(No Model.)

J. E. WATSON.

ELECTRIC ARC LAMP.

No. 262,165. Patented Aug. 1, 1882.

Fig. 1.

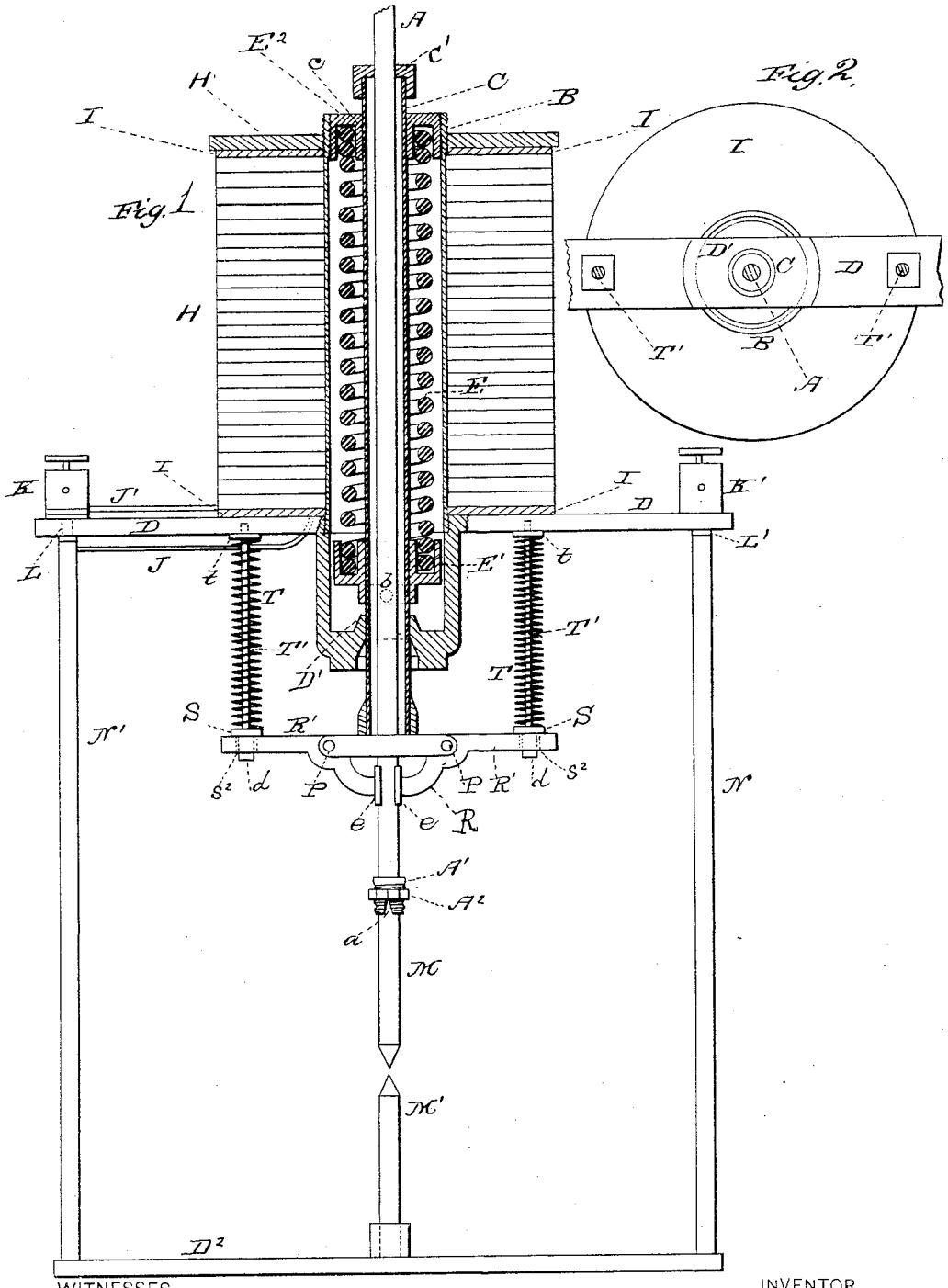

Fig. 2.

WITNESSES

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JOHN E. WATSON, OF LOUISVILLE, KY., ASSIGNOR OF FIVE-EIGHTHS TO JAMES F. CALLAWAY AND GEORGE S. ALLISON, BOTH OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 262,165, dated August 1, 1882.

Application filed March 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN E. WATSON, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented a new and valuable Improvement in Automatic Regulating Devices for Electric-Arc Lamps, &c.; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a sectional view of this invention applied to an electric lamp. Fig. 2 is a plan view, showing the bottom portion of the helix, with the guide for the lifting-tube.

This invention has relation to electric lamps; and it consists in the novel construction and arrangement of parts, as will be hereinafter fully described, and particularly pointed out in the claims.

In the accompanying drawings, the letter A designates a metallic tube or rod, the lower end of which is provided with a socket, A′, for the purpose of holding a carbon pencil. The socket is designed to be provided with a clamping device for holding firmly the carbon pencil M. For this purpose the socket is made to taper externally, and is vertically slit, dividing its lower portion into tongues *a*, around which passes a clamping-nut, A^2. When this nut is turned up it causes the tongues *a* to press against and hold the carbon pencil firmly.

B represents a metallic tube, having its lower end threaded and screwed firmly into the base-plate D. This tube B forms the core of the helix or electro-magnet H, and its upper end is threaded exteriorly to hold the spool-head H′, which caps the helix. The tube B is also threaded inside, at its upper end, to hold the socket-piece or fastening E^2, to which the upper end of the extensible magnet-core E is secured.

C designates a sliding tube, made of brass or other suitable material, passing through an opening in the socket-piece E^2, which forms its upper guide or bearing. This tube C extends downward, passing through a lower guide or bearing at D′, with which the arched portion of the base-plate D is provided. The upper end of the slide-tube C is provided with a bearing, *c*′, which forms the upper guide of the carbon-holder A. The lower end of said tube terminates in a clamping device, R, which forms the lower guide of the carbon-holder.

E′ represents a metallic socket or bearing, fitting loosely around the sliding tube C, and provided with one or more set-screws, *b*, whereby the tube C is clamped or secured to the bearing E′. This bearing is firmly secured to the lower end of the extensible or spiral magnet-core.

E represents a steel spiral spring, fitting loosely within the core B of the electro-magnet or helix, and forming the metallic core of the helix. The upper end of this spring-core is rigidly connected to the upper spool-head of the helix by means of the socket-piece or bearing E^2, through which passes the sliding tube C, carrying the carbon-pencil holder A. To the lower end of the spiral magnet-core E is secured the socket or bearing E′, which is provided with set-screws for holding the tube C after the latter has been adjusted with reference to the lift of the spiral magnet-core E. The whirls of the spiral magnet-core are somewhat separated from each other for the purpose of raising the sliding tube C when said core is under the influence of the magnetism produced by the passage of the electric current through the insulated wire composing the electro-magnet or helix H.

D represents the base-plate, bar, or bridge on which the helix H rests, the tubular core B of said helix being screwed into the plate or otherwise firmly attached thereto at its arched portion. At the bottom of the arched portion is the lower-guide bearing for the sliding tube C. Depending from the base-plate D are two metallic rods, T′, which are firmly screwed into said base-plate, their upper ends being threaded for some distance below the plate to receive nuts *t*. The lower ends of said rods are provided with shoulders or stops *d*, on which rest the loose washers *s*. On each rod T′, between the washer *s* and the nut *t*, is confined a spiral spring, T, and these springs are designed to operate on the levers R′ of the clamping device R, said levers being pivoted

at P on each side of said device, and having clasping-jaws *e* arranged on each side of the carbon-pencil holder, near its lower end. The lower ends of the rods T pass through apertures s^2 in the outer ends of the levers R′.

Above and below the electro-magnet or helix H are placed the insulating-disks I, for the purpose of more perfectly insulating the wire of the helix H from the spool-head H′ and the base-plate D. The terminal wires of the electro-magnet are represented at J and J′, the wire J passing through an opening in the base-plate D and being connected to the side rod N′. This rod, together with the opposite side rod N, serves to support the lower bridge, bar, or base, D^2, which carries the lower carbon pencil, M′. The wire J is connected through the side rod N′, carbon pencils M and M′, and base-plate D to the binding-post K′ on said base-plate. On the opposite side of the base-plate, but insulated therefrom, is the binding-post K, to which the wire J′ is connected. L indicates the insulating-piece for the side rod N′ and plate D, and L′ the insulating-piece for the side rod N.

The mode of operation of this electric lamp is as follows: The electric current, entering at the binding-post K′, in connection with the base-plate D, passes through the carbon pencils M and M′, the lower bridge-plate, D^2, side bar N′, and wire J into and around the helix H, and out through the wire J′ to the binding-post K, so that the carbon pencils are made a portion of the circuit. While passing the electro-magnet the electric current magnetizes the spiral magnet-core E, causing the spiral to contract upon itself by the magnetic attraction of its numerous convolutions or whirls, and raise the sliding tube C and its clamping device until the clamping-levers R′ are brought under the influence of the downward pressure of the spiral springs T, which force said levers against the carbon-pencil holder A. The carbon points being in contact, an arc of electric light is formed at their intersection. As the carbons waste through combustion and the resistance of the arc increases, decreasing the magnetism of the helix H, the spiral core E is allowed to spring outward or elongate by its own elasticity, carrying the sliding tube C downward and allowing the carbons to approach nearer to each other. At the same time, however, the carbon-rod holder is firmly held by the clamping device, influenced by the springs T T, until the loose washers *s* engage the stops or shoulders *d* of the spring-rods T′, whereby the clamping-levers are relieved from all actuating pressure, and release the carbon-holder, allowing it to feed the carbon pencil downward by gravity, the holder slipping gently through its bearings.

It will be seen that the magnetic attraction of the magnetic core is designed to be governed by the current passing through the arc. Should, therefore, a circuit intended for a number of lamps become shortened to one or more lamps, the increased quantity of the current passing from the machine would cause the remaining lamps to form much larger electric arcs, so that the resistance of the remaining one or two lamps would be equal to the resistance of the entire circuit.

It is apparent that the spiral magnet-core may be made of any material which is subject to contraction under magnetic induction, and which extends to its normal form when relieved therefrom.

Having described this invention, what I claim, and desire to secure by Letters Patent, is—

1. In an electric lamp, the spiral elastic core of steel or other material subject to magnetic induction having its whirls or convolutions separated, in combination with a helix, substantially as specified.

2. The spiral elastic core, of steel or other material subject to magnetic induction, having its whirls or convolutions separated, in combination with a helix, substantially as specified.

3. In an electric lamp, an automatic feeding-clamp, in connection with the carbon-holder, the electro-magnet or helix and its connections, the elastic magnet-core, and the lifting-tube connecting said magnet-core and the feeding-clamp, substantially as specified.

4. The combination, with an electro-magnet and its spiral elastic core, of the guide-bearings, fastening-sockets, the lifting-tube, carbon-holders, base-plates, side posts, clamping device, carbons, and binding-posts, substantially as specified.

5. In an electric lamp, the combination, with the helix or electro-magnet and its connections, of the elastic magnet-core and the automatic feeding-clamp, substantially as specified.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JOHN EDWARD WATSON.

Witnesses:
WALTER S. HUFF,
AL. AINSLIE.