

**FMB****FMB****FMB**

# Unbreakable Jointless and Rustless Grid Type Resistances

FOR ALL DUTIES.

Traction.

Cranes.

Haulage.

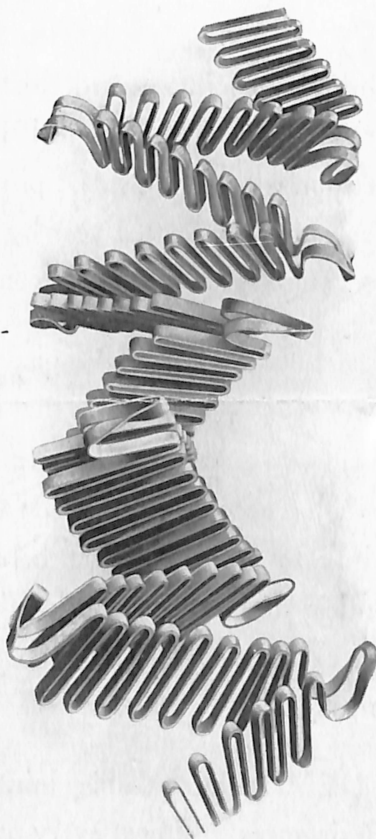
Winches.

Capstans.

Rolling Mills.

Steel Works.

Shipyards.



Mines.

Earthing.

Arc Welding.

Battery Charging.

Testing.

Railways.

Power Stations.

Docks.

Over 100,000 in Use.

## The Electro-Mechanical Brake Co. Ltd. West Bromwich, Staffs., England.

Established 1908.

Telephone—291 (Three lines).

Telegrams—"Brakes, West Bromwich."

Codes—A.B.C. 5th Ed., Bentley's.

LONDON:  
Cecil Chambers,  
86, Strand.

MANCHESTER:  
28, Piccadilly.

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## RESISTANCES.

We have little fear of contradiction in claiming that we are the pioneers of the Unbreakable Jointless and Rustless Grid Type Resistances.

Our original Unbreakable Jointless and Rustless Grid Type Resistance was presented to our friends in 1910, and although we were in competition with Cast Grids, Spirals and other inferior types, our sales have increased year by year, and up to the present we have supplied over 100,000 complete units.

Other Electrical Manufacturers have copied our Resistance as far as their experience permits. We do not blame our competitors for following us in the design and manufacture of modern Resistances, but accept their attitude as a compliment. We feel it our duty to point out that behind each **EMB** Unbreakable Jointless and Rustless Grid Type Resistance, there are years of experience and research which no other manufacturer can offer.

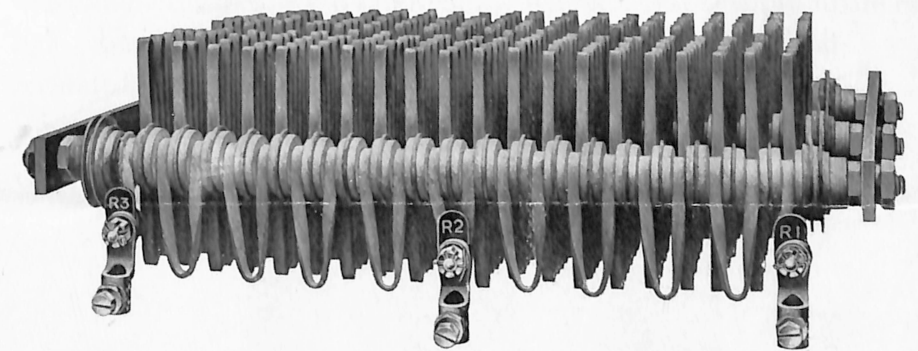
We have supplied **EMB** Unbreakable Jointless and Rustless Grid Type Resistances to almost every part of the World and to cover practically every duty for which a resistance is required.

We have therefore every confidence in placing our experience at the disposal of our customers.

## SPECIAL FEATURES OF THE **EMB** RESISTANCES.

**UNBREAKABLE** and therefore particularly suitable for use in positions where the vibration is heavy. We have thousands of Resistances in use on Cranes, Furnace Chargers, Tramcars and Telfers.

**JOINTLESS**—Each section is made in one continuous length of drawn material.



A cast or stamped Grid Resistance would have 19 joints in the 20 grids shown above, making 19 probable sources of trouble in the maintenance of the electrical path. **EMB** Resistances are designed so that the only joints in the Resistance are formed when the cross section of the strip is changed to conform with the grading of the Resistance. The risk of open circuit or intermittent contact is therefore reduced to a minimum with **EMB** grids.

**RUSTLESS**—**EMB** grids do not perish or deteriorate under the most severe conditions.

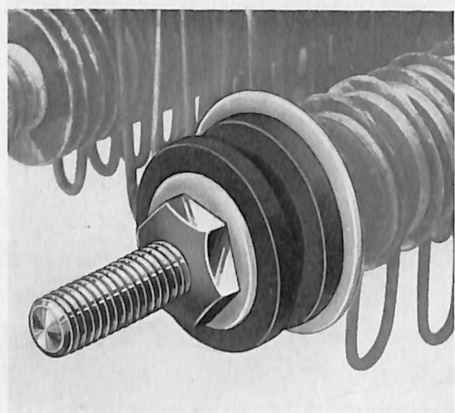
**NON-INDUCTIVE** and therefore particularly suitable for use on A.C. circuits.

**RIGID**—the section of the grid is such as to secure stiffness and prevent the peaks of adjacent grids touching one another under the most severe vibration.

**WEIGHT** of **EMB** Resistances is less than that of cast grids of the same rating.

**UNIFORM SECTION**—The material, being drawn, is absolutely uniform in cross section, and this removes all risk of local heating, as with uneven cast grids.

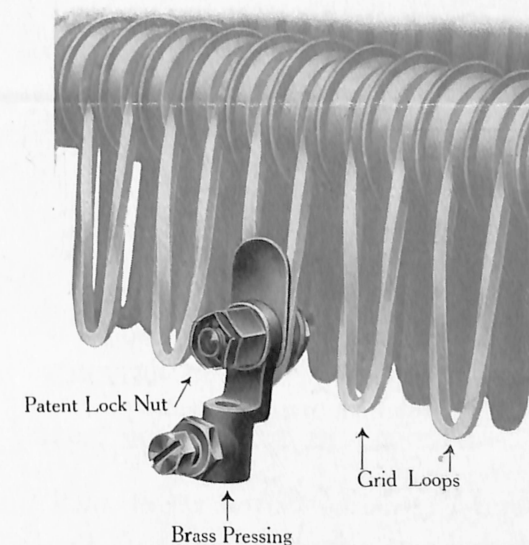
**INSULATION** of mica and bakelite exclusively. The grids are mounted on steel rods insulated by special heat-resisting micanite tubes, covered with a thin layer of bakelite to prevent flaking. Washers of natural mica separate the grids, and special end spacers are provided to give large creeping distances. All Resistances are tested with 2,500 volts A.C. between grids and end frames before despatch.



**TEMPERATURE CO-EFFICIENT**—For ordinary purposes we use our standard material having a temperature co-efficient of 16% per degree Fahrenheit, as against 11% for cast iron. For special purposes we can supply grids of Copper-Nickel Alloy, which has a negligible temperature co-efficient.

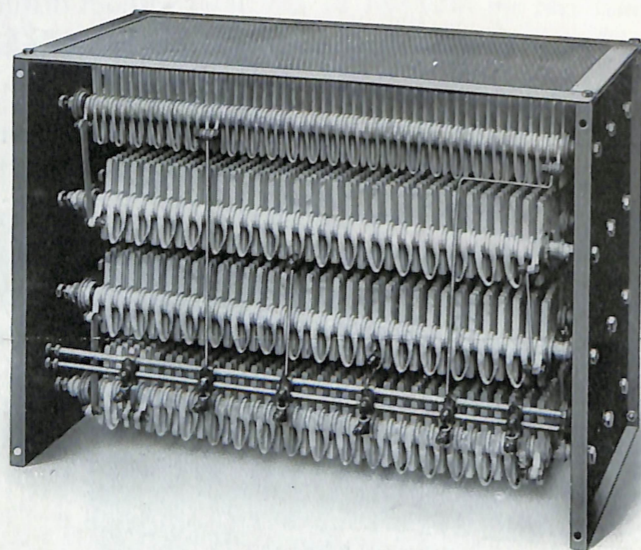
**TERMINALS**—Brass pressings of substantial section and provided with extra large cable holes. The cable is screwed by a headed bolt of ample size, secured with a lock nut. The terminal itself is bolted to the appropriate grid loop by a sherardised steel bolt fitted with patent lock nut. Ample contact surface is obtained by copper washers between the grids and terminal.

Adjustment in the grading of a Resistance is a simple matter as each grid loop forms an available tapping point and the terminal can be attached to any loop without disturbing the grids. When desired, a terminal bar can be mounted at the base of the resistance. This arrangement is often desirable when cables enter at a definite position through pipe flanges, glands, and cable boxes.



**REPLACEMENT OF GRIDS**—In the event of accident, to which all electrical equipment is subject, it is quite an easy matter to replace our grids. It is not necessary to dismantle a complete tier. A few new grids can be slipped into position by removing the tie rod nuts—this enables the spacing washers and damaged grids to be taken out, and reassembled with new parts.

**RATING AND TEMPERATURE RISE**—The rating of our Resistances naturally varies in accordance with customers' requirements, but in all cases we calculate our ratings to ensure that the temperature of the grids does not exceed 290° C., as laid down in the B.E.S.A. specifications. Owing to the excellent radiating properties of our Resistances, the cooling periods between each individual cycle of operations can be much less than with many other types.



**STANDARD CRANE TYPE RESISTANCE**  
(with front cover removed).

**COVERS**—Standard Ventilating Covers are of small mesh expanded metal, reinforced with wide beading of steel strip at the edges.

To suit particular local requirements, special enclosures can be provided, such as :

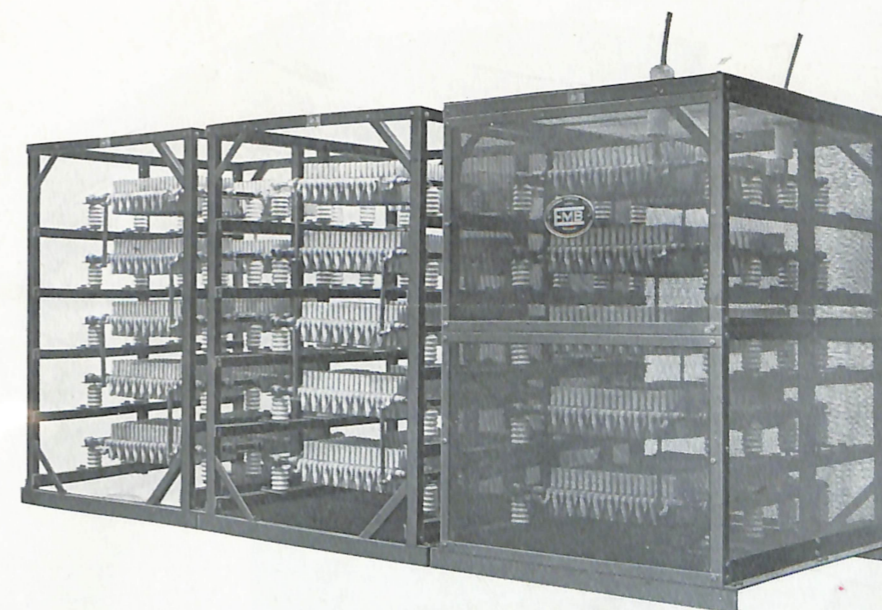
Louvred weatherproof.

Totally enclosed watertight.

Totally enclosed explosion-proof, for use in fiery mines, see page 11.



## HIGH TENSION NEUTRAL POINT EARTHING RESISTANCES.



**11,000 VOLT EARTHING RESISTANCE.**

We can supply Earthing Resistances with suitable enclosures for mounting outside, and many have been supplied for use in this Country and Abroad.



## STEEL CASE TRAMWAY RESISTANCES

AS SUPPLIED TO  
ALL THE LEADING TRAMWAYS IN THIS COUNTRY AND ABROAD.  
(Platform Type).



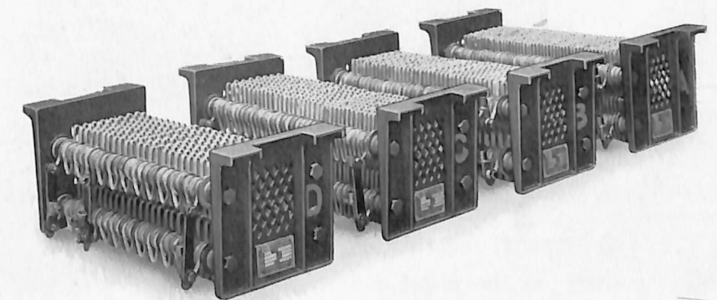
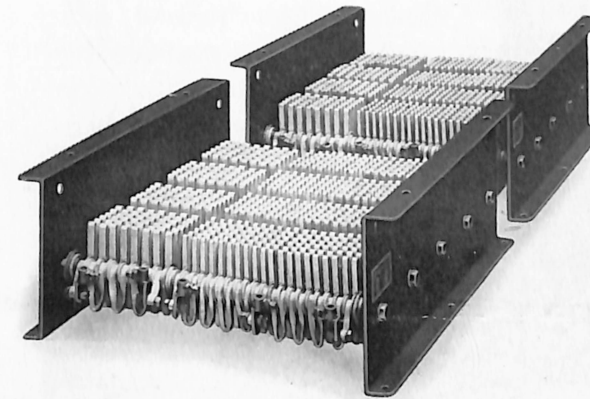
Our Resistances are provided with a special form of ventilation, which ensures that the top and front are kept cool even when fitted on vestibule cars.

Terminal bar is adopted as a Standard Fitting.



## UNDER CAR TYPE TRAMWAY RESISTANCES.

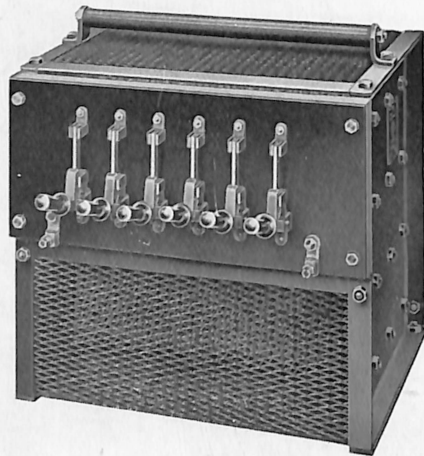
AS SUPPLIED TO  
THE LONDON COUNTY COUNCIL AND OTHER  
LEADING TRAMWAYS.



Other Type Frames can be supplied to suit Special Requirements.



## ARC WELDING RESISTANCES.



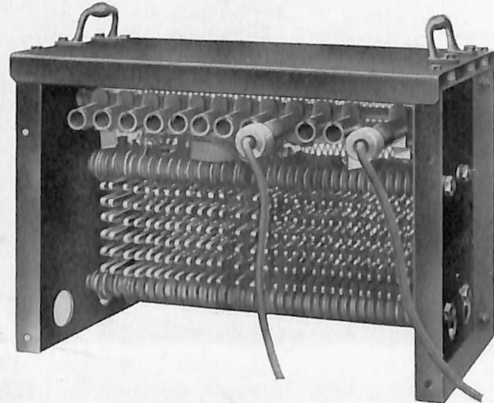
Consisting of **EMB** special low temperature co-efficient grids, arranged in a number of parallel paths connected to the Q.B. Knife Switches, mounted on insulated panel at the front of the Resistance.

These Resistances are constructed to withstand rough handling. The Switch panel is of a strong insulating material.

**Cast Iron Grid Resistances are Easily Broken.  
"EMB" GRIDS ARE UNBREAKABLE.**

Alternative type, with grids arranged in series and connected to sockets. Two plugs are provided with each unit.

This type is constructed entirely on the metal and mica principle.



**Our Welding Resistances are 30% Lighter than Resistances made up with Cast Grids.**

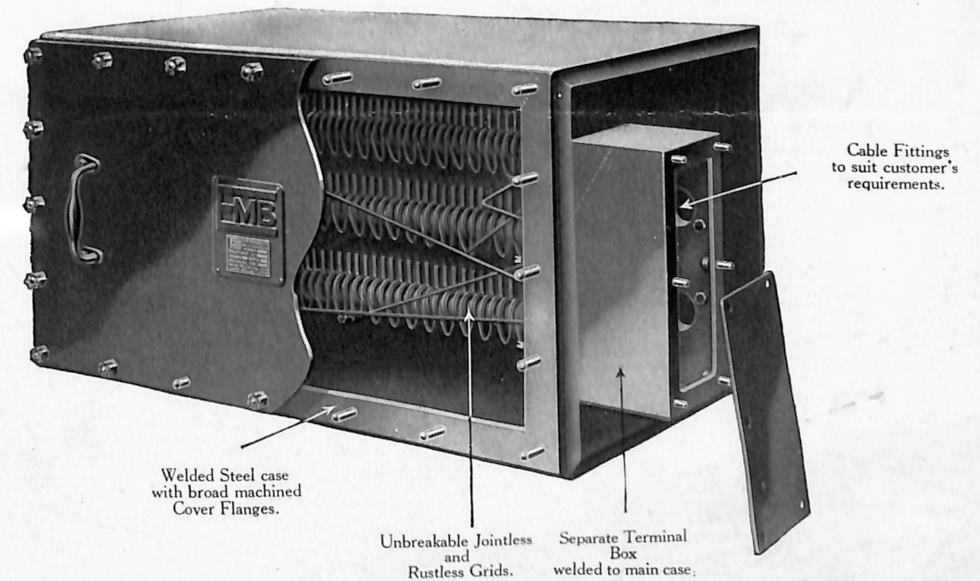


## EXPLOSION-PROOF RESISTANCES.

The Grids are our Standard Unbreakable Jointless and Rustless type.

The Case is built on the same lines as our Explosion-proof Controller Case, which has been thoroughly tested by the Mining Department of the University of Sheffield.

The size illustrated is suitable for use with motors up to 30 h.p. on haulage service, starting against full load torque in 5 minutes, every 15 minutes. The rating and ohmic value is also sufficient to enable creeping speeds to be obtained for long periods during rope inspection.



We do not make Oil Immersed Resistances for haulage service in fiery mines, as no advantages are obtained with that type in space or price. Further, the periodical inspection necessary with oil immersed gear is eliminated.

With Resistances for haulage work or use in non-fiery mines where Rule 132 does not apply, standard covers can be supplied, as described and illustrated on page 6.



# UNBREAKABLE JOINTLESS AND RUSTLESS GRID TYPE RESISTANCES.

For all Duties.

