# AERONAUTICAL JOURNAL.

The Organ of the Royal Aëronautical Society

> Entered at Stationers' Hall.



Edited for the Council of the Royal Aëronautical Society

W. Barnard Faraday, LL.B., F.S.S.

Price to Non-Members and Non-Subscribers,

No. 92.

AUGUST, 1918.

Vol. XXII.

# VICKERS LIMITED.

Contractors to H.M. GOVERNMENT.

Aviation Department, Imperial Court, Basil Street, KNIGHTSBRIDGE, S.W.3.

Telephone KENSINGTON 6520 (2 lines).



Telegraphie Address: VICKERFYTA-KNIGHTS, LONDON."

https://doi.org/10.1017/S0001924000148948 Published online by Cambridge University Press



# The Alliance Aeroplane Company Ltd.

CONTRACTORS

Ministry of Munitions of War Air Board.



Regist red Offices:
45, CASTLE ST. EAST
LONDON
W. 1.

CAMBRIDGE ROAD HAMMERSMITH.

NOEL ROAD, ACTON.

### IMPORTANT to Aeroplane Manufacturers.

For ...

### Tin Plating, Lead Plating, Nickel Plating,

Send to the actual Works, who Specialise in

ALL KINDS OF

PLATING, OXIDISING, BRONZING and GILDING.

### JOHN WILKINS & Co.,

231 to 243, St. John Street, Clerkenwell, E.C.

Telephone Nos.:

HOLBORN 1675. CENTRAL 8611.

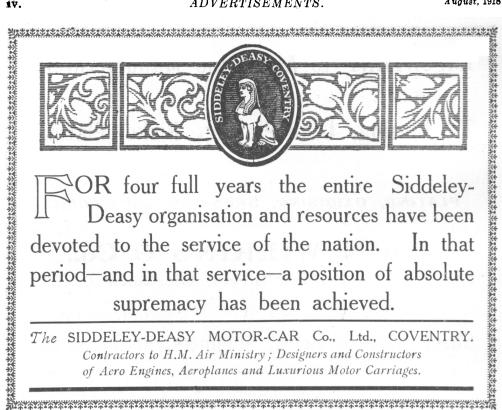
Telegrams:

"BRONZITE, LONDON."

Sheet Metal Workers, Stampers, Spinners, etc.

ESTABLISHED LONDON AND PARIS, 1873.





#### ESTABLISHED 1912.

Contractors to H.M. Air Ministry.

# SUPERMA

AVIATION WORKS, Ltd.

Designers

Constructors of

# LYING BOATS

Telephone:

THE

WOOLSTON 37.

Telegrams:

SUPERMARIN."



Offices, Works, Flying Waters,

SOUTHAMPTON, Eng.

H. SCOTT-PAINE, Director and General Manager.



### AIRCRAFT STEELS.

All Grades: by Electric, Siemens, and Crucible Processes

Heat-treated, Forged or Rolled,

to Airboard & Engineering Standard Specifications.

JNO. HY. ANDREW & Co., Ltd.,
Toledo Steel Works.

London Offices-

loledo Steel Morks

City: 118, Cannon St., E.C.4. Westminster: 17, Victoria St., S.W.1.

SHEFFIELD,

ENGLAND.

Telegraphic & Cable Address: "ANDREW, SHEFFIELD."

TELEPHONE: GERRARD 7337.

TELEGRAMS: "GRATZELIM, OX LONDON."

#### GRATZE, Ltd., 44 to 46, Whitfield Street, LONDON, W.I.

Manufacturing, Mechanical, General and

Manufacturing, Mechanical, General and Electrical Engineers and Contractors.

Branch Works:

18, Tottenham Street, London, W.I., and 43. Beech Street.

Barbican, London, E.C.

Agents for Scotland:

CHISHOLM, MUIR & Co.,
108a, West Regent Street,
Glasgow.

CONTRACTORS TO H.M. GOVERNMENT and DEPARTMENTS.

War Office, Royal Aircraft Factory, Ministry of Munitions, Munitions Inventions Department The Air Board, Metropolitan Munitions Committee, etc.

For all classes of Machined Work, Repetition Work, Mechanical Apparatus, and Electrical Parts, etc.

AIRCRAFT WORK.—FITTINGS, COMPONENTS, ETC., PETROL COCKS, GAUGES, PUMPS, FILTERS, UNIONS, ETC., OIL AND TANK FITTINGS AND CONNECTIONS, PRESSED WORK AND PARTS, OXY-ACETYLENE WELDING, SPINNING AND STAMPING.

MECHANICAL CORK PARTS AND CORK INSULATORS, DISCS AND PACKING FOR ALL PURPOSES.

We Specialise in the Manufacture

OF

# DROP FORGINGS

FOR ALL TRADES.

SEND YOUR ENQUIRIES

TC

JOHN GARRINGTON & SONS, LTD., ALBERT WORKS, DARLASTON, STAFFS.

Telegrams: "Garringtons, Darlaston."

Telephone: 53 Darlaston.





**British Built** 

### **AERO ENGINES**

The Chief requirement in the air is

### RELIABILITY

Napier Aero Engines, like the famous Napier 6-Cylinder Car (the original and proved best), are manufactured by a firm with

Over a Century's

Engineering Experience

Behind It.

## D. NAPIER & SON, LTD.,

WORKS: ACTON, LONDON, W.

14, NEW BURLINGTON STREET, LONDON, W.

#### AERO ENGINES

## IMPERIAL LIGHT Ltd.

Oxy-Acetylene Welding Engineers,

123, Victoria St., London, S.W.1.

TELEPHONE: 3540 VICTORIA (3 LINES). TELEGRAMS:
"EDIBRAC, PHONE, LONDON."

SUNFLOWER



Trade Mark.

FLUX

**FOR** 

ALUMINIUM WELDING.

00 (M20)

WRITE FOR A SAMPLE.

# THE BRITISH AND COLONIAL AEROPLANE Co., Ltd.,

FILTON, BRISTOL.

CONSTRUCTORS OF -



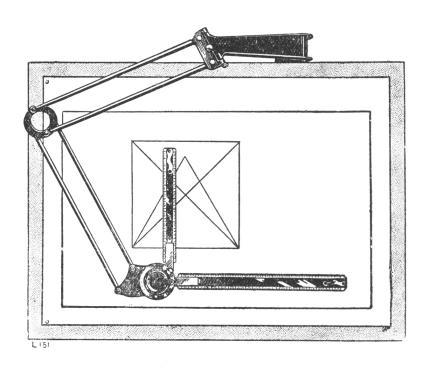
CONTRACTORS TO THE

ROYAL AIR FORCE.

TELEGRAMS:
"AVIATION. FILTON."



TELEPHONES: 3906 BRISTOL.



# UNIVERSAL DRAFTING MACHINES.

When time presses, the Universal Drafting Machine proves its greatest worth. It is a remarkable aid to clearness of thought, accuracy and rapidity of expression. It considerably increases the efficiency of a draftsman owing to its accuracy and easy sensitive motion.

All our draftsmen use them; we could not afford to have our drawings made by the old method.

May we send YOU particulars?

#### ALFRED HERBERT LTD. COVENTRY.

TELEPHONE: -

OFFICE ... 912 REGENT. WORKS ... 4762 KENSINGTON.

... 281-2-3 WEMBLEY.

"SOCIABLE, PHONE, LONDON."

### HOOPER & CO.



AEROPLANE BUILDERS TO H.M. AIR COUNCIL.



BY ROYAL WARRANT.





MOTOR BODY-BUILDERS AND COACHBUILDERS

H.M. THE KING H.M. THE QUEEN H.M. QUEEN ALEXANDRA

54, St. James's Street, PIGGADILLY, LONDON, S.W.1

# JAMES W. SOUTHERN & SON L. MANCHESTER





Woodside Engineering Company, Limited, Possilpark, Glasgow.

# AEROPLANE TIERODS

IN

STREAMLINE & ROUND SECTIONS

COMPLETE WITH

:: UNIVERSAL OR FORK JOINTS ::

LARGE STOCKS.

PROMPT DELIVERY.

WORKS 1495 DOUGLAS (2 Lines). OFFICE: 3456 CENTRAL (3 Lines).

(Private Branch Exchange).

TELEGRAMS: "FUSELAGE," GLASGOW.

Registered Office:

50. WELLINGTON STREET

GLASGOW.



FOUNDED 1909.

Contractors to British and Allied Air Forces.

### BUY

# WAR BONDS.

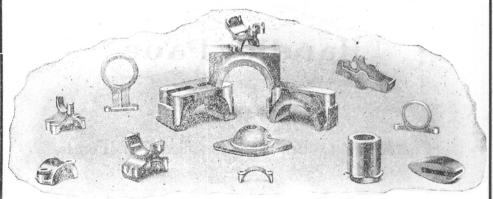
Telephone:
Hampstead 7500.
(ten lines).

Telegrams:
"Hydrop Ltd., Crickle,
London."

— HANDLEY PAGE Ltd., -

CRICKLEWOOD, LONDON, ENGLAND.

AERATORS, Limited.
PRANA WORKS, EDMONTON, LONDON, N.18.



### ALUMINIUM DIE CASTINGS for ALL PURPOSES.

Speciality—

ALUMINIUM CASTINGS for AERO ENGINES, FIELD TELEPHONES, Etc., Etc.



Established

1770.

Highest Quality
STEEL WIRE CORDS &
STRANDS FOR AIRCRAFT.

Contractors to H.M. Admiralty and War Office.

J. & E. WRIGHT, Ltd.,

Universe Wire Rope Works, BIRMINGHAM.

Telegrams: "UNIVERSE, BIRMINGHAM." Telephone: CENTRAL 6914 (3 lines).

### "Machinery" says:

"As an example of an efficiently compiled and attractive publication, the latest catalogue of B.S.A. high-speed twist drills is distinctly praiseworthy. Every variety of twist drill manufactured by the Birmingham Small Arms Company is illustrated, while the wide range of sizes includes a drill to suit almost every purpose. . . Though this list is so thoroughly comprehensive, any drill, from the tiny wire gauge jobber to the largest size, can be quickly located by means of the thumbhole index cut on the edge of the catalogue. The fact that it also contains considerable information on the use and care of twist drills should make the book of value in every machine shop. The illustrations and text throughout are admirably printed, and tasteful finish is added by the grey cover with its striking design embossed in several shades of grey."

WRITE FOR LATEST CATALOGUE.



SELLING ACENTS'FOR ENGLAND:

Manufactured by the Birmingham Small Arms Co., Ltd., Birmingham.

### BURTON, GRIFFITHS & CO., Ltd.,

1. LUDGATE SQUARE, LUDGATE HILL, LONDON, E.C.4.

ALSO AT BIRMINGHAM, MANCHESTER & GLASGOW.

No.

PURE METALS AND ALLOYS
FOR USE IN
AIRCRAFT CONSTRUCTION.



REG.TRADE MARK

EXPERT IN WELDING REPAIRS Of all kinds.

# THERMIT, L-

(Proprietors: NOBEL'S EXPLOSIVES CO., LTD., GLASGOW.)

OWNERS OF THE ALUMINO-THERMIC PROCESS PATENTS.
(ESTABLISHED 1904).

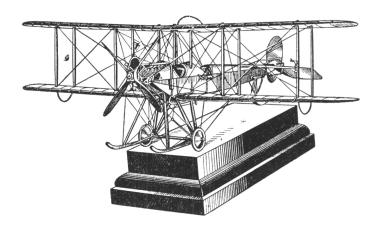
ALLOYS MADE TO ANY SPECIFICATION.

675, COMMERCIAL ROAD, LONDON, E.14.



We are the original firm, and have no connection with any other concern which has seen fit to adopt a title somewhat similar to our own.





### Aeroplane Models

THE Silver Model of an Aeroplane illustrated shows how technical knowledge and skilled workmanship are allied in the models produced by the Goldsmiths and Silversmiths Company.

Infinite care is taken to ensure every detail being accurate and of proper proportions, and to reproduce an exact replica of the original.

Models can be prepared from the original or from a photograph. Estimates and designs will be submitted free upon application.

The Goldsmiths and Silversmiths Company have no other establishments in Regent Street, Oxford Street, or anywhere else in London, and no branches in the Provinces or Abroad.

THE

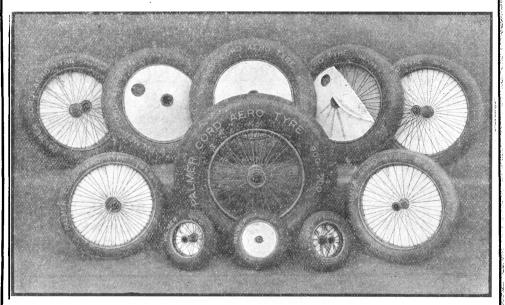
GOLDSMITHS & SILVERSMITHS COMPANY LTD with which is incorporated The Goldsmiths Established 1751

112, Regent Street, London, W. I.



### PALMER

Landing Wheels and Tyres.



#### STANDARD SIZES:

Tyre Sizes	Wheel No.	Hub.		Track	Tyre	Wheel	Hub.		Track
		Length	Bore.	Line.	Sizes.	No.	Length.	Bore.	Line.
		m/m	m/m	m/m	1		m/m	m/m	m/m
300 x 60	16	111.12	25 4	Centr. 1	750 x 125	33	150.	38.09	Central
,,	17	72.39	12.7	Central	,,	77	178.	44.45	132/46
450 x 60	30	89.	31 75	Central	,,	92	185.	55.	135/50
575 x 60	21	160.	28	Central	,,	95	185.	55.	Central
,.	34	150.	31.75	104/46	,,	96	178.	55.	132/46
,,	111	150.	38.09	104/46	,,	99	178.	38,89	132/46
650 x 65	78	178.	44.45	132/46		112	150.	40.	Central
,,	79	178.	44.45	Central	800 x 150	36†	185.	55.	135/50
,,	100	178.	38.09	132/46	,,	40†	185.	60.32	135/50
,.	101	178.	31.75	132/46	,,	41†	185.	55.	Central
600 x 75	21	160.	28.	Central	,,	82 85	185.	55.	135/50
,,	34	150.	31.75	104/46	,,	85	185.	55.	Central
,,	111	150.	<b>3</b> 8.0 <b>9</b>	104/46	,,	106	185.	47.62	135/50
700 x 75	78	178.	44.45	132'46		205†	185.	60.32	Central
,,	79	178.	44.45	Central	1000 x 150	97	250.	65.4	Central
,, !	100	178.	<b>3</b> 8.09	132/46	,,	102	185.	55.	125/60
,,	101	178.	31.75	132/46	1 1	201	185.	60.32	125/60
700 x 100	33	150.	38.09	Central	900 x 200	107	185.	55.	Central
,,	77	178.	44.45	132/46	.,	108	185.	55.	125/60
,,	92	185.	55.	135/50	,,	120	185	66.67	125/60
,,	95	185.	55.	Central	,,	202	185.	60.32	Central
,,	96	178.	55.	132/46	,,	208	185.	60 32	125/60  4
,,	99	178.	38.89	132/46	1100 x 200	52	185.	55.	116/691
**	112	150.	40.	Central	,,	57	185.	55.	Centra
650 x 125	119	178.	55.	132/46	,,	203	185.	60.32	116/69
				l '	,,	204	185.	60.32	Central

† Wheels Nos. 36, 40, 41 and 205 are of stronger type than the other wheels for 800 x 150 tyres.

#### PALMER TYRE LIMITED, THE

Contractors to the Admiralty, the War Office, and the Ministry of Munitions. 119, 121, 123, SHAFTESBURY AVENUE, LONDON, W.C.2.

Telegrams: "TYRICORD, WESTCENT, LONDON." PARIS: 24, Boulevard de Villiers, Levallois-Perret.

Telephone: GERRARD 1214 (Five Lines),

**AIRSCREWS** 

AND

CONSTRUCTION. AIRCRAFT

APPROVED GLUES.

Manufacturers-OLDROYD & SONS, Ltd., 9. MINCING LANE.

TELEPHONE 4978 Avenue.

E.C. 3.

LONDON.

# **WYCOMBE** AIRCRAFT Contractors to H.M. Telegrams:—Aircraft, High Telephones:—High Wycom (Stores—High Wycom

Contractors to H.M. Government.

Telegrams :- Aircraft, High Wycombe.

Telephones: - High Wycombe 84 and 235.

(Stores-High Wycombe 120.)

HIGH WYCOMBE.

# ORIGINAL MANUFACTURERS OF STREAMLINE



BRUNTONS
MUSSELBURGH
SCOTLAND.——

# **ALUMINIUM**

# CYLINDERS.

WATER AND AIR COOLED.

ALUMINIUM CASTINGS

Of every description for

AEROPLANE AND MOTOR ENGINES

IN SPECIAL STRONG LIGHT ALLOYS.

## CAST IRON CYLINDERS

WATER AND AIR COOLED

**FOR** 

AEROPLANE & MOTOR ENGINES.

WILLIAM MILLS, Ltd.,

Contractors to H.M. Government,

Grove Street,

Telegrams - "WILMIL, BIRMINGHAM."
Telephone—SMETHWICK 9.

BIRMINGHAM.

# **GWYNNES**

LIMITED.

CONTRACTORS TO H.M. GOVERNMENT.

MANUFACTURERS AND SOLE LICENSEES IN THE BRITISH EMPIRE.

# "CLERGET" PATENT AERO ENGINES



ENGINEERS, LONDON.

Telegrams: "Gwynne, London."

When the time arrives for the resumption of normal business you will be wanting a

### Class A

CAR—Then your name should be on the HUMBER PRIORITY LIST—secure a place there now and avoid disappointment later on.



HUMBER LIMITED, COVENTRY.

A 183.

### Speciality—HIGH GRADE

### ALUMINIUM ALLOYS

HIGH TENSILE, FOR AERO WORK & OTHER SPECIAL REQUIREMENTS.



#### T. J. PRIESTMAN

Metal Manufacturerand General Caster in all Metals

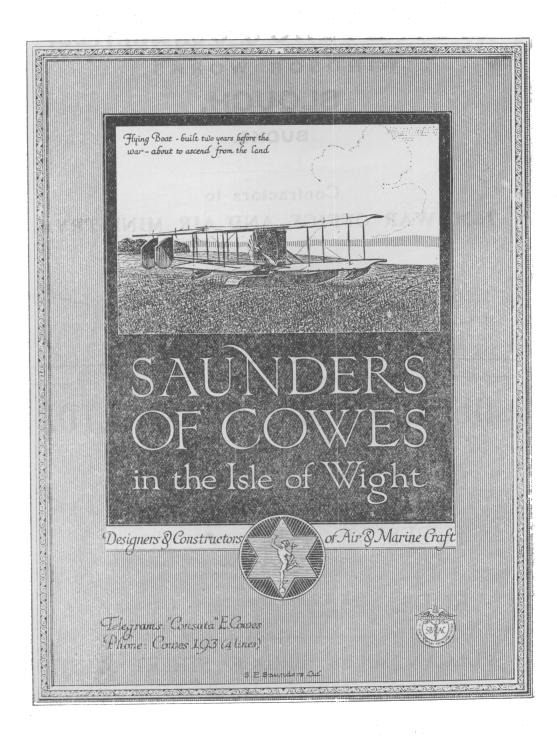


OFFICIAL REFINER of ALUMINIUM to H.M. MINISTRY OF MUNITIONS

Cupro Foundry - Leopold Street - Birmingham

Established 1872. Telephones: Works, Midland 281; Offices, Midland 282

Buyer of Every Description of Aluminium Scrap and Swarf.



## C. D. PETERS & Co., LIMITED.

WINDSOR WORKS, SLOUGH, BUCKS.

Contractors to

H.M. WAR OFFICE AND AIR MINISTRY.

Telephones: Victoria 2900, 2901.

London Office: SLOUGH 201, 202, 203, 15, Dean's Yard, Westminster, S.W.1.

Telegrams: PETERS, SLOUGH. Peters, London.

### DUGARD BROTHERS, LTD.

ROLLED METALS. Brass, Copper, Bronze, Gun Metal, etc., in Sheets, Rolls, Strips, Foil and Circles.

Solid drawn Brass and Copper Tubes, for Oil TUBES. Pipes, Petrol Pipes, Radiators and all Aircraft requirements. Also Mandril drawn Tube for Scientific and Optical Instruments.

Brass, Gun Metal and Bronze. Round, Hexagon RODS: and Square.

VULCAN MILLS, BRIDGE STREET WEST, BIRMINGHAM.

Telegrams: "Vulcan," BIRMINGHAM.

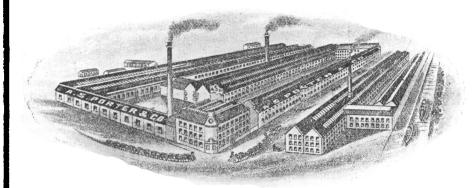
Telephone: CENTRAL 98.

Contractors to the Admiralty, War Office and Allied Governments.

### ARTHUR S. PORTER & CO. Wapping Mills, LIVERPOOL

Telegrams and Cables—"Magasins, Liverpool." Codes—ABC, Engineering and Lieber's.

Telephones  $\left\{ \begin{array}{l} 4307 \\ 3613 \end{array} \right\}$  Bank.



Actual Manufacturers of

Cotton of Every Description.

Sponge Cloths, Mops, Wicks, etc., Kit Webbing.

Aeroplane Message Bags, Bunting, Flags and Banners, Code Signals, Flags of All Nations.

Any Type of Flag made.

Cleaning Wastes Ropes, Cordage, Lines and Whipping Twines In Manilla, Flax, Cotton and Hemp.

> Aeropiane, Balloon Kite Cordage a Speciality.

Cotton and Linen Canvas. Tent, Marquee and Tracing Lines.

Shipping Orders a Speciality. Prompt Deliveries and Shipments. LARGE STOCKS ALWAYS READY.

Correspondence invited in French, Spanish and Portuguese.

### "SCEPTRE" supersedes "SUPER"

#### **ANNOUNCEMENT**



# The SCEPTRE AVIATION Co., Ltd.

CONTRACTORS TO THE AIR MINISTRY.

Dudden Hill Lane, Willesden, N.W. 10

Managing Director - N. LEWIN.

Telephone:—Willrsden 642 & 643 (2 lines) Telegrams:—"Supavicol, Crick, London." When we adopted the name of the Super Aviation Co., Ltd., we had no idea it was likely to clash with another Company's name, but it having been suggested some confusion has arisen by reason of the adoption of the word "Super," and having no desire that this should be the result, we immediately offered to change our name on the matter being brought to our notice.

We therefore publish this announcement to acquaint our many customers that in future this business will be known as THE SCEPTRE AVIATION CO., LTD., and feel sure you will realise that though changed in name—the nature of the organisation remains the same—The Sceptre Aviation Co., Ltd., is as keenly anxious as ever to give you satisfactory service and to preserve your valued good-will.

### BOLTS & NUTS.

ENGINEERS' MILD STEEL STUDS, Etc.



"HELICOID" LOCK-NUT

A COIL OF STEEL.
VIBRATION ACTUALLY
TIGHTENS THE GRIP.

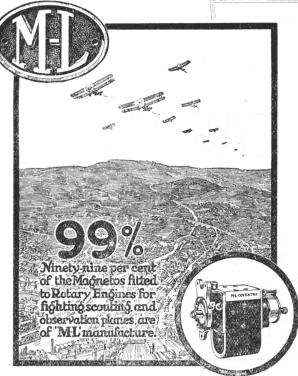


Made from  $\frac{1}{2}$ In. To  $2\frac{1}{4}$ In.

CATALOGUE FREE ON APPLICATION.

BAYLISS, JONES & BAYLISS, Ltd. WOLVERHAMPTON.

London Offices & Showrooms:-139/141, CANNON STREET, E.C. 4.



M-L Magnetos are lighter and smaller (yet stronger) than any pre-war magnetos of same electrical capacity. They are of British design and built by British labour in a British-owned factory. They have been supplied in large numbers for work of national importance.

The M-L Magneto, Type A.D.S., is designed for use on rotary or other engines in which the distributor is carried on the engine itself and does not form a part of the magneto. It is fitted with an "H" armature and gives two sparks per revolution.

THE
M-L MAGNETO SYND. LTD.,
VICTORIA WORKS
COVENTRY.

# SANKEY Pressings & Stampings.

WE have special facilities for turning out combinations of stamped or hydraulically pressed, rivetted and welded work of all descriptions, with or without machining, of any thickness from 20 gauge sheets to  $\frac{3}{4}$  in. plates, in steel or other material.

Let us know your requirements and we will quote you.

### JOSEPH SANKEY & SONS

WELLINGTON, SHROPSHIRE.

# W. G. TARRANT,

Contractor to Air Board.

Aircraft Head Offices:

BYFLEET, SURREY.

TELEPHONE: BYFLEET 1.

London Offices:

CLOCKHOUSE.

ARUNDEL STREET.

STRAND, W.C.

TELEPHONE: GERRARD 8362.

### FERRO-ALLOYS AND METALS

FERRO-SILICON 45/50% Silicon.

 $\begin{tabular}{lllll} FERRO-CHROME & 70/75\% & Chromium, 4/6\% & Carbon. \\ \end{tabular}$ Immediate delivery from Stock.

MACNESIUM METAL In Sticks

The best deoxidiser and scavenger for Copper, Bronze and Phosphor Bronze Castings.

ANTIMONY CADMIUM **GOPPER MANCANESE** COPPER-SILICON

FERRO-COPPER COPPER-VANADIUM

FERRO-MANGANESE FERRO-URANIUM PHOSPHOR-COPPER FERRO-MOLYBDENUM PHOSPHOR-TIN FERRO-TANTALUM

TUNCSTEN

VANADIUM

ZIRCONIUM

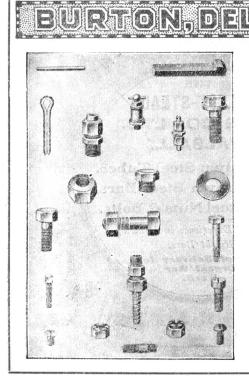
POLISHING POWDERS, PLUMBAGO, MANGANESE OXIDE.

RITT & CO.,

40, CHAPEL STREET,

LIVERPOOL.





MANUFACTURERS OF

# CAPSTAN & AUTOMATIC WORK

IN BRASS, STEEL, GUNMETAL, ETC.,

FOR ALL BRANCHES OF THE MOTOR & AEROPLANE INDUSTRIES.

### **DROPFORGINGS**

STAMPINGS ONLY OR FINISHED—
MACHINED TO CUSTOMERS' REQUIREMENTS.

HEAD OFFICES: MOSELEY ST., BIRMINGHAM.
WORKS: BIRMINGHAM & OLD HILL (STAFFS).

# GROVE GLUES

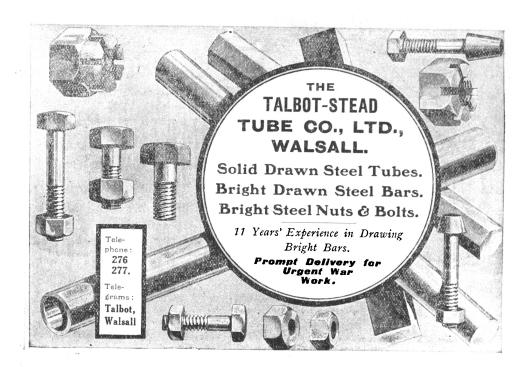
#### FOR AIRCRAFT

and all other purposes.

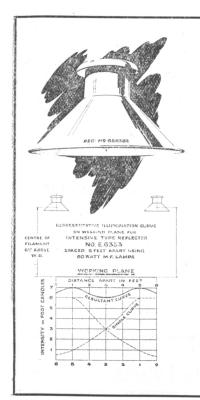
THE GROVE CHEMICAL Co., Ltd.,
APPLEY BRIDGE, near WIGAN.

Telegrams-"CROWN, APPLEY BRIDGE."

Telephone--12 PARBOLD.







### PLEX SCIENTIFIC

Specially designed for Factories Aerodromes. With Simplex Steel Reflectors properly installed every ray of light is diverted to useful work, and there is no glare.

Write for special leaflet.

### SIMPLEX · CONDUITS · LTD.,

GARRISON LANE, BIRMINGHAM.

113-117, CHARING CROSS ROAD, LONDON.

AND AT MANCHESTER - GLASGOW - NEWCASTLE BRISTOL

LIVERPOOL SWANSEA AND CARDIFF.

- LEEDS

Telephone:

Central 1449.

Cable & Telegraphic Address:

"Cantonia," Sheffield.

THE

## CANTON STEEL & TOOL CO.,

CANTON STEEL WORKS.

CORNISH STREET, SHEFFIELD.

Manufacturers of . . .

Canton" High Speed Steel.

CAST & TOOL STEELS for EVERY DESCRIPTION of TOOLS.

—ওভ®্য—

AIRCRAFT STEELS to A.I.D. Inspection and Tests.

Contractors to H.M. Government.

On "Lloyd's Register."

Hors Concours Membre du Jury: Brussels International Exhibition, 1910, Grand Prix London, 1908, and Buenos Aires, 1910.





Telegrams:JONAS,





Telephone:No. 4660. PRIVATE BRANCH

OLVER & Co., 1

GRADE STEEL and NICKEL **FORGINGS** 

for Naval and General Marine Purposes.

Special Heat Treated Alloy and other Steels Automobile Purposes.

IMPORTANT SPECIALITIES:

A SPECIAL NICKEL CHROME GEAR STEEL.
FOR AIR OR OIL HARDENING. When treated this steel has exceedingly-tough properties and is specially suitable for Gear Wheels, Connecting Rods, etc.

A NICKEL CHROME STEEL in 4 GRADES.

Eminently suitable and strongly recommended for Gears, Crankshafts, and other highly stressed parts, and having exceptional machining qualities. Combines unusually heavy shock-resisting and wearing properties with silent running.

A HIGH GRADE ALLOY CASE HARDENING STEEL

for severely strained parts, such as Gear Wheels, Gudgeon Pins, etc.

Continental Steel Works and Novo Steel Works, Sheffield.

# SANDERSON BROTHERS & NEWBOULD, LTD.,

ATTERCLIFFE FORGE and ROLLING MILLS,
SHEFFIELD.

Makers of High-Class

# AIRCRAFT STEELS

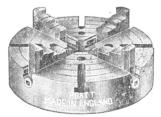
Either Rolled or Heat Treated to

AIR-BOARD SPECIFICATIONS.

Ask for our Special Book on

HIGH TENSILE STEELS.

### BRITISH MADE CHUCKS.



#### Independent 4-Jaw Chucks.

Reversible Jaws and Heavy Bodies.

Screws have Double-thrust Bearings (10in. size and upwards).

STANDARD SIZES:-4½, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 22 and 24in. diam.



#### 3-Jaw Geared Scroll Chucks.

Self-Centring.

SIZES IN PROGRESS: 6in., 7½in. and 9in. diam.
With One or Two Sets of Jaws as required.

Price Lists on Application.

Can be had from all Merchants and Dealers.

Manufactured by--

### F. PRATT & CO., LTD., HALIFAX, Eng.

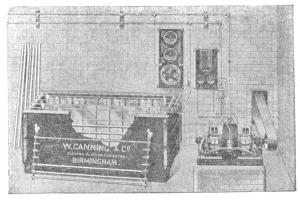
Telegrams: "Pratt, Halifax."

Telephone: No. 161.

### W. CANNING & Co.,

MANUFACTURERS OF

#### PLANT AND MATERIALS



FOR

ELECTRO-ZINCING, NICKEL PLATING, TIN PLATING, LEAD PLATING, COPPER PLATING, BRASS PLATING, SILVER PLATING,

etc., etc.

POLISHING MACHINERY AND MATERIALS. ENAMELLING AND DRYING STOVES. LACQUERING AND DRYING TABLES.

### Great Hampton St., BIRMINGHAM.

18-20, St. John's Square, Clerkenwell, LONDON.



# "NIEUPORT"

— AND —

## General Aircraft Company, Ltd.

Contractors to H.M. Government.

REGISTERED OFFICE AND WORKS:

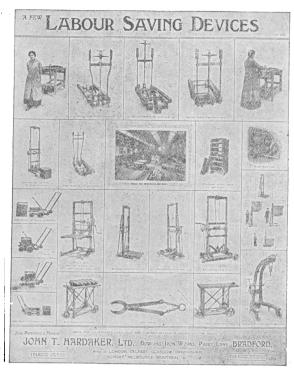
LANGTON ROAD, CRICKLEWOOD, LONDON, N.W.2.

Telephone (3 lines):

WILLESDEN 2455.

Telegrams:

NIEUSCOUT, CRICKLE, LONDON



## JACKTRUCKS.

Specially designed for transporting Aeroplane Engines on working benches.

Used by all the leading Aero Engine makers and Aircraft Stores, etc.

Write for full Illustrated Catalogue to

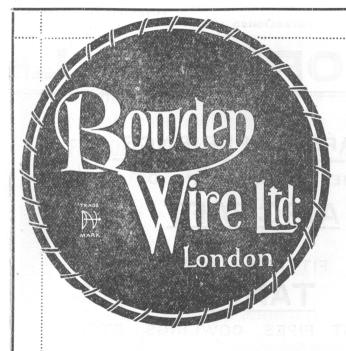
(Sole Makers and Patentees):

#### JOHN T. HARDAKER,

(AERO TRUCK DEPT.),

Bowling Ironworks, BRADFORD, YORKS.

Telegrams: "GIMP, BRADFORD."
Telephone: 120 DUDLEY HILL.



BEING wholly engaged upon production for the British and Allied Governments, we regret that we are unable for the present to execute any orders for private purposes.

Established
1897.

Victoria Road, Willesden Junction, N.W. 10.

Godbolds.

#### Thomas Andrews & Co. Ltd.

-ROYDS WORKS AND SHEFFIELD.

High ALLOY STEELS

MADE TO AIR BOARD AND E.S.C. SPECIFICATIONS

FOR AIRCRAFT AND
AUTOMOBILE CONSTRUCTION

Telegrams—Bits, B'ham.

ESTABLISHED 1800.

Telephone-355 Northern.

## R. COOPER & Sons Ltd.

#### 10 YEARS' EXPERIENCE IN

THE MANUFACTURE OF

#### <u>AIRCRAFT</u>

METAL

DETAIL FITTINGS, COMPONENTS,

#### TANKS,

EXHAUST PIPES, COWLINGS, ETC.

40, High Street, Aston New Town, BIRMINGHAM.

Contractors to the Admiralty and Air Board.



#### THE CENTRAL AIRCRAFT COMPANY,

DESIGNERS AND CONSTRUCTORS
OF AIRCRAFT.

Office and Works:

KILBURN, N.W.6.

Telegrams: AVIDUCTION, PHONE, LONDON.

Telephone: HAMPSTEAD 4403, 4404.

#### For many years Engineers who used leather for clutches and brakes have substituted FRICTION SURFACES which are FFRODO vastly more efficient.

Over twenty years ago we invented Ferodo Fabrics. Since then, by specialising on the one product, and as a result of practical experience, we have so improved them that they are to-day readily acknowledged to be the finest friction surfaces in the world.

They are entirely unaffected by water, oil or acid, and absorb more foot lbs. of energy per square inch than any other material known. Wood and leather linings char and quickly wear out. Ferodo Fabrics are spark-proof and non-inflammable.

Ferodo Fabrics have the name stamped on each foot. Look for it when ordering your new linings.



#### SURFACES

Contractors to the War Office and Admiralty, London General Omnibus Company, and Underground Electric Railways of London and Paris, List "A.J.," from

#### HERBERT FROOD

Works: CHAPEL-EN-LE-FRITH.

'Phone-19 and 20 Chapel.

Wires-" Friction, Chapel." Depots at Lendon, Birmingham, Belfast, Bristol, Cardiff, Edinburgh, Glasgow, Liverpool, Manchester and Newcastle.



# B.G.L. Metal Components for Aircraft

Tanks, Exhausts, Fins, Rudders Empennages, Spar Boxes Sockets, Wiring Plates & Levers

The Birmingham Guild Ltd. Great Charles St., Birmingham

Telegraphic Address: "Barr, Kilmarnock,"

Telephone No. 71 Kilmarnock.

#### BARR, THOMSON & Co., Ltd.,

Netherton Ironworks, Kilmarnock, Scotland.



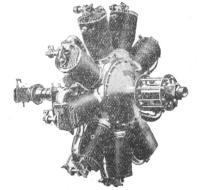
MAKERS OF STAMPED STEEL CYLINDER LINERS FOR AEROPLANE ENGINES,

and

All Kinds of Hydraulic Stampings and Forgings.



## W. H. ALLEN SON & GO. LTD.



## AIRCRAFT ENGINES

QUEEN'S ENGINEERING WORKS, BEDFORD.

## **TERRY**

Quality means Service, Accuracy and Precision.

ICROMETRIC accuracy—precisional action—and a quality of production, seasoned by more than 60 years' manufacturing experience.

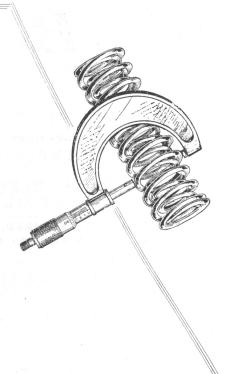
That is TERRY Service!

For WARWORK we invite your inquiries for prices and delivery dates for Springs—Hose-clips — Presswork — Cable-work — Flexible Shafts, &c.



HERBERT TERRY & SONS Ltd., The Spring & Presswork Specialists, Redditch, England.

Telephone 61 (4 Lines).



PU

**FOR** 

AERO ENGINES.

OIL, AIR, WATER, PETROL.

MANUFACTURED BY

THE

SELSDON

AERO & ENCINEERING CO., L.

1, ALBEMARLE STREET, PICCADILLY, W.1.

S.

#### Anti-Friction BEARINGS

FOR ALL PURPOSES.

TO ENSURE

ACCURACY, EFFICIENCY, AND ECONOMY, Instal ANTI-FRICTION BEARINGS made and lined under

THE WALKER-HANNA PATENTS

FOR

MOTOR CARS, ELECTRIC MOTORS, TRAMWAYS, AND ALL OTHER PURPOSES.

NO MACHINING REQUIRED, absolute INTERCHANGEABILITY with those you are at present using.

Write us on any question concerning Bearings.

## WALKER-HANNA BEARINGS, Ltd.,

IMPERIAL WORKS, GREAT JACKSON STREET,

'Phone: 85 OPENSHAW.

WEST GORTON, MANCHESTER.

AGENTS-

E. T. WHITE & CO., Albemarle Mansions, 1 Albemarle Street, Piccadilly, London, W.1.



## W. GILBERTSON & CO.,

LIMITED, —

#### PONTARDAWE, GLAMORGAN.

Contractors to Admiralty, War Office, India Office, etc.

Manufacturers of Special Steels of all kinds.

STEEL BARS.
STEEL BILLETS.
SPECIAL STEEL.
HIGH CARBON STEEL.
ALLOY STEEL.
GALVANISED SHEETS.

3,000 tons
per week.

CORRUGATED SHEETS.
BLACK SHEETS.
ARMATURE SHEETS.
TINPLATES.
TERNE PLATES.
ALUMINIUM Coated Plates

## SUTCLIFFE.

WARMING AND VENTILATING PLANTS

FOR DOPE ROOMS.



DUST COLLECTING PLANTS

FOR GRINDING and POLISHING SHOPS.

CONTRACTORS TO THE WAR OFFICE AND ADMIRALTY.

Ask for copy of New Booklet, just issued, "The Warming and Ventilating of Dope Rooms and Aeroplane Factories to satisfy Home Office requirements." Sent post free on request.

SUTCLIFFE VENTILATING & DRYING Co., Ltd.,

Cathedral Gates, MANCHESTER.

T.N.—3920 City Manchester. MANCHESTER

T.A.-Ventilabro, Manchester.

## MARTINO'S TREATING AND TESTING WORKS LTD.

HEAT TREATMENT OF STEEL TO AIR BOARD SPECIFICATIONS.

Telephone:
No. 845
COVENTRY.

NORMALISING.
ANNEALING.
HARDENING.
OIL QUENCHING
and TEMPERING.
CASE HARDENING.

Telegrams:
"QUENCHING,"
COVENTRY.

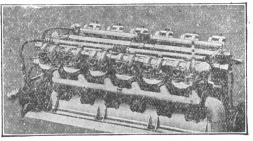
MECHANICAL TESTING. AND CHEMICAL ANALYSIS.

SANDY LANE, COVENTRY.

#### HOYT BEARING METALS,

IN LARGEST USE FOR AERO ENGINES.

300-H.P.
"GREEN"
AERO
ENGINE.



BEARINGS:
HOYT
METAL
LINED.

#### NUMBER ELEVEN-THE WORLD'S BEST.

OUTLASTS ALL OTHERS.



ABSOLUTELY THE HIGHEST QUALITY WHITE METAL MADE. SPECIMEN TWISTED AND HAMMERED COLD, SHOWING TOUGHNESS. COMPRESSION REQUIRED TO CRACK TEST SAMPLES: 20'55 TONS SQ. IN.

#### THE HOYT METAL CO., LTD.,

(WORKS: MILLWALL, E.)

189, HAMMERSMITH ROAD, LONDON, W.6.

## PETTERS LIMITED.

AIRCRAFT CONSTRUCTORS TO THE ADMIRALTY.

Orders can be accepted for Complete Machines Propellers Parts.

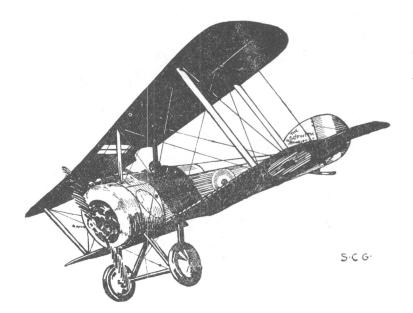
#### WESTLAND AIRCRAFT WORKS

(Branch of Petters Limited), YEOVIL. ENGLAND.

Telegrams: "Aircraft-Yeovil."

Telephone: Yeovil 129.

# SOPWITH



## AVIATION COMPANY, LIMITED KINGSTON-ON-THAMES, ENGLAND. CONTRACTORS TO H.M. GOVERNMENT.

Telephone: KINGSTON 1988 (8 lines). Telegrams: SOPWITH, KINGSTON.



Paris Office:

21, RUE DU MONT THABOR.

#### The Aëronautical Journal.

ADVERTISEMENTS.

THE ORGAN OF THE ROYAL AËRONAUTICAL SOCIETY.

#### CONTENTS, AUGUST, 1918.

For the opinions expressed in papers that are signed or initialled the authors alone are responsible. None of the papers or paragraphs must be taken as expressing the opinion of the Council of the Royal Aëronautical Society, unless such is definitely stated to be the case.

												PAGE
Ι.	Notices		•••	•••	•••	•••	•••		•••	•••	•••	253
II.	COMPRESSIBLE	FLUID	s, by I	PROF.	G. H.	Bryan,	F.R.S	· · · ·	•••			255
III.	THE DYNAMIC PROBLEM OF											
	Fellow			•••	•••	•••	•••	•••	•••		•••	258
IV.	THE RESISTAN	CE TO	Torsic	ON OF	Wood	s	•••	•••	•••	•••		263
V.	ABSTRACTS			•••	•••	•••	•••	•••	•••	•••	•••	266
VI.	BIBLIOGRAPHY	•••	•••		•••	•••	•••		•••			272
VII.	CORRESPONDED	NCE	•••				•••	•••	•••	•••	•••	273
VIII.	ABRIDGMENTS	OF RE	CENT P	ATENT	SPEC	IFICATIO	ons (A	ERONA	utics)			276
IX.	RECENT ADDIT	rions 1	о тне	Libra	RY		•••	•••	•••	•••	•••	280
All con	munications respe	tina Edi	torial Me	ittera sh	anuld be	addressed	i to—					

THE EDITOR, 7, Albemarle Street, W.I.

Telegrams: "Didaskalos, Piccy, London."

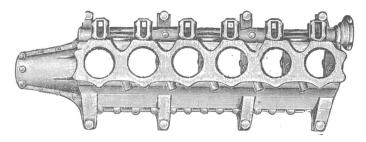
TELEPHONE: 7373 GERRARD

All communications respecting Advertisement Matters should be addressed to-

The Advertisement Manager, 63, Ludgate Hill, London, E.C. 4.

### THE ALUMINIUM CASTINGS CO LD

SOUND CASTINGS.



PROMPT DELIVERIES

Ingleston Foundry, CREENOCK. SCOTLAND.



