

H. M. SUTTON & W. L. & E. G. STEELE.
ELECTRICAL INTERRUPTER.
APPLICATION FILED DEC. 2, 1907.

905,115.

Patented Nov. 24, 1908.

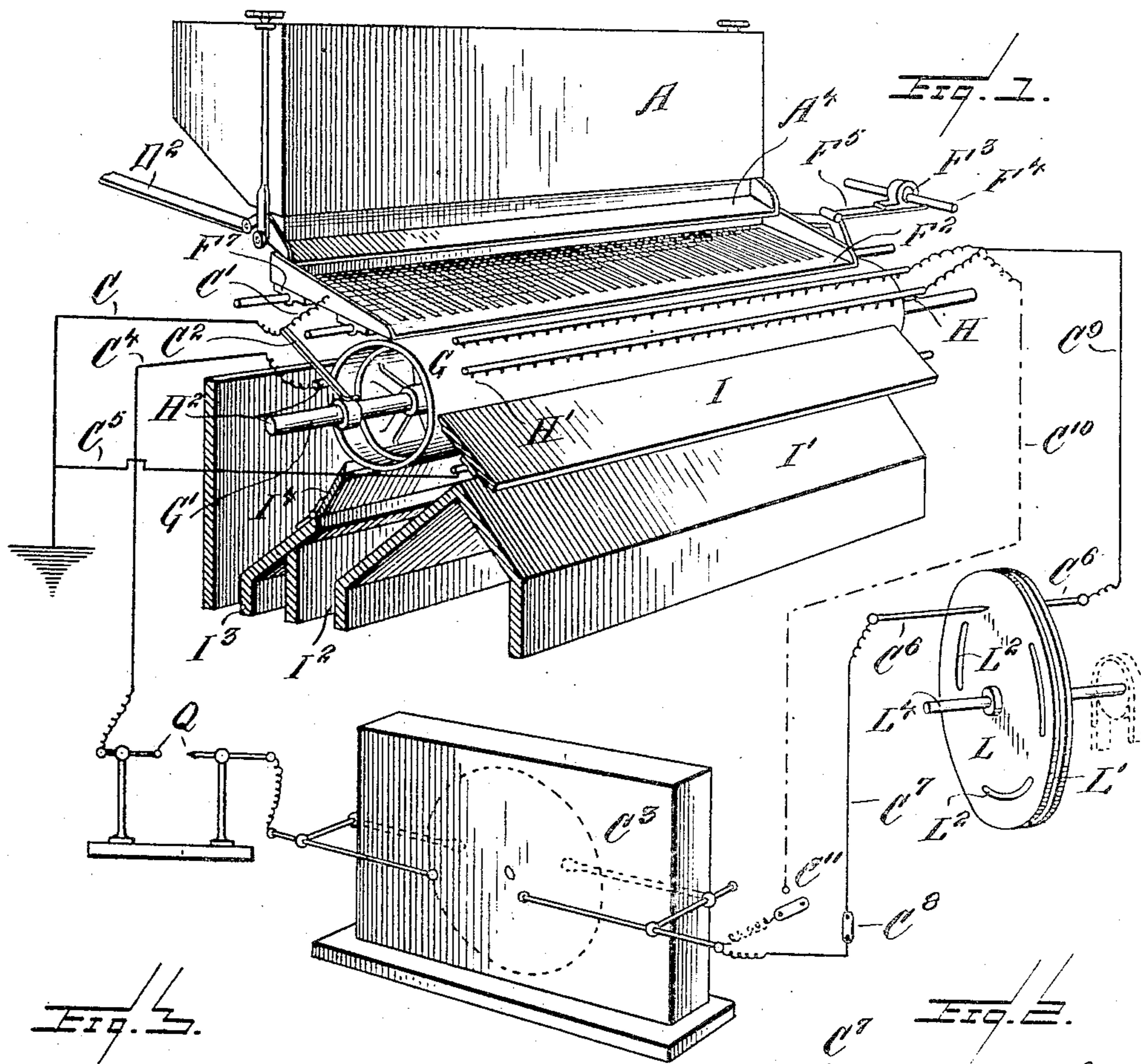


Fig. 1.

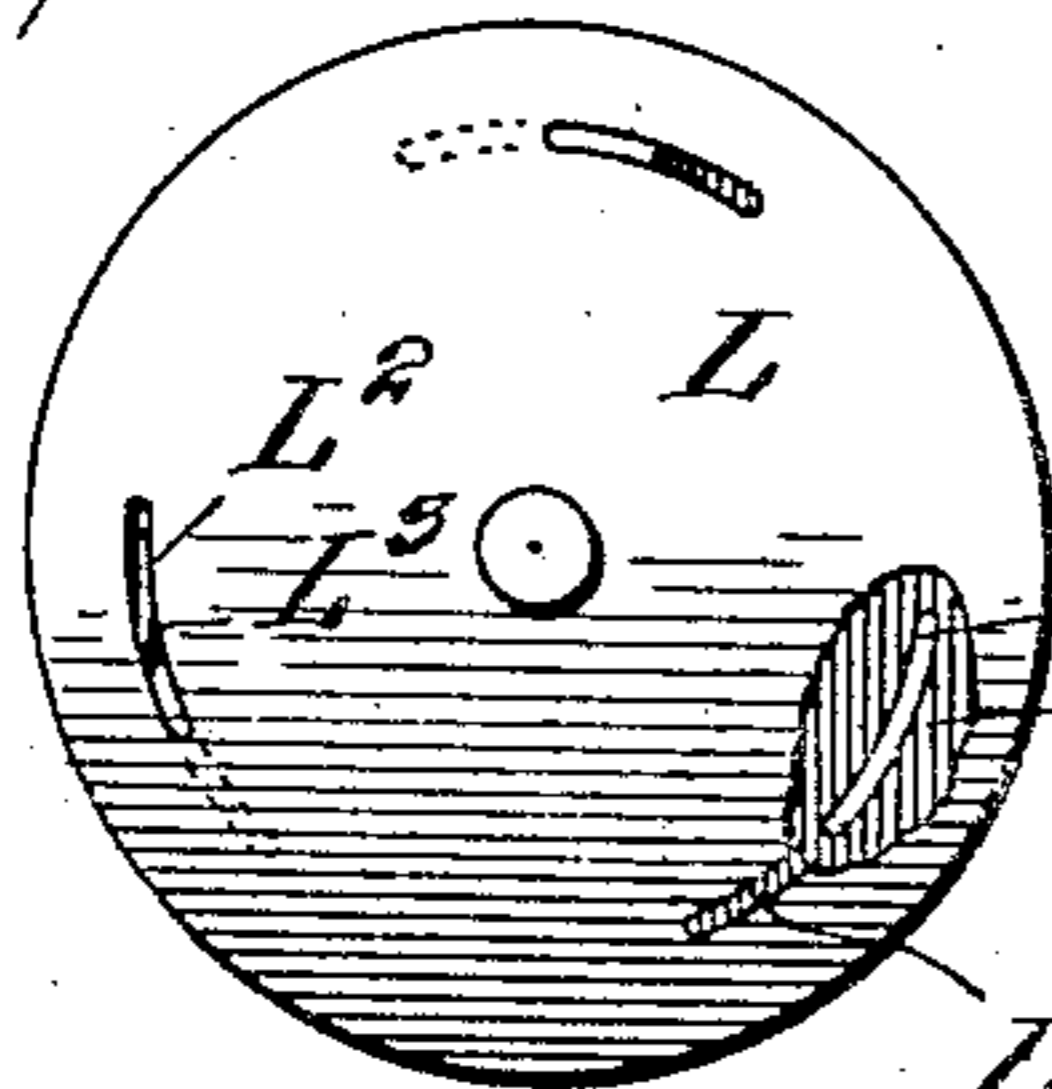


Fig. 2.

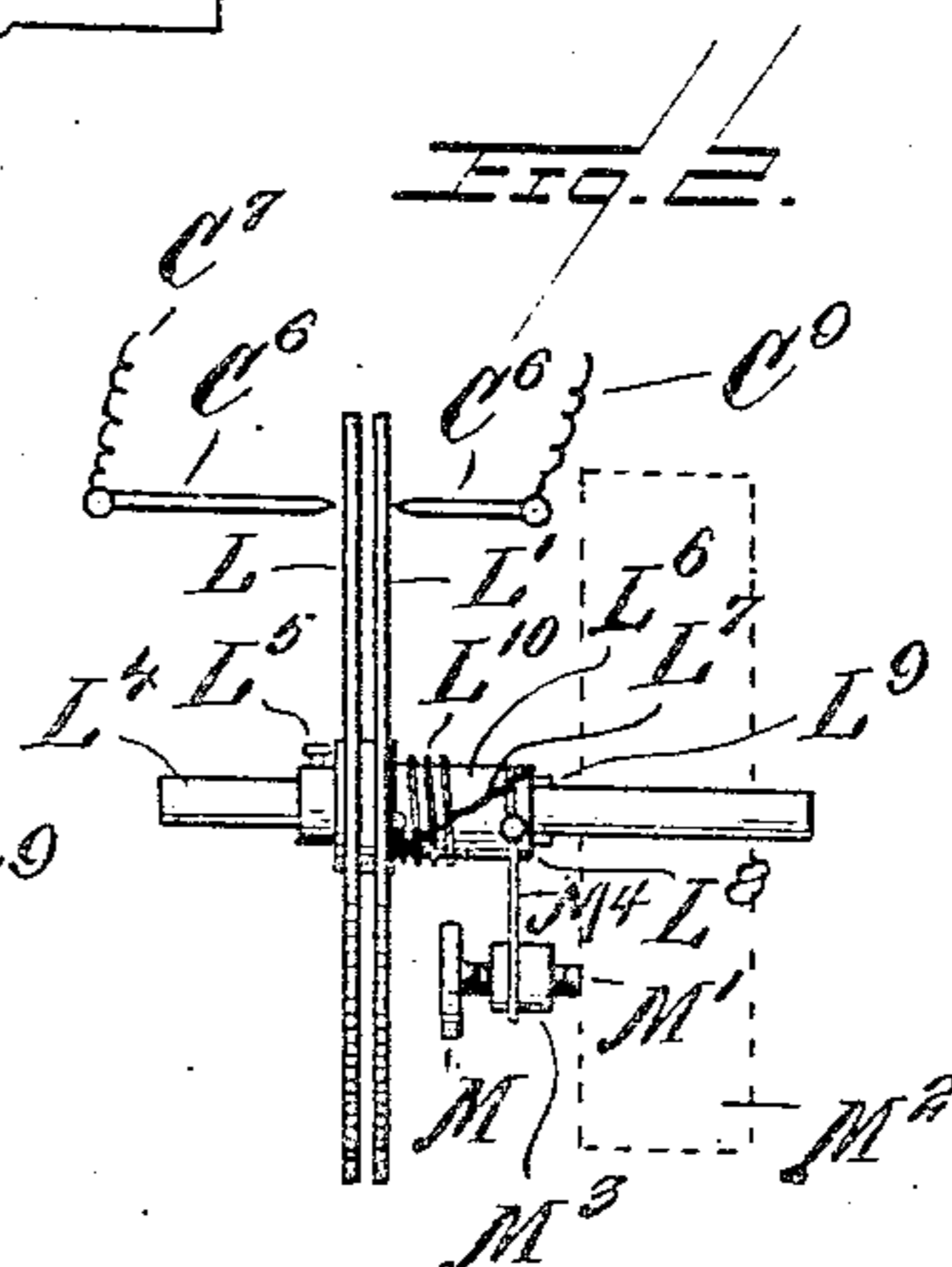
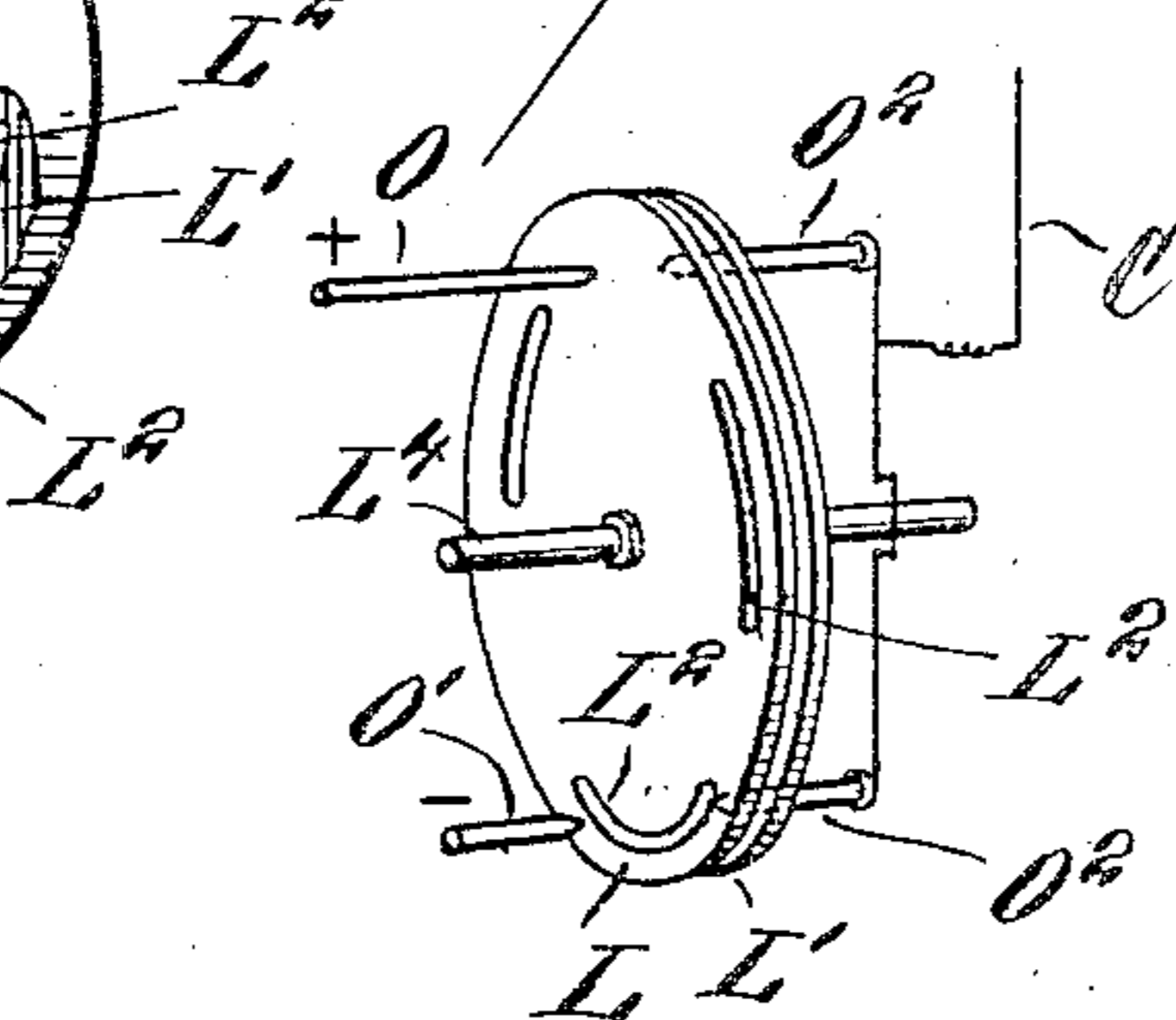


Fig. 3.

WITNESSES

Wm. F. Hoyle
Alfred S. Luge

BY

INVENTORS
Henry M. Sutton
Walter L. Steele and
Edwin G. Steele.
E. B. Stocking Attorney

UNITED STATES PATENT OFFICE.

HENRY M. SUTTON, WALTER L. STEELE, AND EDWIN G. STEELE, OF DALLAS, TEXAS.

ELECTRICAL INTERRUPTER.

No. 905,115.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Original application filed September 24, 1904, Serial No. 225,852. Divided and this application filed December 2, 1907. Serial No. 404,746.

To all whom it may concern:

Be it known that we, HENRY M. SUTTON, WALTER L. STEELE, and EDWIN G. STEELE, citizens of the United States, residing at Dallas, county of Dallas, and State of Texas, have invented certain new and useful Improvements in Electrical Interrupters, comprising a division of our application filed September 24, 1904, Serial No. 225,852, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to an electrical interrupter, and particularly to a device for varying a charge of any character, and comprises a division of our application filed September 24, 1904, Serial No. 225,852.

The invention has for an object to provide a rotating device capable of dividing a charge supplied for any desired purpose into a series of impulses separated by substantially inactive intervals, and also for conveying charges of alternately opposite polarity to the object to be charged.

A further object of the invention is to provide means by which the variations of the impulses or the intervals between them may be adjusted or regulated relative to the material to be treated.

Other and further objects and advantages of the invention will be hereinafter fully set forth and the novel features thereof defined by the appended claims.

In the drawing:—Figure 1 is a perspective showing the application of the invention to a static ore separator; Fig. 2 is a detail elevation thereof; Fig. 3 is a side elevation with parts broken away; Fig. 4 is a detail perspective showing the arrangement for transmitting charges of opposite polarity.

Like letters refer to like parts in the several figures of the drawing.

While this invention is capable of numerous applications for the purpose of varying electrical charges or currents, it is there shown in connection with an electro static ore separator, such as disclosed in our application Serial No. 225,852 before mentioned. In this application of the invention, the letter A designates a hopper which is mounted in any desired manner, and the material is fed therefrom upon the shaker pan A⁴ which is vibrated from any desired means by the strap D², and thence upon the separator tray

F² adapted to be reciprocated laterally by the eccentric F³ upon the shaft F⁴ and the connection F⁵ therewith. The lower smooth edge of this tray delivers upon the separating electrode G which may comprise a cylinder of metal or other conducting material as shown. The shaft G' of this electrode is connected to ground by means of the wiper C² and line C. Adjacent to the electrode G are one or more metallic rods H provided with points H' adapted to deliver a convective or brush like discharge to the electrode, while at the front thereof a division plate I is mounted and adapted to discharge into a chute I', while beneath the electrode a plate I⁴ controls the discharge into the chutes I², I³. At the rear of the electrode a releasing rod H² is disposed adjacent thereto so as to establish a circuit from the electrode through the line C⁴ and regulator Q to the static machine or generator C³. The division plate I is connected by line C⁵ to the ground.

The interrupter, as shown, comprises the parallel plates L and L' each of which is provided with slots L² and are mounted upon a driving shaft L³ so that when the terminals are opposite the slots passing through both plates or disks the charge is carried to the points, and when the solid portion of either disk is opposite said terminals no charge may pass to the points, and the separating electrode becomes inactive for separating purposes. This interrupter is connected to the generator C³ by means of the line C⁷ provided with the controlling switch C⁸ and the pointed terminal C⁶ which provides a brush like convective charge at one side of the plates or disks. At the opposite side thereof a similar pointed terminal C⁶ is provided and a line C⁹ extends therefrom to the charging electrode. As shown by dotted lines, a line C¹⁰ provided with switch C¹¹ may be used when desired for conveying a current to the charging electrode without interruption.

In order to provide for the adjustment of the interrupter disks to vary the interval of charge, the disk L is fixed to the driving shaft L⁴ by set screw and collar L⁵ and rotated thereby by any desired means, while disk L' is provided with the collar L⁶ extended therefrom and formed in two parts separated diagonally as indicated at L⁷ in Fig. 2. The portion L⁶ carried by the disk

L' is loosely mounted upon the shaft L⁴ to rotate thereon but held against longitudinal movement, while the separated portion L⁸ of the collar is free to reciprocate upon the shaft, but prevented from turning thereon by means of the key or spline L⁹. The members L⁶ and L⁸ of the collar are connected together by suitable spring L¹⁰ coiled around the same. For the purpose of operating the sections of the collar to adjust the relative position of the slots in the disks L and L', a hand wheel M is provided having a threaded shank M' mounted upon a fixed support M² carrying a threaded nut M³ which is provided with a forked portion M⁴ engaging the section L⁸ of the collar so as to shift the same upon the driving shaft. If the hand wheel be operated to shift the movable member of the sleeve toward the support it will cause one disk to advance ahead of the other in its rotation. This movement of the disk is effected by the relative movement of the diagonally disposed adjacent ends of the collar members L⁶ and L⁸. When the latter member is moved upon the shaft it continues its rotation and separates from the adjacent end of the collar member L⁶ and the encircling spring connected to the members exerts a retarding tension upon the member L⁶ thus causing it to partially rotate and bringing the peak of the diagonally disposed end thereof at a different point upon the adjacent end of the member L⁸ and varies the relative position of the disk L' to that of the disk L which is driven from the same shaft, but always in a fixed relation to the collar member. The greater the movement of the collar section from the disk L' the further one disk will be moved ahead of the other, and consequently the slots through the two disks from one electrical terminal to the other will be diminished in length until practically the limit is reached, as indicated in Fig. 3 where only a small opening is provided. It will be obvious that an adjustment of the hand wheel to the opposite extreme of movement brings the slots in the disks opposite each other and thus provides the maximum opening between the terminals. These terminals C⁶ are connected to one side of the static machine and provide a brush like discharge, a fraction of which passes through the slots of the interrupter when in alinement during the charging periods so as to maintain a uniform potential in the charge at the point of its application and consequently in the phases thereof.

As illustrating means for alternating the polarity of the charges one form of mechanism is shown in Fig. 4. This interrupter when so arranged varies the polarization or changes the polarity which is alternated upon the terminal of the line C⁶. For this purpose terminals O and O' are connected

to the opposite poles of the generator and upon the other side of the disk terminals O² are connected together and to the line C⁶ so that the alternation of charges passing therethrough are each conducted to this line and to the charging electrode. With this arrangement it will be obvious that when the slots are so adjusted as to bring both the terminals O and O' into alinement through the slots with the terminals O², a short circuiting back to the generator will occur and the charging electrode is absolutely deprived of potential.

In the operation of the invention it will be seen that the movement of the disks divides the charges or current into a series of impulses separated by substantially inactive intervals when the solid portion of the disks are between the terminals, and by an adjustment of the disks with their slots relative to each other the period of duration of such intervals may be varied dependent upon the uses to which the invention is applied. It is also apparent that the use of the pointed terminals at the opposite sides of the disks or interrupter provides a brush like discharge a portion of which will pass through the slots of the disks as the latter traverse the line of charge thus utilizing an even or high potential thereof at the peak of the wave as the disks cut out the weaker or outlying edges of the brush like discharges and utilize only the high potential thereof.

This interrupter is adapted for various uses in the electrical art, but particularly for producing substantially inactive intervals in an electro static charge convectively delivered to comminuted material whereby some of the particles are caused to lag in charge from that of a separating electrode and thereby temporarily adhere thereto.

Having described our invention and set forth its merits, what we claim and desire to secure by Letters Patent is:—

1. An electrical interrupter comprising opposite terminals one of which is adapted to deliver convectively to the other, an interposed movable member constructed to deliver a series of charges separated by inactive intervals, and means for varying the duration of said charges.

2. An electrical interrupter comprising a rotatable slotted disk, terminals at the opposite sides thereof, and means intermediate one terminal and said disk for varying the charging period of said disk.

3. An electrical interrupter comprising a plurality of rotatable slotted disks, means for shifting one of said disks relative to the other, and terminals at the opposite sides of said disks.

4. An electrical interrupter comprising a plurality of slotted disks, a collar for one of said disks having separate sections one of which is longitudinally movable upon the

driving shaft for the disks and rotatable therewith, means for connecting said collars together, and means for shifting the sliding section of said collar.

5. An electrical interrupter comprising a plurality of slotted disks, a collar for one of said disks having separate sections one of which is longitudinally movable upon the driving shaft for said disks and rotatable therewith, means for connecting said collars together, a screw member having a fixed support, a traveling nut upon said screw, and a connection from said nut to said sliding section.

6. An electrical interrupter comprising a slotted disk, a driving shaft upon which said disk is secured, an opposite slotted disk having a collar one section of which is rotatably mounted upon said shaft and the other section slidably mounted thereon and held against rotation, a spring member encircling said sections and connecting them together, and means for shifting the sliding section of said collar.

7. An electrical interrupter comprising fixed terminals and an interposed rotatable member constructed and arranged to deliver series of charges separated by inactive in-

tervals and having means for varying the duration of said intervals.

8. An electrical interrupter comprising a slotted disk for predetermining the charging periods, a convectively discharging terminal at one side of said disk and means cooperating with the disk for varying the charging period thereof. 30

9. In an electrical interrupter, a driving shaft, a slotted disk secured thereto, a parallel slotted disk carried by said shaft, and means for adjusting said disks relative to each other during their rotative action. 35

10. In an electrical interrupter, a driving shaft, a slotted disk secured thereto, a parallel slotted disk carried by said shaft, means for adjusting said disks relative to each other during their rotative action, and pointed terminals disposed at the opposite sides of said disks. 40

In testimony whereof we affix our signatures in presence of two witnesses.

HENRY M. SUTTON.
WALTER L. STEELE.
EDWIN G. STEELE.

Witnesses:

C. O. EDENS,
H. R. PERKINS.