

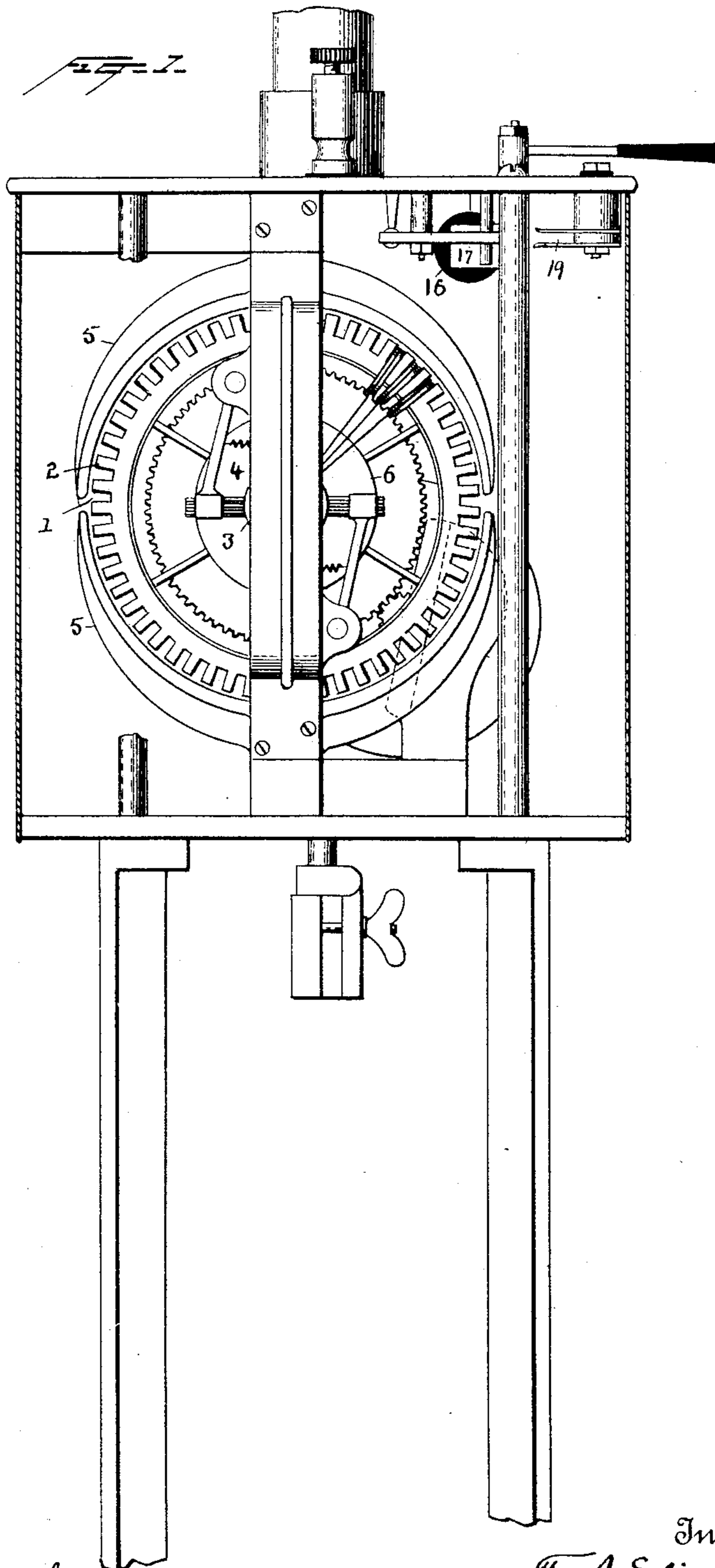
(No Model.)

3 Sheets—Sheet 1.

T. A. EDISON.
ELECTRIC ARC LAMP.

No. 476,993.

Patented June 14, 1892.



Witnesses
Norris S. Clark.
A. F. Shirley

Inventor.
T. A. Edison
By his Attorneys
Syert Seely.

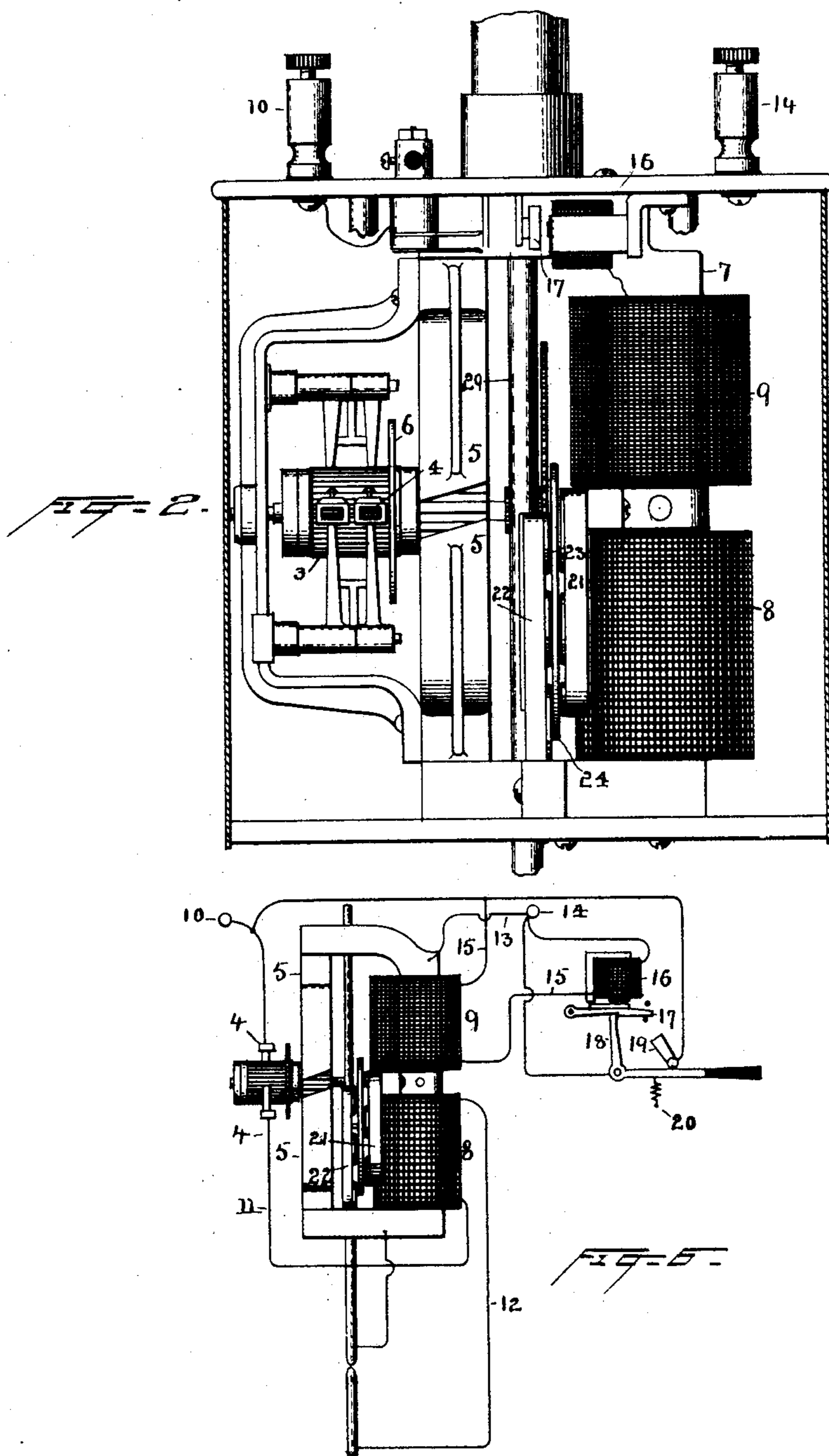
(No Model.)

3 Sheets—Sheet 2.

T. A. EDISON.
ELECTRIC ARC LAMP.

No. 476,993.

Patented June 14, 1892.



Witnesses
Norris A. Clark.
H. F. Clarke.

Inventor
T. A. Edison.
By his Attorneys
Sylvester Selby.

(No Model.)

T. A. EDISON.
ELECTRIC ARC LAMP.

3 Sheets—Sheet 3.

No. 476,993.

Patented June 14, 1892.

Fig. 3.

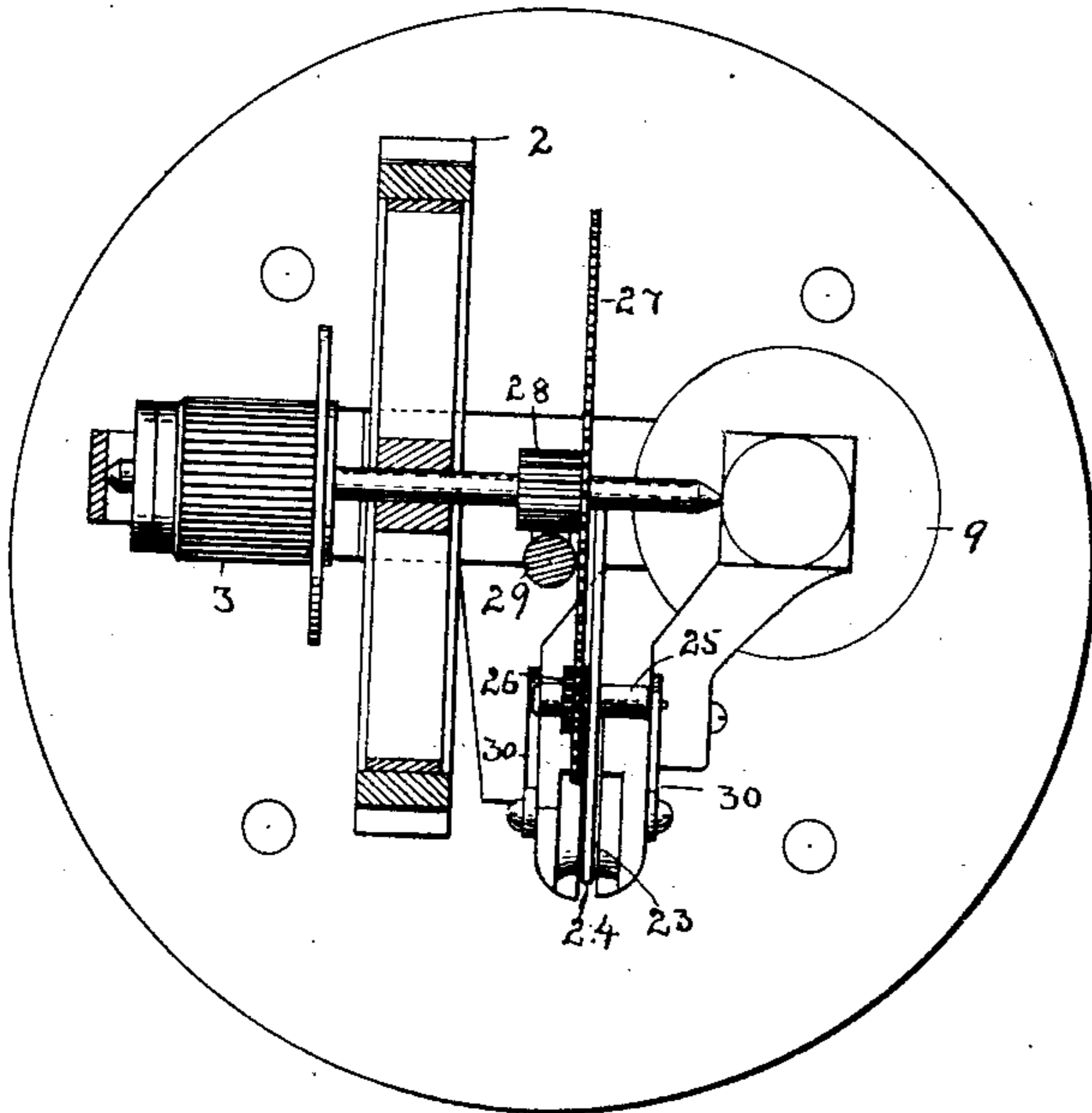


Fig. 5.

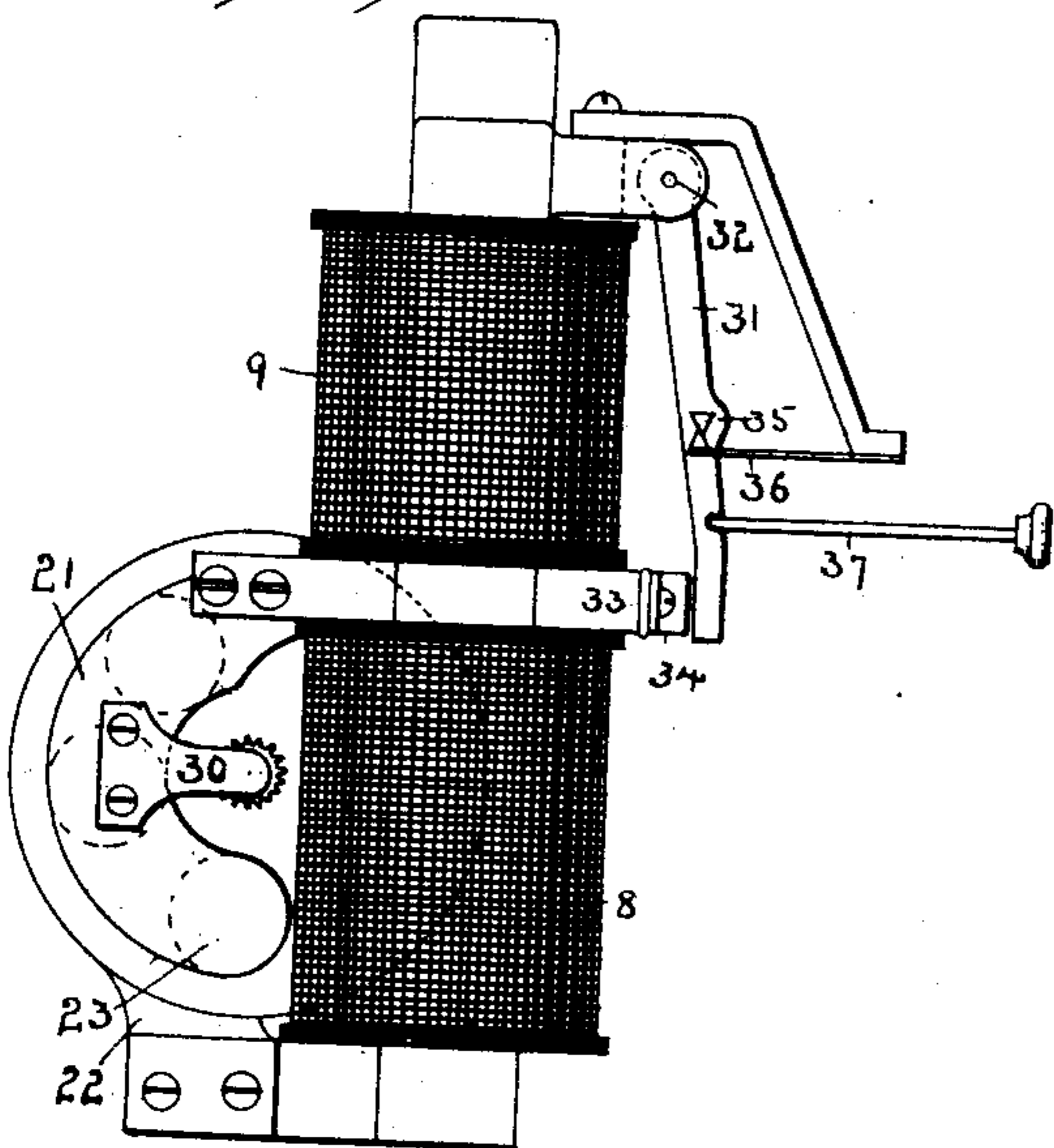
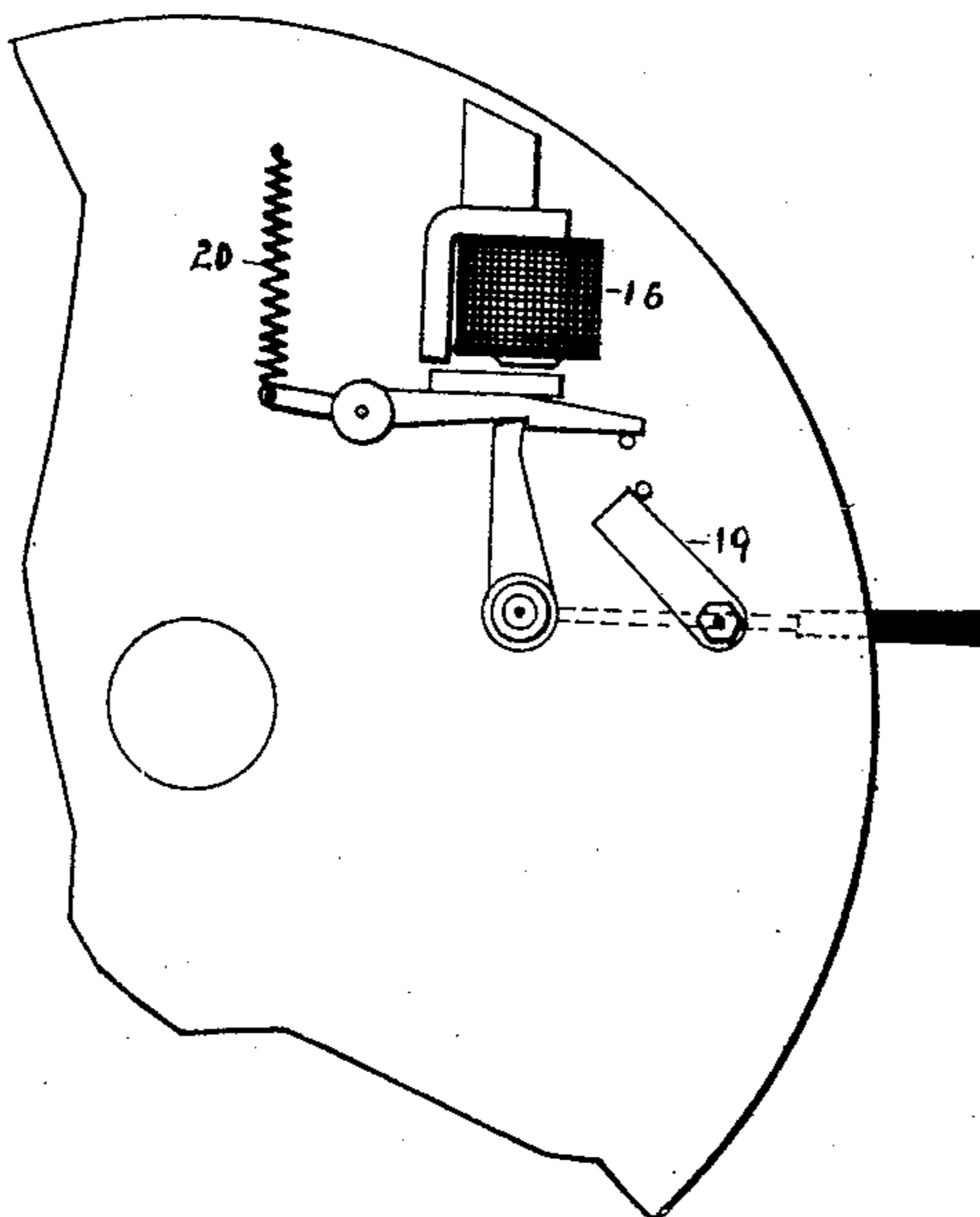


Fig. 4.



Witnesses
J. H. Clark.
A. F. Clark.

Inventor
T. A. Edison
By his Attorneys
Lyons & Seely.

UNITED STATES PATENT OFFICE.

THOMAS A. EDISON, OF LLEWELLYN PARK, NEW JERSEY.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 476,993, dated June 14, 1892.

Application filed October 1, 1891. Serial No. 407,451. (No model.)

To all whom it may concern:

Be it known that I, THOMAS A. EDISON, a citizen of the United States, residing at Llewellyn Park, in the county of Essex and State of New Jersey, have invented a certain new and useful Improvement in Arc Lamps, (Case No. 923,) of which the following is a specification.

The present invention relates to improved feeding and controlling mechanism for the movable carbons of arc lamps and to certain features of construction in lamps, as hereinafter set forth and claimed.

The main objects of the invention are to provide apparatus which shall move the carbon or carbons gradually and steadily, so as to avoid flashing or irregularity of the light, and to provide a simple and efficient retarding device.

In the accompanying drawings, which illustrate the invention, Figure 1 is a side view of the main portion of a lamp. Fig. 2 is a view at right angles thereto; Fig. 3, a plan view partially in section. Figs. 4 and 5 illustrate two forms of cut-out for the lamp, and Fig. 6 is a diagram showing the circuits of the lamp.

The lamp to be described belongs to the class in which the upper-carbon-carrying rod is moved positively up and down by an electric motor, the rotation of which is controlled by the strength of current in the field-magnet coils, one of which is in series with the arc and one of which is in a shunt thereto and wound differentially. This arrangement is described in my patent, No. 438,303, dated October 14, 1890.

In the motor employed in the present lamp the armature 1 is in the form of a large Pacinotti ring, the core of which is provided with a large number of teeth or projections 2 around its outer periphery. In the grooves between the teeth are wound ordinary armature-coils connected to the commutator 3, on which the brushes 4 rest. Preferably two brushes are used on each side of the commutator-cylinder to insure perfect contact. The poles 5 5 of the field-magnet extend around the armature to a considerable distance and terminate in lines at an angle to the teeth or polar projections extending across the face of the armature. With this construction of motor the

movement of the armature will be gradual, since the teeth on the armature will approach and recede from the magnet-poles gradually. This is especially advantageous, since it tends to move the carbons forward or backward without causing sudden and large flashes in the light.

6 is an insulating-disk over which the resistance-wires leading from the armature-coils to the commutator-bars are passed, as set forth by me heretofore.

On the yoke 7 of the field-magnet is a main field-magnet coil 8 of coarse wire and a differential shunt-coil 9 of finer wire. The first coil is connected to terminal 10 by wire 11 and by wire 12 to the lower carbon of the lamp, thence to the frame and by wire 13 to the terminal 14. The second coil is in a shunt to the motor and the arc in wire 15. This wire includes, also, a cut-out magnet 16, having a detent-armature 17, which when the lamp is in normal operation stands under the switch-lever 18 and holds it away from the cut-out contacts 19.

20 is a retracting-spring for said switch-lever.

While the motor above described moves the carbon with considerable delicacy, it is desirable to still further regulate said movement. To accomplish this, I attach a pole-piece 21 to the yoke of the field-magnet at the point between the main and shunt coils, as shown most clearly in Fig. 2, and a second pole-piece 22 to the yoke of the magnet on the opposite side of the main coil, thus producing a continuous magnetic field in the space between the two polar extensions, the strength of which depends on the current flowing in said coil. The adjacent faces of these polar extensions are preferably provided with circular raised surfaces 23 to concentrate the lines of force. Within this field is mounted a copper disk 24 on a shaft 25, having a pinion 26, with which gears a wheel 27 on the motor-shaft. Said shaft is also provided with a pinion 28, with which the rack on the carbon-carrying rod 29 engages. The shaft 25 is journaled in brass plates 30, suitably supported on the polar extensions.

In Fig. 5 is shown a second form of cut-out. 31 is a switch-arm pivoted at 32 and having

its lower end adjacent to the yoke of the field-magnet at 33. 34 is a contact-spring mounted on the yoke. The lever 31 is provided with a projection 35, which co-operates with a spring 36 to hold the lever in the position shown or to hold it in its retracted position after it has been moved forward and has snapped by the triangular piece on the end of spring 36. 37 is a handle by means of which the cut-out circuit may be closed manually.

The operation of the lamp will be clear without detail description. When the arc is of proper length, the current is divided between the main and shunt coils, so that the motor is stationary. When, however, the length of the arc increases, a larger proportion of current is thrown through the shunt-coil, thereby turning the motor in the direction to advance the carbon. When the carbon shortens the arc abnormally, more current passes through the series coil and turns the motor in the direction to raise the carbon. Owing to the construction of the motor and to the resistance offered to the movement of the copper disk in the magnetic field, these movements of the carbon will be gradual and steady, as already indicated. When the current in the shunt becomes too strong for safety, magnet 16 will be energized and the cut-out circuit automatically closed. If it is desired to close the cut-out manually, the de-

tent-armature 17 or the switch-lever 31 can be moved by hand.

What I claim is—

1. The combination, in an arc lamp, of a motor field-magnet, an armature therefor, polar extensions extending from said field-magnet, and a metal disk in the magnetic field formed by said extensions operatively connected to the motor-shaft and forming a retarding device, substantially as described.

2. The combination, in an arc lamp, of a movable carbon, a motor for moving it, polar extensions having raised surfaces, and a metal disk in the field of said polar extensions and connected to the motor, whereby it operates as a retarding device, substantially as described.

3. The combination, in an arc lamp, of a movable carbon, a motor having a field-magnet coil in the main and a field-magnet coil in a shunt circuit, a polar extension from the field-magnet on each side of one of the coils, and a disk connected to the motor and movable between said polar extensions, substantially as described.

This specification signed and witnessed this 31st day of July, 1891.

THOS. A. EDISON.

Witnesses:

JOHN F. RANDOLPH,
FREDERICH OTT.