

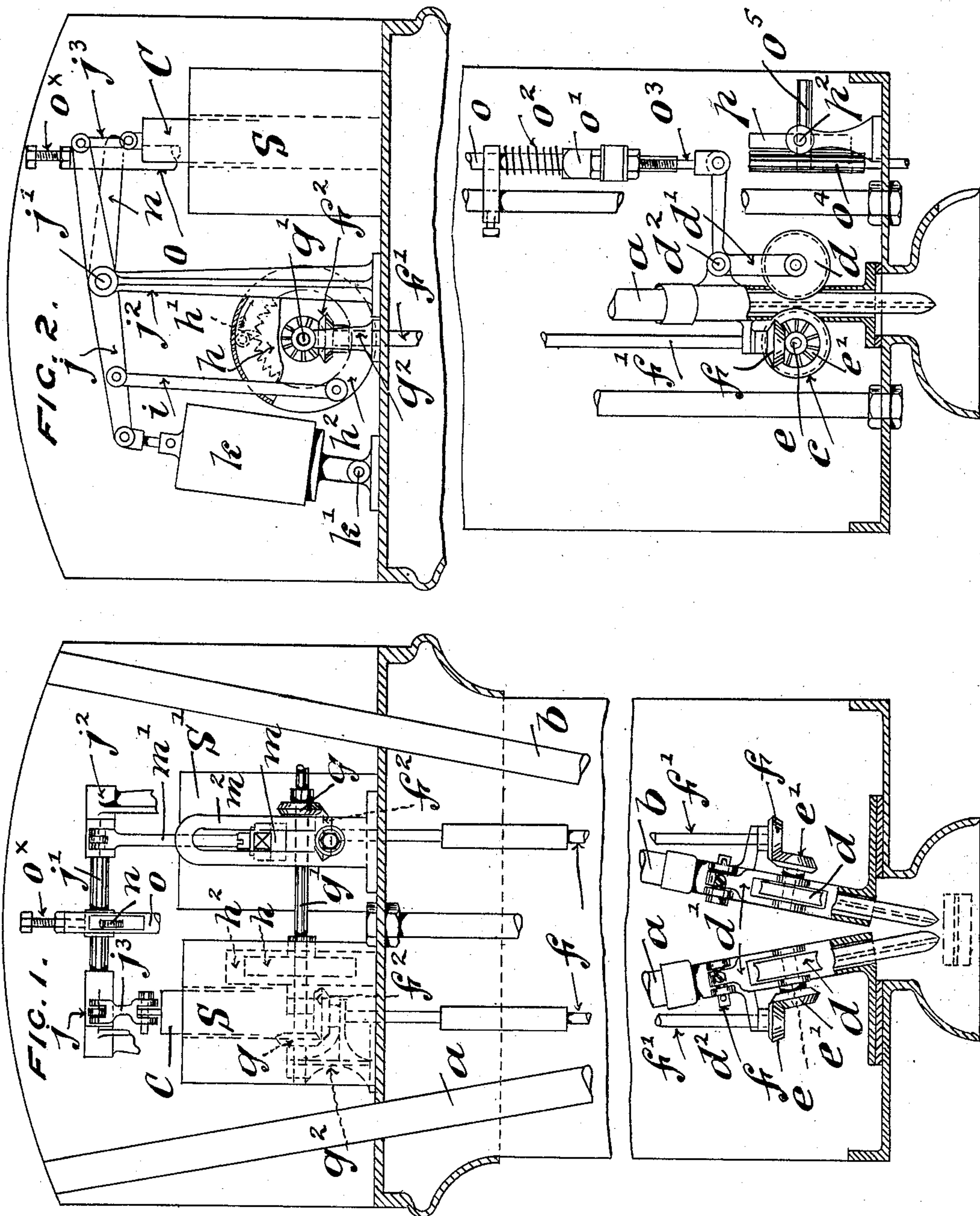
No. 759,880.

PATENTED MAY 17, 1904.

O. GROSS.
ELECTRIC ARC LAMP.
APPLICATION FILED DEC. 11, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES.

Wm. Kuchner
John A. Percival

INVENTOR

Otto Gross.

By his Attorneys

Richard R.

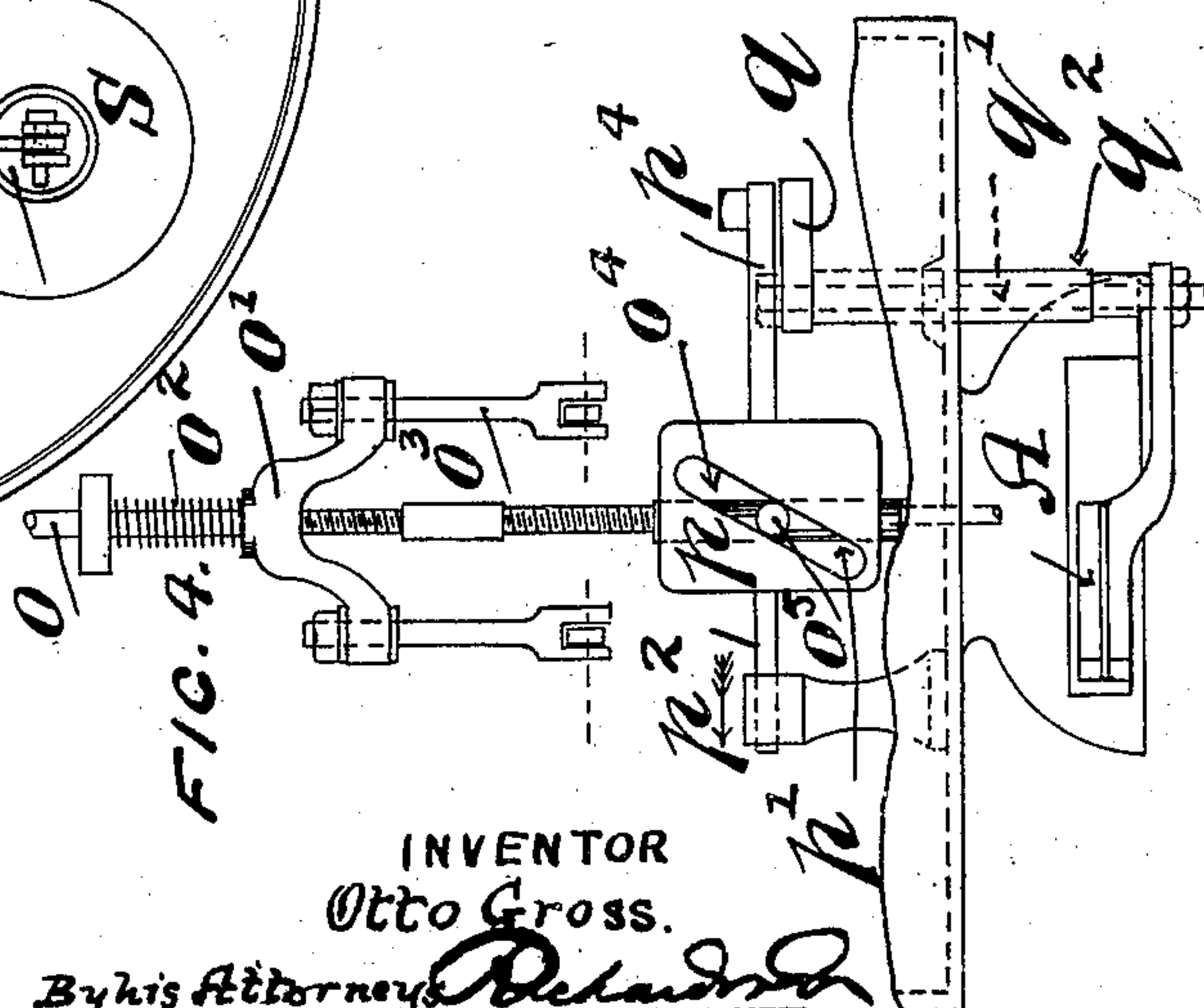
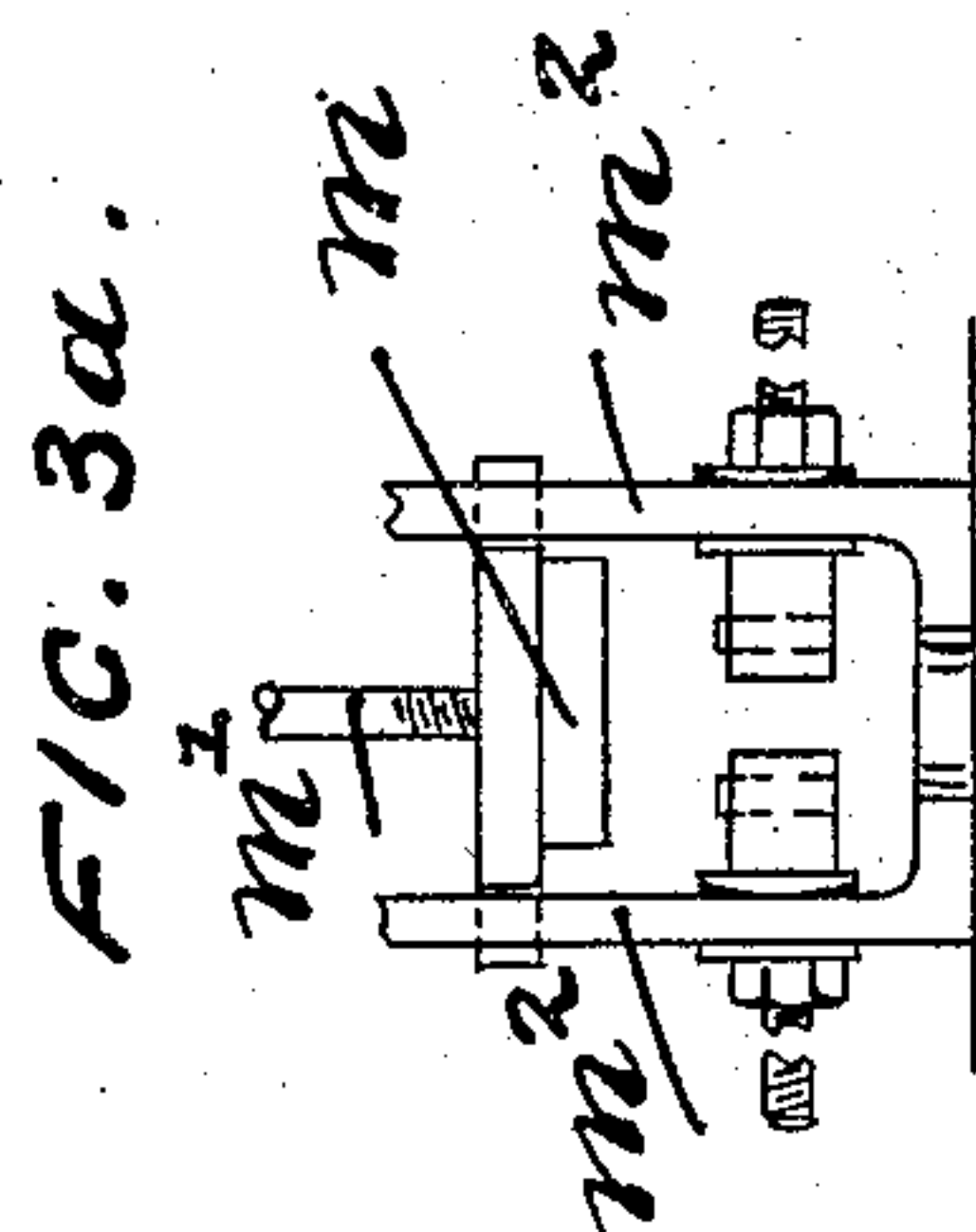
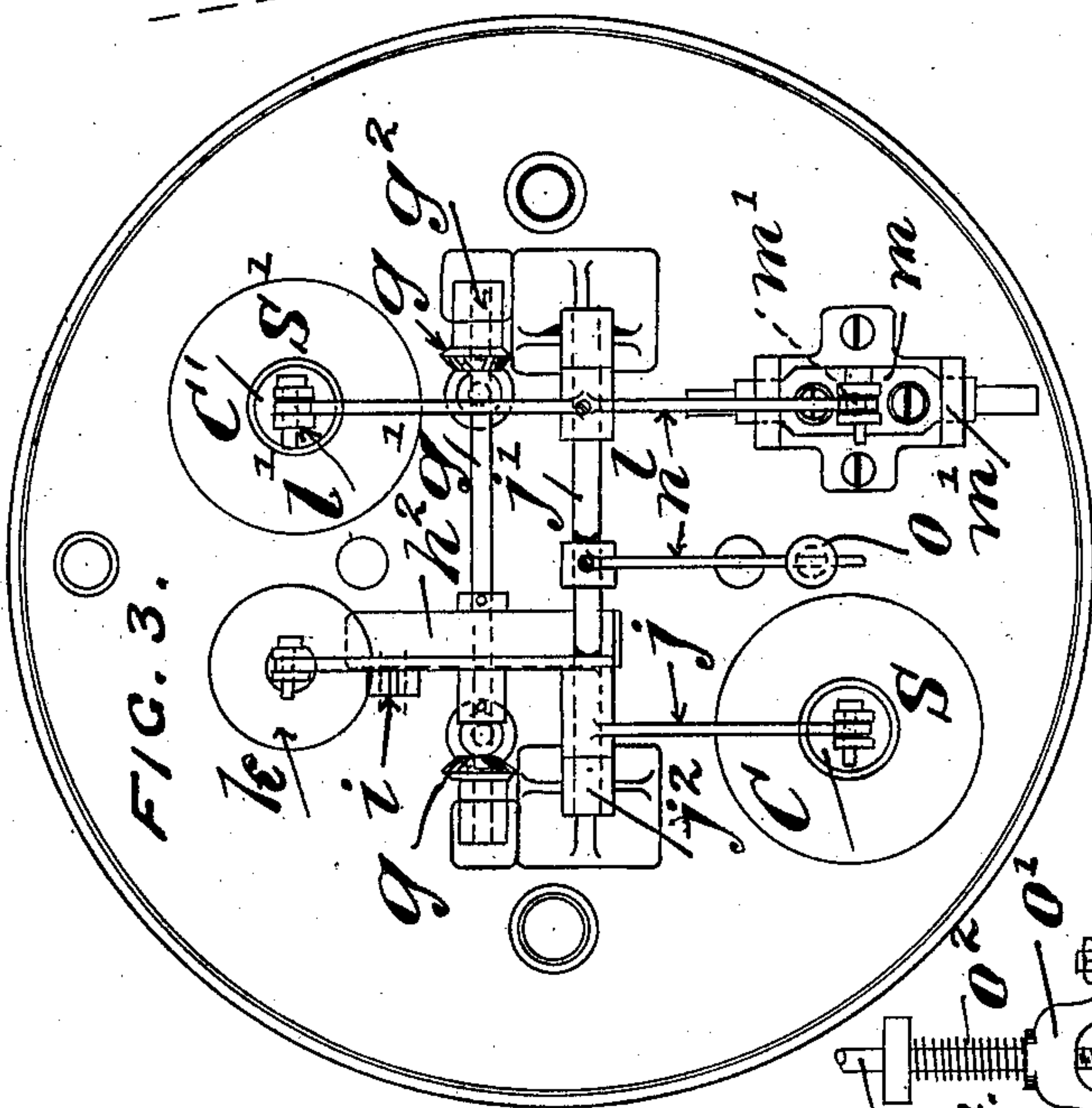
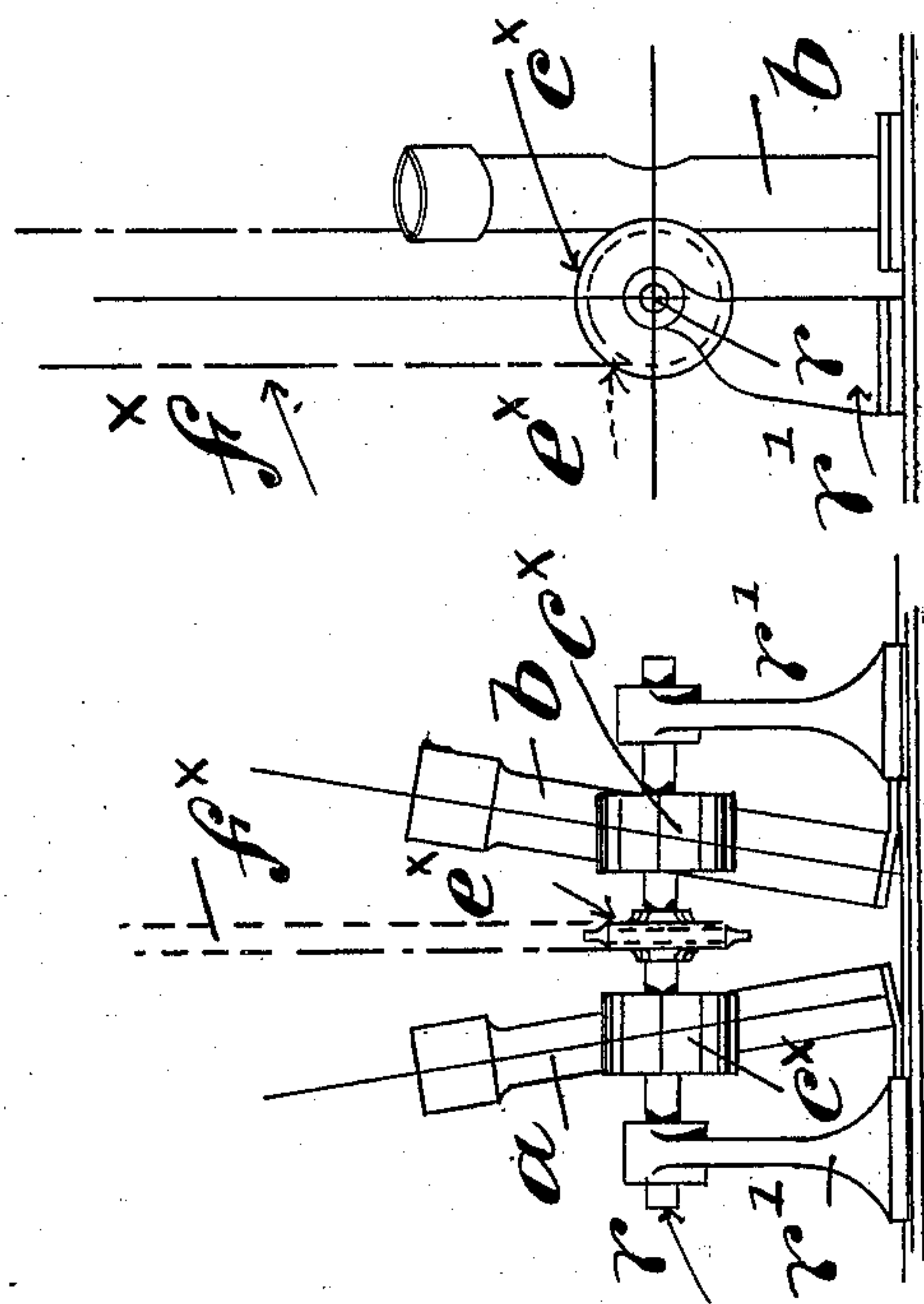
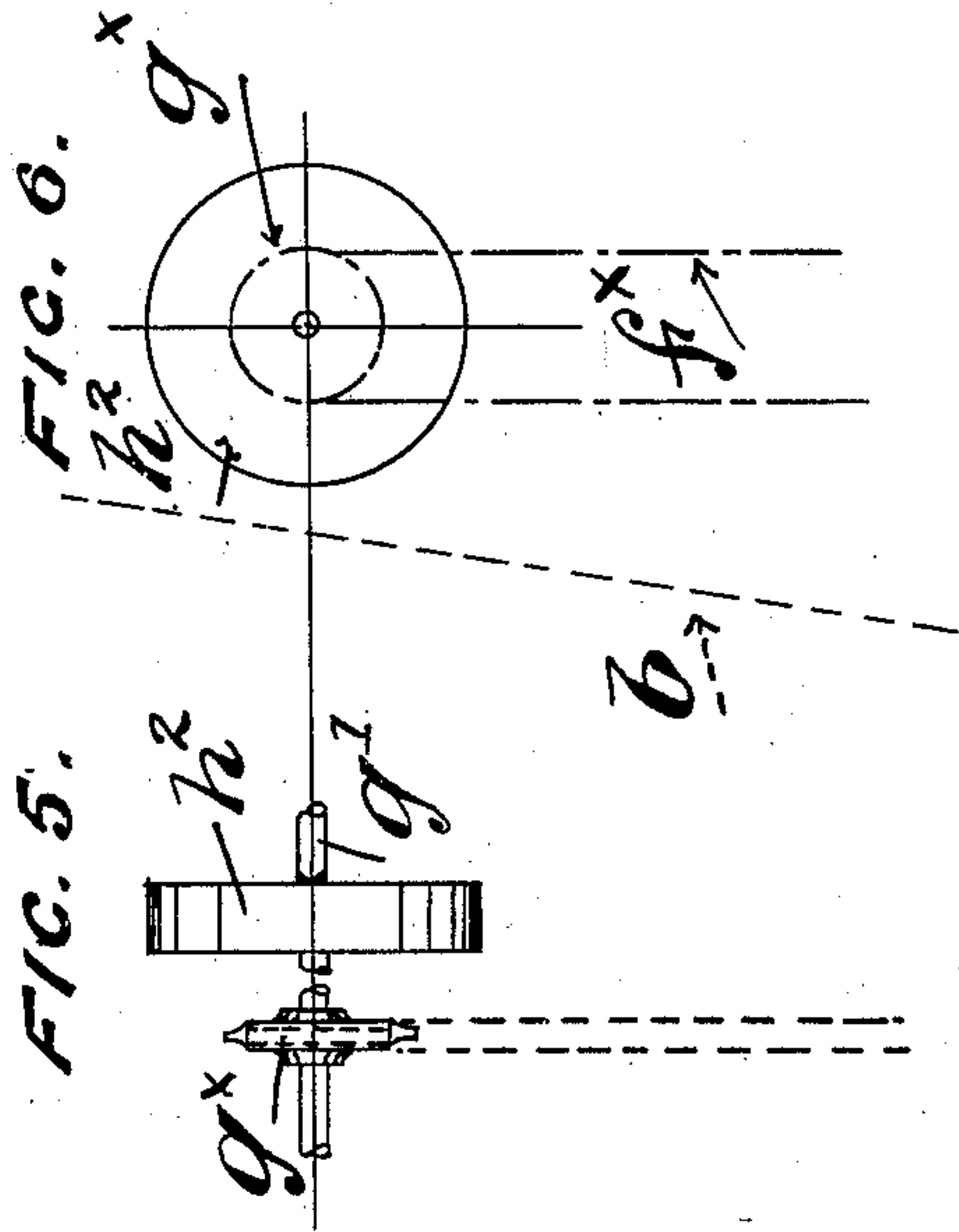
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2 SHEETS—SHEET 2.



WITNESSES
Wm. H. Hume
John A. Percival

INVENTOR
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By his Attorneys *Richardson*

UNITED STATES PATENT OFFICE.

OTTO GROSS, OF NEAR MANCHESTER, ENGLAND.

ELECTRIC-ARC LAMP.

SPECIFICATION forming part of Letters Patent No. 759,880, dated May 17, 1904.

Application filed December 11, 1903. Serial No. 184,818. (No model.)

To all whom it may concern:

Be it known that I, OTTO GROSS, electrical engineer, a subject of the Emperor of Germany, residing at 14 Albert Place, Longsight, near Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Electric-Arc Lamps, (for which I have made an application in Great Britain, No. 27,861, dated the 17th day of December, 1902, and also an application in Germany was made on the 26th day of September, 1903,) of which the following is a specification.

This invention relates to electric-arc lamps, and particularly to means for automatically feeding forward the carbons or electrodes used in such lamps and to means for automatically striking the arc.

According to my invention I arrange to gradually and positively feed forward the carbons as they are consumed by means of wheels, said wheels being so arranged as to bear on the carbons and wheel same down, the wheels being actuated by positive gear from a top arrangement of solenoids or the like, the motive power being the current passing through the lamp. The mechanism or gear which feeds down the carbons also actuates the striking mechanism, as will be explained.

To enable my invention to be readily understood by those skilled in the art to which it appertains, I will describe the same fully with reference to the annexed two sheets of illustrative drawings, in which—

On Sheet 1, Figure 1 is a side elevation of an arc-lamp constructed in accordance with my invention, the view being partly in section and certain elements omitted for the sake of clearness in the view. Fig. 2 is an elevation of Fig. 1 drawn at right angles. On Sheet 2, Fig. 3 is a plan view of the top of the lamp and clearly shows the solenoids and top gear, while Fig. 3^a is a detail side elevation of a bridging-piece which moves in slotted bearings or guides. Fig. 4 is a front view of the striking mechanism and other parts, which are also clearly shown in Fig. 2, the parts being at right angles to each other in the two views. Fig. 5 is a diagrammatic view of a

modified way of actuating and using a pair of broad wheels for feeding down the carbons. Fig. 6 is a view of Fig. 5 drawn at right angles.

In lamps made in accordance with my invention I employ carbon-tubes *a b*, said tubes being arranged downward and at a suitable angle one to the other, as clearly indicated in the drawings. These tubes, which are firmly secured in position in the lamp, vary slightly in diameter to suit the differing diameters of the carbons used in lamps of this class. The carbons are passed into position down the tubes, being readily inserted, for instance, at the top of said tubes. Toward the lower ends of the tubes *a b* suitable holes or inlets are cut, which give access to two wheels or bowls *c d*, which engage or bear on the carbons, said wheels being grooved or otherwise shaped to readily engage the carbons. The wheels *c* are carried in fixed brackets and bear against the carbons, as clearly seen in Fig. 2, while the wheels *d* are carried in hinged bell-crank brackets *d'*, centered at *d''*, each bracket and wheel being movable on the center *d''*. The first-named wheels *c* are stationary wheels, which are positively rotated to feed down the carbons, while the second-named wheels *d* are not positively actuated, but rotate with the carbons and act as clutch-wheels. Upon the spindles *ee* of the wheels *cc* small miter-wheels *e' e'* are fixed, and gearing with these miter-wheels are similar miter-wheels *f f*, carried upon the lower ends of the upright spindles *f' f'*, the upper ends of the spindles *f' f'* also carrying miter-wheels *f² f²*, which gear with miter-wheels *g g*, carried by a cross-spindle *g'*, supported in brackets *g²*, arranged at the top of the lamp. From this it will be seen that any rotation imparted to the cross-spindle *g'* is transmitted by the miter-gears down to the wheels *c*, and in this way said wheels are rotated, and so feed on the carbons.

To rotate the cross-spindle *g'*, I employ a ratchet or notched wheel *h*, which is acted upon by a pawl *h'*, carried by a housing *h²*, which surrounds said ratchet *h*, said housing being partially rotated at intervals by a pivoted link or lever *i*, tied to a rocking beam or bar *j*, loose upon the shaft *j'*, which is mounted in brackets

j^2 . One end of this beam or bar is connected by a link j^3 to the core C of a series coil S, working as a solenoid, the other end of the beam being connected to a dash-pot k , pivoted at k' , said dash-pot acting as a steadying and moderating means. The shaft j' has also secured thereto a second beam or bar l , one end of which is connected by a link l' to the core C' of a shunt-coil S', working as a solenoid, while the other end is connected by a hinged rod m' to a bridging piece or armature m , capable of sliding in slotted bearings m^2 , (see Fig. 3^a;) and which bridging piece or armature when raised causes the current to flow through the series coil. When, however, the bridging-piece m is down, the current passes directly to the carbon-tube and feeds the arc.

Upon the shaft j' and in about a central position an arm n is secured, which works the striking mechanism, said arm engaging the upper slotted or other end of a guided rod or spindle o . This rod or spindle carries an adjustable cross-head o' and is normally pressed down by a spring o^2 , the cross-head also having arms o^3 , which are pivoted to the horizontal arms of the hinged brackets d' d'' . To the lower end of the rod o or an adjustable part o^4 , carried thereby, a finger o^5 is secured, and this finger projects into an inclined or other slot p' , cut in a slidable plate p , the spindle p^2 of which is free to slide endwise in a bracket p^3 . Connected to the plate p is a bar or arm p^4 , which is connected by a pivot-pin to an arm q , attached to a rotatable spindle q' , carried in a fixed extended bearing q^2 , the lower end of said rotatable spindle being secured to the arcing-plate or striker A. When the rod o is drawn up, the plate p is slid endwise in the direction of the arrow, and the arm p^4 , pulling on the arm q , partially rotates the spindle q' and causes the striker A to be swung (moving with the spindle q' as a center) below the carbons. The way in which the rod is raised will be explained later. In addition to operating the striker the upward movement of the rod o by means of the arms o^3 , rocks the bell-crank brackets d' on their centers d^2 , thereby removing the clutch-wheels d from contact with the carbons and allowing the latter to fall upon the striker.

I will now briefly describe the action of the lamp, the wiring being omitted from the drawings for the sake of clearness. When the current is first switched on, it passes strongly through the shunt-coil S', the core C' of which is sucked down, pulling with it one end of the bar l , so that the spindle j' is rocked and with it the arm n . The arm n , pressing on the adjustable stud o^x , raises the rod o , which in the manner before described causes the striker to be swung below the carbons, said carbons at the same time being allowed to drop onto the striker A, owing to the releasing movement of the clutch-wheels d . When this occurs, the carbons are short-circuited and the

current flows through the lamp, the bridging-piece m falls, and the shunt-core rises, so that with the arm n no longer supporting the rod o said rod is thrust down, the clutch-wheels drop into gear with the carbons, and the striker is swung clear. The lamp is now burning and the conditions are normal; but as the carbons are gradually consumed the resistance becomes greater in the arc, as will be understood, so that a variation in the current passing through the solenoids results, the shunt-coil becomes more powerful, sucking down its core and raising the bridging-piece. When the bridging-piece m is raised, the current passes through the series coil S, the core of which is acted upon and sucked down, rocking the bar j . When the bar j is rocked, the link i rotates the housing h^2 and causes the pawl h' to actuate the ratchet h , and consequently the shaft q' , the movement of which is communicated by the miter-wheels and spindles to the wheels c , which positively feed down the carbons.

The lamp described is designed for use as a single lamp; but where the lamps are used in series then in such case series and shunt coils might be used, the current normally passing through the series coil; but when passing strongly around the shunt-coil, owing to resistance in the arc, a bridging piece or armature in connection with the series coil is raised, causing the current to traverse a feeding-coil, the core of which, pulling on a rocking bar, would cause the pawl to rotate the ratchet and feed down the carbons.

As a modification of my invention and as shown in Figs. 5 and 6 instead of using angularly-disposed wheels in connection with the carbons broad wheels or bowls e^x e^x , bearing on the carbons at one point only, might be used, and instead of miter-gear a chain and chain-wheels might be used. In Figs. 5 and 6 I have shown a chain and chain-wheels in connection with broad wheels or bowls e^x e^x , the chain being lettered f^x and the chain-wheels e^x g^x , the spindle for the lower chain-wheels and bowls being carried in fixed brackets g' . It will be understood that similar clutch-wheels d to those described are used in connection with the modified arrangement indicated in Figs 5 and 6.

I declare that what I claim is—

1. An arc-lamp having converging carbon-tubes, carbons within said tubes, fixed rotatable wheels engaging said carbons, and angularly-movable clutch-wheels clutching said carbons, positive gear for driving said fixed rotatable wheels, solenoids located above the arc and having cores actuating a rocking bar, ratchet mechanism, vibrating bars and a rock-shaft, an arm upon said rock-shaft, and a vertical rod working said angularly-movable clutch-wheels, substantially as described.

2. An arc-lamp having downwardly-projecting and converging tubes and fixed rota-

table wheels, gear for driving said fixed rotatable wheels, angularly-movable clutch-wheels, solenoids, rocking bars operated by said solenoids, moderating means and a bridging device *m*, a rocking shaft and an arm on said rocking shaft, a vertical rod operated by said arm, a cross-head on said rod, connection between said cross-head and the movable clutch-wheels, and an arcing-plate, and means intermediate between said plate and vertical rod operating said arcing-plate, for the purposes and substantially as described.

3. In combination in an arc-lamp having downwardly-projecting and converging carbons, fixed rotatable wheels, gear for driving said wheels, angularly-movable clutch-wheels

and means for automatically striking the arc comprising a vertical actuated rod, a vibrating finger operating said rod, a cross-head, connections between said cross-head and the clutch-wheels, an arcing-plate suitably centered, and a sliding device operated by the vertical rod, said sliding device when operated, swinging the arc-plate below the said carbons so as to strike the arc, substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses.

OTTO GROSS.

Witnesses:

RICHARD WEBSTER ILBERSON,
ALFRED YATES.