Staff Officer (Ref. E/E-444), London Passenger Transport Board, 55, Broadway, S.W.1, so as to be received not later than 13th September, 1947. 9145

LONDON Passenger Transport Board. Applications are invited for the post of a temporary Engineering Assistant in the office of the Signal Engineer for the design section of the drawing office. Applicants should be not more than 30 years of age and should be in possession of a Higher National Certificate in mechanical engineering or an equivalent qualification. Their drawing office experience should include the design of electrical and mechanical components and jigs and tools. The appointment will be subject to a three months' probationary period, after which the probable duration of the employment will be two or three years. The commencing salary will be from £500 per annum, dependent upon qualifications, ability and experience. Applications, giving particulars of experience, qualifications, present remuneration and age, should be sent to the Staff Officer (Reference E/E-443), London Passenger Transport Board, 55, Broadway, S.W.1, so as to be received not later than 12th September, 1947. 3144

MINISTRY of Supply. Professionally Qualified Engineers are required for experimental and development work in the Ministry's Research, Development and Design Establishments located mainly in the Midlands and South of England. Candidates must be natural-born British subjects of British parents. Applicants must have received a full professional training and have obtained, or be eligible for, professional membership of the Institution of Civil, Mechanical, or Electrical Engineers, or be an Associate Fellow of the Royal Aeronautical Society. Successful applicants may have an opportunity to compete for permanent posts at a later date provided they are able to satisfy the conditions laid down at the date of the competition. The duties of the appointments cover nearly all branches of engineering and give opportunities for experience on work of an advanced nature using the most modern techniques and equipment. The fields covered include aircraft and associated equipment; gas turbine engines of all types; weapons for all services; radio-communications and electronics; wheeled and tracked vehicles; bridging; earth-moving equipment, etc. Salaries will be paid according to age, qualifications and experience within the following inclusive ranges, which are the provincial rates for men: Range I, £997 to £1,192; Range II, £720 to £960; Range III, £470 to £720. Salaries in the London area are slightly higher. Write, quoting C.482/47A, to Ministry of Labour and National Service, Technical and Scientific Register, Room 171, York House, Kingsway, W.C.2, for application form. 3138

NORTHERN Coachbuilders Ltd., of Claremont Road, Newcastle-on-Tyne, 2, require for their battery electric vehicle division young and keen Electrical Engineer (H.N.C. or B.Sc. standard). Good experience offered, with prospects of advancement. Please write, giving full particulars, to the above. 3092

OIL company invites applications from suitably qualified candidates for the following appointments in its Middle Eastern areas: Assistant Electrical Plant Engineers, experienced in the operation/maintenance of L.T. and H.T. motors, substations and industrial distribution (P/5-3); Electrical Installations Assistant, experienced in the construction/maintenance of installations in conduit and lead-covered cables, f.h.p. motors, and conversant with the practical application of I.E.E. regulations (P/5-5). The age limit for both categories is 34; and possession of H.N.C. the minimum qualification. Salaries (progressive) from £650, plus free furnished quarters and allowances from £350-£550 dependent on family circumstances, with provident and (non-contributory) pension fund membership. No married accommodation available until after the first two years. Write, quoting the appropriate symbol reference, to—Box 1836XY, c/o Charles Barker & Sons Ltd., 31, Budge Row, London, E.C.4. 3031

PIPEWORK Draughtsmen required, seniors, capable of arrangement work and supervision on large contracts, for employment in Derby, London, Manchester or Newcastle. Apply, stating experience, age and salary required, to—Aiton & Co. Ltd., Stores Rd., Derby. 3082

PETROCARBON Limited require the services of a Senior Electrical Draughtsman. Applicants are required to have experience of power station layout and general installation in conduit and pyrotenax. Good salary is offered to a suitable applicant. Applications in writing to—24, Clarendon Road, Eccles, Lancs. 3185

POWER House Superintendent for electricity undertaking in the Middle East. Applicants should be 30-35 years of age, with sound technical training and experience in operation and maintenance of medium pressure boilers and turbine plant, and be capable of taking complete charge of the power house on shift duty. Previous experience as shift charge engineer essential. Salary £80 per month on three-year contract, plus cost-of-living allowance and suitable house allowance, with first-class passage to and from England and three months' leave on full pay in the U.K. on completion of contract. Good prospects for a suitable and energetic man.—Box 3115, c/o The Electrical Review.

PRIVATE Secretary to Managing Director required. Duties include shorthand, typing and also the keeping of statistical records. Applications in writing, stating age, experience and salary required, to—The Sun Electrical Co. Ltd., 118/124, Charing Cross Rd., W.C.2. 3131

PRODUCTION Assistant for planning, also inspection and test at sub-contractors' works. A good knowledge of working methods and some experience of medium quantity production control high-grade electronic equipment. Applicants should preferably be 25-30 years, with H.N.C. and good education. Commencing £350-£400 p.a. Good prospects with increasing responsibility and knowledge of firm's products. Give full particulars, age, education, training and experience.—Box 3193, c/o The Electrical Review.

REFRIGERATION Engineer. Please reply, stating experience, qualifications and salary required, to—Box 2982, c/o The Electrical Review.

REPRESENTATIVE, by well-known manufacturer, to cover South and South-West England, including South Wales. (1) Give full details of remuneration required: (2) Age and experience: (3) Connections with wholesalers in the above area: (4) Whether in possession of a car.—Box 2848, c/o The Electrical Review.

REPRESENTATIVE required for Tenco clocks for the Midlands. Replies, stating age, previous experience, whether car owner and remuneration required, in strictest confidence, to—The Sales Director, T.M.C.-Harwell (Sales) Ltd., 37, Upper Berkeley Street, London, W.1. 3104

REPRESENTATIVE, with first-class sales technique, to sell electrical lines in variety to corporations, electrical undertakings, stores, contractors, shipping cos. and shops. Salary, expenses allowance and commission. Good opportunity for ambitious man. Car essential.—Box 3100, c/o The Electrical Review.

RESEARCH Laboratories of the General Electric Co. Ltd., North Wembley, Middx., require a Physics or Electrical Engineering Graduate with knowledge of and preferably some experience in small transformer design. Apply by letter only to the Director, stating age, experience and academic qualifications. 3076

SALES Office Assistant for electrical instruments manufacturers (West London). Must have electrical training and be capable of dealing with enquiries and correspondence. Knowledge of electrical measuring instruments an advantage. Commencing salary £300/£400 according to qualifications.—Box 2984, c/o The Electrical Review.

SALES Representative for engineering goods used by all electrical and mechanical manufacturing engineering companies. Commission and expenses, London and Home Counties. Car essential.—Box 6290, c/o The Electrical Review.

SENIOR Draughtsman. A new and expanding branch of an old-established organisation require a man with good experience in the design of electrical installations for specialised industrial plant of highest class. A neat worker with practical training and with some design qualifications is preferred. There is good opportunity for responsibility to a competent man.—Box 6323, c/o The Electrical Review.

SENIOR Estimators for production estimating in a large engineering company engaged in the radio component industry. Suitable men must be capable of complete breakdown of prices. Write, stating age, experience and salary required, to—Box 3103, c/o The Electrical Review.

SENIOR Jig and Tool Draughtsman, by progressive concern engaged in telecommunications industry, situated in South-East London area. Preference will be given to applicants who have served an apprenticeship and received a thorough practical training. Applications in writing, stating age, qualifications, experience and salary required, to—Box 150, c/o The Electrical Review.

SUPERINTENSION Electrical Cable Plumber-Joiners for contracts, capt. of large cable-making company. Work mainly in London area. Write, stating age and experience, to—Box 3109, c/o The Electrical Review.

SENIOR Shift Attendant for supply substation at large steelworks, for control and maintenance of E.H.T. and L.T. switchgear, large machines etc., staff appointment. Applicant should have H.N. certificate and practical experience of steelworks plant, and apply with references to—Electrical Engineer, Guest Keen Baldwins Iron & Steel Co. Ltd., East Moors, Cardiff. 3191

SHIFT and Maintenance Engineer for well-known public school near Buckingham. Ex-Merchant Navy engineer preferred. Plant consists of oil-fired boilers, D.C. generators and heating installation. Wages £5 7s. 6d. per week, two weeks' paid holiday per year, and one free week-end in three. No night shift. Flat or cottage accommodation available at nominal rental.—Box 3090, c/o The Electrical Review.

SKILLED Test Room Man to organise production in test room engaged in the manufacture of accurate electrical instruments. Applicant must have had previous experience in supervising the manufacture and testing of all types of accurate moving coil instruments. Progressive post for the man who can attain improved production. Factory situated in Home Counties. State age, experience, qualifications and salary required to—Box 2936, c/o The Electrical Review.

STRUCTURAL Designer and Structural Draughtsman in London area for work in connection with overhead lines, radio towers, etc.: 5-day week, superannuation fund, good prospects. Apply in writing to—Staff Officer, British Insulated Callender's Cables Ltd., Norfolk House, Norfolk Street, W.C.2. 75

SUPERVISING Engineer, for contract work in Scotland. Duties will include estimating for, and supervising internal wiring and wood pole overhead line construction on small hydro-electric schemes.—Box 3187, c/o The Electrical Review.

TIME Study Engineer, by large light electrical engineering concern in the East London area. Write, stating age, experience and salary required, to—Box 3102, c/o The Electrical Review.

TRANSFORMER Designer, aged about 30, experienced on mercury are rectifier transformers up to 100 kW. Salary approximately £500.—Nevelin Electric Co. Ltd., Purley Way, Croydon, Surrey. 44

WANTED by old-established electrical manufacturing co., Chief Engineer, Transformer Dept. Must have E.H.V. experience. Housing accommodation will be provided. Salary according to qualifications and experience. Reply full particulars to—Box No. 358, 8, Serle Street, London, W.C.2. 2953

WINDER, competent, to take charge of small shop. D.C. & A.C. up to 50 h.p.—C. A. Newton & Co. Ltd., 19, St. James's Street, Derby. 3180

YOUNG Engineer required by light electrical manufacturing organisation in the Midlands. Essential qualifications must cover all branches of production engineering for mass production methods. Excellent opportunity for the right man. Reply, stating full details of experience, age and salary required, to—Box 3017, c/o The Electrical Review.

YOUNG Junior Detail Draughtsman, by well-known firm of electrical manufacturers in the London area, for work on fluorescent lighting fittings. Reply in writing giving age, past experience etc. to—Box 3176, c/o The Electrical Review.

YOUNG men required with polyphase meter testing experience. There are also a few vacancies for young men with electrical technical experience to train as testers. Applications should be made to—The Personnel Manager, Landis & Gyr, Victoria Road, North Acton. 3030

APPOINTMENTS FILLED

Dissatisfaction having been so often expressed that unsuccessful applicants are left in ignorance of the fact that the position applied for has been filled, may we suggest that Advertisers notify us to that effect when they have arrived at a decision? We will then insert a notice free of charge under this heading.

BOROUGH of Royal Tunbridge Wells—Mains Superintendent; South Lancashire Transport Co.—Shift Charge Engineer; W. N. Froy & Sons Ltd.—Junior Assistant. All applicants are thanked.

SITUATIONS WANTED

A Capable Engineer (37), with managerial experience, seeks responsible position, London area. Conversant all machine tools, jigs, fixtures, planning progress and rate fixing.—Box 6330, c/o The Electrical Review.

A position as Executive i/c development, or technical assistant to management, sought by physicist (29), B.Sc., A.Inst.P., Grad.I.E.E. Prospects essential. Experience light electrical and high vacuum, including 6 yrs. mass production.—Box 6369, c/o The Electrical Review.

A.M.I.E.E., A.M.I.Mech.E., age 36, desires change to Midlands or Southern Counties. Wide experience electrical engineering in heavy industries, executive control, plus technical and practical administration.—Box 6316, c/o The Electrical Review.

ADMINISTRATIVE position required. 28 years' exp. electrical and mech. engineering, radio, radar, switchgear, dynamos, motors, manufacture and repair, production etc. Southern Counties or North-west preferred, available immediately.—Box 6366, c/o The Electrical Review.

A.M.I.E.E. (39), excellent industrial equipment and instrument experience, requires represent first-class manufacturer in South. Resident Southampton, own car, moderate remuneration.—Box 6358, c/o The Electrical Review.

CABLE Joiner, age 34, wishes situation abroad, experienced in electrical fitting, switchgear erection. Willing to travel any part of the world.—Box 6352, c/o The Electrical Review.

CAPACITY Assist. Manager (w'sale prefd.); 23 years' exp. trade, both dist. and contracting, practical and admin., inc. buying, sales, costing; reliable contacts with M.O.W. contractors and others. Sal. approx. £430 p.a.—Box 6345, c/o The Electrical Review.

CHIEF Designer, desires responsible position with scope. Wide experience, all phases of electric cooker and appliance industry.—Box 6367, c/o The Electrical Review.

CONTRACTORS: Engineer, age 52, disengaged, requires post. Managerial, consulting and estimating, good contacts. Replies in confidence to—Box 6288, c/o The Electrical Review.

DRAUGHTSMAN (23), Grad.I.E.E., requires good position in London. Please state approx. salary.—Box 6370, c/o The Electrical Review.

ELECTRICAL Engineer desires to widen experience, seeks progressive technical and/or administrative post, 7 years' practical experience in general electrical engineering, including indentured apprenticeship. Tech. quals. include Elec. H.N.C. and Mech. O.N.C. Further details—Box 6368, c/o The Electrical Review.

ELECTRICAL Engineer, used to design, estimating and supervision of industrial power, heating and lighting installations, e.h., u.g. transmission lines. Wide commercial experience, which includes area office management, sales, advertising.—Box 6343, c/o The Electrical Review.

ELECTRICAL Engineer (32), desires change, at present supervising the repair and maintenance of industrial plant.—Box 6374, c/o The Electrical Review.

ELECTRICIAN, aged 40, ex-Royal Navy, desires employment, experienced in maintenance or other electrical work. Travel anywhere. Excellent reference.—S. W. Hill, 8, Fortescue Place, Plymouth. 6341

ENGINEER, age 39, desires responsible position carrying salary of £750 p.a. Specialist in mass production tooling and methods. Experience covers tool design, planning and progressing.—Box 6305, c/o The Electrical Review.

EXECUTIVE, age 32, office, works and sales experience. Good contacts for purchasing and sub-contracting. Free.—Box 6332, c/o The Electrical Review.

EXPERIENCED Elec. Draughtsman, 22 years with leading manufacturer, seeks change of post where trustworthiness and personality, in addition to technical ability, are required. Christian partnership considered. Newcastle preferred.—Box 6315, c/o The Electrical Review.

F.H.P. Motor Designer, considerable experience universal and H.C. design, manufacture and application, wide variety electro-mechanical products, at present employed as research engineer by established manufacturers, desires change, either in similar capacity or as technical representative.—Box 6356, c/o The Electrical Review.

PRODUCTION Engineer (late m/c shop supt.), sound experience modern production methods, planning, jig and tool design, organisation and labour control. Light mechanical and electrical engineering. Ex. refs.—Box 6337, c/o The Electrical Review.

QUALIFIED Instrument and Meter Engineer, both electrical and gas, aeronautical instruments and clocks, all types, highest testimonials, desires change. Present position assistant general manager; previous positions held, chief draughtsman-designer, superintendent of manufacture, production engineer and manager.—Box 6344, c/o The Electrical Review.

SALES and Commercial Manager (32) desires change. Fully experienced home and export sales. Excellent connection. Would consider representation for progressive concern. Preferably Midlands or seaside area, but not essential.—Box 6313, c/o The Electrical Review.

WORKS Executive, A.M.I.Mech.E., M.I.E.C.E., comprehensive administrative experience covering the application of time and motion study, production control, scheduling standard costing and process planning to electro-mechanical engineering work. Good organiser with successful record in handling labour and getting results.—Box 6346, c/o The Electrical Review.

WORKS Superintendent, experienced electrical and mechanical engineer, seeks change. Free end July. London area.—Box 6280, c/o The Electrical Review.

AUCTION NOTICES

SECOND SALE

G. R.

BY ORDER OF THE MINISTER OF SUPPLY
(Without Reserve)

DEPOT No. 103, KINGS NEWTON, Nr. MELBOURNE,
DERBYSHIRE (6 miles south of Derby).

1,350 LOTS OF INDUSTRIAL, ELECTRICAL AND MISCELLANEOUS EQUIPMENT AND STORES

including 23 Mobile and other Cranes, 6 Bradford Gas Engines, 4 Ford v.8 Engines, 2 A.E.C. Diesel Engines, 8 Diesel Winches, 2 Austin 8-h.p. Engines, 2 Morris Engines, 7 Gas-producing Plants, 5 Concrete Mixers, 24 Generating Sets, 8 Kelbus Sand Dryers, large Electric Oven, 3 large Gas Ovens, Packing Machine, 21-h.p. Electric Motor, Electric Welding Plant, 2 Electric Drilling Machines, Electric Pumps, 2 Chrysler Marine Engines, quantity of Crane Spares, 44 Industrial Tractor Trailer Trucks, 4 Portable Battery Charging Sets, Electric Pulley Blocks, Steel Roller Conveyors, quantity 50-ton Hydraulic Jacks, 52 Joyce Model Jouna, Jacks, quantity Yale Pull Lifts, Overhead Travelling Chain Blocks, 30,000 lb. Red Pressure Plastic, quantity of Railway Engine Lifting Jacks, 8,400 Steel Corner Boxes, 16,000 Upper and Lower Culvert Sections, quantity of Hand Winches, quantity of Derrick Masts, 34 Semi-rotary Pumps, quantity of Reinforced Fuel Hose, Steel Wire Rope Slings, Steel Wire Ropes, Chain Slings, quantity of Electric Cable, large quantity of Electrical Spares, 1,344 Battery Charging Boards, large quantity of Aeroplane Spares and Equipment, 1,000 Expredictor Telescopes, 781 Gunsighting Telescopes, 4,270 Electro-Pneumatic Rams, 100 Radiators, quantity of Oxygen Mask Equipment, Portable Merry-go-round Pumping Set, large quantity of Insulating Tape, 590 Wood Filing Cabinets, quantity of Railway Equipment, large quantity of Miscellaneous Equipment and Stores.

To be Sold by Auction by
MESSRS. W. S. BAGSHAW & SONS
on Tuesday, Wednesday, Thursday and Friday, 26th, 27th, 28th and 29th August, 1947, at 11 a.m. each day. Viewing: Wednesday, Thursday and Friday, 26th, 27th and 28th August, 10 a.m. to 5 p.m. each day.

Admission on view days and sale days by catalogue only. One catalogue to admit two persons. Catalogues price 6d. each.

Auctioneers' Offices: High Street, Uttoxeter, Staffs. Tel. No. 44 (2 lines); also at Ashbourne, Bakewell and Derby. 2957

G. R.

BY ORDER OF THE MINISTER OF SUPPLY

Of interest to Electricians, Garage Proprietors, Builders, Wireless Dealers, Furnishers, Ship Repairers, Engineers, etc.

M.O.S. DEPOT No. 154, CASTLE COURT, WESTGATE STREET, CARDIFF (opposite Angel Hotel).

MR. C. T. STEER, F.A.I., has received instructions to Sell by Auction on the premises as above, on Tuesday, Wednesday and Thursday, 2nd, 3rd and 4th September, 1947, at 11 a.m. daily, approximately 1,000 Lots of
INDUSTRIAL EQUIPMENT AND SURPLUS GOVERNMENT STORES

(Without Reserve)
including Douglas Petrol Engine Portable Generating Sets, Insulators, Contact Breakers, Lamp Fittings, Cables, Joint-Washers, Motor and Fan Gear, Motors (A.C. and D.C.), Switchboards, Ironclad Switch Panels, Oil Filters, Jacks, Spanners, Oil Guns, Lamp Holders, Brake Linings, Skid Chains, Asbestos Sheets, Millboard and C.W.H. Industrial Kelvinator Refrigerator, Overalls, Sulphuric Acid, Tool Boxes, Steel Nuts and Bolts, Tongs, Pulleys, Riveting Machines, Cable Drums, Pressure Gauges, Oxy-Acetylene Welding Equipment, Kaseint, Steel Wool, Platform Weighing Machines, Weighing Scales, Firemen's Axes, Tarpaulin Sheets, Paint, Food Containers, Dressing Trolleys, Sectional Spring Fracture Mattresses, Whittle and V. Belts, Exhaust Fans, Sturtevant Crusher, Rubber Tyres, Pneumatic Tyre Truck Wheels, Crossley Diesel Generators, Drying Oven, 20-h.p. A.C. Motors with Starters, Surveyors' Tripods, Plug Cocks and Valves, Rubber Hose, Pipe Vices, Pulsometer Refrigerators, Test Meters, Compasses, Flexible Drives, Sliding Resistances, Bed Trays, Coventry Chains, Wireless Accessories, Metro-Vick Vacuum Pumps, Asbestos Tape, Fire-lighting Equipment, Surveyors' Linen Tapes, and numerous other lots.
On view from 10 a.m. to 1 p.m. and 2 p.m. to 4.30 p.m. Thursday, Friday and Monday prior to sale. Terms cash. Admission by catalogue only, price 6d., obtainable from the Auctioneers' Offices, Clive Chambers, 121, Queen St., Cardiff. Tel. 4461. 3093

FOURTH SALE

G. R.

BY ORDER OF THE MINISTER OF SUPPLY
(Without Reserve)ASHCHURCH, GLOS
(within 2 miles of Tewkesbury and 7 of Cheltenham)Sale by Auction of
A LARGE QUANTITY OF GENERAL STORES
including

10,000 gallons of Paint; 320 14-cwt. Chain Hoist Trolley Blocks; 66 Compressors; 1,200 Steel Cabinets; 500 Cabin Trunks; 1,300 Plywood Drawing Boards, ranging from 120" x 60" to 60" x 42"; large quantity of Radio Equipment; 3,600 various Tuning Units; 150 Radio Receivers; 110 Petrol Engine-driven Winches; Generators; large assortment of Hand Tools, etc.

Auctioneers: BRUTON, KNOWLES & CO.,

in conjunction with GEORGE HONE.

Sale Days: Tuesday, Wednesday, Thursday and Friday, 2nd, 3rd, 4th, 5th September; Tuesday and Wednesday, 9th and 10th September, 1947, at 11 o'clock punctually each day.

View Days: Thursday and Friday, 28th and 29th Aug., Monday, 1st September, and Monday, 8th September, from 10 a.m. to 4 p.m., and on Sale Days from 9 a.m. to 10.30 a.m.

Catalogue, covering complete sale, price 6d. (postal orders only), may be had of the Auctioneers, Bruton, Knowles & Co., Albion Chambers, Gloucester (Telephone, Gloucester 2267) or George Hone, Tewkesbury (Telephone, Tewkesbury 101).

Note: Applications for catalogues to be sent in envelopes marked "ASH" top left-hand corner. Admission will be by catalogue only. 3134

G. R.

BY ORDER OF THE MINISTER OF SUPPLY
(Without Reserve)

MINISTRY OF SUPPLY DEPOT 130, BAMFORD, DERBYSHIRE (on main Sheffield-Manchester L.M.S. Line, 12 miles from Sheffield).

ELECTRICAL ENGINEERING MACHINERY,
TOOLS, ELECTRIC MOTORS

and Miscellaneous Government Stores, etc., to be offered for Sale by Auction, from Catalogue, by MARCHANT BROOKS & CO., on WEDNESDAY, 3rd SEPTEMBER, 1947, at 11 a.m., at the above Depot.

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Motors, Generators, Compressors, Gas and Electric Drying Ovens, Heat Treatment Equipment, Conveyors, large quantity of Paint, 2 complete Power Gas Producer Plants (20-therm output), etc.

Lots on view: Monday and Tuesday, 1st and 2nd September, 1947, from 10 a.m. to 4 p.m., by catalogue only (price 6d.), on application to the Auctioneers' Offices, Rutland Chambers, Bakewell (Tel. 61), and Westminster Bank Chambers, Matlock (Tel. 94). 3147

FOR SALE

Traders buying and selling hereunder must observe the Restriction of Resale Order, S. R. & O. 1942 No. 958.

COUNTY BOROUGH OF PRESTON
ELECTRICITY UNDERTAKING

THE Electricity Committee of the above Council invites Tenders for the purchase and removal of the following:

ONE BATTERY DRIVEN LOCOMOTIVE. Make, English Electric Co. Ltd., No. 572, Year 1924; weight, 24 tons; gauge, 2' 6"; wheelbase, 3'; overall length, 9' 4"; overall width, 4' 0".

The present battery, which requires renewing, is of 129 amp. hr. capacity at 5 hr. discharge rate; it is composed of 40 cells with 9 plates per cell, type 1.M.V.4, and was manufactured by the Chloride Battery Company. The approximate h.p. of the motor is 5.

Arrangements for inspection can be made on application to the undersigned, to whom Tenders in plain sealed envelopes endorsed "Sale of Locomotive" should be forwarded not later than Saturday, 6th September, 1947. The Committee does not bind itself to accept the highest or any Tender.

G. A. ROBERTSON,

M.Sc.(Tech.), M.I.E.E., M.I.Mech.E.,

Borough Electrical Engineer.

40 & 41, Lune Street,

Preston.

30th July, 1947.

3155

COUNTY BOROUGH OF BURY ELECTRICITY DEPT.

TENDERS are invited for the purchase of the following plant:

One Musgrave Zoelly Steam Turbine (damaged) coupled to 3,000-kW, 3-phase, 6,000-volt alternator, also condensing and auxiliary plant.

Ferguson, Pallin and Metropolitan-Vickers, 6,600-volt, 3-phase Switchgear, including eight oil switches.

Three Metropolitan-Vickers, single-phase Reactors.

The plant may be inspected by appointment and particulars and conditions of sale obtained from the Engineer & Manager, Electricity Department, Market Street, Bury.

EDWARD S. SMITH,

Municipal Offices,

Bank St., Bury.

1st August, 1947.

Town Clerk.

3156

THE County Council of the West Riding of Yorkshire have for disposal the following electrical plant:

(a) 16.0-kVA Ruston Hornsby Diesel-driven Alternator, 1,000 r.p.m., 400 v., 3-phase, 50 cycles. Engine size 3: control board; cooling tanks.

(b) 27.5-kVA Lister Diesel-driven Alternator, 1,000 r.p.m., 400 v., 3-phase, 50 cycles; control board; cooling tanks.

Full details of plant, conditions of purchase, etc., may be obtained from the County Architect, County Hall, Wakefield. Tenders to be delivered to the undersigned not later than 10.30 a.m. on Saturday, 13th Sept., 1947.

BERNARD KENYON,

County Hall,

Wakefield.

Clerk of the County Council.

3130

TURTON U.D.C. ELECTRICITY DEPARTMENT

THE Council have for disposal a 10,000/10,000-volt, 750-kVA Delta/Star-connected Transformer, of Ferranti manufacture, indoor type. It is in good condition and suitable for rewinding. Can be inspected by appointment with the Electrical Engineer and Manager at Bromley Cross, Telephone, Eagle 225.

Offers to Alban Baldwin, Esq., Clerk to the Council, Council Offices, Bromley Cross, Nr. Bolton. 3136

A. Cooksley & Co. Ltd. offer large selection of used Electric Motors, D.C. Write—21/25, Tabernacle Street, London, E.C.2 (Monarch 3357/58). 46

A quantity of D.C. and A.C. Credit, Prepayment and Polyphase Meters. Full details can be obtained from—P. E. Smith, Esq., A.M.I.E.E., Borough Electrical Engineer and Manager, 320/326, High Road, Ilford. 3084

A Superior Streamlined Toaster in one-piece die-cast aluminium, with attractive mirror finish. Price 39s. 6d. subject. Immediate delivery. Sample, 31s. Cash with order.—Metropolitan Distribution Ltd., Truro. 94

A.C. and D.C. Motors, all sizes, large stocks, fully guaranteed.—Milo Engineering Works, Milo Road, East Dulwich, S.E.22. Forest Hill 2278-9. 102

A.C./D.C. Motors can be supplied from stock or at short notice.—John Phillips & Co. Electric, 31, Fortune Green Road, N.W.6. Hampstead 8132. 126

A DIESIE Thread. Just what you have been looking for. Particularly suitable for binding ravelled ends of flexible wires; 100 yards, 4s. 6d., subject.—Barries Electrical Agencies Ltd., King Street, Brighton. 127

A V. Auto High Speed Wireless and Telephone Screened Relays with Switch Contacts, 500 available. Cost £6 each to make, our price 20s., each or would consider offer for lot.—Kayes The Electrical Specialists, St. Anns Road, Harrow, Middlesex. 6383

A LTERNATING Diesel Sets: 5 kVA, 230/1/50; 55 kVA, 400/3/50; 90 kVA, 400/3/50; brand new, direct coupled. Delivery partly ex stock, partly three months.—The Electroplant Co., Wembley, Middx. 3125

A LTERNATOR, Crompton Parkinson, 5 kVA, 400/440 volts, 3-ph., 50 c., 1,500 r.p.m., with exciter, regulator, Price £62 10s.—Universal Electrical Co., 221, City Road, London, E.C.1. 3118

A LTERNATORS, G.E.C., 5 kVA, 230 v. A.C., 1,500 r.p.m., B/B, with exciter, £47 10s.; ditto, 10 kVA, £77 10s.—Universal Electrical Co., 221, City Road, London, E.C.1. 2629

A M M E T E R S, 0-30, 4" dial, A.C., first grade, flush or surface mounting, even scale, new, Govt. surplus, 45s. each, cheap.—Smith & Hammond, 5, Buckingham Street, London, W.C.2. 3127

A P P R O X I M A T E L Y 12,000 Pencil Bar Electric Fire Formers, unwound, for disposal, sizes from 6" to 104", 20-22 T.P.I., 9/16" dia. Perfect thread for easy wiring. Very best quality refractory material. Offers, whole or part.—Box 2880, c/o The Electrical Review.

A V A I L A B L E, new 60-kVA, Diesel Alternator, 400/230 volts, 3-phase, 50 cycles.—Box 6371, c/o The Electrical Review.

ARMoured Cables, unused, on original drums, C.M.A. 77/029 Twin P.I.L.C. S.W.A. served overall 440-yd. drums, £130 per drum; also 77/064, 3-core V.I.R. circular galvd. wire armoured, 350-yd. drums, £150 per drum. Ex stock, drums free.—Smith & Hammond Ltd., 5, Buckingham Street, W.C.2. Tel. 5063. 3128

AT less than cost price, 4,500 yards, 110/36 Twin A Circular Heavy Duty C.T.S. High Voltage Test Trailer Cable, Canadian manufacture, 4,500 yds. 70/36 Triple ditto, 4,500 yards, 1/084 Triple V.I.C. Flexible Armoured ditto, 4,500 yards, 1/084 Twin V.I.R. Armoured ditto, 40,000 yards, 40/36 Triple Circular Flexible, 25,000 yards, 23/0076 Triple Circular, 4,000 yards, 23/36 Triple C.T.S. Cable. All 100-yard coils.—Kayes The Electrical Specialists, St. Anns Road, Harrow, Middlesex. 6380

B& W. Water Tube Boilers for disposal: Two 50,000 lb. evap., 310 lb. w.p.; one 30,000 lb. evap., 260 lb. w.p.; one 20,000 lb. evap., 175 lb. w.p.; two 16,000 lb. evap., 190 lb. w.p.; one 12,000 lb. evap., 200 lb. w.p.; one 9/10,000 lb. evap., 200 lb. w.p.; also one 5,000-kW Turbo-Alternator. We install complete, including brickwork. Economisers, Pumps, Piping, Valves, Motors in stock. Please send us your enquiries. We can give immediate delivery.—Burlford, Taylor & Co. Ltd., Boiler Specialists, Middlesbrough (Tel. Middlesbrough 2692). 32

B1-Um. The New Push-Button Flush-Fitting Domestic Switch. Wholesale enquiries only. Send for details.—Scemco Ltd., Scemco House, 6/7, Soho Street, London, W.1. Tel. Ger. 1461/2/3. 122

BUSBARs: 250 English Elect. Co., in 12 ft. sections, 3-ph. and neutral, with 6 tappings per section, in excellent condition and guaranteed as new; also 3-ph. only of above, with tapping-in fuse boxes. Electric Motors: 1 Keith Blackman D.C. 460 v., 0.75 amps., 920 r.p.m., type T.E. complete with starter; 1 Stewart Turner 1-h.p. Pump, D.C. 460 v., complete with automatic starter, mercury float switch and float; 1 Worthington Simpson Salvo Portable Fire and Salvage Gunmetal Pump, with Mawdsley motor, D.C., compound wound, 220 v., 30 amps., 2,800 r.p.m.; 7.4 h.p., enclosed drip-proof, complete with Allen West starter; 7 Lancs. Dynamo/Crypto 68-h.p., 3-ph., 50-c., 400-v., 1.7-amp., 700-r.p.m. totally enclosed Fan Motor; 1 Motor Alternator, 2.5 kW, at unity power, 200 v. D.C., 18 amps., 3,000 revs., 230 v., 1-ph., 11 amps., 50 c.; 1 ditto, 3 kW, at 0.8 power factor, 220 v. D.C., 18 amps., 3,000 revs., 230 v., 3-ph., 7.53 amps., 50 c. Electric Starters: 1 Allen West, type SC2, 20-h.p., 400/440-v., 3-ph., 50-c. star/delta Starter; 2 do. direct-on Starters, 4 h.p., 200/220 v., single-ph., 50 c., 2.55 amps. Switchgear and Fuse Boards: 1 Automatic Igranic A.C./D.C. Change-over Controller, complete with busbar chamber and 1 160-amp. D.E. switch, 50 c.; 1 60-amp. do., mounted on 2" angle iron frame; quantity of 3-ph. and neutral Switches; also 3-ph. Switches and Fuses; 3 400-v. line, 230-v. coil, 37-amp. Contactors; 5 Brlce Electric Flow Low Scale Controllers, 0.700-3 C. Electric Welders: 1 British Federal Electric Flash Butt Welder, 100 kVA, 50 c., 400 v., water-cooled; 1 Metropolitan-Vickers Flash Butt Welder, 60 kVA, 400/440 v., 1-ph., water-cooled. Electric Furnaces: 2 Birmingham Electrical Furnaces, 25 kW, 400 v., 38 amps., 3-ph., 50 c., zones 1, temp. 0/700°C.; 1 R. M. Catterson Smith Electric Furnace, type O.F., 230 v., 5.5 kW, temp. 0-1,050°C. Transformers: 1 Hackbridge Transformer, 40 kVA, 57.7/1,115 amps., 400/20 v., 3-ph., 50 c.; 1 British Electric Transformer, 40 kVA, 55/1,120 amps., 420/20.6 v., 3-ph., 50 c.; 22 Low Voltage Transformers, 230 v., single-ph., 50 c. input, output 12 v., 100 watt. Electric Blowers: 1 Laurence Scott, 2.5 h.p., 400/440 v., 3-ph., 50 c., 1,425 r.p.m., complete with Sturtevant blower; 4 Keith Blackman Blower Exhausters, type 30, 400 v., 20 amps., 15 h.p., 2,900 r.p.m., 50 c., type PT; 4 do., type SA, 400 v., 11 amps., 8 h.p., 2,900 r.p.m., 50 c. Condensers: 1 12.5 plus 12.5 U.F. Condensers; 4 300-v., 30 U.F. do.; 1 300-v., 50 U.F. do.; 1 300-v., 60 U.F. do. Conduit Fittings: 200 galvd. and black, 6" x 3" x 2" Inspection Boxes; 10 6" x 6" x 24" Inspection Boxes; 150 gross 14" Female Brass Bushes; 84 Porcelain Bayonet Cap Holders; quantity of Rubber and Lead-covered Wire; also Bare Copper Wire. Reduction Gears: 2 D. Brown & Co. Radial Reducers, 3,000/1; 4 Openner Reduction Gears, 40/1. Coal and Ballast Hoppers: 20 as new, with conveyors, complete with 5" buckets, size of hopper across top 10 ft. sq., depth of hopper 10 ft. x 16 ft. Tool Boxes and Racks: 6,000 Steel Tool Boxes, size 2' 2" x 9" x 9"; 600 variable size Steel Racks and Benches. Acetylene and Oxygen Gauges: 10 Acetylene; 18 Oxygen. Pumps: 2 2½" Centrifugal. Pulleys and Plummer Blocks: 4 42", 6-groove, 2½" bore Pulleys; 4 2" G.M. Plummer Blocks; 26 14" do. Gas Furnaces: 5 Brayshaw Furnaces, year of manufacture 1940; 2 Incandescent Heat Co. Furnaces, square type. 1 Degrassing Plant, 2 5-therm Gas Producing Plants.—C. J. Rice, 137, Mayplace Road West, Bexley Heath, Kent. 55

BATTERY Chargers for home and export, 4 models, 2.6-12 v., 1, 2 or 4 amp. D.C., any mains voltage. Generous trade terms. Write for catalogue.—The Banner Electric Co. Ltd., Hoddesdon, Herts. Tel.: Hoddesdon 2659.

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BLISTER Hangars, 91' span x 45' long, and other sizes. Steel or asbestos roofing. Suitable for repair shops, factories, storage, etc. Details from—Thorn & Sons Ltd., Box 10B, Brampton Road, Bexleyheath, Kent. Phone, Bexleyheath 305. 43

BLOCKS, best quality, polished wood, imitation walnut. All standard sizes in stock at current prices.—British Elec. & Mfg. Co., 25-27, Berners Street, London, W.1. 65

BRITISH Electric Co. (Beco Ltd.) offer 15-kVA, 400/230, 3-phase, 50-cycles, Petrol-driven Alternator Set complete with control panel, etc.—British Electric Co. (Beco Ltd.), 25/29, Lower Rd., Rotherhithe, S.E.16. 148

BRYCE Transformer to B.S. spec., 20 kVA, volts high 3,300, volts low 400, imp. volts 4.5%, amps. 3.5 and 28.8, 3-phase, with fuses and complete switchgear by New Switchgear Construction Co. Ltd. All perfect and ready to remove. Offers—Box 2881, c/o The Electrical Review. 76

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CABLE, 1/044, 3/029, 7/029, 7/044, P.V.C. single, twin, triple, from stock. Lists available.—Barries Electrical Agencies Ltd., King Street, Brighton. 76

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DC Exhaust Fans, 200/250 v., 12" diam, blades, 1,400 r.p.m., Porthole type, new, £6 6s. each.—Johnson Engineering, 319, Kennington Road, London, S.E.11. Reliance 1412/3. 99

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MOTOR Generator Sets and Converters, all sizes and voltages from 1 kW up to 500 kW in stock.—Britannia Manufacturing Co. Ltd., 22/26, Britannia Walk, City Road, London, N.1. Telephone, Clerkenwell 5512, 5513 & 5514. 23

MOTOR, 2 h.p., 250/1/50, Beaton, 1,440 B.B. with starter, £20.—Box 6372, c/o The Electrical Review. 23

MOTORIZED 1" Bench Drilling Machine, 13 speeds, £16 10s.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066. 51

MOTORS, 1 h.p., 230 volts, single-phase, complete with starters (new).—H. Hywood Ltd., 18, Coram Street, W.C.1. Tel. Terminus 8547. 2932

NAMEPLATES, Engraving, Die-sinking, Stencils.—Stellwell & Sons Ltd., 153 Far Gosford St., Coventry. 14

NEW Nichrome V Wire, 20 s.w.g., about 500 lb. Spot delivery. What offers?—Munster, Simms & Co. Ltd., Imperial House, Donegal Square East, Belfast. 3121

NUMBER unused D.C. Motors, 10 to 30 h.p., 110 and 220 v., by English Electric, Metro-Vick, etc., with starters.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford, Tel. B.S. 1000/1. 154

NUMBER unused L.D.M. 110 and 220-v. D.C. Motors, 1 h.p. and 1 h.p. Suitable for exciters for alternators. Cheap.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 155

OFFERS, for two E.C.C. Motor Alternator sets, 27 kW and 70 kW, D.C. 460 v., 300 v. A.C., 50 per cent. single phase, switchgear. Running order.—Le Bas Tube Co. Ltd., Millwall, London, E.14. 375

ONE 45 and one 80-h.p., 400/50/3, 1,425-r.p.m. Crompton Parkinson Motors, slipping, totally enclosed, ball and roller bearings, with Igranite fully automatic remote controlled starters.—M. G. Electrical Co., 28, Crouch St., Colchester. 6355

ONE 300-kVA, 50-cycle, 3-phase, oil-immersed, natural-cooled Transformer, primary (delta) 6,600 v., 26.3 amps.; secondary (star), with neutral point, 400 v., 434 amps.—H. W. Lindop & Sons Ltd., Junction Foundry, Pleeke Road, Walsall. 3120

ONE 1,000-amp., 400-v., 3-phase, 50-cycle Crompton Parkinson "Kladd" Floor Mounting Circuit Breaker; one 800-amp., 400-v., 3-phase, 50-cycle M. & C.S. Circuit Breaker, built in with unit type "Bill" distributor set.—M. J. T. Thomas & Co. Ltd., 150/154, Kingsland Rd., E.2. Shoreditch 5416/8. 2997

OSMOR A.C./D.C., 8-wave, 5-v. Superhet Radio Heart, includes (fully assembled) chassis, coil pack, calibrated dial, 2-gang, I.F., V.C., choke, 8-lb dropper, circuit diagrams, small resistances and condensers only required, £4, cabinets available.—Morgan Osborne & Co. Ltd., Southview Rd., Warringham, Surrey. 101

OSMOR A.C./D.C., 3-wave, 5-v. Superhet Receivers, excellent reproduction and sensitivity, attractive cabinet, early delivery, shipping wave-band if required. Write for literature.—Morgan, Osborne & Co. Ltd., Southview Rd., Warringham, Surrey. 110

OVER 100 Plating and Anodising Generators from 200 to 1,600 amps. D.C. or A.C. motors can be supplied for most sizes.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford, Tel. B.S. 1000/1. 153

PENCIL Elements, good quality, 93" fixing centres, 1,000 watts. Dozen lots 3s. 9d. each. Immediate delivery.—S. & S. Spares, Pulham Works, Station Road, Broxbourne, Herts. 6301

PETROL Electric Generating Sets, 115 v., 250 watts D.C.; 120 v., 21 amps. A.C., 1-phase, 60 cycles; 125 v., 3 kVA, 3-phase, 50 cycles; also 5, 6.3, 7.5 and 25-kVA Sets.—Scottorn Limited, 173, Kingston Road, New Malden, Surrey. Telephone, Malden 3633. 132

PHONE 98 Staines. 25-kW Mirlees Diesel Set, 110 v. D.C.; 10-kW Ruston Diesel Set, 110 v. D.C.; 34-kW Browett Steam Set, 220 v. D.C.; Rectangular Steel Tank, 30" x 9" x 5"; Fuel Oil Tank, 45" long x 6" dia.; Weir Feed Pump, 10 1/2" x 8" x 22"; Feed Water Heater, 10" x 2" 6" dia.—Harry H. Gardam & Co. Ltd., Staines. 60

PORTABLE Petrol-Electric Generating Plants, from 550 watts to 5 kW D.C. and to 5 kVA A.C. All plants are modern and most of them new in cases, details from—Burlifex, Brownswood Works, Exhibition Grounds, Wembley. Phone, Wem. 011-0211-1900. 6217

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PLATING Generators, unused, several ranging from 350 to 700 amps, 6 to 12 volt, plain or with A.C. or D.C. motor drive. Particulars from—Stewart Thomson & Sons (Liverpool) Ltd., Fort Rd., Seaford, Liverpool, 21 (Boottle 2697); or Dacre House, Victoria Street, London, S.W.1 (Abbey 4017). 63

POWER Plant, one 400 kW, 440/50/3, Diesel Alternator Set; one 260 kW, 440/50/3 Diesel Alternator Set; one 1,500 kW, 3,000/50/3 Steam Turbo Alternator Set with Jet Condenser; one 320 kW, 400/50/3 Steam Turbo Alternator Set with Condenser; one 70 h.p., 42 kW, 200/240-v. Diesel driven Generator Set; two 8,500 lb. evap. 180 lb. pressure Steirling Boilers with chain grate stokers; one three 400 kW, 440 volt D.C. Steam Generating Sets; one 4,000 kW, 6,600/50/3 Power Station, including Boilers, Turbo Alternators and accessories; several 240 h.p., 115 h.p., 195 h.p., 50 h.p. and smaller Diesel engines; portable petrol-driven Saw Benches and stationary electric motor driven Saw Benches.—Abelson & Co. (Engineers) Ltd., Coventry Road, Sheldon, Birmingham (Tel. Sheldon 2424); 333, Station Road, Harrow (Tel. Harrow 2253); 94/96, Grosvenor Street, Manchester, 1. Tel. Ardwick 1328. 3072

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RESISTANCE Wire, Alloy Wire Co. Ltd., Lawrence Lane, Old Hill, Staffordshire, manufacturers of high-grade Resistance Wires for all electrical applications. 25

RHEOSTATS, to clear, geared, sliding, 0.45 amps. 290 ohms, 5 amps., 300 ohms, 16s. each; larger models, 2.8 amps., 60 ohms, 40s. each, carr. paid. Isenthal, Govt. surplus, new.—Fireheat Ltd., 5, Buckingham Street, W.C.2. TEM. 3866. 3143

ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 16

SELENIUM Metal Rectifiers, D.C. output 12 volts, 5 amps., 20s.; suitable Transformers, 230/16 v., 6 a., A.C. 27s. Other rectifiers available. All new repeatable goods.—S. G. Lewis, F. Portland Court, New Brighton, Cheshire. 6284

SE Priming Electric Pumps, 300 g.p.h., £15 15s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 53

SLOTMETERS are ideal for hotels, boarding houses. Prepare now for the winter. Billiard-Switches.—Brent Electrical Co., 6, Holmdale Gardens, London, N.W.4. 130

SPIRAL Elements for electric fires, boiling rings and other appliances, supplied to order.—Electrothermal Engineering Ltd., 270, Neville Road, London, E.7. 54

SPLITTERS, 250 v., 30 amps., 3-way, 27s. 6d. each.—Universal Electrical, 221 City Rd. London, E.C.1. 3117

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write—Box 523, Smiths, 100, Fleet Street, London, E.C.4. 31

STORAGE Cells, Alkaline, Edison and Nife; 600 available in September; suitable for lighting. Just off work. Particulars—Smith Harmond Ltd., 5, Buckingham Street, Strand, London, W.C.2. 3140

SUPERIOR Type Builders' Ladders now in production: also Steps, Trestles and Extension Ladders. Phone—Shaftesbury Ladders Ltd., 453, Katherine Road, E.7. Grangewood 3363/4. 15

SWITCH Blocks, all types, from seasoned hardwood. Send for list: 6" x 6" x 1", I.W., 22s. 6d. dozen, carriage paid.—Elf Manufacturing Co., Dept. R., 9a, Sansome Place, Worcester. 6312

SWITCHPLUGS—15-amp., 3-pin Surface Switchplugs, suitable for domestic or industrial purposes, housed in steel box, 5" x 3" x 2" deep, attractively finished in black crackle, manufactured in accordance to B.S.S. 16s. each; with entry for 1" conduit, 17s. Delivery 3-4 days upon receipt of order. Orders dealt with in strict rotation. Terms of business, cheque with order only. Write manufacturer—Y. Gower, 29 Genesta Rd. London, S.E.18. 6303

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TRANSFORMER, English Elec. Co., capacity 75 kVA, oil immersed, naturally cooled, 415/190 v., 50 cycles, 3-phase supply. Can be viewed at—The Theatre Royal, Hanley, Stoke-on-Trent. 6336

TO Manufacturers, Wholesalers and Export Agents: High-grade 9", 10", 12" Rod Elements; 500-w., 600-w., 750-w., 1,000-w. Boxed Spirals, 80/20, nickel-chrome. Samples sent on request.—A. E. Parsons Ltd., Manufacturing Electrical Engineers, Chesterfield. 2995

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UNUSED Ford and Austin Generating Sets for plating and battery charging, 200/400/800 amps., 15/7½ v.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 156

UNUSED Portable Petrol-driven Welding Sets, by Meadows, with switchboards and resistances. Suitable for electrodes sizes 6 to 14.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. Tel. B.S. 1000/1. 151

VACUUM Cleaner Supplies, parts and fittings, all makes, from stock, for retailers, rewinders and repairers. Wholesale only. Price list.—V.C.S. Ltd., 543, Mosley Road, Birmingham, 12; and 20-22, Gipsy Hill, S.E.19. GIP. 4014. 80

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WESTINGHOUSE Metal Rectifiers, complete with 3-circuit charging panels. Price £70 each complete ex stock.—Houchin Ltd., Engineers, Garsford St., E.14. 6342

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1 120-h.p., 970 r.p.m., Slipping Motor, 400 volts, 3-phase, 50 cycles, with sliding base, stator and rotor control.—Box 3179, c/o The Electrical Review.

3 tons of each, 21 and 27 s.w.g. Smaller quantities other sizes also available. Apply—Mercro (Scotland) Ltd., 20, King Street, Glasgow. 2890

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8 unused, 13/24-h.p., 220-volt, 1,000/1,600-r.p.m. vertical spindle, totally enclosed Motors by Allen, Admiralty pattern.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 3167

9 15/7½ Dual Speed Squirrel Cage Metro-Vickers Motors, 400/3/50, at 975/475 r.p.m., and Allen West pillar type control gear.—Electric Machinery Co., Union Works, Union St., Ancoats, Manchester. Collyhurst 1352. 104

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60 h.p., 3/50/400-volt Metro-Vick. slipping Motor, 1,450 r.p.m., modern machine, splendid condition, with contractor type Igranite starting panel, floor mounting; also a similar Motor without starter.—Wm. Steward & Co. Ltd., 154, Albany Street, N.W.1. Euston 3763. 6360

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250 kW Rotary Converters (2), with transformers and switchgear, input 6,600 volts, 3-phase, 50 cycles, output 420/210 volts; also A.C. and D.C. Motors, Switchgear, Generating Sets, Welders, etc.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 295

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ONE secondhand 800/1,000-h.p. Diesel Engine; one secondhand or reconditioned 6,000-kVA Alternator; one secondhand ditto 3,000-kVA Alternator.—Box 3141, c/o The Electrical Review.

ONE 20-h.p., totally enclosed, slipring Motor, with reduction gears, to give an output speed of 35 r.p.m., for 400/50/3 cycles.—Box 144, c/o The Electrical Review.

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WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

22/6.6-kV, 3-phase, 50-cycle, outdoor type Transformers, H.V. bushings, I.V. boxes, impedance 5.5, 3,000, 2,000 or 1,000 kVA.—Box 6363, c/o The Electrical Review.

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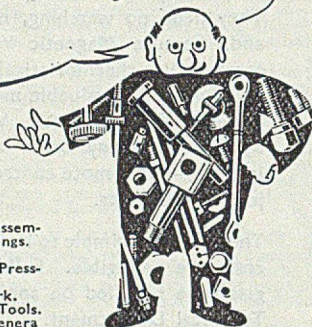
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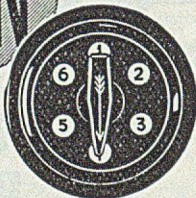
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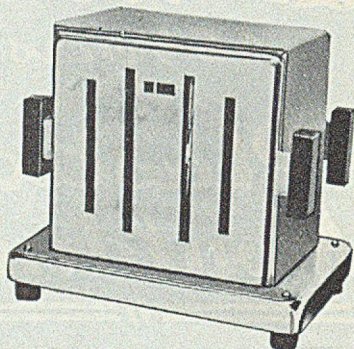
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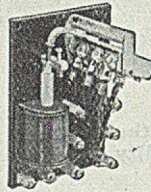
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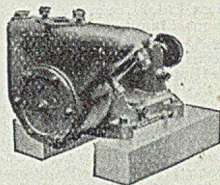
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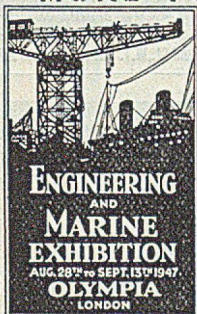
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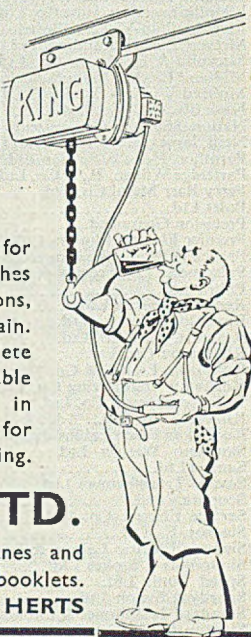
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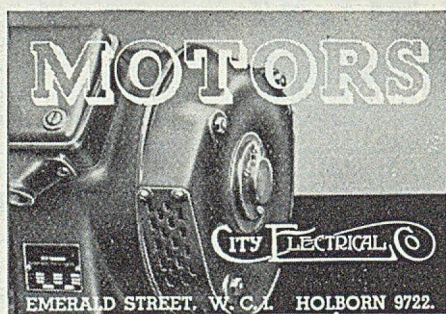
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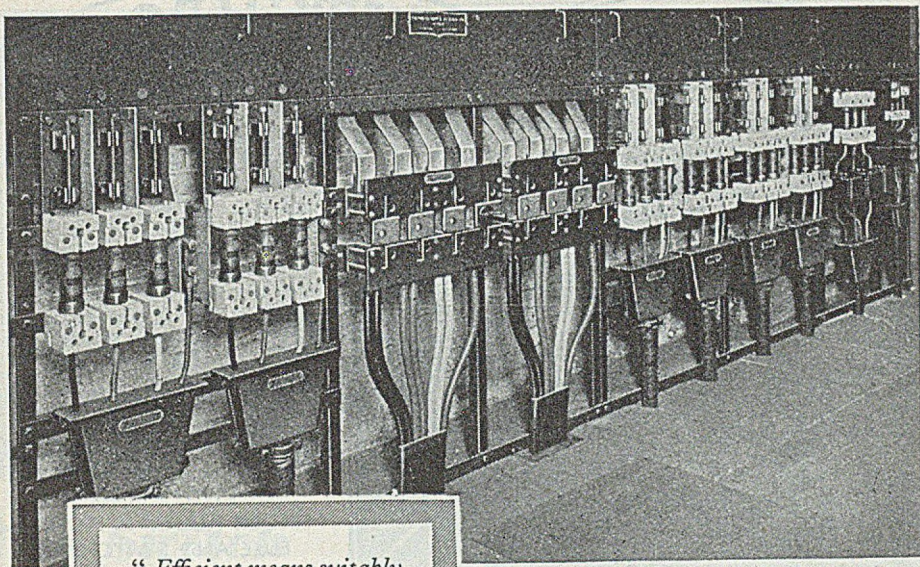
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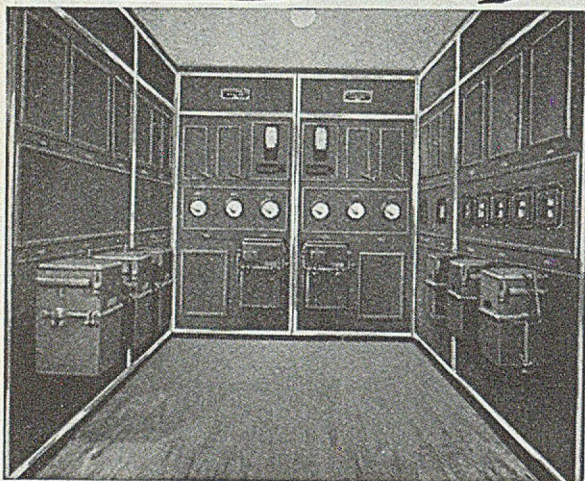
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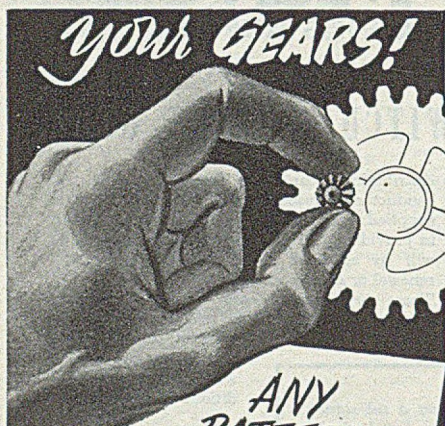


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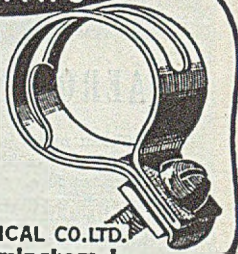
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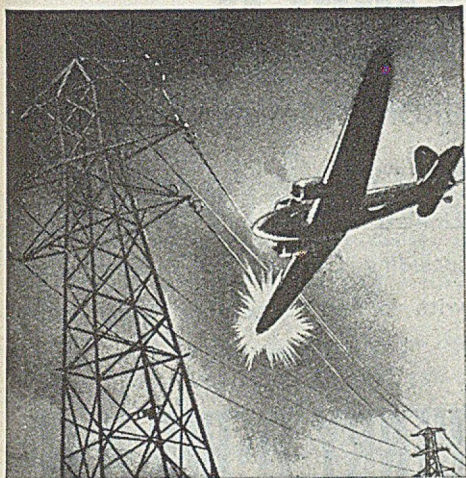
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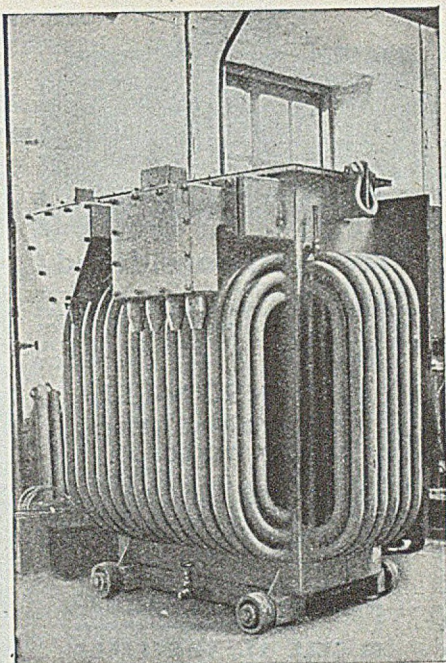
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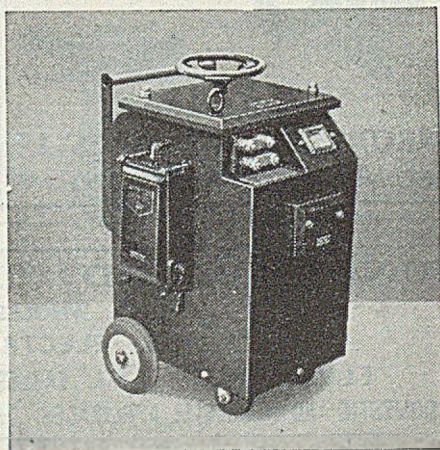
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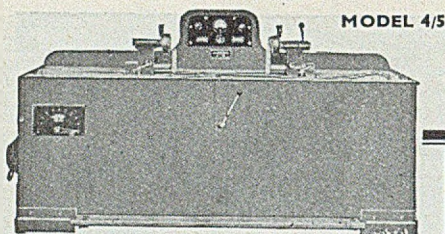
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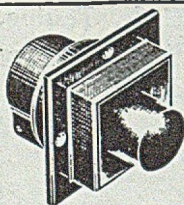
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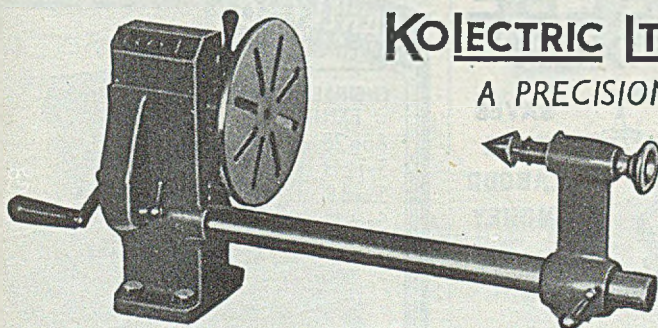
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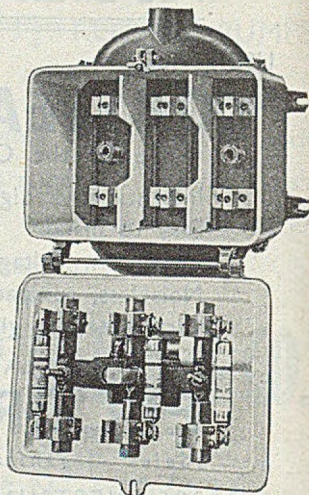
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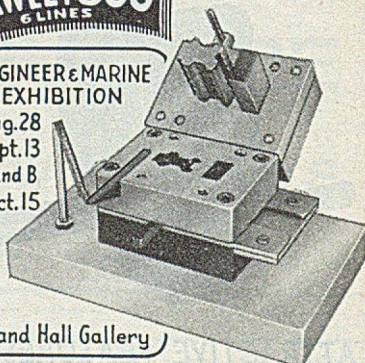
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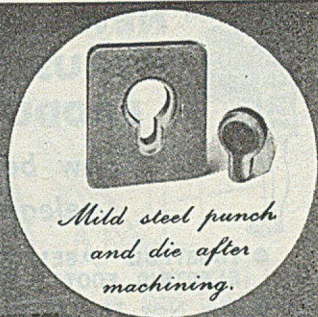
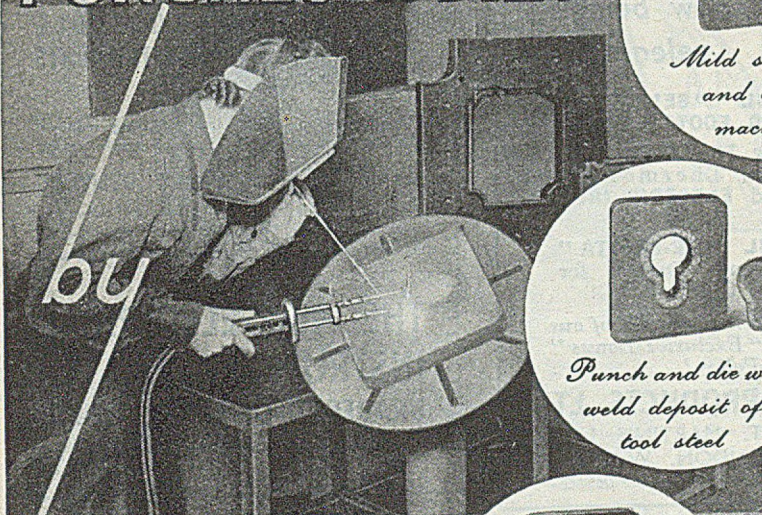
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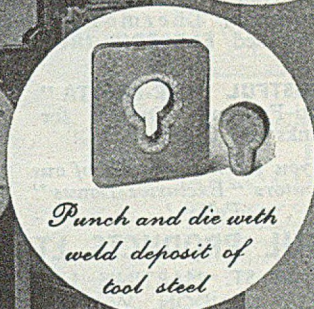
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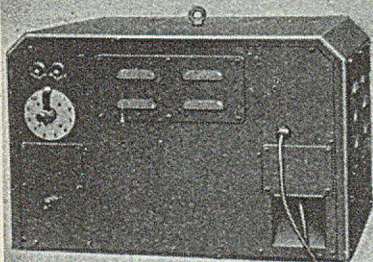


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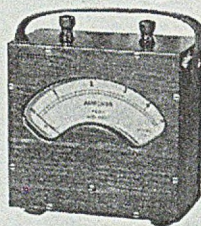
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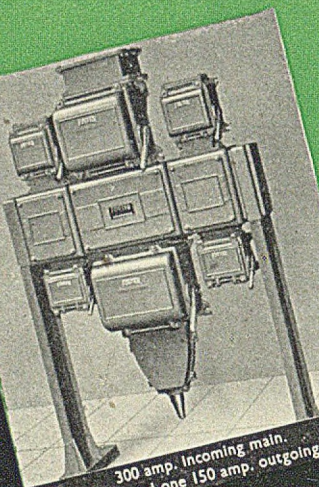
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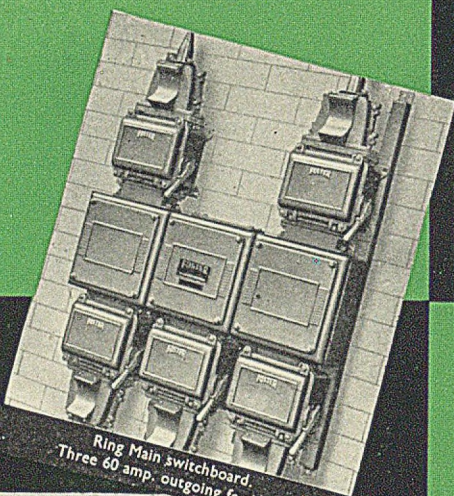
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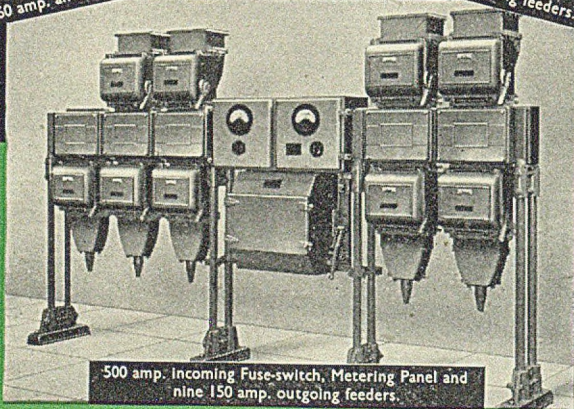
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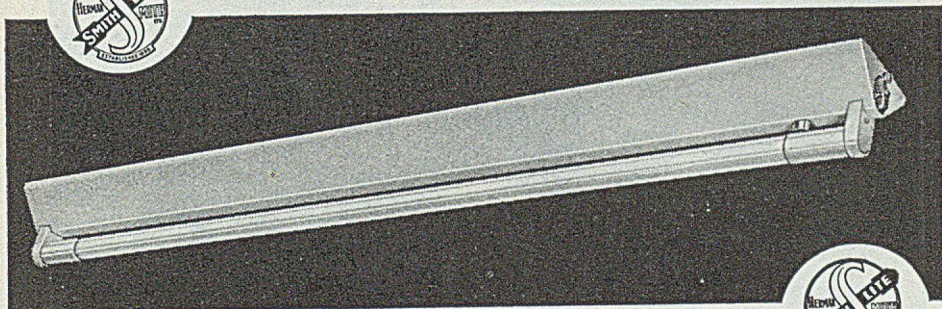
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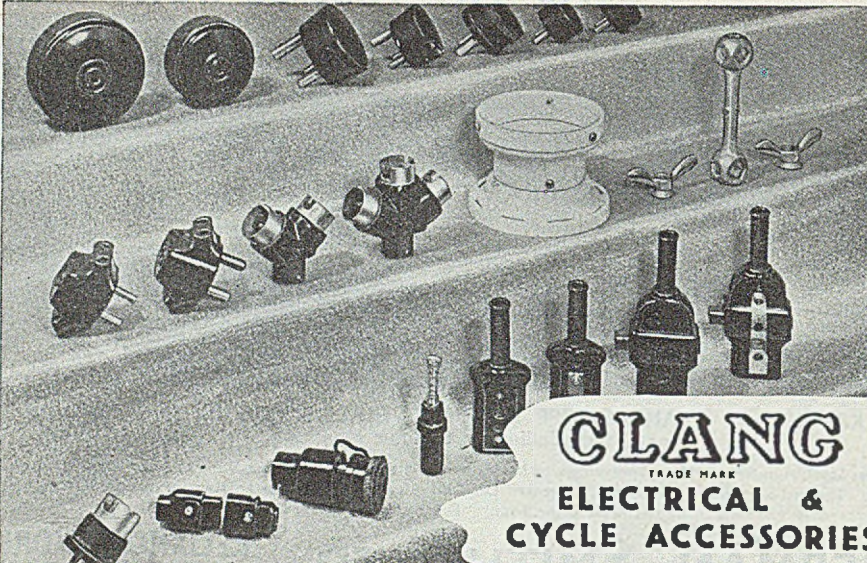


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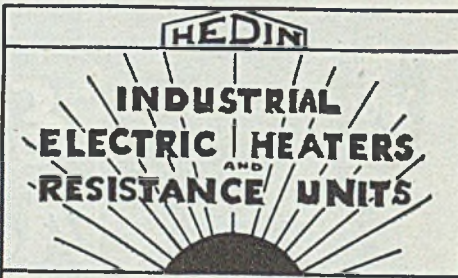
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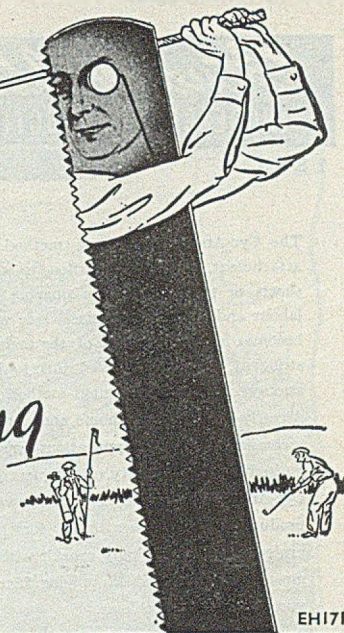
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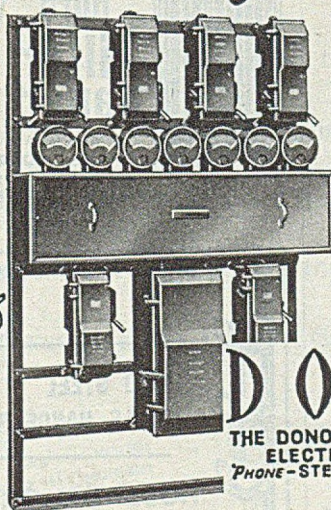
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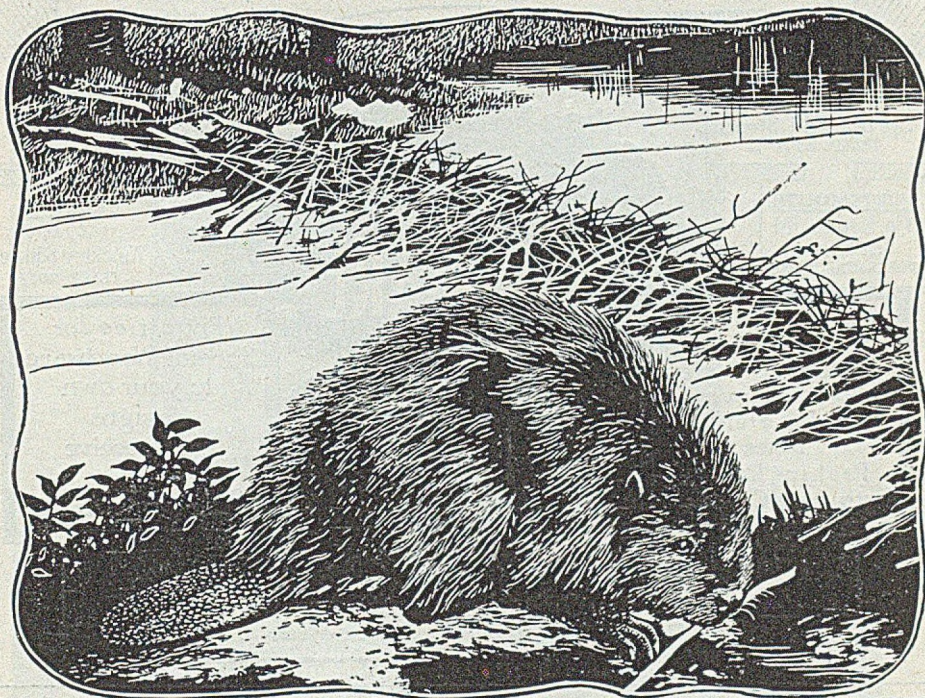
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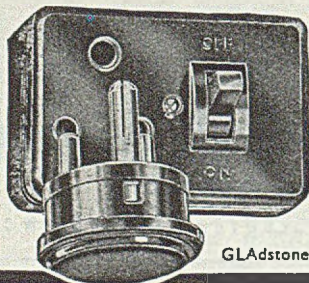
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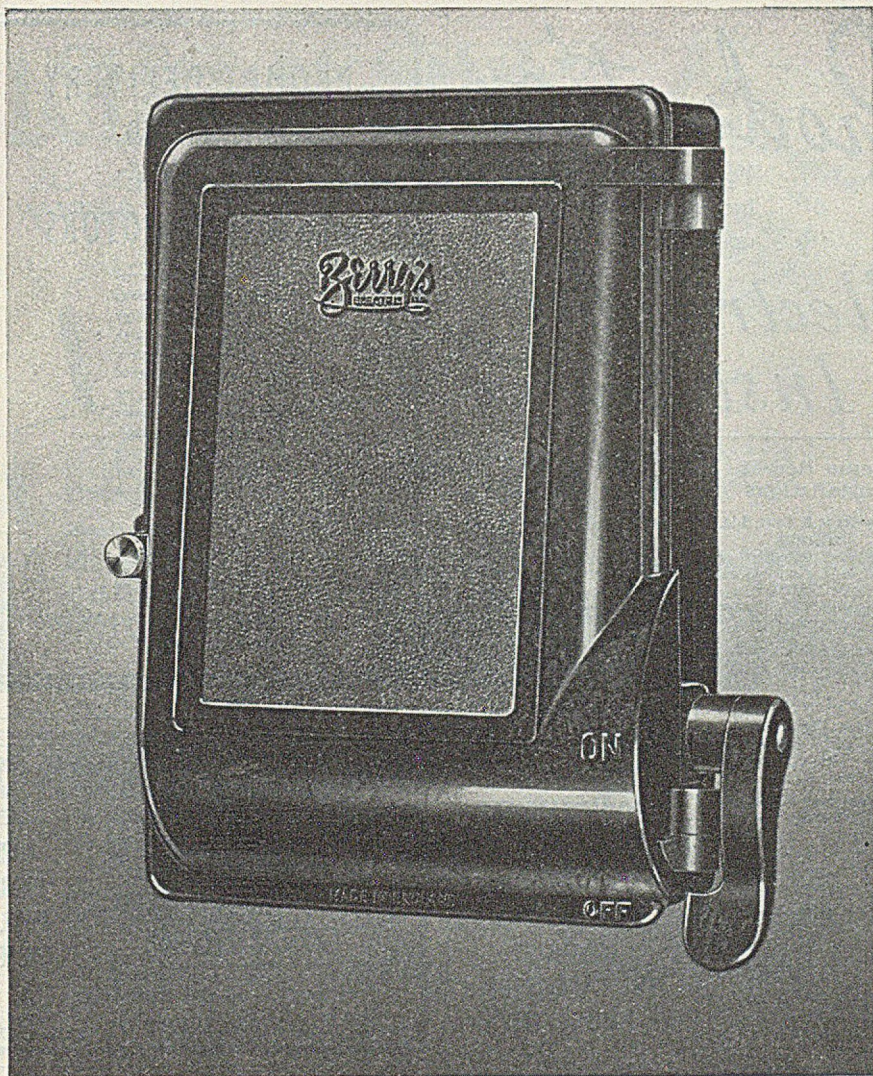
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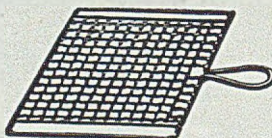
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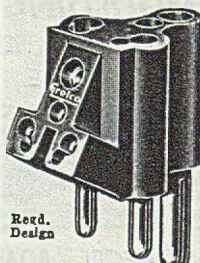
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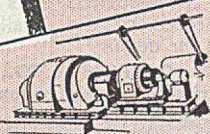
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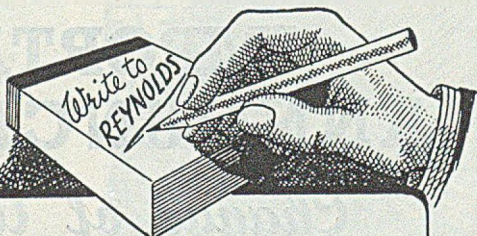
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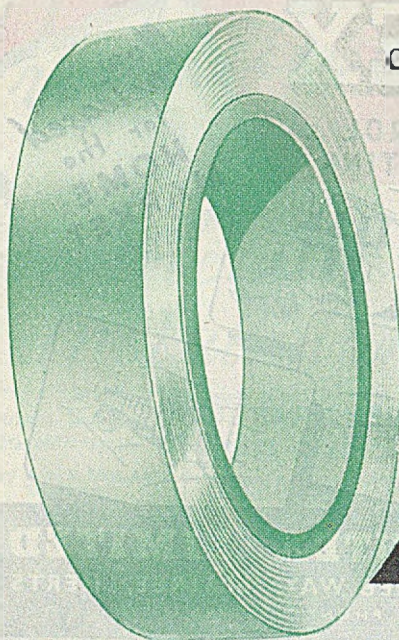
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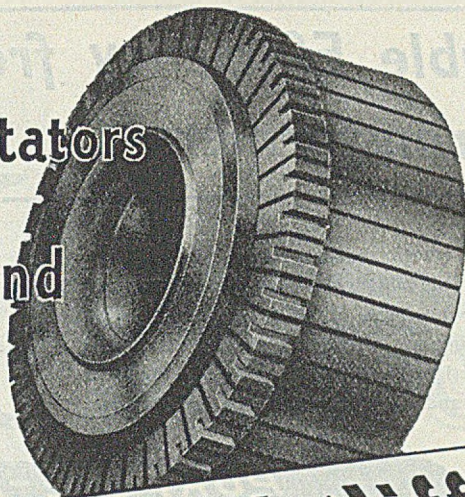
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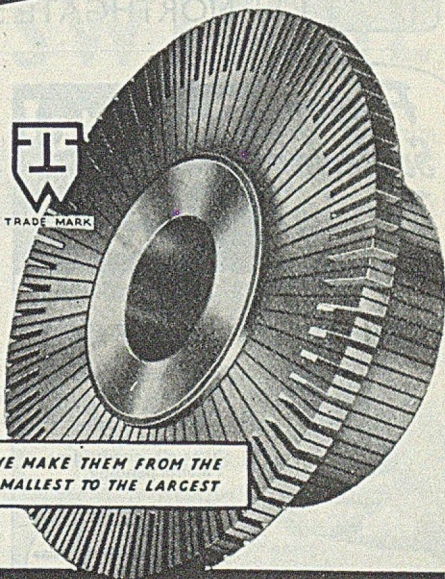
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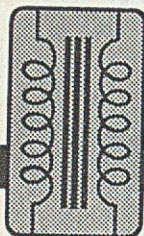
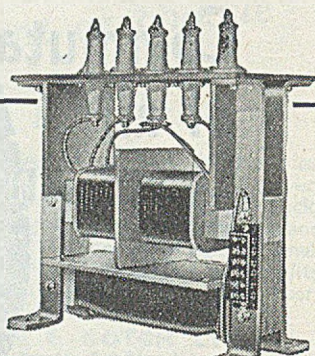
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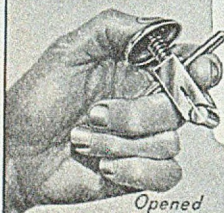


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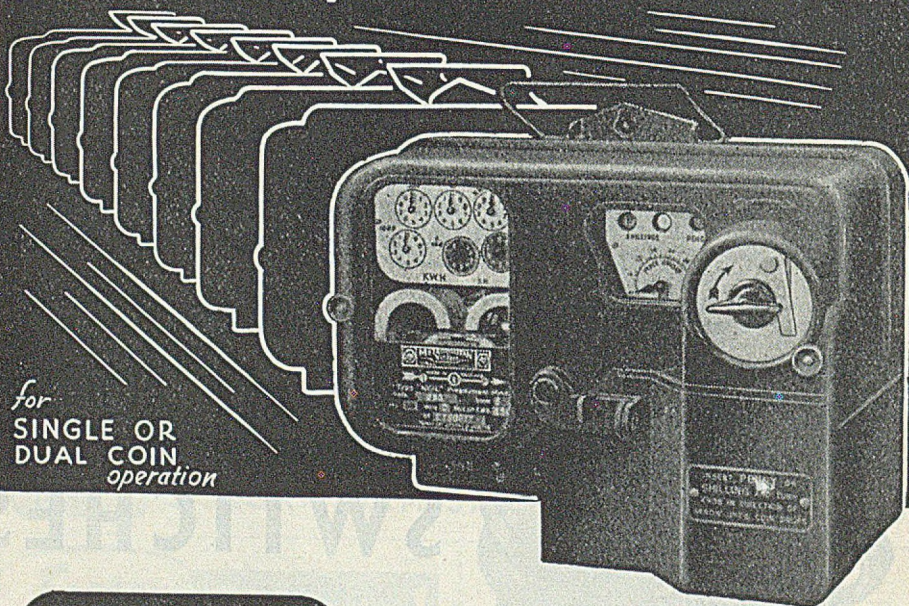
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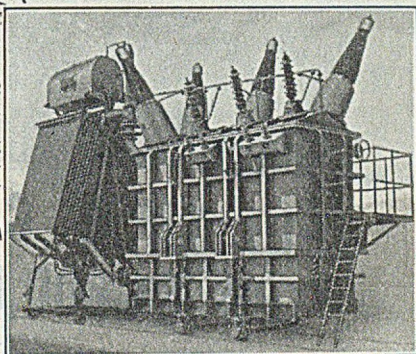
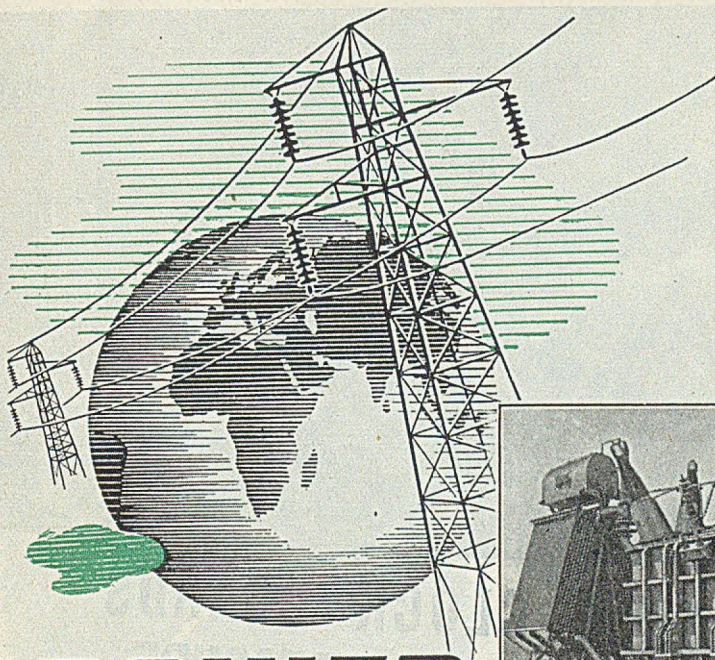
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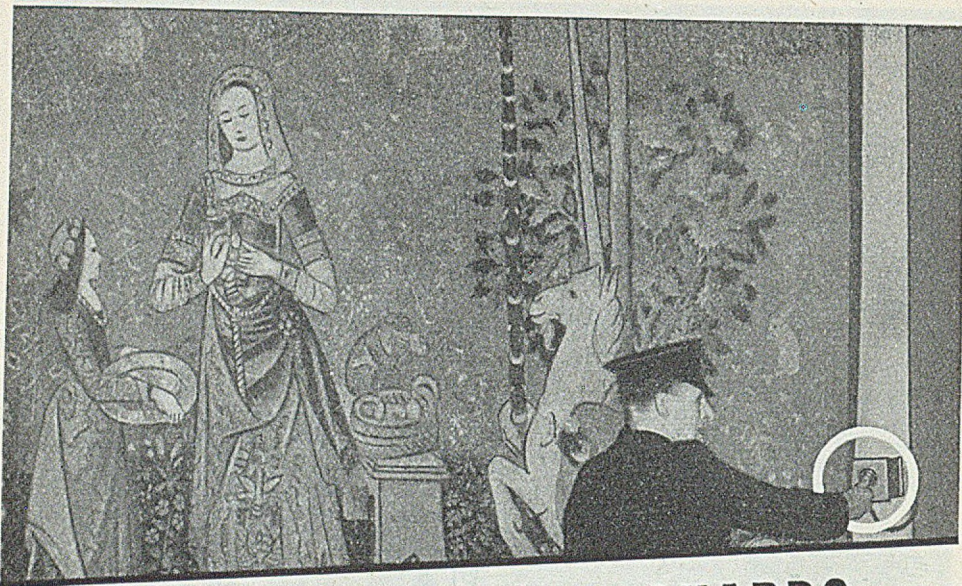


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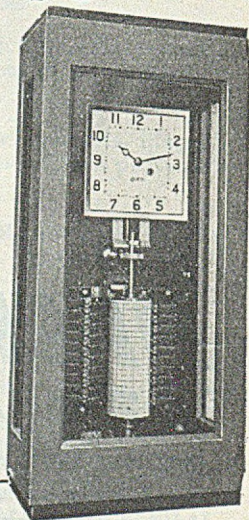
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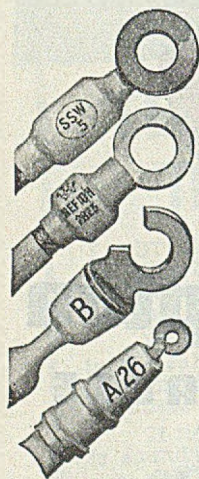
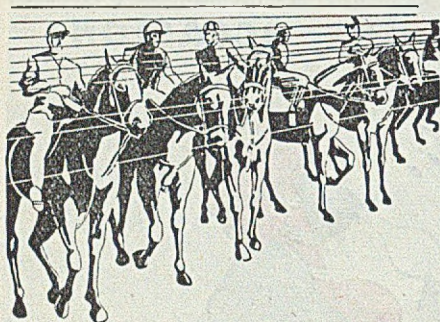
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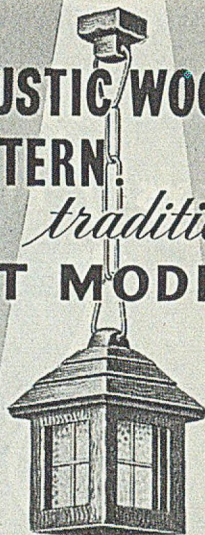
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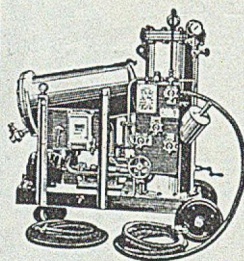
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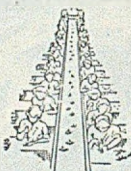
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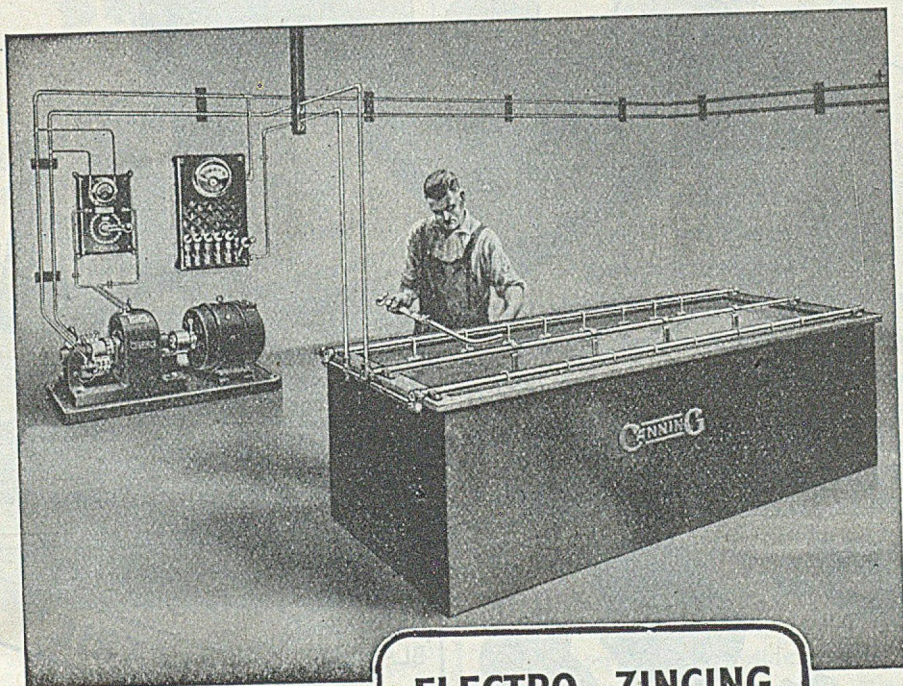
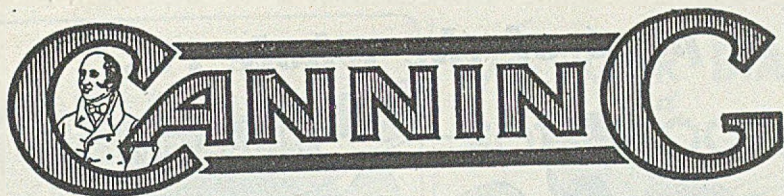
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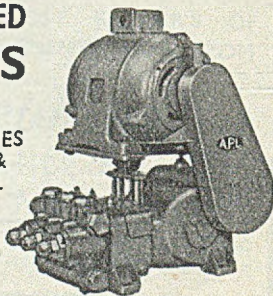
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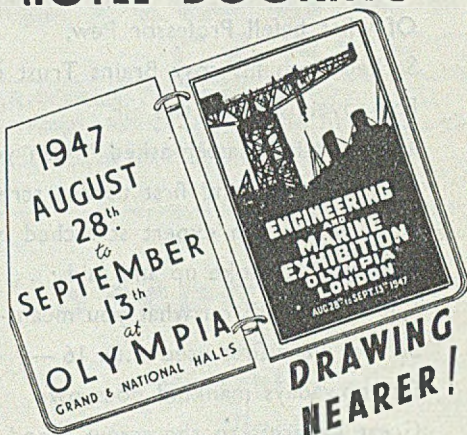


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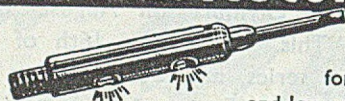
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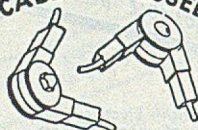
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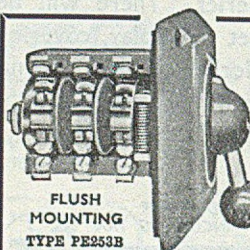


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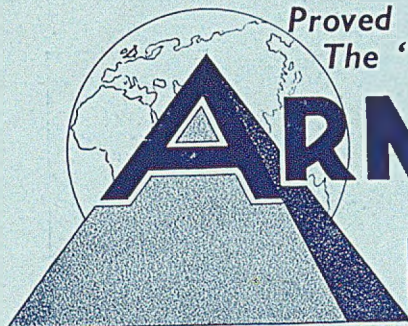
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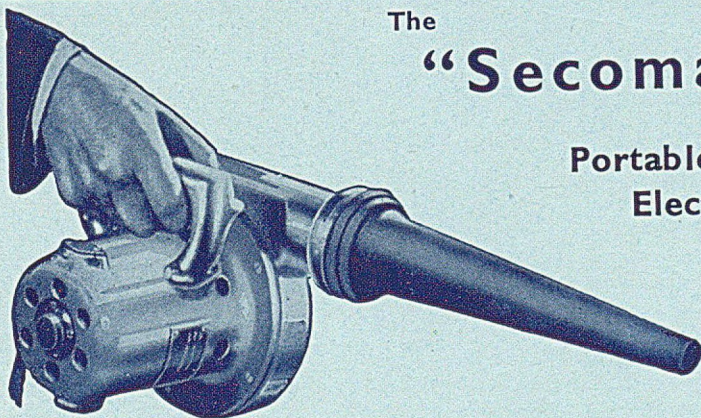
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