(No Model.)

F. BAIN.

ELECTRIC LAMP.

No. 283,186. Patented Aug. 14, 1883.

Fig. 1.

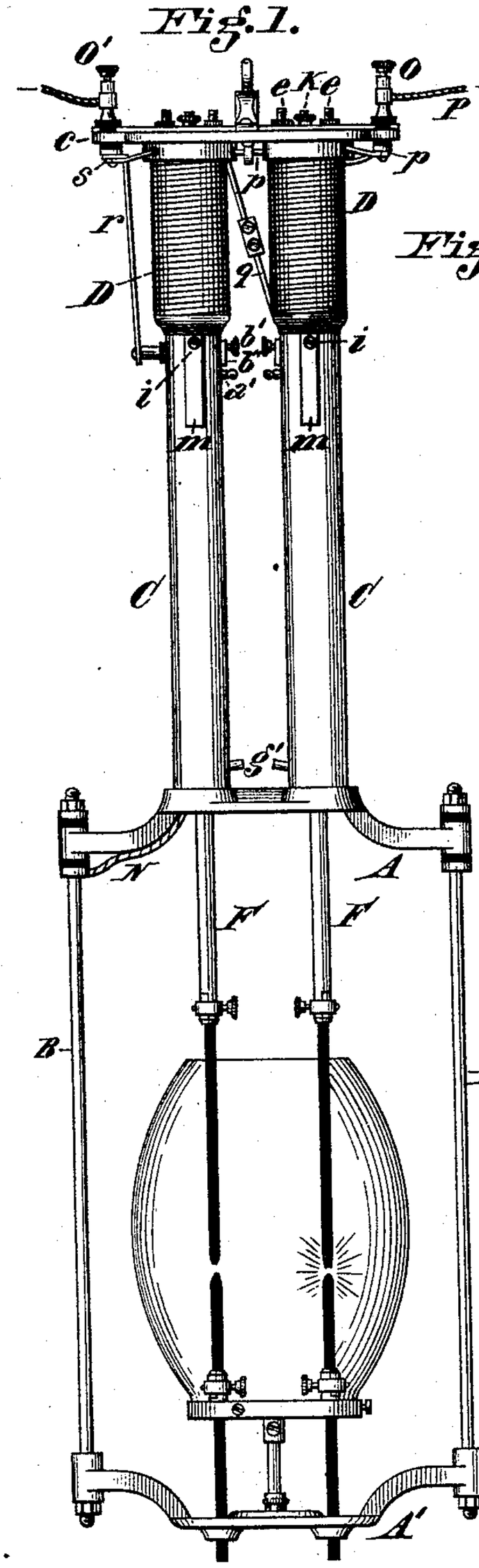


Fig. 2.

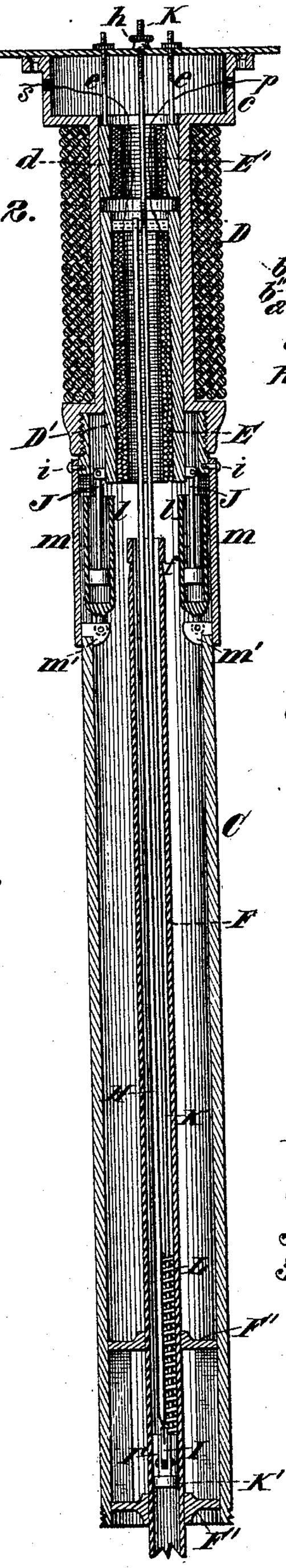


Fig. 3.

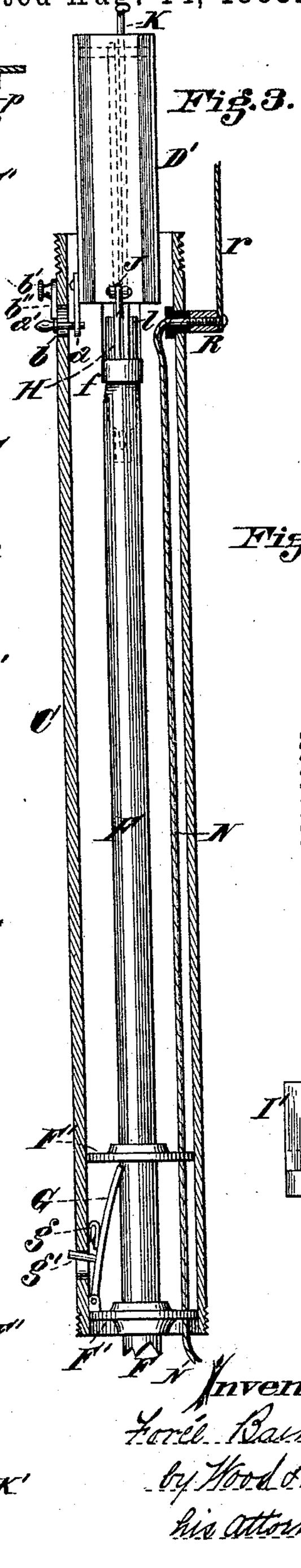
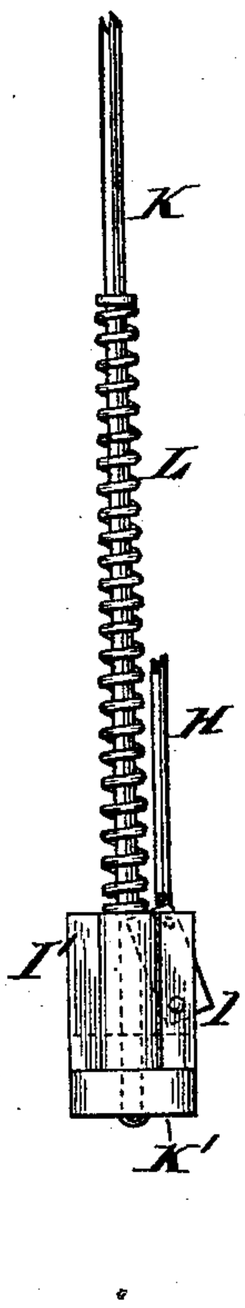


Fig. 4.



Witnesses:
Jno. L. Jones,
L. Gluckowsky.

Inventor
Forcé Bain,
by Wood & Boyd
his attorneys &c.

UNITED STATES PATENT OFFICE.

FORÉE BAIN, OF UNION CITY, INDIANA, ASSIGNOR TO THE FISHER ELECTRIC COMPANY, OF SAME PLACE.

ELECTRIC LAMP.

SPECIFICATION forming part of Letters Patent No. 283,186, dated August 14, 1883.

Application filed July 26, 1882. (No model.)

To all whom it may concern:

Be it known that I, FORÉE BAIN, a citizen of the United States, and a resident of Union City, in the county of Randolph and State of Indiana, have invented certain new and useful Improvements in Electric Lamps, of which the following is a specification.

My invention relates to an improvement in electric lights; and it consists in the novel combination of devices hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is an elevation representing my improvement as applied to a double lamp. Fig. 2 is a central vertical section of one of the supporting-sleeves. Fig. 3 is a transverse section of Fig. 2, with the magnet-coils and adjustable portion of the core removed. Fig. 4 is an elevation of my improved spring-clutch device.

A A′ represent the cross-heads of the frame of the lamp.

B B represent the side rods, which are insulated from the head A.

C represents the supporting-tube, made of brass or other diamagnetic material.

c represents a cross-head for supporting the upper end of the sleeve C.

D represents a magnet-coil of low resistance placed in the prime circuit and wound upon the diamagnetic sleeve C.

D′ represents a hollow soft-iron core; *d*, a secondary hollow core.

E E′ represent secondary coils of high resistance placed inside of the axial cores D′ *d*.

e represents adjusting-screws attached to the core *d*, and provided with nuts on their upper ends to adjust the core *d* vertically within the sleeve C.

The core D′ and its contained coil E are suspended within the sleeve C, so as to move freely up and down to control the movement of the carbon. This movement is limited by means of an arm, *a*, attached to the magnet-core D′, and a screw, *a′*, which passes through a slot, *b*, in the supporting-sleeve C. This slot *b* is of sufficient length to allow of the proper movement of the gravitating core D′. The limit of movement is adjusted by the screw *b′* and stop-plate b^2.

The wires forming the coil D and the wires forming the interior coils, E E′, are so wound relatively to each other that the coils E E′ have a magnetic effect upon core D′ in opposition to the magnetic effect of the coil D. The coils E E′ are preferably wound of one wire and in the same direction, the terminals S and R being connected in line, as shown in Fig. 2, the terminals of coil E being connected to coil E′, so as to form a compound coil, one being stationary and the other movable with its core D′.

F represents the carbon-tube. It is supported in a vertical position in the disk-guides F′. The construction and arrangement of the carbon-holder is fully shown in Letters Patent No. 243,749, granted L. G. Wooley, July 5, 1881, upon which my invention is an improvement. The upper end of tube F is grooved to form a slot, *f*.

G repretents a finger pivoted to the sleeve C between the disks F′ F′, so as to secure an electric connection between the sleeve C and the carbon-holder F.

g represents a spring for keeping the parts in contact.

g′ represents a pin for removing the contact and allowing the rod F to be removed. When the stop *f* descends to the finger G, the finger will drop into the groove and prevent the rod from dropping out.

H represents a clutch-rod, attached to the magnet-core D′, and passing down, preferably, to a point between the disks F′ F′, to which is attached a clutch-brake, I, pivoted to the frame I′, which is suspended upon the rod. K K′ represent the tripping-disk, which acts as a stop to the descent of the frame I′, which throws or trips the clutch I. Rod K is made adjustable by means of the screw *h*, as shown in Fig. 2.

The parts F, H, K, K′, I, and I′ are constructed susbtantially as described in hereinbefore-said Wooley patent, but I have improved the same by applying the tension-spring L to the rod K, as shown in Fig. 4, whereby I obtain a more accurate means of controlling the operation of the clutch under the action of the magnet. The spring L has a bearing at its top against a collar attached to the shaft K, and the lower end bears upon the top of the pivoted clutch I,

the tension of the spring tending to retain the clutch in the position shown in Fig. 4, in which position the lower end of the clutch acts to hold the carbon-holder against vertical movements. I also apply dash-pots to the axial movable core D′, as shown in Fig. 2.

l l represent the dash-pots. They are pivoted to removable segments *m* of the sleeve C, *m′* representing catch-lugs cast or attached to the segments *m*.

i i represent screws for securing segments *m* in position.

The dash-pot rods J J are pivoted to lugs on the core D′. When it is desired to fill or remove the dash-pots, the screws *i* are removed, the segments *m* are lifted up to remove the catches *m′*, when the pivoted dash-rods will swing outward and allow the removal of the pots.

It is exceedingly important to have the clutch-brake I act positively and have a spring, allowing a delicate adjustment of the tension.

The screw *h* upon the rod K may be turned to depress the rod and the disk K′, and thereby compress the spring L and regulate the throw of the clutch I. The arrangement of this adjusting mechanism of the clutch and of the removable dash-pot *l* are important improvements upon the said Wooley patent, securing a much more positive and accurate movement of the armature.

The operation of my lamp is as follows: P represents the positive conducting-wire attached to the binding-post O. At the foot of the post O the circuit divides, the larger wire, P, connecting with the larger coils, D D, which are electrically connected by wire *g;* thence through the sleeve C C, and through fingers G, to the rods F, and thence to the carbons; thence to cross-arm A′, side rods, B, and negative wire N, passing up through sleeve C, and out through insulated sleeve R, to conductor *r* and binding-post O′. The lesser portion of the current is conducted by a fine flexible insulated wire, *p*, at the foot of binding-post O, into the interior of the lamp, connecting with one end of the wire of the lesser coil, the other opposite end of the said coil E being connected to the binding-post O′ by a similar wire, *s*.

The adjustment of the carbons is attained as follows: When two sets of carbons are grouped, as shown in Fig. 1, the carbons are adjusted so that their points will rest one upon the other, and the plate b^2, adjusted so as to allow the carbons to rise a sufficient distance to form the arc, and the axial core D′, with its contained coil E, being below the center of the magnet D, will be raised and lift the carbons, when the arc will be formed between whichever set of the carbons is adjusted, so as to have the lesser resistance. As the carbon is raised a portion of the current passes through the shunt coil or coils, which amount increases as the arc increases, and the resistance of the lamp-circuit consequently becomes greater. When the arc reaches a predetermined point, the relative resistances of the two circuits become such that the opposing magnetic effects of D and E upon D′ become equal, whereupon gravity acts and D′ and its attached carbon-holder falls—a sudden fall, jar, or shock being prevented by the action of the dash-pots referred to. The carbon falls to its new position, and the sequence of operations is repeated until the carbon is consumed or the current switched away from the lamp.

Any suitable devices may be used with this construction of lamps to switch the current from one carbon to the other in double lamps, upon one carbon being consumed, or when from other causes it is desired to throw one out and the other in, and any suitable known circuiting arrangements for series or for multiple-arc systems may be used with the lamps so as to use them in either system.

I claim—

1. The combination, in an electric-arc lamp, of a movable carrier of the carbon to be fed, a compound magnet having a coil of low resistance wound on a diamagnetic sleeve, and having inside of said sleeve a hollow axial core, inside of which is a divided lesser coil of high resistance, one portion of which is wound on the vertically-moving core D′, and the other wound on a stationary core, *d*, and so combined that the magnetic action of the coils adjusts the axial core D′ in a vertical direction, and regulates the feed of the movable carbon-holders, substantially as described.

2. The combination, in an electric-arc lamp, of a movable carrier of the carbon to be fed, a compound magnet having a coil of low resistance wound on a diamagnetic sleeve, and having inside of said sleeve a hollow axial core, inside of which is a coil of high resistance wound on a rising-and-falling core actuating a clutch-rod and clutch, substantially as described.

3. In combination with the vertically-moving core D′, the adjusting-arm *a*, screw *a′*, and sleeve C, having the slot *b*, adjusting-screw *b′*, and stop-plate *b″*, for adjusting and limiting the movement of the said core, substantially as described.

4. In an electric-arc lamp, the combination of the dash-pots *l l* upon the detachable segments *m*, and the vertically-moving axial core, substantially as herein set forth.

5. In combination with the pivoted rod H and adjusting clutch-frame I′, stop K′, and suspending-rod K, the tension-spring L, coiled upon rod K, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FORÉE BAIN.

Witnesses:
JNO. E. JONES,
ANDREW E. SCOTT.