

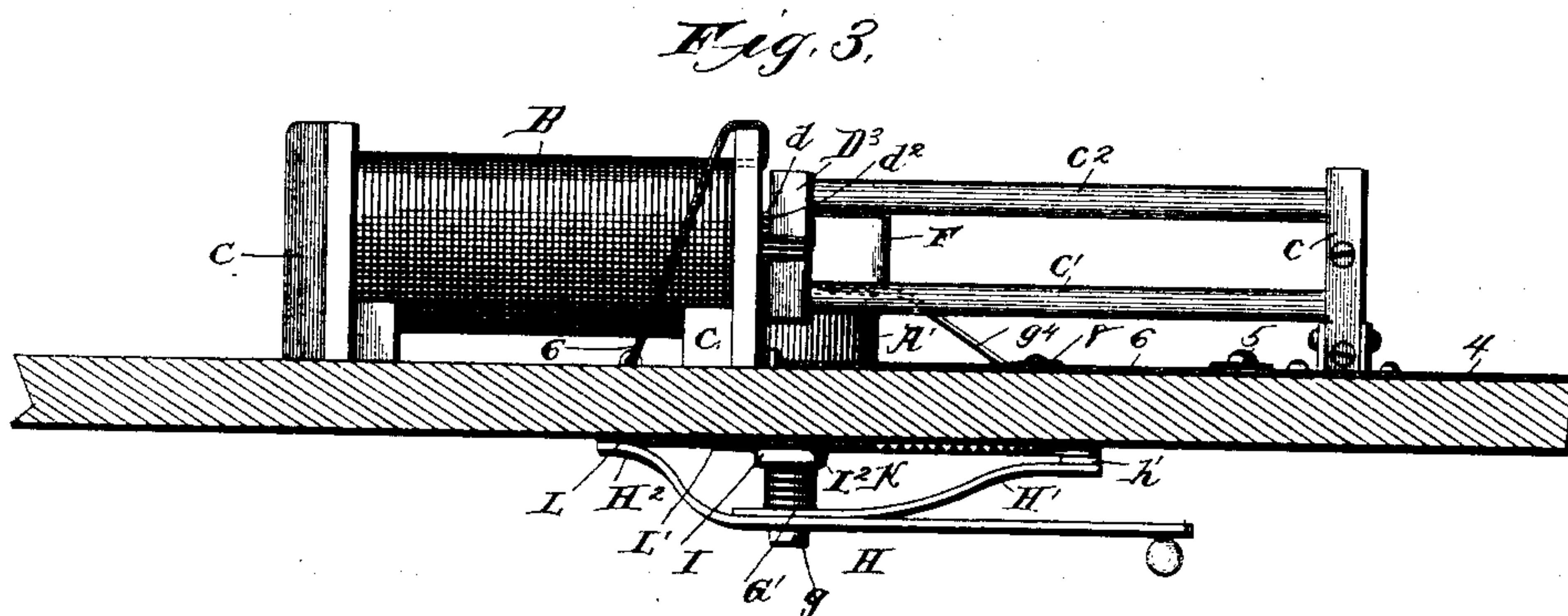
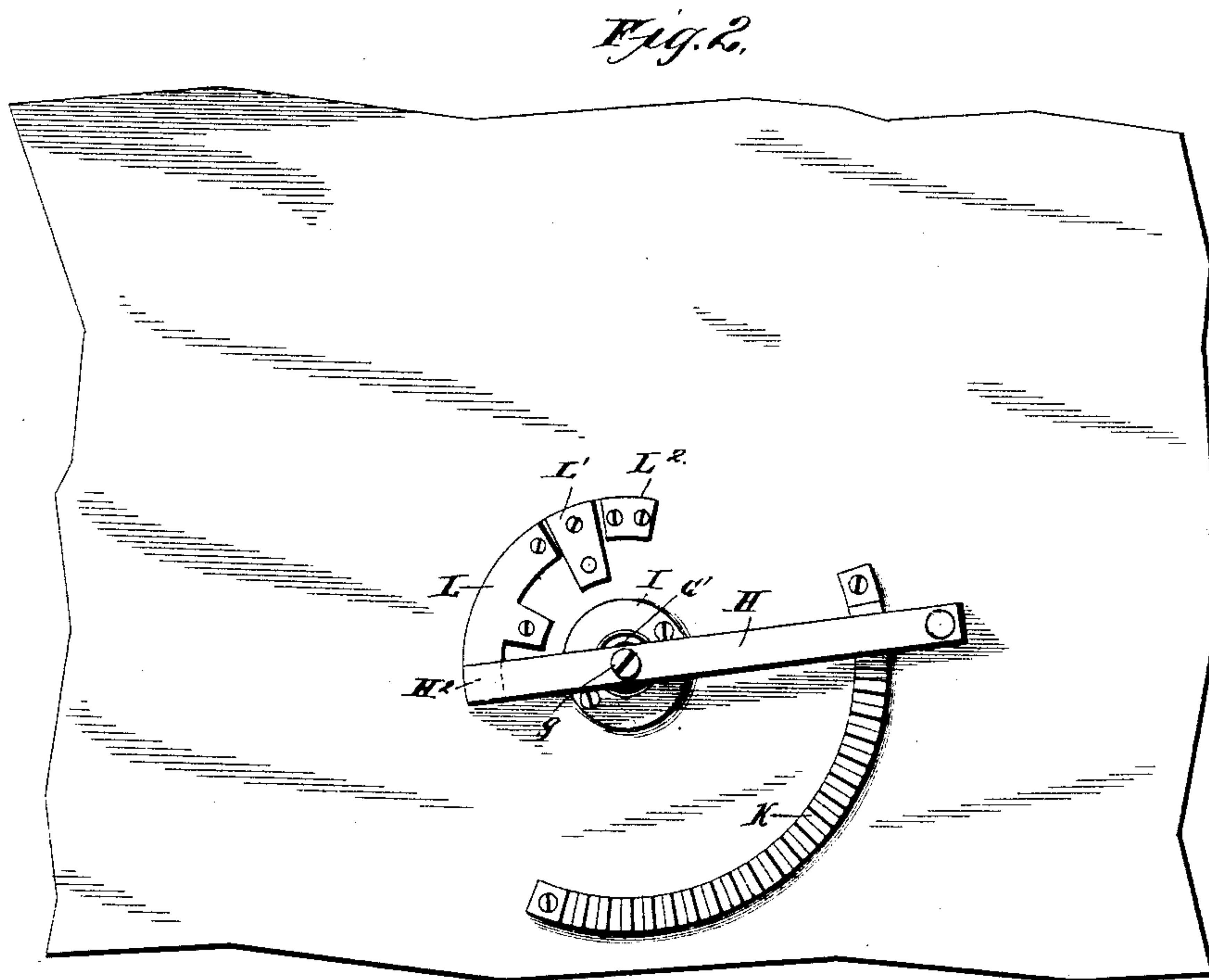
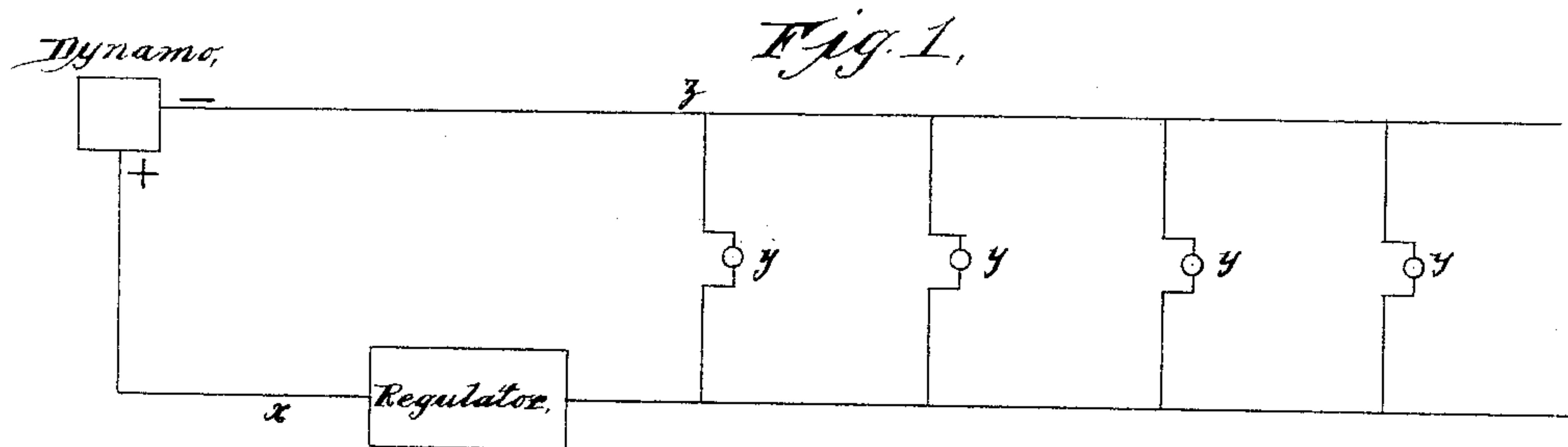
(No Model.)

2 Sheets—Sheet 1.

J. McKIM.  
ELECTRIC REGULATOR.

No. 540,557.

Patented June 4, 1895.



*Witnesses:*

G. B. Hooper.  
M. R. Ramsey.

*Inventor,*

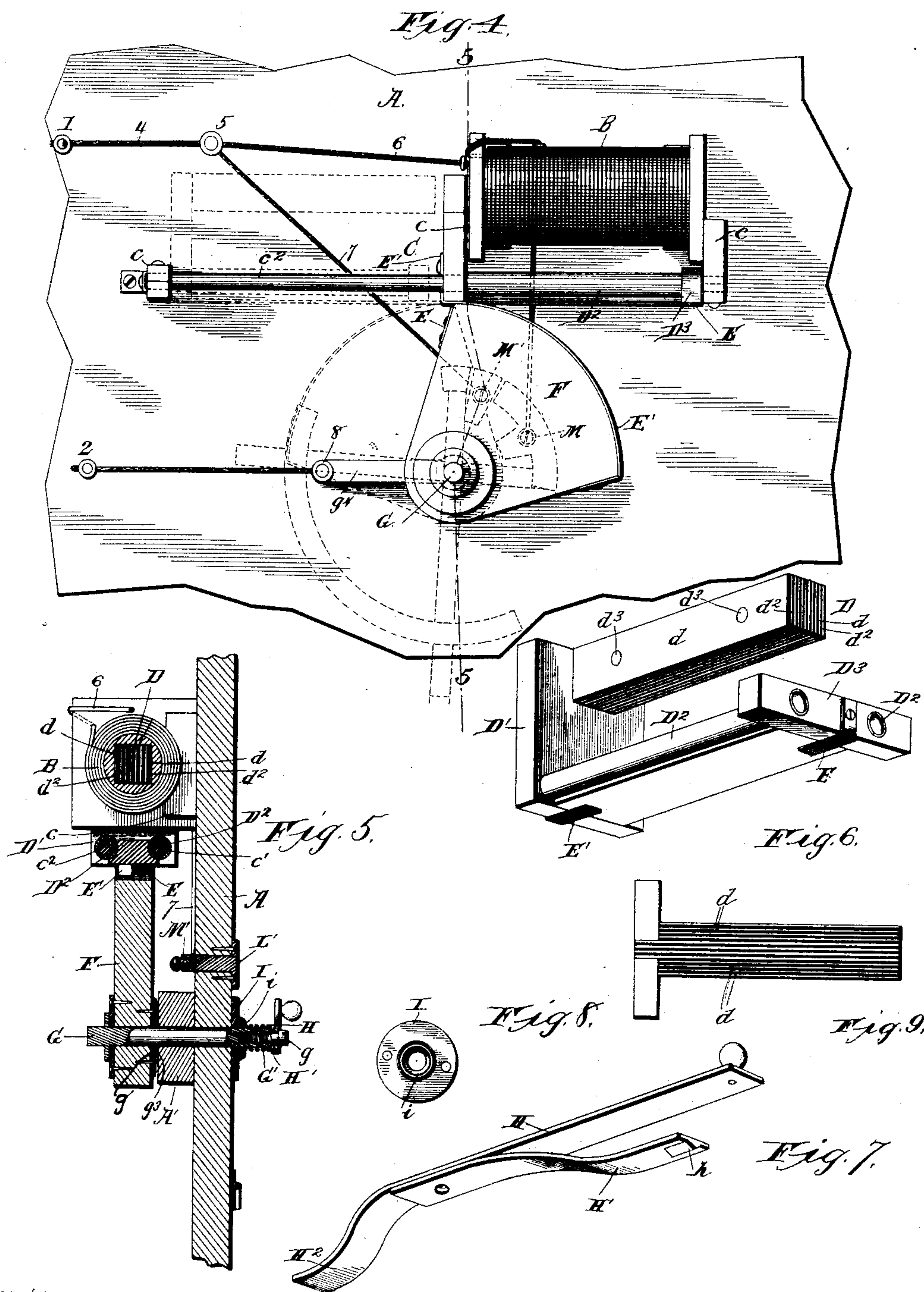
James M<sup>c</sup>Kim,

By *Hjarn & Hjarn*  
*attys*

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Inventor:  
*James McKim.*

By *Higdon & Higdon*  
Attys.



# UNITED STATES PATENT OFFICE.

JAMES MCKIM, OF WEIR, KANSAS.

## ELECTRIC REGULATOR.

SPECIFICATION forming part of Letters Patent No. 540,557, dated June 4, 1895.

Application filed September 12, 1892. Serial No. 445,718. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES MCKIM, of Weir, Cherokee county, Kansas, have invented certain new and useful Improvements in Electric Regulators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to electric regulators, and more particularly to that class of regulators employed to regulate the amount of current passing through a system of lights.

The object of my invention is to provide a current regulator composed of a single coil, and a core adjustable therein to any required position, to increase or decrease the flow of the current uninterruptedly, and correspondingly increase or decrease the light by imperceptible gradations. The core employed is of peculiar construction, adapted especially to this class of regulators where alternating currents are employed, and other details of construction for switching or breaking the current are employed, as will hereinafter appear by reference to the accompanying drawings, wherein—

Figure 1 is a diagrammatic view of an incandescent-light system, showing the location of my regulator therein. Fig. 2 is a front elevation of a part of the exterior casing of regulator-box with its switch-lever and terminal segment connections. Fig. 3 is a horizontal section of the casing-door and a plan of the regulator mechanism supported thereon. Fig. 4 is a side elevation of the latter and of the interior face of the door. Fig. 5 is a vertical sectional elevation in the line 5 5 of Fig. 4. Figs. 6, 7, 8, and 9 are views, respectively, of the core and its frame, the switch-lever, the escutcheon-bearing, and the core detailed from other connections.

In the drawings,  $x$  and  $y$  designate the line wires of an electric light system leading from a dynamo, and connecting said wires are the branch wires  $y$  upon which the lights are located.

A, designates the door of a box (part only of which is illustrated) containing my improved regulator, which is composed as follows:

$c-c$  designate supports projecting from the inner side of the door, and  $c'-c^2$  parallel

guide and supporting rods connecting the end supports  $c$ .

B, designates my induction coil, which is formed with a passage rectangular in cross-section, and is secured firmly and vertically above the center of the space between the guide-rods  $c'-c^2$ .

D, designates the core, of a peculiar construction, which will be hereinafter described, which projects from the end-block D' of the core-frame. The opposite end-block D<sup>3</sup> of the core frame is connected to the end-block D', by the sleeves D<sup>2</sup>, which are arranged parallel with the core D, and a distance apart sufficient for them to circumferentially embrace the guide-rods  $c'$ ,  $c^2$ , upon which said sleeves are adapted to reciprocate, and at the same time the core D, fits into the correspondingly-shaped passage of the coil B.

Journaled in the door A, a suitable distance below and about midway the length of the guide-rods  $c'-c^2$  is a shaft G, which also projects through a hub A', secured to the inner side of the door to form an extended bearing, and mounted rigidly upon the inner end of said shaft is a segmental arm F. In order to cause the reciprocatory action of the core carrying frame, I employ a pair of flexible straps E and E'. The strap E, is attached at one end to the end-block D<sup>3</sup>, and at its opposite end, after engaging the periphery of the segmental arm F, is secured to the side of said arm farthest from said end-block. The other strap, E', is secured to the opposite side of said segmental arm, and after engaging peripherally the same, is attached at its opposite end to the end-block D'.

It is manifest from the above connection that the movement of the segmental arm in one direction or the other, causes a corresponding movement of the core-carrying frame and either moves the core farther into the coil or withdraws the same from the coil.

Projecting from the outer end of the shaft G, is a screw-bolt  $g$ , and mounted rigidly upon said screw-bolt is a switch-lever H, and spirally encircling said shaft and bearing at its opposite ends within the recess  $i$ , of the escutcheon plate I, secured to the door, and against said switch-lever, is an expansion spring G', which thus prevents the accidental operation or movement of the core D, by ex-



erting a pressure against said switch-lever  
 which supports it at any desired point of ad-  
 justment. Metal wear-plates  $g'$  and  $g^3$ , are  
 secured to the adjacent or opposing faces of  
 5 the segmental arm F and the bearing hub A',  
 and are held frictionally together by the action  
 of the spring G'. Secured at its inner end to  
 the switch-lever and curving inwardly there-  
 from or toward the door, is a spring arm H',  
 10 having a spur  $h$ , at its free end, which en-  
 gages one or another of the radial corrugations  
 formed in the face of a plate K, secured to the  
 door and having said corrugated surface con-  
 centric to the axis of the shaft G. These cor-  
 15 rugations may be of any required degree of  
 fineness so as to secure the switch-lever and  
 its connections positively at any point in their  
 adjustment. The short arm H<sup>2</sup>, of the switch-  
 lever bears with a yielding pressure upon one  
 20 or another of the contact-plates L, L', and L<sup>2</sup>,  
 arranged upon an imaginary circle correspond-  
 ing to that described by the short arm H<sup>2</sup>, and  
 projecting inwardly through the door from  
 the contact-plates L and L', respectively, are  
 25 the binding-posts M and M'. The plate L, is  
 of sufficient length to hold the switch-lever in  
 contact during the entire movement of the  
 core within the coil. The intermediate plate  
 L', is short and used when the regulator is cut  
 30 out of the circuit, and the plate L<sup>2</sup>, is without  
 electrical connections and is used to cut both  
 the regulator and the lamps out of circuit.

The core D is composed of thin sheets  $d$ , of  
 soft iron, and sheets  $d^2$ , of paper or other in-  
 35 sulating material which are placed alternately  
 side by side and so secured by the transversely  
 extending rivets  $d^3$ . The object of this con-  
 nection will be hereinafter more fully set forth  
 at the end of the statement of the operation  
 40 of the regulator.

The line conductors are connected to the  
 binding-posts 1 and 2, within the box, and  
 from the post 1, a wire 4, leads to a post 5.  
 Said post in turn is respectively connected by  
 45 branch wire 6, through the coil B, to the bind-  
 ing-post M, of contact-plate L, and by wire 7,  
 to the post M', of contact-plate L'. Binding  
 post 2, is connected by a suitable conductor  
 to the post 8, carried by the arm  $g^4$ , of wear-  
 50 plate  $g^3$ .

From the foregoing, it will be apparent that  
 the current passes from post 1, through the  
 coil B, to the post 2, only when the plate L, is  
 contacted by the lever H. When said lever  
 55 is in contact with the plate L', the current  
 passes through the wire 7, therefore cutting  
 the coil out of circuit, and when said lever is  
 in contact with the plate L<sup>2</sup>, both the coil and  
 the lamps are cut out of circuit, because said  
 60 plate having no electrical connection, no cur-  
 rent flows through the line.

When starting the regulator move the switch  
 from the short end segment to the intermedi-  
 ate segment. The lamps now burn to their  
 65 full brilliancy and power, and no current  
 passes through the coil, but as the switch  
 moves on to the large segment and the core

moves into the coil the counter current is  
 gradually increased, and the current to the  
 lamps thereby reduced, to any desired extent. 70

When the core is inclosed to its full extent  
 within the coil, the counter electro motive  
 force is increased to its utmost limit and very  
 little current flows through the coil. The al-  
 ternating current being used, such current 75  
 flows back and forth through the coil, and  
 tends to highly heat the core, due to its rapid  
 magnetization and demagnetization, and the  
 core hereinbefore described as especially  
 adapted to this machine overcomes greatly 80  
 this tendency.

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

1. An electric regulator, consisting of a hol- 85  
 low coil located in an alternating current cir-  
 cuit, electric lamps in said circuit, a core, a  
 switch-lever connected to said core in such  
 manner that the movement of the one affects  
 the position of the other, and a contact-plate 90  
 also located in the circuit and in the path of  
 said switch-lever, so that when the same is in  
 contact with said plate the circuit is com-  
 pleted, and the movement of the lever in one  
 direction or the other and the consequent 95  
 movement of the core farther in or out of the  
 coil, either diminishes or increases the bril-  
 liancy of the electric lights, substantially as  
 set forth.

2. An electric regulator, comprising a hol- 100  
 low coil located in an alternating current cir-  
 cuit, electric lamps therein, a contact-plate  
 having no electrical connection, contact-plates  
 located also in said electric circuit, one of  
 105 them only being electrically connected to the  
 said coil, a switch-lever normally engaging  
 the first-mentioned contact-plate and thereby  
 cutting the coil and the lamps out of circuit,  
 and a core connected to the switch-lever in  
 such manner that when said lever engages 110  
 the first-mentioned plate the core is with-  
 drawn from the coil and with the operation  
 of said lever to contact with the plate in the  
 circuit but not connected to the coil, said core  
 approaches but does not enter the coil, and 115  
 when said lever is moved to contact with the  
 plate electrically connected to the coil, said  
 core enters said coil, substantially as set forth.

3. An electric regulator, consisting of a hol- 120  
 low coil located in an alternating current cir-  
 cuit, electric lamps therein, a core for said  
 coil, a switch-lever connected to said core in  
 such manner that the movement of one affects  
 the position of the other, a contact-plate also  
 located in the circuit and of such length that 125  
 when the switch-lever is in contact therewith  
 the core is more or less within the coil, and  
 when the lever is not in contact therewith the  
 core is entirely withdrawn from the coil, a  
 friction-plate, and an arm carried by the 130  
 switch-lever engaging the same so as to hold  
 said lever from accidental movement at any  
 point in its adjustment, substantially as set  
 forth.



4. In an alternating electric current regu-  
lator, the combination with a frame having  
guide-rods, and a hollow coil having a fixed  
relation thereto, of a frame slidingly mounted  
5 upon said guide-rods, a core carried by said  
frame, a shaft, a segmental arm mounted  
thereon, a lever mounted upon the opposite  
end of said shaft, and flexible straps connect-  
ing the segmental arm and the sliding frame  
10 in such manner that the proper operation of  
the lever causes the oscillation of said arm  
and consequently the reciprocation of said  
core-carrying arm, substantially as set forth.

5. In an alternating electric current regu-  
15 lator, the combination with a frame having  
guide-rods, and a hollow coil having a fixed  
relation thereto, of a frame slidingly mounted

upon said guide-rods, a core carried by said  
frame, a shaft, a segmental arm mounted  
thereon, a lever mounted upon the opposite 20  
end of said shaft, flexible straps connecting  
the segmental arm and the sliding frame in  
such manner that the proper operation of the  
lever causes the oscillation of said arm and  
consequently the reciprocation of said core 25  
carrying frame, a segmental friction-plate,  
and a spring-arm having a spur engaging the  
same, substantially as set forth.

In testimony whereof I affix my signature  
in the presence of two witnesses.

JAMES MCKIM.

Witnesses:

JOHN W. KIRK,

ARTHUR L. HAYDEN.