No. 679,700. Patented July 30, 1901.

S. M. MEYER.

ELECTRIC ARC LAMP.

(Application filed Oct. 10, 1900.)

(No Model.)

Fig. 1.

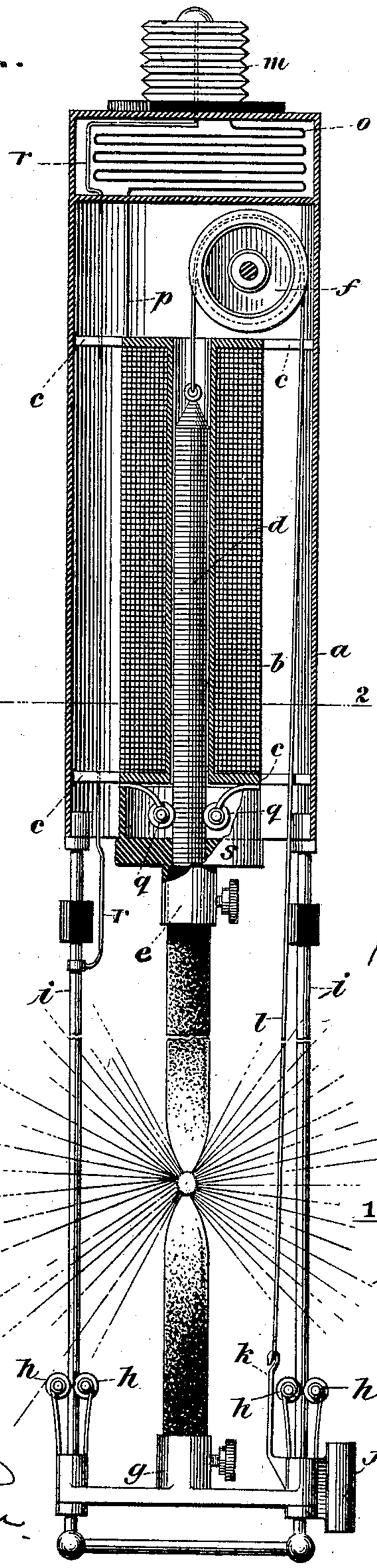

Fig. 3.

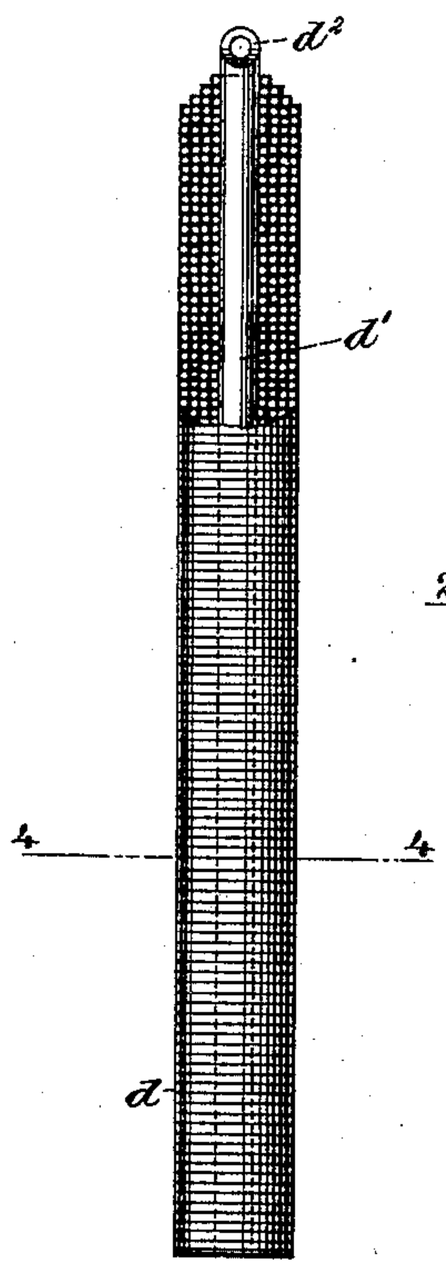

Fig. 4.

Fig. 5.

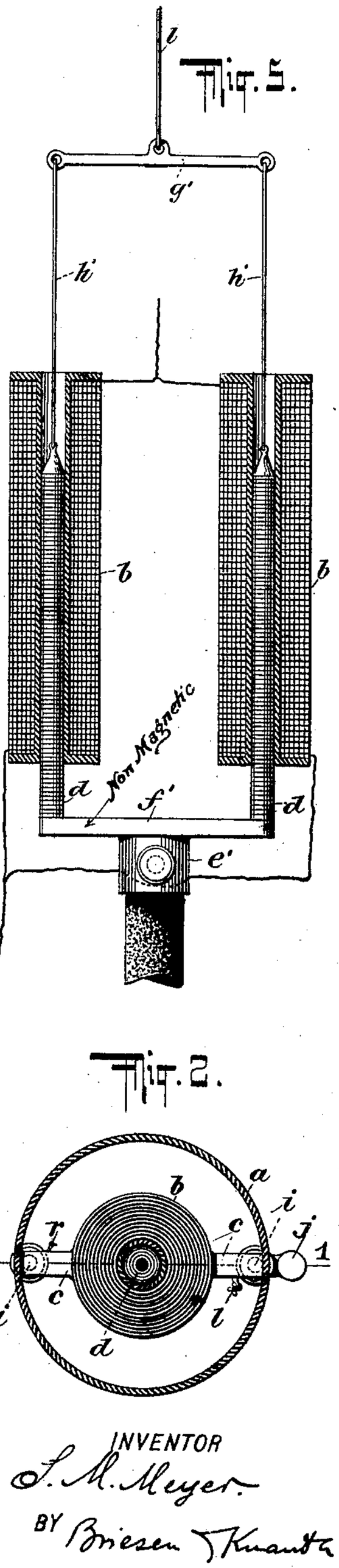

Fig. 2.

WITNESSES:

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SVEND MARTIN MEYER, OF BROOKLYN, NEW YORK, ASSIGNOR OF ONE-HALF TO THOMAS A. CAYTON, OF SAME PLACE.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 679,700, dated July 30, 1901.

Application filed October 10, 1900. Serial No. 32,571. (No model.)

To all whom it may concern:

Be it known that I, SVEND MARTIN MEYER, a subject of the King of Denmark, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Arc-Lamps, of which the following is a specification.

My invention relates to that class of electric-arc lamps wherein a solenoid-core is employed to bring about the action of feeding the carbons, and has for its special object to produce a lamp which will be of simple and inexpensive construction and which will operate reliably.

In the accompanying drawings I have shown a lamp embodying my invention, in which lamp the operating-solenoid is in series with the arc and acts upon a solenoid-core of peculiar construction. This solenoid-core will be hereinafter described; but for the present it is sufficient to state that this solenoid-core is laminated both axially and transversely, so that the inductive effect will be at a minimum and the evil of residual magnetism.

It will be understood that the lamp shown in the accompanying drawings is illustrative merely and that the essential characteristic features of the invention will be pointed out in the claims at the end of the specification.

In the accompanying drawings, Figure 1 is a vertical section of a lamp in which my invention is embodied. Fig. 2 is a horizontal section through the lamp on the line 2 2 of Fig. 1, the said Fig. 2 also showing the section-line 1 1 upon which Fig. 1 is taken. Fig. 3 is an enlarged broken-away detail view of the solenoid-core, showing the construction thereof. Fig. 4 is a section through the solenoid-core on the line 4 4 of Fig. 3, and Fig. 5 is a fragmentary view of a modified form of lamp preferably employed in projectors or search-lights.

The lamp shown in Fig. 1 belongs particularly to that class of lamps which maintain the arc in a fixed position. In this figure, which is a full-sized representation of an arc-lamp, *a* is the lamp-casing, which supports the parts.

b is a solenoid suitably supported therein, the supports being herein shown as brackets and mounted on the lamp-casing. The solenoid-core *d*, whose construction will be particularly described hereinafter, is provided with a suitable electrode-holder *e* and slides freely in the solenoid. A suitable sheave or pulley *f* is hung in the lamp-casing. The lower carbon is supported by a carriage *g*, provided with guiding contact-rollers *h* in suitable numbers, works freely upon the side rods *i* of the lamp, and is shown in the present instance as provided with a balance-weight *j*, although carriages employing no balance-weight may be used without departing from the spirit of my invention. The carriage for the lower carbon is provided with a suitable hook *k*, to which a flexible connection *l* is connected. This flexible connection *l* is preferably a highly-flexible cord, band, chain, or wire and passes around the sheave *f* and is secured to the solenoid-core *d*, which in the present instance is shown as provided with an eye d^2. The lamp may be suitably connected in circuit. In the present instance I have shown an ordinary Edison-lamp base *m*, mounted rigidly upon the lamp-casing *a*, whereby the lamp may be inserted in the socket after the manner of the ordinary Edison lamp. Other forms of socket may be employed, if desired.

The circuit connections of the lamp shown in the drawings are as follows: The current passes from the outer shell of the socket through the balancing resistance-wire *o* by wire *p* through the solenoid *b* and thence to the rollers *q*, which bear upon the solenoid-core. Thence the current passes through the arc and by means of the rod *i* to the wire *r* and thence by the said wire to the center contact of the base *m*. When the lamp is trimmed and is ready for operation, the current is turned on and the solenoid thereupon raises its core to strike the arc, and the arc will thereafter be maintained constant, for as the magnetization of the solenoid will vary as the resistance of the arc increases the strength of the solenoid will lessen upon an increase of resistance due to the lengthening of the arc and the core will descend to shorten the arc. Thus by a series of almost infinitesimal movements of the solenoid-core and upper carbon the arc will be maintained normal

and in a normal fixed position, it being understood that the lower carbon will rise as the upper carbon descends, and thus the position of the arc will be at all times constant.

In order to insure the efficient operation of the structure under all circumstances, the upper carbon is preferably provided with a heavy weight, shown in the present instance as a cup-shaped weight *s*, which is adapted to come into contact with a fixed stop—for instance, the lower end of the solenoid—so as to preserve the rollers from being struck by the said weight. Of course the upper-electrode holder might be made massive instead of employing the weight. The lamp by reason of its simplicity of construction may be made very light and at very slight expense and will operate very efficiently upon both direct and alternating current systems. The lamp is especially adapted for use upon low-tension multiple-arc circuits.

The solenoid-cores shown in the drawings are of peculiar and novel construction. Referring for the present to Fig. 3, a center rod *d'* is provided and is wrapped with a wrapping of several turns or layers of iron wire. I preferably employ a single length of iron wire and fill in the spaces between the individual turns or wrappings which are adjacent to each other with solder flowed in for the purpose of obviating oxidation. By this means I produce a solenoid-core which is laminated in the direction of its length and transversely of its length, so that each turn of wire constitutes, in effect, a pair of magnets when current flows in the solenoid, so that upon cessation of current the iron core instantly becomes demagnetized. I have found that a core of this general construction will be entirely sucked into the solenoid, as shown, instead of, as in cases where the core is made solid, only partially so. This effect is due, I believe, to the fact that the laminations are of such peculiar character that the ends of the core do not become too strongly polarized and the magnetization is distributed in the core in a harmonious manner. It will also be observed that the rollers *q*, which are preferably of iron, will coöperate with the wrapped exterior surface of the core, and thereby produce an action in the nature of a ratchet-escapement. This is especially true in case the rollers are made of iron, as these rollers will be strongly attracted and held firmly against the core by the magnetism of the said core.

In Fig. 5 I have shown the construction preferably employed in projectors or search-lights. In these lights, by reason of the very large size of the carbon electrodes, a very powerful magnet is required. The upper carbon electrode is carried in an electrode-holder *e'*, which is connected by a yoke *f'*, of non-magnetic metal, such as copper, to two cores *d*, which work in solenoids *b*, the cores *d* and the solenoids *b* corresponding in construction to the construction shown in Fig. 1. A yoke or suspension device *g'* is connected at its middle to the flexible connection *l* and is connected to the cores by the connections *h'*. The solenoids are electrically connected in multiple arc and in series with the arc. The lamp by reason of its simple construction can be made very light, weighing only a few ounces, and it will be obvious from the construction shown that the lamp may be very cheaply made. I have found that arc-lamps constructed in accordance with my invention operate very reliably and light up and maintain the arc without that objectionable flickering so often observed in lights of the clutch type, wherein the feed is apt to be irregular and to be disturbed by local conditions.

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

1. In an arc-lamp, the combination of a pair of electrodes operatively connected to each other, a solenoid and a rigid solenoid-core cooperating with the said solenoid and operating to effect the feed of the electrodes, the said solenoid-core comprising in its structure a series of turns of wire of flexible magnetic material.

2. In an arc-lamp, the combination of a pair of electrodes operatively connected to each other by a flexible connection, a solenoid in series with the arc and a solenoid-core coöperating with the said solenoid and operating to effect the feed of the electrodes, the said solenoid-core comprising in its structure a series of layers of wire composed of magnetic material.

3. In an arc-lamp, the combination of a pair of electrodes operatively connected to each other by a flexible connection, a solenoid in series with the arc and a solenoid-core coöperating with the said solenoid and operating to effect the feed of the electrodes, the said solenoid-core comprising in its structure a series of layers of wire composed of magnetic material and a flexibly-mounted roller *q* bearing against the ribbed surface of the solenoid-core.

4. A solenoid-core especially adapted for use in arc-lamps requiring a long steady pull magnet comprising in its structure a bar or support and a number of turns or windings of wire composed of magnetic material.

5. A solenoid-core comprising in its structure a bar d^2 and a series of windings of magnetic wire, said turns or windings being transverse to the longitudinal axis of the bar.

SVEND MARTIN MEYER.

Witnesses:
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