

174 P.69/53/I  
2438/11.02

# FOUNDRIY

EST. 1902

## TRADE JOURNAL

VOL. 95  
No. 1935

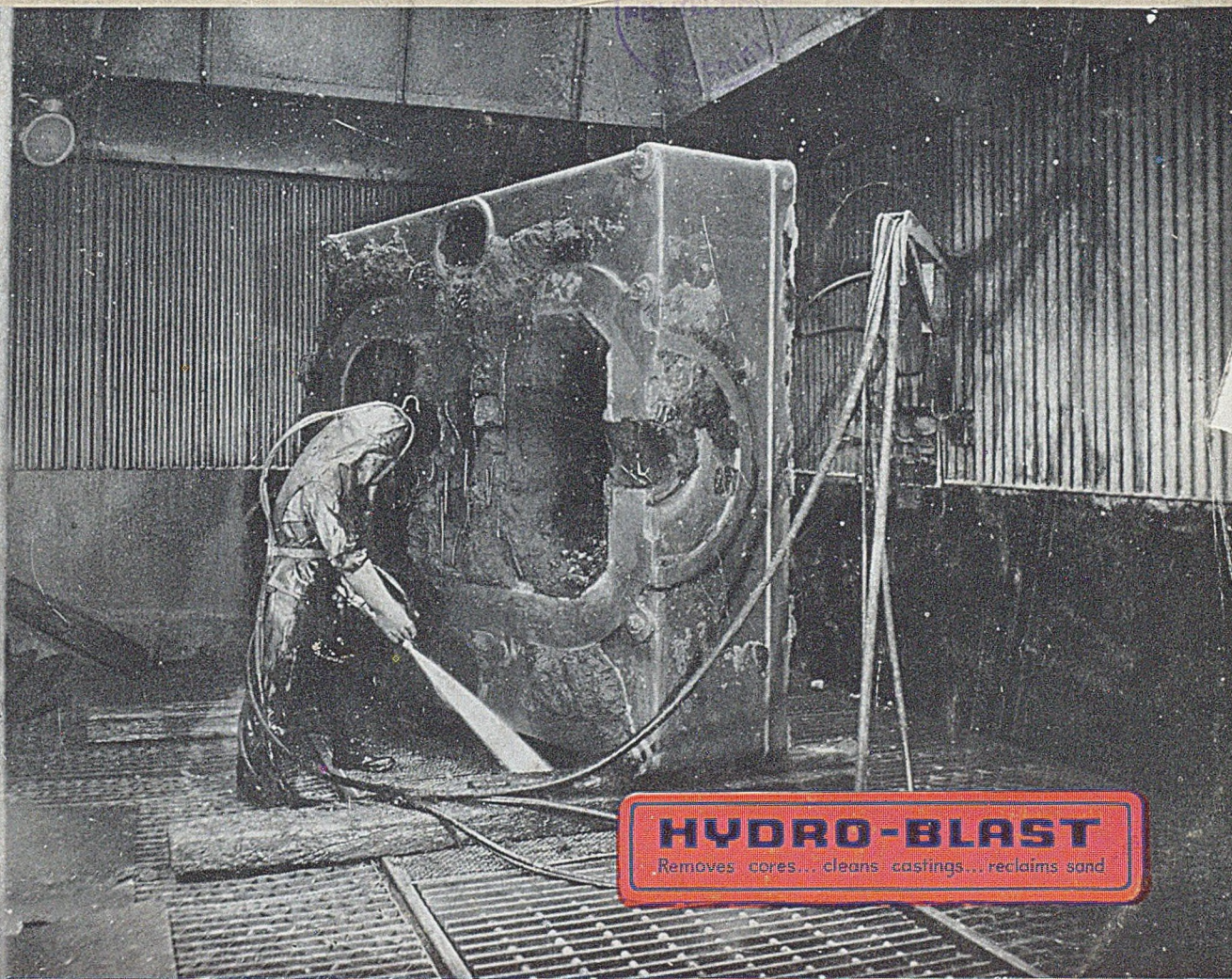
Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

OCTOBER 1, 1953

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

Single Copy, 9d. By Post 11d. Annual Subscription, Home 40/-, Abroad 45/- (Prepaid)



### HYDRO-BLAST

Removes cores... cleans castings... reclaims sand

Built in England by

**PNEULEC LIMITED, SMETHWICK, N.P. BIRMINGHAM**

**ALLDAYS & ONIONS LTD.**

BIRMINGHAM 11

Manufacturers of

**IRON FOUNDRY EQUIPMENT**

**PRICE'S FIREBRICKS**

As used by all the leading Iron and Steelworks  
and Foundries at Home and Abroad

Manufactured by

**J. T. PRICE & CO. LTD., STOURBRIDGE**

# 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**

PHENIX WORKS & PLUMPTON MILLS, PENISTONE, near SHEFFIELD  
Telephone: PENISTONE 21 and 57  
Telegrams: BLACKING, PENISTONE

**FOR  
PERFECT  
SHELL  
MOULDS**

**Synphorm Resin  
Powders have  
excellent Flow  
and Hardening  
properties  
Give great dry  
strength and smooth  
surface  
to the shell**



SYNPHORM LIQUID RESINS  
AND POWDERS HAVE ALSO BEEN  
SPECIALLY DEVELOPED  
FOR PRECISION SAND CORES

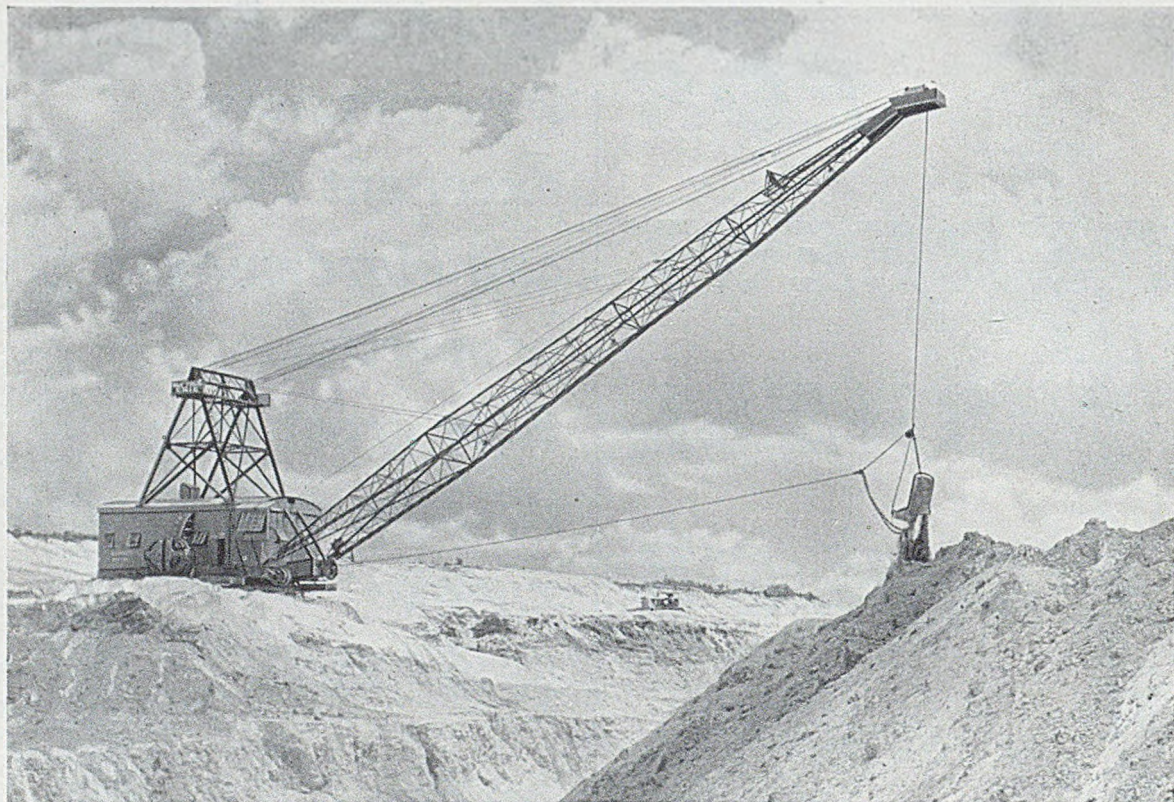
**BLACKBURN & OLIVER LTD**

*Manufacturers of Synthetic Resins*  
LAMBERHEAD INDUSTRIAL ESTATE  
WIGAN

Telephone: WIGAN 82252  
Grams: SYNPHORM WIGAN



## aluminium adventure



### *bauxite for WORLD MARKETS*

Sail 65 miles up the Demerara River in British Guiana, and you will come upon the thriving mining town of Mackenzie. Here the Demerara Bauxite Company Ltd. (an Aluminium Limited Company) is engaged in mining bauxite—basis of aluminium, and raw material for the making of abrasives, refractories and important industrial chemicals.

Among the operations undertaken by the Company is the stripping of many thousand tons of overburden to expose the rich deposits of ore. One of the machines which performs the task is a powerful walking dragline, with a reach of almost 200 ft., capable of stripping and stacking 400 cubic yards of clay and sand an hour. A skilled operator can 'walk' the dragline step by step over almost any terrain,

to lay bare new supplies of bauxite for mining and shipment to Group Companies and to the markets of the world.

*As world demand for Aluminium increases and its usefulness as a major raw material becomes more widely recognised, so must production be expanded. A leading organisation engaged in this task is the Aluminium Limited Group of Companies whose resources encompass many widespread activities. These cover every aspect of the Industry—the mining and shipping of raw materials, the generation of hydro-electric power and smelting and fabrication of the metal. To these must be added world-wide selling services and a programme of continuous research designed to improve production methods and to find new alloys.*

## Aluminium Union Limited

(Incorporated in Canada)

THE ADELPHI, STRAND, LONDON, W.C.2. AN ALUMINIUM LIMITED COMPANY  
PRINCIPAL BRITISH COMMONWEALTH DISTRIBUTOR OF ALUMINIUM



# FORDATH MACHINES IN THE FOUNDRY

*—lower costings in the office*

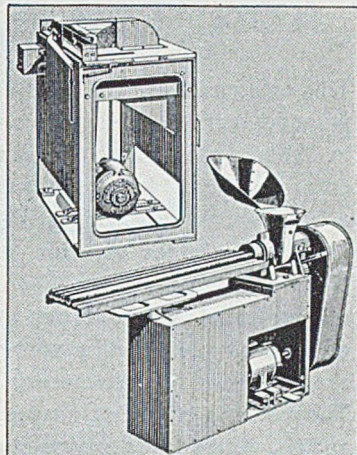
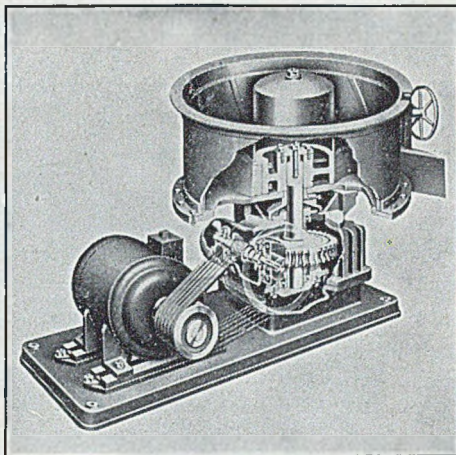
Fordath 'New Type' Mixers, one for everybody, seven sizes to cope with batch capacities from 20 lbs. to 1 ton. To mix foundry silica sands with core bonding compounds *without crushing*. Stiff compounds as low as 1% can be completely dispersed through the sand, coating each grain with a film of binder. Mixing blades rotate in a horizontal plane, conveying the sand from the centre of the pan, rubbing it thoroughly against rubbing plates and tumbling it back to the centre. Two

to three minutes is enough and the batch is discharged in a well aerated homogeneous mix. Gears and bearings totally enclosed.

The Fordath Multiplunger Core Machine is going to town, to the country, to export markets, wherever there are foundries. The thrust of the core sand through the multiple die is provided by plunger action instead of a rotating worm. Quality and consistency of the core sand mixture are not critical factors. Di-

mensionally accurate extrusions are satisfactory with sands of poor quality and even facing sand or plain red moulding sand can be extruded. With all sands, the core mix is at its best when Glyso is the bonding agent.

*The FORDATH MULTI-PLUNGER CORE MACHINE admirably exemplifies the success of equipment designed by foundrymen for foundrymen.*



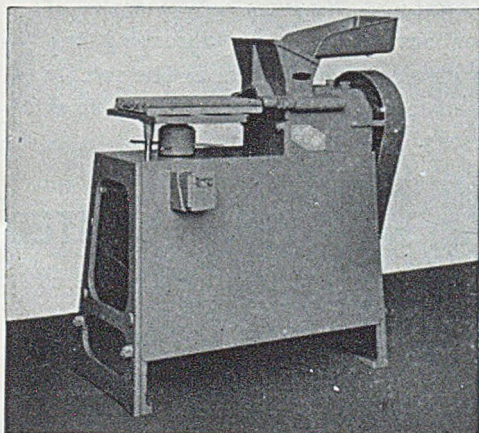
(ABOVE LEFT) FORDATH 'NEW TYPE' MIXING MACHINES use the well known Fordath principle of rubbing and folding without crushing in each of the seven models in the range.

(ABOVE RIGHT) FORDATH CUT-OFF MACHINES have many years of satisfactory service built into them.

The FORDATH MULTIPLE ROTARY CORE MACHINE has an enviable reputation for accurate extrusions in foundries everywhere.

The Fordath Multiple Rotary Core Machine extrudes cores from  $\frac{1}{8}$  inch to 6 inches. Multiple extrusion of up to ten (smallest diameter) cores simultaneously and accurately. All dies have venting device. Senior model (power driven) and Junior (power or hand operated bench model).

Fordath Core Cut-off Machine cuts cores up to 3 inches diameter accurately to lengths required. Motor and roller bearings totally enclosed.





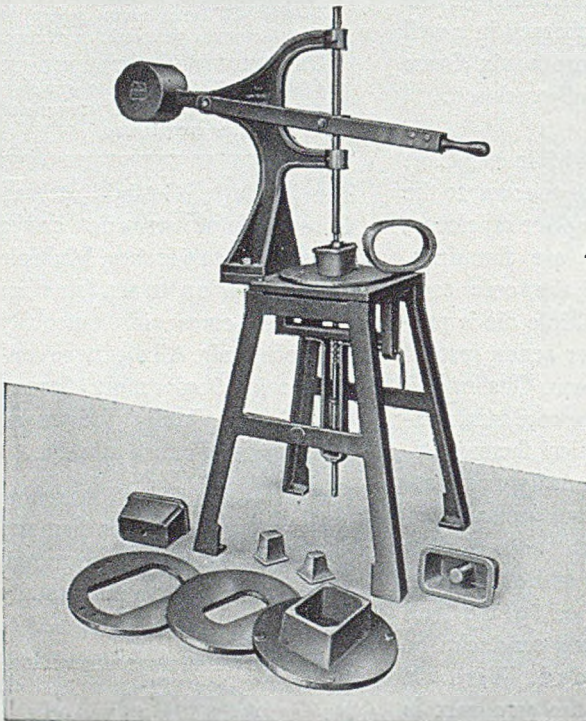
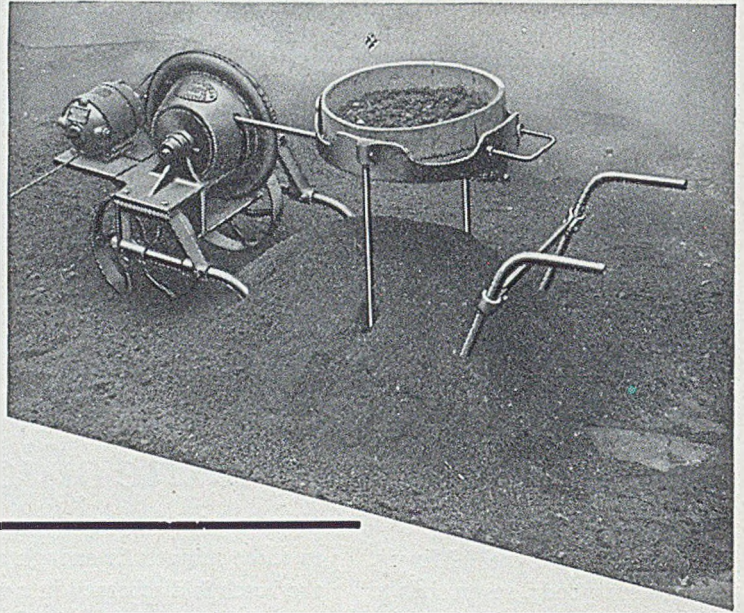
Full details obtainable from

**THE FORDATH ENGINEERING CO. LTD.**  
HAMBLET WORKS, WEST BROMWICH  
STAFFS.

PHONE: West Bromwich 0549, 0540, 1692  
GRAMS: Metallical, West Bromwich

## ADAPTABLE PORTABLE POWER RIDDLE

This electrically-driven Sand Riddle provides very considerable savings in labour time, with consequent cost economy. Its use eliminates a bottle-neck in production progress and releases valuable labour for work which cannot be done mechanically. One cwt. per minute of fine facing sand will pass through the  $\frac{1}{8}$  in. mesh, 18 in. diameter riddle. The machine is easily transportable and the motor leads may be plugged into any convenient light or power socket.



## ADAPTABLE RUNNER BUSH MACHINE

By speedy and economical production this simple and robust machine has solved a problem for many foundries. It is quite normal for a juvenile operator to produce in one hour on this machine a quantity of runner bushes previously absorbing one full day's work. The plates can be quickly changed to suit various shapes and sizes of bushes.

**THE ADAPTABLE MOULDING MACHINE COMPANY LIMITED**

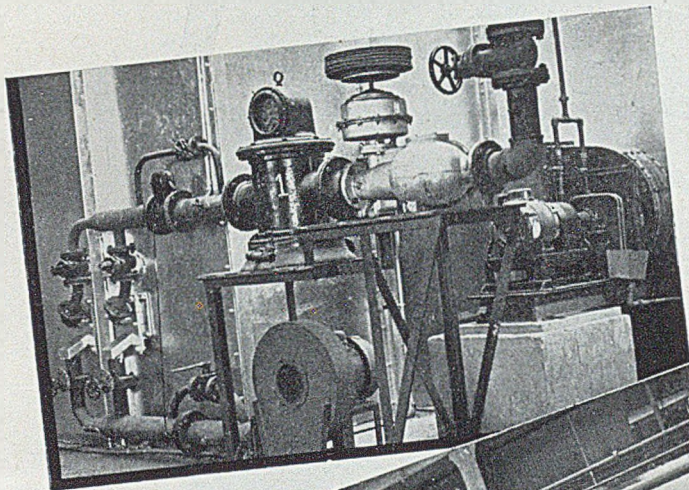
**CHARLES HENRY STREET, BIRMINGHAM, 12** Phone: MIDland 6911  
London Office: 47 WHITEHALL, S.W.1 Phone: WHITEHALL 7740

*Other Products include* MOULDING MACHINES, VIBRATORY KNOCK OUTS (Suspension type), CORE MACHINES, SNAP FLASKS, BOXES, PATTERN DUPLICATORS, SQUEEZE MACHINES, DUPLEX ROLLOVERS.

# *Leading the Way..*

**BATTERY OF CLEAN GAS FIRED,  
RECIRCULATING TYPE**

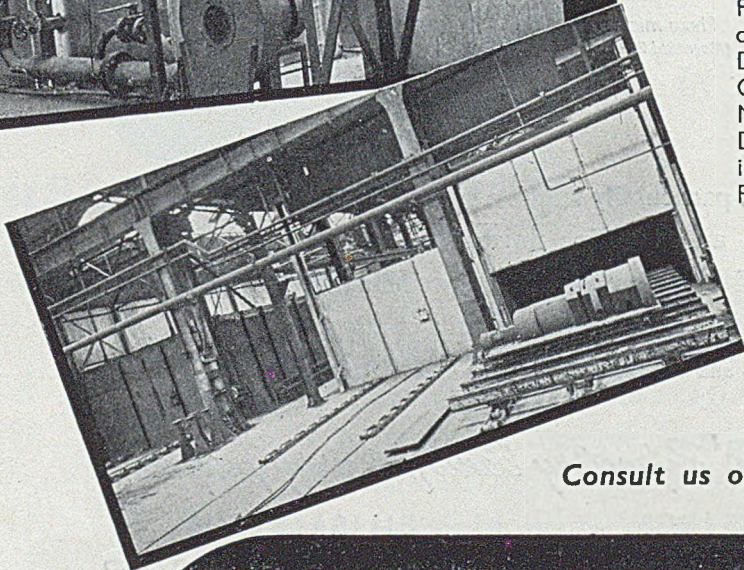
## *Mould Drying Stoves*



Installed at the renowned steel foundry of Messrs. F. H. Lloyd & Co. Limited, James Bridge Steelworks, near Wednesbury, Staffs.

### **MATHISON CLEAN GAS FIRED RECIRCULATING SYSTEM :—**

Increases Production · Lowers Fuel Costs · Ensures Uniformity of Heat Distribution · Reduces Drying Time · Reduces Labour Costs · Eliminates Deposits on Moulds · Guarantees Perfect Drying · Gives Maximum Drying Capacity with Minimum Floor Space Utilization.



*Consult us on your drying problems*

# **JOHN MATHISON LTD**

**E N G I N E E R S**

**HUTTON HALL, GUIBOROUGH, YORKS, ENG.**

PHONE: GUIBOROUGH 59, GRAMS: MATHISON, GUIBOROUGH



Photo micrograph  
(Magnified 25 diameters)

A fine-grained sand, particularly suitable for oil cores where an extra fine finish is essential. Disintegrates very freely after casting. Specially recommended for intricate iron and non-ferrous castings. Grading is mainly on 100 and 150 mesh B.S.S. Silica Content 96.5%

★ *There's a 'GR' Refractory Sand for every purpose!*

#### MOULDING SANDS

YORKSHIRE	MANSFIELD
LEVENSEAT	WARSOP '59' & '60'
BRAMCOTE	YORK YELLOW
HENSALL	WEATHERHILL

#### SILICA SANDS

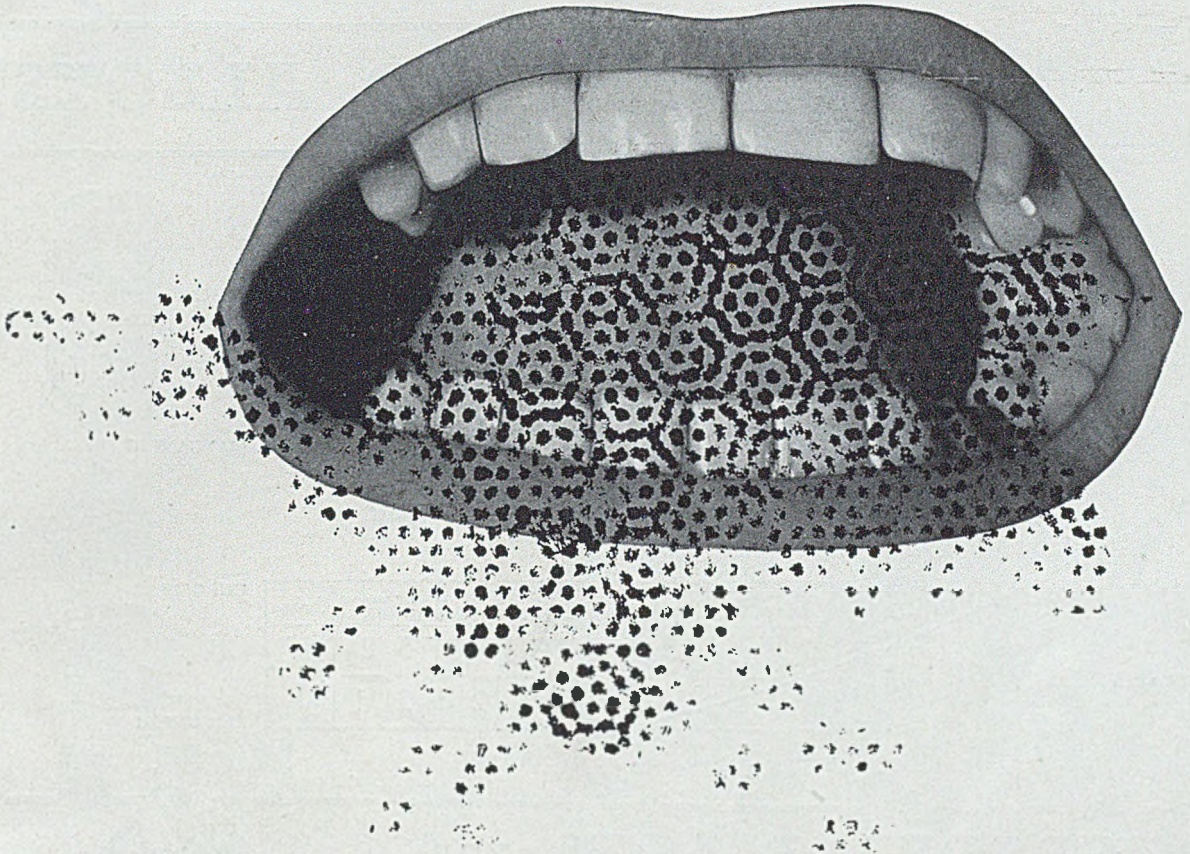
KINGS LYNN	LEIGHTON BUZZARD
MINIMUM	BAWTRY
LEVENSEAT	SOUTHPORT
CHELFORD	SOMERFORD

TECHNICAL DATA of any of the above G.R. Refractory Sands sent on request.

# GENERAL REFRACTORIES LIMITED

GENEFAX HOUSE · SHEFFIELD 10 · Telephone: Sheffield 31113





## ***Dust means trouble —***

***and you can't make a thing without making dust***

Machine-made dust, continually breathed in day after working day, is dangerous to your work-people — and to expensive machine tools. Can you stop making dust? No! Can you control dust, keeping it out of delicate membranes and equally delicate machinery? Yes! Get in touch with us. We've been dealing with tricky problems of dust control for a long time now.

# see us for dust

DALLOW LAMBERT & CO. LTD. (DUST CONTROL EQUIPMENT FOR INDUSTRY)

HEAD OFFICE & WORKS: SPALDING STREET, LEICESTER. TEL.: LEICESTER 67832 (5 LINES)

LONDON OFFICE: 20 FITZROY SQUARE, LONDON, W.1. TEL.: EUSTON 5796 (2 LINES)

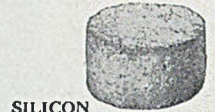
CRC34



# BRIQUETTED ALLOYS

## PROVIDE CUPOLA ECONOMY

- Uniform in size
- Regular and consistent recovery obtained
- No mechanical loss of alloy
- Weighing is avoided
- Greater convenience in use
- ● ● Allow the use of a higher proportion of scrap in the charge



Type	Manganese		Silicon (Standard)		Silicon (Special)		Zirconium (+ Silicon)		Chrome	
Weight of Briquette (lbs.) ...	3	1½	5	2½	1½	3½	1¾	5	2½	1¾
Weight of Contained Alloy (lbs.)	2	1	2	1	½	2	1	2	1	1

## GRADED ALLOYS FOR LADLE ADDITION



### GREATLY IMPROVE THE STRUCTURES OF CAST IRONS

#### 75/80% FERROSILICON

To reduce chill and improve machinability.

#### 6% ZIRCONIUM FERROSILICON

To improve machinability and increase strength.

#### S M Z 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 ¼ × ¼ : ½ × ½ : 100, 120 & 200 Meshes.

6% Zirconium Ferrosilicon ½ × ½ : ¾ × ¾.

SMZ Alloy ½ × 32 Mesh.

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

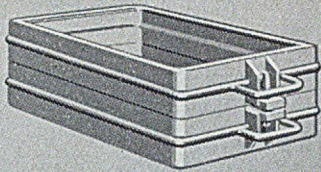
## BRITISH ELECTRO METALLURGICAL COMPANY LTD.

WINCOBANK

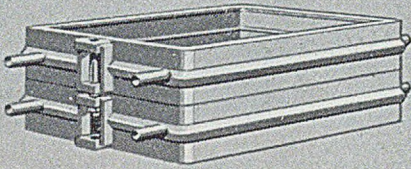
SHEFFIELD

ENGLAND

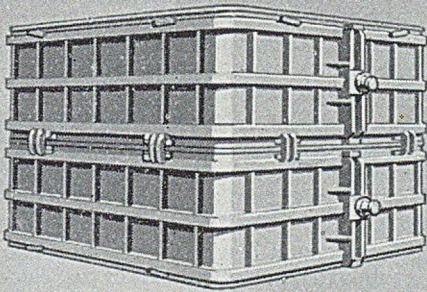
TELEPHONE: ROTHERHAM 4257 · TELEGRAMS: "BEMCO" SHEFFIELD



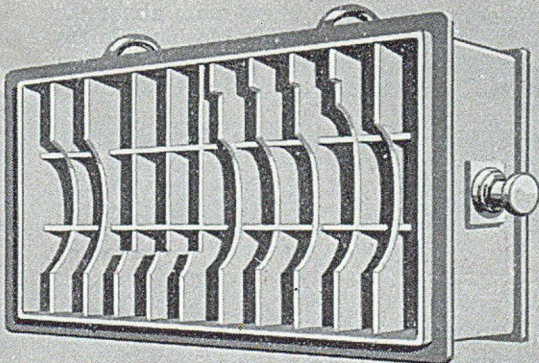
**LIGHT WORK - 1 MAN LIFT**



**MEDIUM WORK - 2 MEN LIFT**



**MEDIUM WORK - CRANE LIFT**



**HEAVY WORK**

# *Sterling*



MOULDING BOXES  
FOR ALL TYPES OF  
FOUNDRY WORK



*seasoned  
in foundry  
service*

STERLING FOUNDRY SPECIALTIES LTD., BEDFORD

London Office: Hildesleigh House, Casson St., S.W.1. Tel. Abbey 3018

# Magnetic Moulding Machines

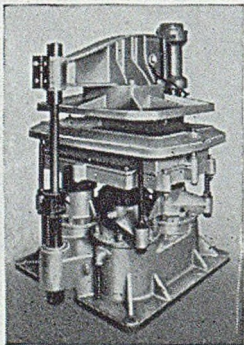
## Operation and Applications

In foundries laid out for large scale repetition work moulding machines long ago proved their worth; today the advantages afforded by the Magnetic type of moulding machine are helping towards even greater efficiency and economy. These machines whilst frequently having a somewhat higher initial cost than other types of mechanical moulding machines gain by their low installation charge, negligible maintenance and the immense saving in running costs amounting to as much as £85 in twelve months.

Moulding pressure in the magnetic types is applied through a D.C. solenoid. Apart from the cable connecting the machine to the power supply, there are no other connections, pipes or any exterior equipment, although a D.C. supply is of course essential. It is, in this respect, virtually self-contained, and, since there are few moving parts, requires very little maintenance.

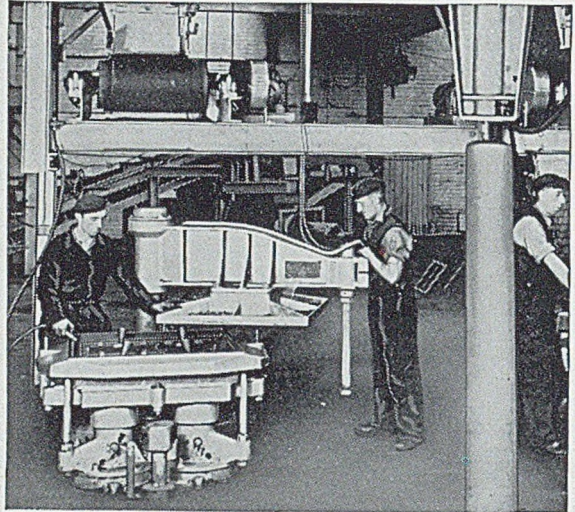
### Operation

No technical knowledge is required by the operator, for the machines are automatically controlled by a simple push-button system that is practically fool-proof. When the push-button is released at the end of the pressure stroke the pattern is automatically stripped from the mould, the stripping speed being controlled by the rate of displacement of oil in the main dashpot. Electric vibrators are normally fitted which are energised momentarily immediately the "squeeze" push-button is released, to ensure that the pattern is stripped cleanly from the mould. Electric heaters (with 3-heat control switch) can be supplied to prevent the moulding sand from adhering to the pattern. The machines can usually be arranged to suit equipment already standardized for machine moulding methods. But it is, perhaps, on the evidence of power consumption-figures that the case for magnetic moulders presents its strongest argument. Unlike



Down-sand frame magnetic moulding machine.

hydraulic or pneumatic machines where compression power must be maintained at all times throughout the shift, magnetic moulding machines only use electric power during the time the actual moulding stroke is being made—for perhaps  $1\frac{1}{2}$  to 2 seconds. A typical example is quoted of a magnetic moulding machine producing 350 complete moulds in boxes  $20'' \times 12'' \times 3\frac{1}{2}''$  deep, for an electrical consumption of approximately  $3\frac{1}{2}$  units; a remarkable figure by any



Magnetic moulding machine producing moulds for heavy cooker-frame castings

comparison. When a battery of machines is in use, the electrical control includes a sequence selector device to prevent the solenoids of two or more machines being energised simultaneously, thus automatically limiting the instantaneous power demand.

### Types of Machine and Applications

The two most popular types in current use are the "Squeeze-strip" and "Down-sand Frame squeeze strip" machines. The former has a very wide and diverse application; the latter is particularly applicable to the production of moulds for flat or shallow castings where the box depth does not exceed 6 inches.

"Double-face Boxless" and "Roll-over" types are also manufactured to meet special requirements. Slight differences in the types of machine available enable manufacturers to choose a model most suited to their particular requirements.

The field of application is wide and includes the production of moulds for the components of gas, electric and solid fuel combustion cookers and stoves; industrial and agricultural machine parts, electrical fittings and instrument components.

Magnetic Moulding Machines are made exclusively by British Insulated Callender's Cables Limited in their Prescot factory; this organization also provide the customary "After Sales Service".

For those who wish to know more about the application of Magnetic Moulding Machines in the foundry, BICC have published detailed information (Publication 276 V) which is available on request to:



British Insulated Callender's Cables Limited  
21, Bloomsbury Street, London, W.C.1

*Head and  
shoulders  
above  
the rest!*



**-BALTISEED**

directs the issue, scor-  
ing by sheer excellence  
where the goal is in-  
creased production of  
better cores.

# "Baltiseed"

**CORE BINDERS**

**FREE BOOKLET**—Write to-day for the BALTISEED handbook "It's a Masterpiece." It contains useful information about our wide range of materials for the making of good cores—and you'll like the pictures!



J.J.M.

**Wm. ASKE & CO. LTD**

**BALTISEED**

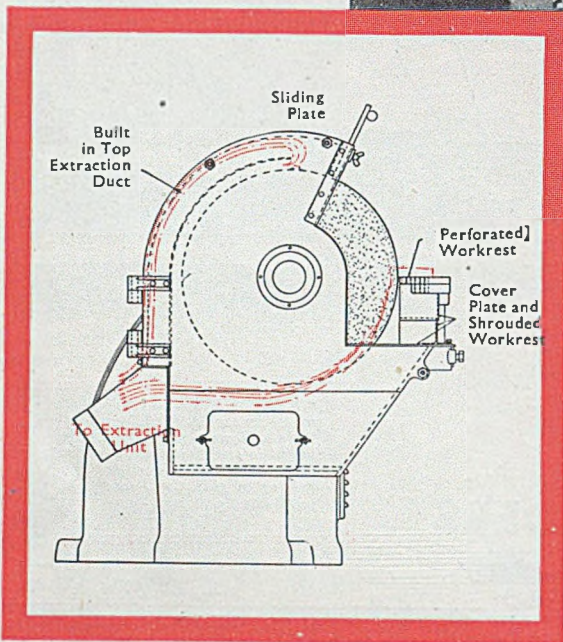
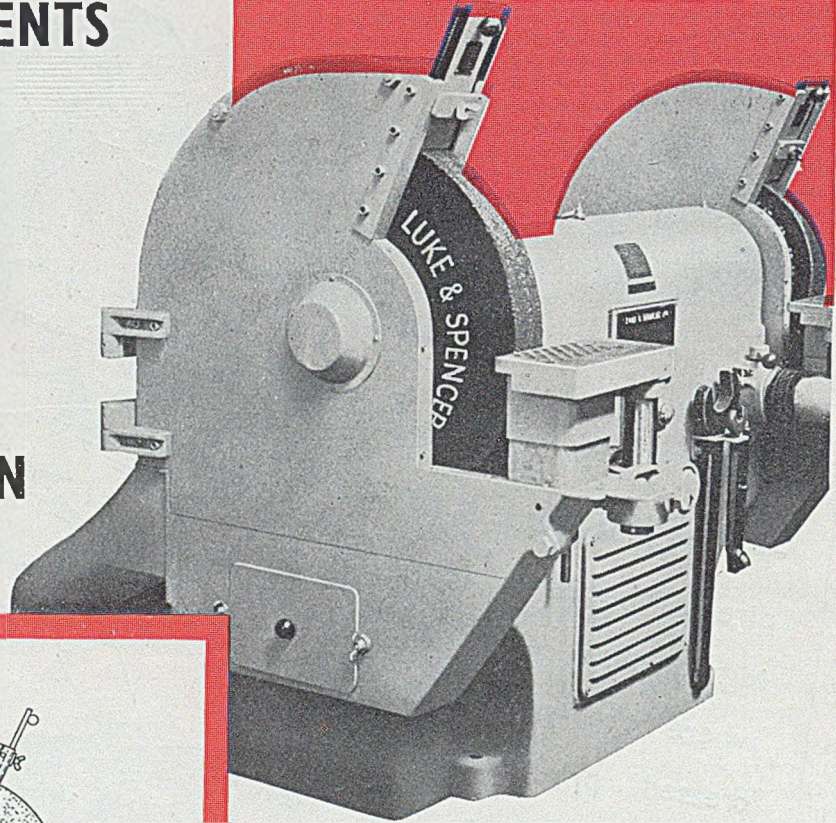
REGD  
**CORE OIL**  
COMPOUNDS

**VICTORIA WORKS • WATERSIDE  
HALIFAX** • TELEPHONE: HALIFAX 60661/2  
TELEGRAMS: BALTISEED, HALIFAX

Scottish Representatives: W.H. McKENZIE & CO 28 ROYAL EXCHANGE SQUARE, GLASGOW C.I. Tel: Glasgow Central 5670

**Embodying  
THE LATEST  
IMPROVEMENTS  
TOWARDS  
100 %  
DUST  
EXTRACTION**

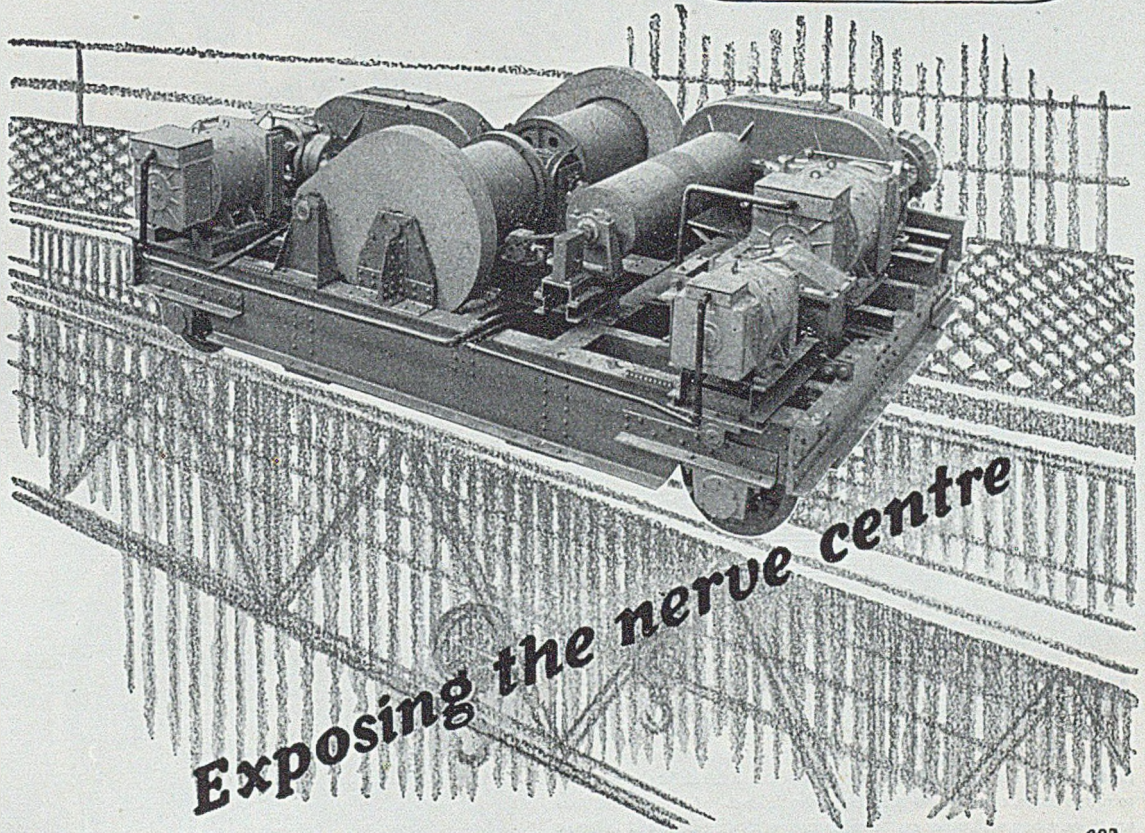
**The new *Luke & Spencer*  
HIGH SPEED  
DUPLEX GRINDER**



- ★ Independent 3-speed drive to each wheel
- ★ Quick Speed-Change Mechanism
- ★ Compulsory speeding-up of grinding wheels at correct diameters to maintain wheel cutting efficiency
- ★ Safety mechanism to safeguard wheels against overspeed
- ★ Available in four sizes with wheels 20, 24, 30 & 36m. diameter . . . and it PROTECTS YOUR OPERATORS FROM DANGEROUS GRINDING DUST!

**LUKE & SPENCER LTD., VIADUCT WORKS, BROADHEATH, ALTRINCHAM, CHESHIRE**

Telephone : Altrincham 3281 Grams : 'Emery' Altrincham



199

The modern overhead crane is an essential unit of industry today, and can be seen doing scores of different jobs in various works throughout the country. Not so well known is the crab, which is probably the most vital part of the crane, being directly responsible for the hoisting and cross travel motions. When necessary Stacreep Control can be fitted to standard crabs enabling slow speeds to be obtained on all motions, giving a far greater degree of control and finer setting.

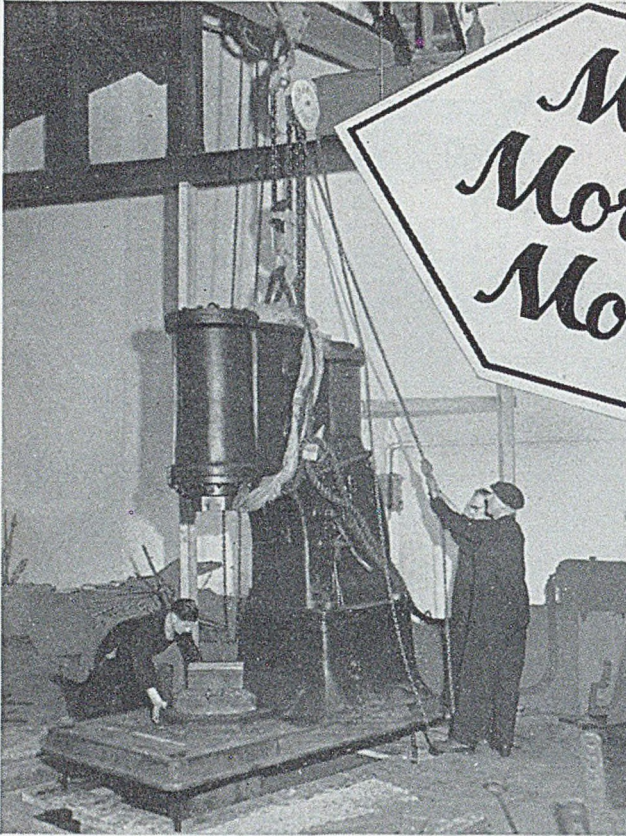
*The crab shown is of 60-ton capacity with an auxiliary hoist of 20 tons, and is designed for arduous duty in a steelworks.*



## JOHN SMITH (Keighley) LTD

THE CRANE WORKS, KEIGHLEY, YORKSHIRE. TEL. 2283/4 2035

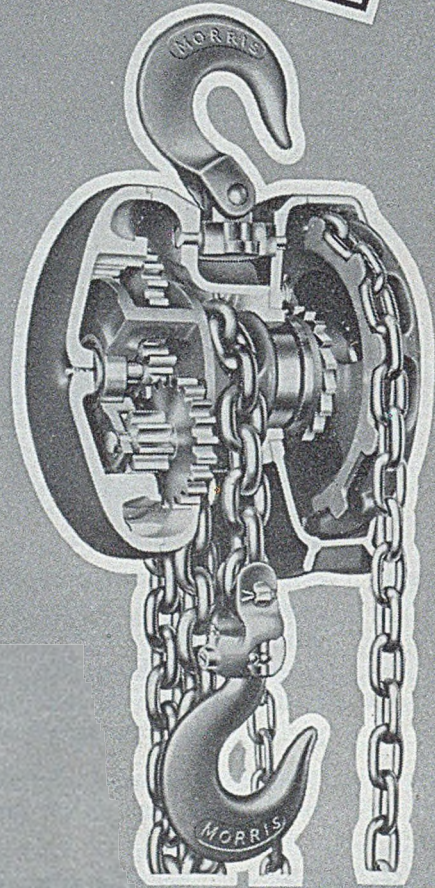
London Office: Buckingham House, 19/21 Palace St. (off Victoria St.) S.W.1. Tel: Tate Gallery 0377/8.  
Southern Counties Office: Brettenham House, Lancaster Place, Strand, London. W.C.2. Tel: Temple Bar 1515.



*More power  
More stamina  
More portable*

**E**VERY new Morris Ball-bearing Triple-gear Pulley-block is tested with 50 per cent, overload before despatch; but the real test comes when it is on the job, especially on maintenance work for which it is ideally suited. Such work demands portability, plenty of power, ample protection for the mechanism, a very close lift, and the ability to stand up to rough usage, even to an occasional shock load. All these qualities are there, along with other exclusive features of design described in book 231. We shall be pleased to send you a copy.

And may we remind you that besides making the world's best pulley-blocks, we are also large manufacturers of overhead cranes, conveyors, hoist-blocks, foundry mechanization plant, lifts, elevators, runways, telfers and all kinds of mechanical handling equipment.

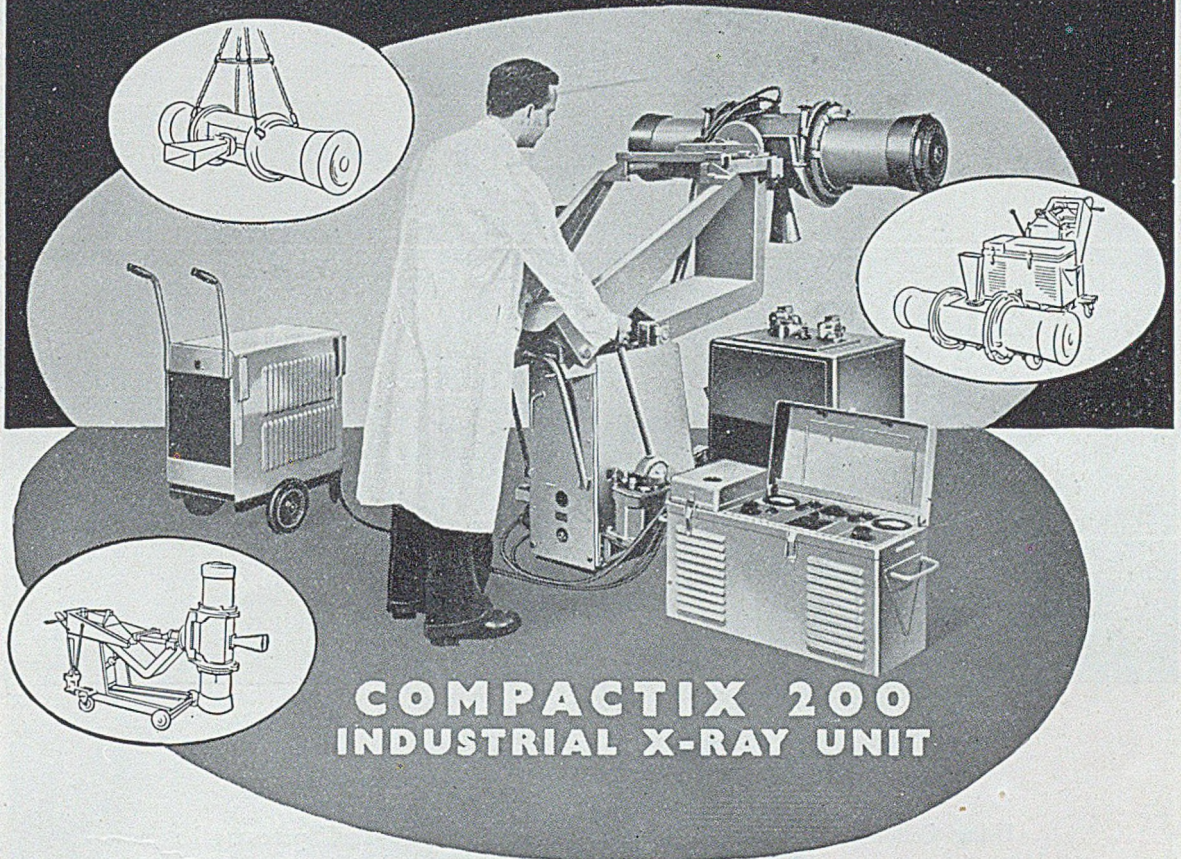


# THE NEW MORRIS BALL-BEARING TRIPLE-GEAR PULLEY-BLOCK

**HERBERT MORRIS LTD LOUGHBOROUGH ENGLAND**



# A NEW APPROACH-TO YOUR X-RAY INSPECTION PROBLEMS



## COMPACTIX 200 INDUSTRIAL X-RAY UNIT

THIS new industrial X-ray unit by PHILIPS shows an insight into the problems of non-destructive testing which only the experience of a quarter of a century can provide. The 'COMPACTIX 200' is praised and admired by engineers everywhere for its *engineering*.

It is completely self-contained, high tension source and X-ray tube being housed together in a cylindrical tank. The continuous rating is 200

kVp 10MA. There are no valves and no cables. Connection to the control box is by low tension supply only.

The 'COMPACTIX 200' has versatility to an hitherto unknown degree. It is equally well suited to inspection work out-of-doors as it is in the foundry or factory. It is rugged and trouble-free and designed for service anywhere in the world. May we send you further particulars?



# PHILIPS ELECTRICAL

LIMITED

X-RAY EQUIPMENT FOR ALL PURPOSES · ELECTRO-MEDICAL APPARATUS · LAMPS & LIGHTING  
EQUIPMENT · RADIO & TELEVISION RECEIVERS · SOUND AMPLIFYING INSTALLATIONS

X-RAY DEPARTMENT, PHILIPS ELECTRICAL LTD., CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2.

**INTRICATE  
MASS  
PRODUCTION**

**SHELL MOULDING  
WITH  
CELLOBOND  
FOUNDRY  
RESINS**

Using Cellobond Phenolic and Cresylic resins in the shell process the most intricate pattern can be faithfully reproduced any number of times. Their exceptionally good flow characteristics ensure a strong bond between the sand grains, and produce a shell with a perfect surface. Cellobond resins have a short curing time which gives quicker handling—an essential factor in economic foundry practice. Please write for samples and further information.

**CELLOBOND** resins are also available for sand/core binding. These resins show marked economies in core costs and save fuel and time. Easily mixed and clean to handle, they have been specially formulated to eliminate the objectionable odour usually associated with this type of core binder.

**BRP** BRITISH RESIN PRODUCTS LTD

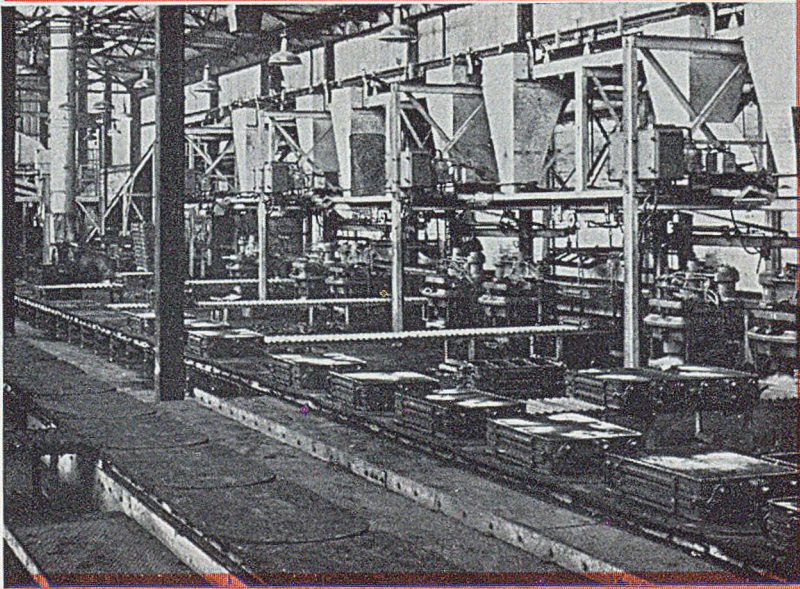
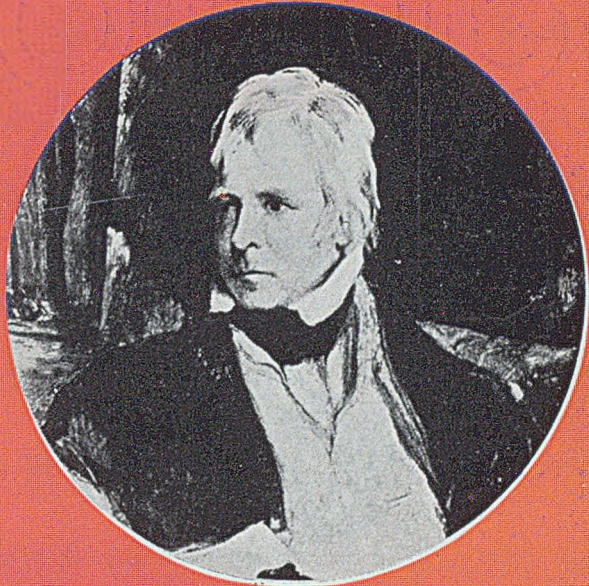
**CELLOBOND**

**SYNTHETIC RESINS**  
*for foundry practice*

No. NINE—SIR WALTER SCOTT

# MEN OF VISION

Masterpieces of literature flowed from the prolific pen of that distinguished Scottish writer, Sir Walter Scott. His enviable imagination and brilliant use of words brought him undying recognition: his books are still in demand and few bookshelves are without one or more of his works. Imaginative planning and skill are behind every successful project and the Foundry Industry has benefitted in the same way by Paterson Hughes Engineering Co. Ltd., pioneers of mechanical handling in the foundry.



*View of moulding shop, showing mould conveyor, sand distribution conveyor and supply hoppers over moulding machines.*

## DATERSON HUGHES ENGINEERING COMPANY LIMITED

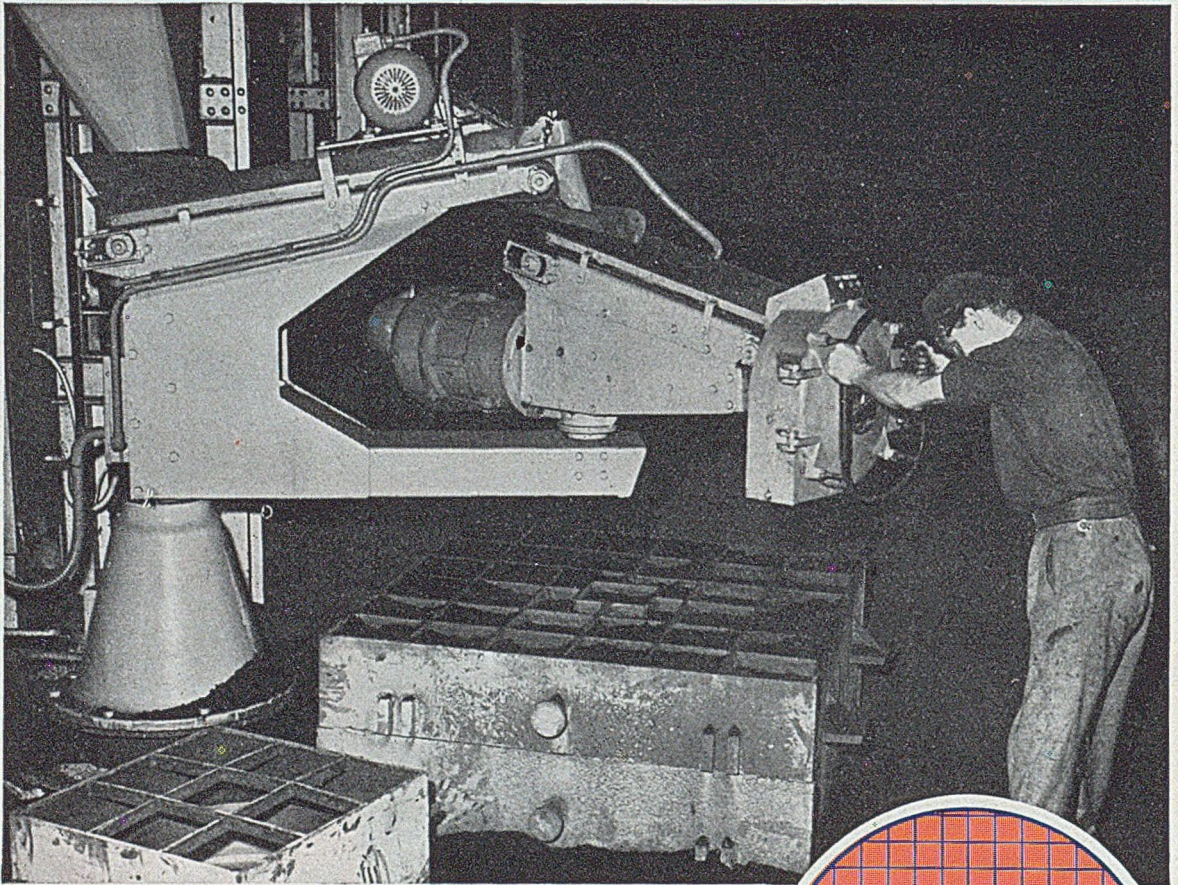


WYNDFORD WORKS  
MARYHILL  
GLASGOW  
TEL.: MARYHILL 2172-4

BEDFORD HOUSE  
BEDFORD STREET  
STRAND LONDON W.C.2  
TEL.: TEMPLE BAR 7274-6

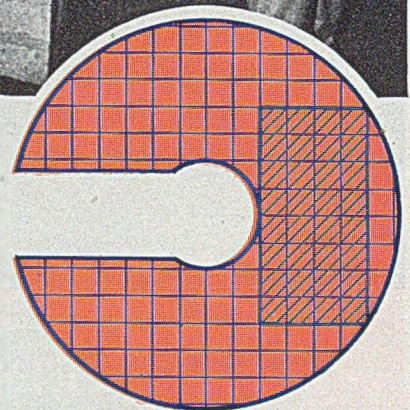
3 HIGHFIELD ROAD  
EDGBASTON  
BIRMINGHAM 15  
TEL.: EDGBASTON 2957/8

# THE JUNIOR SANDRAMMER AT WORK



Ramming a 4 ft. 6 in. square by 2 ft. deep box in a Grey Iron Jobbing Foundry

- Improved design for strength and efficiency
- High output—600 lbs. of sand rammed per minute (maximum)
- Generous box coverage—see diagram
- Equally suitable for repetition or jobbing work
- Supplied with or without Integral Hopper and Feeder Belt
- Skip Loader or Elevator available to form completely independent unit

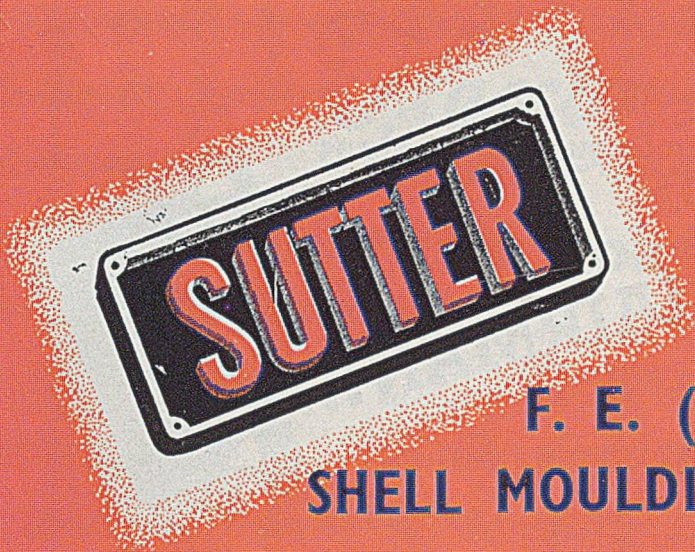


Box coverage diagram. Each division represents one square foot. Shaded area represents box 8 ft. x 4 ft.

## FOUNDRY EQUIPMENT LTD

LEIGHTON BUZZARD, BEDFORDSHIRE, ENGLAND.

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



## F. E. (SUTTER) SHELL MOULDING MACHINES.

### PATENT POSITION

Foundry Equipment Limited guarantee that the F.E. (Sutter) Shell Moulding Machines, for which patent applications have already been lodged, can be used in the British Commonwealth and Empire without infringement of any other patents, provided they are used with the moulding compositions and lubricating sprays recommended by Foundry Equipment Limited, and in accordance with the directions supplied with the machines.

### CLOSING, CLAMPING AND BACKING-UP OF SHELL MOULDS

At the British Industries Fair, Birmingham, recently, Foundry Equipment Limited demonstrated their system of closing, clamping and backing-up shell moulds. Patent Application No. 3618/53 has been lodged for this process, but they would be pleased to consider the granting of a licence, free of all charge, to any foundry desiring to use this process, providing they will make formal application in writing to Foundry Equipment Limited, Leighton Buzzard, Bedfordshire.



# FOUNDRY EQUIPMENT LTD

LEIGHTON BUZZARD · BEDS. · ENGLAND

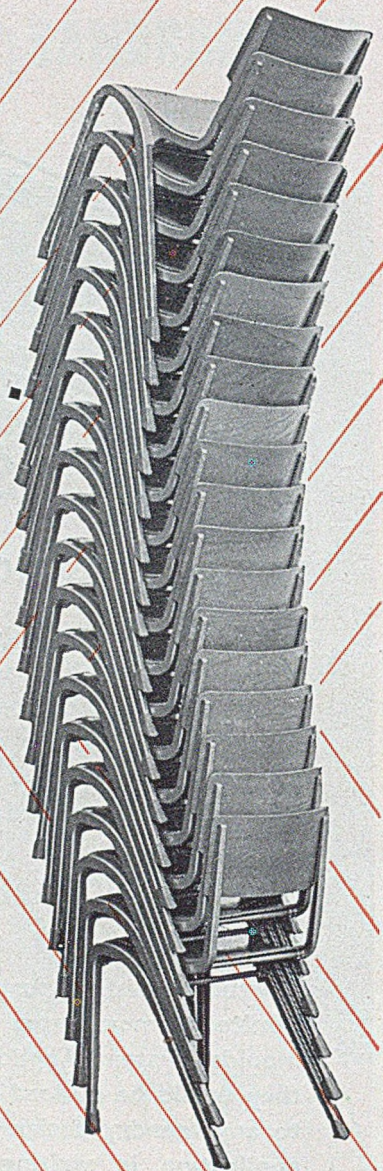
Telephone: Leighton Buzzard 2206-7-8 · Telegrams: Equipment, Leighton Buzzard

# IDEA for the CHAIRMAN...

... they have all the right qualities; but then, they started the right way, with the better quality metal from Morgan crucible furnaces.

'Esavian' chairs are but one of the multitudinous products which sell well because they are made well—and made well because someone knew the value of "CRUCIBLE MELTING... the Morgan way". Please write for literature.

With acknowledgments to the Educational Supply Association Ltd.

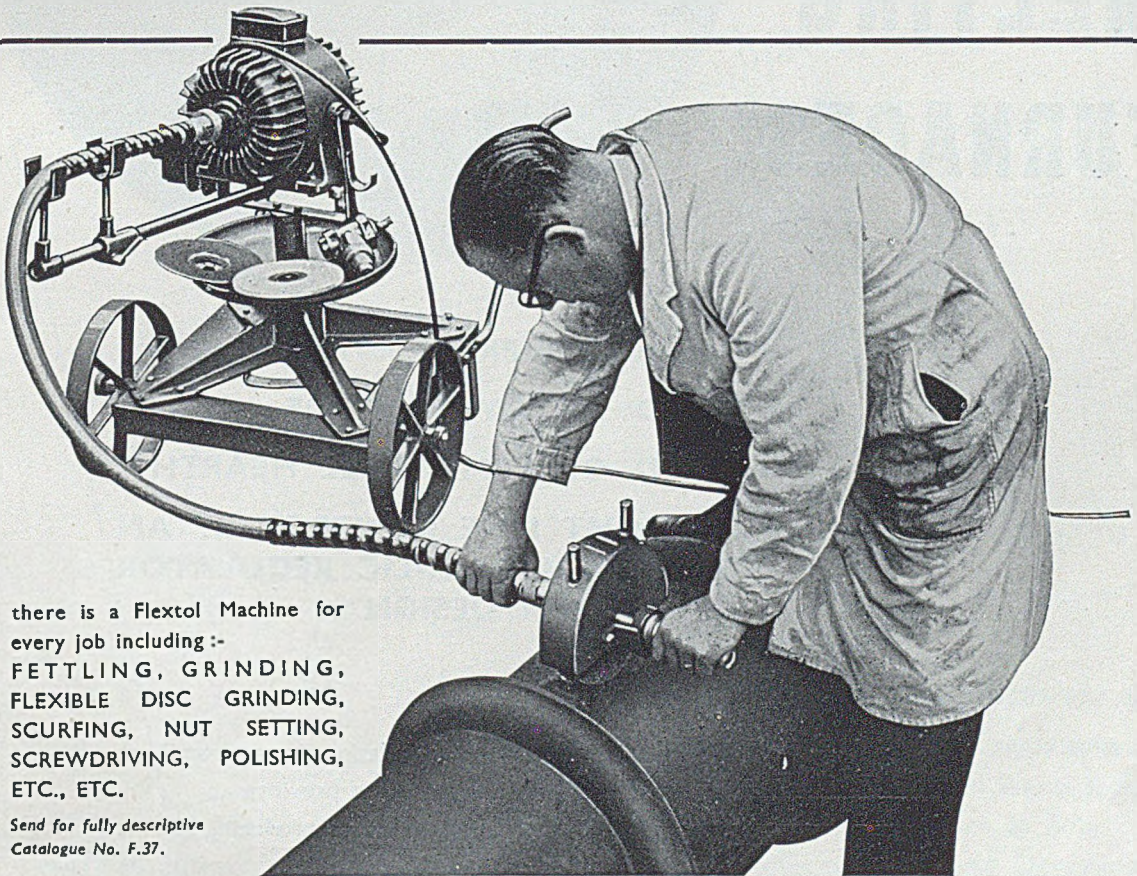


## CRUCIBLE MELTING ... the Morgan way

*Flextol*  
 POWER-DRIVEN HAND TOOLS  
 Regd. Trade Mark

## GF 70 Heavy Duty PORTABLE GRINDER

This unit, which has been specially developed for use in Foundries for fettling and grinding castings, consists of a Flextol GF70 8in. Grinder on a portable floor trolley, with tray for handpieces and accessories. A type GFD/2 ball-bearing handpiece, with heavy grinding wheel attachment and guard, is fitted as standard. For disc sanding, type R9/2 handpiece and sanding disc attachment are available, interchangeable with GFD/2 handpiece. Full particulars on application.



there is a Flextol Machine for every job including :-  
 FETTLING, GRINDING,  
 FLEXIBLE DISC GRINDING,  
 SCURFING, NUT SETTING,  
 SCREWDRIVING, POLISHING,  
 ETC., ETC.

Send for fully descriptive  
 Catalogue No. F.37.

## FLEXTOL ENGINEERING COMPANY LTD.

Head Office & Works: THE GREEN, EALING, LONDON, W.5.

Telephone: EALING 6444/5/6/7

Telegrams: Dominating Ealux, London.

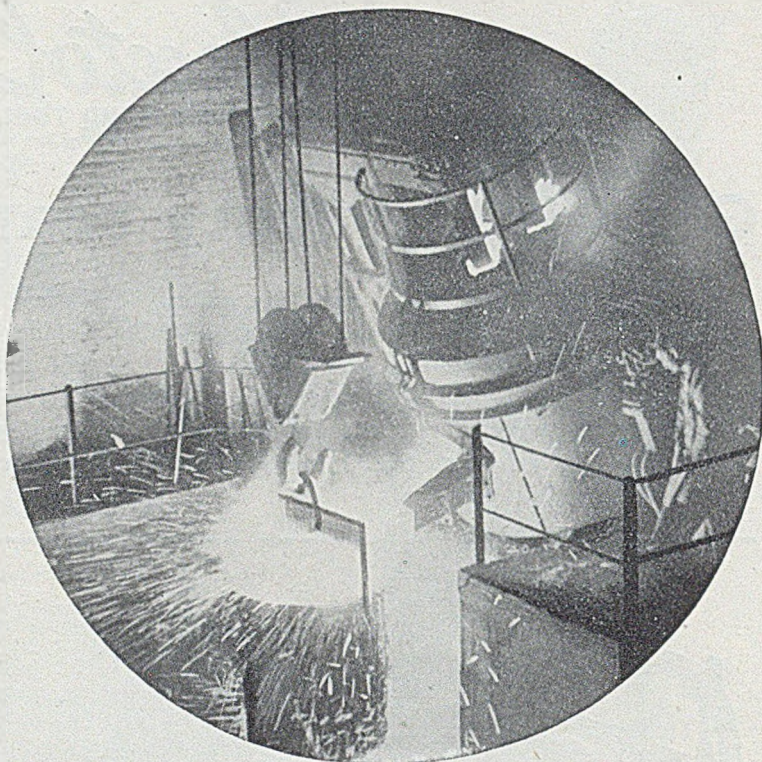
Midland Area: W. H. SIMPSON, 9 HILLSIDE AVENUE, MAPPERLEY, NOTTINGHAM. Telephone: Arnold 68273

Northern Area: J. H. BOGG, 19 HOWARD ROAD, NORTHENDEN, MANCHESTER. Telephone: Wythenshaw 3061

Western Area: T. SHEPPARD, 17 STRADBROOK AVENUE, KINGSWAY, BRISTOL 5.

Scotland Area: G. K. BAILLIE, 66 CRAIGLOCKHART ROAD, EDINBURGH 11.

# DIRECT ARC STEEL MELTING FURNACES



- CAPACITIES FROM 500 lbs. TO 50 tons
- FIXED OR SWING ROOF
- FIXED OR REMOVABLE HEARTH
- STRAIGHT LINE CONTROL BY AN ELECTRO-HYDRAULIC REGULATOR OF PROVEN DESIGN

A recent repeat 25 ton installation in a prominent European steel works has doubled previous output of 60,000 tons per annum, by producing 28 tons in 200 minutes from tap to tap.

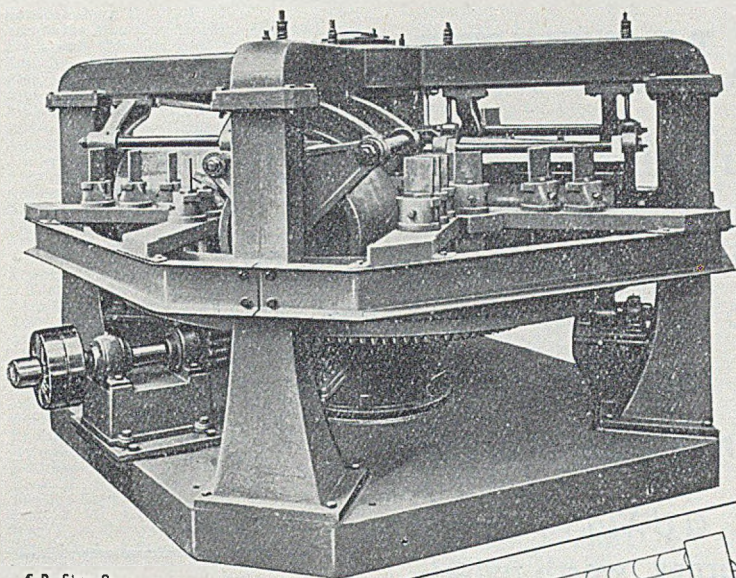


**METALECTRIC FURNACES LTD.**

SMETHWICK ENGLAND

PHONE SMETHWICK 1561 & 2 LONDON OFFICE - 16, GROSVENOR PLACE S.W.1. Phone SLOANE 7803 & 9818



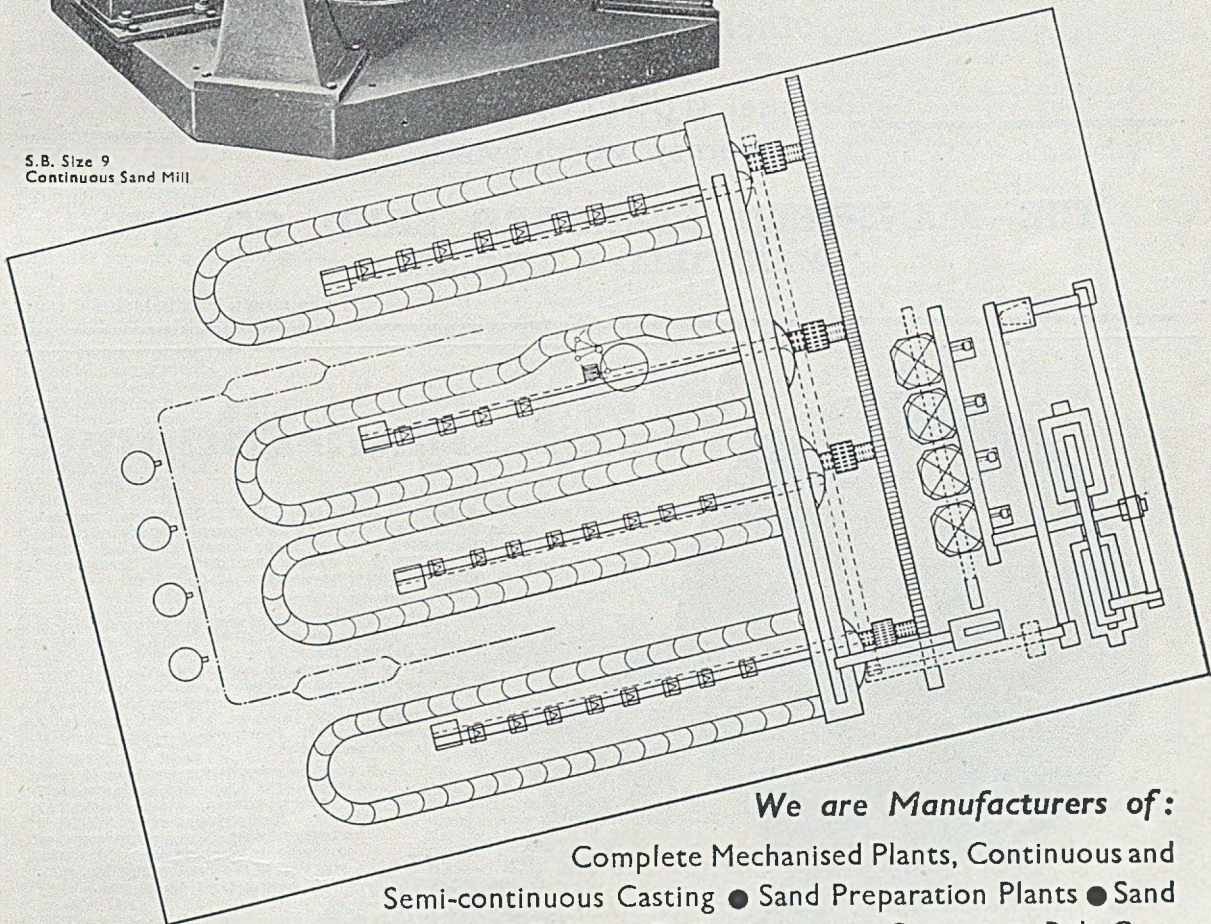


S.B. Size 9  
Continuous Sand Mill

Please write  
for details  
of our  
products  
and/or

**"FOUMEC"**

for a  
visit from  
one of our  
representatives



***We are Manufacturers of:***

Complete Mechanised Plants, Continuous and  
Semi-continuous Casting ● Sand Preparation Plants ● Sand  
Mills, Continuous and Batch ● Disintegrators ● Screens ● Belt Con-  
veyors ● Elevators ● Mould Conveyors ● Moulding Machines ● Sand Dryers, etc.

# FOUNDRY MECHANISATIONS (BAILLOT) LTD

19 VICTORIA STREET, LONDON, S.W.1

Phone : ABBey 6644 — Grams : Foumec, Phone, London

# MANSFIELD MOULDING SAND

*travels long distances to meet the needs of the Foundry—to Scotland and South Wales, to Scandinavia and Singapore, and many other places overseas.*

Because *QUALITY* makes its  
Journey worth while

**THE MANSFIELD STANDARD SAND CO. LTD.**  
**MANSFIELD · ENGLAND**

Telephone : Mansfield 201.

## WHY *man-cooling?*

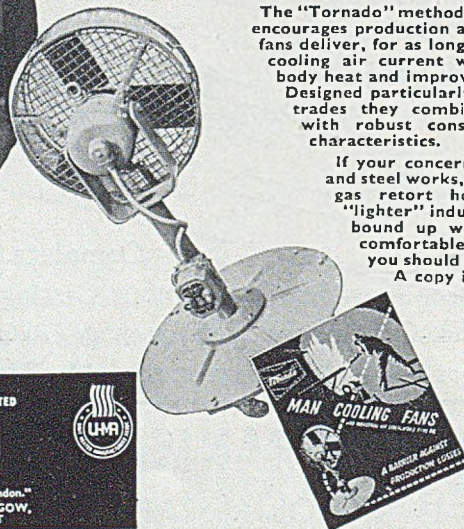


BECAUSE MEN CANNOT WORK at full stretch under the oppressive conditions existing in industrial "hot spots" without some means of relief. Often they resort to "taking a breather". But "breathers" are costly and time-wasting.

Consider the alternative.

The "Tornado" method of man-cooling definitely encourages production all the time. Man-cooling fans deliver, for as long as is necessary, a brisk, cooling air current which relieves excessive body heat and improves breathing conditions. Designed particularly for use in the "heavy" trades they combine an easy portability with robust construction—two essential characteristics.

If your concern is for workers in iron and steel works, foundries, boiler houses, gas retort houses, glass works or "lighter" industries where efficiency is bound up with the maintenance of comfortable working conditions then you should see Publication No. 9/25. A copy is waiting for you.



**ASK FOR  
PUBLICATION  
NO. 9/25**



**Keith Blackman** LIMITED

MILL MEAD ROAD, TOTTENHAM, LONDON, N.17

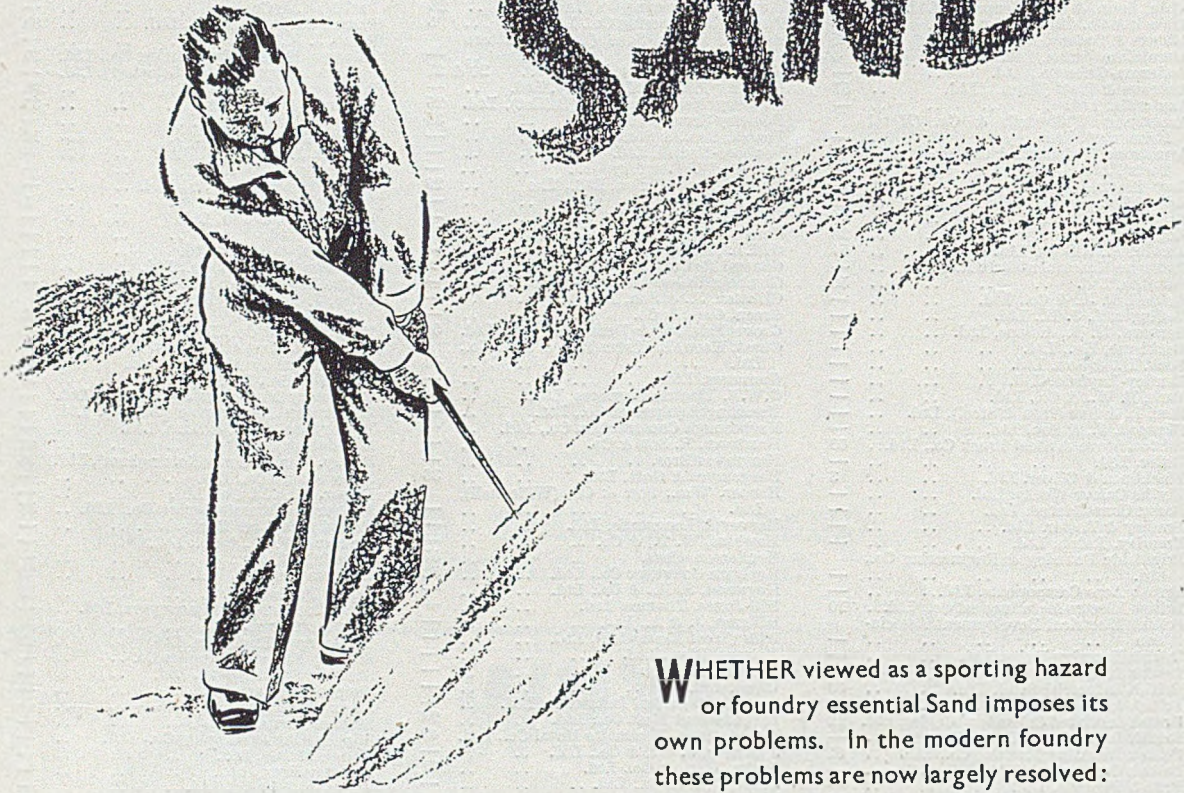
\*Phone: Tottenham 4522 (twelve lines). \*Grams: "Keithblac, Norphone, London."  
BRANCH OFFICES: AT MANCHESTER, BIRMINGHAM, LEEDS, GLASGOW,  
NEWCASTLE-ON-TYNE, PENARTH near CARDIFF, AND BELFAST



## INDEX TO ADVERTISERS

PAGE NOS.		PAGE NOS.		PAGE NOS.	
Aabacas Engg. Co., Ltd.	—	Ether, Ltd.	—	Nitr alloy, Ltd.	—
Adaptable Moulding Machine Co., Ltd.	6	Every, Hy., & Co., Ltd.	—	Norton Aluminium Products, Ltd.	—
Aerograph, The, Co., Ltd.	—	Eyre Smelting Co., Ltd.	53	Norton Grinding Wheel Co., Ltd.	—
Aero Research, Ltd.	—	F. & M. Supplies, Ltd.	435	Page Packing, Ltd.	—
Alar, Ltd.	—	Felco Hoists	—	Page Engineering Co. (London), Ltd.	—
Alba Chemicals Co., Ltd.	—	Ferguson, James, & Sons, Ltd.	—	Palmer Tyre, Ltd.	—
Alblon Pulverising Co., Ltd.	—	Fisher Foundries, Ltd.	—	Pantlin, W. & C., Ltd.	—
Allan, John, & Co. (Glenpark), Ltd.	—	Flextol Engineering Co., Ltd.	23	Parish, J., & Co.	—
Allcock & Co. (Metals), Ltd.	—	Fordath Engineering Co., Ltd.	5	Pascall Engineering Co., Ltd.	59
Alladays & Onions, Ltd.	1	Forrest, H. & Sons (Engrs. Pattern Makers), Ltd.	—	Passé, J. F., & Co.	—
Aluminium Union, Ltd.	4	Foundry Equipment, Ltd.	20 & 21	Paterson Hughes Engineering Co., Ltd.	19
Anderson-Grice Co., Ltd.	—	Foundry Plant & Machinery, Ltd.	—	Pattern Equipment Co. (Leicester), Ltd.	—
Andrews & Platt (Engn.), Ltd.	57	Foundry Mechanicals (Ballot), Ltd.	25	Patternmakers (Engg.) Co., Ltd.	36
Anglardia, Ltd.	—	Foundry Services, Ltd.	38	Patterns (Derby) Ltd.	35
Armstrong Whitworth & Co. (Metal Industries), Ltd.	—	Fowell, Geo., & Sons, Ltd.	—	Perry, G., & Sons, Ltd.	—
Armstrong Whitworth & Co. (Pneumatic Tools), Ltd.	—	Foxboro-Yoxall, Ltd.	—	Phillips Electrical, Ltd.	17
Asca Electric, Ltd.	—	French, W. T. & Sons	—	Phillips, J. W. & C. J., Ltd.	—
Aske, Wm., & Co., Ltd.	13	Fullers' Earth Union, Ltd., The	29	Pickering, Ltd.	—
Atlas Diesel Co., Ltd.	—	Gadd, Thos.	—	Pickford, Hollard & Co., Ltd.	—
August's, Ltd.	28	Gamma-Rays, Ltd.	—	Pinelec, Ltd.	1
Austin, E., & Sons, Ltd.	54	General Electric Co., Ltd.	39	Portway, C., & Son, Ltd.	—
Badische Maschinenfabrik A.-G.	—	G.H.L. (Painters), Ltd.	—	Potclays, Ltd.	—
Bakelite, Ltd.	50	General Refractories, Ltd.	8	Powder Metallurgy, Ltd.	—
Ballard, F. J., & Co., Ltd.	—	Glenbolg Union Fireclay Co., Ltd.	—	Precision Presswork Co., Ltd.	—
Balling, L. J. H., Ltd.	—	Gilksten, J., & Son, Ltd.	—	Premo Pattern Co., Ltd.	—
Barnard, H. B., & Sons, Ltd.	—	Green, Geo., & Co.	—	Price, J. T., & Co. (Brass & Aluminium Founders), Ltd.	42
Beakbaue, Hy., Ltd.	—	Grove Painting & Decorating Co., Ltd.	56	Price, J. T., & Co., Ltd.	1
Beck, H., & Son, Ltd.	—	Guest, Keen, Baldwins Iron & Steel Co., Ltd.	44	Ransomes, Sims & Jefferies, Ltd.	—
Bentley-Layfield, Ltd.	—	Gummers, Ltd.	—	Rapid Magnetic Machines, Ltd.	—
Berk, F. W., & Co., Ltd.	—	G.W.B. Electric Furnaces, Ltd.	—	Reavell & Co., Ltd.	56
Bier, I., & Son (Iron & Steel), Ltd.	—	Handling Equipment Co., Ltd.	—	Refractory Mouldings & Castings, Ltd.	—
Bigwood, J., & Son, Ltd.	—	Harborough Construction Co., Ltd.	—	Richardson Engineering (B'ham), Ltd.	—
Bilston Stove & Steel Truck Co., Ltd.	00	Hardman, E. Son & Co.	—	Richardson, R. J., & Sons, Ltd.	—
Birlec, Ltd.	—	Hargraves Bros.	—	Ridsdale & Co., Ltd.	62
Blackburn & Oliver, Ltd.	3	Hargreaves & Gott, Ltd.	36	Ridley, Wm., & Sons (Nottingham), Ltd.	55
Blythe Colour Works, Ltd.	—	Harper, Wm., Son & Co. (Willenhall), Ltd.	—	Riley Stoker Co., Ltd.	—
Borax Consolidated, Ltd.	—	Harvey & Longstaffe, Ltd.	—	Roper, E. A., & Co., Ltd.	—
Bradley & Foster, Ltd.	—	Hawkins, W. T., & Co.	—	Rothervale Manufacturing Co., Ltd.	58
Brearley, Ralph, Ltd.	—	Henderson, Chas.	57	Round Oak Steel Works, Ltd.	—
Brightside Foundry & Engineering Co., Ltd.	—	Hepburn Conveyor Co., Ltd.	52	Rowland, F. E., & Co., Ltd.	—
British Aero Components, Ltd.	—	Heywood, S. H., & Co., Ltd.	—	Rule & Moffat	—
British Electro Metallurgical Co., Ltd.	10	Hill-Jones, Thomas, Ltd.	—	Rustless Iron Co., Ltd.	56
British Electrical Development Association	—	Hillman, J. & A., Ltd.	—	Safety Products, Ltd.	53
British Foundry Units, Ltd.	—	Hills (West Bromwich), Ltd.	—	Sandvik Steel Band Conveyors, Ltd.	—
British Industrial Plastics, Ltd.	—	Holman Bros., Ltd.	—	Sarginson Bros., Ltd.	—
British Industrial Sand, Ltd.	—	Horrocks, Joseph	—	St. George's Engineers, Ltd.	42
British Industries Fair	45	Iford, Ltd.	—	Scottish Foundry Supplies Co.	—
British Insulated Callenders' Cables, Ltd.	12	Imperial Chemical Industries, Ltd.	—	Sheffield Smelting Co., Ltd.	—
British Iron & Steel Federation	—	Incandescent Heat Co., Ltd.	24	Sheppard & Sons, Ltd.	—
British Moulding Machine Co., Ltd.	61	International Mechante Metal Co., Ltd.	43	Sluex Engineering Co., Ltd.	—
British Oxygen Co., Ltd.	—	Jackman, J. W., & Co., Ltd.	—	Sklenar Furnaces, Ltd.	—
British Pig Irons, Ltd.	—	Jacks, Wm., & Co., Ltd.	31	Silp Trading & Shipping Co., Ltd.	—
British Resin Products, Ltd.	18	Jeffrey, A., & Co., Ltd.	—	Slough Metals, Ltd.	—
British Ronoceay, Ltd.	—	Keith-Blackman, Ltd.	26	Smedley Bros., Ltd.	—
British Shotblast & Engineering Co., Ltd.	—	King Bros. (Stourbridge), Ltd.	48	Smeaton, John A., Ltd.	—
British Thomson-Houston Co., Ltd.	—	King, John, & Co. (Leeds), Ltd.	58	Smith, Albert, & Co.	—
British Tyre & Rubber Co., Ltd.	—	Kodak, Ltd.	—	Smith, John (Kelghley), Ltd.	15
Bromsgrove Die & Tool Co., Ltd.	—	Lafarge Aluminous Cement Co., Ltd.	—	Smith, W. H., & Sons, Ltd.	—
Broom & Wade, Ltd.	—	Laidlaw, Drew & Co., Ltd.	—	Spencer & Halstead, Ltd.	—
Burdon Furnaces, Ltd.	—	Lambeth & Co. (Liverpool), Ltd.	—	Spermolln, Ltd.	—
Burtonwood Engineering Co., Ltd.	—	Lazarus, Leopold, Ltd.	29	Stanton Ironworks Co., Ltd., The	—
Butterworth Bros.	—	Leicester, Lovell & Co., Ltd.	—	Staveley Iron & Chemical Co., Ltd.	41
Catalin, Ltd.	47	Lennox Foundry Co., Ltd.	—	Steele & Cowlishaw, Ltd.	—
Central Manufacturing & Trading Co. (Dudley), Ltd.	53	Levy, B., & Co. (Patterns), Ltd.	30	Stein & Atkinson, Ltd.	37
Chalmers, E., & Co., Ltd.	—	London & Scandinavian Metallurgical Co., Ltd.	—	Stein, John G., & Co., Ltd.	—
Chance Bros., Ltd.	—	Lord, E. S., Ltd.	—	Sterling Foundry Specialties, Ltd.	11
Chapman & Smith, Ltd.	—	Luke & Spencer, Ltd.	14	Sternol, Ltd.	—
Clayton Crane & Hoist Co., Ltd.	—	Macdonald, John, & Co. (Pneumatic Tools), Ltd.	—	Stewart, Collin, Ltd.	—
Cohen, Geo., Sons & Co., Ltd.	—	Macnab & Co., Ltd.	—	Stewart and Gray, Ltd.	48
Coleman-Wallwork Co., Ltd.	—	Madan, Chas. S., & Co., Ltd.	—	Sturtevant Engineering Co., Ltd.	55
Colt Ventilation, Ltd.	—	Mansfield Standard Sand Co., Ltd.	26	Suffolk Iron Foundry (1920), Ltd.	60
Consolidated Pneumatic Tool Co., Ltd.	—	Marco Conveyor & Engineering Co., Ltd.	38	Swynnerton Red Moulding Sand	—
Constructional Engineering Co., Ltd.	—	Marsden, Hind & Son, Ltd.	36	Tallis, E., & Sons, Ltd.	—
Controlled Heat & Air, Ltd.	—	Mathews & Yates, Ltd.	—	Tangyes, Ltd.	—
Cooke, Bailey, Ltd.	36	Mathison, John, Ltd.	7	Telsen, Th.	62
Copper Development Association	—	Matterson, Ltd.	—	Thomas, G. & R., Ltd.	—
Core Oils, Ltd.	—	May, J. H.	36	Thomson & McIntyre	58
Corn Products Co., Ltd.	—	Metalline Cement Co.	—	Thlghman's Patent Sand Blast Co., Ltd.	—
Council of Ironfoundry Associations	437	Metaelectric Furnaces, Ltd.	—	Turner Machine Tools, Ltd.	—
Cox, Long (Importers), Ltd.	—	Metals & Methods, Ltd.	—	Tysley Metal Works, Ltd.	—
Crockett, & Co.	35	Metronic Instrument Co., Ltd.	—	United States Metallic Packing Co., Ltd.	—
Crooke & Co., Ltd.	—	Midgley & Son, Ltd.	52	Universal Conveyor Co., Ltd.	—
Crofts (Engrs.), Ltd.	—	Midland Silicones, Ltd.	—	Universal Pattern Co. (London), Ltd.	—
Cumming, Wm., & Co., Ltd.	40	Mining & Chemical Products, Ltd.	—	Vaughan Crane Co., Ltd.	—
Cunliffe, J. C.	—	Mitchell's Emery Wheel Co., Ltd.	49	Vaughans (Hope Works), Ltd.	—
Cupodel, Ltd.	51	Modern Furnaces & Stoves, Ltd.	59	Vauxhall Motors, Ltd.	—
Cuxson, Gerrard & Co., Ltd.	—	Mole, S., & Sons (Green Lane Foundry), Ltd.	—	Vickers, John, & Sons	—
Dallow Lambert & Co., Ltd.	9	Mollneux Foundry Equipment, Ltd.	62	Vokes, Ltd.	—
Davidson & Co., Ltd.	—	Mond Nickel Co., Ltd.	—	Waddington, G., & Son, Ltd.	—
D.C.M. Metals (Sales), Ltd.	—	Monometer Manufacturing Co., Ltd.	57	Wadkin, Ltd.	—
Diamond Motors (Wolverhampton), Ltd.	—	Monsanto Chemicals, Ltd.	—	Walker, I. & I., Ltd.	—
Dowson & Mason Gas Plant Co., Ltd.	—	Morgan Crucible Co., Ltd.	22	Ward, Thos. W., Ltd.	439
Dunford & Elliott, Ltd.	—	Morris, Herbert, Ltd.	16	Waring Bros.	57
Durrans, James, & Sons, Ltd.	2	Muir, Murray & Co., Ltd.	—	Warner & Co., Ltd.	—
Eaves & Sharples, Ltd.	—	Musgrave & Co., Ltd.	—	Watsons (Metallurgists), Ltd.	60
Electric Furnace Co., Ltd.	—	Musgrave, Elliott, Ltd.	—	Webster & Co. (Sheffield), Ltd.	—
Electromagnets, Ltd.	—	Neville, T. C., & Sons, Ltd.	—	Wengers, Ltd.	—
Elliott, Theo. & Son, Ltd.	—	New Conveyor Co., Ltd.	46	West Midlands Refining Co., Ltd.	—
Esso Petroleum Co., Ltd.	—			Wilkinson, Bentley & Co., Ltd.	48
				Witham, L. A., & Co.	—
				Woodward Bros. & Copelin, Ltd.	—
				Wright & Platt, Ltd.	37

# SAND



**W**HETHER viewed as a sporting hazard or foundry essential Sand imposes its own problems. In the modern foundry these problems are now largely resolved: Sand is correctly mixed and effortlessly moved by mechanical contrivance, at fingertip control.

Time-and-cost-saving is enormous. The fatigue factor is cancelled out. Reduced overheads and increased output provide the best testimony of true foundry efficiency.

A discussion with August's technical and research staff will cost you nothing and may prove a revelation in procedure.

Sole Licensees and Manufacturers  
for British Empire (excluding  
Canada) of the Simpson Sand Mixer.



Specialists in Modern  
Foundry Mechanisation

*August's*  
LIMITED

J.J.M.

**HALIFAX ENGLAND**

Telephone: Halifax 61247/8/9  
Telegrams: August, Halifax.



### PRINCIPAL CONTENTS

Features	PAGE		PAGE
Leader: Paris Congress	411	Cast Iron for Enamelling	433
Film Review	422	<i>News</i>	
Conference Paper Authors	430	8th I.B.F. Golf Meeting	412
Notes from the Branches	432	Australia Relaxes Restrictions	422
Book Reviews	434	U.K. Trade in August	422
Forthcoming Events (Advert. section)	31	Midlands Productivity	422
<i>Technical</i>		I.B.F. Constitutional Representatives	432
Feeding of Steel Castings at Greater-than-atmospheric Pressures, by Charles W. Briggs and Howard F. Taylor	413	News in Brief	436
I.B.F. National Works Visits	423	Personal	438
Notable Steel Castings	429	Raw Material Markets	440
Templates in Patternmaking, by F. H. Wakeham	433	Obituary (Advert. section)	31
		<i>Statistics</i>	
		Current Prices of Iron and Steel and Non-ferrous Metals (Advert. section)	34

PUBLISHED WEEKLY: Single Copy, 9d. By Post 11d. Annual Subscription, Home 40s. Abroad 45s. (Prepaid).  
 49 Wellington Street, London, W.C.2. 'Phone: Temple Bar 3951 (Private Branch Exchange) Grams: "Zacatecas, Rand, London"

## Paris Congress

Unquestionably, the Paris International Foundry Congress which ended in the early hours of last Sunday morning, was the greatest gathering of foundrymen held in Europe since the war. The total attendance was of the order of 1,100, of whom over 800 were drawn from some 23 countries. There were large parties from America, Germany, France, Italy, Belgium, and this country. The president of the congress, Mr. Muguet, worked strenuously for its success, but the strain was such that illness prevented his attendance at the closing banquet. Everybody will now wish him a rapid return to complete health. The chief guest was Mr. L. N. Shannon, of Birmingham, Alabama, U.S.A., as he is this year's president of the International Committee of Foundry Technical Associations. There were also in attendance the president of the American Foundrymen's Society; the president and vice-presidents of the Institute of British Foundrymen, as well as five past-presidents of the A.F.S., and three who have served the Institute of British Foundrymen in a similar capacity.

Advantage was taken of the occasion for a meeting of the International Committee and Mr. Brizon, of France, was elected president. He will be the chief guest at the next International Congress to be held at Florence, in September next year. Additionally, there were meetings of the European Committee on Foundry Productivity; the nickel licensees for spheroidal-graphite cast iron and the French Meehanite licensees, plus, of course, the committees for test-bars, foundry dictionary and foundry defects—of the International organization. On the Sunday before the Congress was officially

opened, there was an excursion to the Chateau of Dompierre, which belongs to the Duke of Luynes, a member of the French foundry association, as there is a moulding-sand quarry on his estate. This visit was greatly appreciated by the guests.

Both the opening and closing ceremonies were at the Sorbonne in the traditional French manner, with the chair being taken by a minister of the State, who is accompanied on the platform by foreign and national personalities. At the latter ceremony, Mr. L. N. Shannon and Mr. P. Chevenard were presented with *Grandes Medailles d'Honneur* and Dr. Everest and Mr. Georges Delbart with *Medailles d'Or*—in reality magnificent plaques. The International Award, that of a statuette of the killing of Medusa, made by Benvenuto Cellini, was presented to Professor Portevin for his services to the foundry industry.

An exceptionally pleasing visit was made to the research laboratories of the "Centre Technique" at Sèvres. Here every branch of the foundry industry is catered for and thus it is not quite comparable with any similar institution in this country. We were impressed with the coloured projections of photomicrographs of cast iron, the colours being obtained by heat tinting; the installation of an experimental cupola having twin tuyeres, and the translations being made from technical reports—even from ideographic Japanese. The receptions accorded to the visitors by the City of Paris at the *Hotel de Ville* and by the Chamber of Commerce were a type of social event which the French do so admirably. Those who were fortunate to be official delegates were entertained to dinner at the

*Paris Congress*

Le Doyen restaurant in the Champs-Élysées. It was in every way a charming function. There were many other social happenings such as a mannequin parade by Christian Dior, visits to see the illuminated fountains at Versailles, a cabaret show in Montmartre, but we liked best the visit to the statuary section of the Louvre to see the two great masterpieces, the Victory of Samothrace and Venus de Milo under the effect of floodlighting. We have often seen them in the past, but (especially the former) they were exceptionally satisfying when shown devoid of all background effect.

At the closing banquet, a most important statement was made by Mr. Olivier, president of the *Syndicat Général des Fondateurs de France* (the French foundry employers' federation) that there had just been created a European foundry employers' federation to include *inter alia* France, Germany, Holland and Belgium. It is to be presided over by Mr. Olivier and it will strive to ensure the maintenance of economic prices and conduct other activities germane to the welfare of the foundry industry.

At a guess, over 50 technical papers were presented, but with the exception of a "starred" paper by Dr. Bastein, they were only available in French. This one, on hydrogen in steel, pig-iron and cast iron, was of exceptional interest, for, at least so far as the last alloy is concerned, not much is known. As for the rest of the papers, whilst often of quite a high quality, there was really nothing outstanding, and the omission of the subject of shell moulding was somewhat regretted by many of the participants.

Though this was an International Conference, it was still characteristically French, and we would not have it otherwise. There is no place for standardization in such matters, and each country has the opportunity in turn to act as hosts in their natural manner. On this occasion, with so many visitors from so many countries, the French did exceptionally well, and we thank and congratulate Mr. Muguet and his chief helpers, Mr. Debar and Mr. Delpueche on the unquestioned success they achieved. To act as hosts for more than a week is no light task and they did extremely well— *mille remerciements !*

In addition to the 42 competitors there were 33 other participants at the meeting, consisting of wives and spectators, and these added much to the enjoyment of the occasion. A special vote of thanks is due to the retiring honorary secretary, Mr. F. Arnold Wilson and his helpers for their truly magnificent organization of the whole function.

In view of the fact that the English Ladies' Golf Championship is being held at Woodhall Spa at the end of September, 1954, the ninth I.B.F. Golfing Society meeting at Woodhall Spa is to be held next year on September 18 and 19—a week earlier than usual.

**Eighth I.B.F. Golf Meeting**

Now well established and highly rated among the social events of the Institute of British Foundrymen, the annual meeting of the I.B.F. Golfing Society was held last week-end, September 26 and 27. This was the eighth meeting and the fifth in succession to take place at Woodhall Spa, with admirable headquarters in the Golf Hotel. The weather was perfect throughout—producing "mists and mellow fruitfulnesses," and some very fine golf scores.

*Saturday morning: Stroke Competition for the I.B.F. handicap and scratch cups (42 competitors).*

1. H. C. Hanson, 91–21 = 70; Winner handicap cup.
2. E. Arthur Phillips, 81–10 = 71; Second handicap prize.
3. H. L. Thorne, 85–13 = 72; Third handicap prize.
4. H. Oliver, 90–18 = 72.
5. E. W. Pugh, 80–6 = 74; Winner scratch cup.
6. Tom Reynolds, 101–26 = 75.
7. C. S. Bosworth, 101–26 = 75.
8. W. Jones, 95–19 = 76.
- 11 E. C. Carrott, 99–22 = 77; Winner veterans cup.

In addition to holding the handicap and scratch cups for one year, the winners also received a tankard each, kindly presented by Dr. Cyril Dadsell, immediate past-president of the Institute. The veterans cup (challenge) a tankard presented by Mr. W. E. Aske was won after a tie with Mr. F. Arnold Wilson. The second and third handicap prizes were presented by Mr. R. B. Templeton. The branch "Coronation" challenge shield, presented by Mr. P. B. Higgins, was won by the Birmingham branch "B" team—E. W. Pugh 74, H. Thorne 72 and H. C. Hanson 70 = 216. The winners also received prizes presented by the West Riding of Yorkshire branch whose "A" team (P. G. Higgins 78, W. Jones 76 and H. Oliver 72 = 226) were themselves second in this event. The East Midlands branch team were third (228) and London fourth (234).

*Saturday afternoon: Greensome foursomes v. bogey.*

1. P. G. Pennington and F. Webster (12)–5 up.
2. R. C. Sheppard and W. H. Richards (12) 5 up.
3. A. J. Ford and J. H. Ainsbury (12) 2 up.
4. R. S. Smeeth and A. G. Robiette (12) 1 up.

The winners received a chromium plated Lincoln imp each, kindly presented by the Lincolnshire branch. The runners-up received golf balls presented by Mr. R. B. Templeton and Mr. R. S. Darby.

*Sunday morning: Four-ball foursomes v. bogey.*

1. H. C. Hanson (21) and A. Swain (16)–7 up.
2. C. H. Wilson (22) and P. G. Pennington (12)–5 up.
3. H. Oliver (18) and W. E. Aske (20)–5 up.
4. R. C. Sheppard (15) and P. B. Higgins (8)–4 up.

The winners received ½ dozen golf balls each, kindly presented by Mr. Frank Webster.

*Ladies' Competition—Stapleford.*—This was held on Saturday morning, when eight competed for the ladies' Coronation rose bowl (challenge) kindly presented by Mr. E. G. Evans.

1. Mrs. Thos. Ringley (23)–28 points.
2. Mrs. R. C. Sheppard (28)–27 points.
3. Mrs. E. W. Pugh (34)–20 points.
4. Mrs. Wm. E. Aske (29)–18 points.

The runner-up received golf balls presented by Mr. J. F. Stanier.

**Annual General Meeting**

At the annual meeting of the I.B.F. Golfing Society, which took place on Saturday evening, with Mr. R. B. Templeton, president, in the chair, the prizes were presented by Mrs. Dadsell, wife of the immediate past-president of the Institute.

Afterwards, the following officers for next season were elected or confirmed in office:—As president, Mr. R. B. Templeton; vice-presidents, Mr. P. H. Wilson, O.B.E., Mr. V. C. Faulkner, and Mr. R. C. Shepherd; committee: Mr. E. A. Phillips, Mr. J. Bell, Mr. R. C. Shepherd, Mr. G. W. Nicholls, Mr. I. A. Menzies, Mr. F. Arnold Wilson, and Mr. P. G. Pennington (hon. secretary). The resignation of Mr. F. Arnold Wilson, who has been honorary secretary for the past five years, was accepted with much regret, and the Golfing Society were grateful to announce that Mr. P. G. Pennington had agreed to accept this office

(Continued at the foot of col. 1)

# Feeding of Steel Castings at Greater-than-atmospheric Pressures\*

By Charles W. Briggs and Howard F. Taylor

*After first reviewing principles established from previous work on feeding and methods of measuring the degree of efficiency, the Authors describe apparatus and applications whereby gas pressures above atmospheric can be applied to freezing castings. A section is included on temperature effects independent of pressure. Results are analysed and critical conclusions drawn.*

## INTRODUCTION

Many attempts have been made to improve casting quality by modifications of the "blind"-riser technique for feeding steel castings. The insertion of a sand core in the top of riser<sup>1</sup> allows atmospheric pressure to exert its force on the molten steel of the riser, thus permitting more efficient feeding of the casting. Prior to the development of this technique, the performance of blind risers was unreliable. Other techniques that have been developed to improve feeding include the use of graphite rods in risers,<sup>2,3</sup> and the use of exothermic materials.<sup>4</sup> Insulating sleeves around the risers are beneficial,<sup>5</sup> but no completely satisfactory insulator has as yet been found for steel.

Since the force of atmospheric pressure enhances the attainment of soundness in castings, the question arises whether or not a pressure higher than that of atmospheric pressure might result in further improvement. Such use of high pressures, if practicable, might also permit the use of a small riser accomplishing efficient feeding with a saving of metal. The purpose of this investigation was to determine the effects of the application of greater-than-atmospheric pressures in the risers of steel castings.

## Blind Risers

A "blind riser" is defined as a riser which is entirely surrounded by sand, and does not extend to the atmosphere. It can, therefore, be placed at any position in the mould. Its shape is usually a cylinder with a spherical segment top. (For a typical blind riser, see Fig. 3, and for complete details concerning the feeding mechanism of the "atmospheric pressure riser," consult reference 6.)

Many attempts have been made to improve casting quality by modification of the original technique in which atmospheric pressure was employed. The use of a pressure greater than atmospheric, applied to a riser while the steel is still molten, has been proposed by several foundry engineers. In November, 1945, Jazwinski and Finch<sup>7</sup> published the first article on the use of high pressures in the risers

of steel castings. Their preliminary work included a study of shrinkage cavities in both blind and open risers. Open risers, which are fed by the force of gravity, have carrot-shaped cavities which extend deeply into the riser, and usually contain considerable secondary shrinkage. Blind risers, fed by atmospheric pressure, show similar cavities with a slightly more globular shape, and less secondary shrinkage. Their conclusion is that "The height of a feeder-head necessary is determined by the length of shrinkage cavity, and consequently, if the cavity is globular instead of carrot-shaped, a constant volume of casting will require less of head height, and will result in an increase in yield." From a series of experiments, they found that the size and type of shrinkage cavity formed in the blind riser was proportional to the applied pressure. They stated that if the pressure was high enough to force the metal from the blind riser into the casting so as to form a flat-bottomed cavity, the riser could be reduced to a minimum size, thereby producing a high casting yield.

## Application of Pressure to Blind Risers

It has been stated by Jazwinski and Finch that to produce sound castings with a high yield, two conditions must be fulfilled:—(1) Pressure must be applied; and (2) the blind riser must be kept liquid as long as possible. These conditions are met by Jazwinski and Finch by introducing into the riser cavity (before closing the mould) a material which, after a surface skin has formed in the riser, creates a gas-pressure to act upon the liquid metal and force it into the casting. In addition to the gas-forming constituent, there is introduced an exothermic compound to create heat to make up for losses resulting from convection and radiation. This pressure and heat-forming material, called "Kayell" compound, is contained within a refractory or metal container to withstand the heat from the liquid steel until a skin has formed over the entire surface of the riser. Then the combined effect of the pressure and heat results in a globular cavity, claimed to improve feeding of the casting. The "Kayell" mixture is introduced into the riser by means of a core suspended from a wire attached to a core-print in the mould. As soon as a thin skin is formed in the riser, the exothermic reaction gives off heat to keep the riser metal liquid, and the gas given off is trapped in the riser, thus forcing feed metal into the casting.

\*This report, which was presented at the fiftieth annual meeting of the Institute of British Foundrymen, was prepared from a research study carried on at Massachusetts Institute of Technology for the Steel Founders' Society of America and is published with the permission of Steel Founders' Society of America. The Authors are technical and research director, Steel Founders' Society of America, and associate professor, Dept. of Metallurgy, Massachusetts Institute of Technology, respectively.

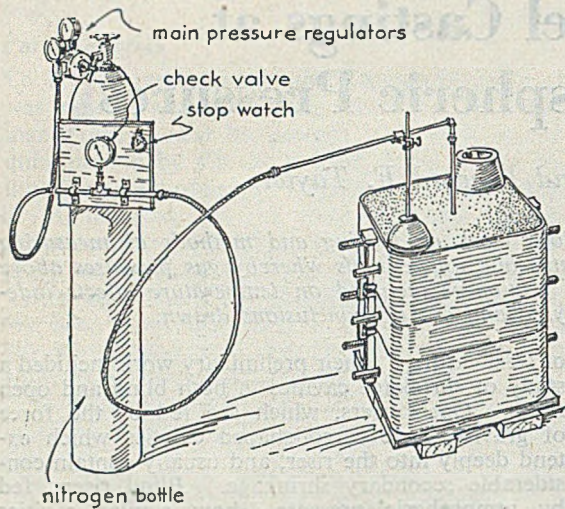


FIG. 1.—Sketch of Apparatus used for the Application of External Gas Pressures to Castings.

Jazwinski and Finch developed several methods of delaying the pressure action: by enclosing the compound in a steel or copper tube, or by coating with a thick refractory paint. These coverings delay the gas and heat formation by varying degrees to accommodate different sized risers in order that sufficient skin may first be formed at the riser/sand interface. They also gave examples of sound castings which they produced by this method, and claim that the yield is increased over that when simple atmospheric pressure or gravity feeding is used.

#### Centrifugal Pressure

Many attempts have been made to obtain improved feeding of castings by applying pressures of a high order by centrifugal means. To date, it has not been found possible to improve feeding markedly by pressures exerted in this manner. Once bridging dendrites form across the centreline, or path of feeding of the solidifying casting, they establish a barrier to the passage of molten metal from the riser. Since the spaces between the dendrites are extremely small, calculation readily shows that pressures of a fantastic order would be required to move metal of reduced fluidity through them. In fact, the centrifugal pressure method of feeding, as contrasted to the ordinary gravity methods, permits only a slight increase in the ability of feeding heavy sections through light sections. "Directional solidification," to prevent dendritic bridging, remains as the consideration of paramount importance, and it is for this reason that certain castings can be produced centrifugally with fewer risers than can be produced statically with equal soundness. Hence, it does not seem probable that such pressures as might be developed practically in a riser cavity would prove greatly beneficial over ordinary atmospheric methods.

#### Estimation of Feeding Efficiency

It seems logical that any attempt to assess feed-

ing efficiency on the basis of size or shape of riser cavity might lead to erroneous conclusions. The only dependable criteria of casting soundness are transverse radiography or magnetic inspection of sectioned castings.

The flat-bottomed cavities, with uniform walls shown in the sectioned risers of the Jazwinski and Finch publications, indicate that the molten metal forced out of the riser went elsewhere than to compensate for shrinkage of the casting. The extremely uniform wall of the cavity indicates clearly an instantaneous displacement of metal, a condition incompatible with the progressive feeding required for riser efficiency. The metal could only be displaced by (1) enlargement of the casting, (2) penetration of metal into the sand of the mould, or (3) forcing of metal back out of the downgate. Without such an instantaneous displacement, these unnatural shrinkage forms can only be obtained when a large quantity of exothermic or carbonaceous materials is used in the riser.

Experience indicates that the amount of exothermic material required for such a condition would be far more than could be packed into the riser, and still leave room for feed metal. A highly exothermic reaction would cause release of gas-pressure by remelting of the solidified skin. Furthermore, the uniform wall could not be obtained, if highly exothermic material were used.

#### Practical Considerations

The rate and extent of feed demand of castings are functions of casting shape and volume. Some castings have early and others late feed demand requirements. It is obvious that gas-forming capsules must possess great latitude of performance. Also, the selection of the capsules would be critical. It seems almost too much to expect that an inexpensive capsule could be provided which would:—

(1) Possess exactly the delayed action necessary for the riser (*a*) to build up sufficient skin-strength to support the gas pressure, and (*b*) to accommodate wide variations in the feed demand of the casting as it solidifies. (These variables are influenced by pouring temperatures, mould material, size and configuration of the casting, and by the rate of filling of the mould cavity.)

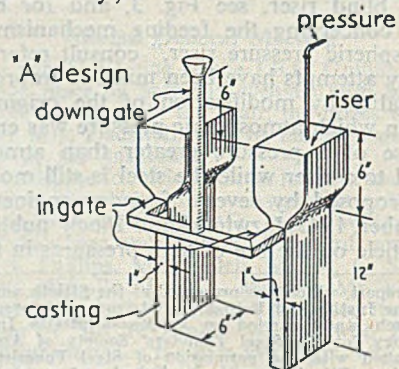


FIG. 2.—Design "A" Experimental Casting.



(2) Develop a low pressure, early on, and an increasingly higher pressure with time, as the molten metal loses fluidity and the feed demand becomes greater. This is particularly difficult, because the temperature of the riser is falling, and gas pressure tends to decrease when it should be increasing. The development of such a graduated series of capsules would have to be done by trial and error methods, as no data exist upon which to base performance required.

Finally, it is doubtful if the limited decrease in riser size possible with an ideal capsule behaving in an efficient manner would be sufficient to pay for the cost and inconveniences entailed in its use.

In spite of the above reasoning, there still remains the possibility of obtaining sounder castings by pressure feeding. It was the object of the present investigation to explore this possibility further, having always in mind both facets of the problem.

**EXTERNAL APPLICATION OF GAS PRESSURE TO BLIND RISERS**

**Materials**

Eight patterns were used in the experimental work. Green- and dry-sand moulds were first used in the tests, but, after it was found that pressure caused undue penetration in green-sand moulds, dry-sand moulds only were used. The steel was melted in a 1½-ton "Lectromelt" electric arc furnace, and poured from a bottom-pour ladle. All the castings were poured from either plain carbon or low-alloy steel of the following approximate composition:—

	Per cent.	
	Low alloy.	Plain carbon.
Carbon .. .. .	0.35	0.27
Manganese .. .. .	1.10	0.75
Silicon .. .. .	0.40	0.50
Nickel .. .. .	0.55	—
Chromium .. .. .	0.60	—
Molybdenum .. .. .	0.25	—
Sulphur .. .. .	0.030	0.030
Phosphorus .. .. .	0.030	0.030

**Method of Application of Pressure**

A diagram of the method of applying pressures is shown in Fig. 1. Pressures were regulated from

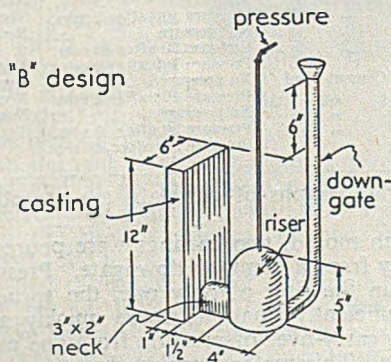


FIG. 3.—Design "B" Experimental Casting.

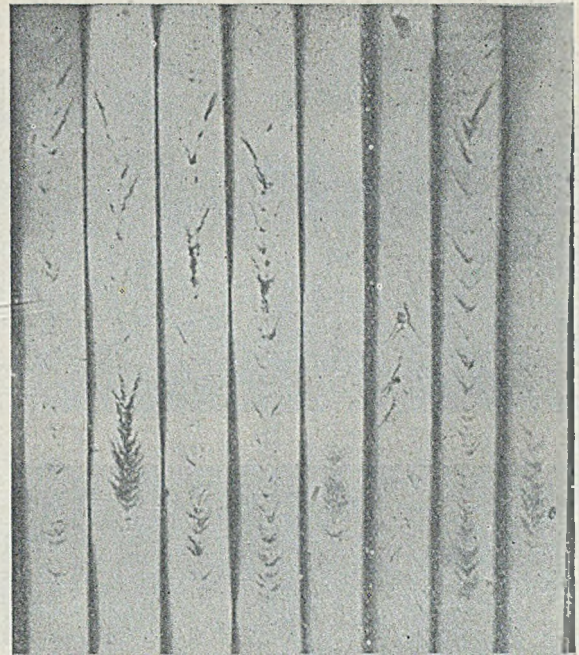


FIG. 4.—Transverse Radiographs of Casting Designs "A" and "B,"

a valve at the nitrogen tank, and check readings were made at an intermediate pressure gauge. Gas-tight connections led to an L-shaped pipe extending into the riser mould cavity. Pressure was applied within the riser at a predetermined time after the metal was poured. Dry sand was packed into the end of the tube projecting into the riser cavity to prevent metal flowing into the tube. Because of the ability to regulate the amount and time of application of pressure at will, it was felt that such a system would be far superior in latitude and dependability to cut and try methods than using pressure-forming capsules. The variables which could be controlled were (1) the amount of gas pressure applied, (2) the time of application of pressure, and (3) sequences of varying amounts of pressure with time.

**Preliminary Tests**

The first problem was to design a casting upon which effect of pressures could best be studied. It was felt that any beneficial effect of pressure would

TABLE I.—Summary of Preliminary Tests, Designs "A" and "B" (Figs. 2 and 3).

Test No.	Type of mould.	Conditions.
0-1	Green-sand .. .. .	No pipe eliminator.
0-2	Green-sand .. .. .	Non-exothermic pipe eliminator.
0-3	Green-sand .. .. .	Exothermic compound added.
0-4	Green-sand .. .. .	Open riser blinded.
0-5	Dry-sand .. .. .	No pipe eliminator.
0-6	Dry-sand .. .. .	Non-exothermic pipe eliminator.
0-7	Dry-sand .. .. .	Exothermic compound added.
0-8	Green-sand .. .. .	Blind riser (design B).



Fig. 5.—Sectioned Blind Top Risers of "A" Design, 1 to 8, without External Gas Pressure. 1A to 8A with External Gas Pressure.

be most easily discernable in a casting which is difficult to produce sound, using ordinary foundry techniques. Upon this basis, design A, Fig. 2, was selected. When top risers and normal techniques of gating are used for this particular casting, it is very difficult, if not impossible, to produce the casting without some centreline shrinkage.

A group of preliminary tests were made with the "A" design, the conditions for which are listed in Table I. Each test was carried out in an individual mould. In No. 0-8, a blind riser was used, as in design "B," Fig. 3. This is the only casting made from this design.

The downgate, ingate, and riser were removed and the riser cut in half with an oxygen torch. A specimen  $\frac{3}{8}$  in. thick was removed from the centre of the remaining 12 by 6 by 1-in. slab with a cut-off wheel. Radiographs were taken of the section with a 150-kv. X-ray unit using standard technique. Fig. 4 shows prints of the transverse radiographs, and Fig. 5 illustrates a few representative sectioned risers.

All of the radiographs in the preliminary tests

show the expected characteristic centreline shrinkage,<sup>8</sup> manifested by a pattern of chevron-shaped voids which point away from the direction of feeding. The least shrinkage was found in the slab fed with a blind riser at the bottom, in which temperature gradients were most favourable (casting 0-8).

All castings having top, open risers showed essentially identical widespread shrinkage. The slab is too thin to permit reorientation of temperature gradients by insulation, or even by heat applied in the riser. Since the casting was so difficult to produce sound when top risers were used, it was felt that if pressure feeding were effective, it would show up to best advantage in this type.

#### Pressure Feeding using Design "A"

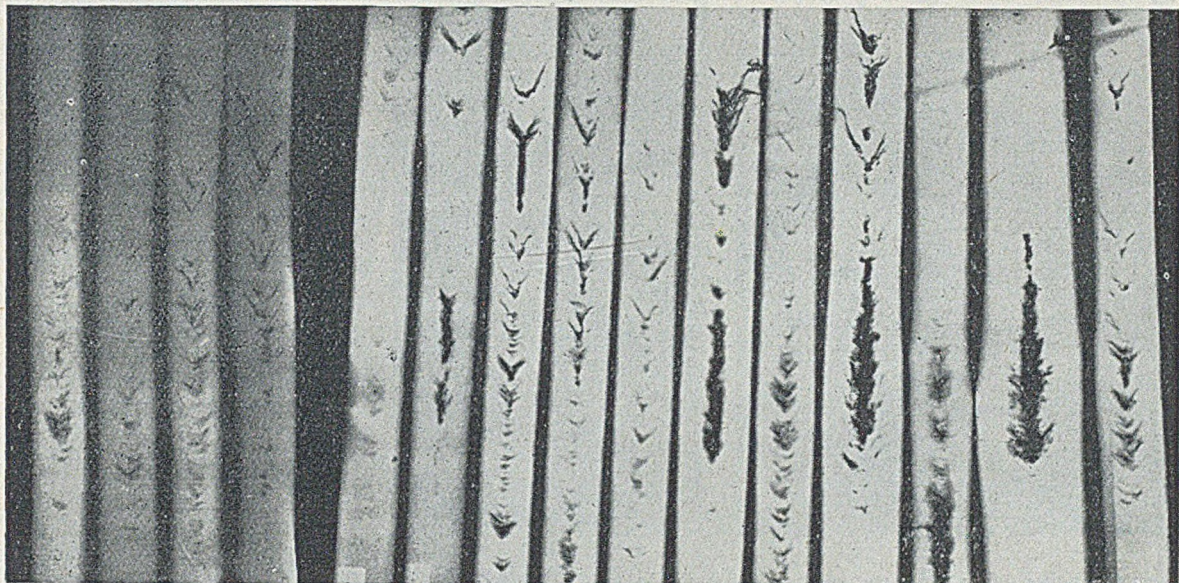
The first pressure tests were conducted using the "A" design. Pressure was applied as previously described. A summary of the results is shown in Table II, photographs of typical risers are shown in

TABLE II.—Summary of Tests 1-20, Design "A" (pressures in lb. per sq. in.).

Test.	Type of mould.	Conditions.	Penetration.
1	Green-sand	No pressure	None
1A	"	Pressure 50 after 30 secs. —steel blew out	$\frac{1}{4}$ in.
2	"	No pressure	None
2A	"	Pressure 50 after 1 $\frac{1}{2}$ min.	0 to $\frac{1}{8}$ in.
3	"	No pressure	None
3A	"	Pressure 50 after 2 min.	0 to $\frac{1}{4}$ in.
4	"	No pressure	None
4A	"	Pressure 100 after 2 min.	Little
5	"	No pressure	None
5A	"	Pressure 50 after 1 $\frac{1}{2}$ min.	0 to $\frac{1}{4}$ in.
6	"	No pressure	None
6A	"	Pressure 5 after 30 secs.	0 to $\frac{1}{2}$ in.
		Pressure 20 after 60 secs.	Centre bulge
		Pressure 50 after 90 secs.	None
7	"	No pressure	None
7A	"	Pressure 15 after 60 secs. Pressure 50 after 90 secs. Pressure 100 after 120 secs.	$\frac{3}{8}$ to $\frac{1}{2}$ in.
8	"	No pressure	None
8A	"	Pressure 100 after 2 $\frac{1}{2}$ min.	Broke through mould
10	"	No pressure	None
10A	"	Pressure 80 after 2 $\frac{1}{2}$ min. Metal did not fill riser	None
11	"	No pressure	None
11A	"	Pressure 50 after 1 min.	$\frac{1}{4}$ to $\frac{1}{2}$ in. Lower bulge
12	"	No pressure	None
12A	"	Pressure 10 at once Pressure 15 after 45 secs.	— None
13	"	No pressure	None
13A	"	Pressure 20 after 30 secs.	None
14	"	No pressure	None
14A	"	Pressure 20 after 1 min.	None
15	"	No pressure	None
15A	"	Pressure 100 after 2 min.	None
16	"	No pressure	None
16A	"	Pressure 135 after 2 $\frac{1}{2}$ min.	None
17	Dry sand	No pressure	None
17A	"	Pressure 100 after 2 min.	Slight
18	"	No pressure	None
18A	"	Pressure 20 after 30 secs. Pressure 100 after 2 min.	Slight
19	Cement-sand	No pressure	None
19A	"	Pressure 100 after 2 min.	None
20	"	No pressure	None
20A	"	Pressure 20 after 30 secs. Pressure 100 after 120 secs.	Slight

Fig. 5, radiographs of the slabs are reproduced in Fig. 6.

In each mould, two castings were poured simultaneously from a common downgate. Pressure was applied in the riser of only one, the sprue system being sufficiently small to freeze quickly and prevent any carry-over of pressure from one casting to the other. This method provided a means of comparison of a pressure-fed and a gravity-fed casting,



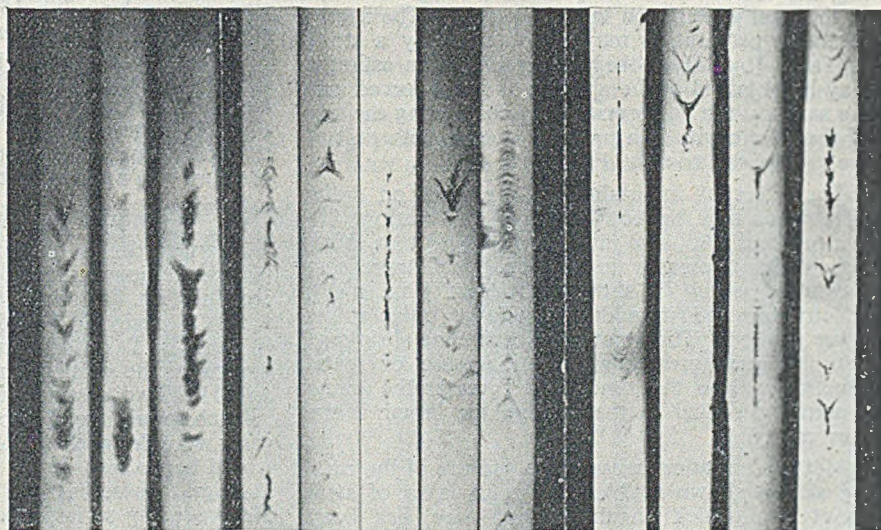
1 1A 2 2A 3 3A 4 4A 5 5A 6 6A 7 7A 8

FIG. 6.—*Transverse Radiographs of Castings of Design "A" with and without the Application of Gas Pressure. Letter "A" designates Gas-pressure Application.*

both poured at the same time under identical conditions except for pressure. Throughout the experiments, the pressure fed castings were designated by a number plus the letter "A," and the corresponding gravity-fed casting by the number only.

At a predetermined time after pouring (as observed with a stop watch), the pressure was applied by adjusting the valve on the nitrogen tank. The reading of the gauges on the tank and on the board were always compared and at no time were discrepancies between the readings found. Gas pressure was maintained in the riser for several minutes until the casting had solidified.

In the first casting, made by applying a pressure of 50 lb. per sq. in. (1A), the steel blew out the downgate immediately after the pressure was applied. The gas pressure was released at once until a weight could be placed upon the downgate, after which the pressure was re-applied. This loss of metal may be seen by observing the large riser cavity (1A) Fig. 5. To prevent such further hazardous conditions, a



10A 11 11A 12A 13A 14A 15A 16A 17A 18A 19A 20A

50-lb. steel weight was placed always on the downgate before applying gas pressure.

All castings of the "A" design, with or without gas pressure, contained centreline shrinkage. The effect of gas pressure applied to the risers may be seen from radiographs of 1 and 1A, 2 and 2A, etc., Fig. 6. In most cases, a pressure-fed casting shows even more centreline shrinkage than its corresponding gravity-fed mate. The gravity-fed castings always showed the same shrinkage conditions, so only the pressure-fed castings were cut and radiographed, after No. 8, to save machining time.

Penetration of steel into the green-sand moulds

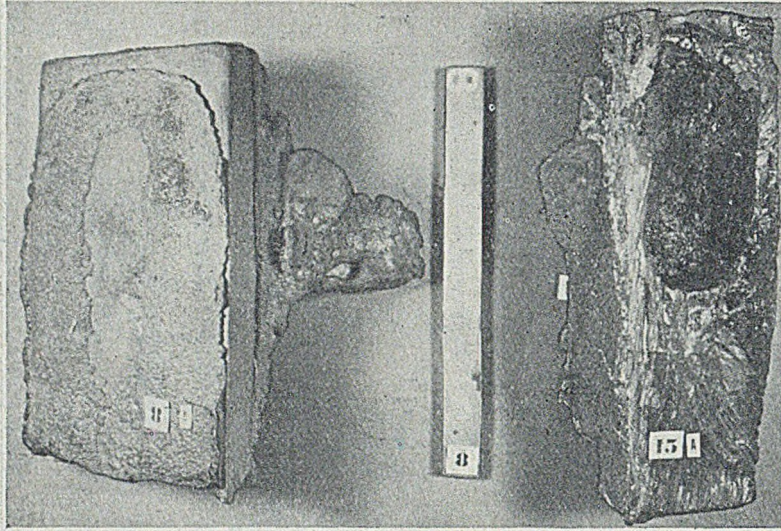


FIG. 7.—Metal Penetration into the Sand Mould, caused by Gas Pressure.

was extensive when pressure was applied quickly to the risers. Since the metal penetrated rather uniformly into the sand on both sides of the plate casting, the thickness of the plate is a rough measure of the steel penetration into the mould. The degree of metal penetration may be obtained by a study of Table II or from the radiographs. An estimate may be obtained of the amount of metal forced into the sand by the gas-pressure, by comparing the size of the riser cavity in a pressure casting with that of the gravity-fed casting, Fig. 5.

The effect of increasing gas-pressures on metal penetration may be seen by comparing castings 4A, 5A, 6A, and 7A. The radiographs show that metal penetration increases in the order of increasing pressure, casting 7A showing at least  $\frac{1}{2}$  in. metal penetration, and in addition, a large bulge in its lower portion. The amount of centreline shrinkage also increases greatly with an increase of metal penetration into the sand. The greater the metal penetration found in the casting, the larger is the riser cavity.

Metal penetration caused by a rupture of the casting skin is shown in 8A, Fig. 7. A layer of steel about  $\frac{1}{4}$  in. thick on the casting face, has been forced into the mould. Also, at one corner of the casting, the sand gave way, and the metal penetrated several inches into the mould. The riser for casting 8A, Fig. 5, shows a large, smooth cavity resulting from the metal being forced into the mould.

It was decided to resort to lower pressures after finding that the high pressure used in examples 1A to 8A, design "A," added little except trouble. It was also decided to ram the moulds very hard in order to decrease penetration. Instead of using gas-pressure of 50 to 100 lb. per sq. in., lower pressures of 10 to 20 lb. per sq. in. were used, but were applied at an earlier time. In group 11A to 16 A, Fig. 6, metal penetration into the sand was almost eliminated by especially hard ramming. An examination of the radiographs shows that the centreline shrinkage was somewhat less than had

been obtained previously, but it had not been eliminated.

In order to reduce further the penetration of the metal into the sand, dry-sand and cement-sand moulds were used. Castings 17A and 18A were made in dry-sand; 19A and 20A in cement-sand moulds. The radiographs show that the penetration and bulging has been eliminated, but the characteristic centreline shrinkage is still present. This series of tests indicates that it is not possible to improve the feeding of top-risered plate castings

1-in. thick by using gas-pressure in the risers. The slab of the "A" design is too thin for attainment of directional solidification when top-risered.

A final attempt was made to feed the "A" design casting by using 15 lb. of highly exothermic pipe-eliminator. Steel was poured into the mould to about 1 in. above the riser/casting junction, after which exothermic material was added to the molten steel. A radiograph of the plate casting is shown in Fig. 11, casting No. 30. Centreline shrinkage was markedly improved over that obtained when gas pressure was applied, but was not eliminated.

#### Pressure Feeding using Design "C"

The next design chosen for study was a rectangular parallelepiped, 12 in. high, with a  $3\frac{1}{2}$ -in. square cross-section. A sketch of the casting is shown as the "C" design in Fig. 8, a summary of conditions is given in Table III, and photographs and radiographs of the castings are illustrated in Figs. 9, 10 and 11. Two castings were poured simultaneously in each mould from a common downgate. The ingates were designed to solidify quickly, so that there would be no transfer of pressure to the gravity-fed castings. These castings are numbered similarly to the preceding series, since the same choice of gas pressures were used. The subscript "C" indicates the "C" design.

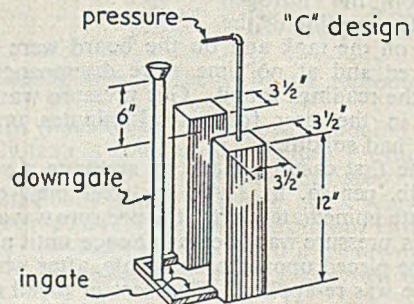
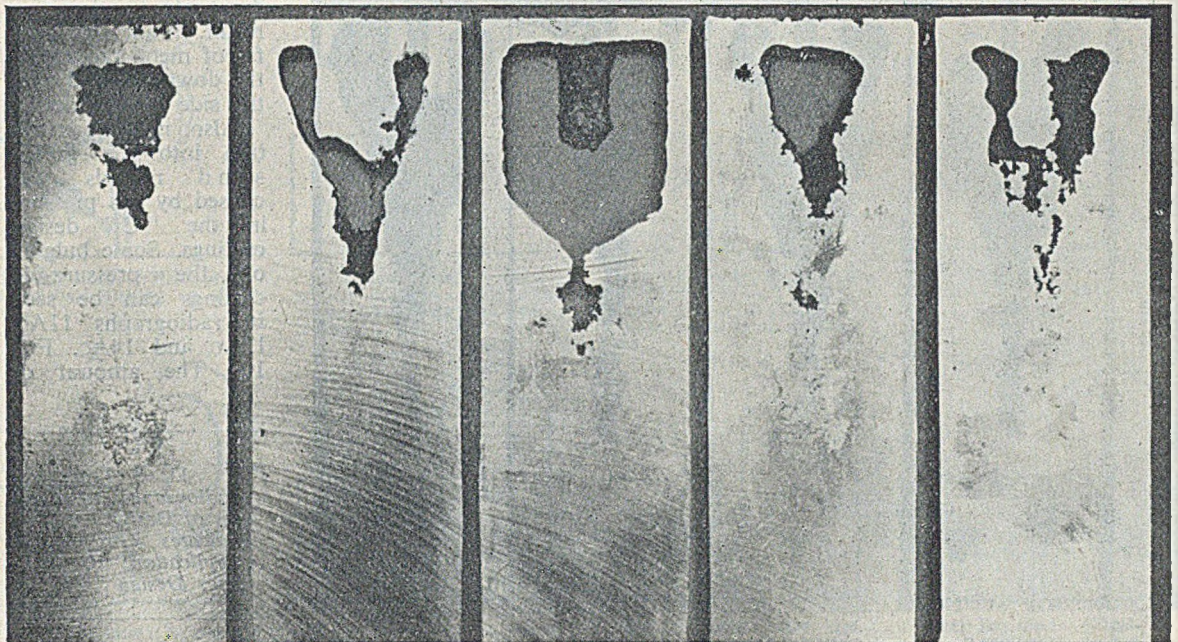


FIG. 8.—Design "C" Experimental Casting.



11C

11AC

13AC

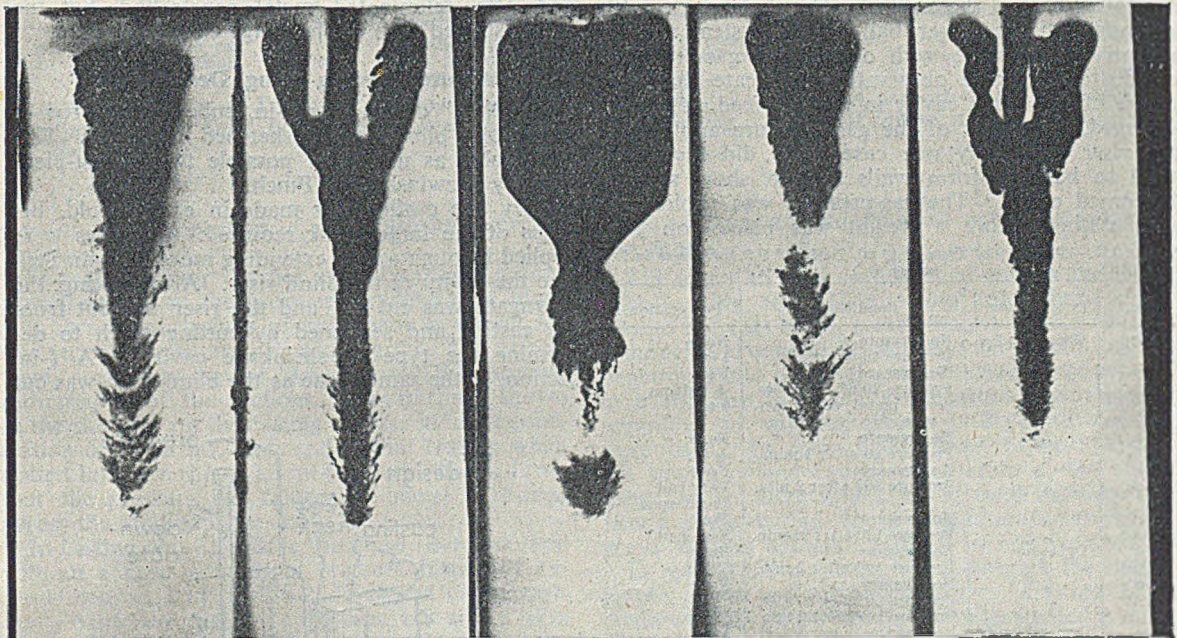
14C

14AC

FIG. 9.—Sections from the "C" Design Castings.

Gas pressure was applied as before by means of a pipe extending 2 in. into the cavity. The heavy weight was used on the downgate to prevent loss of metal from the mould. As there was no riser, as such, the upper one-third of the section may be

considered riser, and the lower two-thirds the casting to be fed. This design was chosen to ensure the same rate of build-up of skin thickness in the riser (pressure chamber) as in the casting. The chief purpose of these tests was to determine the type of



11C

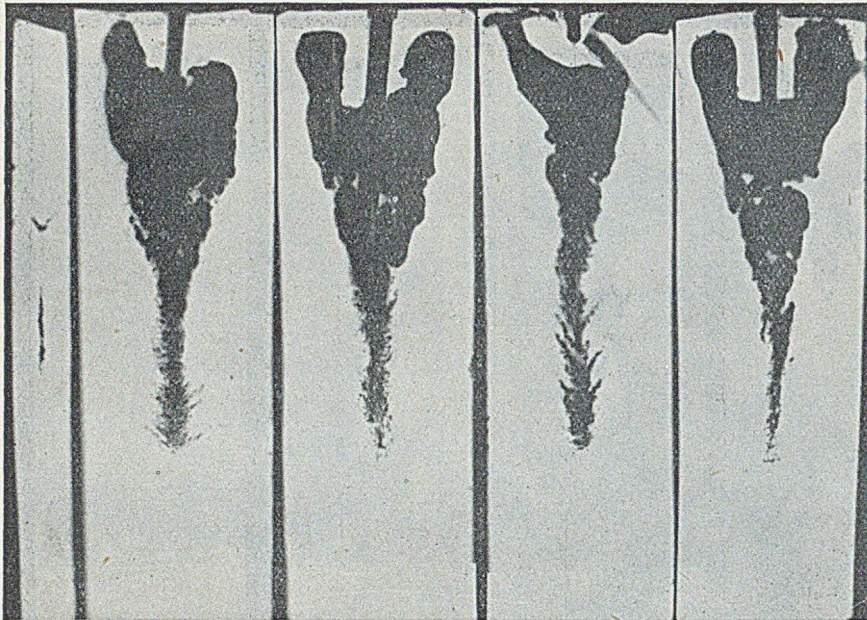
11AC

13AC

14C

14AC

FIG. 10.—Transverse Radiographs of Castings of Design "C." A indicates Gas-pressure Application; C indicates Design "C."



30

17AC

18AC

19AC

20AC

shrinkage cavity obtained with the application of greater-than-atmospheric pressure in a large cross-section.

Sections  $\frac{1}{8}$  in. thick were cut from the centre of the casting and radiographed. The shrinkage cavity had a characteristic carrot-shape when the casting was produced without gas-pressure (see 11c, Fig. 9), showing some secondary shrinkage extending into the lower half of the casting. The shrinkage cavity extends into the lower half of the system and is essentially the same with or without gas-pressure application. These observations indicate that the shape of shrinkage cavity in normal feeding is not changed, regardless of the gas pressure applied in the riser. In only one case, 13Ac, did the riser tend to have uniform walls and to show a flat-bottomed cavity. The gas-pressure was applied to this casting before a weight was placed on the

penetration is given in Table III. When a pressure of 100 lb. per sq. in. was applied two minutes after pouring, the green-sand gave way, metal penetrated 2 in. into the mould as shown in 15Ac, Fig. 7, and a large cavity was produced. With 120 lb. per sq. in. pressure applied after two and a half minutes, metal also penetrated very badly into the sand. The use of dry-sand and cement-sand moulds reduced and often eliminated metal penetration, but the carrot-shaped type of shrinkage cavity persisted.

**Pressure Feeding using Design "D"**

The "D" design is a 4-in. cube casting, fed by means of a blind riser, as sketched in Fig. 12. This was scaled as nearly as possible to the test-piece used by Jazwinski and Finch.

Only one casting was made in each mould, because of the larger flask required. Pressures were applied through a pipe extending more than an inch into the cavity of the blind riser. After casting, the downgate was cut off, and the riser was cut from the casting and sectioned by cutting torch to determine the type of shrinkage cavity. A  $\frac{1}{8}$ -in. section, in the same plane as the blind riser, was cut

downgate, and as a result, about one cupful of metal ran out of the downgate and over the side of the mould.

Also, metal penetration into the green-sand moulds was caused by gas pressure in the "C" design castings. Some bulging of the pressure-fed castings can be seen in radiographs 11Ac, 13Ac and 14Ac, Fig. 10. The amount of

FIG. 11. — Transverse Radiographs of Castings of Design "C"; A indicates Gas-pressure Application; C indicates Design "C."

TABLE III.—Summary of Tests 11 to 20, Design "C" (pressures in lb. per sq. in.).

No.	Type of mould.	Conditions.	Penetration.
11c	Green-sand	No pressure	None
11Ac	"	Pressure 10 at once	$\frac{1}{8}$ in.
13c	"	No pressure	None
13Ac	"	Pressure 20 after 30 secs.	$\frac{1}{8}$ bottom
		Some metal out down-gate	0 top
14c	"	No pressure	None
14Ac	"	Pressure 20 after 1 min.	$\frac{1}{8}$ in.
15c	"	No pressure	None
15Ac	"	Pressure 100 after 2 min.	Very bad
			Burnt open
16c	"	No pressure	None
16Ac	"	Pressure 120 after 2½ min.	Very bad
17c	Dry-sand	No pressure	None
17Ac	"	Pressure 100 after 2 min.	Slight
18c	"	No pressure	None
18Ac	"	Pressure 20 after 30 secs.	Slight
		Pressure 100 after 2 min.	None
19c	Cement-sand	No pressure	None
19Ac	"	Pressure 100 after 2 min.	None
20c	"	No pressure	None
20Ac	"	Pressure 20 after 30 secs.	None
		Pressure 100 after 2 min.	None

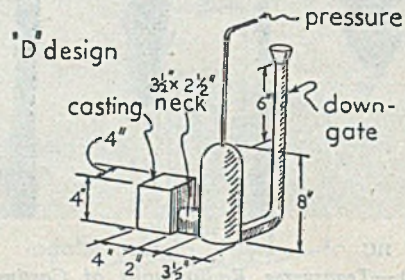


FIG. 12.—Design "D" Experimental Casting.

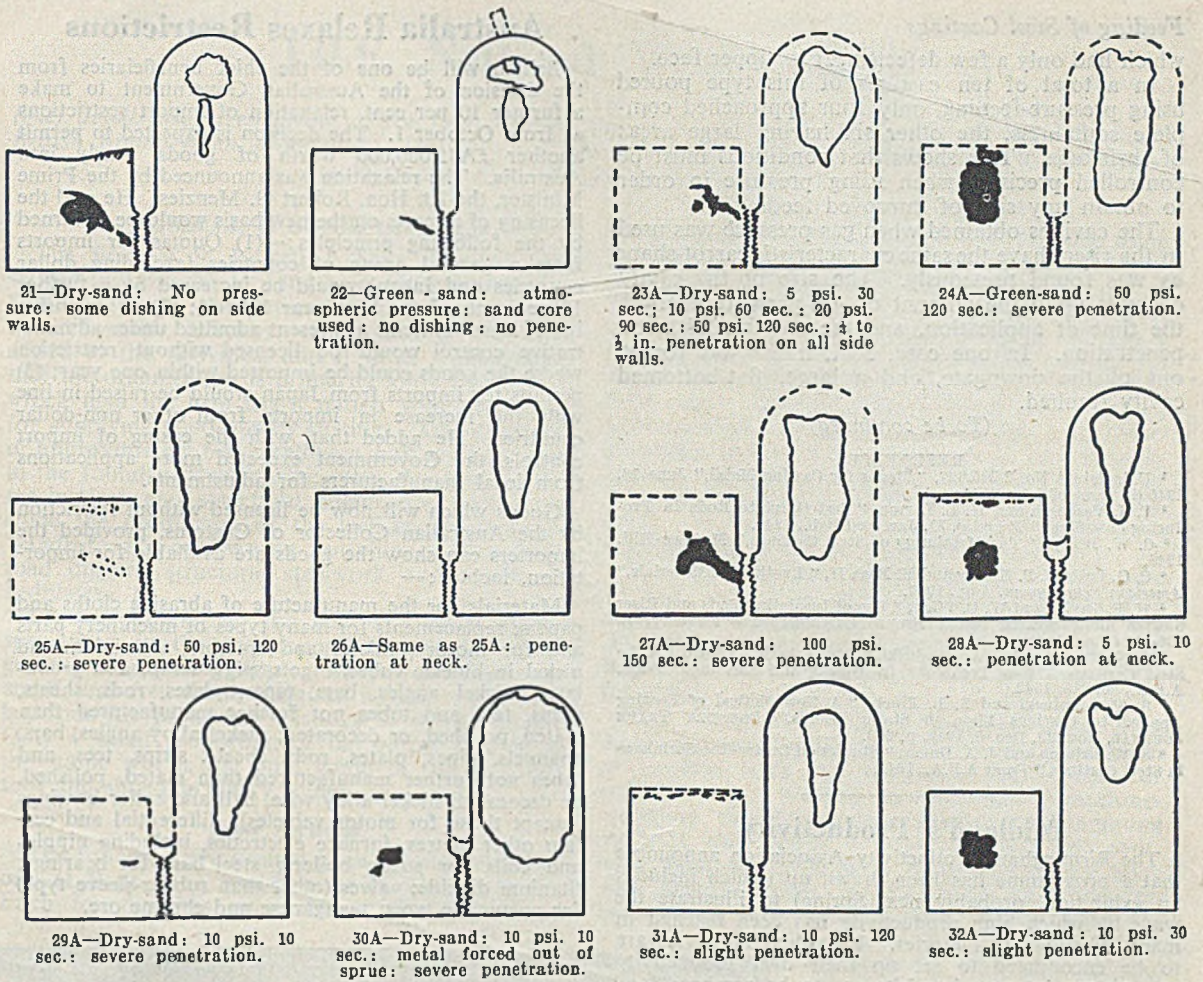


Fig. 13.—Sketches of Transverse Radiographs of "D" Design. Dotted lines indicate Areas of Metal Penetration. Solid Black Areas show Shrinkage in the Casting. Outlined Areas show Shrinkage in the Riser.

from the central portion of the cube with a mechanical saw.

Sketches of riser cavities and of casting sections reproduced from the transverse radiographs, along with brief descriptions of the conditions used for this series of tests, are given in Fig. 13. The defects were accurately scaled down from the original radiographs of the sections. Dotted lines shown in the sketches on the casting or riser indicate penetration of metal into the sand in that region; when dotted lines are shown about the neck, they indicate that the pressure has forced the metal to bridge across the sand gap just above the neck.

In casting No. 21, where the blind riser was used without a core or without pressure from any external source, a large shrink developed in the casting. After the ingate had frozen off and a skin of metal had formed in the riser and casting, the partial vacuum within the system and the force of atmospheric pressure from the outside caused a

"dishing" or indentation effect upon the faces of the cube.

The insertion of a vertical sand core in the blind riser (casting No. 22), allowing atmospheric pressure to exert its effect, greatly improved the casting, although the cope defect was not eliminated. Metal penetrated into the sand at some place in the system in every case in which gas-pressure was applied, regardless of whether green- or dry-sand moulds were used. In some cases, metal bridged across the sand gap and caused penetration at the neck, even though there was 2 in. of sand between the riser and the casting. More penetration was found in green- than in dry-sand moulds, as was expected.

In several of the pressure-fed castings, the radiographs show very little shrinkage. Casting 25A, made with 50 lb. per sq. in. pressure applied 2 min. after pouring, showed very little shrinkage, although penetration was severe. With a pressure of 10 lb. per sq. in. after 2 min., a casting resulted (31A)

### Feeding of Steel Castings

which had only a few defects near its upper face.

In a total of ten castings of this type poured using pressure-feeding, only four approached complete soundness, the other six having large areas of shrinkage. This shows that conditions must be controlled precisely when using pressure in order to obtain any sign of improved feeding.

The cavities obtained when gas pressure was used in the risers have the same characteristic carrot-shape as was found previously. The size of the cavity depends upon the amount of gas-pressure exerted, the time of application, and the amount of metal penetration. In one case, 30A, metal was forced out of the downgate, and a large, flat-bottomed cavity resulted.

(To be continued)

#### REFERENCES

- <sup>1</sup> U.S. Patent No. 2,205,327, "Means for Casting Metal," June 18, 1940 (in name of John Williams).
- <sup>2</sup> F. J. Vosburgh and H. L. Larson, "Test Graphite Rods in Producing Cast Steel," *Foundry*, 72, Jan. and Feb., 1944.
- <sup>3</sup> C. W. Briggs, "The Metallurgy of Steel Castings," McGraw-Hill, 1946.
- <sup>4</sup> C. G. Tutts, J. P. Hickey and M. Boeh II, "Exothermic Materials," *American Foundryman*, Aug., 1940.
- <sup>5</sup> H. F. Taylor and W. C. Wick, "Use of Insulating Pads and Riser Sleeves for Producing Sound Bronze Castings," *The Foundry*, 73 106-111 (Nov., 1945).
- <sup>6</sup> H. F. Taylor and E. A. Rominski, "Atmospheric Pressure and the Steel Casting—A New Technique in Gating and Riserling," *Trans. A.F.A.*, 50, 215, 1942.
- <sup>7</sup> S. T. Jazwinski and S. L. Finch, "A New Method of Feeding Applied to Castings Made in Static Moulds," *FOUNDRY TRADE JOURNAL*, Nov. 29, Dec. 6, 1945, p. 269.
- <sup>8</sup> S. W. Brisson and J. A. Duma, "Studies on Centre-line Shrinkage in Steel Castings," *Trans A.F.A.*, 1942.

### Midland's Productivity

The Birmingham Productivity Association announces that a programme has been drawn up (which includes an exhibition, probably next Spring) to illustrate the ways by which high productivity has been reached in many Birmingham factories. Individual industries are to be encouraged to set up their own productivity committees, inter-works visits are to be arranged, and the Association will help management, technical and scientific bodies to serve their members and recruit new members.

Individuals are to be encouraged to give advice in their own special fields by becoming associates of the organization and members of an advisory panel of specialists. A "clearing house" to deal with questions on productivity problems is to be set up at the Birmingham Chamber of Commerce, where the Association will have an office and permanent staff. A number of firms are already giving the Association financial help to supplement the small grant it receives from the British Productivity Council.

### Film Review

"The Stockton Test."—This short film has been produced by Allied Ironfounders Limited to illustrate how reasonably well-built sub-standard houses can be converted into decent little homes by the installation of modern heating, washing, bathing and cooking appliances. The producer of the film was lucky in having Mr. W. T. Wren as the representative of the enlightened landlords, as he is so obviously "at home" on the screen, but he was not so fortunate in the other characters (with one quite good exception—"grandma") as it just so happened that they were not natural actors. Nevertheless, the message of the film rose superior to the cast and was incisive in its presentation.

### Australia Relaxes Restrictions

Britain will be one of the chief beneficiaries from the decision of the Australian Government to make a further 10 per cent. relaxation of import restrictions as from October 1. The decision is expected to permit another £A45,000,000 worth of goods yearly into Australia. The relaxation was announced by the Prime Minister, the Rt. Hon. Robert G. Menzies. He said the licensing of imports on the new basis would be governed by the following principles:—(1) Quotas for imports from a general group of countries (excluding dollar countries and Japan) would be increased by a further 10 per cent. of the base year 1950-51; (2) an extensive list of essential items at present admitted under administrative control would be licensed without restriction where the goods could be imported within one year; (3) permits for imports from Japan would be raised in line with the increase in imports from other non-dollar countries. He added that, with the easing of import controls, the Government expected more applications from local manufacturers for adjustments.

Goods which will now be licensed without restriction by the Australian Collector of Customs, provided the importers can show the goods are available for importation, include:—

Materials for the manufacture of abrasive cloths and papers; replacements for many types of machinery parts and for motor vehicles and tractors; aluminium and nickel in blocks, cubes, ingots, pigs, scrap, and granulated, nickel angles, bars, pipes, plates, rods, sheets, strips, tees and tubes not further manufactured than plated, polished, or decorated; nickel alloy angles, bars, channels, pipes, plates, rods, sheets, strips, tees, and tubes not further manufactured than plated, polished, or decorated; nickel alloy wire, ball and roller bearings (except those for motor vehicles); differential and certain other metres, furnace electrodes, including nipples and coils for sugar boilers; steel balls for bearings; titanium dioxide; valves (other than rubber-sleeve type) for pneumatic tyres; manganese and chrome ore.

### U.K. Trade in August

Exports from the United Kingdom in August, which contained only 25 working days and was affected by industrial holidays, were valued at £198,100,000; imports were also low, at £249,200,000. The best comparison with earlier periods is obtained by taking July and August together. The average of exports for the two months was £216,300,000, compared with an average of £210,000,000 in the second quarter of the year and £208,500,000 in the first. The average of imports, £271,100,000, was 7 per cent. lower than the level of the second quarter and slightly below the level of the first quarter.

Re-exports in August totalled £8,800,000 and the excess of imports (c.i.f.) over exports and re-exports (f.o.b.) was £42,300,000. In July and August the excess averaged £46,200,000.

U.K. exports to North America in August declined to a provisional total of £24,500,000, exports to Canada accounting for £11,800,000 and exports to the U.S.A. for £12,700,000. The average for July and August together, at £27,300,000, was 8 per cent. below the level of the second quarter, although well above that of the first quarter. Exports to the U.S.A. in July and August were maintained at the second quarter's average of £13,900,000, but exports to Canada averaged £13,300,000 a month, 15 per cent. below the high level of the second quarter.



## I.B.F. National Works Visits

Brief details are given below of the four other foundries to be visited by parties of the Institute of British Foundrymen to-morrow. Particulars of the remainder of the foundries which are to receive members were given in last week's JOURNAL.

### S. RUSSELL & SONS, LIMITED

The firm of S. Russell & Sons, Limited, was started in Leicester in 1864 as a brass foundry by Samuel Russell, grandfather of the present generation of senior directors. Ironfounding was soon added to the activities, and it is as ironfounders that the organization is primarily known to-day, in which field the firm has a nation wide reputation for supplying good-quality castings. Out of a total of approximately 600 employees, half are employed in the foundry departments; other departments are mechanical and structural engineering (which include the production of the well-known range of "Hydrofeed" cold-sawing machines), couplings, road diggers, structural steelwork and fabricated bedplates.

In their foundries, the company have always specialized in the production of castings for the general engineering trade, where quantities are small, and even the mechanized section is primarily laid out for producing castings in small batches. Only a small proportion of the output is used in the home works, the bulk going to the machine-tool and shoe-machinery trades.

#### Four Sections

The foundries are located in two separate works, one at Bath Lane, and one at Bonchurch Street. Each foundry has two sections; the Bath Lane

foundries consist of: (a) A general foundry using the normal methods of production for hand-moulded castings ranging from a few ozs. up to 2 tons in weight, by green- and dry-sand processes, the metal being melted by a cupola, and (b) a foundry devoted to making alloy-iron castings for which the metal is melted by a 1-ton creosote-pitch-fired rotary furnace. This foundry uses ordinary hand-moulding methods, but also has a machine-moulding section. The products of this foundry include high-duty cast irons up to 24 tons per sq. in. tensile, Ni-Resist, Ni-Hard and other compositions. A basic-lined cupola has recently been installed, but is still in the experimental stage.

The company are licensees for the manufacture of S.-g. cast iron, and rapid strides are being made in its production. Also at Bath Lane are situated a well-equipped laboratory, a test house and heat-treatment shop. These serve the whole of the foundries.

The Bonchurch Street foundries have been developed over the last 30 years for the production of castings with the minimum employment of skilled labour. Starting as an ordinary machine-moulding foundry, using mainly hand-ramming methods, this section is now equipped with overhead sand distribution, a fully-mechanized floor with nine machines, making boxes up to 16- by 14-in., and a semi-mechanized section with six machines making boxes up to 46- by 28-in. The coreshop contains core-blowers, and the layout of the fettling department is of special interest to visitors. Unit-type synthetic sand and resin-bonded cores are used throughout this section.

The other section at Bonchurch Street is concerned with making machine-tool castings which are too large for the mechanized plant, and which may go up to 2-tons each. Here all the moulds are made by a travelling impellor-type ramming machine (Fig. 12), with automatic sand feed. The moulds are dried at present completely, but experimental plant for skin drying is installed. The whole of the Bonchurch Street foundry is supplied with metal from a pair of 36-in. dia. cupolas, running all day (alternately). The charge collection method and weighing system here is worthy of particular examination by the visiting party.

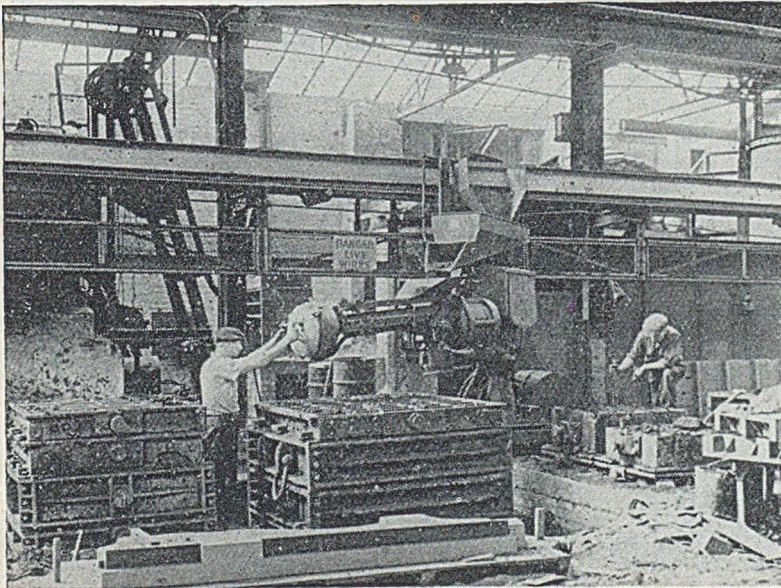


FIG. 12.—Motive-type Impellor Ramming Machine for Heavy Moulds at the Bonchurch Street Foundry of S. Russell & Sons, Limited.

### LLOYDS (BURTON), LIMITED

Lloyds (Burton) Limited is a subsidiary company of F. H. Lloyd & Company Limited, of Darlaston. The foundry was built by the Ministry of Supply during the last war for the casting of carbon and manganese steels but was not used as such until early in 1945. For two years, the production was entirely devoted to steel, but in 1947 it was decided to change to high-duty irons. The market trends have again dictated a change and at present high-duty and spheroidal-graphite irons, and alloy- and carbon-steel castings are being manufactured.

The melting plant consists essentially of (a) two 6-tons per hour cupolas with tilting receivers for the high-duty irons (Fig. 13), and (b) one 3½-ton electric-arc furnace for steel castings (Fig. 14), and one Tropenas converter for use as a stand-by. Metal is transported by monorail or overhead crane to the casting point, in bottom-pour ladles for steel and in teapot-spout ladles for the iron.

#### Moulding and Coremaking

The moulding sand is knocked out over Sterling shakers (Fig. 15), and carried by belt conveyors through magnetic separators and screen to a desilting plant, where it is cooled and the "fines" are drawn out. From here it passes through storage hoppers to the Simpson mills and then through a "Royer" to the moulding machines. The moulding machines are mainly of the shockless jolt-squeeze type for pin-lift moulds, with Pneulec roll-overs and an impellor/rammer for the heavier boxes. All moulds are transported on roller con-

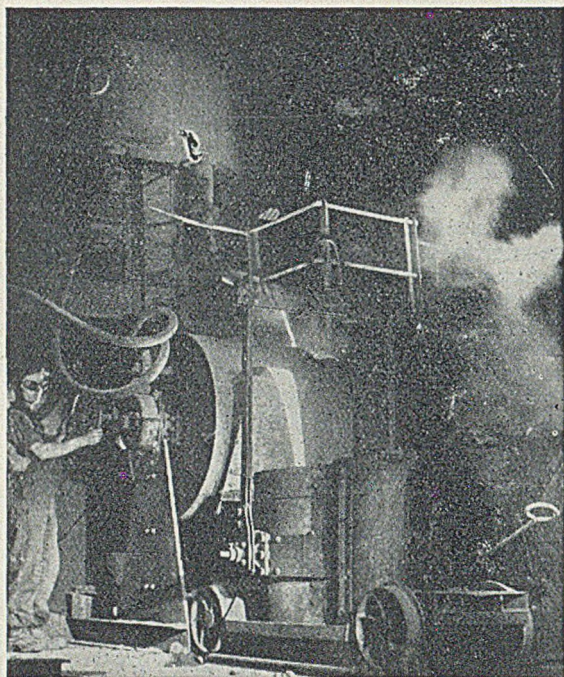


FIG. 13.—Metal being delivered from the Cupola to a Barrel-type Receiver and in turn to a Teapot Ladle at Lloyds (Burton), Limited.

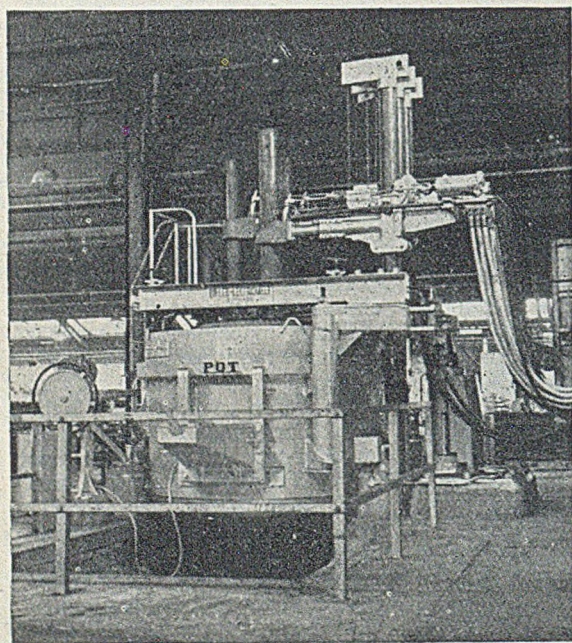


FIG. 14.—Electric-arc Furnace for Steel Melting at Lloyds' Foundry.

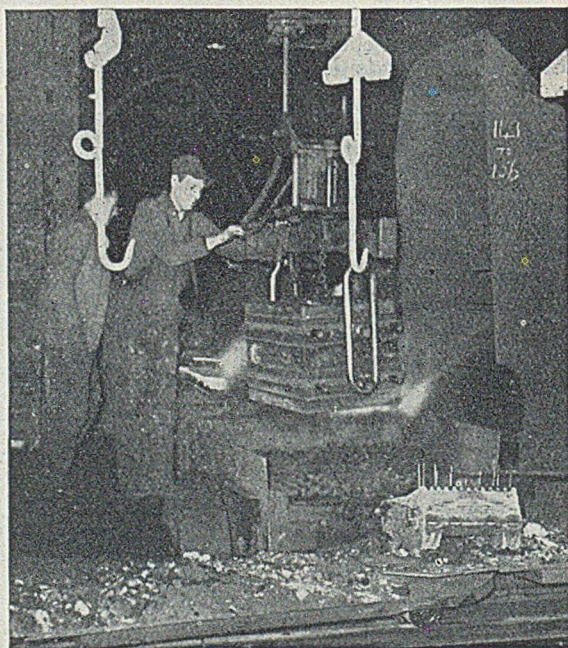
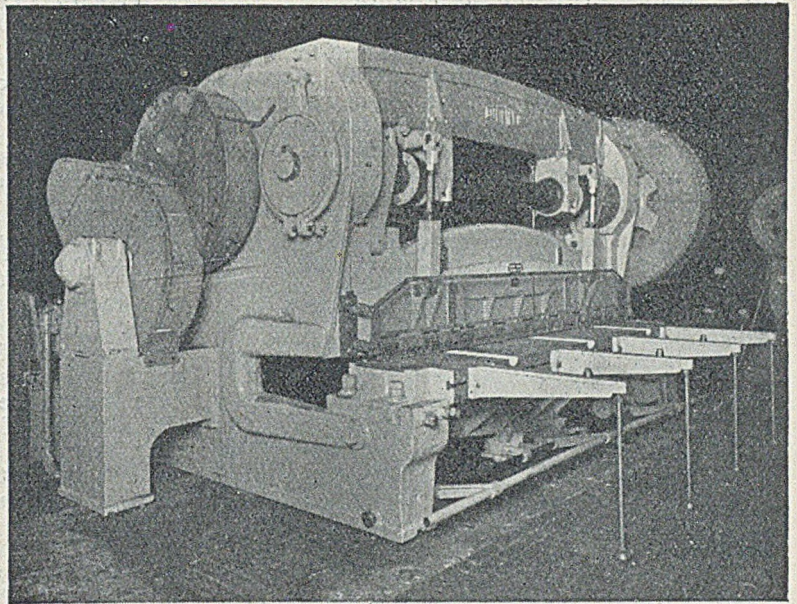


FIG. 15.—One of the Knock-out Points at Lloyds, showing the Side Exhaust. In the foreground are Hooks of the Pendulum-type Casting Conveyor.

FIG. 17.—Guillotine Shears, capacity 11 ft. by  $\frac{3}{4}$  in., manufactured by the Butterley Company for New Zealand. This Job, which weighs 30 tons, is representative of the Firm's Products.



veyors and after casting are lifted by a "humper" from which they run by gravity to the shake-out.

The core-shop has undergone a major change in the last few years and the majority of the cores are now being blown. Women operate most of the core-blowers and have acquired a very high degree of skill. The cores are carried to the vertical, tray-type core-stoves by a pallet conveyor, which also returns the core plates and drying shells to the operators. Castings are taken from the shake-out by pallet conveyor and after cooling are carried by a pendulum conveyor (Fig. 16) into a Wheelabrator chamber where they are shot-blasted by four impellor wheels while revolving slowly. After grinding and chipping, the steel castings are heat-treated in a bogie-hearth furnace fitted with quenching tank, and are then inspected, ready for transport.

Castings in iron and steel of up to 3½ tons have been made in the foundry for use in the automobile, agricultural and general-engineering industries, and quantity production or jobbing work is equally catered for. Reorganization and expansion is taking place continually and plans are in hand for installing addition sand plant, extending the core-shops and main foundry bays, erecting a shell-

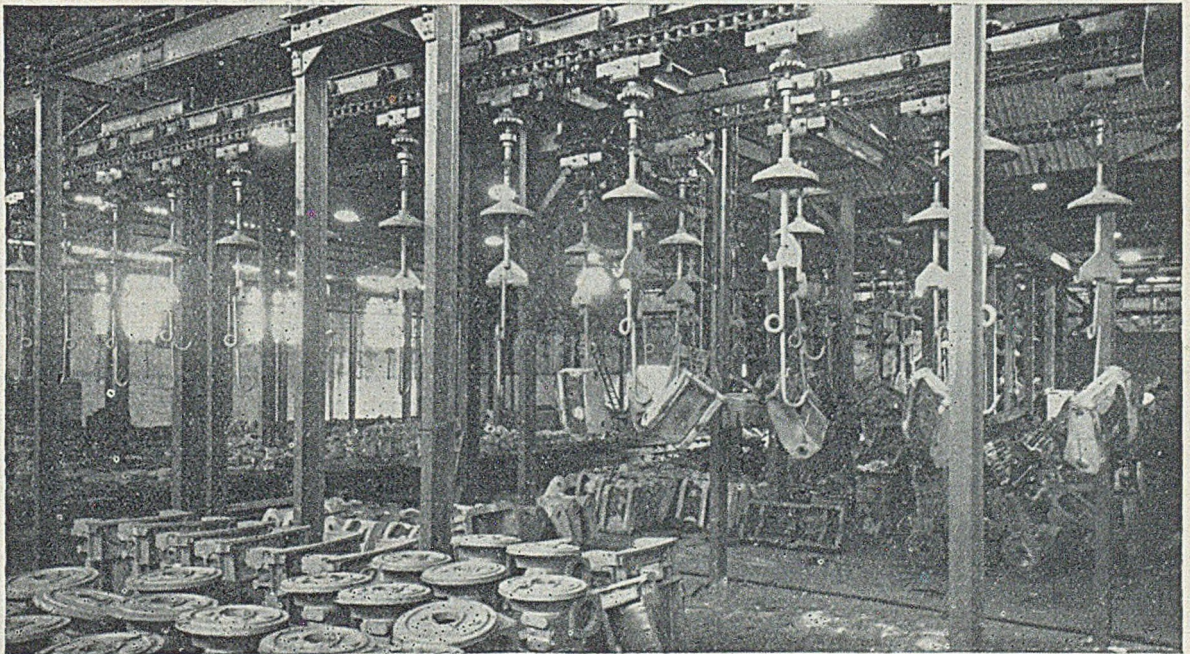


FIG. 16.—View of Part of the Pendulum Conveyor at Lloyds, taking Cooled Castings continuously through the Wheelabrator Chamber.

*I.B.F. Works Visit—Lloyds Limited*

moulding shop, installing additional heat-treatment stoves and increasing machining capacity. Approximately 500 workers are employed on day and night shift, and are provided with adequate canteen, washing and shower-bath facilities, whilst first-class sports field and other recreational facilities are also provided.

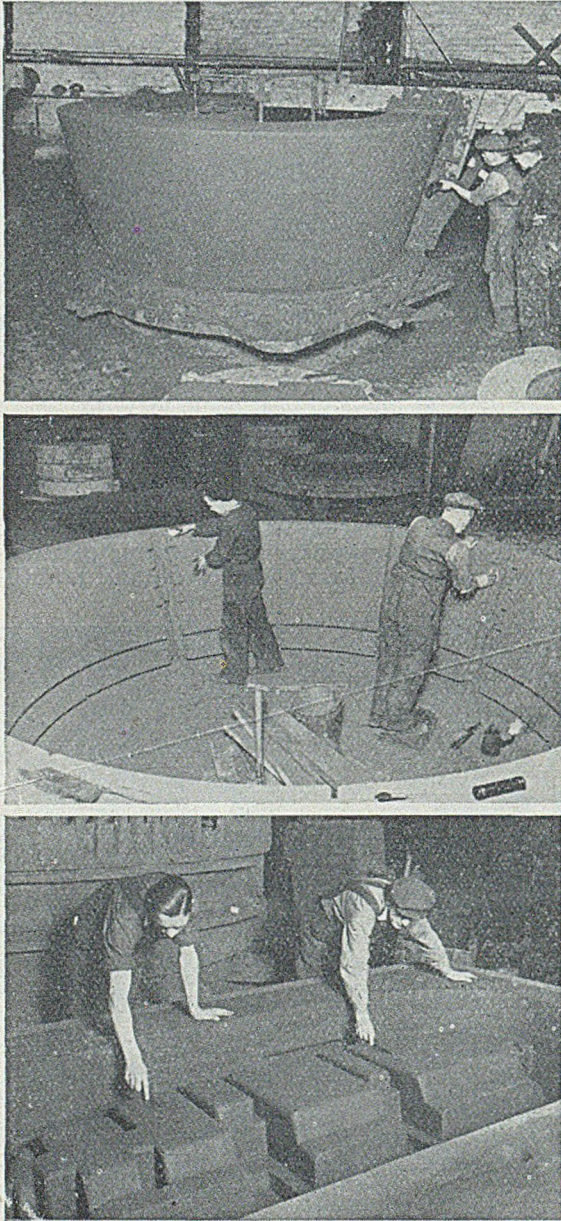


FIG. 18.—Views of Three Large Moulds in the Course of Construction at Butterley Foundry. In each case, a Young Apprentice is working with and receiving instruction from a Highly-skilled Moulder.

**THE BUTTERLEY COMPANY LIMITED**

The Butterley Company was founded in 1790 to operate coal workings on the Butterley estate, then recently acquired by Francis Beresford and Benjamin Outram. Two years later the Butterley Ironworks were erected, and at the beginning of the 19th century had already reached considerable proportions. The original members of the company were Benjamin Outram, William Jessop, Francis Beresford, and John Wright. Outram spent his life in the construction of roads, canals, and railways (*i.e.*, wagon-ways where, to facilitate its passage, the wagon ran on some form of smooth, hard surface), by substituting his own invention of the flanged plate of cast iron for the wooden ways previously in use, so that the flat wagon wheels were kept to the track. Jessop, of Butterley Hall, the engineer of the Cromford Canal, improved upon Outram's invention in his edge rail, which was introduced to avoid the objection to Outram's outstanding flanges where a road was crossed. Jessop reversed Outram's system, attaching the flange to the wheel, so inventing the flanged railway wheel which is now standard practice throughout the railways of the world. Both Outram and Jessop were close associates of Telford in many enterprises, notably the Shropshire Canals, with their famous cast-iron aqueducts, in the Caledonian Canal, and in a project to replace the old London Bridge by an iron bridge with a single span of 600 ft., and in inventions concerning pipes for conveying water. Wright, another of the founder members of the company, took a part in another transport development—the steam railway.

**Notable Work**

The mid-years of the century saw a considerable growth both of the plant and the scale of its products. In 1833 a record of the locality states that the employees of the company then numbered 1,500. At the Great Exhibition of 1851 were exhibited rails of 75 lb. section and 108 ft. long, and at about the same period iron beam-plates were made 7 ft. wide, 30 ft. long, and 2½ in. thick—no mean achievements for their day. The early association of The Butterley Company with all forms of transport has been reflected in many of its notable engineering feats. Among these are the cast-iron work for (the first) Vauxhall Bridge, the great roof over the quay and other work at the West India Docks; bridges and lock-gates of the Caledonian Canal; cast-iron work for the dock-yard of Sheerness, and for the harbours and docks at Dublin and Leith. Butterley also produced the large main pipe for Edinburgh's early water and gas undertakings. Pipes laid in Stamford in 1825 were raised for inspection 111 years later and found to be perfect. The famous roof of St. Pancras Station stands out as a unique achievement of the firm. The company made important contributions to many war-time engineering and constructional feats, including products ranging from gun carriages and mountings to track links for tanks, 150-ft. span bridges, and

trench mortar bombs. It is noteworthy that both cannon and cannon balls were produced for the Crimean war.

#### Present-day Activities

By the nationalization of the company's extensive colliery undertakings a few years ago, the company suffered a severe curtailment of some of its activities, but in the outcome this released energies and funds which were soon directed into other channels, by developing a number of subsidiary and associated undertakings, including Hughes & Lancaster, Limited; Butterley-Goodall, agricultural machinery; Bradley & Craven, sheet-metal machinery; and the acquisition of Kelvin Construction Company, Limited, Glasgow, and A. H. Causer, Limited, Leamington Spa. The company's latest development of great interest to foundrymen is the acquisition of the manufacturing licence for oxygen generating plant from Air Products, Inc., of Allentown, Pa., U.S. The licence covers the supply of oxygen generators to the British Commonwealth and certain European countries. Many bulk users of oxygen in the United States produce their own supplies.

The company to-day has approximately 3,500 employees. In addition to the newer enterprises just described, the main engineering works at Butterley, near Derby, comprise iron foundries for the manufacture of castings up to 20 tons in weight (Fig. 18) and a modern mechanized foundry capable of high output of smaller castings. The products of the iron foundries include hydraulic-press castings and other pressure-resisting castings, chemical

and civil engineering castings, compressors, and large castings for turbine and other mechanical plant. The company are licensees of the Meehanite process. In this same plant are also made "Tri-pedal" unit system of cast-iron flooring tiles.

In the associated machine-shops at Butterley, the manufacture of electric overhead travelling cranes, colliery haulage gears, and also the machining of large castings and mechanical equipment are carried out. Some of the machine tools are of large size and can machine castings and welded fabrications which are beyond the capacity of the customers' machine-shops (Fig. 17).

#### G. PERRY & SONS, LIMITED

The patternmaking business of G. Perry & Sons, Limited, was founded in Leicester in 1889 by George Perry, and over sixty-five years it has developed from a one-man business to a company employing two hundred craftsmen making all types of foundry patterns. It is the policy of the company to undertake all classes of patterns, large and small, in wood or metal. The foundrymen's visit will be to the main works at Hall Lane, Leicester, where one hundred and fifty men are employed over a floor space of approximately 50,000 sq. ft.

At these works will be seen all types of wood and metal patterns in course of construction. Pine patterns for all types of castings will be on view (Fig. 19) and one bay of the factory has been specially constructed to cope with the very largest patterns—a pattern recently made was for a casting weighing over 150 tons. Also, mahogany patterns for the aircraft, motor and other industries are well catered for. In particular the visitors will

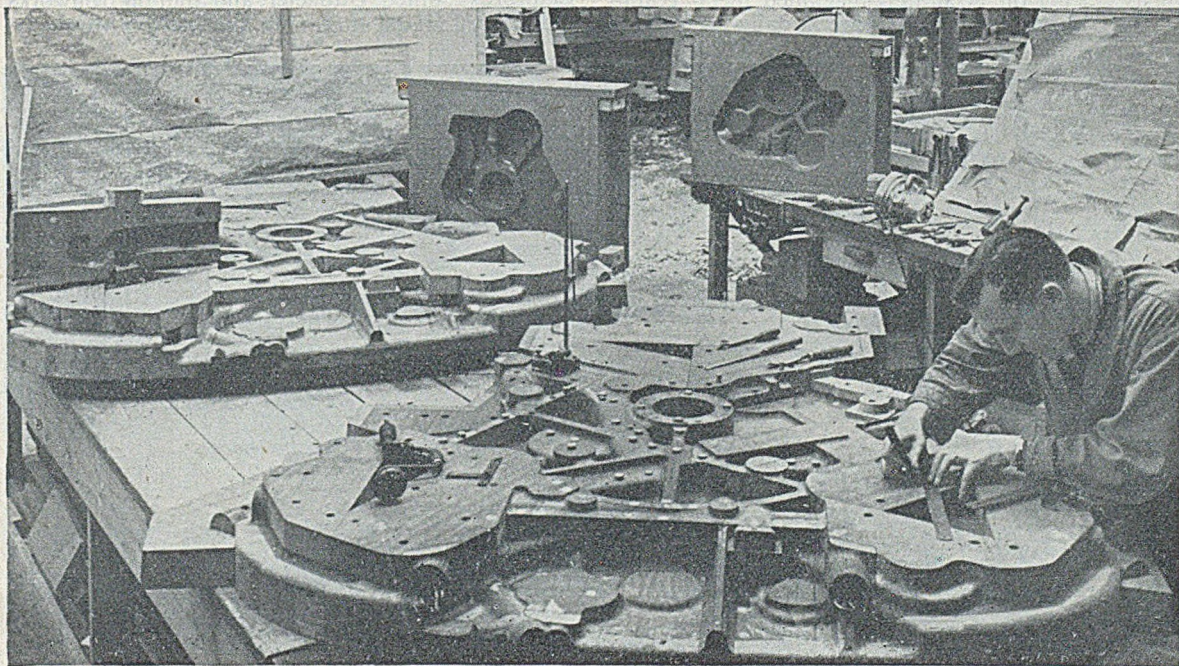


FIG. 19.—Large Pine Pattern and Corebox in the Course of Manufacture at Perry's Hall Lane Works.

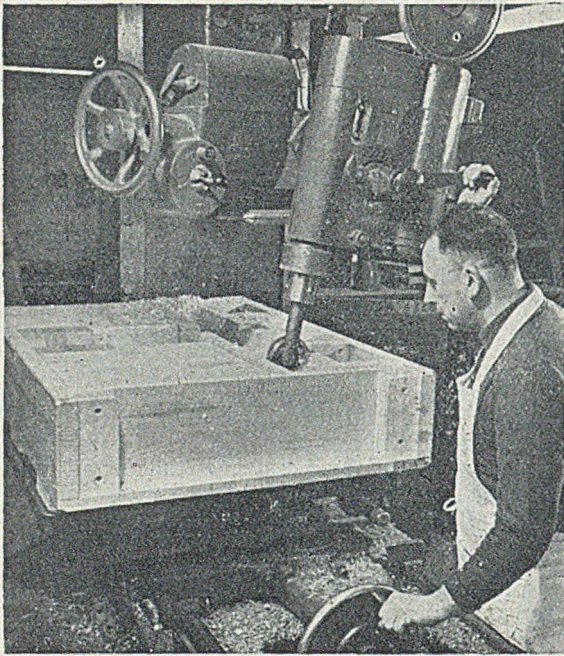


FIG. 20.—Wadkin Pattern Miller engaged on a Corebox at the Works of G. Perry & Sons, Leicester.

see how extensively modern wood-working machinery is used (Fig. 20).

Approximately half the capacity of the works is devoted to the making of metal patterns, the emphasis being on accurately-machined metal equipment. Forty machine-tools are in daily use making

equipment in cast iron or aluminium. Fig. 21 shows a copying machine at work following the contour of a wooden model. More recently a proportion of this work has been designed for shell moulding.

#### Own Foundries

Nearby, the company runs two small foundries—a sand foundry for making aluminium pattern castings and a pressure-casting foundry for making pressure-cast patternplates. These foundries will not be visited on this occasion, but the various types of pressure-cast plates will be seen in the metal patternshop being checked, drilled and generally inspected before despatch. The company also has two smaller patternshops in the centre of the city, about three miles away, but there will not be time for these to receive a visit.

The main Hall Lane factory is sectionalized into groups for the various classes of work undertaken, each under separate foremen. The men in these groups, along with their foremen, have been trained particularly for that certain type of work. There is a separate inspection and finishing department, where fully-qualified operators check all completed pattern equipment. In the well-equipped works canteen, it is expected to entertain the visiting foundrymen to luncheon.

**Other foundries to be visited.** The five other foundries to be visited by parties of members of the Institute on October 2 are:—Herbert Morris Limited, Loughborough; Ley's Malleable Castings Company Limited, Derby; Qualcast Limited, Derby; Bamfords Limited, Uttoxeter; and Stanton Ironworks Company Limited at Stanton and Melton Mowbray.

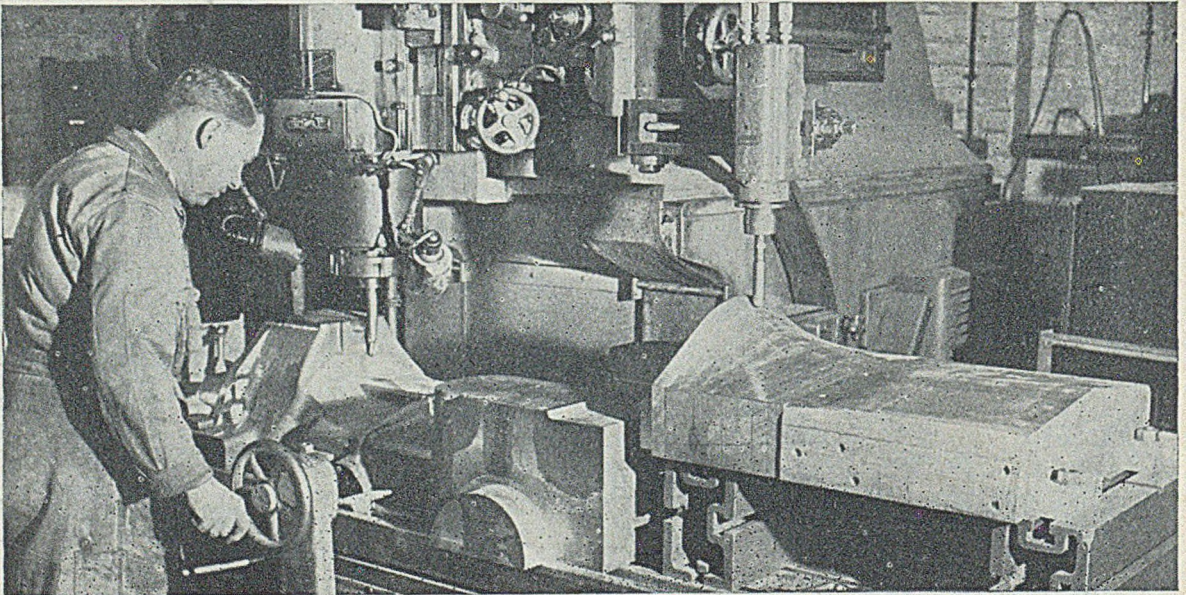


FIG. 21.—Cast-iron Pattern being machined by Copying from a Wooden Model at Perry's. This Half-pattern and its Moulding Plate weighed One Ton when completed.

## Notable Steel Castings

Three out-of-the-ordinary steel castings which are currently in the news are illustrated in this article. Size, complexity and novelty of purpose are the special features revealed. The castings described well substantiate the contention that a modern trend is for designers to specify still larger and more complicated castings, making even more exacting demands upon the ingenuity of the steelfounder.

### Difficult Mine Casting

Details of the first two castings were given by Usines Emile Henricot, of Court St. Etienne, Belgium. Fig. 1, which was kindly supplied by the Editor of *La Fonderie* (Belgium), shows a sealing door made from steelcastings. Here it is understood that concrete is normally used for such purposes in the coal-mining monopoly. The casting illustrated is shown during erection and the door is employed in cases of a sudden inrush of water into the mine to isolate the workings thereby abandoned, so that the rest of the vital parts of the pit can be protected from flooding, much as a bulkhead door is employed in ship construction. The casting, which is provided with a doorway 4 ft. 7 in. by 6 ft. 6 in., is designed to withstand a 1,300-ft. head of water. It is made up of a frame of four separate castings and a combined shutter strongly ribbed on the side not shown in the illustration. The thickness of the door is one inch. The joint-tightness between the shutter and the frame is assured by casting lead into the groove of the frame. Under test, this method has proved entirely efficacious.

### Assembly

The four castings of the frame are assembled by bolting, using  $\frac{1}{4}$ -in. sheet lead between the contact faces, so that seepage may be stopped, as this could come about through the concrete in which the door is almost completely embedded. So as to help the rapid installation of the seal in case of need, it is provided with double hinges on which it pivots. Four screws are used to lock the door at the start of the damage, when the volume of water is insufficient to ensure pressure-tightness of the joint.

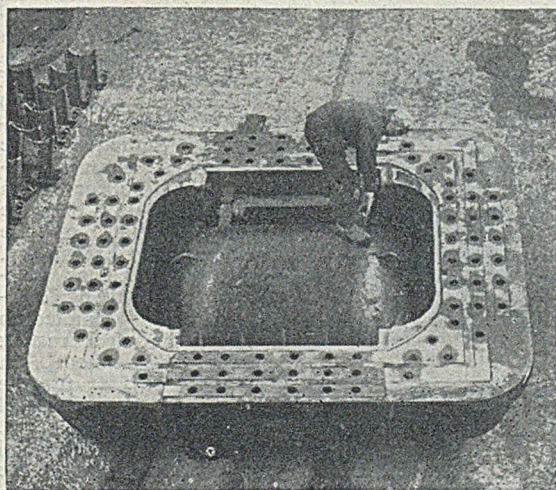


FIG. 1.—Steel Sealing-door Assembly for use in a Coal Mine, size 4 ft. 7 in. by 6 ft. 6 in. and designed to withstand 1,300 ft. head of water.

The steel used, made in the electric furnace, has a breaking strength of 31.7 to 34.9 tons per sq. in., an elastic limit of 19.0 to 20.0 tons per sq. in., and a minimum shock resisting strength of 10 kgs. per sq. cm. under Mesnager-type testing.

In spite of the difficulties associated with the moulding of such an assembly, the pressure tests carried out in the works revealed no porosity in the walls. Designed and carried out by the steel foundry to the wishes of the client, this door is a good example of the co-operation between the research staff and the foundry personnel—a condition which nowadays should invariably exist.

### Bathyscaphe Castings

The French Bathyscaphe, illustrated in Fig. 2, was manufactured in 1947 for the first attempts of Professor Piccard. The depth attained of 2,100 m. (6,400 ft.) proves sufficiently that the casting was perfectly sound and watertight. The Bathyscaphe weighs about 13 tons and was manufactured in two halves in special alloyed steel of Cr/Ni/Mo, self-hardening type. This steel, known under the name of "Infatigable," is manufactured by Usines Emile Henricot, under licence of the French firm, Société Delachaux. This metal had to give a very high tensile strength with sufficient ductility, but in this particular case, perfect homogeneity of the casting was the most important feature.

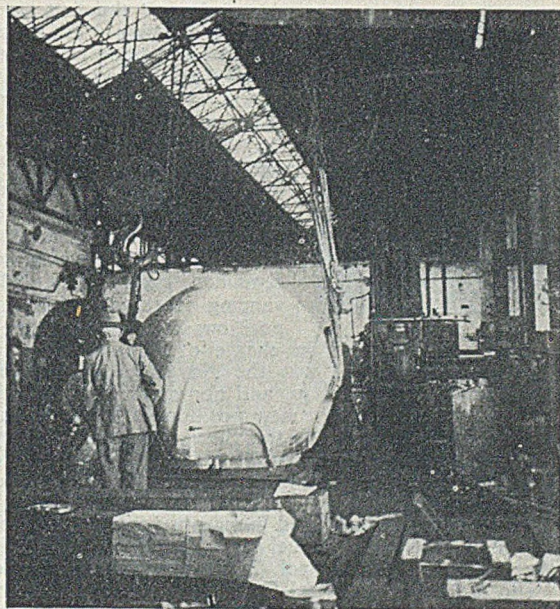
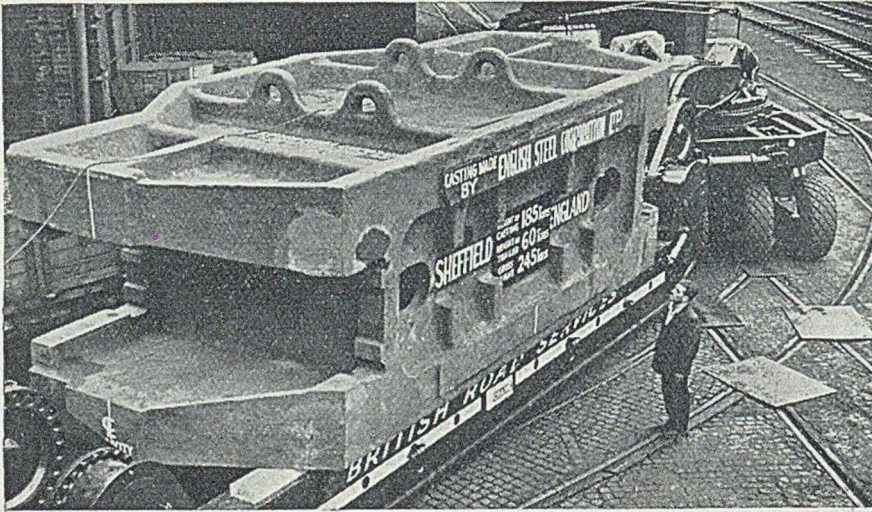


FIG. 2.—The Bathyscaphe, manufactured for Professor Piccard, weighing about 13 tons, pictured leaving the works of Usines Emile Henricot in 1947.

### Notable Steel Castings

Manufacturing control was, of course, very strict, and radiographic examination was used to prove that in spite of the difficulty of casting the half spheres, they were perfect. The thickness of the casting varied from 90 mm. (3½ in.) to 150 mm. (6 in.) where the holes were located. Preliminary tests made on small-scale castings had shown the correlation of theoretical calculations and practical results.



Manufacturing processes were followed with utmost care by the firm which succeeded in manufacturing a casting of accurate shape and which machined well.

### Mammoth Steel Casting

The mammoth steel casting, illustrated in Fig. 3, weighs 185 tons, and is believed to be the largest ever made in Britain. It was made at the Grimesthorpe Foundry of the English Steel Corporation and is for export to America, where it will be built into a 35,000-ton press. It is the first of four castings of the same size, and in addition the order covers two 164-ton castings and two smaller ones.

FIG. 3.—Britain's Heaviest Steel Casting, 185 tons, is illustrated here, leaving the Grimesthorpe Foundry of the English Steel Corporation, Limited, Sheffield.

### Conference Paper Authors

Charles Willers Briggs, joint Author of the Paper "Feeding of Steel Castings at Pressures Higher than Atmospheric," the first part of which appears in this issue, received his formal education at Stanford University, California, after which he became research metallurgist for the Standard Oil Company of California. He left this position to become a member of the staff of the Naval Research Laboratory, Washington, D.C., where he remained eight years, advancing through different positions to senior physical metallurgist. He was in charge of the steel casting research section, and was the Navy's consultant on steelmaking, steel castings, and non-destructive testing. In 1938, he accepted the new position of the technical and research director of the Steel Founders' Society of America, the trade association of the industry. He is an officer of the Society, and directs all of its technical activities.



Mr. Briggs has published numerous technical articles on subjects relating to steel-casting production. He is the author of the "Steel Castings Handbook" and "The Metallurgy of Steel Castings," and has an international reputation in the field of steel foundry technology. He has received the McFadden Gold Medal of the American Foundrymen's Society, the Mehl Gold Medal of the Non-Destructive Testing Society, and the Electric Furnace Steel Conference Award of the

American Institute of Mining and Metallurgical Engineers. He is a member of the American Institute of Mining and Metallurgical Engineers, American Society of Metals, American Foundrymen's Society, American Society for Testing Materials, American Society of Mechanical Engineers, the Society of Naval Engineers, and the Non-Destructive Testing Society.

Professor H. F. Taylor, M.I.B.F., joint Author with Mr. Briggs, was born in 1913, and received his technical education at Michigan State College, where he was awarded the degrees of B.S. (Chemical Engineering) and M.S. (Metallurgical Engineering). Subsequently, he was employed as an instructor at the College from 1936 to 1937. In 1937, he joined the staff of the Naval Research Laboratory, Washington, D.C., as assistant to the welding engineer, and was promoted to head of the steel casting research department in



1938, which position he relinquished in 1945 to take the appointment of associate professor of Mechanical Metallurgy at Massachusetts Institute of Technology. In 1952, he was promoted professor of Mechanical Metallurgy. Professor Taylor, who has received the Distinguished Civilian Service Award (Joint Army-Navy), is the author of many papers, and in 1945 was awarded the Simpson Medal by the American Foundrymen's Society. He is a member of a number of American metallurgical societies.



# Templates in Patternmaking

By F. H. Wakeham

The use of templates on certain types of patterns is essential to obtain accurately the shape given on a blueprint. In the case of the casting shown at Fig. 1, great care must be exercised, not only in the use of the template, but also in the handling of the patternmaking tools, for one reckless cut may undo two or three hours' work, and a repair to such a pattern is not very satisfactory. Especially is this so if the pattern is to be mounted on a moulding-machine plate, where the bumping it will receive may soon loosen an inlaid piece until it stands above or below the true profile.

In the example shown, the pattern is parted through the centre and moulded in a two-part box. The pattern in the first instance is formed of two blocks of timber dowelled together, and the views as marked out on the layout board are transferred to the respective faces of the pattern, thus giving the position where the pattern has to be cut down to the various levels—parallel to the pattern joint. Once the levels are cut, the shape of the bosses and ribs can be scribed in their respective positions. Such bosses and ribs are better left until the main profile, as shown in the section drawing at *AA*, is cut down by means of the template.

The carving of the shape should be carefully executed and the template used frequently until it finally touches all points of the pattern and at the same time coincides with the joint line of the pattern. The template, in all the operations, should be worked backwards and forwards parallel to the centre line of the bore, so ensuring a profile which is parallel at all points to the pattern joint. Furthermore, the template

should be crayoned or chalked frequently to register the high and low points.

The tools used in forming such a pattern are mainly short-bend spoon gauges, which will carve the filleted portions, and short-bend chisels to finish the flat portions. Particular care should be taken that all tools used are in perfect cutting condition; this will eliminate all finishing except that done with fine glass paper. A good pattern cannot result from badly sharpened tools, no matter how much glasspapering it eventually receives; this is particularly true of the example shown, which has comparatively deep and constricted pockets.

## Template as a Master Gauge

In some turned patterns, a template can be made which will dispense altogether with the use of inside and outside callipers, contraction rule, straight-edge or depth gauge; such an example being shown in section at Fig. 2. The only conditions which must be observed are, (a) the wooden faceplate should be larger than the largest diameter of the pattern, (b) it must be faced perfectly true, and (c) the template must follow exactly, the section on the layout board.

Again, care must be exercised when turning the job in the lathe, so as not to take too heavy a cut when, from the template, it can be seen to approach the finished shape. A further important point that must be observed when turning by template only is that it must be a full template that is provided, so that it touches the face-plate on either side of the pattern and locates on the face of the pattern at the same time.

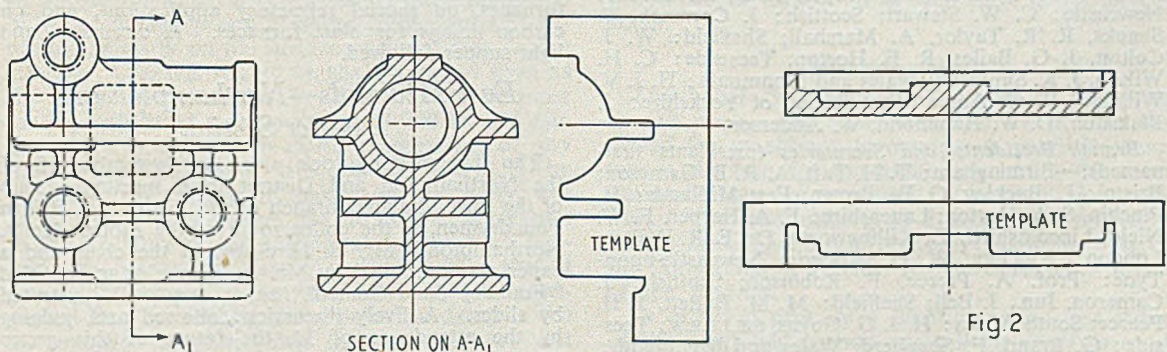


FIG. 1.—Drawings of a Pattern and a Suitable Template for Checking the Profile during Manufacture at the Position shown in the Half-section at *AA*<sub>1</sub>.

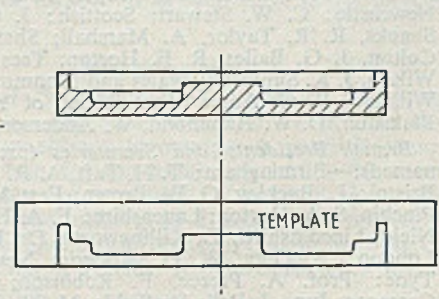


FIG. 2.—Symmetrical Pattern, which can be made by Turning in a Lathe, and a Template for providing all the Gauging Required.

The Council of Ironfoundry Associations will hold a conference on foundry health and safety early next year. Among the subjects to be discussed will be the Iron and Steel Foundries Regulations, and arrangements will be made for contributions to be presented showing how compliance with the Regulations may be achieved. This is a preliminary notice only, and although no applications should be made at this stage, member-firms who may wish to take part are invited to reserve the dates. The conference will be held at Ashorne Hill, from March 1 to 3, 1954.

The first of a series of concentrated residential courses designed to include all aspects of management is being launched by the British Institute of Management and will take place at Management House, 8, Hill Street, London, W., from November 1 to 28, 1953, under the general direction of the Director of Studies, Mr. Norman C. Rimmer. The syllabus, methods, and organization of work of these courses are explained in the Executive Development Programme, which, with application forms, may be obtained from the director of studies at the above address.

## I.B.F. Constitutional Representation

Probably very few of the newer or prospective members of the Institute of British Foundrymen realize on what truly democratic lines the business of the Institute is organized. For this section of JOURNAL readers the following list of current officials may be useful:—

### Council Members

As a result of the elections at the Institute's annual general meeting in June and changes in branch representation, the Council of the Institute is now constituted as follows:—

*Ex-officio Members:* E. Longden, M.I.MECH.E., president; John Bell, senior vice-president; A. B. Everest, PH.D., junior vice-president, and N. P. Newman, J.P., hon. treasurer.

*Past-presidents:* J. Cameron, J.P.; V. C. Faulkner, F.R.S.A.; J. T. Goodwin, M.B.E.; S. H. Russell; J. E. Hurst, C.B.E., D.MET.; C. W. Bigg; R. Miles, M.ENG.; D. Sharpe; J. W. Gardom, F.I.M.; D. H. Wood; P. H. Wilson, O.B.E.; R. B. Templeton, M.I.MECH.E.; N. P. Newman, J.P.; J. J. Sheehan, B.SC.; Colin Gresty, and C. J. Dadsell, PH.D.

*Members elected by Ballot:* J. Blakiston; E. M. Currie; V. Delpoit; H. G. Hall, F.I.M.; R. L. Handley, B.SC.; J. Hird; A. E. Peace; G. R. Shotton; P. A. Russell, B.SC., and R. Yeoman.

*Branch Representatives:*—Birmingham: T. H. Gameson, G. M. Callaghan, J. L. Francis, E. R. Dunning; Bristol: D. F. B. Tedds; East Midlands: F. G. Butters, G. L. Harbach, D. W. Berridge, J. Hill; Lancashire: D. Fleming, H. Haynes, J. Jackson, C. R. van der Ben; Lincolnshire: J. Burrell; London: L. G. Beresford, F. Arnold Wilson, Barrington Hooper, C.B.E., M. Glenny; Newcastle: C. W. Stewart; Scottish: J. Cormack, T. Shanks, R. R. Taylor, A. Marshall; Sheffield: W. J. Colton, J. G. Bales, R. F. Horton; Tees-side: C. H. Wilson, J. K. Smithson; Wales and Monmouth: H. J. V. Williams, R. G. Amos; West Riding of Yorkshire: J. Blakiston, D. W. Hammond, W. Anderson.

*Branch Presidents and Secretaries* (presidents first-named):—Birmingham: T. H. Taft, A. R. B. Gameson; Bristol: L. Buckley, G. W. Brown; East Midlands: H. Pinchin, S. A. Horton; Lancashire: F. A. Harper, F. W. Nield; Lincolnshire: D. Killingworth, Dr. E. R. Walter; London: B. Levy, W. G. Mochrie; Newcastle-upon-Tyne: Prof. A. Preece, F. Robinson; Scottish: J. Cameron, Jun., J. Bell; Sheffield: M. M. Hallett, J. H. Pearce; South Africa: H. J. G. Goyns, S.E.I.F.S.A.; Tees-side: G. Brand, F. Shepherd; Wales and Monmouth: G. McKinley, A. S. Wall; West Riding of Yorkshire: C. S. Johnson, H. W. Griffiths.

*Section Presidents and Secretaries* (these officers are invited to attend Council Meetings):—Burnley: J. Jackson, H. J. W. Cox; East Anglian: H. S. Ward, L. W. Sanders; Falkirk: J. Ferguson, A. Bulloch; Slough: J. P. P. Jones, P. Hoesli; Southampton: V. W. Meager, Dr. O. P. Einerl; West Wales: B. Godber, C. G. Jenkins; North-East Scottish Section: H. J. M. Conacher, R. Leeks; Cape Town: acting hon. secretary, W. A. McLaren.

*Co-opted Members:* J. G. Pearce, O.B.E., M.SC., M.I.MECH.E., F.INST.P.; G. L. Bailey, C.B.E., M.SC., and J. F. B. Jackson, B.SC.

*Secretary:* T. Makemson, M.B.E.

*Honorary Corresponding Member of Council.*  
*Australia:* W. T. Main.

### Technical Council

At the meeting held on July 1, the Technical Council was reconstituted as follows for the year 1953-54:—

*Chairman:* A. E. Peace; *deputy chairman:* Dr. A. B. Everest. *Ex-officio Members:* E. Longden, M.I.MECH.E., J. Bell.

*Branch Representatives:*—Birmingham: G. R. Shotton; Bristol: G. W. Brown; East Midlands: C. A. Payne; Lancashire: C. R. van der Ben; Lincolnshire: F. Dunleavy; London: F. Hudson; Newcastle-upon-Tyne: G. Elston; Scottish: J. McPheat; Sheffield: H. S. W. Brittain; Tees-side: L. Johnson; Wales and Monmouth: A. H. Bevan; West Riding of Yorkshire: G. W. Nicholls. *Co-opted Members:* J. Blakiston, L. W. Bolton, C. Gresty, J. W. Gardom, A. Logan, R. W. Ruddle, P. A. Russell, and A. Tipper.

In addition, the following sub-committee chairmen are *ex-officio* members of the Technical Council: F. J. McCulloch (T.S.24), M. M. Hallett (T.S.32), E. M. Currie (T.S.35), J. E. O. Little (T.S.37), F. C. Evans (T.S.38), W. J. Colton (T.S.39), A. Logan (T.S.40), C. H. Kain (T.S.41), Dr. Brynmor Jones (T.S.42), E. S. Renshaw (T.S.43), S. J. Sargood (T.S.44), A. Logan (T.S.45), J. Hird (T.S.46), R. W. Ruddle (T.S.48).

## Notes from the Branches

### Australian—Victoria

At a general meeting of the Australian—Victoria branch of the Institute of British Foundrymen, held at the Metallurgy School, Melbourne Technical College in August, members and their guests heard a Paper, "Refractories in the Foundry," by Mr. J. H. Myrtle, M.I.B.F. Mr. Myrtle is managing director of the Morgan Crucible Company (Aust.) Pty., Limited. He spoke on the application of refractories in melting furnaces, on special refractory applications, and on carbon linings for blast furnaces. A discussion and light supper followed.

### East Midlands—Northampton and District Section

The first meeting took place on September 18 of the Northampton and District local meetings group of the East Midlands branch of the Institute of British Foundrymen, in the coffee room of the Plough Hotel, Northampton. Mr. B. Hird was in the chair and a paper was presented by Mr. A. Tipper, m.sc., entitled "Foundry Sand Control," being very well illustrated by slides. A lively discussion followed and, judging by the attendance of 34, the future of this group warrants some measure of optimism. Acting as honorary secretary is MR. W. D. FORD, A.M.I.MECH.E., Morris Motors, Limited (Engines Branch), Nuffield Foundry, Wellingborough, Northants.

**Early Iron Working.** Mr. F. W. Tobias, and Dr. D. J. Smith of King's College, Newcastle, have discovered large lumps of clinker believed to have come from iron workings used by the Romans, near Corby's modern blast furnaces. Dr. Smith believes that a Roman villa there, the site of which is being excavated, may have been the house of the manager of the local iron works. The theory is strengthened by the discovery of an early coin of the reign of the Emperor Vespasian. It is known that during his reign, the production of iron in this country was developed and his coins are often found in the iron-bearing areas.

# Cast Iron for Enamelling\*

Cast-iron ware which is to be subsequently enamelled must be made from suitable material. Troubles of one sort or another can arise and then disappear again before one has had time to determine their cause.

The moulding sand used is of considerable importance. To obtain a clean, smooth finish on the surface of the casting the particle size of the sand must be carefully controlled as follows:—

Particle size mm.	0.3	0.3-0.2	0.2-0.1	0.1-0.05	0.05
Proportion per cent	0.9	6.9	60.5	13.9	6.3

The sulphur content of the sand should be under 0.029 per cent. To obtain a high degree of permeability, some silica sand may be substituted for the ordinary moulding sand. The water content of the moulding sand should not exceed 7 per cent.; sand which is too damp and dense leads to the formation of patches of rust. These rust patches can always be cleaned off, but after a short time they will always re-appear on the surface. This defect may also be due to other causes, for instance, the casting remaining too long in the mould; too high a sulphur content in the iron; too high an iron content in the moulding sand, or poor quality of coal dust.

## Knock-out Precautions

It is advisable to remove the casting from the mould as soon as possible. The longer it remains in the damp mould so the greater is the likelihood of the steam (which is generated by the evaporation of water during pouring) being condensed and deposited as water on the surface of the casting during cooling. Castings should be shaken out as soon as the metal is "black-hot." This ensures that the casting will be at a temperature of 300 to 400 deg. C., which is enough to cause evaporation of any moisture which comes into contact with it. The view that the casting, if shaken out too early, will be too hard is mistaken, for no further alteration in the structure of the casting takes place at a temperature below 500 deg. C. The casting should not be left overnight in the foundry, but transported into the fettling shop, since the damp in the air of the foundry when the furnaces are out can be considerable and can moisten the moulding sand still clinging to the surface of the casting.

## Iron in the Sand

Moulding sand itself can be a cause of rust formation if it contains too much iron, whether this be in the form of iron oxide, iron hydroxide, or iron silicate—an iron content of over 4 per cent. should not be tolerated. A similar state of affairs is caused if the iron itself is too high in sulphur. In this case it is possible that the iron and manganese sulphides on the surface of the casting are attacked by the moisture in the sand and form acids which in turn leads to the formation of rust.

The sulphur content of the iron should not be over 0.1 per cent.

Regarding the addition of coal dust an addition of 3 to 5 per cent. by volume should be made to the moulding sand, when making thin-wall castings. The coal dust should be well mixed into the sand. During pouring, a uniform gas film is formed between the casting and the moulding sand. This gas film leaves behind a thin film of grease on the surface of the casting and, if impregnated with tar from the coal dust, this acts as a protection against rust.

## Gummaton of Optimum Conditions

In general, therefore, to avoid the formation of rust, a high gas permeability of the moulding sand is required and sulphur should be absent. The moisture and metallic iron content of the sand must be low and the casting should be knocked out quickly and the iron also must not contain more than a certain amount of sulphur.

The quality of mould dressings should also be watched, such material should be free from sulphur and silica. In places where a dressing becomes detached, brown flecks appear on the metal surface and the enamel will come off. With castings having an abrupt change of section, there is always the danger that the casting will "tear" during enamelling. Such failures are often wrongly attributed to breakage during annealing, especially where proper inspection at each stage is not undertaken.

## Microstructure

The belief that enamelling grades of cast iron should possess the same structure as an iron designed for machining is wrong. A pearlitic structure is the best for machinability, but is the most unsuitable type of structure for enamelling-quality iron. The iron undergoes a change of structure during the enamelling process and, as in the case of full annealing, a ferritic structure replaces much of the pearlite.

In order to procure a ferritic casting, the value of the combined carbon and silicon contents must amount to or exceed 6 per cent. According to the manner in which iron is cooled, the structure may be made either white or grey. With rapid cooling, the structure becomes white, consisting chiefly of cementite and pearlite. Grey iron consists of ferrite and graphite and results from slow cooling. The critical cooling speed is determined by the alloying elements in the iron and the thickness of the casting section—manganese tends to form white-iron structures while silicon makes for the formation of grey iron. There are, therefore, two systems which result:—I. Iron/carbide, the less-stable system; and II. iron/graphite, the stable system.

Pearlite is not a stable component. At an enamelling temperature of 700 deg. C., pearlite

\*Translated from an article appearing in *Giesserei Praxis*

### Cast Iron for Enamelling

decomposes into ferrite and graphite. Therefore, no flake-graphite iron of high tensile strength is suitable for enamelling, as during the latter process the structure is destroyed. Enamel is best applied to a ferritic cast iron. To bring about the change from pearlite to ferritic constitution, the iron emits a certain quantity of gas, and this has to escape through the enamel. In doing so it can force the enamel away from the metal surface.

Enamelling should therefore only be undertaken after the casting has been subjected to an annealing treatment, and if failures still appear, then these are due to some other cause. A good enamelling iron is one of the following percentage composition:—C, 3.4 to 3.8; Si, 2.6 to 3.1; Mn, 0.5; P, 0.8 to 0.9, and S, <0.09.

Enamels cling better to a ferritic iron because the graphite flakes on the surface of the casting can act as little bonding points. During fettling, also, it is not enough merely to remove the adherent sand; a jagged-edged shot should be used which can at the same time roughen the whole surface of the casting. Round shot does not do this, but tends to close the otherwise porous surface. If the iron contains too much sulphur, the skin of the casting is made hard and again it cannot be satisfactorily roughened. In addition, ferrous sulphate can be formed on the surface and the enamel erupts into a series of small blowholes and will not bond at all satisfactorily. If blue or brown flecks are seen on the surface of the casting after the enamel has peeled off, this is a sign that the sulphur content of the iron is over 0.12 per cent. Such castings should be annealed until no further decomposition takes place, but this will generally raise the enamelling cost.

#### Other Precautions

The analysis of the iron must be adjusted if necessary after tapping and before pouring. The silicon content can be estimated by taking a "wedge" sample and breaking for viewing the fracture. The formation of blowholes during enamelling is aggravated if the iron is overheated or held too long at a high temperature, and pyrometers should be used to control casting temperature.

It is important that the castings be properly dried after the deposition of the first coat of enamel. The drying bogie should only carry a certain number of castings, then, by the time it is loaded, the first casting to be sprayed have not been exposed to dampness for sufficient time for there to be a danger of re-penetration of moisture into the iron.

There are, thus, a number of ways in which enamelling may be defective. The most general cause of failure is an unsatisfactory composition of the cast iron. For each cast, the charge must be carefully computed and a particularly careful watch must be kept on the analysis of the return scrap (heads, risers, etc.). If control cannot be maintained over every single cast, then samples should be taken every so often, and, by the use of hematite iron, the sulphur and phosphorus contents of the metal may be kept under control.

### Book Reviews

**Coke-burning Appliances Handbook.** Published by the Gas Council (Coke Department), 1, Grosvenor Place, London, S.W.1. Price 12s. 6d.

The book was launched recently at a meeting which was addressed by Mr. H. V. Skelton, chairman of the British Ironfounders Association. In it he stressed the need for a *va piano* approach to the question of smokeless areas on the grounds that there was insufficient suitable fuel at the present time to fill normal domestic requirements. Rather should recourse be had to the installation in existing homes of efficient and cleaner appliances now available. These are described and illustrated in full detail in this book, which in addition gives technical data on coke and lists the coke-burning appliances which have been approved and much other matter germane to the subject. The book, as a work of reference will be invaluable to architects, builders and allied trades and professions.

**Electric Resistance Heating.** Published by the British Electrical Development Association, 2, Savoy Hill, London, W.C.2. Price 9s., post free.

The foundry industry is a large user of electric-resistance furnaces and appliances for melting metal, heat-treatment, patternplate warming—to cite but a few. This book is well worth careful examination as here and there applications new to the reviewer are revealed. For instance, the very last paragraph tells of an electrically-heated riddle, for handling sand drying. Then there is a long chapter (No. 8) on electric ovens and infra-red heating. However, no mention appears of portable electric mould-driers—fairly new to this country, but thought to be in use in Switzerland. Naturally, in a book of this type there is information about application to the manufacture of paper, stockings and a host of other trades.

**Das Giessereiwesen in gemein fasslicher Darstellung.** 3rd edition. Published by Giesserei-Verlag G.M.B.H., 27, Breite Strasse, Düsseldorf 22a. Price 24 D Marks.

The title of this book could be translated as foundry practice set out in simple language. It is a very comprehensive work, written by experts, and covers both the technical and economic activities of the foundry industry, and in doing so unfolds to the student or layman all the problems to be associated with the casting of metals. Clarity of presentation has made the fundamental scientific principles governing foundry practice easy of assimilation. Obviously, there is no need to rely on foreign books for the common technology of the industry, for it is available in the English language, yet this book is of great interest from the historical and economic aspects. It contains, for instance, the British output of ferrous castings for 1936 (3,147,000 metric tons)—a useful figure when making comparisons. Then an insight is given to the German approach to standardized costing—dating back to 1919—a section well worth study in this country.

A section the reviewer much appreciates is a series of pictures of all sorts of castings ranging from a simple bath tub to examples of works of art. Such matter should be included in all books of this character, as it is the best means of showing the layman the wide boundaries of the industry.

The book is thoroughly up to date and includes a few paragraphs on shell moulding, but above all it is well balanced. Those who can read German will welcome this addition to their libraries.



**HAVE YOU SEEN..**



ILLUSTRATIONS SHOW SUPINEX "R" IN USE.

**..THE AMAZING "Knock-out" PROPERTIES OF**

**SUPINEX "R"**  
**C O R E B I N D E R**

★ **AN ENTIRELY NEW TYPE OF BINDER  
STARTLING IN ITS PERFORMANCE...  
FUMES AND GASES GREATLY REDUCED**

**LOW PRICE REDUCING YOUR COST PER TON OF CORE SAND**



Developed and manufactured by :

**F. & M. SUPPLIES LTD.**

4, BROAD STREET PLACE, LONDON, E.C.2 Telephone: LONDON Wall 7222

Free working samples gladly supplied on request.

## News in Brief

AT THE BUTTERLEY foundry and engineering works near Ripley, and Codnor Park forge and rolling mill, near Ironville, about 150 employees are over the age of 65.

A RESIDENTIAL COURSE FOR FOREMEN, organized by the Midland area training committee of the British Iron and Steel Federation, is being held at Moreton Paddox, Warwickshire, from September 28 to October 2.

AN INFORMATION COURSE for executives in the iron and steel industry is to be held by the Midland-area Training Committee of the British Iron and Steel Federation at the Dudley and Staffordshire Technical College this winter.

W. T. HENLEY'S TELEGRAPH WORKS COMPANY LIMITED announce that their Glasgow branch moved to more commodious premises on September 29 at 149/153, North Street, Glasgow, C.3., Telephone—Central 1771.

THE DIRECTORS of Jowett Cars, Limited, Bradford, have announced that, because arrangements for the continued supply of bodies have still not been made, the company is to suspend the manufacture of Javelin cars and Bradford commercial vehicles.

A COURSE of ten lectures on precision measurement in engineering will start at the Birmingham College of Technology on October 15. Designed for senior inspection staff, the course has been arranged in conjunction with the Institution of Production Engineers.

AN OUTBREAK OF FIRE at the premises of J. Sagar and Company Limited, manufacturers of woodmaking machinery, Halifax, recently, originated in the wood wool and pattern store. The blaze was confined to the immediate area and little other damage was caused.

IN AN EXPLOSION in the heat-treatment department of the Aeroplane & Motor Aluminium Castings, Limited, Erdington, Birmingham, on September 17, a furnaceman was seriously injured. An oven was blown open and about 25 sq. yds. of asbestos and glass roofing was shattered.

KELVIN & HUGHES, LIMITED, instrument manufacturers, have introduced a most appropriate award for their successful craft and technical apprentices. As an annual prize, an "Outward Bound" or "Moray Sea School" course is made available to the successful candidate (as selected by the training panel).

THE PADDLE STEAMER *Duchess of Fife*, which has carried holidaymakers on the Firth of Clyde for half a century, is now in the hands of the shipbreakers. She took part in the Dunkirk evacuation. She was built at Fairfields, Glasgow, in 1903, and was taken out of service in June.

CRAVEN BROS., LIMITED, Stockport, have completed what is claimed to be the largest machine-tool ever made in Great Britain—a 650-ton 40-ft. vertical boring and turning mill—for John English & Company, Toronto. The machine, which occupies a floor space of 3,700 sq. ft. and cost £180,000, took two years and a half to design and build.

MIDLAND INDUSTRIALISTS should take some quantity of open-cast coal as a precaution in view of the likely shortage of large coal and the smaller stocks compared with a year ago, according to the regional director of the Ministry of Fuel and Power. He also advises domestic consumers, if possible, to take unrationed fuel as a safeguard.

MR. WALTER C. PUCKEY, president of the Institution

of Production Engineers, gave an address to members of the Derby section of the Institution at the Midland Hotel, Derby, on September 21. His subject was "What we think of the Future," which embraces industry's relationship with politics, defence obligations, financial difficulties, and technological tasks.

BRADLEY METHODIST CHURCH (Staffs) treasures a pulpit cast in iron by John Wilkinson, the famous Bilston ironmaster. No longer used, it stands near the modern pulpit of the church and is grained over to give it the appearance of wood. The pulpit is all that is left of the "iron" chapel built by Wilkinson, in which he used the metal for every fitting possible in the building.

THE ANNUAL BALL of the Midlands Area of the Royal Metal Trades Pension and Benevolent Fund is to be held at the Grand Hotel, Birmingham, on October 15. As a result of last year's Ball, more than £700 was handed to the fund, bringing the total raised by this annual event to £6,269. Chairman of the Area Council is Mr. A. H. Wilson, of Evered & Company, Limited, Smethwick.

A NEW APPROACH to Britain to join the European Coal and Steel Community as an associate, even if not a full member, is to be made by the High Authority and the six countries of the community. This was stated recently at the National Coal Board Summer School at Oxford by Mr. D. J. Ezra, N.C.B. representative on the United Kingdom permanent delegation to the High Authority of the community.

DELEGATES from Great Britain, the United States, France, and Western Germany, including the world's acknowledged experts in the industrial phosphating field, met in conference last week at the Pyrene Company, Limited, Great West Road, Brentford, Middlesex, for an exchange of technical information and to discuss future developments of the internationally known range of industrial phosphating processes.

VAUXHALL MOTORS, LIMITED, who are celebrating their golden jubilee this year, hope to achieve a record output and to produce over 100,000 vehicles for the first time in their history. In 1903, the output was one car every 12 days. The first Vauxhall car, a 5-h.p., single-cylinder model, was built in September 50 years ago. Its top speed was 25 m.p.h., and petrol consumption 35 to 40 m.p.g. In 1905, the firm moved from London to Luton and in 1925 General Motors Corporation of America acquired the ordinary shares of the company.

DECISIONS on six applications for planning permission to work limestone in the Peak District National Park, all of which were the subject of local inquiries, have been announced by Mr. Harold Macmillan, Minister of Housing and Local Government. Two applications to open new quarries and one to reopen an old one have been refused. Three applications for work in existing quarries have been granted; two are for limited periods, and all three are subject to conditions designed to deal with aspects open to objection.

THE PAKISTAN GOVERNMENT has allowed the Industrial Development Finance Corporation to extend bank guarantees to their businessmen placing orders overseas for machinery on a deferred-payment basis. An official notification states that, under the recent trade agreement with Japan, importers in Pakistan can place orders for machinery on a deferred-payment basis. Similar facilities are being extended by the United Kingdom and other countries. The Government is also understood to have granted importers an extension of foreign exchange cover.

(Continued on page 438)

GREY and MALLEABLE

# IRON CASTINGS

*Create  
Confidence*

- \* ASSIST DESIGN
- \* REDUCE COSTS
- \* AID SALES



ISSUED BY THE COUNCIL OF IRONFOUNDRY ASSOCIATIONS  
CRUSADER HOUSE, 14 PALL MALL, LONDON, S.W.1

## News in Brief

*(Continued from page 436)*

THE TWENTY-THIRD MEETING of the Iron and Steel Engineers' Group of the Iron and Steel Institute will be held at 4, Grosvenor Gardens, London, S.W.1, on Wednesday, October 28, and a buffet luncheon will be held in the library in connection with the meeting. At 10.30 a.m. there is to be presentation and discussion of a paper on "Roll-design Research as Applied to Rolling Mill Development," by B. Robinson and W. A. Lugar, and, in the afternoon, of "Manipulating Equipment, Guides, Guards and Strippers for Rolling Mills," by W. Bailey, will be presented and discussed.

IN A CIRCULAR issued to stockholders of the British Aluminium Company, Limited, the directors announce that the difficult trading conditions have shown little sign of improvement, and they wish to emphasize that the maintenance of the interim dividend on the ordinary stock at 4 per cent. in respect of the year ending December 31, 1953, should not be taken as an indication that the total distribution for the year will necessarily be the same as in recent years. For each of the two preceding years the total was made up to 12 per cent., less tax, with a final of 6 per cent. and a bonus of 2 per cent.

THE ORIGINAL cast-iron bridge, built by the Horseley Bridge Company and erected in 1848 at Shifnal to carry the Paddington-Birkenhead line, is to be reconstructed because of its age and deterioration. It is to be replaced by a new structure based on four steel girders, each weighing 22 tons, and made by the Horsehay Works Company at Wellington, and topped by a pre-cast reinforced concrete deck to a total weight of 120 tons. It says much for the soundness of design and construction of the early cast-iron bridge that it has outlasted a century of service under conditions of traffic scarcely envisaged at the time of manufacture.

SIR LEONARD BROWETT, director of the National Union of Manufacturers for the past eight years, who is to retire shortly, presented an illuminated address in a silver casket to Mr. William Blackwell, chairman of the Midland area of the Union since 1943 and now its president, at a dinner in his honour in Birmingham on September 23. Sir Leonard was deputising for Sir Patrick Hannon, a vice-president of the area association, who was prevented by illness from attending. Tributes to Mr. Blackwell were paid by the speakers, who included the Lord Mayor of Birmingham (Alderman G. H. W. Griffith), Aldermen A. G. B. Owen, and A. Paddon Smith, Councillor Harry Weston and Mr. Norman Tiptaft. Mr. A. Stephens, chairman of the Midland area presided.

MEMBERS from as far as New York, Nairobi, Southern Rhodesia and the Sudan travelled to attend the fourth residential school of the Institute of Cost and Works Accountants at St. Catharine's College, Cambridge, from September 21, for one week. The president of the Institute, Mr. F. W. H. Saunders, opened the proceedings and Dr. J. M. S. Risk, chief accountant to the Southern Region Gas Board, gave the first of a series of papers, his subject being "Financial Control of Large-scale Organizations." At later sessions, Mr. A. D. Coventry, of the Industrial and Commercial Finance Corporation, spoke on "Finance and the Cost Accountant," and Mr. R. T. Kennedy, cost accountant of Winsor & Newton, Limited, addressed the school on "Comparable Costs." Mr. Harold Wincott gave the final address entitled "Some Reflections on Modern Capitalism."

## Personal

MR. H. P. GLENNIE has been appointed a director of J. A. Prestwich Industries, Limited.

LORD HIVES, chairman and joint managing director of Rolls-Royce, Limited, Derby, has been made an Honorary Fellow of the Royal Aeronautical Society.

MR. D. H. ARMITAGE, lately chief development engineer with the British Steel Castings Research Association, has resigned and joined the Board of P.I. Castings (Altrincham), Limited.

MR. F. DONALD RUSHBROOKE has been appointed chairman of the Halford Cycle Company, Limited, in succession to his father, the late Mr. F. W. Rushbrooke. He also retains his position as joint managing director.

MR. C. WHITEHOUSE has relinquished his appointment as foundry superintendent of Lloyds (Burton), Limited, to take up duties of foundry manager of John Hill & Sons (Iron Founders), Limited, Wolverhampton to-day.

MR. W. TWADDLE, of Dunstable, has joined the technical staff of the Coleman-Wallwork Company, Limited. Mr. Twaddle is well known in the foundry industry, where he has been associated with the mechanizing of some of the largest plants in the country.

MR. CECIL F. HURST has been appointed deputy chairman of Samuel Osborn and Company Limited, steel founders and tool manufacturers, Sheffield. Mr. Hurst has been with the firm for 30 years, and was a departmental works manager before becoming a director in 1938.

IT IS ANNOUNCED that Wing-Commander J. M. Aiton, chairman and managing director of J. Aiton & Company, Limited, pipe founders, of Stores Road, Derby, will relinquish the command of the Derbyshire Wing of the Air Training Corps in February, owing to pressure of business.

JOHN S. KIDD, who has been 59 years an iron moulder, 52 of them with R. & A. Main, Limited, Falkirk, retired on his 70th birthday. For the last 20 years he has been foreman moulder and very popular with his workmates. He was presented with the latest model electric razor by the moulders and coremakers, while the staff gave him a mahogany grandmother clock.

MR. F. LONSDALE MILLS is to retire on March 31, 1954, from the post of Director of Education for Wolverhampton, which he has held since 1945, being previously deputy director. Associated with his duties is the office of clerk to the governors of the Wolverhampton and Staffordshire Technical College. Throughout his career in Wolverhampton, Mr. Mills has been closely associated with industry and with technical and trade education.

MR. J. A. WADHAMS, head of the department of applied science at Wolverhampton and Staffordshire Technical College, has been invited to speak in November at the second international conference on pneumoconiosis at Münster University, Germany, on the work being done by his department on dust research. A group of research students has been at work for a year on problems arising from atmospheric dust, especially in industry. The foundry industry has a close interest in research of this nature, which is also going on at centres in Germany, Switzerland and France.



**TWW**

**MOULDERS' SUNDRIES**

**FOUNDRY COKES and COAL DUST**

**PIG IRONS, FOUNDRY & FORGE**

**MOULDING SAND**

**GANISTERS Limestone and FLUORSPAR**

**BRUSHES SIEVES & RIDDLES**

**TONGS, SHANKS and LADLES**



**THOS W. WARD LTD**  
**ALBION WORKS · SHEFFIELD**

TELEPHONE: 26311 (22 Lines) · TELEGRAMS: "FORWARD, SHEFFIELD"

LONDON OFFICE: BRETTENHAM HOUSE · LANCASTER PLACE · STRAND · WC2

## Raw Material Markets

### Iron and Steel

Production of pig-iron keeps pace with the current requirements of most consumers. Producing furnaces are supplied regularly with the necessary raw materials to maintain outputs at recent levels. Any fears which the furnaces may have had on the question of sufficiency of coke have so far been allayed, as supplies, although none too plentiful, have been at hand to enable capacity outputs to be obtained. Ore deliveries are good and the tonnages available not only meet current needs, but provide ample stocks. Increased deliveries of coke to augment stocks would make the raw-material position still more secure.

The steelworks are well provided with basic pig-iron, and the supply of scrap is on a much better level. Although preference in pig-iron production is given to the needs of the steelworks, which utilize about three-quarters of present outputs, the foundries have, in the main, no difficulty in securing the grades and tonnages they require. Apart from hematite, production of which is below needs in some areas, all the iron they are at present specifying is coming forward, although some of the engineering and speciality foundries would prefer a larger intake of the low- and medium-phosphorus irons. Most of these foundries are obtaining good outputs of castings, but the light-casting trades and some of the jobbing foundries are still very short of work. The demand for high-phosphorus pig-iron has recently shown some improvement. This is due in some measure to a slight improvement in trade in light castings, but the chief reason is that the foundries' stocks of pig-iron have been reduced to such an extent that they now find it necessary to obtain tonnages to implement the orders on hand. Many of the light foundries have not taken deliveries of pig-iron for some months, and this has compelled the furnaces to take supplies into stock. The demand for the refined grades of pig-iron is below the output level.

Ample supplies of steel semis are now available, chiefly because re-rollers are taking up less than their normal tonnages.

With new business on the quiet side, producers of finished-steel products are effecting a big reduction of their backlogs and forward commitments for heavy joists and sections, with the result that consumers are finding conditions a little easier in certain sizes, although the demand for the more popular sections continues to be heavy. While the plate mills are working to capacity, little headway seems to be made in reducing their heavy bookings and new orders for medium thicknesses are still very difficult to place.

### Non-ferrous Metals

Price movements on the copper market last week were erratic, but certainly not lacking in interest, for the settlement price on Thursday was established at £242 10s., which is the highest level reached since the market opened on August 5 last. At the same time, three months touched £224, also a new high level for this post-control market, but this was not held, and at the close of business on Friday there were sellers of the forward position of £222 10s. Cash fell by £5 on the last day of the week's trading, the close being £237 10s. Once again it was a matter for comment that the Government broker did not seem to be a very keen seller, although at £240, which is equal to 30 cents, it might have been supposed that the Ministry would

not have been averse from getting rid of some of its large stocks. There certainly appears to be a persistent demand in some directions for early copper, but whether this can be ascribed to greater activity in the non-ferrous industry is a question. In view of the price uncertainty, consumers have undoubtedly been sticking very much to a hand-to-mouth policy and they may have cut things a little too fine. On balance the cash price showed no change in comparison with the previous Friday, but three months was up by £4 10s. The backwardation stood at £15.

Both zinc and lead closed below the best, the former, however, being £1 17s. 6d. better on balance for September and 15s. December. The backwardation which developed early in the week and reached £3 15s. at one time was reduced to £2 on Friday. Lead was fairly steady, gaining £1 for September and 10s. for December. Tin fluctuated considerably and finished £4 10s. down for cash and £7 lower for three months.

Figures issued by the Copper Institute in New York for the month of August show that production of crude copper in the U.S.A. was 82,700 short tons, against 88,100 tons in July, while output of refined was 106,800 tons, compared with 112,600 a month earlier. Deliveries to domestic users were 107,000 tons, against 104,500 tons in July. Stocks of refined copper in producers' hands at 78,825 tons were up by about 1,000 tons, compared with July 31. Outside the United States output of crude copper was 124,500 tons, compared with 128,800 tons in July. Production of refined copper in August was 90,300 tons, compared with 96,400 tons in the previous month, while stocks of refined copper at August 31 stood at 209,200 tons, an increase of 43,000 tons. Deliveries to consumers fell by 24,200 tons to 43,900 tons.

Official metal prices were as follow:—

**COPPER, Standard—Cash:** September 24, £237 10s. to £242 10s.; September 25, £235 to £237 10s.; September 28, £232 10s. to £237 10s.; September 29, £232 10s. to £235; September 30, £235 to £237 10s.

**Three Months:** September 24, £224 to £224 10s.; September 25, £221 10s. to £222; September 28, £221 10s. to £222; September 29, £222 to £223; September 30, £221 10s. to £222.

**TIN, Standard—Cash:** September 24, £622 10s. to £625; September 25, £610 to £612 10s.; September 28, £607 10s. to £610; September 29, £612 10s. to £615; September 30, £615 to £617 10s.

**Three Months:** September 24, £607 to £608; September 25, £599 to £600; September 28, £597 to £598; September 29, £605 to £606; September 30, £606 to £607 10s.

**ZINC—September:** September 24, £70 15s. to £71; September 25, £69 5s. to £69 15s.; September 28, £70 15s. to £70 17s. 6d.; September 29, £71 10s. to £71 15s. **October:** September 30, £69 15s. to £70.

**December:** September 24, £68 10s. to £69; September 25, £67 15s. to £68 5s.; September 28, £68 5s. to £68 10s.; September 29, £68 10s. to £68 15s. **January:** September 30, £68 5s. to £68 10s.

**LEAD—September:** September 24, £92 15s. to £93; September 25, £91 10s. to £91 15s.; September 28, £92 10s. to £92 15s.; September 29, £93 10s. to £94. **October:** September 30, £92 7s. 6d. to £92 12s. 6d.

**December:** September 24, £88 15s. to £89; September 25, £87 15s. to £88; September 28, £88 to £88 10s.; September 29, £89 to £89 5s. **January:** September 30, £88 10s. to £88 15s.

# 'FULBOND'

TRADE MARK

## SAND CONTROL

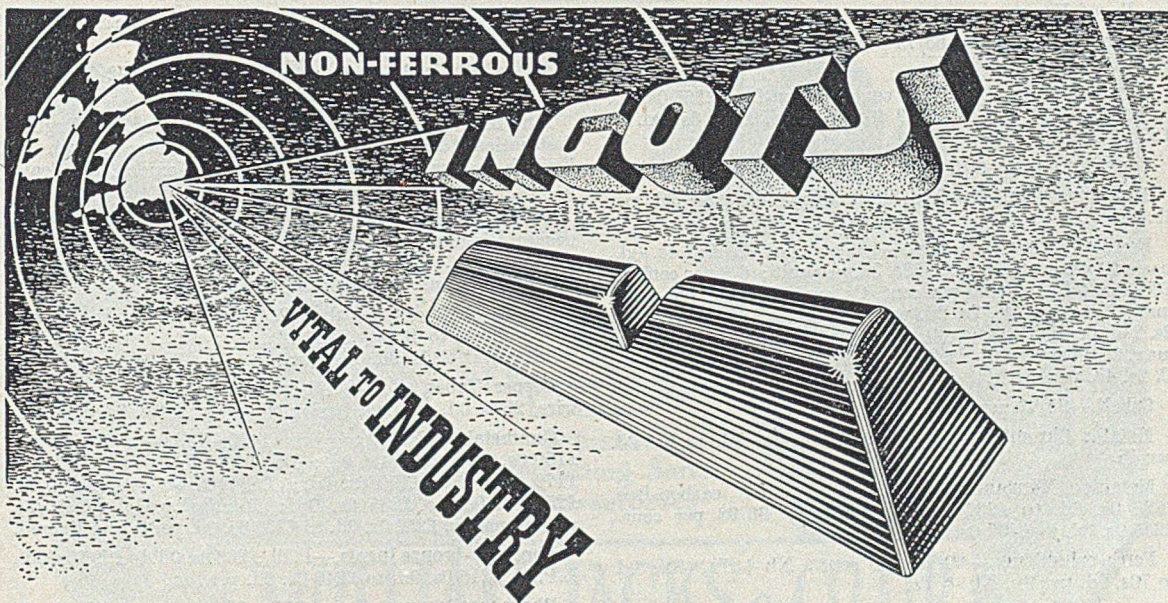
You can adjust any moulding property by the use of 'FULBOND'. 'Fulbond' gives better control of synthetic sands and strengthens natural sands.



For service and information write to:-  
**THE FULLERS' EARTH UNION LTD.**

Patteson Court, Redhill, Surrey. Tel: Redhill 3521

C.M.F.7



CREECHURCH HOUSE  
 CREECHURCH LANE  
 LONDON, E.C.3  
 TEL. AVENUE 5341

WORKS:-  
 ST. STEPHENS STREET  
 ASTON  
 BIRMINGHAM 6  
 TEL. ASTON CROSS 3115



ON A.I.D. APPROVED LIST

CHRONICLE BUILDINGS  
 CORPORATION STREET  
 MANCHESTER 4  
 TEL. BLACKFRIARS 3741

POWELL DUFFRYN HOUSE  
 ADELAIDE STREET  
 SWANSEA  
 TEL. SWANSEA 4035

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

(Delivered unless otherwise stated)

September 30, 1953

## PIG-IRON

**Foundry Iron.**—No. 3 IRON, CLASS 2:—Middlesbrough, £13 18s. 0d.; 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. 0d., d/d Grange-mouth.

**Cylinder and Refined Irons.**—North Zone, £18 3s. 0d.; South Zone, £18 5s. 6d.

**Refined Malleable.**—P, 0.10 per cent. max.—North Zone, £19 3s. 0d.; 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. 0d.; Scotland (Scotch iron), £16 18s. 6d.; Sheffield, £17 13s. 0d.; 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., £53 10s. 0d., basis 45 per cent. Si, scale 21s. 6d. per unit; 70/84 per cent., £82 10s. 0d., basis 75 per cent. Si, scale 23s. per unit.

**Ferro-vanadium.**—50/60 per cent., 23s. 8d. to 25s. 0d. per lb. of V.

**Ferro-molybdenum.**—65/75 per cent., carbon-free, 10s. 0d. to 11s. 0d. per lb. of Mo.

**Ferro-titanium.**—20/25 per cent., carbon-free, £165 0s. 0d. to £181 0s. 0d. per ton; 38/40 per cent., £229 0s. 0d. to £235 0s. 0d. per ton.

**Ferro-tungsten.**—80/85 per cent., 20s. 0d. per lb. of W.

**Tungsten Metal Powder.**—98/99 per cent., 23s. 3d. per lb. of W.

**Ferro-chrome** (6-ton lots).—4/6 per cent. C, £85 4s. 0d., basis 60 per cent. Cr, scale 23s. 3d. per unit; 6/8 per cent. C, £80 17s. 0d., basis 60 per cent. Cr, scale 26s. 9d. per unit; max. 2 per cent. C, 2s. 2d. per lb. Cr; max. 1 per cent. C, 2s. 2½d. per lb. Cr; max. 0.15 per cent. C, 2s. 3½d. per lb. Cr; max. 0.10 per cent. C, 2s. 3¾d. per lb. Cr; max. 0.06 per cent. C, 2s. 4d. per lb. Cr.

**Cobalt.**—98/99 per cent., 20s. 0d. per lb.

**Metallie Chromium.**—98/99 per cent., 6s. 3d. to 6s. 9d. per lb.

**Metallie Manganese.**—93/95 per cent., carbon-free, £225 0s. 0d. to £232 0s. 0d. per ton; 96/98 per cent., £255 0s. 0d. to £262 0s. 0d. per ton.

**Ferro-columbium.**—60/75 per cent., Nb + Ta, 40s. 0d. to 70s. 0d. 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 0s. 0d.; silico-manganese, £33 16s. 0d.; free-cutting, £28 16s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £32 12s. 0d.; case-hardening, £33 0s. 0d.; silico-manganese, £34 17s. 6d.

**Billets, Blooms, and Slabs for Forging and Stamping.**—Basic soft up to 0.25 per cent. C, £29 16s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £30 16s. 0d.; acid, up to 0.25 per cent. C, £33 0s. 0d.

**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. 0d.; 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. 0d.; 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.**—Cash, £235 0s. 0d. to £237 10s. 0d.; three months, £221 10s. 0d. to £222 0s. 0d.; settlement, £237 10s. 0d.

**Tin.**—Cash, £615 0s. 0d. to £617 10s. 0d.; three months, £606 0s. 0d. to £607 10s. 0d.; settlement, £617 10s. 0d.

**Zinc.**—October, £69 15s. 0d. to £70 0s. 0d.; January, £68 5s. 0d. to £68 10s. 0d.

**Refined Pig-lead.**—October, £92 7s. 6d. to £92 12s. 6d.; January, £88 10s. 0d. to £88 15s. 0d.

**Zinc Sheets, etc.**—Sheets, 15 g. and thicker, all English destinations, £99 7s. 6d.; rolled zinc (boiler plates), all English destinations, £98 2s. 6d.; zinc oxide (Red Seal), d/d buyers premises, £87 0s. 0d.

**Other Metals.**—Aluminium, ingots, £150 0s. 0d.; magnesium, ingots, 2s. 10½d. per lb.; antimony, English, 99 per cent., £225 0s. 0d.; quicksilver, ex warehouse, £64 15s. 0d.; nickel, £483 0s. 0d.

**Brass.**—Solid-drawn tubes, 22½d. per lb.; rods, drawn, 32d.; sheets to 10 w.g., 239s. 0d. per cwt.; wire, 29½d.; rolled metal, 235s. 9d. per cwt.

**Copper Tubes, etc.**—Solid-drawn tubes, 27½d. per lb.; wire, 267s. 0d. per cwt. basis; 20 s.w.g., 296s. 0d. per cwt.

**Gunmetal.**—Ingots to BS. 1400—LG2—1 (85/5/5/5), £160 0s. 0d. to £170 0s. 0d.; BS. 1400—LG3—1 (86/7/5/2), £170 0s. 0d. to £190 0s. 0d.; BS. 1400—G1—1 (88/10/2), £252 0s. 0d. to £285 0s. 0d.; Admiralty GM (88/10/2), virgin quality, £252 0s. 0d. to £300 0s. 0d. per ton, delivered.

**Phosphor-bronze Ingots.**—P.Bl, £265 0s. 0d. to £295 0s. 0d.; L.P.Bl, £215 0s. 0d. to £240 0s. 0d. per ton.

**Phosphor Bronze.**—Strip, 351s. 6d. per cwt.; sheets to 10 w.g., 373s. 3d. per cwt.; wire, 44½d. per lb.; rods, 38½d.; tubes, 37d.; chill cast bars: solids 40d., cored 41d. (C. CLIFFORD & SON, LIMITED.)

**Nickel Silver, etc.**—Rolled metal, 3 in. to 9 in. wide × .056, 3s. 0½d. per lb.; round wire, 10g., in coils (10 per cent.), 3s. 5½d.; special quality turning rod, 10 per cent. ½ in. dia., in straight lengths, 3s. 4½d. All prices are net

## Forthcoming Events

OCTOBER 5

### East Midlands Metallurgical Society

Presidential address by Dr. H. K. Lloyd, "Hydrogen in Steel," 7.30 p.m. in the Nottingham and District Technical College, Shakespeare Street, Nottingham.

### Institute of British Foundrymen

Sheffield branch—Smoking Concert. Presidential Address by M. M. Hallett, "Communications" at the Royal Victoria Station Hotel.

### Institution of Works Managers

Paisley group:—"Management Ethics for Foremen," by W. H. Bower, 7.30 p.m., in the canteen of Eadie Bros. and Company, Limited, Paisley.

OCTOBER 6

### Incorporated Plant Engineers

London branch:—"Patterns, Castings and Foundrywork," by B. Levy, president of the London branch of the Institute of British Foundrymen, 7 p.m. (preceded by tea at 6.30) at the Royal Society of Arts, John Adam Street, Adelphi, Strand.

OCTOBER 7

### Incorporated Plant Engineers

Southampton branch:—"Oxygen in Industry," by E. Ryalls, 7.30 p.m. at the Polygon Hotel.

### Purchasing Officers' Association

Tyneside branch:—"Purchasing—the Profession and the Association," by P. J. H. Bailey, 7 p.m., Crown Hotel, Clayton Street West, Newcastle-upon-Tyne.

OCTOBER 8

### Institute of British Foundrymen

Lincolnshire branch:—"C Process," by J. Fallows, 7.15 p.m., at Lincoln Technical College.

### Institution of Works Managers

Wembley sub-branch:—"Work Study as a factor in Industrial Efficiency," by A. G. Northcott, 12.45 p.m., at the Century Hotel, Forty Avenue, Wembley.

OCTOBER 10

### Institute of British Foundrymen

Scottish branch:—Presidential address, followed by "Investment Precision Casting without an Expendable Pattern," a paper by A. Dunlop, 3 p.m., at the Royal Technical College, Glasgow.

## Obituary

THE DEATH is announced of Miss Dora Ostroff, president of the foundry concern of Thomas Paulson & Son, Inc., of Brooklyn, New York. Miss Ostroff was a member of the American Foundrymen's Society and she died in Paris while participating in the International Foundry Congress last week.

THE DEATH HAS OCCURRED of Dr. Th. Geilenkirchen, who was editor of *Die Giesserei*—the German foundry journal—between the two wars. He organized the International Foundry Congress held in Düsseldorf in 1936. He was also secretary of the *Verein Deutscher Giessereifachleute*, and well known in international foundry circles.

MR. PERCY BUTLER, director and general manager of Bruce Peebles & Company, Limited, engineers, Edinburgh, has died. Born at Normanton, Yorks. in 1896, he gained his early experience with Rhodes & Company, Limited, Wakefield. After service in the first world war he took his B.Sc. degree in electrical engineering at Leeds University and joined the Metropolitan Vickers Electrical Company, Manchester, and became a transformer designer. In 1926 he was appointed senior transformer designer to Bruce Peebles & Company, Edinburgh, and was promoted manager of the transformer and rectifier departments in 1943; joint general manager in 1952, and a director of the company later in the same year.

PIG

Low Phosphorus  
Refined & Cylinder  
Hematite  
Malleable  
Derbyshire  
Northamptonshire  
Swedish Charcoal

Ferro Silicon (12-14%)  
Alloys & Briquettes  
N.F. Metals & Alloys  
Limestone  
Ganister  
Moulding Sand  
Refractories

IRON

## WILLIAM JACKS & CO., LTD.

Winchester House, Old Broad Street  
London, E.C.2.

TELEPHONE: LONDON WALL 4774 (8 Lines)

<p style="margin: 0;"><u>Birmingham, 2.</u> 39, Corporation Street. MIDLAND 3375/6.</p>	<p style="margin: 0;"><u>Liverpool, 2.</u> 13, Rumford Street. CENTRAL: 1558.</p>	<p style="margin: 0;"><u>Glasgow, C.2.</u> 93, Hope Street. CENTRAL: 9969.</p>
---	---	--

## NOTICE

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

## SITUATIONS WANTED

**YOUNG FOUNDRY CHARGEHAND** (Mechanised Iron) seeks progressive position. Five years' indentured apprenticeship. City and Guilds certificates. Patternmaking and foundry practice.—Box 3777, FOUNDRY TRADE JOURNAL.

**FOUNDRY MANAGER**, aged 38, M.I.B.F., City and Guilds, experienced, ferrous and non-ferrous, loose pattern and mechanised, used to complete control, buying, selling, and production, excellent references.—Box 3787, FOUNDRY TRADE JOURNAL.

**NON-CORROSIVE Steel Foundryman** wide administrative experience, seeks supervisory position with progressive company.—Box 3786, FOUNDRY TRADE JOURNAL.

**PRACTICAL REPRESENTATIVE**, M.I.B.F., 30 years' experience in all branches as Works Manager and Technical Representative, requires position. Well known to Foundry Managements, particularly North England and Scotland. Fully capable of demonstrating where necessary.—Box 3785, FOUNDRY TRADE JOURNAL.

**FOUNDRY FOREMAN/SUPERINTENDENT**, 45, desires position, 30 years' experience in all classes of ferrous foundry practice, mechanised, jobbing, etc., A.M.I.B.F.—Box 3790, FOUNDRY TRADE JOURNAL.

**STEEL FOUNDRY METALLURGIST** (35) desires change. D.A. and H.F. Furnaces. Ingots and castings. Experienced modern foundry methods and draughtsmanship.—Box 3791, FOUNDRY TRADE JOURNAL.

**GENTLEMAN**, with good connections in Engineering Trades and long experience of Technical Sales and administration in Foundry trade is open to entertain offers affording scope for exercise of ability, knowledge and experience. Excellent credentials.—Box, 3789, FOUNDRY TRADE JOURNAL.

**FOUNDRY MANAGER**, 45, wishes change, present position full control jobbing and semi mechanised foundries. Experienced all branches iron and non-ferrous, heavy jobbing, repetition, and mechanised plants, estimating, costing and sales.—Box 3783, FOUNDRY TRADE JOURNAL.

## SITUATIONS VACANT

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

**FOUNDRY** in S.W. London requires active full-time sales representative in the Midlands with connections in the trade. Capable of organising sales effort and preferably with working knowledge of up-to-date foundry practice. Progressive position and adequate salary to successful candidate.—Box 3745, FOUNDRY TRADE JOURNAL.

## SITUATIONS VACANT—contd.

**FOUNDRY MANAGER**, must be expert in chill cast yellow metal rods and cored bars, for sole charge of Foundry. Apply with full details to—"CHAIRMAN," METALS & ALLOYS LTD., Minworth, Birmingham.

**PATTERNMAKER**, genuine opportunity for above average craftsman experienced in motor or aircraft work. Age preferably 25 to 35. Flat available.—G. PERRY & SONS, Leicester.

**METALLURGICAL CHEMIST**, 22-25 years of age required, with some experience of ferrous and non-ferrous analyses. Near Bradford, Halifax and Huddersfield.—J. BLAKEBOROUGH & SONS LTD., Brighouse, Yorkshire.

**FOUNDRY MANAGER** required for Australia. Experienced in mechanical and floor jobbing work, with metallurgical training. Knowledge stove and bath castings. Salary £A1,500/£A1,700 p.a., plus bonus. First-class passages applicant and family.—Box 3776, FOUNDRY TRADE JOURNAL.

**FIRST-CLASS MOULDERS** used to Machine Tool castings and having served apprenticeship, wanted for Machine Tool Foundry in provincial town in North Wales (castings up to 5 tons). Good rates of pay plus bonus. Houses available for suitable applicants.—Write Box 3788, FOUNDRY TRADE JOURNAL.

**FOUNDRYMAN** required for India (Bombay Area) with considerable experience of Automobile Engine Castings preferably having specialised in Cylinder Blocks. Good salary according to experience, free passage. Willing consider man in late fifties with long experience in this kind of work. Apply in confidence giving full details of experience to—Box 3792, FOUNDRY TRADE JOURNAL.

**DRAUGHTSMAN** required for Foundry Consultant's Office. Foundry experience essential. Experience of Mechanical Handling an advantage. Able to work with minimum supervision. Apply stating salary, age, experience, etc., to—P. C. FASSOTT, Trevelyan Chambers, Boar Lane Leeds, 1.

**MANAGER** required to take full control progressive iron and non-ferrous foundry capable of producing 100 tons monthly. Preston district. Applicants should have foundry and office training. State full particulars and experience.—Box 3784, FOUNDRY TRADE JOURNAL.

**FOUNDRY FOREMAN** required for Grey Iron Foundry in the Midlands, to take charge of moulders producing castings from 56 lb. to 5 cwt. Must have knowledge of cupola control, together with metallurgical qualifications. Write, with full particulars of experience and salary expected.—Box 3770, FOUNDRY TRADE JOURNAL.

**WRIGHT & PLATT, LIMITED**, the World's Largest Engineering Master Patternmakers, with own ferrous and non-ferrous foundry, with unlimited capacity, desire to appoint experienced representatives in some of the larger towns and districts on a part salary and commission basis. Write fully giving age, experience, connections, etc., to Irving Street, Birmingham.

## SITUATIONS VACANT—contd.

**FOUNDRY FOREMAN** required by small Non-ferrous Jobbing Foundry producing high grade castings for the engineering trade. Bench, Floor and Machine Moulding.—Write, stating experience and salary required, to Box 3774, FOUNDRY TRADE JOURNAL.

**PATTERNMAKER** (preferably single) required to take charge and organise small pattern shop in Grey Iron Foundry. Must be able to work on own initiative, be conversant with up-to-date production of metal pattern plates for small repetition moulded castings and willing to supervise training of apprentices. Write stating age, full experience and salary expected, to—BUCKLEY FOUNDRY (Chester) Limited, Buckley.

**FOREMAN PATTERNMAKER** required to take charge of Pattern Shop of high-class Grey Iron Foundry in Birmingham. Applicants must have had experience in the production of wood and metal patterns for the automobile industry, and to have held a previous position in a supervisory capacity. The vacancy offers a permanent superannuated staff position to the right man.—Apply, stating age, experience and salary required, Box 3778, FOUNDRY TRADE JOURNAL.

**A LONDON Foundry**, producing high duty iron castings, requires a young man as **PERSONAL ASSISTANT** to the Works Director. Applicants should be between 25-33 years of age, and possess a good general and technical education and practical experience. This is a new appointment and offers excellent prospects for a suitably qualified man who has initiative and can assist in production and administrative problems.—Box 3775, FOUNDRY TRADE JOURNAL.

**MEN** with good experience of selling Foundry Products required to act as **LOCAL SALES REPRESENTATIVES** by progressive foundry manufacturing Grey Iron and High Duty Iron Castings. A good salary will be paid to the right man. Replies, which will be treated in confidence, should give full details, including age, experience, employers, and areas in which the applicant has operated.—Box 3780, FOUNDRY TRADE JOURNAL.

**AVELING-BARFORD, LTD.**, Grantham, require a Metallurgist primarily for the supervision of heat treatment processes and metallurgical quality control duties. This is a new appointment and the successful candidate will be required to establish a small Metallurgical Department capable of performing the above functions. Applicants should be of graduate or equivalent educational status and have had industrial experience in the fields outlined. Assistance with housing accommodation will be provided, if necessary. Replies, giving pertinent details and an indication of salary required should be forwarded to.—THE WORKS MANAGER.

## AGENCY

**AGENCY**.—Experienced, well-known Technical **FOUNDRY REPRESENTATIVE**, A.M.I.B.F., with live connections throughout British Isles, wishes to obtain Agency for Foundry Engineering Supplies/Equipment.—Box 3773, FOUNDRY TRADE JOURNAL.

**PROPERTY**

**S** MALL Iron Foundry for Sale, York-shire. Capacity up to 15 cwt. Freehold.—Box 3768, FOUNDRY TRADE JOURNAL.

**O** WING to retirement of Directors holding controlling interest an opportunity occurs for interested parties to acquire the entire Share Capital of a Glasgow Private Company. The Assets include a well equipped Iron Foundry situate in Glasgow with adjacent Mineral Station and Main Road. Total area approx. 23,000 sq. ft. Buildings, etc., 9,000 sq. ft. Freehold. No Bonds, Loans or Debentures. Plant includes new 5-ton Overhead Electric Crane, 2-ton/hr. Cupola, Mould and Core Stoves, Core Shop, Sand Mixer, Royer, Moulding Boxes and Dressing Shop Equipment. Output 50 tons castings per month. Adequate Ministry Licences. Audited accounts for several years available for inspection. Enquiries from Principals only are invited. Address in first instance to:—Box No. 3790, FOUNDRY TRADE JOURNAL.

**WANTED**

**O** NE Copy of "Melting Iron in the Cupola" by J. E. Hurst. Please write Box 3756, FOUNDRY TRADE JOURNAL.

**MACHINERY WANTED.**

**W** ANTED.—Indicating or Recording Thermometer. Any range, to include a working temperature from 200/400 deg. F., or equivalent, in Centigrade. Must be in good condition.—HILSYDE FOUNDRY Co., HARRISENHEAD, Stoke-on-Trent.

**W** ANTED.—Core Sand Mixer, of rotary or trough type, preferably with motor attached. State price, condition, and where to be seen.—ERRO, LTD., Manor Road, Erith.

**WANTED—contd.**

**MACHINERY.**

**W** ANTED.—2 tons, or thereabouts, Electric Arc Steel Melting Furnace. Age not important. Hand-operated electrodes accepted.—Box 3733, FOUNDRY TRADE JOURNAL.

**W** ANTED.—Pallet Conveyor Tracks. Approximately 250 ft.—Box 3779, FOUNDRY TRADE JOURNAL.

**W** ANTED.—RD.5 or BT.5 Jolt Squeeze Turnover Moulding Machine.—Particulars of price, condition, etc., to HENRY WALLWORK & Co., LTD., Red Bank, Manchester, 4.

**W** ANTED.—250-lb. Oil-fired Tilting Furnace, Morgan Type CA or similar. Portable Electric Sieve.—AUTOMATIC PUMPS, LTD., Maidstone, Kent.

Pallet Conveyor, plates about 3 ft. by 2 ft.  
Pneumatic Plain Jolter, table 21 in. by 17 in.  
Rotary Blower, 1,400 c.f.m. to 7 lbs. per sq. in. pressure.  
Air Compressor, 2,000 c.f.m. to 30 lbs. per sq. in.  
Sand Mills, up to 6 ft. dia. pan.  
Exhaust Fans, all sizes.  
Box 3748, FOUNDRY TRADE JOURNAL.

**MACHINERY FOR SALE**

**T** WO Colemans C. N. Model Moulding Machines complete. Nearly new. Cost £400 each. Accept £100 each.—L. A. JULL. L.E.C. Factory, Bognor Regis.

**MACHINERY FOR SALE—contd.**

**F** OR THE DISPOSAL AND PURCHASE OF ALL TYPES OF FOUNDRY PLANT AND MACHINERY.

**S. C. BILSBY, A.M.I.C.E., A.M.I.E.E.,**  
Haing Road, Tividale, Tipton, Staffs.  
TIPTON 2448.

**T** WO Molineux type X1 Pin Lift Rapid Combination Jolt, Squeeze Moulding Machines, complete. Very little used and in excellent condition. Birmingham area.—Box 3781, FOUNDRY TRADE JOURNAL.

**O** NE used 1½-Ton Electric Crane, by Herbert Morris, Ltd., Loughborough. Three-motor type, for 400/440 volts, 3-phase, 50 cycles; cab control, rail centres 27 ft. 6 in. Inspection invited.—JOHN NEEDHAM & SONS, LTD., Portwood Foundry, Stockport.

**F** OR SALE: HUNDTWEBER CENTRIFUGAL CASTING MACHINE suitable for casting Bronze Bushing, Cylinder Liners, Piston Rings, etc. Condition as new.—Box 3750, FOUNDRY TRADE JOURNAL.

**H** ERMAN JARR ROLL OVER MACHINE with clamps, size 25 in. by 36 in., 750 lbs. capacity. Ten years old, but not used in high production unit. £335.—RICHARDS, Phoenix Works, Leicester.

**ALBION  WORKS**

**20-CWT.** capacity "Massey" Clear Space Pneumatic Power Hammer. Stroke 32 in., ram pallet face 13 in. by 10 in., ram pallet face from floor 24 in., complete with anvil block, pallets, baseplate. 70 h.p. Crompton-Parkinson S.C. Motor, 400-440/3/50, and starter.  
Unused. Ditto. New 2 years ago; never installed; latest four flat type ram, clear space. 80 h.p. C/P Motor; virtually new. Delivery ex-stock.  
"Hercules" Belt-driven Forging Hammer. Weight of ram 160 lb., 16 in. stroke, 225 blows per minute to take bars up to 4½ in.  
"Goliath" Belt-driven Forging Hammer. Weight of ram 60 lb., 15 in. stroke, 275 blows per minute to deal with bars up to 3½ in.  
Drop Stamp Installation, consisting of 5½, 3- and 2-cwt. capacity; all housed in supporting gantry, with practically new overhead gear, including friction lifters, anvil blocks, etc.

**THOS W. WARD LTD.**

**ALBION WORKS : SHEFFIELD**

Phone 26311 "Grams: "Forward."  
Remember Wards might have it!

**DELIVERY EX STOCK**

New shot blast cabinets complete with Dust Extractors, etc., size 5ft. x 3ft. Also new 8ft. cube room Plants

Low prices.

Please send for our NEW illustrated catalogue on request

**ELECTROGENERATORS LTD.**

14 AUSTRALIA RD., SLOUGH

Telephone: SLOUGH 22877

BUY FROM US AND SAVE MONEY

**OCEAN IRONWORKS NEWTON ST., OFF BOTTOMGATE, BLACKBURN.**

**G. F. SINGLETON & CO.,**

will offer for **SALE BY AUCTION** on the premises on **MONDAY 12th OCTOBER, 1953** at 11a.m. (unless previously sold by private treaty), the

**BRICK BUILT FOUNDRY**

measuring 54ft. 6in. x 30ft 6ins. x 22ft. high to eaves. Core Drying Oven, Cupola House, Office and Covered Yard (total floor area 4250 sq. ft.) together with the **ELECTRICALLY DRIVEN PLANT** including 2½ton Overhead Travelling Crane. Jackman No. 2 Cupola, Edge Runner Sand Mill, Pneulec Royer Sand Mixer, Brass Furnace, Steel Moulding Boxes, Fettling Equipment, Weighing Machines and a Morris Light Goods Van, also the **STOCK IN TRADE** of Pig Iron, Scrap Metal and other materials.

The Premises are Leasehold for the residue of 999 years subject to a ground rent of £12. 13. 4½ but with the benefit of a receivable rent of £6. 6. 10½. A Plot of Land adjacent thereto, used as a Scrap Yard, is held on short lease. Manner of Offering: The Premises and Plant will be offered firstly as a whole and, if not so sold, the premises and certain fixtures will be offered as a separate lot and the contents sold piecemeal.

Note:—The Premises are also suitable for Motor Body Building, or as Garage for Heavy Goods Vehicles.

On View October 8th and 9th, 10a.m. to 4 p.m. or by appointment. Particulars and Catalogues from the Auctioneers, 9, Richmond Terrace, Blackburn (Tel. 7722/3), 53, King Street, Manchester 2 (Tel. BLA 2264/5), or from the Solicitors: Messrs. **FOYSTER, WADDINGTON, MORGAN & ROBINSON**, 40, Brazenose St., Manchester 2 (Tel. DEA 2178). and Messrs. **ROBINSON & SONS**, Preston New Road, Blackburn (Tel. 6282).

## MACHINERY FOR SALE—contd.

## 600

## CRANES.

NEW 10-ton Rushworth two-motored Electric Derrick Crane, with 120-ft. Jib. Motorized 400/3/50.

New 5-ton Rushworth two-motored Electric Derrick Crane, with 120-ft. jib. Motorized 400/3/50.

Anderson-Grice 5-ton two-motor Electric Derrick Crane, new 1950. With 120-ft. steel jib and complete with B & A automatic safe load indicator. Visible and audible warnings. Motorized 400/3/50.

Several new Rushworth, 2, 3 and 5-ton capacity Hand Derrick Cranes, with 50-ft., 60-ft. and 70-ft. Jibs.

Two Tate 6-ton, 4 motor, Electric Mobile Cranes, fully slewing and fed by overhead cable. Mounted on 4 twin solid-tyred wheels, fitted 24-ft. lattice cantilever jibs. Complete with cabs and suitable for 415/3/50.

Jones "Super" 40, 3-ton Mobile Cranes, fitted 30-ft. lattice Jibs, and powered by Ruston or Turner Diesel Engines. Mounted on crawlers and each complete with Cab.

Several Jones "Super" 22, 2-ton Mobile Cranes, fitted Cantilever Jibs, and powered by Ruston or Turner Diesel Engines. Mounted on pneumatic tyred wheels and each complete with Cab.

3½/5-ton Portal Wharf Crane by Derrick & Hoist Construction Co. Rail centres 15 ft. Length of Jib 64 ft. 5-motored, voltage 440/3/50. Weight approx. 70 tons.

New B. H. & C. "Pingon" 30/100-cwt. Tower Cranes. Practically self-erecting, load handled along full length of jib, no load swing, instantaneous control. Lifts up to 129 ft. outreach to 82 ft.

New Portable House Building Crane, by The British Hoist & Crane Co. Will lift 10 cwt. at 17 ft., 5 cwt. at 35 ft. radius. Lifts up to 48 ft. Easily erected by two men.

New Brayda Electric Tower Cranes, 1½-ton at 65 ft. radius, max. load 69 cwt. max. height of hook 130 ft.

## GEORGE COHEN

SONS &amp; CO., LTD.

WOOD LANE, LONDON, W.12

Tel: Shepherds Bush 2070

and STANNINGLEY nr. LEEDS

Tel: Pudsey 2241

pulverite

GOAL DUST

lowest in ash

The STANDARD PULVERISED FUEL Co. Ltd.

Head Office:

166 VICTORIA STREET, WESTMINSTER,  
LONDON, S.W.1. Tel.: VICTORIA 3121/2/3

## MACHINERY FOR SALE—contd.

## FOR SALE.

**PNEULEC** Herman Jarr Ram Rollover Machine, complete with Pattern Draw Equipment. Machine Rollover capacity, 1,500 lbs. Jolt Unit capacity, 2,000 lbs. Bumper Table, 30 in. by 48 in. Turnover Plate, 36 in. by 48 in. This machine is in good condition, and is approximately three years old.—Box 3782, FOUNDRY TRADE JOURNAL.

## SALES.

**L**ANCASHIRE Steel Boiler Tube, 7/16 in. throughout, 27 ft. long, 37 in. inside dia., tapering last 6 ft. to 29 in. inside dia. Also new 4 ft. by 4 ft. by ¾ in. Steel Drop Bottom Plate, with new doors and hinges, and 4 steel supports. Purchased to make cupola, but never used. Price £90. **JOHN HOLKER**, Central Eng. Works, Church Street, Westhoughton, Bolton.

**F**OR SALE.—70 Sterling Steel Moulding Boxes, 19½ in. pin centres, 7 in. deep, 16½ in. inside, beading top and bottom, fitted with double lugs, drilled for ¾ in. dia. pins, two central lifting handles, and wedge clamping keys. In very good condition.—**ARTHUR LYON & Co. (ENG'RS.) LTD.**, Park Works, Stamford, Lincs.

## FOR SALE.

**N**O. 16 ATRITOR CRUSHER by Alfred Herbert, complete with Feed Hopper, overhauled and with a quantity of spares. Also a No. 12 Atritor by Alfred Herbert, for which we have available about 6 tons of spares. Both these machines are offered at extremely low prices for quick clearance.

## SAVILLE-CALVERT (MACHINERY) LIMITED.

BIRMINGHAM ROAD,  
STRATFORD-ON-AVON

Tel.: Stratford-on-Avon 3681.

**N**EW Centre Axis Tilting Furnace. 600 lbs. Oil-fired, with Morgan Oil Burner and new Keith Blackman A.C. Blower. £375.

**N**EW motorised Ingersoll-Rand three cylinder, air cooled, two-stage Compressor with inter-cooler. £200. Coleman Core Blowing Machine, seen little use, condition as new, size R2. £375.

Portable Electric Sieve, A.C. motorised. £33.

Fordath Senior Sand Drier. £85. Also August Sand Drier. £30.

Over 40 Bale-Out Furnaces in stock, cheap.

Large stock of Air Receivers at reasonable prices.

New Broomwade Compressors.

New Keith Blackman Fans.

Morgan Tilting Furnaces.

Two new ½ ton aluminium capacity Lip Axis Tilting Furnaces by British Furnaces.

Immediate attention to all enquiries.

ELECTROGENERATORS LTD.,

Australia Road, Slough.

Telephone: Slough 22877.

## MACHINERY FOR SALE—contd.

## FOR SALE.

7-ton E.O. Travelling Crane. Cabin controlled, 38 ft. span. Low price. 5-ton ditto. ditto. 58 ft. span. 7½-ton Elec. Lifting and Travelling Block.

**S. C. BILSBY, A.M.I.C.E., F.A.M.I.E.E.,**  
Hainge Road, Tividale, Tipton, Staffs.

**"S**AND WIZARD" Shot Blast Machine for Sale. Barrel size, 44 in. by 40 in. Electric, 400 volts, 3-phase, 50 cycles. Machine almost new and in excellent condition, complete with sack-type dust extraction plant. Offers.—Box 3766, FOUNDRY TRADE JOURNAL.

**1** CUMMING Jolt Table Moulding Machine. Table size, 20 in. by 30 in.  
1 Cumming Jolt Table Moulding Machine. Table size, 30 in. by 40 in.  
1 Holman Foundry Floor Rammer. Size 20R.

1 6-cwt. Bogie Ladle.

2 6-in. Portable Wolf Grinders.

1 manually-operated Time Clock.

1 Lister Diesel Engine, twin cylinder,

10-12 b.h.p., 600/650 r.p.m.

**H. HEWINS, LTD.**, Port Foundry, Brimscombe, Glos. Tel.: Brimscombe 2239.

One B.M.1 Sand Mill, by Foundry Equipment. Surplus to requirements. As new.

One Crocodile Jaw Type Cropper, to take up to ¾ in. plate, by Brookes. In full working order.

Two Tilghman's Shot Blast Cabinets, 30 by 30. Rotary Barrel type, with two nozzles. Barrel 19 in. long, 2 ft. dia. Complete with Motors, dust arrestor, etc.

One Core Making Machine—Rocket, by Coggen.

Three Alldays & Onions No. 24 Duplex Fans, 7 in. outlet.

**SYKES & HARRISON, LTD.,**

Port Penrhyn Foundry, Bangor, N. Wales

## CAPACITY AVAILABLE

**C**APACITY available for Iron Castings up to 4 tons. Competitive prices, with good deliveries. Foundry established since 1789.—**J. W. THOMPSON (IRONFOUNDERS), LTD.**, Bridge Foundry, Sunderland.

## H. G. HOPPER (Kingston) Ltd.

HAMPDEN ROAD, KINGSTON

KIN 0177/8/9

PATTERNS (Wood &amp; Metal)

CASTINGS (Iron &amp; Non-Ferrous)

GEAR CUTTING

GENERAL MACHINING

All at our

KINGSTON WORKS

Good Deliveries



**CAPACITY AVAILABLE**

**I**MEDIATE capacity available for Iron Castings up to 2 tons. Machine Tool Castings, etc.—**H. H. MARTIN & Co., LTD.**, Sunningend Works, Cheltenham, Glos.

**C**APACITY available for Light Castings weighing from 1 lb. to 5 cwt., including Castings for Vitreous Enamelling. **WESTERN LIGHT CASTINGS FOUNDRIES, LTD.**, Fairwood Foundry, Gowerton, near Swansea, manufacturers of malleable iron castings.

**N**ON-FERROUS FOUNDRY—First-class quality castings in Aluminium, Bronze, Gunmetals, etc., at competitive prices, including patterns if required.—**BESTON LEE & Co., Ltd.**, 33, Swindon Road, Stratton St. Margaret, Wilts.

**C**ASTINGS.—We can save your porous castings, ferrous or non-ferrous, by an approved Impregnation Process; sample castings treated.—**RECOVERO, LTD.**, 66, South Harrow Viaduct, Harrow, Middx. Phone: Byron 1178.

**C**APACITY available for castings weighing from 1 lb. to 15 tons, including Quasi-Bessemerised ingot moulds up to 10,000 tons per annum.—**THE CROSS FOUNDRY & ENGINEERING Co., LTD.**, Gorseinon, near Swansea.

**M**ECHANISED FOUNDRY.—Malleable and Grey Iron Castings offers 20 tons per week free capacity at early date. Preference for boxes up to 28 in. by 16 in. by 5 in. by 5 in. Snap Flasks up to 14 in. by 14 in. by 3 in. by 3 in. Hand moulding capacity also available. Cast Iron Pipes flanged and specials. Patternmaking facilities if required.—**E. J. WALLACE**, 39, Constitution Street, Dundee.

**CAPACITY AVAILABLE—contd.**

**F**OUNDRY capacity available. For up to 5 cwt., machine moulded; for up to 2 tons, floor moulded. Prompt delivery.—**LEWIS' FOUNDRY Co., Ltd.**, Ammanford.

**W**EST RIDING OF YORKSHIRE.—Huddersfield Foundry has capacity for Light, Medium, and Heavy Castings up to 4 or 5 tons. Engineering castings a speciality. All enquiries will receive immediate attention.—Box 3765, **FOUNDRY TRADE JOURNAL**.

**N**EW Foundry, starting for the sole production of Shell Moulded Castings, ferrous and non-ferrous, invites enquiries for Castings suitable for this process.—Replies in first instance to Box 3735, **FOUNDRY TRADE JOURNAL**.

**MISCELLANEOUS**

**R**EFRACTORY MATERIALS.—Moulding Sand, Ganieter, Limestone, Core Gum; competitive prices quoted.—**HENSALL SAND Co., LTD.**, Silver Street, Halifax.

**N**OW is the time to change your Supplier of Sand. Try Southport Wind Blown Sea Sand for castings, free from shell. Any quantity, Road or Rail.—**JOHN LIVESBY (AINSDALE), LIMITED**, Ainsdale, Southport. Telephone: Southport 77489.

**W**E welcome your enquires for all types of pattern equipment, models, castings.—**A. P. HOLLINGS & SONS**, 2, Nelson Mews, Southend-on-Sea. Tel. 2350.

**MISCELLANEOUS—contd.**

**M**ANURE, especially suitable for Foundry work and as supplied to the trade for over 25 years. Quotations on request.—**FRANK GINSTER**, Moxley, Wednesbury. Phone 0688 Wednesbury.

**F**IREWOOD for Cupolas. Sleepers and Sleeper Wood in wagon loads.—**TILLEY'S (WOLVERTON), LTD.**, Wolverton, Bucks.

**PATTERNMAKING**

**P**ATTERNS for all branches of Engineering for Hand and Machine Moulding.—**FURMBSTON AND LAWLOR, LTD.**, Letchworth.

**P**ATTERN EQUIPMENT of all types and sizes. Accurate workmanship. Quotations by return.—**HAYWOOD BROS.**, Victoria Works, Littleborough, Lancs. Tel. 8543.

**C**OMPLETE PATTERN SERVICE.—WOOD Patts, Coreboxes and MODELS. Ultra precision equipment for SHELL moulding and MECHANISED foundry production. YOUR own METALS machined and fitted. Quick REPAIR service. Brass slotted corebox AIR VENTS. STEEL corebox DOWELS (Pat. App. For). Iron or alum MACHINED PLATES. Ejector Pins and Springs. Matching dowels for SHELL PLATES.—**BOOTH BROS. ENGINEERING**, Baggrave Street, Leicester. 67020.

**CROCKETT & CO.**

Engineers' Pattern Makers  
43-44, Hoxton Square,  
Old Street, London, N.1  
Telephone: Shoreditch 6022

**PATTERNMAKERS' Section**

**PATTERNS (DERBY) LIMITED**

SPECIALISTS IN HIGH CLASS PRECISION PATTERNMAKING

ALL BRANCHES OF THE TRADE CATERED FOR

KEEN QUOTATIONS

GOOD DELIVERY

**DARLEY STREET, DARLEY ABBEY, DERBY**

TELEPHONE: DERBY 58165

**A  
PATTERN  
SERVICE**

**H. FORREST & SONS (ENGINEER'S PATTERN MAKERS LTD.)**

CHAPEL STREET WORKS, LEVENSHULME,  
MANCHESTER, 19

Telephones: RUSHOLME 3699 and 3807

- LARGE AND SMALL WOOD PATTERNS AND CORE-BOXES.
- ★ METAL PATTERNS IN ALUMINIUM, BRASS, AND CAST-IRON.
- SYNTHETIC RESIN PATTERN AND MATCH-PLATES.
- ★ PRESSURE CAST ALUMINIUM ALLOY PATTERN AND MATCH PLATES.
- INSERT METAL AND PLASTIC PATTERNS IN CUSTOMERS' OWN PLATES.
- ★ METAL PATTERN EQUIPMENT FOR THE "C" PROCESS.
- PLASTER, PLASTIC OR METAL ODD-SIDES, CORE-DRIERS, ETC.
- ★ FABRICATED METAL PATTERN EQUIPMENT.
- PRESSURE OR GRAVITY DIES.
- ★ STEEL AND ALLOY MOULDS FOR ALL TRADES.

# PATTERNMAKERS' Section

ALL TYPES OF WOOD  
& METAL PATTERNS  
**COOKE, BAILEY LTD.**

MORLEY ST., HANLEY, STOKE-ON-TRENT  
Telephone : Stoke-on-Trent 2627

PATTERNMAKING  
LARGE CAPACITY AVAILABLE  
IN ALL BRANCHES OF THE TRADE  
**MARSDEN HIND & SON LTD.**

GUIDE BRIDGE WORKS,  
JOHN ST., ASHTON-U-LYNE.  
EST. 1929 TEL. : ASH 2426

**PATTERNMAKERS**  
(Engineering) CO. LTD.  
Shrewsbury Road, London, N.W.10  
**HIGH-CLASS PATTERNS  
NON-FERROUS  
CASTINGS**

Phone: ELGAR 8031/2

WOOD

## PATTERN MAKERS

METAL

PLATE OR LOOSE PATTERNS, MODELS, ETC.

Good accurate work at competitive prices and prompt delivery.  
Under personal supervision.

### J. H. MAY

117, CENTRAL STREET, LONDON, E.C.1  
CL Erkenwell 5085 & 3509

Branch Works CROWN WHARF, DACE ROAD, OLD FORD, E.3 AMHerst 3411



TOOL ROOM PATTERN  
EQUIPMENT  
FOR  
**SHELL  
MOULDS**

**HARGREAVES & GOTT LTD.**  
PRINCESS STREET,  
ROCHDALE, LANCs.  
PHONE : ROCHDALE 3223  
STOKE-ON-TRENT 29154

THE  
LARGEST  
**WOOD  
PATTERNS  
IN THE  
INDUSTRY**

We have pleasure in announcing that our capacity to manufacture the wide range of pattern equipment for the older and conventional foundry practices has now been augmented by further facilities to embrace precision class

## SHELL MOULDING PATTERNS

Layouts and design-methods prepared in our own drawing office embody technical "know-how", and our specialised machinery and equipment provides the tools for the job.

**B. LEVY & CO. (PATTERNS) LTD., OSBERT STREET,  
LONDON, S.W.1.**

Telephones: Victoria 1073 & Victoria 7486

# PATTERNMAKERS' *Section*

## PATTERN MAKERS IN WOOD AND METAL

PATTERNMAKERS  
TO THE  
ENGINEERING  
MOTOR, AERO  
& ALL OTHER  
TRADES



Telephone  
MIDLAND 3411  
3412  
3413

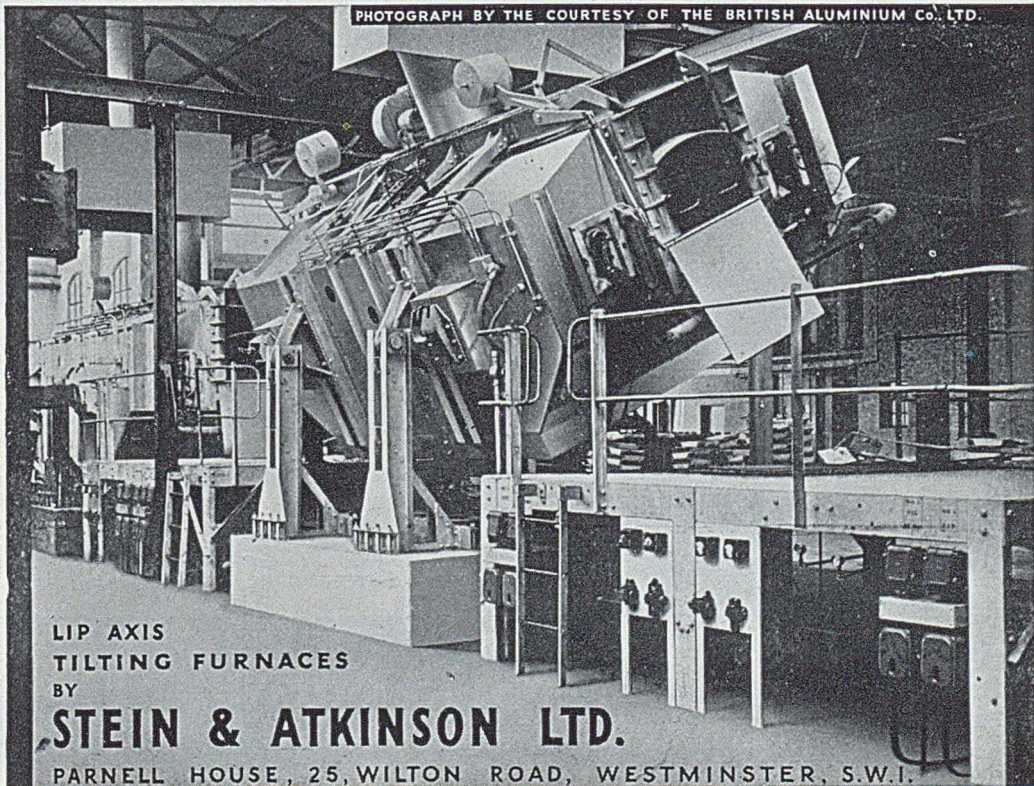
Telegrams  
"MODEL BIRMINGHAM"

PIONEERS OF  
SHELL-MOULDING  
EQUIPMENT TO  
ALL THE LEADING  
FIRMS IN  
THE COUNTRY

### THE WORLDS LARGEST ENGINEERING MASTER PATTERN & MODEL MAKERS

### 45-58 IRVING STREET, BIRMINGHAM · 15

PHOTOGRAPH BY THE COURTESY OF THE BRITISH ALUMINIUM Co. LTD.



LIP AXIS  
TILTING FURNACES  
BY

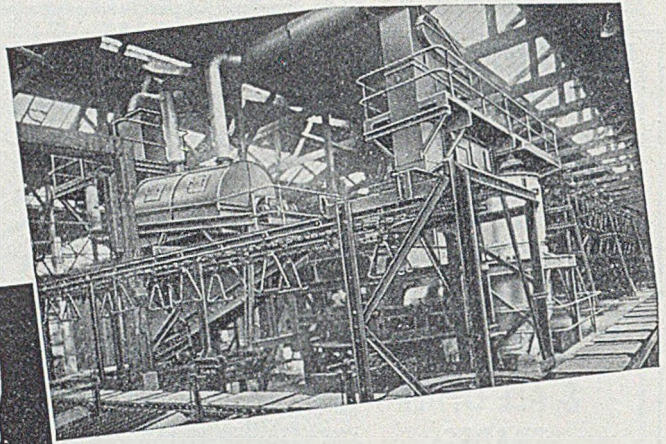
### STEIN & ATKINSON LTD.

PARNELL HOUSE, 25, WILTON ROAD, WESTMINSTER, S.W.1.

# Foundry

## MECHANISATION PLANTS

★ One of the largest designers and manufacturers of Foundry Mechanisation Plant and Sand Conditioning Plant in the country.



**MARCO**  
CONVEYOR & ENGINEERING CO. LTD.

Represented in:  
Israel  
France  
Belgium  
South America  
India  
Norway  
Sweden

★ Catalogue on request

**MARCO CONVEYOR & ENGINEERING CO. LTD., ROWIN WORKS, LYNN ROAD, LEYTONSTONE, E.11**  
Tel: Leytonstone 2254/5 Grams: Enigmarco, Easphone. Midland Office: 3 Bond St., Hockley, Birmingham 19 Tel: Cen. 2917  
North East Coast and Yorkshire representative: Mr. E. B. Crofton, Grove House, Chester-Le-Street, Co. Durham

We are designers and manufacturers of all types of handling equipment, elevators, conveyors, screens and bunkers. Also all types of foundry mechanised and reconditioning plants. Our Technical Department is at your service if you are interested in labour-saving devices and in speeding production.

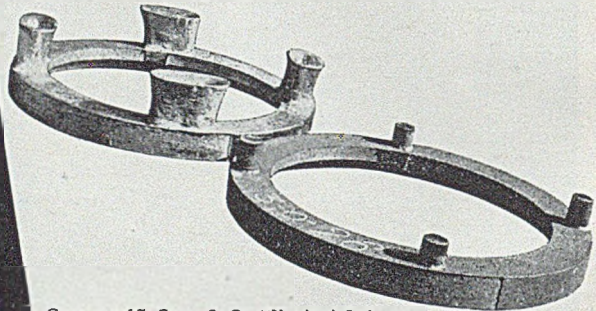
**For efficient and economical handling, it pays to consult MARCO**

F.T.2

# SAVE MELTING AND FETTLING COSTS

## FOSECO FEEDEX THE MOULDABLE EXOTHERMIC FEEDING COMPOUND

GRADES AVAILABLE FOR USE WITH  
IRON, STEEL, LIGHT ALLOYS, AND  
MOST NON-FERROUS ALLOYS



Courtesy of J. Stone & Co. (Charlton) Ltd.

Two similar castings in high tensile brass—but the lower cast with Feedex lined feeding heads.

	With Feedex	Without Feedex
Wt. of casting and heads	362 lb.	517 lb.
Yield .. .. .	96%	67%
Metal Saved .. .. .	155 lb.	
Total area to be fettled	20 sq. in.	162 sq. in.

Thus substantial saving in both melting and fettling costs are made possible by use of Feedex.

**FOUNDRY SERVICES LIMITED**  
LONG ACRE · NECHELLS · BIRMINGHAM 7  
Telephone: EAST 1911 (10 lines).

**ENSURE SOUND CASTINGS**

Electrify production—

use **G.E.C.**

## ELECTRIC Process Heating

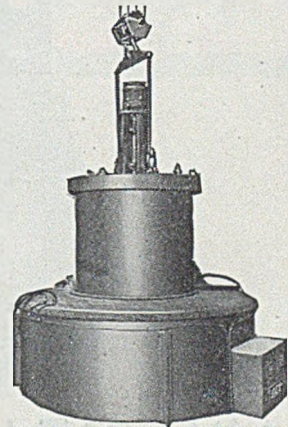
▼ FURNACES · INFRA RED · HIGH FREQUENCY

● Bold thinking about bigger production demands new methods of heat treatment. G.E.C. *electric* process heating ensures maximum output and true economy. The many heating equipments in its range are clean, safe, simple to operate, and heat rapidly to constant correct and controlled temperatures. Its versatility is being proved every day.

● Its applications are many: for melting, annealing, hardening steel, softening resin glues, drying paint and numerous other processes. For example, the vertical cylindrical furnace is widely used in heavy industry for the bright annealing of all classes of metal.

● G.E.C. has had many years' experience in the design and construction of heating plant. The Company's specialists welcome opportunities to discuss potential uses with engineers and metallurgists.

### Furnace Plant



G.E.C.

#### VERTICAL CYLINDRICAL FURNACE

The charge is carried in the heat-resisting steel container. Rapid and uniform heating is ensured by the forced convection set up inside the container by the high-speed fan combined with the correct distribution of heating elements on the furnace wall.

Vertical cylindrical furnaces provide a perfect bright anneal for most ferrous and non-ferrous metal and alloys in coils of wire or strip.

FOUNDRY FACINGS

FOUNDRY FURNISHINGS

# SHALAGO BONDED BLACKING

MIX ONLY WITH CLEAR WATER  
FOR  
DRY SAND MOULDS  
AND COREWASH

**W<sup>M</sup> CUMMING & CO LTD**

GLASGOW

FALKIRK

CHESTERFIELD

DEEPFIELDS near BILSTON

&amp; MIDDLESBROUGH

“The range of Staveley pig irons offers material for all general foundry purposes. The Staveley Technical service is offered free to any requiring advice on foundry problems”

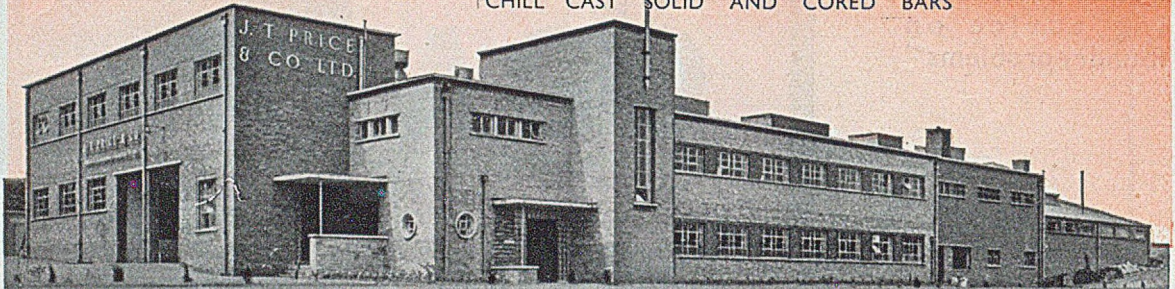


# PIG IRONS

THE STAVELEY IRON & CHEMICAL CO. LTD. NR. CHESTERFIELD

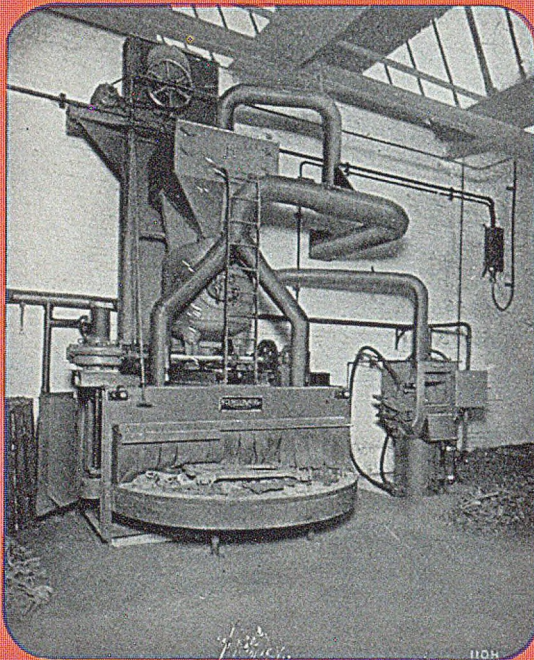
*The Home of..*  
*Reputable Non-ferrous Foundrywork*

HEAVY, MEDIUM AND LIGHT SAND CASTINGS  
 IN ALUMINIUM BRONZES - MANGANESE  
 BRONZES - NICKEL BRONZES - PHOSPHOR  
 BRONZES - GUN METALS - ALUMINIUM, ETC.  
 PATTERN MAKING AND MACHINING  
 CHILL CAST SOLID AND CORED BARS



**J.T. PRICE & CO. [BRASS AND ALUMINIUM FOUNDERS] LTD.**  
 NEWCASTLE · UNDER · LYME + STAFFORDSHIRE

PHONE  
 68011/2&3  
 GRAMS



**You cannot afford to be  
 without a ST. GEORGE'S  
 SHOT BLAST PLANT**

**AIR OR WHEEL TYPES**

**ONE CLIENT IS SAVING £1500 PER YEAR.  
 CAN WE DO THE SAME FOR YOU?**

ROOMS, CABINETS, BARRELS,

SHOT, GRIT,

HOSES, NOZZLES

Telephone: TRAFFORD PARK 1207 (4 lines).

Telegram: GEORGIC MANCHESTER.

BUY BRITISH MACHINES

Over 50 years experience embodied in all our plants.

**ST. GEORGE'S ENGINEERS LTD., ORDSALL LANE, MANCHESTER. 5**



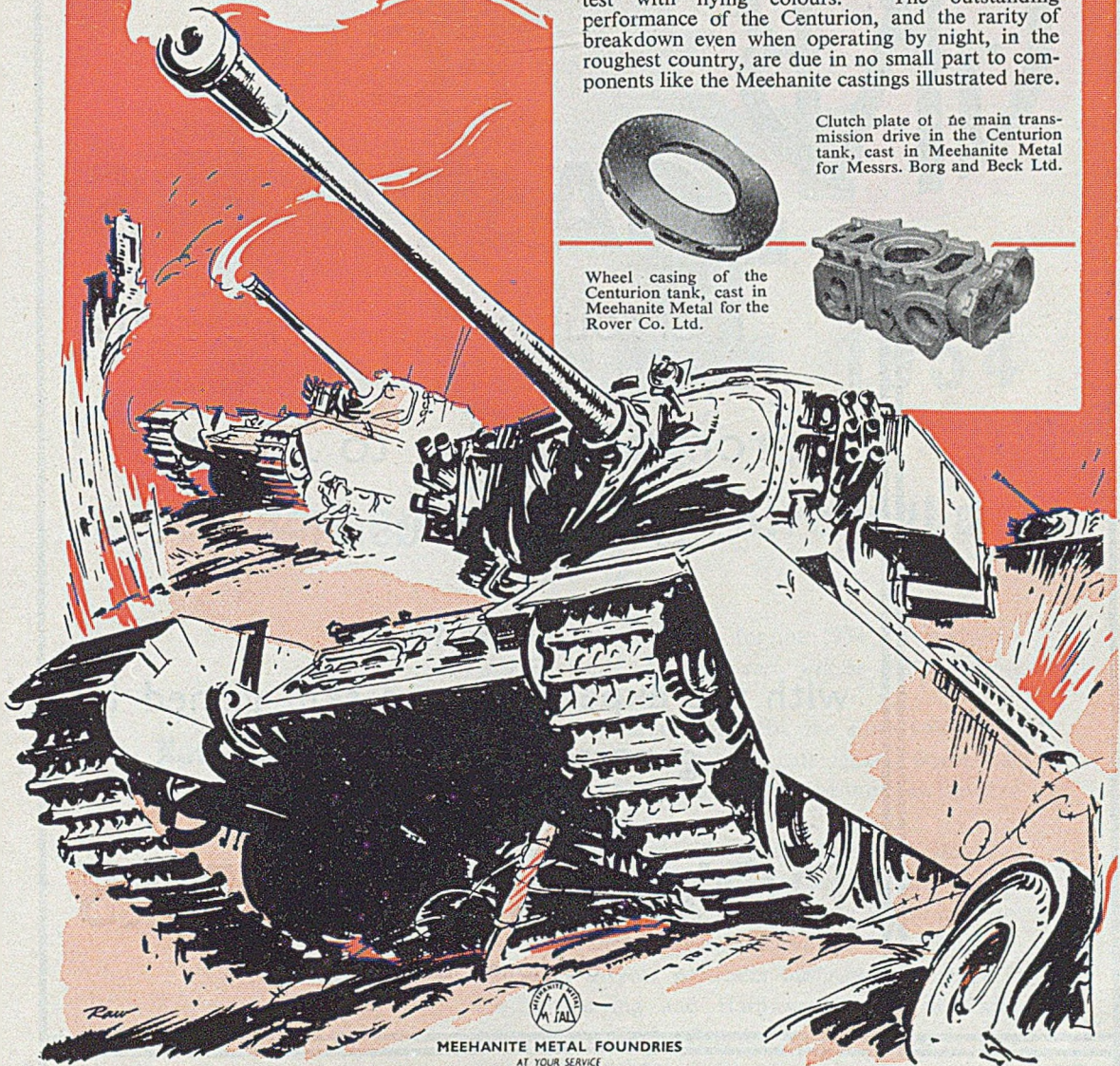
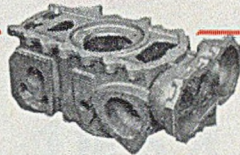
# Trial by Combat

Claims of dependability are easily made. The test of action is another matter; and the Meehanite castings in the Centurion tank are meeting this gruelling test with flying colours. The outstanding performance of the Centurion, and the rarity of breakdown even when operating by night, in the roughest country, are due in no small part to components like the Meehanite castings illustrated here.



Wheel casing of the Centurion tank, cast in Meehanite Metal for the Rover Co. Ltd.

Clutch plate of the main transmission drive in the Centurion tank, cast in Meehanite Metal for Messrs. Borg and Beck Ltd.



MEEHANITE METAL FOUNDRIES  
AT YOUR SERVICE

## HOW MEEHANITE METAL CAN HELP YOU

Write for a copy of "The Specification of MEEHANITE Metal (M.S. 106C)" to any of the MEEHANITE Foundries listed.

CARDIFF & NEWPORT, MON.  
Goulds Foundries Limited

KIRKINTILLOCH  
Cameron and Robertson Limited

LONDON, W.5  
Qualcast (Ealing Park) Ltd.

NEWCASTLE-ON-TYNE 6  
C. A. Parsons and Company Ltd.

ROCHESTER  
Winget Limited

STOCKTON-ON-TEES  
Ashmore, Benson Pease and Co.

GLASGOW  
G. M. Hay and Company Ltd.

SOUTH SHIELDS  
Carmichael Bros. Limited  
Nile Street

WILLENHALL STAFFS  
John Harper (Meehanite) Ltd.

CROYDON  
Southern Foundries Limited

RIPLEY, DERBY  
The Butterley Company Limited

LEICESTER  
Richards (Leicester) Limited

**THE INTERNATIONAL MEEHANITE METAL CO. LTD.**

66 VICTORIA ST., LONDON, S.W.1

Telephone: VICTORIA 9921-22    Telegrams: Meerian Phone London





# FOR CASTINGS

(Ferrous and Non-Ferrous)

From a few lbs. to 20 tons  
for all industries

Made  
with the experience and skill gained by  
generations of craftsmen  
at the famous

## DOWLAI'S WORKS

Telephone: Dowlais 70

**GUEST KEEN BALDWIN'S IRON & STEEL CO LTD**

HEAD OFFICE

East Moors, Cardiff

Telephone: Cardiff 30551



**BIF**

**3-14 May**

**1954**

**London and Birmingham**

Bookings are now open for the 1954 BIF and—*this year exhibitors who apply early will be able to choose the site they prefer.*

**New opportunities  
in the greatest  
of all National  
Trade Fairs**

More—the earlier you book the surer you are of getting into the advance catalogues; world-wide publicity to 25,000 business men before they travel to Britain.

Apply now to your Regional Office of the Board of Trade for space at the London sections of the Fair and for full information about exhibiting. If you have not exhibited before, they can tell you what the Fair can now offer to your particular business. For space in the Engineering and Hardware Section at Castle Bromwich apply to Chamber of Commerce, 95 New Street, Birmingham.

**BIF MEANS BUSINESS**

---

# Newcon Sand Unit



**NEW CONVEYOR**  
**COMPANY LIMITED**  
BROOK STREET · SMETHWICK 40

# Catalac

## flame-set spray

for better mouldings  
and better castings



Photograph by courtesy of Samuel Csborn & Co. Ltd., Sheffield

So simple to use  
Try it!

**Saves time** — less fettling  
—dries moulds without stoving

**Improves quality** — gives cleaner  
castings by reducing sand-wash  
and metal penetration.

Stops striking-back and drying out  
of green sand moulds.


**Increases production** by reducing scrap.

*Apply by low pressure spray and ignite.*

Patent Application No. 12404/53

CATALIN LIMITED, WALTHAM ABBEY, ESSEX · TEL.: WALTHAM CROSS 3344

Manufacturers of Core-bonding and Pattern-making resins for the Foundry



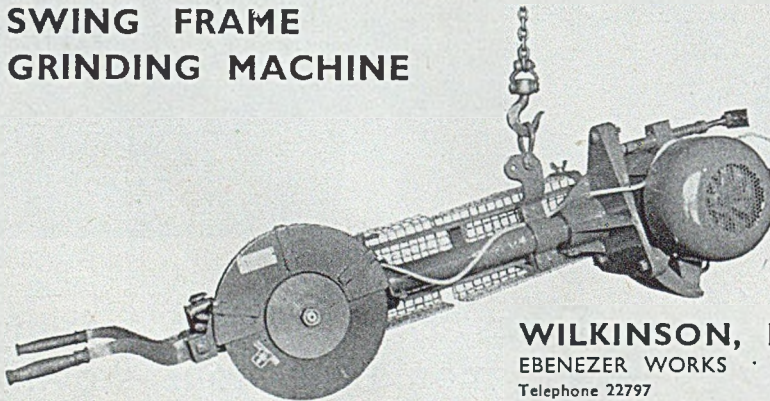
THE SYMBOL OF SERVICE AND QUALITY

## VITREOUS ENAMELS VITREOUS ENAMELLING REFRACTORY COATINGS ON METAL

STEWART & GRAY LTD •  
PAISLEY WORKS • SWAINS ROAD • TOOTING JUNCTION • S.W.17 •  
*Telephone:*  
MITCHAM 1634 (5 LINES)

*Telegrams:*  
ESCOL • TOOT • LONDON •

## SWING FRAME GRINDING MACHINE



Illustrating our No. 5 size for a 14in. by 2in. wheel. For use on any kind of fettling work.

Also to the same arrangement, this type can be supplied for "CUTTING OFF" purposes, using a 16in. by 1/2in. disc. For cutting off risers and runners on castings, and cutting bars and angles, etc., in any metal. Capacity 2 1/2in. diameter on steel.

## WILKINSON, BENTLEY & CO. LTD.

EBENEZER WORKS • MORPETH STREET • SHEFFIELD 3  
Telephone 22797      Telegrams: "WILBENT"

## Metal treatment

### and Drop Forging

A monthly journal devoted to the properties, uses, testing and treatment of special steels and light alloys, and to forging technique in all its branches.  
2/6d. per copy, 30/- yearly.

Write for a specimen copy to:

Metal Treatment and Drop Forging  
49, Wellington Street, London, W.C.2

## KING Bros.

(Stourbridge), Ltd., STOURBRIDGE, England.

Telegrams: "KING BROS., STOURBRIDGE."

### STOURBRIDGE CLAY.

THE HIGHEST AWARDS for GAS RETORTS and other goods (in Fire Clay) have been awarded to KING BROTHERS for their goods made from their renowned STOURBRIDGE FIRE CLAY

Manufacturers of CUPOLA BRICKS, Best QUALITY.  
Lessees of DELPH and TINTERN ABBEY BLACK and WHITE CLAY. BRICKS FOR REGENERATIVE SETTINGS. BLAST FURNACE LININGS. COWPER and other HOT AIR STOVE BRICKS.

Coke Oven Bricks a speciality

*Specify...*

# MITCHELLS REXITE

ABRASIVE PRODUCTS



**REXITE**

## HIGH SPEED SNAGGING

**90  
YEARS  
EXPERIENCE**

We specialise in the manufacture of high speed snagging wheels for use in the foundry. We also manufacture double ended floor grinders from 12in. to 30in.

Catalogue on Request . . .

**MITCHELL'S  
EMERY WHEEL CO., LTD**

DEPARTMENT "S" OPENSHAW MANCHESTER 11.

TEL: EASc 1254/5,6



Est. 1862

# All you need for the

## SHELL MOULDING PROCESS

**Bakelite Limited** have been closely associated with the development of the Shell Moulding Process and, with forty years' experience of phenolic resin production to their credit, can give you valuable assistance on this important new technique.

**Materials** Products supplied include:  
 POWDERED RESINS (for different mixing temperatures)  
 Parting and Wetting Agents (for application to patterns)  
 Adhesives (for assembling shell moulds.)

**Research Service** The Bakelite Research and Development Department is continually working on the development of improved materials with particular emphasis on greater economy in the foundry. Our laboratories are specially equipped for the study of the Shell Moulding Process, on a practical basis.

**Information** Bakelite engineers are available at our Sales Offices and will be pleased to advise and assist on any aspect of the process. If general information is required please ask for our illustrated booklet.

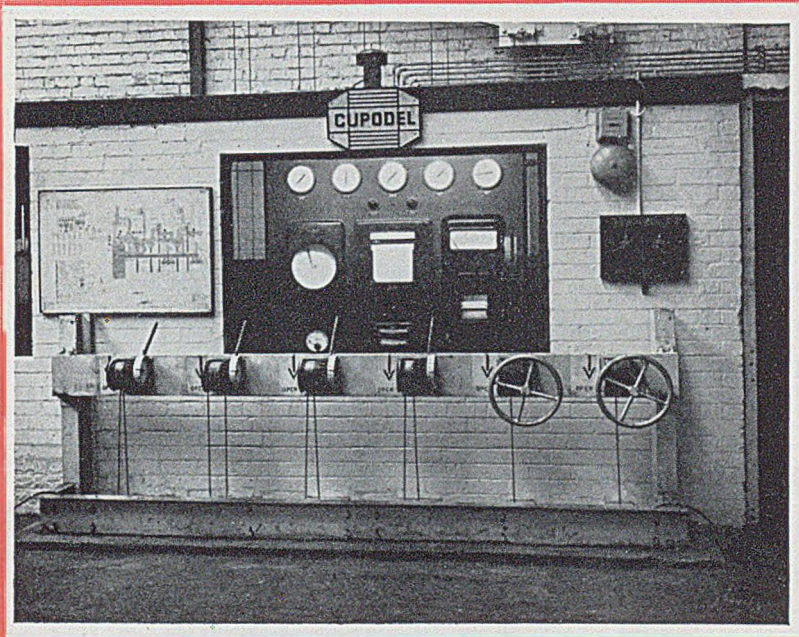
TREFOIL  
**BAKELITE**  **RESINS**  
 REGD. TRADE MARKS

BAKELITE LIMITED • 12-18 GROSVENOR GARDENS • LONDON • SW1  
 Sales Offices: LONDON, Sloane 0898; BIRMINGHAM, Midland 5911/4; MANCHESTER, Blackfriars 5174/7;  
 GLASGOW, City 6825



# CUPODEL

## HOT BLAST FOR CUPOLAS



### EVERYTHING UNDER CONTROL!

In this CUPODEL hot blast Cupola installation all valves and dampers used during normal working are remotely operated from the instrument panel.

Automatic safeguards prevent the recuperator tubes from becoming overheated and only occasional supervision, by existing melting shop staff, is necessary.

Other special features of the CUPODEL system are described in our leaflet. Please send for a copy.

CUPODEL LIMITED • 86 SOUTH ROAD • BIRMINGHAM 31  
and at ABFORD HOUSE, WILTON ROAD, LONDON, S.W.1



*Photograph by courtesy of Dartmouth Auto Castings Limited*

Telegrams :  
"TRIUMPH" SHEFFIELD

**AMCOR**

Telephone :  
24112-3

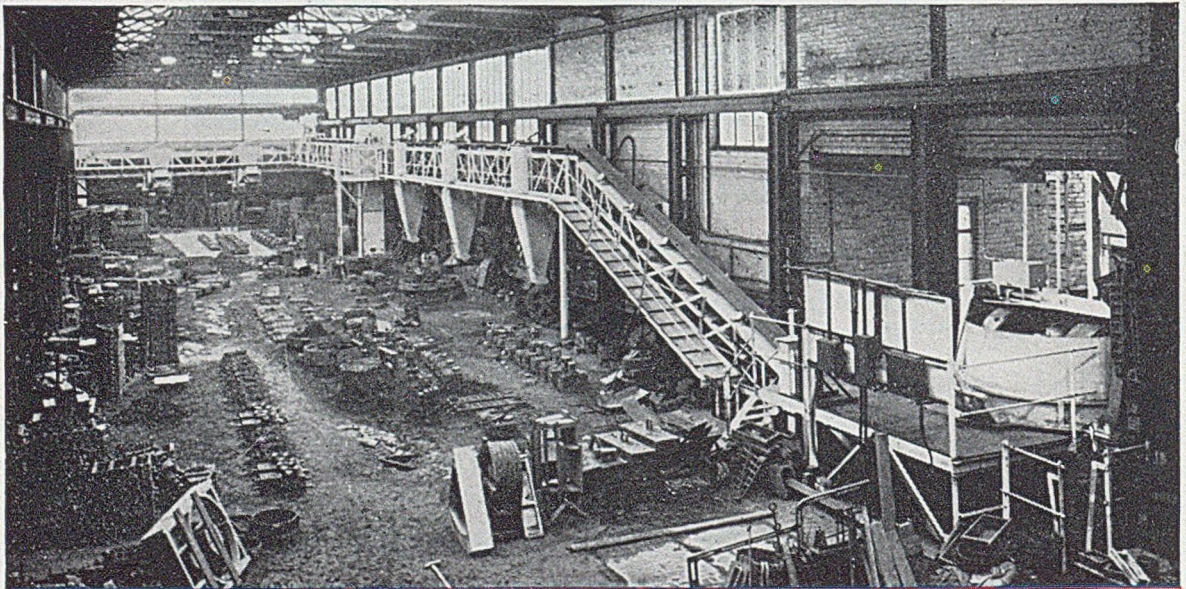
**FERRO-ALLOYS**  
PRODUCED IN SOUTH AFRICA BY  
**African Metals Corporation**  
LTD.

**FERRO-SILICON**  
**SILICO-MANGANESE**  
**LOW CARBON FERRO-MANGANESE**  
**HIGH CARBON FERRO-CROME**



Sole European Agents:

**MIDGLEY & SON, Ltd.**  
SPARTAN WORKS,  
SHEFFIELD 4, Eng.



SAND TREATMENT PLANT FOR IRON FOUNDRY. PHOTOGRAPH BY PERMISSION OF  
BRADLEY & CRAVEN LTD., WAKEFIELD.

• GAS OR OIL FIRED EFFICIENT SAND DRYERS •  
COOLING & DESILTING UNITS "COLREP" PATENT No. 558806  
**HEPBURN CONVEYOR CO. LTD.**  
ROSA WORKS Phone: 3473-47 Wakefield  
Grams: Conveyor WAKEFIELD



**ESCO INGOTS**

**GUNMETAL  
AND  
PHOSPHOR BRONZE  
INGOTS** ~  
**CONFORM TO B.S.I.  
SPECIFICATIONS**

★  
Also manufacturers of  
Ariel & Esco Chill Cast  
Phosphor Bronze Rods  
& Tandem White Metals

Test Certificates  
available  
for every batch

**THE EYRE SMELTING CO., LTD.**  
TANDEM WORKS, MERTON ABBEY, S.W.19. Telephone: MITCHAM 2031  
ALUMINIUM WORKS · WILLOW LANE · MITCHAM · SURREY



## This legging has the right ideas

LOOK AT ITS SIX

### SAFETY/COMFORT FEATURES

This new Safety Products Legging has been specially designed to give comfortable protection to foundrymen, welders—anyone exposed to the risk of leg or foot-burns. The Legging has a spring frame with a detachable cover of good quality asbestos cloth. It works like this:

- 1** **ADJUSTABLE FIT.** The spring is designed to adjust itself to the size of the leg, ensuring a comfortable fit.
- 2** **RIGID COVER.** The spring holds the cover rigid: the asbestos cannot crumple or move out of position.
- 3** **COOLNESS.** The legging is pleasantly cool to wear: the asbestos does not touch the leg at all.
- 4** **QUICK REMOVAL.** These leggings need no fasteners (though snap fasteners are provided if preferred): there is no under-foot strap. If hot metal falls on the legging, it can be removed in an instant, before the heat can reach the skin.
- 5** **FOOT SAFETY.** The reinforced spat front cannot curl: it gives full protection always to the top of the foot.
- 6** **ECONOMY.** The covers are easily replaced when necessary: the spring gives long service and outlasts many replacement covers.

OBTAINABLE NOW FROM CEPT. (E-11.)

**SAFETY PRODUCTS LTD.**  
44 HATTON GARDEN, LONDON, E.C.1, ENGLAND

## ASBESTOS CORE DRYING PLATES & MOULDING BOARDS

- LOW PRICED
- NON-BRITTLE
- LIGHT TO HANDLE

**CENTRAL MANUFACTURING &  
TRADING CO. (DUDLEY) LTD.**

OLD HILL, STAFFS.

Phone: CRADLEY HEATH 69434 (6 lines)

# INGOT METALS

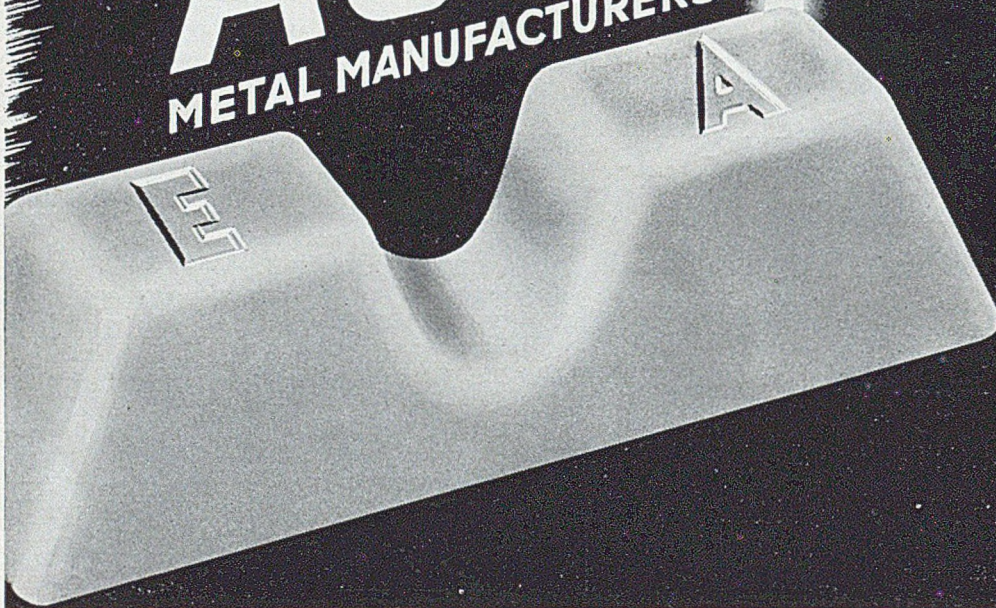
*non-ferrous alloys  
to guaranteed standard  
specifications*

GUNMETAL · BRASS  
PHOSPHOR BRONZE

# AUSTINS

METAL MANUFACTURERS

SINCE 1870



**E. AUSTIN & SONS (LONDON) LTD.**

HACKNEY WICK · LONDON · E.9

Telephone: AMHerst 2211

**Wm. RIGLEY & SONS** (Nottingham) **L<sup>TD</sup>**  
**RAILWAY WAGON WORKS · BULWELL FOREST**  
**NOTTINGHAM**  
 TELEPHONE 78561

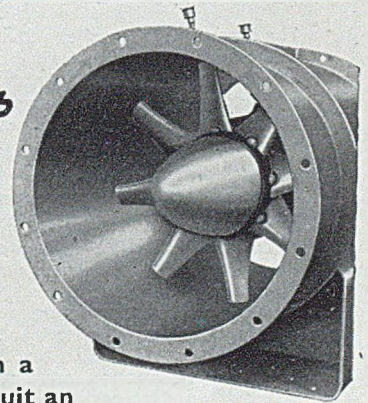
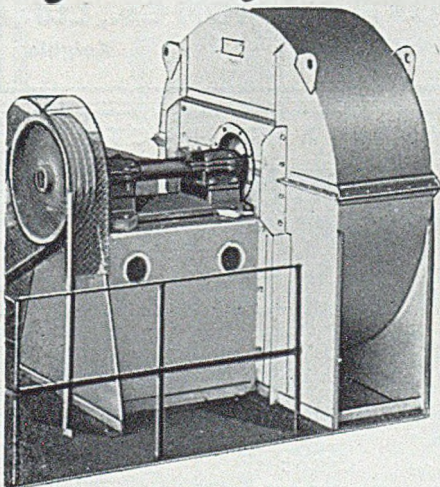
Iron and  
 Steel Foundry  
 Regulations  
 1953

STRUCTURAL STEELWORK  
 ALTERATIONS IN LAYOUT  
 CONVEYOR SYSTEMS  
 REPAIRS AND RENEWALS

*Designs prepared to Individual Requirements*

the best of both

*Centrifugal and Axial Flow Fans*



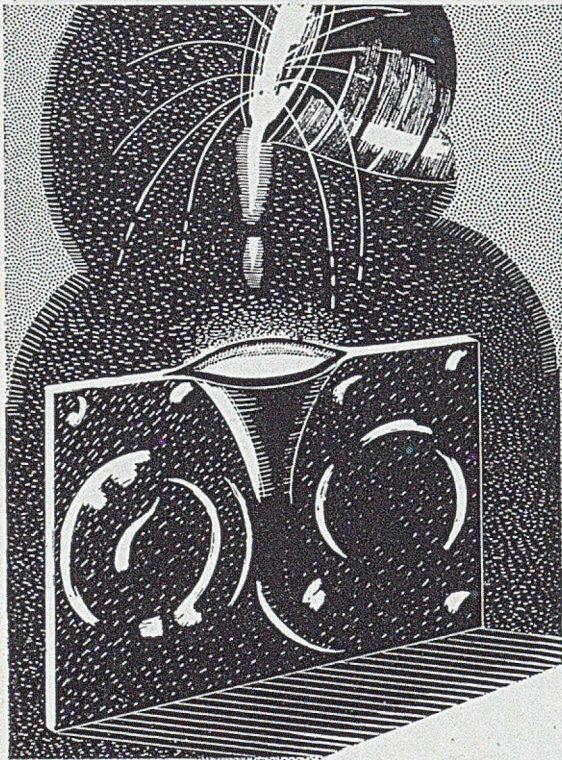
made by STURTEVANT in a wide variety of designs to suit an equally wide range of duties.

Our advice as to the best choice—depending so much on your particular problem—duty, site conditions, etc.—is always gladly given.

Details of Sturtevant Fans, contained in our publications FY.2203 and FY.3201, are available to all engineers interested in problems of air movement.

**STURTEVANT ENGINEERING CO. LTD.**

Southern House, Cannon Street, London, E.C.4. Phone: MANsion House 0533



## SHELLMOULDING

The inherent ability of the Shellmoulding Process to produce castings of high dimensional accuracy and exceptional surface finish is receiving wider and wider recognition, but these attributes can be destroyed by the use of unsuitable materials.

The degree of casting finish that can be achieved and the dimensional accuracy that can be maintained are dependent almost entirely on the use of a highly refractory Sand of the correct grain size.

REDHILL SANDS have been extensively used in the development of Shellmoulding and have withstood the most exacting tests where other Sands have failed. Freedom from impurities ensures the refractoriness needed to enable a thin wall of sand—often as little as  $\frac{1}{16}$  in.—to withstand the impact of the molten metal: correct grain size distribution gives optimum casting finish without excessive binder consumption.



Full details of the application of Redhill Sands to the Shellmoulding Process are given in a leaflet which, together with samples, will gladly be sent on request.

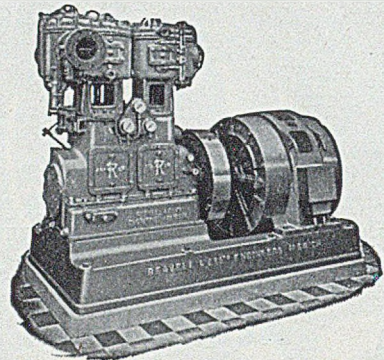
### BRITISH INDUSTRIAL SAND LTD

HOLMETHORPE · REDHILL · SURREY

REDHILL 1122

## COMPRESSORS & EXHAUSTERS

FOR AIR OR GASES



These Vertical double-acting crosshead type compressors are built as single and two-stage machines for pressures up to 40 and 120 lbs. per sq. in. They are built in a range of sizes for capacities up to 10,000 and 5,000 cu. ft. per minute respectively.

For particulars of these machines and for other types write to: Ref. Y

**REAVELL & CO., LTD,**  
RANELAGH WORKS, IPSWICH

Telegrams: "Reavell Ipswich."

Phone: 2124 Ipswich

## VITREOUS ENAMELLED CASTINGS

ARE EASILY CLEANED, UNAFFECTED  
BY HEAT, AND ADD TO THE BEAUTY  
OF THE HOME

**THE RUSTLESS IRON Co., Ltd.,**  
Trico Works . . . . . Keighley

FOUNDRY AND FACTORY

## PAINTING and LIMEWASHING

SERVICE

Immediate Capacity—Countrywide Service

# Grove

PAINTING AND DECORATING CO. LTD.

Ruby Triangle,  
London, S.E.15  
New Cross 2187

AND  
LEEDS

Regd. Office: Sackville St.,  
Salford 3, Lancs.  
BLA 6098/9

# HOT METAL RECEIVERS

## MONOMETER

**MANUFACTURING CO. LTD.**  
SAVOY HOUSE 116 STRAND  
LONDON, W.C.2  
Telephone: TEMPLE BAR 9025

10-TON CAPACITY TWIN-POUR OIL-FIRED RECEIVER  
INSTALLATION FED CONTINUOUSLY BY 4 CUPOLAS.

## APEL · APEL · APEL

### Foundry Beam Slings

Made in sizes  
to suit your  
requirements

FORGINGS, MACHINING,  
ATOMIC HYDROGEN, ELECTRIC  
ARC AND OXY-ACETYLENE WELDING,  
PROFILE CUTTING, FABRICATING  
AND VERSATILE ENGINEERING

Andrews & Platt (Engineers) Ltd.

Dacre House, Victoria Street, S.W.1

Telephone: WHITEHALL 7970

## DEPENDABILITY

IN GREAT OR SMALL  
**IS**  
ESSENTIAL.

CHAPLETS are the SMALL

things in the FOUNDRY  
but the BEST are NEEDED.

## WARING BROS.

QUALITY IS DEPENDABLE

TEST THEM

Write-DOCK WORKS, BARNSELY

## BUYERS OF SCRAP

- ★ COPPER
- ★ LEAD
- ★ BRASS
- ★ HIGH SPEED STEEL
- ★ D.C. MOTORS
- ★ WHITE METAL SWarf
- ★ MERCURY
- ★ OBSOLETE MACHINERY

**CHARLES HENDERSON**

21 Armour Street, Glasgow, E.I. · Phone: Bridgeton 2481

# Craftsmanship

Unlike many crafts the basic principles of Pattern-making have not been affected by mechanical progress. To-day as ever the foundry product depends on the foundation laid by the expert pattern-maker.

We pride ourselves on many years' successful service to the Foundry Trade and welcome all enquiries, no matter how complex or simple these may be.

*Write or 'phone Central 4823*

## THOMSON & MACINTYRE

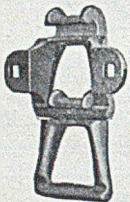
925 and 927 ARGYLE STREET, GLASGOW C.3

### CLIMAX *Tested* CHAINS



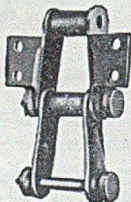
FOR YOUR

#### MECHANISED PLANT



ELEVATOR BUCKETS

EWART TYPE  
GRAY PIN  
STEEL BUSHED  
CHAINS Etc.



SPROCKET WHEELS

OVERHEAD  
CONVEYOR  
CHAINS and  
TROLLEYS



INTERCHANGEABLE  
WITH THOSE OF  
OTHER MAKES  
WHICH YOU MAY BE  
USING

*Actual Manufacturers*

**JOHN KING & CO (LEEDS) LTD.**  
Climax Malleable Works, Leeds, 11

'Phone' Leeds 75414 (3 Lines)

Grams Malleable Leeds 11

## WOODFLOUR

We supply woodflour, both hard and soft-wood, to the Iron & Steel Foundry trades.

Woodflour mixed with coal dust has the following advantages:—

- Suppresses buckling and scabbing even with sand of uniform grain size
- Low explosibility of mould gases.
- Decreases sand expansion.
- Has no effect on permeability.
- Reduces tearing of casting in 'locked' parts of mould.
- Slight saving in cost.

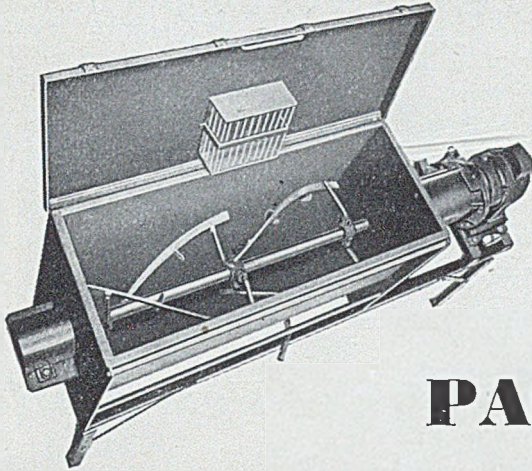
We will supply YOU with woodflour to your OWN specification packed in 112 pound returnable jute sacks or 56 pound non-returnable paper bags.

**THE ROTHERVALE MANUFACTURING CO. LTD.**  
WOODHOUSE MILL, NR. SHEFFIELD

MILLS AT SHEFFIELD AND NORTHALLERTON



## shell moulding



For efficient results it is essential that sand and resin are thoroughly and evenly distributed throughout the mass. Pascall Mixers produce this result quickly and economically.

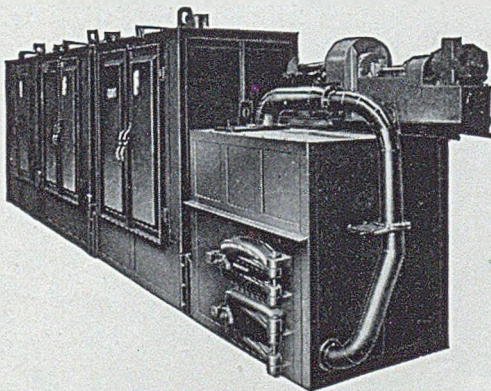
They have many features of interest to foundrymen such as self-emptying troughs, removable agitators, safety devices, etc. Models available with trough capacities of 2, 4, 6, 8, 10 and 20 cu. ft.

## PASCALL MIXERS

Write or telephone  
Paddington 7236 for List 3110

THE PASCALL ENGINEERING CO., LTD., 114 LISSON GROVE, LONDON, N.W.1.

## Three-Cabinet "TRAYKOR"



Dries 3 tons of Oilsand Cores and consumes only 2 cwt. of Coke breeze per shift.

### Perfect Cores obtained!

Each cabinet may be regulated separately or shut off altogether.

Practical, reliable and economical Stove!

Sole Suppliers: **MODERN FURNACES & STOVES LTD.**

BOOTH STREET HANDSWORTH BIRMINGHAM 21

Telephone: SMEthwick 1591 & 1592

Telegrams: MOFUSTOLIM, B'ham 21.

# WATSONS

## (METALLURGISTS)

### LTD

## *Ferro Alloy Powders,*

All meshes, for Inoculations, Coatings, Spraying and Dustings. All Foundry Metals and Supplies for Steel or Iron. Refractories and Reagents.

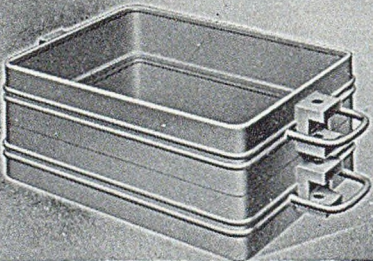
## *All grades of Ferro Alloys*

**PULVOMETAL WORKS, MILL LANE, DRONFIELD  
NEAR SHEFFIELD**

Telephones: 3136-3137 Dronfield

Telegrams: Cargo, Dronfield

*Rolled Steel*  
**MOULDING BOXES**  
SPECIALLY DESIGNED CHANNEL SECTION



ACCURATELY DRILLED AND REAMERED  
ALL BOXES INTERCHANGEABLE  
SIZES & SHAPES TO REQUIREMENTS

**BILSTON STOVE & STEEL TRUCK CO LTD**  
BILSTON PHONE: BILSTON 41921. STAFFS.



**SIFBRONZE**

OVERCOMES THE PROBLEM OF DISTORTION IN WELDING

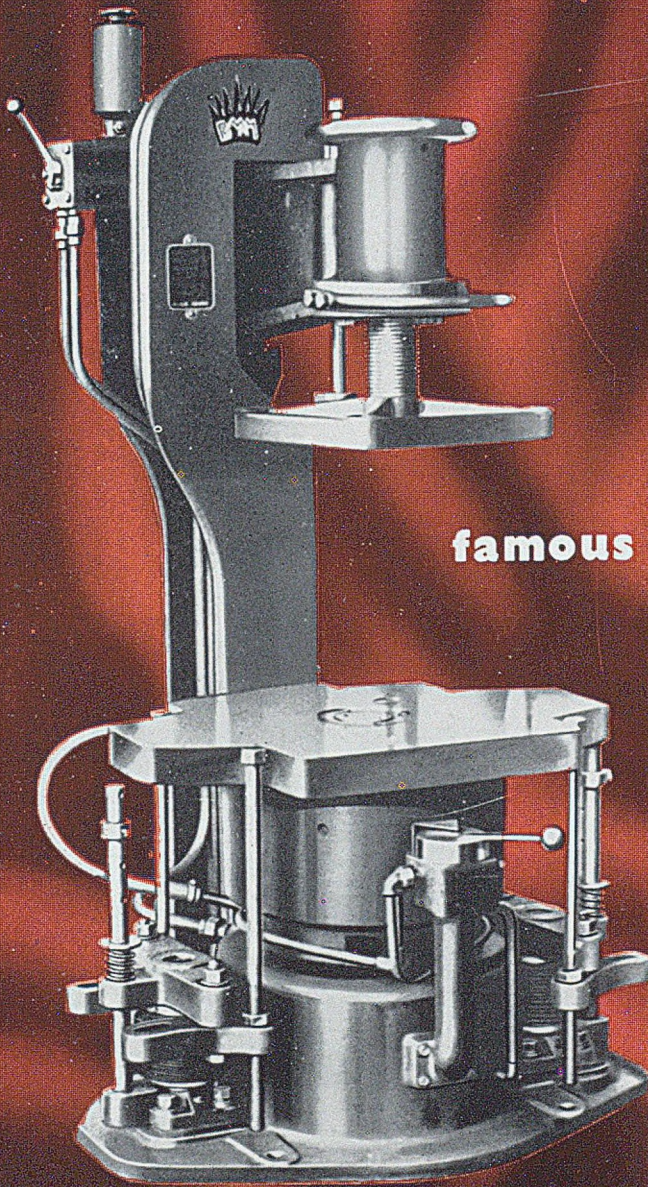
These patented copper-zinc alloy welding rods make highly successful welds at remarkably low temperatures yet produce a join with a tensile strength of as high as 28 to 40 tons per sq. inch, and at the same time overcome the problem of distortion and the necessity of pre-heating.

\* "Sif-Tips", welding quarterly magazine. Free on request:  
**SUFFOLK IRON FOUNDRY (1920) LTD.**  
Sifbronze Works, Stowmarket, Suffolk. Tel: Stowmarket 183

Will the welder  
POLITECHNIKI  
WASKIEJ



T45



**famous throughout the world**



**BRITISH MOULDING MACHINE CO. LTD**

FAVERSHAM KENT

# 714 FOUNDRY

EST. 1902

TRADE JOURNAL

VOL. 95

No. 1935

Registered at the G.P.O. as a Newspaper

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

OCTOBER 1, 1953

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

Single Copy, 9d. By Post 11d. Annual Subscription, Home 40/-, Abroad 45/- (Prepaid)

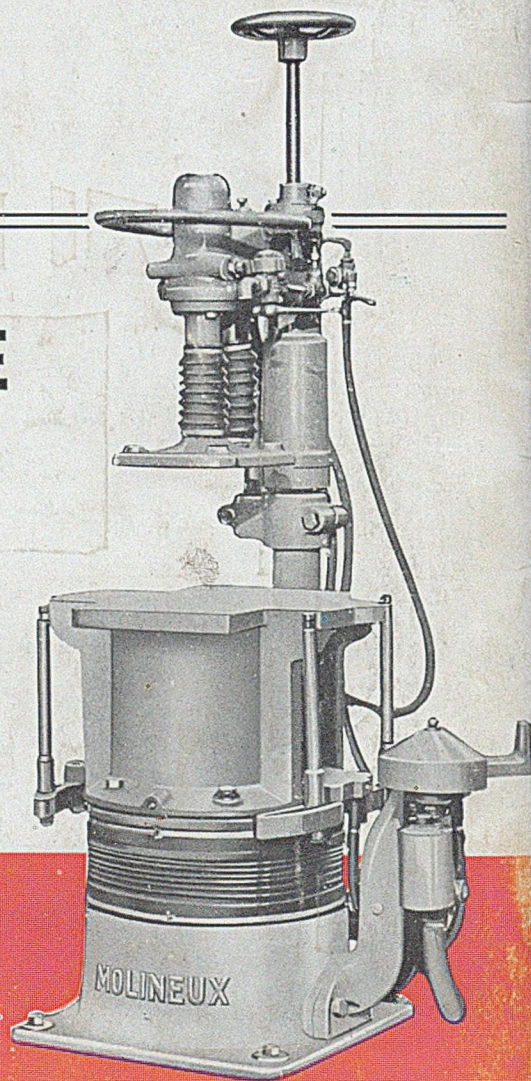


## MOULDING MACHINE

**Squeezes and Jolts  
in 1 Operation . . .**

A uniformly dense mould is produced complete in 2-3 seconds.

Molineux Moulding Machines are in use in many of Britain's most important Foundries, including Europe's largest producer of Valve Guides and Tappets.



# MOLINEUX

FOUNDRY  
EQUIPMENT LTD.

Marlborough Works, Marlborough Road, London, N.19

Phone: Archway 4127

Scottish Representative: L. A. WITHAM & CO., 59 Vine Street, Glasgow, W.1

**EFFICIENCY** in your foundry begins with  
**SAND CONTROL**

Full range of testing machines illustrated in CATALOGUE No. 368  
free on request from

**RIDSDALE & CO. LTD., MIDDLESBROUGH**  
NEWHAM HALL Telephone 56856-7

## TEISEN FURNACES

**FOR ALL INDUSTRIES**

KING'S NORTON, BIRMINGHAM