

(No Model.)

2 Sheets—Sheet 1.

H. LEMP.

APPARATUS FOR MOUNTING THE FILAMENTS OF INCANDESCENT LAMPS.

No. 392,159.

Patented Oct. 30, 1888.

Fig. 1,

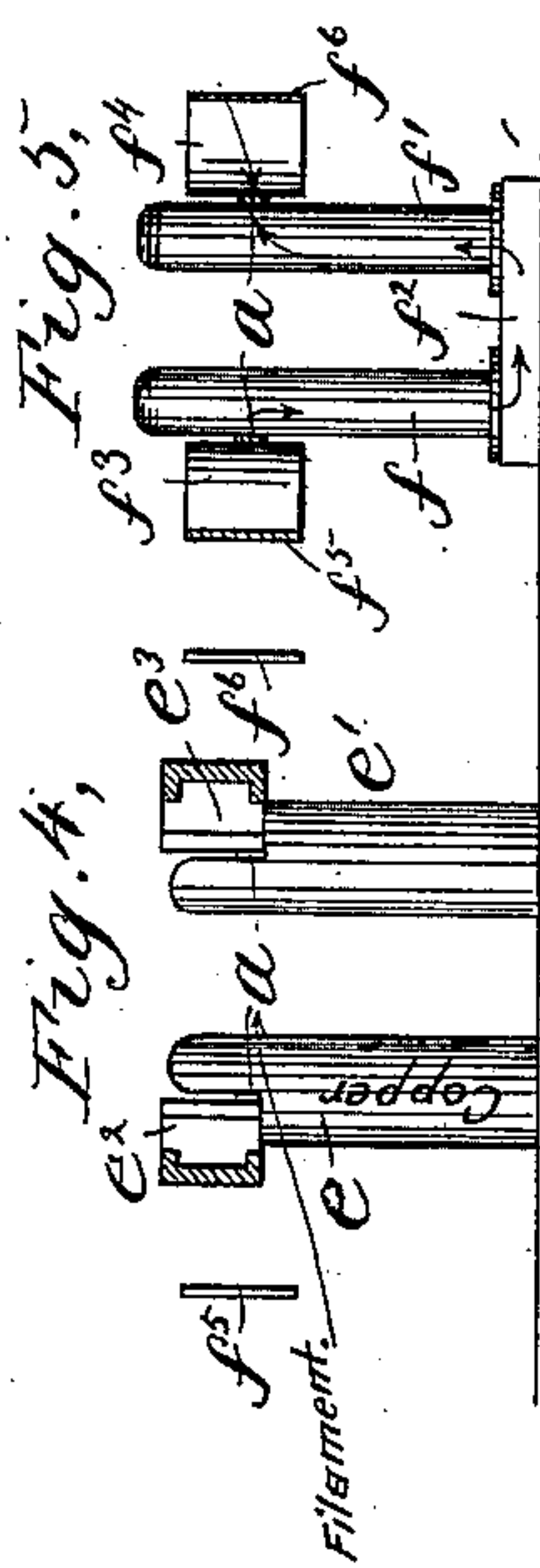
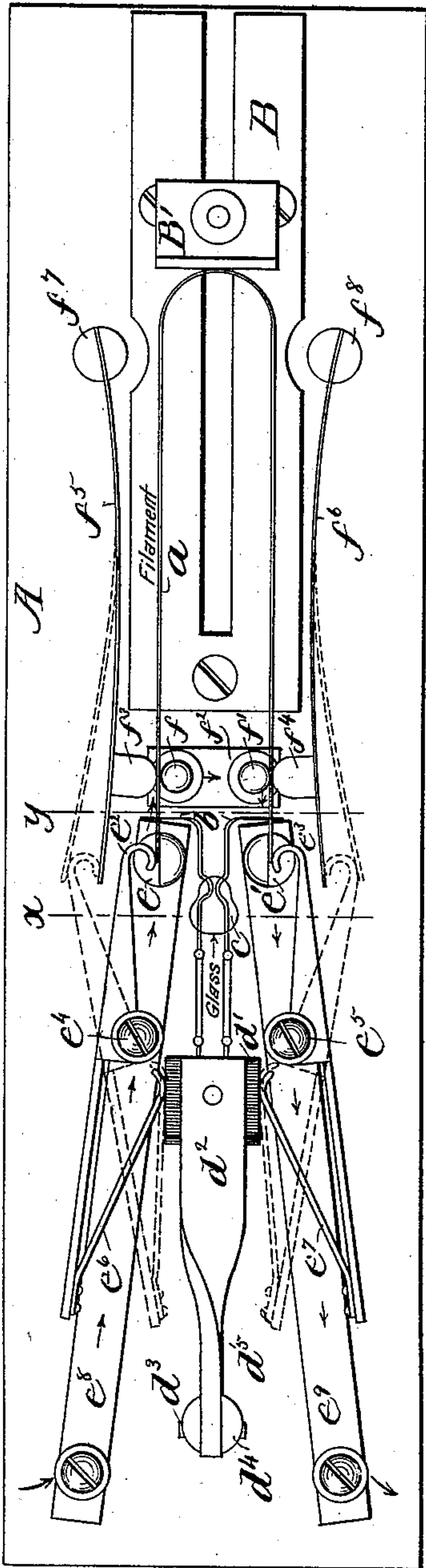


Fig. 2,

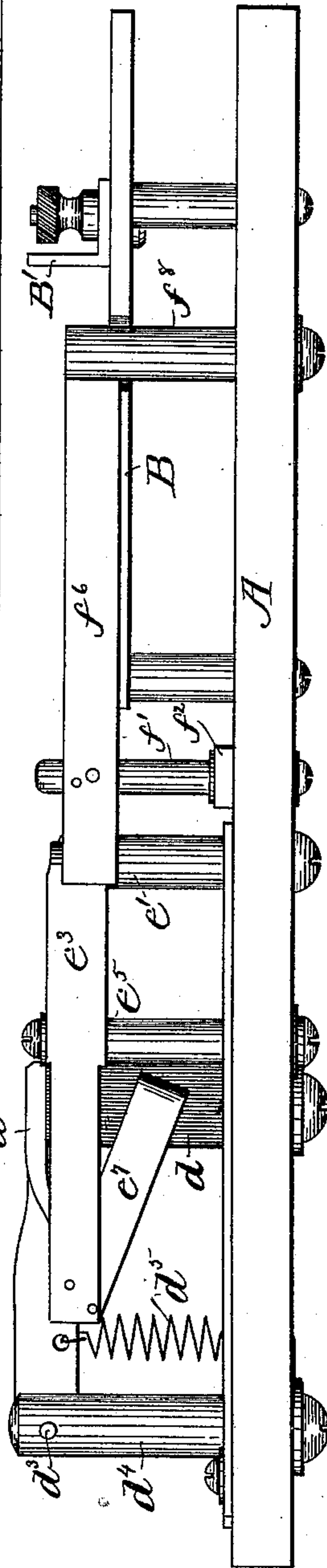
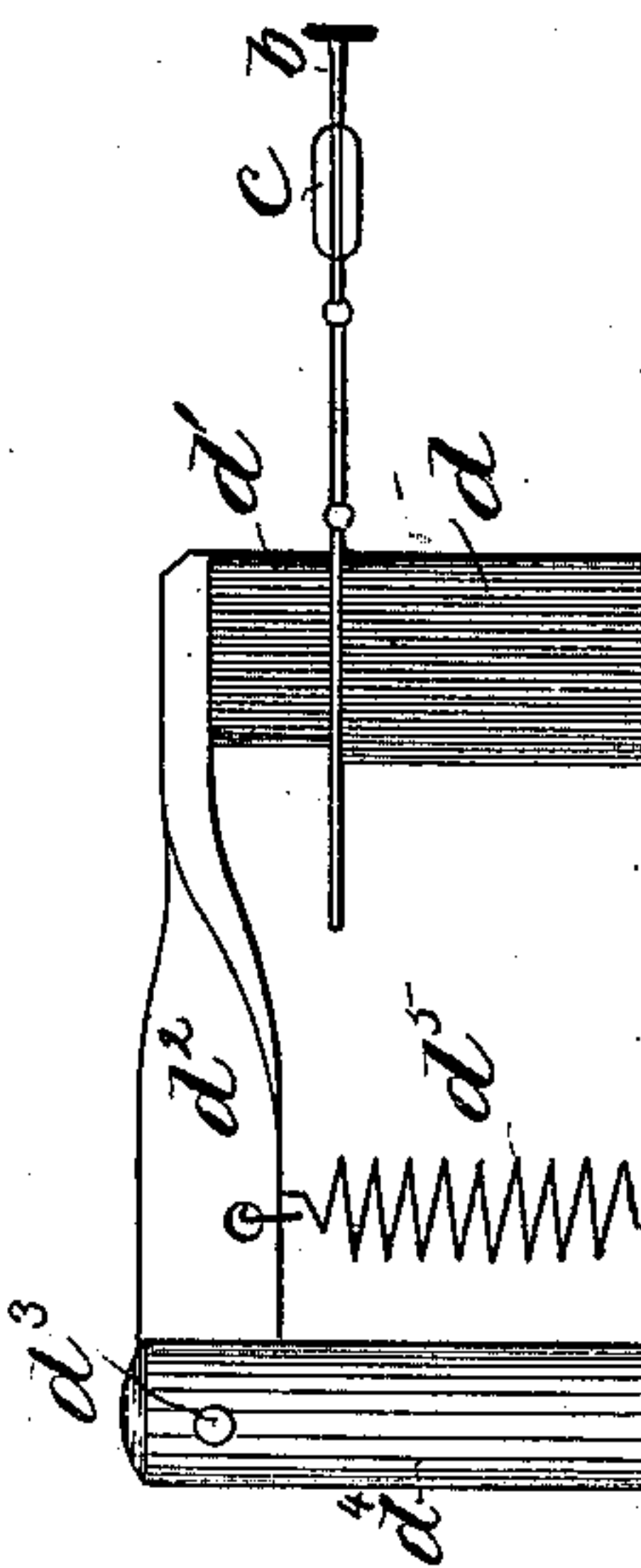


Fig. 3,



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Fig. 6.

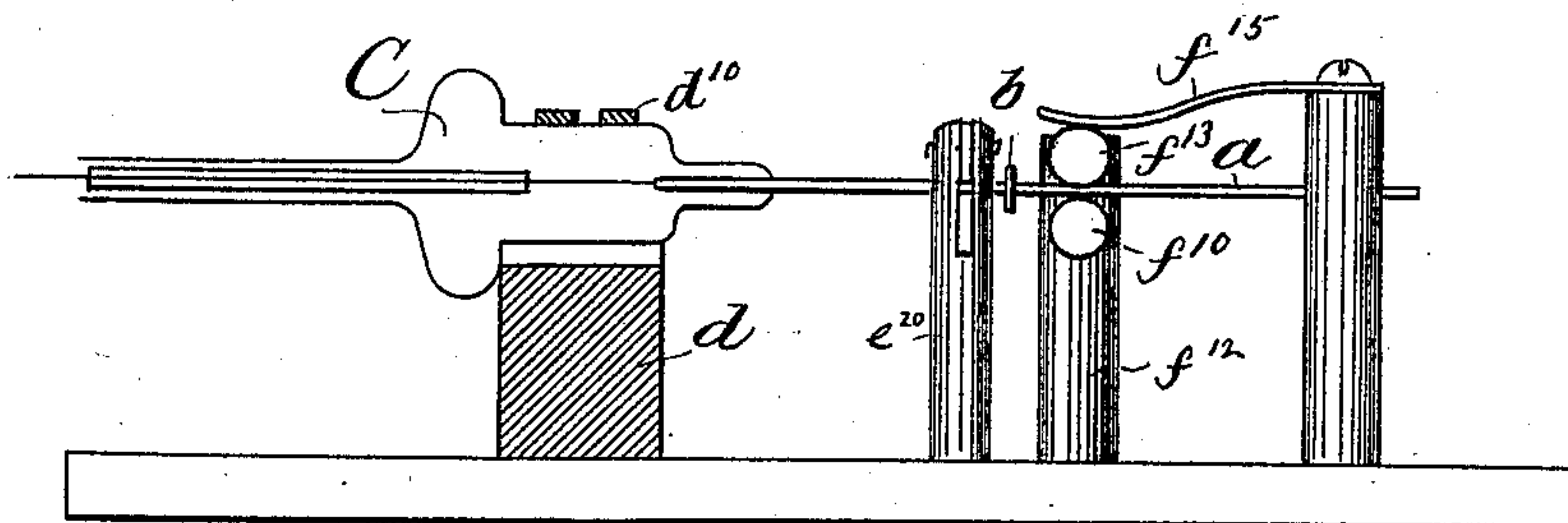


Fig. 7.

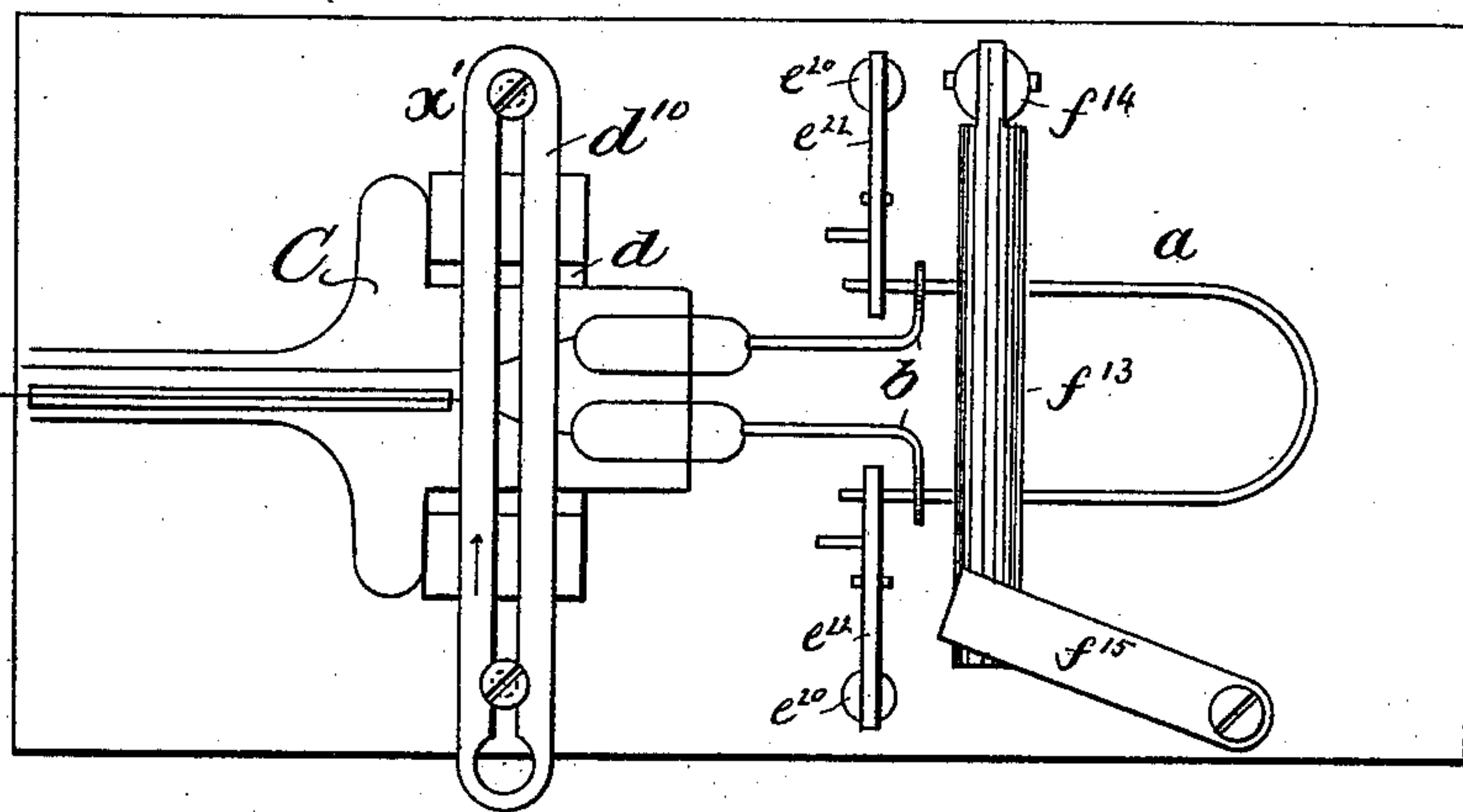


Fig. 8.

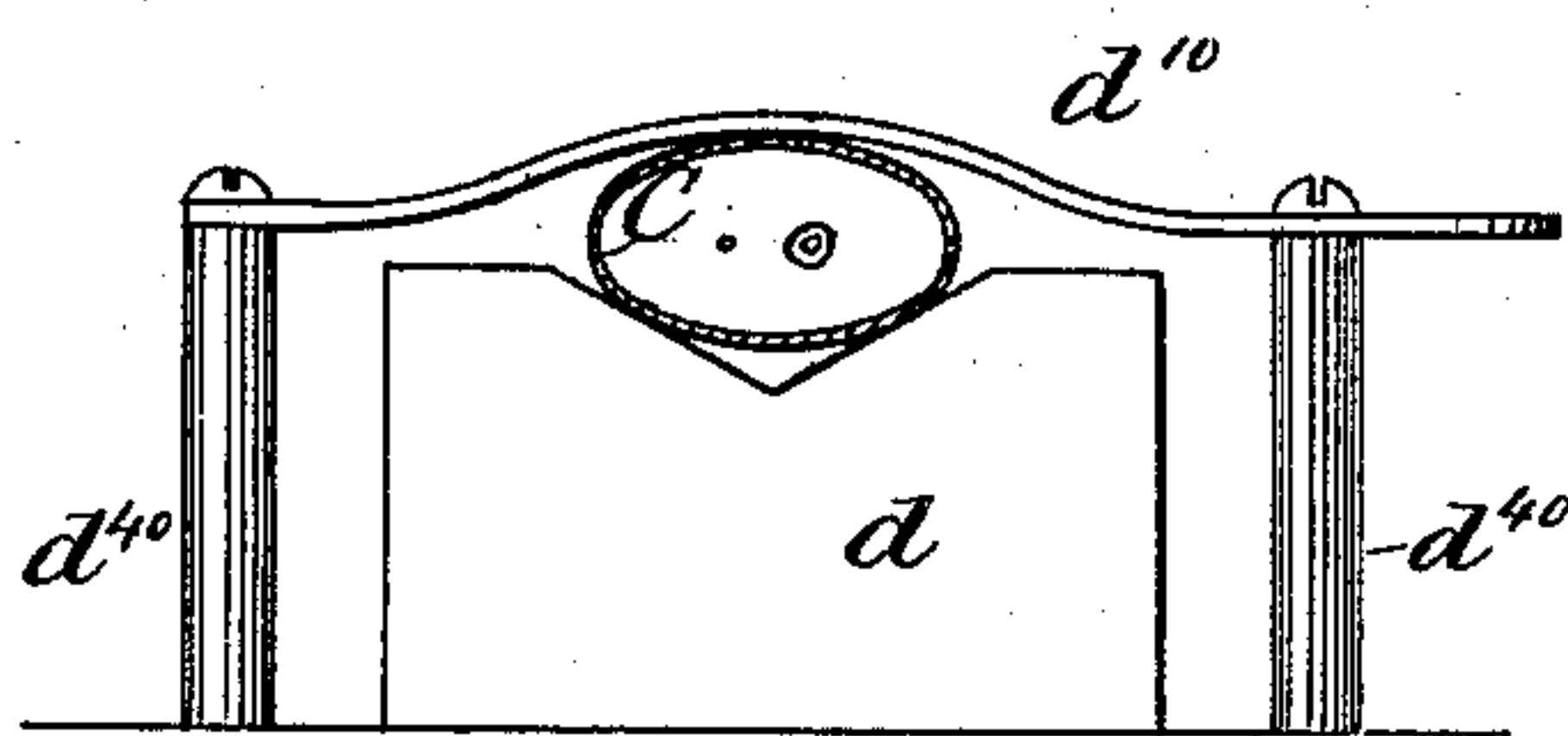


Fig. 9.

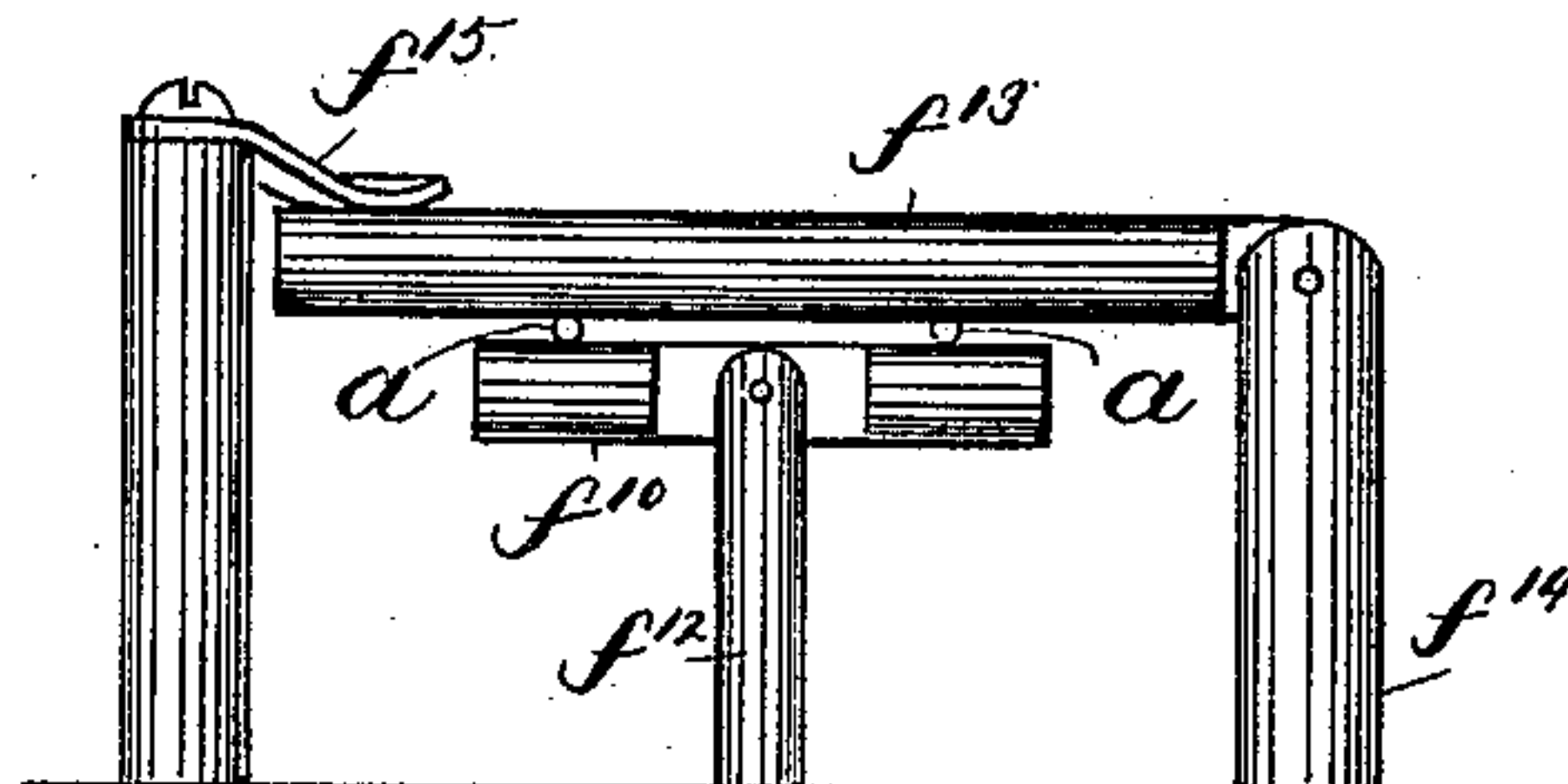
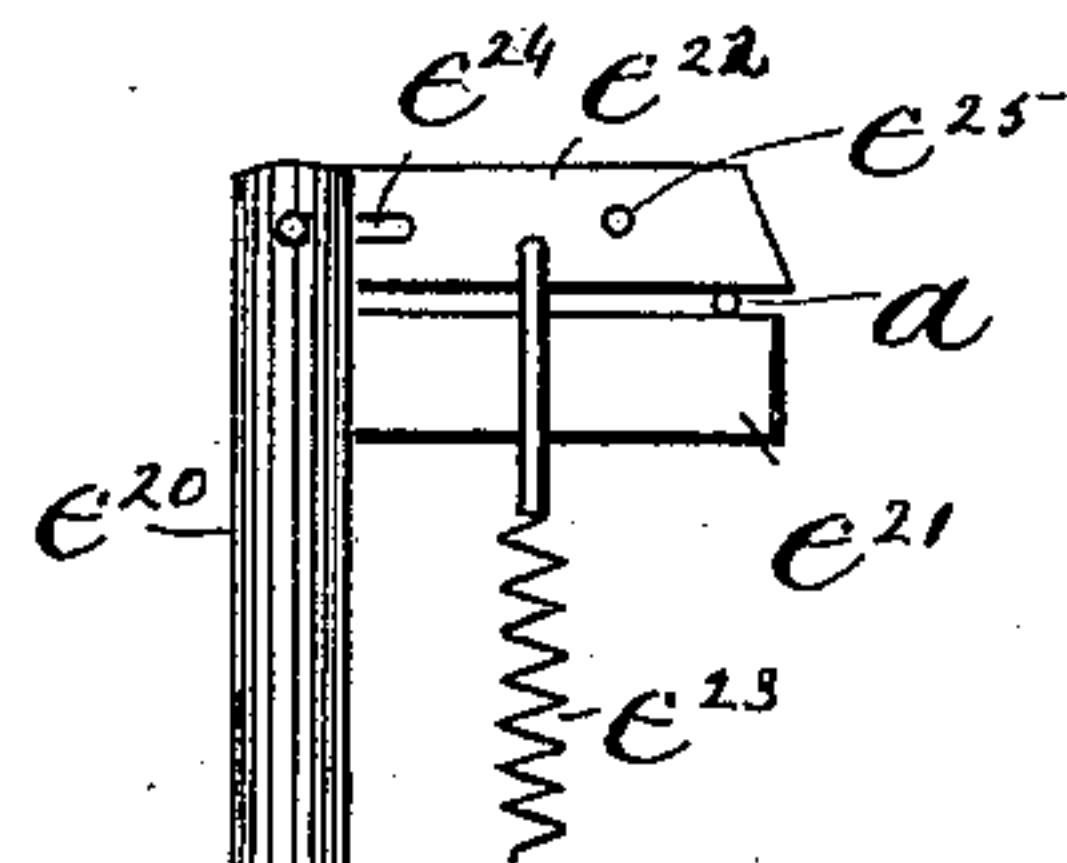


Fig. 10.



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# UNITED STATES PATENT OFFICE.

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APPARATUS FOR MOUNTING FILAMENTS OF INCANDESCENT LAMPS.

SPECIFICATION forming part of Letters Patent No. 392,159, dated October 30, 1888.

Application filed May 31, 1888. Serial No. 275,638. (No model.)

*To all whom it may concern:*

Be it known that I, HERMANN LEMP, of Lynn, county of Essex, and State of Massachusetts, have invented an Improvement in Apparatus  
5 for Mounting the Filaments of Incandescent Lamps, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 My invention relates to a machine or apparatus for mounting the filaments of incandescent lamps, and is intended to be used in making the joint between the ends of the carbon filament and the leading-in wire by deposition  
15 of carbon at the joint.

In another application filed herewith I have described a method of making a joint by thermal deposition of carbon, which method is applicable for the purpose of making the joint  
20 between the carbon and leading-in wire, and the apparatus forming the subject of this invention may be employed for making the joint in accordance with that method, although it is not limited to such use.

25 The apparatus forming the subject of this invention embodies appliances for holding the leading-in wires and filament in proper position with relation to one another during the operation of making the carbon deposit by  
30 which the said parts are mechanically and electrically united, and, in addition to this function of supporting the parts to be thus united, a portion of said appliances also serve to convey the current by which the parts are  
35 heated to cause the deposition of carbon to take place. The joint between the filament and metallic conductors is usually made after the metallic conductors have been sealed into the neck of the lamp, but before the globe that  
40 incloses the filament has been attached to the neck.

The apparatus forming the subject of this invention comprises a support or holder for holding the metallic conductors either with or with-  
45 out the neck of the lamp attached thereto, and a support or holder for holding the filament in proper position with relation to the metallic conductors and circuit-connecting devices, by which the portion of the conductors on  
50 which the deposit is to be formed may be placed

in circuit to receive the current by which the said conductors are heated when immersed in a fluid that deposits carbon under the influence of heat in the well-known manner.

Figure 1 is a plan view of an apparatus embodying this invention for forming the joint between the ends of a carbon filament and metallic conductors; Fig. 2, a side elevation thereof; Fig. 3, a detail showing the support for the metallic conductors in side elevation; 60  
Figs. 4 and 5, sectional details on line *x* and *y* of Fig. 1, showing the supports and circuit-connecting devices for the carbon filament. Fig. 6 is a side elevation, with part in longitudinal section, representing a modification 65  
used for carbons and metallic conductors of different shape from those used with the apparatus represented in Figs. 1 to 5; Fig. 7, a plan view of the instrument represented in Fig. 6, and Figs. 8, 9, and 10 details representing the several supports or clamps in elevation. 70

The apparatus shown in Figs. 1 and 2 is adapted to be used with a filament, *a*, that is flat in cross-section, as shown in Figs. 4 and 5, 75  
and is to have its ends connected with metallic conductors *b*, which are held in fixed relation to one another, but insulated from one another by glass or insulating material, *c*, in which a portion of said wires are embedded. 80  
As shown in this instance, the ends of said wires are bent outward, flattened, and provided with openings, through which the ends of the filament *a* are passed, so that the said wires will be firmly united with the filament by a deposit built up on the filament, as indicated in dotted lines, for a portion of its length at either side of the point which passes through the opening in the metallic conductor. 85

The apparatus forming the subject of this invention is intended to hold the conductors *b* and filament *a* in the proper position with relation to one another while such deposit is being formed on the filament, and the instrument comprises a stand or support, *d*, (best shown in 95  
Fig. 3,) that sustains the metallic conductors, as shown, in proper position with relation to the filament *a*. The parts of the instrument are supported on a base, *A*, of insulating material, and the support *d'* is of insulating material. 100



material supported on the end of an arm,  $d^2$ , pivoted at  $d^3$  on a stand or upright,  $d^4$ , and acted upon by a spring,  $d^5$ , that presses the block  $d^6$  down upon the metal conductors resting on the stand

5  $d^7$ . The clamping device may be readily lifted against the stress of the spring  $d^5$  to release the metallic conductors and permit the insertion of others. The base A is also provided with two supports,  $e^1 e^2$ , which should be made of  
10 copper or other conductive material, and are provided with shoulders at their upper ends, upon which the extremities of the filament rest, as shown, after passing through the openings in the ends of the metallic conductors  $b$ .  
15 The ends of the filament are held upon these supports by clamping-jaws  $e^3 e^4$ , pivoted upon uprights  $e^5 e^6$  and acted upon by springs  $e^7 e^8$ , that tend to press the ends of the jaws  $e^3$  against the sides of the flat filament, so as to  
20 hold the same firmly, as shown in Fig. 4.

One entire support and co-operating clamp is insulated from the other, each being connected with a conductive strip,  $e^9 e^{10}$ , supported on the base A, and constituting the conductors  
25 by which the current is carried to and from the filament.

The body of the filament  $a$  may be further supported, if required, upon a platform, B, which is shown as provided with an adjustable  
30 gage,  $B'$ , that may be used to set the filaments in proper position to give uniformity in length of a number of filaments successively treated in the machine.

In order that the current may pass through  
35 only a small portion of the filament at each side of the ends of the connecting-wires  $b$ , circuit-connecting devices are provided consisting of uprights  $f^1 f^2$ , of conductive material, electrically connected together by a conducting-  
40 base,  $f^3$ , said uprights touching the branches of the filament  $a$  at a short distance from the ends of the metallic conductors  $b$ , and in order to make a good electrical contact the branches of the filament are pressed against the uprights  
45  $f^1 f^2$  by clamping devices  $f^4 f^5$ , which may consist of blocks of copper supported on springs  $f^6 f^7$ , themselves supported on uprights  $f^8 f^9$  on the base A.

In the construction shown in Figs. 1 and 2  
50 the springs  $f^6 f^7$  extend by the ends of the clamping-jaws  $e^3 e^4$ , so that the one operation of pressing together the handle ends of said clamping-jaws, as shown in dotted lines, Fig. 1, will wholly release the filament, and by then  
55 raising the clamp for the metallic conductors the joined carbon and filament may be removed from the machine and new ones inserted.

In order to make the joint after the filament  
60 and conductors have been supported and clamped in proper position with relation to one another, as shown in Fig. 1, the terminals of the current-supplying circuit are connected with the strips  $e^9 e^{10}$ , the current passing from  
65 one of said strips, as  $e^9$ , to the clamp  $e^3 e^4$  and one end of the filament, thence along the said

filament to the circuit-connector  $f^1 f^2$ , thence across by the connection  $f^3$  to the connector  $f^4 f^5$ , thence along the filament to the other  
70 clamp,  $e^6 e^7$ , and out by the strip  $e^{10}$ . The current is applied in this manner while the instrument is immersed in a fluid bath that deposits carbon under the action of heat, and as all the conductors that are in circuit, with the  
75 exception of the short portions of the filament, are of low resistance, a very large current may be employed, causing a very rapid deposit on the short portions of the filament between the clamps that engage it, which de-  
80 posit, when it builds out, engages and surrounds the ends of the metallic conductors through which the filament is passed.

The invention is not limited to the specific construction and shape of the supports and holders thus far described, as they may be  
85 modified in order to co-operate with conductors and filaments of various kinds.

In the construction illustrated in Figs. 6 to 10, inclusive, the metallic conductors  $b b'$  are sealed into a tubular neck,  $c$ , of glass, and the  
90 support  $d$  for the main conductors is of proper shape to receive such neck, which is held securely thereon by a clamp,  $d^{10}$ , shown as consisting of a spring-strip supported on up-  
95 rights  $d^{11}$ , provided with projections at their upper ends, which may be screw-heads, as shown, having a smaller neck between said projections and the upright. The spring  $d^{10}$  has a slot of a width equal to the diameter of  
100 the neck, and at one end an opening communicating with said slot large enough to permit the passage of the head through it, as clearly shown in Fig. 7. By slipping the spring along in the direction of the arrow, Fig. 7, until the  
105 opening comes in line with the head, the spring will be released and may be turned aside to permit the removal of the lamp-necks E, and a reverse movement will fasten the clamp after another lamp-neck has been placed in position.

The devices that support and clamp the end  
110 of the filament  $a$  may be constructed as best shown in Fig. 10, each of said devices consisting of an upright,  $e^{20}$ , provided with a stationary arm,  $e^{21}$ , that rests beneath the filament  $a$ , and a clamping-arm,  $e^{22}$ , pivoted in said up-  
115 right and acted upon by a spring,  $e^{23}$ , that tends to hold it down upon the filament  $a$ . The arm  $e^{22}$  is slotted, as shown at  $e^{24}$ , where it engages its pivot, so that it can be slipped laterally off from the filament  $a$  when the latter  
120 is to be released, a handle,  $e^{25}$ , facilitating the manipulation of the clamp-arm  $e^{22}$ .

The circuit-connecting device, by which the main portion of the filament is short-circuited and the current carried across from one to the  
125 other of the two short portions on which the deposit is to be formed, consists of a supporting-lever,  $f^{10}$ , (best shown in Fig. 9,) pivotally supported on an upright,  $f^{12}$ , and a firm contact between said support and filament is ef-  
130 fected by a clamping-lever,  $f^{13}$ , pivoted upon an upright,  $f^{14}$ , and adapted to be acted upon



at its other end by a spring-holder,  $f^{15}$ , which presses it against the filament. The pivoting of the lever  $f^{10}$  causes the pressure on the two sides of the filament to be equal. After the  
 5 deposit has been made in substantially the same way as before described the lamp-neck C and connected filament may be removed by first turning aside the spring  $f^{15}$  and lifting up the clamp  $f^{13}$ , then slipping back the two  
 10 clamping-arms  $e^{20}$ , and then turning aside the clamp  $d^{10}$ , after which a new lamp-neck and filament may be placed in proper position with relation to one another, being supported and held in such position while a joint is being  
 15 made.

I claim—

1. In a machine for mounting filaments, a pair of insulated supports for the two branches of the filament and pivoted clamping-jaws co-  
 20 operating therewith, and a pair of connected conductors engaging the branches of the filaments, and spring-clamps co-operating therewith and extended to be engaged and operated by the pivoted clamping-jaws, substantially  
 25 as and for the purpose described.

2. In a machine for mounting filaments, the combination, with the support that holds the

metallic conductors, of clamps that engage the filament near the ends thereof and other clamps that engage the legs of the filament at a short  
 30 distance from the first-mentioned clamps, whereby the short sections of each leg of the filament between the two clamps that engage each leg may be brought into proximity but out of electrical contact with adjacent parts of  
 35 said conductors.

3. In a machine for mounting filaments, the combination, with a bar extending across from one to the other leg of the filament and pivoted between them, of a bar also extending  
 40 across from one to the other leg of the filament and constituting, with the pivoted bar, a clamp for the filament, and a short-circuit connection between the two legs of the filament, substantially as and for the purpose de-  
 45 scribed.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HERMANN LEMP.

Witnesses:

A. L. ROHRER,  
 E. WILBUR RICE, Jr.