(No Model.)

T. H. PETTENGILL.

ELECTRIC ARC LAMP.

No. 603,283. Patented May 3, 1898.

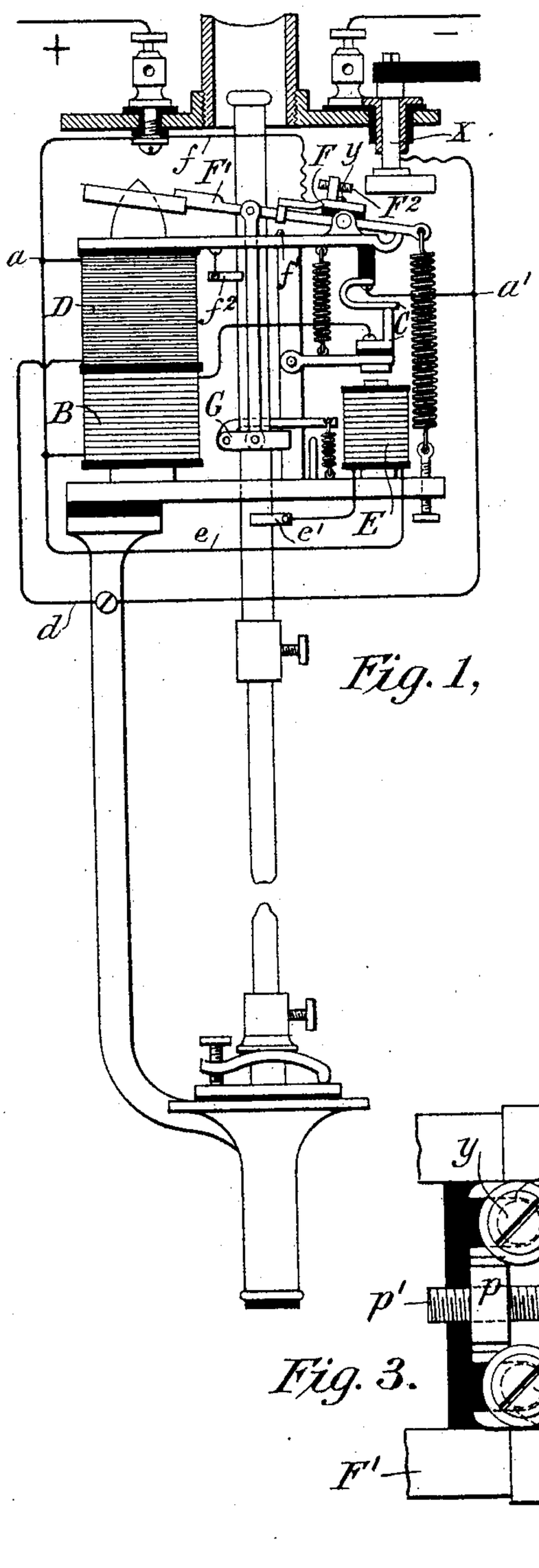

Fig. 1,

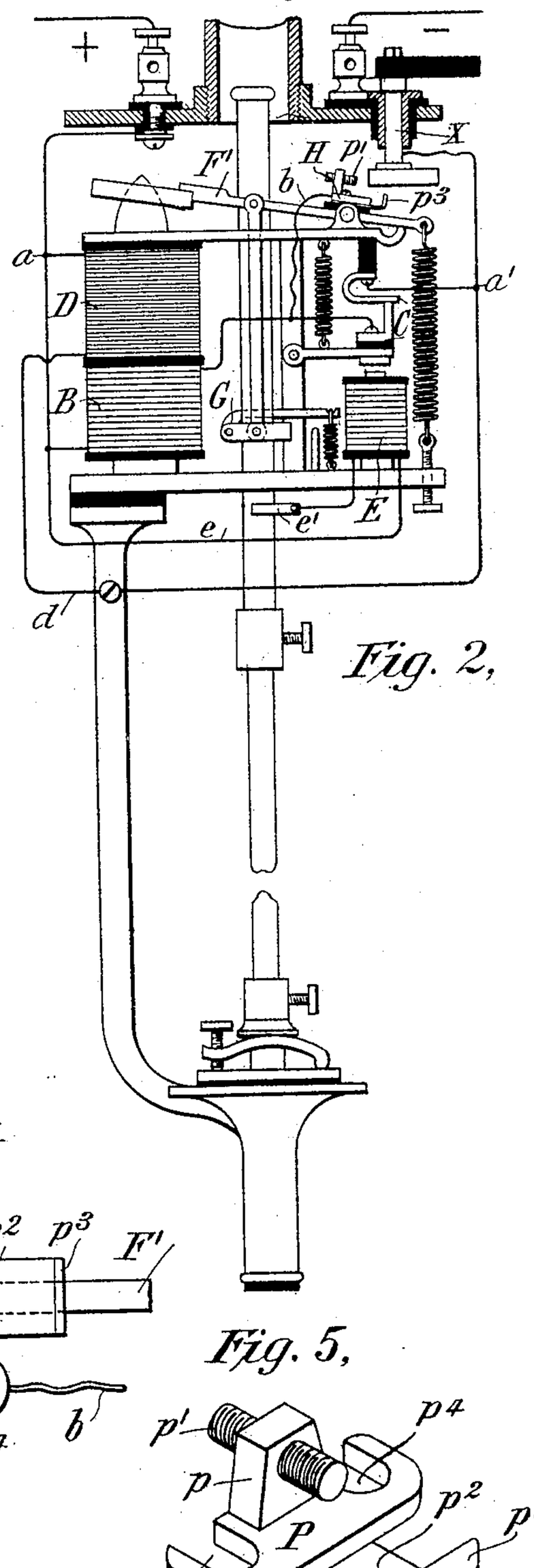

Fig. 2,

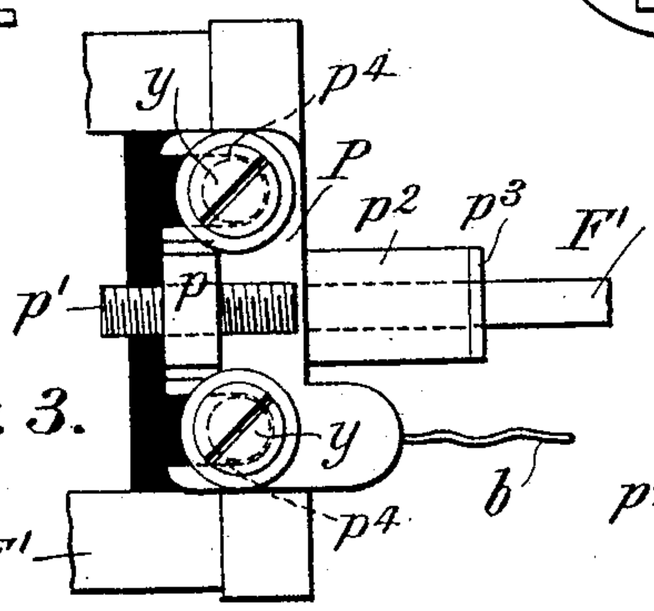

Fig. 3.

Fig. 5,

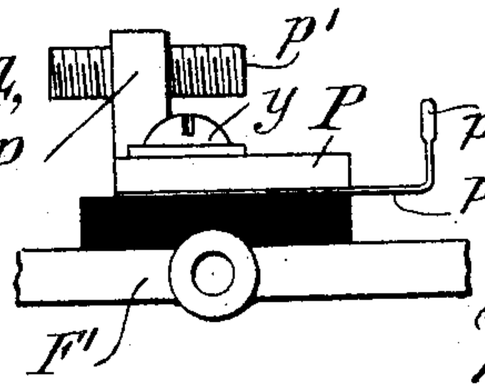

Fig. 4,

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TIMOTHY H. PETTENGILL, OF AMSTERDAM, NEW YORK.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 603,283, dated May 3, 1898.

Application filed September 7, 1897. Serial No. 650,795. (No model.)

To all whom it may concern:

Be it known that I, TIMOTHY H. PETTENGILL, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Electric-Arc Lamps, of which the following is a specification.

My invention relates more particularly to what are known in the trade as "Thomson & Houston lamps," which lamps are shown and described in Letters Patent of the United States No. 370,572, to Thomson and Rice, dated September 27, 1887; and my invention comprises an improved organization whereby the lamp is cut out when the carbons are burned out and refuse to feed, and also a special form of the cut-out of such construction that it is adapted to be placed in the Thomson & Houston lamps as a substitute for the cut-out device of such lamps.

The details of my invention will be apparent from the following description.

In the accompanying drawings, Figure 1 is a diagrammatic view illustrating the ordinary Thomson & Houston lamp and is substantially a reproduction of Fig. 1 of the Letters Patent No. 370,572, hereinbefore mentioned. Fig. 2 is a similar view illustrating my improvements; and Figs. 3, 4, and 5 are respectively detached views, in plan, end elevation, and perspective, illustrating my special form of cut-out device.

Since the construction and mode of operation of the Thomson & Houston lamp are well understood, no detailed description thereof is required.

Referring to Fig. 1 briefly, the circuit is led from the positive terminal of the lamp to the point *a*, thence through the coarse-wire coil B, and thence through the normally-closed bridge-contacts C to the point *a'* and the negative terminal of the lamp. There is also from the point *a* a circuit through the shunt or fine-wire coil D, and thence by conductor *d* to the point *a'* and negative terminal of the lamp. There is also a circuit from the point *a* by conductor *e* through the coil of the starting-magnet E, and thence to the contact *e'*, bearing upon the upper or feed carbon rod. A circuit connection *f* from the positive terminal of the lamp is led to an insulated contact-piece F, mounted upon the lever F' of the armature of the magnet, whose cores carry the coils B D. The contact-piece F, when the armature of the lever F' has been drawn down to its lowest position, comes against the contact *f'*, which is connected, through the frame of the lamp or otherwise, to the contact-finger f^2, that bears against the upper carbon rod.

X is the trimmer's switch, and F^2 an adjustable contact carried by the part F, against which the trimmer's switch works to entirely short-circuit the lamp while he is trimming it.

G is the carbon-feed clutch.

The general construction and mode of operation is well understood, and the operation is as follows: The current entering from the positive terminal of the lamp passes through the coil B, thence through the normally-closed bridge-contacts C to the negative terminal of the lamp and also through the shunt-coil. The lever F' being drawn down brings the carbons in contact, when the circuit is completed, through the starting-coil E, thus effecting the opening of the bridge-contacts C and the lifting of the upper carbon to strike the arc. When the carbons are burned out or there is some sticking of the carbons or derangement of the feed, the rise of current in the coil D draws the lever F' to its lowest position and the contact F comes against the contact *f'*, thus establishing a circuit from the positive terminal to the upper carbon, which circuit is a shunt around the starting-magnet E; but this shunt-circuit is nevertheless completed through the carbons to the negative terminals of the lamp. The intention is that this shunt will divert sufficient current from the starting-magnet E to cause that magnet to release its armature and effect the closing of the bridge-contacts C to thereby cut out the lamp. While the lamps will usually work this way when in good order and carefully adjusted, they do in practice frequently fail to work, partly because the contacts F *f'* may become foul, and as the drop in voltage across these contacts is very small—about one volt, the starting-magnet usually being of a resistance of only one-tenth of an ohm—a proper contact is not made and the arc will burn until it breaks from excessive length. Sometimes also the paper on the core of the starting-magnet be-

comes displaced and its armature freezes to the core, so that there is a failure of closure of the bridge-contacts C, even when the desired amount of current has been diverted or withdrawn from the coil of the starting-magnet E. The effect of this failure from either cause to establish the short circuit through the bridge-contacts C is that the arc will continue to lengthen until it breaks from excessive length, and a severe strain is for that reason thrown upon the insulation of the lamp, causing its deterioration and finally breaking it down altogether.

Referring now to Fig. 2, which illustrates the operation of my invention, it will be observed that I have shown an organization identical in nearly all respects to that of Fig. 1, with the following exceptions: The circuit connection f and the contact f' are omitted, and a circuit connection b is led from the terminal of the coarse-wire coil B, adjacent to the bridge-contacts C, to a cut-out device H, mounted on the lever F′, and which has a contact-piece p^3, that makes contact with the trimmer's switch when the lever F′ has been drawn to its lowest position, thus establishing a short circuit around the arc which includes the coarse coils B and contact h, the voltage across which is substantially the same as that across the carbons. No mere fouling of the contacts will therefore prevent the establishment of the proper contact.

I am aware that heretofore organizations of apparatus and circuit connections for arc-lamps have been proposed in which a cut-out shunt has been established around the arc; but, so far as I know, such shunts have included a resistance in addition to the coarse-wire coil, the presence of which reduces the voltage across the cut-out contacts and impairs the efficiency of the cutting-out operation. The particular form of cut-out device that I employ is illustrated in Figs. 3, 4, and 5. It consists of a plate P, having an upright lug p, in which is fitted the adjustable screw-contact p', similar to that in the Thomson & Houston lamp and against which the trimmer's switch works, and also an elastic arm p^2, projecting horizontally under the trimmer's switch and having an upturned straight-edge contact p^3, adapted to bear against the under face of the trimmer's switch. The contact-plate F, Fig. 1, of the Thomson & Houston lamp is mounted upon a block of insulating material, as shown, and is secured in position by two screw-bolts y y, one of which is seen in the side elevation of Fig. 1. The plate P of my device is formed with two slots or recesses p^4, extending inwardly from the rear edge of the plate, and the shape and arrangement of my device is such that it may be substituted for the contact-plate F of the Thomson & Houston lamp and secured by the same screw-bolts y y, which then fit in the slots or recesses p^4. I can therefore merely by lifting the contact-plate F of the Thomson & Houston lamp and by the substitution of my device therefor radically change and improve the cut-out of the lamp, as already described.

I claim as my invention—

1. In an arc-lamp, the combination with the coarse and fine wire coils, the starting-coil, bridge-contacts and circuit connections, of the armature-lever, an insulated cut-out contact carried thereby, a circuit connection from said contact to the terminal of the coarse coil adjacent to the bridge-contacts, and a short-circuiting contact against which the first-named contact is drawn when the armature-lever is brought to its lowest position, substantially as and for the purpose set forth.

2. A cut-out device adapted to be inserted in a lamp of the character described, and consisting of the plate P having the slots p^4, a cut-out contact as p^3, the stud p, and an adjustable screw-contact p', in combination with the armature-lever F′ upon which it is mounted, and from which it is insulated, the retaining-screws working in the slots p^4, the circuit connections, and the cut-out contact of the trimmer's switch X on the frame of the lamp against which the contact p^3 works, substantially as and for the purpose set forth.

In testimony whereof I have hereunto subscribed my name.

TIMOTHY H. PETTENGILL.

Witnesses:

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ED. J. MAXWELL.