

(No Model.)

G. W. RUSSELL, Jr. & A. V. OFFICER.
AUTOMATIC ELECTRIC SWITCH.

No. 547,230.

Patented Oct. 1, 1895.

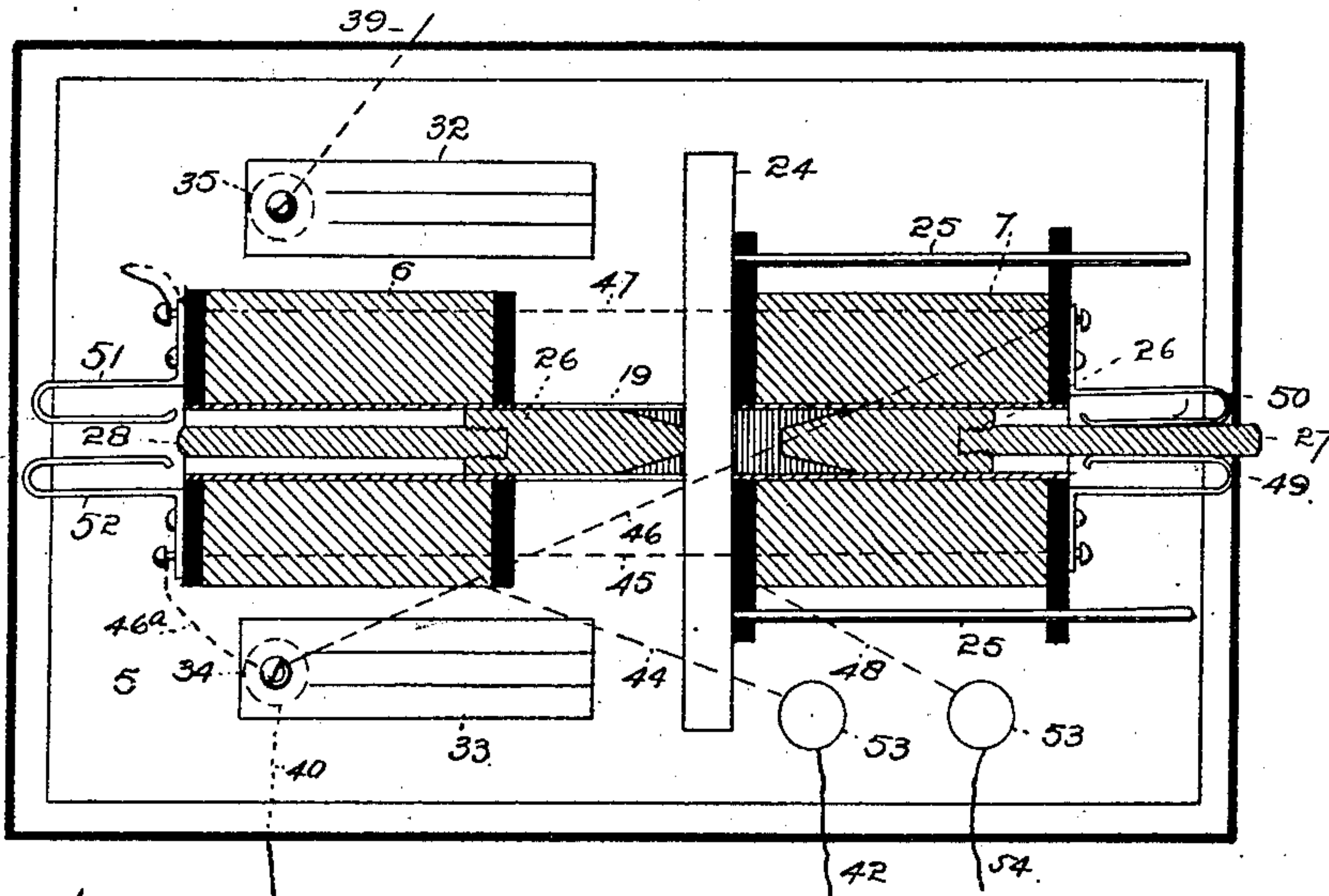


FIG. 1

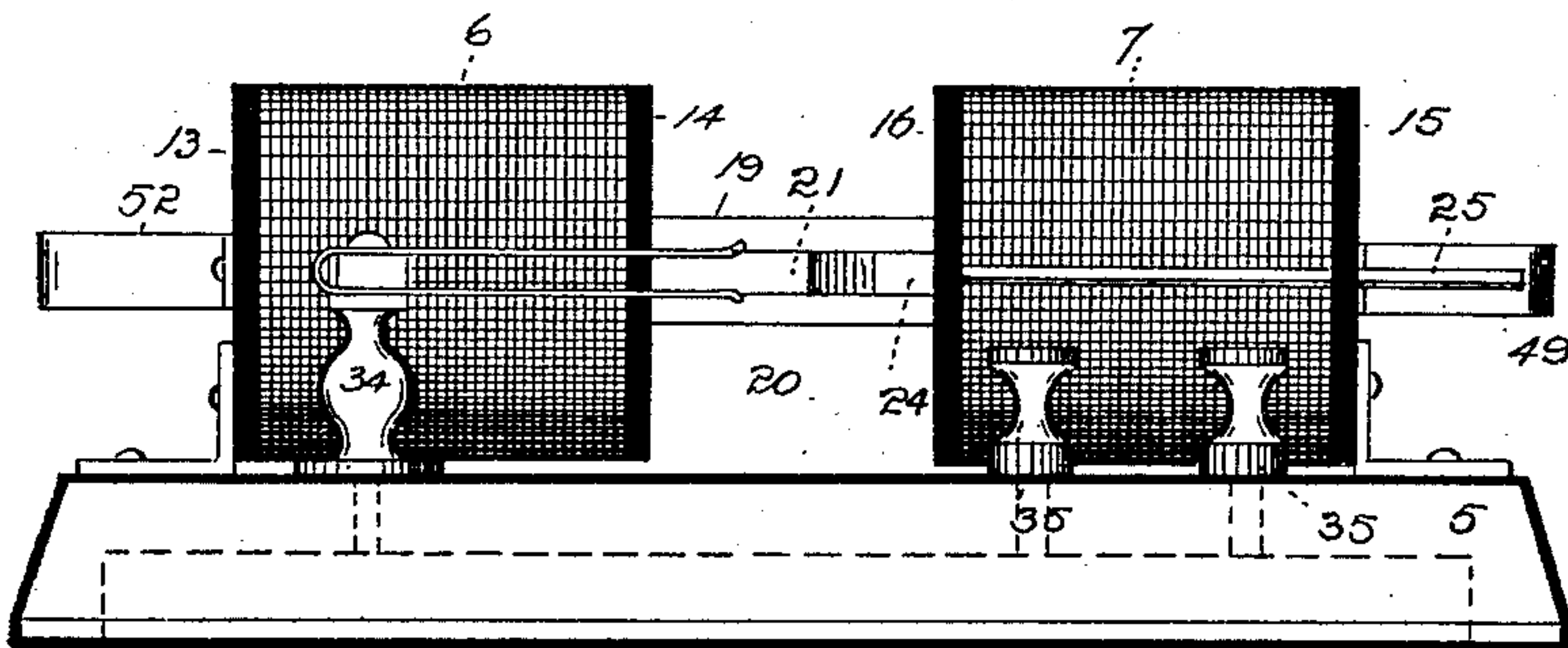


FIG. 2

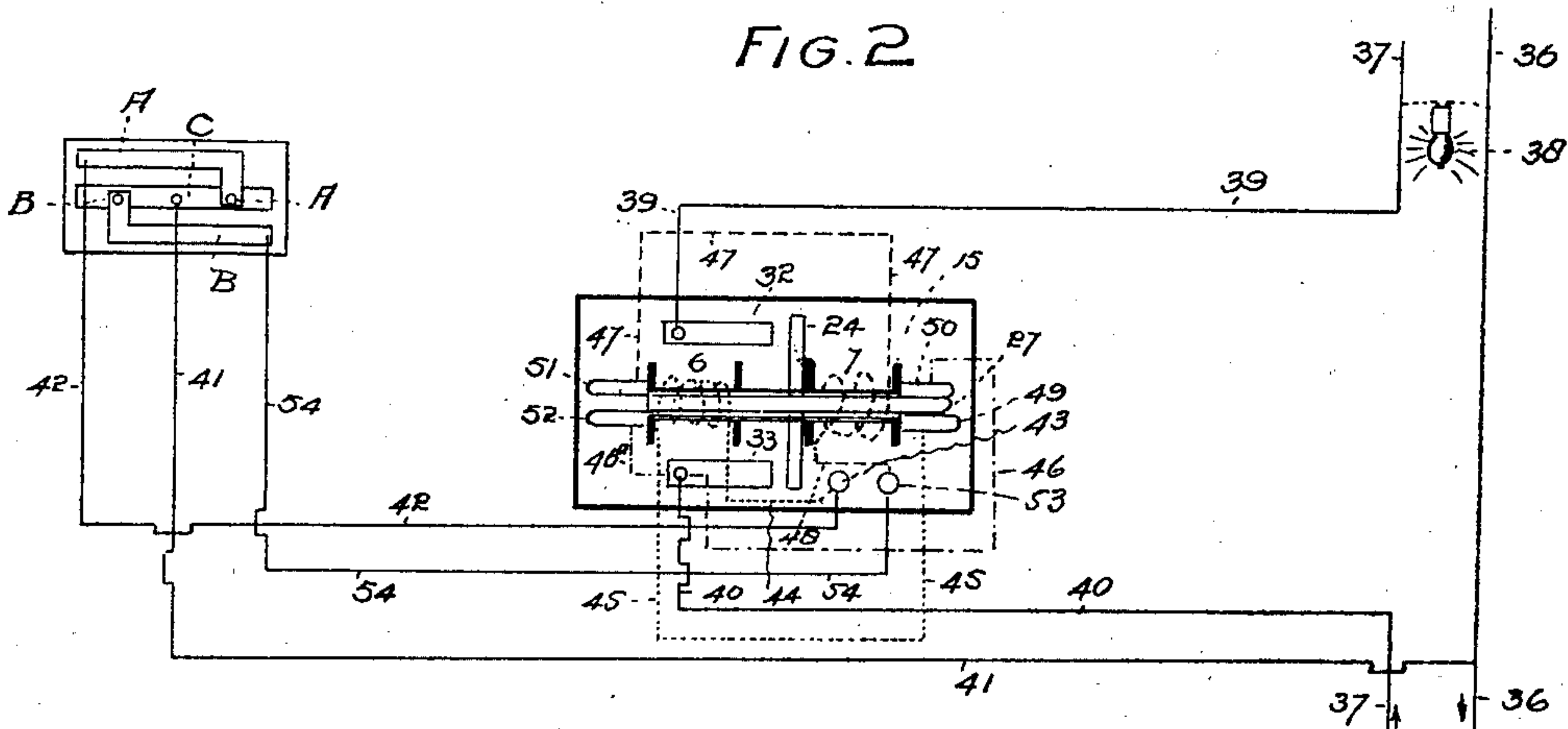


FIG. 3

WITNESSES:
G. J. O'Connell
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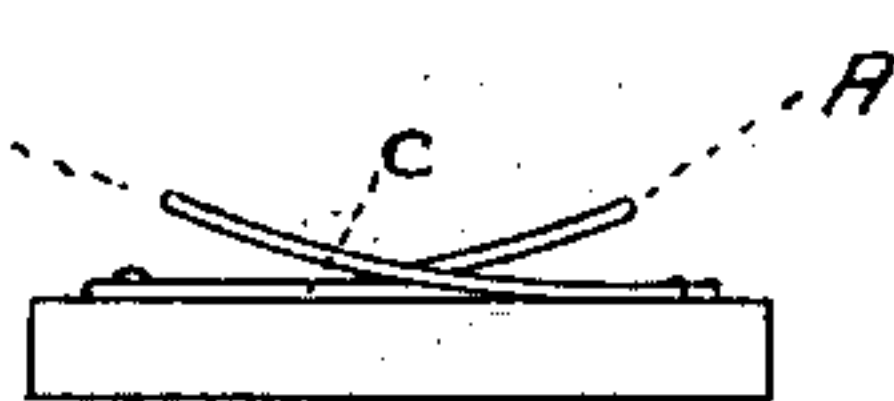


FIG. 4

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AUTOMATIC ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 547,230, dated October 1, 1895.

Application filed March 18, 1895. Serial No. 542,248. (No model.)

To all whom it may concern:

Be it known that we, GEORGE WILLIAM RUSSELL, Jr., and ALEXANDER V. OFFICER, citizens of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Automatic Electric Switches; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Our invention relates to improvements in automatic electric switches, and our object is to still further improve the construction set forth in Letters Patent No. 483,123, and bearing date September 20, 1892.

The distinguishing feature of our present invention consists in cutting the solenoids out of the circuit after they have been momentarily energized. This is accomplished by arranging a pair of auxiliary brushes at the outer extremity of each solenoid, the reciprocating bar being so constructed that it is adapted to pass between said brushes and close the circuit of the opposite solenoid—that is to say, the circuit of each solenoid is closed through the auxiliary brushes located at the outer extremity of the opposite solenoid when the reciprocating bar is between said brushes. The reciprocating bar is slotted to receive a cross-head which passes there-through. The main circuit is completed through the medium of this cross-head, which is forced by the reciprocating bar between double brushes arranged in suitable proximity to the solenoids.

The invention will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a top or plan view of the device, partly in section. Fig. 2 is a side elevation thereof. Fig. 3 is a diagrammatic view illustrating the circuit. Fig. 4 is a side view in detail of the push-button mechanism.

Similar reference characters indicating corresponding parts in these views, let the numeral 5 designate an insulating-base, upon which are mounted the solenoids 6 and 7. The solenoids are provided with insulating end plates 13 14 and 15 16, respectively. The outer end plates are secured to the base in any suitable manner. Through the hollow of the solenoids passes the non-magnetic tube 19, preferably composed of brass. This tube forms the connection between the solenoids, which are separated by a space 20. The portion of the tube which passes through this space is slotted, as shown at 21. Through the slotted portion of this tube passes a cross-head 24, composed of some good conducting material, as copper. To this cross-head are attached two guide-rods 25, slidingly mounted in apertured lugs formed on the end plates 15 and 16. This cross-head also passes through a central slot formed in a bar 26, composed of magnetic material, preferably soft iron. To the extremities of the bar 26 are respectively attached projections 27 and 28, composed of conducting material, preferably copper. To the end plates 13 and 15 of the solenoids are attached the auxiliary brushes 49 50 and 51 52, respectively, so located that the projections 27 and 28 alternately engage both auxiliary brushes of each pair as the magnetic bar reciprocates.

On the opposite sides of the solenoids 6 are supported double brushes 32 and 33, composed of some good conducting material, preferably copper. These brushes are adapted to engage the cross-head as it is actuated in one direction by the magnetic bar. The brushes 32 and 33 are supported upon metal lugs 34 and 35, respectively, attached to the insulating-base in any suitable manner.

Let the numerals 36 and 37 designate the wires of the main circuit, in which the lamp 38 is located. The switch mechanism is interposed in the branch 37 of the circuit. From this wire 37 leads a wire 39 to the brush 32. From the brush 33 leads a wire 40 to the main wire 37. Hence when the cross-head 24 engages the brushes 32 and 33 the circuit is closed through the switch mechanism and

the lamp is lighted. This cross-head is shifted for the purpose of making and breaking the circuit through the instrumentality of the solenoids 6 and 7, push-buttons A B, and a
 5 conducting-bar C, located beneath the push-buttons, but normally detached from both. From the circuit-wire 36 leads a wire 41 to the bar C. From the push-button A leads a wire 42 to the binding-post 43. From this
 10 binding-post leads a wire 44 to the coils of the solenoid 6, from which leads a wire 45 to the auxiliary brush 49, attached to the insulating-plate 15 of the opposite solenoid. From the auxiliary brush 50 leads a wire 46 to the
 15 brush 33, from which leads a wire 46^a to the auxiliary brush 52, attached to the plate 13 of the solenoid 6. From the auxiliary brush 51 leads a conductor 47 to the coils of the solenoid 7, while from the opposite terminal of
 20 these coils leads a conductor 48 to the binding-post 53, from which leads a conductor 54 to the push-button B.

The operation of the switch is as follows, assuming that the magnetic bar 26 and its attachments 27 28, together with the cross-head
 25 24, are in the position shown in Figs. 1 and 3, the lamp-circuit being broken: Now, if the push-button A is pressed to engagement with the bar C, the electric current may be said to
 30 pass from the wire 36 through the conductor 41 to the part C, thence to the push-button A, thence *via* the wire 42 to binding-post 43, thence *via* the wire 44 to the coils of the solenoid 6, thence *via* the wire 45 to the auxiliary
 35 brush 49, thence *via* the projection 27 to the auxiliary brush 50, thence *via* the wire 46 to the lug 34, supporting the main brush 33, and thence *via* a conductor 40 to the main wire 37, completing the circuit. As the current passes through the coils of the solenoid
 40 6, the magnetic bar 26 will move toward the left, (referring to the figures of the drawings,) disengaging the projection 27 from the auxiliary brushes 49 and 50 and forcing the cross-head 24 to engagement with the main brushes
 45 32 and 33, thus completing the lamp-circuit and simultaneously cutting the coils of the solenoid 6 out of the circuit. The projection 28 is at the same time brought between and
 50 to engagement with the auxiliary brushes 51 and 52. When it is desired to extinguish the lamp 38, the push-button B is pressed. In this case the current may be said to pass from wire 36 through the following circuit elements—namely, the wire 41, the bar C, the
 55 push-button B, the wire 54, the binding-post 53, the wire 48, the coils of the solenoid 7, the wire 47, the auxiliary brush 51, the projection 28, the auxiliary brush 52, the wire 46^a, the lug 34 or the brush 33, and the wire 40 to the main wire 37. Hence when the current takes this
 60 path, the solenoid 7 will again shift the magnetic bar 26, disengage the cross-head 24 from the brushes 32 and 33, break the lamp-circuit, and thrust the projection 27 between and to

engagement with the auxiliary brushes 49 and 50.

Though the position of the auxiliary brushes, as shown in the drawings, is believed preferable, we are aware that they may be
 70 otherwise arranged or fashioned without departing from the spirit of the invention. Hence we do not limit the invention to the construction and arrangement shown. The function of these auxiliary brushes and the
 75 parts co-operating therewith is to cut the solenoids out of the circuit after momentary energization, whereby the liability to accident by burning out the coils is reduced to a minimum.
 80

By slotting the reciprocating bar, whereby the cross-head is loose therein, the bar acts as a hammer on the cross-head and has more power than if the cross-head were fitted
 85 tightly in the bar. Since the bar moves a short distance before it engages the cross-head, it strikes the latter with considerable momentum or impetus; hence the result heretofore stated.

Having thus described our invention, what
 90 we claim is—

1. The combination with the main circuit of a pair of solenoids, a reciprocating bar supported therein, a cross-head adapted to be actuated by said bar, brushes located on each
 95 side of the reciprocating bar and forming a part of the main circuit, said brushes being arranged in the path of the cross-head which bridges the space between them, and through which the main circuit is completed, auxiliary
 100 brushes arranged at the solenoid extremities through which the solenoid circuits are completed, projections applied to the reciprocating bar and adapted to engage the auxiliary brushes, and suitable means as push buttons
 105 for closing the solenoid circuits, substantially as described.

2. The combination with the main circuit in which the translating devices are placed of a pair of solenoids, a reciprocating bar supported therein, branch circuits in which the solenoids lie, auxiliary brushes arranged at the solenoid extremities and lying in the path
 110 of the projections on the reciprocating bar, a cross-head passing through a slot formed in the reciprocating bar, brushes located on each side of the reciprocating bar and lying in the path of said cross-head which bridges the space between the brushes, and suitable means
 115 for alternately and momentarily closing the solenoid circuits, substantially as described.
 120

3. The combination with the main circuit in which the translating devices are placed, of a pair of solenoids, a reciprocating bar supported therein, a brush located on each side
 125 of the reciprocating bar said brushes forming parts of the main circuit, a cross-head attached to the reciprocating bar and adapted to bridge the space between the two brushes, branch circuits in which the solenoids lie, suitable
 130

means as push buttons whereby the current
is alternately passed through the solenoids
and the main circuit closed or broken and
auxiliary brushes adapted to engage the re-
5 ciproating bar for automatically cutting the
solenoids out of the circuit after momentary
energization, substantially as described.

In testimony whereof we affix our signa-
tures in the presence of two witnesses.

GEORGE WM. RUSSELL, Jr.
ALEXANDER V. OFFICER.

Witnesses:

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FREDERICK ROBBINS.