No. 659,717. Patented Oct. 16, 1900.

E. THOMSON.

CONTACT DEVICE.

(Application filed May 6, 1899.)

(No Model.)

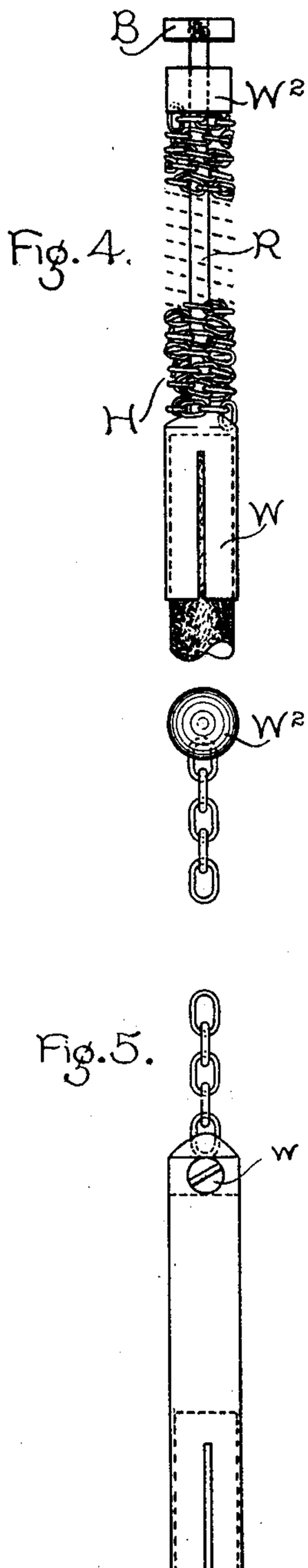

Fig. 4.

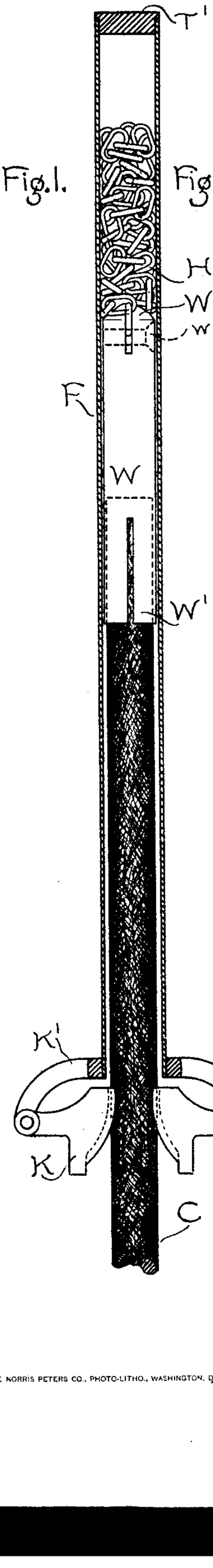

Fig. 1.

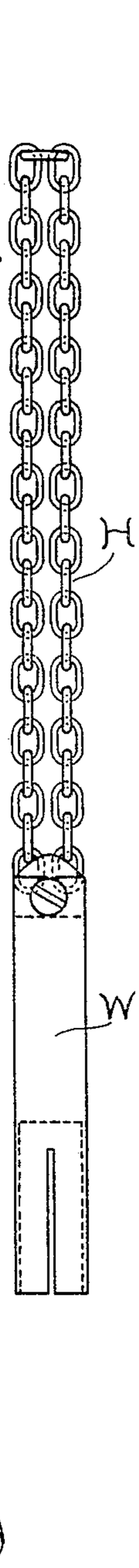

Fig. 3.

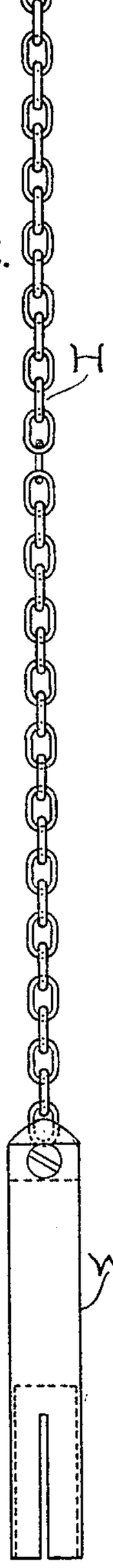

Fig. 2.

Fig. 5.

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UNITED STATES PATENT OFFICE.

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CONTACT DEVICE.

SPECIFICATION forming part of Letters Patent No. 659,717, dated October 16, 1900.

Application filed May 6, 1899. Serial No. 715,835. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Contact Devices, (Case No. 1,129,) of which the following is a specification.

It frequently happens that it is desirable to make or maintain electrical connection between a fixed or relatively-fixed and a moving contact and that it is necessary for the successful operation of the apparatus provided with these contacts that good connection be established between the parts with the least possible amount of friction. Such a construction is found in an electric-arc lamp having a carbon-tube which controls the feeding of the lamp and a holder for the carbon mounted within the tube and provided with one or more devices for establishing electrical connection with the inside of the tube.

Referring to the accompanying drawings, which illustrate an embodiment of my invention, Figure 1 is a sectional view of the carbon-tube of an electric-arc lamp with a carbon-holder and a chain contact device. Fig. 2 is a view of the holder with the links of the chain extended. Fig. 3 is a slight modification of the same with the chain doubled on itself. Fig. 4 is a further modification in which the chain is coiled around a spindle and a weight is arranged to rest on the top of the chain; and Fig. 5 is a slight modification of the arrangement shown in Fig. 4, the spindle being omitted.

Referring to Fig. 1, F represents a tube in section, in the present instance one designed for use in an electric-arc lamp.

It is to be understood that while I have shown my invention in connection with certain well-known parts of an arc-lamp it is not to be construed as limited to that, since it is useful in many other kinds of electrical apparatus where good contact is desired between fixed and moving contacts with a minimum amount of friction.

On the lower end of the tube is a frame K′, carrying pivoted clutch-shoes K, that are arranged to engage with the carbon pencil C or a holder therefor and regulate its feed, the shoes also conveying current between the carbon-tube and the carbon pencil. Mounted on the upper end of the carbon is a holder W. This holder is provided on the lower end with spring-fingers W′, which securely grip the carbon, and on the upper end with means for securing it to the chain H. The holder preferably has considerable weight or, what is the equivalent, the chain resting on the holder with a weight on top of the chain, as shown in Fig. 4. This is done in order that the carbon pencil may feed smoothly and evenly regardless of the amount of carbon contained in the holder. The upper end of the tube is closed by a plug T′, so that no portion of the chain H can be pushed out of the tube when the lamp is recarboned. The chain H may be of any desired construction, and preferably the links are considerably shorter than the diameter of the tube, so that there will be no opportunity for them to bind within the tube. The upper end of the holder W is preferably rounded or made conical, as at W^2, so that the links of the chain will seat themselves in such manner that they will not bind, yet will establish good contact between the tube and the holder. The holder is slotted to receive the end link or to receive a fastener secured to the end link, and a screw *w* is employed to secure said link or fastener. The chain should be so designed that the links have no tendency to kink. Such a chain is found in the average watch-chain, and the art of manufacturing them is well understood. It is desirable, although not necessary, to silver-plate the inside of the tube, and it is also desirable to thoroughly silver-plate the links of the chain, since better contact is established when this is done.

The arrangement shown offers little or no resistance to the feeding of the carbon, a feature of prime importance where lamps are designed to feed with very small changes of potential at the arc. The chain may to advantage, however, be arranged so that it will pack slightly when pushed upward, as in recarboning, so that it will scour the inside of the tube.

With the chain arranged in the manner shown, a great many points of contact are established between the tube and the holder

and no difficulty is found in carrying all of the necessary current.

By leaving the chain free on one end there is no danger of its being jammed in the tube when the holder W is raised either by hand or by the action of the lamp mechanism. It will readily be seen that the same or practically the same amount of contact between the tube and the holder exists at all times irrespective of the position of the holder. With this construction it matters little if good contact is not established between each outside link and the tube, since there are so many points of contact that a few more or less imperfect ones have no effect upon the total conductivity.

In Fig. 3 I have shown a slight modification in which the chain is doubled on itself. Otherwise the arrangement is the same as in Fig. 1. If desired, the number of chains may be increased to three or even more, depending upon the conditions under which the parts are to operate.

In Fig. 4 the upper end of the holder W is provided with a spindle R and the chain H is coiled around the spindle. One end of the chain is secured to the holder and the other end is secured to a weight W^2, which slides freely on the spindle and is also capable of being rotated thereon. The upper end of the spindle is provided with a nut B, which prevents the weight from being forced off of the spindle when the lamp is recarboned. The holder W is provided with spring-fingers, as before; but instead of making it heavy, as before, a separate weight is provided, which in addition to assisting in the feeding of the carbon pencil acts to pack the chain and to assist in keeping the links in contact with the inside of the tube. Another advantage in this construction lies in the fact that by rotating the weight W^2 with respect to the holder the chain can be closely coiled for the purpose of inserting the holder in the lamp, after which the chain will settle into position and establish good electrical contact between the tube and the holder.

Fig. 5 is a slight modification of the arrangement shown in Fig. 1. In this instance the chain H is secured to a weighted holder or follower at one end and to a ball at the other, the ball acting to force the chain against the inside of the carbon-tube when mounted in position.

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

1. In an electric-arc lamp, the combination of a carbon-tube, a holder mounted for movement within the tube, a carbon pencil carried by the holder, means for feeding the carbon, and a plurality of separately-acting interlinked contact devices piled upon each other for establishing electrical contact between the holder and the tube; the said contact devices also acting to assist the carbon-feeding means.

2. The combination of a conducting-tube, a device movable within the tube, and a plurality of interlinked contacts which are arranged in a coil and rest on the said device and establish contact between it and the tube.

3. In an electric-arc lamp, the combination of a carbon-tube, a holder arranged for movement within the tube, a carbon pencil mounted in the holder, a coiled chain composed of links which are of less diameter than the tube, for conveying current between the tube and the holder, the weight of said chain being utilized to force the carbon and its holder downward, and a carbon-feeding device which is carried by the tube.

4. The combination of a tube, a holder mounted therein having an end which is highest in the center and slopes toward the outer edges, and a coiled-chain contact device which rests on the top of the holder the links of which are forced outward thereby and into engagement with the tube.

5. The combination of a pair of conducting-pieces movable with respect to each other, a coiled chain for conveying current between them, and means for coiling the chain.

6. In an electric-arc lamp, the combination of a carbon-tube, a holder mounted therein, a contact-chain, and a weight movable with respect to the holder for forcing the chain against the sides of the tube.

7. In an electric-arc lamp, the combination of a carbon-tube, a holder mounted therein, a contact-chain, a spindle around which the chain is coiled, a weight resting on the chain, and means for preventing the weight and chain from being slipped off of the spindle.

8. The combination of a pair of conductors which are movable with respect to each other, one of said conductors being located within the other, a chain which is secured to one of the conductors and conveys current between them, and means secured to one of the conductors for regulating the movement of the other, which means also acts in conjunction with the chain to convey current.

In witness whereof I have hereunto set my hand this 4th day of May, 1899.

ELIHU THOMSON.

Witnesses:

DUGALD MCKILLOP,

HENRY O. WESTENDARP.