

FOUNDRY

EST. 1902

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VOL. 94
No. 1921

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WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

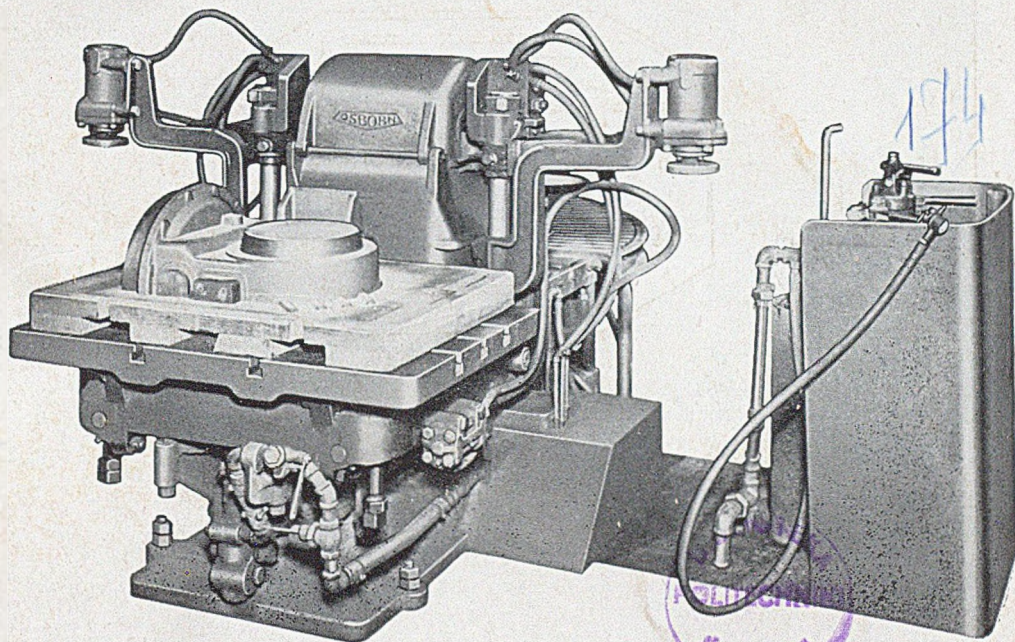
JUNE 25, 1953

Offices: 49, Wellington Street, Strand, London, W.C.2

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OSBORN ROCKOVER JOLTER

SIZE 242W



SPECIAL FEATURES

Pneumatic Clamps, which operate in tandem, to secure box during rockover.

Clamps rest on bottom board laid loosely on back of Mould and hence there is no reduction in box length capacity.

Air lock levelling mechanism to take care of variation in bottom boards.

Conveyor Rollers on levelling mechanism.

Oil controller pattern draw with slow and fast draw.

"T" slots in table for quick pattern change.

J. W. JACKMAN
AND COMPANY LIMITED

VULCAN WORKS
BLACKFRIARS ROAD
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COMB YOUR SAND WITH A **ROYER**

Built in England by

PNEULEC LTD., SMETHWICK, NR. BIRMINGHAM

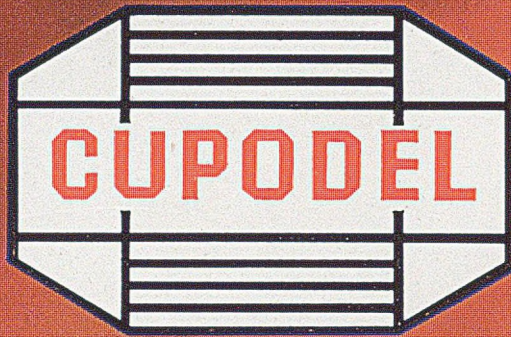
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Combine a variety of selected LOAMS and SILICA SANDS of guaranteed quality, suitable for every appropriate foundry requirement. In all fundamental respects they are the outstanding sands for present-day practice, and are tried and proved by performance and results.

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We are pleased to announce the successful operation of the latest hot blast cupola installation in the United Kingdom. It is engaged in the production of molten iron for high-grade automobile and other light engineering castings and has an ultimate designed capacity of 15 tons per hour.

Please invite us to investigate the possibilities of the MODERN MELTING METHOD as applied to your own conditions.

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and at ABFORD HOUSE • WILTON ROAD • LONDON • S.W.1



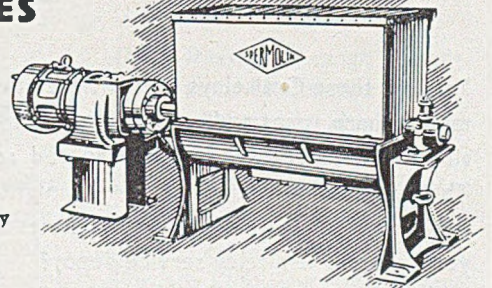
**Ensure
sound
consistent
CASTINGS**

**WRITE FOR FULL INFORMATION OF
the Spermolin range
OF FOUNDRY SPECIALITIES**

*Photograph by courtesy of
Messrs. John Stirk & Sons Ltd.,
Halifax*

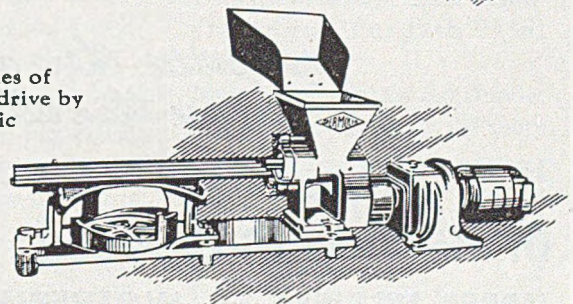
CORE OILS & BINDERS FOR EVERY TYPE OF CASTING

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.



SAND MIXING MACHINES

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

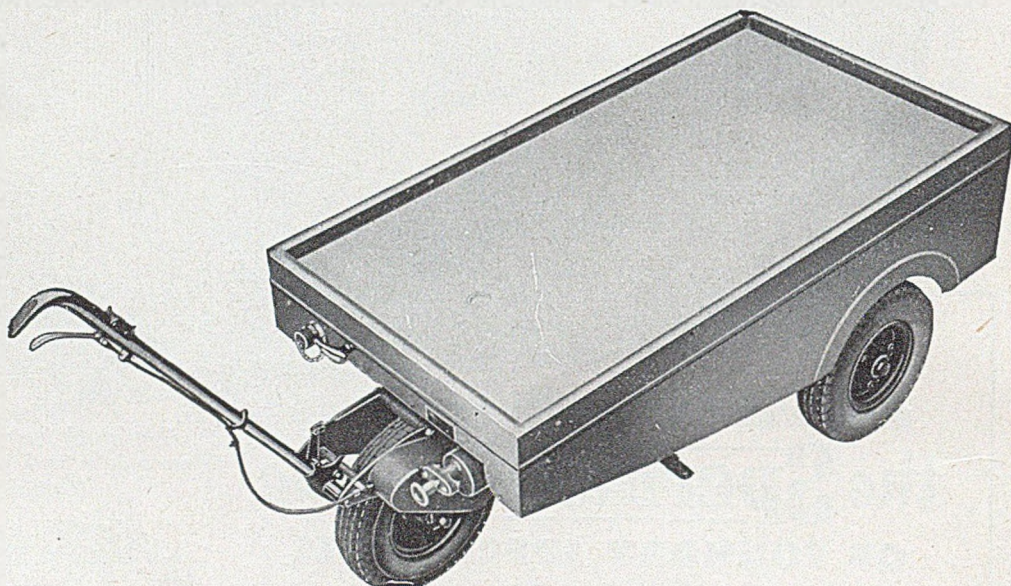
This SPERMOLIN Rotary Core Maker is simple, efficient and economical in operation and offers a wider scope than any similar machine.

WRITE TO SPERMOLIN LIMITED, HALIFAX, ENGLAND

Telephone: Halifax 4197

Telegrams: Spermolin, Halifax

and often quicker
Cheaper than any other form of transport



You see these Graiseleys everywhere now, carrying loads up to 20 cwt., backing into awkward places, taking sharp turns and confined spaces in their stride, doing their ten miles a day for about 3d. The single handle is used for forward and reverse drive, braking and steering, so no skill is necessary. There are no fumes or noise. At night they are simply plugged in and forgotten. The automatic cut-out switches off when the batteries are charged. May we arrange a demonstration for you with your nearest Graiseley service depot?

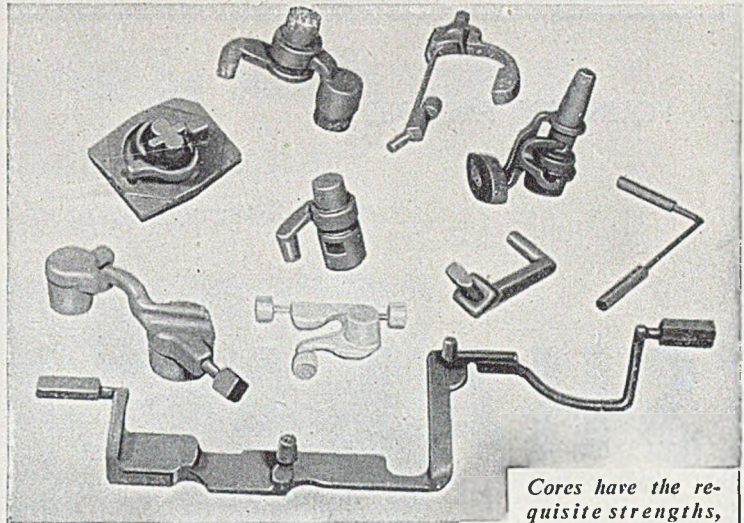
No wonder there are more Graiseleys in daily use than all other makes combined

DIAMOND MOTORS (WOLVERHAMPTON) LTD.
UPPER VILLIERS ST., WOLVERHAMPTON

Telephone : 22951



THE CORE-MIX IS AS GOOD AS ITS BOND



(PHOTO BY COURTESY OF MESSRS. WESTINGHOUSE BRAKE & SIGNAL CO. LTD.)

Cores have the requisite strengths, both green and 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 im-

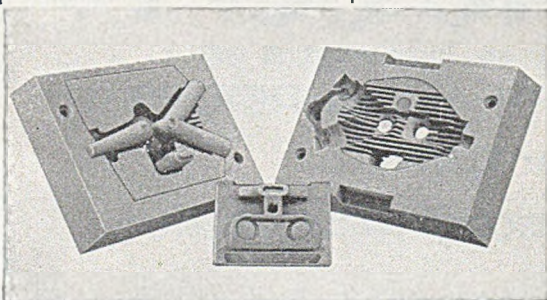
pregnated with core oil in accurate quantities for different classes of core work.

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.



(PHOTO BY COURTESY OF MESSRS. CENTRAL FOUNDRY CO. LTD.)



Full details obtainable from,
THE FORDATH ENGINEERING CO. LTD.
HAMBLET WORKS, WEST BROMWICH
STAFFS.

PHONE: West Bromwich 0549, 0540, 0562
GRAMS: Metallical, West Bromwich

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MIX ONLY WITH CLEAR WATER
FOR
DRY SAND MOULDS
AND COREWASH

W^M CUMMING & CO LTD

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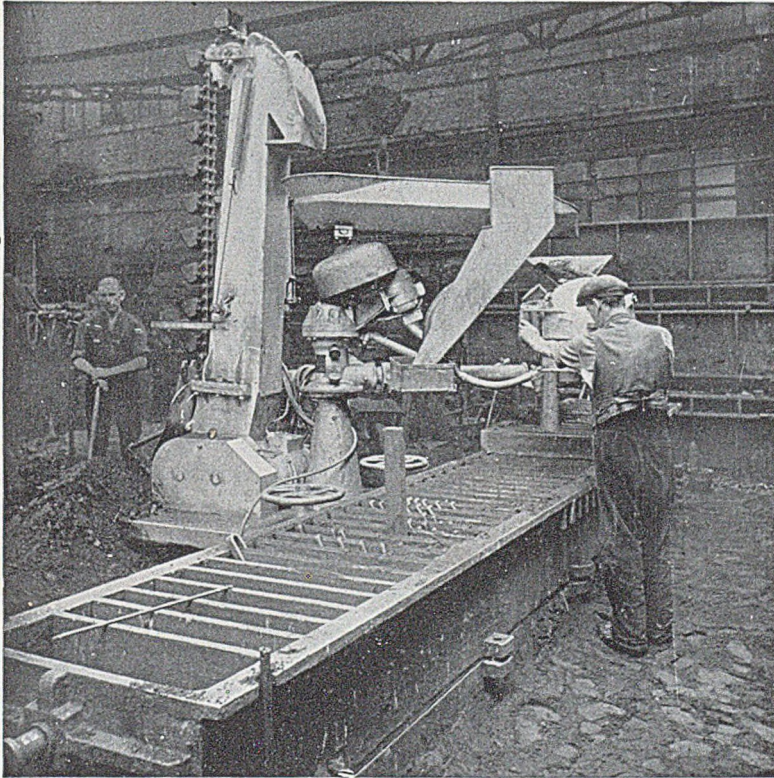
CHESTERFIELD

DEEPFIELDS near BILSTON

& MIDDLESBROUGH

SPEED UP PRODUCTION ON JOBBING WORK

The times demand Mechanical Aid
to increase production.



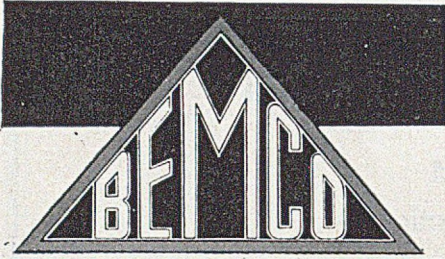
■
**Operator
Controls
all
Motors
by
Push Buttons
on
Sandslinger
Head**
■

To Jobbing Founders—Cut out the ramming of large boxes by hand. Let the Portable Sandslinger do the work in a small fraction of the time.

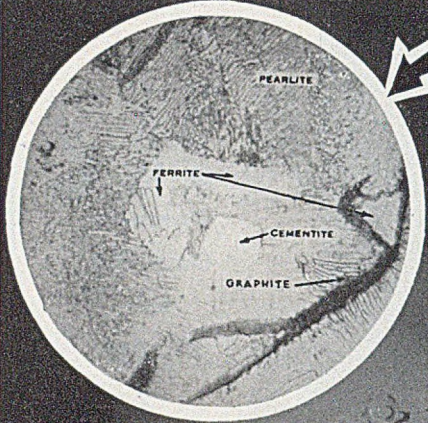
No foundations or air supply required. An electrical connection sets the machine to work.

FOUNDRY PLANT & MACHINERY LTD.

**113 W. REGENT ST.,
GLASGOW**



GRADED ALLOYS for LADLE ADDITIONS...



These structures in various forms and distributions can be greatly improved with ladle additions.

75/80% FERROSILICON

To reduce chill and improve machinability.

6% ZIRCONIUM FERROSILICON

To improve machinability and increase strength.

SMZ ALLOY

To improve strength and balance section thickness variations.

FOUNDRY GRADE FERROCHROME

To increase chill, refine structure and improve strength.

All Silicon bearing alloys are supplied **FREE FROM DUST** because fines give uncertain recovery, high oxidation loss and dirty ladles.

GRADINGS :

75/80% Ferrosilicon $\frac{1}{2} \times \frac{1}{4}$: $\frac{1}{2} \times \frac{1}{2}$: 100, 120 & 200 Meshes.

6% Zirconium Ferrosilicon $\frac{1}{2} \times \frac{1}{2}$: $\frac{1}{2} \times \frac{3}{4}$.

SMZ Alloy $\frac{1}{2} \times 32$ Mesh.

Foundry Grade Ferrochrome (65% Cr. - 6/8 % Si) 20 Mesh

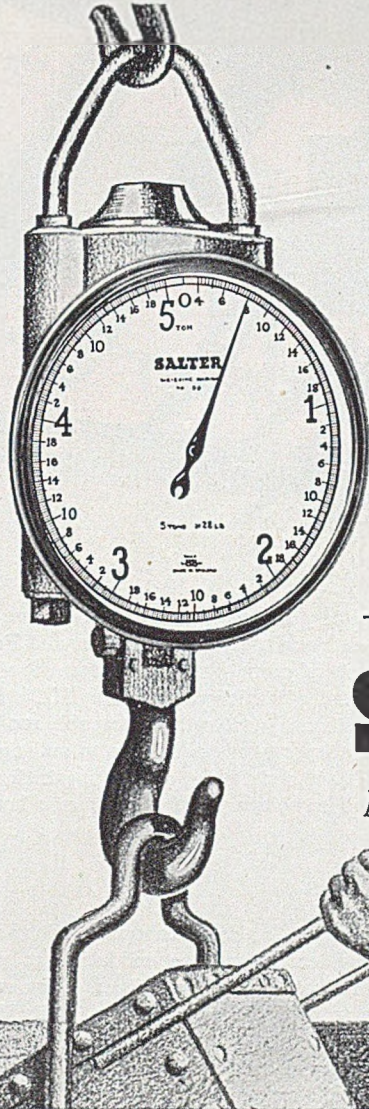
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WINCOBANK · SHEFFIELD · ENGLAND

Telephone: ROTHERHAM 4257 (2 Lines)

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For increased
productivity
in the foundry



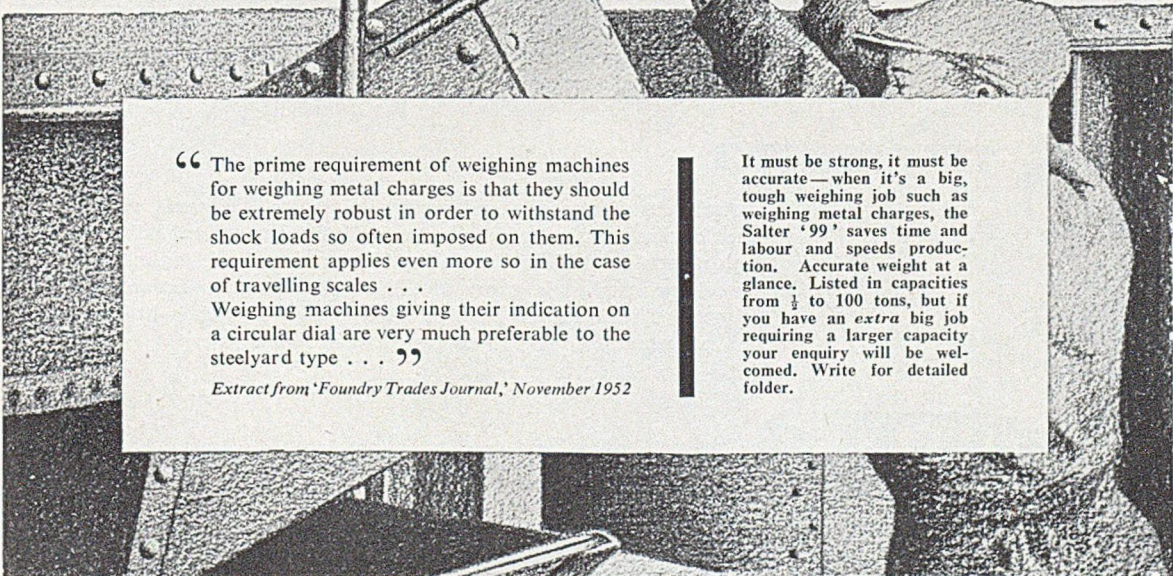
**Weigh
as you
charge**



—WITH THE

SALTER

No. 99 CRANE WEIGHER



“ The prime requirement of weighing machines for weighing metal charges is that they should be extremely robust in order to withstand the shock loads so often imposed on them. This requirement applies even more so in the case of travelling scales . . . Weighing machines giving their indication on a circular dial are very much preferable to the steelyard type . . . ”

Extract from 'Foundry Trades Journal,' November 1952

It must be strong, it must be accurate—when it's a big, tough weighing job such as weighing metal charges, the Salter '99' saves time and labour and speeds production. Accurate weight at a glance. Listed in capacities from 1/2 to 100 tons, but if you have an extra big job requiring a larger capacity your enquiry will be welcomed. Write for detailed folder.

GEO. SALTER & CO. LTD., WEST BROMWICH

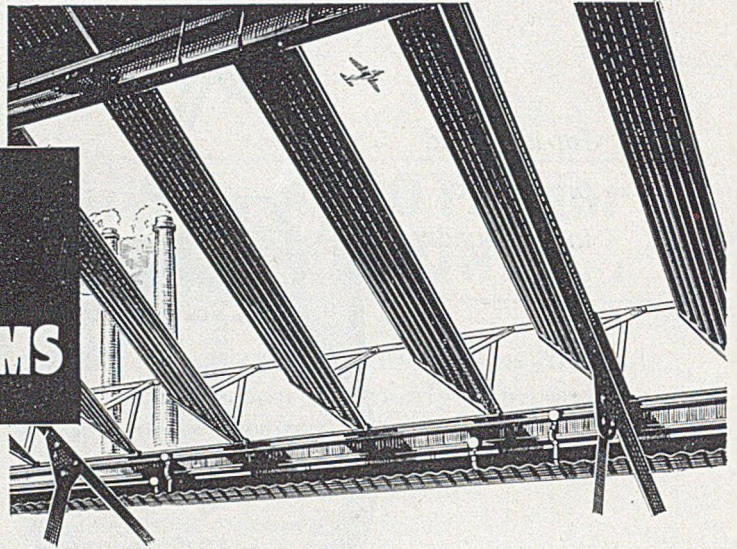
M-W-354

How

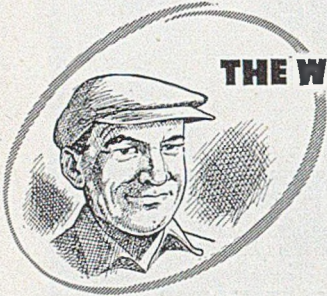
HILLS

VENTILATING SYSTEMS

Help...



THE WORKER



Where fumes, smoke, steam and excessive heat result from manufacturing processes—in Foundries, Retort Houses and Furnace Buildings—the great thing from the workers' point of view is to clear the air rapidly. No other system offers such rapid and efficient ventilation as Hill's Patent Roof Ventilating Shutters. They provide what is virtually a moveable roof to the building, and at the touch of a button they can be opened up to an angle of 65 degrees in 60 seconds—drawing off heat and fumes, and letting in fresh air and unobstructed daylight—a great and immediate relief to workers in hot or humid shops.

THE MANAGEMENT



Good ventilation is a sound investment on the part of the management, because good working conditions are conducive to good workmanship, and efficient ventilation reduces fatigue and absenteeism and leads to increased production. In addition to their greater efficiency, Hill's Ventilating Shutters offer the most economical system of ventilation, require negligible maintenance, effect a considerable saving in artificial lighting and glass-cleaning and can be installed in old or new buildings.

THE ARCHITECT



Architects who specify, and builders who install, industrial ventilating systems must obviously insist on those of proved efficiency and reliability. Proof of the high reputation of Hill's Ventilating Shutters is to be found in the fact that they have been installed in many of the best-known organizations throughout the country. Architects and Builders are assured of the whole-hearted co-operation of our Technical Advisory Department at all times.

HILLS

INDUSTRIAL VENTILATORS

In addition to Ventilating Shutters, Hills INDUSTRIAL VENTILATORS include STACK ROOF VENTILATORS and WALL-TYPE AIR INLET VENTILATORS. For expert advice on installing efficient ventilation in a new or existing building, we invite you to consult our Technical Advisory Department. Literature gladly sent on request.

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REDUCE

SCRAP
CROSS JOINTS
FETTLING
IDLE BOXES

Nitrided! LAST LONGER!

Specify **B·A·C** Bushes
when ordering new
boxes or when rebushing.

BRITISH AERO COMPONENTS, LTD.
HOLBROOKS LANE, COVENTRY

THE 'MAJOR' SANDRAMMER

SMALL PERMANENT MAGNET

1,000 LB. CAPACITY SAND HOPPER

ALL CONTROLS CONVENIENTLY PLACED ON HEAD

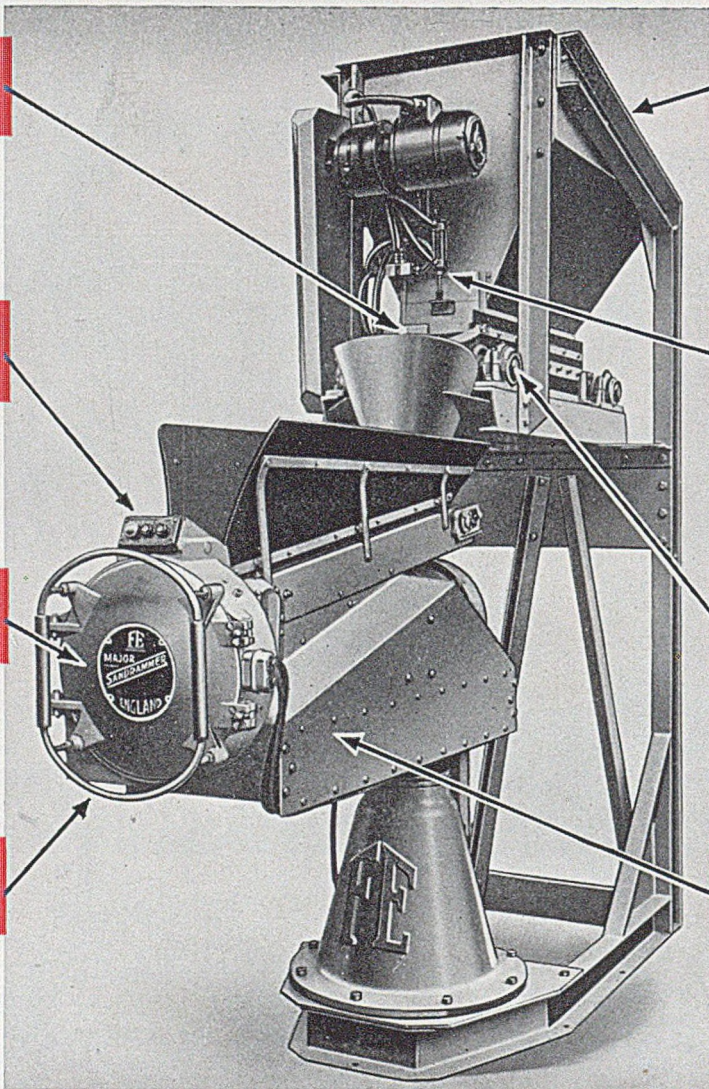
PNEUMATICALLY CONTROLLED HOPPER GATE

LARGE DIAMETER MULTI-BLADED IMPELLER HEAD

BUILT-IN FEEDER BELT FOR SAND SUPPLY

HIGH OUTPUT, 600 LBS. PER MINUTE

MAXIMUM BOX COVERAGE 4 ft. by 2 ft. 6 in. by 2 ft. 1 1/2 in. DEEP



BRITISH PATENT NO'S. 657197 AND 663318. FOREIGN PATENTS GRANTED OR PENDING

FOUNDRY EQUIPMENT LTD

LEIGHTON BUZZARD, BEDFORDSHIRE, ENGLAND

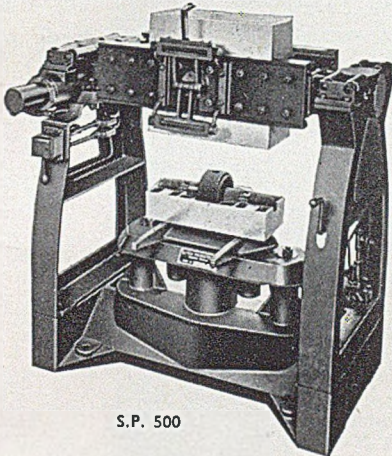
PHONE: LEIGHTON BUZZARD 2206-7-8 GRAMS: 'EQUIPMENT' LEIGHTON BUZZARD



CORE BLOWING EQUIPMENT —

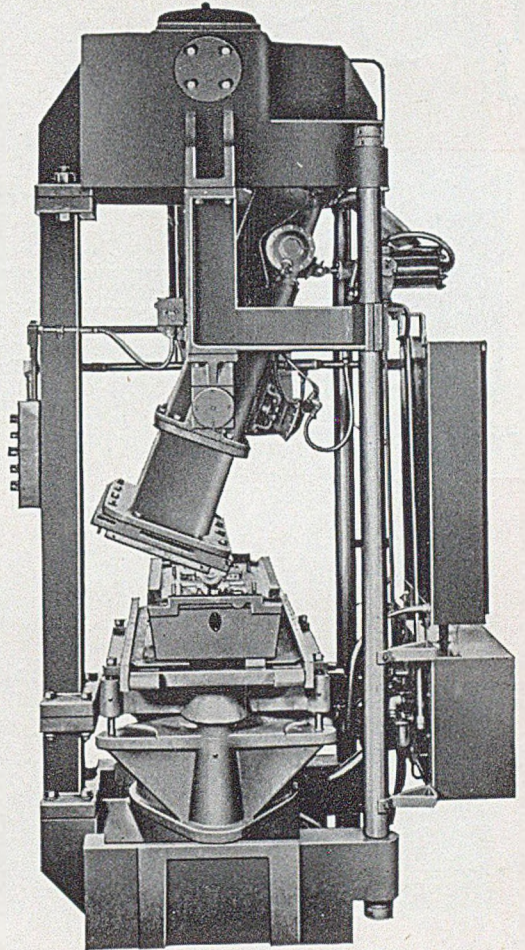
F.E. (SUTTER) Core Blowing Equipment has been designed for and proved in production foundries, where high output and accuracy with reduced manpower are of vital importance.

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.



FOUNDRY EQUIPMENT LTD

LEIGHTON BUZZARD, BEDS, ENGLAND.

'PHONE: LEIGHTON BUZZARD 2206-7-8.

'GRAMS: "EQUIPMENT" LEIGHTON BUZZARD.

FOUNDRY DUST

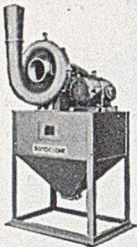
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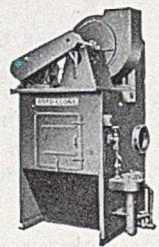
ROTOCLONE[®]

DUST FROM

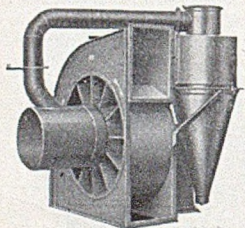
SHAKEOUTS, SAND HANDLING SYSTEMS, SWING FRAME, SNAGGING and PORTABLE GRINDERS, TUMBLERS, MULLERS, and ABRASIVE CLEANERS; SMOKE AND FUMES FROM ELECTRIC FURNACES



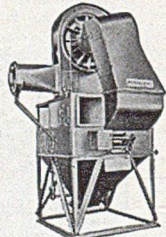
TYPE "D"



TYPE "N"



TYPE "F"



TYPE "W"

Write for details and Manual of Exhaust Hood Designs to:

AIR CONTROL INSTALLATIONS LTD
RUISLIP MIDDX.
 'Phone: RUISLIP 4066 (8 lines)
 'Grams: CONTROLAIR, RUISLIP



BIRMINGHAM · MANCHESTER · GLASGOW

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Beetle
in use
No. 25



**“28% saving in
sand mix costs”**

—The Avery Foundry,
Sherburn-in-Elmet.

What does the changeover to Beetle W20 mean in terms of prime cost? In the experience of this foundry, the introduction of W20 has effected a 28% reduction in the cost of binding materials alone. That is but the beginning of the economics of W20. Better ramming and stripping; quicker stoving and easier knock-out properties of W20 cores make for economy in production all along the line.

Write for Technical Leaflet C.B.1



BEETLE RESIN W20 Core-Binder

BRITISH INDUSTRIAL PLASTICS LIMITED, 1 Argyll Street, London, W.1

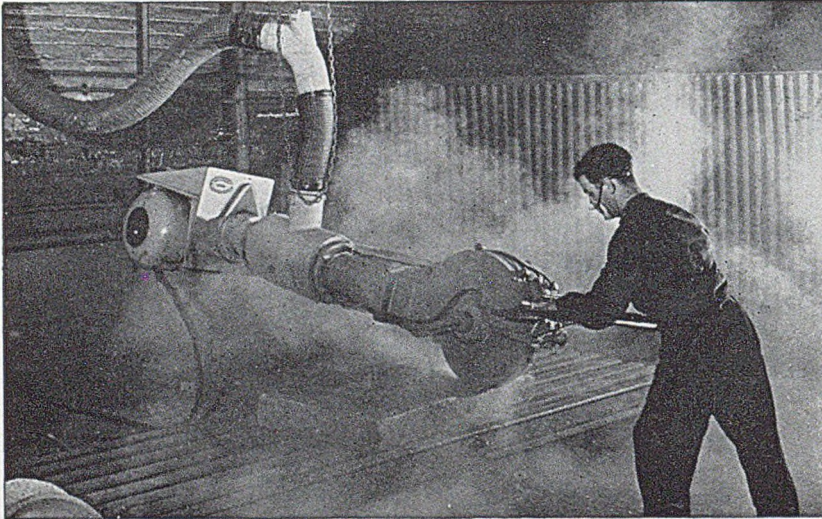
Sole agents in Scotland and Northern Ireland:

FOUNDRY & ENGINEERING PRODUCTS CO. (GLASGOW) LTD., 1-8 Farm Rd., Glasgow, S.1

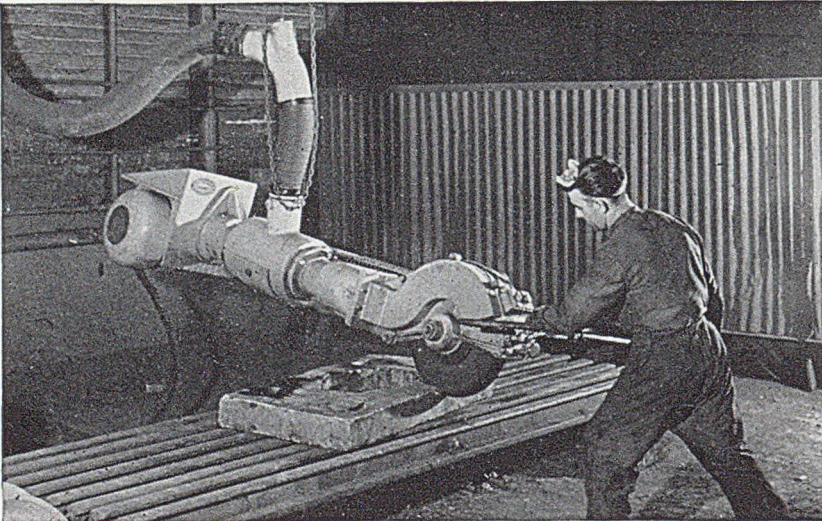
'BEETLE' is a trade mark registered in Great Britain and in most countries of the world

A NEW 20" SWING FRAME GRINDER

which completely solves one of the worst problems in the foundry



GRINDING
WOOD
WITH
EXHAUST
OFF



GRINDING
WOOD
WITH
EXHAUST
ON

Reproduced above are unretouched photographs taken by The English Steel Corporation Ltd., Sheffield, showing the machine grinding wood for the purpose of photographing the smoke produced.

The second photograph, not faked in any way, shows the remarkable extraction achieved.

This grinder has been designed and built as a result of experiments over four years on an entirely new theory of dust extraction.

Exhaustive tests which have been filmed prove that this machine completely solves one of the worst problems in the campaign against Pneumoconiosis.

In your own and your operators' interests, we should like to send you full details.

LUKE & SPENCER LTD.

Centurian Works, Broadheath, Altrincham, Cheshire

Phone: Altrincham 3281

Grams "Emery, Altrincham"

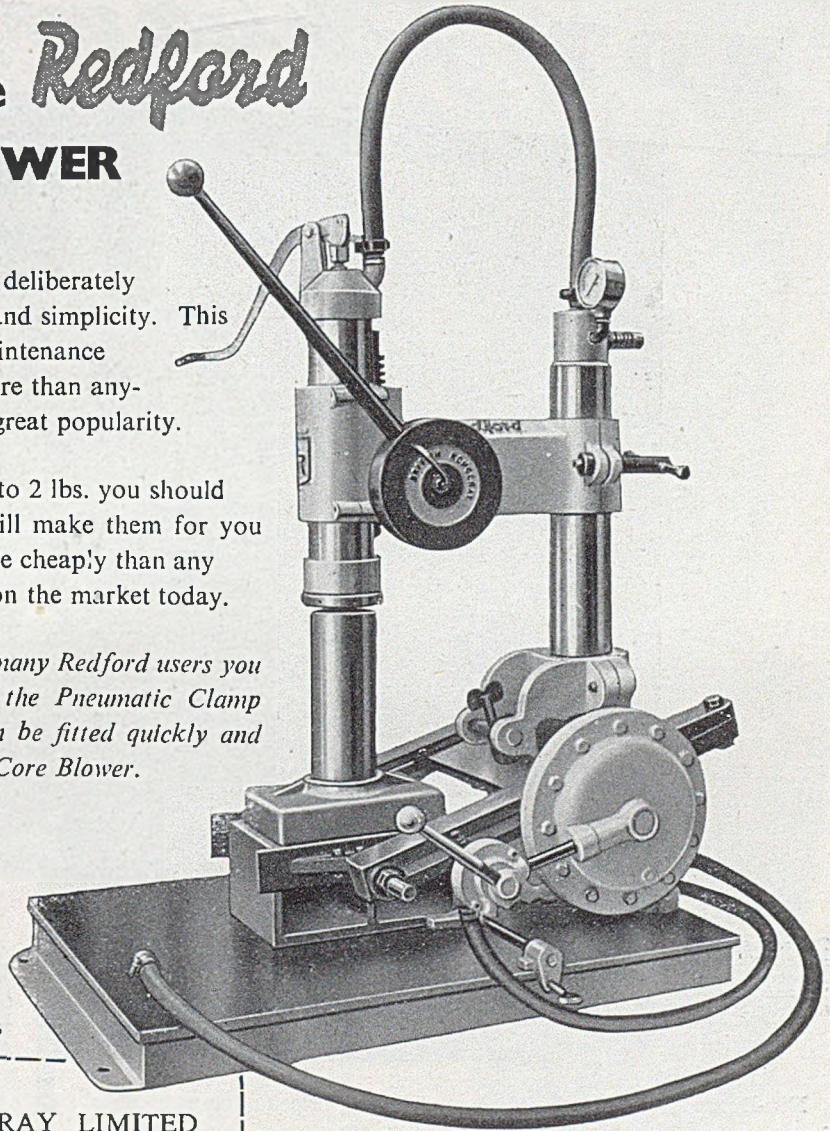
Simplicity itself-

-that's the *Redford* **CORE BLOWER**

The Redford has been deliberately designed for strength and simplicity. This cuts operating and maintenance costs and accounts more than anything else for its very great popularity.

If you make cores up to 2 lbs. you should use a Redford. It will make them for you more quickly and more cheaply than any comparable machine on the market today.

If you are one of the many Redford users you will be interested in the Pneumatic Clamp (illustrated) which can be fitted quickly and easily to your present Core Blower.



PAT. No. 618436

To BRITISH RONCERAY LIMITED

Please send me further details of the Redford Core Blower/Redford Pneumatic Clamp without obligation.

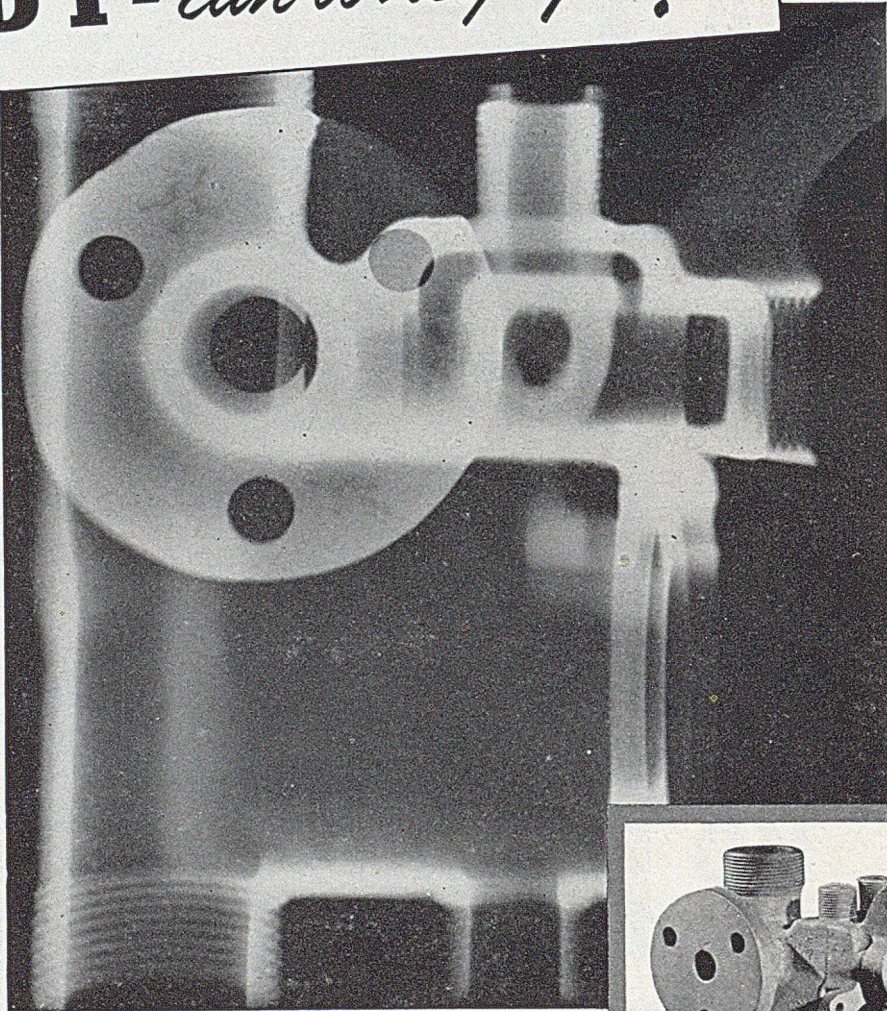
Name.....

Just attach to one of your Letter-headings and post to-day to:—

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HATTON HOUSE, THE SQUARE, DUNSTABLE, BEDS.
Tel.: DUNSTABLE 1190 Grams.: 'BRONCERAY' Phone Dunstable

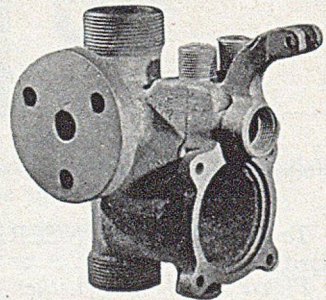
NDT - *can it help you?*



The radiograph was made on 'Crystallex' X-ray Film with 'Kodak' Lead Intensifying Screens.

Non-Destructive Testing by gamma-radiography helped to detect a defect in this partly-machined casting, which had failed to pass its hydraulic test. Gamma-radiography made it possible to record all the specimen on one sheet of film covering the whole range of thicknesses involved.

Gamma-radiography can help you solve production problems. We shall be glad to advise you about its many uses.



Casting from which gamma-radiograph was made.

KODAK Films FOR GAMMA-RADIOGRAPHY

'Crystallex' X-ray Film • 'Industrex' Type D and Type S X-ray Films

KODAK LIMITED, Industrial Sales Division, KODAK HOUSE, KINGSWAY, LONDON, W.C.2

'Kodak', 'Industrex' and 'Crystallex' are registered trade-marks

What a bind!



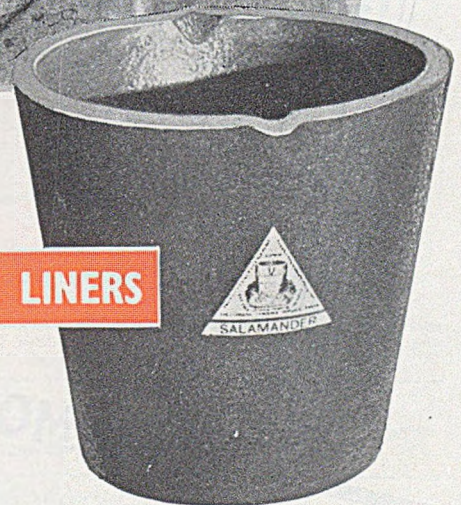
"Every week I have to mess about with dirty clay, daubing the stuff until I feel like an old fashioned potter—and every day I've got to put back the bits that've come unstuck. It's an absolute waste of time."

Have you ever calculated the working hours saved by using pre-fired liners? With hand daubing it takes thirty minutes to refit a ladle, 2 hours to dry out, 15 minutes every day to repair it, with another 10 minutes to dry out; that's 4½ hours a week—and it only lasts a week! *117 hours in 6 months spent in maintenance. A Salamander liner lasts as long *without* any maintenance. That is only one ladle—think of the hours saved on *all* your ladles. Added to this, there is no wetting or contamination of the metal, reduced heat loss, easier working conditions and a perfect casting every time. It will pay you to change to Salamander Plumbago Ladle Liners.

★ *Figures based on ladle with 1 cwt iron capacity.*

Salamander PLUMBAGO LADLE LINERS

- No contamination of metal
- Cannot cause porosity in casting
- Reduced heat loss
- Simple easy fitting
- No slagging
- Maximum working life
- Regular capacity



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Telephone: BATTERSEA 8822. Telegrams: Crucible, Souphone, London

CR. 100

NO. 10 PREPARED BLACKING

• The Core and Mould Wash
for **IRON CASTINGS**

STEELMOL for STEEL and SPECIAL IRON CASTINGS

HIGH CARBON BLACKING · CEYLON PLUMBAGO
TERRA FLAKE · COAL DUST · GANISTER AND
"ALUMISH" FOR ALUMINIUM

Non-Silica **PARTING POWDER**

JAMES DURRANS & SONS LTD

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Telephone: PENISTONE 21 and 57

PENISTONE, near SHEFFIELD
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There is a lively interest in the new applications of zircon and zirconium products in the foundry. Our Technical Development Service will be glad to have your enquiries :

ZIRCOSIL IN FOUNDRY PRACTICE



ZIRCOSIL GRANULAR ZIRCOSIL D	Zircon sand and flour for cores, mould washes ; precision casting investment, shell moulding, permanent ceramic moulds ; pre-treatment of enamelling cast iron.
ZIRCOSIL BLENDED	For high temperature cores.
ZIRCOSIL WASH PASTE	A wash or spray for moulds and cores.
ZIRCOSIL RAMMING MIX	For ramming and patching electric furnace linings.

* By arrangement with the Titanium Alloy Manufacturing Division of the National Lead Company, New York, we are making under licence their range of "TAM" products and represent them in Europe for zirconium metal and zirconium chemicals.

ASSOCIATED LEAD MANUFACTURERS LIMITED

ZIRCON DIVISION, CRESCENT HOUSE, NEWCASTLE UPON TYNE. 2.

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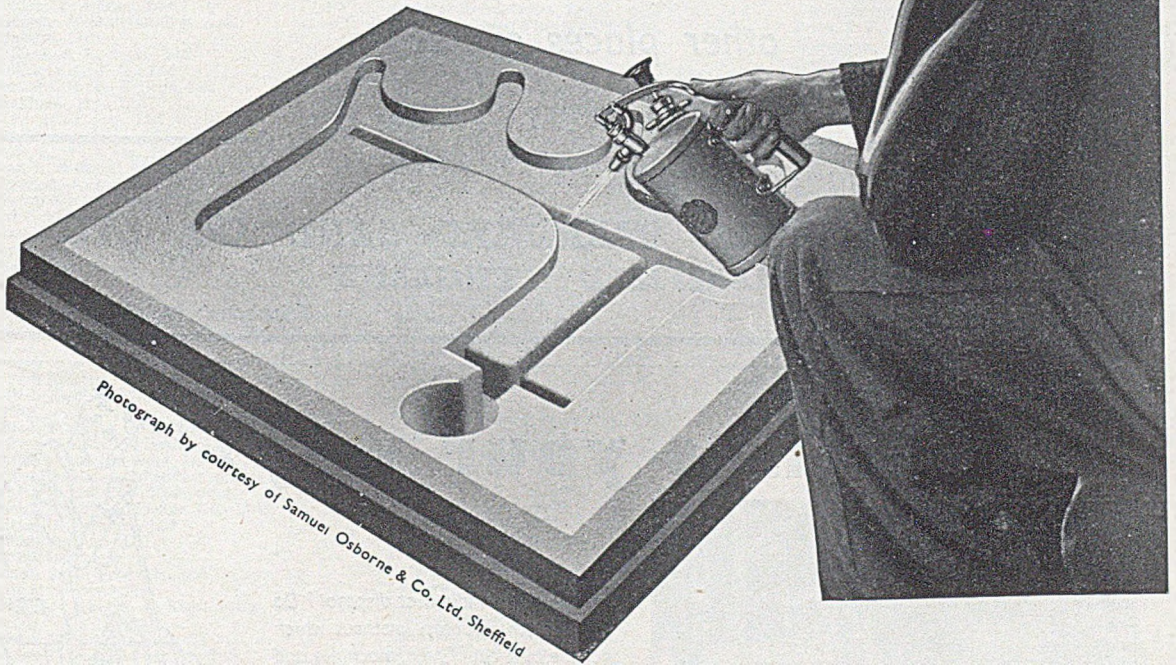
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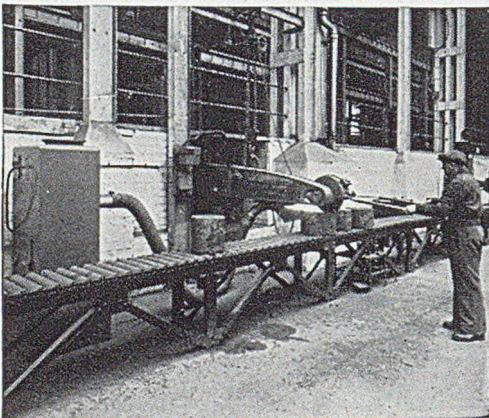
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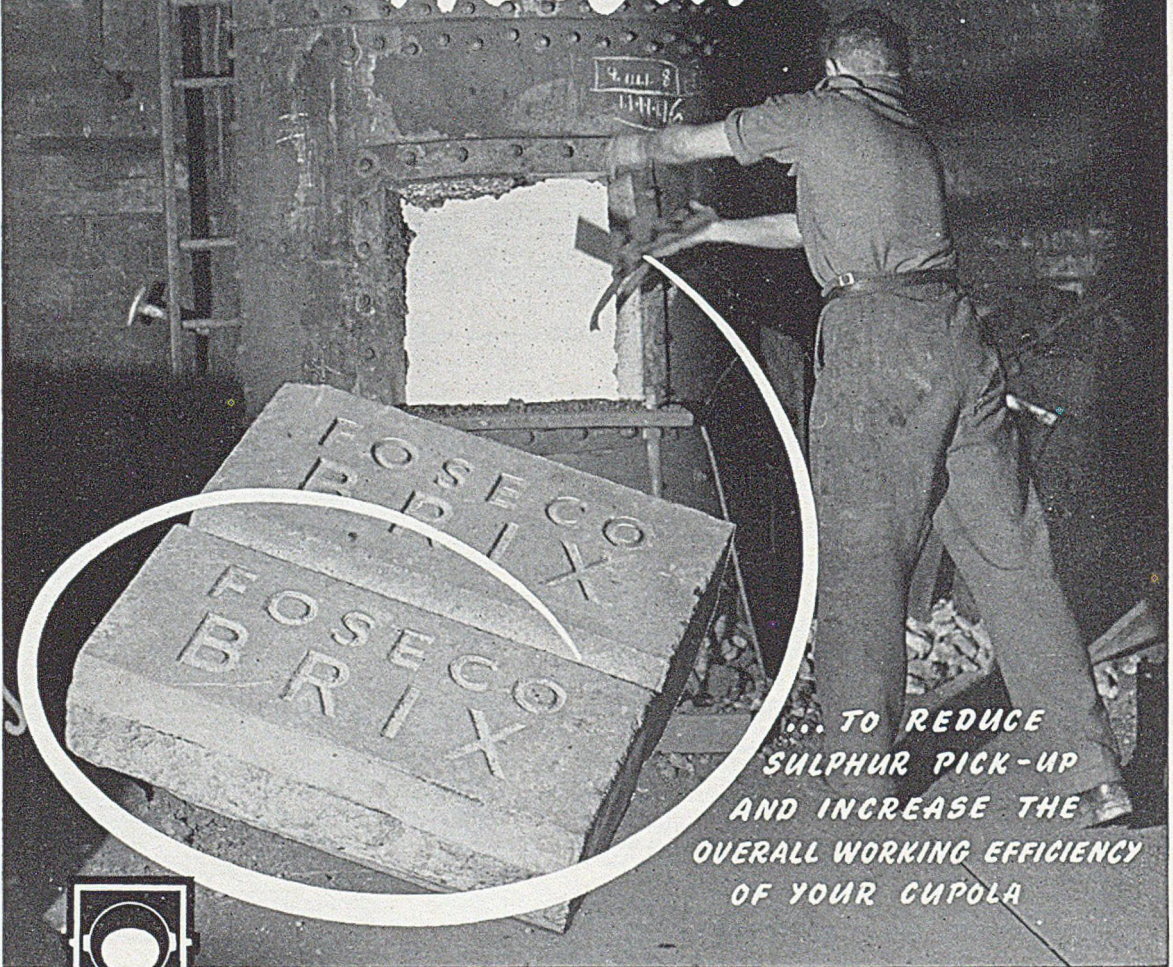
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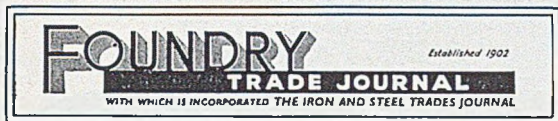


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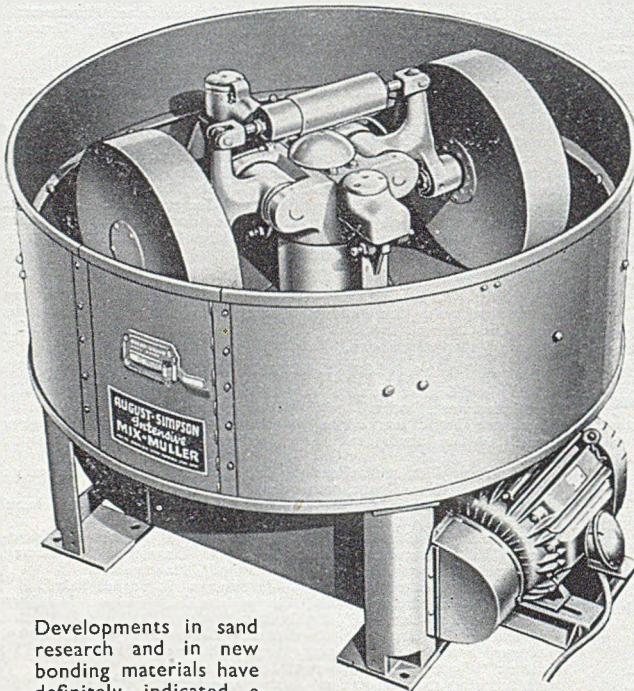
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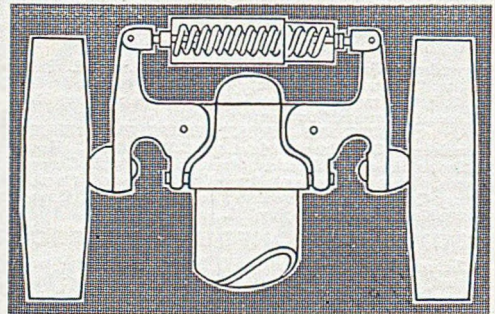
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The Blackpool Conference

The fiftieth Conference of the Institute of British Foundrymen, like the first, was held under the auspices of the Lancashire branch. Moreover, the first conference to be held in Blackpool, in 1921, saw the presentation of the first of an unbroken and brilliant series of American exchange papers. Mr. Longden's presidential address, based on a long and honourable career in the foundry industry, was well received. The Edward Williams lecturer, Mr. E. W. Colbeck, gave his large audience a vision of things to come when he dealt with the impact of atomic science on the foundry industry. He promised no easy time for manufacturers of castings, as new materials and new methods would be needed, coupled with the most rigid inspection. He received an ovation reminiscent of the last appearance of an operatic star, and well he deserved it.

The technical sessions were well attended, with varying enthusiasm. The session on shell moulding was of major interest. In presenting the American exchange paper on this subject, the Author, Mr. Ames, was fortunate in having Mr. Hallett as his deputy, for not only was his representative a master of the subject, but was exceptionally clear in exposition. This was followed by a second paper by Mr. Buttrey, who kept his hearers entranced at the developments reported. By now, the limitations as well as the potentialities of the process are being

realized, yet there are avenues for improvements which, so far, have scarcely been traversed. Moreover, many of the difficulties so far encountered can, and will, be overcome. The discussion on the suppression of dust from stand grinders fell flat. Two systems were shown by means of films and perhaps no one wished to make any contentious criticism.

The social side of the Conference was an undoubted success. Blackpool has exceptional facilities for the staging of large conferences—and this one was attended by nearly 600 persons. We thought the after-dinner speeches were excellent and commendably short. Sir William Larke did extremely well, deputising at short notice for Mr. A. R. W. Low, M.P., Parliamentary Secretary to the Minister of Supply. It was a very gracious speech, for, as one who, though primarily associated with iron and steel, has since 1927 taken a profound interest in the Institute, he is particularly well placed to assess its value to the industry it serves and to the community at large. The organization was, as always, carefully envisaged and meticulously carried through. The members were indeed grateful to the secretariat and the Blackpool Corporation officials for creating such a well-thought-out programme, which was enjoyed to the full by the visitors. Foundrymen and their ladies will long cherish happy memories of the 1953 Conference.

Trade with the Caribbean

Sir William Rootes, chairman of the Dollar Exports Council, said in Birmingham on June 12 that the new "Elizabethan Age" could not be successful through mere phrases or patriotic sentiments, but depended for its realization on the efforts of everyone. Sir William was speaking at a meeting held at the Birmingham Chamber of Commerce to encourage British trade to Caribbean countries and to publicize the conclusions of the British trade mission which recently visited that area.

The Caribbean markets, he said, were largely Britain's before the war. America had since taken Britain's place, but there was no reason why that should continue. We must be more competitive and more aggressive in merchandising and salesmanship. Firms, generally, do not give enough consideration to the establishment of the right agents, Sir William added, pointing out that those firms which cannot afford their own export organization might give greater consideration to forming export groups. Mr. H. Eccles-Williams, of Rabone, Petersen & Company, Limited, Birmingham, a member of the mission, said that its most important recommendation was that British firms of consulting engineers should be established in Caracas and Bogota. British firms should also open factories in Mexico.

New Protective Device



[Courtesy Frigidaire Division of General Motors Limited.]

Shoulder-braced face guard worn for jobs where there is a danger hazard from flying chips of metal. It is made by R. F. D. Company, Limited, Catteshall Lane, Godalming, Surrey.

THE JOINT LIQUIDATORS of the Shotts Iron Company, Limited (in voluntary liquidation), announce that a second distribution of 6s. per 10s. share will be made on July 28 to shareholders on the register at June 30. A first distribution of assets of 24s. per share was made on May 15.

Census of Production

An order indicating the scope of the census of production to be taken in 1954 for the year 1953 has been made by the Board of Trade. Sampling methods which were introduced for the census of 1952 for the first time will again be used, and the census form will accordingly contain few questions. The decision to take a simplified sample census for the second year in succession will again represent a substantial reduction of the burden on industry. It will also permit the greatest possible economy in the census of production office at the Board of Trade.

The census will cover all producing industries, as before, and returns will be required from all firms over a certain size in each trade. A sample will be taken of the medium-sized and smaller firms, however, which means that the majority will not be required to make a return. From the information obtained, early estimates will again be made of certain important aggregates such as total sales, materials used, stocks, and capital expenditure for each trade.

The Order, which operates from December 31, 1953, is the Census of Production (1954) (Returns and Exempted Persons) Order, 1953. Copies may be obtained from the Stationery Office (2d.).

The statutory form of return will include questions on the number of working proprietors; average employment during the year; wages and salaries; expenditure on plant, machinery and vehicles, and also on new building work; total cost of materials and fuel purchased; total amount paid for work given out; value of stocks at the beginning and end of the year of return; total value of output; and transport payments.

Undertakings producing coal, gas, electricity, oil shale, crude or refined petroleum, and shale oil products are exempted from making a census of production return to the extent to which they supply the necessary information to the Minister of Fuel and Power.

Conference Paper Author

Mr. CLAUDE MASCRE, the author of the French exchange paper "Modification Methods for High-silicon Aluminium Alloys and the Corresponding Structure," which is printed on page 725 of this issue, was born in 1927 and educated at Saint-Cloud High School and at l'Ecole Supérieure de Physique et Chimie in Paris, where he obtained his Ingénieur diplôme. In 1950 he joined the staff of the Centre



Technique des Industries de la Fonderie, where he is engaged, in the field of light alloys, in promoting the application of research in foundries.

THE LENIN STEELWORKS at Diosgyör, in North Hungary, will have an output of 1,000,000 tons a year when it comes into full production in the near future, according to the Hungarian Press. All plants together produced 647,500 tons of steel in 1938. The production target for 1954 is 2,200,000 tons. The Lenin works' new blast furnace came into production at the beginning of this year.

I.B.F. Awards, 1953

Presentation of the following awards took place at the annual general meeting at the Winter Gardens, Blackpool, last week of the Institute of British Foundrymen.

Oliver Stubbs Medal

MR. G. W. NICHOLLS, of the West Riding of Yorkshire branch, has been awarded the Oliver Stubbs



MR. G. W. NICHOLLS

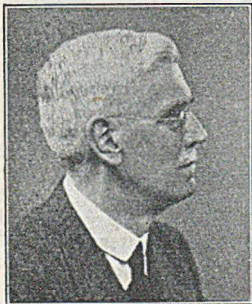
Medal in recognition of the outstanding quality of the many papers, largely of a practical nature, which he has presented to the Institute and for his contributions to the technical development of foundry practice. Mr. Nicholls is manager and metallurgist of Modern Foundries, of W. Asquith's Limited, Halifax. Born in 1911, Mr. Nicholls was educated at Rutherford Technical College and served his apprenticeship in the laboratory and foundry of the North Eastern Marine Engineering

Company, Limited, Wallsend-on-Tyne. Subsequently he served for nine years in the technical and research department of A. Reyrolle & Company, Limited, Hebburn-on-Tyne. He joined Modern Foundries, Limited, in 1940 as chief chemist and assistant manager, and was promoted to his present position in 1945.

Mr. Nicholls first joined the Institute as a junior member in 1928 and rejoined as a member of the West Riding branch in 1941. He was awarded a diploma of the Institute in 1944, and has presented papers to many branches of the Institute. He has been a representative of the West Riding branch on the Technical Council since 1944, and has served on a number of technical sub-committees. Mr. Nicholls is the author of the Institute's official exchange paper to the 1953 Convention of the American Foundrymen's Society.

E. J. Fox Medal

SIR WM. LARKE, K.B.E., was awarded the E. J. Fox Medal for 1953 in recognition of the great help and encouragement he has given to the foundry industry in many capacities. Sir



(Portrait by Vandyk)

SIR WM. LARKE, K.B.E.

William was educated privately and received his early industrial training at H. F. Joel & Company, and Siemens Brothers Company, Limited, of Woolwich. He joined the British Thomson-Houston Company in 1898 and in the following year became engineer and manager of the Power & Mining Department; in 1912 he was appointed executive engineer, a post which he relinquished in July 1915, when he volunteered for service with the Ministry of Munitions,

where he was placed in charge of various departments. He then became Director General of Raw Materials,

and was a member of the Disposal Board from 1919-22. In July, 1919, he was appointed a member of the Co-ordinating (Supply and Demobilisation) Committee. Three years later he became director of the British Iron & Steel Federation, a post which he filled with great distinction until 1946.

The many other important public appointments which Sir William has held include membership of the Advisory Council to the Committee of the Privy Council for Scientific and Industrial Research (1927-31), chairman of the Advisory Committee on Non-ferrous Minerals, Minister of Supply (1940), and controller of Non-ferrous Mineral Development 1942-45. Sir William was president of the British Standards Institution in 1949 and 1950, and is a past-president of the Institute of Welding (1938-42) the Junior Institution of Engineers (1936-37) and the Institute of Fuel (1933-34). He is a vice-president of the Iron & Steel Institute, by which organization he was awarded the Bessemer Medal in 1947.

Meritorious Services Medal

MR. HAROLD HAYNES, of the Lancashire branch, has received the Meritorious Services Medal in recognition of his active and exceptional work over a long period



MR. HAROLD HAYNES

for the progress of founding and in imparting his knowledge to others. Mr. Haynes is a past-president of the Lancashire branch, and foundry manager at the National Gas and Oil Engine Company, Limited. He served his apprenticeship at Moorhouse's Brass Foundry, Stalybridge, and at the works of Scott & Hodgson, Guide Bridge. He has since been at various other foundries engaged in making the largest gas-engine castings produced in this country.

On joining his present company in 1918 he introduced loam moulding and had the task of designing and erecting the present pits for making the large engine beds and columns. In 1939 he was appointed foreman and in 1943 became foundry manager.

During his term as president of the Lancashire branch, Mr. Haynes organized a short paper competition for apprentices throughout Lancashire. Great interest was displayed, over fifty entries for the competition being received. Positive results of Mr. Haynes' activities in training are shown in the number of apprentices and young journeymen under his charge. Examples of the practical nature of the information Mr. Haynes provides are contained in articles published in the FOUNDRY TRADE JOURNAL on pattern jiggling (being an account of the system employed by him with great success for the mounting and rapid changing of patterns for machine moulding) and on the ramming of cores with reclaimed sand. The film "Production of Castings for Internal Combustion Engines," which he prepared, along with his colleague, Mr. van der Ben, and which has been presented to most of the Institute's branches during the past three years in addition to presentation at two foremen's training courses held at Ashorne Hill, and numerous showings and talks to non-technical and juvenile audiences were other outstanding efforts.

*I.B.F. Awards, 1953***British Foundry Medal and Award**

The British Foundry Medal and Prize of £10 (donated to the Institute by the FOUNDRY TRADE JOURNAL) has this year been awarded to MR. D. F. B. TEDDS, of the Bristol branch, in recognition of the excellence of his paper entitled "Experiences with the Investment Casting Process."*



MR. D. F. B. TEDDS

Mr. Tedds, who is superintendent of the investment casting foundry at the Bristol Aeroplane Company, Limited, was educated at the Coventry Technical College and also the Central Technical College, Birmingham, obtaining the National Certificate for chemistry and the London City and Guilds certificates for ferrous and non-ferrous metallurgy.

He commenced his career in the laboratories of the Daimler Company under the late Mr. A. J. Harley (president of the Institute in 1931). He then went to the Northern Aluminium Company, Limited, Banbury, and after a period joined his present company as foundry metallurgist. After being associated with the light alloy foundries and bearing foundries he was detailed to commence work on the investment casting process. This has resulted in a number of patent applications being granted and also the employment of an extensive new investment foundry at Bristol.

Mr. Tedds is a very active member of the Bristol and West of England branch, of the Council of which he is a member. He also serves on various sub-committees and is the branch representative to the General Council. He was branch president in 1950-51 and has presented a number of papers at various branches and to other societies. Mr. Tedds is a Fellow of the Institution of Metallurgists and a member of the Iron and Steel Institute.

* Printed in FOUNDRY TRADE JOURNAL, March 20, 1952.

Commercial and Industrial Education

Methods used in Europe to educate and train young workers will be studied at the annual conference of the West Midlands Regional Group of the British Association for Commercial and Industrial Education at Ashorne Hill, Leamington, from June 26 to 28. The theme of the conference is "Learning from Overseas," and foreign speakers will include Mr. G. C. M. Hardebeck, of Holland, and Mr. Rolf Lahnhausen, of Sweden, both proficient in apprenticeship training. Professor H. F. Humphreys, vice-principal of Birmingham University, will open the conference with a talk on the purpose of education, and Professor C. H. Dobson, Professor of Education, Reading University, will speak on the training of the young worker in France.

THE TOTAL DIVIDEND on the £433,850 one-class capital of Simon-Carves, Limited, manufacturers of coke-oven plant, etc., of Stockport (Cheshire), is brought up to 20 per cent. by a final recommendation of 7½ per cent. Group trading profits for the year to December 31 reached £840,456, or 136 per cent. higher than in the previous year.

Welding of Aluminium

A demonstration of two methods of overcoming difficulties in the welding of aluminium was given recently by Northern Aluminium, Limited, at Hillington, Glasgow. For some years, aluminium has been recognized as a potentially suitable structural material in many more uses than those to which it is normally put, because of its lightness and strength, but its range of applications has been limited by inherent difficulties in joining which are now being overcome. Aluminium is coated with an oxide film which is difficult to break down, thus preventing parts from fusing together when welding, and where a flux is used it is not always possible to clean it off the metal, with the result that corrosion can occur.

The more spectacular of the Glasgow firm's methods from the point of speed was "Sigma" (shielded inert gas metal arc). In this an arc is struck between the workpiece and a consumable wire which is both electrode and filler material, being continuously led through the welding nozzle, and consumed in the arc. Wire, arc, and weld pool are always shielded from the atmosphere by an argon-gas shroud. The process uses direct current from standard generators, and high densities are used with fast wire speeds, giving fast welding speeds. The weld metal is deposited in the form of a fine spray. No flux is used.

Argon-arc welding is also fluxless, the aluminium oxide film being removed from the weld pool by electrical forces during welding. The tungsten electrode is consumable, and electrode, arc, and weld pool are again shielded from the air by argon gas. Welding can be carried out with or without filler wire, depending upon the type of joint to be welded.

Advantages claimed for both processes include flexibility, complete freedom from flux corrosion, localized disturbance of the parent metal, reduction of distortion to a minimum, ease of mechanization, and positional welding. These processes are at present used on Government contracts in this country, but equipment will be available this year to industrial users. A wide range of new uses for aluminium is opened up, one of the most notable being as an alternative to steel in certain structural uses. The joining of separate aluminium castings with wrought products or other castings to form complicated assemblies from simple components is now being practised on an increasing scale, using the methods described.

Clyde Steamer for Scrap

The oldest passenger steamer on the Clyde, and last of the famous Caledonian fleet of "fliers," the 50-yr.-old paddle steamer *Duchess of Fife*, has ended her career. She has arrived at the Albert Harbour, Greenock, where she is being dismantled before going to the shipbreakers. The vessel was one of the most popular that ever sailed under the Caley flag. She was beautifully proportioned and her graceful lines were greatly admired, but it was her ability to travel at 18 knots in the days before the first world war when Clyde steamers openly raced for the piers and helped to make coast travel a lively and exciting affair, that made her famous. She was built by the Fairfield Shipbuilding & Engineering Company, Glasgow, and designed by Mr. Percy A. Hillhouse, later Prof. of Naval Architecture at Glasgow University. The *Duchess of Fife* played her part in two world wars. From 1916 to 1919 she was engaged as a minesweeper and she did similar work throughout the last war. She was one of the now historic fleet of "little boats" that helped in the evacuation of Dunkirk.

Modification of High-silicon Aluminium Alloys and the Corresponding Structures*

By Claude Mascré, Ing.E.P.C.I.

This Paper deals with the action of phosphorus and sodium on hyper-eutectic aluminium/silicon alloys: the results of the tests allow the postulation of the following conclusions:—Phosphorus reacts on aluminium to form particles of aluminium phosphide which play the part of nuclei of crystallization for the silicon; the fineness of the resulting structure attains its maximum for an addition of 0.01 per cent. of phosphorus and this is associated with higher mechanical strengths. Sodium, by increasing the viscosity of the liquid aluminium changes the silicon crystals from a geometric form first to one of a dendritic character and then globular. These structural modifications reduce the mechanical strength of the alloy.

Aluminium/silicon alloys have been studied since the birth of the metallurgy of aluminium. They assumed very little technical importance, however, until the discovery by Dr. Pacz of the possibility of increasing the mechanical properties of the eutectic alloy containing 13 per cent. of silicon, by the addition of small quantities of sodium. Later, light alloys carrying more silicon than the eutectic percentage were used; in particular, some pistons were cast in hyper-eutectic silicon/aluminium alloys, characterized by a low coefficient of thermal expansion.† In this Paper, it is proposed to deal with and compare the action of the different modification treatments on the properties and structure of the hyper-eutectic silicon alloy A-S2OU, which has the following percentage composition:—Iron less than 0.80; silicon 18 to 23; copper 1 to 3; zinc less than 0.03; magnesium less than 0.10; manganese less than 0.10; nickel less than 0.10; lead less than 0.10, total impurities less than 0.2 and aluminium the balance.

* Official Exchange Paper from the *Association Technique de Fonderie Française* presented to the Blackpool Conference of the Institute of British Foundrymen. The Author is on the research staff of the *Centre Technique des Industries de la Fonderie*. The Paper was translated by V. C. Faulkner.

† French specification No. A57-702.

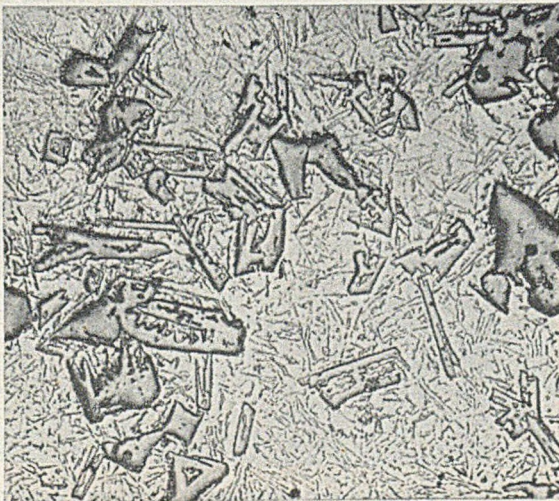


FIG. 1.—($\times 90$) Chill-cast Unmodified Alloy. Silicon Crystals geometric and irregular.

EXPERIMENTAL CONDITIONS

(a) *Raw materials.*—The following were the basic materials chosen for the range of experiments:—A-S 22—basic commercial alloy with 22 per cent. of silicon; A-U 50 basic commercial alloy with 50 per cent. copper; granular phosphor-copper; and metallic sodium.

(b) *Melting Conditions.*—An electric-resistance furnace, equipped with a coated iron crucible having a capacity of 10 kg. (22 lb.) of light alloy was used, as well as a tar-oil-fired furnace using a graphite crucible. For each heat, the metal bath was taken up to and maintained at a temperature ranging between 750 and 780 deg. C.

(c) *Modification by sodium.*—Clean, weighed pieces of metallic sodium were introduced into the bath by means of a perforated and coated plunger. An interval of from 4 to 8 minutes after the introduction of the sodium before taking the samples was allowed.

(d) *Modification by phosphorus.*—To introduce phosphorus into high-silicon alloys, one process consists of using phosphorus pentachloride, but this method does not give constant results. It appears that it leads to high and variable losses of phos-

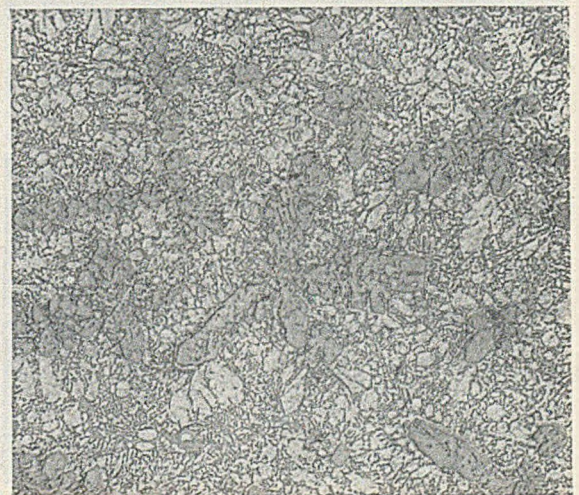


FIG. 2.—($\times 90$) Chill-cast Alloy treated with 0.05 per cent. of Sodium. Dendritic Silicon Crystals.

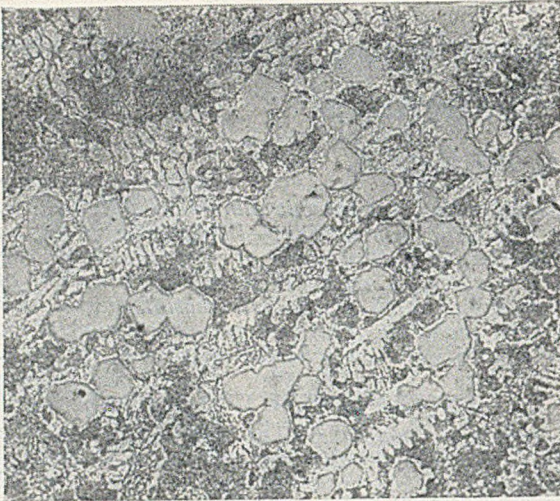


FIG. 3.—($\times 90$) Chill-cast Alloy treated with 0.20 per cent. Sodium. Rounded Silicon Crystals.

phorus. Moreover the phosphorus pentachloride yields lachrymatory fumes, unpleasant for the operators.

For these reasons, the Author preferred to choose from the varieties of phosphor-copper, one carrying 0.75 per cent. of P and the other 2.8 per cent. The method of using them is as follows:—The alloy A-S 22 is taken to a temperature ranging between 750 and 780 deg. C. and the phosphor-copper is added so as to yield the selected quantity of phosphorus. At the same time, there is added the necessary quantity of the master aluminium alloy carrying 50 per cent. of copper to give a copper content of 1.8 per cent. In this temperature range and for the composition selected, the grains of phosphor-copper dissolve in the liquid bath within a few minutes.



FIG. 4.—($\times 90$) Chill-cast Alloy treated with 1 per cent. Sodium. Large, rounded Silicon Crystals. (Compare with Fig. 5.)

(e) *Test-pieces used.*—Tensile tests were carried out on samples cast into a chill, giving the shape of the standard test-piece according to French Specification No. A-57-702. The casting temperature was standardized at 750 deg. C. and that of the chill at 250 deg. C. As cast, the test-pieces are cylindrical and of 18 mm. dia.; they are machined down to 13.8 mm. dia. before testing.

RESULTS OBTAINED

(1) Unmodified Alloys

(a) *Structures Noted.*—The A-S20U is a hyper-eutectic alloy; its solidification starts by the appearance in the bath of silicon crystals and finishes by the formation of a binary eutectic mixture of silicon and a solid solution of copper in aluminium. Often observed is the simultaneous formation of primary crystals of silicon and dendrites of aluminium. In the unmodified alloy, the crystals of silicon have rectilinear contours in conformity with the symmetry of the system, but are hollow and incomplete; the aluminium/silicon eutectic has a coarser structure (Fig. 1).

(b) *Mechanical Properties.*—The following average values have been reported:—Breaking strength 14.3 kg. per sq. mm. (9.2 tons per sq. in.); elongation 0.75 per cent. and Brinell hardness S6.

(2) Sodium-modified Alloys

(a) *Structures Noted.*—After treatment by small quantities of sodium* (0.05 per cent.), the aluminium/silicon eutectic appears as a fine structure. The silicon crystals are dendritic (Fig. 2). If the quantity of sodium introduced is increased, the crystals become coarser and more rounded (Figs. 3 and 4) until, with 1.0 per cent.

* The sodium percentages referred to are invariably those of the quantities introduced and not the quantities retained in the cast alloy.

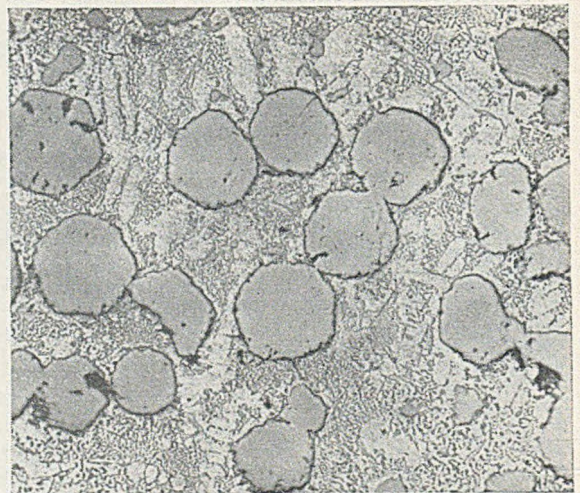


FIG. 5.—($\times 45$) Sand-cast Alloy with 1 per cent. Sodium cast in 400 mm. square section. Very large spheroidal Silicon Crystals.

sodium, they show the remarkable spheroidal structure visible in Fig. 5. This last illustration refers to an alloy cast in sand. Its linear magnification is $\times 45$, whilst that for the other photomicrographs is $\times 90$. These structures show up the analogy which has already been mentioned between the modification by sodium of light alloys and the modification of the graphite in cast iron (spheroidal cast iron).^{1, 2}

The silicon crystals are slightly less dense than the liquid aluminium. When they are sufficiently large (Figs. 3, 4 and 5), they invariably produce distinct segregation, even in the case of test-pieces cast in chills, where cooling conditions are accelerated. The portions situated towards the bottom of castings are almost totally devoid of silicon crystals.

(b) *Mechanical Properties.*—Contrary to what has been stated in the case of alloys approaching the aluminium/silicon eutectic, the effect of the sodium appears to be detrimental to the tensile strength of high-silicon alloys (see Fig. 6). The elongations remain fairly low (of the order of 0.6 per cent.) whilst the Brinell hardness varies very slightly in the same direction as the breaking strength. (83 for an addition of 1 per cent. sodium.)

(3) Phosphorus-modified Alloys

(a) *Structures Noted.*—The addition of 0.005 per cent. phosphorus† strongly influences the structure of high-silicon alloys. Silicon crystals become numerous, fine and of a geometric shape, while the matrix is a fairly coarse aluminium/silicon eutectic (Fig. 7). The finest silicon crystals are obtained by adding 0.01 per cent. phosphorus. Higher percentages of phosphorus, up to 0.05 per cent., have no effect on the primary silicon crystals, but produce in places an extremely fine eutectic (Fig. 8).

(b) *Mechanical Properties.*—The breaking strength is increased by phosphorus additions (see Fig. 9) and reaches a maximum with the introduction of 0.01 per cent. phosphorus. The elongation is still low, seldom higher than one per cent. The Brinell hardness follows the same trends as the tensile strength but to a lesser extent (93 for 0.01 per cent. phosphorus).

† The percentages of phosphorus are, like those of sodium, the quantity introduced and not those contained in the cast alloy.

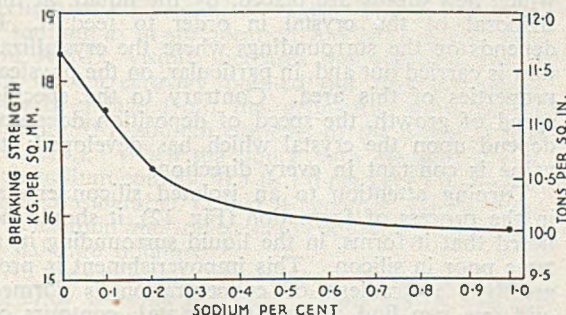


FIG. 6.—Variation of the Tensile Breaking Strength of A-S20U related to the Quantity of Sodium introduced into the alloy.



FIG. 7.—($\times 90$) Chill-cast Alloy treated with 0.01 per cent. Phosphorus. Small Ideomorphic Crystals.

(4) Alloys Modified Simultaneously with Na and P

In this series of tests, varying percentages of sodium were added to an alloy containing 0.01 per cent. of phosphorus.

(a) *Structures Noted.*—The shape of the silicon crystals is much the same as those shown in the absence of phosphorus, but they are smaller. After very small additions of sodium, the silicon crystals are not clearly dendritic but assume an elongated form. The aluminium/silicon eutectic is invariably fine (Fig. 10).

(b) *Mechanical Properties.*—Mechanical properties of this alloy are intermediate between those of the alloys modified by phosphorus and those modified by sodium. They show a regular decrease with increasing additions of sodium (Fig. 11).

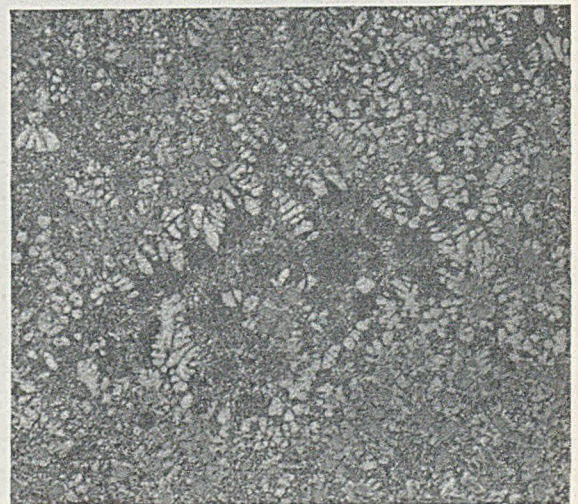


FIG. 8.—($\times 90$) Chill-cast Alloy treated with 0.025 per cent. Phosphorus. Small Ideomorphic Crystals. Very fine Eutectic Zone.

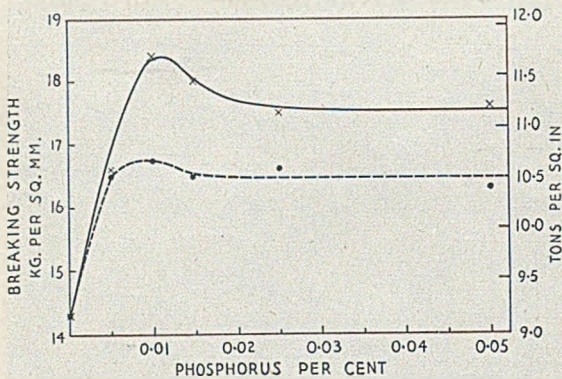


FIG. 9.—Variation of the Tensile Breaking Strength of A-520U related to the Quantity of Phosphorus introduced into the Alloy. Continuous line represents the Once-melted Alloy and the broken line Remelted Material.

(5) Stability of the Action of Sodium and Phosphorus

The effect of sodium is fleeting and decreases with the holding time of the liquid bath, the effect of an addition of 0.20 per cent. of sodium disappearing almost completely after a holding time of 45 mins. Furthermore, the effect of sodium does not persist after a remelting. The action of phosphorus on the other hand is very stable. It is completely effective throughout a holding time of an hour in the liquid state, and even partially persists after remelting, when the micrographic appearance is the same as for an alloy only once melted. The mechanical properties are somewhat lower (Fig. 9).

ORIGIN OF THE STRUCTURES

The effects of phosphorus and sodium on silicon illustrate the classical theories of the nucleation and

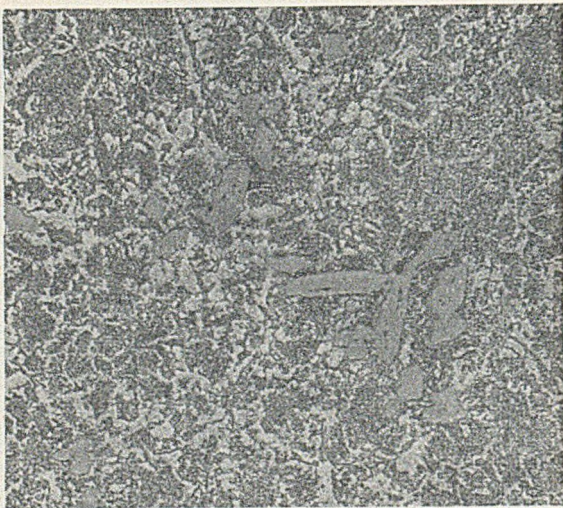


FIG. 10.—($\times 90$) Chill-cast Alloy treated with 0.01 per cent. of Phosphorus and 0.2 per cent. of Sodium. Elongated Crystals of Silicon.

growth of crystals^{3,4,5}. Later in the Paper, short references are made to these theories, applying them to the two types of modification dealt with.

(1) *Rôle of Phosphorus*.—The solidification of a liquid starts with the precipitation of nuclei, which act as the bases upon which the crystals form. Then those of the nuclei which develop give to each crystal its characteristic form. The actual form of the crystals depends on the number of nuclei and the speed of their growth; for a given body and sphere of crystallization, the more nuclei present, the smaller and more numerous the crystals. Phosphorus reacts on the aluminium to give aluminium phosphide, which compound, having a high melting point, very probably acts as a nucleant or centre of crystallization for the silicon because the parameters of the systems of these two bodies nearly approach each other (see Table I).

TABLE I.—Comparison between the Crystal Systems of Aluminium Phosphide and Silicon.

	Aluminium phosphide, ⁶	Silicon.
Crystalline system	Cubic: diamond type	Cubic: diamond type
Length of ridge of the basic cube	5.42 Å	5.42 – 5.48 Å
Minimum distance between atoms	2.34 Å	2.35 Å

(2) *Rôle of Sodium*.—Media which produce crystals having a very rapid growth, such as metals, normally yield dendrites. On the contrary, media which possess a slower growth speed like silicon, usually form crystals of geometric shape. In actual fact, the speed of growth depends on two factors: the specific speed of growth and the speed of consolidation. It is the slower of these two speeds which determines the nature of the crystallization. The specific speed of growth is the speed with which the crystalline structure is constituted, beginning with a superabundant quantity of atoms existing in the liquid state. At a given temperature, the specific speed of growth only depends on the body which crystallizes. Growth is not the same in every direction, being determined by the orientation of the faces of the crystals in relation to the system of crystallization of the mass and that is why it confers on the crystal a shape relative to the symmetry of the whole system. The speed of deposition is the speed with which new atoms are placed, by the liquid, at the disposal of the crystal in order to feed it. It depends on the surroundings where the crystallization is carried out and, in particular, on the physical properties of this area. Contrary to the specific speed of growth, the speed of deposition does not depend upon the crystal which has developed; its value is constant in every direction.

Turning attention to an isolated silicon crystal in the process of formation (Fig. 12), it should be noted that it forms, in the liquid surrounding it, a zone poor in silicon. This impoverishment is progressive; a gradient of concentration is formed and one can find around the crystal, contours of equal concentrations of this element. In consequence, the angles and ridges of the crystal

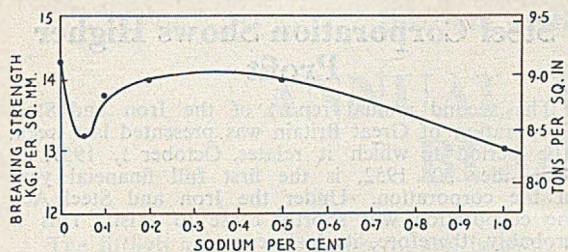


FIG. 11.—Variation of the Breaking Strength of A-S20U related to the Quantity of Sodium introduced into an Alloy modified with 0.01 per cent. Phosphorus.

in course of growth are in contact with a liquid richer in silicon than the centre of the faces of the crystals'. The impoverished zone is thus of less consequence to the angles and to the ridges of the crystals than to their faces. It is necessary that this zone should be enriched in silicon, either by diffusion or by convection movements, so that the crystal can continue to grow.

(a) If the speed of deposition of new atoms of silicon is high in relation to the speed of growth, the existence of the impoverished zone can be ignored, and the crystal assumes a geometric form in relation to the symmetry of the silicon system.

(b) If the speed of deposition is of the same order as the speed of growth, the angles and the ridges of the crystal increase quicker than the faces and the crystal exhibits elongation at these points (Fig. 13). That is the way in which dendrites are formed, their shape is no longer geometric, but they still retain something of the make up of the symmetry of the silicon system.

(c) Finally, if the speed of deposition is very slow (as against the speed of growth), it is this alone which determines the faces of the crystallization and the grain takes a shape similar to that of the surfaces of equal concentration, that is to say, spheroidal. The form of the crystals no longer possesses the characteristic symmetry of the silicon formed; their shape is no longer geometric, but they still retain something of the symmetry of the silicon system.

One of the factors which governs the speed of deposition is the viscosity of the surrounding material, where crystallization is being carried out. An increase in the viscosity of the liquid retards the deposition of new atoms, by diminishing the strength of convection currents. The introduction of sodium, as in specification A-S 20 U or specification A-S 13, visibly increases the viscosity and it can be correlatively pointed out that the silicon crystals change from the geometric form to the dendritic (for sodium contents of the order of 0.05 per cent.). When the liquid bath contains a very high sodium content (0.5 to 1.0 per cent.) its viscosity is considerable, in fact it becomes more a paste than a liquid and under these conditions, spheroidal crystals are obtained.

At the same time, the viscosity of the surrounding alloy is being reduced. There also is present a growth of the dendritic type and each region can, in a given set of circumstances, have one of its zones or surfaces grow quicker than the others. It

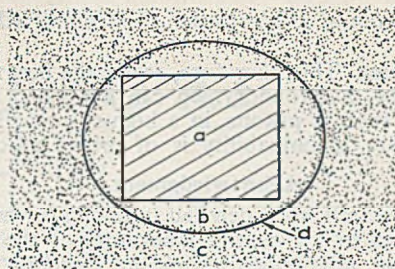


FIG. 12.—Impoverishment of the Mother Liquor around a Crystal. (a) Silicon Crystal; (b) Liquid Zone poor in Silicon; (c) Liquid Zone rich in Silicon; (d) Surface of constant Concentration of Silicon. The Concentration of Silicon of the Liquid Alloy is higher at the Angles of the Crystal than at the Middle of the Faces.

thus forms on itself an appendage, which, in its turn, takes a spherical shape and the silicon finally crystallizes as strings of globules.

Observations

It should be noted that the modification of the eutectic silicon/aluminium alloy brings about other similar phenomena. In fact, no matter what the speed of cooling, unmodified Alpac shows up some sharp-angled silicon crystals and ridges, whilst after modification by sodium, it presents rounded silicon crystals. The hypotheses which are used to explain the modification of silicon under the action of sodium are transposable in the case of eutectic aluminium/silicon alloys and can, therefore, help to explain the mechanism of the modification of Alpac.

Conclusions

An alloy modified by phosphorus possesses the following advantages over one modified by sodium: Its structure is more homogeneous: the silicon crystals are small and have not the time to separate out before the solidification of the whole casting; its machinability is better, because cutting tools no longer encounter large-size silicon crystals; its tensile strength is very much higher; its elongation and its Brinell hardness are a little higher and its structure persists, even despite holding in the liquid state

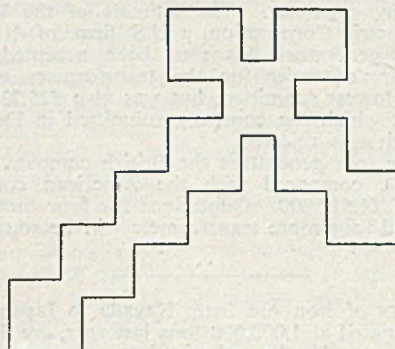


FIG. 13.—Sketch showing the Dendritic Growth of a Crystal.

Modification of High-silicon Aluminium Alloys

or remelting. This, therefore, seems the best method of refining that foundrymen can use when making castings, such as pistons, in a high-silicon alloy, because, here, machinability is of prime importance.

Acknowledgment

The research work detailed in this Paper has been carried out in the central laboratory of the *Centre Technique des Industries de la Fonderie*. The Author expresses his gratitude to the director, Mr. A. le Thomas, who has kindly consented to the publication of the results.

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Basic Material Prices Fall

The overall level of prices of basic materials used in British industry declined very slightly in May. The general fall over the month, according to Board of Trade statistics, amounted to one-half per cent. The main influence was a substantial fall in copper prices which took place towards the end of April, but was only partially reflected in that month's index figure, and had its main effect in May, when the copper index fell by 7.9 per cent.

Each of the four other indices measuring the costs of materials used in the mechanical engineering, electrical machinery, building and civil engineering, and housebuilding industries also fell during May. The fall in copper and brass prices was mainly responsible for the drop of 3.4 per cent. in the index for materials used in the electrical machinery industry. The index of mechanical engineering materials, in which copper is of less importance, fell by 1.7 per cent.

Dam Contract for English Electric

The bid of £629,000 submitted by the English Electric Export & Trading Company, Limited, for 10 transformers for the Chief Joseph Dam project has been accepted by the Seattle district office of the U.S. Army engineers. The estimate of the Westinghouse Electric Corporation, a U.S. firm, of £1,517,000 for four generators has also been accepted. The British firm's tender for the transformers was not only the lowest submitted, but was also £25,236 lower than that which the company submitted in December and which was rejected.

For the four generators the British company offered £1,570,000, compared with the American company's tender of £1,517,000. Quotations for four more generators and four more transformers will be sought next year.

EXPORTS of iron ore from Nevada to Japan, which were estimated at 1,000,000 tons last year, are declining and may cease by the end of this month on the availability of cheaper ore from British Columbia and the Far East.

Steel Corporation Shows Higher Profit

The second annual report of the Iron and Steel Corporation of Great Britain was presented last week. The period to which it relates, October 1, 1951, to September 30, 1952, is the first full financial year of the corporation. Under the Iron and Steel Act, the corporation will shortly cease to exist. This is probably, therefore, its last report.

The companies' sales of all kinds totalled £733,000,000, or, if inter-company sales are excluded, total sales were £618,000,000. The manufacturing and trading profit of the group amounted to £64,400,000 after charging all expenses and provisions (including normal depreciation of £17,100,000 and additional depreciation of £10,000,000), but before deducting interest and taxation charges. In the opinion of the corporation, this additional provision for depreciation is essential to meet the continued rise in the cost of replacement and modernization of plant, equipment, and buildings. The profit earned in the year shows an increase of £10,000,000 over the rate in the previous year.

About half of the profits were earned from the normal iron and steel activities of the companies, the balance being due to activities outside the iron and steel industry, export premiums, and book profits on stocks due to rising prices. Since the end of the financial year this revenue from export premiums in respect of certain products and stock profits has shrunk considerably.

Burden of Taxation

Dividends paid by the subsidiary companies to the corporation have continued, when justified by the earnings of the company, at the rate permitted under the Iron and Steel Act, 1949. By this policy the corporation has left undistributed profit in the possession of the individual companies to meet their need for more capital.

Taxation is a serious burden on the industry. Tax on the profits for the year amounts to £37,951,085, and the total liability shown in the balance sheet for current and future taxation amounts to £94,480,370.

Manufacturing costs continued to rise during the year and in addition a considerable burden was placed on the industry in respect of losses on importation of steel bought at high prices overseas and resold at home prices in Great Britain. Selling prices of steel products were increased in February, 1952, to cover part of these importation losses and to offset some increases in manufacturing costs. The increased prices were not sufficient to cover all the increased costs, and the profits of the companies diminished in the later months of 1952 from the rate earned in the first three months of the financial year.

Capital development continues at a high level and the general programme of development which outlines the pattern of reconstruction and new building for the next five years has been largely settled. The capital expenditure on major projects is estimated at £263,000,000, and the total expenditure on replacement, rebuilding and new construction will probably approach £350,000,000. The corporation and the companies have been able to finance the operations of the companies and the heavy capital investment without recourse to new loans or to the issue of more Iron and Steel Stock during the year. If the corporation were to continue during the current financial year, it would require to borrow at least £25,000,000 for these purposes.

Institute of British Foundrymen

ANNUAL MEETING AT BLACKPOOL

The fiftieth annual conference of the Institute of British Foundrymen was opened at Blackpool on Tuesday, June 16, by a reception given by the Mayor, supported by the Mayoress, in the Windsor Lounge and Spanish Hall, Winter Gardens, Church Street, at 8 p.m. Following the official welcome, there was dancing until 11.30 p.m.

The annual general meeting of the Institute was held in the Baronial Hall, Winter Gardens, Blackpool, on Wednesday, June 17, the president, Dr. C. J. Dadswell, PH.D., B.SC., INGENIEUR E.S.F., M.I.MECH.E., being in the chair. Following the reading and approval of the minutes of last year's annual general meeting, held at Buxton, the president said that before proceeding to the annual report he would welcome on behalf of the Institute some visitors from overseas. These included Mr. Goffart, president of the Belgian foundry technical association, who was one of their own members; Mr. Sissener, president of the Norwegian foundry association, was no newcomer to the conference, he was also one of the Institute's members; Mr. C. Mascré, a member of the French foundry association, was the Author of the official exchange paper from that association, which was to be given during the conference, and, finally, there was Mr. Steel, junior vice-president of the South African branch of the Institute. A welcome was given to all those gentlemen and any others from overseas who might be present.

Annual Report

Presenting the Annual Report* for the Session 1952-53, the PRESIDENT said, as it had been circulated, he did not propose to say much about it, but he hoped members would all find time to read it. It was important that members should know of the wide activities of the Institute, its success in many quarters, and the high prestige which attached to it to-day the world over. Present membership exceeded 5,000, and its distribution among the different branches was printed. The total did not take into account the Victorian division of the Institute of Australian Foundrymen, which had signified its desire to become a branch of the British Institute. It would be known as "Australian Branch (Victoria) of the Institute of British Foundrymen." If there were no questions, he proposed the adoption of the report.

MR. P. H. WILSON, seconding the adoption of the report, pointed out that two years ago he had made reference to the importance of associate members becoming qualified and transferring to full membership. During that year there had been 48 transfers, but, according to the minutes for the present year

to April 30, there had been only 20 transfers and there were 2,194 associate members. Once again he would impress on associate members the importance of becoming full members, as it was a measure of their status as foundrymen.

When put to the meeting the report was adopted unanimously.

Balance Sheet

Presenting the balance sheet for the year 1952, together with the income and expenditure account for the year ended December 31, 1952, the treasurer, MR. N. P. NEWMAN said they had the balance sheet and the accounts in the annual report, and he had little to say about them because he thought they were quite clear. However, there were some salient features; income had increased, largely due to increased membership, from £12,555 to £13,015. He was, personally, hoping that the decline in costs which had begun in industry generally would continue and that members could look forward to a decline in expenditure in the coming year. He formally proposed the adoption of the accounts to December 31, 1952, the proposition being seconded by Mr. Colin Gresty and carried unanimously.

Technical Council Report

MR. A. E. PEACE, chairman of the Institute's Technical Council, said he would like to be as meticulous as their president in referring to their own report. From the report it was obvious that the Technical Council had once again had a very active year, but it had not actually materialized in a great number of publications, and members would see indications in the report of work still outstanding. He would specially draw attention to the three sub-committees on micro-structures whose reports were expected in a few months' time. They would result in a publication which he was sure would be found valuable and unique in its comprehensive coverage of cast irons, non-ferrous metals and steel, dealing with them in what he thought was a very practical and useful manner. It would be realized that additional subjects for investigation were being considered. The report accorded thanks to various bodies and to members and authors, and he endorsed the thanks of the Technical Council for the financial aid received from the Joint Iron Council.

DR. A. B. EVEREST, seconding the adoption of the report, said in the Technical Council the Institute had an intensely important activity, and he thought the range of the Council's report in the annual report was a proof of that activity and the importance which they attached to it.

For several years, as the chairman of the Technical Council, Mr. A. Peace had put drive and energy

* Printed in last week's issue of the JOURNAL.

Annual Meeting at Blackpool

into the work. That the Technical Council was so successful was due to his activity, enthusiasm and the time he put into the work. In the work of the Council and its sub-committees, the secretarial work was one of the most important, and he would pay tribute to Mr. George Lambert for the work which he did in looking after the sub-committees. He also paid tribute to the work of the Manchester office. He also acknowledged the work of the chairmen of sub-committees and the members and behind them the firms which they represented and which gave them time off and provided the facilities for experimental work.

Awards

Oliver Stubbs Medal

Making the award of the Oliver Stubbs Medal for 1953 to Mr. G. W. Nicholls, past-president of the West Riding of Yorkshire branch of the Institute, the president said the official citation was that the award had been made "in recognition of the outstanding quality of many papers, largely of a practical nature which he had presented to the Institute, and for contributions to the technical development of foundry practice." Those papers of Mr. Nicholls which he had read, he had found most interesting and obviously were the result of an analytical and active mind. It was a great pleasure to him when he had heard that Mr. Nicholls was to give the Institute's official exchange paper to the 1953 Convention of the American Foundrymen's Society.

MR. NICHOLLS, accepting the medal, said it gave him the greatest possible pleasure and pride to accept that award, not solely on behalf of himself, for he did not think of individuals in connection with the work which had been recognized. It was a question of team work, and he had, therefore, to couple with his thanks the names of his friends and colleagues who had during his 28 years' association with the foundry industry assisted him and encouraged him.

E. J. Fox Medal

On the recommendation of the assessors, Dr. J. E. Hurst and Mr. F. Scopes, the Council made the award for 1953 of the E. J. Fox medal to Sir William Larke "in recognition of the great help and encouragement he had given the foundry industry in many capacities." Making the presentation, the president said members reading the citation of Sir William's achievements would realize the many capacities in which he had served and the great responsibilities he had carried for very many years.

Acknowledging the award, SIR WILLIAM LARKE said he was under no delusion as to having any real right to the great distinction they had been good enough to honour him with.

He would like to pay a small tribute to the founder of the medal. Mr. Fox and himself first met in the early years of the century, when they were both young engineers in Rugby, and some 30 years later he became president of the Iron and Steel Federation. Mr. Fox always disclaimed being a technical man, but in fact he was no mean technologist, as was proved in his early years at Crompton's when he and

Col. Crompton filed the original patents for electric heating and cooking arrangements, on which successful developments had been built. Then, all knew the great courage he had shown in taking technical advice he had received in connection with the centrifugal casting of pipes. He paid that tribute to his old friend because he thought he had not always received the recognition for his courage and other qualities that the facts demanded.

Meritorious Service Medal

Making the award to Mr. Harold Haynes "in recognition of his active and exceptional work over a long period for the progress of founding, and in imparting his knowledge to others," the president said he was sure there would be no more popular award in the eyes of all of the members present. To his mind, also, there could be no more correct choice than Mr. Harold Haynes to fill the requirements for the award.

Acknowledging the award, MR. HAYNES said it made him feel like an old man to have to come along and receive that award, but he felt he had a long way to go yet, although he had only done 50 years in the foundry. In their foundry there was a glass case and he proposed putting that medal in it as an encouragement to the other men in the works.

There was something serious he had to add. It was that there was a need to raise the skill of the foundryman and to foster it. At present, they had a host of technologists telling them all sorts of fancy things about the foundry, but what was needed was more attention to the skill of the foundryman, for it was declining.

British Foundry Medal

MR. BARRINGTON HOOPER, C.B.E., presented the British Foundry Medal to Mr. D. F. B. Tedds, and with it the prize of £10 (both given by the FOUNDRY TRADE JOURNAL), and said he was glad to do so. It was notable that, of all the awards made, it was the only one handed over personally. Mr. Tedds, who is a past-president of the Bristol branch, received the award for his paper on "Experiences with the Investment Casting Process."*

Acknowledging the medal and prize, MR. TEDDS said it rather overwhelmed him to receive that award. He had seen recipients in other years, and had never thought he would be in their position, but he was very pleased for the honour it brought to his branch, Bristol and the West of England, and the recognition that it gave to the investment casting process, which had been a bit of a "Cinderella" in the industry.

Diplomas

The secretary, MR. T. MAKEMSON, then read the following list of awards of diplomas of the Institute awarded for the year 1953:—Mr. J. R. Jones, for his paper on "Production of Ingot Moulds by the Sandslinger"; Mr. J. M. Douglas and Mr. W. S. Richardson, for their paper on "Practical Application of Some Modern Ideas in the Brass Foundry"; Mr. D. H. Potts, for his paper on "Aluminium Pressure-cast Matchplates"; Mr. E. H. Beech and Mr. H. J. Hayes, for their Paper "Core Assembly as a Production Aid to Jobbing Founders"; and Mr.

* See illustration on page 737.

J. H. Pearce and Mr. G. D. Whitehouse, for their paper on "Casting Design in Relation to Production."

Election of Officers

President

The president, DR. DADSWELL, proposed the election of Mr. E. Longden, M.I.MECH.E., as president for 1953-54, and in doing so said he had known much of Mr. Longden and his work some time before he had met him personally. In fact, while no doubt they had been together at Institute meetings and conferences, it was since the war that he had really made his acquaintance when visiting the David Brown Jackson works at Salford, where he was formerly works manager. It was therefore with the greatest pleasure that he had renewed his intimate friendship with Mr. Longden as vice-president—a period, as they knew, of close association with the senior officers of the Institute and which were most valuable.

MR. F. ALBAN HARPER, who seconded, said, as representative of the Lancashire branch, it was his pleasure and privilege to support the proposition. Mr. Longden was held in very high esteem in Lancashire, and his election was an honour rightly deserved, but it had to be proved. Fortunately there was present one whose word would carry more weight than his and who was known throughout the length and breadth of England. He called on Mr. Greenwood to support the resolution.

MR. J. R. GREENWOOD said it was a particular pleasure to him to support the resolution and to take that opportunity of expressing his personal appreciation and regard for his old friend "Teddy" Longden. He had, he thought, several qualifications for butting in on the proceedings, for he was one of the oldest members of the Institute—oldest in length of membership and one of the oldest in years, although having heard what had been said that morning, that 80 was the average age of foundrymen, he still had a few years to run. Among people who had been doing Institute work, Mr. Longden was one of the most important and one of the hardest workers. He referred also to Mr. Harry Longden, father of the Longden brothers, who would be a proud man if he were present.

When put to the vote, the proposal was unanimously accepted, and Mr. Longden was then installed president by the retiring president, Dr. Dadswell.*

Acknowledging his election, MR. LONGDEN said he deeply appreciated the high honour they had conferred on him, and particularly did he appreciate the remarks of the proposer and seconder and his old friend Mr. Greenwood. He had been a member of the Institute far too long (37 years) not to appreciate the responsibilities of the office, but his predecessors had worn a very deep channel of conduct which made it much easier for him to negotiate.

In his remarks he wished to mention the many expressions of good wishes which he had received, and in particular one from that grand old man of the industry, Mr. Cameron. He thanked members most heartily for the high honour they had conferred on him.

Having conferred the past-president's badge on Dr. Dadswell, Mr. Longden requested him to continue in the Chair for the rest of the meeting.

Senior Vice-president

Proposing the election of Mr. John Bell as senior vice-president, MR. J. W. GARDOM said he could relate much about Mr. Bell, but he did not think it was necessary because members all knew him very well. Some years ago he (Mr. Gardom) was asked to give a paper in Scotland and he went into the meeting hall and asked, "Is this the meeting place of the Institute of British Foundrymen?" Those present replied, "Do you mean John Bell's Institute?" It was thus clearly unnecessary for him to say anything about Mr. Bell.

MR. JOHN CAMERON, JUNR., seconding the proposal, said it was a great pleasure to him to support that proposition in view of the very long friendship that had existed between his family and Mr. Bell.

When put to the meeting, the proposition was carried unanimously.*

MR. JOHN BELL, thanking the members for his election, said he could assure them that the move would give a great deal of satisfaction to Scottish members and, while he could not promise that they would all agree with the Council next year, they would do their very best to be worthy hosts for the holding off the 1954 conference and hoped that as many as possible would travel north for it.

Junior Vice-President

For this position, Dr. A. B. Everest had been nominated, and MR. V. C. FAULKNER, making the proposition, said it gave him great pleasure to do so. He had first met Arthur Everest on the Spanish Express in Paris, and they had started a friendship then which had gone on ever since. For many years they had been next-door neighbours and throughout the time he had watched his career with great admiration. During the whole time Dr. Everest had been with the Mond Nickel Company he had added lustre to the escutcheon of British foundry practice.

MR. A. E. PEACE seconded, and said he thought that particular annual meeting would go down in their records as a historic one. He had known Dr. Everest for something approaching a quarter of a century, but in spite of that they had still a long way to go to reach their average age of members of the Institute. One feature which had been outstanding in his last few years' colleague-ship with Dr. Everest on the Technical Council was one which was common to very busy men; it was that he was always grumbling that he could not take on anything more—he was just the fellow on whom he loved to unload things because it was known he would do them well. The proposition was carried unanimously.

DR. EVEREST, in a brief reply of thanks for his election, said he appreciated the great trust they had placed in him, and he was particularly grateful to Mr. Faulkner and his great friend Mr. Peace for the very nice way in which they had presented him for election.

Auditors

On the proposition of MR. R. YEOMAN, past-president of the Lancashire branch, seconded from the body of the room, J. & A. W. Sully & Company,

* See illustration on page 737.

Annual Meeting at Blackpool

of Parliament Mansions, Abbey Orchard Street, S.W.1, were re-elected auditors of the Institute for the year 1953-54.

Members of Council

The ballot for the election of seven members of Council was announced by the secretary, Mr. T. Makemson, as follows:—Representatives elected were Mr. John Blakiston, Mr. V. Delport, Mr. P. A. Russell, Mr. E. M. Currie, Mr. R. Yeoman, Mr. John Hird and Mr. G. R. Shotton.

Thanks to Retiring President

Proposing a vote of thanks to the retiring President (Dr. Dadswell), MR. LONGDEN said it was a long time since members had first heard of Dr. Dadswell and his educational and industrial successes. Then they learned of his joining the Institute of British Foundrymen and becoming a member of the Council and its committees; later as branch president for Sheffield and, finally, of his becoming the Institute's president. In none of those duties or activities had Dr. Dadswell been so successful as in the latter office; he had carried out his duties most efficiently and he had been most popular.

The Institute's best wishes went forward to Dr. Dadswell and his wife, that they would have a very prosperous future, and that they would be seen frequently at Institute functions.

MR. N. P. NEWMAN, seconding, said doing so was one of the pleasures of being hon. treasurer of the Institute. Dr. Dadswell was a man very much after his own heart; not only was he a hard worker, but he enjoyed himself. During his year of office he had done a grand job of work. He had visited every branch except one and had brought distinction to the Institute. If he might pay a second tribute he would pay it to his wife, because no president could do his job well without the full support of his wife. That support Mrs. Dadswell had given most charmingly.

DR. DADSWELL, replying to the vote, said they had brought back to him his boyhood and youthful habit of blushing which always embarrassed him in any awkward situation in which he might find himself. He could assure members that last year he had been a very humble man, humble in accepting the very high office as president of the Institute. Now, he was a very proud man in that he had been president of such an important institute; important in this country and the world over.

He would treasure very much the past-president's badge which they had given him and would finally, if they would forgive him, repeat what he had said the previous evening in case some members who were present had not been at the reception. This was to give thanks to the branch-presidents and secretaries for their hospitality and kindness during the visits which he and his wife had made to the respective branches during the year.

He also on their behalf thanked Mr. Makemson for his running of the Institute year in and year out; during the year he had seen the amount of work

that had to be done. Finally, he thanked Mr. Lambert and his colleagues at head office for all the work which they had put in during his year of office.

DR. DADSWELL asked the meeting to approve the sending of the usual cable of greeting to the American Foundrymen's Society from the annual conference of the Institute of Foundrymen, and this approval was given, Mr. Makemson being instructed to forward the cable.

Presidential Address

The presidential address for 1953 was delivered by Mr. E. Longden, who took as his subject "Science, Technology and Craftsmanship." [This was printed in the last issue of the JOURNAL.]

Proposing a vote of thanks to the president, DR. DADSWELL said Mr. Longden's title, "Science, Technology and Craftsmanship," indicated his interest in the foundry and, in fact, explained his own career. He had fixed members' attention on some interesting thoughts and points of view, which they would enjoy assimilating and analysing.

MR. D. H. WOOD seconded and said the president had touched upon all branches of the industry, and members would have to read the address fully to appreciate all that he had said. Early on, he had made a reference to the badge of office. When he examined, as no doubt he would, the badge which he was wearing, he would find that the designer had slightly altered the wording of the motto from that to which members were accustomed. Instead of "Science hand in hand with Labour" he had suggested the words, "Science hand in hand with Technology and Skill." It might be worth while to consider adopting those words as the motto of the Institute for the future.

When put to the meeting, the vote was carried unanimously and Mr. Longden, acknowledging, said, if members had not been bored, he had been amply repaid.

Edward Williams Lecture

MR. E. W. COLBECK, M.A., a past-president of the Institute and a fellow of the Institution of Metallurgists, who gave the Edward Williams Lecture, spoke on "Aspects of Nuclear Fission of Interest to Foundrymen and Metallurgists." [This was also printed in last week's issue of the JOURNAL.]

Proposing a vote of thanks to Mr. Colbeck, MR. J. J. SHEEHAN, past-president, said the applause with which Mr. Colbeck's lecture concluded was almost proof enough of their appreciation, but it was his official duty to convey to Mr. Colbeck a vote of thanks. He had had the privilege of working with him in committee and knew well the qualities of precision and clarity of thought and expression that he brought to his work and of which on that occasion members had received a sample.

The vote of thanks was seconded by DR. J. G. PEARCE, director of the British Cast Iron Research Association, and, when put to the meeting, was carried unanimously.

MR. COLBECK, in acknowledgment, said their kind reception of his lecture had been far more than he deserved and he appreciated it very much.

Institute of British Foundrymen
ANNUAL BANQUET
 Extracts from the Blackpool Speeches

The annual banquet of the Institute of British Foundrymen was held in the Spanish Hall of the Winter Gardens, Blackpool, on Wednesday evening, June 17, Mr. E. LONGDEN, M.I.MECH.E., presiding.

The PRESIDENT proposed the Loyal Toast "Her Majesty The Queen Duke of Lancaster," which was duly honoured. He then read the following message, received from Brigadier A. R. W. Low, C.B.E., D.S.O., M.P., Parliamentary Secretary to the Minister of Supply:—

"I much regret my enforced absence from your annual banquet to-night in a fine room in the best seaside resort and in my own constituency. Please explain to all present that I have been unable to leave the House of Commons and ask them to accept my sincere apologies. I was looking forward to meeting you, your president and members, and to telling them of the very great importance we, in the Ministry of Supply, attach to your work. Recent years have shown that you can do so much to help improve quality, output, methods and working conditions. Good luck in your work and may you all enjoy Blackpool."

Proposing the Toast "The Corporation of Blackpool," DR. C. J. DADSWELL, immediate past-president, said that while travelling to the conference with his wife, they had tried to analyse what they knew of Blackpool. They found they knew little else other than that it had a football team which had won the Cup, and so he had decided to do a little research. As a result, he had learned that the first mention of Blackpool was dated 1602. It had been a health resort before becoming also a centre of entertainment, and the sea and the sands were still the basis of the holiday for the family and, particularly, for the children. To the official statement that Charles Dickens had come to Blackpool, as a resort, by stage coach, he was able to add that a colleague of his had in his possession a letter written in 1830 by one of his ancestors, from York. This letter said that the air of Blackpool compared favourably with that of Scarborough, a recommendation indeed, coming from a Yorkshireman. There was a tendency to think of Blackpool as the playground of Lancashire, but in fact it received visits from people from all parts, and catered for all sorts of affairs, serious and otherwise.

Although it was his own first visit to Blackpool, the first visit of the Institute for a Conference had been in the year 1921, and he sincerely hoped they would come again. He had personally enjoyed being in the company of the Mayor and Mayoress the previous evening, when they had offered such splendid hospitality.

Responding to the Toast, HIS WORSHIP THE

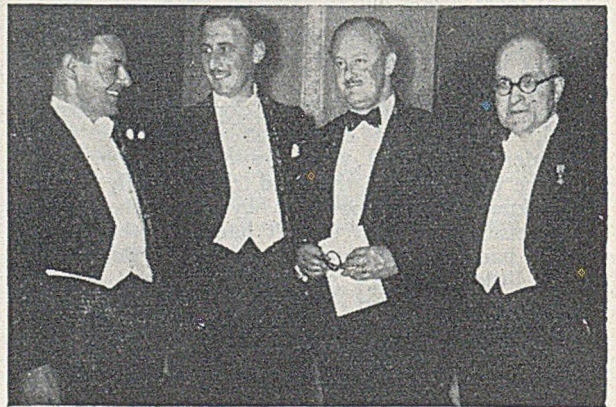
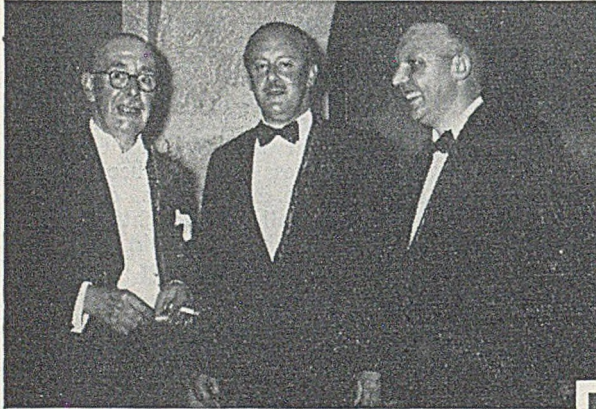
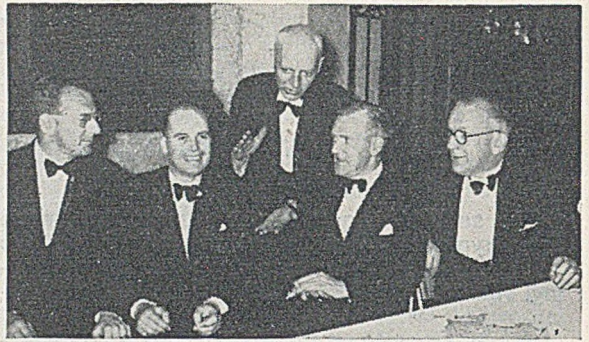
MAYOR (Councillor EDWIN SMITH) first congratulated Mr. Longden, a Lancashire man, on his installation as president of the Institute. Referring to Dr. Dadswell's remarks he said that the Toast of the County Borough of Blackpool was one that he loved to reply to because he had been born in the town and had seen it grow, and in that connection he had gathered together a few facts. In 1851 the population of Blackpool was 2,000; in 1951 it was 147,000, but they had had to suffer through the growth of the town because whereas in 1851 the rates were 3s. 2d., in 1951 they were 18s. 6d. Such was the penalty of progress! It had been a great pleasure for him to meet the members of the Institute because they were all such delightful people, and he hoped that Blackpool would again be honoured by their presence on another occasion.

"The Institute"

Proposing the Toast "The Institute of British Foundrymen," SIR WILLIAM J. LARKE, K.B.E., said that he was very much impressed with the importance of the Institute of British Foundrymen and with what he conceived to be its mission under the present national conditions. A friend of his had been negotiating at very high level internationally about a year previously and had been rather surprised when his American colleague said "We want only two things from Britain: coal and leadership." Before they could, to paraphrase Pitt's famous sentence, save the world by their example they must save themselves by their exertions, and that was where bodies such as that great and live Institute could make a valuable contribution.

During the annual general meeting, he had been very impressed with the report of the Technical Committee and had noticed with pleasure that they already had a number of joint researches with other industries, which contributed to their own production. He wanted members to bear in mind that they probably did not control more than 25 to 30 per cent. of their own costs, if they estimated them by adding the costs of other firms supplying materials and services which they could not control. If foundrymen were to save themselves by their exertions, industry in Britain must operate as a whole and not sectionally; an industry must think where it could obtain some advantage for itself without having repercussions on the whole of the national position and ultimately worsening its own position, which it was under the false impression that it was actually trying to improve.

During the time that he had been associated with the Iron & Steel Research Association they had carried on joint work with no fewer than 16 different research associations. He urged that the Institute should go still further into the question of



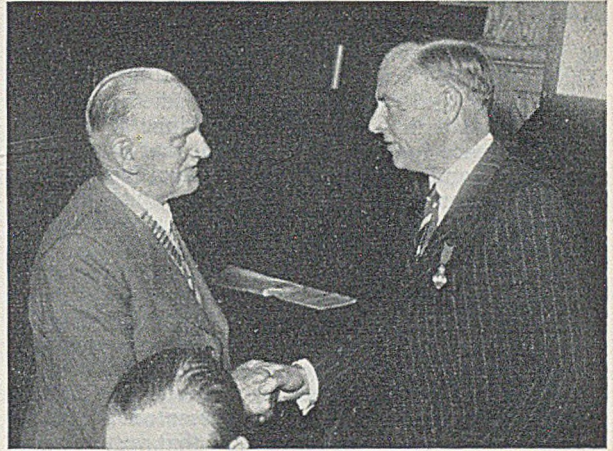
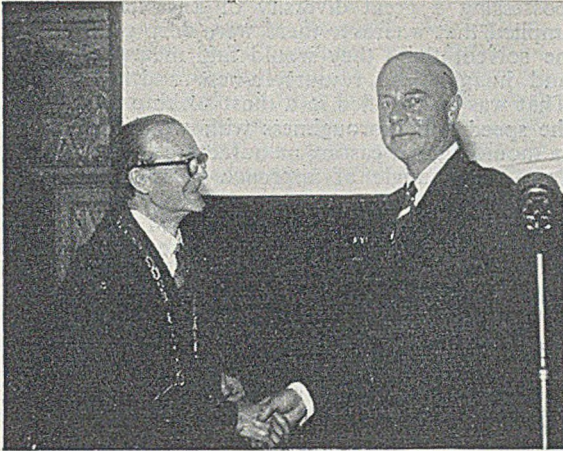
A selection from the groups photographed at the Annual Banquet of the Institute of British Foundrymen in the Winter Gardens, Blackpool, on June 17.

Among those photographed are well-known personalities in the industry, including (top, left) Mr. E. Longden, the new president, and Mrs. Longden, with the Mayor of Blackpool, Councillor Edwin Smith, and Mayoress of Blackpool; (middle, left) Mr. V. C. Faulkner, with Mr. J. F. B. Jackson, director of the British Steel Castings Research Association, and Mr. J. Armitage, also of the B.S.C.R.A., and (bottom, right) Mr. George Lambert, Mr. John Bolton, Mr. Jackson, and Mr. Tom Makemson.

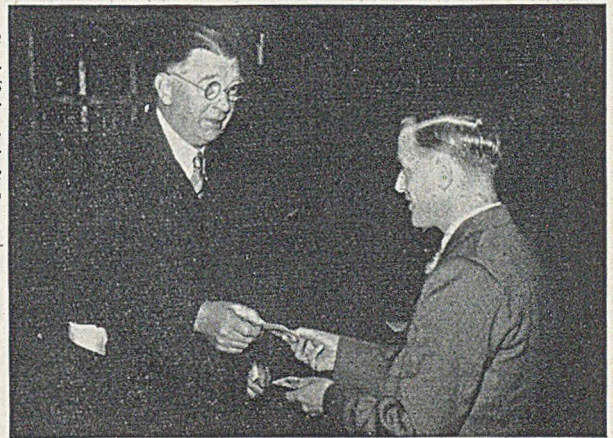
joint researches, so that their own efficiency as an industry should reach the maximum of which it was capable, by collaborating with the inter-dependent industries to ensure that their efficiency reached the maximum permitted by present conditions.

Reverting to the Institute itself, he offered his warm congratulations to them on having exceeded a membership of 5,000, and on having established branches within the Empire and the promise of an important branch in Australia, which would add

another 250 members to their roll. The proceedings at the Conference were a model: it would be false modesty on his part if he did not claim to be something of an expert in such matters, as he had attended probably many more conferences of that kind than most people present and had been responsible for organizing a good many. He had never seen one better organized than the foundrymen's and he had never seen a meeting in which every individual member contributed so effectively to its success.



Incidents during the Annual General Meeting of the Institute of British Foundrymen at Blackpool last week. (Top, left) the Past-president, Dr. C. J. Dadswell, invests his successor, Mr. E. Longden, with the Chain of Office; (top, right) Dr. Dadswell, who continued in the Chair, congratulates Mr. John Bell on his election to the Vice-presidency, and (right) Mr. Barrington Hooper, the donor, hands the British Foundry Medal and Prize to Mr. D. F. B. Tedds.



It was bodies such as theirs which could stimulate not only their own circle but their workpeople and their inter-dependent industries to make those exertions, which, he ventured to suggest, were necessary for salvation if Britain was to give that leadership for which the world was crying out. It was right that the world should look to this country for leadership, because we had enjoyed 900 yrs. of freedom from invasion or occupation, and we had evolved our own special political system. We were probably, therefore, the wisest people on earth politically—without boasting about it—and that placed upon us a very grave responsibility.

Scope for Great Achievement

The Institute of British Foundrymen was a very fine example of organized effort for a common purpose, working to a common ideal, and he urged that it should expand its influence as widely as possible, not only in membership but by exerting an influence, through their purchasing power as an industry, on their supplying industries, to ensure that they also were stimulated to give of their best. There was no question about this country ultimately saving itself, and he had absolutely unassailable faith in the fundamental qualities of the British people. "The Times," in a remarkable leading article, had recently said "The British are a good race grown careless," but he ventured to suggest that they had not yet grown unintelligent, and if that were so then they would exert themselves so that the new Elizabethan Age, of which they had been talking so glibly during that wonderful, impressive and inspiring period of the Coronation, would be not only a phrase but an achievement.

and to that end bodies such as the Institute of British Foundrymen could make a very valuable contribution.

There was a very sensible dictum which said that great institutions were always the extension of the shadow of a single man, and in the case of the Institute of British Foundrymen there could be no doubt who that was—their secretary. He considered himself fortunate in coupling the Toast with the name of their president, who had that morning given them a most thoughtful and farseeing presidential address, and therefore he felt that the contribution which the Institute could make to those exertions, which would save the nation and set an example to the world, were likely to be made, because they would be under Mr. Longden's leadership. Few people could be better qualified to lead the Institute in the fateful year during which he would occupy the Chair than their new president, and therefore it was with every possible good wish that he proposed the health of the Institute, in the belief that it would make its contribution towards giving their beloved country a still finer hour.

MR. E. LONGDEN, president of the Institute, responding to the Toast, said it was his privilege and honour to extend to all a very hearty welcome

I.B.F. Annual Banquet

to the happiest and brightest function of the year. That great hall was a very fitting setting to the bright array and the charm of the ladies present, and he trusted that they would continue to enjoy the conference functions in the spirit that was then abounding and that they would leave Blackpool all the happier for having done so. In spite of the magnitude of the occasion, it seemed a very cosy gathering.

As they had heard, the Institute had held its first conference in Manchester, under the auspices of the Lancashire branch, in 1904, and in 1954 the Institute would celebrate the golden jubilee of its existence. The international exchange of technical papers was a special feature of the conferences, the first exchange Paper having been presented by the American Foundrymen's Society in that very town, again under the auspices of the Lancashire branch. All such international contacts had been beneficial, not only in the dissemination of knowledge, but also in generating better general international relationships, which were so very necessary at the present time.

In responding to the Toast of the Institute, so ably proposed by Sir William Larke, he felt very conscious of his inability fully to express all that he felt at that moment. However, so far as the Institute of British Foundrymen was concerned he accepted all the tributes without the slightest blush. On the other hand their distinguished guest's reference to himself was rather embarrassing: indeed, the more he learned of himself the more he learned of his defects. In retrospect, it all now appeared so strange, in the light of his earliest ambitions as a boy. At that time in his life, a foundry was not his choice of occupation—the ruling factor was necessity. If he might reveal a secret, his earliest impressions of the foundry were not very favourable at all; he had hated the dirtiness, drabness and discomforts, so common to foundries of those days, and those early impressions of his formative years were to remain with him for very many years. His work in the foundry only began to be justified when he discovered the interest that surrounded the use of the then illusive materials employed to produce castings. Thus his boyhood's ambition to enter the drawing office and become a designer was of necessity relegated to the realms of the unattainable.

It was necessary to think on the lines of a quotation by Carlyle, when he stated: "our grand business is not to see that which lies dimly at a distance, but to do what lies clearly to hand." The very evasiveness of things had been a fascination and an incitement to help to throw more light on the many problems to be solved, and as with all aspects of life the solution of a problem was only one step which would allow a better vision of the next problem waiting. The manufacture of castings had captured the imagination of designers, inventors and scientists, and in that the Institute had functioned as more than just a catalyst, so that at present it could claim to have in its ranks a most representative cross-section of scientific and technical leaders,

possessing a great diversity of knowledge. That implied that wherever there were deep problems to be solved, there they would find men of courage and imagination, resourcefulness and endeavour. That was exemplified in a most striking manner by the speed and thoroughness with which new ideas in moulding and casting manufacture were tried out from every angle of approach in many parts of the country. Members were now seeing every evidence of a shortening of the period of delay in the adoption of new ideas in their methods of production. The solution of problems and the benefits of ideas accruing to the nation depended upon the existence of a sufficient number of technical leaders who could correctly interpret the probable results when carried out in the field of practice.

Concluding his remarks, the president thanked Sir William Larke for his very fine tributes to the Institute of British Foundrymen.

"The Guests"

MR. JOHN BELL, senior vice-president of the Institute, proposing the Toast "The Guests," said that many years ago, when he was little more than a boy, his mother, with that deep wisdom so often given to the woman and denied to the man, used to say to him "In your journey through life, my son, you will meet many different kinds of people: some of them you will like and some of them you may not like, but before you make up your mind about any of them try to find out what kind of friends they have got. That will tell you all you need to know about them." Those words had come back to him on that occasion because it was his privilege to endeavour to tell them something about the kind of friends the Institute had got.

To those who were members of the Institute the annual banquet became a really happy family party at which the doors were thrown wide open so that others might come in, seeking old friendships or perchance to make new ones. On that occasion the foundrymen were in jovial mood, but in order that their cup of joy might be really full they had invited many of their friends to join them, and to become their honoured guests.

It was his duty to mention some of those guests, and first it gave him great pleasure to mention His Worship the Mayor and his wife, the Mayoress, coupling with their names that of Mr. H. Porter, the director of attractions and publicity for Blackpool, and Mrs. Porter. Without the efforts of Mr. Porter the conference would not have been so successfully arranged. The duty of the Mayor and Mr. Porter was to administer the law in a civic sense, and the people who knew them best and whose interests they most willingly served had recognized them to be men of integrity and had learned to trust their judgment, their sense of honour and their sense of fair play.

Secondly, he wished to mention Sir William Larke, who that morning had been the recipient of the Institute's E. J. Fox medal, and rarely had one merited it so much. With Sir William, he wished to mention Mr. E. W. Colbeck, M.A., their Edward Williams Lecturer, who had given them a wonderful lecture on applications of atomic research.

Next, there was Mr. J. F. B. Jackson, director of the British Steel Castings Research Association, who had done so much work for that particular branch of their industry, and Dr. J. G. Pearce, O.B.E., who had led the British Cast Iron Research Association very conspicuously almost since its beginning. There was one other name which he would have liked to mention, but unfortunately Dr. J. E. Hurst could not be present; he had hoped to be able to offer Dr. Hurst their congratulations on his recent award of the C.B.E.

Reference to the production side, had reminded him that most of the members were on the production side of the industry and so naturally many of their guests were also on that side. They had Mr. F. Webster, president of the Foundry Trades Equipment and Supplies Association, with Mrs. Webster; Mr. S. A. S. Smith, works manager at the Horwich works of British Railways, with Mrs. Smith; Mr. J. Skinner, managing director of Howard & Bullough, Limited, with Mrs. Skinner; Mr. W. R. Marsland, president of the Association of Bronze & Brass Founders, and Mrs. Marsland; Mr. S. Markland, director of Leyland Motors, Limited, and Mrs. Markland, and also life-long friends of the president, Mr. and Mrs. J. R. Greenwood and Mr. and Mrs. Phillips. In the same category, of course, was Mr. F. Scopes, president of the Joint Iron Council, to whom would fall the task of replying to that Toast, and it was right that it should fall to him because his name was widely known and respected wherever foundrymen met. They were indeed very glad that Mr. Scopes was their principal guest.

Turning to the overseas guests, there was Mr. J. F. Goffart, president of the *Association Technique de Fonderie de Belgique*, and Mr. John Steele, the junior vice-president of the South African branch of the Institute. He mentioned those two together for the one reason that they had both joined the Institute in Scotland (which was why they were such good fellows!) Then there was Mr. J. Sissener, president of the Norwegian Foundrymen's Association, without whom no gathering of foundrymen would be complete, and Mr. C. Mascré, who had come to deliver the French exchange paper.

Finally, there was one other group about whom he had thought of saying "They toil not, neither do they spin," but that would not be true. However, he could use the second part of that wonderful quotation correctly, and say that "even Solomon in all his glory was not arrayed like one of these." He referred, of course, to the ladies, without whose presence their gathering would have lost much of its beauty and most of its sparkle.

Mr. Scopes' Reply

Responding to the Toast, MR. F. SCOPES, president of the Joint Iron Council and of the British Cast Iron Research Association, said that to him, as to many of his fellow guests, the hospitality and the friendliness of the members of the Institute of British Foundrymen were very well known. Indeed, they were probably as well known as their emi-

nence in the technical field, to which presumably the major part of their energies during those few days were being devoted—at any rate in the daytime. It was therefore a particular pleasure to have the privilege of expressing the thanks of the guests for the Institute's hospitality that evening.

When he had listened to the senior vice-president reciting the list of guests, he had felt even more than when he first came into the room how very badly qualified he was to reply on behalf of such an array of varied talent and experience. He was glad that it was unnecessary for him to attempt to reply on behalf of His Worship the Mayor, as those present had all so much enjoyed the latter's sparkling speech. He was very glad to see so many visitors from abroad, although he would be diffident in replying in any detail on their behalf, and he would be even more diffident in attempting to reply on behalf of the ladies.

Possibly, as at the moment he was the titular head of two of the organizations, which, with their Institute, were so concerned in all the problems of their industry, namely the Joint Iron Council and the British Cast Iron Research Association, it was appropriate that he should express their sincere appreciation of the friendly co-operation which existed between both of those bodies and the Institute of British Foundrymen, and also his own confidence and that of all those who took such a great interest in those bodies, that the helpful and friendly co-operation would continue, to the benefit of the whole industry.

MR. N. P. NEWMAN, J.P., past president and honorary treasurer of the Institute, said it was his particularly pleasant duty, on behalf of the president, the vice-presidents and the past presidents, to make a presentation to Mrs. Dadswell. He believed it was true to say that no president could really do his job well without the assistance and help and encouragement of his wife, and he wished to pay particular tribute to the beauty and charm which Mrs. Dadswell had brought to the office during her husband's year of work. As a token of their esteem he then presented Mrs. Dadswell with a coffee service.

MRS. C. J. DADSWELL, expressing her very warm thanks for the gift, said that all her school life she had chased a prize but had never managed to catch up with it, and yet now for having had a wonderful year as the president's lady she had received an equally wonderful gift. In thanking the ladies' committee for all their help, she said that without their assistance the president's wife's lot would be—like the policeman's—not a happy one. There were three wise men in history, who had perhaps grown a little dim, but the Institute had three of its own, of whom Manchester had produced two—Mr. T. Makemson, M.B.E., the secretary, and Mr. G. Lambert, assistant secretary. There had to be a third, and as Sheffield was never far behind, it provided Mr. J. H. Pearce. She thanked the donors for the gift and the staff of the Institute very heartily for all the help which they had given during her husband's year of office.

Society of Chemical Industry

Corrosion Group

The report of the committee for 1952-53, presented at the annual general meeting of the Corrosion Group of the Society of Chemical Industry, discloses that the Group, now completing its second session, has grown steadily to a membership of practically 300. Further enlistment of overseas members has brought the number of countries represented to 10. The programme for the year comprised 10 meetings (apart from an exhibition and a works visit), of which six were held in London; all were well attended. Notable among the London meetings was the January lecture on the "Electrochemical Behaviour of Metals and Corrosion," by Dr. M. Pourbaix, an overseas member, director of the *Centre Belge d'Etude de la Corrosion*. The most ambitious event yet organized by the Group was the all-day symposium on caustic cracking in steam boilers held in November at the Institution of Mechanical Engineers. Six papers were presented, three by foreign specialist authorities from France, Holland and the U.S.A. One meeting of a special character was that held jointly with the Institute of Metal Finishing, at which papers were presented on the new tin/nickel alloy coatings. Other "domestic" meetings have dealt with the subjects of filiform corrosion and the corrosion of aluminium by supply waters.

Four highly successful provincial meetings have been held jointly with Sections in Sheffield, Nottingham, Newcastle and Manchester. The Sheffield meeting in December, in which members of the Sheffield Metallurgical Association also took part, was addressed by Dr. U. R. Evans, F.R.S., on the corrosion resistance of stainless steel. The meeting was followed on the next day by the first works visit of the Group through the courtesy of Messrs. Firth Brown. Together with the main work of organizing meetings, the Committee has given much attention to the encouragement of corrosion education. Thus it has extended its activity, commenced last year in London and Birmingham, in promoting educational work in co-operation with technical colleges.

The report concluded with the news that a symposium on cathodic protection is to be organized in the autumn of this year.

Midlands Employment

Ironfounding is one of the industries where there has been marked improvement in trade and consequently employment. Mr. Barry Kay, Regional Controller, Board of Trade told the Midland Regional Board for Industry in Birmingham on June 16. There is, however, still "fairly substantial" short-time working in non-ferrous metal manufacture and in founding, tube, pipe and nut, bolt and screw factories. Mr. Kay stressed that, despite improvement, "there is not the slightest room for complacency." Industry had got to go all out to hold its position as overseas competition became more fierce.

Mr. W. E. Davis, Regional Controller, Ministry of Labour, reported the total of Midland unemployed in May as 23,715 compared with 26,271 in April and 32,179 in March.

A great deal of "spring cleaning" of sales organizations was taking place, Mr. Kay said. He further disclosed that the number of applications for Industrial Development Certificates during May was 60 to 70 per cent. higher than in any month of the previous half year. Most were for extensions to existing factories. "We can take heart from this further sign of Midland industrial foresight and vigour" he concluded.

Yorkshire Aids Colombo Plan

Yorkshire engineering firms are making no small contribution to the Colombo Plan, drawn up in 1950 with a view to improving the living standard for the peoples of Asia. Kitchen & Wade, Limited, machine tool makers, Halifax, have supplied large radial drilling machines for use in the Chao Phya irrigation project in Thailand, while Dean, Smith & Grace, Limited, lathe manufacturers, Keighley, are sending out a precision swing lathe. Another Keighley firm of textile machine makers, Prince-Smith & Stells, Limited, are supplying complete sets of drawing and spinning plant machinery to India. The Ceylon State Railways are being supplied with goods wagons and brake vans by Charles Roberts & Company, Limited, Railway Wagon Works, Horbury Junction, near Wakefield, and Diesel crawler tractors have been sent to India and Malaya by the Leeds engineering firm of John Fowler & Company (Leeds), Limited. Storage sheds for Pakistan have been supplied by Octavius Atkinson & Sons, Limited, Harrogate, and India has received weighbridges and portable steelyard machines from Ashworth, Ross & Company, weighing machine makers, Scout Hill, Dewsbury.

Colvilles' New Plant Scheme

A £25,000,000 scheme for new plant at Colvilles Limited, Motherwell, is among development proposals for the Scottish iron and steel industry. The scheme for Colvilles includes a new blast furnace, steel-making furnaces and rolling mills, and the new plant will be associated with the installation of extra pre-handling equipment at Glasgow docks and will create an integrated iron and steel works at Motherwell.

Tables of schemes included in the report of the Iron and Steel Corporation include a fourth blast furnace at Colvilles, plant costing £3,000,000 and due for completion in 1956. There is also a £5,000,000 tube mill and steel foundry at Stewarts and Lloyds Limited, Clydesdale and Tollcross, which is to be ready by 1955. Also included in the development plan is a £9,000,000 scheme for coke ovens and blast furnaces, mainly for foundry iron, at the Gartsherrie Iron Works of Bairds & Scottish Steel Limited.

Proposed Foundry Safety Committee

The Council of Ironfounding Associations is taking further steps to promote accident prevention in the ironfounding industry, supplementing the work already done in encouraging more ironfounders to appoint joint safety committees in their works. The Council now considers that there should be a standing safety committee which can advise it and its member-firms on accident-prevention matters, and appointments are imminent. The matter was delayed because the Council had to deal first with the Foundry Workers (Health and Safety) Bill, and then the draft Iron and Steel Foundries Health and Safety Regulations which succeeded the Bill. The early introduction of these Regulations by the Minister of Labour was indeed a condition upon which the Bill was withdrawn. A committee of representatives of the Council's constituent associations has been examining the regulations, and its task should shortly be completed.

J. A. ANDERSON, founder and sole proprietor of Southampton Bronze Foundry, Parsonage Road, Southampton, died last Tuesday. He was a member of Council of the Southampton section of the London branch of the Institute of British Foundrymen.

Non-ferrous Melting and Ingot Casting

During the last decade, many advances have been made in the methods employed by refiners and smelters of non-ferrous metals, particularly the smelting and casting operations. The pit-type crucible furnace has been almost entirely superseded by the modern reverberatory, rotary, tilting or fixed-hearth, gas- or oil-fired furnace. Also, the casting of the metal into moulds laid out at floor level is rapidly being abandoned in favour of machine casting, with the consequent saving in casting time and the heavy manual labour entailed in the casting, stripping and handling of ingots and moulds.

A melting and casting plant installed by Sheppard & Sons, Bridgend, Glamorgan, at the works of H. B. Barnard & Sons, Limited, Tipton, Staffs, which has been in continuous production for several years, is shown in Fig. 1. The melting unit consists of a rotary furnace 8 ft. shell dia., 6 ft. inside lining, and 14 ft. 6 in. over the cone ends. The furnace is mounted on rollers, the rotating motion being actuated by a 10-h.p. motor, through a worm reduction gear-box, providing a revolution every $\frac{1}{4}$ min. The total weight on the furnace rollers when charged under operating conditions is approximately 50 tons. The furnace is oil-fired by a single "Dine" burner mounted in the movable-port end. The flue connection is mounted on a mechanically-propelled carriage, the charging operation being carried out at both ends as required. A hand-operated tilting gear is placed in the position convenient to the operator providing accurate control during the pouring operation and a safeguard against electric power failure.

Ingot Casting

The ingot casting machine is of the double-strand type — each

strand being fitted with 100 moulds, which each produce an ingot weighing 20 lb. The metal is fed from the furnace continuously from the commencement to finish of casting by means of a breeches-type launder. The average cast of 10 tons is carried out in 45 to 60 min. The two strands of ingots are independently driven (and controlled) by variable-speed motors through slip coupling and worm reduction gear, the object being to take full advantage of the moulds being cool at the commencement of the cast, with a consequent slowing down as they become heated. Water-cooling sprays are fitted over the cooling zone of each strand, each being independently controlled, with trays arranged below each mould strand to collect surplus water. Automatic tapping hammers are fitted integral with the head of the machine to help ingot ejection. The complete installation as above described provides a compact and self-contained ingot-production unit, coupling a high order of economy in manpower, with minimum space and fuel consumption.

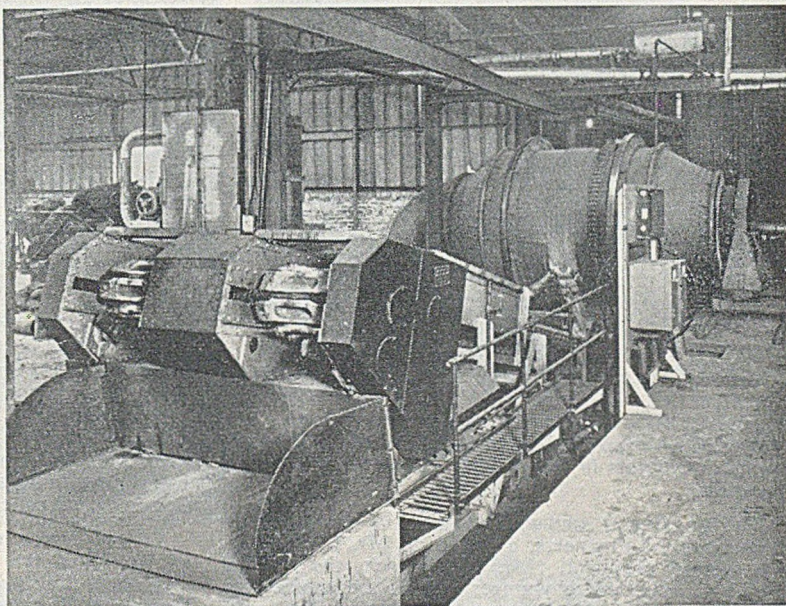


FIG. 1.—"Sheppard" 12-ton capacity Rotary Oil-fired Furnace and Double Strand Ingot Casting Machine.

House Organs

The Stantonian. Published by the Stanton Ironworks Company, Limited. Vol. 18, No. 5.

The main feature of this issue is a fully-illustrated article on the Holwell Foundry. Other foundries are to be dealt with in future issues.

600 Magazine—Coronation Number. Published by the 600 Group of Companies, Cunard Works, Chase Road, London, N.W.10.

There is much dignity about this issue, plus, as usual, a modicum of humour. The main theme—that of the Coronation—has been magnificently handled, and congratulations are offered to those responsible. The K. & L. silver-jubilee celebrations are shown to have been on a grandiose scale, and the object of giving pleasure to the staff and their families has obviously been achieved. Mr. Frank Rowe's paper to the British

Steel Founders' Association's buyer/seller conference has been reprinted. The literary articles have been both well chosen and interestingly produced.

Ruston Overseas News, Vol. 2, No. 13. Published by the Ruston-Paxman Group.

There is no better method of overseas publicity than to provide foreign agents and customers with a magazine covering the firm's activities, yet properly to do this the material sent must be high grade, informative and above all, well presented. Ruston-Paxman do this superlatively well and unquestionably add prestige not only to their own manufactures, but also to British engineering. This issue contains a beautifully illustrated article by Mr. R. C. Shepherd based on Mr. Bruce L. Simpson's book "The Development of the Metal Castings Industry." For the rest, the work of the agents in various parts of the world is recounted as well of course as the development of the newer types of plant.

News in Brief

A REVIEW of commercial conditions in Burma dated February, 1953, has been published by Her Majesty's Stationery Office, price 1s. 1½d. post free.

THE INSTITUTE OF ECONOMIC ENGINEERS, of 28, Victoria Street, London, S.W.1, announces that it has changed its name to the Society of Industrial Engineers.

A NEW WELDING GUN, which uses two small electrodes instead of a single larger one, is said to shorten the time taken to complete a weld in thick material by as much as 50 per cent.

A BRASS FIRE ALARM BELL made in 1883 by Charles Carr, Limited, of Grove Lane, Smethwick, and weighing 2½ cwt., will "very probably" be reclaimed by the firm from the Rochdale police who have found it at the foot of an old tower.

IN ORDER THAT the name of the company may more comprehensively describe its activities, Sir W. G. Armstrong Whitworth & Company (Ironfounders), Limited, has been changed to Armstrong Whitworth (Metal Industries), Limited.

A CASTING weighing 164 tons, more than 25 ft. long and over 8 ft. high, made by the English Steel Corporation, Limited, Sheffield, has been despatched to the United States. A further casting, weighing 185 tons, is expected to leave the works this week.

IT IS UNDERSTOOD that Qualcast, Limited, are altering two of the cupolas in their Derby die-casting foundry to use hot blast. When the alteration is completed, the equipment, supplied by Metallurgical Engineers, Limited, will enable the cupolas to give 10 tons per hour.

MUSGRAVE & COMPANY, LIMITED, St. Ann's Works, Belfast, announce that their Bristol office has been removed to more spacious premises at 1, Host Street, Bristol, 1. Telephone and telegraphic address are as before, viz.:—Bristol 23369 and "Centigrad, Bristol."

THE NEW FACTORY of Behr-Manning, Limited, is to be opened in Belfast on July 6 by Viscount Brookeborough, P.C., C.B.E., M.C., the Premier of Northern Ireland. The Norton Grinding Wheel Company, Limited, will be acting as distributors in this country for all Behr-Manning materials.

AT THE ANNUAL GENERAL MEETING of the Keighley Association of Engineers, on June 19, Mr. J. Whitaker was elected president. Mr. C. Barwick, the retiring president, appealed to younger men in the engineering industry to eliminate slackness and the "couldn't care less" attitude.

AT THE ANNUAL MEETING of the Birmingham branch of the Purchasing Officers' Association, the following officers were elected:—As *chairman*, Mr. W. H. Parry; as *vice-chairman*, Mr. J. H. Townend; as *honorary secretary*, Mr. R. C. Woodward, and as *honorary treasurer*, Mr. I. Faulkner.

THE ENGINEERING HALL of the Museum of Science and Industry, Birmingham, which is the largest section yet completed, was opened to the public on June 20. Among the items exhibited are a beam engine of 1820, a steam-roller of 1892, a 35-h.p. Diesel engine of 1901, an axial-flow steam turbine of 1903, and a light oil-engine of 1894.

MR. JOHN FORD, Midlands manager of Paterson Hughes Engineering Company, Limited, was recently appointed to the Board. The firm's Midlands office is now at 3, Highfield Road, Edgbaston, Birmingham, 15 (tel.: Edgbaston 1639), and Mr. Ford will continue to

be available for advice on all mechanical handling matters.

FOSTER TRANSFORMERS, LIMITED (a Lancashire Dynamo company) announce that price reductions have become effective in many of the products which they manufacture. These reductions are in part due to the drop in the price of electrolytic copper, but are also brought about by the greater productive capacity resulting from the starting up of the Foster No. 2 factory at Leatherhead.

A NEW LIGHT ENGINEERING INDUSTRY which will provide work for more than 300 people is to be established at the new town of East Kilbride. Sir Patrick Dollan, chairman of East Kilbride Development Corporation, said work has already started on the site at Nerston, and that production is expected to commence next year. The firm involved, Hayward-Tyler & Company, Limited, of Luton, will manufacture light engineering products.

A NEW COMBINED ASBESTOS AND NEOPRENE GASKET MATERIAL is said to possess many of the qualities of both asbestos and rubber. It is soft and compressible and therefore needs only a low sealing pressure, yet it will stand up to medium high temperatures. The material is made by adding latex neoprene to asbestos pulp. It is resistant to petrol and oils and is unaffected by water and anti-freeze solutions.

A LEAFLET has been received from Radiovisor Parent, Limited, 1, Stanhope Street, London, N.W.1, describing their new Mark XV automatic lighting control unit. This equipment, operated by changes in daylight intensity, has been specially designed to overcome the problems associated with controlling interior lighting in factories, offices, hospitals, etc., and is provided with a much finer degree of control than units used for outside street lighting.

CONCERN AT THE DEPRESSION being experienced by the foundries in the Falkirk area was expressed at a meeting of the Central Scotland Chamber of Commerce at Stirling. It was decided to submit a resolution to the Secretary of State for Scotland recommending that consideration be given to the reconstruction of existing tenement properties and, in particular, to the installation of bathrooms under a subsidy to assist the housing situation and also benefit local industries.

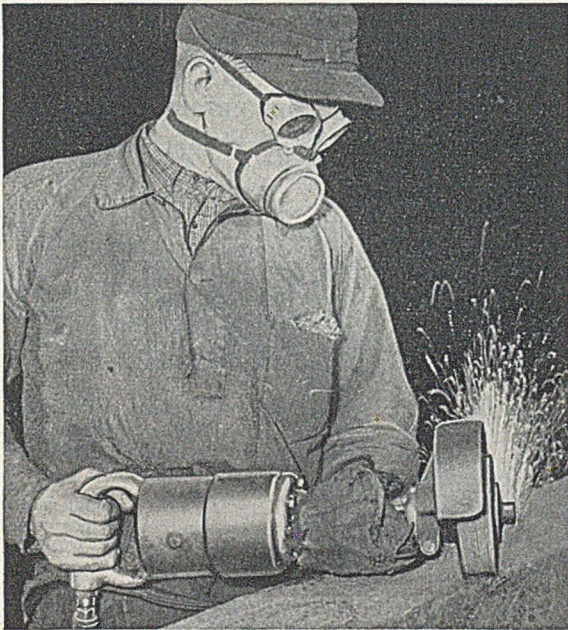
TWENTY-THREE employees of the Darlaston factory of Rubery Owen & Company, Limited, appeared at Darlaston Magistrates' Court on June 11 on charges involving 34 cases of theft from the works. They were accused of stealing scrap metal, sheeting, timber and other materials worth more than £400. Fines totalling £282 were imposed, with 37 gns. costs, on 20 of the cases. The other three cases were postponed for seven days.

AT AN INQUEST in Birmingham, on June 19, on a former employee of Serck Tubes, Limited, Richard Scullion (aged 30), it was stated that the man was engaged in "pickling" tubes, and that he was following a normal trade practice in syphoning acid from a vat with a metal syphoning tube. He slipped from a raised catwalk on which he was standing into a vat of very hot water and died from burns. The Coroner, Mr. George Billington, recording a verdict of "Accidental death," commented that, although the syphoning operation might be trade practice, it seemed one that was dangerous and rather primitive. The jury added a rider that they thought strenuous efforts should be made to provide some form of safety device if the method of syphoning was to continue.

ATLAS

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Below: R. S. 13 Grinder Fettling a Casting at The Bofors Steel Works



Above: One of the R Series Chipping Hammers, also employed at The Bofors Steel Works

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

(Delivered unless otherwise stated)

June 24, 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 Grange-mouth.

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., 21s. 10d. to 22s. 6d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 24s. 8d. to 27s. 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. 3½d. per lb. Cr; max. 0.06 per cent. C, 2s. 4d. per lb. Cr.

Cobalt.—98/99 per cent., 20s. per lb.

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

Metallie 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. STEMENS 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., £49 19s. 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, £252; high-grade fire-refined, £251 10s.; fire-refined of not less than 99.7 per cent., £251; ditto, 99.2 per cent., £250 10s.; black hot-rolled wire rods, £261 12s. 6d.

Tin.—Cash, £680 to £682 10s. three months, £677 10s. to £680; settlement, £680.

Zinc.—June, £92 to £92 5s.; September, £87 5s. to £87 10s.

Refined Pig-lead—June, £74 to £74 5s.; September, £73 10s. to £73 15s.

Zinc Sheets, etc.—Sheets, 15 g. and thicker, all English destinations, £99; rolled zinc (boiler plates), all English destinations, £96 15s.; zinc oxide (Red Seal), d/d buyers' premises, £90.

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

Brass.—Solid-drawn tubes, 23½d. per lb.; rods, drawn, 32½d.; sheets to 10 w.g., 256s. 3d. per cwt.; wire, 30½d.; rolled metal, 243s. per cwt.

Copper Tubes, etc.—Solid-drawn tubes, 28½d. 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 £162; BS. 1400—LG3—1 (86/7/5/2), £172 to £190; BS. 1400—G1—1 (88/10/2), £254 to £275; Admiralty GM (88/10/2), virgin quality, £254 to £300 per ton, delivered.

Phosphor-bronze Ingots.—P.BI, £265 to £295; L.P.BI, £215 to £240 per ton.

Phosphor Bronze.—Strip, 368s. per cwt.; sheets to 10 w.g., 389s. 9d. per cwt.; wire, 45½d. 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. 5½d. per lb. (7 per cent.) to 3s. 8½d. (30 per cent.); rolled metal, 3 in. to 9 in. wide × .056, 2s. 11½d. (7 per cent.) to 4s. 2½d. (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, unshaped, 2s. 8½d. to 3s. 11½d. Wire, 10 g., in coils, 3s. 6½d. (10 per cent.) to 4s. 8½d. (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.



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Pig-iron and Steel Production

Statistical Summary of April 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 April, and

Table III, deliveries of finished steel in March, 1953. Table IV gives the production of pig-iron and ferro-alloys in April, 1953, and furnaces in blast. (All figures 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. ²	Output of ingots and castings.	Deliveries of finished steel.	Stocks. ³
1951	284	170	200	186	175	8	301	244	585
1952 ⁴	306	190	228	202	171	29	310	252	739
1952—November	312	194	229	207	189	23	345	277	717
December ¹	290	189	227	206	160	26	314	245	739
1953—January	325	199	234	214	188	25	346	279	770
February	328	194	234	214	193	19	352	272	770
March ¹	334	197	237	210	194	23	351	259	804
April	319	189	242	213	189	20	349	—	867

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

District.	Open-hearth.		Bessemer.	Electric.	All other.	Total.		Total ingots and castings.
	Acid.	Basic.				Ingots.	Castings.	
Derby, Leics., Notts., Northants and Essex Lanes. (excl. N.W. Coast), Denbigh, Flints. and Cheshire	—	4.5	11.0 (basic)	1.4	0.2	17.0	1.0	18.0
Yorkshire (excl. N.E. Coast and Sheffield)	1.6	21.3	—	1.6	0.6	24.0	1.1	25.1
Lincolnshire	—	34.5	—	—	0.1	34.5	0.1	34.6
North-East Coast	2.1	65.2	—	1.3	0.6	67.3	1.9	69.2
Scotland	4.1	41.2	—	1.7	0.8	45.7	2.1	47.8
Staffs., Shrops., Wores. and Warwick	—	17.8	—	1.1	0.6	17.9	1.6	19.5
South Wales and Monmouthshire	6.3	67.1	5.8 (basic)	1.1	0.1	79.8	0.6	80.4
Sheffield (incl. small quantity in Manchester)	9.8	27.6	—	9.1	0.5	44.9	2.1	47.0
North-West Coast	0.3	1.3	4.8 (acid)	0.4	0.1	6.8	0.1	6.9
Total	24.2	280.5	22.5	17.7	3.6	337.9	10.6	348.5
March, 1953 ¹	24.0	280.7	23.1	19.7	3.9	339.8	11.6	351.4
April, 1952 ¹	23.7	239.9	20.9	16.9	3.7	294.7	10.4	305.1

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

Product.	1951.	1952 ⁴	1952.		1953.	
			March.	Feb.	March.	Feb.
Non-alloy steel:						
Ingots, blooms, billets and slabs ¹	4.0	4.5	4.8	5.5	5.4	
Heavy rails, sleepers, etc.	10.1	9.8	11.0	11.2	10.7	
Plates $\frac{1}{2}$ in. thick and over	41.0	41.4	42.0	46.5	45.8	
Other heavy prod.	39.9	39.0	39.5	45.7	42.8	
Light rolled prod.	46.7	46.0	44.3	53.4	52.5	
Wire rods	15.9	15.9	16.2	17.5	16.5	
Bright steel bars	6.5	6.5	6.6	7.8	7.7	
Hot-rolled strip	19.5	18.8	18.0	21.3	20.7	
Cold-rolled strip	6.0	6.1	6.2	5.6	4.0	
Sheets, coated and uncoated	30.4	31.6	33.7	33.9	32.3	
Tin, terne and blackplate	13.8	16.0	16.6	14.4	13.8	
Steel tubes and pipes	20.3	20.1	20.4	22.6	19.7	
Tube and pipe fittings (excl. flanges)	0.5	0.7	0.5	0.4	0.3	
Mild wire	11.6	12.2	12.5	11.5	11.0	
Hard wire	3.5	3.6	3.7	4.0	3.6	
Tyres, wheels and axles	3.7	3.5	3.3	3.5	4.2	
Forgings (excluding drop forgings)	2.3	2.8	2.8	3.4	3.2	
Steel castings	3.8	4.2	4.3	4.2	4.2	
Tool and magnet steel	0	0.3	0.3	0.3	0.3	
Total	279.5	283.0	287.3	312.7	299.6	
Alloy steel	11.4	13.7	14.4	16.1	15.3	
Total deliveries from U.K. prod. *	290.9	296.7	301.7	328.8	314.9	
Add: Imported finished steel	5.8	13.8	16.7	8.5	4.9	
Total	296.7	310.5	318.4	337.3	319.8	
Deduct: Intra-industry conversion ⁷	55.0	60.2	62.5	66.9	62.1	
Total net deliveries	241.7	250.3	255.9	270.4	257.7	

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

District.	Furnaces in blast.	Hematite.	Basic.	Foundry.	Forge.	Ferro-alloys.	Total.
Derby, Leics., Notts., Northants, and Essex	27	—	18.5	24.6	1.4	—	44.5
Lanes. (excl. N.W. Coast), Denbigh, Flints. and Cheshire	8	—	13.3	—	—	1.5	14.8
Yorkshire (incl. Sheffield, excl. N.E. Coast)	13	—	30.4	—	—	—	30.4
Lincolnshire	24	4.3	42.3	—	—	1.5	48.1
North-East Coast	8	0.8	13.2	2.4	—	—	16.4
Scotland	8	—	7.3	1.6	—	—	8.9
Staffs., Shrops., Wores., and Warwick	8	—	7.3	1.6	—	—	8.9
S. Wales and Monmouthshire	9	3.7	29.9	—	—	—	33.6
North-West Coast	6	16.0	—	—	—	—	16.0
Total	103	24.8	154.9	28.0	1.4	3.0	212.7
March, 1953 ¹	105	26.4	154.3	29.9	0.7	4.4	215.7
April, 1952 ¹	100	27.4	142.1	28.3	1.0	2.6	201.4

¹ Five weeks, all tables.

² Weekly average of calendar month.

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

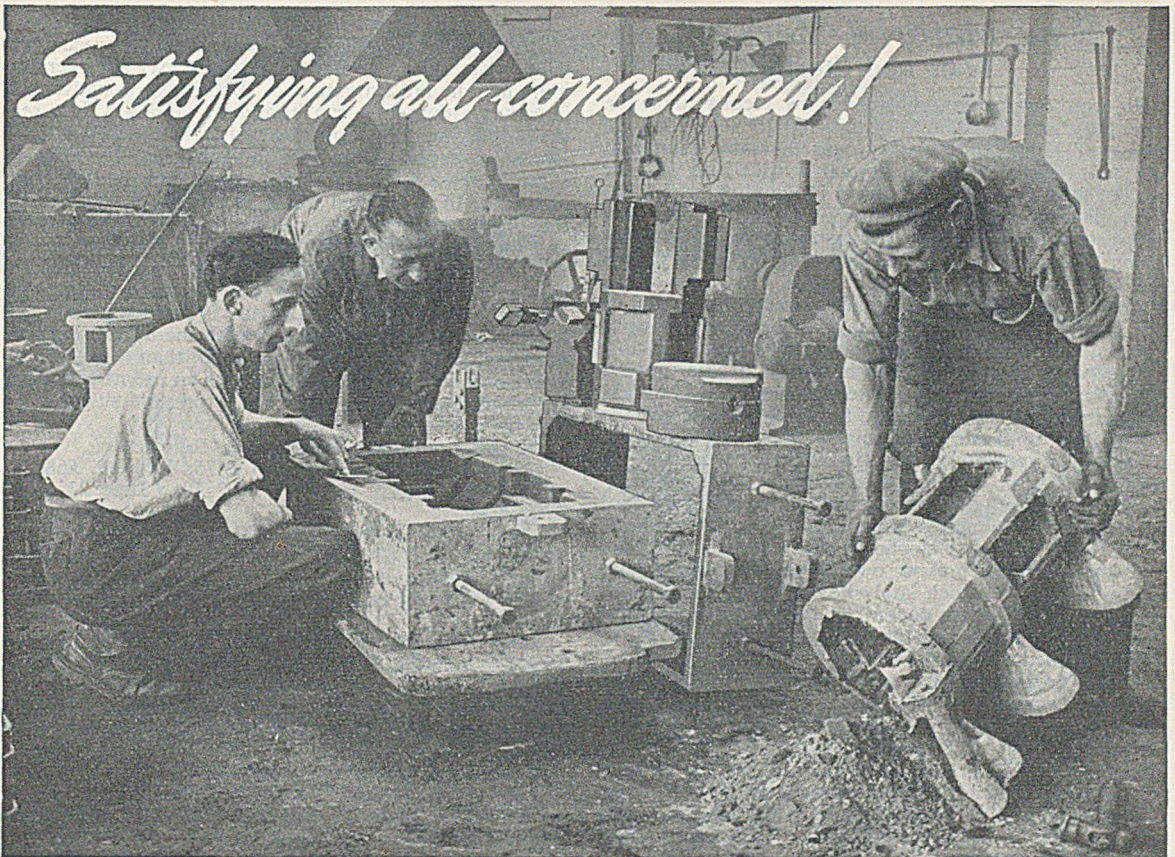
⁴ Average 53 weeks ended January 3, 1953.

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

⁶ Includes finished steel produced in the U.K. from imported ingots and semi-finished steel.

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

⁸ Included with alloy steel.



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SUPINEX "R" IN USE —

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

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Raw Material Markets Iron and Steel

Pig-iron output continues to show record tonnages. The May weekly average of 214,700 tons gave an increase of 13,600 tons weekly over the same month of last year, representing an annual output rate of over 11,000,000 tons. This expansion in supplies, which has been made possible by the blowing in of new furnaces, is directed almost entirely to the steelworks, and its provision is largely responsible for the record output of steel.

The foundries have little embarrassment on account of the supply of pig-iron, except, possibly, the engineering and speciality foundries, whose production of castings depends on the supply of hematite. Home supplies are below demand, but imported hematite has considerably minimized this difficulty, although analyses of the iron both from home and foreign sources are not always to the requirements of the foundries, particularly in regard to silicon, which is mostly in the lower percentages. The supply of low- and medium-phosphorus irons to engineering foundries is about equal to the demand. In the case of high-phosphorus irons for the light and jobbing foundries, present outputs appear to be in excess of demands, which lately have fallen off, and most of these foundries are content to use up existing stocks or to specify only those tonnages which are essential to satisfy immediate requirements.

Order-books for castings do not, on the whole, reveal any improvement in the trade. Business is coming through regularly, but tonnages are small and are readily completed, with little to add to forward bookings, as buyers appear to prefer to indent only for the castings which are needed for the orders on hand.

The re-rollers, particularly those in the Midland area, are not now so heavily employed. The orders which accumulated, owing chiefly to the shortage of steel semis, have now been practically eliminated, as recent deliveries of steel from home and foreign sources have changed the position considerably. The liquidation of existing obligations has helped to maintain the high level of production of finished steel, as new specifications have shown a decided decline over the past few weeks. Steelworks' order-books will enable them to maintain output for a long time ahead.

Non-ferrous Metals

Lead continues to be the most active of the non-ferrous metals so far as turnover on the London Metal Exchange is concerned; last Friday saw about 2,500 tons change hands. Dealing was sustained for June and September, with keen bidding at times for interim dates. On balance, prices, although they closed well above the lowest points touched during the week, registered gains of no more than £1 5s. for June and £1 15s. for September, the backwardation narrowing slightly to £5. Better business is reported on the Continent, but things are not very brisk here and buyers are still somewhat reluctant to commit themselves far ahead.

The feature of the zinc market has been the interest shown in prompt metal, this demand being met by the Government broker. Metal changed hands at a premium over the June price. Supplies of physical metal outside the exchange seem to be somewhat restricted for nearby delivery, and this may have led to bidding on the market. Tin gave way rather badly last week; as yet, there is no news of any contract being fixed up between the Americans and the Bolivian producers, but there are very comfortable stocks of tin in the United States at present.

Scrap prices have been distinctly firmer, and the consumer looking for any of the better grades of secondary copper would find to-day that he must pay considerably more than he did a month ago. Brass, too, has advanced in value, although it can hardly be said that the users are displaying any more interest. Business in brass ingots for export is reported, and this may have led to some increase in the call for swarf and similar types of metal. In the United States, and on the world market, too, there appears to be a firmer tone in virgin copper and, looking forward to the opening of the market in August, there is a disposition to take a more cheerful view of the prospective price level at which trading will begin. In the meanwhile, demand is decidedly restricted here and consumers are buying with the utmost caution, covering, so far as they can, no more than a week or so ahead and drawing on their stocks to an extent which has surprised many observers of the present situation in non-ferrous metals.

Official tin quotations were as follow:—

Cash—June 18, £672 10s. to £675; June 19, £680 to £682 10s.; June 22, £690 to £692 10s.; June 23, £688 to £690.

Three Months—June 18, £670 to £672 10s.; June 19, £677 10s. to £682 10s.; June 22, £687 10s. to £690; June 23, £688 to £690.

The following official prices of refined pig-lead were recorded:—

June—June 18, £90 5s. to £90 15s.; June 19, £91 15s. to £92; June 22, £92 to £92 5s.; June 23, £92 10s. to £92 15s.

September—June 18, £85 to £85 10s.; June 19, £86 15s. to £87; June 22, £87 to £87 10s.; June 23, £88 to £88 10s.

Official zinc quotations were:—

June—June 18, £69 17s. 6d. to £70; June 19, £70 5s. to £70 10s.; June 22, £70 5s. to £70 10s.; June 23, £71 10s. to £72.

September—June 18, £69 12s. 6d. to £69 17s. 6d.; June 19, £70 to £70 5s.; June 22, £70 to £70 5s.; June 23, £71 7s. 6d. to £71 12s. 6d.

The official prices of non-ferrous metals for to-day (Wednesday) are given on the Price List (Page 744).

Aluminium to be Freed

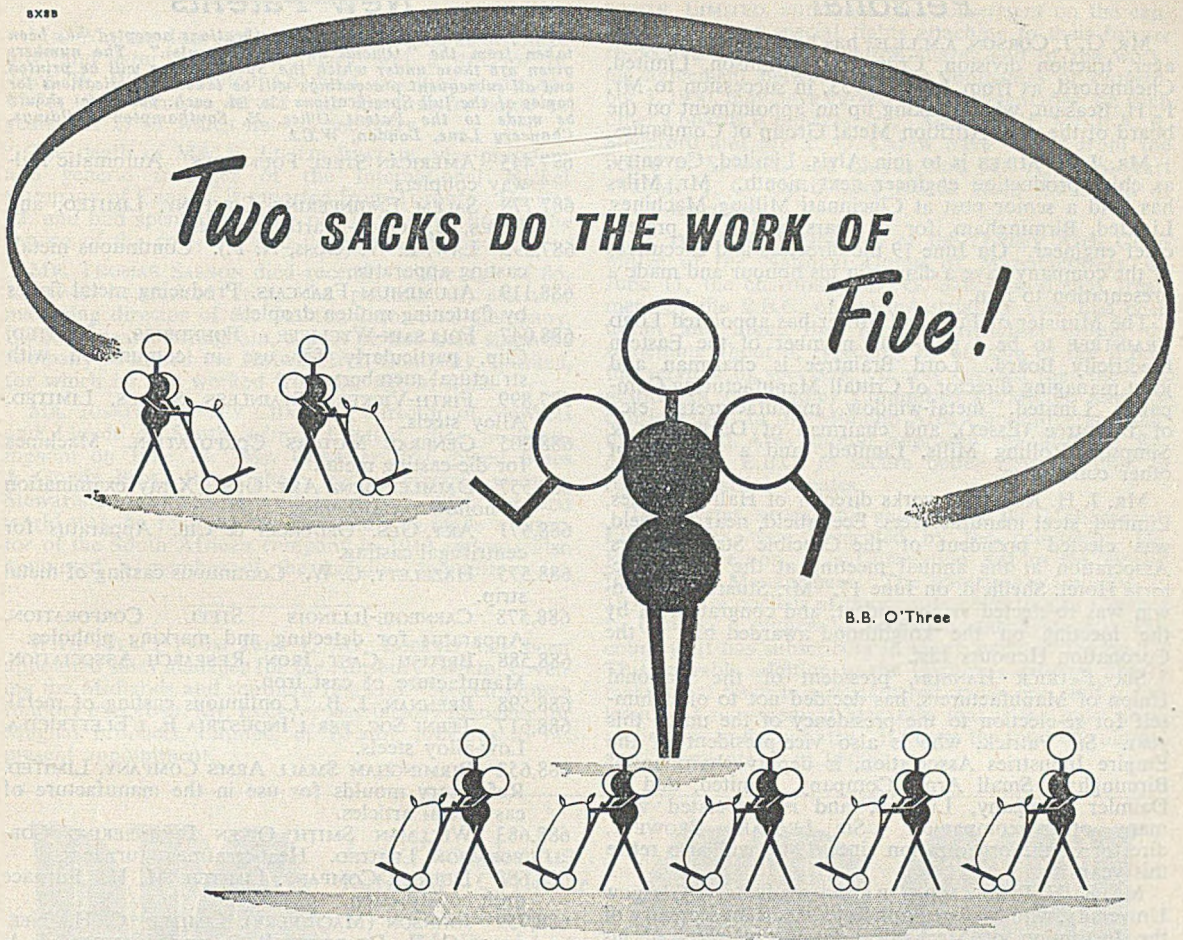
It was announced in the House of Commons on Monday that the private import of aluminium will be restored as from July 1 under individual licences issued by the Board of Trade.

A reduction of £6 per ton has been negotiated by the Ministry of Materials with the Canadian producers, and this reduction, bringing the price to £155 per ton, will operate under the new arrangements. The producers have agreed to charge no more than the Ministry would have charged, so that, in effect, £155 will be a maximum price.

Albion Motors Lose Contract

A Ministry of Supply contract for Service vehicles worth £3,000,000, placed last year with Albion Motors Limited, Glasgow, has been cancelled because of a change in the defence programme. The firm state that this will not mean any reduction in employment and it is hoped that under the revised defence programme another contract will be secured to compensate for the loss of this work. Under the contract the firm were to have produced 10-ton and 3-ton transport and fighting vehicles. A special plant was laid down to handle the work.

8X88



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Personal

MR. G. J. CORSON, A.M.I.E.E., has been appointed manager, traction division, Crompton Parkinson, Limited, Chelmsford, as from July 1, 1953, in succession to Mr. F. H. Beasant, who is taking up an appointment on the board of the Anti-Attrition Metal Group of Companies.

MR. J. B. MILES is to join Alvis, Limited, Coventry, as chief production engineer next month. Mr. Miles has held a senior post at Cincinnati Milling Machines, Limited, Birmingham, for 15 years, and is at present chief engineer. On June 19 the directors and executives of the company gave a dinner in his honour and made a presentation to him.

The Minister of Fuel and Power has appointed LORD BRAINTREE to be a part-time member of the Eastern Electricity Board. Lord Braintree is chairman and joint managing director of Crittall Manufacturing Company, Limited, metal-window manufacturers, etc., of Braintree (Essex), and chairman of Darlington & Simpson Rolling Mills, Limited, and a number of other companies.

MR. J. H. RUSSELL, works director of Hall & Pickles, Limited, steel manufacturers, Ecclesfield, near Sheffield, was elected president of the Crucible Steel Makers' Association at the annual meeting at the Royal Victoria Hotel, Sheffield, on June 17. Mr. Stuart C. Goodwin was re-elected vice-president, and congratulated by the meeting on the knighthood awarded him in the Coronation Honours List.

SIR PATRICK HANNON, president of the National Union of Manufacturers, has decided not to offer himself for re-election to the presidency of the union this year. Sir Patrick, who is also vice-president of the Empire Industries Association, is deputy chairman of Birmingham Small Arms Company, Limited, and of Daimler Company, Limited, and is associated with many other companies. SIR LEONARD BROWETT, director of the organization since 1945, will also retire this year.

MR. K. H. PLATT, M.B.E., B.Sc., a graduate of Glasgow University, who has been appointed assistant secretary of the Institution of Mechanical Engineers, received his practical training with Andrew Barclay, Sons & Company, Kilmarnock, and Craig & Donald, Limited, Johnstone. Later he joined the drawing office of James Howden & Company, Limited, Glasgow. Before and since the war he has been concerned with technical education, and during the war period with the R.A.O.C. and R.E.M.E.

MR. J. ROY GORDON has been appointed general manager of Canadian operations of the International Nickel Company of Canada, Limited, succeeding the late Mr. R. Leslie Beattie. He has also been elected vice-president of the company. Mr. Gordon has been an assistant vice-president since December, 1947, and in May, 1952, was appointed assistant general manager of the company's Canadian operations. Born on a farm near Kingston, Ontario, he graduated from Queen's University in 1920 with the degree of B.Sc. in chemistry. He held an appointment from 1920 to 1929 with M. J. O'Brien, Limited, as a research metallurgist. From 1929 to 1936 he was with the Ontario Research Foundation at Toronto. During the later years he served as assistant director of metallurgy. He joined the International Nickel Company of Canada, Limited, in 1936, when he was appointed director of the research department established by the company in that year at Copper Cliff, Ontario. He was made an assistant to the vice-president in 1941 and technical assistant to the vice-president in 1946.

New Patents

The following list of patent specifications accepted has been taken from the "Official Journal (Patents)." The numbers given are those under which the Specifications will be printed and all subsequent proceedings will be taken. Applications for copies of the full Specifications (2s. 8d. each, post free) should be made to the Patent Office, 25, Southampton Buildings, Chancery Lane, London, W.C.2.

- 687,445 AMERICAN STEEL FOUNDRIES. Automatic railway couplers.
- 687,778 SALEM ENGINEERING COMPANY, LIMITED, and JONES, H. Open-hearth furnaces.
- 687,595 LAW, L. W. (Goss, N. P.). Continuous metal-casting apparatus.
- 688,119 ALUMINIUM FRANCAIS. Producing metal flakes by flattening molten droplets.
- 688,047 FOLLSAIN-WYCLIFFE FOUNDRIES, LIMITED. Clip, particularly for use in conjunction with structural members.
- 687,899 FIRTH-VICKERS STAINLESS STEELS, LIMITED. Alloy steels.
- 688,005 GENERAL MOTORS CORPORATION. Machines for die-casting metal.
- 688,557 DAIMLER-BENZ AKT.-GES. X-ray examination of hollow metal bodies.
- 688,571 AKT.-GES. OEDERLIN & CIE. Apparatus for centrifugal casting.
- 688,575 HAZELETT, C. W. Continuous casting of metal strip.
- 688,578 CARNEGIE-ILLINOIS STEEL CORPORATION. Apparatus for detecting and marking pinholes.
- 688,588 BRITISH CAST IRON RESEARCH ASSOCIATION. Manufacture of cast iron.
- 688,598 BRENNAN, J. B. Continuous casting of metal.
- 688,617 TERNI SOC. PER L'INDUSTRIA E. L'ELETTRICITA. Low-alloy steels.
- 688,652 BIRMINGHAM SMALL ARMS COMPANY, LIMITED. Refractory moulds for use in the manufacture of cast metal articles.
- 688,683 WELLMAN SMITH OWEN ENGINEERING CORPORATION, LIMITED. Heat-treatment furnaces.
- 688,688 DETRICK COMPANY, LIMITED, M. H. Furnace arch construction.
- 688,759 JOHNSON (MACHINERY), LIMITED, C. H., NEESOM, C. H., DEARDEN, B. B., and HARTLEY, J. A. Conveyor elevators.
- 688,858 MOND NICKEL COMPANY, LIMITED. Ferritic steel.
- 688,955 JUNGHANS, S. Automatically supplying molten metal in continuous casting of metal rods, particularly high-melting metals or metal alloys.
- 688,998 NEEDLE INDUSTRIES, LIMITED. Electric furnaces for the heat-treatment of metal articles.
- 689,051 BOOTH & COMPANY, LIMITED, J. Extruding aluminium alloys.
- 689,223 SCHMIDT, K. Melting and treating non-ferrous metals in rotary furnaces.
- 689,443 BOENNHOF, H. Apparatus for releasing and extracting ingots from their moulds.
- 689,465 MARSHALL & COMPANY (LOXLEY), LIMITED, T., and HOWSON, H. O. Feeder heads of ingot moulds and the like.

Recent Wills

THOMAS, F. W., formerly assistant sales manager of the British Aluminium Company, Limited, London, S.W.1	£7,749
WALLES, W. T., managing director of Aldam (Misterton), Limited, repairing engineers, iron-founders, etc., of Doncaster	£13,249
DENNISON, EDWARD, formerly commercial manager in the pontoon department of Smith's Dock Company, Limited, North Shields	£18,217

Obituary

MR. WALTER JOHNSON, who started work as an office boy and later became secretary and a director of Thos. W. Ward, Limited, Sheffield, has died at the age of 80. Mr. Johnson served with the firm for some 60 years, for 27 of which he was secretary.

The death of MR. R. LESLIE BEATTIE, vice-president and general manager of the International Nickel Company of Canada, is reported from Toronto. He was 62, and had spent the whole of his working life in the service of the company and its associated concerns.

MR. THOMAS SARSON died recently at the age of 86. In 1940 he retired from the position of assistant managing director of the Stanton Ironworks Company, Limited, near Nottingham, a post he had held since the company absorbed the Holwell Iron Company, Limited, for which he had worked from the age of nine.

MR. JOSEPH STANLEY CHAWNER, director of Stewarts and Lloyds of South Africa, Limited, died in Birmingham on June 13. Mr. Chawner first joined Bates & Goode Bros., Birmingham, and afterwards went to Stewarts and Lloyds as a junior clerk. After the first world war, he rejoined the firm and was made a director of the South African company in 1949 and was also appointed a member of the London committee.

WITH EFFECT FROM June 1, Mr. Lockyer has been appointed sales manager for the Ainsbury Group, covering the Midlands and southern England. A well-known foundry executive, Mr. Lockyer was factory manager for Magnal Products, Limited, of Bristol, previous to his present appointment.

STEWARTS AND LLOYDS, LIMITED, AND TUBE INVESTMENTS, LIMITED, announce that consequent on the cancellation of the special rights attaching to their former respective holdings of liaison shares and of the working agreement between the two companies of November 3, 1930, they have agreed that representation on each other's boards is unnecessary. Accordingly, Mr. I. A. R. Stedeford and Mr. P. G. Carew have retired from the board of Stewarts and Lloyds, and Mr. A. G. Stewart and Mr. J. C. Lloyd have retired from the board of Tube Investments.

AT THE ANNUAL MEETING of the Dudley Area Committee of the National Union of Manufacturers, on June 11, the chairman, Mr. G. Salter, said that treatment by the B.B.C. of the industrialists' case had been unfair and urged that local industrialists should do something about it, especially by offering to the B.B.C. the services of speakers. It was decided that the suggestion of the Dudley Committee should be sent for consideration to the Midland Area Committee and that the Midland Area should approach the Midland Region of the B.B.C. to secure better representation in future industrial debates.

THE ENTIRE STOCK and goodwill of the Management Library has been presented by the proprietor, Mr. R. C. A. Vernon, as a Coronation gift to the British Institute of Management. The library was founded, in 1930, with a nucleus of the private collection of Colonel L. Urwick, a pioneer of scientific management in this country; it has subscribers in many parts of the world. This valuable addition to the Institute's existing library means that there is now gathered under one roof a collection of management literature that is the most comprehensive in the country. It brings the total of volumes and documents up to 20,000.

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CLASSIFIED ADVERTISEMENTS

PREPAID RATES: Twenty words for 5s. (minimum charge) and 2d. per word thereafter. Box Numbers 2s. extra (including postage of replies).

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, 49, Wellington Street, London, W.C.2. If received by first post Tuesday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

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.

FOUNDRY MANAGER, A.M.I.B.F., desires change; 30 years' experience in all classes of foundry practice; mechanisation casting for the machine-tool trade up to 6 tons; costing ext.; used to being in complete charge.—Box 3564, 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 exempted from the provisions of the Notification of Vacancies Order 1952.

TWO Cast Iron FETTLERS required by Sundry Equipment Manufacturers, Pitsea Street, Stepany, E.1.

LABOURER required by Sundry Equipment Manufacturers, Pitsea Street, Stepany, E.1.

METALLURGIST (28) requires progressive position. Midlands or South. B.Sc., A.I.M., A.M.I.B.F. Several years' senior research experience on cast ferrous metals.—Box 3558, FOUNDRY TRADE JOURNAL.

SMELTER (aged 30-35) wanted for Steel Foundry in Glasgow area, producing carbon and alloy steel from basic electric arc furnaces. Output 35-40 tons of casting per week. Good prospects for suitable man.—Box 3557, FOUNDRY TRADE JOURNAL.

WEST YORKSHIRE FOUNDRIES, Sayner Lane, Leeds, require ASSISTANT FOUNDRY METALLURGIST for technical control in iron foundries. Previous experience on cupola control and foundry practice an advantage. Five-day week; canteen facilities.—Apply in writing to CHIEF METALLURGIST.

REPRESENTATION required in London and surrounding Counties area of a progressive Cast Iron Foundry Casting Repetition and Jobbing Work in normal Grey and High Duty Cast Irons. Capacity for machining coupled with foundry desirable. Connection available. Advertiser wishes for remuneration on area commission basis.—Write Box 3556, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—Contd.

SKILLED JOBBING AND MACHINE MOULDERS required; top rates of pay.—Slough Foundries, Ltd., Trading Estate, Slough.

PATERNSHOP FOREMAN for Steel Foundry in Scotland (12 Pattern-makers). Estimating experience essential. Applicant must have initiative and ability to organise for mechanised production. House available. Send fullest details of experience, age, and salary required to Box 3546, FOUNDRY TRADE JOURNAL.

REPRESENTATIVES required for sale, on commission, of foundry equipment and sundries. Established trade. (1) Leicestershire, Nottinghamshire, Derbyshire, Staffordshire; (2) Lancashire, Cheshire, North Wales; (3) South Wales. Applications would also be considered for: (a) Northamptonshire, Bedfordshire and eastern counties; (b) London and south-eastern counties. Applicants should state particulars of foundry experience and present activities.—Box 3545, FOUNDRY TRADE JOURNAL.

FRASER & CHALMERS ENGINEERING WORKS, ERITH, KENT have vacancies for SENIOR DRAUGHTSMEN

Applications are invited from men preferably with some experience of Coal Washing Plant, but applicants with Material Handling Plant layout, Structural, or Piping experience will be considered.

Good Salaries according to experience and ability

Pension Scheme and good working conditions

Apply giving full details of experience to:

Personnel Manager (Ref. C.P.D.),
Fraser & Chalmers
Engineering Works,
Erith, Kent

SITUATIONS VACANT—Contd.

ESTIMATOR RATEFIXER wanted. Must be fully capable of estimating weights and fixing initial rates direct from drawings for High Duty and Grey Iron castings manufactured in semi-mechanised plant and plate moulding. Position is a permanent one, with opportunity to join the Company's Pension Scheme, and offers scope for the right man with drive and initiative. Assistance will be given with housing.—Write, giving full particulars of experience, and salary, to SYKES & HARRISON, Ltd., Port Penrhyn, Bangor, North Wales.

FOUNDRY FOREMAN required to assist Superintendent of a large mechanised Foundry in Yorkshire, producing high grade Steel and Iron Castings. Applications are invited from men with first-class steel foundry experience, together with a good general knowledge of wood and metal patterning. A good salary will be paid and applicants are invited to write, giving full details of experience and particulars of present and past appointments, to Box 3567, FOUNDRY TRADE JOURNAL.

METHODS ENGINEER required by large mechanised Iron and Steel Foundry in Yorkshire. Applications are invited from men holding similar position. Please write stating qualifications and details of past and present appointments to Box 3565, FOUNDRY TRADE JOURNAL.

FOREMAN MOULDER required for Grey Iron Foundry. Experience of intricate jobbing work; knowledge of mechanised production an advantage; first-class working conditions; pension scheme; canteen and recreational facilities. House will be provided after satisfactory probationary period.—Apply Labour Manager, MARSHALL, Sons & Co., Ltd., Britannia Works, Gainsborough.

CHIEF INSPECTOR OF CASTINGS required by large mechanised Foundry in Yorkshire, producing high grade iron and steel castings. Applicants should have a good foundry and patterning background, preferably with some machine shop experience, and at the present time be holding a similar position. A good salary will be paid to the successful applicant. Applications, giving full particulars of present and past appointments to Box 3560, FOUNDRY TRADE JOURNAL.

ESTIMATOR required for Mechanised Foundry situated in South-West London. Applicant must have first-class knowledge of all aspects of estimating for Shell Moulded Castings together with Sales Office procedure. State age, experience and salary required.—Box 3561, FOUNDRY TRADE JOURNAL.

METAL PATTERN PLATE FITTER, with experience in pattern making, wood and metal (moulders apprenticeship an advantage) as assistant foreman in a malleable iron foundry in the Home Counties. Permanent position with good prospects.—Apply giving full details of age, experience, etc., to Box 3562, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT—Contd.

PATTERN PLATE DESIGNER for shell moulding required by foundry in the south of England.—Box 3568, FOUNDRY TRADE JOURNAL.

LONDON FOUNDRY requires representative for Iron and Non-ferrous Castings on Commission basis.—Apply F. H. CLARK & SON, Sutherland Road, Blackhorse Lane, Walthamstow, E.17.

PATTERN MAKER: Man experienced on motor or aircraft metal pattern work required for checking duties in Metal Department. Small flat available to suitable applicant.—G. PERRY & SONS, Hall Lane, Leicester.

CHIEF EXECUTIVE required to head Steel Foundry Division of large and old-established Engineering Works. The post is an important one, carrying high responsibility and high salary. Applications are invited from men with excellent production and administrative experience and a good educational and technical background, and will be treated in strict confidence at this juncture.—Fullest details, together with salary expected, should be sent to THE MANAGING DIRECTOR, K. & L. Steelfounders & Engineers, Ltd., Letchworth, Herts.

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.

LIGHT-ALLOY FOUNDRY.—Applications are invited for a SENIOR EXECUTIVE appointment in an important light-alloy foundry. Applicants should be 35/45 years and at present in receipt of four-figure salary; must have wide experience in production of aluminium and magnesium castings by the most modern methods; proved administrative ability and preferably an engineering background.—Box 3530, FOUNDRY TRADE JOURNAL.

NON-FERROUS firm of foundry 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.

WANTED, for Manchester Area, **FOREMAN,** to take charge of modern Vitreous Enamelling Plant (including Milling, Pickling, Sand-blasting, etc.). Applicant must be fully experienced in enamelling sheet and cast-iron, must also be an efficient organiser and strict disciplinarian. Applications must be made in writing, stating experience and salary required. All communications will be regarded as strictly confidential.—Box 3534, FOUNDRY TRADE JOURNAL.

AGENCY

WELL-KNOWN manufacturer of Foundry Equipment requires SELLING AGENTS in various territories of the U.K. Applications will be considered from established firms, or from experienced individuals wishing to act as part-time Agents.—Apply Box 3555, FOUNDRY TRADE JOURNAL.

FINANCIAL

ADVERTISER with Patterns, Equipment and Connection, would consider investment in small Iron Foundry capable of producing repetition castings up to 56 lbs.—Box 3563, FOUNDRY TRADE JOURNAL.

PATENT

THE proprietor of British Patent No. 601968, entitled "Improvements in the extraction of alumina from its ores," offers same for licence or otherwise to ensure practical working in Great Britain.—Inquiries to SINGER, STERN & CARLBERG, 14, East Jackson Boulevard, Chicago 4, Illinois, U.S.A.

MACHINERY WANTED

MOULDING MACHINE JAR RAM PIN LIFT TABLE size 1 ft. 9 in. by 1 ft. 5 in. "Britannia" Type preferred.—Box 3569, FOUNDRY TRADE JOURNAL.

WANTED: BALING PRESS; suitable for baling non-ferrous scrap; hydraulically operated; must be in good condition.—Box 3565, FOUNDRY TRADE JOURNAL.

SCRAP Baling Press required. Mechanically or hydraulically operated.—Send fullest particulars, including drawings, etc., to Box 3533, FOUNDRY TRADE JOURNAL.

WANTED.—6 ft.-8 ft. Grinding Mill, with rack and pinion. Bottom discharge door.—JOSEPH HARPER, LTD., Upper Gornal, near Dudley.

MACHINERY FOR SALE

SALE: CUPOLA, 32 in. dia. Shell (Constructional Engineering) together with Keith Blackman Fan and Motor. Good condition.—GOLDENHILL FOUNDRY, LTD., Goldenhill, Stoke-on-Trent. Tel.: Kids Grove 342.

2-TON ELECTRIC OVERHEAD TRAVELLING CRANE, 3 motor type, 30 ft. span, floor controlled, 400/440/3/50; modern and almost new. Price: £1,190.—FRANK SALT & CO., LTD., Station Road, Blackheath, Staffs.

GAS HARDENING OVEN manufactured by Incandescent Heat Co. for immediate disposal. Hearth 124 in. high (centre), 183 in. wide by 2 ft. 7 in. deep.

GAS CORE OVEN manufactured by Foundry Engineering Co. for immediate disposal. Size of cabinet 6 ft. 4 in. wide by 6 ft. 0 in. high by 3 ft. 4 in. deep. Complete with motor 3/4 h.p. 400/440-v., 3 ph., 50 c.
(Can be inspected and offers made to ARTHUR LYON & CO., (ENGINEERS) LTD., Park Works, Stamford, Lines.

MACHINERY FOR SALE—Contd.

FOR SALE, as a lot or separately: Five Incandescent Heat Co.'s Furnaces, Semi-Muffle. Size 3 ft. 6 in. by 2 ft. by 15 in., height approximately. 3 Double Decker, 2 Singles. Capacity 1,000 deg. C. Inspection by appointment only.—F. H. BOURNER & CO. (ENGINEERS), LTD., Crawley, Sussex. 'Phone 1312.

CORE STOVES, 2 re-circulating batch type with coke-fired Furnace and motor-driven circulating fan by Constructional Eng. 4 ft. 0 in. high, 3 ft. 3 in. by 3 ft. 6 in. deep. Small and large size Adaptable Moulding Machines, good condition.—S. C. BITSBY, A.M.I.C.E., A.M.I.E.E., Haining Road, Tividale, Tipton, Staffs. TIPTON 2448.

FOR SALE.—One 20-in. dia. Cupola, complete with motor control gear and blower. Spare set of bricks for lining, together with charging platform, size 20 ft. by 12 ft. approx., gantry and electric hoist block and bucket, etc. A complete installation in first-class condition.—Apply H. & E. LINTOTT, LTD., Horsham, Sussex.

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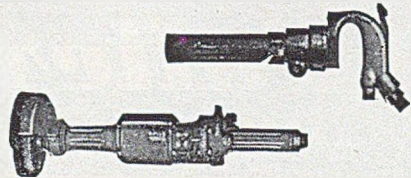
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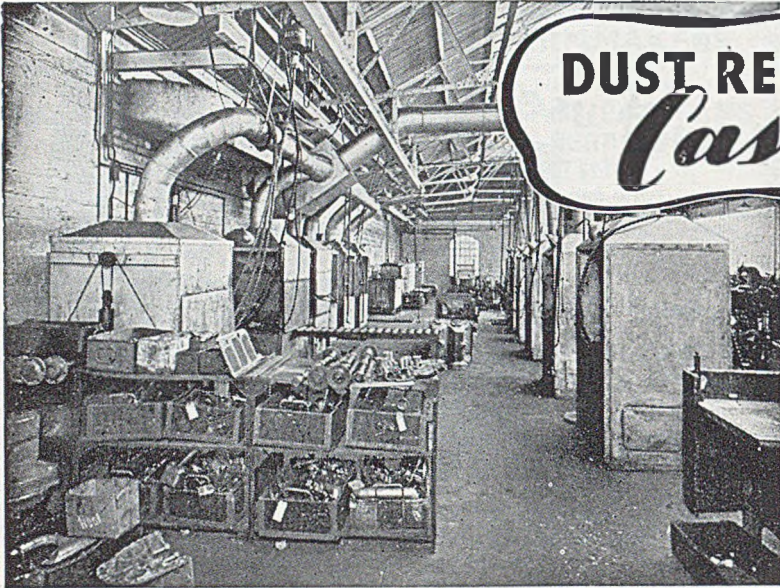
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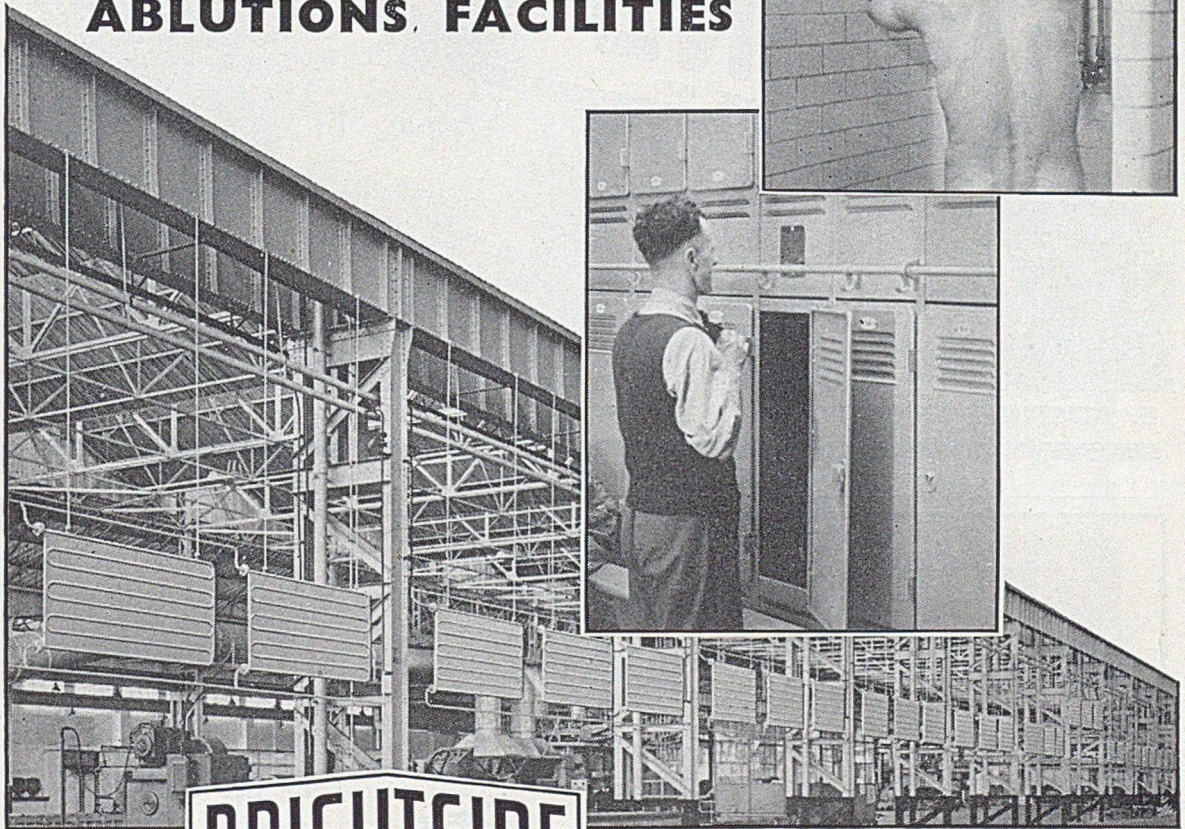
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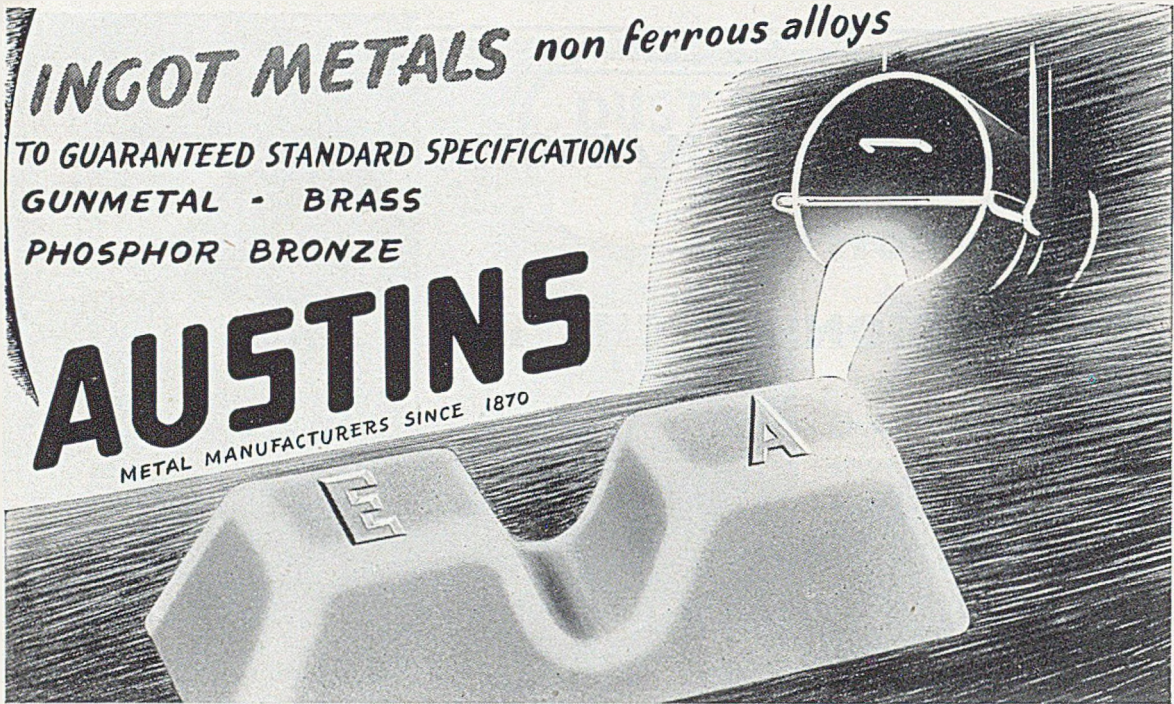
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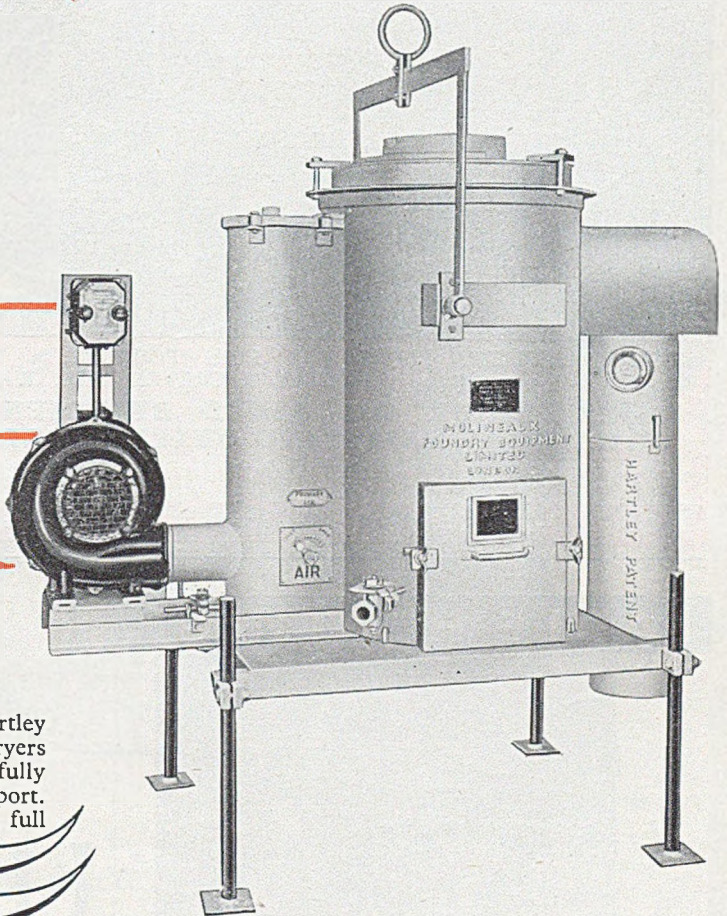




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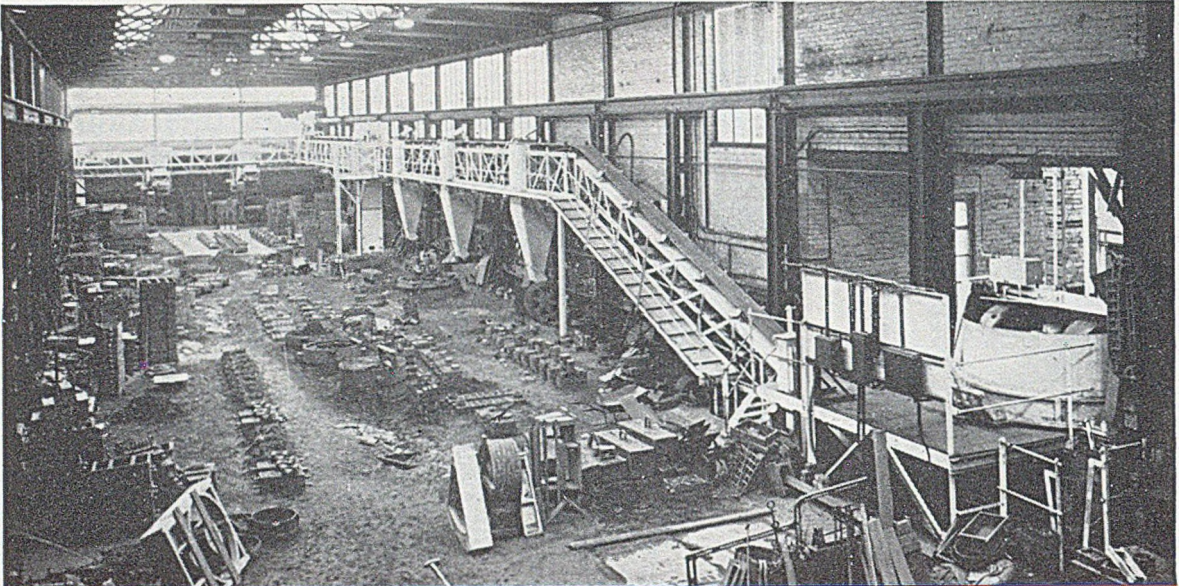
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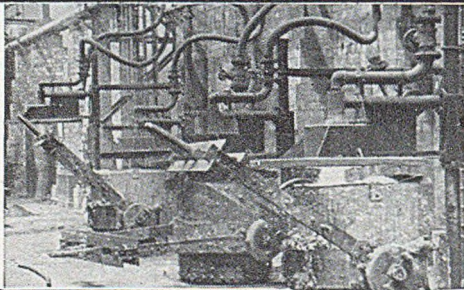


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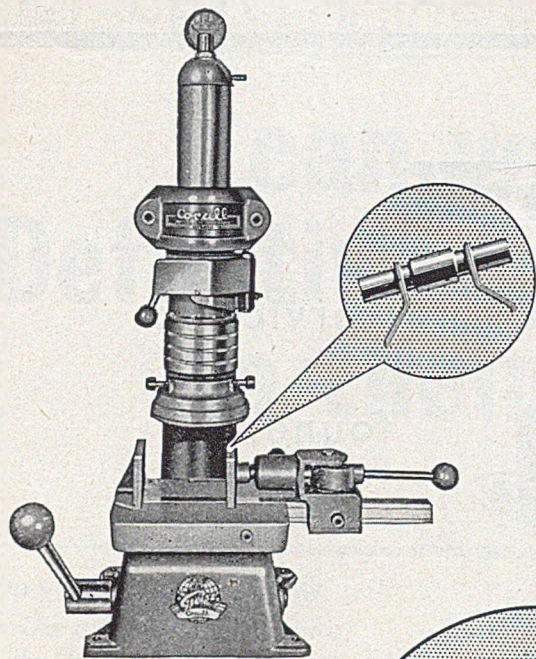
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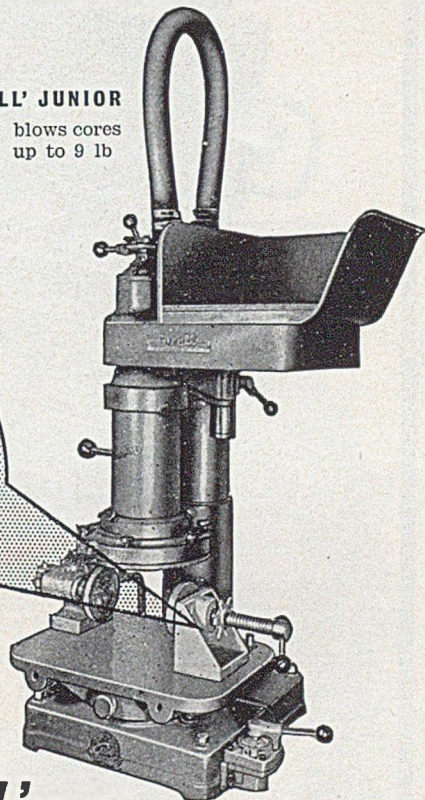
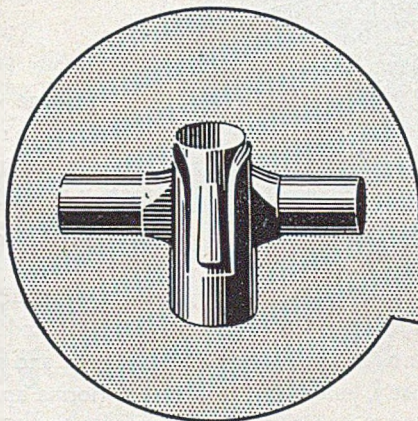
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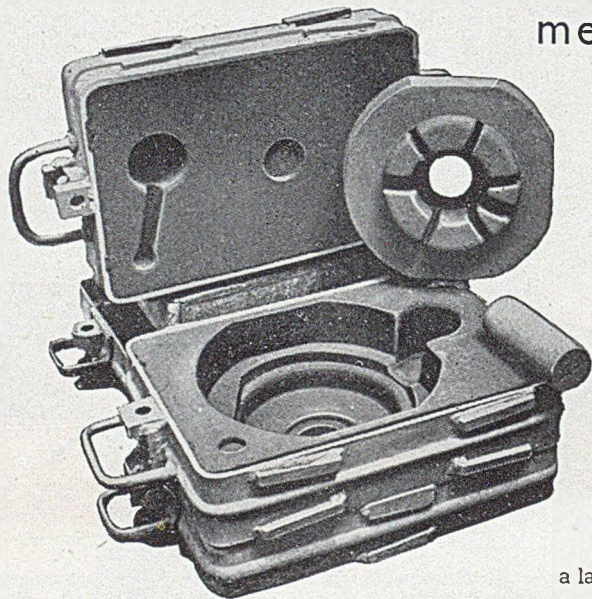
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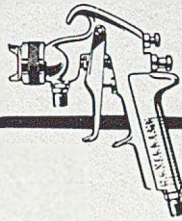
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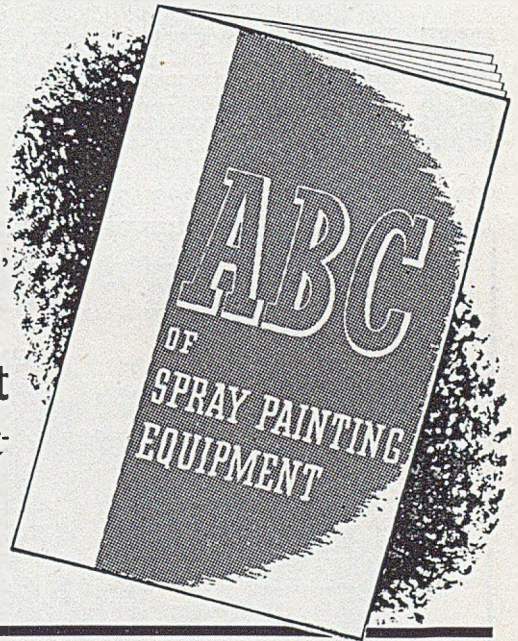
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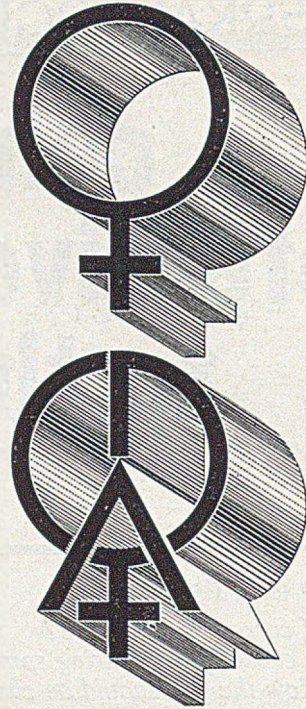
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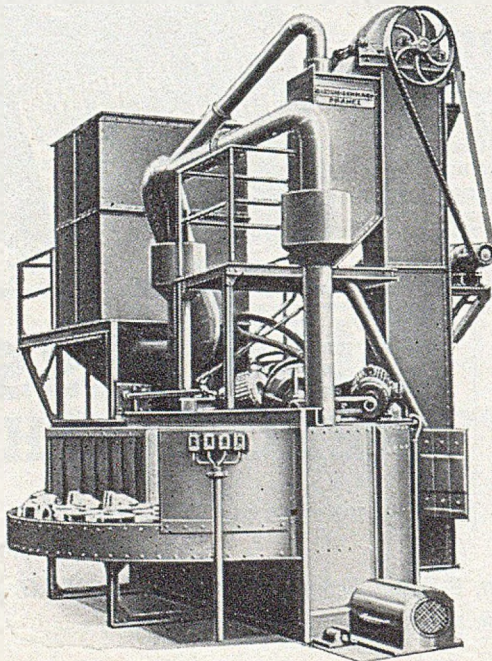
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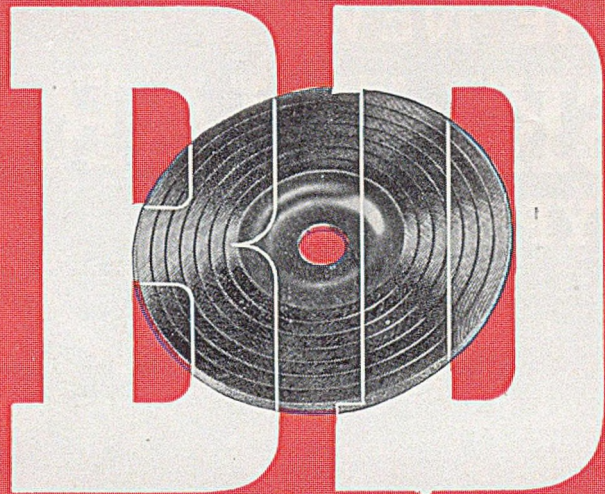
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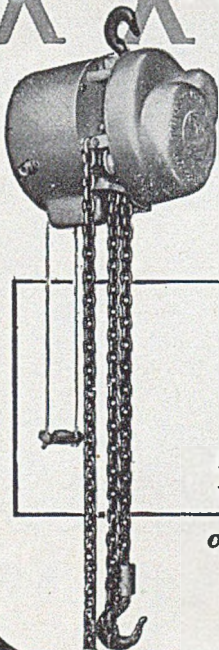
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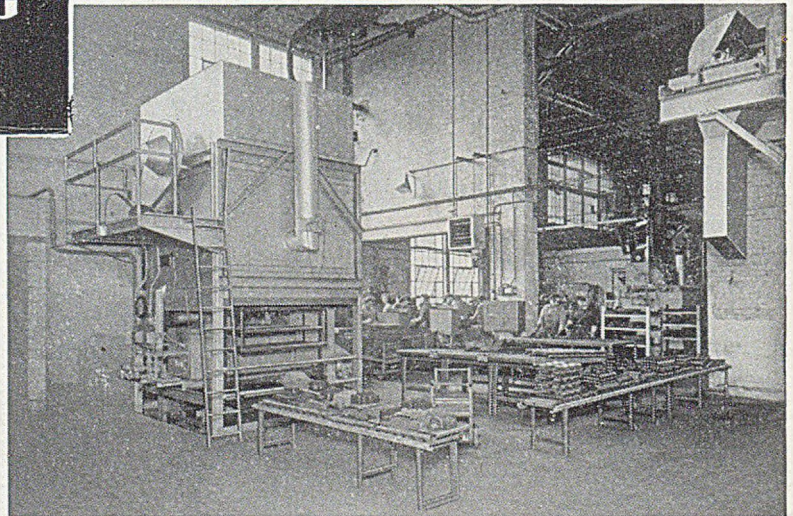
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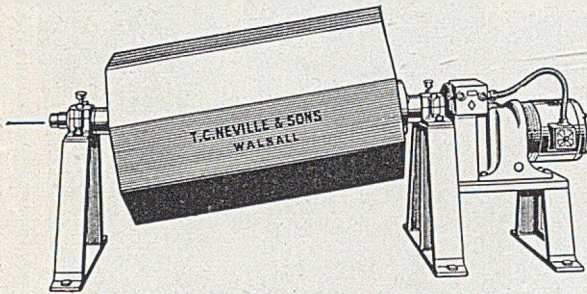
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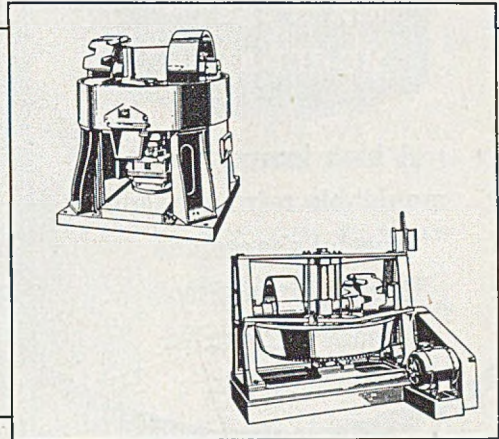
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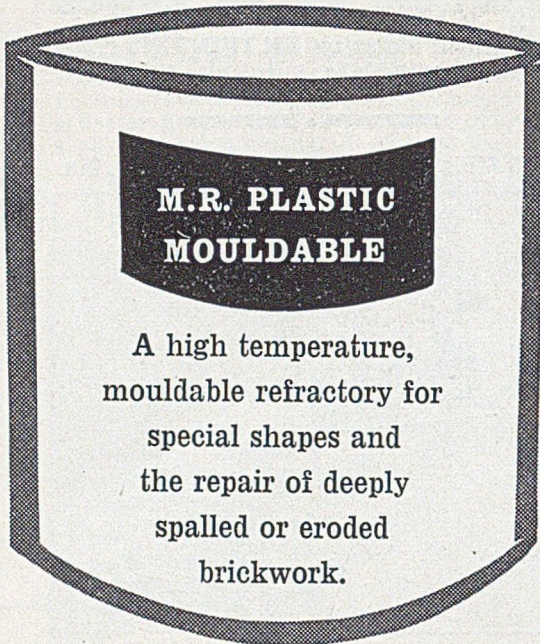
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Dry to 1 hour at 1620°C:	...	less than 1.00%

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1 hr. at 1000°C	...	200 lb/sq.in.
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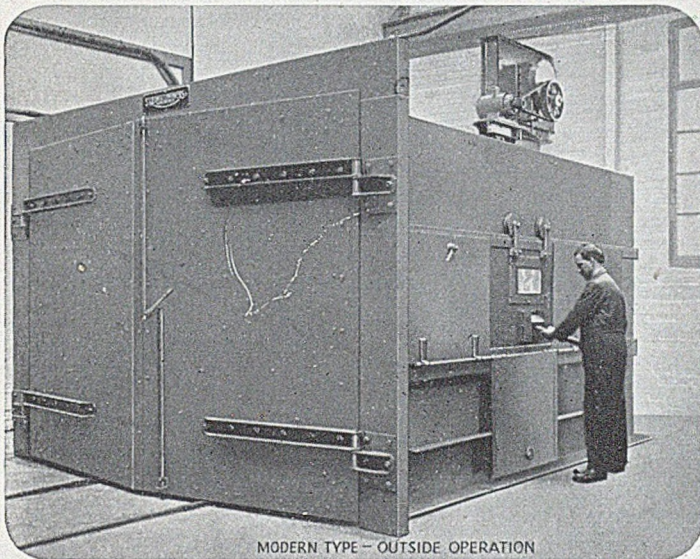
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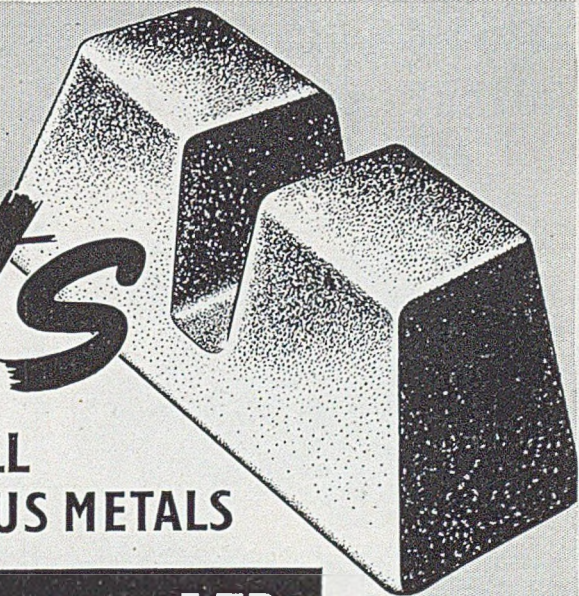
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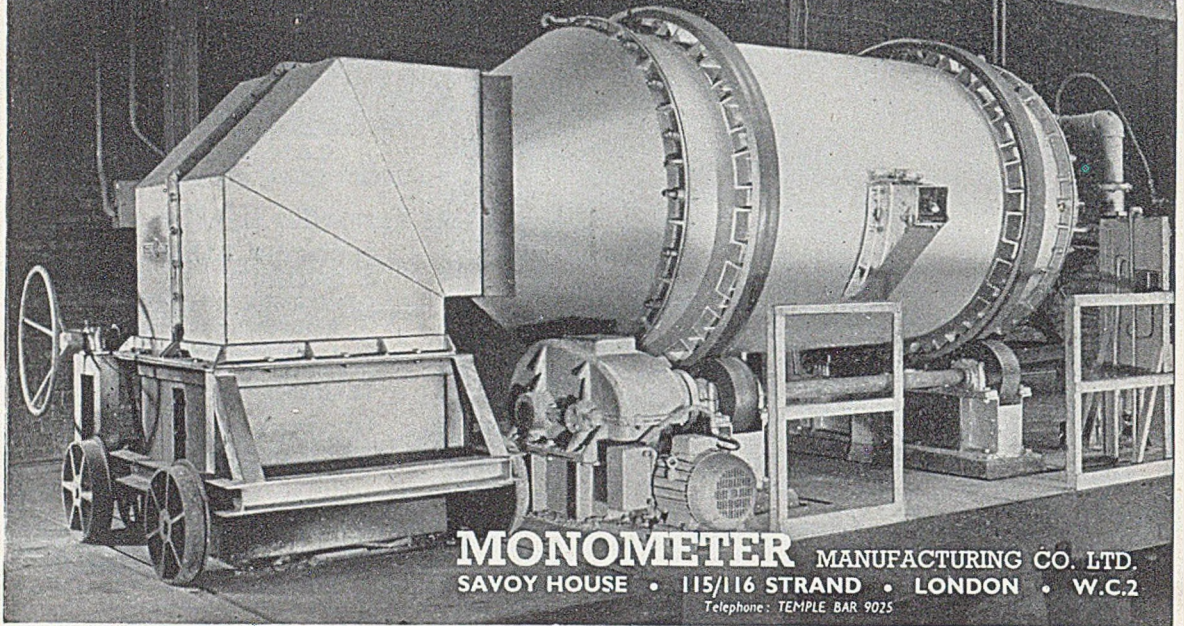
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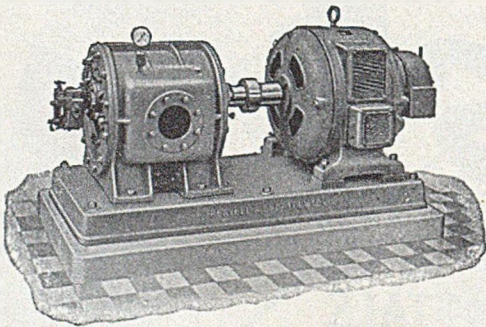
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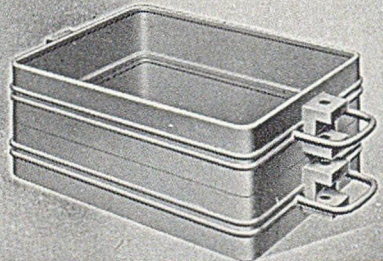
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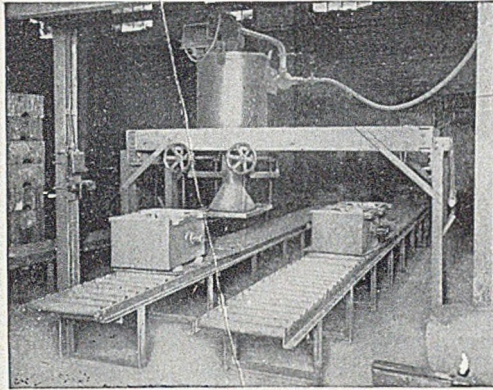
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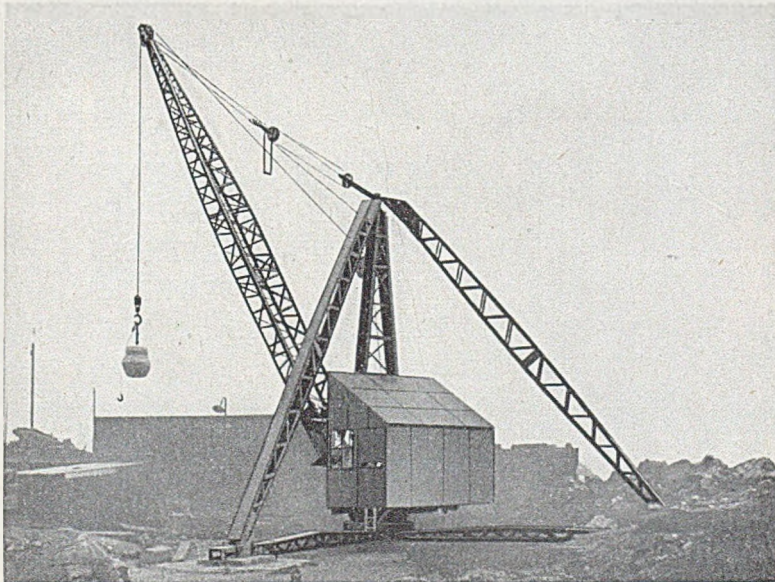
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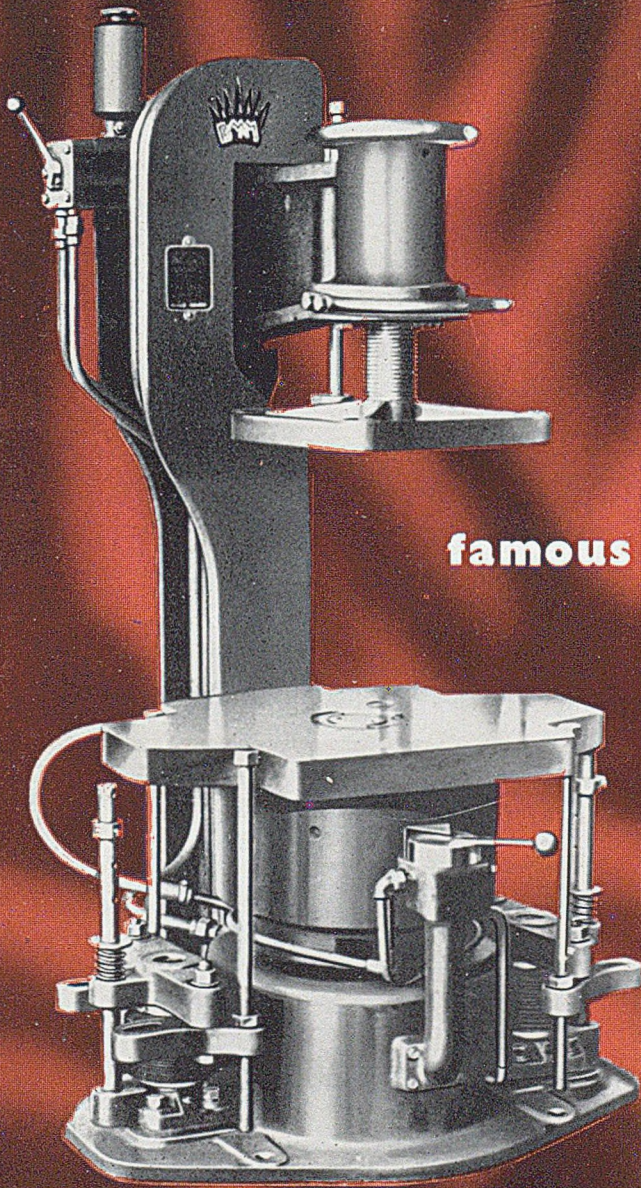
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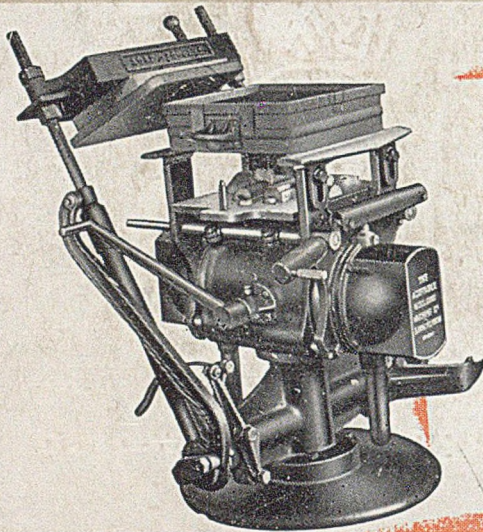
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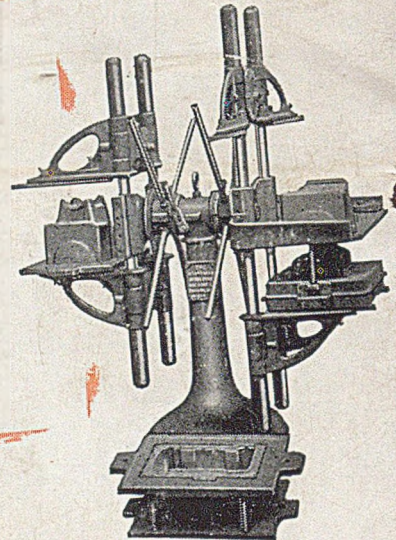
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