No. 771,907. PATENTED OCT. 11, 1904.

C. E. HARTHAN.

ELECTRIC ARC LAMP.

APPLICATION FILED MAR. 11, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1.

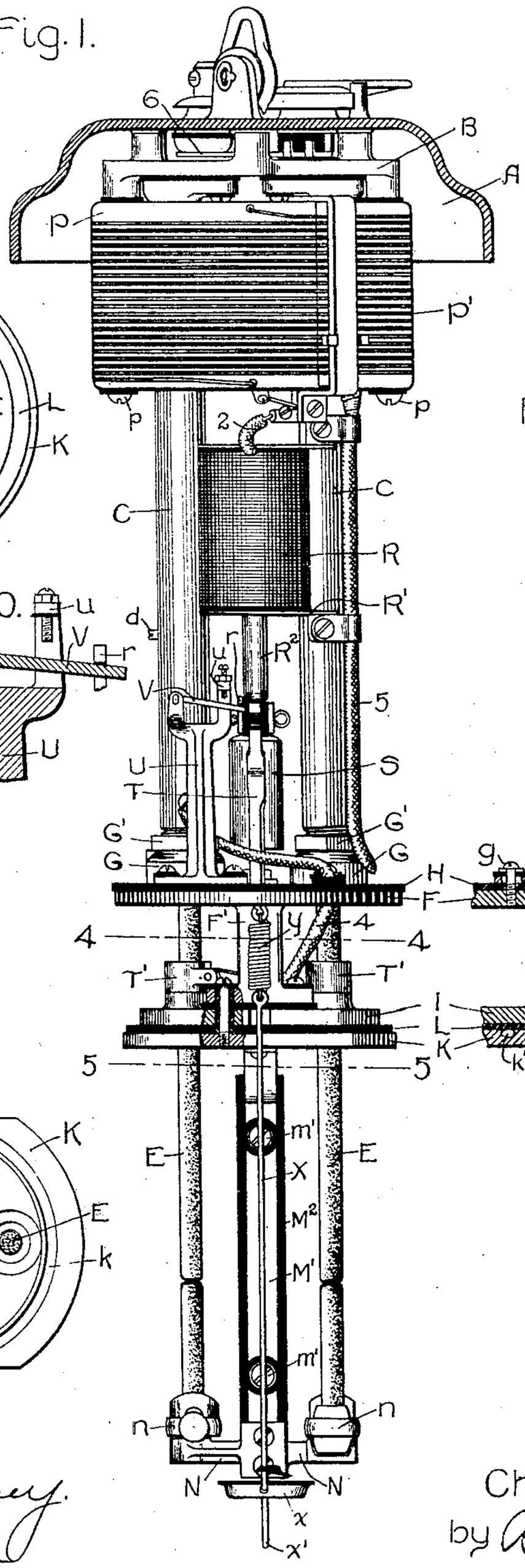


Fig. 4.

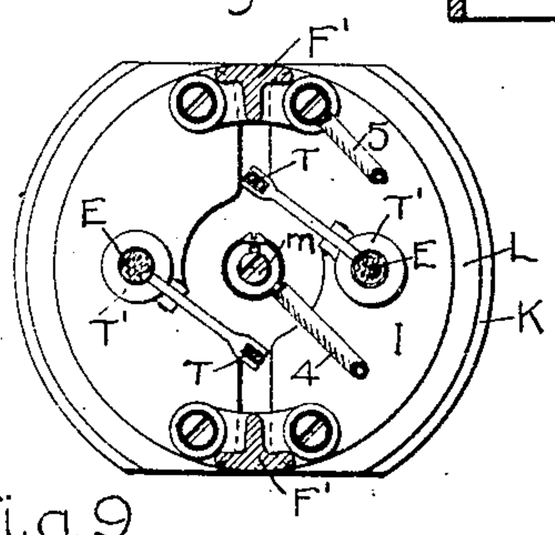


Fig. 9.

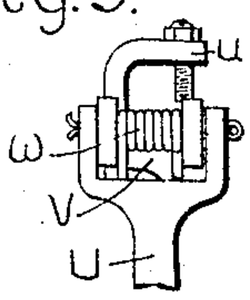


Fig. 10.

Fig. 8.

Fig. 7.

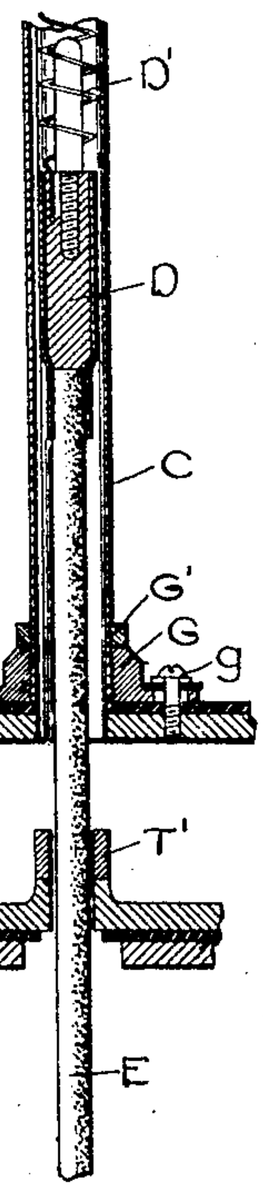
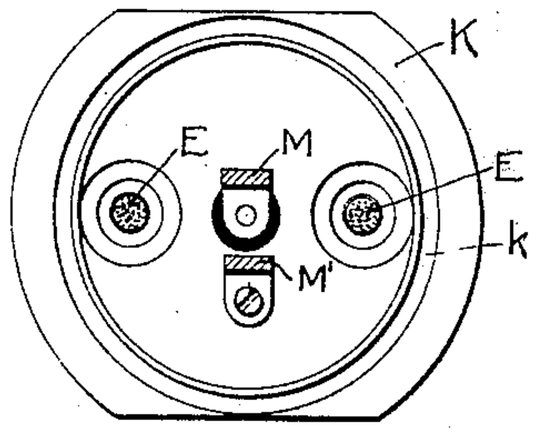


Fig. 5.



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No. 771,907. PATENTED OCT. 11, 1904.

C. E. HARTHAN.

ELECTRIC ARC LAMP.

APPLICATION FILED MAR. 11, 1902.

NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2.

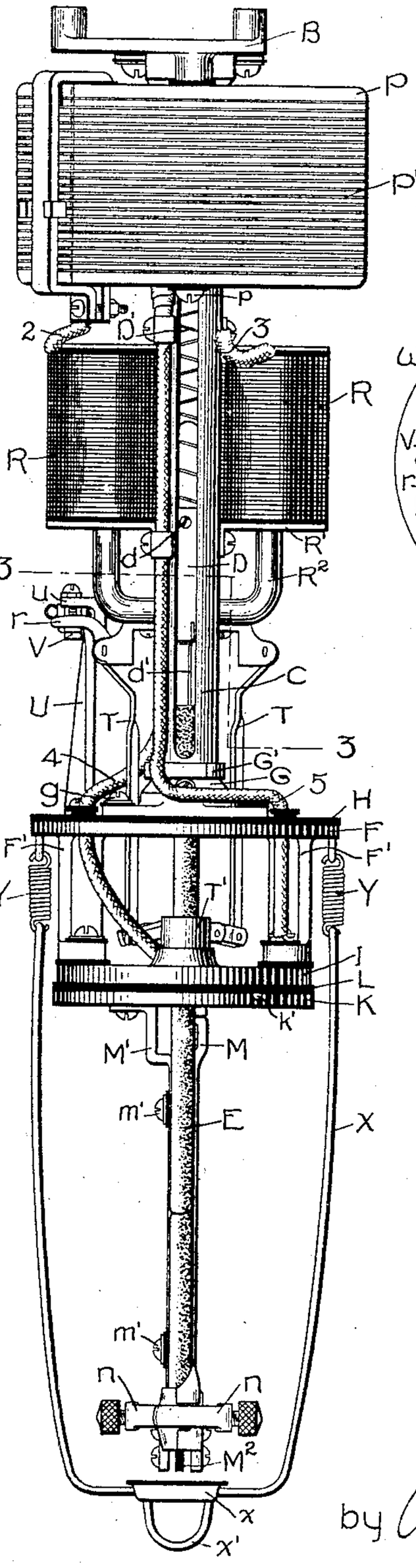


Fig. 11.

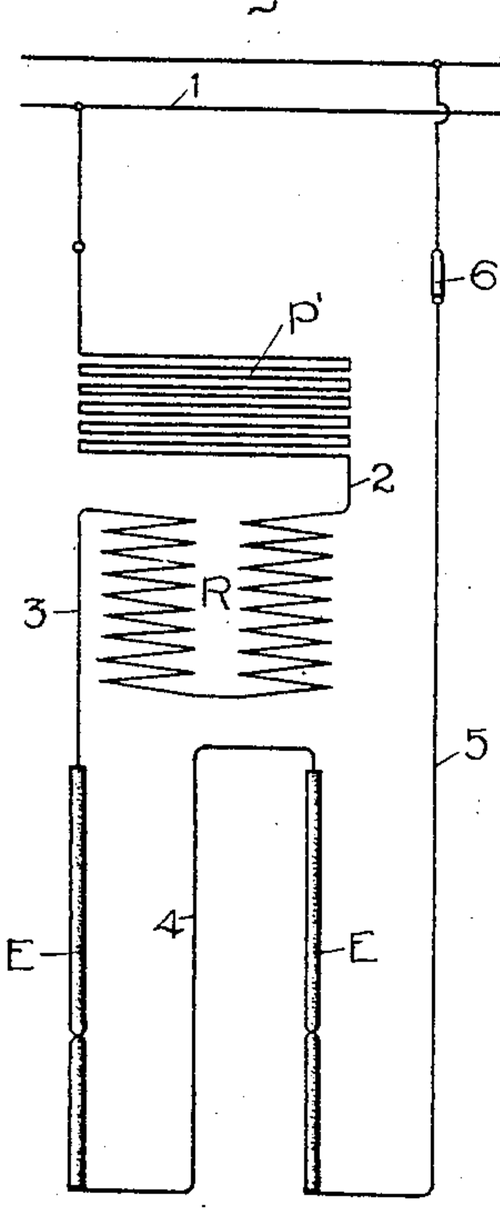


Fig. 3.

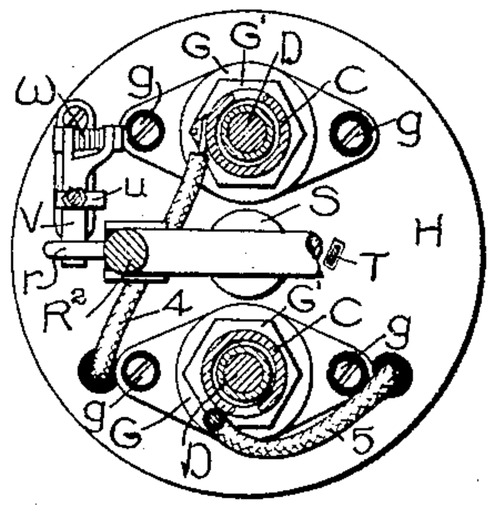
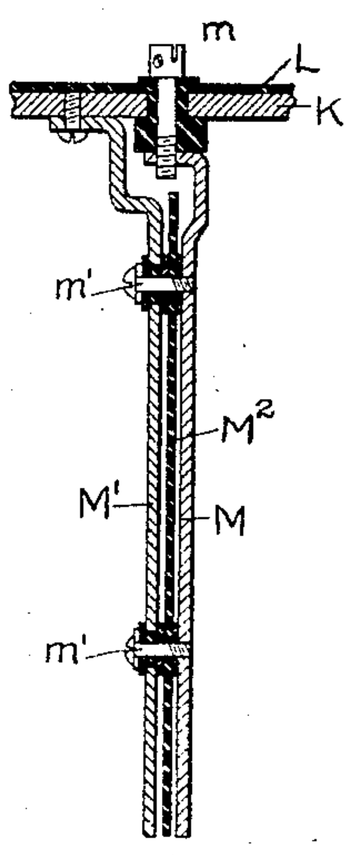


Fig. 6.



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No. 771,907. PATENTED OCT. 11, 1904.

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ELECTRIC ARC LAMP.

APPLICATION FILED MAR. 11, 1902.

NO MODEL. 3 SHEETS—SHEET 3.

Fig. 12.

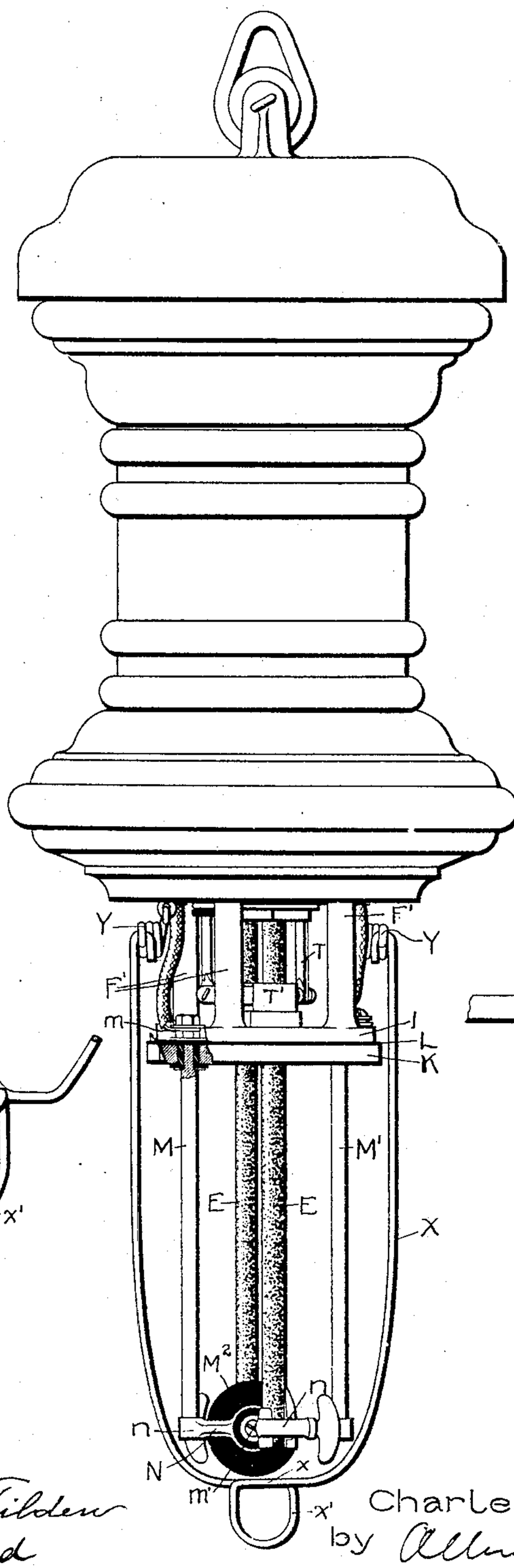


Fig. 13.

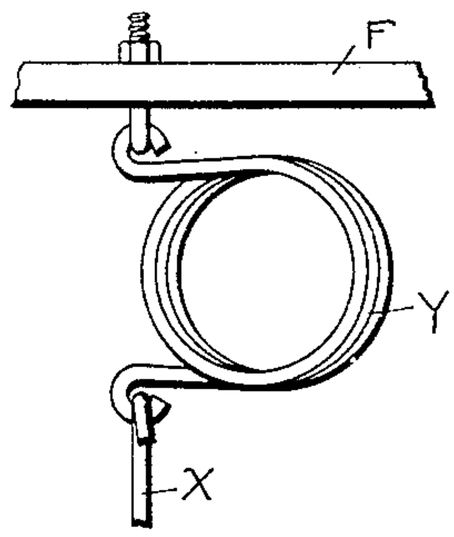
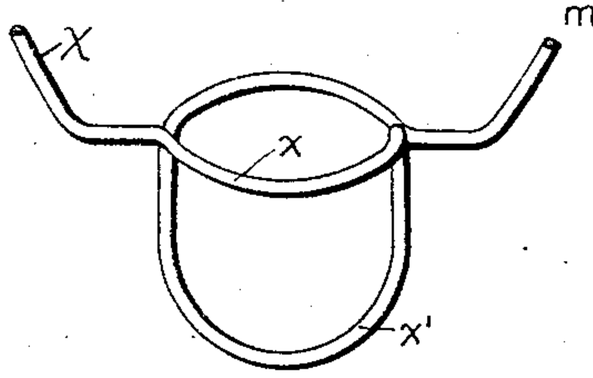


Fig. 14.



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Att'y.

No. 771,907. Patented October 11, 1904.

UNITED STATES PATENT OFFICE.

CHARLES E. HARTHAN, OF LYNN, MASSACHUSETTS, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 771,907, dated October 11, 1904.

Application filed March 11, 1902. Serial No. 97,691. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HARTHAN, a citizen of the United States, residing at Lynn, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

This invention relates to direct-current constant-potential twin arc-lamps; and its object is to improve certain details of construction more especially with reference to the frame of the lamp, the negative leads for the carbons, the automatic pick-up, and the support for the inner globe. These improvements are fully described hereinafter and are clearly illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a double-carbon arc-lamp embodying my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a top plan sectional view of the base-plate, taken on the line 3 3, Fig. 2. Fig. 4 is a similar view of the gas-cap on the line 4 4, Fig. 1. Fig. 5 is a bottom plan view of the gas-cap. Fig. 6 is a vertical section of the upper portion of the negative leads. Fig. 7 is a partial longitudinal section of one of the carbon-tubes. Fig. 8 is a detail sectional view at right angles to Fig. 7. Figs. 9 and 10 are details showing the hinge of the lever of the automatic pick-up. Fig. 11 is a diagram of the circuits. Fig. 12 is an elevation of a modified form of my lamp, showing an improved support for the inner globe. Fig. 13 is a view of the spring on a large scale, and Fig. 14 shows the bottom loop on a larger scale.

To the cap A is secured the top plate B, from which depend the two parallel carbon-tubes C, slotted on one side to form a guide for the carbon-holder D, which has a stud *d* sliding in said slot. The carbon-holder is connected by a flexible coiled conductor D′ with the upper end of the carbon-tube and is slotted at *d′* to constitute a spring-clamp for the carbon E. The lower ends of the carbon-tubes are secured to the base-plate F in any suitable manner—as, for instance, by screwing them into annular blocks G, fastened to the base-plate by screws *g* and insulated from the plate and from each other by fiber or other good insulating material H. A lock-nut G′ and a set-screw G^2 may be used to assist in holding the tube firmly in place in the block.

Below the base-plate F are two segment-plates I, connected with the base-plate by hangers F′ and serving as tripping-platforms. Immediately under the tripping-platforms and fastened to them by insulated screws is a disk K, having an annular groove *k* in its lower face and serving as a gas-cap. A sheet of insulation L is interposed between the gas-cap and the tripping-platforms. Depending from the gas-cap are two legs M M′, each serving as the negative lead of one of the carbons. One leg, M, is insulated from the gas-cap and is provided with a small binding-screw *m* at its upper end. The other leg is in electrical connection with the gas-cap. At the lower end of each leg is a laterally-projecting foot N, carrying a screw-clamp *n* for holding a lower carbon. The two legs and feet are united into a rigid structure by one or more screws *m′*, but are insulated from each other by interposed insulation M^2.

The resistance-drum P, of porcelain or the like, is fastened to the top plate B by means of long screws *p*, which pass upward through holes in the drum and screw into tapped holes in the top plate.

The magnets R are supported on brackets R′, fastened to one of the carbon-tubes. They are wound in series with each other and with the resistance-coil P′. The armature R^2 is built up from U-shaped annealed-iron stampings. Attached to and moving with the armature is the cylinder S of the dash-pot. The clutch-rods T are pivotally attached to the armature, preferably in line with the magnets. They pass down through insulated openings in the base-plate and are connected with the dogs of the clutches T′, which rest on the tripping-platforms I. Since both clutches are operated by the same armature, the two arcs are struck at the same instant. Mounted

on the base-plate is a yielding abutment to insure prompt and accurate feeding. A standard U, preferably Y-shaped, has pivoted to it, preferably in a bifurcated arm of the Y, a light arm V, normally raised against an adjustable stop *u* on the other arm of the Y by means of a spring, preferably a helical spring W, coiled around the pivot of the arm. On the armature is a finger *r*, which projects over the free end of the arm V. When the armature in its downward movement, caused by the consumption of the carbons, reaches the spring-supported arm, the latter arrests the movement of the armature and causes such a lengthening of the arcs that the circuit is finally broken. As soon as this occurs the magnets are deënergized, and the weight of the armature is then sufficient to force down the spring-arm far enough to allow the tripping of the clutches. The carbons then feed down, closing the circuit, whereupon the magnets lift the armature and draw both arcs simultaneously.

In order to permit the use of inclosing globes of different lengths, an improved supporting device is provided, consisting of a wire bail X, suspended by springs Y and having at its lower end a ring *x* to receive the lower end of the globe, and a depending loop *x'*, serving as a finger-hold in pulling down the bail to release the globe. The ring *x* may be either of sheet metal, as shown in Figs. 1 and 2, or integral with the bail and loop, as shown in Figs. 12 and 14. The spring Y may be an upright helical spring, as shown in Figs. 1 and 2, or a horizontal U-shaped spring with several coils in its bight, as shown in Figs. 12 and 13. Each spring is supported by an eyelet on the under side of the base-plate. The upper end of the inclosing globe fits in the annular groove *k* in the gas-cap, and the hot gases escape through tortuous passages *k'* in said cap to the outer air.

The construction of the lamp permits the two pairs of carbons to be placed near together, preferably about two inches apart, so as to prevent the arcs from being too near the inner surface of the globe. It is found that by bringing the carbons near each other the current traversing one pair has a steadying effect on the arc between the other pair; but this effect is lost if they are so near as to exert a blow-out action.

The positive line 1 is connected with the resistance-coil P', from which a lead 2 runs to one terminal of the magnets R, whose other terminal is connected by lead 3 with that one of the carbon-tubes C whose lower carbon is supported by the leg M. The binding-post at the upper end of this leg is connected by lead 4 with the other carbon-tube, and the circuit therefrom is by way of the leg M', gas-cap K, lead 5, and switch 6 to the negative side of the line 7.

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

1. In a twin arc-lamp, the combination with the frame and two pairs of carbons, of a solenoid, a core therefor, clutches for a carbon of each pair connected to the core and operated simultaneously by said solenoid, and two legs secured together with insulation between them depending from the frame, each forming the negative lead for a carbon.

2. In a twin arc-lamp, the combination with the frame and two pairs of carbons connected in series relation, of two depending legs, each forming the negative lead for a carbon, a foot projecting laterally from the lower end of each leg, a carbon-clamp on each foot, and insulation clamped between said feet.

3. In a twin arc-lamp, the combination with the frame and two pairs of carbons connected in series relation, of two depending legs, each forming the negative lead for a carbon, said legs being secured together with insulation between them.

4. In an arc-lamp, in combination with the frame and two pairs of carbons connected in series relation, of two legs rigidly connected to the frame of the lamp, each leg carrying at its lower end a holder for the lower carbon and forming the negative lead of the carbon.

5. In a twin arc-lamp, the combination with the gas-cap, of two legs depending therefrom, one insulated from the gas-cap and the other in connection therewith, a lateral foot at the lower end of each leg, and a carbon-clamp on each foot, said legs being united into a rigid structure but insulated from each other.

6. In a twin arc-lamp, the combination with the base-plate, of two tripping-platforms insulated from each other depending from said plate, and a gas-cap fastened to but insulated from said tripping-platforms.

7. In an arc-lamp, the combination with the base-plate, of a standard thereon, an arm pivoted to the standard, a spring holding said arm normally raised, and a movable armature carrying a finger adapted to force said arm downward, said spring being strong enough to arrest the movement of the armature but too weak to support it when the circuit is broken.

8. In an arc-lamp, the combination with the frame, of a support for the inclosing globe comprising a wire bail, springs connecting it to the frame, and a horizontal ring formed in the wire at the lower end of the bail to receive the end of the globe.

9. In an arc-lamp, the combination with the frame, of a leg rigidly connected thereto, a lower-carbon holder carried thereby, a closed base-globe inclosing the holder, and a support for the globe comprising a wire bail, springs connecting it to the frame, and a horizontal ring formed in the wire at the lower end of the bail to receive the closed end of the globe.

10. In an arc-lamp, the combination with

the frame, of a support for the inclosing globe comprising a wire bail, springs connecting it to the frame, and a horizontal ring and a vertical loop at the lower end of the bail, said ring and loop being integral bends in the wire.

11. In an arc-lamp, the combination with the frame, of a support for the inclosing globe comprising a wire bail, and springs connecting it to the frame, said bail being bent at its lower end to form both a horizontal supporting-ring to receive the end of the inclosing globe and a finger-hold.

In witness whereof I have hereunto set my hand this 8th day of March, 1902.

CHARLES E. HARTHAN.

Witnesses:

DUGALD McK. McKILLOP,

JOHN A. McMANUS.