

No. 767,052.

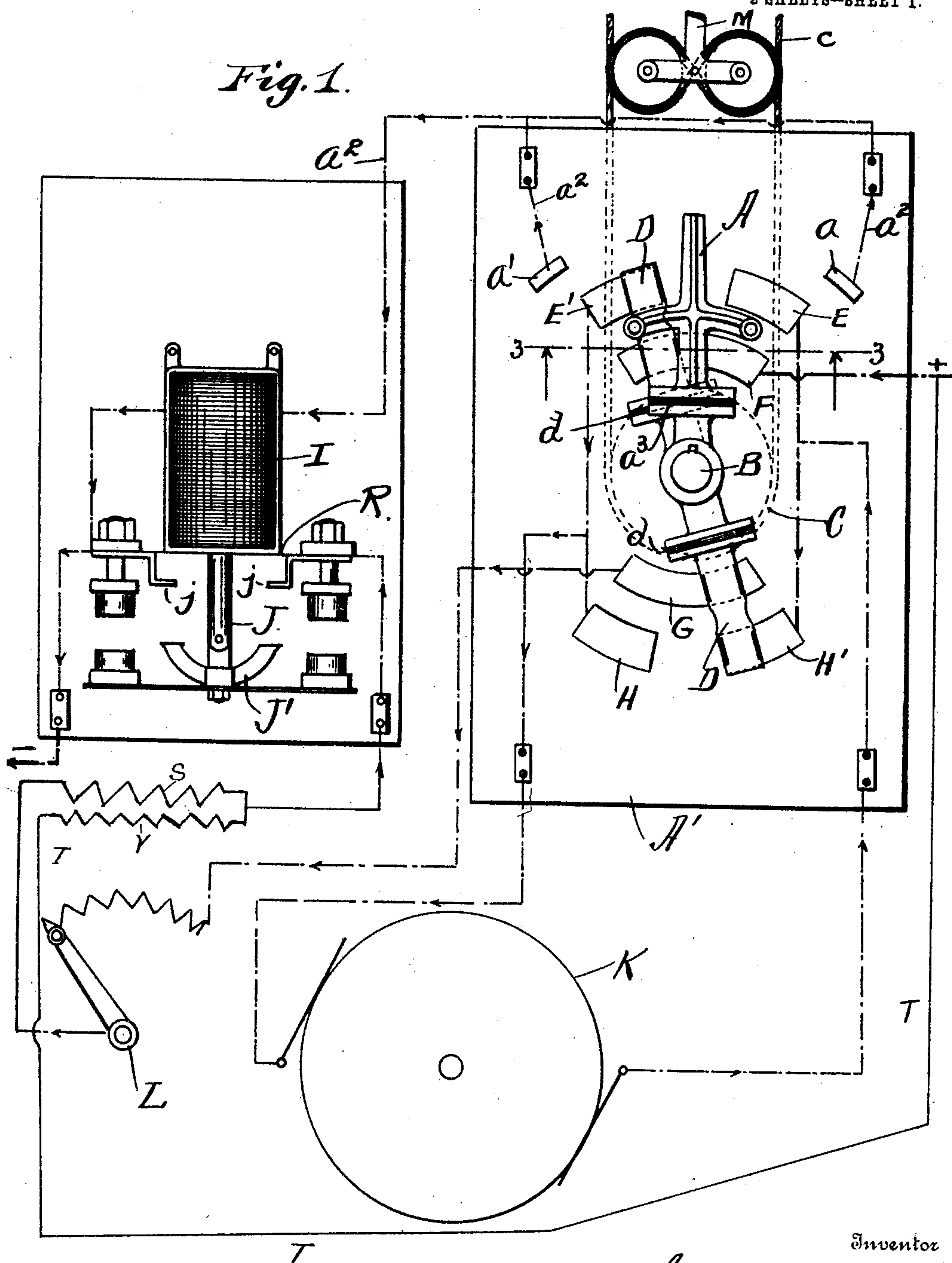
PATENTED AUG. 9, 1904.

A. E. HANDY.
ELECTRIC SWITCH.

APPLICATION FILED AUG. 29, 1903.

NO MODEL.

2 SHEETS--SHEET 1.



Witnesses

S. Gabriel
E. D. Ogden.

Inventor

Arthur E. Handy.

இது

Howard E. Barlow.
Attorney

No. 767,052.

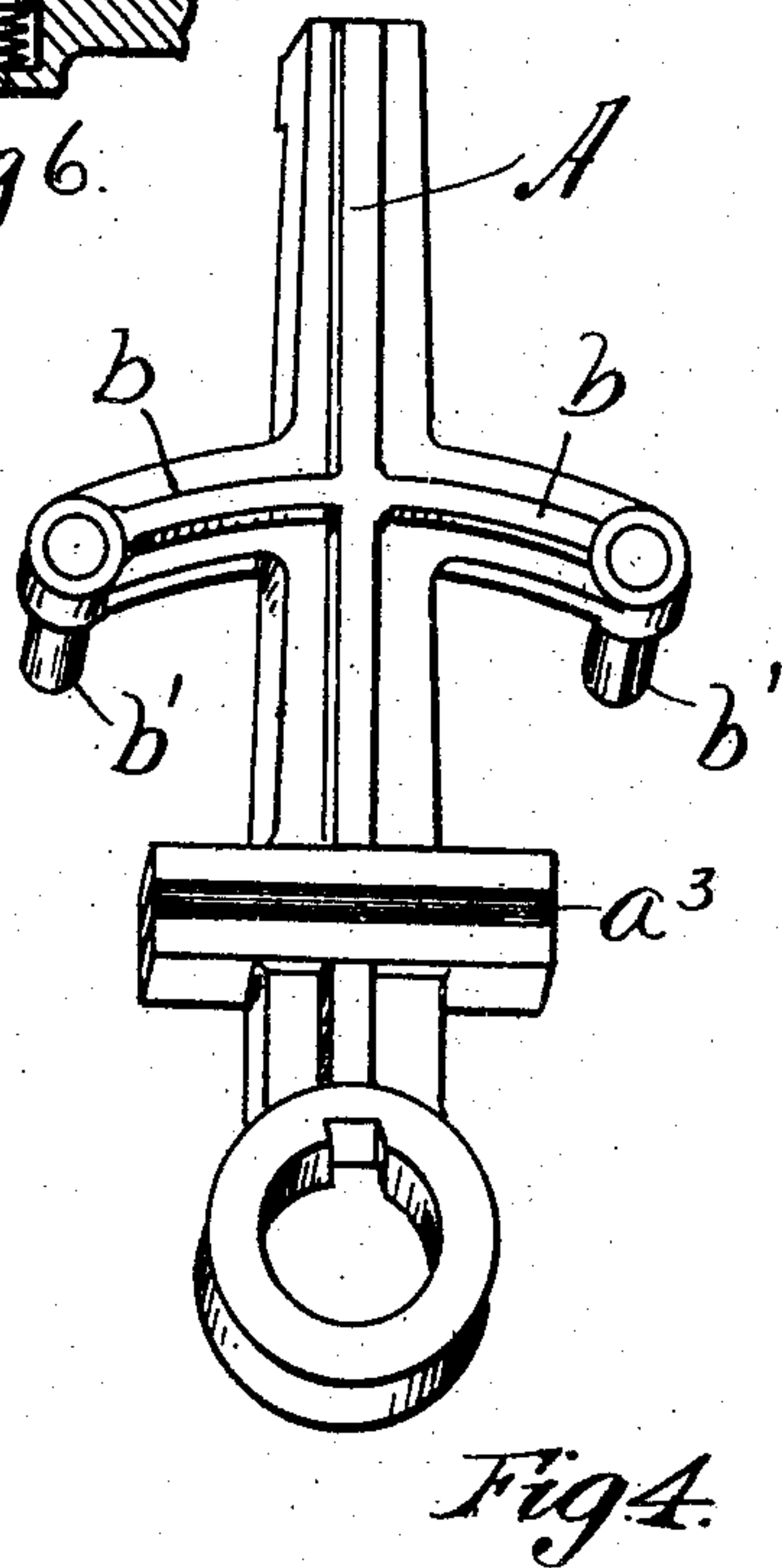
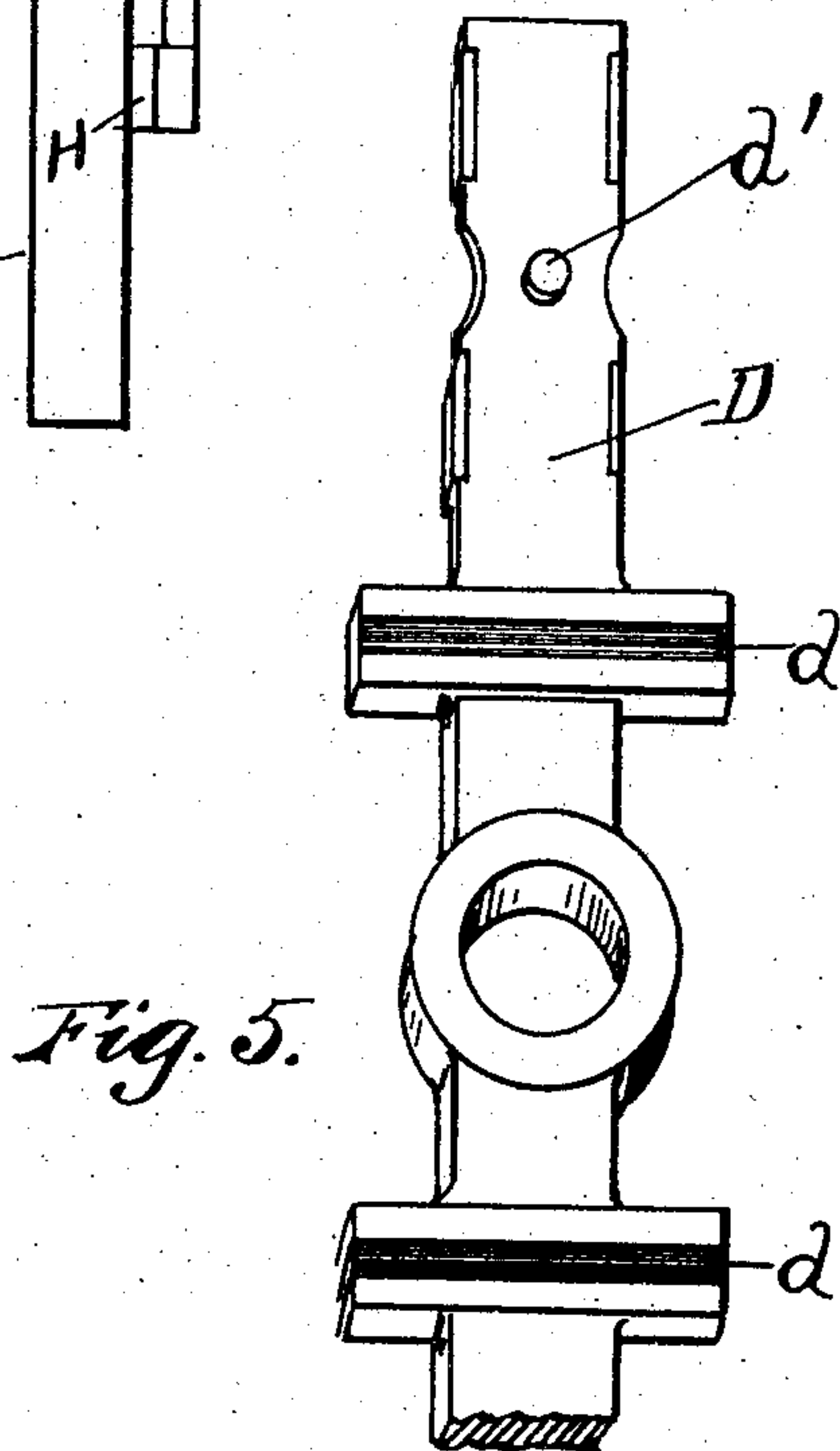
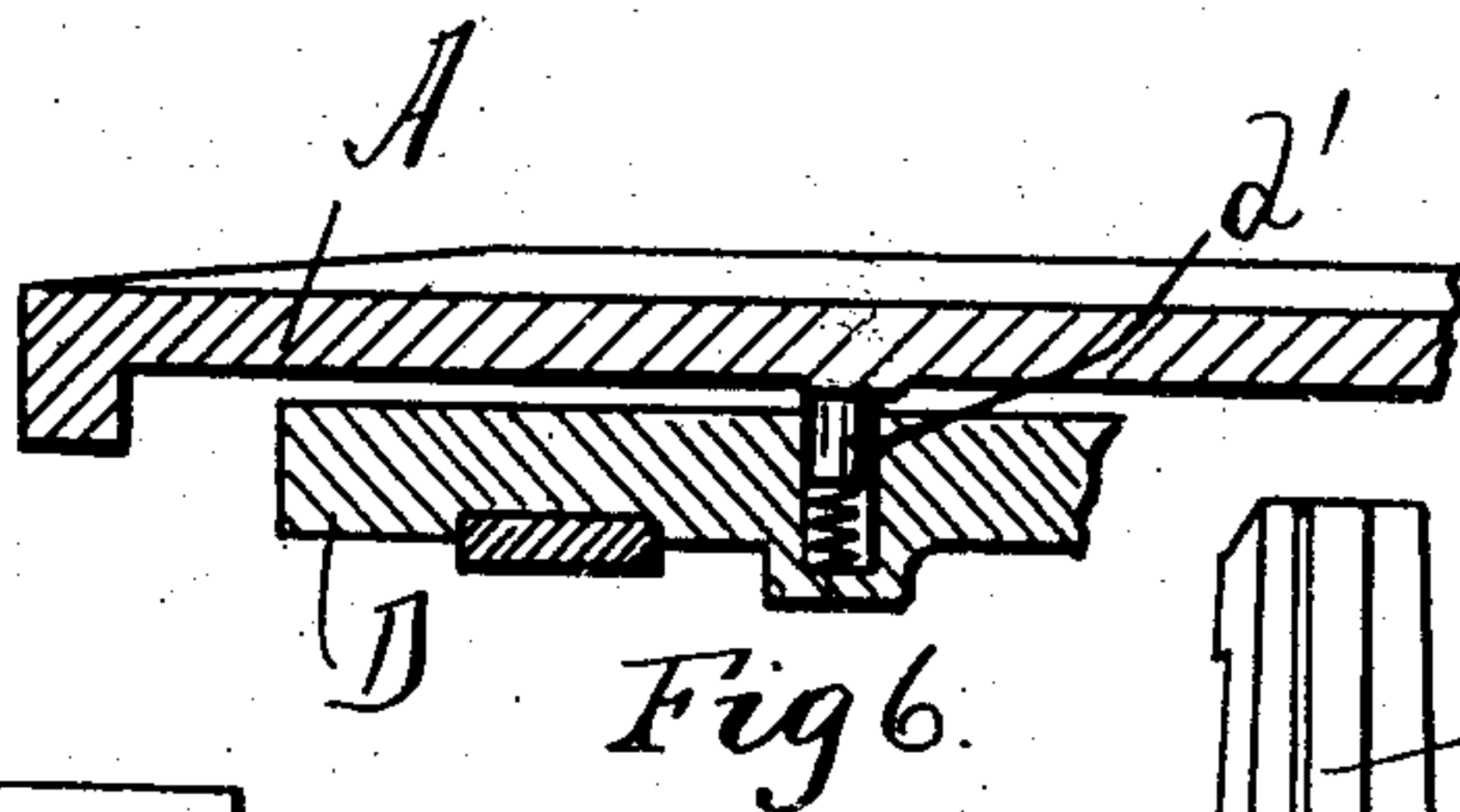
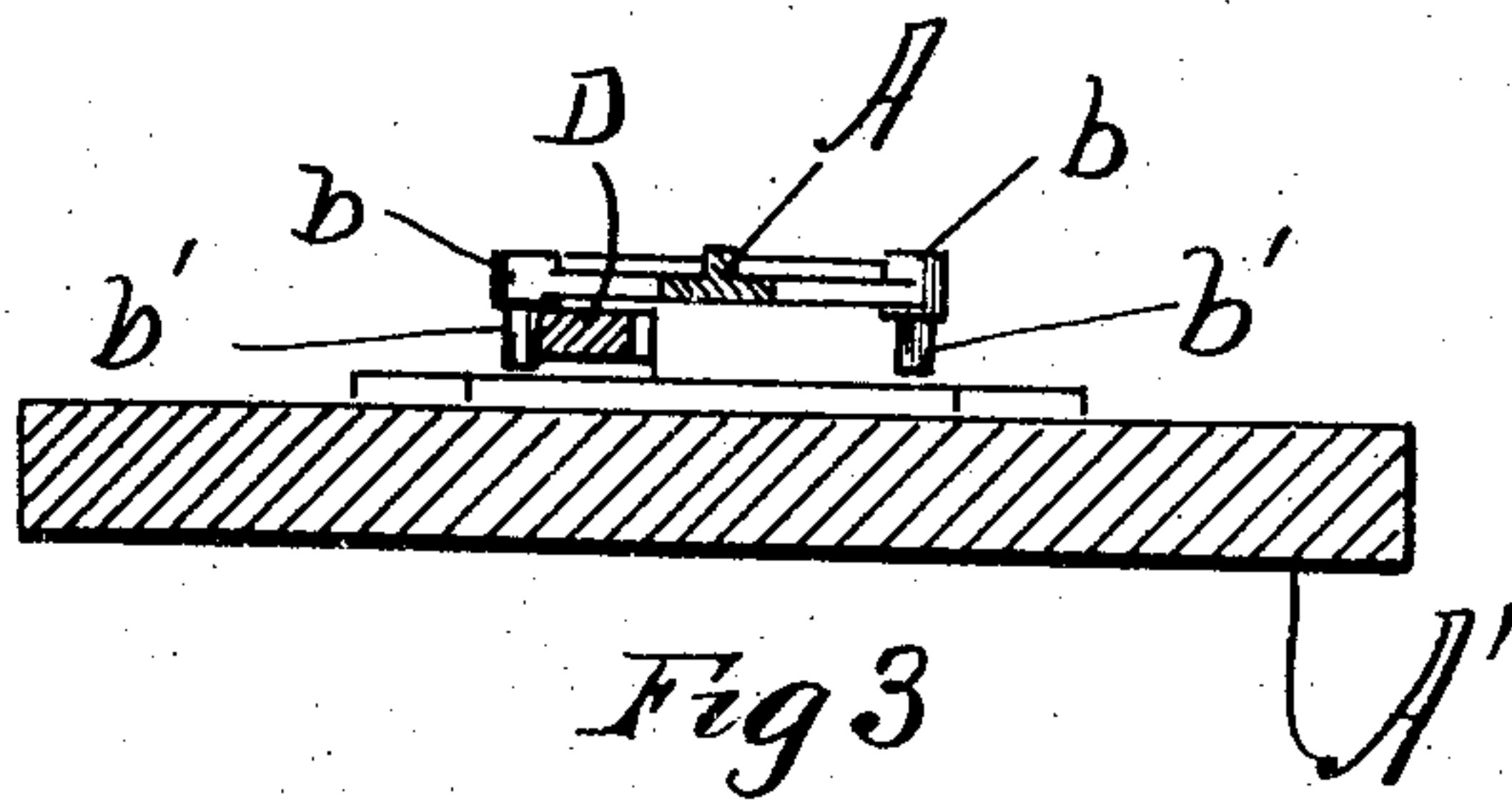
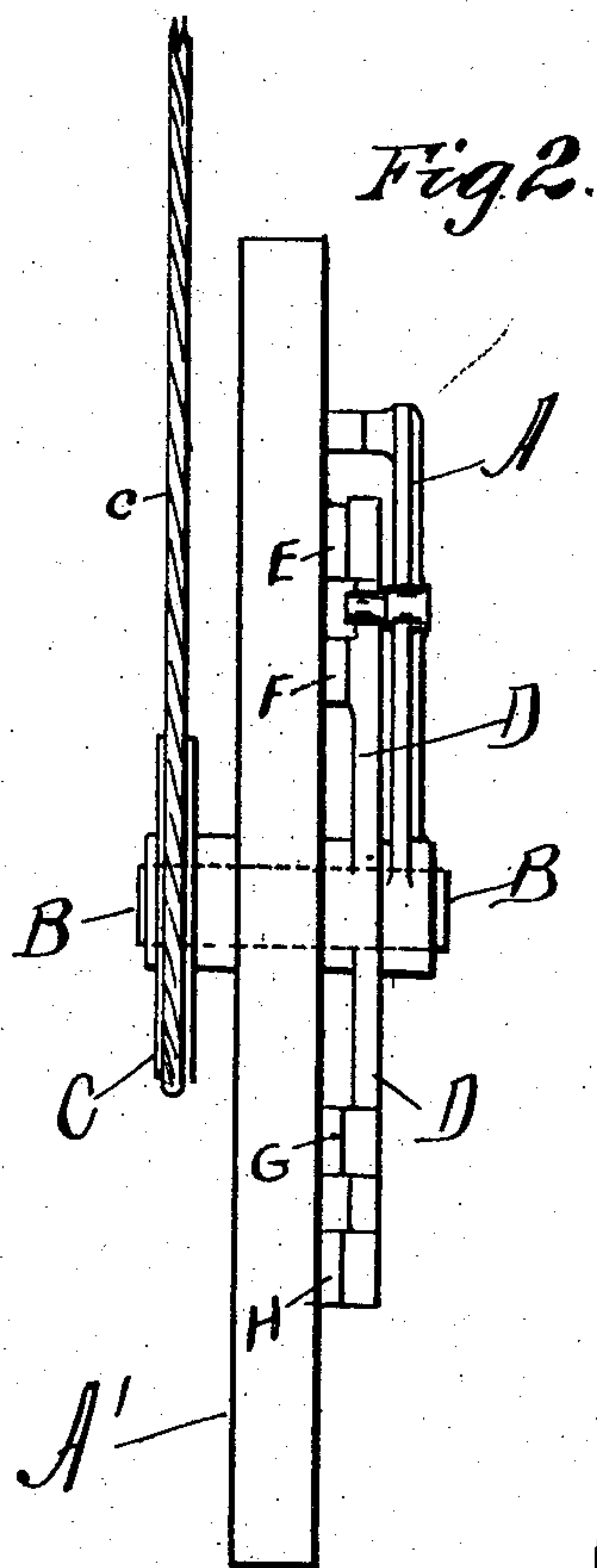
PATENTED AUG. 9, 1904.

A. E. HANDY.
ELECTRIC SWITCH.

APPLICATION FILED AUG. 29, 1903.

NO MODEL.

2 SHEETS—SHEET 2.



Witnesses

S. Gabriel
E. J. Ogden

By

Inventor
Arthur E. Handy.
Attorney
Howard E. Barlow

UNITED STATES PATENT OFFICE.

ARTHUR E. HANDY, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO THE RHODE ISLAND ELEVATOR AND MACHINE COMPANY, OF PROVIDENCE, RHODE ISLAND, A CORPORATION OF RHODE ISLAND.

ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 767,052, dated August 9, 1904.

Application filed August 29, 1903. Serial No. 171,261. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR E. HANDY, a resident of the city of Providence, in the county of Providence and State of Rhode Island, have
5 invented certain new and useful Improvements in Electric Switches; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of
10 reference marked thereon, which form a part of this specification.

This invention relates to electric switches, and has for its object the construction of a compound controlling-switch for use on high-
15 tension currents to effectually eliminate arcing on the contacts when making and breaking the connections and prevent shocks to the armature by induced currents which may be set up by continually making and breaking a
20 current of high electromotive force.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in claims.

25 A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

30 Figure 1 is a diagrammatic view illustrating my compound switch and means for operating it. Fig. 2 is a side elevation of the compound switch, showing means of operating the contact-arms through the center shaft.
35 Fig. 3 is an end view of the contact-arms sectioned on line 3 3 of Fig. 1 looking in the direction of the arrows. Fig. 4 is a perspective view of the controlling-arm. Fig. 5 is a perspective view of a portion of the reversing-
40 switch arm. Fig. 6 is a longitudinal sectional view of the two arms, showing the contact-pin which connects them together electrically.

Referring to the drawings, at A' is the slate
45 or board on which is mounted the two arm-controlling switches and their respective contacts, of which D is the reversing-switch arm mounted to turn loosely on the center shaft

B. The center portion of this switch is insulated at $d d$ from the end sections. A spring-
50 actuated contact-pin d' (best illustrated in Fig. 6) is set into this arm D and is for the purpose of making a continuous electrical connection between it and controlling-switch arm A. This controlling-switch arm is best illustrated
55 in Fig. 4 and is mounted on and keyed to the center shaft B, through which it may be operated from the elevator-car (not shown) by means of the rope c and pulley C. The outer
60 portion of this arm is also insulated at a^3 from the center portion. Extending outward from each side of the insulated outer portion of the controlling-arm are side arms $b b$, fixed near
65 the ends of which arms are downwardly-extending pins $b' b'$, which pins engage and move the reversing-switch arm D through the movement of lever A when it is desired to reverse the direction of the motor.

E, E', F, G, H, and H' are contact-plates, the engagement of which by the arm D deter-
70 mines the running direction of the motor. The contact-plates a and a' are for the purpose of receiving the electrical current through the controlling-arm A when the latter is at
75 its extreme throw in either direction, the current then being transmitted through the wires a^2 to the solenoid I, and the contact-bar J' is drawn up, completing the circuit through the
80 contact $j j$, the motor K is energized, and the elevator started in the desired direction. The main current comes to the controlling-switch on the wire marked + and follows the
85 course designated by the arrow-heads through the switch-arm D, motor K, rheostat L, main switch R, and out at the point marked —.

To control the movement of the elevator-car, the lever A is moved in the manner described above by the rope c and connections to the car from the running or extreme side position to the stopped or central position
90 without opening the armature-circuit. This is accomplished by my particular method of wiring, which is more particularly described as follows: Instead of going from the rheostat L directly through the main switch R the
95 current is sent through the series winding of

the motor (represented at S) and then to the main switch. The current also comes through the wire T from the positive side of the line through the shunt-winding V of the motor and then to the same terminal on switch. By this arrangement of connections when the main switch is open we still have a continuous circuit from the positive to the negative brush of armature on the motor through loop made by the series and shunt windings. The current is only interrupted by the opening of main switch, the armature-circuit not being opened until arm D is drawn from its contact-points, which latter is only done when the reversing of the direction of rotation of the motor is desired. When the arm A is thrown over to starting position, it completes the circuit to the main-switch solenoid I, which solenoid is energized and the circuit to the motor is completed in the manner described above.

The operation of my device is further explained as follows: In the ordinary switch where one arm alone is used to make and break the circuit in a high-tension current to the armature arcing is caused on the contacts, which contacts in a short time become destroyed and shocks are produced on said armature by the induced currents, as is well known by those skilled in the art; but by my arrangement of the double-arm switch these objectionable features are obviated.

My invention may be attached to any electric elevator and operated by any of the well-known controlling devices. In Figs. 1 and 2 I show one way of connecting to and operating an electric elevator by the ordinary controller-rope *c*, which engages a pulley C, (see Fig. 2,) which is mounted on the switch-shaft B. My device is so constructed that a slight movement of the car-lever will operate the controlling-switch arm A and throw it from one extreme to the other, which would be from the up to the down position. For illustration the car-lever, the lower end of which is shown at M in Fig. 1, is now supposed to be in the center or stopped position to correspond with the position of the parts as shown in Fig. 1 in the drawings, and by throwing said lever to the right, which would be the up position, the controlling-arm A will be thrown over a corresponding distance onto the contact-plate *a*, carrying with it the reversing-switch arm D, by the engagement of pin *b'* with said arm. Just before the controlling-arm reaches the contact-plate *a* this reversing-switch arm D will have made its complete contact on the four plates E, F, G, and H, in which position it will safely transmit the high-tension current about to pass through it. As soon as the circuit is completed by the engagement of the controlling-arm with the contact-plate *a* the current travels through the wires *a'* to the main-switch solenoid I, which solenoid is thus energized to draw up the arm J and in turn complete the circuit through this main switch

and the rheostat L to the motor-armature K. To stop the car, (not shown,) the operator carries the car-lever back to the central position, which carries the controlling-lever to a corresponding central position without moving the reversing-switch D. Should the operator desire to continue upward, the controlling-arm A is again caused to move to the right and complete the circuit without moving the reversing-switch arm D. When it is desired that the motor should be reversed and the elevator descend, the lever is moved to the extreme left, carrying the controlling-arm to the contact-plate *a'* on the opposite side of the board. When this arm A reaches the central position in its movement toward the opposite side, it engages the reversing-arm D and carries that, as above explained, to make the complete contact before the controlling-lever completes the circuit to reverse the motor.

By the above description it is obvious that this double-arm-contact arrangement allows the controller to be brought back to the normal or central position without opening the armature-circuit, also on account of the small movement and the ease in which these arms can be moved makes it practical to use the lever-control in the elevator-car.

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

1. In a compound electric switch, the combination of a reversing-arm, a controlling-arm, an electrical contact or connection between said arms, means whereby said controlling-arm may be moved to stop and start the car while said reversing-arm remains at rest, means for engaging and moving said reversing-arm to make the connection with its contact-pieces in advance of that made by said controlling-arm only when it is desired to reverse the motor.

2. In a compound electric switch the combination of a reversing-arm, said arm being moved only when it is desired to reverse the running direction of the motor, a controlling-arm, both of said arms being pivoted on the same center, means whereby said controlling-arm may be operated from the car to stop and start the same without engaging or moving the reversing-arm and means on said controlling-arm for engaging and moving said reversing-arm to its contact-pieces in advance of that made by said controlling-arm only when it is desired to reverse the motor.

3. In a compound electric switch the combination of a reversing-arm, a controlling-arm, an electrical connection between said arms, means whereby said controlling-arm may be operated from the car to stop and start the same without engaging or moving said reversing-arm, means on said controlling-arm for engaging and moving said reversing-arm to its full connection with its contact-pieces in advance of the contact made by said control-

ling-arm when it is desired to reverse the motor.

4. In a compound electric switch, the combination of a reversing-arm, said arm remaining at rest except when it is desired to reverse the motor, a controlling-arm, an electrical contact or connection between said reversing and said controlling arms, means whereby said controlling-arm may be operated from the car to stop and start the same without engaging or moving said reversing-arm, extensions on said controlling-arm to engage said reversing-arm and carry it to its contact position before said controlling-arm shall make the necessary connection to allow the current to pass through said reversing-arm to the motor.

5. In a compound electric switch, the combination of a reversing-arm, said arm remaining at rest except when it is desired to reverse the motor, a controlling-arm, both of said arms being pivoted from the same center, an electrical contact or connection between said reversing and said controlling arms, extensions on said controlling-arm to engage said reversing-arm and carry it to its contact position before said controlling-arm shall make the necessary connection to allow the current to pass through said reversing-arm to the motor.

6. In a compound electric switch, a main-switch arm pivotally hung and insulated from its two contact ends, a controlling-arm fixed to and insulated from a center shaft through which shaft said arm is operated, an electrical connection between said reversing and said controlling arms, means for engaging said arm to carry it to its contact position before said controlling-arm shall make the necessary connection to allow the current to pass through said reversing-arm to the motor.

7. In a compound electric switch, a switch-board, contacts on said board, an operating-shaft extending through said board, a reversing-switch arm, a controlling-switch arm fixed to said shaft, a sliding electrical contact between said reversing and said controlling arms, means for causing said reversing-arm to make its full connection to its contact-pieces in advance of the contact made by said controlling-arm, means for moving said reversing-

switch arm from its contacts only when it is desired to reverse the motor.

8. In a compound electric switch, a reversing-switch arm pivoted at its middle portion, a controlling-arm pivoted at one end, an arm extending out from each side of said controlling-arm, pins in said side arms, said pins arranged to engage said main arm and carry it to its contact position before said controlling-arm shall make the necessary connection to allow the current to pass through said reversing-arm to the motor, substantially as described.

9. In a compound electric switch, a reversing-switch arm pivoted at its middle portion, said middle portion being insulated from its two contact ends, a controlling-arm fixed at one end to and insulated from a center shaft through which shaft, said arm is operated, an electrical connection between said reversing and said controlling arms, an arm extending out from each side of said controlling-arm, pins in said side arms, said pins arranged to engage said reversing-arm and carry it to its contact position before said controlling-arm shall make the necessary connection to allow the current to pass through said reversing-arm to the motor, substantially as described.

10. In a compound electric switch, a switch-board, contacts on said board, an operating-shaft extending through said board, a reversing-switch arm pivoted at its middle portion to said shaft, a controlling-switch arm fixed at one end to said shaft, both of said arms being insulated from said shaft, a sliding electrical contact between said reversing and said controlling arms, means for causing said reversing-arm to make its full connection to its contact-pieces in advance of the contact made by said controlling-arm, means for moving said reversing-switch arm from its contacts only when it is desired to reverse the motor, substantially as described.

In testimony whereof I have hereunto set my hand this 27th day of August, A. D. 1903.

ARTHUR E. HANDY.

In presence of—

HOWARD E. BARLOW,
FRANK A. FOSTER.