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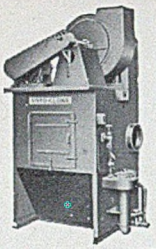

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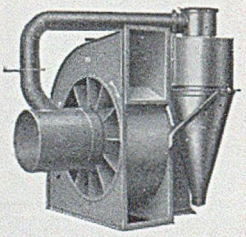

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TYPE "W"

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OF FOUNDRY SPECIALITIES

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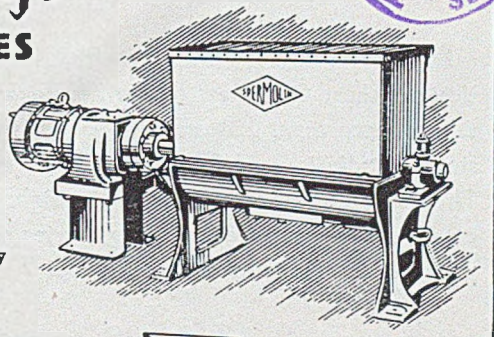
The cores shown above are used in the casting of 12 ton planing machine beds. A good green bond and dry strength are required for this type of core and it is essential that no distortion takes place. This modern foundry employs similar cores for all types of castings, from 5 to 20 tons and these are made entirely with SPERMOLIN Core Oils and Binders. The cores break down easily when castings reach the fettling shop, thereby saving time and labour costs.



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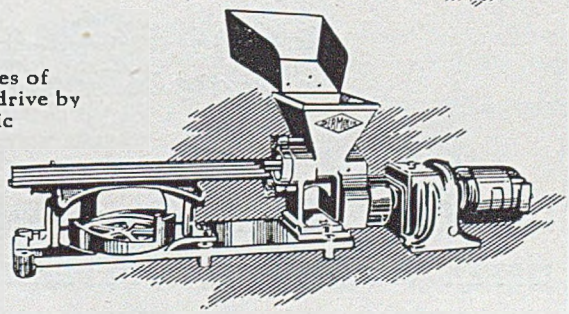
The SPERMOLIN Major thoroughly mixes batches of sand and oil in 4 minutes. Supplied with direct drive by 5 H.P. motor or belt drive and provides automatic discharge. Machine stops when safety grid is open.

ROTARY CORE MACHINES

This SPERMOLIN Rotary Core Maker is simple, efficient and economical in operation and offers a wider scope than any similar machine.



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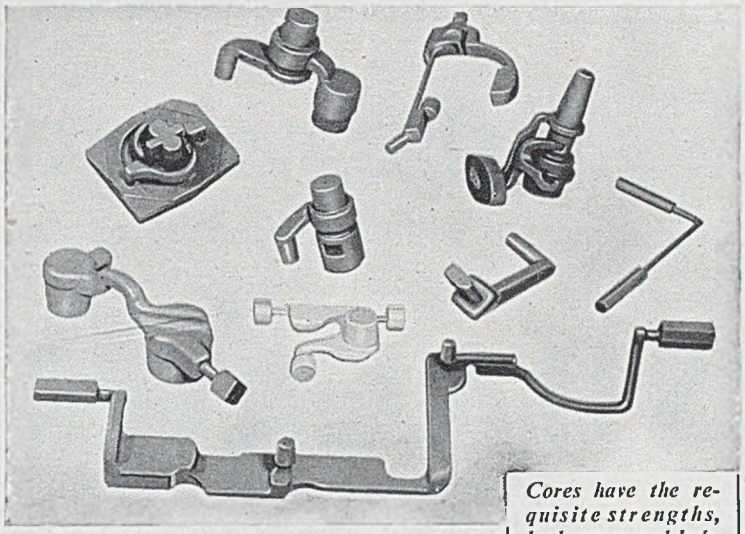
A

THE CORE-MIX IS AS GOOD AS ITS BOND



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Cores have the requisite strengths, both green und baked, when the sand is bonded with Glyso, mixed in the Fordath 'New Type' Mixer.

GLYSO Core Bonding Compounds

A RANGE TO MEET EVERY NEED

High green bond, free flowing mix with high baked strength, quick drying without stoving—what are the requirements? The GLYSO range of Core Bonding Compounds provides every characteristic specified in the core-shop. Famed for their substantial contribution to core-making technology, GLYSO binders are widely used in foundries near and far.

Semi-Solid Compounds give a high green bond covering a wide range of sand characteristics.

Creams combine a lower green bond and free-flowing mix with high baked strength; unsurpassed for core-blowing mixtures.

Dark Compounds provide a lower priced range giving excellent results for general work.

Permol Core Oils are in seven grades, selection being governed by relating dried strength requirements to binder cost. Permol bonded cores have good knock-out after casting.

Glyso XL Core Powder, a pure film-dried cereal, produces high green strength in the mix and is best used with Permol Core Oil.

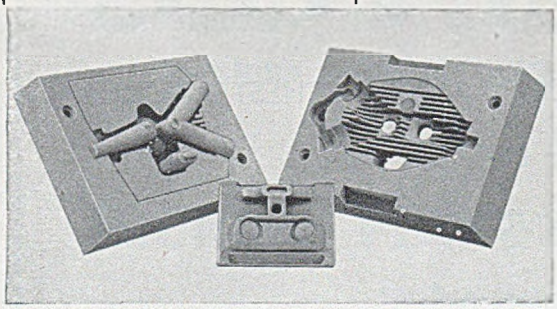
Glyso — Exol Core Powders, a range of cereal powders impregnated with core oil in accurate quantities for different classes of core work.

Glyso Airbond, quick drying without stoving, or stove-dried in half the usual time.

Glyso Resyns. A range of synthetic resin binders for quicker drying of cores by short-period stoving, or by dielectric heating. Excellent knock-out. Enquire also about Glyso Spray Oils, Fordavol, Fordath Parting Powder, Fordath Moulding Sand Regenerator and Fordath Paint Powders.

Make certain that the right binder is used for every job in the shop.

Intricacy and accuracy with Glyso in the sand mix for this mould and core assembly.



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GLYCO CORE BINDERS GLYSO

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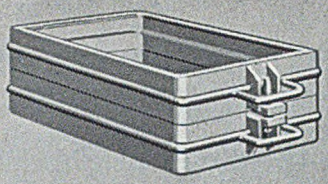
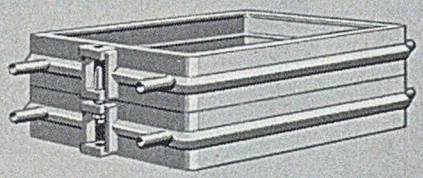
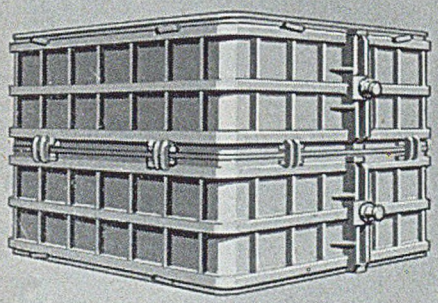


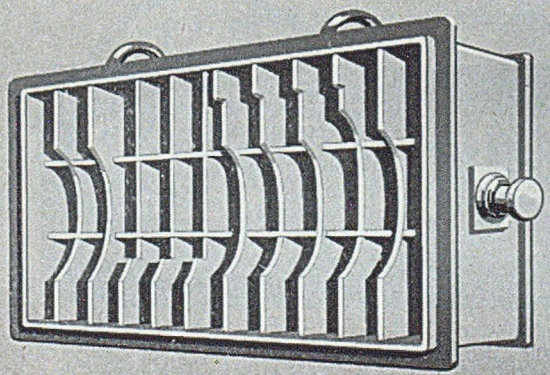
LIGHT WORK - 1 MAN LIFT



MEDIUM WORK - 2 MEN LIFT



MEDIUM WORK - CRANE LIFT



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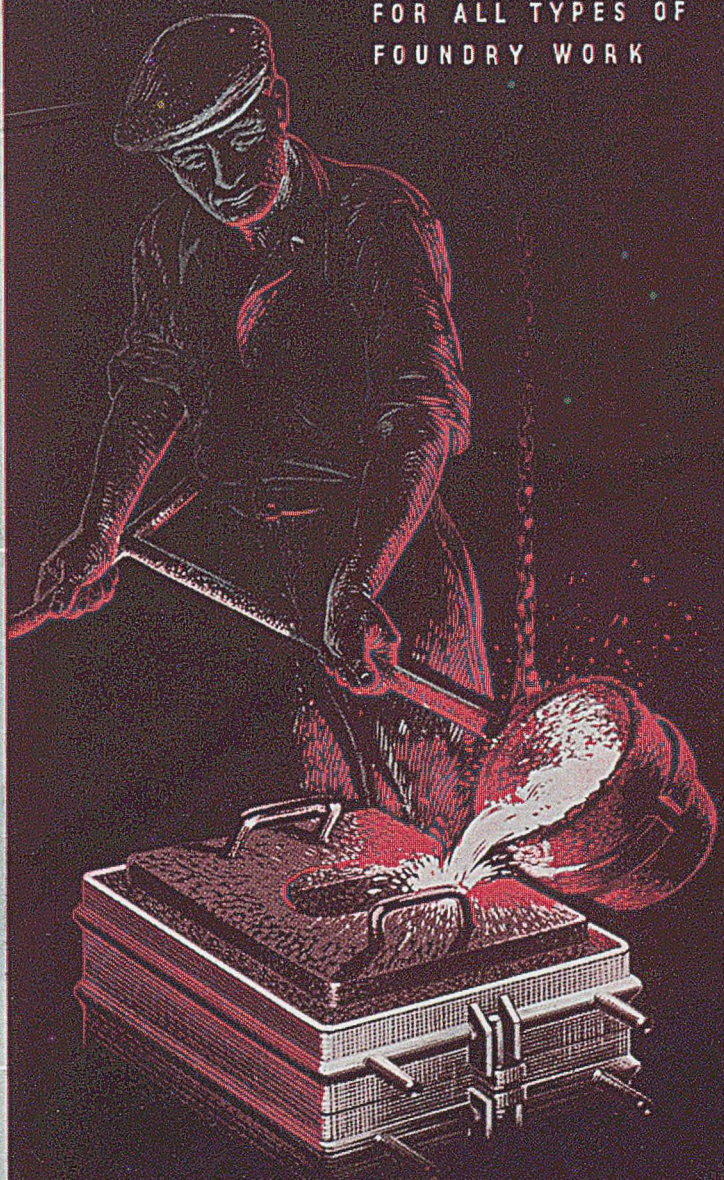

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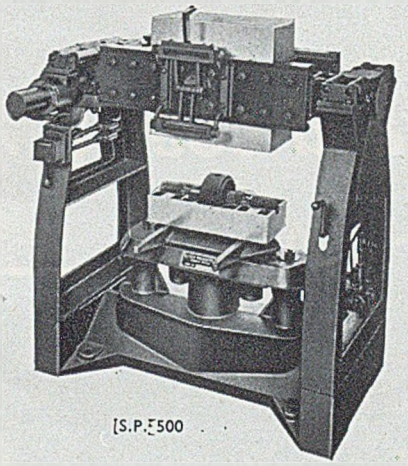
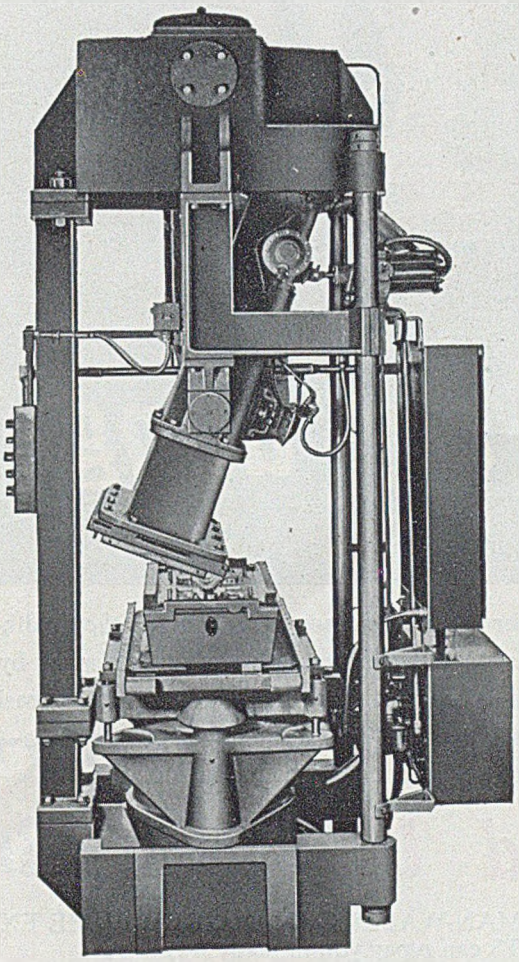
The machines illustrated are of the very highest efficiency, and when combined to form an automatic core making installation, produce outstanding results.



S.P. 500

The SP.500 Automatic Double Rollover core draw machine—Automatic operation, automatic self-centring device, uniform draw for improved quality, increased output, variable speed, right or left hand operation.



S.P. 220

The SP.220 Vertical Coreblower incorporates push button control "tilt-to-fill" sand chamber, unobstructed access to both ends of corebox, squeeze piston giving counterpressure during blowing, overhead dome air reservoir. These features ensure increased output, higher quality, easier operation. This machine has been designed to eliminate the high cost of maintenance normally experienced with coreblowers.

Patents applied for in all Industrial Countries.

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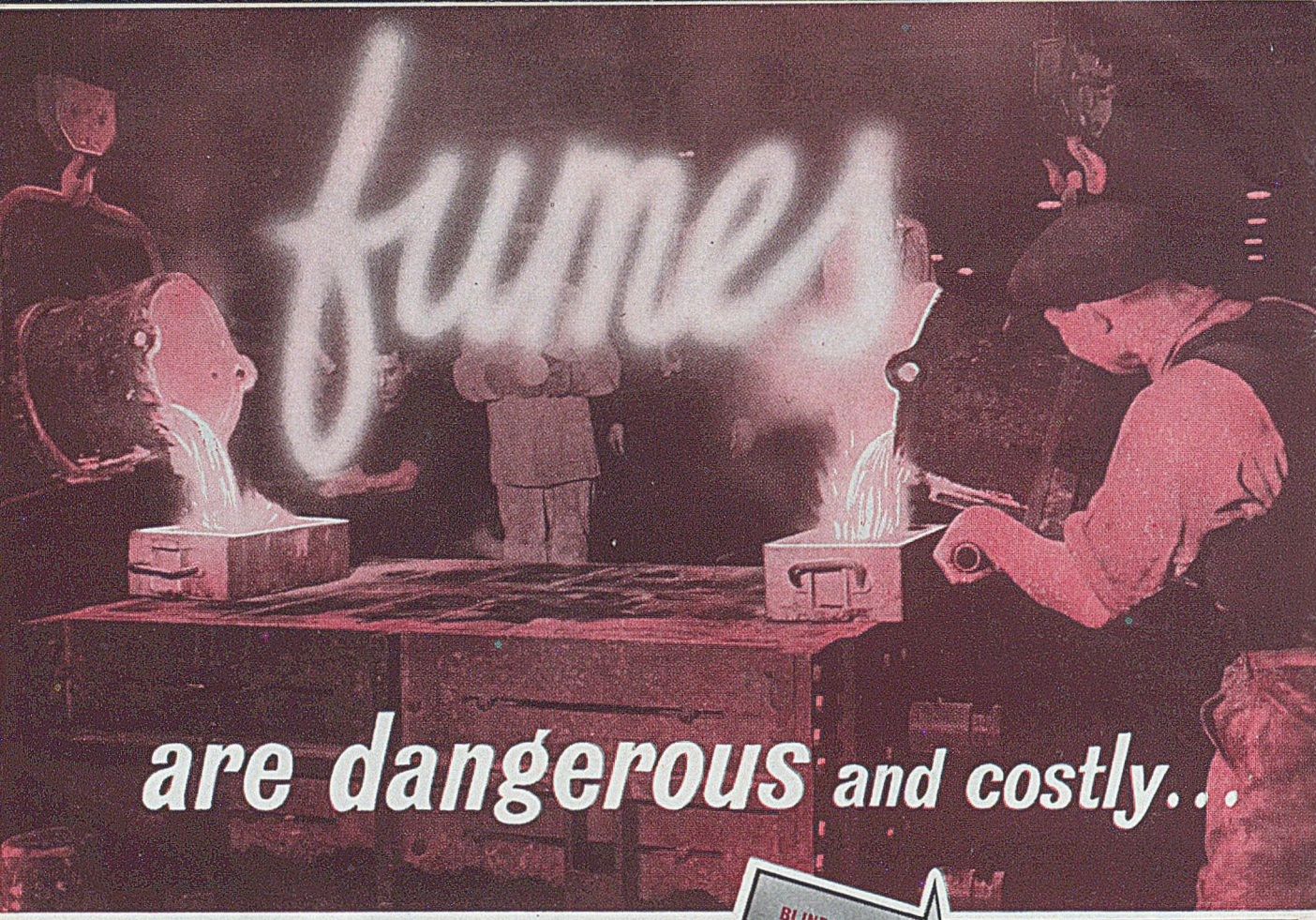

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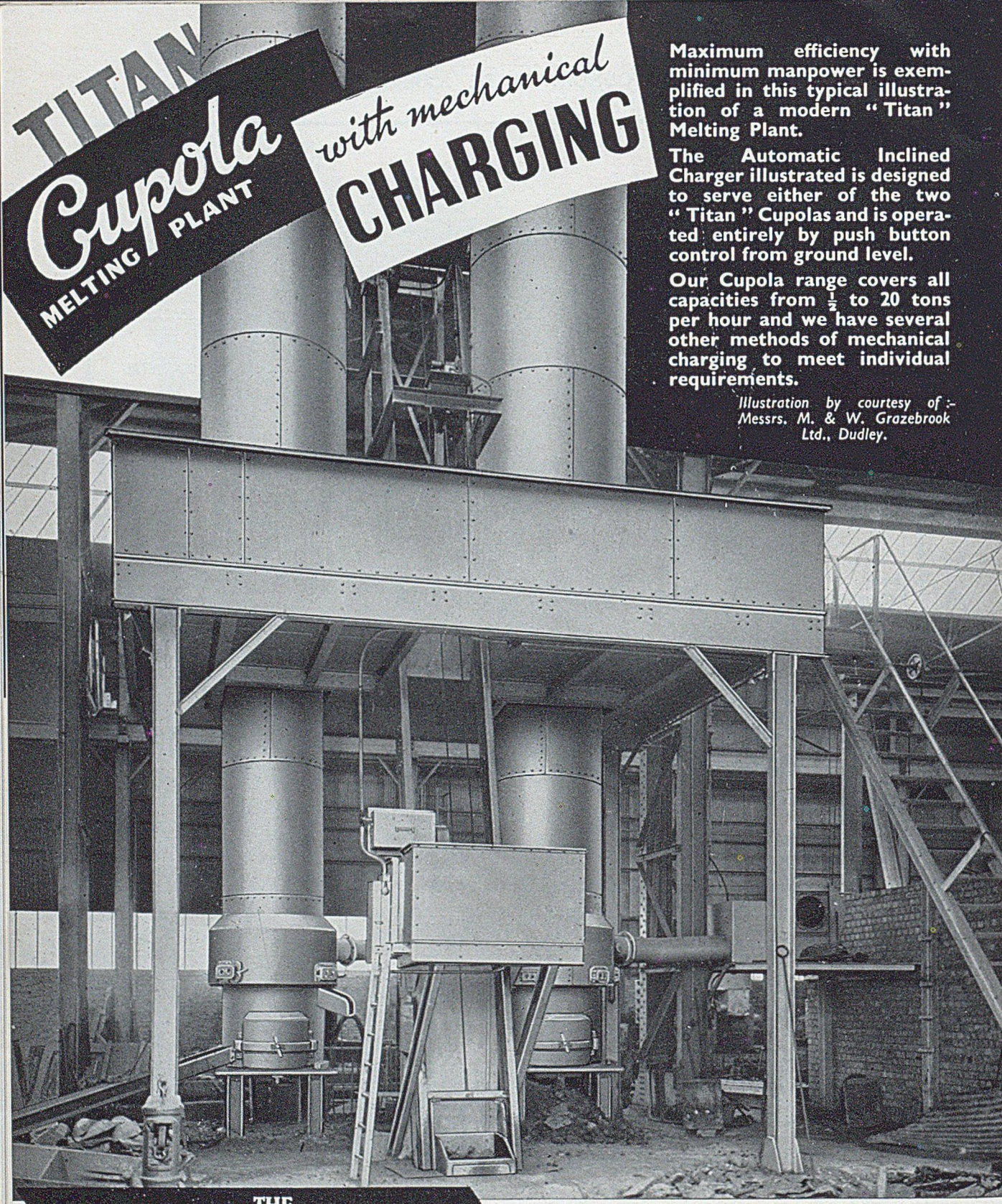
TITAN Cupola MELTING PLANT with mechanical CHARGING



Maximum efficiency with minimum manpower is exemplified in this typical illustration of a modern "Titan" Melting Plant.

The Automatic Inclined Charger illustrated is designed to serve either of the two "Titan" Cupolas and is operated entirely by push button control from ground level.

Our Cupola range covers all capacities from ½ to 20 tons per hour and we have several other methods of mechanical charging to meet individual requirements.

Illustration by courtesy of :- Messrs. M. & W. Grazebrook Ltd., Dudley.

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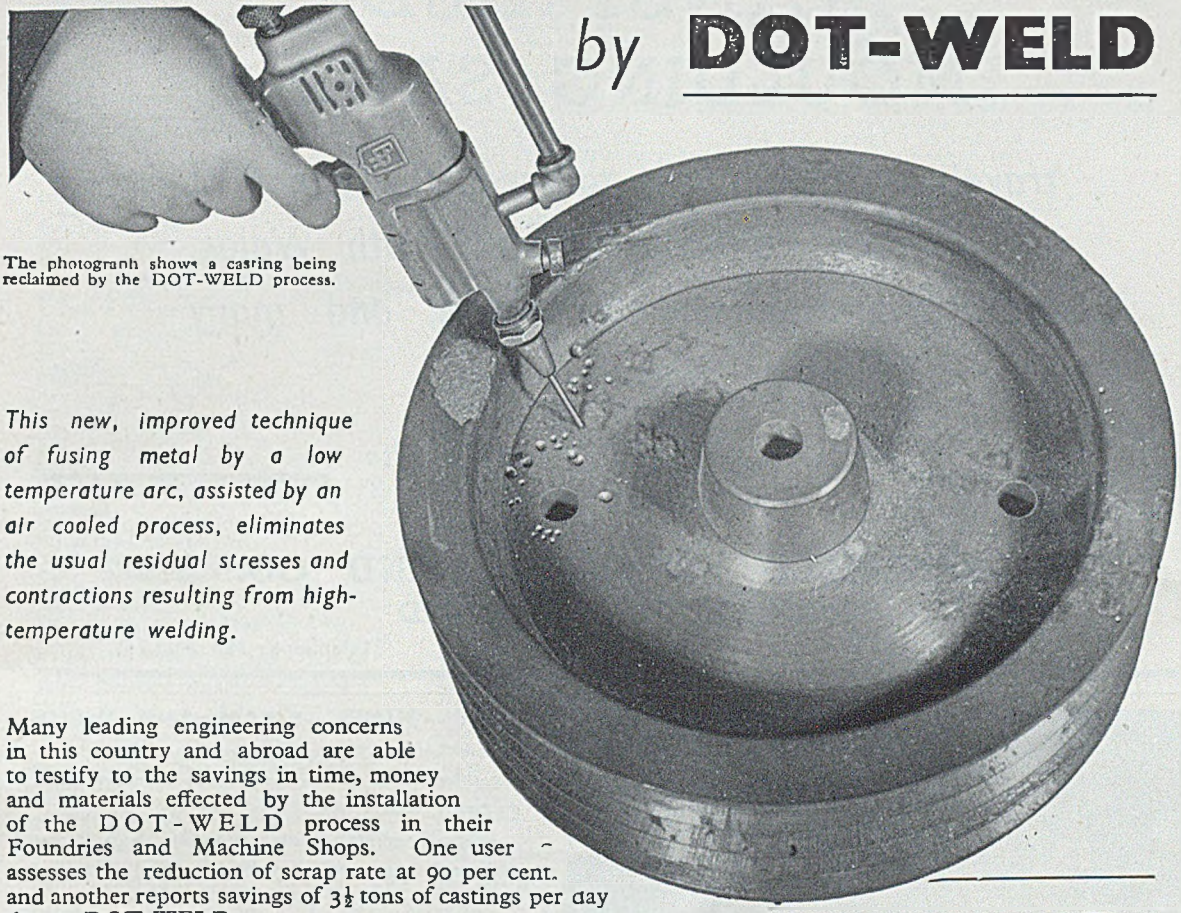
RECLAIM your defective castings by DOT-WELD



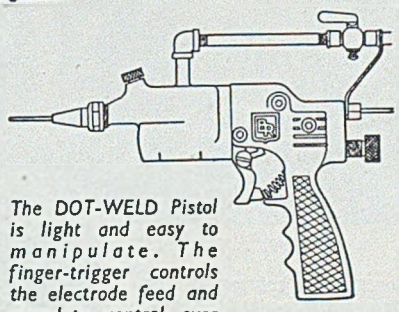
The photograph shows a casting being reclaimed by the DOT-WELD process.

This new, improved technique of fusing metal by a low temperature arc, assisted by an air cooled process, eliminates the usual residual stresses and contractions resulting from high-temperature welding.

Many leading engineering concerns in this country and abroad are able to testify to the savings in time, money and materials effected by the installation of the DOT-WELD process in their Foundries and Machine Shops. One user assesses the reduction of scrap rate at 90 per cent. and another reports savings of 3½ tons of castings per day due to DOT-WELD.

Holes, hair-lines and other surface faults are filled in without any burning or oxidation by this process and the parent body is not subject to the risk of distortion, cracking, or the formation of hard spots. The surface of the weld can be finished off where necessary by filing, grinding or machining on a light cut.

DOT-WELD can be applied to castings of Steel, Malleable Iron, Grey Iron, Aluminium (Sand and Die Castings) and Bronze. It does not require a skilled operator, is extremely mobile and costs very little to maintain. It offers to Foundries and allied trades an economical method of reclaiming castings and retrieving the high cost of machining, thereby reducing costs and increasing output.



The DOT-WELD Pistol is light and easy to manipulate. The finger-trigger controls the electrode feed and complete control over the air-supply is ensured by use of a needle valve screw on the gun itself. The complete equipment includes the DOT-WELD Pistol, the quench-arc machine encased in a trolley-cabinet, pneumatic peening hammer, earth clamp, goggles, files, etc.

Demonstration of the DOT-WELD process can be arranged in your own works. Write to-day for further particulars to

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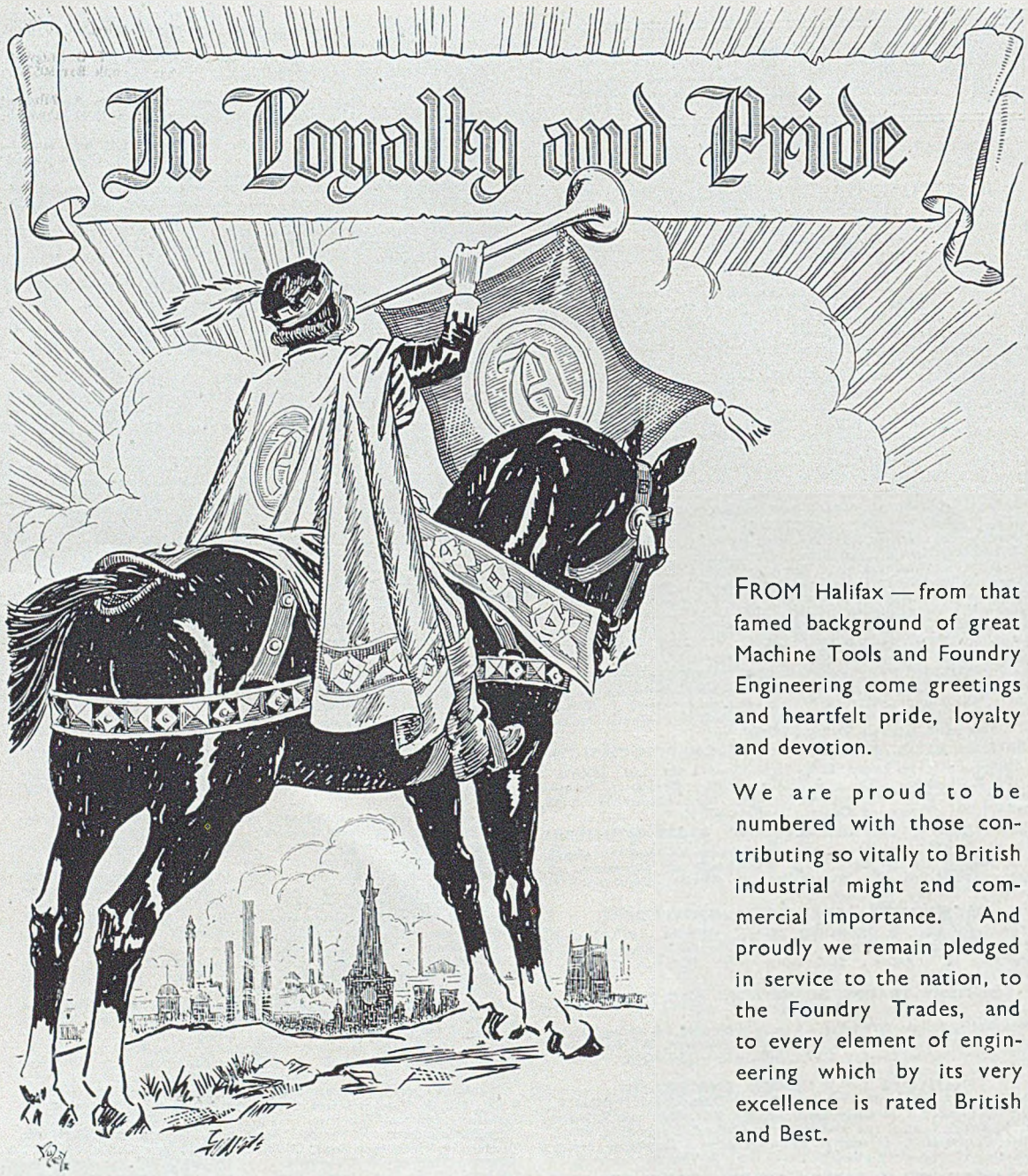

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Iron and Steel Board

With the announcement of the names of eminent people who are to form the Iron and Steel Board, many of the earlier anxieties felt by the majority of the ferrous foundry industry will be dissipated. The chairman, Sir Archibald Forbes, through his previous activities in a somewhat similar capacity, is both well respected and trusted by all iron and steel interests. With him as permanent officials are Sir Lincoln Evans and Mr. R. Shone. The former ranks amongst the most brilliant and soundest of trade union leaders. As secretary of the Iron and Steel Trades Confederation, he visited Russia and wrote an exceedingly interesting and erudite account of the metallurgical industries of that country. Mr. Shone comes from the British Iron and Steel Federation and is well informed and an exceedingly enthusiastic protagonist of the industries he so cleverly represents.

The foundry side of the Board is represented by Mr. James Shaw, the chairman of Allied Ironfounders, Limited, and Sir Percy Lister, of R. A. Lister & Company, Limited, Dursley. Both these gentlemen have spent a lifetime in the service of ironfounding, the former in the sphere of builders' castings and the latter in the field of light-engine and dairy-machinery work. Both are large users of pig-iron, scrap and steel sheets. We regard it a real misfortune that Mr. Beard, the secretary of the United Patternmakers' Association, finds himself unable to serve, as his knowledge of the foundry industry is both wide and thorough. Steel founders have an expert on the Board through the appointment of Sir Andrew McCance, who has always taken a profound interest in the affairs of the Clyde Alloy Steel Company, Limited, and in him his colleagues in this section of the industry have well-placed trust.

As matters are at the moment, there does not seem very much for the Board to do for the foundry industry. Controls, virtually, have been lifted. One factor, however, which is exercising the minds of both ironmasters and foundry owners is the high price of fuel. If representations on this matter to the appropriate bodies come within the Board's terms of reference—which we doubt—it would be an activity deserving the enthusiastic approbation of both the two great industries they are to serve. The new Board is certainly one which does command the respect of the whole of the foundry industry.

Overcoming Isolation

Whilst on holiday in Falmouth, we were accorded excellent opportunities to examine the conditions under which the isolated Cornish foundries not only exist but make progress. Reliance has necessarily to be placed on the technical Press, as personal contact with much of our industry is not easy. Naturally, there are the visits from the representatives of the equipment and supply houses, and we received the impression that their frequency largely depends

Overcoming Isolation

on whether or not founders write to advertisers for catalogues or enlightenment. The type of output includes municipal castings; components for the repair of tankers—involving much pipe work; maintenance work for the very extensive china-clay enterprise and some work for light machine-tools.

From the foundry angle, the works of Holman Bros., Limited, of Camborne, are of major interest, especially for the high quality output. During a visit to the shops, it is truthful to say that we saw not one blemish on the machined surfaces. The firm is a Meehanite licensee and the control instituted thereby is meticulously followed. Experimental work is being undertaken both on shell moulding and exothermic feeding heads. Machine moulding, core-blowing and very efficient sand-handling plant combined with intelligent inspection are all making worthwhile contributions to the high order of the productions from the foundry. The Falmouth Dockyard (Siley Cox, Limited) is a very large enterprise, yet so situated as not to impair the amenities of the town. It employs nearly 3,000 people and handles some 400 ships a year. The foundry has recently changed its control and many improvements have been made. Baths are being erected at strategic positions around the works. Attempts, sometimes but not always successful, have been made to cast large non-ferrous castings from the cupola. Shortly, the melting department is to be enlarged. Unlike Holman's, where Cornish sand is used, reliance is placed in the dockyard foundry on Royer-prepared Erith sand and the castings have a good surface and machine up nicely.

At the Charlestown Engineering Company, Limited, where castings for the clay mines are made, good use is made of the Sandslinger for economizing moulders' time, as there is a shortage of skilled men at this foundry. The cupolas are mechanically charged. Both here and at Falmouth some castings are bought from the large centres, but the quality has not always reached expectations and attempts are likely to be made to undertake the jobs in the home works. The foundries visited all evinced real enthusiasm for progress and their isolation should not be mistaken for retrogression. Finally, we wish to thank our chaperones, Mr. Symons of Holman's, Mr. Spargo of Falmouth, and Mr. Broad of Charlestown.

SANDERS & FORSTER, LIMITED, structural engineers of Hertford Road, Barking, announce the appointment of MR. L. PEMBERTON as their chief technical representative.

THE BRITISH STANDARDS INSTITUTION has just published B.S. 885, "Brass tubes for general purposes, 70/30 brass, aluminium brass," which replaces the 1940 edition of B.S. 885/6. Copies may be obtained from the sales branch, 24, Victoria Street, London, S.W.1, price 2s. 6d.

New Shell-moulding Machine

Readers, who by now will know the fundamental advantages and drawbacks of the shell-moulding process, will learn with interest that a machine for making "biscuits" has been designed by Mr. A. Wansbrough Jones and is being marketed by Clino Foundry Supplies, Limited, of 25, Clyde Vale, Dartmouth Road, Forest Hill, S.E.23. To ascertain and establish automatically the timing of the plant, a preliminary run is undertaken and thereafter the process is push-button controlled. There are four independent time switches, actuating solenoid-operated pilot air valves, which in turn control the air at both ends of the air cylinders which work the machine. Air at 100 lb. pressure is supplied by a small motor-driven compressor and receiver, or connections can be provided for existing air lines where available.

Operating Cycle

Providing the various time cycles have already been set for the particular patternplate in use, the master time-switch will take over the operation for making a single shell mould. The general process of operation is as follows:—

(1) The patternplate (size 16 by 28 in. max.) is loaded. This plate is mounted on two dowelled studs, and clamped with two hexagon nuts.

(2) The heating hood swings over the patternplate and applies infra-red heat for a predetermined period.

(3) The hood swings back and the patternplate is reversed ready to meet the dump box containing the sand/resin mixture.

(4) The dump box rises to meet the patternplate.

(5) The dump box and patternplate are turned completely over to enable the sand/resin mixture to invest the pattern. After a set period, this movement is reversed to allow surplus mixture to fall back in the box, which is then lowered away from the plate. The pattern and its investment then turns over to its original position and the heater hood swings over it for the final cure. After a set time, the hood returns to its stand.

(6) The dump box is lifted up to the ejector plate, which engages with the ejector pins and so raises the shell mould approximately 2 in. and holds it off the plate for any predetermined time, during which the shell is removed by the operator. The dump box is then lowered again. At this stage, the machine is ready to commence another cycle of operations, and the starting button can be pressed.

The time of a complete cycle—which is the time taken to make a shell mould—varies with different patternplates and according to the thickness of mould required. It naturally takes longer to cure a thick mould than a thin one, but an average cycle might be taken as 2½ to 3 min. The actual operational time would be not more than 30 secs., plus, of course, the varying investment and curing times.

I.B.F. Golfing Society

Mr. P. B. Higgins, member of the West Riding branch of the Institute of British Foundrymen, has presented to the Institute a very handsome Coronation Challenge Shield to be competed for annually at the I.B.F. Golfing Society meetings. The committee have gratefully accepted this generous gift.

Teams of three from each branch are to be nominated on the eve of each Golf Meeting and the branch team winning it will hold it for one year. This year's meeting will be held at Woodhall Spa on Saturday and Sunday, September 26 and 27. Entry forms will be issued shortly by the hon. secretary, Mr. F. Arnold Wilson.

Runners and Risers

*By E. Daybell, P. A. Russell, and R. W. Ruddle, M.A.**

At this symposium organized by the London branch of the Institute of British Foundrymen the three chief speakers representing steel, iron and non-ferrous founders outlined trends in running and risering practice in their particular branch of foundry technology. Then, in general discussion, points of similarity and difference between the systems were brought out, in an attempt to apply more widely experience gained in the localized spheres, to agree on the solution to common problems and to assess divergent practices as particular functions of the metal and mould being dealt with. In this way it was found possible to isolate the requirements of running and feeding into means taken to deal with (a) liquid and (b) solid contraction, (c) solidification and (d) mould-material characteristics for the metals being poured. The common factors arising appeared to be prevention of heat loss from riser metal; emphasis always on proper directional solidification (by re-designing the mould if necessary); employment of scientifically designed and pattern-made running systems instead of leaving such matters to the moulder, and agreement that much more fundamental research on metal-flow characteristics is necessary.

Runners and Risers for Steel Castings

By E. Daybell

There are so many interesting and complex problems which arise when designing gating and feeding systems for steel castings, that in this short Paper it is necessary to restrict the subject to modern techniques used in the production of quality castings by machine-moulding methods. The words "Gating and Feeding" are used because these are the terms generally used in steel practice, the emphasis being on the feeding, which is the primary function of a riser as opposed to flow-offs and run-throughs. Fig. 1 shows the terms to be used in the runner system, in order that there shall be no confusion.

Objects of Feeding and Gating

Objects of feeding and gating systems are listed in four categories, not necessarily in order of preference:—

(1) To ensure sound, clean castings to correct limits and tolerances.

(2) To achieve and maintain a consistently-high standard of product throughout the order, using a minimum amount of excess metal for feeding purposes, etc.

(3) To reduce to a minimum the operations of chipping, "burning" grinding, shaping, etc.

(4) To produce castings under the most congenial conditions by reducing or eliminating the less-attractive operations wherever possible, with particular reference to the fettling department. If successful, this objective must influence:—(*a*) the quality of the finished products; (*b*) the acceleration of work flow through the shop and (*c*) the reduction of costs, all which lead to (*d*) maintaining the good name of the steelfounding industry and attracting good-quality recruits into it by assisting management to maintain good working conditions and general efficiency.

It is necessary constantly to remind moulding machine operators, that although the runner is probably the smallest part in size on the pattern board, in many cases, all the metal for both casting and heads passes through the aperture it produces in the mould, and therefore, when adding facing sand and building up a mould structure, it is one of the most important parts on which to concentrate attention.

Top Gating or Bottom Gating

Each system has its own advantages and disadvantages, and just as each individual casting has its own peculiar problems, so must the decision to top- or bottom-gate be made with regard to *all* the other practical problems involved. An example of top-gating is shown in Fig. 2. Whereas the top gate may be ideal to promote the correct heat gradient and produce directional solidification, it may also produce turbulence, scouring and scabbing, which result in the casting being scrapped for gas holes and sand inclusions. For these reasons, coupled with the modern trend to extend the use of synthetically-bonded moulding sands cast in a

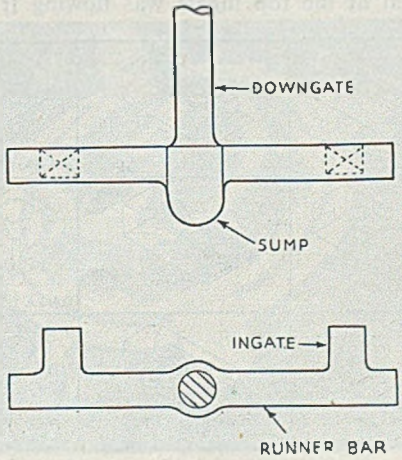


FIG. 1.—*Nomenclature of a Typical Running System for Steel Casting.*

* The Authors are, respectively, associated with K. & L. (Steelfounders and Engineers), Limited; S. Russell & Sons, Limited; and British Non-Ferrous Metals Research Association.

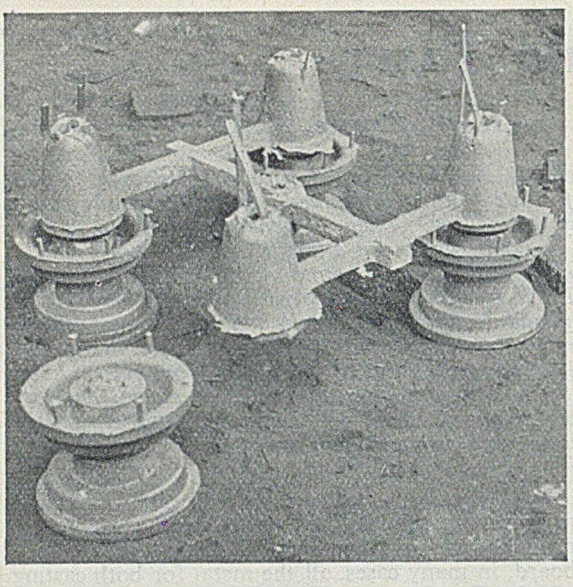


FIG. 2.—*Example of a Running System employing Top Gating Practice.*

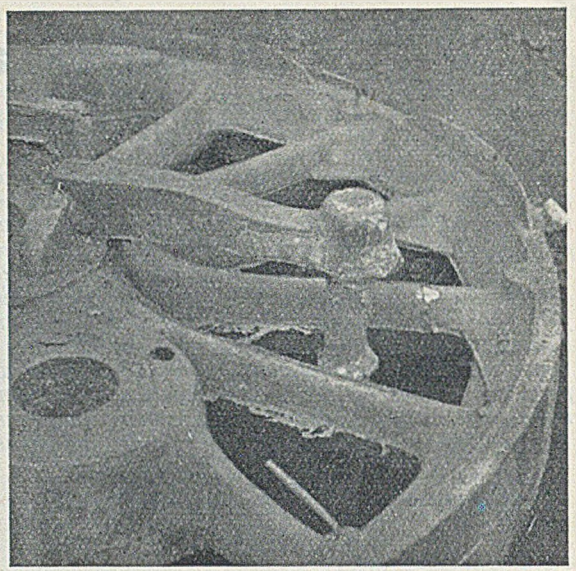


FIG. 3.—*Example of Bottom Gating employed on a Steel Driving-wheel Casting.*

"green" state, the bottom gate, which enables the metal to roll into the mould with a minimum amount of turbulence is more suitable in the majority of cases (Fig. 3). It is germane to note that temperature differences caused by unequal sections in the casting design itself, are often considerably greater and more dangerous than the unavoidable temperature gradients and differences caused by the runner system. In spite of these considerations, however, top gates are successfully used on certain types of castings. Step gating, which is a compromise between the two, may be resorted to, but only after much careful thought. It has to be remembered that once a stream of metal has commenced to run along a certain channel it will continue to do so until it is definitely checked, and instances have been found with step gates where the metal at the top ingate was flowing from the casting towards the downgate instead of *vice versa*. There are other practical ways of reaching a compromise, such as pouring by bottom gate until the metal is just entering the heads, then pouring directly into each head in turn, or pouring the heads short and applying exothermic powder to raise the temperature of the metal in them. This latter expedient is dealt with later. Fig. 4 demonstrates the importance of proportion in design of a gating system and is an example of finger gating. The ratios of the cross-sectional area of the downgate or sprue to the ingates or fingers are shown as 1 to 2, 1 to 1, and 1 to ½; it is the 1 to 1 ratio which gives the best results.

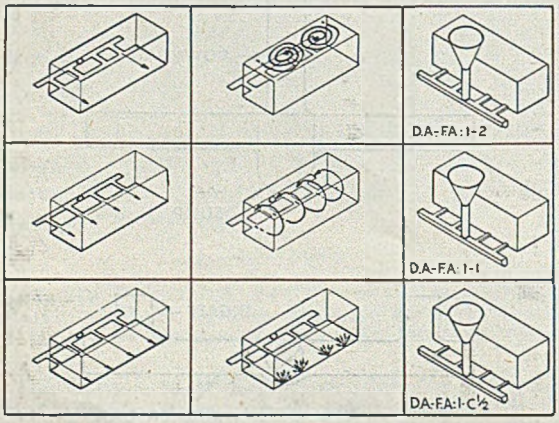


FIG. 4.—*Sketches showing the Application of Finger-gating Area Ratios and Flow Patterns induced.*

Typical Methods

It will be apparent that there are no hard and fast rules which one can apply to the design of runners and risers which apply to all metals or even to any one metal under all circumstances. Thus it is advisable to examine a few practical running methods which are in daily use. Fig. 5 shows the application of the pencil-type gate which is effective in helping to produce directional solidification,

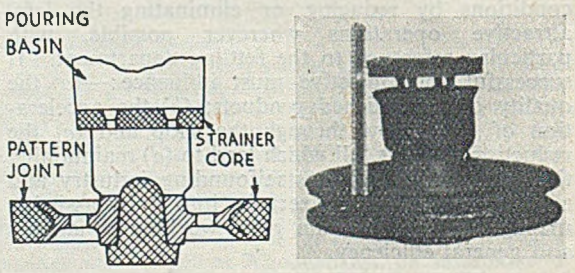


FIG. 5.—*Layout Drawing and Actual Casting made by the use of Pencil-type Gates.*

providing the casting is not too big and the metal does not have to drop too far.

Fig. 6 shows examples of top-gating into atmospheric "heads" with Washburn cores; Fig. 7, a further example, showing a bottom runner with top ingates which is becoming popular both in America and in this country; whilst in Fig. 8 a bottom ring runner which distributes the heat around the circumference of the casting is shown.

Heading or Risering

Feeding heads are designed to take care of reduction in volume as the steel changes from liquid to solid. Liquid metal must be supplied to the solidifying casting to compensate for liquid shrinkage, which, in steel is approximately from 6 to 10 per cent. To determine the size of head required to feed a certain section the Heuver circle method (A) gives a good indication of the largest mass which has to be catered for. This system is shown in Fig. 9. By inscribing a circle at the heaviest section or cross-sections the position and size of such sections is determined. An indication as to the bulk of head required may be obtained from Fig. 9. It is then necessary to position the head in such a manner that there is the shortest possible distance between it and the mass of metal it is designed to feed, whilst bearing in mind two important factors, *viz.*:—ease of removal at the fettling stage, and simplicity of mould design.

There are often alternative positions from which the mass area in the casting can be reached, and a flat face should be chosen in preference to shaped parts, which require for their efficient removal extra washing with the acetylene burner, and extra grinding. With the latter, also, it is much more difficult to decide when the correct shape of the finished product has been obtained, than in the case of heads attached to plain surfaces. On this question of maintaining shapes, the Washburn core, which is dealt with elsewhere, makes a valuable contribution in this direction. It may be, however, that the mass accumulation of the casting cannot be readily reached from the outside, in which case *padding* is resorted to. Padding simply means building up the cross-section to at least the area of the inscribed circle, and preferably in progressively larger areas, until it reaches the head itself. Figs. 10 to 12, taken from Heuvers' Paper, show respectively a crane wheel, a rope drum, and

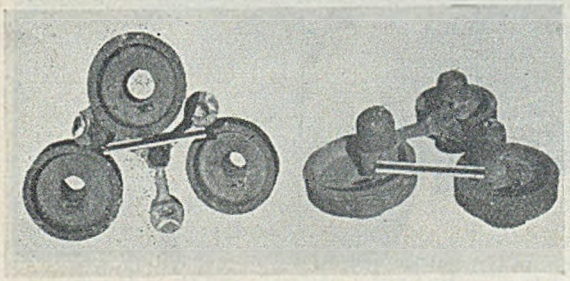


FIG. 6.—*Typical Castings incorporating Top Runners leading into Knock-off Heads.*

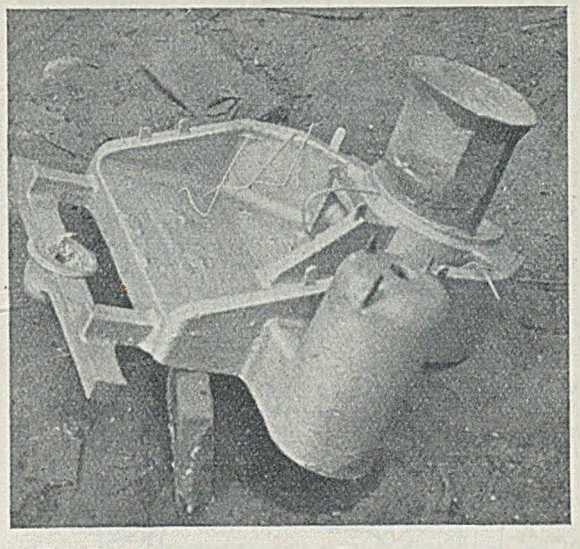


FIG. 7.—*Casting made with Top Ingates from a Bottom Runner Bar.*

the "shoulder effect." "Shoulder effect" means the difficulty found in "pressing" the steel round corners during solidification. The cross-section above the shoulder must be large enough to ensure adequate feeding of the wall section below. Special feeders must be placed above the corner or, alternatively, "padding" from the corner to the central head must be provided. The padding may, by agreement, be incorporated in the design of the casting, or be removed during subsequent cleaning operations.

"Williams" or Atmospheric-pressure Heads

The type of head shown in Fig. 13 is known as the Williams or atmospheric-pressure head and uses a pencil core to form a hot spot and allows the influence of atmospheric pressure to reach the molten metal in the centre of the head after the

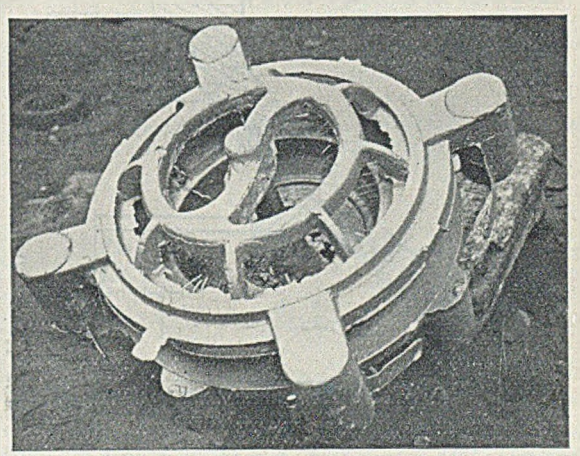


FIG. 8.—*Underside of a Sprocket Casting showing the Ring-type Bottom running Method.*

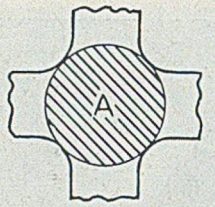


FIG. 9.—*Heuver Circle Method of Computing Head and Neck Sizes. Where A is the area of the Inscribed Circle, B the area of the Neck, in the case of Side Heads, and C, the area of the Head, then ratios are A=1, B=1½, and C=2½ or, A=1, B=2, and C=3.*

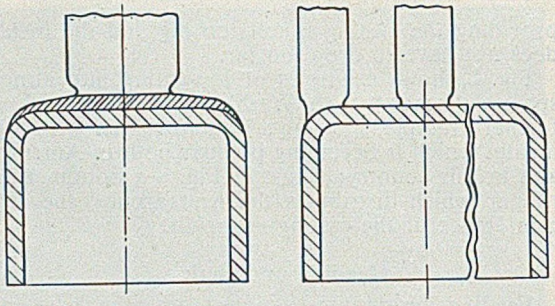


FIG. 12.—*Sketch illustrating the "Shoulder Effect" when designing Feeder Heads.*

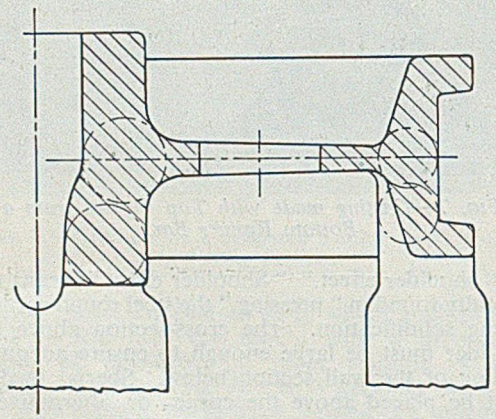


FIG. 10.—*Application of the Heuver-circle Method to a Crane Wheel.*

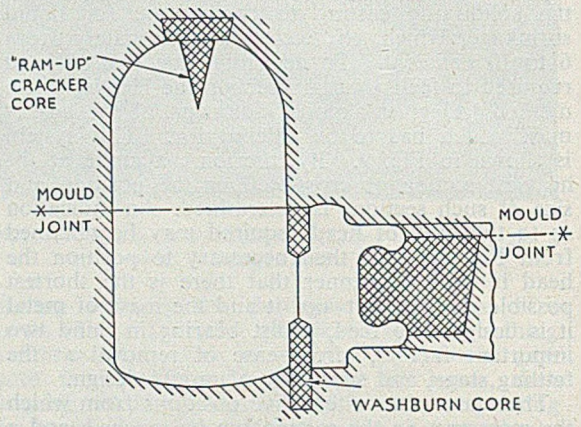


FIG. 13.—*Diagram showing the Application of an Atmospheric Head Feeder.*

initial skin on the rest of the head has frozen. Previous to the introduction of this principle, it was thought necessary to have the head high up, so that the fill-up steel flowed downwards, with the aid of gravity, from the head, into the casting, but the atmospheric head shows that gravity flow is relatively unimportant, and that heads can be placed on the side, or even on the bottom of a casting, often

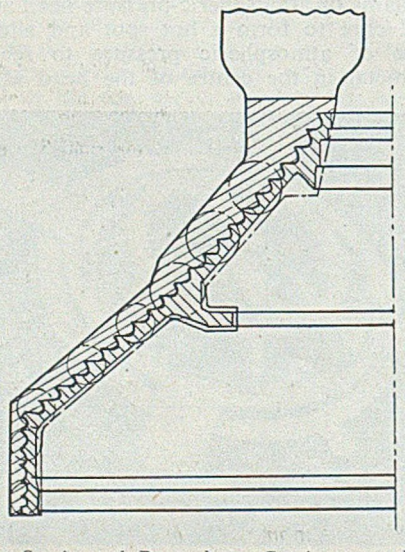


FIG. 11.—*Section of Rope-drum Casting on which the Heuver-circle Method was applied.*

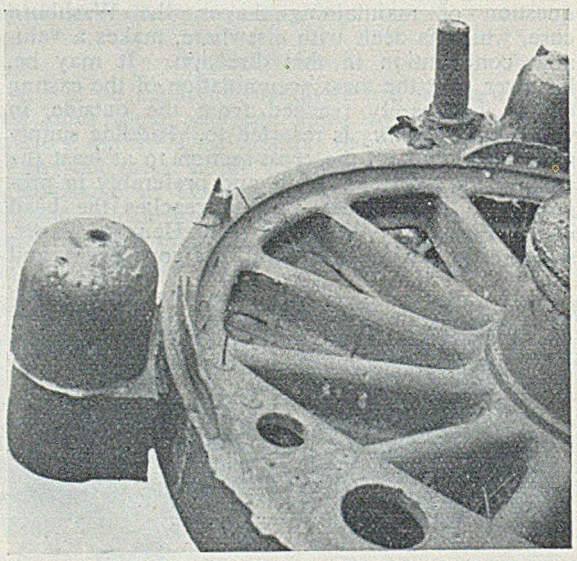


FIG. 14.—*Wheel Casting for which an Atmospheric-pressure or "Williams" Head was employed.*

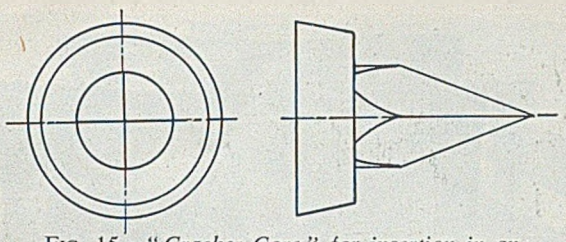


FIG. 15.—*"Cracker Core" for insertion in an "Atmospheric" Head.*

with better results, if sufficiently hot. In other words, the difference in temperature between the head and the casting are much more important than the downward flow, and this was admirably illustrated with a U-tube and water by Mr. Basil Gray in his paper[2] on whirlgate heads. As the whole success, then, of this method of feeding (Fig. 4) depends on the controlled hot spot provided by the pencil core in the head, one can realize how disastrous it could be to the whole mechanism of feeding a casting if uncontrolled hot spots due to design, or any other cause, were to appear in the casting itself during the solidifying period. The only possible result could be unsoundness.

The most reliable design of pencil core personally used is the one at present in use in the Author's foundry and which was developed by Mr. Finch (now with Catton & Company, Limited, of Leeds) when he was a member of the Letchworth foundry staff. This consists of a square-section core, instead of the usual cylindrical type, tapering to a point (Fig. 15), and gives five good chances of breaking through the skin on the atmospheric head to allow the mechanism to function, against the one chance in the usual round core. The five chances referred to are the five sharp corners on the core, which, as is well known, are the best ways of causing the skin to break, and as such have to be guarded against in designing the casting itself.

It is sometimes necessary to use "Williams" heads at different levels, in conjunction with gravity

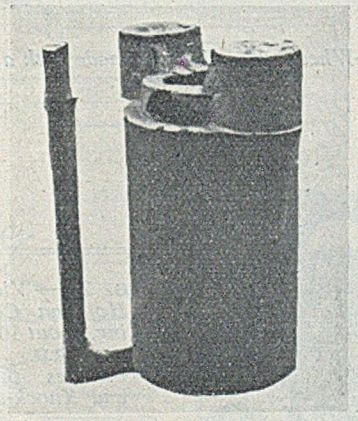


FIG. 16.—*Example of Improved Yield conferred by an Exothermic Head, Cast weight 984 lb.; fettled weight 728 lb.; yield 74 per cent.; yield with normal heads 59 per cent.*

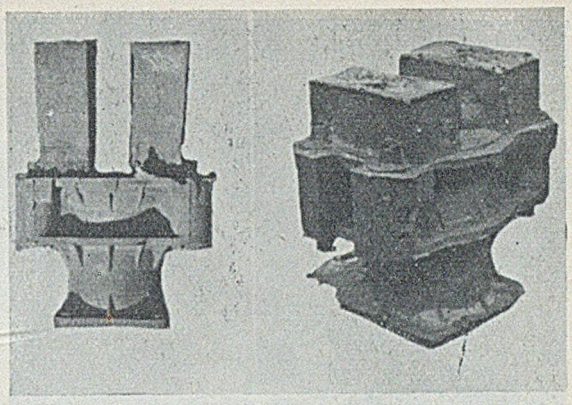


FIG. 17.—*Another Example of Improved Yield from the employment of an Exothermic Head; Cast weight 1,320 lb.; fettled weight 880 lb.; yield 67 per cent.; yield with normal heads 47 per cent.*

heads, and this can be accomplished successfully only if a balanced system of feeding be designed. To do this it is necessary to ensure that the areas fed by atmospheric-pressure heads are isolated by thin sections, or the use of chills, from those fed by gravity or top heads, otherwise the latter will feed through the casting into the former, and unless they are sufficiently large and efficient to feed the casting plus the atmospheric heads, cavities will appear in the casting. There is no doubt that the most im-

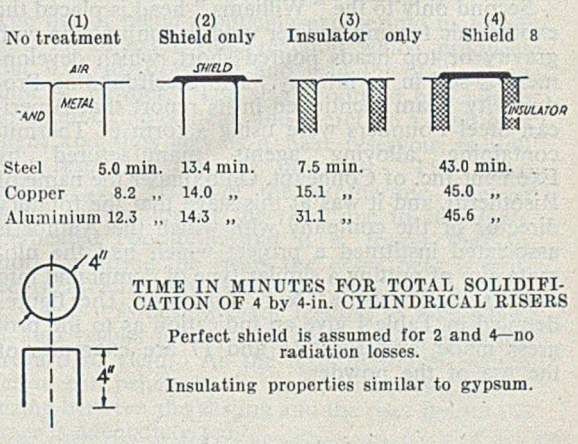


FIG. 18.—*Insulation Characteristics for Various Types of Shielded and Open Feeder Heads.*

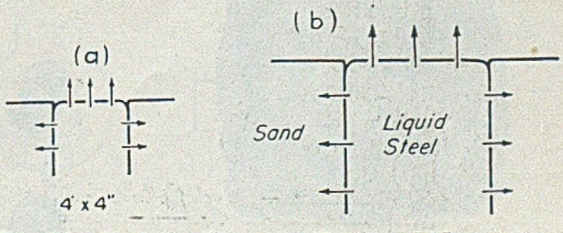
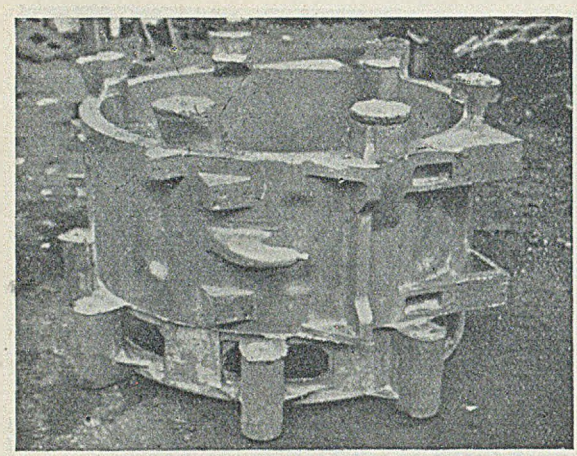
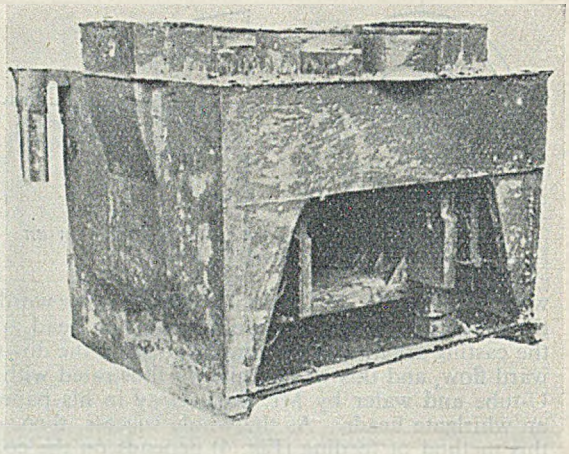


FIG. 19.—*Radiation Losses for Heads of Different Sizes; (a) 4 by 4 in., 50 min., with 42 per cent. Top Loss; (b) 8 by 8 in., 128 min., with 55 per cent. Top Loss.*





FIGS. 20 AND 21.—*Further Examples of Improved Yield through Exothermic Heading Practice.* FIG. 20 (*left*) *C.-P. Job, cast weight* 4,368 *lb., fettled* 3,094 *lb., yield* 70 *per cent.; yield with normal heads* 62 *per cent.* FIG. 21 *Y.-E. Job, cast weight* 8,512 *lb.; fettled* 6,420 *lb.; yield* 75 *per cent.; yield with normal heads* 65 *per cent.*

portant contribution made to steel feeding techniques for the elimination of shrinkage cavities during the last five decades has been the development of the " Williams " head.

Exothermic Feeding Powder

Second only to the " Williams " head is placed the exothermic feeding powder used in conjunction with gravity or top heads poured short, which development is still in its infancy. The Steelfounding Productivity Team mentioned in its report that American Steel Founders were using a form of Thermit, containing alloying agents manufactured by Exoment Inc. of Conneaut, Ohio, under the name of Risotherm, and it was at this stage that the foundry director of the company with which the Author is associated instituted a project which had the ultimate aim of putting a similar type of compound into regular use in the K. & L. foundry. The figures detailed in Table I give an indication as to the progress made, and Figs. 16 and 17 are examples of the use of the powder.

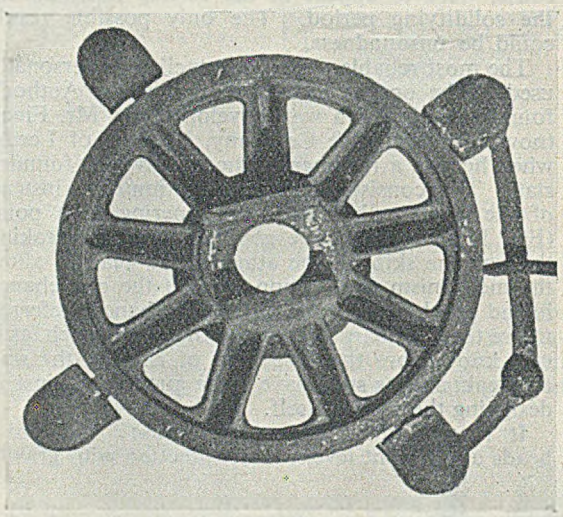


FIG. 22.—*Wheel-centre Casting, made with a Restricted-neck Feeder.*

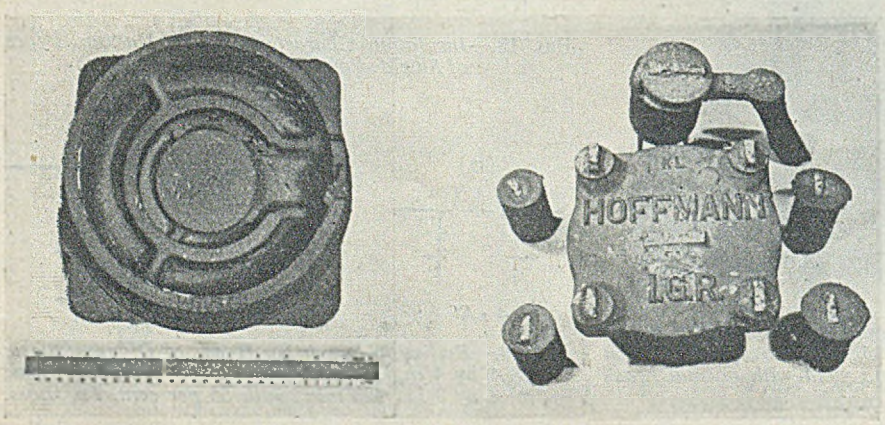


FIG. 23.— *Views of a Hoffman Cover Casting, about* 10 *in. square; the* R.H. *Illustration includes the Runner and Knock-off Heads.*

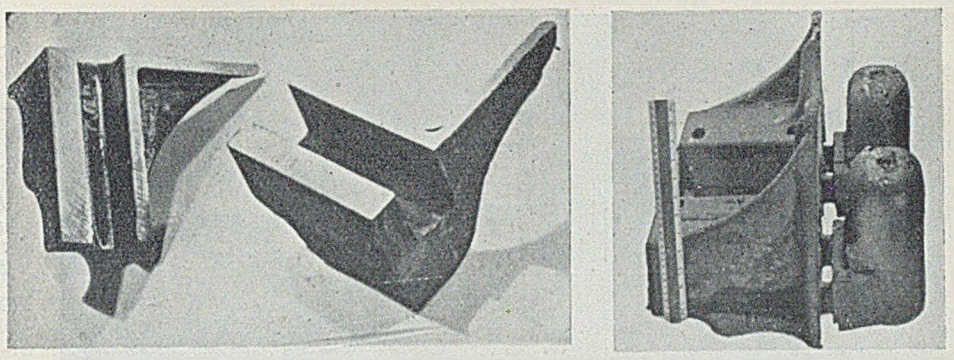


FIG. 24. — (*left*) *L.N.E. Cover Castings As-finished, and* (*right*) *As-cast, with Side Feeders attached.*

TABLE I.—*Economies Secured from the Use of Exothermic Feeding Powder.*

	1950-51.			
No. of castings produced	12,055			
	T.	C.	Q.	LB.
Weight of steel saved	1,543	11	0	19
Weight of powder used	208	16	3	27

Additional monetary gain calculated at £16,092.

	1951-52.			
No. of castings produced	13,575			
	T.	C.	Q.	LB.
Weight of steel saved	1,288	9	3	22
Weight of powder used	204	1	1	23

Additional monetary gain calculated at £13,018.

Research carried out at the Massachusetts Institute of Technology indicated that heat is lost from an open riser by (1) convection, (2) radiation and (3) conduction. Heat leaves the exposed upper surface of a riser by convection in the air, and by radiation, and is transferred to the body of the mould by conduction into the sand. It is further stated that the advantage gained by insulating a steel riser without top shielding is very slight, the freezing time for copper is increased twofold and for aluminium is nearly tripled, when using insulating material with insulating properties similar to those of gypsum. The illustration (Fig. 18) shows calculated increases in solidification times obtained by 4 by 4 in. cylindrical risers, and are sufficient to draw attention to heat losses by radiation, especially at high temperatures. Enlarging upon this, Fig. 19 shows that on a 4 by 4 in. cylindrical riser there is 42 per cent. top loss, and on an 8 by 8 in. riser 55 per cent. top loss when there is no shielding, and following this line of reasoning, large open risers obviously lose practically all their heat through the top unless means are taken to prevent this. It is therefore possible that insulating the sides of the riser could cause more heat to be lost through the top of the riser than otherwise would be the case.

The use of metal-producing exothermic materials results in an exothermic reaction which produces about 0.46 lb. of metal and 0.54 lb. of slag per pound of powder. The slag produced has a high aluminium-oxide content, and therefore a high heat content and thus acts as a heat reservoir as well as an insulating top for the riser. The metal produced as a result of the exothermic reaction remains on the top of the riser due to its highly superheated condition, and it is found that by "short" pouring the risers the extra heat is produced nearer the junction of the riser and the casting, where it is desirable for feeding to take place, and also results in the most economical situation in regard to yield. As the heat produced by the reaction can penetrate the neck, this prevents any freezing between the casting and the riser before the former is adequately fed.

The temperature produced in the riser metal is

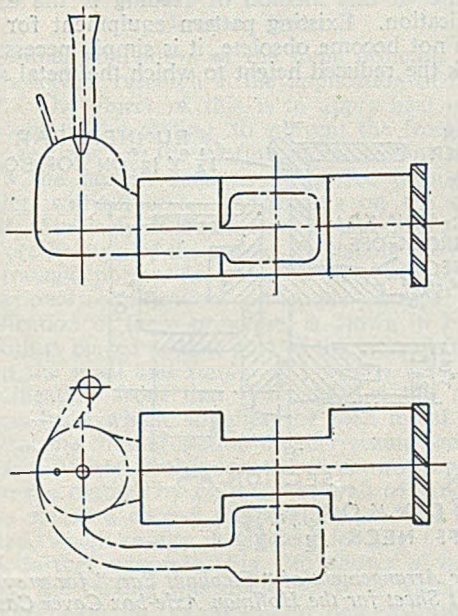


FIG. 25.—*Mould Arrangement incorporating both a Remote Heating Pad and a Chill.*

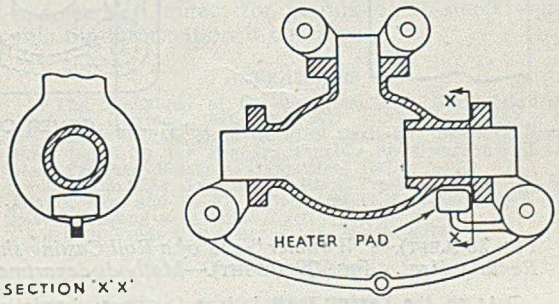


FIG. 26.—*System of Heater Pads arranged for a Steel Valve Casting.*

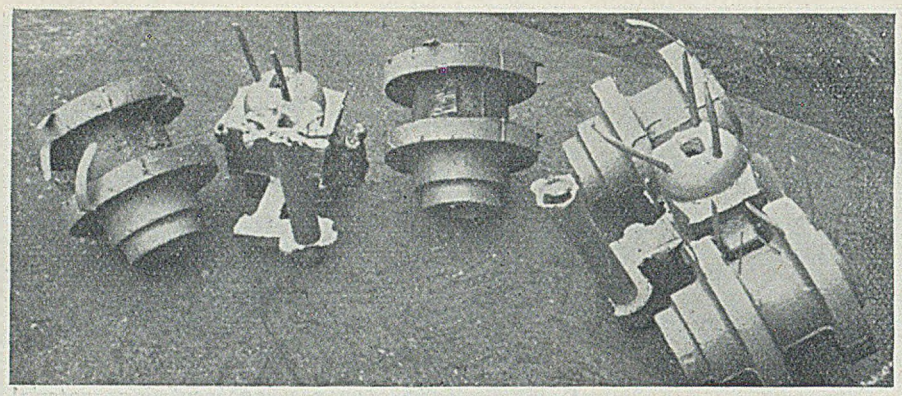
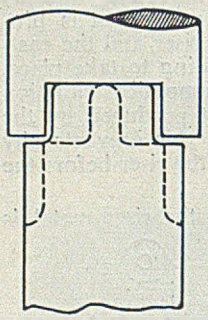


FIG. 27. — *Aveling Hub Castings, separately and with Running and Feeding Systems attached. In this case the Head itself provides Remote Heat.*

very high, so that the feeding area of a given size of riser is more effective than in normal conditions. It is possible to develop a temperature of 2,000 to 2,600 deg. C. by the use of this material, and normal running and risering practice may be followed, provided that the heads are "short" poured as stated. Enough metal should be in the risers to take care of shrinkage, and if risers are taken off at different levels, the "short" pouring must be governed by the risers taken off the highest part of the casting.

The exothermic powder is not added immediately after casting, but after a waiting time based on the fact that a casting having a late feed demand can utilize heat more efficiently at a later stage in the solidification than castings having an early feed demand. Admittedly, there is some loss of heat during the initial flash of the reaction, but a slag cover is quickly produced which acts as a good shield and thereby prevents large heat losses by radiation. Returning to Table I, it should be stated that the additional gain was only achieved by having a high demand for liquid steel in the foundry, and obtaining increased productivity through having moulds available in which to pour the metal saved.

It would, however, be considered a worthwhile proposition if the value of the metal saved only equalled the cost of the powder, because there are numerous other advantages which are not so easy to assess in terms of £ s. d., but are nevertheless apparent. For instance, in many cases it has been possible to reduce the number of box-parts required on the cope side of a mould in accordance with the reduced head-height, saving equipment, sand preparation, transport costs and ramming times. The short head-height also lessens the amount of restriction by them to contraction, saving time in easing after the mould is cast and reducing the incidence of hot-tearing. Crane power which would be utilized in casting about five tons of metal per day into risers, can be diverted to servicing moulding operations, which in turn reduces "overhead" expenses by giving increased production. Another feature of this method of feeding is the ease of application. Existing pattern equipment for risers does not become obsolete, it is simply necessary to mark the reduced height to which the metal should



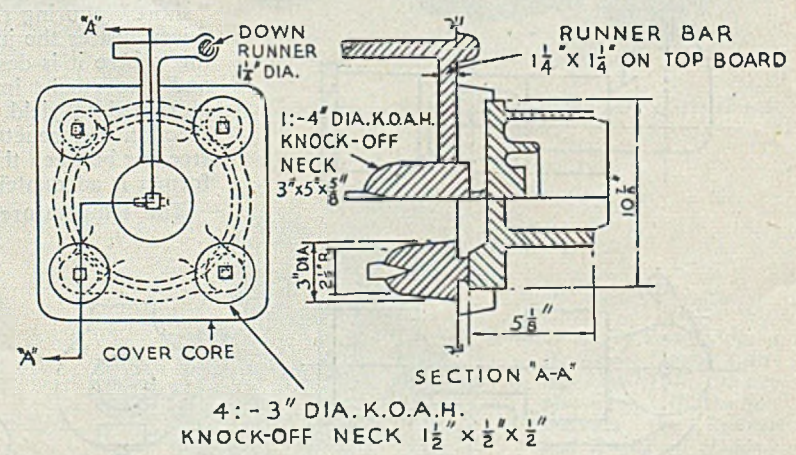


FIG. 28 (LEFT).—*"Wobbler"-end of a Roll Casting showing the Arrangement of "Elephant Ears" for providing Remote Heat.* FIG. 29 (RIGHT).—*Methods-department Layout Sheet for the Hoffman Axle-box Cover Casting.*

Data on the Layout Sheet include Customer; description; pattern number; drawing number; methods-department number; moulding machine; box-size, sand and metal to be used; initials of staff responsible for drawing and checking; the date, scale and space for remarks and alterations.

be poured in one of the controlling heads on the mould, to have the powder weighed up in paper bags of suitable denominations, and to drop them down the risers at the appropriate time. (This is a worthwhile factor in selling the idea to the already harassed foreman.) Further examples are shown in Figs. 20 and 21.

"Washburn" or Restricted-neck Cores

As previously stated, the "Washburn" or restricted-neck core is most useful in reducing the area beneath a head which has to be formed by burning, grinding and chipping in the fettling shop. Its use is shown in Fig. 22. This device again uses the principle of the hot spot, by utilizing a core of comparatively wafer thickness between two masses of metal, one the head and the other the casting. These heat the core to a high temperature and enable the metal to flow freely through the reduced aperture between head and casting for a sufficient length of time to satisfy the feed demand of the casting. There is no doubt that there are many benefits to be gained in return for ingenuity and patience in applying these principles wherever possible. Examples of the use of "Washburn" cores are shown in Figs. 23, 24 and suitable sizes are given in Table II.

TABLE II.—*Suitable Sizes for "Washburn" Cores.*

Core thickness (minimum).	Feeding-aperture size.	Taper, deg.
¼ in.	¼ in. square +	15
⅜ in.	⅜ in. ,, +	20
½ in.	½ in. ,, +	20
¾ in.	1⅛ in. ,, +	20
1 in.	1½ in. ,, +	20
1¼ in.	2⅛ in. ,, +	20

Remote Heat

Another adaptation of the same principle which needs further research is the application of remote heat. The object of this is to apply heat locally, adjacent to the casting, to prevent the freezing of thin sections of the casting at that point and so allow the heavier sections to be fed through the lighter, without resort to padding on the casting itself. Similarly, it is necessary to take into account the pre-heating of the mould by placing the ingates at strategic points, for these in turn will promote directional solidification. A simple example of the application of these principles is shown in Fig. 25. A chill is placed at that part of the casting furthest from the head and runner to promote progressive solidification from that point toward the atmospheric head which supplies the feed metal. To prevent the thinner-section metal freezing too soon, a basin of hot steel is located as shown, separated from the casting by only a thin wall of sand. By these means a correct temperature gradient is promoted, which results in efficient feeding.

A further example (Fig. 26) shows a valve in which the seating was made perfectly sound by a remote head; this example also demonstrates how narrow the margin between success and failure can be. In the first experiment, the basin was fed with an ingate direct from the runner bar, and slight porosity in the seating resulted. The ingate was then taken from the head as shown and the porosity disappeared on subsequent castings. It was therefore assumed that the first metal from the downgate, being chilled by contact with the cold mould, also contributed to fill the remote-heat basin, with a consequent loss of temperature. By allowing this first metal to enter the casting itself and the later and hotter metal to form the basin, the temperature at that point was sufficiently increased to promote satisfactory feeding.

Another example shown in Fig. 27 utilizes a "Washburn" core with the head itself supplying remote heat. American foundrymen claim to be producing roll castings (Fig. 28) in which the shape of the wobbler at the head end can be retained with a normal machining allowance without interfering with the feeding of the main parts of the casting.[4]

Having designed a runner system, it is a good investment to check the pouring time by stop-watch on prototype castings, and record it on the method sheet, which also shows the heads and runner system, especially on jobs which require fast pouring to hold up the top of the mould or because of thin sections. In this way, periodical checks can be made during production and careless pouring practices can be corrected before much harm is done. An example of a method sheet is shown in Fig. 29. This, along with the master layout, is kept in a special envelope, which also contains a history of the job from its inception, including records of alterations, customers' letters, action taken, etc. By allocating one of these envelopes to each individual job it is possible to obtain accurate information quickly and efficiently.

Conclusion

In conclusion, it is suggested that if one understands basic principles, and the reason *why* runner and risers serve their purpose, one can apply these principles successfully to all castings of reasonable design. The results should be checked by non-destructive methods of testing such as X-ray, gamma-ray, penetrating fluids or magnetic-particle inspection and if necessary by destructive methods. The conclusions reached and action taken should then be recorded, as it is only by such means that progress can be made.

Finally, the Author expresses thanks to the foundry staff for the help given in preparing this Paper, and to the directors of K & L (Steelfounders and Engineers), Limited, for permission to make available the information it contains.

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[1] "The Technique of Casting Steel" by Aloys. Heuvers (Bochum) *Giesserei*, 1943, Sept. 30.
[2] "The Whirlgate Head for Steel Castings" by Basil Gray, B.A., issued by the Foundry Practice Sub-Committee of the Steel Castings Research Committee, 1943.
[3] "A Simplified Analysis of Riser Treatments" by O. M. Adams, Jnr., and H. F. Taylor, presented at the 1952 A.F.S. annual meeting at Atlantic City.
[4] British Productivity Report on Steelfounding.

(*To be continued*)

THE JAPANESE GOVERNMENT has decided to apply for membership of the International Tin Study Group.

Pneumatic Pattern Sprayer

Recently, our representative visited the Shaw Foundry Company, Limited, Willenhall, Staffs, malleable and grey-iron founders, and saw being used a new pneumatic hand sprayer* for applying liquid parting media to the patternplates. It works on the pressure-blow-lamp system, and, when once charged, requires only an occasional pump to maintain the working pressure throughout the day. At this plant, which incorporates an up-to-date mechanized section, there is a preference for the hand-operated sprayer, as distinct from the paint-gun type, which needs to be connected to a compressed air line.

The newly-designed sprayer was reported to be giving every satisfaction, points in its favour being extreme robustness, low maintenance, and the fact that its nozzle requires less cleaning than is usual. Several different makes of parting fluid have been used in the sprayer with equal success. At Shaw Foundry (Fig. 1),

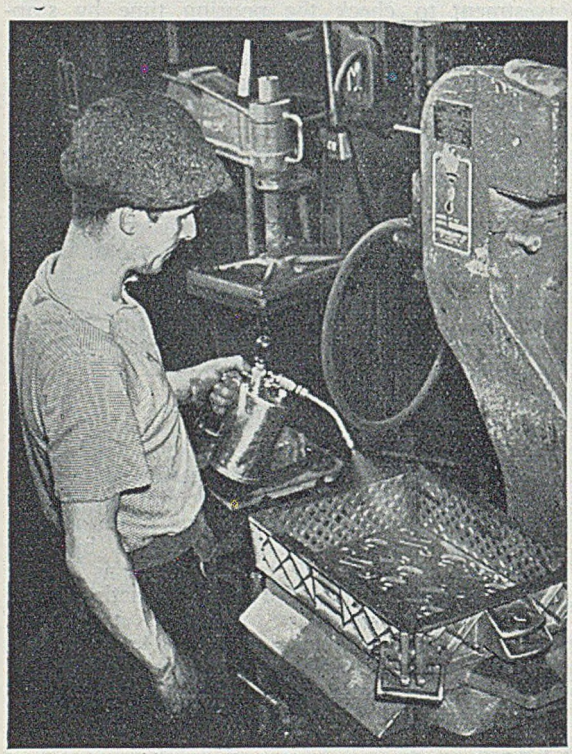


FIG. 1.—"*Mysto*" *Hand-operated Pattern Sprayer in use at Shaw Foundry, Willenhall. (Note also the use of Slip Flasks on these Moulding Machines.)*

one sprayer is shared between two adjacent moulding-machine operators, and the reservoir requires filling about twice a day for a production of 1,200 or more half-moulds. The body of the sprayer holds 2 pints, and re-charging takes but a few seconds, as the filler cap has a quick-release action. Removing this cap also brings away the pump portion—a useful maintenance feature.

* Manufactured by W. T. French & Son, Limited, Browning Street, Ladywood, Birmingham, 16.

Hobkirk's New Foundry

Production began at the new non-ferrous foundry of J. Hobkirk Sons & Company, Limited, on May 18. This modern building, with adequate room for expansion, is situated at Hardwick Hill, Kempston Hardwick, Bedford, just over a mile from the Company's main works in Ampthill Road, Bedford. The new foundry will operate only for non-ferrous castings, and that part of the firm's production has been transferred to the new site, leaving more space for development of the iron foundry. Previously a saw mill, the new branch was purchased last November and since that time the premises have been completely re-equipped to meet the demands of a modern foundry and new washing facilities with shower-baths, a changing room, and toilets, have been provided.

At the opening ceremony, which was attended by the directors and visitors, the foundry was blessed by the Vicar of Kempston, the Rev. H. John, M.B.E., B.A., C.F., and, for good luck, the chairman, Mr. J. T. Hobkirk, who recently celebrated his eighty-sixth birthday, tossed a silver coin into the melt.

The first cast was a bronze plaque to commemorate the opening, bearing the inscription:—"This plaque was cast from the first metal at the Hardwick Hill Works of J. Hobkirk, Sons & Company, Limited, on May 18, 1953, the Coronation Year of Her Majesty Queen Elizabeth II." The non-ferrous foundry will now be under the control of Mr. J. T. W. Hobkirk, grandson of the chairman. Mr. W. T. Hobkirk, managing director, plays a prominent part in the work of the trade associations and is a member of the Joint Foundry Committee of the Engineering and Allied Employers' National Federation.

Midlands Employment

Unemployment in the Midlands is now at its lowest and vacant jobs are at their highest for three months, it was reported at a meeting of the Midland Regional Board for Industry in Birmingham on May 19. Mr. W. E. Davis, Ministry of Labour Regional Controller said that he thought unemployment would continue on the downward grade, and Mr. Barry Kay, Board of Trade Regional Controller stated that the recent slight upward trend in business was being maintained.

Major C. R. Dibben, the chairman, said short-time working in the Birmingham non-ferrous metal trade was largely due to uncertainty about prices. Until they reached "rock bottom," firms were not buying. The continuing scrap-metal shortage was affecting firms in the Black Country, it was stated. Non-ferrous metal makers, particularly those handling brass and copper were unable to keep employees fully employed. Birmingham and district were mainly affected and the numbers on short time increased by almost 600 during the last week of April. The overall rate of unemployment, however, had fallen to 1.3 per cent.

DR. DIEGO IBARRA, manager of Equipos y Materiales, C.A., Apartado 2424, Caracas, Venezuela, wishes to contact U.K. manufacturers of petrol-driven generating sets of 500W.-20 kw., and Diesel-driven generating sets of 20 kw.-100 kw. The equipment should be 110 volts, single phase, 50 or 60 cycle. Interested manufacturers should communicate with the company at the above address, at the same time notifying the Board of Trade, Commercial Relations and Exports Department, Horse Guards Avenue, London, S.W.1 (C.R.E./15644/53), of any action taken.

Castings and Ultrasonic Testing

By "Reflector"

The rise in importance of the steel casting industry and the more stringent specifications which apply to the products have focused attention on the developments of non-destructive methods of testing. This article summarizes the present-day position with regard to ultrasonic testing which shows promise for some classes of work.

The application of X-ray and radiological techniques and magnetic methods have all been in use for several years past. For non-destructive testing of castings X-ray and radiological techniques are both relatively slow and highly-expensive methods of testing, while magnetic methods are restricted largely to defects which extend to the surface. The need for cheaper and more rapid methods of detecting internal defects has stimulated work in many directions, not least in the possibilities of ultrasonic testing.

Developed about 10 yrs. ago, the first major application of ultrasonic testing was to wrought light alloys and the early deliveries of testing equipment suitable for routine control in the plant were in the early 1940's. Ultrasonic waves are acoustic waves of frequency above the audible limit, generated by the mechanical vibration of an oscillator operating at the appropriate frequency. The oscillator which has proved most convenient for flaw detection is a quartz crystal, a slice of which, when suitably cut, exhibits the property of expanding and contracting when an alternating electric potential is applied to the two faces of the crystal section. If the frequency of this applied potential corresponds to the natural vibrational frequency of the quartz crystal, resonance produces powerful mechanical oscillations of this frequency giving ultrasonic waves of considerable intensity. This property of the quartz crystal, known as "piezo-electrical effect," is reversible so that it is possible to use a similar section of a crystal of quartz as a means of detecting ultrasonic waves. The resulting oscillatory electrical potential produced in the crystal can be readily amplified by an electronic circuit. As air is not a suitable medium for the transmission of the ultrasonic waves in the testing of metals, it is essential to ensure a very good degree of contact between the transmitter and the metal surface to ensure that a reasonable proportion of the ultrasonic energy is forced into the metal.

Application to Testing

If the ratio of wave-length to crystal diameter is suitably chosen, it is possible to produce the ultrasonic waves as a directional beam with an angle of 17 to 20 deg. At the lower boundary of the metal surface there is a sharp change in the medium and almost all the energy in the ultrasonic waves is reflected and returned towards the surface at which the energy was originally generated. The time interval between the transmission and reflection of the wave is proportional to the distance of the reflecting surface from the surface of transmission. The velocity of the ultrasonic waves is high (5,900 m. per sec. in steel) so the time interval between the transmission and reflection is very small (5×10^{-6} secs. per in.).

These time intervals are measured on a cathode-ray oscillograph, the life history of each ultrasonic pulse up to the reception of the first bottom echo being observed on the fluorescent screen of a cathode-ray tube. When any defect exists in the metal, a reflected wave may be set up from the defect and the resulting deflection pulse upon the screen appears at a position between the transmission and bottom echo deflections. Obviously, maximum reflection will be brought about by a defect with the major axis at right angles to the incident beam.* This fact explains the considerable success in the application of ultrasonic testing to wrought materials, particularly wrought light alloys and steel. In the testing of castings, much greater difficulties have been experienced. These difficulties arise mainly from two causes: (*a*) surface character and conditions and (*b*) physical constitution of castings, *e.g.*, crystal structure, porosity and type of defect.

Difficulties with Castings

The difficulties encountered in forcing the ultrasonic energy into metal have already been mentioned, these difficulties lead to the necessity for a machined surface, firm pressure of the surface of the transmitter on to the metal surface and the use of a film of machine-oil. These conditions are very difficult to satisfy in the testing of castings of which the original surface shows varying degrees of roughness and frequently has a definite contour. Interest has been aroused recently by reports of the possibility of using a pad of nylon impregnated with rubber as a means of ensuring the transmission of ultrasonic energy into a component with rough and non-planar surfaces. It has been reported that the device has yielded interesting results on small-diameter metal bars and even in the testing of silicon-carbide grinding wheels.

Differences in the physical constitution of wrought and cast steels also cause considerable difficulties in testing, even if the surface conditions are satisfactory. Fine porosity and the general openness of cast material lead to high absorption of energy and to problems in interpreting results obtained. In this connection, it has been suggested that an alteration in the frequency of the vibrations employed in the crystals may be of considerable

* An account of the principles and apparatus is given by A. C. Rankin (*Jnl.*, West of Scot. Iron and Steel Institute, 55 (1947-48), 69-118.

Castings and Ultrasonic Testing

assistance. A reduction from the standard 2 megacycles per sec. down to 0.5 megacycles per sec. or even less has been proposed.

Variations in the wave-length have also a bearing on the effective use of ultrasonic testing in steel castings. There is a conflict of interests at this point. The shorter the wave-length in comparison to the diameter of the transmitter the more nearly parallel does the beam become, but the shorter the wave-length the greater are the effects of minute porosity and probably even of variations in crystal size. Methods of changing the wave-length include changing the size and thickness of crystals and in the employment of alternative piezo-electric materials, such as barium titanate in place of quartz. It has been claimed that by the selection of a suitable wave-length, cracks and other minute flaws may be detected in the presence of porosity even when the size ratio is only 4 to 1.

Apparatus

Other problems in the application of ultrasonic testing are concerned with the type and number of transmitters and receivers. In the original pattern of the standard equipment two probes (one transmitting and one receiving) were fitted but of recent years there has been a greater demand for single-probe instruments. The use of the single probe has the advantage of causing less fatigue to the operator and also of simplifying the testing of complex shapes. On the other hand the single probe is limited in the detection of certain types of defects. Long thin cracks, lying at an angle to the incident beam, may cause the reflected beam to be thrown completely out of range of the receiver. One development has been the use of a composite probe with a central transmitting crystal flanked by two receiving crystals; this it is claimed gives a better basis for comparison.

Another urgent problem is the "dead zone." It has not proved possible to detect flaws in the metal in the immediate vicinity of the transmitting and receiving crystals. The thickness of this dead zone may be as much as $\frac{1}{4}$ in. in certain cases. This inability to detect flaws lying within the first $\frac{1}{4}$ in. of surface metal represents a serious disadvantage of the method, the single-probe technique being worst in this respect. A technique has been devised using two probes mounted on triangular prisms or wedges so that ultrasonic waves are directed at an angle into the metal. For the complete investigation of metal near the surface of the casting, a whole series of probes would be required, but it is claimed that by the two angle probes the thickness of the dead zone may be reduced to $\frac{1}{10}$ in.

Finally, while such factors as capital cost, running cost and range of thickness to be tested all point in favour of ultrasonic testing as compared with X-ray or radiological testing, there are still great difficulties in drawing proper inferences from the results. Highly-skilled operators with considerable experience in the work are essential but even under these conditions interpretation is not an easy matter.

Robert Warner Fellowship

The Worshipful Company of Founders administers the trust fund left by their former Master, the late Robert Warner, for providing a fellowship to foster research applied to foundry practice. The first award has been made to Mr. John Henry Gittus, B.SC., a member of the research staff of the British Cast Iron Research Association. The holder will continue with his present work and carry out the fellowship programme on a part-time basis, on the related subjects of mould erosion by the molten metal and the effect of mould conditions on the surface finish of the casting. The work will be supervised by the Association's research manager, Mr. H. Morrogh.

Conditions of Award

In interpreting the above bequest, the Company has wide and absolute discretion and for this award it does not desire to stipulate the age, previous training or qualifications of candidates, or where the research should be conducted. Indeed, the work need not necessarily be regarded as a full-time occupation and may cover the whole field of appropriate research and its application, provided it has specific relation to foundry practice. Candidates, however, must be natural-born British subjects of British parents.

In view of this, the Company consider it undesirable to indicate the funds which would be available, but in no circumstances is it likely that the amount available for a period equivalent to a year would exceed £600. The Company also has a scheme for the award of Fellowships which are primarily intended to give facilities for advanced education to men who have already completed their normal course of training. The Company believes that these two types of award serve different purposes and consequently in no circumstances can the two awards be held at the same time, although the possibility of one candidate holding both awards at different times is not excluded.

The Company will require to be satisfied that the proposed subject for research is likely to prove sufficiently valuable to the industry; that the facilities available to the individual are adequate; that the character of the applicant is satisfactory; that the capacity and ability of the applicant are adequate to deal with the work proposed; and that sufficient supervision of its progress can be provided. It is a condition of the award that periodical reports of progress shall be furnished to the Master of the Company, and that the successful candidate shall be prepared to report this progress personally during his period if required by the Company so to do; that any equipment which may be bought for the holder of a Fellowship shall remain the property of the Company; and that after completion of the period a full report shall be prepared, the copyright of which will vest in the Company, which shall, without payment to the Fellow, have power to make the results obtained available to the foundry industry as it may deem advisable.

A NEW ELECTRIC CHAIN HOIST is now being marketed in this country by Aabacas Engineering Company, Limited, Birkenhead. It has been introduced in order to meet the demand for a light-weight, low-priced hoist for smaller loads than those covered by their range of wire-rope hoists. Named the "Bantam-Demag," the equipment caters for loads of 2½, 5 or 10 cwts. and lifting speeds of 32 or 16 ft. per min. The motor can be wound to give both fast and slow speeds of 32 and 8 ft. per min. or 16 and 4 ft. per min. respectively.

Foundry "Brains Trust"*

Question Master, F. K. Neath

MR. ANDERSON introduced the members of the "Brains Trust," Mr. F. K. Neath as question-master, with the panel composed of Mr. Simpson, Mr. Kershaw, Mr. Johnson, and himself. Questions submitted were then dealt with *seriatim*.

Moulding Problems

Could the "Brains Trust" give a suitable moulding method for producing a flat plate 6 ft. by 3 ft. by $\frac{5}{8}$ in. thick, which should be free from scabs, etc.?

MR. ANDERSON said he would use a sand giving not above 4 lb. per sq. in. in the compression test. He would run the job uphill, not on the level, placing the runner at the bottom and a riser and vent on the top. He advised the questioner to lift the mould up on the riser end at least 2 in. to get a casting free from scabs; in this way the turbulence of the metal was not in contact with the top part (or cope) all the time.

MR. NEATH agreed with Mr. Anderson.

MR. SIMPSON added that if one cast on the angle or uphill, a reasonable head pressure on the runner box could be obtained.

MR. KERSHAW advised fairly quick running. With regard to casting uphill, he thought more would be understood about the necessity for that when the film on methods of gating was presented. In this film were shown different types of gating. With a flat casting made level, metal entered at the ingate and immediately ran to the far side of the mould. When casting uphill, the metal rose steadily.

MR. JOHNSON said that 4½ per cent. wood-flour in the sand might be helpful if difficulty was encountered from scabbing. Usually, in casting flat plates, the underside of the mould was exposed to the rising metal and the skin of the mould was destroyed before the metal came up into contact with it to give support. He thought this knowledge was the secret of successful avoidance of scabbing.

In ramming a box by sandslinging, what was the cause of open cracks forming on the mould surface when the pattern was drawn?

MR. ANDERSON said this was a vexing occurrence, but he believed he had isolated the cause. He thought the defect resulted from the hard ramming; that is, the force with which the sand entered the moulding box, but sometimes it was due to the way in which the box was rammed. One could ram from the outside into the centre.

MR. KERSHAW asked if uneven ramming left a weak spot for a crack to commence. Presumably the crack started because of movement initially. He had not particularly studied the matter, but his firm rammed facing sand against the pattern first, until it reached the box bars.

MR. ANDERSON stated that facing sand was consolidated before ramming, and the box was then filled up with the impellor rammer. He found, especially in the bottom, that he had to limit ramming to between the bars, for the bars were arranged in both directions; one was forced to miss them, and ramming moved the sand from between one bar to another.

MR. NEATH reminded members that discussion was "open," and if anyone in the body of the hall would like to contribute, they would be welcomed.

MR. ATHERTON suggested that the sand was probably coming from the impellor unevenly; in some cases the cup was getting too much work, and the flow was uneven; also it might be that the ramming head was kept in one place too long. If the head moved more quickly over the box, a more even flow of sand and better density would be obtained.

A MEMBER said he had noticed the same trouble when patterns were rammed on a jolting machine.

MR. ANDERSON stated that similar trouble could also occur with a heavy pattern that was not located in the centre of the patternplate. It was caused by uneven weight on the jolting pistons at each side, one acting more freely than the other, which moved the sand over to the other side. Some of his more-experienced operators worked with their hands in the sand, so preventing it from moving away. On a deep job, the bottom surface got very hard, and they then used their hands to limit the jolting impact.

In the case of "rat-tails" and "scabs," which was the better cure: to increase the clay content or the grain-size of the moulding sand?

MR. ANDERSON replied that much depended on which part of the casting was affected. Assuming it was the top part, mould hardness could have an effect on the cause of "rat-tails" but he advised in the first place an increase in the grain size of the sand.

MR. JOHNSON said he had had some experience of this subject. Under identical conditions, using a synthetic sand, when a change had been made from one metal to another, "rat-tailing" became more prevalent, and going back to a low-strength sand had increased it. He had been told that spread of grain size was very important, rather more so than having a core-sand of uniform grain size.

MR. KERSHAW thought that having a sand of high dry-strength prevented much "rat-tailing." Increasing the grain size of the sand, and thereby reducing the hardness of ramming, helped a great deal in reducing the defect.

MR. JOHNSON thought "rat-tailing" was an expansion defect, caused by a bubble on the mould

* Report of a meeting of the West Riding of Yorkshire branch of the Institute of British Foundrymen. In recording this account, questions and answers have been arbitrarily grouped roughly according to subject.

Foundry "Brains Trust"

surface. Wood-flour additions could also be very helpful in overcoming the difficulty.

Metallurgical Matters

What were the advantages of the basic cupola?

MR. JOHNSON stated, in reply, that there were two advantages. It was possible to get sulphur contents much lower than are normally obtained from an acid cupola; from 0.02 to 0.04 was quite a normal proposition. Usually, when melting in a basic cupola, a much higher carbon pick-up was obtained.

He also pointed out some disadvantages, the main one being the very heavy lining burn-out which was experienced, particularly of the patching material, apparently due to its lack of adhesion to the body of the lining. For that reason, water-cooling in conjunction with basic lining sounded as though it had valuable possibilities. Basic lining material was much more costly than acid materials. Another disadvantage was that one got a high silicon loss in melting—higher than with acid practice—at its maximum one might get 50 per cent. loss. With a high-silicon pig-iron, one could get about 25 per cent. loss, but even that was much higher than normal for an acid-lined cupola.

What was Meehanite iron? What was its approximate analysis, physical properties, and how was it melted?

MR. JOHNSON remarked that the questioner seemed to think that it was some new metal, but it was a range of irons produced by inoculation under controlled conditions to give specific structures.

MR. KERSHAW stated that for its production minute control of the foundry operations were essential, particularly with regard to gating and feeding.

In chilling cast iron, what thickness of exterior or metal chill would give a chill depth of $\frac{1}{16}$ to $\frac{3}{32}$ in. in a casting, and what factors governed chilling in general?

MR. KERSHAW said the reply depended on what was the condition of the parent iron. The main factor governing chilling was the silicon content of the iron. Carbon and sulphur or the sulphur: manganese ratio, and also the casting temperature, affected it.

MR. SIMPSON stated that the thicker the exterior metal chill used the greater would be the depth of chill obtained in the casting. If a chill was placed on a 3-in. section, little chilling would result. As the depth or size of the chill was increased, so was the density of the metal.

MR. ANDERSON claimed that the chill depth obtained in the casting was governed by the thickness of exterior chill in proportion to the casting itself. It should be large enough to absorb sufficient heat.

Why was the sulphur content of cast iron so critical in centrifugal casting, and what did the "Brains Trust" consider a safe maximum?

MR. JOHNSON considered it would be very unwise to increase sulphur above 0.09 per cent., which was a recommended maximum. From an ordinary cupola, the lower the sulphur obtained the better, and it was an advantage to have a proper sulphur: manganese ratio.

On being requested to give some information on the de-sulphurizing process, Mr. Johnson continued by saying the usual method was to carry out the operation in the ladle. A disadvantage was that metal always lost temperature. Fortunately with centrifugal casting a high pouring temperature was not necessary, but, of course, a suitable ladle lining was essential.

Core-making

In making a large pattern and corebox, should one make the corebox according to blueprint, or incorporate allowances for core expansion during drying?

MR. SIMPSON replied that he had found it very difficult to determine which was the best method. He had made a pattern in depth to contraction rule, and the corebox to standard rule, and got a satisfactory casting. In the same way, at the present time, if the job had come from the jolting machine unsatisfactorily rammed, sagging occurred when drying. With regard to heavy work, he suggested that the pattern should be made to contraction rule and the coreboxes to standard rule, which meant an increase of $\frac{1}{8}$ in. on a 20-ft. job. In some foundries, if metal thickness was not satisfactory, cores were shaved to get a bigger safety allowance.

MR. ANDERSON said he had noticed frequently that a man got out his file before he cored-up the mould, and rubbed the core down; he thought moulders preferred a slightly oversize core for this purpose.

MR. SIMPSON stated that his firm banned the use of rubbing on cores, as it caused considerable flash, and more trouble later on if the castings had to go into a jig for machining. Unless costly metal patterns were provided, he did not think one could obtain really precision moulding, and without precision moulding the fit of cores would always be a problem.

MR. KERSHAW said that assuming one had a reasonable sand, the degree of accuracy depended much on the individual core-maker. He could vary his ramming, and also the rapping of the corebox, *e.g.*, quite a number of cores in his foundry had been found to be about $\frac{1}{4}$ in. short in height, and that had been solely due to rapping causing a gap between the sand and the corebox before stripping.

MR. JOHNSON explained that, where there were exceptionally important thicknesses to be maintained, it was the practice to gauge the cores to ensure they were of the correct dimensions before they were put into the mould. There were instances of cores expanding considerably when the metal was cast around them, particularly cylinder-head

cores. If the metal temperature was too high, the core expanded to such an extent that it penetrated the casting wall, and the result looked like a short-run casting. About 1,430 deg. C. was a satisfactory temperature, but about 1,480 deg. C. caused trouble.

Could the "Brains Trust" give (1) *a substitute for manure in the manufacture of loam barrel cores for pipes; and* (2) *a mixture for cement-sand moulding?*

MR. ANDERSON considered that a substitute for manure would be very finely chopped hay or straw; it could be obtained from fodder merchants.

MR. MAXFIELD said he had had occasion to use such a substitute which consisted of chopped straw, bentonite and wood-flour. Two parts of wood-flour and three of chopped straw were mixed with water, and 3½ parts of bentonite were added slowly while stirring.

MR. MILNES said that Mr. G. L. Hancock of David Brown Foundries Company had written a paper "Cement-sand Moulding" where percentages were quoted. The moisture content recommended was only about 5 per cent. The cement when set was just strong enough to contain the metal, and the mould could be broken down by giving it a quick blow. Moulds were air-dried—a process taking three days.

What were the advantages of synthetic resins for core-binding?

MR. KERSHAW stated that resins were certainly cheaper than the more conventional core oils. Resin binders commonly in use were either phenol-formaldehyde (P.F.) or urea-formaldehyde (U.F.). U.F. cores had the advantage of coming out very easily at the knock-out as compared with oil-bonded cores. U.F. cores could be more or less poured out of the casting. There was also saving in the baking time with U.F. cores, the resin-bonded variety baking in about half the time of oil-bonded sand. One stated disadvantage of the quicker breakdown of U.F. cores was the risk of collapse during the solidification of the metal around them. However, he had made castings of up to 2½ tons weight with U.F. cores and there had been no premature break-down, and he did not think there was a great deal to fear from this possibility.

MR. JOHNSON disagreed with Mr. Kershaw when he said that the resin sand was much cheaper overall. He had never yet used a core-sand which was cheaper than a corresponding oil-bonded sand. He had only used resin-bonded sand because of its other merits.

MR. KERSHAW, with regard to the economic side, was not certain whether his firm had been using too much oil previously. U.F. binders were much cheaper than P.F., though he agreed with Mr. Johnson that synthetic resins were more difficult to work on some jobs. Core-oils had a lubricating action, whereas the resins were adhesive and stuck to coreboxes, and also dissolved the pattern varnish.

MR. NEATH said his firm had been using P.F. resins for two years, and would not go back to oil-sand. The chief trouble with using cores of this type on core-blowers was the stickiness. When water was added to the mixture to improve the flow of the core-sand, a lubricant also had to be added to prevent stickiness in coreboxes. Paraffin oil was very good as a parting medium, but if the moisture rose much above 2 per cent. coreboxes were difficult to work, even though there was a recommended parting medium used. Just recently, however, he had had introduced another liquid type of phenol resin, and with that the moisture could rise to 4 per cent., and resin drop to 1 per cent. or less, which represented quite a saving. The cores from this mixture were just as hard as linseed-oil cores.

On being asked if the stickiness was due to the varnish dissolving from the coreboxes, and what thinners were used, MR. KERSHAW replied that many foundries used shellac varnish on the coreboxes which contained a certain amount of alcohol. The stickiness was due in some respects to the resin dissolving the protective varnish from the corebox.

MR. COLLINSON commented that the trouble of the solubility of the varnish could be overcome by using cellulose paint or varnish.

MR. KERSHAW said his firm had found a material by which the trouble could be overcome, but it was itself a plastic and hard to apply. He had tried a cellulose coating and it had peeled off.

MR. HAMMOND asked if it was the practice to spray the resin cores in the "green" state before baking.

MR. KERSHAW replied that spraying a resin core with water might increase surface hardness, due to the resin migrating towards the surface.

General Matters

Did members of the team consider that it was better to fence or guard machinery, as required in this country, or would it prove more advantageous if men were trained to be more cautious and safety-conscious?

MR. KERSHAW thought that the only safe way was to fence machinery.

MR. ANDERSON said that the average foundrymen did not think of their own safety. They were given goggles when engaged on pouring of metal and in many cases they would wear them, but pushed up on their foreheads, so that they could see better!

MR. SIMPSON thought that all machines should be properly guarded for the type of work that was being done. Much depended on the individual, as to how much commonsense he used, and if he watched what he was doing. It was not always practicable to have a guard in position, but always proper care should be taken to ensure safety.

MR. HAMMOND thought that the experience of others in the question of accident prevention should be made more public. For instance, he had noticed in several foundries certain provisions being made to prevent accidents, whilst elsewhere similar provision had not been made, simply because they were not aware of accidents which had happened

with that type of plant. Full publicity should be given through the Factory Inspectors to inform foundries of accidents which have occurred elsewhere.

MR. NEATH mentioned the monthly bulletin of the Industrial Accident Prevention Society, which dealt with accidents that had happened. One part dealt with foundry conditions exclusively.

MR. ATHERTON considered that good-housekeeping was the major problem; approximately 62 per cent. of accidents were caused by people falling off ladders or staging, over shovel handles, etc. Only about 9 per cent. were caused by guards being left off machines, or accidents of the type which involved inefficient guards.

MR. SUNDERLAND agreed with Mr. Simpson that no amount of training would work as well as care. He was astonished how much machinery in the foundry was passed by the Factory Inspector, which if it were in the engineering industry would have to be guarded.

What were the advantages of patternmaking by pressure-casting of plates?

MR. JOHNSON recalled that these had been described in the FOUNDRY TRADE JOURNAL* after a productivity team's visit to the U.S. He believed the casting was done under air-pressure.

MR. SIMPSON stated that the method had great possibilities in view of the fact that when making aluminium patterns one was liable to get shrinkage, and with the pressure-cast system one got a truer shape than by the ordinary method.

It was said that foundrymen could not count—either they gave less than the number required, or more, but never the correct number—why was this?

MR. ANDERSON stated that moulders on a profitable piece-rate preferred to make one or two over. On the other hand, if the job was difficult to mould, they would soon say that the order was complete. If an order was for 12, and the management asked for 14 to be made, it depended if there was any scrap whether 14 or, say, 10 were delivered.

MR. KERSHAW queried as a contra charge as to whether engineers could calculate weight from drawings.

Splitting Plates

What did the "Brains Trust" consider the best grade of coal-dust to use for medium-class work (from 1 to 6 cwt.)? What was the cause of splitting plates (of cast iron) melting during the pouring period of mould?

With regard to the coal dust (for 1- to 6-cwt castings), MR. ANDERSON advised a coarse grain material, and 9 per cent. addition to the sand mixture.

MR. KERSHAW recommended the minimum grade possible, a finer grade would give a smoother finish on the casting.

Answering the second part of the question, MR. ANDERSON said he had had some experience of this type of work, but sometimes splitting plates and sometimes splitting "tins" were used in making, for example, a small toothed wheel about 2 in. dia. The tins were heated and bent to the required shape, and, prior to use, were heated and dipped into boiling tar, being self-drying in two or three minutes. The composite castings were first machined and then could just be dropped and they would split open. On this job there was a wall thickness of metal on either side the "tin" of about ¼ in. The job had a boss on with flanges; all these were machined before splitting.

Asked by a MEMBER if he had much trouble with the heating of the tins, and if the thin plates did not melt on, MR. ANDERSON replied in the negative.

MR. JOHNSON said where the splitting plates were tin-coated steel, the iron cast round had a much lower temperature than their melting point. Melting might be due to the carbon in the cast iron diffusing into the steel.

MR. HAMMOND reminded members that the questioner was referring to difficulties with the use of cast-iron splitting plates. They were used for splitting the boss and also the rims of heavy-section wheel blanks. These blanks would be of anything up to 8 in. or 9 in. thickness of metal, and the splitting plates in use were most likely made of the same type of iron as the casting they were to be used for. Their simplest application was to enable the casting to be split, for re-bolting together afterwards, and thickness plates or shims would be included within the boss or rim of the actual casting when pouring. What would be of assistance would be any suggestion for coating metals of that nature to withstand the heat of pouring and to prevent them sticking to and mating with the casting. The use of such splitting plates was quite a common practice in the gear-founding industry, and he himself on occasions had had the sort of trouble described. Sometimes, he had included about 0.4 or 0.5 per cent. chromium in the iron composition for the splitting plates, in order to give extra resistance to fusion. It was rather a specialist question, directed to founders who were making a particular class of work.

MR. KERSHAW said that where possible a stream of metal impinging on the plates should be avoided.

MR. HAMMOND added that another case was where cast-iron chills or chaplets were used for supporting cores and similar trouble could be caused if these insertions melted before the casting had solidified. Help was required on means of increasing the resistance of the chill or chaplet to melting before the casting was finally solid.

At the conclusion of the evening, MR. COLLINSON proposed a vote of thanks, which was seconded by MR. SUNDERLAND. MR. NEATH replied suitably for the "Brains Trust."

MR. ANDERSON, at the beginning of the meeting, had presented a Diploma to Mr. S. L. Finch for his paper entitled "Process Planning in the Steel-founding Industry," and MR. FINCH replied suitably.

* JOURNAL, July 31, 1952.

Iron and Steel Board

Chairman : Sir Archibald Forbes

Eleven members have been appointed to the Iron and Steel Board in accordance with the provisions of the Iron and Steel Act, 1953. The three full-time members are Sir Archibald Forbes, who will act as independent chairman, Sir Lincoln Evans, vice-chairman, and Mr. Robert Shone. This announcement was made in the House of Commons by the Minister of Supply, Mr. Duncan Sandys, on Thursday of last week. The Act prescribes that the Board shall be composed of not less than 10 and not more than 15 members.

Since it would not be appropriate for a whole-time member of the Board to hold any other appointment connected with the iron and steel industry, stated the Minister, Sir Lincoln Evans had arranged to resign his appointment as general secretary of the Iron and Steel Trades Confederation. Likewise, Mr. Robert Shone's appointment as director of the British Iron and Steel Federation had been terminated.

Full-time Members

SIR ARCHIBALD FORBES was chairman of the Iron and Steel Board set up in 1946 (before the industry was nationalized), and terminated in March, 1949. Chairman of Spillers, Limited, he has a distinguished record of public service. He was president of the Federation of British Industries from 1951-53, and is a member of the Board of the Finance Corporation for Industry, Limited. He was knighted in 1943.

SIR LINCOLN EVANS has been general secretary of the Iron and Steel Trades Confederation since 1946. He was also a member of the pre-nationalization Iron and Steel Board from 1946 to 1948. Sir Lincoln's service to industry is well known. He is a member of the Economic Planning Board, and at the end of 1952 agreed to serve as deputy chairman of the British Productivity Council.

MR. ROBERT SHONE, C.B.E., will end an association of about 18 years with B.I.S.F., whose statistics and economics department he joined in 1936. During part of the war period he was general director in charge of prices, costs, and statistics for the Iron and Steel Control. In 1946, he was appointed secretary of the B.I.S.F., combining his appointment with the directorship of economic work of the Federation. He was appointed the Federation's director in 1950.

Part-time Members

The eight part-time members of the Board are:—

SIR ANDREW MCCANCE, joint managing director of Colvilles, Limited. He is chairman of the raw materials co-ordinating committee of the B.I.S.F., and was last years president of the Iron and Steel Institute.

MR. NEVILLE ROLLASON, managing director of John Summers & Sons, Limited, who is chairman of the advisory committee on development for B.I.S.F. He is chairman of the Shelton Iron, Steel & Coal Company, Limited, and a director of United Steel Companies.

MR. JAMES OWEN, general secretary of the National Union of Blastfurnacemen, and a member of the general council of the Trades Union Congress.

MR. JAMES SHAW, chairman and managing director of Allied Ironfounders, Limited, who is also chairman and managing director of the British Bath Company, Limited, and chairman of the Planet Foundry Company, Limited.

MR. CHARLES CONNELL, president of the Shipbuilding Conference, who is vice-president of the British Employers' Confederation.

SIR CHARLES PERCY LISTER, chairman of R. A. Lister & Company, Limited, agricultural and general engineers and ironfounders, of Dursley (Glos.), who is a director of several companies, including Broom & Wade, Limited, and Harrisons Lister Engineering, Limited. He is also chairman of Blackstone & Company, Limited, Diesel engine manufacturers, of Stamford.

MR. GEORGE BEHARRELL, managing director of the Dunlop Rubber Company, who is past-president of the Society of Motor Manufacturers and Traders.

Mr. W. B. Beard, general secretary of the Pattern Makers' Association and a member of the T.U.C. general council, who was nominated in the list published last Thursday, has since withdrawn his acceptance. The Minister of Supply announced on Saturday that another member of the T.U.C. council, Mr. Andrew Naesmith, general secretary of the Amalgamated Weavers' union, has been appointed in his place.

Realization Agency

After the Minister's announcement last Thursday, Mr. George Strauss asked what would be the appointed day and when the Holding and Realization Agencies would be appointed or the names announced. Were the full-time members really going to be full-time members, he asked, or, in view of the last amendment made to the Bill, would they be able to take on highly-paid jobs in private industry as well.

Mr. Sandys said that the members were well aware of the terms of the Act and knew their responsibilities and powers. He had gone out of his way to impress upon them the importance which Parliament attached to the responsibilities entrusted to them. The Realization Agency was a matter for the Chancellor of the Exchequer and the names would be announced shortly. He could not name the appointed day because before fixing it he thought it right to consult the chairmen of the Board and the Agency.

Mr. Strauss said that the Opposition suspected that the full-time members might be able to take responsible jobs outside the board, upon which Mr. Sandys assured him that he would not consider the appointment of anyone as a whole-time member of this important body unless he were quite sure that they would make their duties on the Board the first call on their time and that in no circumstances whatever would any appointment which they took on outside in any way encroach upon the time necessary for them to discharge adequately their duties on the Board. In deciding what, if any, additional appointments it would be appropriate for a whole-time member to retain, he should, as far as possible, be closely guided by the precedent provided by Mr. Strauss and his predecessor,

Replying to Mr. Holt (Bolton, West, L.), Mr. Sandys said that he had appointed a larger proportion of consumers' representatives than was asked for in the first place by the consumers' council.

Iron and Steel Act, 1953

The Iron and Steel Board. At a meeting in London, on May 21, the Council of Ironfoundry Associations heard with great satisfaction of the appointment of Mr. James Shaw, chairman and managing director of Allied Ironfounders Limited, as a representative of the ironfounding industry on the new Iron and Steel Board. Mr. Shaw's impartiality, long practical experience as a foundryman, and eminence in the industry, alike command the confidence of ironfounders everywhere. By appointing Mr. Shaw, the Minister has fulfilled the understanding previously reached that an industrialist with ironfounding experience should have a place on the Board when it was set up.

Parliamentary

Iron and Steel Prices Order Schedules

Copies of deposited schedules to the Iron and Steel Prices Order, 1951, were available for inspection at the offices of the Ministry of Supply, the Iron and Steel Corporation of Great Britain, and the British Iron and Steel Federation in London, and at the offices of the Ministry of Supply in Newcastle, Sheffield, Leeds, Birmingham, Manchester, and Glasgow and at the Ministry of Commerce in Belfast, stated MR. DUNCAN SANDYS, Minister of Supply, in reply to a question from MR. S. SWINGLER (Newcastle-under-Lyme, Lab.). Other steps taken to bring the schedules to the notice of persons likely to be affected by them included the issue of notices to the Press, the publication of price lists in trade journals, and the issue of copies of the full schedules to trade associations and of many thousands of copies of abbreviated schedules to both buyers and sellers of steel.

Prosecutions for contraventions of the Iron and Steel Prices Order, 1951, were initiated against 111 persons by his Department up to May 1, 1953. There had been 77 convictions and 13 persons were acquitted. Twenty-one cases had still to be heard.

Atmospheric Pollution

The problems of fluorine would be one of the items covered in the investigations being undertaken by the Minister of Housing and Local Government into air pollution, as particularly applied to industrial areas, said the Parliamentary Secretary to the Ministry of Health, MISS PATRICIA HORNSBY-SMITH, in reply to a question from DR. BARNETT STROSS (Stoke-on-Trent, Lab.).

With regard to the question of fluorine in water supplies, pending the report of the British mission to North America which was inquiring into this problem, to be published at the end of the month, she would add nothing further yet.

Pneumoconiosis Clinics

There were 590 chest clinics in the National Health Service on December 31, 1952, in addition to the ordinary hospital out-patients' clinics, at any of which patients could obtain the recognized palliative and symptomatic treatment for pneumoconiosis, the Minister of Health, MR. IAIN MACLEOD, told DR. B. STROSS (Stoke-on-Trent, Lab.).

He understood that one particular form of therapy—the inhalation of aluminium powder—was being investigated by the Medical Research Council, but that results were not yet available. He had no intention of discontinuing or reducing the clinic service.

Quarterly Sulphur Returns

Sir Arthur Salter, Minister of Materials, told MR. M. LINDSAY (Solihull, C.) that he would still require British manufacturers to furnish him with particulars as to quantities of sulphur used. The information required had been reduced to the minimum and it had been found possible to dispense with returns from some 1,200 small users. Simplified quarterly returns were still necessary from importers and from firms using sulphur in bulk, particularly in view of the continuance of the United States' control of exports.

THE HOUSE OF COMMONS has approved the Town and Country Planning (Minerals) Regulations, 1953, and the Town and Country Planning (Minerals) (Scotland) Regulations, 1953, which make a few small amendments to the existing regulations dealing with planning control over quarrying and other work.

Careers in Fan Engineering

National College Formed

The need for trained technicians in fan engineering is urgent. Young men skilled in this branch of industry are scarce. At one time this could be attributed to a lack of facilities for the technological education required. But to-day the necessary facilities exist.

The National College for Heating, Ventilating, Refrigeration and Fan Engineering was formed for this purpose in 1948 and established at the Borough Polytechnic in London.

The purpose of the National College is to remedy the previous lack of opportunities for higher technological training in its specialized fields. Its aim is "... to ensure a steady flow of properly trained engineers, skilled in their profession, able to appreciate modern scientific advances having a bearing on their work and capable of exploiting them to the advantage of these industries." The college provides for full-time diploma courses in the subjects with which it is concerned, associateship courses, and post-graduate research courses.

More State Aid Needed for Research

An appeal for greater Government expenditure on long-range scientific research in the interests of industrial progress was made at the annual conference of the Institution of Professional Civil Servants by the president, Sir Richard Redmayne, last week.

Sir Richard referred to the advisory council's view that there was no alternative to the expansion of the Department of Scientific and Industrial Research which had been recommended six years before. He said that the council was concerned at the restrictions limiting the department's long-range research.

He gave as an instance that when the department prepared its post-war plans provision had been made for the completion in about 30 years of a geological survey of some 33,000 sq. miles of Great Britain on the 6-in.-to-the-mile scale. At the present rate of progress this would take more than 100 years.

Scottish Industry Saves Fuel

Surveys of industrial fuel-appliances which have been carried out by the Scottish Fuel Efficiency Committee may result in over 104.000 tons of coal being saved a year. This is revealed in a report issued recently, which states that the committee's mobile testing unit has now completed 49 such surveys, and if the recommendations are carried into effect, 104,196 tons of coal a year will be saved, equal to an economy of almost £500,000.

A smaller testing unit has also been at work surveying an additional 29 industrial plants and reforms which have been recommended are expected to result in a further saving of about 7,000 tons of coal in a year. "The estimated aggregate saving in 72 solid-fuel-using plants is 111,140 tons a year, equal to 25 per cent. of the present consumption," states the report.

IT WAS UNDERSTOOD that Stewarts and Lloyds, Limited, were purchasing from the Ministry of Supply special cyclone equipment, which would shortly be installed in an attempt to minimize pollution, it was stated at a recent meeting of Wellingborough (Northants) Urban District Council when consideration was given to complaints of alleged atmospheric pollution.

I.B.F. Conference Fund

The first list of subscriptions to the special fund which is being raised in connection with the Blackpool Conference of the Institute of British Foundrymen has now been received. It should be noted that Keppel F. Massey, M.A., M.I.MECH.E., B. & S. Massey, Limited, Openshaw, Manchester, 11, is treasurer of the Fund.

	£	s.	d.
Craven Brothers (Manchester), Limited	105	0	0
Vickers-Armstrongs, Limited	100	0	0
Henry Wallwork & Company, Limited	52	10	0
Widnes Foundry & Engineering Company, Limited	50	0	0
L. Gardner & Sons, Limited	50	0	0
Textile Machinery Makers, Limited	50	0	0
(on behalf of Platt Brothers & Company, Limited, Howard & Bullough, Limited, Dobson & Barlow, Limited, Brooks & Doxey, Limited)			
Leyland Motors, Limited	50	0	0
Joseph Berry, Limited	50	0	0
Mather & Platt, Limited	50	0	0
James Hodgkinson (Salford), Limited	50	0	0
George Richards & Company, Limited	50	0	0
National Gas & Oil Engine Company, Limited	50	0	0
Ferranti, Limited	50	0	0
Distington Engineering Company, Limited	50	0	0
Stanton Ironworks Company, Limited	50	0	0
Lancashire branch of the Institute of British Foundrymen	50	0	0
Central Wagon Company, Limited (on behalf of subsidiary, Ince Waggon Company, Limited)	30	0	0
E. Longden	25	0	0
Gresham & Craven, Limited	25	0	0
Walmsleys (Bury), Limited	25	0	0
David Brown-Jackson, Limited	25	0	0
English Steel Corporation, Limited	25	0	0
Crossley Brothers, Limited	25	0	0
Metropolitan-Vickers Electrical Company, Limited	25	0	0
Buckley & Taylor, Limited	25	0	0
Manganese Bronze & Brass Company, Limited	20	0	0
North Foundries, Limited (per J. & E. Arnfield, Limited)	20	0	0
Leigh & Sillavan, Limited	15	0	0
Lancaster & Tonge, Limited	15	0	0
British Insulated Callender's Cables, Limited	10	10	0
Gilbert Gilkes & Gordon, Limited	10	10	0
Dilworth & Carr, Limited	10	10	0
Knowsley Cast Metal Company, Limited	10	10	0
T. & T. Vicars, Limited	10	10	0
Henry Hollingdrake & Son, Limited	10	0	0
Thomas Blackburn & Sons, Limited	10	0	0
Palatine Engineering Company, Limited	10	0	0
David Caird, Limited	10	0	0
Heatley & Sons, Limited	10	0	0
John Hall & Son (Oldham), Limited	10	0	0
Ryder Brothers, Limited	10	0	0
Sir W. H. Bailey & Company, Limited	7	7	0
Hattersley (Ormskirk), Limited	5	5	0
Charles S. Madan & Company, Limited	5	5	0
Ferrous Castings, Limited	5	5	0
Tweedales & Smalley (1920), Limited	5	5	0
Newtons (Ironfounders), Limited	5	5	0
Linotype & Machinery, Limited	5	5	0
W. Woodcock, Sons & Company, Limited	5	5	0
F. S. Cooper (Dolphin Foundry)	5	5	0
J. Pritchard & Sons, Limited	5	5	0
C. M. Hesford & Company, Limited	5	0	0
Storey Foundry Company, Limited	5	0	0
Richard Baxendale & Sons, Limited	5	0	0
Cooper Brothers, Limited	5	0	0
Ouzeldale Foundry Company, Limited	5	0	0
Lang Bridge, Limited	5	0	0
Garston Foundry Company, Limited	3	3	0
Whitehead & Poole, Limited	3	3	0
S. S. Stott, Limited	3	3	0
Ferroder, Limited	2	10	0
Ward Bros. (Blackburn), Limited	2	2	0
Burtonwood Engineering Company, Limited (Air Units, Limited)	1	1	0
Total	£1,429	14	0

So GREAT has been the demand for the Institute of British Foundrymen's film, "Flow of Metal into Moulds," prepared by sub-committee T.S.35, that arrangements have been made for copies to be made for sale. Applications should be addressed to the Institute's Manchester office. Already the film has been shown at about 20 branch and section meetings.

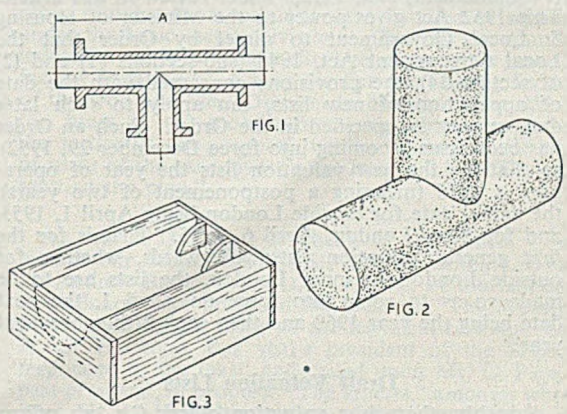
Cores and Coreboxes

By "Chip"

The number off any particular pattern often decides the type of core-making equipment supplied, and, whereas a certain job being made in large numbers in a production foundry would probably have a metal corebox for core-blowing, the same job required from a jobbing shop would have coreboxes which involved a minimum of work.

Such an example is shown in Fig. 1, a section of a T-piece. For productive moulding, a corebox would be supplied to produce the core in one piece, while for a one-off casting, two pieces of "stock" core would be used. By "stock" core is meant cores made on a core-extrusion machine or from cylindrical coreboxes. In this case, a length of core "A" would be obtained to form the main portion and another piece would be rubbed to suit and then cut off to the desired length. In mould assembly, the long piece would be placed in the mould and the other piece over it and then brought down into position as in Fig. 2.

For one-off pipes of diameter larger than the "stock" core available, the branch piece can be made in a straight corebox of the correct diameter, with pieces as shown at XX, Fig. 3, tacked against one end to define the shape of the large core over which the branch has to fit.



FIGS. 1 TO 3.—*Producing Cores for One-off Branch Pipes.* FIG. 1.—*Casting Drawing of a Right-angle Branch Pipe;* FIG. 2.—*Core Layout for the Casting, embodying Two Pieces of Standard Extruded Cores; and* FIG. 3.—*Half Corebox with a Shaped End for producing a Mating Piece for a Branch-pipe Core.*

Australian Notes

The April Meeting of the Institute of Australian Foundrymen, Victorian division, at the University of Melbourne, took the form of a round-table conference dealing with a subject of interest to all foundrymen—"Casting Defects." Four speakers introduced the subject under the following headings: Design, Melting and Pouring, Moulding and Sand, and general discussion followed. This conference was preceded by dinner.

Members were informed by circular letter that the ballot conducted at the general meeting in March, 1953, showed 98 per cent. in favour of amalgamation with the Institute of British Foundrymen.

Rating of Industrial Premises

By F. J. Tebbutt

Reason for the New Valuation Lists (Postponement) Act, 1952: General Rating Procedure by The Local Government Act, 1948.

Something of a historical nature concerning rating by local authorities as it affects both private and business premises is necessary to understand the reason for the New Valuation Lists (Postponement) Act, 1952. Under the Rating and Valuation Acts and the Valuation (Metropolis) Acts, 1869 to 1940, general valuations were taken every five years, but the 1939 outbreak of war caused postponement of these valuations. Furthermore, no valuations were taken after the war, but the Local Government Act, 1948, was passed, and by this measure the procedure for local rating was altered, so that valuations became the job of the Commissioners of Inland Revenue. Incidentally, in the main, rating procedure now applies the same, for inner London and outside London, but the *first* valuations apply outside London on April 1 and for inner London on April 6.

Originally, the year 1952 was laid down for revaluation both for inner and outside London, only to become 1953 and 1954, but still further postponement was found necessary, and this time an amending Act was required, this being the "New Valuation Lists (Postponement) Act, 1952," under review in this article. This 1952 Act gives power to the Minister of Housing & Local Government to direct by Order that the Local Government Act, 1948 (sub-sections (1) and (2) of section 34), the provisions concerned with the date of application of new lists, can apply to such later date as may be specified in the Order. Such an Order has been issued (coming into force December 29, 1952), so that for the new valuation lists the year of operation is 1955 (meaning a postponement of two years), the actual date for outside London being April 1, 1955, and for inner London, April 6, 1955. That is for the *first* general valuation lists; afterwards, whether for outside London or inner London, the lists are to be made so as to come into force on April 1, the next date being the year 1960 and then each fifth subsequent year.

Draft Valuation Lists

Roughly, there is a valuation officer (*i.e.*, an officer of the Inland Revenue) for each valuation list, and the Act lays down his duties. He is responsible for the preparation of a draft valuation list, and, when completed, a notice to this effect must be published, and three copies of the draft sent to the rating authority.

If there is included in the draft list some hereditament not previously assessed, the occupier must be sent, within seven days of the completion of the draft, particulars of the gross value, net annual value, and rateable value of the hereditament, inserted in the draft list. No personal communication is ordinarily sent to other ratepayers, but at the office of the rating authority a copy of the draft list is to be open for inspection during ordinary office hours for 21 days. A point of interest is that, usually at this deposit period, there is a special staff on duty, who will usually help an inquirer to find any particular entry, but the lists are in most cases easily understood.

An important point to remember is that no hereditament in the new list will be treated as an agricultural, industrial, or freight transport hereditament, unless either it was so treated for the purposes of the last preceding list, or a claim that it ought to be so treated has been made to the valuation officer by the owner or occupier of the hereditament. Industrial hereditaments (*e.g.*, foundries and other factories) and freight transport hereditaments are rated at one quarter of the net annual value and agricultural land and agricultural buildings are exempt from rates. At the end of the December preceding the date on which a new valuation list is to come into force, the valuation officer shall settle the list, sign it, and notify the clerk of the local valuation panel that this has been done.

Objections to Draft Lists

Anyone who is aggrieved at anything in the lists (*e.g.*, the value; any statement made or omitted or included wrongly) can enter an objection, and notice of such must be sent to the valuation officer within 25 days of the date of the publication of the draft lists. When the period for the lodging of objections is over, the valuation officer can revise the draft and may make such alterations whether for the purpose of meeting an objection or for any other reason as he thinks proper. But where he revises and alters, he must forthwith serve notice of the alteration on the occupier of the hereditament to which the alteration relates, and also on the relevant rating authority. No notification to the occupier is required if he has made no objection, and the alteration is only a reduction in the value; but where there has been an objection the person objecting must be informed.

Valuation Courts

Provision is made for appeals to a local valuation Court by notice of appeal being served on the valuation officer. There is a valuation Court for every county and every county borough (sometimes two), these being formed from local valuation panels under schemes submitted to the Ministry of Housing and Local Government. When an appeal to these Courts is heard, the applicant, owner or occupier, valuation officer, rating authority, are entitled to be heard and to examine any witness before the Court and to call witnesses. The foregoing also applies to the objector if he is not one of those just mentioned and where the appeal is against an objection. The matter can be taken to the county court for the relevant district if any person is aggrieved (appeal to be made within 21 days) at a decision of a local valuation Court.

Sundry Matters

A point to note is that even after new valuation lists come into operation, "proposals" for alterations in lists can be made by any person who is aggrieved (or the valuation officer), by the inclusion of any hereditament in the list or by any value ascribed in the list to it, or by any other statement made in or omitted from the list, and also to some other matters. Rates are to be collected and be recoverable notwithstanding any appeal which may be pending, but where the value questioned by the appeal exceeds the value as last previously determined, the amount recoverable cannot exceed the amount which would have been recoverable if its value had not been so increased.

Rating authorities can correct any clerical errors in the rate; or correct any erroneous insertions or omissions or misdescriptions; and also make any additions or corrections to cover such things as any newly-erected hereditament or any hereditament which was unoccupied at the time of the making of the rate, or to note any change in occupation of any hereditament. It should be noted that although the Inland Revenue (by the 1948 Act) now functions for valuations and not the local authorities as regards these,

(*Continued on facing page, Col.* 2)

G.K.N. Group Research Laboratory

Last week saw the opening near Wolverhampton of new research laboratories for the G.K.N. group of companies. In addition to the parent concern, this association of interests includes Joseph Sankey & Sons, Limited, Garringtons, Limited, John Lysaght's, Limited, Exors. of James Mills, Limited, Bayliss, Jones & Bayliss, Limited, and United Wire Works, Birmingham, and operating units can be found in many countries overseas. The Group's laboratory was founded upon an existing organization started by Sankeys in 1945, and from 1947 until the end of 1952 was housed in buildings at various Sankey works in the Bilston area. During this period, work was progressing on the new building opened (now) on the main Wolverhampton to Birmingham road, about 1½ miles from Wolverhampton.

New Building

The building stands on approximately nine acres of ground, and consists of three main sections, a front administrative block containing the canteen, drawing office, directors' office, conference hall and library, a two-storey laboratory wing with basement; and a single-storey workshop wing. A two-storey section joining the main laboratory wing and the workshop area houses the materials stores and offices for senior staff, while a further section of the basement accommodates the oil-fired heating plant. The total floor area is approximately 40,000 sq. ft. The total staff at the moment comprises 115 people, and of these some 40 are graduates in various branches of science and technology. Administratively the laboratory is divided into the following main sections, with the head of each section responsible to the director of research, Dr. T. Emmerson:—Metallurgy, chemistry, instrumentation and control, mechanical construction, operational research, administration, mechanical-engineering research, physics, electrical engineering, electrical construction and installation, liaison and information and maintenance.

Work in progress includes the design of the high-speed machinery; development of special methods of analysis and testing; non-destructive methods of testing, and developments in the production of silicon-iron sheet for use in electrical equipment. Equipment, in addition to that normally to be found in such laboratories, includes specialized plant for the induction melting of high-purity alloys in vacuum and in air, and a considerable amount of newly-designed apparatus for counting and electrical testing.

Founders Visit a Spade Works. The executive committee of the Manchester and District Ironfounders' Association visited the works of Caldwells, Limited, Stockton Heath Spade Works, Warrington, recently to see the manufacture of moulders' spades. Eighteen members attended, and were shown round the works by Mr. H. Simcock, managing director, Mr. T. Knowles, director, and Mr. F. Starkey, works manager. Upwards of fifty different types of spades were shown in different stages of manufacture. The committee were afterwards entertained to lunch at the Hill Cliffe Hydro, and afterwards Mr. J. E. Smethurst, president of the Association, thanked the directors for a most instructive visit, complimented them on a most efficient output, and mentioned the good conditions which prevail for the workpeople. Mr. H. Simcock, in his reply, said the good reports of their spades which had been developed after so many years of experience made pleasant hearing.

Scottish Productivity Drive

Industrialists in the West of Scotland on May 13 formed a Glasgow Productivity Committee with Mr. John Malley, a director of the Mirrlees Watson Company, Limited, engineers, as chairman, and Mr. James Lambert, of I.C.I., Limited, as vice-chairman. Among other members of the committee nominated was Mr. C. A. Oakley, who has been prominent in the industrial and commercial life of the Clyde valley for many years. Most West of Scotland interests are represented, while it is intended that representatives of the Royal Technical College, Glasgow, the trade-union movement and various professional bodies should be added to the committee. Mr. Ernest W. L. Field was chairman of the meeting held to form the committee, following on the recommendations of the British Productivity Council. Various bodies representative of all sides of industry, including the Federation of British Industries, the Association of British Chambers of Commerce, and the T.U.C., have given their backing to the Council.

Contagion?

An editorial in *Foundry* dealing with American controls states:—

"The best deal was secured by the non-ferrous foundry industry, where a foundry branch handled problems of copper-base alloy castings producers. In other foundry fields, castings were handled as sections under the basic metals divisions. The ferrous foundry industries made a valiant effort to correct this unsatisfactory situation by raising the Ferrous Casting Section of the Iron and Steel Division to branch status. While top brass in the mobilization programme recognized the justice of the proposal, vindictivenesss on the part of some of the executives in the Iron and Steel Division scuttled the plan."

AT THE 1953 annual luncheon of the British Compressed Air Society held at St. Ermin's Hotel, London, Sir Andrew Bryan, D.SC., LL.D., F.R.S.E., of the National Coal Board, who proposed the toast of "The Society," commented on the value of the technical sessions. Mr. H. G. Harwood, this year's president of the Society, responded to the toast, and called upon Mr. C. Pike, a past-president, to propose "The Guests," amongst whom were Mr. L. H. Robinson, C.B., deputy-secretary to the Ministry of Supply; Mr. B. H. Metcalfe, chief mechanical engineer, N.C.B.; Mr. W. R. Manning, assistant chief engineer, Plastics Division, I.C.I.; Lieut.-Col. Travers and Mr. E. W. Cave, of the Ministry of Supply; and Mr. S. G. Munday, of the Society of Motor Manufacturers and Traders. Mr. L. H. Robinson responded on behalf of the guests.

Rating of Industrial Premises

(Continued from facing page)

the procedure of assessing (except as regards dwelling houses) is the same as before, as the 1948 Act provides that nothing in this Act is to affect the principles to be followed in making valuations as laid down in former Acts. Roughly speaking, assessments are to be based on the rent at which a hereditament might reasonably be expected to let from year to year, the tenant to be responsible for usual tenant's rates and taxes. Special provision is made for valuations of dwelling houses in the 1948 Act. For local authority houses and other post-1918 houses the new assessment procedure is to be by reference to the 1938 cost of construction and 1938 site cost.

Pig-iron and Steel Production

Statistical Summary of March Returns

The following particulars of pig-iron and steel produced in Great Britain are from statistics issued by the British Iron and Steel Federation. Table I summarizes activities during the previous six months, Table II gives production of steel ingots and castings in March, and Table III, deliveries of finished steel in February, 1953. Table IV gives the production of pig-iron and ferro-alloys in March, 1953, and furnaces in blast. (Weekly averages in thousands of tons.)

TABLE I.—*General Summary of Pig-iron and Steel Production.*

Period.	Iron-ore output.	Imported ore consumed.	Coke receipts by blast-furnace owners.	Output of pig-iron and ferro-alloys.	Scrap used in steel-making.	Steel (incl. alloy). Imports.[3]	Output of ingots and castings.	Deliveries of finished steel.	Stocks.[3]
1951	284	170	206	186	175	8	301	244	585
1952[4]	306	190	228	202	171	29	310	252	739
1952—October[1]	302	196	227	204	182	31	328	271	725
November	312	194	229	207	180	23	345	277	717
December[1] ..	296	189	227	206	166	26	314	245	739
1953—January	325	199	234	214	188	25	346	279	770
February	328	194	234	214	193	19	352	275	770
March[1]	334	197	237	216	194	23	351	—	804

TABLE II.—*Production of Steel Ingots and Castings in March*, 1953.

District.	Open-hearth. Acid.	Open-hearth. Basic.	Bessemer.	Electric.	All other.	Total. Ingots.	Total. Castings.	Total ingots and castings.
Derby, Leics., Notts., Northants and Essex ..	—	3.4	12.1 (basic)	2.0	0.2	16.6	1.1	17.7
Lancs. (excl. N.W. Coast), Denbigh, Flints, and Cheshire	2.1	21.8	—	1.7	0.6	25.0	1.2	26.2
Yorkshire (excl. N.E. Coast and Sheffield) ..								
Lincolnshire	—	35.0	—	—	0.1	34.9	0.2	35.1
North-East Coast	2.3	64.5	—	1.3	0.5	66.6	2.0	68.6
Scotland	4.7	40.0	—	1.7	0.9	45.1	2.2	47.3
Staffs., Shrops., Worcs. and Warwick	—	17.1	—	1.2	0.7	17.2	1.8	19.0
S. Wales and Monmouthshire	6.2	67.4	5.9 (basic)	1.3	0.2	80.3	0.7	81.0
Sheffield (incl. small quantity in Manchester) ..	8.7	29.1	—	10.1	0.6	46.2	2.3	48.5
North-West Coast	—	2.4	5.1 (acid)	0.4	0.1	7.9	0.1	8.0
Grand Total	24.0	280.7	23.1	19.7	3.9	339.8	11.6	351.4
February, 1953	24.9	282.1	22.1	19.5	3.8	340.8	11.6	352.4
March, 1952	24.9	251.3	21.5	18.5	4.0	308.8	11.4	320.2

TABLE III.—*Production of New Non-alloy and Alloy Finished Steel.*

Product.	1951.	1952.[4]	1952. Feb.	1953. Jan.	1953. Feb.
Non-alloy Steel:					
Ingots, blooms, billets and slabs[5]	4.0	4.5	4.6	5.4	5.4
Heavy rails, sleepers, etc.	10.1	9.8	9.2	11.6	11.2
Plates ¼ in. thick and over ..	41.0	41.4	40.9	47.0	46.5
Other heavy prod.	39.9	39.0	38.5	46.5	45.6
Light rolled prod.	46.7	46.0	43.3	53.3	55.7
Wire rods	15.9	15.9	15.5	18.2	17.5
Bright steel bars ..	6.5	6.5	5.7	7.8	7.8
Hot-rolled strip ..	19.5	18.8	18.8	20.5	21.3
Cold-rolled strip ..	6.0	6.1	5.9	6.1	5.7
Sheets, coated and uncoated ..	30.4	31.6	30.0	35.0	34.0
Tin, terne and blackplate ..	13.8	16.0	16.2	14.7	14.4
Steel tubes and pipes	20.3	20.1	17.9	20.7	22.5
Tube and pipe fittings (excl. flanges)	0.5	0.7	0.6	0.4	0.4
Mild wire	11.6	12.2	11.9	11.9	11.6
Hard wire ..	3.5	3.6	3.3	4.3	4.0
Tyres, wheels and axles	3.7	3.5	1.9	5.3	3.5
Forgings (excl. drop forgings)	2.3	2.8	2.5	3.3	3.3
Steel castings ..	3.8	4.2	4.3	4.2	4.2
Tool and magnet steel	[8]	0.3	0.2	0.4	0.3
Total	279.5	283.0	271.2	316.6	314.9
Alloy steel	11.4	13.7	12.0	16.3	15.6
Total deliveries from U.K. prod.[6] ..	290.9	296.7	283.2	332.9	330.5
Add: Imported finished steel ..	5.8	13.8	16.5	14.2	9.2
	296.7	310.5	299.7	347.1	339.7
Deduct: Intra-industry conversion[7] ..	55.0	60.2	59.8	70.0	67.0
Total net deliveries ..	241.7	250.3	239.9	277.1	272.7

TABLE IV.—*Production of Pig-iron and Ferro-alloys March*, 1953.

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants and Essex	27	—	17.6	25.9	0.7	—	44.2
Lancs. (excl. N.W. Coast), Denbigh, Flints, and Cheshire ..	8	—	12.1	—	—	1.6	13.7
Yorkshire (incl. Sheffield, excl. N.E. Coast) ..							
Lincolnshire ..	13	—	29.8	—	—	—	29.8
North-East Coast	24	4.3	43.9	—	—	1.4	49.6
Scotland	9	0.8	14.1	2.4	—	—	17.3
Staffs., Shrops., Worcs. and Warwick ..	8	—	7.3	1.6	—	—	8.9
S. Wales and Monmouthshire	9	3.6	29.5	—	—	—	33.1
North-West Coast	7	17.7	—	—	—	1.4	19.1
Total ..	105	26.4	154.3	29.9	0.7	4.4	215.7
February, 1953 ..	105	25.8	151.1	31.6	1.0	4.0	213.5
March, 1952 ..	102	25.4	143.8	29.0	1.0	2.5	201.7

[1] Five weeks all tables.

[2] Weekly average of calendar month.

[3] Stocks at the end of the years and months shown.

[4] Average 53 weeks ended January 3, 1953.

[5] Other than for conversion into any form of finished steel listed above.

[6] Includes finished steel produced in the U.K. from imported ingot and semi-finished steel.

[7] Material for conversion into other products also listed in this table.

[8] Included with alloy steel.

Personal

DR. PAUL BASTIEN has been elected vice-president of the *Société des Ingénieurs Civils.*

MR. ROGER DELPUECH, the secretary of the *Association Technique de Fonderie* has been nominated *Officier d'Académie.*

MR. ALLEN L. STOCK, managing director of the Morgan Crucible Company, Limited, London, S.W.11, has been elected treasurer of the London Chamber of Commerce.

PROF. J. F. BAKER, head of the Department of Engineering at Cambridge University, has received the honorary degree of Doctor of Science from Leeds University.

THE BOARD OF TRADE announce that SIR ARNOLD PLANT has been appointed a part-time member of the Monopolies and Restrictive Practices Commission. The appointment is for four years.

MR. R. COPIN, manager of the Noyon Works of the Société Général de Fonderie, has been nominated to receive the decoration of *Chevalier of the Legion of Honour.*

AT THE ANNUAL MEETING of the Keighley Rotary Club last week, Mr. James T. MacLeod, managing director of H. Widdop & Company, Limited, diesel-engine manufacturers, who is a Keighley magistrate, was elected president.

Following the recommendations of the British Productivity Council, a Glasgow productivity committee has been formed, of which MR. JOHN MALLEY, a director of Mirrlees Watson Company, Limited, engineers and ironfounders, etc., is the chairman.

MR. A. C. B. OWEN, chairman and joint managing director of Rubery Owen & Company, Limited, structural engineers, of Darlaston (Staffs), who is chairman at present, and formerly from 1942-46, of Darlaston Urban Council, has accepted an invitation to be chairman during the coming year.

MR. R. A. BALFOUR, managing director of Arthur Balfour & Company, Limited, high-speed, crucible-steel, and tool manufacturers, of Sheffield, a former Master Cutler and a past-president of Sheffield Chamber of Commerce, has been elected chairman of the overseas trade committee of the Association of British Chambers of Commerce.

MR. GEORGE MORRISON, managing director of Greenock Dockyard Company, Limited, has been re-elected by the directors as president of Greenock Chamber of Commerce for the ensuing year. The new vice-president is MR. M. A. SINCLAIR SCOTT, a director of Scotts' Shipbuilding & Engineering Company, Limited, Greenock.

MR. H. P. MCCONWAY, manager of the purchasing department, MR. J. V. TAYLOR, erection superintendent in the Glasgow area, and MR. J. J. SWALES, a fitter, who retired recently after 50 years' service with A. Reyrolle & Company, Limited, electrical engineers, of Hebburn-on-Tyne, have each received an illuminated address and a wallet of notes.

MR. FRED STANIFORTH, of Doncaster, has been appointed chief New Zealand representative for Peglers, Limited, brassfounders, Doncaster, in succession to Mr. Hollis, who is retiring. Mr. Staniforth, who has been with the company for 32 yrs., plans to sail for New Zealand on June 4 and will make his home in either Wellington or Auckland.

MR. A. A. F. HASTILOW was elected president of the Birmingham Chamber of Commerce on May 18. He had been a vice-president since 1951. Mr. Hastilow is chairman of Docker Bros., Limited, of Birmingham, and a director of Pinchin Johnson & Company, Limited, of London. During the war, he was assistant controller of miscellaneous chemicals.

Metropolitan-Vickers Electrical Export Company, Limited, announce that from April 1 MR. F. C. HALLAWELL, Rio office manager, was appointed manager for Brazil in succession to MR. H. W. FOY, who continues in an advisory capacity, MR. E. E. SARASA, sales engineer, was appointed manager for Argentina, and MR. R. MORRIS, technical representative in Colombia, Peru and Venezuela.

COLVILLES, LIMITED, announce that the HON. RONALD J. B. COLVILLE has been appointed a director of the Steel Company of Scotland, Limited. MR. JAMES STEWART has been appointed a director of Smith & McLean, Limited, and MR. R. M. LEITH, secretary, Carnlough Lime Company, Limited, has been appointed sales director of that company in succession to the late MR. JOHN HARDIE.

MR. W. E. THOMPSON, secretary of Laycock Engineering, Limited, Archer Road, Sheffield, has been appointed a director, with particular reference to commercial and financial matters. MR. KENNETH WALKER, assistant production engineer, has been appointed works director. He holds associate membership in the Institution of Mechanical Engineers and the Institution of Production Engineers.

MR P. W. JOHNSON, managing director of Percy Johnson, Limited, Leamington, has been elected chairman of the West Midland Region of the Institute of the Motor Industry (Inc.) for 1953-54. Mr. S. L. Sadler, director of R. H. Collier and Company, Limited, Birmingham, is deputy chairman; Mr. F. R. Freeman, Birmingham divisional manager of Regent Oil Company, Limited, honorary secretary and Mr. John Howell, Midland manager of the Royal Automobile Club, honorary treasurer.

MR. J. B. HASSETT was elected chairman of the Birmingham branch of the Incorporated Sales Managers' Association in Birmingham on May 18. MR. D. A. BEATSON-HIRD, retiring chairman, said that the Birmingham branch with a membership of 365 had outstripped Glasgow and was now second only to London. The retiring president, SIR BASIL R. G. TANGYE, installed the newly-elected president, MR. E. M. CLAYSON, managing director of the Birmingham Post and Mail, Limited.

LORD COOPER, the Lord President of the Court of Session, joined a distinguished company, which included the Duke of Edinburgh and Sir Winston Churchill, when he received hon. membership of the Institution of Mechanical Engineers. The ceremony took place at Dunblane Hydro on May 22. Lord Cooper's father was borough engineer of Edinburgh, and the honour was bestowed in recognition of his lordship's outstanding services in relation to local government, particularly where town planning, housing, and engineering projects are concerned.

MR. MICHAEL CLEAR, who joined the group in 1945 and has been for the past three years managing director of Brush A.B.O.E. (Southern Africa), Limited, has been appointed group sales director of the Brush Group of companies, and a member of the Board of Associated British Oil Engines, Limited. He is 39. MR. F. A. VAUGHAN, who for the past 35 years has been associated with one or other of the companies of the group, succeeds Mr. Clear. Mr. Vaughan is overseas director of Associated British Oil Engines (Export), Limited, and National Oil Engines (Export), Limited, and will take up his new appointment in June.

News in Brief

PAGET ENGINEERING COMPANY (LONDON), LIMITED, of Braintree Road, Ruislip, Middlesex, announce that their telephone numbers have been changed to Ruislip 4894-5.

LAWFORD IRONWORKS, LIMITED, Manningtree, Essex, for their annual holidays will close their works and offices from Friday, July 24, to Monday, August 10. Between these dates no goods will be handled.

THE DUKE OF EDINBURGH stood ten minutes at the stand of Foundry Equipment, Limited, at the British Industries Fair at Castle Bromwich, where moulding processes were explained to him by Mr. A. S. Beech, the managing director.

MORE THAN 60 employees of Brown's Foundry, Limited, Nottingham Road, Derby, visited London and Windsor on their annual works outing. Mr. C. T. A. Brown and Mr. W. J. Brown, directors of the firm, were with the party.

MULLARD EQUIPMENT exhibits at the British Instrument Industries Exhibition to be held at Olympia from June 30 to July 11 will be divided into three groups: electrochemical apparatus, electronic instruments, and ultrasonic equipments.

THE BURMESE GOVERNMENT COMMISSION have placed an order with Euclid (Great Britain), Limited, Newhouse Industrial Estate, for 40 scrapers and 10 dumper trucks for use in road-making. The delegates are to return to Britain after next month's visit to Continental firms.

HANDLEY PAGE, LIMITED, have given Aston Technical College, Birmingham, a considerable number of samples of aircraft constructions which have been subject to destructive tests and show the kind of failure which may occur. Full technical data regarding each specimen has been supplied.

KODAK, LIMITED, demonstrated their safety consciousness recently at a most successful and comprehensive safety exhibition held at the Harrow factory. In the presence of local dignitaries, and officials from safety organizations, the exhibition was opened by Mr. A. E. Amor, a deputy managing director of the firm.

AN ORNAMENTAL TRAY, 4 ft. dia., made in 1851 by Joseph Sankey, founder of J. Sankey & Sons, Limited, Bilston, for the Crystal Palace Exhibition, was presented on loan to Bilston on May 18 by Col. H. B. Sankey, chairman and managing director of the firm. The tray was received by the Mayor of Bilston, Ald. Norman Bayliss.

THE BRITISH STANDARDS INSTITUTION has just published B.S. 1977, "Copper for electrical purposes: Tubes (High Conductivity)," which is the fourth in a series of standards for copper for electrical purposes. Copies may be obtained from the British Standards Institution (sales branch), 24, Victoria Street, London, S.W.1. price 2s. 6d.

SEVENTEEN WORKERS at J. F. Ratcliff (Metals), Limited, New Summer Street, Birmingham, were presented with Coronation tankards in Birmingham on May 22 to mark their long service. Each tankard had the recipient's initials and the Royal cipher. The presentations were made by the chairman and managing director of the company, Mr. Gerald Ratcliff.

SALFORD ELECTRICAL INSTRUMENTS, LIMITED, stand 64 at the British Electrical Power Convention, Torquay, June 8 to 12, will show a selection of industrial rectifier units for light- and heavy-duty power supplies and all types of battery charging. A 1,000-amp. selenium rectifier stack is to be displayed, together with samples from a wide range of selenium and copper-oxide rectifiers.

COLEMAN-WALLWORK COMPANY, LIMITED, Windsor Works, Stotfold, Arlesey, Beds, have established branch offices for the Southern area at 181, Knightsbridge, London, S.W.7 ('Phone: KEN 4443); for the Midland area at 10, Vicarage Place, Walsall, Staffs; for the Northern area at Bleasby Street, Oldham, Lancs ('Phone: Oldham Main 5421); and for Scotland at 53, Carlyle Avenue, Hillington, Glasgow ('Phone: Halfway 1998).

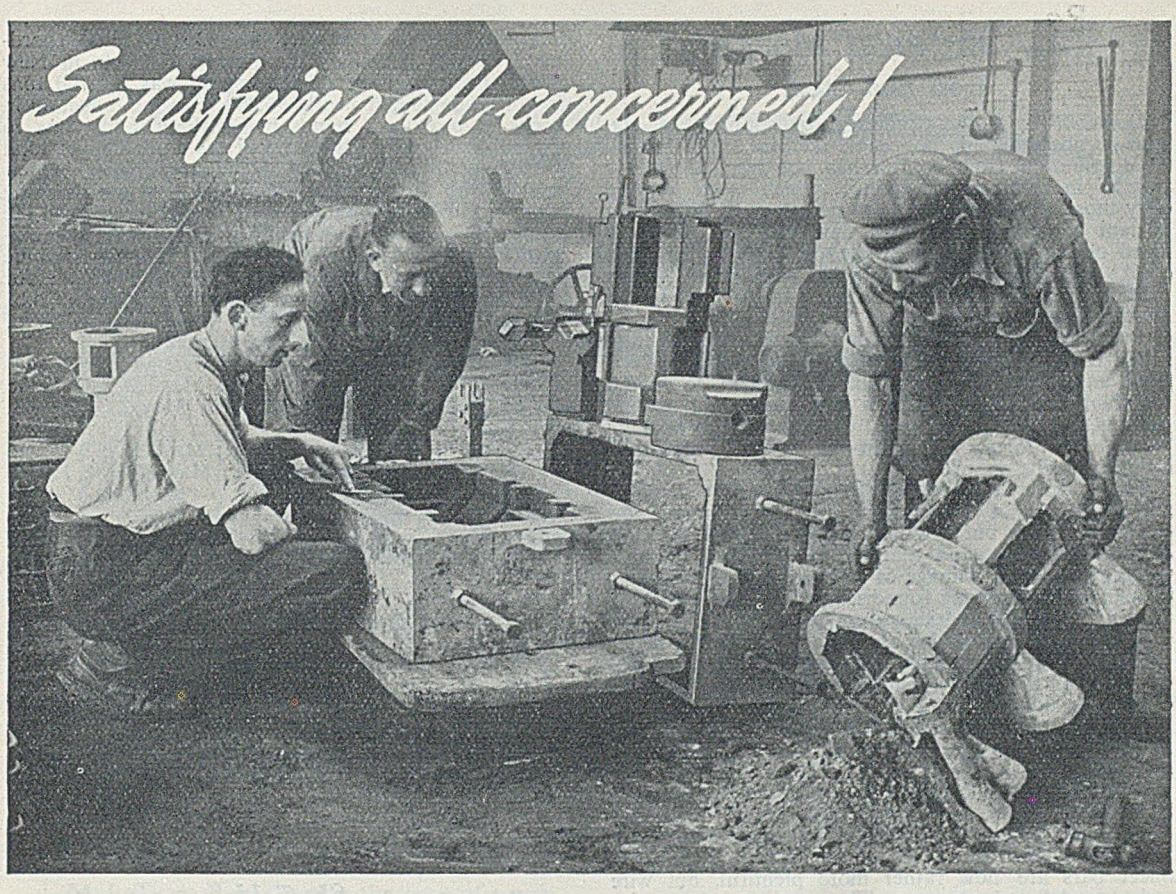
JAMES HOWDEN & COMPANY, LIMITED, engineers, are carrying out a 50,000 sq. ft. extension to their works in Scotland Street, Glasgow, to meet the increased demand for auxiliary machinery in land and marine generating plant. The new premises, which will add 20 per cent. to the parent factory, are expected to be completed before the end of this year. The extension will provide facilities for the employment of at least 200 men, in addition to the present labour force of 1,400.

AT BRADFORD CITY COURT, last week, a fine was imposed on George Gordon Whitehead after he had pleaded "guilty" to stealing a quantity of scrap metal from the Bradford engineering works of Hepworth & Grandage, Limited, by whom he had been employed. It was stated that a detective officer, while making a routine visit to the premises of a scrap dealer, found Whitehead there disposing of a quantity of scrap metal, part of which he admitted belonged to Hepworth & Grandage.

WITH £9,000,000 to spend in the sterling area on machinery, equipment, and other capital goods, a Burmese delegation arrived in Glasgow last week and signed a contract valued at £782,000 with Fleming & Ferguson, Limited, Paisley, for two passenger and cargo vessels of about 1,500 tons each. The first of these vessels will be delivered in August next year and the second in November. Equipment which the delegation intend to buy is required to carry out a five-year scheme of reconstruction and rehabilitation announced by the Burmese Government last year.

BIRMINGHAM COLLEGE OF TECHNOLOGY has received its first offer of a research scholarship from industry—one of £500 a year from International Combustion, Limited, Derby, for the study of the causes and prevention of the formation of sulphur trioxide in combustion gases. The solution of this problem would help by considerably extending the life of boiler plant. Three departments—metallurgy, mechanical engineering and chemistry—are to be assigned to the project if the College governing body accepts the offer, as it is generally expected to do, being anxious to undertake applied research for industry. The recently appointed vice-principal of the College, Dr. M. R. Gavin, has been given the special task of co-ordinating research.

AN INDUSTRIAL FILM CONFERENCE, held in Birmingham on May 20, was attended by approximately 80 representatives of Midland firms. The conference, which was the first of its kind to be held in the Midlands, was arranged by Dr. J. Horne, of the Senate committee on film instruction in the University of Birmingham, together with representatives of commercial and industrial education in Birmingham. The speakers stressed the importance of the contribution that films are making to industrial efficiency at all grades, and the films shown illustrated the many spheres in which films give visual aid to safety, economy and production methods. "Training for jobs can be achieved by films in simple processes," said Mr. E. N. Marriott, of Stewarts and Lloyds, Limited, "though highly-skilled processes have to be taught by craftsmen."



SUPINEX "R" IN USE—

Illustration of Binnacle casting in DTD 165 alloy by courtesy of Gascoignes Non-Ferrous Foundries Ltd., Slough.

SUPINEX "R"
CORE BINDER

AN ENTIRELY NEW TYPE OF BINDER, STARTLING IN ITS PERFORMANCE . . .

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Raw Material Markets

Iron and Steel

Demands from the foundries for supplies of pig-iron do not show any noticeable increase. The freeing of distribution from control has not resulted in any change in ironfounders' policy, which is to acquire only those quantities which are necessary to implement current commitments. They have not the orders on hand or in prospect to justify the carrying of large stocks at present prices of pig-iron, and where stocks exist they prefer to utilize them, instead of taking additional tonnages from the furnaces.

Business for most castings remains sluggish, and many establishments, including those producing both light and heavy castings, find it difficult to secure sufficient work to enable them to increase their lagging outputs, which are the result of a shortened working week or a forced reduction in labour necessitated by the decline in orders.

There are more hopeful signs of improvement in some sections of the industry, for both home and export business, but this has yet to materialize. Collieries, steelworks, and machine-tool makers continue to specify a good tonnage of castings, and these orders benefit the engineering foundries which cater for these trades. Some foundries supplying castings for the motor and tractor trades appear to be slightly better employed than for some months, but demand for castings for the textile machinery trade and for light castings is slow.

Supplies of most grades of foundry pig-iron are adequate and requirements are, in the main, fully satisfied.

Better deliveries of slabs are now coming to hand from British sources of supply, but heavy imports of billets and blooms of Continental manufacture are required to meet the needs of the re-rolling industry. Sheet bars are now rather more plentiful, but wire rods are definitely scarce. The need for the maintenance of imports at a high level must continue until home requirements can be met by a substantial expansion of output. Demand for heavy finished steel products is maintained, but there is a falling-off in the demand for sheets.

Non-ferrous Metals

Although there was nothing exceptional in last week's turnover on the Metal Exchange, price movements were rather spectacular, for, following a sharp rise during the first half of the week, a sharp reaction occurred, and, with the exception of May lead, net losses were registered. The outlook for tin is not particularly good and a further fall in values would not occasion any surprise. As regards lead, rather better business was reported on both sides of the Atlantic, but it is a little difficult to find where the improvement in this country is to be seen. The American quotation advanced by 50 points in all in the early part of last week to 13 cents and the two markets reacted on each other. The trade would be very glad to have more stability in zinc and lead, for the present situation is not at all satisfactory.

With effect from May 21, the premium for 99.95 per cent. grade zinc is increased from £4 to £6 per ton, and the premium for 99.99 per cent. grade zinc is increased from £6 per ton to £9 per ton, for sales of zinc by the Ministry of Materials. It is the intention of the Ministry to alter the premiums it charges according to the premiums currently fixed by the producers.

In the United States, business in non-ferrous metals continues to be good, the demand for copper being particularly sustained. Deliveries of refined copper to consumers during April were 142,300 short tons, according to details issued by the Copper Institute in New York. Production of refined copper was 112,700 tons and of crude copper nearly 96,000 tons, the reduction in stocks in producers' hands being about 7,000 tons to around 48,000 tons. Included in the crude copper total was about 14,000 tons of secondary copper, which bolstered up the output of the mines. A similar thing happened in March, but, even so, it is obvious from the delivery figures, to which monthly consumption approximately conforms, that the United States must continue to import heavily from abroad. This is fortunate for Chile which is able to market copper at 35½ cents f.o.b., a price a very long way above the ruling figure of 30 cents on the U.S. domestic market.

Official prices of refined pig-lead were as follow:—

May—May 21, £87 to £87 10s.; May 22, £84 5s. to £84 10s.; May 26, £86 10s. to £87; May 27, £88 10s. to £88 15s.

August—May 21, £82 to £82 5s.; May 22, £78 15s. to £79; May 26, £80 15s. to £81 5s.; May 27, £82 15s. to £83 5s.

Official zinc prices were:—

May—May 21, £71 to £71 2s. 6d.; May 22, £68 5s. to £68 7s. 6d.; May 26, £69 10s. to £69 12s. 6d.; May 27, £70 to £70 5s.

August—May 21, £71 to £71 5s.; May 22, £68 5s. to £68 10s.; May 26, £69 15s. to £70; May 27, £70 5s. to £70 10s.

Official tin quotations:—

Cash—May 21, £747 10s. to £752 10s.; May 22, £722 10s. to £725; May 26, £730 to £732 10s.; May 27, £735 to £740.

Three Months—May 21, £737 10s. to £742 10s.; May 22, £722 10s. to £725; May 26, £727 10s. to £730; May 27, £735 to £740.

Notes from the Branches

Sheffield

A party of 55 members of the Sheffield and district branch of the Institute of British Foundrymen visited the works of the Renishaw Iron Company, Limited, on Saturday, May 16. They were received by Mr. H. Draycott, secretary, and Mr. J. T. Gilmore, blast-furnace manager. During the conducted tour, the party saw the tapping of a blast furnace and inspected the foundries and patternshop. Tea was provided by courtesy of the Renishaw Iron Company.

In welcoming the party, Mr. Draycott apologized for the unavoidable absence of Mr. J. F. Stanier, chairman of the company, and expressed the hope that the visit may become an annual one. Mr. F. A. Martin, president of the Sheffield branch, suitably responded.

PICKERINGS, LIMITED, Globe Elevator Works, Stockton-on-Tees, advise us that they have recently obtained larger and more suitable premises at 66-70, McCulloch Street, Glasgow, S.1, where in future the sales, service, and drawing-office departments for the Scottish area will be located.

IN ORDER to give some of their important customers an opportunity of watching the Coronation procession, the David Brown Companies have erected a 100-seat stand outside their London offices in Piccadilly, on the procession route. Seats on the stand are also being reserved for married employees, selected by ballot.

GOODWIN BARSBY & COMPANY, LIMITED, St. Margaret's Ironworks, Leicester, announce that MR. G. ALAN POCHIN has been appointed deputy chairman and MR. JAMES GAVIN, deputy managing director. The foundry department of this works has almost completed its installation of air-conditioned baths, and changing rooms.

Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

May 27, 1953

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £13 18s.; Birmingham, £13 11s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £16 14s. 6d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £17 0s. 3d.

Scotch Iron.—No. 3 foundry, £16 11s., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £18 3s.; South Zone, £18 5s. 6d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £19 3s.; South Zone, £19 5s. 6d.

Hematite.—Si up to 2½ per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. Coast and N.-W. Coast of England, £16 12s.; Scotland (Scotch iron), £16 18s. 6d.; Sheffield, £17 13s.; Birmingham, £17 19s. 6d.; Wales (Welsh iron), £16 18s. 6d.

Basic Pig-iron.—£14 6s. 6d. all districts.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered).

Ferro-silicon (6-ton lots).—40/55 per cent., £57 10s., basis 45 per cent. Si, scale 21s. 6d. per unit; 70/84 per cent., £86, basis 75 per cent. Si, scale 23s. per unit.

Ferro-vanadium.—50/60 per cent., 23s. 8d. to 25s. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 10s. to 11s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £204 to £210 per ton; 38/40 per cent., £235 to £265 per ton.

Ferro-tungsten.—80/85 per cent., 22s. 10d. to 23s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 25s. 9d. to 28s. per lb. of W.

Ferro-chrome (6-ton lots).—4/6 per cent. C, £85 4s., basis 60 per cent. Cr, scale 28s. 3d. per unit: 6/8 per cent. C, £80 17s., basis 60 per cent. Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. per lb. Cr; max. 1 per cent. C, 2s. 2½d. per lb. Cr; max. 0.15 per cent. C, 2s. 3½d. per lb. Cr; max. 0.10 per cent. C, 2s. 3¾d. per lb. Cr; max. 0.06 per cent. C, 2s. 4d. per lb. Cr.

Cobalt.—98/99 per cent., 20s. per lb.

Metallic Chromium.—98/99 per cent., 6s. 5d. to 7s. 6d. per lb.

Metallic Manganese.—93/95 per cent., carbon-free, £262 to £275 per ton; 96/98 per cent., £280 to £295 per ton.

Ferro-columbium.—60/75 per cent., Nb + Ta, 40s. to 70s. per lb., Nb + Ta.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £25 12s. 6d.; tested, 0.08 to 0.25 per cent. C (100-ton lots), £26 2s. 6d.; hard (0.42 to 0.60 per cent. C), £28; silico-manganese, £33 16s. free-cutting, £28 16s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 12s.; case-hardening, £33; silico-manganese, £34 17s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £29 16s.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 16s.; acid, up to 0.25 per cent. C, £33.

Sheet and Tinplate Bars.—£25 11s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £30 6s. 6d.; boiler plates (N.-E. Coast), £31 14s.; floor plates (N.-E. Coast), £31 15s. 6d.; heavy joists, sections, and bars (angle basis), N.-E. Coast, £28 9s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., untested, £32 4s. 6d.; flats, 5 in. wide and under, £32 4s. 6d.; hoop and strip, £32 19s. 6d.; black sheets, 17/20 g., £41 6s.; galvanized corrugated sheets, 24 g., £50 13s. 6d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £51 14s. 3d.; nickel-chrome, £73 3s. 6d.; nickel-chrome-molybdenum, £80 18s. 3d.

Tinplates.—57s. 9d. per basis box.

NON-FERROUS METALS

Copper.—Electrolytic, £253; high-grade fire-refined, £252 10s.; fire-refined of not less than 99.7 per cent., £252; ditto, 99.2 per cent., £251 10s.; black hot-rolled wire rods, £262 12s. 6d.

Tin.—Cash, £735 to £740; three months, £735 to £740; settlement, £740.

Zinc.—May, £70 to £70 5s.; August, £70 5s. to £70 10s.

Refined Pig-lead—May, £88 10s. to £88 15s; August, £82 15s. to £83 5s.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £95 12s. 6d.; rolled zinc (boiler plates), all English destinations, £93 12s 6d.; zinc oxide (Red Seal), d/d buyers' premises, £99.

Other Metals.—Aluminium, ingots, £161; magnesium, ingots, 2s. 10½d. per lb.; antimony, English, 99 per cent., £225; quicksilver, ex warehouse, £70 5s. to £70 10s. (nom.); nickel, £483.

Brass.—Solid-drawn tubes, 23d. per lb.; rods, drawn, 32⅜d.; sheets to 10 w.g., 255s. 3d. per cwt.; wire, 30½d.; rolled metal, 242s. per cwt.

Copper Tubes, etc.—Solid-drawn tubes, 28⅞d. per lb.; wire, 282s. 9d. per cwt. basis; 20 s.w.g., 311s. 9d. per cwt.

Gunmetal.—Ingots to BS. 1400—LG2—1 (85/5/5/5), £160 to £218; BS. 1400—LG3—1 (86/7/5/2), £172 to £238; BS. 1400—G1—1 (88/10/2), £254 to £375; Admiralty GM (88/10/2), virgin quality, £254 to £380 per ton, delivered.

Phosphor-bronze Ingots.—P.Bl, £275 to £385; L.P.Bl, £215 to £275 per ton.

Phosphor Bronze.—Strip, 368s. per cwt.; sheets to 10 w.g., 389s. 9d. per cwt.; wire, 45¾d. per lb.; rods, 40½d.; tubes, 38½d.; chill cast bars: solids 3s. 3d., cored 3s. 4d. (C. CLIFFORD & SON, LIMITED.)

Nickel Silver, etc.—Ingots for raising, 2s. 5¾d. per lb. (7 per cent.) to 3s. 8¾d. (30 per cent.); rolled metal, 3 in. to 9 in. wide × .056, 2s. 11¾d. (7 per cent.) to 4s. 2¾d. (30 per cent.); to 12 in. wide × .056, 3s. to 4s. 3d.; to 25 in. wide × .056, 3s. 2d. to 4s. 5d. Spoon and fork metal, unsheared, 2s. 8¾d. to 3s. 11¾d. Wire, 10 g., in coils, 3s. 6½d. (10 per cent.) to 4s. 8¾d. (30 per cent.). Special quality turning rod, 10 per cent., 3s. 5½d.; 15 per cent., 3s. 11½d.; 18 per cent., 4s. 4d. All prices are net.

Obituary

MUREX LIMITED, Rainham, Essex, deeply regret to announce the death of Mr. C. H. Blenkinsop on May 19, following a protracted illness.

THE DEATH occurred recently of Mr. Mark Radcliffe Milnes, at the age of 67. Mr. Milnes was chairman and managing director of Heywood & Porteus, Limited, engineers and ironfounders, Gomersal, near Leeds, a firm with which he had been connected for forty years.

MR. WILLIAM STEVENS, who has died at Walsall aged 59, was one of five brothers who at Wolverhampton early this century introduced the A.J.S. motor cycle. He was director of Stevens Bros. (Wolverhampton), Limited, and of Stevens Screw Company, Limited, Wolverhampton.

WHEN A SKIPTON-BRADFORD train collided with an empty train when about to enter Forster Square Station, Bradford, last week, one man was killed and 10 others were injured. The dead man was Mr. Alfred Bell, a director and secretary of Charles Hahlo (Brazil), Limited, textile machinery exporters, of Bradford.

MR. C. B. TAYLOR, superintendent of the British Thomson-Houston King Edward Factory at Thorne, Doncaster, who has died, aged 47, was a Coventry man by birth. In 1927 he joined the test department of the B.T.H. Coventry Works; in 1935 he was made assistant chief tester; and in 1951 transferred to Thorne. He was a member of the Coventry Engineering Society.

PROF.-EMERITUS ROBERT HORNE, who died in Edinburgh on May 19, occupied the Chair of Mechanical Engineering for 16 years at Heriot-Watt College, Edinburgh, and for 12 years was professor at Gordon's Technical College, Aberdeen. He was 72 and began his engineering studies as an evening student in the Heriot-Watt College. His period in the Chair of Mechanical Engineering at the college was notable, and during that time he was responsible for the extension and development of the workshops and laboratories. During the first world war, he was district superintendent of the Ministry of Munitions, and for his work received the O.B.E.

Alteration to Iron and Steel Board

As announced elsewhere in this issue, Mr. Beard resigned last Saturday from the newly-appointed Iron and Steel Board. His withdrawal became known after he had met members of his union's executive, and his change of attitude is apparently the result of their discussions. The incident is particularly significant because the Pattern Makers' Association is a conservative craft union composed in the main of highly-skilled workers. It suggests that opposition in the movement to the acceptance by union leaders of positions on the Board may be wider than was previously thought.

Mr. Naesmith, the new member, is due to retire from the secretaryship of his union in August on reaching the age limit of 65. His position is somewhat different from that of other union leaders because he is not directly concerned with the steel industry. He is a part-time director of the Bank of England and will seek the formal approval the Governor and Court of the Bank for acceptance of his new duties.

NOTICE

Replies to Box Numbers to be addressed to "Foundry Trade Journal," 49, Wellington Street, London, W.C.2.

SITUATIONS WANTED

FOUNDRY FOREMAN / MANAGER desires change; West Midlands; small foundry; 44; M.I.B.F.; practical, technical, administration, sales; full responsibility; prove ability; post good prospects; grey, malleable, non-ferrous; life experience trade; jobbing, repetition; wide range castings; salary / results. — Box 3500, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER wants change; progressive position; West Midlands; fully practical, technically trained; entire responsibility, full charge; jobbing engineering, mechanised; sound results; experience wide range, estimating, costs, sales, administration, grey, malleable, non-ferrous; 45; M.I.B.F.; excellent record; references.—Box 3501, FOUNDRY TRADE JOURNAL.

FOUNDRY MANAGER, A.M.I.B.F., desires change; experience in all classes of foundry practice; mechanised, M/c tool, marine engine casting up to 6 tons; rate fixing, costing, estimating; used to being in complete control.—Box 3502, FOUNDRY TRADE JOURNAL.

WANTED: position of Foreman-Manager, ferrous or non-ferrous; take full responsibility of small Foundry; life experience; prospective accommodation.—Box 3503, FOUNDRY TRADE JOURNAL.

PRACTICAL FOUNDRYMAN, thirty years' experience, seeks post with small Foundry; willing to build up foundry if run down; capable of training labour; Managerial qualifications. — Box 3504, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 *inclusive or a woman aged* 18-59 *inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order* 1952.

WORKING FOREMAN required for small Non-ferrous Jobbing Foundry and Pressure/Gravity Diecasting Department. Previous experience controlling labour essential. Permanent position with excellent prospects for suitable applicant. South Coast area.—Write, first instance, stating previous experience, age, and salary required, to Box 3486, FOUNDRY TRADE JOURNAL.

REPRESENTATIVE required by well-known bronze foundry, manufacturing all types sand castings, maximum 2 tons. For area London including Home Counties. Salary and commission. Great opportunity for experienced man with live connections among buyers of sand and chill castings. Existing accounts will be handed over and the appointment carries remuneration at present worth four figures per annum. — Write in confidence: Managing Director, CHARLES CARR LTD., Grove Lane, Smethwick, 40, Staffordshire.

SITUATIONS VACANT—*Contd.*

FOUNDRY METALLURGIST for Modern Mechanised Non-Ferrous Foundry required to take charge of Physical and Chemical Laboratories and maintain high standard of production control at all stages of process. Analytical experience essential. Must be a man with definite initiative and leadership. Excellent prospects, salary according to qualifications and experience.—Box 3510, FOUNDRY TRADE JOURNAL.

VACANCY for Junior Draughtsman (North London). Age 21 years or over; preferably experienced in design of tools for Gravity Die Castings (Aluminium).—Box 3494, FOUNDRY TRADE JOURNAL.

LABORATORY ASSISTANT (Female) required with experience of routine Chemical Analysis for work in Foundry Laboratory. Please give full details of qualifications, experience, and salary required to H. WALLWORK & Co., LTD., Red Bank, Manchester, 4.

ESTIMATOR required for steel foundry. Applicant must have first class knowledge of all aspects of estimating for steel castings and sales office procedure. Persons not possessing these qualifications need not apply. State age, experience and salary expected to Box 3490, FOUNDRY TRADE JOURNAL.

REPRESENTATIVE required for first-class Non-ferrous Foundry in the London area. Able to introduce substantial business. Good connections essential. Excellent possibilities and remuneration to right man. State full particulars in the first instance in confidence.—Apply Box 3478, FOUNDRY TRADE JOURNAL.

FOUNDRY FOREMAN required, for large Midland Foundry. Must have first-class practical knowledge of the Light Casting Trade and General Engineering Castings. Knowledge of Rate-fixing, and must be first-class disciplinarian, preferably a resident in the Midland area.—Box 3492, FOUNDRY TRADE JOURNAL.

WANTED: Foundry Metallurgist for large engineering foundry in the Glasgow district. Work covers engineering grades of cast iron and a wide range of gunmetals, complex brasses and nickel alloys. The work calls for a sound knowledge of metals and melting practice coupled with some experience of moulding and moulding materials. Preferred age 25-30.—Box 3507, FOUNDRY TRADE JOURNAL.

NON-FERROUS firm of founders require representative with established connection already calling on engineering and allied trades to introduce their castings, as an additional line, and obtain business on a commission basis only. A representative already handling cast iron and steel castings would suit. Full particulars, size of area covered and other lines already carried.—Box 3505, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE required by Vitreous Enamel and Ceramic Colouring Oxide Manufacturers. Knowledge of the Enamelling Trade essential. Position superannuated. Applicants should state in confidence: age, their complete experience and salary required.—MAIN ENAMEL MFG. CO. LTD., Gothic Works, Angel Rd., Edmonton, London, N.18.

AGENCY

WELL-ESTABLISHED Midland Grey Iron Foundry engaged in making light castings, require agent on Commission basis. Reply stating terms, etc., Box 3499, FOUNDRY TRADE JOURNAL.

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2—Floor Space 302,000 sq. ft.; Site Area 17,000 sq. yds. Part modern, mainly multi-storied. Concrete on Brick Arch Floors. Covered Loading Yards, Road and Rail Docks. Price £40,000.

Sole Agents.—HILLIER PARKER MAY & ROWDEN, 77, Grosvenor Street, London, W.1 (Mayfair 7666.)

IRON FOUNDRY for sale as going concern, Manchester area, freehold land and building, capacity for castings up to 25 cwt.—NORMAN RAMSDEN, Estate Agent, 15, Clegg Street, Oldham. Mai. 4911.

IRONFOUNDRY PREMISES and plant for sale; Yorkshire, (W.R.); freehold; 2-ton Cupola; 2-ton Crane, Pneulec Royer, etc.—Box 3470, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

ROTARY MELTING FURNACE, second-hand, oil fired, 2-4 ton copper capacity.—Box 3508, FOUNDRY TRADE JOURNAL.

WANTED: Modern 20 cwt. motor-driven Drop Stamp.—Box 3506, FOUNDRY TRADE JOURNAL.

WANTED: 4 ft. or 4 ft. 6 in. shell diam. Cupola. also 5 ft. to 6 ft. underdriven Sand Mill.—FRANK SALT & Co., LTD., Station Road, Blackheath, Staffs.

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1—No. 3 DAVIES CUPOLA, 30 cwt. cap., complete with staging, Spark Arrestor, 20 in. Fan.

4—Size No. 275 J. Osborn type Pneumatic Jolt Press Moulding Machines, 250 lbs. cap. at 80 lbs. pressure per sq. in., complete with Vibrators, Knee Valves and Blow off Cocks; Table 16 in. by 20 in.; Jolt Cylinder diameter 3 in.; Press Cylinders dia. 10 in.—Box 3495, FOUNDRY TRADE JOURNAL.

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SAND MIXERS and DISINTEGRATORS for Foundry and Quarry; capacities from 10 cwts. to 10 tons per hr.—W. & A. E. Brealey (Machinery), Ltd., Misterton, nr. Doncaster. Tel.: Misterton 202.

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50	63	400/3/50	2,889	Cont.	Protected	S.C.	Elect. Const. ..	£60
10	14.6	,,	950	,,	,,	,,	Higgs	£25
30	43.5	,,	905	,,	,,	S.R.	E.E.C.	£70
15/7½	21/13	,,	975/475	,,	,,	S.C.	Metro.-Vic. ..	£45
15/7½	21/16	,,	945/478	,,	,,	,,	L.D.C.	£45
10	17	,,	475	,,	,,	,,	C. Parkinson ..	£50
7	13	,,	715/560	,,	,,	,,	,, ,, ..	£30
15/10	—	,,	1,460/960	,,	,,	,,	Brook	£45
30	43	,,	950	,,	,,	S.R.	C. Parkinson ..	£60
40	—	,,	1,500	1 hour	,,	S.C.	Brook	£55
12	17.5	,,	1,440	Cont.	,,	S.R.	L. Scott	£40
30	39	,,	720	,,	,,	S.C.	Lanc. Dynamo ..	£45
30	42	,,	970	,,	,,	,,	,, ,, ..	£45
10	15.5	,,	1,435	,,	,,	S.R.	Bull	£35
15	8	,,	2,840	,,	,,	S.C.	Metro.-Vic. ..	£4
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9	12	,,	1,400	,,	,,	S.C.	C. Parkinson ..	£25
7.5	18	,,	1,500	1 hour	T.E.	..	Mather & Platt ..	£27
10	12.6	,,	1,000	Cont.	Protected	,,	G.E.C.	£32
25	34	,,	1,460	,,	,,	,,	Higgs	£45
3	5	,,	2,920	,,	Fireproof	,,	B.T.H.	£25
¾	1.2	,,	1,420	,,	Protected	,,	Brooks	£7
¼	.53	,,	1,400	,,	,,	,,	Beresford	£3
35	—	,,	1,480	,,	,,	S.R.	Higgs	£65
½	—	,,	2,850	,,	,,	S.C.	Canning	£4
20	—	,,	1,500	,,	,,	,,	Brooks	£40
¼	—	,,	1,425	,,	,,	,,	C. Parkinson ..	£3
4	—	,,	1,465	,,	,,	,,	B.T.H.	£15
2	—	,,	950	,,	,,	,,	L. Scott	£12
½	—	,,	1,420	,,	,,	,,	Brooks	£4
2	—	,,	1,430	,,	,,	,,	C. Parkinson ..	£10
.95	—	,,	1,415	,,	,,	,,	B.T.H.	£5
5	—	,,	960	,,	,,	,,	Elect. Const. ..	£20

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2 COLEMAN WALLWORK Type C.N. Jolt Squeeze Pattern draw, 600 lbs. maximum box size 20 in. by 20 in. by 12 in. Pattern draw 10 in.

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2 Coleman Wallwork Type WT563C Jolt Squeeze. table 35 in. by 24 in. Pattern draw 12 in.

1 Molineux Type XI Shockless Jolt moulding machine.

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2 Pneulec Herman 1,500 lbs. Rollover machines.

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600

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42IN. KEITH BLACKMAN FAN, discharge 45 deg. downcast; multivane impeller; belt drive; 2,500 c.f.m., 2 in. w.g., 465 r.p.m.

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High pressure Fan by Keith Blackman, horiz. bottom discharge, 700 c.f.m., 30 in. w.g., 2,930 r.p.m.; belt driven from 10 h.p. S.C. Motor, 400/3/50.

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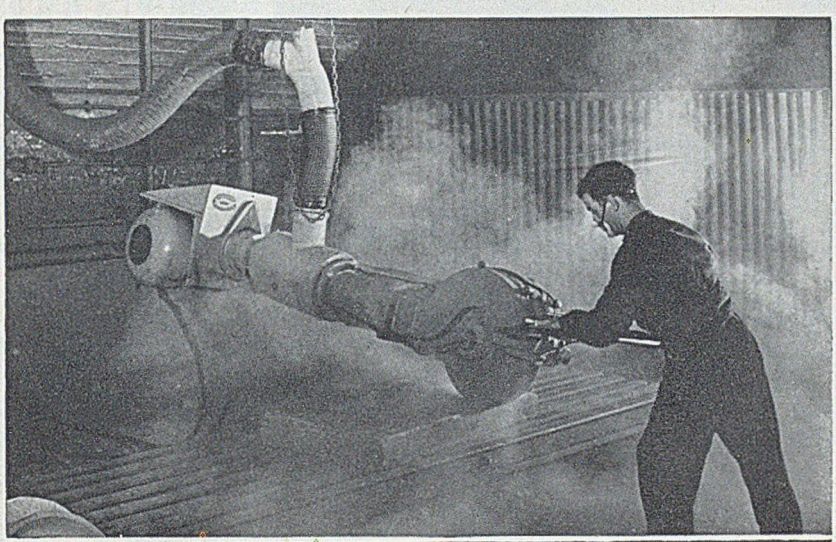

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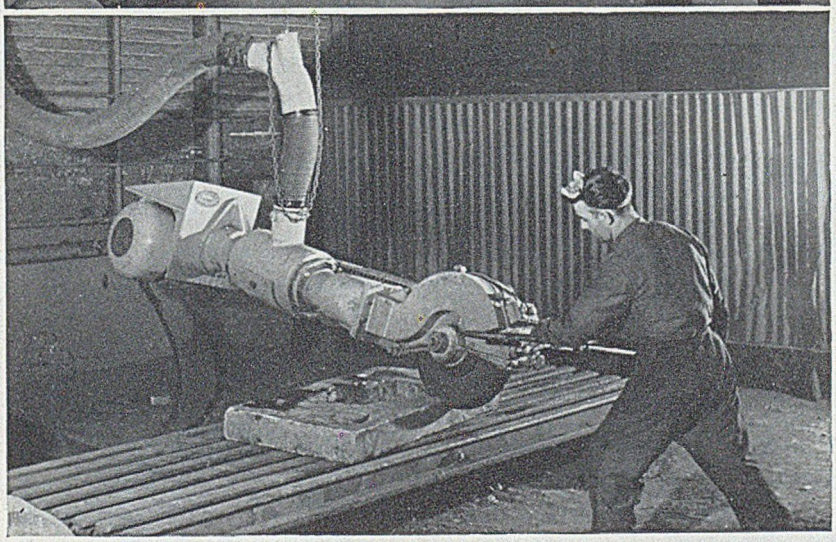

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