

ELECTRICAL REVIEW

FOUNDED
1872

Vol. CXXXV. No. 3484

SEPTEMBER 1, 1944

9d. WEEKLY



THE NEW CRAFTSMANSHIP FOR THE NEW CONSTRUCTION

The post-war demand that the building industry and its suppliers will have to face will be for quality in quantities. Only the New Craftsmanship of mass production can provide it. M.E.M. have demonstrated, in the manufacture of Switch and Fuse Gear, how the scientifically organised large-scale production of standardised designs can combine quality, quantity and low prices. M.E.M. will be ready for the new conditions.

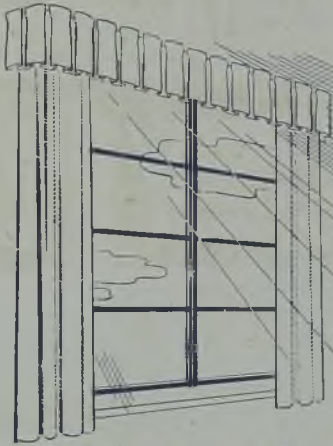


SWITCHGEAR

MOTOR STARTERS · FUSEGEAR

ELECTRIC FIRES

MIDLAND ELECTRIC MANUFACTURING CO. LTD., TYSELEY, BIRMINGHAM, 11
London Showrooms and Stores: 21-22 Rathbone Place, London, W.1 • Manchester Showrooms and Stores: 48-50 Chapel St., Salford, 3



Glass for Light

Glass in windows lets in the light either in walls or overhead and Holophane Glass Reflectors control the artificial light. Holophane units are scientifically designed to direct light down where it is wanted and at the same time to provide some upward light to relieve the darkness overhead. There is a Holophane unit for every purpose. Holophane engineers all over the country are ready to help you with your lighting.



Specialists
in Lighting
Research
and
Application
since 1898

HOLOPHANE

LIMITED

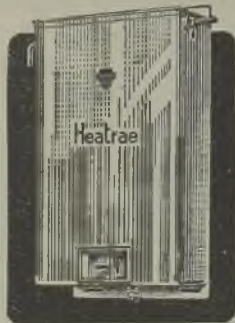
ELVERTON STREET, LONDON, S.W.1

Telephone
VICtoria 8062 (4 lines)

The Art of Knowing How



Just as Meteorologists must be able to forecast Weather conditions, so it is equally important in Electrical Water Heater design to anticipate the exact conditions under which each particular type of Heater will function.



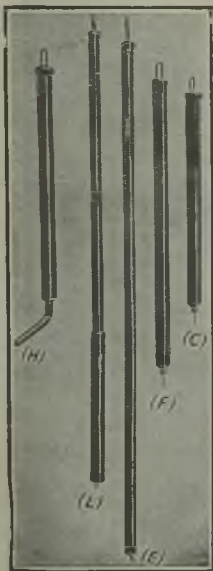
**LEADERS IN
ELECTRIC
WATER HEATING**



HEATRAE LTD., NORWICH

PHONE : NORWICH 25131

GRAMS : HEATRAE, NORWICH



IS IT ALIVE?

THE "PARTRIDGE" PRESSURE DETECTOR

(Regd. T.M. No. B.581955)
will infallibly tell you, giving
visible and audible indication
(No earth connection required)

Type	Range up to	Length of handle
C	Volts 11,000	36"
E	60,000	84"
F	15,000	48"
H	11,000	36"
L	33,000	72"

Also makers of "Westminster" Vacuum Tube Detector and H.T. Earthing Rods

Patent No. 619619

The WESTMINSTER ENG. Co. Ltd.
Victoria Road, Willesden Junction, N.W.10
Telephone: Telegrams:
Willesden 1700-1 "Regency, Phone, London."

TAG TERMINALS

FOR WIRELESS AND SIMILAR CONNECTIONS

A WIDE RANGE OF SIZES IN STOCK

ROSSCOURTNEY & Co. Ltd.

ASHBROOK ROAD, LONDON, N.19

ASSEMBLY BOLTS

to the specific requirements of our customers

Makers of all types of repetition products from the bar in all metals

M C L and REPETITION LTD.
Pool Lane - Langley - Birmingham.

You must have



in your

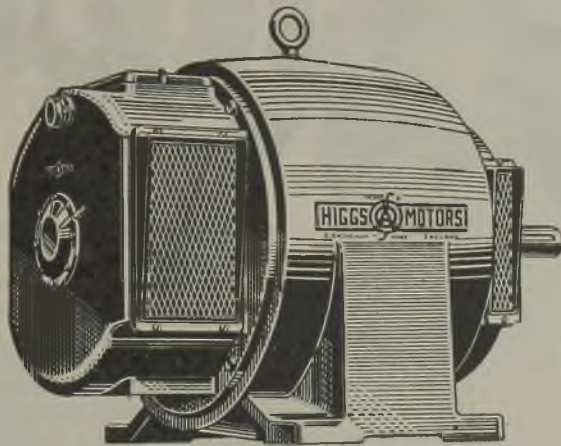
**ELECTRICAL
INSTALLATIONS**



Members of the Cable Makers' Association

THE LIVERPOOL ELECTRIC CABLE CO., LTD.

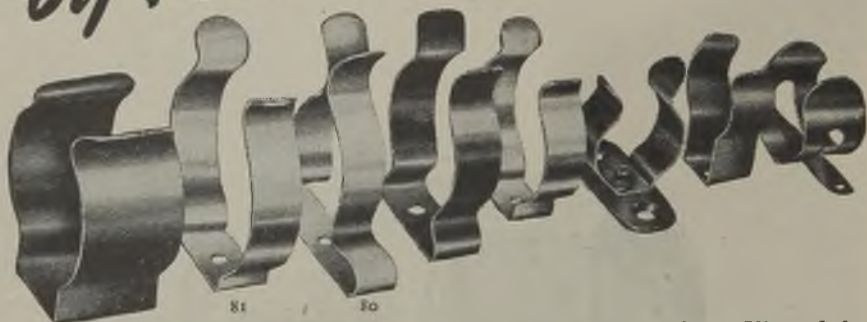
LINACRE LANE, BOOTLE, LIVERPOOL



Production for war has extended HIGGS' range of products and broadened our already extensive manufacturing experience. Consequently, when the era of competition returns and business is no longer "directed," HIGGS motors will more than ever merit the unfettered choice of discerning buyers.

Birmingham, Bristol, Dundee, Glasgow, London, Manchester,
Nottingham, Peterborough, Sheffield, Wolverhampton.

CLIPS by TERRY SPRINGS



TERRYS make hardened and tempered Steel Clips of the very highest quality.

We show here, among others, two of our stock lines—80 and 81—which are in constant demand. These along with other patterns from our very wide range can be delivered very quickly. If you want a special clip we shall be pleased to design and make one to suit your particular requirement.

Over 88 years of good spring making experience go into every clip we make. You *know* our Springs—our Clips are equally good.

JUST A FEW STOCK PATTERNS



— AND A FEW MADE TO ORDER



* Write today for comprehensive catalogue showing a remarkable variety of clips and small metal goods.

Sole Makers:

HERBERT TERRY & SONS L^{TD.} REDDITCH

LONDON

BIRMINGHAM

MANCHESTER T.C.1

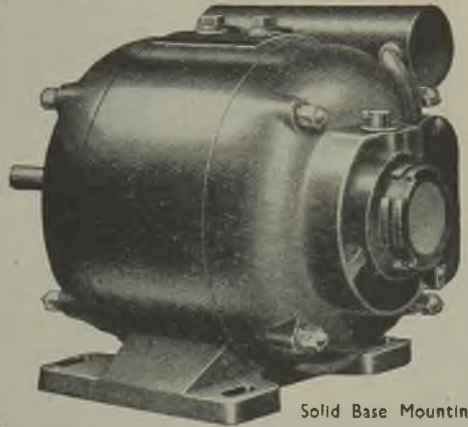


FRACTIONAL HORSEPOWER MOTORS

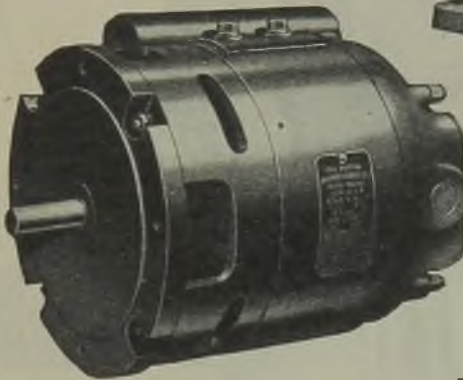
The most popular in the country

CAPACITOR MOTORS

$\frac{1}{2}$ H.P. to 1 H.P.
Up to 250 volts.
BALL OR
SLEEVE BEARINGS



Solid Base Mounting



Spigot Mounting
(Vertical, Horizontal,
or Inclined Positions)

Motors are available for :—

- Solid Base Mounting
- Cradle Mounting
- Resilient Mounting
- Resilient Mounting
fitted with
Automatic Belt-tension Adjuster
- Spigot Mounting

The most compact machines
obtainable compatible with
reliability, quiet running, and
proved performance.

BTH

THE BRITISH THOMSON-HOUSTON CO., LTD.
CROWN HOUSE, ALDWYCH, LONDON, W.C. 2



Flameproof Switchgear

SWITCHES

have removable solid copper links. Top and bottom terminal boxes either tapped for conduit or fitted with sealing boxes and glands for armoured cable.

RANGE

30, 60, 100, 150, 200, 300 ampere in double pole, triple pole, triple pole and neutral, and four pole.

Tested and certified by "Buxton" for Groups I and II gases under certificates FLP 1667, 1668, 1705, 1717, 1718, 1728 and for Group III gases under MD Tests P 199-200, 205, 209, 210 and 214.

FUSED SWITCHES

either HRC or rewirable. Solidly built quick make and break semi-rotary action giving simultaneous make and break on all poles.

Walsall

FLP

WALSALL CONDUITS LTD. WEST BROMWICH STAFFS.



Recommend Elasta Lamps, the lamps your customers can rely upon to give them dependable service all the time.

Elasta
ELECTRIC LAMPS

E.L.M.A. LAMPS MADE IN ENGLAND

POPE'S ELECTRIC LAMP CO., LTD.
5, EARNSHAW STREET, NEW OXFORD ST., LONDON, W.C.2

Telephone : TEMple Bar 6074.

Telegrams : "Duramentum, Westcent, London."

Branches holding stocks from which supplies can be obtained :-

MANCHESTER :
18 Pool St., Market Street.
Tel. : Deansgate 5687.

LEEDS : 6 Park Square.
Tel. : Leeds 22119.
Grams : "Pope's, Leeds 22119."

LEICESTER :
89 London Road.
Tel. : Leicester 59028.
Grams : "Pope's, Leicester 59028."

Grams : "Pope's, Deansgate 5687."
BIRMINGHAM : 3 Grosvenor Chambers,
Broad St. Corner, Broad Street.
Tel. : Midland 2580.

BRISTOL :
123 Victoria Street.
Tel. : Bristol 23239.
Grams : "Pope's, Bristol 23239."

Grams : "Pope's, Midland 2580, Birmingham"

BELFAST (Managers : Campbell, Gardner & Co.) : 27 Franklin Street.
Tel. : Belfast 25171. Grams : "Camergard, Belfast."

Liverpool Representative : Mr. B. MARKS, 29 Lascelles Road, Liverpool 19.

THE POCKET TESTOSCOPE

Size of a Fountain Pen

A convenient rapid fault-finding instrument for use on AC or DC Circuits



for use on 100-750 volts

FOR TESTING

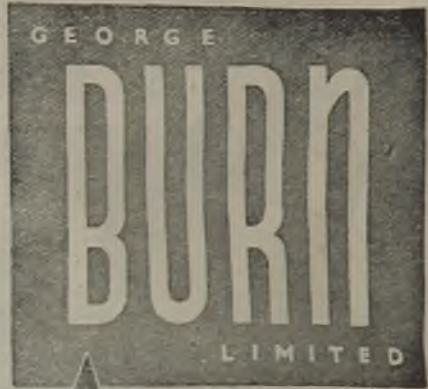
- SWITCHES OPEN CIRCUITS
- LIVE CONDUCTORS LEAKAGES
- EARTHS INSULATION VALUES
- NEUTRAL WIRE POLARITY
- CONTINUITY, ETC.

The Electrician's Good Companion.

DRAKE & GORHAM WHOLESALE LTD.

77 LONG ACRE, LONDON, W.C.2

Telephone : TEMple Bar 3993
MANCHESTER: 29 Piccadilly. BRIGHTON: 24 Marlborough Place. GLASGOW : 182 St. Vincent Street. BRISTOL : 2-4 Church St., Temple. DUBLIN: 2 Church Lane, College Midland Representative : [Green
W. T. BOWER, 184 Jockey Road, Sutton Coldfield



Remember the name - you'll want it again



CITY TUBE AND CONDUIT MILLS
SMETHWICK, BIRMINGHAM
Telephone Smethwick 1511 (5 lines)
London 79 Finsbury Pavement, E.C. 2
Liverpool Caledonian Buildings 15 Toxteth St. 2

U.S.P.

B.I. PVC

THERMOPLASTIC

CABLES & FLEXIBLE CORDS

STOCKS
HELD
AT ALL
B.I. BRANCH
OFFICES



*and conserve
rubber*



BRITISH INSULATED CABLES LTD.

Head Office:- **PRESCOT — LANCS.** Tel. No: **PRESCOT 6571.**

Outstanding Installation Accessories in the **TUCKER** range



SWITCHES

WAT	Dist
17.6	
18	
17.5	
18	
20	
18	
17.4	
18	
17.4	
20.4	
17.4	
17.4	
18	



TITAN

SHOCKPROOF SWITCHES

of colossal capabilities & diminutive dimensions.

For Post War installation schemes we shall be happy to place at the disposal of our many Trade friends the same high standards of design and performance which are standing the test of stringent war-time requirements.

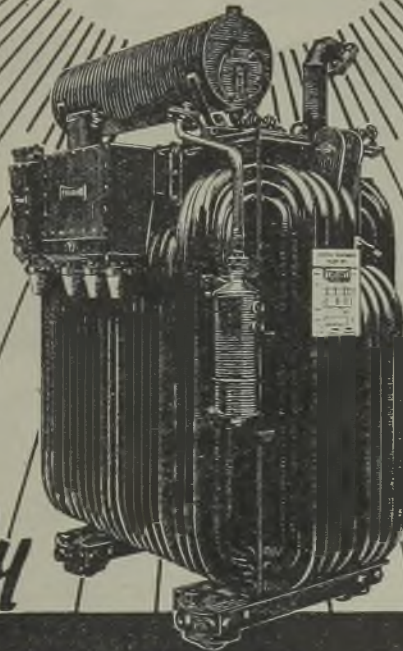


J. H. TUCKER & CO. LTD., Kings Rd., Tyseley, Birmingham 11

Makers of First Grade Electrical Accessories for 50 Years



For your
NEW
TRANSFORMER



Specify

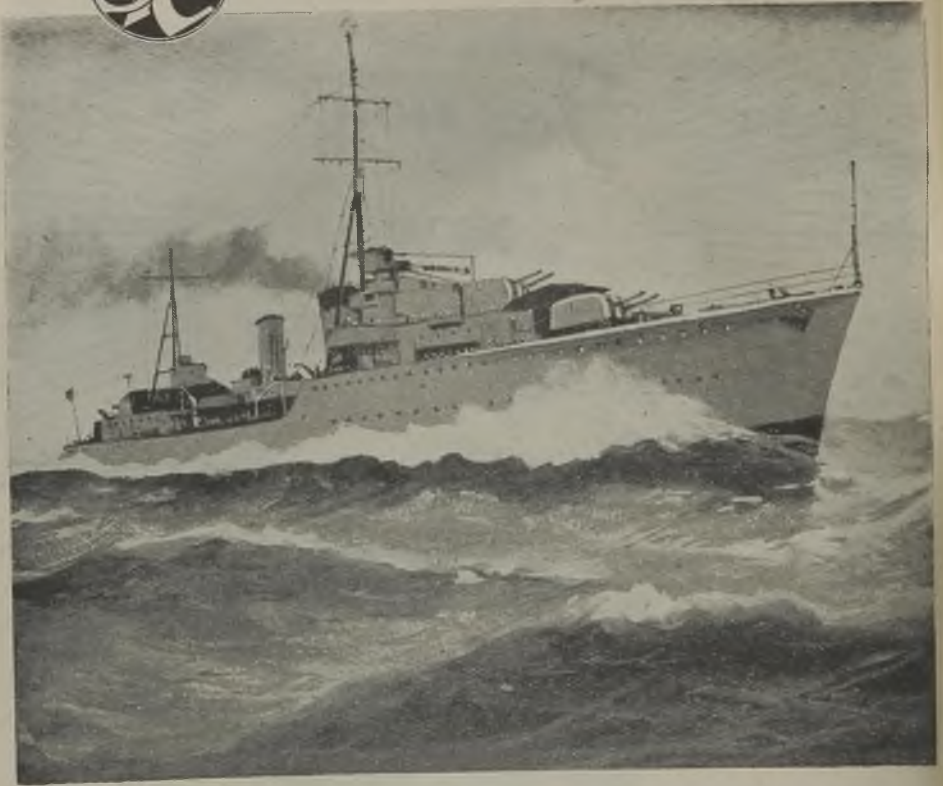
FT59

FERRANTI

FERRANTI LTD., Hollinwood, LANCs. London Office: Kern House, Kingsway, W.C.2



CABLES



V.I.R. and Synthetic Insulated Cables
produced by this Company are being
used for all essential war purposes

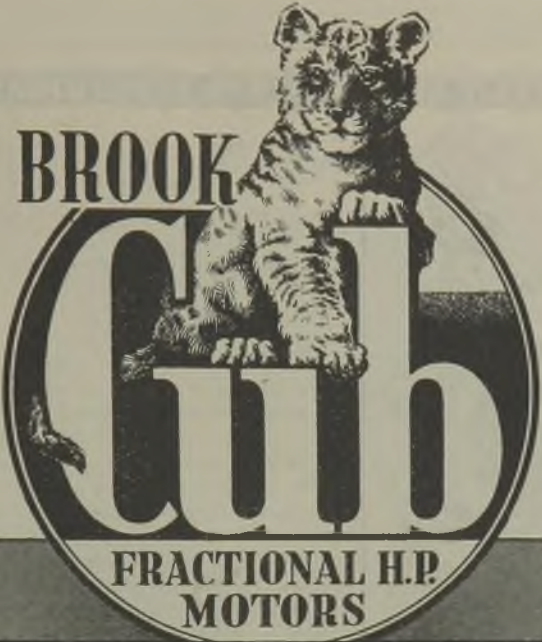
*Manufactured in accordance
with Government Specification*

Standard Telephones and Cables Limited

(Cable Sales Department)

North Woolwich • London • E.16

Telephone : Albert Dock 1401



ALTERNATING CURRENT ONLY

BALL BEARINGS • LOW IN COST

WITH OR WITHOUT FEET



B R O O K M O T O R S L I M I T E D

E M P R E S S W O R K S • H U D D E R S F I E L D

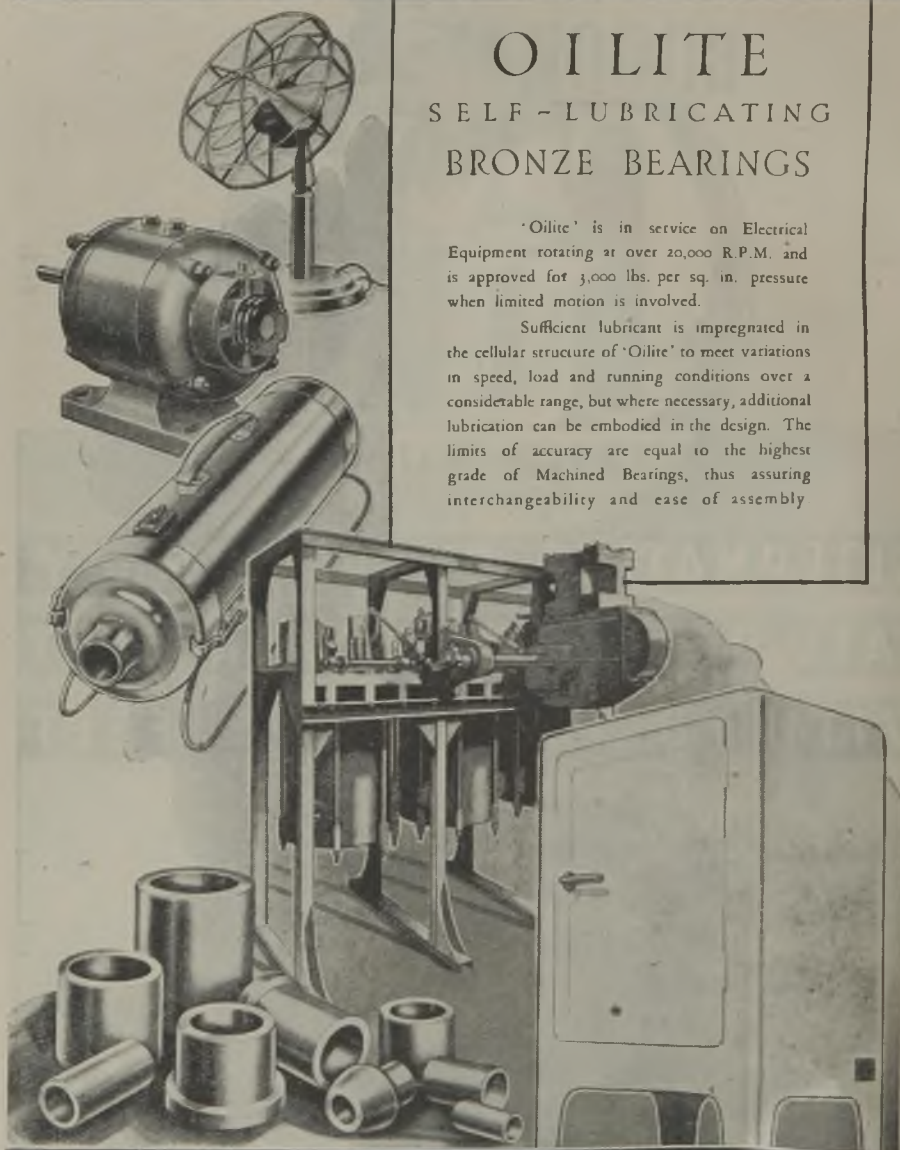
'OILITE' APPLICATIONS IN THE ELECTRICAL FIELD

OILITE

SELF-LUBRICATING BRONZE BEARINGS

'Oilite' is in service on Electrical Equipment rotating at over 20,000 R.P.M. and is approved for 3,000 lbs. per sq. in. pressure when limited motion is involved.

Sufficient lubricant is impregnated in the cellular structure of 'Oilite' to meet variations in speed, load and running conditions over a considerable range, but where necessary, additional lubrication can be embodied in the design. The limits of accuracy are equal to the highest grade of Machined Bearings, thus assuring interchangeability and ease of assembly.

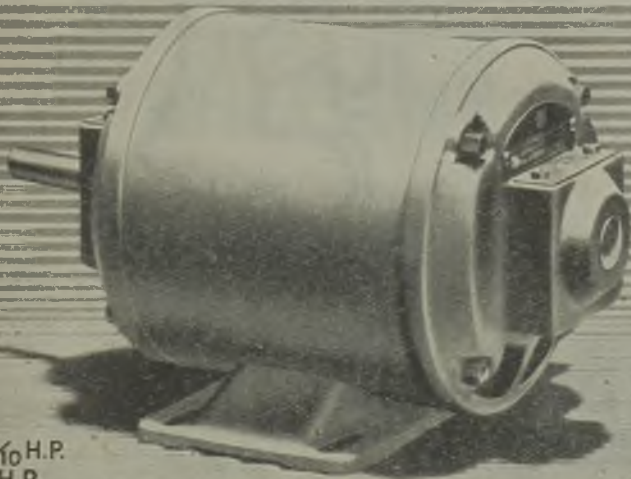


THE MANGANESE BRONZE & BRASS CO. LTD
HANDFORD WORKS, IPSWICH

TELEPHONE IPSWICH 2127 TELEGRAMS BRONZE IPSWICH



FRACTIONAL H.P. MOTORS



From $\frac{1}{10}$ H.P.
to 1 H.P.



*Specify
'English Electric'
for
Excellence & Efficiency*

THE ENGLISH ELECTRIC COMPANY LTD.
— STAFFORD —



CROMPTON
V.I.R. CABLE



WILL NEVER LET YOU DOWN



CROMPTON PARKINSON LIMITED ELECTRA HOUSE, VICTORIA EMBANKMENT, LONDON, W.C.2
 Telephone: TEMple Bar 5911
 Telegrams: Crompark, Strand, London



STILL THE BEST

ELECTRIC COOKERS

ELECTRIC FIRES

ELECTRIC IRONS

ELECTRIC TOASTERS, ETC.

When obtainable again after the war
they will be **STILL BETTER**

ELECTRICAL DOMESTIC APPLIANCES
Elexcel Ltd., Victor Works, Broad Green, Liverpool, 14

ARM OF THE LAW...

THERE HE STANDS—symbol of authority in an orderly World — controlling — directing — obeyed because absolutely trustworthy and reliable.

What a fitting comparison with BIRCH RESISTANCES, *Arms of the Ohm's Law.*

Backed by many years of practical experience in which their reliability has been tested under all conditions, BIRCH RESISTANCES, in their various applications, stand up to their job and can always be depended upon to provide specified service because of their first-class workmanship.

Birch

Please call upon us to help you solve any Resistance problem.

Resistances

May we quote you for any of the following:—

DIMMERS — REGULATORS (Field, Shunt, Voltage) — **RESISTANCES** (Arc Lamp, Charging, Regulating, Sliding) — **RHEOSTATS — ELEMENTS and SPIRALS.**

H. A. BIRCH & CO. LTD., Wilohm Works, Wood Street, WILLENHALL, STAFFS.
 Telegrams: "WILOHM" Willenhall. Telephone: Willenhall 494-495

ARMS OF THE OHM'S LAW





Won't it be grand?

CLIVE UPPON

TITANINE

LACQUERS · PAINTS · VARNISHES · ENAMELS



NOW on war production.
AFTER VICTORY—finishes to
protect and beautify man's
products and possessions.

HEADQUARTERS: 100, GOSWOLD ROAD, LONDON, N.W.9

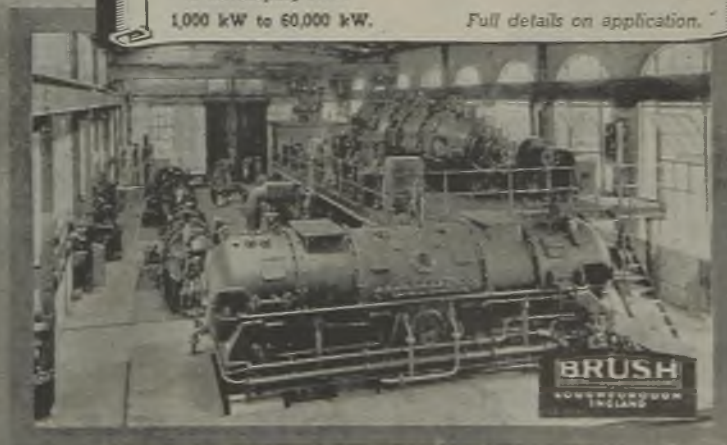
TELEPHONE COLINDALE 8123

BRUSH**L J U N G S T R Ö M****TURBO - ALTERNATORS****COMPACTNESS WITH HIGH EFFICIENCY
FOR SMALL OR LARGE STATIONS**

Top illustration shows a 37,000 kW Turbo-Generator typical of many sets installed in large power stations, whilst below is a group of smaller sets of various sizes installed from time to time in an industrial station to meet a developing load.

1,000 kW to 60,000 kW.

Full details on application.

**BRUSH**
LUNDS
LONDON
MILAN



Callender

RADIO FREQUENCY CABLES

for

ELECTRONICS RADIO EQUIPMENT TELEVISION TELECOMMUNICATIONS

We are specialists in the design, production and testing of all types of low loss and low capacity cables for use at high frequencies. We shall be pleased to make available the accumulated experience of our research and technical organizations in connection with special radio frequency cable problems directly related to the national effort.



CALLENDER'S CABLE & CONSTRUCTION CO. LTD. HAMILTON HOUSE, VICTORIA EMBANKMENT, LONDON, E.C.4

All over the World

The
NATIONAL
FIRE PROTECTION
COMPANY LIMITED

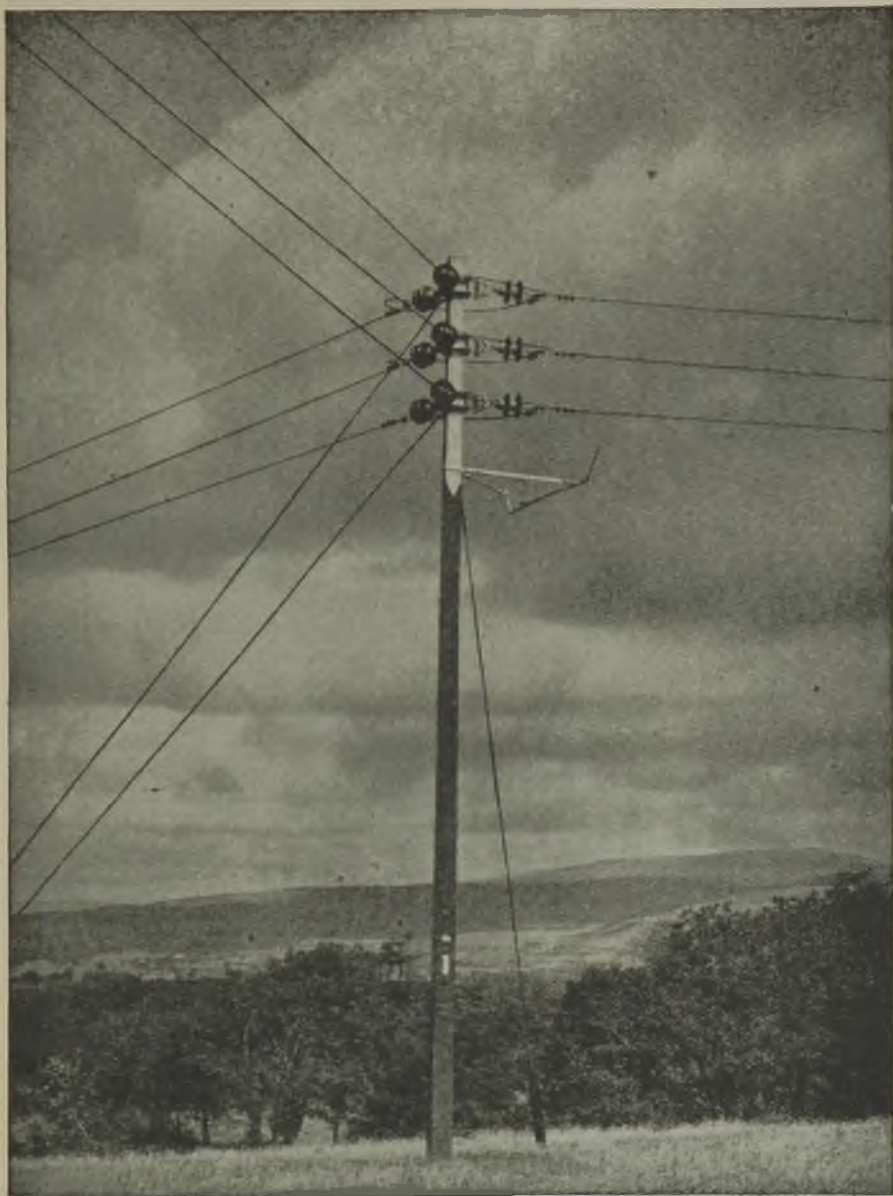
RICHMOND • SURREY

Telephone RICHMOND 2342-3-4



TRADE MARK

Sole Manufacturers of the
Essex
TRADE MARK
METHYL BROMIDE
FIRE EXTINGUISHING EQUIPMENT



THE ENFIELD CABLE WORKS LTD.

Telephone: Howard 2661 (10 lines)

BRIMSDOWN • MIDDLESEX



THE EDISON SWAN
ELECTRIC CO. LTD.



THOS. ALVA EDISON
First practical Incandescent
Electric Lamp 1879.

*No other lamp
has a name like*

R O Y A L

"EDISWAN"



FOR EFFICIENCY, ECONOMY & SERVICE

SIR JOSEPH WILSON SWAN
First practical Incandescent Electric Lamp 1878.

SUPER GRIPPER

ALL INSULATED

HANDLAMP

For use in conditions of special danger

17⁸/₁₆

+33¹/₃%

(SUBJECT)

plus Purchase Tax

(Ref. A.45)



BRITISH CENTRAL ELECTRICAL CO. LTD.
6-8 Rosebery Ave. London E.C.1 Terminus 2525

CONDENSING PLANT

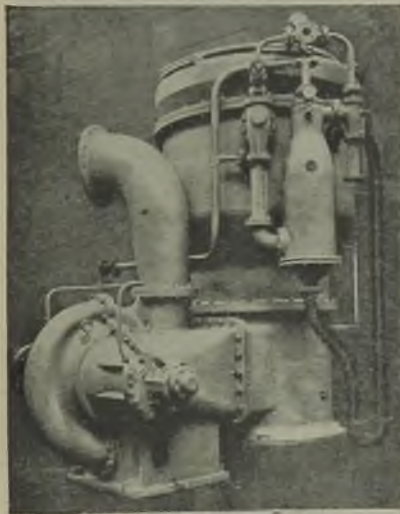
Surface and Jet Types

and all

AUXILIARY EQUIPMENT

from

Turbine Flange to Boiler Check Valves



The illustration shows a Hick Hargreaves Low Level jet type Condensing Plant with "Hivac" Ejector and split casing Extraction Pump working in conjunction with a 5,000 kW. Turbo-Alternator.

HICK HARGREAVES
AND COMPANY LIMITED

Phone : 1373 (3 lines)

BOLTON

Grams : "Hick, Bolton"

AD 48 C

Switchgear by Specialists

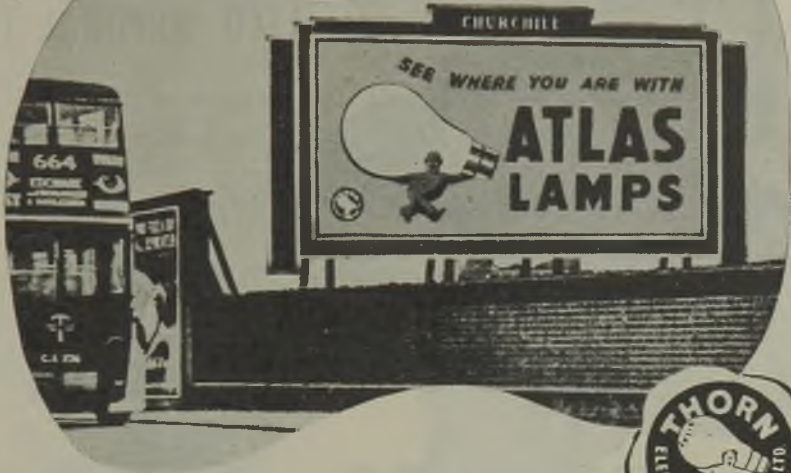


Installed Intelligently

Controlled Confidently

REYROLLE
HEBBURN-DUN-TYNE
ENGLAND

It's that Man again!



Millions of people are meeting him to-day . . . in the streets, the big railway terminals, in the national and provincial press, in the evening newspapers and on the Underground . . . and they are taking to him enthusiastically. Thanks to that little man they have found a lamp that costs a little less yet is of the highest quality obtainable. So stock up with Atlas Lamps, they are always readily acceptable and offer you a better discount and a more generous rebate.

Sell Atlas for more profit.

Contact us for terms to-day

ATLAS LAMPS

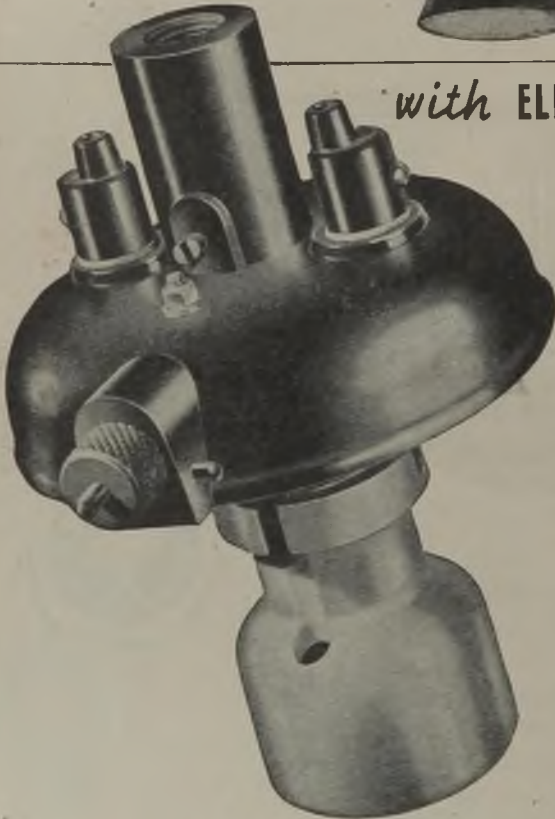
THORN ELECTRICAL INDUSTRIES LTD., JUDD STREET, LONDON, W.C.1. 'Phone : Euston 1183
 Northern Branch : 55 Blossom Street, Manchester 'Phone : Central 7461
 N.E. Depot : 46 Sandhill, Newcastle-on-Tyne, I. 'Phone : Newcastle 24068

Eleco Reflector-Type Fittings

(A) S. L. R.
(B) ANGLE



with **ELECO** TERMINAL TOP



ALL WIRING COMPLETE

Every fitting sent out is completely wired and ready for use. A big saving in time and cost.



EASY CLEANING

The reflector is instantly detachable and every part of lamp and fittings readily accessible.



NO RISK OF OVERHEATING

The wiring cables are connected to two **INSULATED Bakelite Terminals OUTSIDE** the fitting, eliminating all danger of overheating.



SAFE INSULATION

All live parts are thoroughly protected and comply with Home Office requirements.



Is your lighting scientific? Has it been O.K.'d by a competent engineer recently? If not, let an Eleco expert visit your works and report to you in that case.

Send for Folder Now!

ENGINEERING & LIGHTING EQUIPMENT CO. LTD
DEPT. W.S., SPHERE WORKS, ST. ALBANS, HERTS.

(Phone: St. Albans 2258-59)

ELECO

DAVENSET

"FLUXOMATIC" THE NEW CHARGING SYSTEM!

Railway Engineers and all users of traction Batteries have, for many years, sought a battery charging system that is automatic in operation.

The Davenset Fluxomatic System has provided the answer.

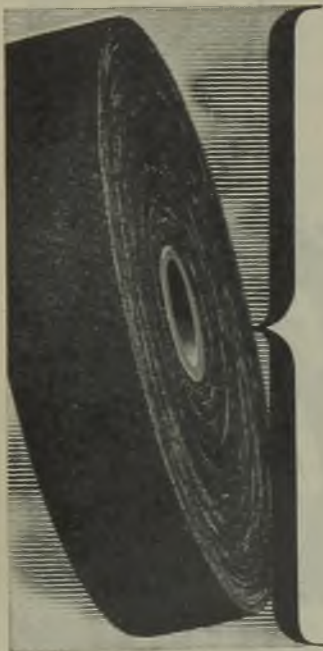
Without manual control, a constant pre-determined current is maintained against a rising battery voltage.

The charging rate, having been pre-set, is unaffected by normal mains fluctuations, and the regulation of the charge current is entirely automatic, irrespective of the battery voltage.



The advantages of these features, coupled with a reduction in the re-charging time, will be apparent to all battery users, and we shall be glad to send full particulars and diagrams on application.

E. PARTRIDGE WILSON & CO. LTD.
MANUFACTURING ELECTRICAL ENGINEERS
DAVENSET ELECTRICAL WORKS, LEICESTER.



CONNOLLY'S

WAR EMERGENCY

LIMPET ADHESIVE TAPE

To meet the shortage of rubber we have temporarily ceased manufacture of the famous "Blackley," "Limpet" and "Jockey" tapes and in their place is introduced a "War Emergency Limpet" tape, which will meet all the exacting requirements of B.S.S. 1078-42 consistent with the lowest possible consumption of rubber.

This tape represents the highest quality which can now be manufactured. It is sold only on a yardage basis in $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1" widths, in rolls of 50-yds., 25-yds. and 10-yds.

We shall be pleased to furnish prices, technical data, etc., on application.

CONNOLLY'S (BLACKLEY) LTD., MANCHESTER 9

Telephone: Cheetham Hill 1801 (3 lines)
Telegrams: "Connollys, Blackley."

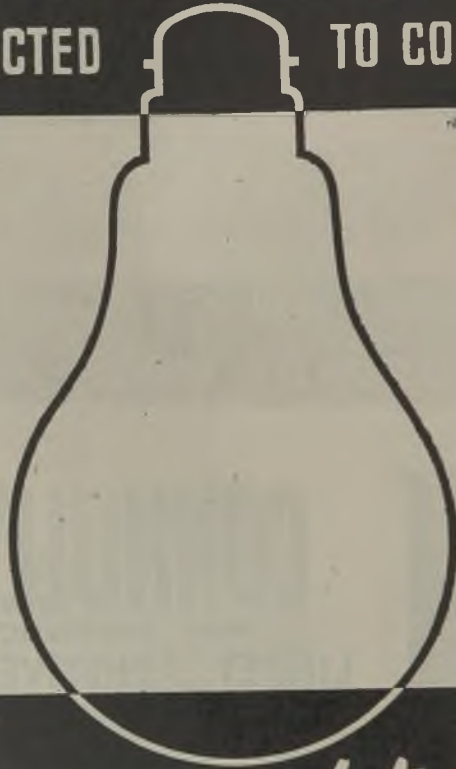
London Office: **OSWALDESTRE HOUSE, STRAND, W.C.1**

Telephone: TEMple Bar 5506-7
Telegrams: "Syllonoc, Estrand, London."

CRYSELCO

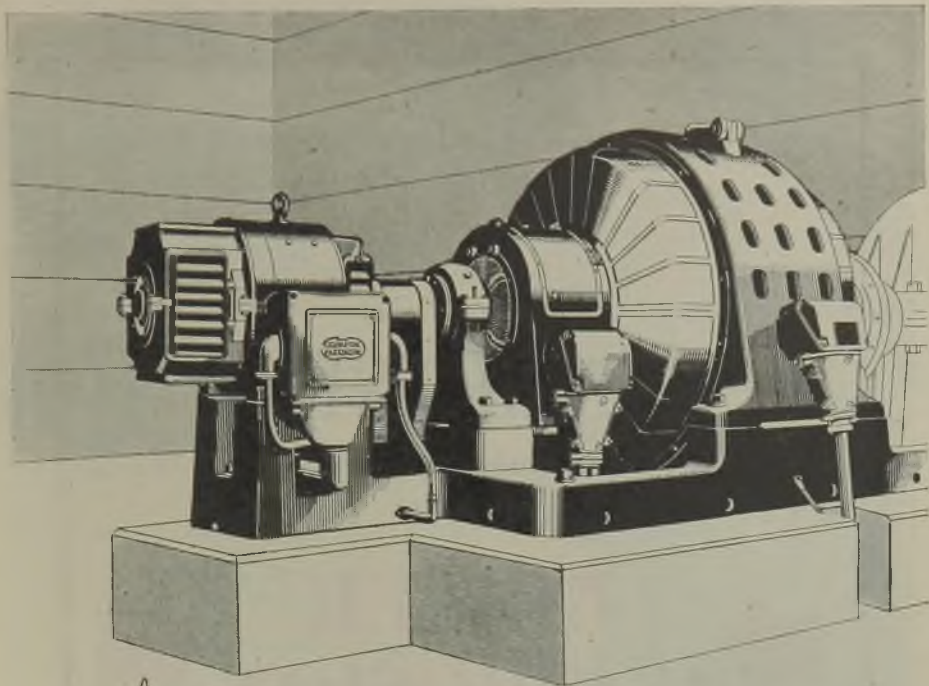
CONSTRUCTED

TO CONSERVE



Save light
- save FUEL

CRYSELCO · LIMITED · BEDFORD



POWER PLUS

power factor correction . . .

This is one of several 1000 h.p. Crompton Auto-Synchronous Motors installed in a large South Wales cement works. While being used for important drives they, at the same time, correct power factor and prevent waste in the system.


CROMPTON PARKINSON
LIMITED

ELECTRA HOUSE · VICTORIA EMBANKMENT · LONDON · W.C.2 and Branches

*Readers of the article
"OCCLUDED GASES"
in the March 17th issue
of "Electrical Review"
were told that*

AMMONIA

*in make-up water
can cause*

 **BOILER
CORROSION** 

*They may not know
that PERMUTIT'S*

"DEMINROLIT"

PROCESS

*is in use for Ammonia
Removal at large
generating stations
in this country.*

Full particulars on application to The Permutit Company Ltd.,
Water Treatment Engineers, Permutit House, Gunnersbury Avenue, W.4.
(Telephone: Chiswick 6431)

Small INDUSTRIAL TYPE

SWITCHGEAR S.F. II

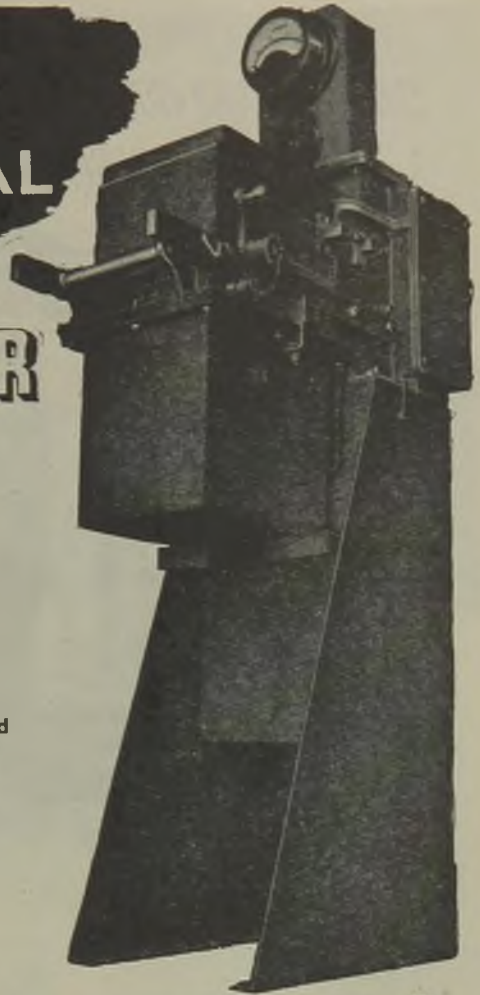
- For use up to 3.3 kV.
- Air Insulated — Draw-out Pattern — Oil Break.
- Fully interlocked mechanically.
- Good access to internal parts.
- Supplied in unit or switchboard form

PROTECTION

- Overcurrent
- Earth-fault
- Under-voltage

INSTRUMENTS & METERS

can be supplied to meet average requirements.



**METROPOLITAN
Vickers** CO. LTD.
ELECTRICAL
TRAFFORD PARK ... MANCHESTER 17.



F/K402

INCREASE PRODUCTION BY *Consulting* **METROVICK'S**
ILLUMINATING ENGINEERS

*CORROSION
IS OUR CONCERN*



—our concern because we are determined that the speed of its damage to, and ultimate destruction of Wire and Wire Ropes shall be reduced to an absolute minimum. The solution of the problem rests with the quality of Zinc Coating and the method of its application. Thus

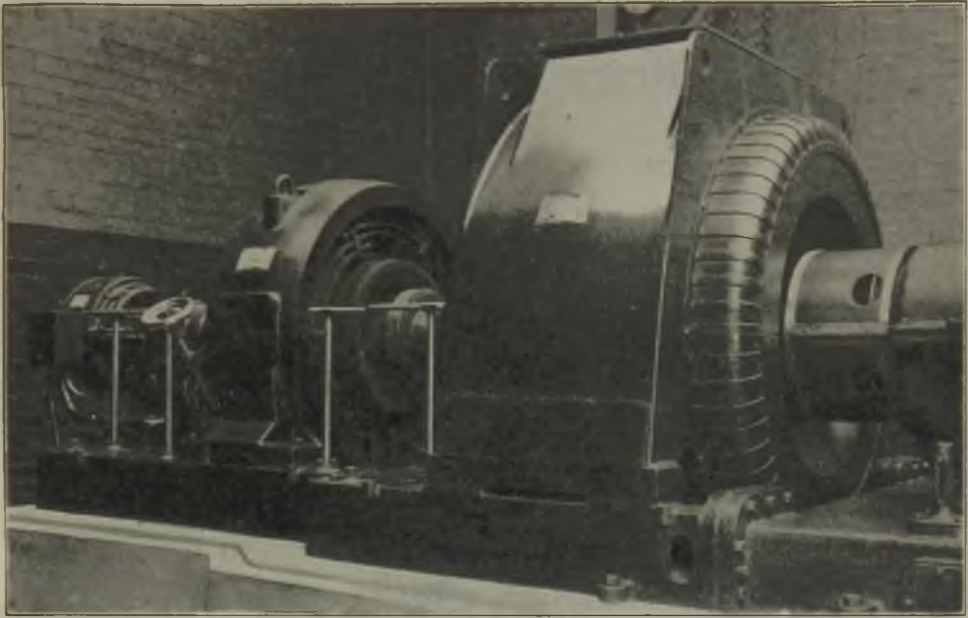


*—the last word in Galvanizing,
provides the strongest possible
defence against corrosion.*

BRITISH ROPES LIMITED

MANUFACTURERS OF WIRE · WIRE ROPES · HEMP CORDAGE

HEAD OFFICE: DONCASTER · OFFICES AND WORKS THROUGHOUT GREAT BRITAIN



1932-1944 !

Designed in 1931 for service in a Scottish Paper Mill and running successfully in 1932, this HARLAND 2060 K.V.A., 3 Phase, 50 Cycle, 440 Volt Alternator is driven at 1000 R.P.M. by geared pass-out steam turbine. The set includes a 380 K.W. 500 Volt D.C. Generator for servicing the variable speed drives of the Mill and the Exciter on the extreme left.

Unimpaired by twelve years of service, the complete installation continues to give every satisfaction and, notwithstanding the lapse of time and subsequent research, compares favourably with present-day practice in method of application and efficiency.

Let HARLAND design the Post-war Power layout which the inevitable Industrial rehabilitation will necessitate

ELECTRICAL



MACHINERY

A.C. and D.C. MOTORS

THE HARLAND ENGINEERING CO. LTD., ALLOA, SCOTLAND

“Discretion is the better part of Publicity in Wartime”



says

GENERAL CABLE

V.I.R., P.V.C., T.R.S., L.C., etc., etc.

“OF course we’re not the only cable manufacturing firm engaged on war work—far from it—but just the same we’re justifiably proud of the job we’ve done and are doing for ALL the services. I’ll be in a position to tell you more about all that when the right time comes.”

“As a commercial user, though, your

immediate interest is what we can do for you now. Not as much as we’d like, I’m afraid, while supplies available for ordinary business are restricted. Our technicians, however, can advise and guide you on current problems and will be in a position to render valuable aid in many ways when cables put on civilian clothes again.”

THE GENERAL CABLE
MANUFACTURING
CO. LTD.
LEATHERHEAD, SURREY



Telephone: LEATHERHEAD 3021/2
(Private Branch Exchange)

Telegrams:
“ISOLDE,” LEATHERHEAD

TRADE MARKS

A guarantee of Quality

A registered trade mark is the sole property of the trade mark owner and distinguishes his products.

The word "**MEGGER**" is the registered trade mark of Evershed & Vignoles Ltd. and must only be used to describe their products.

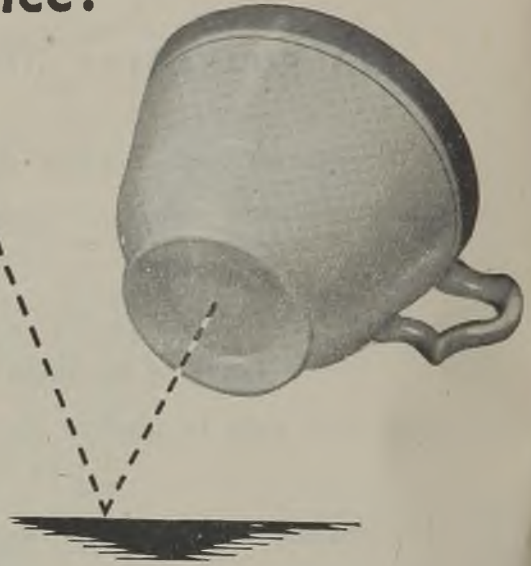
For example, a "**MEGGER**" Insulation Tester means the instrument is made to the designs, standards and inspection of Evershed & Vignoles Ltd.

Thus the registered trade mark "**MEGGER**" which is known all over the world, is your guarantee of a high quality product.



Announcement of Evershed & Vignoles Ltd., Chiswick, London, W.4.

Would you expect a cup to bounce?



Most people are surprised or indignant when a Plastics article fails to stand up to a heavy blow. Some plastics *are* brittle and are not intended for such rough usage. If you really want an article that will bounce, the Plastics Industry will be able to supply it after the war. Plastics can be endowed with a variety of properties to suit a vast number of uses. As an example, Bakelite moulding powder X 199 incorporating a fabric filler will produce mouldings possessing an impact strength as high as 1.5 foot pounds and a cross breaking strength of 14,000 lbs per square inch. Of course,

such material is not made into cups but has its special uses in industry where a high degree of mechanical strength is essential.

The Bakelite Laminated range includes materials so tough that in certain circumstances they can be used with advantage instead of steel, bronze and other metals

Choose the correct material for the job and Plastics will not let you down. The technical staff of Bakelite Limited can give you invaluable help in this direction.

TREFOIL

BAKELITE PLASTICS

REGD. TRADE MARKS

TI 6

Pioneers in the Plastics World

BAKELITE LIMITED, 18 GROSVENOR GARDENS, LONDON, S.W. 1

ELECTRICAL REVIEW

September 1, 1944

Managing Editor :

Hugh S. Pocock, M.I.E.E.

Technical Editor :

C. O. Brettelle, M.I.E.E.

Commercial Editor :

J. H. Cosens

Contents :—

	Page
Editorial.—Coal-Mine Modernisation	289
Colliery Electrification	292
Cable Makers' Association. By the late Llewelyn B. Atkinson	295
Power Trains	298
Meter Maintenance. By E. G. Simmons, A.M.I.E.E.	299
Plant Labelling. By J. H. M. Sykes.	300
Phase Indicator. By W. M. Gore	301
American Notes	302
Correspondence	303
Personal and Social	306
Commerce and Industry	307

<i>Contents continued :—</i>	Page
Lamp Publicity	310
Rural Supplies	311
Wiring Post-war Houses	313
Progress in Manufacture	316
Informing our Allies	316
Electricity Supply	317
Financial Section	318
New Patents	323
Contract Information	324

<i>Classified Advertisements</i>	67
<i>Index to Advertisers</i>	76

EDITORIAL, ADVERTISING & PUBLISHING OFFICES : Dorset House, Stamford St., London, S.E.1
 Telegraphic Address : "Ageekay, Sedist, London." Code : ABC. Telephone No. : Waterloo 3333 (35 lines).
 Registered at G.P.O. as a Newspaper and Canadian Magazine rate of postage. Entered as Second Class Matter
 at the New York, U.S.A., Post Office.

Annual Subscription, Post free : British Isles, £2 7s. 8d. ; Canada, £2 3s. 4d. ; Elsewhere, £2 5s. 6d.

Cheques and Postal Orders (on Chief Office, London) to be made payable to **ELECTRICAL REVIEW LTD.**,
 and crossed "Lloyds Bank."

The brighter side
 of Fuel Saving
 comes from

SIEMENS
 Lamps



SIEMENS ELECTRIC LAMPS
 AND SUPPLIES LIMITED

1/39, Upper Thames Street, London, E.C.4

Remember, selling Siemens Lamps enhances
 your goodwill — and, they help to save the
 Nation's fuel.

194-?

Berry's

FIRES
FITTINGS
SWITCHGEAR
WATER HEATERS

Better than ever after the War!

BERRYS ELECTRIC LTD · LONDON · BIRMINGHAM · MANCHESTER · NEWCASTLE



Smaller than a pin head

Comparison with the homely pin shows how minute is the 1 mm. "SANWEST" jewel . . . but how vital is the part which these instrument bearings have played since the day when other sources of supply were suddenly cut off.

"SANWEST" jewels, in their 1 mm., 1½ mm. or 2 mm. sizes, are meeting the bearing needs of all types of instruments having "V" type jewels with conspicuous success.

"V" TYPE
SANWEST
INSTRUMENT BEARINGS

SANGAMO WESTON LTD. ENFIELD MIDDLESEX

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872



Vol. CXXXV. No. 3484.

SEPTEMBER 1, 1944

9d. WEEKLY

Coal-Mine Modernisation

Strong Case for Public Supply

IT is not, and never has been, the policy of the *Electrical Review* to take sides generally in the long-standing controversy of private generation *versus* public supply for the coal industry, or indeed, for any other industry. This week, however, we publish the first of a series of articles dealing with the recently completed electrification of a large colliery in the South Yorkshire coalfield which is of particular interest, not only to the electrical industry but also to the coal-mining industry, for it points to the solutions of certain problems which have been responsible for the non-completion of many partially electrified collieries.

Generally, colliery electrification in this country during the past ten to twenty years seems to have become stabilised around the idea of installing the electric drive throughout the colliery, with the exception of a portion of or all the winding plant and the air compressors. What has happened at the colliery in question must apply to many collieries throughout the country, namely, the necessity to replace out-of-date steam-raising plant brought the management face to face with the problem of whether to provide new steam plant to replace the old, or to complete the electrification of the mine on a public-supply basis.

Disposal of Slurry

Coupled with these aspects was the fact that the slurry from the washery, for which there was no market, was disposed of in the colliery steam-raising plant, thereby dictating the use of steam private-generation

plant, steam winders and steam compressors. This question has cropped up whenever the completion of mines electrification has been suggested. Indeed, in the project we are describing the disposal of the slurry became a predominating factor in considering the whole scheme. In this case the installation of modern slurry-cleaning plant made possible the commercial disposal of the washery output, because the mixture of cleaned slurry and coking slack commands a price which clearly justifies economically total electrification.

Little Interference With Production

Many colliery owners and managers are hesitant to change over from private generation to public supply for fear of interference with the normal working of the colliery during lengthy shut-down periods demanded by the change-over programme. It has been demonstrated by the instance with which we are dealing that where there are goodwill, determination, courage and good planning on the part of the supply undertaking and its staff, there need be little or no interference with the mine output. Rough corners were smoothed over by temporary connections to meet the demands during reconstruction, and the old plant was disconnected and the newly installed plant connected up during normal holiday periods.

Some colliery authorities do not feel disposed to leave the responsibility for electricity supply for the production of several thousand tons of coal per week to the supply undertaking, but we know that

by the use of stand-by substations supplied from alternative sources, and of suitable interconnectors, the supply undertaking may reasonably be expected to carry out the special tasks for which it exists rather better than can the colliery company whose primary concern is the production of coal. As to the important scheme on which we are focusing attention, both the colliery company and the supply undertaking are to be commended, particularly as the work has been carried out in wartime, and because the results have justified the decision which was taken in 1940. Such good work and results, and the broad outlook augur well for post-war electrification of the coalfields.

District Heating IN one of his not infrequent comments on the electrical industry, "Janus" of the *Gas Times* suggests

that "electric power people like the look of district heating." There seems to be some confusion of thought as well as of fact here. Many electrical engineers have, it is true, displayed broadminded interest in the technical possibilities of improving the overall efficiency of heat utilisation in this way if it can be done economically. It can be in no self-regarding spirit, however, that these would accept a lowering of the efficiency of generation of electricity, as such, or forgo the utmost advantages obtainable from advances in power-station practice, on which hang the prospects of securing some of the larger power and industrial heating loads. Nor is it narrow self-interest that would prompt them to consider yielding to rival agencies any opportunities that arise for meeting the potential space-heating and water-heating requirements of the public.

Air-Cooled Condensers THE most novel feature of the "power trains" described on another page is the use of air-cooling for condensers. In the war-devastated areas for which the generating units are intended to provide electricity for essential needs (perhaps only 2 or 3 per cent. of pre-war outputs) there may be a scarcity of cooling water. Although the low vacuum results in a relatively high steam consumption, the additional quantity of water called for on that account would be only a very small fraction of the amount required by condensers of the orthodox type. One disadvantage of air cooling is illustrated by

the allowance of two trucks for its accommodation—twice that found enough for the turbo-alternator and its associated auxiliaries.

Brush Contacts ALTHOUGH carbon brushes have been in common use for well over half a century, little has been published regarding the physical and chemical characteristics of the dark film which forms on a commutator. Investigations carried out by the General Electric Co., Schenectady, appear to show that the accompanying reduced friction and wear are not due to any lubricating quality of graphite but primarily to water vapour derived from the atmosphere by reversible adsorption. Before this happens, however, another film, seemingly a grease (also from the atmosphere), has to be removed from the rubbing surfaces. Unless that is done test results are likely to be unreliable.

Post-War Power IT is generally considered that there will be no surplus of generating plant in this country after the war; indeed more will be required. Conversely, in the United States, according to Mr. C. W. Kellogg, president of the Edison Electric Institute, there will probably be large blocks of power seeking outlets. The reason given for this is the immense increase in power consumption for war production which has far outstripped the highest anticipated civilian demand. In the past four years the increase in America's annual output is said to have risen by 68 per cent.; here the rise has been about 50 per cent. But, as we have shown, practically all our increase has been on account of industrial production; the civilian load has remained almost stationary. The Americans have not had their present severe restrictions on civilian apparatus sales in force so long as we have had ours. Consequently they have not our great dammed-up demand which when released should absorb all the power available.

Cheapening Electricity NOBODY will disagree, unless it is the gas industry, with Sir George Mowlem Burt, chairman of the Building Research Board, regarding the desirability of making electricity available to householders at "something under a halfpenny a unit all-in" after the war. Householders would no doubt also find it

an advantage to have, say, their coal bills or their 'bus fares halved. But the matter is not so simple as that. As in every other business some attention must be paid to the financial implications. Prices of electricity were being steadily lowered until the war intervened and even since its outbreak increases, if any, have been small compared with other commodities—despite the fact that the price of coal has more than doubled. With continued technical developments towards still higher efficiency and with increased utilisation of electricity, it will undoubtedly be possible to reduce tariffs on an economic basis, provided rises in coal costs are checked. In the meantime we doubt very much whether in view of their low consumption the cost of, say, a "unit" a day for a refrigerator or a "unit" a fortnight for a washer is likely to "break" the consumer.

DISCUSSIONS on rural electrification in the lay **Incomplete Data** Press reveal an ingenuous disregard of economics and

also an inability to get the facts straight or complete. A contributor to recent correspondence on the subject in the *Spectator* says that the company supplying electricity in his rural area has asked him to pay £710 for the provision of a supply. Another correspondent quite justly asks whether this represents the total cost or only a proportion and if the latter how much the proportion is. If the figure of £710 is the total cost of the extension it would appear that the applicant is some way from the existing system, while if it is merely a proportion the distance must be greater still. Even if it be agreed as a general principle that rural supply should be subsidised, either by other consumers of the supply authority or by the State, there must surely be a limit.

Invalid Comparisons compares the prices which he once paid in Hampstead with those charged

in Devonshire where he now lives. He says that the Hampstead prices were much lower although the distribution was underground and not by the less expensive overhead method. He does not, of course, compare the number of consumers per mile of line in the two areas. He also says: "One reads that electricity is much cheaper in America and some parts of the

Continent." One might just as easily read that electricity in some parts of rural England is cheaper than in any comparable district in the world.

MANUFACTURERS interested in trade with **Argentine Trade Policy** Argentina are wondering

what the post-war prospects are likely to be; or, in other words, what will be the attitude of the Argentine Government towards them. The situation is governed by two more or less conflicting factors: the existence of an immense holding in Argentina of gold and foreign exchange and the intensive industrial development which has been proceeding during the war. At the same time the country has been "starved" of many things which it would have been able to import in peacetime and tremendous arrears will have to be made up when the belligerent nations are again able to resume more normal production. It is unlikely that Argentine industry will be able to meet all these needs but where there is any chance of its doing so it is likely to be heavily protected by tariffs. Some comfort may perhaps be derived from a recent statement by the Central Bank of the Argentine Republic that "the high degree of industrial development reached by this country is not incompatible with the maintenance of imports at a high level."

New Zealand's Imports

A **NOTABLE** feature of the import trade returns of New Zealand for the first quarter of the current year (the latest available figures) is the fact that the United States supplied insulated wire and cable of a greater value (£132,227) than that sent from the United Kingdom (£79,619). This country held its position as principal supplier of electric motors, having provided machines to the value of £33,390 of a total of £44,018; in this case the United States is credited with £5,769 and Canada with £3,931. As regards electric lamps, while Canada provided the greatest number (444,710 valued at £4,402), the United Kingdom was responsible for the greatest value (£12,886 for 158,341 lamps). As usual, the United States was the chief source of radio equipment (including valves), accounting for £101,358 of a total of £153,467; the United Kingdom's share was only £14,567.

Colliery Electrification

Public Supply Completes Modernisation Scheme

BEGUN in 1877, Treeton Colliery is an old pit by years, but, in the words of the mine manager, it has been made into a new one by modernisation schemes during the past few years. Our aim in this and subsequent articles is to show what an important part electrification has played in this modernisation.

The colliery is one of a group of three mines of the Rothervale Collieries Branch of the United Steel Companies, Ltd., situated in the South Yorkshire coalfield. At one time three different seams were worked and coal was wound at two shafts from three separate levels, but now the whole of the mine output is worked from one shaft and from one level, as the result of careful planning in deepening the shafts and intersecting the seams with cross measure drifts. The pit bottom is now about 400 yd. deep. As at present constituted, there are three seams being worked—Haigh Moor, Barnsley and High Hazel. Originally Wathwood, High Hazel and Barnsley seams were worked at levels of 180, 240 and 336 yd. deep, respectively.

Haigh Moor is a comparatively new seam and was commenced from the new pit



regarded as more in the nature of standby workings at the present time.

The Barnsley seam is now about 2½ miles from the pit bottom and it is being worked beyond a fault which brought its level below that of the original working, with the result that it can now be reached from the common working level. It has two faces, one 230 yd. long and one 140 yd. long, and it has a 4-ft. seam of coal. The High Hazel seam workings are about 2,000–3,000 yd. from the shaft and have three double-unit faces, each about 220 yd. long, and the coal seam averages about 2 ft. 10 in. thick.

There are two shafts to the mine,



Now the whole of the mine product is worked from one shaft (downcast): pit top (left) and pit bottom (right) of downcast shaft

bottom at the 400-yd. level. The working face in the Haigh Moor is only 400 yd. from the pit bottom, and it is a 3 ft. 6 in. seam in two sections divided by an 8-in. layer of dirt. The seam is at present worked with two 250-yd. double-unit conveyor faces, but on account of the shortage of labour is



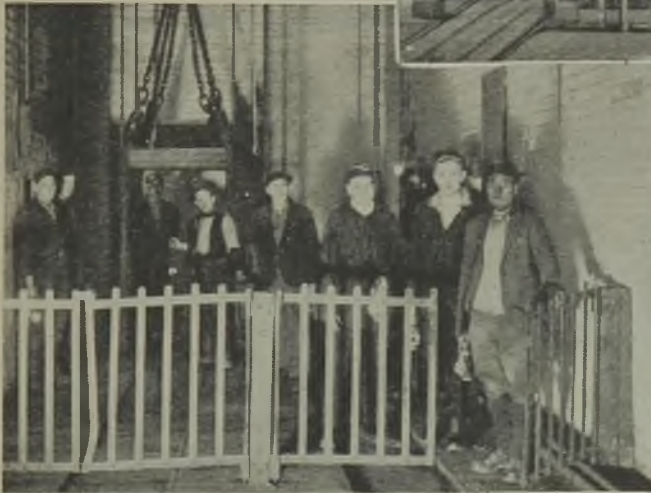
one is used for winding men and materials only, and the other for winding coal and men. In terms relating to the ventilation of the mine, these are the upcast and downcast shafts, respectively, that is, the coal shaft is the air inlet for the mine while the man shaft serves as the air outlet passage. All the main roads for the transporting of coal are served directly from the downcast shaft in the ventilation scheme and there are separate main return airway roads for each seam.

The coal from the three faces of the High Hazel seam is conveyed by three endless rope haulages to a main haulage in the main High Hazel road, which is about 2,400 yd. long. This main haulage first dips from the pit bottom with a gradient of about 1 in 10 and then rises with a gradient of about 1 in 12. The High Hazel seam has an output of about 900 tons per day. In the case of the Barnsley seam the system of haulage is similar to that in the

steam air compressors had been retained, and the exhaust steam from these was used for the generation of electricity and for heating boiler feed water. The electricity generating sets



The upcast shaft is used for men and materials other than coal: pit top (above) and pit bottom (left) of upcast shaft



High Hazel seam. The belt gate conveyors are followed by endless rope haulages which supply the main endless rope haulage which in turn delivers the coal to the pit bottom. The present output of the Barnsley seam is approximately 450 tons per day.

Before the modernisation scheme at present under review was commenced a few years ago, the colliery was already partially electrified with private generation, the ventilating fan, coal screens, washery, underground haulages and pumps being already electrically driven; but with the final scheme of electrification the whole of the colliery has been turned over to public supply. The steam winders and some

replacement by modern plant had become necessary. True, the turbo-generators could have been run for some time longer, but only at a lower efficiency than modern practice dictates.

At the same time underground developments which we have indicated, *i.e.*, the concentration of all coal winding at the downcast shaft, called for an increase of winding capacity and a more powerful winding engine at that shaft. The problem which faced the colliery owners, then, was whether to provide new steam plant for electricity generation, air compression and coal winding, or to completely electrify the mine and take a public

supply from the Yorkshire Electric Power Co. An important point which had to be considered was the fact that the existing boilers had been consuming the whole of the slurry

safer, as with all the main haulage roads in the intake airways it is not necessary to pass coal from the intake to the return airways with consequent loss of ventilation. The arrangement is also more economical as only one pit-bottom staff and one surface staff are necessary to deal with the complete output, as compared with two pit-bottom staffs and two surface staffs



All the coal haulage roads are served in the ventilation scheme directly from the downcast shaft: endless rope haulage return wheel, discharge end of gate conveyor right, and small haulage system for marshalling tubs

where two shafts are used for coal winding.

Above all, assurance had to be obtained that in the change-over there should be little or no interference with

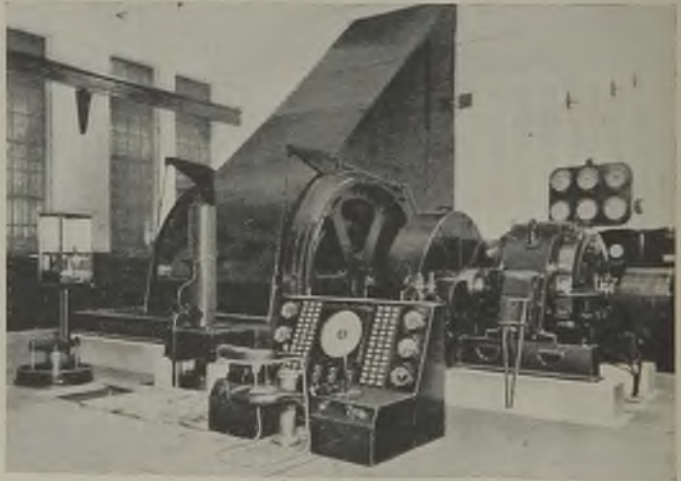
the mine output, and the fact that wartime conditions prevailed made this all the more important.

In a later article we propose to show what an important part the power company played in facilitating the conversion by the provision of temporary connections, etc.,

from the washery; this raised the problem of how to dispose of the slurry, should a public supply be taken. Actually this became a predominating factor commercially in considering the full electrification scheme, and the question was solved by the introduction of a Coppee slurry cleaning plant which will be described in a later article.

The total cost of the completion of the electrification scheme with public supply for the whole of the mine was

The modernisation scheme included the replacement of the steam winders: the illustration shows the new winder at the upcast shaft



shown to be about 44 per cent. of the total cost of replacement of the steam-driven plant and boilers, while the working costs under the electrification scheme after taking into account the revenue obtained from treated slurry, showed a very considerable reduction. The use of all the main haulage roads as intake airways is a direct result of winding all the output from one shaft. There are many advantages in doing this, the principal one being that it is

during the transition period, and how the final change-over of the power house and the winders, which actually necessitated some shutting-down, took place within the limits of normal holidays.

Organisations of the Industry—XI

Cable Makers' Association

By the late Llewelyn B. Atkinson, Hon.M.I.E.E.

IN so far as it relates to the manufacture of cables for lighting and power purposes (heavy current cables) the history of the insulated electric cable industry is intimately interwoven with that of the Cable Makers' Association, and before dealing with the latter a brief review of the genesis and the founders of the industry will be of interest. The necessity for insulated wires and cables followed immediately on the invention of the electric telegraph, and so Wheatstone in 1840 insulated wires with tarred rope or yarn; Morse in 1842 produced wires braided and saturated with tar and pitch; in 1845 Werner Siemens used gutta-percha; and in England india-rubber was experimentally being used as an insulator by Henley, Glass & Elliott, and S. W. Silver & Co.

By 1849 several makers had laid experimental cables insulated with gutta-percha underground, and short lengths under water. Iron wire armouring was added by Crampton in 1853, these developments being steps leading to the technical evolution of deep sea cables which in 1857 made the Atlantic cable a possibility—the first was laid in 1858, but it soon broke down and it was not until some years later that a permanently successful cable was inaugurated. These developments led to the construction of cable-making plants by companies such as Henley's, Glass & Elliott, S. W. Silver & Co., Siemens Bros., and Hooper, all of which, or their successors, remain in the industry to-day.

In 1880 and onwards came the developments which ushered in the new electrical era, namely, the construction of large dynamos and the use of heavy currents for electric lighting and power purposes. At the commencement india-rubber insulated cables were used, though in one or two large installations gutta-percha was adopted. But at that time india-rubber was very expensive (4s. to 5s. and even at one time 10s. or 11s. per lb.) and so cheaper methods were sought. Edison produced a system with copper rods spaced in iron pipes and filled with bituminous compounds, and Crompton and Latimer Clark laid cable systems composed of bare copper rods carried on porcelain

Mr. Atkinson, the author of this article, which was originally published on February 10th, 1939, died in August of the same year. The footnote appended to this reprint brings the article up to date by referring to the wartime activities of the C.M.A.

insulators supported and protected underground by iron or earthenware ducts.

The next advance was the production in the early 'eighties of the Callender system of insulating by the use of a bitumen compound, vulcanised so as

to render it less plastic, and thus a cable was produced which was far cheaper than the rubber insulated cable. A further advance in or about 1889 was made when Ferranti introduced his high-voltage concentric cable, with paper impregnated with tarry matter as the insulator. This cable was made in lengths of about 20 ft. with tapered joints. It was a technical success but did not lend itself readily to laying otherwise than in exceptionally straight runs. The principle was extended, however, by American

inventors who, in 1889, developed a cable insulated with impregnated paper applied in multi-layer strip form, enclosed in a lead tube so that the cable was flexible, the paper layers sliding on one another when the cable was bent. This type of cable was developed in England by a company founded for the purpose, viz., the British Insulated Cable Co., and in course of time practically all the British cable manufacturers took up the manufacture of this product.

So by 1890 the situation was that rubber-insulated cables had become the standard practice

for internal wiring of buildings and generally for short connections, and that india-rubber or bitumen-insulated cables or paper-insulated cables were being used for underground mains, the last two generally in troughs filled in with bitumen. Later, lead-covered cables were laid direct in the ground or drawn into pipes, relying on the lead covering to protect the insulation from moisture. Notwithstanding great efforts to introduce other types, these three held the market with no serious competition for many years, indeed still do so, though the use of bitumen-insulated cables has now been practically given up.

By 1899 the number of units manufacturing rubber-insulated cables had so far exceeded in potential output the actual consumption that serious price cutting commenced and there were clear signs that this was leading



Col. Sir Thomas Purves,
Director of the C.M.A.

to a deterioration in quality. It was soon recognised that if steps were not taken to check this there might be serious breakdowns in the rather new public supply, with the result that people would lose confidence and the rising industry receive a disastrous check. As a result of conferences between the heads of the industry it was resolved to adopt and maintain certain specified standards of quality. A little later a committee of manufacturers was formed who decided to sell at identical prices, a policy which has been followed ever since. It was agreed to form an association to guard and guide these functions and generally to promote the interests of the electrical industry, and so the Cable Makers' Association began.

Foundation Members

The original members of this Association were, in alphabetical order: British Insulated Cables, Ltd., Callender's Cable & Construction Co., Ltd., Connolly Bros., Ltd., W. T. Glover & Co., Ltd., W. T. Henley's Telegraph Works Co., Ltd., India Rubber, Gutta Percha & Telegraph Works Co., Ltd., Johnson & Phillips, Ltd., London Electric Wire Co. and Smiths, Ltd., Siemens Bros. & Co., Ltd., Telegraph Manfg. Co., Ltd., and Western Electric Co., Ltd. (now Standard Telephones and Cables, Ltd.).

Since then, as the industry has expanded, the following have become members: Anchor Cable Co., Ltd., Craigpark Electric Cable Co., Ltd., Crompton Parkinson, Ltd., Edison Swan Cables, Ltd., the Enfield Cable Works, Ltd., Greengate & Irwell Rubber Co., Ltd., Liverpool Electric Cable Co., Ltd., Macintosh Cable Co., Ltd., Metropolitan Electric Cable & Construction Co., Ltd., Pirelli-General Cable Works, Ltd., St. Helens Cable & Rubber Co., Ltd., and Union Cable Co., Ltd.

At the date of the formation of the Cable Makers' Association there were practically no associations of manufacturers in this country, indeed the very idea at the back of such an association was counter to the generally held tenets of business, which envisaged absolutely ruthless competition between the units in an industry; indeed so much was that the case that it was doubtful whether such an association, embodying agreements as to conditions of contract, prices, relative outputs, etc., was not illegal as being in restraint of trade, and to solve this difficulty the C.M.A., as it came to be called, was registered as a trade union.

At this date, however, the economic doctrine of the value of unrestricted competition was beginning to show signs of losing its general applicability. The lowering of prices till no profit margins were left led to lowering of quality, pressing down of wages, neglect of maintenance of plant or

of installing new plant, limitation of or neglect of research and general impoverishment of the industries. In addition, the attack on the British market by organised industries in other countries under trusts and cartels, which was being severely felt, could only be adequately met by a counter attack in the countries concerned, which could only be made successfully by a powerful manufacturers' association.

The Association's work provided a stabilised industry which was gradually able to devote its attention to the rationalisation and improvement of its products. When the British Engineering Standards Institution was founded the C.M.A. co-operated with it in the standardisation of minimum qualities and in the publication of the B.S. copper wire sizes, which contained about 60 sizes of conductors considered as standard. During the war of 1914-18, when stocks of copper had to be kept as small as possible, new standards were proposed by the C.M.A. and afterwards accepted as British Standards by which the number of sizes of wire necessary to produce all standard sizes of built-up conductors was limited to fourteen. Standardisation of sizes of stranded cables and insulation and protective coverings followed. By this time the C.M.A. was recognised by other industries and by Government Departments as the authority representing the insulated cable industry, and took part on their behalf in many of the co-operative efforts during the war. For example, the surplus of copper for all industries outside of war industries was small and was rationed month by month, and the Government entrusted to the C.M.A. the distribution of the monthly ration both to members and to other manufacturers.

Government Committee's Conclusions

After the war, owing to the considerable increase by this time of trading combinations in all industries, the Government appointed a Committee to investigate trusts and combines, including a large number of manufacturers' and other associations, among them the C.M.A. After hearing evidence from cable purchasers and from the Association and its competitors the Committee published its report and among its conclusions were the following:—

"The Cable Makers' Association has been largely instrumental in creating and maintaining the prosperity of the industry in this country, and its operations have been favourable to the improvement of quality."

"From the evidence we have heard we have no cause to believe that any of these Associations (C.M.A.) have acted unreasonably, etc."

Meanwhile, the C.M.A. was developing its efforts to improve the technique of its members and their products, and a special

organisation for mutual exchange of information was set up under the title of "Cable Research" which in effect allows any member of this organisation to have information of and use the best processes of fellow members. The improvements that were thus effected have been remarkable and of immense value to the customers of the C.M.A. In addition to the important research laboratories of members of the Association, working independently and yet as a team, the C.M.A. was one of the founder members of the British Electrical and Allied Industries Research Association, utilising this body to carry out more general and fundamental researches, and has always supplied an important proportion of the necessary funds.

The results of all this research in which the C.M.A. has had the leadership can be realised only by looking back a few years. At the earlier time cables for 10,000 V were looked upon as a high limit, later 20,000, 30,000, 60,000 V were successive steps, and to-day 132,000- and even 200,000-V cables are available.

In quite another direction the C.M.A. lent its aid to the foundation and financing of the British Electrical Development Association. As this Association grew up it was seen that its functions were more properly to be allied to and managed by the electricity supply industry, and the manufacturers by agreement withdrew.

Co-operation with Other Bodies

The Cable Makers' Association has co-operated with and taken part in joint committees of the other organisations operating in the electrical industry, e.g., the British Electrical and Allied Manufacturers' Association, Electrical Contractors' Association and Electrical Wholesalers' Federation, with useful results to all parties concerned. After the war, when the relations of employers with their workpeople were, to say the least, difficult, and after the publication of the Whitley Report recommending the setting up in all industries of joint councils of employers and workpeople, the C.M.A. had considerable discussion with the trade unions involved, and eventually it was agreed to form the Joint Industrial Council for the Cable Making Industry, on which employers not members of C.M.A. have also been included, and this Council, which has now operated for 19 years, has proved of the greatest value in removing causes of friction in the factories of cable manufacturers. The cable industry, even before the Government had taken the matter up, had put into force through the Joint Council an annual holiday with pay for its workpeople, and was well to the front in the adoption of welfare arrangements for its employees.

The thirty-nine years' experience of the Cable Makers' Association has shown that it has worked not only for the benefit of the manufacturers, who have realised a strong financial position, but also for its workpeople, who have had stable and well-paid employment, and for the cable users who have had the benefit of a constantly improved product supplied at a reasonable price. An important national benefit is that the members of the C.M.A. have developed the world's largest export trade in electric cables, thanks to the efficiency of their production and to the tremendous prestige which their quality standards enjoy, both at home and abroad.

Officers of the Association

The first chairman of the Association was Mr. Henry Edmunds (one of the founders), of W. T. Glover & Co., Ltd., with Mr. Albert Howard as secretary. In course of time nearly all the leading members of the industry have occupied the chair. In 1916 Mr. Howard died and Mr. Llewelyn B. Atkinson, Hon. M.I.E.E., Past-President of the I.E.E. and past chairman of the R.S.A., then a director of W. T. Glover & Co., was appointed secretary for the period of the war. After the war he resigned his other appointments and became director of the C.M.A., a position he held until his retirement in 1936. His place was filled by Col. Sir Thomas Purves, past President of the I.E.E. and late Engineer-in-Chief of the British Post Office, and during nearly the whole of the period since 1918 Mr. W. G. Stiles, F.C.I.S., has been secretary.

Footnote.—During the present World War the demand for cables of all kinds required for Service purposes and for maintaining the life of the community has reached unexampled proportions and has been complicated and thwarted by shortages of materials normally considered to be essential, and the C.M.A. has striven to assist the national effort by every means in its power. It has placed the whole of its resources and of its accumulated knowledge at the disposal of the Government and also at the disposal of all the cable makers of the country outside its own membership. It co-operates actively and continuously with the Cable Planning Organisation which has been set up in the Ministry of Supply, and with the official controllers of the wide range of materials required by the industry. Its commercial representatives and its scientific and manufacturing technicians are serving without intermission on numerous committees, sub-committees and panels, Governmental and otherwise, which are determining and providing for production programmes, and dealing with the difficult and complex problems arising from the progressive development of effective substitutes for materials which are not at present available. An adequate supply of electric cables is vital to every major activity of the war and this supply has been, and will be, satisfactorily maintained.—T. F. P.

Power Trains

Essential Supplies in Reconquered Territories

BRIEF reference was made in the *Electrical Review* of April 21st to mobile generating plants for providing essential supplies in reconquered territories. In a recent address before the American Society of Mechanical Engineers, Mr. C. M. Laffoon (Westinghouse Electric & Manufacturing Co.) gave some further technical details of this plant. Two sizes are now being assembled, viz., 5,000-kW and 1,000-kW ratings. For the larger, eight wagons, each 50 ft. long, are required—two each for the steam-raising plant and for the condenser and one each for the generating unit and switchboard, the air compressors and feed pump, the feed water and the workshop and crew's quarters. Each train will be supplied with coal and ash-handling equipment.

Steam-Raising Plant

Each steam-raising wagon contains a 40,000 lb. per hr. two-drum, bent-tube water-wall boiler designed for steam conditions of 660 lb. per sq. in. and 750 deg. F. with feed-water entering the economiser at 200 deg. F., together with superheater and economiser. Air-operated soot-blowers and locomotive type stoker, two 9,900 cu. ft. per min. motor-driven forced-draught fans and one two-speed 46,000 cu. ft. per min. induced-draught fan form part of the equipment. Rated output is to be given when burning lignite of 7,300 BThU per lb., 22 per cent. ash and 24 per cent. moisture.

Two feed pumps, driven by 3,600-RPM turbines, with steam conditions similar to those for the main turbines, deliver 208 gal. per min. of water at 200 deg. F. against a total head of 1,770 ft. Make-up water, 2,400 lb. per hr. at 32 deg. F., is furnished by an evaporator which is supplied from water-treating plant by means of a small electrically-driven pump. Air for operating the stokers, coal spreaders and soot blowers is provided by three 100-HP 400-cu. ft. per min. compressors, one electrically driven by a 720-RPM induction motor and the others by steam turbines through reduction gear. An air-storage tank, cooling tower and pump are also mounted on the same wagon. The feed-water car, which is thermally insulated and provided with heating coils, has a storage capacity of 10,000 gal. and contains also two motor-driven 225-gal./min. booster pumps.

The generating set comprises a 5,000-kW 3,000-RPM turbine requiring 80,000 lb. of steam per hr., at 600 lb. per sq. in. and 750 deg. F., and exhausting at 2 lb. per sq. in. gauge. The 50-cycle 6,250-kVA alter-

nator is wound for 6,300 and 10,900 V. Auxiliaries are fed from a 750-kVA air-cooled transformer connected to the generator through fuses and to the 380-V load through a circuit-breaker mounted within the transformer housing. A 75-kW, 380-V Diesel-driven alternator is installed for starting. The metal-clad switchboard comprises 15-kV, 600-A, 150-MVA oil circuit-breakers controlling the alternator and four feeders and auxiliary-transformer fuses.

The condensers are cooled by air at temperatures ranging from -40 to 95 deg. F., and controlled in its flow by three-piece covers on the air intakes, the number in use being determined by the outside ambient conditions. Eight condensing sections are installed in each car. Four blowers in each case draw air through the condenser to a plenum chamber at the centre and discharge it upwards. A single-stage ejector prevents collection of air in the sections to form ice. By dividing the tubes (of galvanised steel) into five groups of two rows each per section with an orifice in series, the steam distribution is evened; the fifth is an air cooler. The condensers have a total fin surface of 90,000 sq. ft. and a tube surface of 10,500 sq. ft. They require 800,000 cu. ft. per min. of cooling air, the temperature of which rises by 90 deg. F. at full load.

Smaller Type

The 1,000-kW power train consists of a boiler car, a turbo-alternator car, a cooling-tower car and coal-handling equipment, each of which is mounted on two four-wheel tracks. The B. & W. boiler is rated at 16,000 lb. per hr. with steam conditions of 420 lb. per sq. in. and 730 deg. F. and the equipment includes a locomotive type over-feed stoker, steam stoker-feed engine, 50-HP electric induced-draught fan, steam-driven feed pump, water-treating plant, coal hopper and water-storage tank. The main turbine operates with an exhaust pressure of from 2 to 5 lb. per in. abs. and is connected through reduction gearing to a 1,000-RPM 6,300-V 50-cycle alternator. The 1,100 sq. ft. air-cooled condenser, of the three-pass semi-radial-flow type with non-divided water boxes and motor-driven condensate pump, is mounted on the same wagon, which also accommodates a motor-driven feed pump, switchgear rated at 600 A, 8,500 V and 50 MVA (including breakers for two 6.3-kV feeders), a 125-kVA, 380-V fuse-controlled air-cooled auxiliary transformer and a 5-kW petrol set for starting and emergency power service. The cooling tower is of the two-cell induced-draught type.

Meter Maintenance

Proposed Arrangements for Short-circuiting Prepayment Gear

By E. G. Simmons, A.M.I.E.E.

THE general adoption of domestic consumers' service units may create additional problems in maintenance of prepayment meters on site unless modifications are made to the present method of connecting meters.

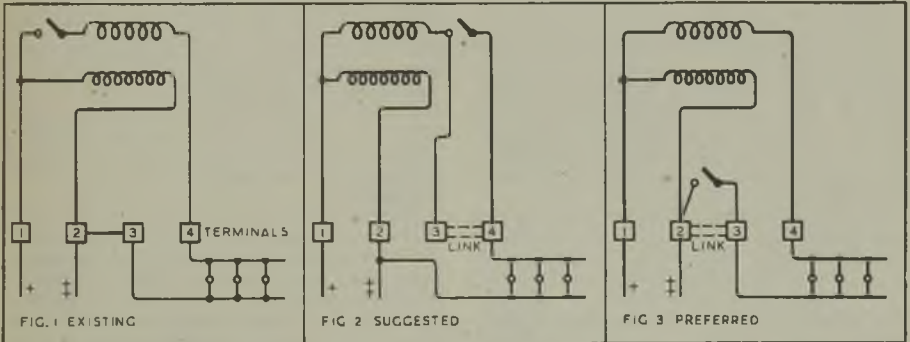
In the case of most supply undertakings it appears to be the practice, especially when faults occur outside normal working hours, for the fuseman to short-circuit the faulty meter. A temporary supply to the consumer is thus afforded until such time as the meter can be changed or a meter mechanic can call and remedy the defect. Most of the proposed design of domestic control units so far put forward would render this procedure exceedingly difficult, since easy access is lost in the general tidying up of service arrangements. In some cases the complete removal of the meter from the unit would be necessitated.

The short-circuiting of prepayment meters means a loss of revenue which can amount to an appreciable sum in the course of a year. This practice tends to encourage certain individuals deliberately to foul the meter and so obtain a free supply of electricity, particularly at week-ends. Incidentally, it is very difficult to deal with this type of consumer, and he creates endless trouble. It is

of the element to terminal 4. To short-circuit the meter the leads from these terminals must be brought together, which is not possible unless there is some flexibility in these connecting leads.

Fig. 2 illustrates how the switch of the meter can be bridged by a link placed externally across terminals 3 and 4 of the connecting block without disconnecting the meter leads. The terminal cover can then be replaced and sealed in the normal way while the registration of the meter is maintained. A slipping clutch drive should, however, be provided between the meter element and the prepayment mechanism to avoid damage to the gearing. This method necessitates an alteration to the present standard meter block and would no doubt increase manufacturing costs. Also, it would not be practicable to adapt existing meters and some confusion might exist when meters with different terminal blocks were changed.

To overcome these disadvantages (Fig. 3) the switch could be placed in the neutral across terminals 2 and 3 and bridged by placing a link across those terminals. The inclusion of a switch in the neutral is unorthodox, but it should be remembered that the overriding purpose of the prepayment



Alternative methods of connecting household prepayment meters

fairly safe to state that about 90 per cent. of prepayment meter failures are caused by faulty operation of the meters by consumers themselves and it should therefore not be considered that the provision of some positive means of short-circuiting the prepayment gear would be an admission of poor design.

With the existing standard arrangement of connections (Fig. 1) a lead is taken from terminal 1 to the switch through the series coil

mechanism is for load interruption and it is not used for safety isolation as in normal wiring.

The advantages of the third arrangement are easy access and freedom from risk of shock when installing and removing the short-circuiting link, which remains under seal. The registration of the meter is maintained. Alterations are not necessary to the existing standard terminal blocks and existing meters

can be easily converted. Production costs of meters should not be increased; in fact they might be reduced, since one type of series coil could be used for ordinary and prepayment meters. Installation inspectors and meter fixers would be able to make sure that the meter was correctly connected and had not suffered damage in transit without the necessity of inserting coins.

The prepayment gear would be at neutral potential and the safety of the consumer from shock, when inserting coins, would be assured in the event of insulation failure in the switch mechanism.

Against these advantages must be considered the possibility of a supply being maintained with the prepayment switch opened

and a neutral earth in the house wiring. This, however, would be immediately disclosed by a discrepancy in the account, since the supply would under all conditions be registered and, in any case, the consumer would be liable for payment of the difference of account. A neutral earth so discovered would also assist the installation department's efforts to maintain a sound installation.

A further improvement of the proposed arrangement would be the use of a credit-debit gear similar to the type used in two-part tariff meters. The consumer would then be obliged to clear arrears which had accrued during the short-circuiting period before a supply could be obtained, thus making it unnecessary to render auxiliary accounts.

Plant Labelling

By J. H. M. Sykes

THE visitor to the majority of the power stations and substations in this country cannot fail to be impressed by the large number of pieces of apparatus which either bear no label at all or only a mysterious inscription, such as "Circuit-breaker No. 23" or simply the maker's name (which is seldom omitted) together with an inadequate data plate.

While the engineer who is accustomed to work with the plant in a particular station has become, by custom, conversant with the function of every portion of it, an essential consideration should surely be that a relief engineer or a stranger temporarily imported or, indeed, any engineer who has reason to work in the station should be made very clearly aware of the purpose of every single piece of apparatus. The ordering of spares, too, is also greatly facilitated if certain essential particulars are given on the data plate. The following suggestions, therefore, are put forward from the maintenance engineer's point of view.

The ideal labelling scheme comprises two labels, although in many cases they could be combined. The first is the manufacturer's data plate; the second is the user's label. (The manufacturer may supply a standard component, such as a transformer, which is used by the undertaking for many different circuits).

The customer's name-plate, to take a typical example, would be something of this style:—"Trickle charger for main operating battery for No. 4 Bank of 33-kV switchgear. Commissioned December, 1930."

The manufacturer's data plate would run on these general lines:—"Jones & Co., West Street, London, W.2. Trickle charger for 110-V battery (metal rectifier pattern with automatic regulation); maximum charge rate 40 A. AC supply 230 V 50 cycles single-

phase. Serial number 12345, type x.y.z. AC input fuses (25 A) (marked 'AC input'). DC output fuses (50 A) (marked 'positive' and 'negative'): Manufactured December, 1929."

The labels should answer the following questions:—What it is; its capacity; the system voltage, number of phases and frequency; serial number and type, and manufacturer's name and address; dates of manufacture and commission; function in the system in which it is used; if applicable, its diagram of connections and its B.S.S. reference (as in the case of a transformer); phase rotation and colouring; direction of rotation; points of isolation, as in the case of a trickle charger; input and output fuses; size or setting required for protective fuses or circuit-breakers. For oil-filled apparatus, the total quantity of oil should be stated. Large units of plant, where special transport arrangements are necessary, should carry an indication of their weight when stripped for transport.

The material for the labels will vary from that used for small relays to the outdoor data plates on power transformers, but in general engraving on chromium plated brass is eminently satisfactory. A point for especial attention on outdoor plant is that the labels should not be in such a position that they are likely to be obscured by painting, and they should be legible when the gear is alive.

Nowhere has the old axiom that familiarity breeds contempt had a more prominent application than in the general lack of clear labelling, both by manufacturers and users: much time would be saved and, indeed, in time of breakdown, many minutes of shutdown might be avoided if this relatively small but none the less important point in power station and substation design were given careful attention.

Phase Indicator

Simple Method of Construction

SINCE a phase indicator is only required at infrequent intervals, it is a

case of insufficient use not always justifying the expense of an instrument that is rarely needed. Such an instrument is very simply made of three bobbins of wire, the iron circuit, a revolving disc, and a wooden box. The iron circuit can be quite simple, as iron losses and heating do not require to be considered when the instrument will be in circuit for only a few seconds at a time.

The phase indicator I have made and tried has a piece of $\frac{1}{8}$ in. iron 3 in. square as the base with a $\frac{3}{8}$ in. hole for the bottom pivot bearing drilled in the centre of it. On a 2-in. diameter circle round this hole three holes were drilled and tapped to take $\frac{1}{4}$ in. bolts, 60 deg. apart, the bolts to be screwed into them forming the poles. Two more holes in this plate, which should be big enough for wood screws, were made in suitable positions so that it could be fastened in a box when it was complete.

The bolts to screw into the plate are three 2 $\frac{1}{4}$ in. by $\frac{1}{4}$ in. hexagon headed and insulated for the wire in the following way. First, the ends were made of presspahn by cutting six discs each 1 in. diameter and punching holes in them at the centre. These holes are made by putting the disc on a piece of lead and by striking with the hammer an old $\frac{1}{4}$ in. bolt where the hole has to be, a clean cut hole results; the piece cut out is left embedded in the lead.

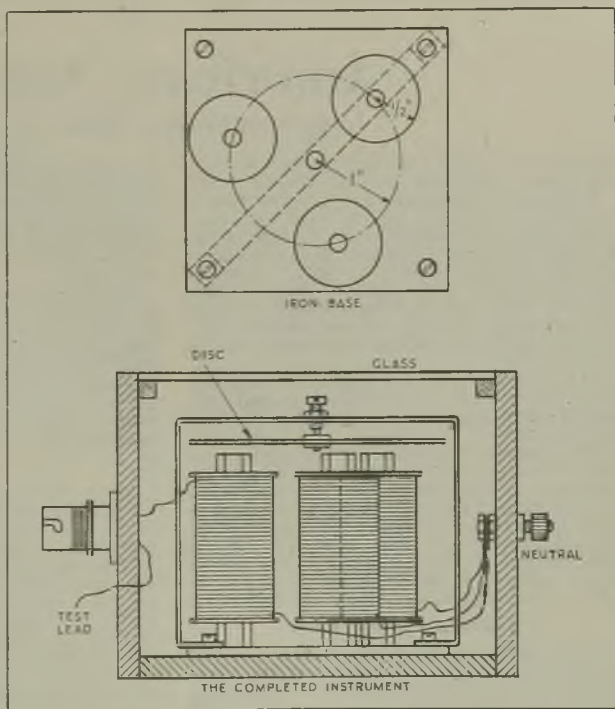
When the discs are finished pass two short pieces of thread through each pair and put them on the bolts; the thread is there to tie up the coil after winding. Now fix a wheel brace in the vice and put the threaded part of the bolt in the chuck after it has been wrapped with paper or copper foil to prevent damage to the threads. The bolt should be so held in the chuck that when winding is complete there will be sufficient thread showing to screw into the base plate

By **W. M. Gore**

after a nut has been put on.

This done, the discs are separated and empire cloth is wrapped round the bolt between them, after which the coil is wound with thin wire until it is level with the discs. The size of wire is not critical and anything above, say, 28 SWG will do. Before taking the coils out of the chuck, cover them with empire cloth and tie up the threads to keep them compact, after which they can be removed and varnished.

While the varnish is drying, the bottom pivot can be put in the plate; it consists of a $\frac{1}{8}$ in. screw threaded in and fastened with a lock-nut. This screw should be countersunk



Plan of iron base and interior of instrument

on the top with a small sharply pointed drill so that a recess is formed for the spindle of the disc. The top pivot is made in a similar way, but is suspended by a strip of brass bent in the form of a square with one side cut away so that it can be fixed diagonally to the base in the manner shown in the diagram.

A disc is now cut 3 in. in diameter from copper or aluminium, or an old relay or meter disc can be utilised. The spindle is made from a $\frac{1}{8}$ in. screwed stud, both ends of which are sharpened to sink into the recesses made in the pivots. A nut on this screwed stud at each side of the disc allows the latter to be fixed in the correct position, which is as near the poles as possible without rubbing.

Assembly

The bolts, with their coils on, each have a $\frac{1}{4}$ in. nut screwed on them and are screwed into the base plate until all three heads are level; then the nuts are locked to the plate with a spanner. The plate is turned over and any protruding bolts are filed down. Next, the bottom pivot can be finally adjusted and locked, and any protrusion underneath can be levelled down. The top stirrup is now fastened down to the base, and the disc put on, then the top pivot, adjusting to get an easy

motion as near to the pole pieces as possible.

The instrument can be put in a small wooden box on which three lampholders are fastened, one on each of three sides. The fourth side has a terminal on it to which is connected one wire of each coil so that it forms the star connection. The remaining wires from the coils are taken, one to each lampholder, and from each lampholder is taken a length of flexible wire for the test lead. Therefore with three 60-W lamps in the holders and the three leads connected to a three-phase supply the lamps will indicate that all phases are alive and the meter will indicate the phase rotation. Connection to a known supply enables the leads to be marked "R.Y.B." and an arrow can be drawn on the disc to show clockwise direction, viewed through a glass window fastened on the top of the box. The instrument can be used for different voltages by changing the lamps.

American Notes

Important Federal Power Plans

A REVIEW of the Federal power developments projected by the United States Government appeared in a recent issue of the *Electrical World*. Among them were mentioned the St. Lawrence Waterway from which it is hoped to develop 2,000,000 HP; Ohio Basin (possibly 341,000 kW); Umatilla, Columbia River (600,000 kW); Snake River, Idaho (155,000 kW); Hungry Horse Dam, Montana (150,000 kW); Upper Missouri River Basin (758,000 kW); and Willamette River, Oregon (207,000 kW).

Proposals are afoot for placing the responsibility of marketing all power developed from these Federal projects upon the Department of the Interior.

Our contemporary says that the principle of river development for flood control, navigation, irrigation and electric power is firmly established as an element of Federal policy. River development is a necessary and logical concern of the Federal Government and moreover "if the principle had no virtue at all, it would still remain a political boon too rewarding ever to be relinquished, regardless of the party in power."

American Power Position

Mr. C. W. Kellogg, president of the Edison Electric Institute, in his address at the recent annual meeting of the Institute, said that in the four years ended in May last the annual output of electricity in the United States had grown from 137,000 to 230,000 million kWh—an increase of 68 per cent. The load factor had improved from 53.3 to 64.4 per cent, and the maximum demand from 29.3 to 40.75 million kW, or 39 per cent. Plant reserves aggregated 8.75 million kW. Although production costs were higher the charge per kWh to customers had gone steadily downward.

Looking ahead, Mr. Kellogg expected new sales records through the replacement of

"overworked electrical servants" and from the several hundred thousand new homes which would be constructed each year. There would also be higher levels of illumination, expansion in commercial cooking and air conditioning and the development of many new applications of electricity.

It appeared that the wartime peak was already passed and there was a downward trend. Civilian activities bore a much smaller relationship to war activities now than they did at the close of the last war. Even if civil industrial production reached the highest level ever attained in the United States the decrease in war production should still leave large amounts of electrical energy for sale.

Cooker Design

Mr. C. W. Kellogg also referred to proposals for the improvement of electric range (cooker) design and construction. Among the recommendations which he mentioned were uniformity of top openings for surface units to facilitate the installation of various sizes of units; a 50 per cent. safety factor for all current-carrying parts; screw levelling device for the feet; simplification of oven units to make replacement easier; frames to be enamelled or made of stainless steel or non-ferrous metal; standardisation of oven unit connections; and improvement of oven door bearings, springs and hinges to withstand years of hard usage.

Consolidation of Organisations

At the same meeting it was decided to appoint a committee (and to ask the other bodies concerned to do likewise) to examine the possibility of consolidating four existing electricity supply organisations into one. The other parties are the Association of Edison Illuminating Companies, the Council of Electric Operating Companies and the Advertising Committee.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Freedom of Choice

SINCE I sit on the same side of the fence as Mr. Purse I read his article with considerable interest. I doubt very much if the renegade members of our fraternity influence the matter, and certainly their opinion is of no serious account.

The situation as I see it at present is reminiscent of "Cinderella," the title role being taken by the coal industry, with the gas and electricity industries as the unpleasant sisters, and the Government as the irresponsible Baron. The consuming community seems to me to be playing the part of "Buttons" but I feel it would do better to aspire to the munificent role of "Prince Charming."

Let me not be thought flippant on a serious subject for it seems to be an ideal analogy. Moreover, a "happy ever after" ending is possible if—a big "if" perhaps—the matter is viewed in its true perspective.

Coal is essential to both the electrical and gas industries, completely so in the case of the latter, but the possibility of a certain amount of water power helps the electrical industry somewhat. Coal varies widely in its characteristics, but much of it contains by-products obtainable through the medium of the gas industry, leaving a coke residue which has a heating value nearly equal to the coal as mined. Primarily, therefore, to mention one instance, it is a serious matter that the burning of coal at about 5 per cent. efficiency on an open fireplace is allowed to continue in order to pamper to the Englishman's traditional but misplaced love of the open fire.

The gas industry in pursuing its present policy, is in the main entitled to both appreciation and sympathy in an unequal struggle. On the other hand the electrical industry finds itself in an excellent strategic position and I venture the view that by education—not propaganda—the community at large can be made to realise that the proper exploitation of electricity will do much to raise the standard of living and also provide the greatest contribution to social security.

Repeating that coal is fundamental and prophesying the demise of gas as a domestic commodity, it is essential in the interests of the nation that the gas industry shall survive to safeguard the by-products, it therefore seems to me that the proper thing is the amalgamation of these three basic industries. The slogan "One for all and all for one" is far preferable to "Freedom of Choice." Education not propaganda is the

essential, and all three industries should combine in this.

I appreciate fully that such a colossal undertaking cannot be achieved by mere suggestion, but this war has at least taught us what can be done by teamwork.

Birmingham, 28.

G. H. HIRONS,
Associate I.E.E.

IN his provocative article in your recent issue Mr. Purse has, as you imply in your leader pages, put the "cat amongst the pigeons" by suggesting that consumers in post-war houses should be forced to decide on "all-gas" or "all-electric." If a householder should prefer gas for cooking, as many still do, does Mr. Purse think that this consumer will be satisfied with gas lighting and willingly go without such conveniences as electric irons, mains radio, vacuum cleaners, etc.?

He accuses the gas authorities of "special pleading" on behalf of their commodity, but is doing exactly the same on behalf of electricity. He further suggests that the gas concerns should confine their activities to industrial expansion and, to what they can "pick up," by additions in existing houses. I wonder what reply the gas companies will make to this suggestion!

Taking what I consider to be a fair view of the situation, the following facilities will have to be provided to satisfy public requirements:—(1) Electricity for lighting, radio, vacuum cleaners, irons and occasional space heating. (2) Gas points for cooker and wash boiler with, say, a conduit run for electric cooker, if required.

On the question of cost, if the gas companies are prepared to pipe all houses for cookers free of charge to the consumer, as most of them did in pre-war times, this expense will not enter into the matter.

London, S.W.1.

F. W. D. ADCOCK,
A.M.I.E.E.

Domestic Plugs and Sockets

ONE hesitates to add to the multiplicity of suggestions put forward regarding the standardisation of socket outlets and plugs. As, however, the whole subject is now apparently "in the melting pot," and is being approached with an open mind by the Electrical Installations Study Committee, I would venture to suggest that consideration be given to the adoption of a "jack" type plug and socket. Such a unit has been used by the Post Office for many years on portable telephone extensions, and

for light-current work appears to have been satisfactory.

I think it is safe to assume that in the not too distant future almost all our requirements for heat, light and power will be met electrically and the insertion and withdrawal of plugs will become as common an operation as the turning on and off of taps. Facility of use will, therefore, be a most important factor and in this connection it can hardly be said that the insertion of three pins into three sockets is a simple and quick operation.

The design of a "jack" type plug suitable for currents up to 15 A should present no great difficulties, and although the cost may be a little greater than the existing types, it would have the following merits:—(a) Maximum simplicity of operation; (b) it can be so designed that if any conductor is reversed in the socket the insertion of the plug automatically blows the circuit fuses; (c) the axis of the socket would be parallel to the wall instead of at right angles as in most existing designs, thus permitting a more compact design, and giving greater ease of operation. (d) the barrel-shaped plug top would conveniently accommodate a small cartridge fuse; and (e) the socket would be almost complete proof against the insertion of metal objects by children, as the earthed contacts would be nearest the mouth of the socket, with the live contact at the extreme end.

It would be interesting to know if any of your readers have had experience of the use of this type of plug and socket on normal public supply voltages.

Castle Douglas, Kirkcudbright. A. N. BOTT.

Compressed-Gas Insulation

SOME information was presented in the *Electrical Review* of February 5th, 1943, regarding the insulating properties of compressed gases which had been advanced by H. M. Hobart. At the St. Louis Technical Meeting of the American Institute of Electrical Engineers held from June 26th to 30th last, Mr. Hobart submitted a paper on "High-Voltage Compressed-Gas Power Transformers" in which he pointed out that in conventional apparatus the bulk of solid insulation is subjected to very low and uneconomical stresses; e.g., slot-linings of high-voltage stator windings operate at 30 to 60 V per mil, whereas in laboratory tests they have withstood several thousands volts per mil.

With compressed gases and high frequencies tenfold frequency and ten times as large a kVA accompany the same flux, thus reducing the size and cost of transformers to about one-seventh. High frequencies increase speed, quality, safety and economy in welding work. An AC arc is more stable and produces a better weld at the higher frequencies:

therefore greater speed and lower voltages may be used. Lower voltage and higher skin effect greatly reduce shock hazards to operators. Core temperatures have hitherto been limited to about 90 deg. C. in order to avoid sludging of oil.

With compressed gases transformer cores can be operated at from 300 to 325 deg. C. with corresponding reduction in core loss and greater economy in core material at higher frequencies and flux densities than are at present possible. Instead of 130 cu. ft. of air per minute per kVA for 55 deg. C. rise allowed in air-blast transformers, only 1.8 cu. ft. of compressed sulphur-dioxide at fifty atmospheres would be needed. SO₂ costs only 6 cents a pound and, free from moisture, is quite non-corrosive.

The paper discusses dielectric strength of transformer oil and tests on four gases between two spheres of 2,500 mil diameter with a 100 mil gap at pressures of 1, 20, 40 and 60 absolute atmospheres, and includes five exploratory designs for compressed-gas power transformers of from 20,000 to 100,000 kVA at 60 to 1,200 cycles per second, carried far enough to disclose trends clearly, and using aluminium conductors.

Herne Bay.

THEODORE STEVENS.

Adequate Installations

I AM glad to see Mr. Illingworth tackling the problem of the electric kitchen, particularly since he arrives at an unquestionably sound conclusion regarding a kitchen service cable. He makes it obvious that we must henceforth divorce the kitchen from the rest of the house, but I hope his practice of lavishing sockets on the kitchen at the expense of the remaining rooms will not become common. Why, after being so generous in the kitchen, does he allocate only ten sockets to the rest of the house? Surely there is a better reason than that ten is the balance between the number he has used in the kitchen and a "mystic seventeen."

Giving the housewife relief from kitchen drudgery does not mean that she must be denied comfort elsewhere in the house. Yet one outlet per room, plus one for luck downstairs, is as bad as the pre-war inadequacy over which the present battle of the outlets is raging. Our objective in this battle can be described quite simply as a matter of providing facilities for the use of electrical appliances both *when* and *where* they are needed. If, with this in mind, the same careful thought that Mr. Illingworth has given to the kitchen is applied to the rest of the house it will be found that a minimum of four outlets is needed in the main rooms: when alternative furniture arrangements are taken into account this figure may be as high as six. Such a scale can be provided with existing B.S. 546 sockets wired on the fused

room-circuit principle illustrated by the accompanying diagram.

Any scheme that raises the cost of such facilities beyond the reach of the modest dwelling is an unacceptable scheme. Not only is it a moral responsibility and sound business—particularly to the electricity undertaking—to guard against this but anything less will lead to our facing, for the second time, an indictment of having incited the public to dangerous improvisation with piles of adaptors and tangles of flexible.

Nor will the housewife be placated by an explanation that the "100 per cent. interchangeable" socket will serve for any appliance she wants to use if, in practice, she finds she has to disconnect the fire when she wants to use her sewing machine or dispense with the lamp she needs for her needlework when her husband plugs in for the news. Nor will a vacant outlet at the fireplace give her anything but irritation when she wants a light on the desk at the other end of the room.

The only true solution to this problem is numbers. By fostering the illusion that 100 per cent. interchangeability is a substitute for numbers we are heading for disaster, for that way lies complication the cost of which precludes the solution. I wonder whether this is how the "mystic seventeen" crept in to spoil Mr. Illingworth's otherwise excellent piece of planning.

Oxshott, Surrey. L. NEWTON DAVEY.

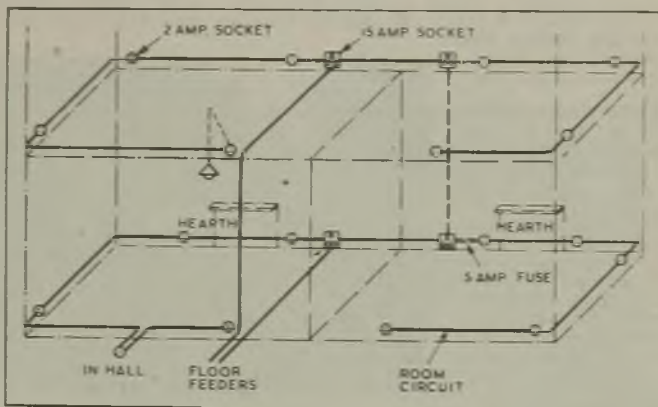
An Exhibition Centre

THE export question is one of high ranking importance in the future of this country, to which the slogan "Export or bust" may aptly be applied.

If Great Britain is to remain one of the principal shopping markets of the world it must meet and counter competition from newly industrialised countries. The amenities provided for the British Industries Fair, which was divided between London and Birmingham, were hopelessly inadequate. The month of February, notoriously the worst in the English calendar, seems to me to have been ill-chosen. The limited number of overseas visitors who attended could scarcely have been impressed, since the art of showmanship is closely linked with that of showmanship.

I consider that, as an important feature of

the reconstruction programme of Greater London, there should be a permanent exhibition centre. This could be situated in one of the London parks, or at some site within easy reach of the centre of London. There are large areas in Regent's Park little used by the general public. In such a position could be built a permanent exhibition and amusement centre without equal in the world. By "amusement centre" I do not mean to imply the Gargantuan fun fair element associated with the Wembley Empire Exhibition. The



Scheme of wiring on the fused room-circuit principle suggested by Mr. Newton Davey

exhibition halls should be large enough to house the whole of the British Industries Fair, and part, or all, could be let for various exhibitions throughout the remainder of the year. In the surrounding grounds there could be show gardens, electrically floodlighted by night, swimming pools, open-air theatre and high-class restaurants of the kind one finds in the Bois de Boulogne, Paris.

The British Industries Fair, held in such surroundings at the height of the summer season, would attract foreign buyers in far greater numbers than hitherto, and would provide an annual stimulus to export trade. I would suggest that part of this exhibition, with its illuminated gardens and an all-electric model farm, be adopted as a permanent Electrical Centre.

London, W.1. RAYMOND BERRY,
Berry's Electric, Ltd.

[Owing to pressure on space, letters by Messrs S. A. Daines, H. M. Sayers and A. C. Stephens are unavoidably held over until next week.—Eds.]

I.M.E.A. Annual Meeting

THE postponed annual general meeting of the Incorporated Municipal Electrical Association is to be held in the Conference Room, Town Hall, Manchester, on Thursday, September 14th, at 11 a.m.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Parliamentary Secretary of the Ministry of Fuel and Power, **Mr. Tom Smith**, has recently been appointed chairman of the Heavy Electrical Plant Committee of the Ministry. The photograph reproduced with this note was taken during a visit by Mr. Smith to the headquarters of the South Wales and South West England Area of the Central Electricity Board as part of a tour of inspection of the area. Mr. Smith is accompanied by **Major E. Cadbury**, D.S.C., D.F.C., controller of the Ministry's No. 7 Region (South West England), and **Mr. J. T. H. Legge**, manager of the Area.

Siemens Electric Lamps & Supplies, Ltd., announces a number of changes in its branch organisations. **Mr. E. A. Ward**, the present Manchester branch manager, is being transferred to Cardiff to succeed the late **Mr. C. J. Neale**. **Mr. A. J. Barry**, the Sheffield branch manager, is moving to Manchester to take charge of the Manchester and Liverpool branches, while **Mr. W. H. Jackson**, who for some years has been in charge of the Nottingham depot, is to be branch manager at Sheffield in place of Mr. Barry.

Mr. George R. Yates, superintendent of Bolton Corporation electricity undertaking's fittings department, is retiring on superannuation after forty-six years' service, and a presentation was made to him on August 25th by his colleagues. **Mr. Harold Wilcock**, his assistant, has been appointed to succeed him.

Mr. S. B. Williams, editor of the *Electrical World* (New York), has been elected president of the American Illuminating Engineering Society.

Mr. A. E. Bendixson, secretary of the Power Investment Corporation, Ltd., has been elected a director of the company.

We very much regret the transposition of the word "late," through no fault of Mr. Brammer's, in connection with the reference to **Mr. W. W. Lackie** in the article on the Association of Supervising Electrical Engineers in our issue of August 18th. We should of course have said "late of the Electricity Commission" and we are delighted to hear that Mr. Lackie is in the very best of health in his retirement in the country.

Mr. R. Bushell has been appointed Midland Counties representative of Sciaky Electric Welding Machines, Ltd. After experience in the building of resistance welding machines at the works of British Insulated Cables, Ltd., and in their installation and maintenance, Mr. Bushell

became welding engineer to Joseph Lucas, Ltd., a post which he held until recently joining the Sciaky Co. Offices and showrooms are to be opened in Birmingham; in the meantime Mr. Bushell is operating from his home at 158, Baltimore Road, Perry Barr, Birmingham.

Mr. F. C. Orchard, chief engineer and manager of the Hornsey Corporation Electricity Department, is to be the guest of honour of the London



Major E. Cadbury, Mr. Tom Smith and Mr. J. T. H. Legge at the headquarters of the Central Board's South Wales and S.W. England Area

Master Builders' Association's Northern Area at a luncheon on September 13th at the Salisbury Hotel, Barnet. He is to speak on "The Use of Electrical Tools in the Building Industry."

Dr. H. Moore, C.B.E., is retiring from the position of director of the British Non-Ferrous Metals Research Association and the Council of the Association is inviting applications for the post at an initial salary of £1,750 per annum.

Obituary

Mr. H. K. Heyland.—The death is reported of Mr. H. K. Heyland, chairman of the Compagnie Generale d'Electricite de Lourenco Marques.

C. H. Merz Memorial.—As a permanent memorial of the outstanding achievements and personality of the late Dr. C. H. Merz his partners decided to commission a portrait of Dr. Merz in oils by Arnold Mason, A.R.A., and to present to King's College, Newcastle-on-Tyne, an inscribed tablet by Laurence A. Turner, R.S.A., Hon. A.R.I.B.A., with a portrait medallion by Allan G. Wyon, F.R.B.S. The portrait has been accepted by the Institution of Electrical Engineers. It may be seen at the Institution and later it may be on view at the Autumn Exhibition of the Royal Society of Portrait Painters. The tablet can be seen at 32, Victoria Street, S.W.1, at any time during the next few weeks.

We may remind readers that Dr. Merz lost his life in an air raid on London in 1940.

COMMERCE and INDUSTRY

Purchase of Iron and Steel. High-frequency Hardening.

Iron and Steel Authorisation

THE Iron and Steel Control (Ministry of Supply), Ashorne Hill, near Leamington Spa, has issued a new guide to the authorities to whom application should be made for authorisation for the purchase of iron and steel. For the requirements of authorised electricity undertakings in respect of power stations and transmission and distribution systems up to consumers' terminals (but not for the requirements of consumers) applications must be made by the undertakings to the Electricity Commission. In the case of Northern Ireland the authority is the Ministry of Commerce, Belfast.

The Ministry of War Transport is responsible for authorisations in connection with tramway and trolley vehicle undertakings, but not for new vehicles or spare parts for the latter. In the case of requirements (other than those for the Admiralty and electricity supply undertakings) for the manufacture of a specified range of industrial electrical equipment, *i.e.*, motors, generators and alternators up to 250 HP or kW, with associated control gear, converters and frequency changers up to and including 40 kW and low- and medium-voltage switchgear authorisations should be obtained from the Machine Tool Control, Caxton House, Tothill Street, S.W.1. This is also the authority for requirements for portable power tools and electric welding equipment (including coated electrodes).

Requirements of iron and steel for the production of cable drums and for plant and maintenance of plant of cable manufacturers are dealt with by the Directorate of Signal Equipment, Iron Trades House, S.W.1.

Henley Scholarship

W. T. Henley's Telegraph Works Co., Ltd., and its subsidiary companies are offering a four-year scholarship, tenable at the Gravesend Day Technical School, for competition among the sons of Henley employees. The scholarship will be awarded annually on the results obtained in the entrance examination held at the Technical School in March every year. Candidates must be between the ages of 11 and 12 on August 1st preceding the examination, and those entering for the examination in March, 1945, must have been born after July 31st, 1932, and before August, 1933. The scholarship will enable the son of a Henley parent to obtain a full-time course at the Technical School leading up to

matriculation standard. It will provide a sum of £15 per annum to cover fees and incidental charges. Full details may be obtained from the Gravesend Technical School.

Fluorescent Lighting Installation

It recently became necessary to re-light completely an important war factory. Philips fluorescent lamps (type MCF/U 80 W, 60 in.) were used throughout in Verity type VS. 6936 "Maxlume" fittings, the installation being carried out by Pinching & Walton, Ltd. The new lighting has been of particular benefit in



Fluorescent lamps give shadowless lighting in a coil-winding shop

the coil-winding shop, where shadowless illumination on the spools is provided, as shown in the illustration, by lines of fittings situated 5 ft. over the working plane, giving 20-25 ft.-candles on the benches. Output has been increased, and working conditions improved. In the drawing office of the same works similar fittings have been installed over each drawing board with extremely satisfactory results.

Contract Price Adjustment Formulæ

We are informed by the British Electrical and Allied Manufacturers' Association that the following are the latest figures for its contract price adjustment formulæ: (a) "Rates of Pay": the rate of pay for adult male labour at August 19th shall be deemed to be 90s. 6d. (b) "Costs of Material": the index figure for intermediate products last published by the Board of Trade on August 19th is 176.1 (against 176.3) and is the figure for the month of July.

Electrical Manufacture in Brazil

Plans are under way in Brazil to erect, immediately after the war, a large plant for the manufacture of electrical equipment in the San Paulo area. It is also believed that the output

of lamps, wire, fuses, switches, transformers, irons, welding equipment, some types of electric motors, lighting fixtures, radio parts, conduits, insulated cables, vacuum cleaners, heaters, and dry batteries will be increased.—*Reuter's Trade Service.*

Orders for Battery Vehicles

The Brush Electrical Engineering Co., Ltd., has received orders for eleven 2½-ton battery electric refuse collecting vehicles—six for the Birmingham Salvage Department and five for the Sheffield Cleansing Department.

Lothians Company's Farm Display

A display at the Haddington showrooms of the Lothians Electric Power Co. has created considerable interest among the local farming community. Mr. C. H. A. Collyns, the acting general manager, tells us that a special feature has been made of the "Essex" mill, and behind



Farm exhibits at the showrooms of the Lothians Company

the 3-HP motor driving it is a backcloth showing the company's main distribution lines. A novel use has been made of inverted glass pin-type insulators which can be seen in the foreground with oats in the outer shed and the flour obtained from the mill in the centre shed.

Northampton Polytechnic

Details of the day, evening, part-time and week-end courses for the 1944-45 session of the Northampton Polytechnic, St. John Street, London, E.C.1, which are starting shortly are now available from the Principal, Mr. S. C. Laws.

Portable Cross-cut Saw

Reference was made in the article on electro-farming in the *Electrical Review* of August 18th to a portable electrically driven cross-cut saw. The makers were said to be Mawdsley's, Ltd., but this company tells us that while it supplied the motor, the saw was made by T. H. & J. Daniels, Ltd., Stroud, and sold by J. Clubley Armstrong, Abford House, Wilton Road, S.W.1.

Fatality on Farm

At the inquest on Geoffrey W. Sylvester Case, six-year-old son of Mr. and Mrs. F. E. Case, of

Buxton-with-Lomas, who died after coming in contact with an overhead line while climbing on the roof of his father's cattle lodge, a verdict was recorded that "death was due to accidental electrocution through the boy touching the cable that he did not realise was dangerous." The boy had been warned not to climb trees and farm buildings. A terminal pole was fixed on the gable end of the cattle lodge and the overhead line was about a foot above the ridge of the corrugated iron roof.

High-frequency Hardening

Excellent results are reported by Black & Decker, Ltd., from the installation of high-frequency (400,000 cycles per sec.) induction-heating equipment of the valve-oscillator type for the hardening of steel components of gears for portable electric tools running at speeds up to 20,000 RPM, including armature pinions with only twelve teeth, 40 diametrical pitch.

Heating each component individually in the coil and quenching it almost immediately in a vertical position has minimised distortion, thus removing a cause of harsh gear running and possible consequent noise. The effect of the hard skin and comparatively soft core, with an absence of scale on the tooth flank, has been to improve products. Moreover, components not originally in mind can be hardened by the new equipment, e.g., splined shafts can be hardened at the wearing portions only.

Formerly as many components as possible were made by the company of pre-heat-treated steel in order to avoid subsequent heat-treatment operations. Now all steel components are manufactured in a fully annealed condition, finished parts being hardened where necessary. On that account alone a 40 per cent. reduction in machining time has been obtained.

Ex-Services Welfare Society

A letter received from Mr. Everett Howard, secretary of the Ex-Services Welfare Society, 51-53, Victoria Street, S.W.1, urges bigger firms themselves to give disabled men sympathetic training much as they at present take on apprentices. Experiences at the Society's Leatherhead training centre, a self-contained commercial concern, are referred to, and an offer is made to co-operate with any organisation now reviewing this problem of rehabilitation.

Fire Fighting Demonstration

A demonstration was given at the Motherwell and Wishaw electricity works on August 16th of means by which fires on live electrical gear can be safely attacked, provided normal precautions are taken. Mr. W. D. Braxington, the burgh electrical engineer, says that this demonstration is believed to have been the first

held in the West of Scotland in which 11,000-V gear has been sprayed without the fire fighter taking elaborate precautions to ensure his own safety by the use of rubber gloves, boots, etc. The operator of the methyl bromide extinguisher stood on the ground about 6 ft. from the bare copper bus-bar. The same extinguisher was used on 440-V three-phase apparatus. The demonstrators from the National Fire Protection Co., Ltd., also showed how oil fires could be effectively attacked. Approximately 70 representative industrialists attended the display.

The A.O.E.C.

Due no doubt to prospects of the Government's introducing legislation affecting the organisation of the electricity supply industry, membership of the Association of Officers and Staff Members of Electricity (Power and Supply) Companies of Great Britain (A.O.E.C.) shows an increase of over 55 per cent. during 1943 on the already increased membership of the previous year. Mentioning this, the Association's annual report, which the secretary, Mr. E. J. Gibbons, Kingsway, Sutton Road, Seaford, has just sent us, adds that the new members have been drawn from about twenty-seven additional companies, which were not before represented in the Association, and these new companies cover several hitherto untapped parts of the country.

E.C.A. Headquarters

The Electrical Contractors' Association has temporarily transferred its headquarters to 12, Southgate Street, Winchester.

Trade Announcement

The Bristol service and sales organisation of Brook Motors, Ltd., is now at 28, Baldwin Street, Bristol, 1 (telegraphic address: Brookmot, Bristol; telephone: Bristol 24427).

Trade Publications

Frank Whitelegg, 90 Robin Hood Lane, Sutton, Surrey.—New price list (C) dealing with mechanical revolution and stroke counters with up to five figures.

Chance Brothers, Ltd., Smethwick, Birmingham.—Technical data sheets on sealing glasses for electronic and X-ray tubes.

Copies of these publications can be obtained from the firms concerned by bona fide trade applicants.

American Radio Production

The United States War Production Board has announced that production of civilian radio sets will not be resumed until after Germany surrenders. Then, however, there will probably be sufficient supply of raw materials to permit civilian production without quota restrictions, since the amount of steel, copper and other raw materials needed by the radio industry is comparatively small.—*Reuter* (Washington).

New Outlook for Managements

Mr. Alan P. Good, managing director of the Brush Electrical Engineering Co., Ltd., told a foremen's conference at Sheffield last week that managements must undergo a change in outlook before they could educate the working man to undergo a similar change. If they

could rehabilitate a man who had suffered mental or physical injuries through the war, he said, they could fit for employment men who, through some industrial or personal problem, were not able to do the work of an ordinary man. Every employer would have to carry a number of men who, physically or mentally, were not fitted to do a full day's work. No longer would it be possible for an employer to use only the good men and let the poorer worker, or the less energetic, rot on the scrap-heap of unemployment. The managements had lost for all time the old scourge which kept less responsible labour working hard—the fear of dismissal.

TRADE MARK APPLICATIONS

THE following applications have been made for trade marks. Objections may be entered within a month from August 23rd.

VEDA. No. 627116, Class 9. Electric flexible conductors, wire and cables.—Jones, Stroud & Co., Ltd., Vida Mills, New Street, Long Eaton, Derbyshire.

CRYPTON. No. 627818, Class 9. Apparatus for charging electric batteries; electrical testing instruments and apparatus; apparatus and instruments (not included in other classes) for testing engines and parts of vehicles, etc.—Crypton Equipment, Ltd., George Street, Bridgwater.

MARY ANN. No. 628477, Class 6. Electric flat irons, kettles and tea infusers.—British Electric Domestic Appliances (1938), Ltd., 105-109, Judd Street, London, W.C.1.

OPTONIC. No. 628699, Class 9. Scientific and optical instruments and apparatus; electrical instruments and apparatus (not included in other classes); parts (not included in other classes) of all these goods.—T. Beech & Sons (Glassworks), Ltd., 3-25, North Road, Preston, Lancs.

DURASIGNS (design). No. 629014, Class 9. Neon advertising signs.—Steels Electrical Products, Ltd., 4, Dean's Yard, Westminster, S.W.1.

MINTON. No. 628808, Class 11. Electric table lamps, lamp shades, lighting fittings, etc., all being goods made of porcelain or earthenware.—Mintons, Ltd., China Works, Stoke-on-Trent.

LIGNEX. No. 629276, Class 11. Separators for electric accumulators.—Chloride Electrical Storage Co., Ltd., Exide Works, Clifton Junction, near Manchester.

INFORMATION DEPARTMENT

GENERAL inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

Our extensive records enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the following:—

Davies Kellar, Ltd., manufacturers of torches.

Lamp Publicity

"Mazda" and Siemens Plans for the New Lighting Season

AS the autumn approaches lamp manufacturers are busy completing plans for their publicity campaigns for the 1944-45 lighting season.

"Mazda" advertisements appearing in the national, provincial, trade and electrical Press will emphasise the need for light and fuel saving, efficient production, and welfare betterment through good lighting. A "Research behind Lighting" series of advertisements in the engineering and industrial Press demonstrates very effectively how B.T.H. research aids industry. The Control of Paper Order has limited display publicity, but by means of the silk screening process and the use of book cloth, another new and effective "Mazda" window piece in colour—red, yellow and black—has been produced. This takes the form of a canvas panel measuring 7 ft. by 26 in. with wood strips top and bottom. The illustration shows the panel in use in a typical small window with the current "Mazda Factory Display" placed on one side.

The large painted road signs, placed in prominent positions on many of the main roads leading out of London, still draw attention to the famous "Stay Bright Longer" lamps. "Mazdalux" industrial fittings and equipment are described, illustrated and priced in the Business Guide L.749/M recently issued and to this a broadsheet "Mazdalux Industrial Lighting

In view of the urgent necessity for speeding up output in all essential industries, special attention will be devoted to improved lighting in factories with Siemens lamps and lighting equipment, and to this end display advertisements will appear in the principal trade journals stressing the economy of good lighting in making possible increased production, and at the same time offering without obligation the skilled advice of the company's lighting engineers on all matters appertaining to scientific factory lighting.

An attractive hanging display bill 20 in. by 30 in., in full colours, entitled "Make Light of Fuel Economy with Siemens Lamps," is printed on the backs of obsolete posters, to comply with the control of paper regulations. It forms the central feature of a window display.

Limited supplies of last year's "Judge" show-cards with lamp prices can also be had from the company. Price-lists are available to the trade on request.



Siemens lamp display bill



New "Mazda" window display

Equipment for Light Conditioning by B.T.H. Engineers" (L.742/M) is a companion publication.

The Siemens Campaign

In the interests of national economy the Siemens lamp publicity for the coming season is of necessity curtailed. Subject to limitations on space, display advertisements will appear from time to time in the national and provincial Press, and will link up with the Ministry of Fuel propaganda on fuel economy.

Theft Charge

A SERIES of thefts between 1941 and 1944, involving nearly £1,400, by the chief accountant of the Mid-Lincolnshire Electric Supply Co., Ltd., was alleged at the Grantham Borough Court last week, when William Thomas Lings, of Tottle, Harrowby Lane, Grantham, was committed for trial at the next Quarter Sessions on four charges of larceny from his employers and three charges of falsification of accounts to the extent of £14 10s. 11d.

Defendant, who pleaded "Not Guilty" to all the charges, was allowed bail himself in £50, and two sureties of £25 each.

Receipt vouchers showing that amounts of varying sizes had been paid out to Lings by the petty cashier were produced and it was alleged that instead of using the moneys on behalf of the company Lings had kept them for himself. On one occasion, the prosecution stated, sums had been withdrawn ostensibly for payment to a sister company, but the auditor denied that this company had received these amounts. The charges of falsification of accounts related to Lings' own consumer account with the company. He was charged with crediting himself falsely on three separate occasions.

Rural Supplies

Experiences at Letchworth

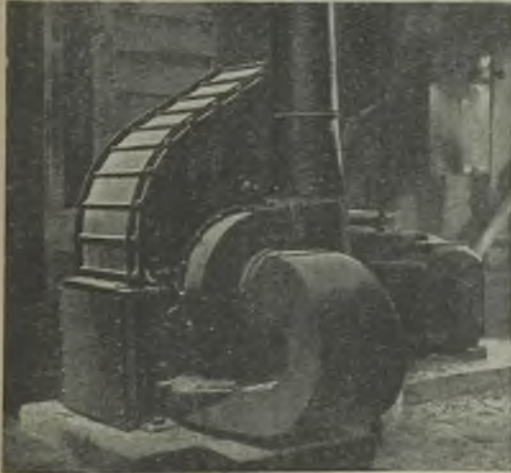
IN our description on April 21st of the post-war planning exhibition held at Letchworth we gave some details of past achievements and contemplated after-the-war developments of the electricity undertaking in the Garden City area. Since visiting this exhibition Mr. Charles Gould, M.I.E.E., chief electrical engineer to the First Garden City, Ltd., has given us the opportunity of seeing something of the work undertaken in the undertaking's 40-sq. mile rural area, a Special Order to supply which was obtained in 1924 and an Extension Order in 1925.

While the system as a whole has been built up on more or less conventional lines, minor differences and preferences are interesting. When supply to the rural area was first commenced, to Baldock, DC at 500/250 V was employed. After six years this was converted to a three-wire split-phase AC system at a pressure of 480/240 V, which was

changed in 1936 to 415/240 V three-phase four-wire, transmission being at 11,000 V. To-day practically the whole of the area



Typical rural substation, with 100 kVA transformer, at Campton



Hammer mill for grinding cattle meal at Manor Farm, Willian

is covered, with ring mains everywhere except for a few odd loops unfinished because there are no consumers in the areas concerned.

Of the sixty or so substations and switching points which are provided the majority are of the brick-built outdoor type, which are gradually superseding kiosks. Even in the rural or "outside" area a high proportion of the mains is underground (twenty-four miles out of thirty-five 11 kV, and forty-six miles out of forty-eight 1 v.). Where overhead lines are used pole-mounted transformers and switches are not favoured, as being inconvenient for inspection and maintenance, and only two instances of their use are to be found, these in the least populated areas.

Occasionally difficulties have been

experienced with faults due to lightning and birds. These have been largely overcome by the use of single-shot automatic reclose gear on the circuit-breakers. For some of the worst stretches of line the adoption of repeater switches is under consideration. Failures due to lightning are also minimised by rearranging circuits in August and September, the periods when it is most prevalent, to reduce interference with certain converting plant employed for the power station auxiliaries. Insulating sleeves are also used on overhead line pole cross-arms to reduce outages due to birds, the clearances on the standard 11-kV lines being considered insufficient.

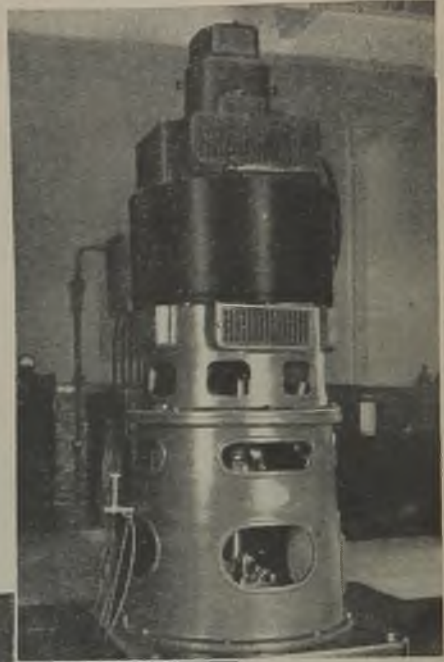
The popularity of electricity in the area—there are now 10,671 consumers (Garden City 5,330, outside area 5,341) out of a potential number of 12,500 and they now use about 40 million kWh a year—can be traced to a considerable degree to the goodwill which the undertaking has painstakingly built up by comprehensive service. This applies both to domestic and to industrial consumers. The latter, absorbing no less than 70 per cent. of the undertaking's output, cover steel foundry and heavy engineering work, the manufacture of road freighter trucks, accounting machines, woodwork, bookbinding, printing, perambulators, corsets, hosiery, radio valves, scientific instruments, photographic materials, various light engineering products, copper tubing, water heaters and geysers, bacon, oiled silk, mastic roofing, articulated trailers, cycle com-

Milk bottling and capping machinery driven by two 1-HP motors at the Letchworth & District Co-operative Society's model creamery

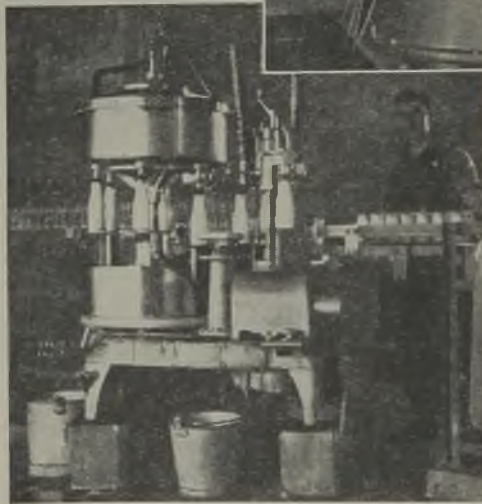
ponents, asphalt, sand and gravel quarrying. More than four-fifths of the factories are in the Garden City area.

Considerable attention has been paid to the needs of the farming community and out of the fifty-two larger farms (200-2,000 acres or more) no fewer than forty-six are now taking supplies. Incidentally, due to the planning policy of the company, which owns the freehold of the whole of Letchworth, there are actually twelve farms situated in

the permanent green belt of 3,000 acres which girdles the Garden City itself. A great deal of dairy farming, general agriculture and market gardening is carried on, and the



A 60,000 gal. per hour pump driven by a 195-HP motor at one of the First Garden City's waterworks



use of electricity is rapidly growing, examples of all the usual appliances—milking machines, grinders, crushers, etc., being plentiful.

Pumping stations in the rural area are now being changed over to electrical operation whereby very reduced costs are obtained by the

water and sewage authorities as compared with engine-driven installations. The saving is, of course, mostly in the very small maintenance required by electric motors, apart from the reduction in energy costs. A special study has been made of industrial canteens and practically all of them have been equipped by the undertaking. Schools are lent cookers free of charge for

instructional purposes by the undertaking.

Actually a drive to popularise electricity in the rural areas was curtailed by the war. At that time, however, the low agricultural wages were a handicap and market gardening was not so very profitable. To-day, with vastly improved conditions in these areas, a tremendous number of new appliances could be hired or sold if they were available. As it is apparatus already sold or on hire in the rural areas includes 189 cookers, 44 water heaters, 26 wash boilers, 157 kettles, and 101 irons. These figures do not, of course, bear comparison with, for instance, 2,400 cookers in the rest of the area. Boding well for the future of rural development is the fact that

the domestic two-part tariff and hire charges are exactly the same in town and rural areas. The charges are moderate, the average working out at 1.28d. per kWh.

The company will supply any electrical appliances and machinery asked for and its installation department has won for itself such a good reputation that its assistance is frequently called for to undertake contracts outside its own area. Often industrial consumers leave in the undertaking's hands not only the electrical installation work but also the choosing of the plant as well.

We should like to thank Mr. Gould and his chief assistant, Mr. W. A. Brown, for their help in preparing this article.

Wiring Post-War Houses

Lessons from Experiments at Birmingham

THE new materials and methods of construction which will be employed in post-war houses are providing interesting problems in electrical installation work. The recognised methods and standards are proving quite unsuitable to meet the new requirements and it has become necessary to develop an entirely new technique, particularly in relation to prefabrication.

Typical of the difficulties of the post-war planners are those encountered by the City of Birmingham Electric Supply Department in the installation it is carrying out in a pair of experimental houses which are now being completed for the Public Works Committee to designs prepared by Mr. H. J. Manzoni, the city engineer and surveyor. To give both electricity and gas an opportunity to demonstrate their comparative merits it was decided that one of the houses, a three-bedroom type, should be left to the Electric Supply Department to equip, while the Gas Department should be responsible for the other, which is a two-bedroom type, both houses, of course, being lighted by electricity. In addition, gas points and plug points in the various rooms and wiring and gas pipes to the cooker and wash-boiler positions are provided in both houses.

By this arrangement not only can electrical apparatus be shown in the "electric" house, and gas equipment demonstrated in the "gas" house, but at a later date when the houses in question are actually occupied, each tenant will be able to utilise either or both types of service for various purposes according to his particular choice. In both houses there is in

the living room a solid-fuel fire of special design which not only warms this room and, by means of a special flue, one of the bedrooms, but also provides the domestic hot water. A gas point is provided for lighting this fire.

In planning the equipment of the "electric" house, the Electric Supply Department has decided against the idea of using it as a means of demonstrating the numerous ways in which electricity can be utilised. Instead, it has concentrated on furnishing an efficient installation which, while providing for all essential services with an adequacy of plug points, does not commit the householder in the lower-income scale to the use of apparatus which he cannot really afford to run.

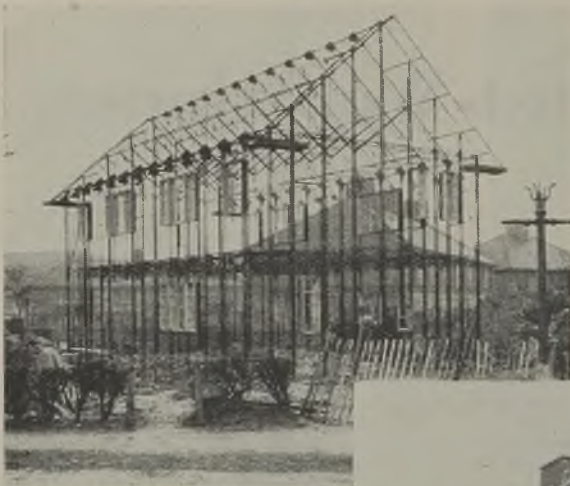
Thus, while the installation includes an electric cooker, wash boiler, and a 3-kW thermostatically controlled circulator in the lagged hot water tank for boosting purposes or for use when the solid-fuel fire is not alight, a refrigerator is not being fitted, although the wiring arrangements are such that a supply for this purpose could be provided if required. Consideration was also given to installing a heater in the drying cupboard which has been provided, but this was thought to be undesirable at present, as the class of tenant anticipated would not in all probability be prepared to meet the running costs involved. Here again, however, the wiring has been arranged so that a heater could be installed later.

A feature of the houses which has largely determined the planning of the electrical installation is the use of a steel framework.

The use of new materials and methods in house construction may demand an entirely new technique in electrical wiring, as instanced in the case of the experimental houses described

This steelwork, which for the two houses weighs about $3\frac{1}{2}$ tons and takes two days to erect, is made up of four different sizes of electrically welded lattice members. On channels fixed to the concrete foundation there are bolted stanchions. On these, girders supporting the upper floor are mounted, somewhat smaller girders being used for carrying the ceilings of the upstairs rooms and for the roof supports. In the "gas" house normal brickwork is employed for the outside walls, but in the "electric" house an experiment is being made with the use of asbestos sheeting.

The inner walls of both houses are con-



The steel framework and (right) the houses nearing completion, showing brick and asbestos coverings

structed of 2 ft. by 1 ft. breeze or foam slag blocks, $2\frac{1}{2}$ in. thick for the inner lining of the cavity walls and 3 in. thick for the partition walls, which are skimmed with plaster. The ceilings consist of plaster boards nailed into position with the usual coating of plaster. The downstairs floors are laid direct on concrete, while for the upstairs floors, the opportunity is being taken to experiment with different types of flooring, which in the case of the "electric" house consists of concrete blocks, over which is placed a surface of asphalt, and in addition, "Cabots Quilt," for sound insulation purposes, is inserted between the downstairs ceilings and the upper floors.

Realising that there is considerable uncertainty as to the availability of normal types

of cable, etc., after the war, the Electric Supply Department has thought it desirable to choose materials that are practically certain to be then obtainable. Conduit is not only considered unnecessarily expensive, but it will be realised, from the unusual type of house construction already described, that numerous difficulties would be experienced in its installation. It has, therefore, been employed only for mechanical protection for bringing the cable down from the ceiling cavity to points in the breeze or foam slag walls, and also to provide the supply to the outside washhouse.

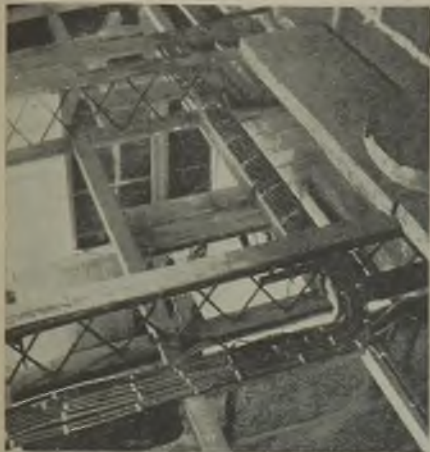
For the wiring H.S.O.S. cable has been adopted, which, in accordance with B.S.1062, can be utilised as a wartime substitute for t.r.p. cable. The service cable is brought into the house through an asbestos tube incorporated in the building construction, and is carried to the special meter cupboard on the one-step-high landing at the foot of the stairs immediately beside the front door. An experimental type service unit installed here provides for single-pole fusing. From these fuses the wiring is taken to the ceiling cavities where it is attached by means of buckle clips to the wooden



bearers fixed to the girders and supporting the ceiling beneath. All chases, slots and fixings were provided during the construction of the building.

Due to the nature and type of the material to which the various fittings were to be fixed

many experiments were necessary to ascertain the quickest, cheapest and best method of securing the wooden boxes which house the accessories. Special fixings were incorporated in the building for such items as the cooker control unit, etc. The boxes for the switches and for the sockets are secured by screws



Construction of upper floor, showing wiring

entering the side of the box into the breeze or foam slag blocks, so that there would be no direct pull on the threads.

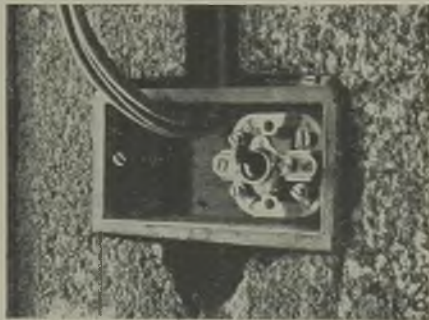
Should this type of fixing be adopted on a housing scheme in future, involving a considerable number of houses, it may be necessary to use some form of template to ensure that the box lines up with the finished plaster surface, but with the two present experimental houses it has been found sufficient to pack the box to prevent displacement when the screws are tightened up. The extra deep recess in the wall makes necessary the use of deep wooden boxes and these are found very useful for looping purposes.

All these switches and sockets are of the all-insulated and flush type. The sockets are all of the 15-A, three-pin type to B.S.546, with the exception of the special socket for the kettle incorporated in the cooker control unit in the kitchen, which is a 5-A, three-pin type to B.S.546, at present the standard unit adopted by the Department for this particular purpose. Except those in the kitchen, the sockets are unswitched, the plugs being fused where necessary for the smaller appliances. The safety factor is taken care of by the employment of shuttered sockets, generally fitted at skirting board level. In the kitchen, however, the sockets are fixed for convenience at table top height and are controlled by switches.

No fixed fires have been installed except in the kitchen where there is a 1-kW radiator

above the table. A clock point with fused plug is provided in the kitchen. Two-way switching is provided for the hall and landing lights and there is a 15-A, double-pole three-heat switch with pilot lamp for the thermostatically-controlled circulator. A special built-in three-way lighting fitting has been designed to illuminate the drying cupboard, the rear of the hall, the larder and the cupboard under the stairs. A door bell is supplied through a transformer. The lighting wiring is divided into two circuits, and the cooker, wash boiler and circulator are wired on separate circuits. The wiring system for the plug points consists of three separate circuits, each wired with 3/036 cable. This was considered preferable to adopting a ring main, not only as additional plug points in future should be unnecessary due to the adequate provision already made, but close investigation showed that the method employed would save cable and facilitate looping. In any case, the full advantages of a ring-main system cannot be realised until the industry has agreed on the various standard accessories which are necessary for such a system.

There are altogether ten plug points involved—living room three, kitchen one (in



Method of fixing wooden switch box

addition to kettle point), first and second bedrooms two each, smallest bedroom one, and landing one. The grouping of the plug points has been arranged on the basis that the maximum load which can be reasonably anticipated on each circuit will not exceed 3kW, having in mind the particular locations where the sockets are situated and the simultaneous use to which they might be put, and is as follows:—(1) living room, three plug points; (2) smallest and first bedrooms, three plug points; and (3) second bedroom, landing and kitchen, four plug points, clock point and 1-kW fire.

We are indebted to Mr. F. W. Lawton, chief engineer and manager of the Electric Supply Department, and members of the staff, in particular Major R. H. Rawll, sales and development engineer, for facilities and assistance in the preparation of this article.

Progress in Manufacture

AN exhibition which Hoover, Ltd., staged last week to enable members of its organisation to visualise the progress made not only demonstrated the company's versatility and adaptability but also showed the remarkable advances that had been made in stepping up production and reducing man-hours on particular processes.

In connection with the production of rotary transformers, one especially compact unit with a rating of 20 W in its original form weighed 6 lb. but by successive stages the weight has been reduced to 1 lb. 5 oz. The development of basic designs has proved very successful and from one type of unit eight others have been produced, using twenty-six standard components. Now the range of rotary transformers covers units of all types, including unit, water-tight and open construction. The range of fractional-HP motors has also been extended and developed. To indicate some of the war-time uses of the company's normal products, a standard vacuum cleaner was shown converted for blowing hot air for paint drying in aircraft repairs, while a "Dustette" unit was seen as adapted for supplying cool air in cabins.

Directions in which time, labour and some-

tools and it was particularly interesting to see how dies for core laminations were built up in sections. Radiography is used for checking castings and for assembly. Electro-deposition and transfer moulding are two processes that are finding increasing applications. The purity of mouldings is carefully watched and the acetone extraction test is a routine feature. For testing dimensions the "Lumigage" is one of the devices developed, while for complicated systems of electrical wiring an automatic telephone system unit has been adapted to test eighty-five circuits at one setting at approximately ten circuits per second for circuit tests and one circuit per second for insulation tests.

Informing Our Allies

AS a result of four visits to England and the Continent—the first in 1934 and the last just before the war—Mr. Davis M. DeBard, vice-president of the Stone and Webster Corporation, N.Y., has made many contacts with electrical engineers in this country, which he has maintained by correspondence.

During the past four and a half years he has, he informs us, received ninety-three news letters from twenty-four correspondents residing in Great Britain. These letters have been copied and circulated among Government officials, electrical manufacturers and supply undertakings throughout the United States and are read regularly by about 35,000 people. Some of them have been published in technical and other magazines.

Mr. DeBard's visits were first prompted by an interest in the electrical sales to medium and low income consumers and the information gained in this way and through his subsequent mail resulted, he believes, in stimulating the pre-war major-appliance companies in the United States.

More recently the data obtained here related to the operation

of undertakings and industries under war conditions, including transport, electrical communications, coal conservation, black-out lighting, labour conditions, factory operation and repairs to bombed areas in addition to various non-electrical matters such as rationing and taxation, post-war plans and the rebuilding of London.

Such information has, Mr. DeBard believes, done something towards creating a fuller understanding of each other by the peoples of the two countries, the public in the United States having been particularly impressed with our experiences during the Battle of Britain, with the bravery of repair men and operators during bombings and with the way in which the supply of electricity has been kept going to war plants—all of which have served as a stimulus to the personnel of utility undertakings in his own country.



Automatic telephone unit for testing complicated wiring systems

times expensive machinery have been saved include the adoption of centreless grinding of armature cores, the use of a special band finishing machine for eliminating the hand filing of armature core slots, a novel method of putting collars on armatures, the development of a special machine for indexing commutators, modifications of armature winding apparatus, improved ways of finish turning commutators, the use of wheel crushing methods, the standardisation of tool and production methods, and the making of a great deal of special machinery and tools for such purposes as cutting long lengths of cable, and burning off the insulation of polyvinyl cables. A new technique will revolutionise commutator production.

The very large quantities of articles required has resulted in the mass production even of

ELECTRICITY SUPPLY

Guaranteeing Payment of Accounts. Purchase Option Extensions.

Cardiff.—PRINCIPLE OF GUARANTEES.—The question of guaranteeing the payment of electricity accounts has arisen at Cardiff in connection with small holdings. At a meeting of the Corporation Small Holdings Committee a letter was read from the electrical engineer of the Cardiff Rural District Council stating that his Council had under consideration a proposal to construct electric lines for the purpose of affording electricity supply to two farms and eleven small holdings. This would involve substantial capital expenditure by the R.D.C., which would accordingly require guarantees from the farmers and small holders concerned to consume electricity to the aggregate minimum value of £130 per annum for a period of five years. The electrical engineer asked whether the Corporation would be prepared to guarantee the required minimum payments so far as the small holders were concerned. The Committee decided to ask the city treasurer to report on the matter.†

Falmouth.—PERIOD EXTENDED.—The Electricity Commissioners have extended for three years the forty-two-year period at the expiration of which the Corporation may purchase the undertaking authorised by the Falmouth Electric Lighting Order, 1903.

Felling-on-Tyne.—PROPOSED STREET LIGHTING CONFERENCE.—The Urban District Council has proposed that a conference of all local authorities on the south side of the Tyne should be called to consider the question of main road lighting. A conference of the Felling, Gateshead Whickham, Newcastle and Lamesley Councils has already been held, but Felling Council contends that the area covered by these councils is not sufficiently comprehensive.

Merthyr Tydfil.—PURCHASE RIGHTS.—The Electricity Commissioners have extended for two years the period ended July 31st, 1944, at the expiration of which the Corporation may exercise its rights to purchase that part of the undertaking covered by the Merthyr Tydfil Electric Lighting Orders, 1899 and 1914, situated within its jurisdiction.

Newcastle-upon-Tyne.—EXTENSION OF TIME.—The Electricity Commissioners have made Orders extending for two years the period ended July 3rd, 1944, at the expiration of which the Corporation may purchase the undertaking of the North-Eastern Electric Supply Co., Ltd., authorised by the Newcastle-upon-Tyne Electric Lighting Order, 1893, and the Newcastle-upon-Tyne (Kenton Extension) Electric Lighting Order, 1911, and the undertaking of the Newcastle and District Electric Lighting Co., Ltd., authorised by the Newcastle-upon-Tyne Electric Lighting Order, 1891.

Rotherham.—REINSTATEMENT OF STREET LAMPS.—Alderman F. A. Barlow, chairman of the Highways Committee, has informed the Council that the reinstatement of electric street lamps will be a comparatively simple matter and all of them should be restored to normal lighting within a week of the suspension of the present ban. The reinstatement of gas lamps would be

much more difficult; in side streets many had been seriously damaged and new fittings would be required.

Stirling.—BULK SUPPLY AGREEMENT.—The Town Council has approved a bulk supply agreement with the Scottish Central Electric Power Co. Hitherto a certain amount of electricity has been produced at the Council's own generating station.

Overseas

Canada.—INCREASED ELECTRICITY PRODUCTION.—During the first six months of this year, production of electricity by the central stations totalled 20,529 million kWh, compared with 19,674 million kWh in the corresponding period of last year.

China.—POWER SUPPLY IN CHUNGKING.—In Chungking electric power and lighting are based on the demands of the area's former population of about 300,000, at a time when industrial development was inconsiderable and there was little reason to expect any substantial increase in either population or factory activity. There are two steam-driven turbo-generators each of 4,500-kW capacity of British make owned by the Chungking Power Company, which at the same time purchases electricity from Chinese military arsenals. According to the *Foreign Commerce Weekly* (Washington), the demand for power considerably exceeds the supply, as the population has risen to nearly one million, and industry has greatly developed. Consequently the company plans to install new plant of 30,000-kW capacity as soon as its importation is possible. Meanwhile supplies to domestic consumers are rationed. The Chinese National Resources Commission proposes after the war to build a hydro-electric station of 100,000 HP on the river Tatu in western Szechwan, about 200 miles from Chungking.

TRANSPORT

Huddersfield.—EXTENSION OF TIME.—The Minister of Transport has made the Huddersfield Corporation (Extension of Time) Order, 1944, extending for three years the time for the commencement of trolley-bus services along certain routes as authorised by the Huddersfield Corporation (Trolley Vehicles) Act, 1936. The time limit was previously extended for three years in 1941.

Southend-on-Sea.—TRANSPORT CO-ORDINATION.—Preliminary agreement for the co-ordination of services in the borough, and extending to Wickford, Battlesbridge and Vange, has been reached between the Corporation Transport Committee, the Westcliff Motor Services Co., Ltd., and the Eastern National Omnibus Co.

Stockton-on-Tees.—CO-ORDINATED OPERATION.—The Town Council has considered a report by the Town Clerk on the negotiations with Middlesbrough Corporation and the Tees-side Railless Traction Board regarding the co-ordination of Tees-side transport, and has decided to continue discussions on the subject.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Thorn Electrical Industries, Ltd.—In the course of his speech at the company's annual meeting on August 25th, Mr. Jules Thorn (chairman and managing director) said that during the period under review their sales of "Atlas" lamps again showed a satisfactory increase, although they had been faced with many production difficulties, principally due to labour supply problems. They had kept abreast of developments in lighting engineering and after considerable work in their research laboratories had succeeded in producing a fluorescent lamp, the quality of which, they were confident, was as good as that produced by any of their competitors. Restrictions on the sale of these had prevented them, so far, from benefiting from the large amount of work which had been done. In view of the great importance that the export trade would have after the war they were taking active steps to extend their organisation for considerably increased business in this field. Referring to the production of civilian wartime radio receivers by the Ferguson Radio Corporation, Ltd., he said that they hoped to be able to begin selling these during the current year. Concerning domestic electrical equipment, the position had not changed since last year, but it was their intention to enter this field again on a substantial scale after the war.

Vactric, Ltd., reports that the net profit of the parent company for the year ended March 31st amounts to £43,325, which compares with £44,357 for the preceding year. To this is added £9,002 (£6,512) brought in and £4,924 (£7,176) for reserve no longer required, making a total of £57,251 (£58,045). From this are deducted £4,366 (£31,065) for taxation, £8,950 (nil) written off cost of shares in subsidiary, £2,168 (£2,425) net preference dividend, £3,888 (£15,553) cumulative sinking fund, and £5,625 (nil) interim ordinary dividend, leaving £32,254. As reported last week a final dividend of 15 per cent. is to be paid, making 22½ per cent. (nil) for the year.

The Engineering & Lighting Equipment Co., Ltd.—Speaking at the annual general meeting on Monday, Mr. S. A. Marples, the chairman, stated that the demand for the company's lighting fittings had been well maintained and contracts had been fulfilled of a highly technical nature for Government requirements. Post-war equipment for all fields of lighting was having attention, not only for industrial, commercial and street lighting, but in other new spheres for the home and export markets. During the past year turnover had increased, despite a decrease in the man-hours worked.

The West London & Provincial Electric & General Trust, Ltd., is again paying an interim dividend of 2 per cent.

The Clyde Valley Electrical Power Co. is again paying an interim dividend of 3 per cent.

The British Power & Light Corporation, Ltd., is maintaining its interim dividend at 2 per cent.

New Companies

C. H. MacVey (Glasgow), Ltd.—Private company. Registered in Edinburgh August 9th. Capital, £600. Objects: To carry on the business of radio, electrical, mechanical and general engineers and suppliers, etc. Directors: G. C. J. Robson, Kingsmere, 29, Garscadden Road, Glasgow; and A. E. Macintosh, 281, Blackness Road, Dundee. Registered office: 182, New City Road, Glasgow.

Car Electrical (Humber), Ltd.—Private company. Registered August 10th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, magnetos, dynamos, starters, batteries, etc. Directors: J. S. Shaw, Highbury, King Tree Avenue, Cottingham, East Yorks; J. L. P. Pinkney, 25, Salmon Grove, Cottingham Road, Hull; and W. A. Kelley, 73, Roslyn Road, Anlaby, Hull (all directors of John Shaw & Co. (Electrical) Ltd.). Registered office: Vane Street, Hull.

D. A. Deeley (Electrical), Ltd.—Private company. Registered August 12th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, dynamos, motors, armatures, magnetos, batteries, insulators, electrical plant and supplies, etc. Directors: D. A. Deeley, 15, St. Mark's Crescent, Maidenhead, and two others. Registered office: 1, Quality Court, Chancery Lane, W.C.2.

Electrical Noise Suppression, Ltd.—Private company. Registered August 10th. Capital, £100. Objects: To carry on the business of locating, identification and suppression of electrical and acoustic interference from power plants, electrical machinery, radio apparatus, etc. First directors: Wing Commr. E. P. Wells and Victor Hall, both of Lendor, Wych Hill Estate, Woking, which is the registered office.

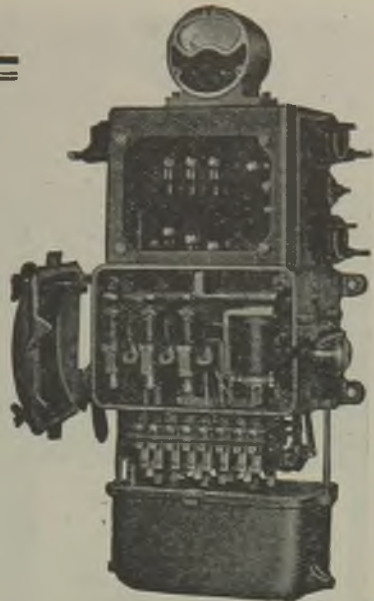
John Sargrove, Ltd.—Private company. Registered August 17th. Capital £100,000. Objects: To carry on the business of manufacturers of and dealers in radio, electric lighting and heating, domestic and other apparatus and appliances, engineers, manufacturers, etc. Directors: J. A. Sargrove and Mrs. M. R. Sargrove (both directors of Sargrove Electronics, Ltd.), Willowdene, Dockett Eddy, Shepperton-on-Thames. Registered office: 55-61, Moorgate, E.C.2.

Ascot Electrical Co., Ltd.—Private company. Registered in Edinburgh August 17th. Capital, £500. Objects: To carry on the business of electricians, mechanical engineers, suppliers of electricity for light, heat, etc. Directors: A. J. McCartney, 15, Kildonan Terrace, Glasgow, and J. A. Geddes, 154, West Regent Street, Glasgow. Registered office: 154, West Regent Street, Glasgow.

Stevens Wholesale (Hounslow), Ltd.—Private company. Registered August 21st. Capital £200. Objects: To carry on the business of manufacturers of, and dealers in, wireless sets and valves, batteries, electrical and mechanical

CONTROL

A full range is available,
 including all types, for
 A.C. and D.C. Motors,
 Hand Operated,
 Automatic,
 Air, and Oil Break.



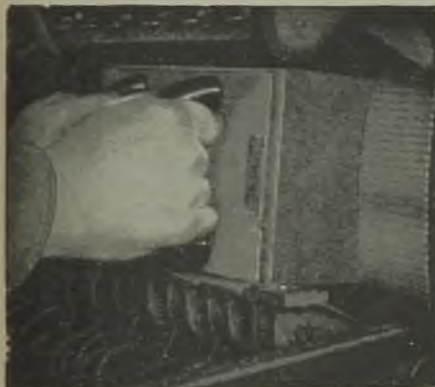
Oil Immersed
 Star-Delta Starter

VERITYS LTD.

ASTON, BIRMINGHAM 6

Sales Headquarters :

BRETENHAM HOUSE, LANCASTER PLACE, W.C.2



**Maintenance
 more important
 than ever before**

MAKE REGULAR USE OF ...

MARTINDALE COMMSTONES

● Cut copper, brass and steel without clogging. Edges of every bar left clean ; no dragging of copper. Save 75% of time and cost of turning commutator in lathe. Give longer life to motors, etc.

Over 50 sizes in stock, in 3 grades: coarse, medium and fine. 20 different types of handle.
 Over 25,000 regular users all over the world.

MARTINDALE ELECTRIC CO. LTD WESTMORLAND ROAD, LONDON, N.W.9

Phone : Colindale 8642-3

Grams : Commstones, Hyde, London

Insulated Wires & Cables

for ALL ELECTRICAL PURPOSES

THERMOPLASTIC INSULATION (P.V.C.)

"POLYKOL" is our registered title and trade mark for a plasticised Polyvinyl chloride, which material is recognised by B.S.I. and authorised by Ministry of Supply Cable Planning Organisation.

Manufacturers of all classes of conductors with rubber or "Polykol" insulation.



*Made to a
Standard*

WARD & GOLDSTONE LTD. PENDLETON, MANCHESTER. 6.

ESTABLISHED OVER HALF A CENTURY

apparatus, etc. Directors: H. J. Stevens and Vera M. Stevens, both of 69, Carlton Avenue, Feltham, Middlesex. Registered office: 295, Staines Road, Hounslow.

T. K. Electrical Controls, Ltd.—Private company. Registered August 21st. Capital £500. Objects: To carry on the business of electrical, constructional, mechanical, marine, motor and general engineers, etc. Directors: H. F. King and Mabel A. King, both of 28, Thornhill Road, Heaton Mersey, Stockport, Lancs. Registered office: 28, Thornhill Road, Heaton Mersey, Stockport, Lancs.

Companies to be Struck Off Register

Unless cause is shown to the contrary the following companies will be struck off the Register at the expiration of three months from August 22nd:—Great Eastern Electric Co., Ltd. (the company registered on March 30th, 1939, not another company of the same name believed to be carrying on business at the present time); Battery Supplies (Electrics), Ltd.; Diamond Lamp Shade Co., Ltd.; and Gordon Primary Cells (Foreign), Ltd.

Companies' Returns

Statements of Capital

British Insulated Cables, Ltd.—Capital, £4,000,000 in £500,000 5½ per cent. "A" preference stock, £500,000 6 per cent. preference stock, £2,000,000 ordinary stock and 1,000,000 unclassified shares of £1. Return dated May 4th. All preference and ordinary stock taken up, £2,572,675 paid on £500,000 5½ per cent. "A" preference stock. £372,350 6 per cent. preference stock and £1,700,325 ordinary stock. £427,325 considered as paid on £127,650 6 per cent. preference stock and £299,675 ordinary stock. Mortgages and charges: Nil.

Lancashire Telephone Systems, Ltd.—Capital, £10,000 in 5,000 8 per cent. participating preference and 5,000 ordinary shares of £1. Return dated January 14th (filed July 15th). 700 preference and 5,000 ordinary shares taken up. £5,080 paid on 700 preference and 4,380 ordinary shares. £620 considered as paid on 620 ordinary shares. Mortgages and charges: Nil.

Pertrix, Ltd.—Capital, £10,000 in £1 shares. Return dated April 10th. All shares taken up. £10,000 paid. Mortgages and charges: Nil.

E.M.F. (Electrical), Ltd.—Capital, £5,000 in £1 shares. Return dated November 18th, 1943 (filed July 6th). All shares taken up. £5,000 paid. Mortgages and charges: Nil.

Automatic Internal Telephones, Ltd.—Capital, £5,000 in £1 shares. Return dated April 27th (filed May 15th), 1944. All shares taken up. £5,000 paid. Mortgages and charges: Nil.

Burma Electric Supply Co., Ltd.—Capital, £270,000 in £1 shares (120,000 ordinary and 150,000 preference). Return dated May 3rd. 120,000 ordinary and 120,000 preference shares taken up. £100,000 paid. £140,000 considered as paid. Mortgages and charges: Nil.

Electric Power & Communications Trust, Ltd.—Capital, £100,000 in £1 shares. Return dated April 17th. 20,000 shares taken up. £9,314 paid. £10,686 considered as paid. Mortgages and charges: Nil.

W. J. Furse & Co., Ltd.—Capital, £35,000 in £1 shares (9,000 preference and 26,000 ordinary). Return dated May 31st. 9,000 preference and 22,860 ordinary shares taken up. £12,566 paid. £19,294 considered as paid. Mortgages and charges: Nil.

Gorseinon Electric Light Co., Ltd.—Capital, £100,000 in £1 shares. Return dated March 15th (filed April 22nd). 87,000 shares taken up. £87,008 paid (including £8 paid on ten shares forfeited). £2 remains unpaid. Mortgages and charges: Nil.

Waste Heat & Gas Electrical Generating Stations, Ltd.—Capital, £350,000 in £160,000 ordinary stock and £80,000 4 per cent. cumulative preference stock transferable in units of 10s. each, and £110,000 in 10s. shares unissued. Return dated April 7th. £160,000 ordinary and £80,000 preference stock taken up. £160,000 ordinary stock paid. £80,000 preference stock considered as paid. Mortgages and charges: Nil.

Brentford Electric Supply Co., Ltd.—Capital, £100,000 in 100,000 ordinary shares of £1 each. Return dated March 21st (filed April 5th). 90,000 shares taken up. £90,000 paid. Mortgages and charges: Nil.

Power & Traction Finance Co., Ltd.—Capital, £250,000 in £1 shares. Return dated April 6th. 50,000 shares taken up. £28,001 paid (being £1 per share on 6,002 shares and 10s. per share on 43,998 shares). Mortgages and charges: Nil.

Switchgear Testing Co., Ltd.—Capital, £30,000 in £1 shares. Return dated April 3rd. All shares taken up. £30,000 paid. Mortgages and charges: Nil.

Mortgages and Charges

St. Austell & District Electric Lighting & Power Co., Ltd.—Satisfaction in full (1) on November 30th, 1942, of debentures authorised June 11th, 1930, and registered July 14th, 1930, securing £15,000, (2) on October 6th, 1943, of mortgage dated September 20th, 1935, and registered April 23rd, 1937, securing £5,000, and (3) on March 31st, 1944, of debentures authorised May 12th, 1936, and registered June 16th, 1936 securing £16,000. (Notices filed August 4th.)

A. E. Chesters, Ltd.—Charge on 2, Atherton Street, Wallasey, dated July 19th, to secure £250. Holder: F. H. Thornton, 54, Castle Street, Liverpool.

W. H. Porter & Co., Ltd.—Satisfaction to the extent of £2,000 (full amount outstanding) on August 2nd, of debenture dated June 16th, 1931, and registered June 29th, 1931.

Liquidation

Eckington Electric Supply Co., Ltd.—Claim^s to the liquidator, Mr. J. Gadsby, 17, Gluman^s gate, Chesterfield, by September 11th.

Bankruptcy

J. A. Whiteman, wireless dealer, lately carrying on business at 4, Northfields, Kilburn, as "Northfield Radio."—Application for discharge to be heard at the Court House, 20, St. Peter's Churchyard, Derby, on September 20th.

STOCKS AND SHARES

TUESDAY EVENING.

A BREAK has occurred in the long succession of weeks during which this record of Stock Exchange markets has chronicled rising prices, and a persistent public demand for stocks and shares. For a day or two last week, prior to the news of the Paris liberation and the Rumanian change of heart, there was an outbreak of weakness in the prices of industrial shares, and an all-round fall in the more "popular" issues. The downward reaction made cumulative progress until it was arrested by the Paris and Rumania news just mentioned. The fall was succeeded by an abrupt recovery, brought about by bargain-hunters who tried to pick up stock at the lowest prices reached. On balance, the following price-lists show nearly thirty declines against a trifling number of rises, four of the latter being in the electricity supply section.

Electricity Supply and Traction

Bournemouth & Poole Electric ordinary are 1s. 6d. better at 64s. 6d. and County of London—of which company the Bournemouth & Poole is a "baby"—at 44s. have gained 6d. Northmet Power shares are again in favour, rising a further 1s. 6d. to 43s. 6d. The Overseas group is quiet. Falls occurred of 1s. 6d. in Madras Electric and 6d. in Calcutta Electric ordinary. A couple of Canadian stocks—Shawinigan Water and Montreal Power—are easier. The popularity of the Indian group has waned with a slackening of the speculation in Calcutta Trams. From 72s. the price of the latter fell to 67s. 6d., rallying to 70s. 6d.; around this there was a certain amount of buying, some of which came from the provinces.

The Falls

There would seem to be no particular object in going through the catalogue of falls, since these are traceable to the same common causes—an unexpected cessation of investment, and the consequent decision, as prices eased off, of holders to sell shares upon which they could take good profits. This may seem to be a very humdrum explanation of the puzzle that bemuses (and irritates) people who ask why Stock Exchange markets should be dull at a time when the war news is so good.

Fundamentally the existing financial position is unaltered. Money unceasingly accumulates. It will have to find employment in stocks and shares. New issues are few and far between. The Government policy of cheap money is fixed. Holiday conditions will last for no more than another fortnight or three weeks. Investment, therefore, need not be perturbed by a fall which,

matched against the previous rise, is indeed of small account. The losses will be recovered when the weight of money begins, once more, to make its influence felt.

Miscellaneous Matters

The Home Railway market has slipped back into a state of suspended animation. (The tired proprietor of the junior stocks might say that the market shows more signs of suspense than of animation.) Prices change but little from week to week. British Electric Traction deferred is 40 points down, at 1275. This sounds a heavy drop until it is remembered that if the £100 stock were represented by £1 units, the loss would be about 7½d. per share. Electric & Musical shares, up to 38s. earlier this month, fell to 32s. last week, rallying to 34s. 6d. on the next day. The radio group stood up well to the recent spasm of weakness. E. K. Cole are 6d. higher at 33s. Cossor, after fluctuations, are unchanged on balance at 25s. 6d. and Pye deferred held their previous price of 35s.

Post-War Prospects

Now that the end of the war seems to be coming more clearly into sight, the endeavour to forecast the effect of peace conditions upon company results becomes of increasing consequence. On the other side of the Atlantic the likelihood of early peace has had the effect of putting down prices, the assumption being that on the change-over from war to peace work many companies are likely to encounter difficulties and declining profits. The pessimists in the United States prophesy widespread unemployment and its attendant evils. On this side of the Atlantic, as the firmness of shares in industrial companies implies, anticipation expects the end of the war to be followed by a wide expansion of business, accompanied by such a demand for all essentials as will keep employment in full swing for years to come.

Vactric

Shareholders in Vactric, Ltd., had a very pleasant surprise in the declaration of a final dividend of 15 per cent. on the ordinary shares, making 22½ per cent. for the year. The optimists had been going for nothing higher than 20 per cent. The price of the shares rose from 17s. to a florin higher but, in the heaviness which overtook most of the well-known industrial shares, Vactric went back to 18s. 3d. At this, the yield on the money comes to £6 3s. per cent. The price will not be marked ex the dividend, 9d. per share gross, until the middle of September.

The change-over in the fortunes of the company has been dramatic, for in the three years 1939–1941 it had to pass the preference dividend. The arrears were paid off two

(Continued on page 322)

ELECTRICAL INVESTMENTS

Prices, Dividends and Yields

Company	Dividend		Middle Price Aug. 29	Rise or Fall	Yield p.c.	Company	Dividend		Middle Price Aug. 29	Rise or Fall	Yield p.c.
	Previous	Last					Previous	Last			
Home Electricity Companies						Public Boards					
Bournemouth and Poole	12½	12½	64/6	+1/6	3 17 4	Central Electricity 1955-60 (Civil)					£ s. d.
British Power and Light	7	7	33/6		4 3 7	Defence	3	3	100		3 0 0
City of London	7	5½	31/-		3 11 0	1955-75	5	5	115		4 7 0
Clyde Valley	8	8	42/-		3 16 0	1951-73	4½	4½	107		4 4 1
County of London	8	8	44/-	+6d.	3 12 9	1963-93	3½	3½	104½		3 7 0
Edmondsons:						1974-94	3½	3½	101		3 4 4
7% Pref.	7	7	34/6		4 1 4	London Elec. Trans. Ltd.	2½	2½	97½		2 11 3
Ord.	6	6	31/-		3 17 5	London & Home Counties 1955-75	4½	4½	111		4 1 1
Elec. Dis. Yorkshire	9	9	45/6		3 19 6	London Pass. Trans.:					
Elec. Fin. and Securities	12½	13½	59/-		4 11 4	A	4½	4½	120½	-1	3 14 8
Elec. Supply Corporation	10	10	47/6		4 4 2	B	5	5	121½		4 2 4
Isle of Thanet	Nil	Nil	18/-			C	3	3½	71		4 11 7
Lancs. Light and Power	7½	7½	37/-		4 1 1	West Midlands J.E.A. 1948-68	5	5	108½		4 12 4
Llanely Elec.	6	6	26/6		4 10 7	Telegraph and Telephone					
London Assoc. Electric	3	4	25/6	-1/-	3 2 9	Anglo-Am. Tel. Pref.	6	6	120		5 0 0
London Electric	6	6	31/-		3 17 5	Def.	1½	1½	30		5 0 0
London Power Red. Deb.	5	5	105½		4 14 7	Anglo-Portuguese	8	8	28/6		5 12 4
Metropolitan E.S.	8	8	43/-	+6d.	3 14 5	Cable & Wireless:					
Midland Counties	8	8	41/6		3 17 0	3½% Pref.	5½	5½	115	+½	4 15 1
Mid. Elec. Power	9	9	44/-		4 1 9	Ord.	4	4	83½	-½	4 15 10
Newcastle Elec.	7	7	31/-		4 10 4	Canadian Marconi	1 Nil	1 Nil	10/-		
North Eastern Elec. Ordinary	7	7	35/-		4 0 0	Globe Tel. & Tel.:					
7% Pref.	7	7	35/-		4 0 0	Ord.	8½	5 ^a	40/6		2 9 4
Northampton	10	10	50/6xd		3 19 6	Pref.	6	6	30/6		3 18 8
Notting Hill 6% Pref. (£10)	6	Nil	11			Great Northern Tel. (£10)	Nil	Nil	24½		
Northmet Power:						Inter. Tel. & Tel.	Nil	Nil	23		
Ordinary	7	7	43/6	+1/6	3 4 0	Marconi-Marine	7½	7½	36/-		4 3 4
6% Pref.	6	6	30/6		3 18 8	Oriental Tel. Ord.	16	10	51/9		
Richmond Elec.	6	6	25/6		4 14 1	Telephone Props.	6	Nil	19/-	+6d.	
Scottish Power	8	8	41/6		3 17 2	Tele. Rentals (5/-)	10	10	12/-		4 3 4
Southern Areas	5	5	23/-		4 7 0	Traction and Transport					
South London	7	7	29/-		4 16 7	Anglo-Arg. Trans.:					
West Devon	5	5	23/6		4 5 1	First Pref. (£5)	Nil	Nil	2/6		
West Glos.	4½	3½	24/6		2 17 0	4% Inc.	Nil	Nil	6		
Yorkshire Elec.	8	8	43/-		3 14 5	Brit. Elec. Traction:					
Overseas Electricity Companies						Def. Ord.	45	45	1275	-40	3 10 5
Atlas Elec.	Nil	Nil	7/-	-3d.		Pref. Ord.	8	8	180		4 9 0
Calcutta Elec.	6 ^a	6 ^a	48/-	-6d.	2 10 0	Bristol Trams	10	10	57/-		3 10 2
Cawnpore Elec.	10	7	40/-		3 10 0	Brazil Traction	\$1	\$1	26½		6 12 1
East African Power	7	7	34/6		4 1 4	Calcutta Trams	5½	6½	70/6		1 17 2
Jerusalem Elec.	7	5	29/6		3 8 0	Cape Elec. Trams	5	6	25/6		4 14 1
Kalgoorlie (10/-)	5	5	11/6		4 7 0	Lancs. Transport	10	10	45/6		4 8 0
Madras Elec.	4 ^a	Nil	30/6	-1/6		Mexican Light:					
Montreal Power	1½	1½	24½	-½		1st Bonds	5	5	107½		4 13 0
Palestine Elec. "A"	4 ^a	5 ^a	40/-	-6d.	2 10 0	Rio 5% Bonds	5	5	105½		4 14 9
Perak Hydro-elec.	6	7	14/-			Southern Rly.:					
Shawiganan Power	83cts.	90cts.	15½	-1		5% Prefd.	5	5	75½	-½	6 12 7
Tokyo Elec. 6%	6	6	27			5% Pref.	5	5	116½		4 5 9
Victoria Falls Power	15	15	4		3 11 7	T. Tilling	10	10	60/-		3 6 8
Whitehall Inv. Pref.	—	6	24/6		4 18 0	West Riding	10	10	46/-		4 7 0

(Continued on next page)

* Dividends are paid free of Income Tax.

Company	Dividend		Middle Price Aug. 29	Rise or Fall	Yield p.c.	Company	Dividend		Middle Price Aug. 29	Rise or Fall	Yield p.c.
	Previous	Last					Previous	Last			
Equipment and Manufacturing											
Aron Elec. Ord.	10	15	61/-		4 18 4	General Cable (5/-)	15	15	15/-		5 0 0
Assoc. Elec. :						Greenwood & Batley	15	15	46/-		6 10 4
Ord.	10	10	52/6	-1/-	3 16 2	Hall Telephone (10/-)	12½	12½	31/6		3 19 4
Prof.	8	8	40/-		4 0 0	Henley's (5/-)	20	20	27/-		3 14 0
Automatic Tel. & Tel. 12½	12½	12½	62/-	-½	4 0 8	4½% Prof.	4½	4½	24/-		3 15 0
Babcock & Wilcox	11	11	51/-	-1/-	4 6 3	Hopkinsons	15	15	68/9	-½	5 1 9
British Aluminium	10	10	50/-	-1/6	4 0 0	India Rubber Pref.	5½	5½	23/6		4 13 9
British Insul. Ord.	20	20	117/-	-1/-	3 8 3	Intl. Combustion	30	30	6½		4 10 8
British Thermostat (5/-)	18½	18½	20/9		4 9 0	Johnson & Phillips	15	15	80/-		3 15 0
British Vac. Cleaner (5/-)	15	30	30/-		5 0 0	Lancashire Dynamo	22½	22½	98/9		4 11 2
Brush Ord. (5/-)	8	9	10/9		4 3 9	Laurence, Scott (5/-)	12½	12½	13/6		4 12 7
Burco (5/-)	15	17½	17/-		5 3 0	London Elec. Wire	7½	7½	37/6	-1/6	4 0 0
Callender's	15	20	5½		3 12 2	Mather & Platt	10	10	53/9		3 14 3
Chloride Elec. Storage	15	15	88/9		3 6 7	Metal Industries (B)	8	8½	49/3	-2/-	3 9 0
Cole, E. K. (5/-)	10	15	32/-	+6d.	2 5 6	Met. Elec. Cable Pref.	5½	5½	21/3		5 3 6
Consolidated Signal	24	27½	6½		4 1 6	Murex	20	20	5		4 0 0
Cosser, A. C. (5/-)	7½*	10*	25/6	-6d.	1 19 6	Pyre Deferred (5/-)	25	25	35/-		3 11 5
Crabtree (10/-)	17½	17½	42/6		4 2 6	Revo (10/-)	17½	17½	42/-		4 1 4
Crompton Parkinson Ord. (5/-)	20	22½	32/-	-1/6	3 7 3	Reyrolle	12½	12½	73/9		3 8 1
E.M.I. (10/-)	6	8	34/6	+6d.	2 6 4	Siemens Ord.	7½	7½	34/6	-1/-	4 7 0
Elec. Construction	10	12½	60/-	+2/-	4 3 4	Strand Elec. (5/-)	7½	7½	8/-	-3d.	6 5 0
Enfield Cable Ord.	12½	12½	64/6		3 17 8	Switchgear & Cow-ans (5/-)	20	20	19/-		5 5 1
English Electric	10	10	52/6	-9d.	3 16 2	T.C.C. (10/-)	5	7½	22/6		3 6 8
Ensign Lamps (5/-)	25	15	21/3		3 10 8	T.C. & M.	10	10	56/-		3 11 6
Ericsson Tel. (5/-)	22*	20*	55/-	-½	1 16 4	Telephone Mfg. (5/-)	9	9	12/3	-6d.	3 13 6
Ever Ready (5/-)	40	40	43/6	-1/-	4 12 0	Thorn Elec. (5/-)	20	20	25/-	-1/-	4 0 0
Falk Stadelmann	7½	7½	35/-		4 5 9	Tube Investments	20	20	96/3		3 4 3 0
Ferranti Pref.	7	7	31/3		4 9 7	Vactric (5/-)	Nil	22½	18/3	-1/-	6 3 0
G.E.C. :						Veritys (5/-)	7½	7½	8/-	-6d.	4 13 9
Prof.	6½	6½	34/-		3 16 6	Walsal Conduits (4/-)	55	55	51/-		4 6 3
Ord.	17½	17½	91/-	-2/6	3 14 6	Ward & Goldstone (5/-)	20	20	28/9		3 13 6
						Westinghouse Brake	12½	14	80/-		3 10 0
						West, Allen (5/-)	7½	7½	8/9		4 5 9

* Dividends are paid free of Income Tax.

Stocks and Shares (Continued from page 320)

years ago, and the ordinary shares re-entered the dividend list with an interim distribution of 7½ per cent. last August.

Preference Shares

Preference shares of the gilt-edged class pay at to-day's prices barely 4 per cent. on the money, nor is it always possible to obtain any reasonable amount even on a 3½ per cent. basis of yield. When shares do come to market, the source is chiefly from executors of deceased holders. Were it not for these the floating supply of stock would indeed be meagre. There are available at the present time 200 British Insulated Cables 5½ per cent. "A" preference, obtainable at 28s. 6d., January and July dividends. The dividend service is covered some twenty times over, but the yield is no more than £3 17s. 2d. Cables Investment Trust 4½ per cent. preference, June and December dividends, are on offer at 22s. 3d.; these pay a few pence over 4 per cent. on the money. They are redeemable in 1970 at 102½ per cent., 20s. 6d. per share, or earlier by a purchase or drawings at 105 per cent., equal to 21s. per share. Not more

than £50,000 nominal may be redeemed by drawings in any one year. The present price, 22s. 3d., is equivalent to 111¼ in stock, so the holder runs the risk of a possible loss of capital.

Anglo-Argentine Tramways

The directors of the Anglo-Argentine Tramways Company have a lamentable tale to tell in the report which accompanies the figures for the year 1943 but which brings the information up to the present time. As reported in last week's issue, the Board refers to decrees that it declares to be unjustified, and that violate the agreement made between the company and the Argentine Government.

The Argentine Government refuses to allow the increases in fares which were arranged about 40 years ago. Expenses have continually mounted: the equipment has become increasingly inadequate and, of course, it has considerably deteriorated. A scheme of arrangement was placed lately in front of the debenture holders, but until the Argentine Government gives some evidence of a willingness to play fair in its dealings with the Anglo-Argentine Tramways, shareholders can hardly hope for any real improvement.

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.

B. N. ADAMS.—"Electric batteries." 4894. April 14th, 1942. (563272.)

A. H. Brackensey and Franco-British Electrical Co., Ltd.—"Reflecting devices for use in advertising signs, road traffic indicators and the like." 6646. April 27th, 1943. (563419.)

Britannia Batteries, Ltd., R. M. Blomfield and F. E. Burt.—"Vents of electric accumulators." 6633. April 27th, 1943. (563418.)

British Thomson-Houston Co., Ltd.—"Method of and apparatus for making wire-drawing dies." 1848/43. February 6th, 1942. (563360.) "Resinous condensation products." 15256/42. November 1st, 1941. (563375.)

"Photo-electric apparatus for amplifying and transmitting the indications of measuring instruments." 948/43. January 22nd, 1942. (563424.)

British Thomson-Houston Co., Ltd., and B. G. Higgins.—"Alternating current control circuit arrangements suitable for resistance welding machines." 14027. October 6th, 1942. (563283.)

Chloride Electrical Storage Co., Ltd., and S. Brown.—"Electric accumulators." 5410. April 5th, 1943. (563323.)

A. C. Cossor, Ltd., and A. Le Boutillier.—"Electrical condensers." 2046. February 8th, 1943. (563407.) "Electrical condensers." 9056/44. February 8th, 1943. (Divided out of 563407.) (563422.)

A. C. Cossor, Ltd., and A. H. A. Wynn.—"Thermionic valve oscillators." 4340/44. February 8th, 1943. (Divided out of 2045/43.) (563421.)

J. A. Crabtree & Co., Ltd., H. F. McLoughlin, B. G. Harrison and R. W. Morgan.—"Electric switches of the ceiling or pull-operated type." 5799. April 12th, 1943. (563327.)

C. C. Craddock.—"Lighting systems." 17217. December 3rd, 1942. (563352.)

Edison Swan Electric Co., Ltd., and F. M. Cocksedge.—"Means for adjustably supporting tubular lamps." 3148. February 26th, 1943. (563395.)

Ferranti, Ltd., and E. D. T. Norris.—"Temperature controlling systems for electric heating apparatus." 2747. February 18th, 1943. (563311.)

H. S. Molyneux-Ffennell and Vacuum-Science Products, Ltd.—"Signal modulating devices for radio-telegraph transmitters." 1980. February 5th, 1943. (563385.)

P. Freedman and Crompton Parkinson, Ltd.—"Circuit arrangements for discharge lamps and tubes." 185. January 5th, 1943. (563376.)

R. S. Hastings.—"Electrode bits for electric spot-welding apparatus." 6554. April 23rd, 1943. (563414.)

H. F. Hedge.—"Dry-battery torches or flash-lamps." 285. January 7th, 1943. (563355.)

O. K. Kolb and O. F. C. Stockel.—"Selenium

rectifiers." 14448. September 3rd, 1943. (563338.)

Marconi Instruments, Ltd., and E. Garthwaite.—"Tuning devices for radio circuits." 338. January 7th, 1943. (563377.)

J. Neill & Co. (Sheffield), Ltd., and W. L. Bower.—"Magnetic work holders, separators, or the like." 6262. April 19th, 1943. (563333.)

G. Oliver and B. M. Oliver.—"Electric alarm arrangements for clocks." 2549. February 16th, 1943. (563367.)

W. C. Pallant, J. Booth and J. Dorras.—"Inspection lamps." 6540. April 23rd, 1943. (563413.)

Philco Radio & Television Corporation.—"Recording apparatus for producing sound grooves for gramophone records." 17092/42. January 7th, 1942. (563351.)

Philips Lamps, Ltd., and E. G. Bourne-Vanneck.—"Electrode holders for electric arc-welding." 1882. February 4th, 1943. (563301.)

Radio Transmission Equipment, Ltd., and K. A. Zandstra.—"Brazing and soldering." 3312/44. August 4th, 1942. (Divided out of 8488/41.) (563420.)

Rolfes, Ltd., H. J. Rolfes and E. C. Halliday.—"Means for safeguarding electric ignitors of blasting detonators against accidental firing." 13284. September 21st, 1942. (563345.)

Sangamo Weston, Ltd.—"Electrical instruments." 6524/43. July 16th, 1942. (563337.)

L. Sharp and R. Winder.—"Lineal measuring machines for electric cables, ropes, cords, tapes and the like." 15451. November 3rd, 1942. (563348.)

D. T. Shaw.—"Fastener for insulators." 5905. April 13th, 1943. (563411.)

J. P. Simpson, J. Stewart and Metropolitan-Vickers Electrical Co., Ltd.—"Drawing instruments." 4871. March 25th, 1943. (563318.)

S. J. Smith.—"Moving coil indicating instruments and relays." 3659. March 5th, 1943. (563315.) "Moving coil indicating instruments and relays." 3660. March 5th, 1943. (563316.)

Standard Telephones & Cables, Ltd., and A. M. Searle.—"Metal rectifiers." 1858. February 4th, 1943. (563362.)

A. V. Tomlinson (Union Switch & Signal Co.).—"Railway traffic controlling apparatus." 4682. October 20th, 1942.

G. Turnock, Ltd., and E. D. Jackson.—"Electric lampholders." 17368. December 7th, 1942. (563290.)

W. Wadsworth & Sons, Ltd., and F. E. Ryder.—"Control of the driving motors of electric lifts and the like." 1666. February 1st, 1943. (563357.)

Waite & Son, Ltd., and H. J. Waite.—"Lamp shades." 18595. December 31st, 1942. (563294.)

Western Electric Co., Inc.—"Loading of transmission lines for signal currents." (Cognate applications.) 6626/43 and 6627/43. April 25th, 1942. (563417.)

Westinghouse Brake & Signal Co., Ltd., and L. H. Peter.—"Air-drying apparatus for air compressors." 1950. February 5th, 1943. (563379.)

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

Manchester.—September 11th. Electricity Committee. Coal chutes, etc., and dismantling of coal conveyor plant. (See this issue.)

New Zealand.—November 28th. Public Works Department. Plant for Maraetai power station and 220-kV substations: turbine and generator plant; transformers; switchgear; synchronous condensers; overhead travelling crane, etc.

Wolverton.—September 4th. Urban District Council. Electric pumping machinery. Plans, etc., from W. H. Radford & Son, Albion Chambers, King Street, Nottingham.

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.

Aberdeen.—Extensions and reconstructions, including new depot at Wick, new creamery at Nairn, reconstruction of creamery at Inverness and depot in Sutherland (£40,000); manager, North of Scotland Milk Marketing Board.

Atherton.—Reinstatement of houses (£5,000); clerk, Town Hall.

Belfast.—Junior school, Serpentine Road site, and dining centres, Model and Whitehouse schools; city surveyor, Donegall Square.

Bewdley.—School feeding kitchen, adjoining Stourport Road, and dining hall, Lax Lane; borough engineer.

Blackley.—Additions to premises; P. Cummings, architect, 25, Cross Street, Manchester.

Cardiff.—Ward blocks, Glan Ely and Cefn Mably Hospitals (£48,000); King Edward VII Welsh National Memorial Association.

Colne.—Maternity home, Langroyd Hall; county architect, Wakefield.

Cornwall.—Accommodation for agricultural staff (£2,000); county architect, County Hall, Truro.

Coventry.—Scheme for treatment of kitchen waste (£5,500); D. E. E. Gibson, city architect, 1a, Warwick Row.

Darlington.—Alterations, Ethel Street, for the Darlington Railway Plant and Foundry Co., Ltd.; McKenzie Brothers, builders.

Fife.—Central kitchen, etc., at Millgate, Cupar, for County Council; county clerk, Cupar, Fife.

Hampshire.—Hostels for children; county architect, The Castle, Winchester.

Heaton Norris.—Works canteen; Architect's Department, L.M.S. Railway, The Grove, Watford.

Huddersfield.—Nurses' home, Bradley Wood Sanatorium; borough engineer.

Isle of Wight.—Rebuilding Ryde Bettesworth Road School; county architect, Newport.

Jarrow (Co. Durham).—Installation of electric lighting in the ground floor at Croft Terrace School; J. S. Weir, borough engineer.

Macclesfield.—Extensions, Springmount Works, Rainow; Springmount Engineering Co., Ltd.

Manchester.—Restoration of premises, Market Street; C. Wild, architect, 72, Bridge Street.

Bank, Broad Street, Pendleton, for Manchester and Salford Trustee Savings Bank; J. W. Beaumont & Son, architects, 53, Spring Gardens.

Dining centre, Rosina Street, Openshaw; city architect.

Building; Allied General Investment Trust, Ltd., 16, Albemarle Street, St. James's, London.

Rebuilding synagogue, Cheetham Hill Road; R. Martin, architect, 90, Deansgate.

Middlesbrough.—Alterations, Wilson Street, for L. Jacobs; T. A. Crawford, architect, Borough Road.

Northwich.—Church hall, Rudheath; Rev. R. H. Johnson, The Vicarage.

Oldham.—Garage, stores, rest room, etc.; T. Barnes & Sons, Ltd., Transport Carriers, High Street.

Oswestry.—Swimming baths, rear of Ty-maen, Lower Brook Street; town clerk.

Oxford.—Rebuilding Eye Hospital (£100,000) for the Regional Hospitals Council and Joint Hospitals Board.

Patricroft.—Works extensions; Sir W. H. Bailey, Ltd., Albion Works.

Rochdale.—Central school kitchen, Ashfield Road, and cooking and dining accommodation, Girls' High School, Greenhill; borough surveyor.

Works canteen, Arkwright Mill; Architects' Department, Lancashire Cotton Association, Ltd., Hopwood Hall, near Manchester.

Rothwell.—Houses (20); U.D.C. surveyor, Council Offices.

Rugby.—Additional nurses' accommodation, Hospital of St. Cross; W. T. Loveday, architect, 2, Lawrence Sheriff Street.

Scarborough.—Additions to maternity home accommodation; borough engineer.

Stockport.—Church Hall and Sunday School, Fenton Avenue, Stepping Hill; Rev. K. Briggs, Calvary Holiness Church, Stepping Hill.

Stretford.—Extensions, Lostock Council School; W. Lionel Gray (1933), Ltd., builders, Hospital Buildings, Farnworth, near Bolton.

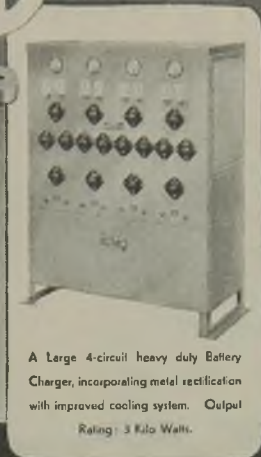
Surrey.—Farm Institute (£30,000); county architect, County Hall, Kingston-on-Thames.

Wolverhampton.—Pumping station, etc., Willenhall Road housing site; borough engineer.

Worcestershire.—Home for defectives, Kidderminster; county architect, 38, Foregate Street, Worcester.

HEAYBERD BATTERY CHARGERS

... are distinctive in performance and design. Types for widely varied application and in all capacities for use with Automobiles, Telephone Systems, Electric Vehicles, Emergency Lighting, and Fire Alarms are in continuous production. Our advice and technical data service are freely at your disposal. Write for list No. 1029.



A Large 4-circuit heavy duty Battery Charger, incorporating metal rectification with improved cooling system. Output Rating: 3 Kilo Watts.

F. C. HEAYBERD & CO. LTD.

Head Office: 20, RUSSELL SQUARE, W.C.1. Telephone: Mus. 6412

CONTACTS *for heavy duty*

The Elkonite range of contact materials provides the required compromise of low contact resistance, high conductivity, low material transfer, and resistance to burning and welding. They are in successful use in a variety of circuit breakers, contactors and relays, where other contact materials have been found to fail by wear, sticking or excessive transfer.

Technical booklet giving full particulars sent on request.

- ★ *low contact resistance*
- ★ *high conductivity*
- ★ *low material transfer*
- ★ *resistance to burning and welding*

ELKONITE

MALLORY METALLURGICAL PRODUCTS LTD · An Associate company of JOHNSON, MATTHEY & Co. Ltd.
78 MATTON GARDEN · LONDON · E.C.1 telephone HOLBORN 5027

nobody fancies it?



Then, send it to F. Dowler & Sons! They know how to handle the oddest sort of things small stampings and pressings that a lot of firms wouldn't look at—twice.

Even though it seems highly improbable that the job can be made, let F. Dowler & Sons have a look at it; they've surprised a lot of customers already occasionally, they've surprised themselves!

They'll even handle a nice, straightforward job once in a while—just to keep their hand in!

F. Dowler & Sons for small stampings and pressings for electrical, radio or engineering use. Don't forget!

F. Dowler & Sons

ASTON, BIRMINGHAM, 6

VIBRATION PROOF FUSES

To those interested in 5-100 Ampere size fuse units for any purpose whatsoever, but particularly for positions subject to vibration, the SLYDLOK fuse answers all problems. Get your name on our mailing list for advance information of new developments as they are available.

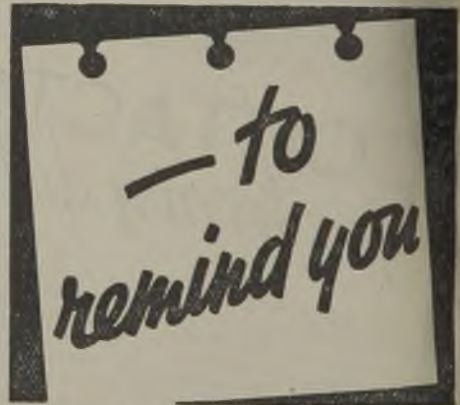


SLYDLOK

EDWARD WILCOX & CO. LTD.

Sharston Road, Wythenshawe, Manchester

dm1168



ARROW

SWITCHES

Arrow Electric Switches Ltd.
HANGER LANE, LONDON, W.

GA

ANNOUNCEMENT-

THE PYRENE COMPANY LIMITED

Metal Finishing Division

TELEPHONE DIALING 3464 (MIDD)
TELEGRAMS "PYRENE BRENTFORD"
CABLES "PYRENE-LONDON"

GREAT WEST ROAD
BRENTFORD·MIDDX

HIGHLAND OFFICE & WAREHOUSE
PARK LANE GLOBURTY, BIRMINGHAM
TELEPHONE BROADWELL 1260

OUR REF MFD/1

To Whom it May Concern.

Dear Sirs,

PHOSPHATE COATINGS FOR TUBE DRAWING AND DEEP DRAWING.

Recent references in the Technical Press to the above subject have aroused considerable interest, and we consequently desire to make a statement regarding the use of such processes.

Long before the war, technical development work had been carried out by this Company, but such work was found to be along similar lines to that covered by a German-owned British Patent No.455,077. The British rights of this patent had not been assigned to us when war broke out, and we were faced with the possibility of an enemy owned Patent hampering further development.

Action was then taken to obtain a Licence for the United Kingdom under Patent No.455,077 to operate and develop the process with power to sub-licence users.

We are able to supply the PARKERIZING chemicals necessary to produce phosphate coatings for Tube Drawing or Deep Drawing, and we are officially authorised to grant sub-licences under the patent, which would otherwise prevent the process from being carried out.

Because of this, British Industry has already been able, and can continue to take advantage of the invention in order to facilitate and improve the production of the implements of war.

Yours faithfully,
THE PYRENE COMPANY LIMITED.
METAL FINISHING DIVISION

W. E. Wright
W. E. WRIGHT,
MANAGER.



METAL FINISHING
PROCESSSES

PARKERIZED

Regd Trade Mark

BONDERIZED

Regd Trade Mark

SPRA-

BONDERIZED

Regd Trade Mark

THE PYRENE COMPANY LIMITED, METAL FINISHING DIVISION

GREAT WEST ROAD, BRENTFORD, MIDDLESEX

WIRING FOR LIGHTING & POWER



Inorganic and thus inherently fire-resistant, Pyrotanax cables need no protection when installed

And they are so easy and economical to install; any form of clip, saddle or clamping device, widely spaced, serving to hold them in position. Moreover, once installed they call for no maintenance or renewal. For they are non-ageing and practically indestructible, being unaffected by extremes of climate, oil, water, condensation, rough usage or accidental overload.

Pyrotanax cables conform to all recognised requirements and are readily adaptable to all standard electrical fittings. Before leaving the factory they are tested to withstand many times their designed voltage.

Further information on request. Queries on specific points particularly invited.



Pronounced PYRO-TEE-NAX
PYROTENAX

MINERAL INSULATED · COPPER COVERED

Cables

Are giving safe and permanent service in:—

Electrical Generating Stations, Factories and Workshops, Aerodromes, Shipyards and Ships, Oil Pumping and Storage Installations and Buildings of every kind.

Supplied with single or multiple cores in a wide range of current ratings.

PYROTENAX LIMITED
HEBBURN Co. DURHAM

Telephone: Hebburn 32244/5

London Office: 7 VICTORIA STREET, S.W.1

Telephone: ABBey 1654

If the engineering specification calls for one or more fractional horsepower motors, with or without special characteristics, be specific . . . nominate **CROYDON** and feel sure your requirements will be suited exactly.

CROYDON
ENGINEERING COMPANY LIMITED

COMMERCE WAY PURLEY WAY CROYDON
Telephone: CROYDON 4125-6 Telegrams: SYNCROY, CROYDON



LIGHTING FITTINGS

— until better times, available only for essential war purposes.

Also

Fuse Gear, Switchboards, Plugs and Sockets, Lampholders.

WILLIAM

McGEOCH & CO. LTD.

Warwick Works, 46 Coventry Road
BIRMINGHAM 10
also GLASGOW and LONDON



Serve the Seven Seas

Brief list of ALLEN'S products

- OIL ENGINES
- STEAM TURBINES
- HELICAL GEARING
- STEAM ENGINES
- CONDENSING PLANT
- CENTRIFUGAL PUMPS
- AXIAL FLOW PUMPS
- D.C. GENERATORS
- D.C. MOTORS
- CONTROL GEAR
- SWITCHBOARDS

BYOND the dark horizon dawns the light of Freedom, bringing a promise of opportunities, greater than any in history, for the material and spiritual progress of mankind in a World of Peace.

In a World of War, Allen products have played a vital part in Ships, in Government and National Service. In a World of Peace, similar products will continue to play an equally important part, but with wider application to Reconstruction and Development on all Continents and the Seven Seas.

The aim of W. H. Allen, Sons & Co. Ltd. is the constant improvement of their established products, and applying their extensive research and technical experience to obtain greater efficiency and economy in the operation of power generating machinery, pumping plant and electrical equipment for the benefit of all industries and essential services on land and sea.

W. H. Allen, Sons & Co., Ltd.,
Bedford, England.

RECONDITIONED & NEW ELECTRIC EQUIPMENT

A SELECTION FROM OUR LARGE STOCK OF
NEW ELECTRIC MOTORS

400/440 VOLTS, 3-PHASE, 50 CYCLES

H.P.	SPEED.	MAKERS.	H.P.	SPEED.	MAKERS.
7½	1,440	G.E.C.	5	1,500	Brook
7½	1,450	G.E.C.	3	950	Brook
5	705	G.E.C.	3	1,000	Brook
5	950	G.E.C.	3	1,500	Brook
5	1,000	Brook	2	1,000	Brook
5	1,425	G.E.C.	1¼	1,500	Brook

FULLY GUARANTEED—IMMEDIATE DELIVERY

**MACHINES THOROUGHLY OVERHAULED AND TESTED BEFORE
DESPATCH ARE SUPPLIED UNDER OUR 12 MONTHS' GUARANTEE**

Telegrams :
" Forward,
Sheffield "

THOS W. WARD LIMITED
ALBION WORKS - SHEFFIELD

Telephone :
26311
(15 lines)

LONDON OFFICE :—
BRETTENHAM HOUSE, LANCASTER PLACE
STRAND, W.C.2

Giant's Wharf
BRITON FERRY

18-24 Fore Street
SCOTSTOUN, GLASGOW, W.4

REPUTATION MERITED FOR OVER HALF A CENTURY



THE REJAFIX SYSTEM
PRINTS ON ANY SURFACE
BY THE REJAFIX SYSTEM
A REJAFIX COMPANY

EMPLOYED IN ENGINEERING, AUTOS AND MARINE PLANTS
AND, ALSO, IN THE MANUFACTURE OF ELECTRICAL AND OTHER ENGINES.
CONSTRUCTIONAL EXPERTS IN ALL REJAFIX SYSTEMS.

CLEAN, PERMANENT MARKING

ON

**BAKELITE, METAL, GLASS, WOOD
COMPONENT PARTS, Etc.**



**LARGE OR SMALL ARTICLES OF ANY SHAPE
PRINTED BY ONE SIMPLE MACHINE**

*Adopted in place of engraving by many
leading manufacturers*

REJAFIX Ltd. 75 BAKER STREET
LONDON, W.1

Tel. : Welbeck 1979



SPEARHEAD of ATTACK

A Ransomes Electric truck forms the spearhead of attack on the problem of internal transport and the handling of goods.

Driven by a girl all day without fatigue, a Ransomes one-tonner will do the work of seven men in a quarter of the time and at a quarter of the cost, carrying a ton at a speed of 7 miles per hour.

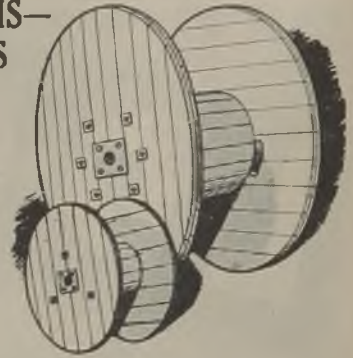
Let us send you full particulars (Dept. E.R.). Ransomes one- and two-ton electric trucks, and also of models up to 4 tons capacity.

Ransomes
Electric **TRUCKS**

RANSOMES SIMS & JEFFERIES LTD
ORWELL WORKS · IPSWICH ·

PRECISION, MECHANICAL & ELECTRICAL
ENGINEERS

DRUMS— REELS



Austins have the necessary timber in stock; they have the threading and other machinery for the steel-work; they have the organised production line for no matter what size of spool.

AUSTINS
OF EAST HAM

LONDON, E.6.

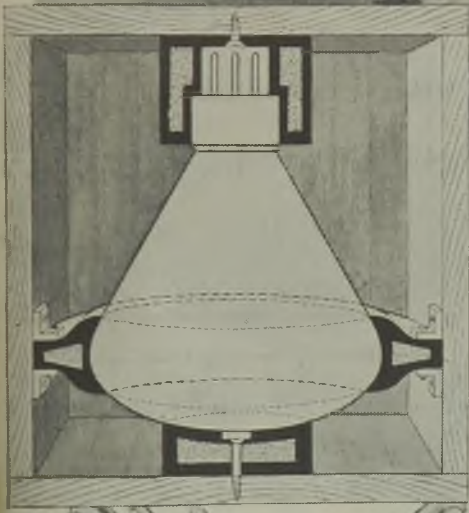
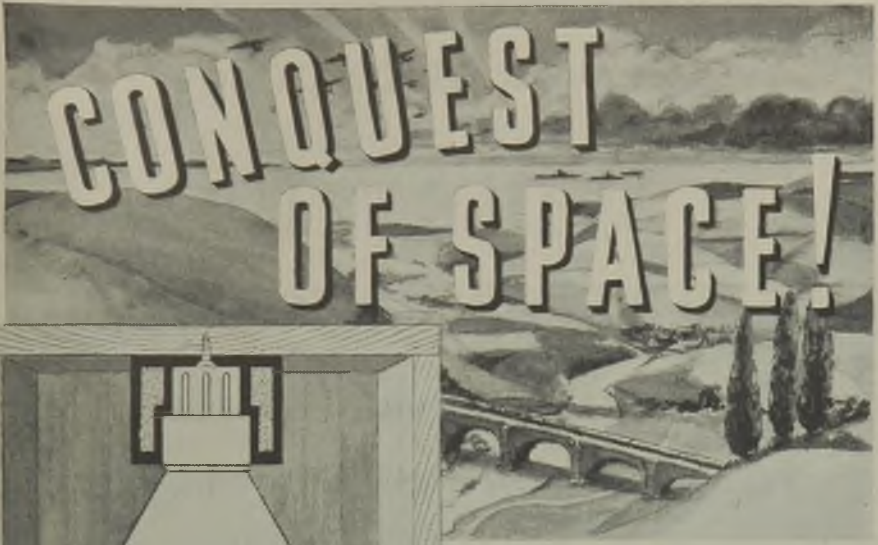
GRANGEWOOD 3444

*maximum
light life*

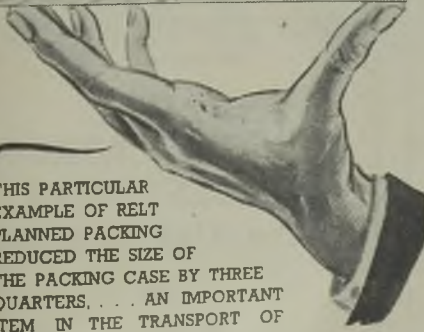
BRITON
ELECTRIC LAMPS

JOHN ISMAY & SONS LTD · ILFORD

THIS PARTICULAR
EXAMPLE OF
PLANNED PRO-
DUCTION HAS
REDUCED THE
PRICE PER
QUARTER.
ITEM IN THE
ESSENTIAL



THIS PARTICULAR EXAMPLE OF RELT PLANNED PACKING REDUCED THE SIZE OF THE PACKING CASE BY THREE QUARTERS, . . . AN IMPORTANT ITEM IN THE TRANSPORT OF ESSENTIAL SUPPLIES.



A Triumph for **RELT**

PAT. NO.
559,054

PLANNED PACKING

Illustration above shows the Relt Suspension Technique applied to the packing of a delicate valve. The Relt collar, part felt and part rubber, is fixed to opposite sides of the case and supports the valve centrally, whilst two further Relt pads retain it top and bottom. Previous method was to use a large case and surround the valve with a mass of packing materials. The Relt method saves weight, space, labour, . . . and above all is a safer method of packing such articles.

**RELT PACKING IS PLANNED PACKING
IF YOU HAVE A PACKING PROBLEM WE
SHALL BE HAPPY TO TACKLE IT FOR YOU.**

EMPIRE RUBBER CO.
DUNSTABLE - BEDFORDSHIRE
Phone DUNSTABLE 533

BURY FELT MFG CO. LTD.
HUDCAR MILLS - BURY - LANCs
Phone - BURY 876

In war as in peace

Chloride

BATTERIES ARE INDISPENSABLE

FOR ALL ELECTRICAL PURPOSES

They are playing their part in the
great National effort

The Chloride Electrical Storage Co., Ltd., Grosvenor Gardens House, London, S.W.1.

WB63a/43

**Save
Time**

Any Coil can be tested
for short circuited turns
and open circuit in 5
seconds

with the

Banner Coil Tester

Provisional Specification No. 4805/44

No valves. No skill
required. Foolproof.
Meter Indication.

Easily detects 1 turn
short circuited.

Price
£7 10s.

THE BANNER ELECTRIC CO. LTD.
BROXBOURNE, HERTS
Hoddesdon 2659

Makers of TRANSFORMERS, CHOKES,
RELAYS, etc., to Government standards.
Also BAKELITE BOBBINS, etc.

**THE GENERAL
ACCESSORIES CO. LTD.**

BARTON HILL WORKS

MAZE STREET, BRISTOL 5

ESTABLISHED 1896

●
**ELECTRIC WIRING
ACCESSORIES**
of the Highest Grade

●
SPECIALITY:

Patent Non-overhang
WALL SOCKETS
AND
B.E.S.A. PLUGS



The IDEAL CONTROL of

- * ELECTRIC FURNACES
- * ELECTROPLATING PLANTS
- * X-RAY EQUIPMENTS
- * SUPPLY SYSTEMS
- * TESTING PLANTS
- * RECTIFIERS

FOR

- HAND OPERATION
- REMOTE CONTROL
- AUTOMATIC CONTROL



The »BRECO« ON LOAD VOLTAGE REGULATOR WITH STEPLESS REGULATION

BRENTFORD TRANSFORMERS LTD BRENTFORD MIDDX

C L A R K E ' S " A T L A S "

MICA *and*

TUBES: Round, Square or Rectangular, in Mica or Bakelite.
 MICANITE: In Moulding, Flexible and Commutator qualities.
 HEATER MICANITE for Domestic and other Electrical Appliances.
 MICA: Uncut or cut to size and calibrated.

MICA for all Electrical Gear and Domestic Appliances.
 MICAFOLIUM - MICA PAPER - MICA CLOTH - STEEL TUBES AND BARS INSULATED WITH MICA OR BAKELITE LEATHEROID - FIBRE - BAKELITE SHEET, ETC.

Contractors to Admiralty, Air Ministry, War Office and other Government Department Lists

H. CLARKE & CO.
 (MANCHESTER) LTD.
 Telephone: ECCLES 2001-2-3-4-5



ATLAS WORKS
PATRICHOFT
MANCHESTER
 Grams: Pirtold, Phone, M'chester

MICANITE

I N S U L A T I O N

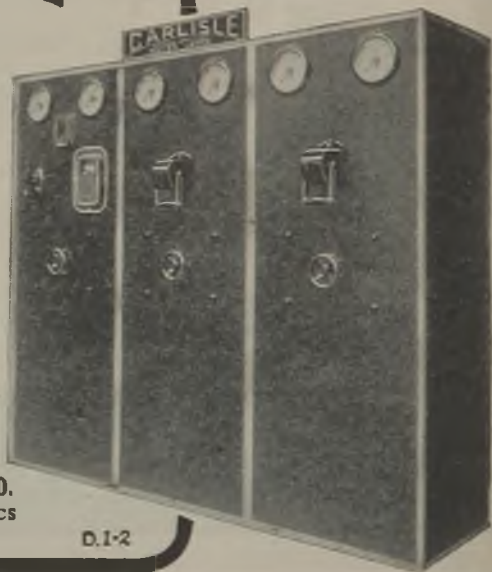
CARLISLE

ELECTRICAL

★ Carlisle Panel Cubicle with leatherette finish and stainless steel surrounds

Specialists in

Switchgear
Switch Boards
Control Gear
Distributing Gear
Convectors
Resistances
Electric Ovens
Airing Cupboards



CARLISLE ELECTRICAL MFTG. CO. LTD.
BENTCLIFFE WORKS . ECCLES . LANCS
and at Horwich

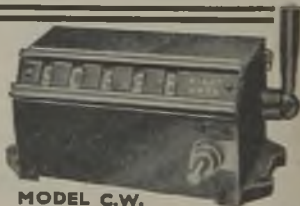
ILLUSTRATION SHOWS MODEL C.W. REVOLUTION COUNTER FOR COIL-WINDING MACHINES, MAXIMUM SPEED 6,000 REVS. PER MIN.

Counters by

English Numbering Machines Ltd.

38 BARRETT'S GROVE . LONDON . N.16

SEND FOR FULL LIST OF COUNTERS

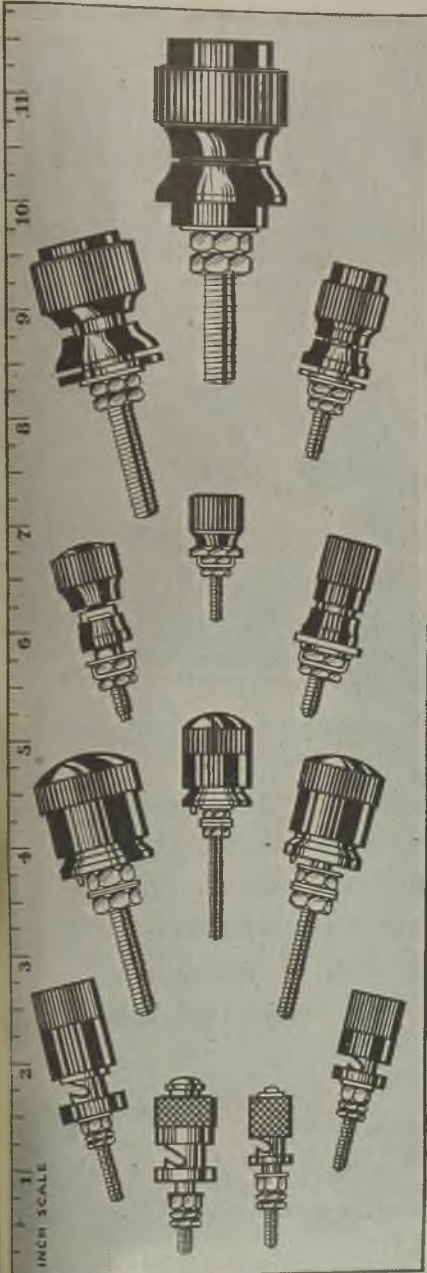


MODEL C.W.

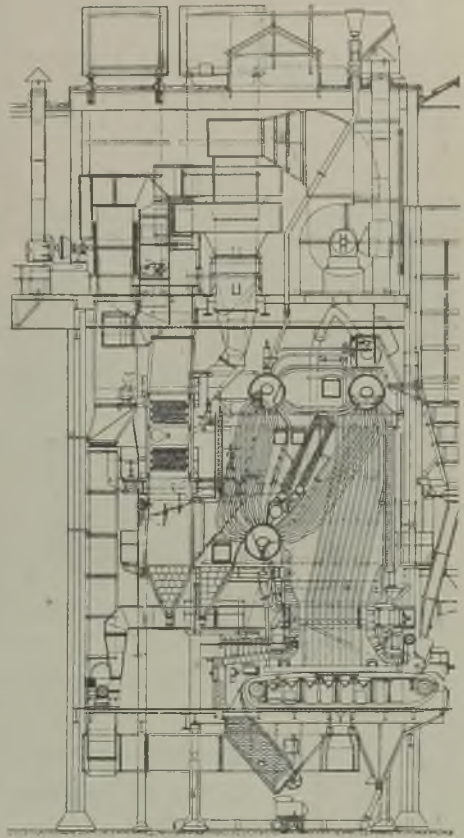
SALTER

SPRINGS

GEO. SALTER & CO. LTD., WEST BROMWICH



BELLING & LEE LTD
 CAMBRIDGE ARTERIAL ROAD, ENFIELD, MIDDXX



Arrangement of one of two Clarke,
 Chapman Tri-Drum Watertube Boilers.
 EVAPORATION (Each Boiler) 120,000 lbs. pr. hr.
 WORKING PRESSURE - - 300 lbs. per sq. in.
 HEATING SURFACE - - - 12,000 sq. feet.

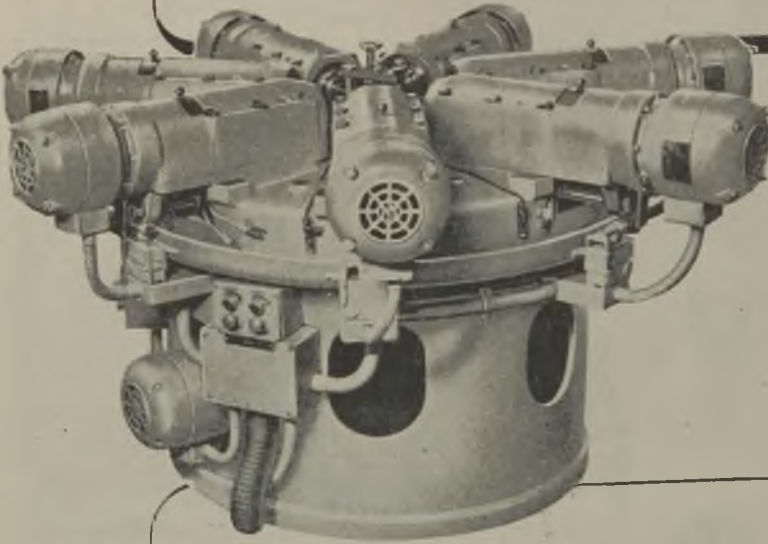
WATERTUBE BOILERS *by* CLARKE, CHAPMAN

AND COMPANY LIMITED

Temporary London Office :

29 CASTLEBAR ROAD, EALING, W. 5
 Phone: Perivale 2254/5. Grams: Cyclops, Phone, London

ECONOMY IN OPERATION



Transmission losses are eliminated by putting **NEWMAN MOTORS** close up to the job at the working points where motion is required. Total enclosure ensures freedom from breakdown in spite of chips, grinding dust, or cutting oils. Fan cooling keeps the motors compact and light in weight.



Head Sales Office : 32 VICTORIA STREET, WESTMINSTER, LONDON, S.W.1

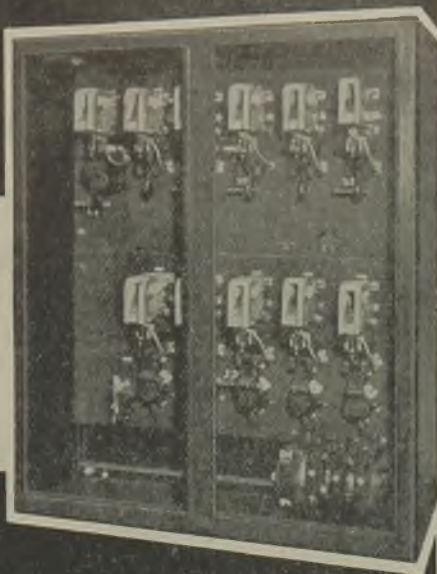
Tel. : ABBey 2023

IGRANIC

Electric Control Gear

Equip your electrically driven machines with the "right" control gear — IGRANIC, which will give positive protection to motor and machine and keep them working to secure maximum production.

Illustration shows IGRANIC Control Panel for Hoist motion of 6-ton Slab Charger for Steel Mill.



IGRANIC ELECTRIC CO. LTD
BEDFORD & LONDON



McKechnie Non-Ferrous Ingots are uniform in composition and therefore easier to melt and handle. Produced by a perfect plant under constant supervision to the correct analysis, the McKechnie range of Non-Ferrous Ingots covers the entire need of the Brass Foundry. McKechnie Chill Cast Bars are closer in structure than Sand Cast Bars and possess greater homogeneity and resistance with an absence of segregation. They are clean, concentric and sound.

Apart from the saving on tool costs and labour which naturally follows the use of Chill Cast as against Sand Cast Bars the saving in scrap and turnings is very considerable.

MADE BY

McKECHNIE BROS. LTD.

Brass Rods, Stampings and Non-Ferrous Ingot Metal Manufacturers
ROTTON PARK STREET, BIRMINGHAM 16

Telephone : Edgbaston 3581 (7 lines)
Telegrams : "McKechnie, Birmingham."

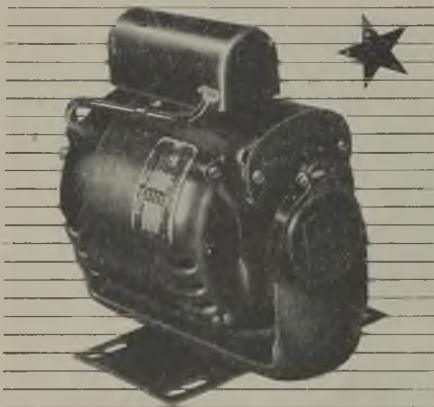


You may wonder whether
a bonded product could solve
your **VIBRATION PROBLEMS**
We should know—if you asked us!

RUBBER BONDERS LTD.

Engineers in Rubber Bonded to Metal
FLEXILANT WORKS, DUNSTABLE, BEDS.

R.B.28



★ From the famous range of Delco refrigerator motors ... made by the largest manufacturers of fractional h.p. electric motors in the world for silent and vibrationless performance. Delco-Remy & Hyatt, Ltd. 111 Grosvenor Rd, S.W.1.

Refrigerator
Delco motors



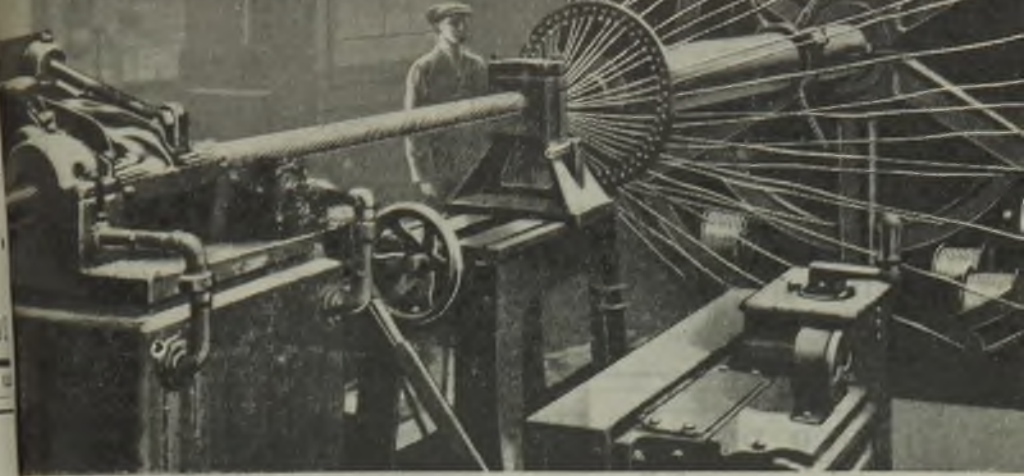
BRAIDING AND INSULATING MACHINERY

FOR ELECTRIC
WIRES AND CABLES

J. B. HYDE & CO. Ltd.
WYTHENSHAW
MANCHESTER

MECHA
ensures u
armouring
o Crompt
steel tap
uniformity
Crompton
Standards
the Cable

CROMPTON PAPER CABLES



MECHANICAL PROTECTION OF CABLE. This machine ensures uniform accuracy in applying the galvanised steel armouring wires, together with the beddings and servings, to Crompton Paper Cables. Other machines that apply steel tape armouring do so with the same degree of uniformity.

Crompton Cables comply with the specifications of the British Standards Institution, Government Departments, and of the Cable Makers Association—of which we are Members.



CROMPTON PARKINSON

LIMITED

HOUSE, LONDON, W.C.2 and Branches



REMOVES 'FUR' FROM KETTLES

Known and proved for years as the most efficient de-scaler for steam generators, water tanks, water heating systems and many other industrial purposes, Epheta is now available for domestic use in handy 4-oz. bottles. This unique preparation removes 'fur' from kettles no matter how thick or hard thus saving fuel, saving time, saving metal. Backed by National Advertising, Epheta is selling on sight wherever shown. Help the fuel situation and help yourself to quick sales and good profits by stocking and displaying Epheta.

EPHETA is on sale at local Gas Cos., and Electricity Cos. showrooms, Army & Navy Stores, Fortnum & Mason's, Waring & Gillow's, Harrods, etc.

EPHETA MANUFACTURING CO.

General Offices and Trade Counter :

(Dept. 3) Epheta House, 64 Newnham St., W.1

Telephone: Museum 2073.

Retail
Price

1/-

per Bottle

**GENEROUS
TRADE
TERMS**

OLIVER PELL CONTROL LTD.

Makers of
the
VARLEY
TRANSFORMERS,
POWER CHOKES,

WIRE WOUND RESISTANCES,
DELAY SWITCHES

**CAMBRIDGE ROW
BURRAGE ROAD
WOOLWICH, S.E.18**

40 years'
reliable
service
to the
industry

Repetition TURNINGS

IN METALS AND
COMPOSITIONS

• • •

Mass Production

LEWIS WOOLF
Limited

144 Oakfield Rd., Birmingham 29

Superspeed
**CORED
SOLDER**

A.I.D. APPROVED

H. J. ENTHOVEN & SONS LTD.

230 THORNTON ROAD, WEST CROYDON, SURREY
THORNTON Heath 2462

POST-WAR—It Affects You

**If it's Overhead Electrical Transmission or Underground
Cable Work—Your Problems are Ours**

183 Miles of E.H.T. and L.T. Underground Cables supplied, laid and jointed
on vital work this last few months under direct Air Ministry contracts

Telegrams : 3036

CONTACT

Telephone : 3036

**TRANSMISSION LINES & CABLE CONSTRUCTION CO.
KEIGHLEY**



BERCO Sliding Resistance



RESISTANCES

Although present circumstances render it difficult for us to give our pre-war service to all customers, we are still working in their interests.

New materials and manufacturing processes which we are now using to increase output also contribute in large measure to improved performance and reliability of our products. Thus, when normal times return, all users of Berco Resistances will benefit by our work to-day.

THE BRITISH ELECTRIC RESISTANCE CO. LTD.
QUEENSWAY, PONDERS END, MIDDLESEX

Telephone :
 HOWARD 1492

Telegrams :
 "VITROHM, ENFIELD"



AGRO BAKELITE BLOCKS

THE ALTERNATIVE TO WOOD BLOCKS

AS SUPPLIED TO THE
AIR MINISTRY
PROMPT DELIVERY



No. 5050 Round type for one 2" or 2½" 5-ampere switch.

No. 7070 Round type for one 2" centre Ceiling Rose.

No. 8080 Oblong type for two 2" or 2½" 5-ampere switches.
BROWN BAKELITE



Marketed by **T.M.C.-HARWELL (SALES) LTD.**

BRITANNIA HOUSE, 233 SHAFESBURY AVENUE, LONDON, W.C.2

Telephone: TEMple Bar 0055 (3 lines)

Telegrams: "Arwelldite, Westcent, London"



DAY AND NIGHT
ELECTRIC SERVICE

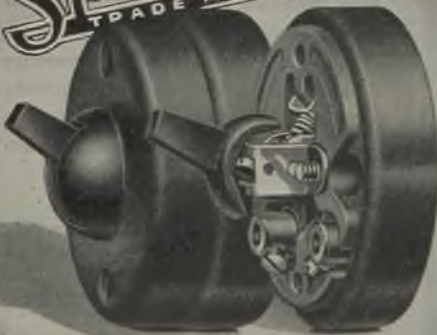


FOR

QUICK RELIABLE REPAIRS
AND
REWINDS

THE MIDLAND DYNAMO Co. Ltd.
LEICESTER Phone 20172 (3 lines)

Sperryn
TRADE MARK



ELECTRICAL
ACCESSORIES
OF
QUALITY

SPERRYN & CO
MOORSOM STREET WORKS
BIRMINGHAM 6

LONDON OFFICE
21, GREAT SUFFOLK ST., S.E.1

A R·E·A·L WINNER!



**R·E·A·L SCREWED GLASS
FITTING 60 W, 100 W—and
200 W IN PREPARATION**

EXTRA TOUGH QUALITY PORCELAIN—one-piece lampholder.

HEAVY-QUALITY PRESSED WELL GLASS—gives much higher threading accuracy, closer limits and a heavier, stronger glass.

DIE CAST MAZAC TOP MEMBER—engaging on rubberised asbestos washer.

HEAVY RUBBER GASKET—giving a definitely watertight joint.

Can be supplied without Mazac Top for mounting direct to standard B.E.S.A. conduit box for positions where headroom is limited.

No steel authorisation required.

Issued by Rowlands Electrical Accessories Ltd., R.E.A.L. Works, BIRMINGHAM 18



*For nearly
70 years*

Our standard products, the result of nearly 70 years' experience in the electrical industry, are the basis of successful transmission, transformation and control of electricity.

Our engineers and designers will gladly co-operate with you.

WE MANUFACTURE : **CABLES—RUBBER AND THERMOPLASTIC.
PAPER INSULATED UP TO 66 kV.**

CABLE BOXES and ACCESSORIES, SWITCHGEAR, TRANSFORMERS, STATIC CONDENSERS, OVERHEAD LINE MATERIAL, INSTRUMENTS, A.C. WELDING EQUIPMENT, "CHARLTON" ELECTRIC WATER HEATERS

JOHNSON & PHILLIPS LTD.,

CHARLTON, LONDON, S.E.7

Telephone : Greenwich 3244 (13 lines).

Telegrams : "Juno," Charlton, Kent



The mark that means that "little more" in quality

**"Floating Contact"
Distribution for the
Post-war Home!**



Cover removed
showing extreme
compactness of design

★ DELIVERY EX - STOCK

THE "Floating Contact" (Patent) all-insulated Distribution Fuseboard is ideal for post-war housing. Compact; power, lighting and heating "under one roof"; easy wiring; each bank of fuses a separate unit; each fuse in its own compartment; impervious to vibration; saves wiring costs, and dimensions of only $7\frac{5}{8}'' \times 6\frac{1}{2}'' \times 4\frac{1}{4}''$.

Write for "Floating Contact" leaflet now!

DORMAN PRODUCTS

DORMAN & SMITH LTD. · MANCHESTER · LONDON · GLASGOW

ER 1544

Mirrlees'

**POWER STATION
EQUIPMENT**

**SURFACE AND JET CONDENSING PLANT
EVAPORATORS AND DE-AERATORS
LOW AND HIGH PRESSURE HEATERS
STEAM EJECTOR AIR PUMPS
CONDENSATE EXTRACTION AND
CIRCULATING WATER PUMPS**

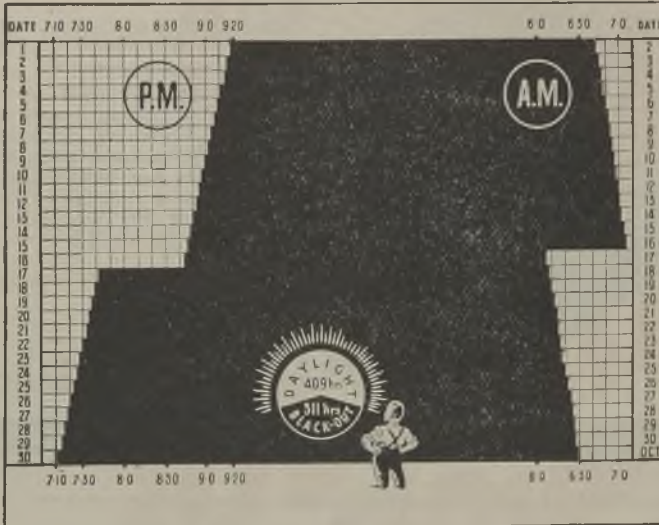
The MIRRLEES WATSON
COMPANY LIMITED

ENGINEERS

GLASGOW

The Sixth Year . . .

BLACK-OUT CHART FOR SEPTEMBER



MOON PHASES

○
FULL MOON
SAT. 2ND.

☾
LAST QTR.
SAT. 9TH.

●
NEW MOON
SUN. 17TH.

☽
FIRST QTR.
MON. 25TH.

*Times shown are those for the London area.

Reproduced from the Nautical Almanac by permission of the Controller of H.M. Stationery Office

September sees the commencement of the sixth year of the War. Black-out is before us again. Increased output must not be hindered. The question of still greater production is the vital need of the nation.

It is well known that the additional hours of darkness need not be a drag on production if good lighting prevails. Osram continues to be the choice of all who demand of their lamps really dependable service under all conditions.

Osram



THE WONDERFUL LAMP

Adv. 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**, at Dorset House, Stamford Street, London, S.E.1.

THE CHARGE for advertisements in this section is 2/- per line (approx. 8 words) per insertion, minimum 2 lines 4/-, or for display advertisements 30/- per inch, with a minimum of one inch. Where the advertisement includes a Box Number 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.

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.

OFFICIAL NOTICES TENDERS, ETC.

CITY OF MANCHESTER

THE Electricity Committee invites tenders for the supply, delivery and erection of COAL CHUTES, SUPPORTS, ETC., also DISMANTLING OF COAL CONVEYING PLANT, ETC. (Specification B.144).

Specification, etc., from Mr. R. A. S. Thwaites, Chief Engineer and Manager, Electricity Department, Town Hall, Manchester, 2, on payment of a fee of one guinea, which amount will be refunded on receipt of a bona fide tender.

Tenders to be delivered by 10 o'clock a.m. on Monday, 11th September, 1944.

R. H. ADCOCK, Town Clerk.

Town Hall,
Manchester, 2.
24th August, 1944.

562

SITUATIONS VACANT

ELECTRICAL POWER ENGINEERS' ASSOCIATION

Appointment of Technical Editor and Director of Studies

THE National Executive Council invite applications for the combined appointment of Technical Editor of "THE ELECTRICAL POWER ENGINEER" and Director of Studies of the Correspondence Tuition Scheme of the Association.

Applicants should be Corporate Members of the Institution of Electrical Engineers or possess equivalent technical qualifications, should have had experience of the technical side of the Electricity Supply Industry and, in addition, experience of technical journalism. Industrial and teaching experience desirable, together with a background knowledge of trade unionism and industrial relationships.

Salary to commence £800 per annum. The successful applicant will be required to pass a medical examination and to contribute to the Association's Pension Scheme.

Forms of Application to be obtained from the:

General Secretary,
Electrical Power Engineers' Association,
102, St. George's Square,
London, S.W.1.

should be returned, endorsed "Technical Editor," not later than Friday, September 15th, 1944.

539

THE YORKSHIRE ELECTRIC POWER COMPANY

Switchboard Attendant

APPPLICATIONS are invited for the position of Switchboard Attendant at a large generating station. Candidates should apply, stating age, training, experience and present position, to GM/GH, The Yorkshire Electric Power Company, Bramhope, Nr. Leeds.

554

ASSISTANT Plant Engineer required for works in the North Midlands. Must have sound theoretical knowledge and practical experience on D.C. and A.C. electrical installations, steam boilers, hydraulic plant and general machinery. Preferably B.O.T. Certificate or equivalent standard. Salary from £420 according to qualifications and experience. Applications in writing (no interviews), stating date of birth, full details of qualifications and experience (including a list in chronological order of posts held) and quoting reference No. 304, should be addressed to the Ministry of Labour and National Service, Appointments Office, Westminster Buildings, Theatre Square, Nottingham. 555

ELECTRICAL Wholesalers require a Clerical Assistant, conversant with trade and materials as handled.—London Electrical Co. (Blackfriars) Ltd., Blackfriars Road, S.E.1. 24

JUNIOR Salesman required for the electrical trade. Living accommodation if desired. Apply—Payne Bros., 7, Station Buildings, Catford, HIT 2198. 567

LEADING firm of electrical manufacturers has a number of vacancies for post-war Technical Representatives. Sound technical education with works and drawing office training essential. Experience in the installation and maintenance of distribution equipment an advantage. Applications will be considered now. Reply, giving particulars of age, education, training and experience, to—Box 15, c/o The Electrical Review.

OVERSEAS Employment: Sudan Government Railways require the services of a Signal and Tablet Inspector, preferably unmarried. Candidates should have had workshop and outdoor experience in the maintenance and renewal of signalling installations, tablet, telephone and telegraph instruments. They should also have some knowledge of train control apparatus and be able to prepare signal diagrams, interlocking table and working charts. The candidate, on appointment, will be required to take charge of a district and Sudanese staff under him. He must possess personality and tact and aptitude for control of staff. Starting rate of pay £E.324-360 per annum (£E.1 = £1 0s. 6d.) according to age and qualifications, with increases in accordance with Government Scales, viz. £E.324-360-398-432-480-540-600-660-720-780, increases being biennial up to £E.660 and thereafter triennial. First increase subject to passing Arabic examination. Successful candidates will be appointed on Probationary Contract for two years with a view to permanent pensionable service and will subscribe to the Provident Fund during the probationary period, after which, if accepted to serve towards pension, his contributions will be transferred to the Pension Fund. Free passage on appointment. Strict medical examination. At present there is no income tax in the Sudan. Written applications (no interviews), giving the following essential details: (1) Full name. (2) Date of birth. (3) National Service Registration number. (4) Local Office shown on address side of Registration Card N.S.2. (5) Medical grade if known. (6) If discharged from the Forces, particulars of Service number, rank, unit and reasons for discharge. (7) Industrial training and experience. (8) Name and address of present employer. (9) Details of present work, should be sent to The Secretary, Overseas Manpower Committee (Ref. 957); Ministry of Labour and National Service, Alexandra House, Kingsway, London, W.C.2. Applications will not be acknowledged.

548

REQUIRED Turbine Driver. Wages and conditions in accordance with D.J.I.C. schedule No. 10 area. Present wage, including war bonus, £5 14s. 2d. for 48-hour week. Applications in writing immediately, giving age, particulars of experience, etc., to—A. E. McKenzie, Esq., M.I.E.E., M.I.Mech.E., Electricity House, Durnford Road, S.W.19. 564

PERSONNEL Manager. Established firm, 1,800 employees, require experienced man capable of handling engagement of labour, labour returns, deferment cases, applications for release and appeal cases, apprenticeship scheme, etc. Knowledge of the Essential Works Order, Factory Acts, working conditions and rates of wages under Engineering Federation agreements essential. Applications treated in confidence. Apply—Box 526, c/o The Electrical Review.

REQUIRED immediately for Municipal Power Station in S.W. England, the following Shift Operation Staff: Turbine Drivers, 25.87d. per hour; Assistant Turbine drivers, 24.34d. per hour; Boiler Firemen, 25.24d. per hour; Assistant Boiler Firemen, 24.01d. per hour; Ash Conveyor Attendants, 23.98d. per hour. The positions are permanent and pensionable for suitable men, and a medical examination is necessary. Previous similar experience is required in all cases. Applicants must ascertain their position regarding release from present employment. In view of the acute housing shortage in the area, successful applicants who, as a result of taking up one of these appointments, have to maintain two homes, will, during the period of hostilities, and whilst awaiting a house, be paid lodging allowances on the Ministry of Labour scale.—Box 498, c/o The Electrical Review.

SALES Representative, permanent progressive position for man with personality and good experience of electrical contracting industry, London and South. Full particulars experience, salary, etc.—Box 6121, c/o The Electrical Review.

WORKS Manager wanted for Electrical Instrument Works, fully experienced in modern production methods and labour control. Essential work with excellent post-war prospects. Write—Box 505, c/o The Electrical Review.

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.

SITUATIONS WANTED

A Constructional Engineer (37), with 19 years' experience with supply companies and contractors engaged on overhead and underground electrification, erection of substation equipment, cable joining, surveying, office routine, control of labour, etc., seeks progressive position. Free now.—Box 6160, c/o The Electrical Review.

ADVERTISER, with 20 years' experience mains engineering, maintenance and construction, desires position with post-war prospects as assistant engineer.—Box 6176, c/o The Electrical Review.

ANY progressive firm requiring services of production development engineer (34), Int. A.M.I.P.E., with experience and ability to plan from model room to finished product on modern methods of line production, should write—Box 6181, c/o The Electrical Review.

CONTRACTS Engineer (40), invalided R.N., not disabled but pre-war activities curtailed through service, 24 years' comprehensive commercial experience of electrical installations, proven record of co-operation and co-ordination, available short notice, seeks permanent engagement with established concern in London, Luton or Bedford area. Some experience mechanical assembly, building construction and journalism. Trained supply co. and manufacturer. Salary £600 p.a.—Box 6185, c/o The Electrical Review.

ELECTRICAL Engineer, age 52, seeks supervising position or charge of factory plant, long experience with D.C. and A.C. layouts for power and lighting, highest testimonials.—Box 6161, c/o The Electrical Review.

ELECTRICAL Engineer (A.M.I.E.E.), 18 years' managerial experience, seeks responsible post on Technical Sales Staff in Manchester district. Would consider representation on agency basis. Replies treated confidentially.—Box 6132, c/o The Electrical Review.

ELECTRICAL Engineer, M.I.E.E. (exempt), transmission, distribution, L.T.—132 kV, construction, administration, executive and consulting experience, requires position offering post-war prospects. Available month's notice.—Box 6130, c/o The Electrical Review.

ELECTRICAL Engineer, 43, wishes to make tentative enquiries with a view to post-war engagement as development officer with supply authority. Extensive knowledge of domestic, industrial and agricultural requirements, and modern methods of administration. Experience covers manufacture, installation, sales, commercial, including twelve years with supply authorities.—Box 6175, c/o The Electrical Review.

ELECTRICAL Engineer (31), industrial power installations and maintenance O.H. lines and substation erection (ten years), area management for rural undertaking (five years), executive position in Ministry (three years), desires appointment to permanent progressive position.—Box 6151, c/o The Electrical Review.

ELECTRICAL Supervising Engineer (45), disengaged, responsible for works' maintenance and installations, contracts, etc., 25 years' experience, desires similar position, London or S. Counties preferred.—Box 6177, c/o The Electrical Review.

ELECTRICAL Supervisor, 36, ex elec. eng. tech. instructor, desires change with view to post-war permanency. Fully experienced in the construction and maintenance of large elec. installations in factories and public buildings with control of staff.—Box 6186, c/o The Electrical Review.

ENGINEER, age 39, general distribution experience, knowledge of generation, specialised experience of measurements, testing and protected gear, A.M.I.E.E., seeks change.—Box 6127, c/o The Electrical Review.

FOREMAN Electrician, fully conversant construction or maintenance power plant, etc., excellent experience and refs., free shortly, genuine.—Box 6190, c/o The Electrical Review.

LONDON B.Sc., age 37, seeks a managerial position, experienced generation and distribution, industrial research, mass production of radio components and general management.—Box 6149, c/o The Electrical Review.

LONDON Electrical and Mechanical Engineer desires change to country or provincial town, 25 years' practical experience, used to controlling labour, good organizer, married, 44 years of age, good accommodation required.—Box 6159, c/o The Electrical Review.

PRODUCTION Control Manager desires change. Experienced in all branches of production control (production planning, scheduling, shop-loading, progressing, stock control). Good engineering background.—Box 6183, c/o The Electrical Review.

YOUNG Engineer, 27, exempt military service, requires responsible position with London firm. Technical qualifications including Higher National Certificate and 8 years' experience.—Box 6162, c/o The Electrical Review.

FOR SALE

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

GEORGE COHEN, SONS & CO. LTD.

for
**GUARANTEED ELECTRICAL
 PLANT,
 MOTORS, GENERATORS,
 SWITCHGEAR,
 etc.**

WOOD LANE, LONDON, W.12.

Telephone: Shepherds Bush 2070

and

STANNINGLEY, NEAR LEEDS.

Telephone: Pudsey 2241.

Established 1834.

WATER TUBE BOILERS IN STOCK

Two 12,000 lbs. evaporation, 200 lbs. W.P.
 One 12,000 " " " 160 " "

We install complete, including brickwork. Economisers, Pumps, Piping Valves, Generating Sets and Motors in stock. Please send us your enquiries; we can give immediate delivery.

BURFORD, TAYLOR & CO. LTD.

Boiler Specialists, Middlesbrough.

Telephone, Middlesbrough 2622

REBUILT MOTORS AND GENERATORS

LONG deliveries can often be avoided by purchasing rebuilt secondhand plant. We can redesign or replace surplus plant of any size.

SEND US YOUR ENQUIRIES.

OVER 1,000 RATINGS ACTUALLY IN STOCK HERE.

DYNAMO & MOTOR REPAIRS LTD.,

Wembley Park, Middlesex.

Telephone: Wembley 3121 (4 lines).

Also at Phoenix Works, Belgrave Terrace, Soho Road, Handsworth, Birmingham.

Telephone: Northern 0898.

26

ELECTRIC MOTORS AND DYNAMOS

WE hold one of the largest stocks of New and Second-hand Motors. Secondhand machines are thoroughly overhauled. Inspection and tests can be made at our Works.

For Sale or Hire. Send your enquiries to:—

BRITANNIA MANUFACTURING CO. LTD.,

22-23, BRITANNIA STREET,

CITY ROAD, LONDON, N.1.

Telephone: 5512-3 Clerkenwell.

13

ECONOMISERS IN STOCK

TWO Green's Economisers, 208 tubes, 250 lbs. W.P.
ONE Green's Economiser, 128 tubes, 185 lbs. W.P.

All guaranteed re-insurable and first-class condition only, low prices. Quotations per return. Installations delivered and erected complete.

BURFORD, TAYLOR & CO. LTD.,

7, Commercial Street, Middlesbrough. Telephone 2622.

65

ARC WELDING MACHINES FROM STOCK

WE offer our latest type No. 2 Max-Arc Welder for immediately delivery, 15/280 amperes. Operates off any A.C. supply voltage. Send for details.

MAX-ARC WELDERS LTD.,

190, THORNTON ROAD, CROYDON.

THORnton Heath 4276-8.

35

MODINSTAL ELECTRIC COMPANY LIMITED

INDUSTRIAL INFRA-RED APPARATUS FOR PAINT DRYING.

COMPLETE EQUIPMENTS OR SINGLE UNITS PROVIDED.

GUARANTEED HEAT GENERATORS

OLDHAM WORKS, OLDHAM TERRACE,

ACTON, W.3, LONDON.

Telephone: Acorn 3504/3.

M.E.C. APPARATUS, DULL EMITTER SYSTEM.

59

A large stock of surplus Fibre, Carbon Rods, Ebonite, A.I.D. Turnbuckles, etc., also Searchlights (sale or hire), Mirrors, Lenses; also Winches of our well-known self-sustaining types. Hundreds of thousands supplied during the last 40 years to Govt. depts., corporations and traders.—London Electric Firm, Croydon.

A.C. and D.C. House Service Meters, all sizes, quarterly

and re-arrangement, reconditioned, guaranteed one year.

Repairs and recalibrations.—The Victoria Electrical Co., 47,

Battersea High Street, S.W.11. Tel. Battersea 0780.

A.C. and D.C. Motors, all sizes, large stocks, fully

guaranteed.—Milo Engineering Works, Milo Road,

East Dulwich, S.E.22 (Forest Hill 4423).

A.C. Diesel Set, 13½ kVA, 400/3/50, direct coupl. cold

start 2-cyl. Lister engine on bed, like new.—J. Gerber

& Co. Ltd., Wembley, Middx.

55

56

57

58

59

60

61

62

63

64

65

66

67

68

69

A.C. Motors, 1/50th h.p. to 3 h.p., from stock, for essential work only.—The Johnson Engineering Co., 86, Great Portland St., W.1. Tel. Museum 6373.

AERIAL Cables, all sizes quoted for; good deliveries against Government contract numbers.—Edwards Bros., 20, Blackfriars Road, London, S.E.1.

ALTERNATING Paraffin Set, 60 kVA, 400/3/50, self contained, rad. cooled, semi-portable, as new.—J. Gerber & Co. Ltd., Wembley, Middlesex.

ALTERNATOR, 500 kVA, 3-p., 50 c., 400/440 v., 750 revs., direct coupled exciter, 2 brgs., on bedplate.—Stewart Thomson & Sons, Fort Road, Seaforth, Liverpool, 21.

ALTERNATORS, 5, 7, 10, 15 kVA, 230/1/50, and 10, 15, 30 kVA, 400/3/50, all brand new from stock.—J. Gerber & Co. Ltd., Wembley, Middx.

BAKELITE Wiring Accessories. Deliveries from stock against priorities.—B.C.M./Elec., London, W.C.1.

BELT Grinders or Sanders, 4" wide belt, £5 5s.; 6" wide belt, £10 10s.—John E. R. Steel, Clyde Mills, Bingley, Phone 1066.

BEST English Cables, 1/044 up to 127/103, deliveries against M.O.S. requirements.—Edwards Bros., 20, Blackfriars Road, London, S.E.1.

CARBONS, large stocks assorted sizes, solid and cored.—Edwards Bros., 20, Blackfriars Road, London, S.E.1.

ELECTRIC Hammers, The Kango Electric Hammer is a necessity for all works. It pays for itself in a few weeks. Write for descriptive pamphlet to—George Cohen, Sons & Co. Ltd., Wood Lane, London, W.12, and Staningley, near Leeds.

ELECTRIC Table Fan, 16" blades, D.C. volts 220. Price £5.—Phone, Ardwick (Manchester) 1322.

EXHAUST Fans, new, 14", 1-phase, 200/250 v., 1,900 cu. ft. m., £11 15s.—Southern Ignition Co., Ltd., 190, Thornton Road, Croydon.

FOR sale, one 30-kW, G.E.C. Generator, volts 230/260 D.C., revs. 450, shunt wound. On combined baseplate. Could be readily adapted for belt drive. Enquiries to—The Medical Superintendent, Cumberland and Westmorland Mental Hospital, Garlands, Carlisle.

FOUR identical 150-kW, "Weir Sulzer/E.C.C." Diesel driven Generating sets, 220 volt D.C.—Stewart Thomson & Sons, Fort Rd., Seaforth, L. pool, 21.

GENERATING SET for sale, 50-kW Belliss & Morcom condensing steam engine, steam 160 lbs., plus 100°C. superheat, direct coupled to 220-volt D.C. Phoenix generator on combined bedplate. Complete switchboard panel. All in good working condition. Best offer submitted by September 23rd, 1944, will be accepted.—C. & W. Walker Ltd., Donnington, Wellington, Shropshire.

GENERATING Sets for immediate sale, petrol, 3 kVA, 230/1/50; 18 kVA, 400/3/50.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford.

HEAVY duty Arc Welding Plants, 200 amps. Price £37 10s. complete. Also Spot Welders, £36 15s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066.

KEITH Blackman Electric Blower, 3,500 c. ft. p.m., cpd. to 20 h.p., 400/3/50, ball-bearing motor, with O.I. starter.—Greenhalgh Bros., Burton's Field Mill, Atherton, Lancs.

LAD-covered and Armoured Cables, P.I. and V.I.R., various special lines at low prices.—Edwards Bros., 20, Blackfriars Road, London, S.E.1.

MODEL 40 Avometer; Frequency Meter, Reedy type, 45 to 50 cycles, portable type; Compton Tong Tester, 0-100 amp.; Tachometers, one 0-500 revs., one 0-1,000 revs.; 3-phase Motors and P.B. Starters. Apply—Summerfield, 2, Marfar Road, Dartford.

MONOMARK. Permanent London address. Letters re-directed, 5s. p.a. Write—BM/MONOS3, W.C.1. 44

MOTOR Generator Set, input 220 v. D.C., output 15 kW, 230/1/50, with Isenthal regulator and control panel. In first-class condition.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford.

MOTOR Generator Sets and Convertors, all sizes and voltages from ½ 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.

MOTORIZED ¼ Bench Drilling Machine, 13 speeds, £11 11s.—John E. R. Steel, Clyde Mills, Bingley. Phone 1066.

NAMPPLATES, Engraving, Dissinking, Stencils, Steel Punches.—Stihwell & Sons Ltd., 152, Far Gosford Street, Coventry.

PORCELAIN Cleats, 2 and 3 groove, various sizes in stock, price list.—Edwards Bros., 20, Blackfriars Road, London, S.E.1.

PORCELAIN Insulators and Spindles, also Cleats, cheap.—Edwards Bros., 20, Blackfriars Road, London, S.E.1.

61

62

63

64

65

66

67

68

69

70

71

72

73

74

75

76

77

78

79

80

81

82

83

84

85

86

87

88

89

90

91

92

93

94

95

96

97

98

99

100

QUANTITY of C.I. Weatherproof Bells, 6" dia. gong. 6 to 230 volts.—Higgins, 15, Kingsley Grove, Audenshaw, Manchester. 437

ROTARY Converters in stock, all sizes; enquiries invited.—Universal Electrical, 221, City Road, London, E.C.1. 416

SELF-Priming Electric Pumps, 300 g.p.h., £11 11s.—

John E. R. Steel, Clyde Mills, Bingley. Phone 1066. 53
SINGLE-core V.I.R., Braided Flexible, heavy insulation, carry 24 amps., cheap.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 6200

STAFF Time Checking and Job Costing Time Recorders (all makes) for quick cash sale. Exceptional condition. Write—Box 528, Smiths, 100, Fleet Street, London E.C.4. 41

STEAM and Diesel Gen. Sets, A.C., D.C., 2 to 900 kW; Chain Blocks, 4 to 5 ton sizes; 20-kW Steam Turbo Sets, 120 v. D.C. and control panel (Lists).—E. Binns, 150a, Falsgrave Road, Scarborough. 6191

SWITCH and Fuse Units, Conduits and fittings, works requirements stocked.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 6201

T.R.S. Cables and Flexibles, Welding Cables, supplied to M.O.S. requirements.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 6202

TWO 375-kVA, 2,000/440-volts, Scott connected, oil immersed Transformers (secondhand), also other sizes, in working order or as scrap. Apply—Engineer and Manager, Electricity Works, 27, Blackhall St., Paisley. 350

0-250-v. Voltmeter, 0-80-amp. Meter, each with 6" dial (A.C./D.C.), make G.E.C., practically unused. Price £2 each.—Potter, Maudlyn Close, Steyning, Sussex. 6185

40 h.p., 45-h.p. and 50-h.p. Motors for sale, 415/3/50 slip ring, at 950, 950 and 1,440 r.p.m. respectively, complete with starters.—Fyfe, Wilson & Co. Ltd., Bishop's Stortford. 569

42 30-amp. Rotary Switches, Diamond H, in good condition. Offers to—Riverside Studios Ltd., Crisp Road, Hammersmith, Tel. Riv. 3012. 566

60 kW, crude oil Generating Set, 220 volts D.C.; 35-kW, crude oil Generating Set, 220 volts D.C.; 250-kW, Brownell Steam Set, 220 volts D.C.; Wier Feed Pump, 94" x 7" x 21"; 35-h.p. Ruston Twin Vertical Diesel; cylindrical pressure Tank, 30" x 7" dia.—Harry H. Gardam & Co. Ltd., Staines. 60

60 vds. 920/029 (1 sq. in.), single core, V.I.R. Braided Flexible.—Edwardes Bros., 20, Blackfriars Road, London, S.E.1. 6203

250 kVA Alternator, 400 volts, 3-phase, 50 cycles, 750 revs., with direct coupled exciter.—Midland Counties Electrical Engineering Co. Ltd., Grice Street, Spon Lane, West Bromwich. 38

500 Electric Motors, Dynamos, Transformers, Converters, etc., etc., at low prices.—S. C. Bilsby, A.M.I.C.E., A.M.I.E.E., Crosswells Road, Langley, near Birmingham. Phone, Broadwell 1359. 21

ARTICLES WANTED

GEORGE COMEN, SONS & CO. LTD.

Engineers and Machinery Merchants
(Established 1834)

REQUEST TO PURCHASE

GOOD Surplus PLANT AND MACHINERY, either single items or Complete Works. Please inform our nearest Area Office:—

GLASGOW: Cogan Street, Pollokshaws.

NEWCASTLE-ON-TYNE: 12, Grey Street.

MANCHESTER: Cobden Street, Pendleton.

SHEFFIELD: Coborn Works, Tinsley.

BIRMINGHAM: 191, Corporation Street.

BATH: Lower Bristol Road.

SWANSEA: Prince of Wales Dock.

SOUTHAMPTON: Princes Street, Northam.

REDRUTH: 25, Albany Road.

Or Chief Offices and Depots:

Southern: WOOD LANE, LONDON, W.12.

Northern: STANNINGLEY, Nr. LEEDS.

34

ACCUMULATOR Plates (old) and Lead Peroxide; as actual smelters we pay top price. Also old storage batteries, transformers and whole installations purchased.—Elton, Levy & Co. Ltd., 18, St. Thomas Street, S.E.1. Hop 2825-6. 39

A number of shunt wound D.C. Motors and Dynamos are required, approximately the following sizes: Motors, 15 h.p., 230 volt, 1,000 r.p.m.; 20 h.p., 230 volt, 1,000 r.p.m.; Dynamos, 12 kW, 230 volt, 1,000 r.p.m.; 20 kW, 230 volt, 1,500 r.p.m. Defective machines would be considered. Please state price, make, type of bearings; whether plain shunt winding or with compound or inter-pole windings; also when and where equipment can be seen.—E. J. Ltd., 65, Vincent Square, London, S.W.1. Vic. 2266. 561

ENGINEERING Technical Books (new or secondhand) wanted in any quantity. Attractive cash offers. Call—Third floor, 356, Oxford Street, W.1, or "Stoneleigh," St. George's Avenue, Weybridge. 62

MERCURY (Quicksilver) wanted. Write for packing instructions. Gold, Silver and Platinum also purchased.—Collingridge & Co. Ltd., Riverside Works, Riverside Road, Watford. (Tel. 5963.) 506

URGENTLY required, 1 65/80-kW, steam-driven Generator, 220/240 volts D.C., steam pressure 150 lbs. sq. in., back pressure 5 lbs. sq. in. Must be electrically and mechanically in good working order. Full particulars and price to—The Medical Superintendent, Cumberland and Westmorland Mental Hospital, Garlands, Carlisle. 551

WANTED, Rotary Converters, any size.—Universal, 221, City Road, London, E.C.1. 22

WINDING Machine suitable for strip elements, need not be in working order.—Box 6190, c/o The Electrical Review.

WORK WANTED AND OFFERED

MOTOR REPAIRS

REWINDING and Repairs. Small Motors and Electric Tools rewonnd and repaired by firm having long experience in this work. Guaranteed work and prompt service. Large assortment of Motors available from stock.

SOUTHERN IGNITION CO., LTD.

190, THORNTON RD.,

CROYDON.

THORNTON Heath 4276-8

27

REWINDING AND REPAIRS

WE rewind and repair any motors, A.C. or D.C., from 1 h.p. to 500 h.p. Motors lent while repairs are being carried out. Established over 24 years.

W. M. SUGDEN & CO. LTD.

Glenny Road, Barking, Essex.

Phone, Rippleway 3302

45

ARMATURE, Rotor and Stator rewinds and repairs. fractional to 600 h.p. Prompt deliveries.—T. A. Boxall & Co., Horley, Surrey. Phone 654. 6136

ELECTRIC Clocks repaired, trade prices.—Menson, Electric Clock Maker, 44, Maxwell Dr., Glasgow. Phone, Ibrox 1331. 6182

ELECTRICAL Measuring Instruments skilfully repaired and recalibrated.—Electrical Instruments Repair Service, "Stanmede," Forlease Road, Maidenhead. 6192

MACHINING Work, for Centre Lathes up to 44 in centres and medium-sized milling (good grade work preferred).—The London Electric Firm, Croydon. Up lands 4871. 64

MEASURING Instrument Repairs. All makes of meter and instruments skilfully repaired by experts. Prompt service for essential purposes.—Rumbaken Electrical Repairs, Meter Dept. (Q52), Manchester, 1. 5

REPAIRS. Clocks, Watches, Time-Switches, Jewellery Radio, Gramophones, Electric and Mechanics Apparatus of all kinds repaired by skilled staff. Inquire welcomed. Representative will call in the London area if required.—Hughes (Ground Floor), 58, Victoria Street, London, S.W.1. Phone, Victoria 0134. 609

TRANSFORMERS, single and three-phase. All types up to 10 kVA.—Woden Transformer Co. (Phone 141959), Moxley Road, Bilston, Staffs. 4

PREMISES WANTED

REQUIRED, Factories in London and Suburbs. Area from 5,000 to 100,000 sq. ft. Pars., in confidence.—Leopold Farmer & Sons, 46, Gresham Street, E.C.

ROI.00

AGENCIES

EXPERIENCED Sales Specialist seeks post-war representation (for Union of South Africa) of modern household electrical appliances of quality. Advertiser is demobilised S.A. Air Force Officer and is prepared to proceed overseas for discussion and consultation if necessary. Bankers and other references available. Write—Captain Allen Frank, Barclays Bank, Adderley Street, Cape Town. 553

MANUFACTURERS' Agent covering Yorkshire, Lancashire and North, including Edinburgh and Glasgow, public supply undertakings and the trade, commission basis, commence October, would entertain well-established line.—Box 6138, c/o The Electrical Review.

MANUFACTURERS' Agents, covering the whole of Great Britain and Colonies, are desirous of contacting manufacturers with a view to sole selling rights (either commission or buying), post-war arrangements considered.—Box 23, c/o The Electrical Review.

PRINCIPAL of small co., with connections amongst municipalities and large users in West Country, would represent interests of reputable manufacturers, commission or retainer. Box 536, c/o The Electrical Review.

BUSINESSES FOR SALE AND WANTED

WANTED, Electrical Engineering or General Engineering Business in Hampshire or Sussex, for either amalgamation or purchase.—Box 6163, c/o The Electrical Review.

WANTED, small Electrical Manufacturing Business in Midlands, preferably already making immersion elements or domestic appliances.—Box 6179, c/o The Electrical Review.

PARTNERSHIPS

ADVERTISERS desire acquire interest in or purchase outright small plant with power presses, and tool room. Particular interests are transformer laminations and assemblies and general pressings up to 14" diameter. Replies treated in strict confidence. Write—Box ZN.659, Deacons, 5, St. Mary Axe, E.C.3. 556

ENERGETIC man, with moderate capital and initiative, wishes active partnership in small business. Electrical contracting, auto repairs, building allied trades, or any sound project considered. Market town preferred. Commercial and technical experience, abstemious, over military age, finest references. Confidential particulars, capital required—Box 6178, c/o The Electrical Review.

MISCELLANEOUS

£10,000 OFFERED

by PARTRIDGE, WILSON & CO LTD., of Leicester,

for the purchase of suitable Patents or Ideas that can be developed and patented in relation to improvements in Electric Road Vehicle Transmission.

PARTRIDGE, WILSON & CO. LTD., DAVENSTON ELECTRICAL WORKS, LEICESTER.

557

DON'T Disclose Your Plans. Produce blue prints and black line copies, etc., in your own office, without glass frame, privately and economically. "Arcodex" Copiers from 25 shillings. As supplied to H.M. Government.—W. A. Broughton, 22, Kenley Road, Merton, S.W.19. 43

PHOTOGRAPHY. A photograph says more than a thousand words. Realistic photographs for catalogues, brochures and general reproductions purposes for present and after-the-war uses.—Miles & Kaye Ltd, Industrial Photographers, 100, Southampton Row, London, W.C.1. Telephone, HOLBORN 6858. Established over 50 years. 547

LESLIE Dixon & Co. for Dynamos, Motors, Switchgear, Chargers and Telephones.—214, Queenstown Road, Battersea, S.W.8. Telephone: Maccalloy 2159. Nearest Rly. Sta.: Queen's Road, Battersea (S.R.). 13

THOSE Raw Materials, by C. A. Ward, A.M.I.E.E., is a mine of information on the preparation, occurrence and uses of raw materials. Topical, useful, interesting. Obtainable now. From all booksellers, 15s. net (18s. post free). Publishers, George Allen & Unwin, 40, Museum Street, London, W.C.1. 6187

EDUCATIONAL NOTICES

LATEST A.M.I.E.E. RESULTS

IN the recent Examinations held by the Institution of Electrical Engineers 477 Candidates sat who had taken B.I.E.T. courses. Of these 457 were successful in passing the examinations. We believe this record of 457 successes out of 477 entrants has never before been approached by any oral or correspondence tutorial organisation, and indicates the very high efficiency of the modern system of Technical Training which we have laid down.

The B.I.E.T. tutorial organisation is waiting to assist you either with a short specialist course or complete training for a recognised examination.

We have available a large full-time staff of instructors, while the efficiency of our extensive organisation is a byword among engineers.

WE GUARANTEE—"NO PASS—NO FEE"

May we send a copy of "ENGINEERING OPPORTUNITIES"? Containing a great deal of useful advice and detailed information on over 200 Home-Study Courses and examinations, this handbook is of very real value to the ambitious engineer.

Our highly informative handbook will be sent FREE and without obligation on request.

BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY.

Established 1927—over 200,000 students.

12, Shakespeare House, 17, 18 & 19, Stratford Place, Oxford Street, London, W.1. 33

Great Possibilities for TECHNICALLY QUALIFIED ENGINEERS

Key Men in War-Time and Afterwards

THE finest posts and the great majority of posts in Great Britain in this war are technical. The same will be the case when the war is over. The vast increase in mechanisation now being applied to war purposes will then be suitably utilised in reconstruction, and in trade and commerce. Take a recognised Engineering Qualification through home-study with the T.I.G.B., whose Students have gained 35 FIRST PLACES in the A.M.Inst.C.E., A.M.I.E.E., A.M.I.Mech.E., A.I.F.R.Ae.S., etc., examinations. Write to-day for "The Engineer's Guide to success," containing the world's widest choice of engineering courses—over 200—covering all branches: Electrical, Aeronautical, Mechanical, Wireless, etc.

THE TECHNOLOGICAL INSTITUTE OF G.T. BRITAIN.

35, Temple Bar House, London, E.C.4. 77

HERIOT-WATT COLLEGE, EDINBURGH

(Affiliated with the University of Edinburgh) Full-time Three Years' Diploma Courses in Mechanical Engineering and Electrical Engineering Mechanical Engineering: Professor A. P. Horne, O.B.E., B.Sc., M.I.Mech.E., A.M.I.C.E. Electrical Engineering: Professor M. G. Say, Ph.D., M.Sc., A.M.I.E.E.

ENTRANCE Examination for those not otherwise qualified for admission, 19th and 20th September. Three Scholarships (value £35 per annum) are offered on the results of this Examination.

Session begins Monday, 9th October. In view of National Service and Ministry of Labour requirements, intending students should make application for enrolment at an early date.

J. CAMERON SMALL, Principal. 40

COMPANY MEETINGS

BROADCAST RELAY SERVICE

Continued Expansion

THE 18th annual general meeting of Broadcast Relay Service Limited was held on August 17th, in London.

Mr. Allan Miller, the chairman, presided.

The following is an extract from the chairman's statement issued with the report and accounts:—

I am very glad to be able to report continued expansion in all departments of our business, all of which have reached new high levels of volume of business and profits earned. Last year's profits had the benefit of Excess Profits Tax deficiencies, whereas the whole of our profits this year have been subject to Excess Profits Tax. This accounts for the decrease in the balance of profits as compared with the previous year.

We have disposed of one of our manufacturing companies in Canada on very satisfactory terms. The new item of "Notes Receivable" appearing in the consolidated balance-sheet represents part of the capital proceeds of this sale.

The company is in a strong position financially, with ample reserves, and we are giving continued consideration to post-war plans for extension and improvement of the company's business. Despite the many difficulties which exist to-day, our businesses have maintained their high standard of service and further improved their efficiency of operation.

Your directors recommend payment of a final dividend of 3½ per cent., free of tax, which is the same as for last year.

The resolution adopting the report and accounts was carried. 549

THORN ELECTRICAL INDUSTRIES

Demand for Atlas Lamps

THE Ordinary General Meeting of Thorn Electrical Industries Ltd., was held on Friday, 25th August, in London.

Mr. Jules Thorn (chairman and managing director) said that during the period under review their sales of Atlas lamps again showed a satisfactory increase although they had been faced with many production difficulties, principally due to labour supply problems. They had kept abreast of developments in lighting engineering and after considerable work in their research laboratories, had succeeded in producing a fluorescent lamp, the quality of which, they were confident, was as good as that produced by any of their competitors.

At their last meeting he had mentioned that they had received a satisfactory share of the export quotas for electric lamps and the popularity of their products overseas had made it possible for them to utilise those quotas fully. In fact, but for the restriction of exports they could have shipped considerably more. They were taking active steps to extend their organisation for considerably increased business in that field after the termination of hostilities.

The company distributed the whole of the domestic radio production of the Ferguson Radio Corporation. That was still on a limited scale because the Ferguson Radio factory had been entirely employed on the production of service equipment and also because the production of domestic radio equipment had been restricted. The Board of Trade, however, having now decided that a quantity of civilian war-time receivers should be made, the Ferguson Radio Corporation had been entrusted with the production of a quantity of these and had given Thorn Electrical the distribution of them.

The net profit for the year, after providing £58,000 for taxation had amounted to £24,644, a result which was approximately the same as for the previous year. It was proposed to declare a dividend of 20 per cent. on the ordinary shares.

The report was adopted.

571

There'll come a time . . .



so remember

GRAHAM FARISH
for
ELECTRIC FIRES & APPLIANCES
GRAHAM FARISH LTD.
BROMLEY • KENT.

**WAXES
OKERIN**

AND

DIELECTRIC MATERIALS

Cable, Condenser, Coil, Transformer and Resistance impregnating, dipping, sealing, filling and finishing


A.I.D. and C.I.E.M.E. TYPE APPROVED WAXES to meet both ARCTIC and TROPICAL conditions

TELEPHONE: WEST DRAYTON 2189

ASTOR BOISSELIER & LAWRENCE LTD.
MIDDLESEX OIL & CHEMICAL WORKS
WEST DRAYTON, MIDDLESEX

Chronovar
 ALL BRITISH COMPENSATED STEEL TYPE HAIRSPRINGS

and
 ALL OTHER TYPES and GRADES
 OF HAIRSPRINGS BY PHOSPHOR
 BRONZE, CALCIUM COPPER AND
 BERYLLIUM COPPER
 COLLECTED AND ENCOLLECTED



100% BRITISH
 MANUFACTURE

BRITISH PRECISION SPRINGS LTD

317 Edgware Road, London, N.W. 2

Phone: GLAdstone 3333 Grams: "Chronovar, Crickle, London"

**THE STATIC
 CONDENSER Co. Ltd.**

★ *Manufacturers of*
**STATIC
 CONDENSERS**

**TOUTLEY WORKS,
 WOKINGHAM, Berks**

Telephone: WOKINGHAM 708



**Automatic
 Voltage
 Regulator**



- **CONSTANT A.C. OUTPUT**
- **WIDE A.C. INPUT LIMITS**
- **ENTIRELY AUTOMATIC**
- **QUICK ACTION**

The constant A.C. input voltage called for in so many modern industrial and laboratory applications is provided with maximum accuracy and reliability by B.A.T. Automatic Voltage Regulators. Seven standard nominal ratings are carried in stock, 10-1,000 Watts, giving 230 V \pm 1% with 185-270 input. Other ratings to special order.

On 1A Priorities delivery is either early or ex stock. Please request Bulletin V.R. 1243 for complete data.

ALSO SUPPLIERS OF

Static Mains Transformers of all types and "Variac" Infinitely variable voltage regulating transformers.

Claude Lyons Ltd
 ELECTRICAL AND RADIO LABORATORY APPARATUS ETC.

180 Tottenham Court Road, London, W.1
 And 76 Oldhall Street, Liverpool 3, Lancs

STRAND
RESISTANCES
ARE
UNRIVALLED
FOR THEIR
QUALITY AND
PERFORMANCE



APPROVED
BY ALL GOVERNMENT DEPT^{OS}

THE STRAND
ELECTRIC & ENGINEERING CO^{LTD}

MANCHESTER

LONDON

DUBLIN

The SOLUTION
OF THE CYCLE
STORAGE PROBLEM



WRITE
FOR
CATALOGUE
ER/201

CONSTRUCTORS CYCLE PARKS

CONSTRUCTORS LIMITED
NICKEL WORKS TYBURN ROAD
ERDINGTON BIRMINGHAM

*Nuts
Washers
& Screws*

**STERNAW
COMPANY LTD**

4 LICHFIELD TERRACE, RICHMOND
SURREY—Richmond 0222 & 4680

WINDING

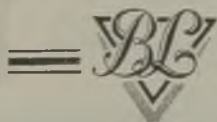
of all types, Armatures, Transformers,
Coils, etc. Priority contracts wanted.
Also electrical assembly and instru-
ment wiring.

"REWINDS"

Electrical Engineers and Manufacturers

37 ST. JOHN'S HILL
BATTERSEA, LONDON, S.W.11

BATtersea 2283



BROMLEY-LANGTON

All British

HIGH-GRADE VARNISHED COTTON
INSULATING TUBING—INSULATED
ELECTRICAL WIRES & FLEXIBLES

THE BROMLEY-LANGTON ELECTRIC WIRE & INSULATOR CO. LTD.
TRADING ESTATE SLOUGH BUCKS.

MATERIALS,
WORKPEOPLE,
DIRECTORS &
MANAGEMENT,
CAPITAL



The 50-range Model 7 Universal AvoMeter.

The AvoMeter is one of a useful range of "Avo" electrical testing instruments which are maintaining on active service and in industry the "Avo" reputation for an unexcelled standard of accuracy and dependability—in fact, a standard by which other instruments are judged.

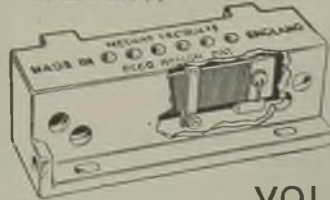
Orders can now only be accepted which bear a Government Contract Number and Priority Rating.

Sole Proprietors and Manufacturers:

AUTOMATIC COIL WINDER & ELECTRICAL EQUIPMENT CO. LTD., Winder House, Douglas Street, London, S.W.1. Phone: Victoria 3404-8

A PHENOMENAL SUCCESS!

"METWAY"



Wound for 750 ohms -3 amp

NOTE: Increased production now enables us to give reasonably prompt deliveries.

VOLTAGE DROPPER

Complete (as illus.) **10/-**
Resistance only, with slider (unshrouded) **5/6**
Spare Sliders **6d.**

Apply Dept. "E.R."

METWAY ELECTRICAL INDUSTRIES LTD.

(Formerly Metropolitan Electric Supplies)

KING STREET, BRIGHTON, 1

Phone: Brighton 4456PBX. Grams: "Metway," Phone, Brighton

Litholite
40 Years
of
Plastic Moulding

LITHOLITE INSULATORS & ST. ALBANS MOULDINGS LTD

WATFORD

PHONE: WATFORD 4494

THE **COIL** DETERMINES PERFORMANCE



- ★ ACCURACY
- ★ UNIFORMITY
- ★ RELIABILITY
- ★ SERVICE
- ★ COMPETITIVE PRICES

EXPRESS DELIVERIES DAILY IN LONDON AREA

The VARLEY MAGNET COMPANY
BLOOMFIELD ROAD

Telephone: **WOOLWICH, S.E. 18**
WOOLWICH 1422 (6 lines)

Index to Advertisers

	PAGE	PAGE	
Agro Electrical Co. Ltd.	62	Drake & Gorham Wholesale Ltd.	8
Allen, W. H., Sons & Co. Ltd.	47	Duratube & Wire Ltd.	78
Arrow Electric Switches Ltd.	44	Edison Swan Electric Co. Ltd.	24
Astor Boisselier & Lawrence Ltd.	72	Elexcel Ltd.	17
Austins of East Ham.	50	Empire Rubber Co.	51
Automatic Coil Winder & Elect. Equipment Co. Ltd.	75	Enfield Cable Works Ltd.	23
Bakelite Ltd.	38	Engineering & Lighting Equipment Co. Ltd.	28
Banner Electric Co. Ltd.	52	English Electric Co. Ltd.	15
Barbour, William, & Sons Ltd.	Cover iii	English Numbering Machines Ltd.	54
Belling & Lee Ltd.	55	Enthoven, H. J., & Sons Ltd.	60
B.E.N. Patents Ltd.	78	Epheta Manufacturing Co.	60
Berry's Electric Ltd.	40	Evershed & Vignoles Ltd.	37
Birch, H. A., & Co. Ltd.	18	Ferranti Ltd.	11
Brentford Transformers Ltd.	53	Fluxite Ltd.	78
British Central Electrical Co. Ltd.	25	Geipel, William, Ltd.	76
British Electric Resistance Co. Ltd.	61	General Accessories Co. Ltd.	52
British Insulated Cables Ltd.	9	General Cable Manufacturing Co. Ltd.	36
British Precision Springs Ltd.	73	General Electric Co. Ltd.	66
British Ropes Ltd.	34	Graham Farish Ltd.	72
British Thomson-Houston Co. Ltd.	Cover iv & 5	Harcourts Ltd.	76
Bromley-Longton Electric Wire & Insulator Co. Ltd.	74	Harland Engineering Co. Ltd.	35
Brook Motors Ltd.	13	Heatrae Ltd.	1
Brush Electrical Engineering Co. Ltd.	20	Heayberd, F. C., & Co. Ltd.	43
Burn, George, Ltd.	8	Henley's, W. T., Telegraph Works Co. Ltd.	77
Callender's Cable & Construction Co. Ltd.	21	Hick Hargreaves & Co. Ltd.	25
Carlisle Electrical Manufacturing Co. Ltd.	54	Higgs Motors Ltd.	Cover 3
Chloride Electrical Storage Co. Ltd.	52	Holophane Ltd.	Cover 3
Clarke, Chapman & Co. Ltd.	55	Hopkinsons Ltd.	77
Clarke, H., & Co. (Manchester) Ltd.	53	Hyde, J. B., & Co. Ltd.	58
Connolly's (Blackley) Ltd.	29	Igranic Electric Co. Ltd.	57
Constructors Ltd.	74	Ismay, John, & Sons Ltd.	50
Crompton Parkinson Ltd.	16, 31 & 59	Johnson & Phillips Ltd.	64
Croydon Engineering Co. Ltd.	46	Lancashire Dynamo & Crypto Ltd.	49
Cryselco Ltd.	30	Litholite Insulators & St. Albans Mouldings Ltd.	75
Davis & Timmins Ltd.	80	Liverpool Electric Cable Co. Ltd.	2
Delco-Remy & Hyatt Ltd.	58	Londex Ltd.	80
Donovan Electrical Co. Ltd.	80	Lyons, Claude, Ltd.	73
Dorman & Smith Ltd.	65	Macromer Ltd.	79
Dowler, F., & Sons	44	Mallory Metallurgical Products Ltd.	43
		Manganese Bronze & Brass Co. Ltd.	14

(Continued on page 78)

Telegrams: "Patella, Sedist, London."

Telephone: Hop 0594 (3 lines)

CABLE

V.I.R. & THERMOPLASTIC BRAIDED, LEAD COVERED & SHEATHED

WILLIAM GEIPEL LTD. Head Office: 156-170 Bermondsey Street, LONDON, S.E.1

Cable Works: WEMBLEY, MIDDLESEX

Publications illustrating
**INDUSTRIAL LIGHT-
FITTINGS** sent on
request.

HF4. "Harfleur"
Fluorescent Fittings.
HF5. Local Lighting
Fittings.



Cat. No. 1802

"Harfleur" lighting

Harcourts

**STANHOPE HOUSE, 1 KEAN STREET,
ALDWYCH, LONDON, W.C.2.**

Telephone: TEMPLE BAR 9671/2/3.


ELECT
W.T. HENLEY

MAXIMUM DISCHARGE CAPACITY

HOPKINSONS'

"HYLIF"

SAFETY VALVE

gives maximum discharge capacity and reduces the number of safety valves required on the modern high-duty boiler.

More than 50 installations operating at pressures of 600 lb. per square inch and above are equipped with "Hylif" Safety Valves.

Used by most high-pressure Power Stations in Great Britain.

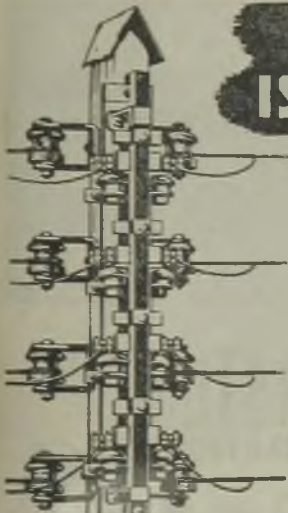


HOPKINSONS LIMITED — HUDDERSFIELD

London: 34 Norfolk Street, Strand, W.C.2

A670 3846

L.T. OUTDOOR ISOLATING SWITCHES



Specially designed for isolating low tension overhead distribution lines erected in vertical formation. The switch embodies a quick-break mechanism and self-aligning contact blades. The operating shaft can be fitted either for hooked rod operation or for operation by hand from ground level. The whole assembly including the pole fittings makes a very neat and inconspicuous arrangement.

Available for 2, 3, 4 or 5 wire lines, working current 150 amperes, up to 500 volts.

An alternative design embodies H.R.C. Cartridge Fuses up to 150 amperes max. working capacity, 500 volts. Write for Catalogue W.O.3.

HENLEY

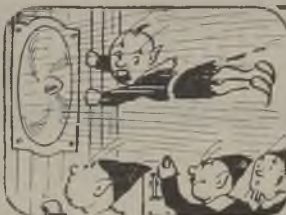
ELECTRICAL DISTRIBUTION EQUIPMENT

W. HENLEYS TELEGRAPH WORKS CO. LTD. MILTON COURT, WESTCOTT, DORKING, SURREY

Index to Advertisers

(Continued from page 76)

	PAGE
Martindale Electric Co. Ltd.	41
McGeoch, William, & Co. Ltd.	46
McKechnie Bros. Ltd.	57
M.C.L. & Repetition Ltd.	1
Metropolitan-Vickers Electrical Co. Ltd.	33
Metway Electrical Industries Ltd.	75
Midland Dynamo Co. Ltd.	62
Midland Electric Mfg. Co. Ltd.	Cover i
Mirrlees Watson Co. Ltd.	65
National Fire Protection Co. Ltd.	22
Newman Motors.	56
Oliver Pell Control Ltd.	60
Partridge Wilson, E., & Co. Ltd.	29
Permutit Co. Ltd.	32
Phosphor Bronze Co. Ltd.	48
Pinchin, Johnson & Co. Ltd.	Cover iii
Pope's Electric Lamp Co. Ltd.	7
Pyrene Co. Ltd.	45
Pyrotex Ltd.	46
Ransomes Sims & Jefferies Ltd.	50
Rejafix Ltd.	48
Rewinds.	74
Reyrolle, A., & Co. Ltd.	26
Ross Courtney & Co. Ltd.	1
Rowlands Electrical Accessories Ltd.	63
Rubber Bonders Ltd.	58
Runbaken Electrical Products.	80
Salter, George, & Co. Ltd.	54
Sangamo Weston Ltd.	40
Siemens Electric Lamps & Supplies Ltd.	39
Sperryn & Co.	62
Standard Telephones & Cables Ltd.	12
Static Condenser Co. Ltd.	73
Stephens Belting Co. Ltd.	80
Sternaw Co. Ltd.	74
Strand Electric & Engineering Co. Ltd.	74
Terry, Herbert, & Sons Ltd.	4
Thorn Electrical Industries Ltd.	27
Titanine Ltd.	19
T.M.C.-Harwell (Sales) Ltd.	62
Transmission Lines & Cable Construction Co. Ltd.	60
Tucker, J. H., & Co. Ltd.	10
Varley Magnet Co.	75
Veritys Ltd.	41
Walsall Conduits Ltd.	6
Ward & Goldstone Ltd.	42
Ward, Thos. W., Ltd.	48
Westminster Engineering Co. Ltd.	1
Westool Ltd.	78
Wilcox, Edward, & Co. Ltd.	44
Woolf, Lewis, Ltd.	60
Wright, Bindley & Gell Ltd.	61
Yorkshire Electric Transformer Co. Ltd.	79



The "Fluxite Quins" at work

"You'll soon see that
FLUXITE is best
We'll just put this
gun to the test
Switch her on, sonny
boy! . . .
"Hey! Cut it!"
wiped off!
"I'll be lucky if I'm
left with a vest!"

For all **SOLDERING** work—you need **FLUXITE**—the paste flux—with which even dirty metals are soldered and "tinned." For the jointing of lead—without solder and the "running" of white metal bearings—without "tinning"—the bearing. It is suitable for **ALL METALS**—excepting **ALUMINIUM**—and can be used with safety on **ELECTRICAL** and other sensitive apparatus.

With **FLUXITE** joints can be "wiped" successfully that are impossible by any other method.

Used for over 30 years in Government works and by leading Engineers and Manufacturers. **OF ALL IRONMONGERS** in tins—8d., 1/4 and 2/8.

The "FLUXITE GUN" puts **FLUXITE** where you want it by a simple pressure. Price 1/6 or filled 2/6

FLUXITE

SIMPLIFIES ALL SOLDERING

Write for Leaflets on Case-Hardening Steel and Tempering Tools with **FLUXITE**, also on "Wiped" joints. Price 1d. each.
FLUXITE LTD. (Dept. R.E.), Bermondsey St., S.E.1

DURAWIRE
YOUR ELECTRICAL WORK AND BE SURE

DURACABLES

FORATUBE & WIRE LIMITED
FACTORY ROAD, FELTHAM, MIDDLESEX

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this Journal should not be taken as an indication that they are necessarily available for export

Ben No. 2 SPRAY PAINT COMBINATION

Comprises essential equipment for continuous spray painting, including Spray Gun, Pressure Paint Container, Hose and connections. Write for Catalogue C.B.36.

B.E.N. PATENTS LTD.
HIGH WYCOMBE, BUCKS



TELEPHONE
Putney
4281-3

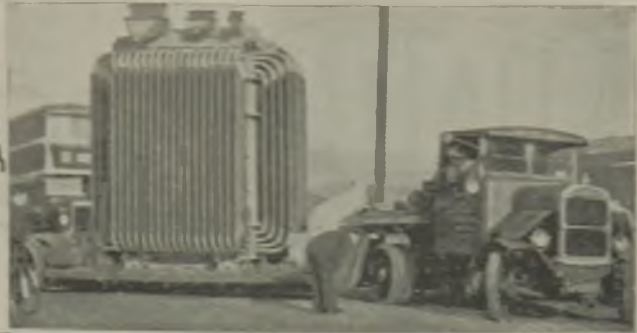
TELEGRAMS
Westoleico-Pus
London

WESTOOL
SOLENOIDS

POWER — PERFORMANCE

YOUR LINK

WESTOOL LTD. PUTNEY LONDON S.W.13



YORKSHIRE

ELECTRIC TRANSFORMER CO. LTD.

SERVES THE COUNTRY with
Enduring QUALITY

EMPIRE WORKS

Phone 1631-2

DEWSBURY

*You've got to
hand it to
MACROME*



*for tools
that will really
finish the job!*

MACROME LTD., ALCESTER, WARWICKSHIRE

ALSO AT LONDON · GLASGOW · MANCHESTER · LEICESTER · LEEDS
COVENTRY · BRISTOL · NEWCASTLE-ON-TYNE · BASINGSTOKE · BIRMINGHAM



ROLLED THREAD SCREWS



*Delivery
from Stock*

BRASS and STEEL

Countersunk Head
Round Head
Cheese Head

B.A. Sizes 0-10
Whitworth $\frac{1}{8}$ "-1"



DAVIS & TIMMINS LTD

Head Office: BILLET ROAD · WALTHAMSTOW · LONDON · E.17

Telephone: Larkwood 2144 and 4461

Small Turned
Parts and Inserts
made to order



"V" DRIVES

Prompt delivery
of all sizes of "V"
Belts and Pulleys

STEPHENS BELTING CO. LTD.

"V" DEPT.
SNOW HILL
BIRMINGHAM

**EARTHING CLIPS
WITH SPECIAL
BITE AND GRIP
INTO TUBE OR
ARMOURING**



Note the tongue which ensures perfect and permanent contact. Easy to fix. Nuts cannot turn. All sizes from half to two inches

THE DONOVAN ELECTRICAL CO. LTD.
BIRMINGHAM 9

Electrical Manufacturers and Stockholders

TESTOSCOPE



Indispensable to Radio Service Engineers. Makes 20 tests. Interesting Booklet on request. From all wholesalers or direct. SEND FOR LEAFLET Q4.

RUNBAKEN · MANCHESTER · I



FLOATLESS LIQUID LEVEL CONTROL SYSTEM

"LECTRALEVEL"

- For PUMPS, VALVES, SIGNALLING, RECORDING
- For DRAINAGE SUMPS, STORAGE TANKS Etc.

Ask for leaflet 94/ER

LONDEX · LTD

MANUFACTURERS OF RELAYS

207 ANERLEY ROAD · LONDON · S.E. 20



FOR LACING SWITCHBOARD CABLES

*Barbour's
flax lacing
Thread*

also **BINDING LINEN THREAD**
No. 30. 3 cord Beeswaxed to P.O.
Specification, on 2-oz. cops.

WM. BARBOUR & SONS LTD. . LISBURN . N. IRELAND

A 'head' of progress!

MINERVA ELECTRICAL INSULATING VARNISHES



Stoving Varnishes, Black or Clear. Air Drying Varnishes, Black or Clear. Cable Lacquers, non-flam, etc. Sleeving Varnishes. Cloth Varnishes. Core Plate Varnishes. Copper Wire Enamels

Why not submit your problems to us, there's no obligation.

Pinchin, Johnson

WITLEY COURT, WITLEY, SURREY, and 6, ARLINGTON STREET, LONDON, S.W.1

Wormley 280-4

Regent 0881



BIBLIOTEKA
POLITECHNIKI
GLASKIEJ

THIS remarkable device splits up light into its component wavelengths and measures the amount of energy radiated at each wavelength. The use of a double monochromator and delicate galvanometers and valve amplifiers enables analyses to be made with precision.

The Spectro-radiometer is used, with many other scientific instruments, in the BTH Laboratories, in a constant endeavour to maintain and improve the quality of the famous Mazda Lamp.

BTH RESEARCH AIDS INDUSTRY

BTH Research Laboratories have made an intensive study of both the physical and psychological aspects of lighting in war-time industry, and their knowledge and experience are at the disposal of the principals of industrial undertakings through the Lighting Advisory Service.

MAZDA
LAMPS

LIGHTING ADVISORY SERVICE

