

No. 692,427.

Patented Feb. 4, 1902.

J. D. CLAY & F. A. LA ROCHE.

ELECTRIC SWITCH.

(Application filed Aug. 22, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1

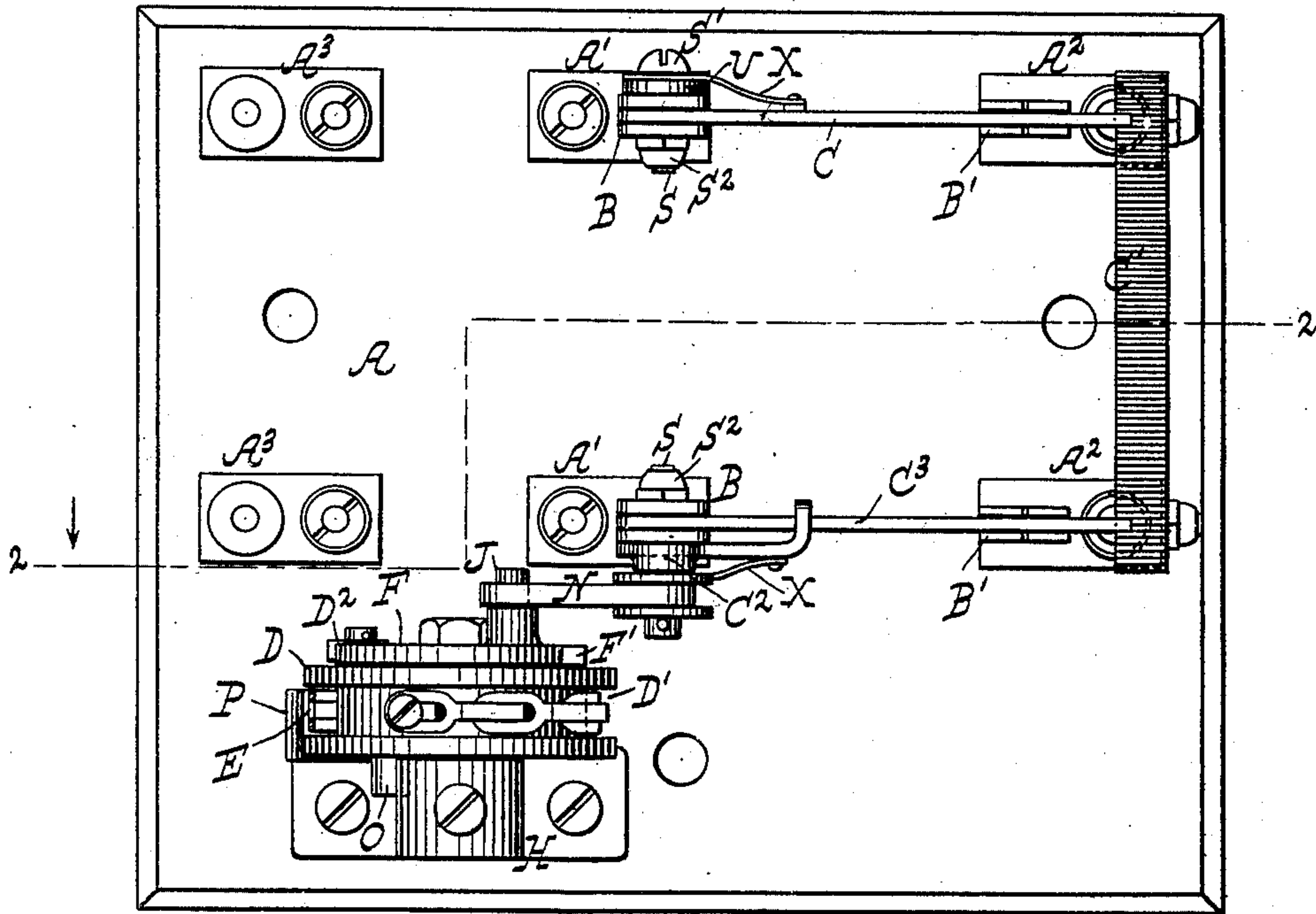
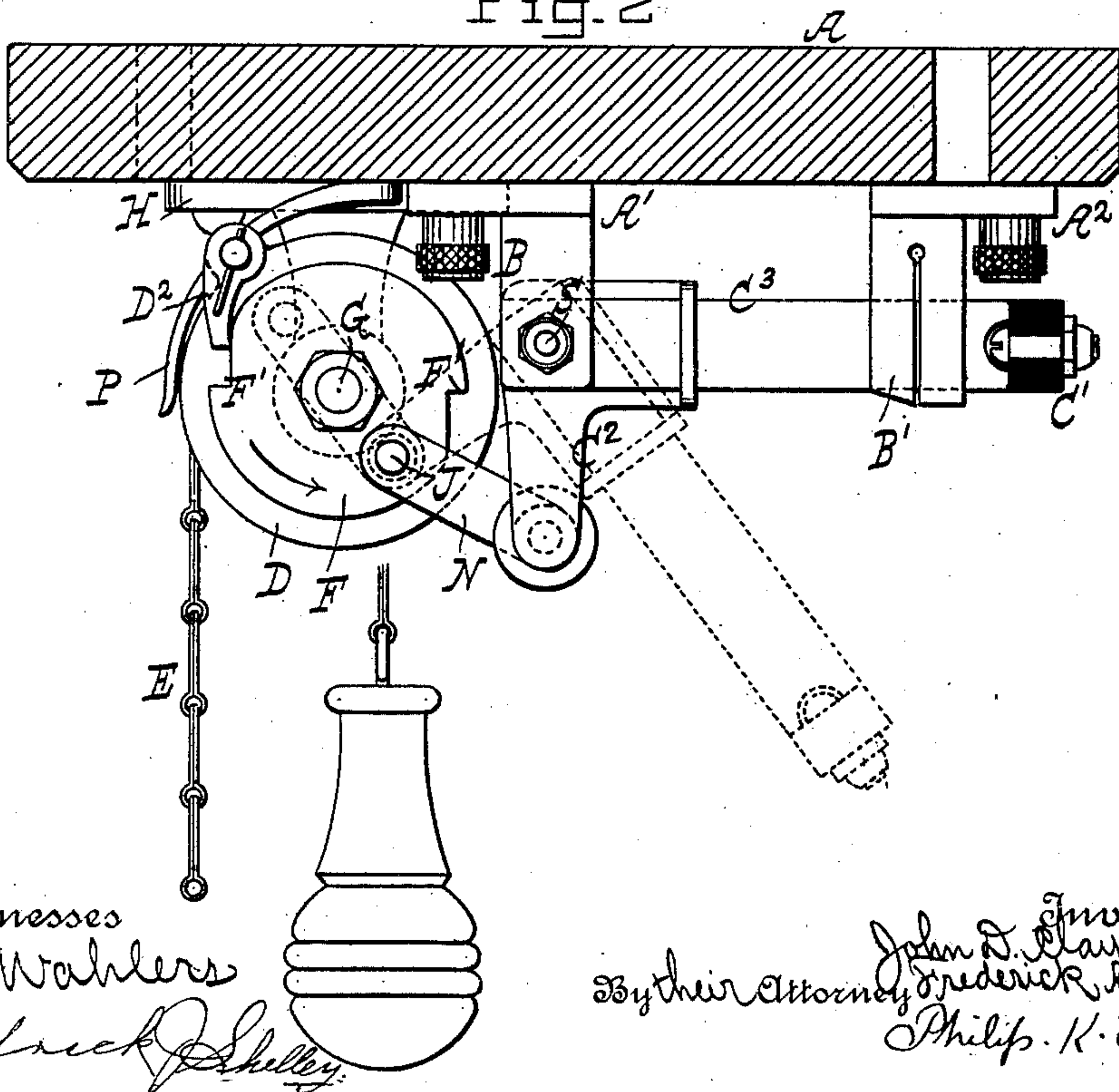


Fig. 2



Witnesses  
Chas. Wahlers  
Patrick J. Shelley.

Inventors  
John D. Clay  
Frederick A. La Roche  
By their attorney Philip K. Stern

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Fig. 3

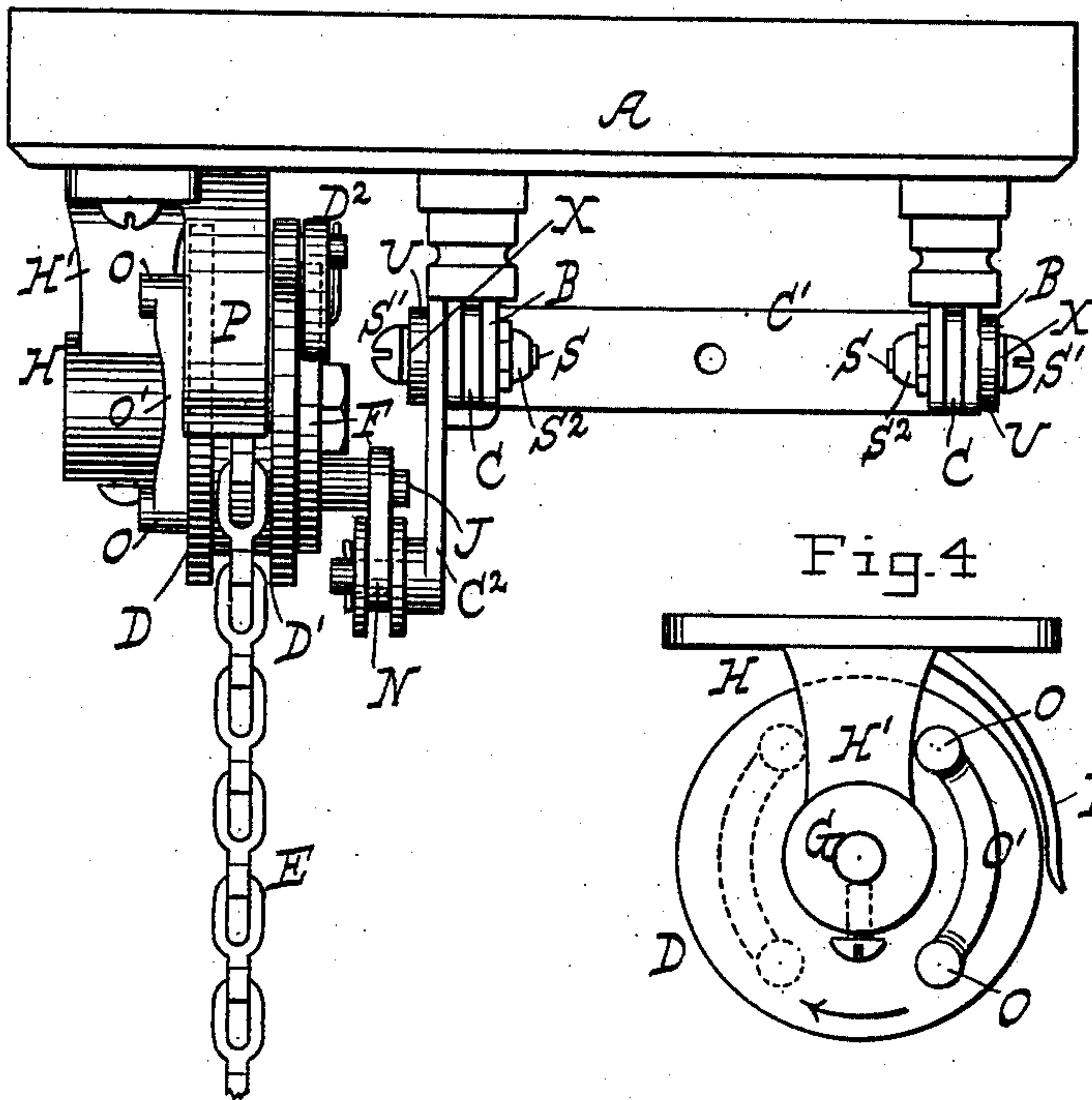


Fig. 4

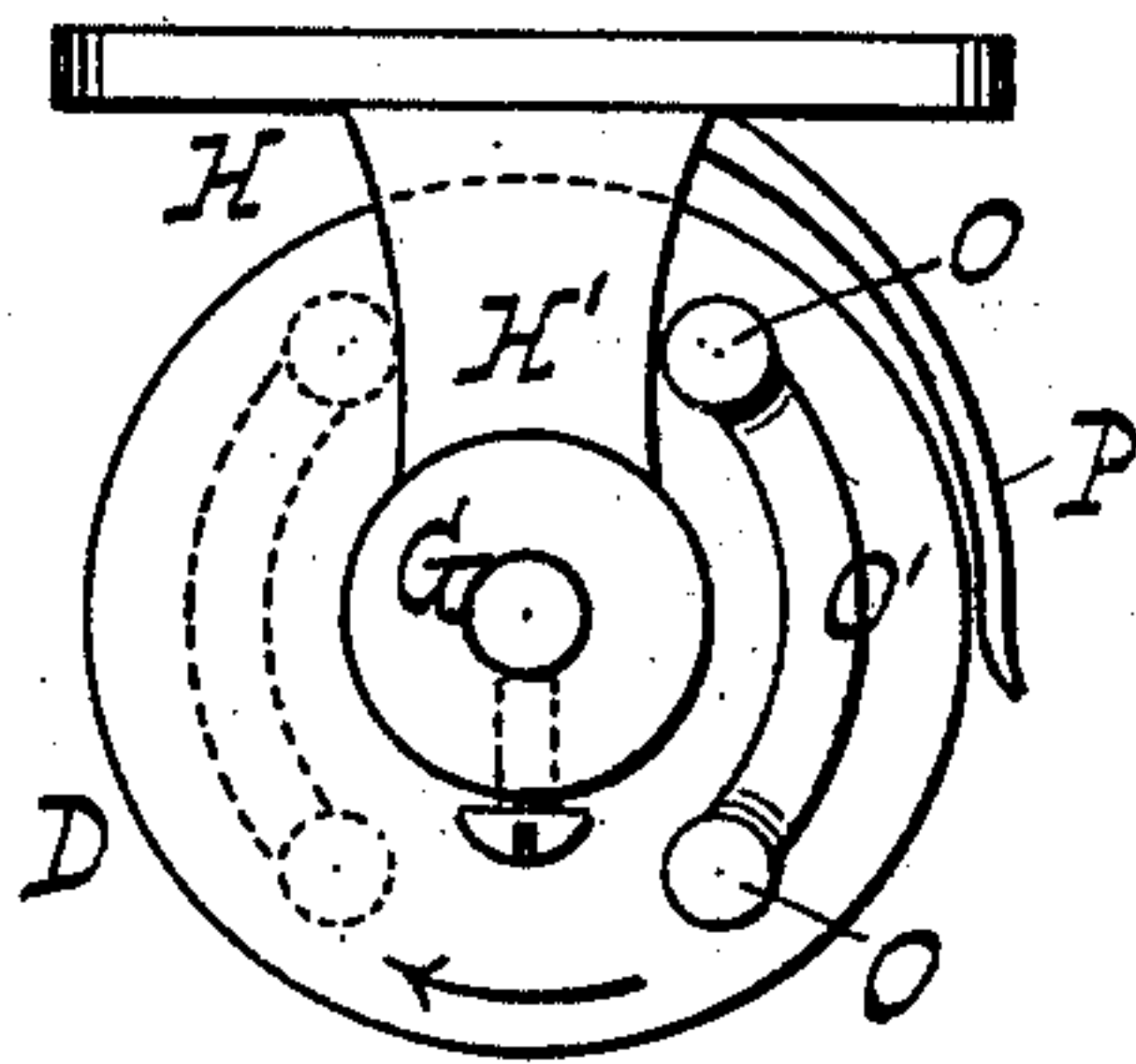


Fig. 5

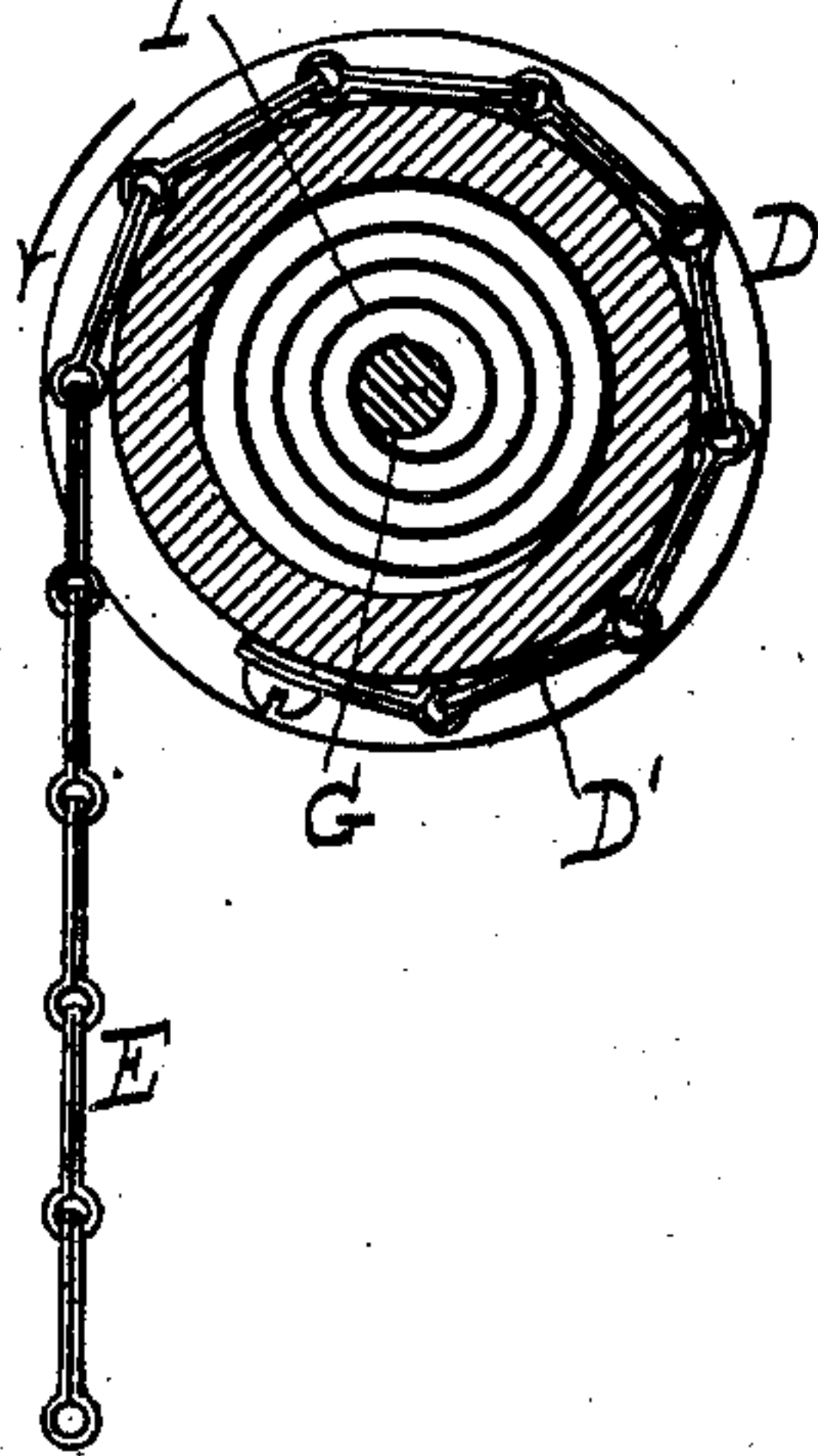


Fig. 6

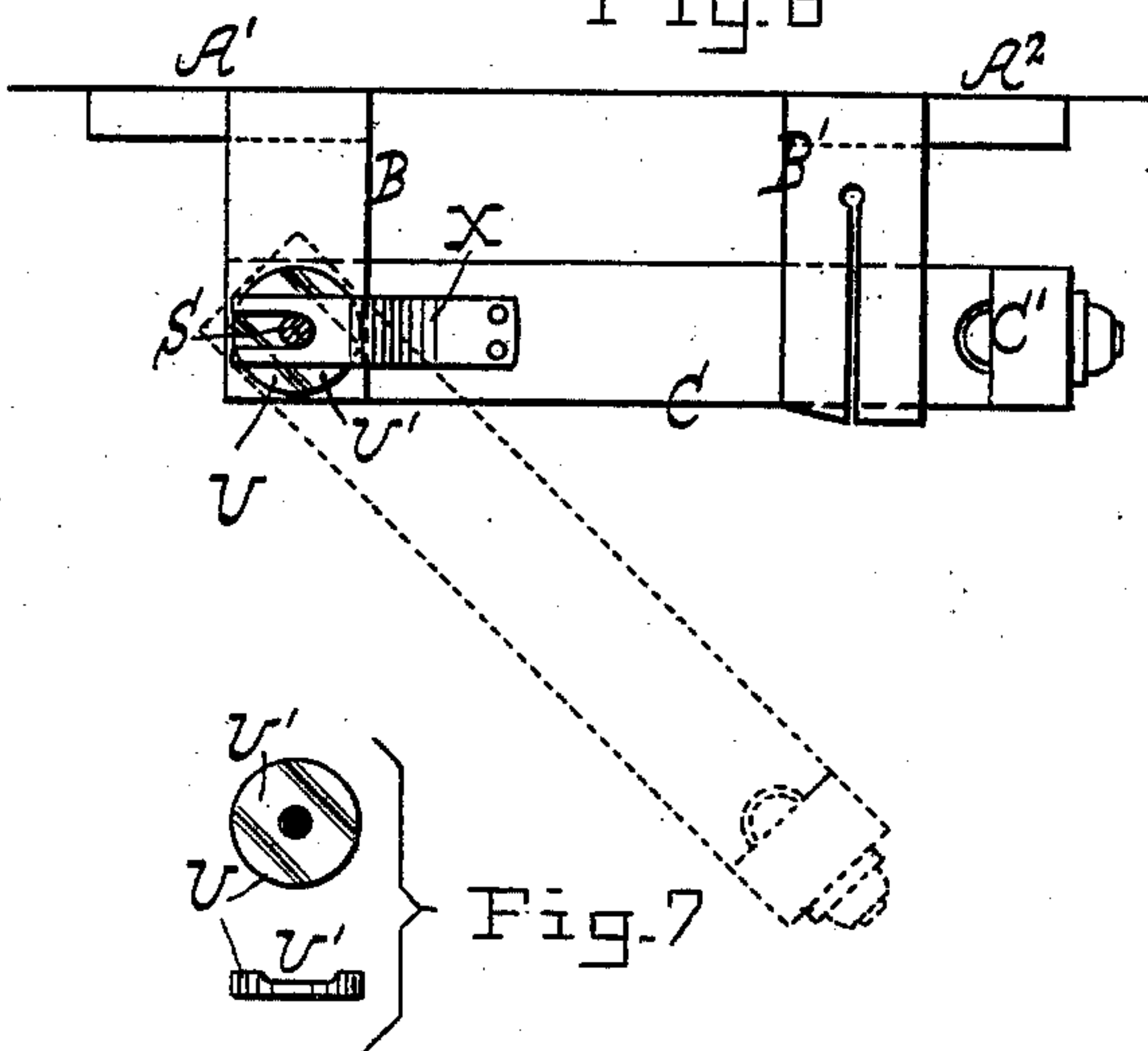
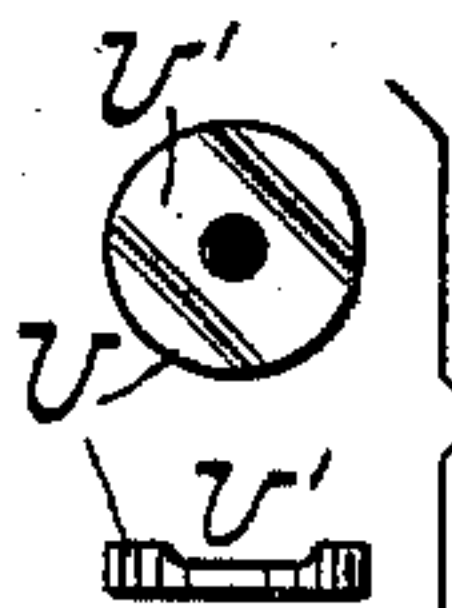


Fig. 7



Witnesses  
Chas. W. W. W. W.  
Patrick J. Kelley

Inventors  
John D. Clay,  
Frederick A. La Roche  
By their Attorneys  
Philip K. Plume



# UNITED STATES PATENT OFFICE.

JOHN D. CLAY AND FREDRICK A. LA ROCHE, OF NEW YORK, N. Y.

## ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 692,427, dated February 4, 1902.

Application filed August 22, 1900. Serial No. 27,662. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN D. CLAY and FREDRICK A. LA ROCHE, citizens of the United States of America, residing at the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Switches, of which the following is a specification.

Our invention relates more particularly to that class of switches known as "ceiling-switches," or switches for which the electrical currents to be operated by the same are not accessible except by a pendant of some sort, whereby the switch-levers are operated; and our invention consists in certain novel features of construction whereby a considerable increase of effectiveness is insured in the opening and closing of the switch and its maintenance in either of these two positions, together with simplicity in the mechanical construction; and the object of the above-said invention is to provide a more effective and economical means of carrying out the construction of switches of this character than has been in vogue heretofore.

The chief features of our invention are fully illustrated in the drawings, forming part of this specification, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 represents an inverted plan view of an electrical switch embodying our invention. Fig. 2 represents a vertical section thereof, taken on the line 2 2, Fig. 1. Fig. 3 represents an end view thereof. Fig. 4 represents a detail side view of a shaft-hanger and pendant wheel or pulley. Fig. 5 represents a longitudinal section of the pendant-wheel with the return-spring. Fig. 6 represents a detail side view of a switch-lever and its concomitants. Fig. 7 represents a detail face and edge view of a cam-washer.

Corresponding parts are marked with the same letters of reference in each of the figures.

A indicates the switchboard, having mounted thereon binding-posts for the electrical conductors, and in accordance with the manner of carrying out our invention we have arranged these in three sets, respectively marked A<sup>1</sup>, A<sup>2</sup>, and A<sup>3</sup>, one of the posts, A<sup>2</sup>, of each set supporting a clip B<sup>1</sup>, which re-

ceives and engages the free end portion of either of said levers when the switch is closed. The two levers C C<sup>3</sup> are united by a cross-bar C', of insulating material.

The letter D indicates a pendant wheel or pulley, having therein a circumferential groove D' to receive the chain E, one end of which latter is secured to the wheel and in practice depends therefrom, forming a sort of pendant, accessible from below the wheel, as shown in the drawings. This chain E is a medium for imparting intermittent rotary motion to the wheel or pulley D in the adjustment of the switch, and in lieu of the chain we may use a flexible cord or band of suitable fabric.

Next or adjacent and parallel to the pendant wheel or pulley D is a ratchet-wheel F, having two teeth F', located diametrically opposite each other. The shaft G, which is connected to said wheels D F, is fixed, while both wheels are free to rotate, and the shaft has its bearing in a hanger H, depending from the switchboard. Encircling the wheel-shaft is a spring I, Fig. 5, one end of which is secured to said shaft and is wound about the same in the form of a scroll, and the other end is secured to the pendant-wheel D in such a manner as to act on said wheel with a tendency to return it to the position shown in the drawings, which is its normal position, in each operation of the switch. The return-spring I is inclosed in the pendant-wheel D, it being introduced therein from one side through an opening covered by the ratchet-wheel. At one side of the pendant-wheel is a pawl D<sup>2</sup>, which is mounted thereon by means of a suitable pivot, so as to engage the ratchet-wheel F, and at one side of the ratchet-wheel is a crank-pin J, which is fixed thereto and to which is connected one of the switch-levers C C<sup>3</sup> by means of a link N, said lever having a driving-lever C<sup>2</sup>, pivoted to one end of said link. Thus when the chain E or its substitute is pulled upon the pendant wheel or pulley is turned in the direction of the arrows in Figs. 2 and 5, and by the pawl D<sup>2</sup> pushing against either of the teeth F' of the ratchet-wheel the latter is turned in the same direction, while through the crank-pin J and link N the switch-lever is set in an open or closed position, as the case may be. The relation



of the pin J to the wheel-shaft G is such as to form a driving-crank to operate the switch through the link N.

The shaft-hanger H has its intermediate part or shank H' shaped and disposed in such a manner relatively to stop-pins O, two in number, on the pendant wheel or pulley D as to form stops for said pins when they shall come in contact with the hanger alternately, according to the direction of motion of said wheel, with the effect of limiting and thereby regulating the motion of both the pendant-wheel and ratchet-wheel, which insures a correct operation of the switch. The stop-pins O may be reinforced by a web O', which, together with the pins, is cast on the wheel. The amount of motion afforded by the stop-pins O is one-half of a revolution of the wheels D F, and in the successive motions of the wheels under the impulse of the chain E the switch-levers are alternately brought into reverse positions.

On the shaft-hanger H is cast or otherwise formed an arm P, of segmental form, which partly overlaps the pendant-wheel D opposite the wheel-groove D'—namely, at its free end. The effect of this disposition of the arm P is to form a guard to keep the chain always in its position in the groove of the ratchet-wheel.

The hinge-joint of either of the switch-levers C C<sup>3</sup> is provided with a screw-bolt S, having a head S' and a nut S<sup>2</sup>, upon which said lever swings, and under the bolt-head S' is a cam-washer U, composed of metal or other suitable material, in the outer face of which washer is a recess U', Figs. 6 and 7, extending radially across it. Between the bolt-head S' and the washer U is interposed the free end of a spring-tongue X, which is secured to the switch-lever C to move with the same. Said free end of the spring-tongue X is forked to straddle the bolt S, and it is fitted in width to the face-recess U' of the washer, while the washer is so disposed as to cause the spring-tongue to enter said recess in the open position of the switch-lever, and vice versa, the effect of which is to alternately tighten and loosen the bolt, according to the position of the lever, thereby insuring a more positive electrical connection when the switch is closed and affording more freedom of motion when the switch is open.

When the switch-levers C C<sup>3</sup> are in an open position, the link N is brought into a line of dead-center in relation to crank G J, as shown by dotted lines in Fig. 2, which tends to lock the switch in the position as aforesaid, and when the switch is in a closed position it is likewise locked against opening, although the relation of the link N to the crank G J is such as to be slightly off from the line of dead-center, which in practice we have found ample to insure the locking of the switch, especially as the switch is prevented from moving by the additional friction that the clips B' offer to the switch-levers, together with the tight-

ening of the hinge-joint in the manner just described.

Having fully described our invention, so that those who are interested in the art to which it pertains may construct and use the same, what we claim, and desire to secure by Letters Patent, is—

1. In an electrical switch, the combination of a pulley having a cord, band or chain secured thereto, a ratchet-wheel adjacent to the said pulley, a shaft common to said pulley and wheel, means coacting between said shaft and pulley for returning said pulley, a pawl on the pulley engaging the ratchet-wheel, a switch-lever, a crank-pin on the ratchet-wheel, and a link-connecting said lever to the crank-pin, substantially as described.

2. In an electrical switch, the combination of a pendant-wheel having a cord, band or chain attached thereto, a ratchet-wheel adjacent to said pendant-wheel, a push-pawl on the pendant-wheel engaging the ratchet-wheel, a shaft common to said wheels, a return-spring on said wheel-shaft acting upon the pendant-wheel, and a shaft-hanger, stop-pins on the pulley adapted to arrest the motion of said pulley when the same shall rotate so as to make contact with the shank of said hanger, for regulating the motion of said pulley when the same shall have been moved in opposite directions alternately; substantially as described.

3. In an electrical switch, the combination of a pulley having a cord, band or chain attached thereto, a ratchet-wheel adjacent to the pulley, a push-pawl on the pulley engaging the ratchet-wheel, a shaft common to said ratchet-wheel and pulley, a return-spring secured to said common shaft adapted to actuate the pulley, said pulley having stop-pins, and a shaft-hanger adapted to contact with said stop-pins on said pulley alternately for regulating and limiting the motion of the said pulley, a switch-lever, and a crank-pin on the ratchet-wheel, and a link connecting said lever to the crank-pin; substantially as described.

4. In an electrical switch, the combination of a pulley having a cord, band or chain attached thereto, a ratchet-wheel adjacent to the pulley, a push-pawl on the pulley engaging the ratchet-wheel, a shaft common to said ratchet-wheel and pulley, a return-spring on said common shaft adapted to actuate the said pulley, and a shaft-hanger, a segmental arm formed integral and homogeneous with said hanger disposed with relation to said pulley so as to form a guard for said pendant, and a switch-lever having a driving-lever, C<sup>2</sup>, connected therewith, a crank-pin on the ratchet-wheel, and a link, N, connecting said driving-lever to said crank-pin; substantially as described.

5. In an electrical switch, the combination with a switch-lever thereof, of a bolt adapted to form a hinge-joint upon which the said lever swings, a cam-washer having a radial-



5 faced recess disposed upon the said bolt, and  
a wedge secured at one end to the said lever,  
having its free end interposed between the  
head of said bolt and the said cam-washer,  
whereby upon moving the said switch-lever  
into an operative position said wedge will  
tighten said hinge-joint, and upon moving  
said lever into an inoperative position so as  
to open the circuit of the said switch, said  
10 wedge will be moved so as to loosen said  
hinge-joint; substantially as described.

15 6. In a mechanically-operated electrical  
switch, the combination of a switch-lever, a  
motor, connecting devices between said mo-  
tor and switch-lever, whereby said motor is  
adapted to open and close the switch by suc-  
cessive movements of the motor, a means  
adapted to retain the said switch in an open  
or closed position when it shall have been op-  
20 erated by the said motor and a means pro-  
vided at the joint of the said lever, adapted  
to increase the conductivity of the said joint  
when the switch is closed, and to give free-  
dom of motion to the said lever at the said  
25 joint when the switch is opened; substan-  
tially as described.

7. In a mechanically-operated electrical  
switch, the combination of a motor being

adapted to actuate the said switch, means  
between the motor and the switch for retain- 30  
ing the said switch in an open or closed posi-  
tion, a reactive spring for returning the mo-  
tor to its normal position, a hanger for the  
motor having a guard, P, depending there-  
from and a pendant for the motor, together 35  
with means for limiting and controlling the  
motion of the said motor; substantially as  
described.

8. In a mechanically-operated electrical  
switch, the combination of a driving mechan- 40  
ism consisting of ratchet-wheel F having  
ratchet-teeth F', a pulley D, having therein a  
groove D', a pawl D<sup>2</sup> carried by the said pul-  
ley, a shaft G and a shaft-hanger H adapted  
to carry the shaft G, a guard P secured to the 45  
shaft-hanger H, a crank-pin J, a link N and  
a driving-lever C<sup>2</sup>; substantially as described.

Signed at the city of New York, in the  
county of New York and State of New York,  
this 17th day of August, A. D. 1900.

JOHN D. CLAY.

FREDRICK A. LA ROCHE.

Witnesses:

LEWIS L. PIERCE,

JOHN J. ROONEY.