

No. 763,330.

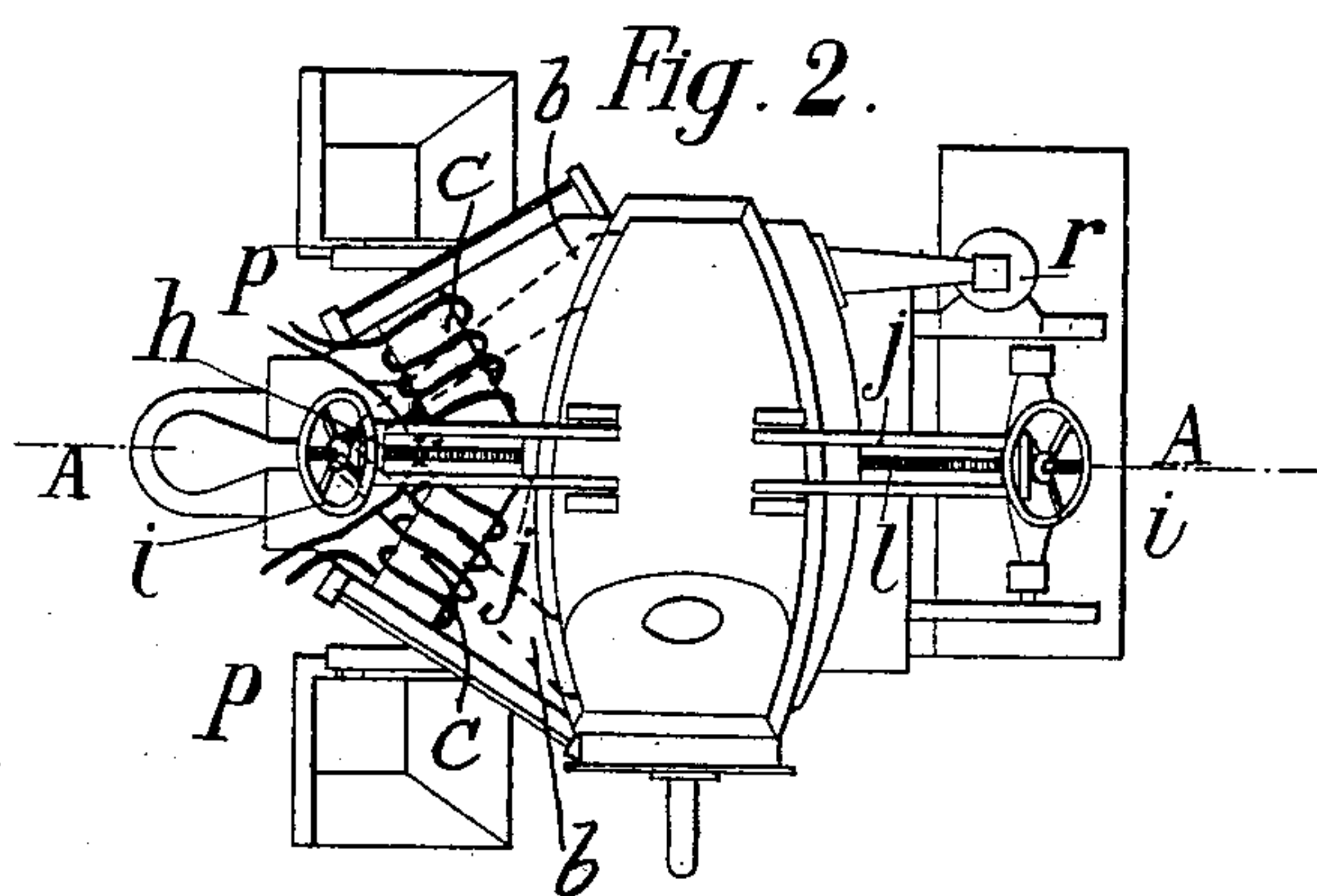
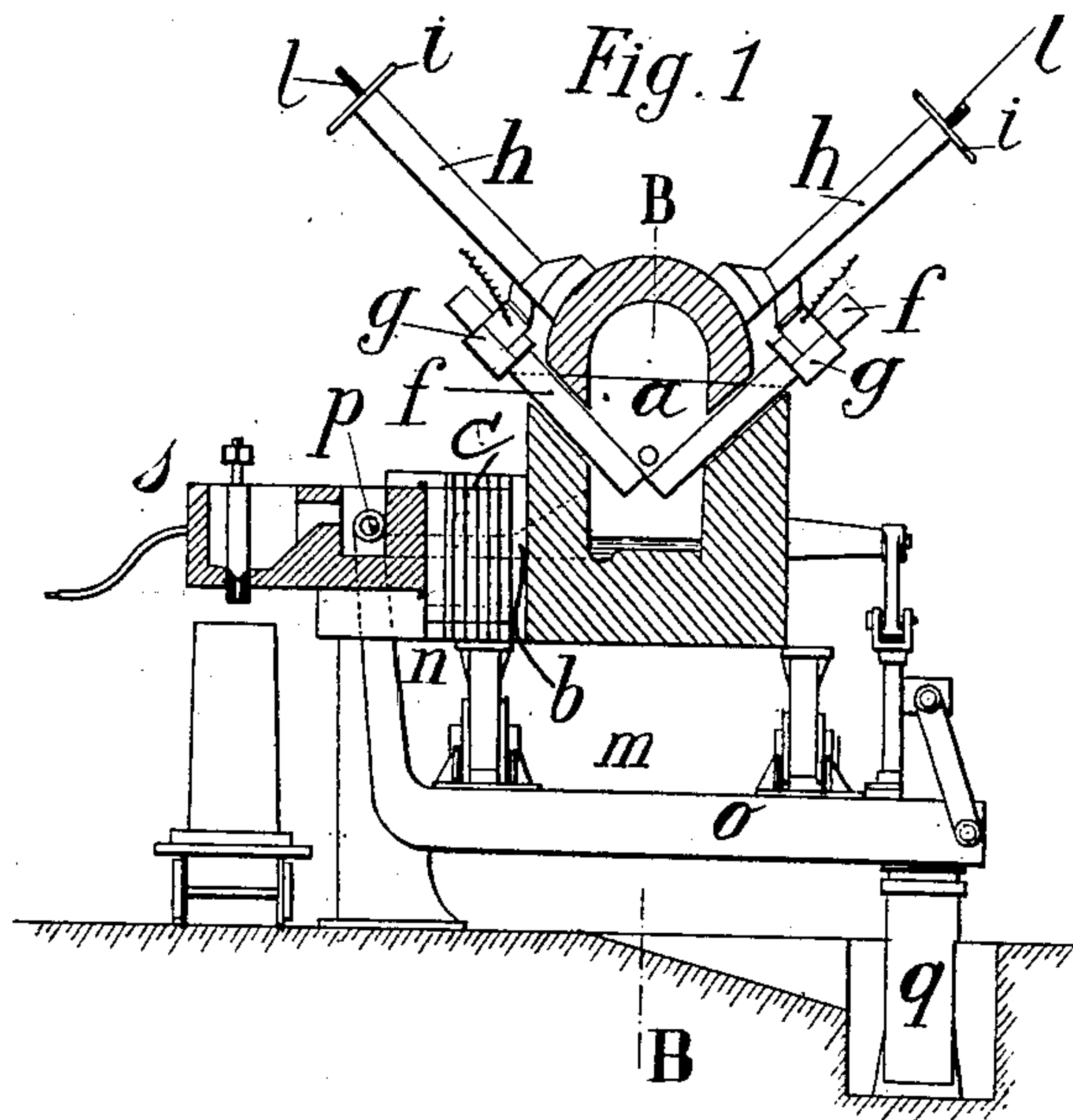
PATENTED JUNE 21, 1904.

C. P. E. SCHNEIDER.
ELECTRIC FURNACE.

APPLICATION FILED DEC. 22, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:

Wm. B. Kerran

Gustave R. Thompson

Inventor:

Charles P. E. Schneider

by

Mauro, Cameron, Lewis Masie

Attys.

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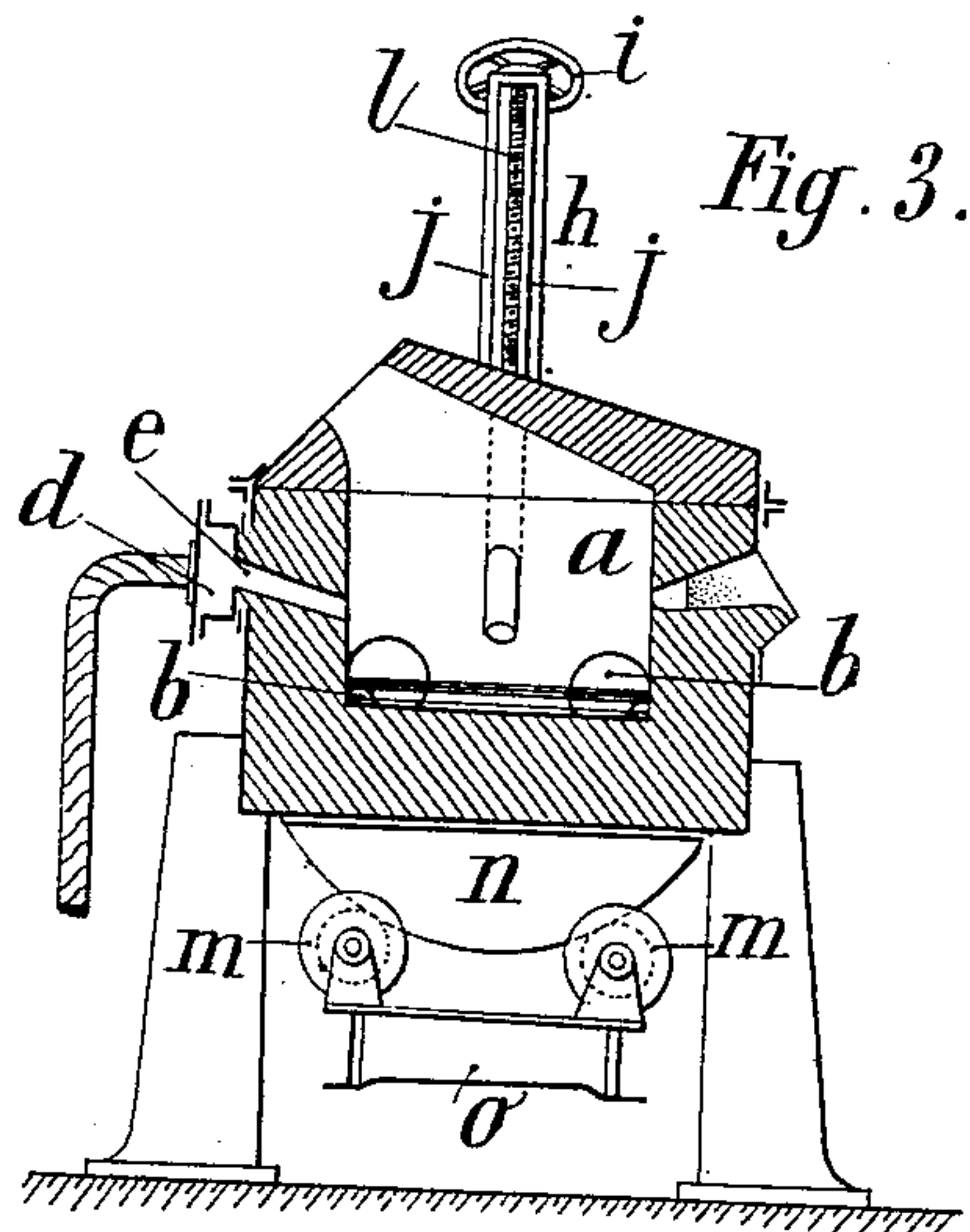
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2 SHEETS—SHEET 2.



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Wm B. Cerkam

Gustave R. Thompson

Inventor:

Charles P. E. Schneider

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Mauro, Cameron, Lewis & Massie,
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UNITED STATES PATENT OFFICE.

CHARLES PROSPER EUGÈNE SCHNEIDER, OF LE CREUSOT, FRANCE.

ELECTRIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 763,330, dated June 21, 1904.

Application filed December 22, 1903. Serial No. 186,169. (No model.)

To all whom it may concern:

Be it known that I, CHARLES PROSPER EUGÈNE SCHNEIDER, a citizen of the Republic of France, residing at Le Creusot, Saône-et-Loire, France, have invented a certain new and useful Improved Electric Furnace; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in electric furnaces of the general character described in my patent application filed October 12, 1903, Serial No. 176,719, and known as "induction-furnaces."

In my application above referred to I have shown and described an induction-furnace the pot or crucible of which is provided with an exterior conduit of small diameter for heating the circulating metal by means of an alternating current passing through a primary coil wound on an iron frame or core, the circuit of molten metal constituting the secondary circuit. In this form of furnace it is always necessary to fuse the metal exterior to the furnace and introduce it into the melting-pot. This occasions a loss of heat in the preliminary melting-furnace and loss of time in the transfer.

It is the object of my invention to produce a furnace which is capable of combining the features of an induction-furnace such as I have described in my application for patent above referred to and that of an electric melting-furnace, whereby the metal may be melted in the chamber or receptacle of the induction-furnace itself, thereby obviating the use of an external melting-furnace, with its accompanying disadvantages. To attain this object, I place one or more pairs of electrodes in the chamber or receptacle of the induction-furnace, preferably locating them in the upper part of the chamber, so that they may be lowered into the chamber or receptacle formed by the basin or sump and its arch. By causing the electric arc to form between these electrodes or between these electrodes and the bath or simultaneously between the electrodes and between the electrodes and the bath heat may be introduced into the cham-

ber or receptacle in addition to that furnished by the heating-tube of the induction-furnace. The chamber or receptacle may also be heated to a very high temperature before the introduction of the metal. Metal may be fused there for filling the tubes and the basin. Finally, by this additional means of heating the main heating effected by the combination of the inclined tube and the basin may be assisted.

The accompanying drawings illustrate, by way of example, a furnace adapted for refining cast-iron for converting it into steel, and to which the present improvements are applied.

Figure 1 is a section taken along the line A A in Fig. 2 with a part of the cover removed. Fig. 2 is a corresponding plan, and Fig. 3 is a section taken along the line B B in Fig. 1.

The furnace consists of a chamber or receptacle *a*, having applied thereto a heating-tube *b*, the latter being heated by the converter or transformer *c*. The tube *b* forms a continuous conduit for molten metal and leads it from and returns it to the chamber *a* of the furnace. Surrounding the conduit *b* are two converters *c c*, consisting of a magnetic circuit and a primary, which is capable of excitation by any suitable means and constitutes the heating means of the induction-furnace. An injector *d* permits of the introduction of air by means of twyers *e* through the fused cast-iron if it is desired to effect the refining by injecting air.

Two carbon electrodes *f* are carried by holders *g*, the position of which may be adjusted by means of screw mechanism, such as *h h*, adapted for being operated either by hand or by automatic means, as may be desired. Each of the screw mechanisms may comprise, for example, a hand-wheel *i*, the hub of which is adapted to rotate in a support which may be formed by the plate which connects the sides *j* of the guideway for the block *k*, the latter being carried by the screw *l*, which passes through the said hand-wheel. The holder pertaining to each electrode is carried by or attached to its respective block *k*. When the hand-wheel is rotated, the hub works as a nut

in the support, while the screw moves longitudinally through the said wheel according to the direction of rotation of the wheel, with the effect that the block *k*, and consequently
5 the electrode, is caused to move inwardly or outwardly. By these means the position of the electrodes, the interval separating their extremities, and consequently the length of the arc, may be regulated.
10 As in the examples described in the prior patent application above referred to, the furnace is supported by a platform adapted for being inclined in two directions whereof the planes are perpendicular to each other. The
15 platform is adapted to rock in the first place in traveling on the rollers *m* by the intermediary of segments *n*. These rollers *m* are themselves carried by a frame *o*, which rocks about the pivots *p*. The movements are
20 given by the two hydraulic cylinders *q* and *r*. A tapping-way *s*, with spindle and plug, communicates with the heating-tube *b* for tapping the furnace.

What I claim, and desire to secure by Letters Patent of the United States, is— 25

1. In combination, an electric-furnace chamber, electrodes therein, and means for adjusting the same whereby they may be lowered and raised in the chamber, a pipe leading from and returning to the bottom of said chamber 30 adapted for circulating molten metal, and a transformer linking said pipe and adapted to heat molten metal therein.

2. In combination, an electric-furnace chamber provided with electrodes, a conduit leading from and returning to the bottom of said chamber, and a transformer linking said pipe whereby molten metal in said pipe may be heated. 35

In witness whereof I have hereunto set my hand in presence of two witnesses. 40

CHARLES PROSPER EUGÈNE SCHNEIDER.

Witnesses:

GEORGES BOURETTE,
NAUDIN ACHILLE.