

No. 621,739.

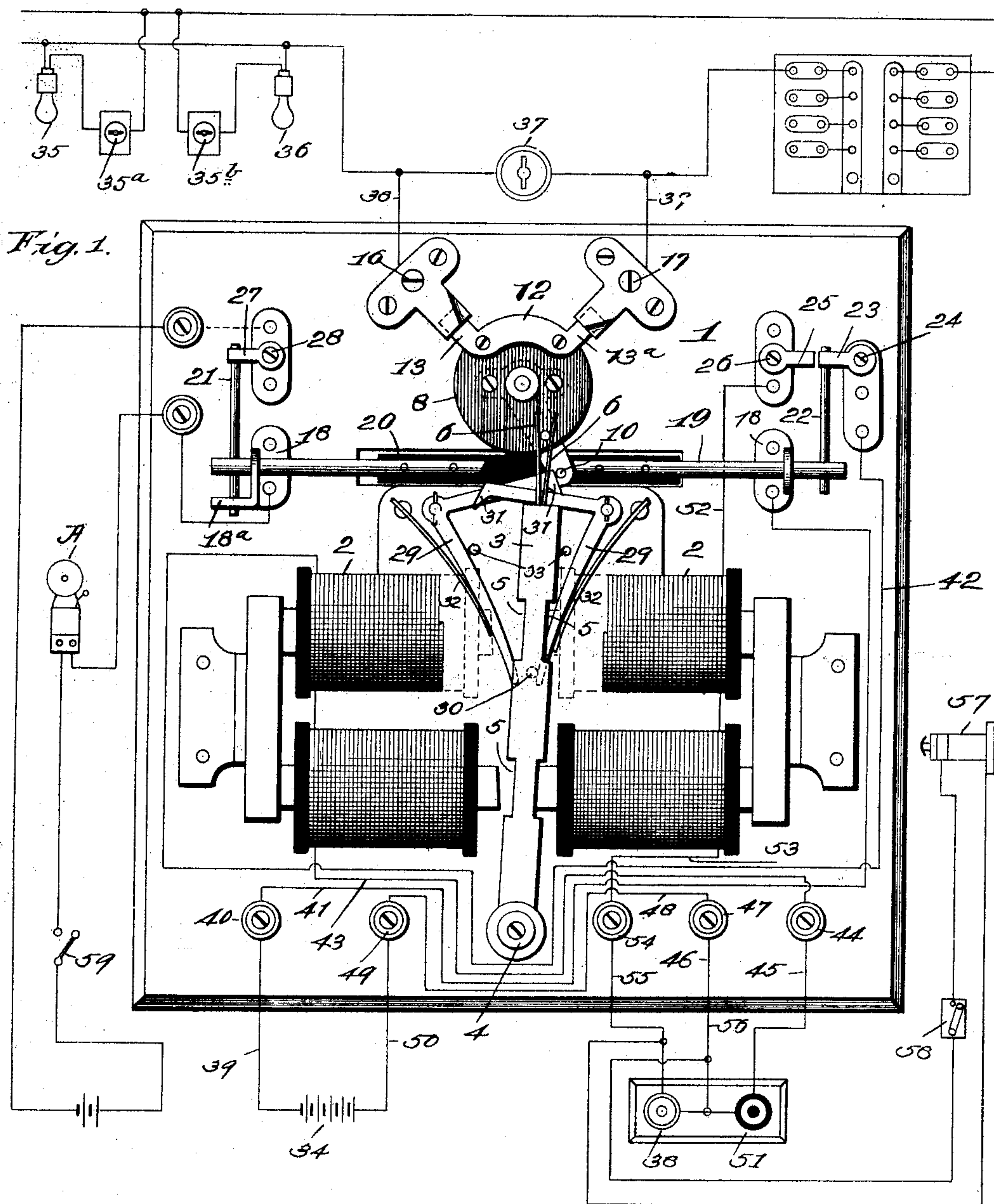
Patented Mar. 21, 1899.

R. BAUMANN.
AUTOMATIC ELECTRIC SWITCH.

(Application filed Mar. 10, 1898.)

(No Model.)

2 Sheets—Sheet 1.



Attest
W. Smith
A. J. McLaury.

Inventor
Robert Baumann
By Higdon, Logan Higdon
attys.

No. 621,739.

Patented Mar. 21, 1899.

R. BAUMANN.
AUTOMATIC ELECTRIC SWITCH.

(Application filed Mar. 10, 1898.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 2.

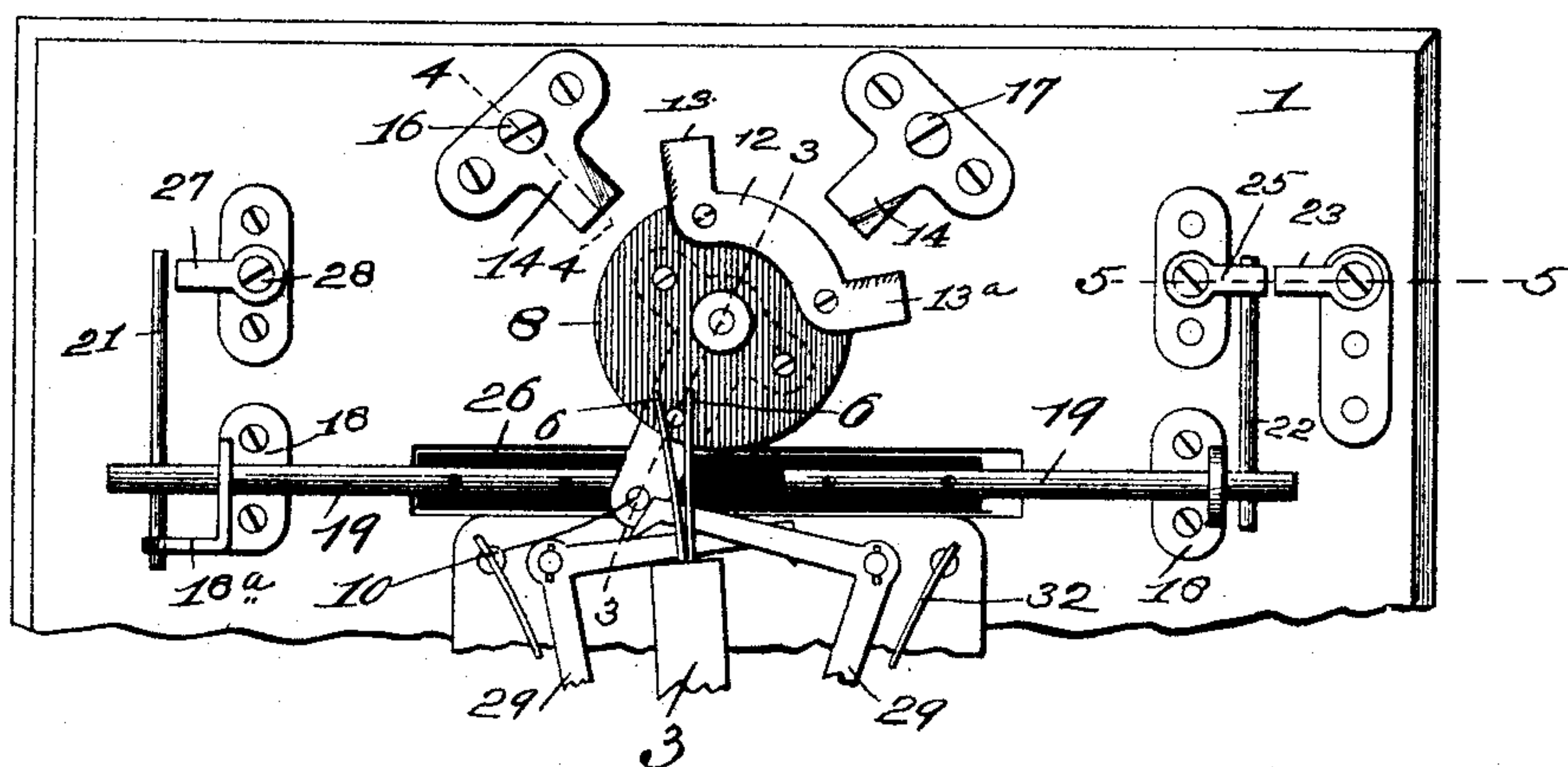


Fig. 3.

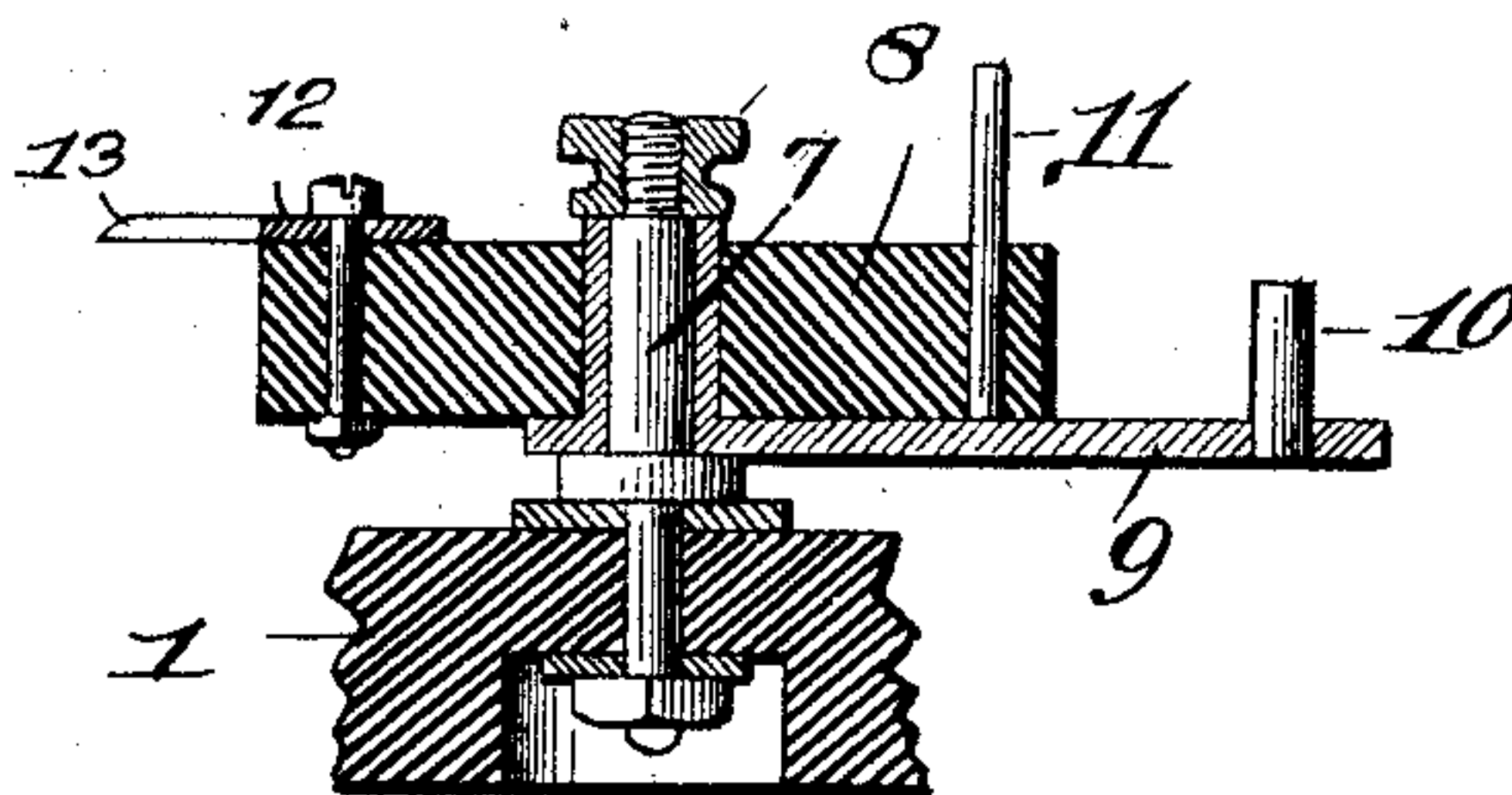


Fig. 4.

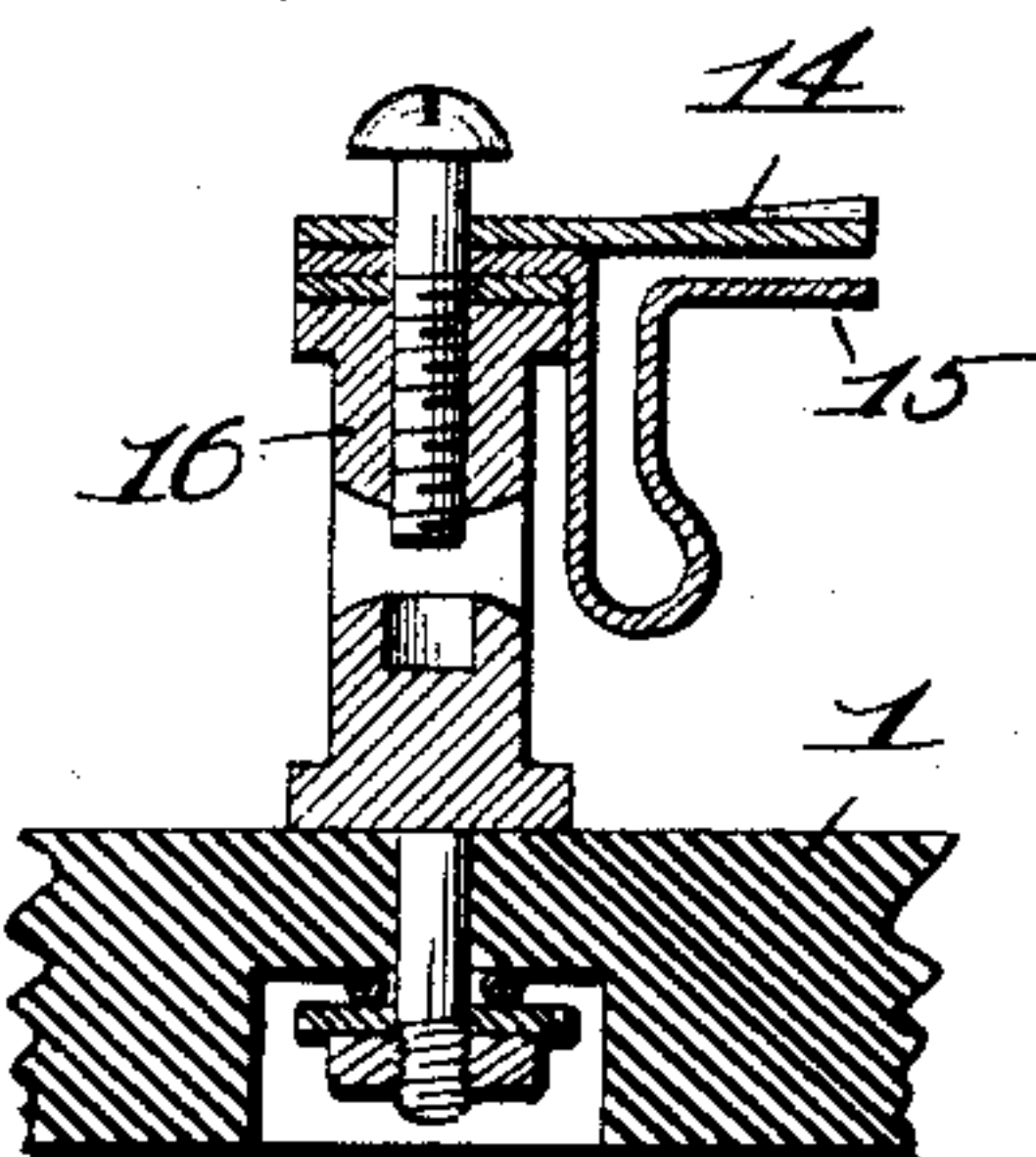
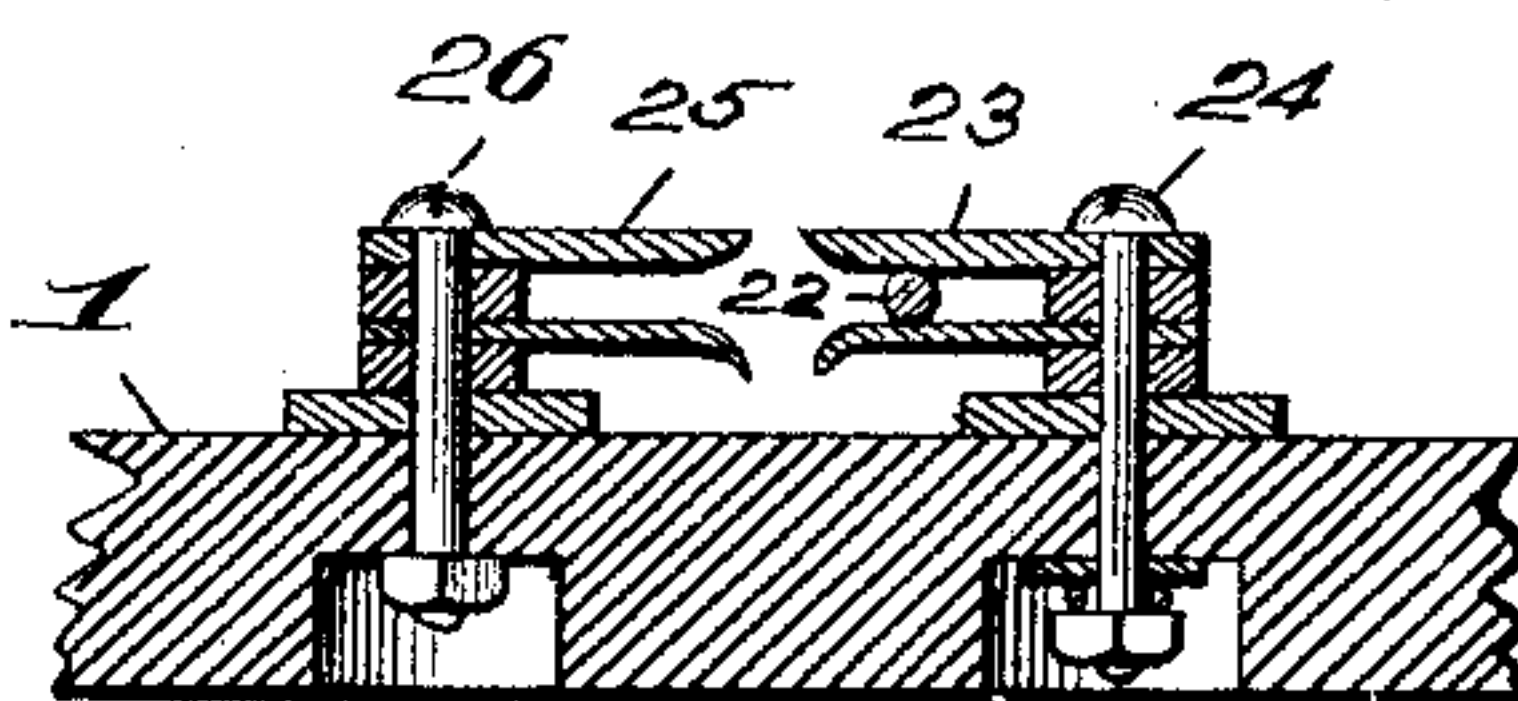


Fig. 5.



Wm. Smith
a. j. m. bailey.

Inventor:-
Robert Baumann.

By Higdon, Lougan Higdon Attys.

UNITED STATES PATENT OFFICE.

ROBERT BAUMANN, OF ST. LOUIS, MISSOURI.

AUTOMATIC ELECTRIC SWITCH.

SPECIFICATION forming part of Letters Patent No. 621,739, dated March 21, 1899.

Application filed March 10, 1898. Serial No. 673,356. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BAUMANN, of the city of St. Louis, State of Missouri, have invented certain new and useful Improvements in Automatic Electric Switches, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to an automatic electromagnetic switch for use in electric lighting and power circuit; and it consists of the novel construction, combination, and arrangement of parts hereinafter shown, described, and claimed.

My present invention is an improvement on the automatic electric switch patented to me June 2, 1891, No. 453,572.

An object of my present invention is to produce a switch that possesses superior advantages in point of simplicity, durability, and general efficiency and which switch will meet all requirements of the National Board of Underwriters.

The principal adaptabilities of my improved switch are to control any one or any number of electric lights limited to one branch circuit by means of two-way push-buttons, which may be located at separated points in a building, to increase the efficiency of burglar-alarm systems by lighting any particular one or any number of lamps in said branch circuit simultaneously with the closing of the burglar-alarm circuit, and to operate electric signal-lights on railways, ships, and other places. Its novel and improved features consist of parts and combinations of parts that produce the following results: the automatic breaking of the battery-circuit at the instant the armature has been attracted by either magnet, which attraction is caused by pressing one of the two-way push-buttons or by the action of the burglar-alarm or other circuit-closer of known form. Said automatic breaking of the battery-circuit insures the least possible drain on the battery and prevents short circuits and untimely polarization.

In the accompanying drawings, Figure 1 is a plan view of my improved switch, the various circuits and connections thereto being shown diagrammatically. Fig. 2 is a plan view of the upper portion of my improved

switch, the disk of said switch in this view being shown thrown open, which necessarily breaks the circuit controlled by said switch. Fig. 3 is a vertical sectional view, enlarged, taken approximately on the indicated line 3 3 of Fig. 2. Fig. 4 is an enlarged vertical sectional view taken approximately on the indicated line 4 4 of Fig. 2. Fig. 5 is an enlarged vertical sectional view taken approximately on the indicated line 5 5 of Fig. 2.

Referring by letters and numerals to the accompanying drawings, 1 indicates a suitable base of non-conducting material on which is mounted two pairs of electromagnets 2, the armature 3 being pivoted at one end to a post 4 in such a manner as to allow said armature to swing between the ends of the cores of said magnets, and in the sides of the armature are formed recesses 5, directly opposite the ends of the magnet-cores. The sides of the armature are thus grooved in order to shorten the path of the magnetic lines of force, and thereby increasing the pull of said armature, while maintaining a sufficiently long range of motion for the free end of said armature. Fixed to the under side and projecting outwardly from the free end of this armature is a pair of leaf-springs 6, and arranged for rotation upon a spindle 7, which projects upwardly from the base 1, is a disk 8, of porcelain, slate, or mica. A metallic arm 9 extends laterally from the under side of this disk 8, and a pin 10 projects upwardly from the outer end of said arm. A pin 11 extends upwardly through the edge of the disk 8 from said arm 9, and said pin 11 is normally held between the outer ends of the hereinbefore-mentioned leaf-springs 6.

A segmental plate 12, which is fixed to the top of the disk 8, is provided on each end with the integral contact-blades 13 and 13^a, which are constructed to pass between the parallel plates 14 and 15, which plates are carried by the posts 16 and 17, which posts extend upwardly from the base 1.

In the brackets 18 is arranged to slide a rod 19, the same being divided at its central point and held together by a strip 20 of hard rubber or analogous material, and in one end of said rod 19 is located a pin 21, and in the opposite end of said rod is located a pin 22.

The arm 9, projecting from the disk 8, operates in the space between the two parts of the rod, this construction regulating the limit of movement of the disk 8 and of the contact-blades 13 and 13^a carried thereby. A pair of contact-plates 23 is located upon a post 24 in such a position as that when the rod 19, carrying the pin 22, is to its right-hand limit of movement the outer end of said pin 22 will pass between said contact-plates 23, and a pair of contact-plates 25 is arranged upon a post 26, directly opposite the plates 23, and when the rod 19, carrying the pin 22, is moved to the left-hand limit of its movement the end of said pin 22 will be located between said plates 25.

A pair of contact-plates 27 is arranged upon a post 28 in such a manner that when the pin 21 is to its right-hand limit of movement it will engage between said plates 27, and when said pin 21 is to its left-hand limit of movement it will be free and disengaged from said plates. The opposite end of the pin 21 slides in a slot formed in an ear 18^a, that projects laterally from the left-hand end of the bracket 18. This pin 21 is intended to close a special local-battery circuit between the post 28 and the left-hand one of the brackets 18 and is preferably used to operate an alarm-bell A, as seen in Fig. 1. A pair of oppositely-arranged bell-crank levers 29 are fulcrumed so that the ends of their long arms operate directly beneath the center of the armature 3, and a pin 30, projecting downwardly from said armature, alternately engages the ends of the long arms of said bell-cranks. The ends 31 of the shorter arms of the bell-cranks are constructed so as to alternately form stops for the pin 10, that projects upwardly from the arm 9 of the disk 8. Leaf-springs 32 are arranged so as to bear against the rear sides of the long arms of the bell-cranks 29. Pins 33 project upwardly from the base 1 and form stops to limit the motion of the bell-crank levers 29.

The power for operating my improved switch is furnished by the battery 34. The electric-light wiring pertaining to the switch is comparatively simple. Any one or any number of lamps limited to a branch circuit may be utilized. In Fig. 1 I show the lamps 35 and 36 in the circuit. Each lamp is provided with a flush switch 35^a and 35^b. The branch circuit, including the two lamps, is controlled by the main flush switch 37. The switch proper is connected in shunt with the main switch 37 by the conductors 38 and 39. In Fig. 1 the electric-light circuit is shown "closed." In order to open it, the black push-button is pressed, and following this operation the current will pass from the battery 34, along the conductor 39, through the binding-post 40, through the conductor 41, through the bracket 18, through the right-hand portion of the rod 19, through the contact-pin 22, through the contact-plates 23, through the post 24, through the conductor 42, through

the coils of the left-hand pair of magnets 2, through the conductor 43, through the binding-post 44, through the conductor 45, through the circuit-closer of the black push-button 51, through the conductor 46 and binding-post 47, through the conductor 48, through the binding-post 49, and finally through the conductor 50, that leads to the opposite pole of the battery 34. The result of the action just described is the attraction of the armature 3 by the left-hand pair of magnets 2. At the first movement of the armature the right-hand one of the leaf-springs 6 will bend and exert a pressure on the side of the pin 11, and thus tend to rotate the disk 8 to the left; but at this point during the operation said disk cannot be moved for the reason that the pin 10 abuts against the end 31 of the short arm of the left-hand bell-crank 29. When the pin 30, that projects downwardly from the armature 3, engages the end of the long arm of the left-hand bell-crank 29, it will move said long arm laterally, and thus throw the end 31 of the short arm of said bell-crank out of the path of travel of the pin 10 and the power that has been stored in the bending right-hand leaf-spring 6 will partially rotate the disk 9 toward the left, and thus throw the blades 13 and 13^a out of engagement with and from between the pairs of contact-plates 14 and 15, that are carried by the posts 16 and 17. The battery-circuit remains closed and the armature attracted until the disk has completed its limited movement toward the left. Upon the completion of this movement the end of the arm 9 strikes the inner end of the left-hand portion of the rod 19 and moves said rod and the insulating-strip 20 and pins 21 and 22, carried by the rod, a slight distance to the left. This movement throws the pin 22 out of contact with the contact-plates 23 and into contact with the contact-plates 25, which movement breaks the circuit through the black push-button 51. This foregoing operation being instantaneous, the push-button 51 can in no wise be pushed quick enough to interrupt the action of the various parts. Continued or repeated pressure upon said push-button will have no effect upon the battery, as its circuit is open. To close the switch, the white push-button 38 is pressed in, and following this movement the battery-current will pass from the battery through the path heretofore described to the bracket 18, from thence through the rod 19, contact-pin 22, contact-plates 25, posts 26, conductor 52, through the coils of the right-hand pair of magnets 2, conductor 53, binding-post 54, conductor 55, through the circuit-closer of the white push-button 38, conductor 56, binding-post 47, conductor 48, binding-post 49, and finally through the conductor 50 to the opposite pole of the battery 34. The result of this action is the attraction of the armature 3 by the right-hand pair of magnets 2, and a reversal of the operation hereinbefore described will take place and the contact-

plates 13 and 13^a will once more be positioned between the pairs of contact-plates 14 and 15; and the electric-light circuit is closed. It is now seen that upon the attraction of the armature by one pair of magnets the contact-pin breaks the battery-circuit and connects with the opposite magnet, the circuit of which magnet will be completed when its corresponding push-button is pressed.

10 The door-alarm spring 57 represents the burglar-alarm system, which may include any number of doors and windows in a building, there being provided the requisite number of hand-switches in the battery-circuit of said burglar-alarm system. All of the burglar-alarms are connected with the conductors 55 and 56, which lead from the push-button 38 to the right-hand pair of magnets 2 of the automatic switch. The special alarm-bell circuit is closed by the action of the pin 21, electrically connecting the bracket 18 and post 28. When it is desired to turn on one lamp only—for instance, the lamp 36—by the automatic switch, which switch is normally open, the flush switch 35^b is turned on, the flush switch 35^a turned off, and the main switch 37 is turned off. By pressing the white button of any of the two-way push-buttons in the house or building wherein the switch is located said switch closes and the lamp 36 is turned on. By pressing the black button of any one of the two-way push-buttons the automatic switch opens and the lamp 36 is extinguished. Any one or any number of lamps in the circuit wherein the automatic switch is used can be operated under the same conditions. For instance, a white button is located in the vestibule of a residence, which controls the lamp or lamps that light the way to a particular room in the building, in which last-mentioned room is located the black button, which can be pressed in order to extinguish the light or lights which were thrown on by pressing the white button. When desired, the hand-switches 58 and 59 of the burglar-alarm system are set, and in case any door or window is tampered with the automatic switch closes and turns on the lights and at the same time closes the battery-circuit of the alarm-bell A, thus giving the alarm. The whole switch may be inclosed in a dust-proof metal cover and when in position occupies a small amount of space and presents a very neat and finished appearance.

55 The mechanism of the electric-light-circuit switch is what is termed "spring-break" and "spring-make," and its action therefore is instantaneous and free of arc. The contact-blades 13 and 13^a lock in either position—"open" or "closed"—and the armature must make the full throw and strike the face of the magnet-cores before said contact-blades are moved. During the throw of the armature the tension of the leaf-springs must be overcome.

My improved switch is simple in construc-

tion, positive in action, and will not easily get out of order or become inoperative.

I claim—

1. In an electric switch, a suitable base, 70 pairs of electromagnets arranged upon said base, an armature pivoted at one end so as to swing between the cores of said magnets, in the sides of which armature opposite the ends of the cores are formed recesses, a pair of leaf-springs fixed to and extending forwardly from the free end of the armature, and means for making and breaking an electric circuit, which means is operated by the leaf-springs. 75

2. In an electric switch, a suitable base, 80 pairs of electromagnets arranged upon said base, an armature pivoted at one end and arranged to swing between the ends of the cores of the magnets, in the sides of which armature opposite said cores are formed recesses, a pair of leaf-springs fixed to and extending outwardly from the end of the armature, a non-conducting disk arranged for rotation on the base in front of the armature, a pin carried by said disk which engages between the leaf-springs, and means carried by said disk for making and breaking an electric circuit, substantially as specified. 85

3. In an electric switch, a suitable base, 90 pairs of electromagnets arranged upon said base, an armature pivoted at one end and arranged to swing between the ends of the cores of the magnets, in the side of which armature opposite said cores are formed recesses, a pair of leaf-springs fixed to and extending outwardly from the end of the armature, a non-conducting disk arranged for rotation on the base in front of the armature, a pin carried by said disk which engages between the leaf-springs, means carried by said disk for making and breaking an electric circuit, and means whereby the armature is locked at the conclusion of its throw, substantially as specified. 95

4. In an electric switch, a suitable base, 110 posts on said base, to which are connected the terminals of an electric-light circuit, pairs of magnets arranged upon said base, a battery-circuit for said magnets, an armature arranged to swing between the ends of the cores of said magnets, means whereby said armature is locked at the conclusion of each throw, means whereby the electric-light circuit is alternately opened and closed by the action of the armature, and means whereby the battery-circuit is automatically opened when the electric-light circuit is opened, substantially as specified. 115

5. In an electric switch, a suitable base, 125 posts carried by said base, to which the terminals of an electric-light circuit are fixed, pairs of contact-plates carried by said posts, pairs of magnets carried by said base, a battery-circuit for said magnets, an armature arranged to swing between the ends of the magnet-cores, means whereby said armature is locked at the conclusion of each throw, a 130

non-conducting disk arranged for operation in front of the armature, contact-blades carried by said disk for engaging between the contact-plates carried by the posts, a pair of
5 leaf-springs carried by the armature for partially rotating the disk, an alarm-bell, a battery-circuit therefor, connections between said bell and the switch, and means whereby the bell and light circuits are simultaneously

closed and the battery-circuit for the magnets is opened, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

ROBERT BAUMANN.

Witnesses:

EDWARD E. LONGAN,
ALBERT J. MCCAULEY.