

No. 654,463.

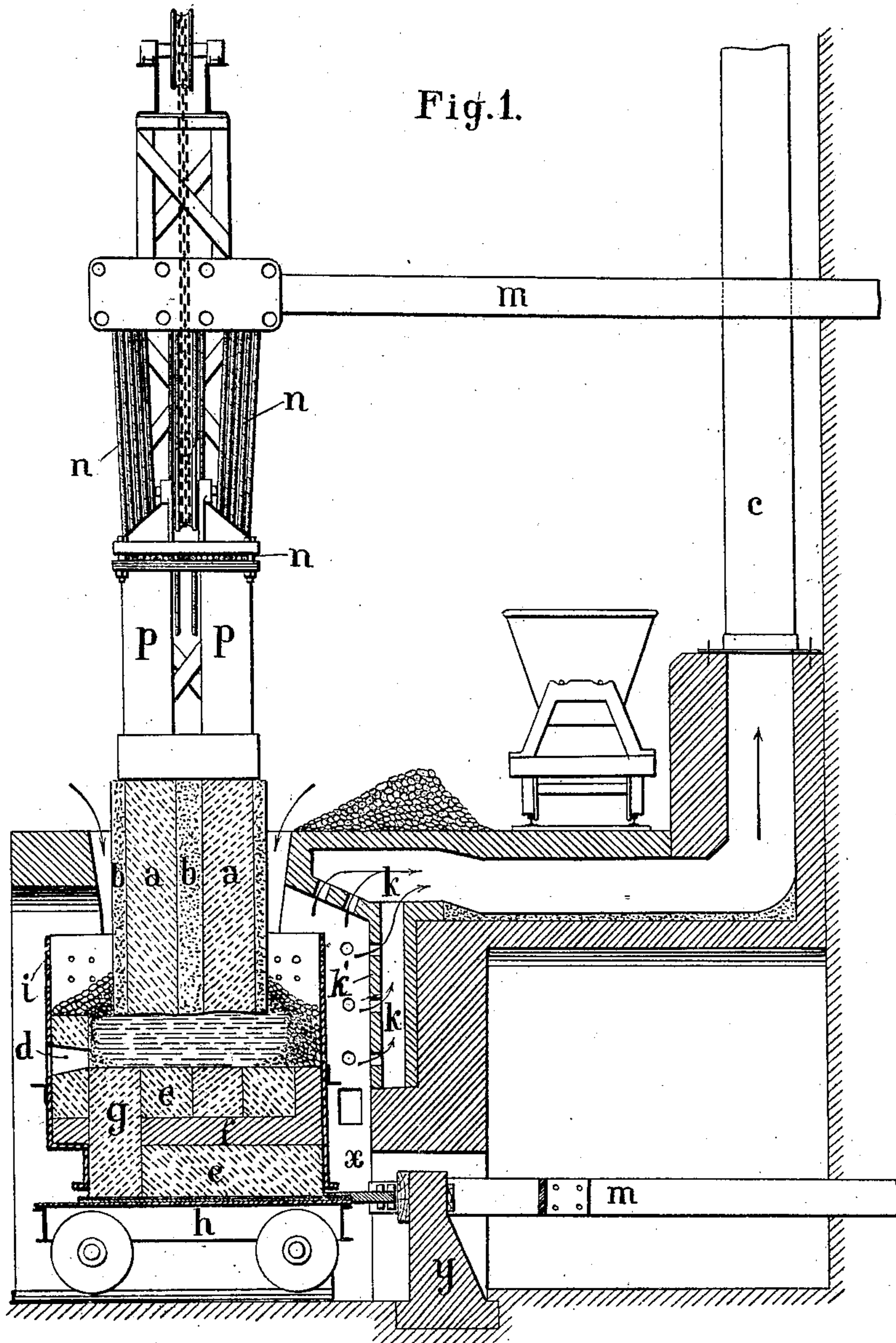
Patented July 24, 1900.

H. LELEUX.
ELECTRIC FURNACE.

(Application filed July 7, 1899.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses.
Dennis Sully
Robert Everett

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No. 654,463.

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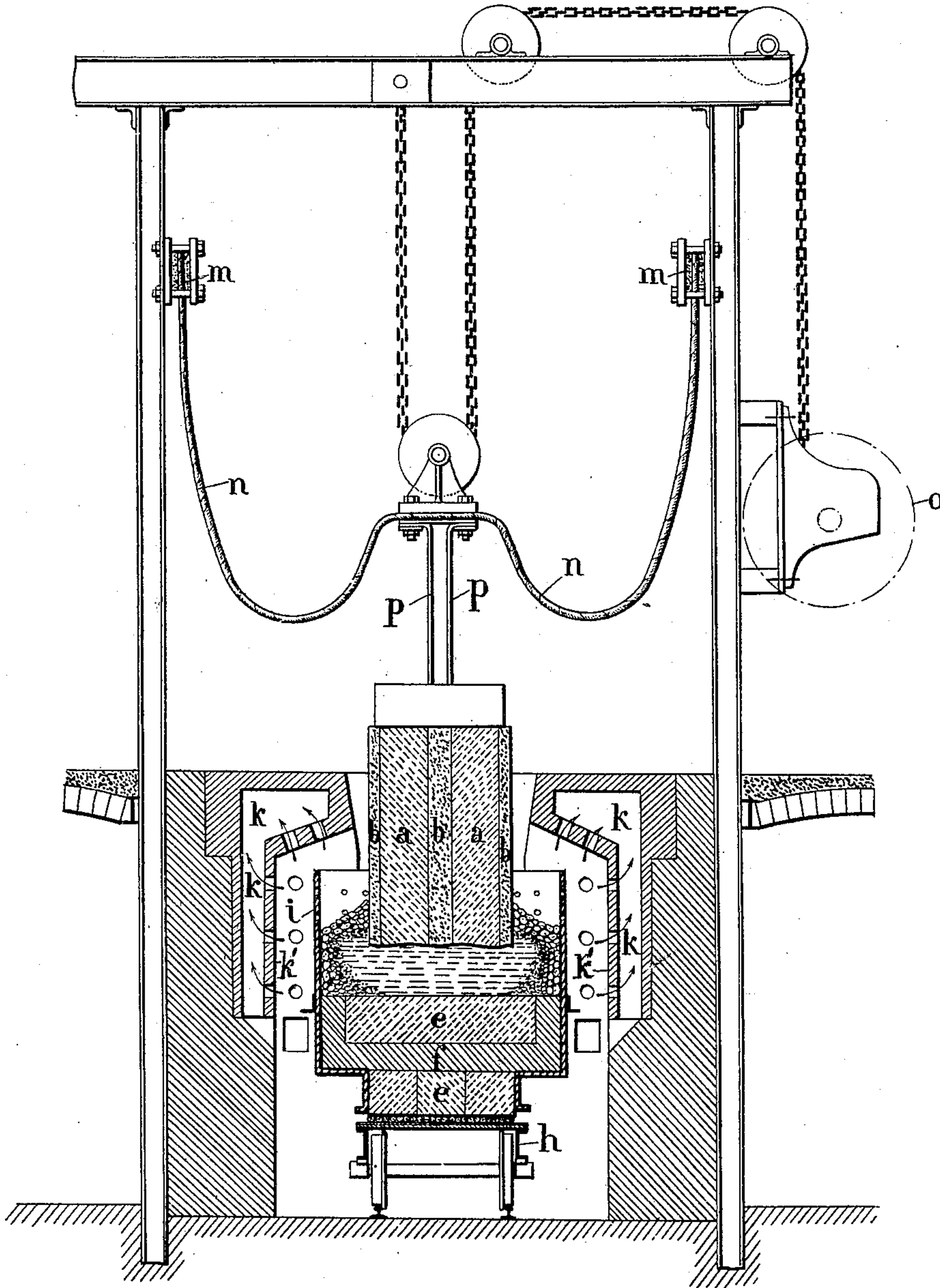
H. LELEUX.
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(Application filed July 7, 1898.)

(No Model.)

3 Sheets—Sheet 2.

Fig.2.



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Fig.3.

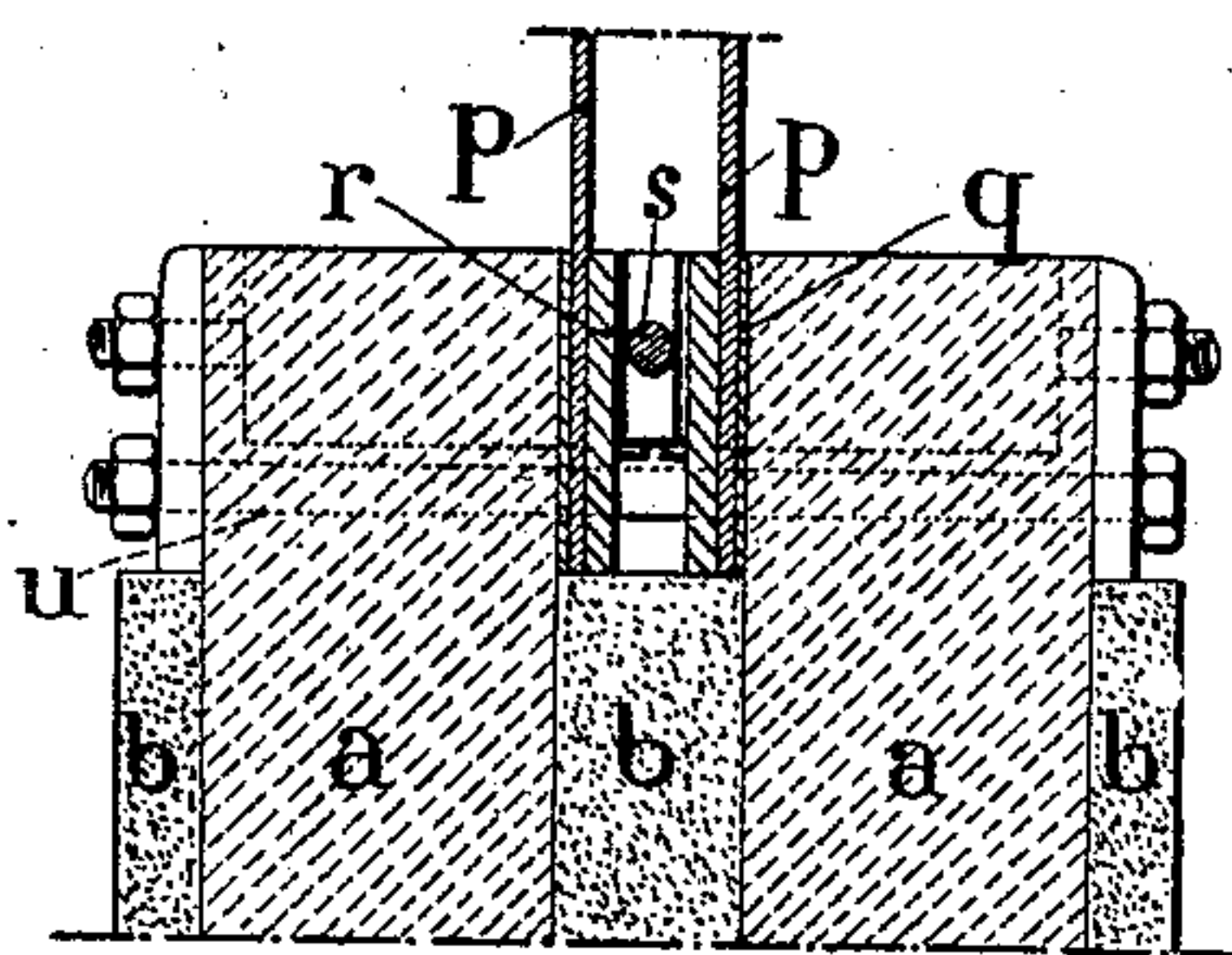
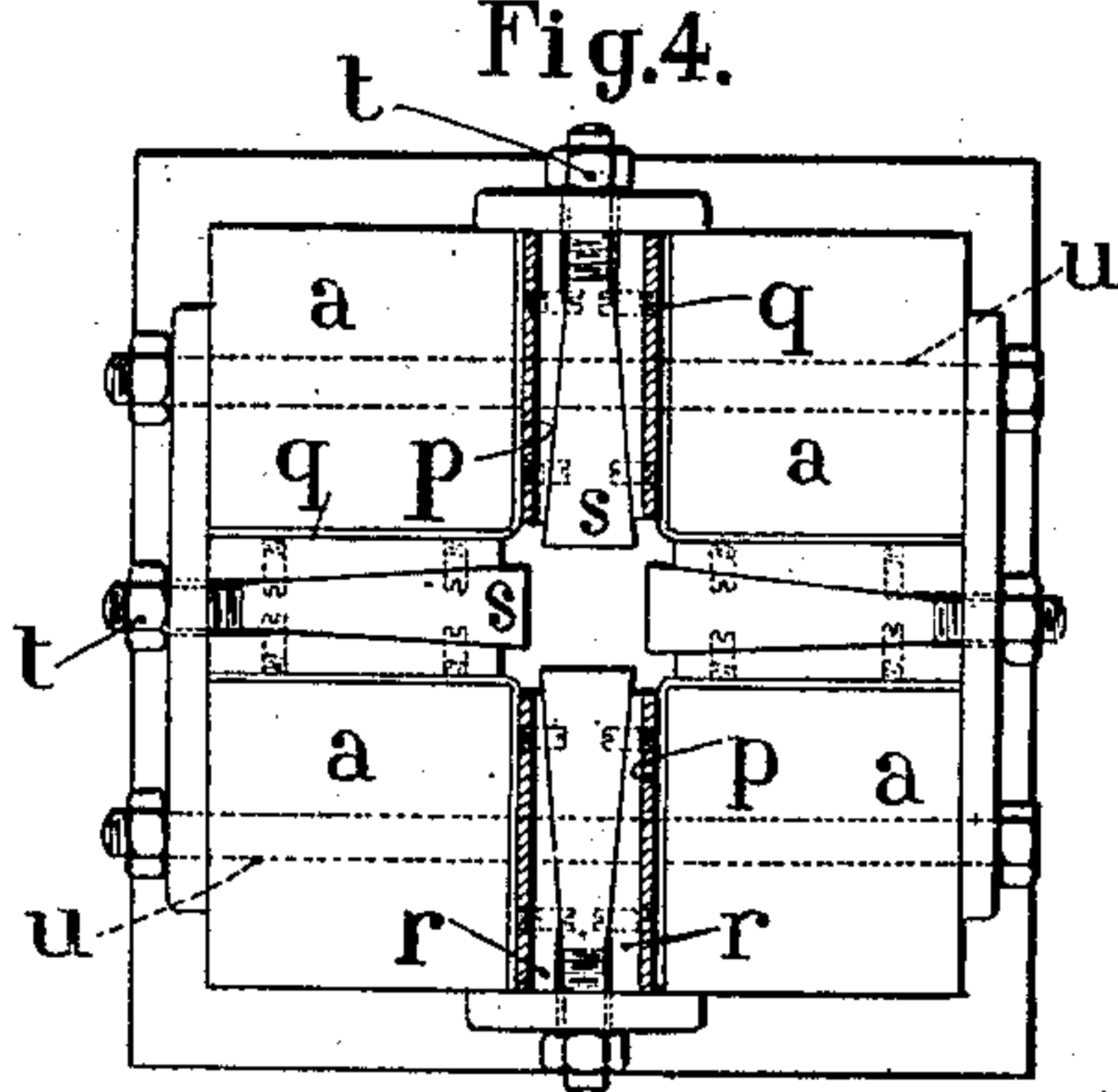


Fig.4.



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UNITED STATES PATENT OFFICE.

HENRI LELEUX, OF PARIS, FRANCE, ASSIGNOR TO LA COMPAGNIE ELECTRO-MÉTALLURGIQUE DES PROCÉDÉS GIN & LELEUX, OF SAME PLACE.

ELECTRIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 654,463, dated July 24, 1900.

Application filed July 7, 1899. • Serial No. 723,117. (No model.)

To all whom it may concern:

Be it known that I, HENRI LELEUX, a citizen of France, residing at Paris, France, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

This invention relates to improvements in electric furnaces of the kind more especially intended for the manufacture of carbide of calcium, and has for its object to improve the working of the same and to increase their yield; and in order that the invention may be clearly understood I will describe the same in detail, with reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a furnace constructed according to my invention. Fig. 2 is a transverse section of the same. Figs. 3 and 4 show, on a larger scale, the means adopted for connecting one of the electrodes with one of the electric conductors or leads.

The improvements which I shall describe relate more especially to furnaces known as "resistance" furnaces, comprising, on the one hand, a vertical electrode capable of a rising-and-falling movement adjustable at will and, on the other hand, a crucible or melting-pot with a fixed hearth or bed-plate constituting the second electrode and serving for the return of the current. The crucible is mounted on a carriage or suspended from traveling pulleys.

The point to which my improvements relate is the construction of the vertical electrodes. In ordinary furnaces with carbons of high conductivity the heat developed by the passage of the current or transmitted by the heat from the hearth is frequently sufficient to raise the electrodes to a red heat and cause their rapid destruction by combustion in the air. To overcome this objection, the upper electrode, according to my invention, is formed of one or more cores *a* of carbon of high electric conductivity. In the drawings I have shown, by way of example, an electrode with four cores square in section; but it will be understood that the number and the sectional form of the cores may be varied. These cores are each surrounded by a mass *b* of carbon agglomerated by means of oil-tar.

The carbon and oil-tar are crushed together in especially-constructed mills, and the whole is coked in a muffle-furnace at a temperature not exceeding 1,000°. When the same has been sufficiently coked, the electrode is constructed by assembling in a suitable manner blocks made with this agglomerate mass and cores of conductible carbon. I thus obtain an electrode with an increased external surface, whereby its cooling is facilitated by the surrounding air, while the superficial material of the electrode has a comparatively-low conductivity, so as to protect the cores from the furnace heat. I thus keep the surface of the material at a temperature below that which is necessary for the combustion of the carbon, which is a great advantage, the electrode being maintained cool by the current of air entering from outside the furnace and drawn in by the draft of the chimney *c*. Moreover, from the temperature of the hearth all the portions of the lower sections of the electrode acquire perceptibly the same electric conductivity, so that the current spreads over the whole section.

The vertical electrode is characterized by its connections with the conductors. The current enters by the upper conductor *m*, passing thence by cables *n* to an armature formed of plates *p*, corresponding in number to the cores *a* in the electrode, and which may be raised and lowered by a fly-wheel *o* and chain and pulleys. Figs. 3 and 4 indicate the manner in which the plates *p* are connected to the carbons *a*. Over the two internal faces of each of the carbons *a* there is applied a continuous elastic pad formed by thin plates *q* of red copper, silvered or not. The plates *p* are applied to one side of each pad and kept in position by means of wedges *r* and keys *s* with screw-heads having nuts *t* thereon. By tightening up the nuts *t* the simultaneous locking of the two plates *p* on the corresponding carbon *a* is thus secured. A similar arrangement is employed to obtain perfect contact between the carbons *a* and that portion of the pad *q* over the faces of which there are no plates *p*. Bolts *u*, passing through the two carbons *a* and the two plates *p*, insure a good connection between the electrode on the one hand and the armature formed by the plates

5 *p* on the other hand. This arrangement for
 connecting the parts together has the advan-
 tage of preventing any disarrangement of the
 parts which might arise from unequal expan-
 sion of the carbon and the metal forming the
 leads. The lower electrode is formed by the
 bed or hearth of the furnace, which consists
 of carbon blocks *ee* and *g*, the blocks of car-
 bon *ee* being arranged in two layers—upper
 10 and lower—separated by a layer of insulat-
 ing material *f*, composed of refractory non-
 conducting concrete, the object being to fa-
 cilitate the flow of the product—for example,
 carbid of calcium—by localizing and concen-
 15 trating the calorific action of the current op-
 posite the discharge-holes *d*, thus maintain-
 ing at this point a higher temperature than
 over the rest of the furnace-hearth to facili-
 tate flow of the carbid. The two superposed
 20 parts *e* of the bed-plate are connected by
 blocks of carbon *g* of relatively-reduced sec-
 tion and situated immediately adjacent to the
 outlet or discharge holes *d*. The passage of
 the electric current through these carbons *g*
 25 of relatively-reduced section and situated im-
 mediately adjacent to the outlet or discharge
 holes *d* maintains at this part a higher tem-
 perature than over the rest of the bed of the
 furnace, thus facilitating the flow of the carbid.
 30 The furnace-bed is supported on a carriage
h, which is made separate from the bed and
 merely acts as a support. The furnace-bed
 is inclosed in a casing, preferably of metal *i*,

provided with perforations for dividing the
 gases which form in the crucible into thin 35
 streams, which are collected in the channels
k, formed in the walls of the furnace com-
 municating with the draft-chimney *c*, said
 channels *k* being separated from the furnace
 by a perforated partition *k'*. 40

The connection for connecting the bed of
 the furnace with the other pole of the source
 of electricity is obtained automatically by
 merely placing the carriage with the bed-plate
 thereon in position. 45

What I claim as my invention is—

An electric furnace provided with a verti-
 cally-arranged electrode formed by one or
 more cores of carbon of high conductivity each
 core being surrounded by an agglomerated 50
 mass of carbon having a less high conductiv-
 ity, each of these cores having its two inner
 faces provided with an elastic pad in order to
 provide a large surface of contact between
 the electrode and the plates connected to the 55
 lead, and said plates being secured against
 the pad by means of wedges and keys in or-
 der to obtain a permanent tightening what-
 ever may be the temperature of the electrode.

In testimony whereof I have hereunto set 60
 my hand in presence of two subscribing wit-
 nesses.

HENRI LELEUX.

Witnesses:

EDWARD P. MACLEAN,
ALFRED FREY.