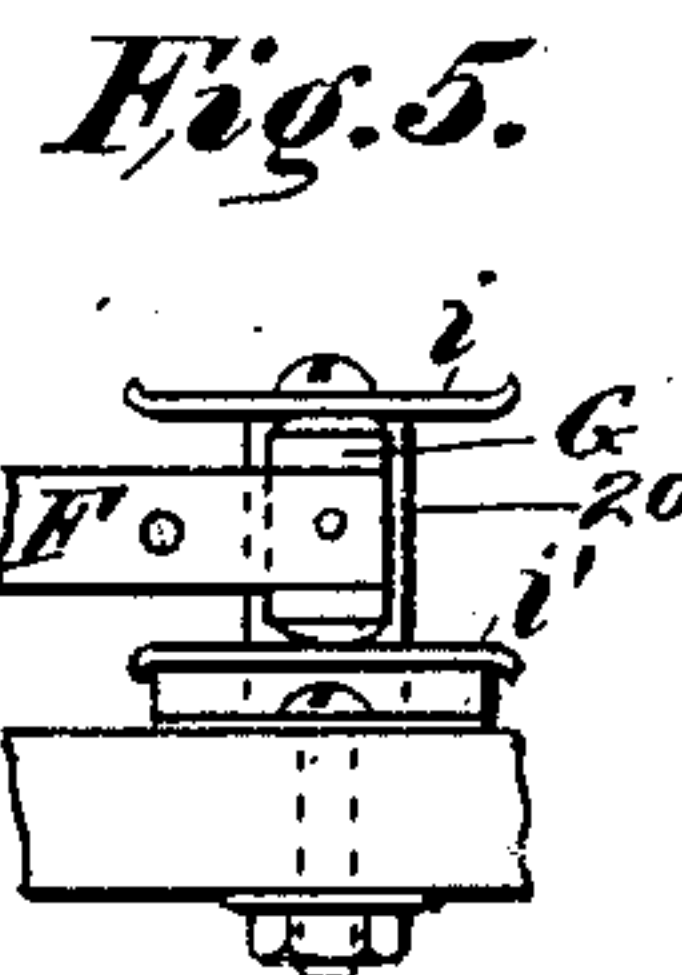
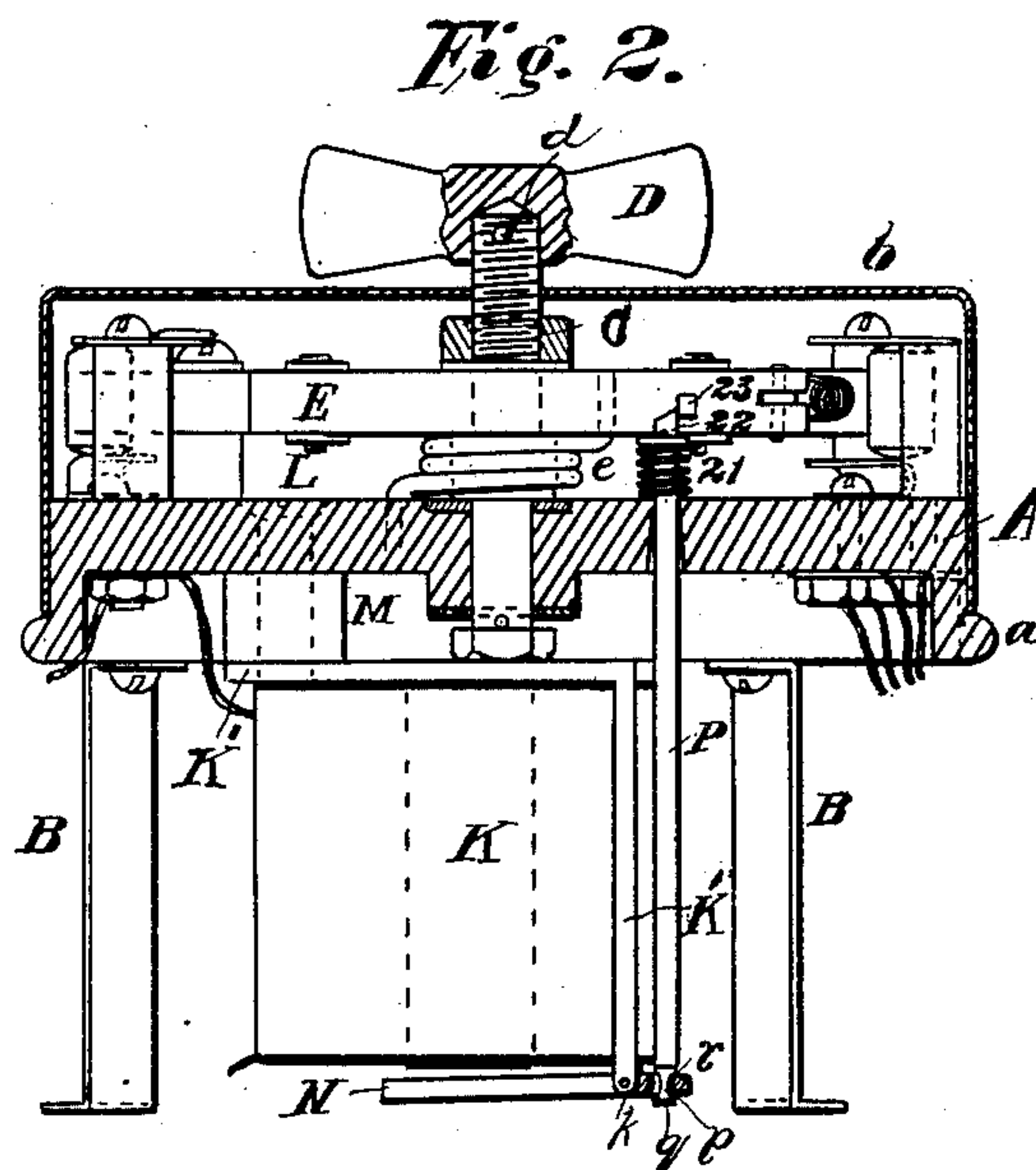
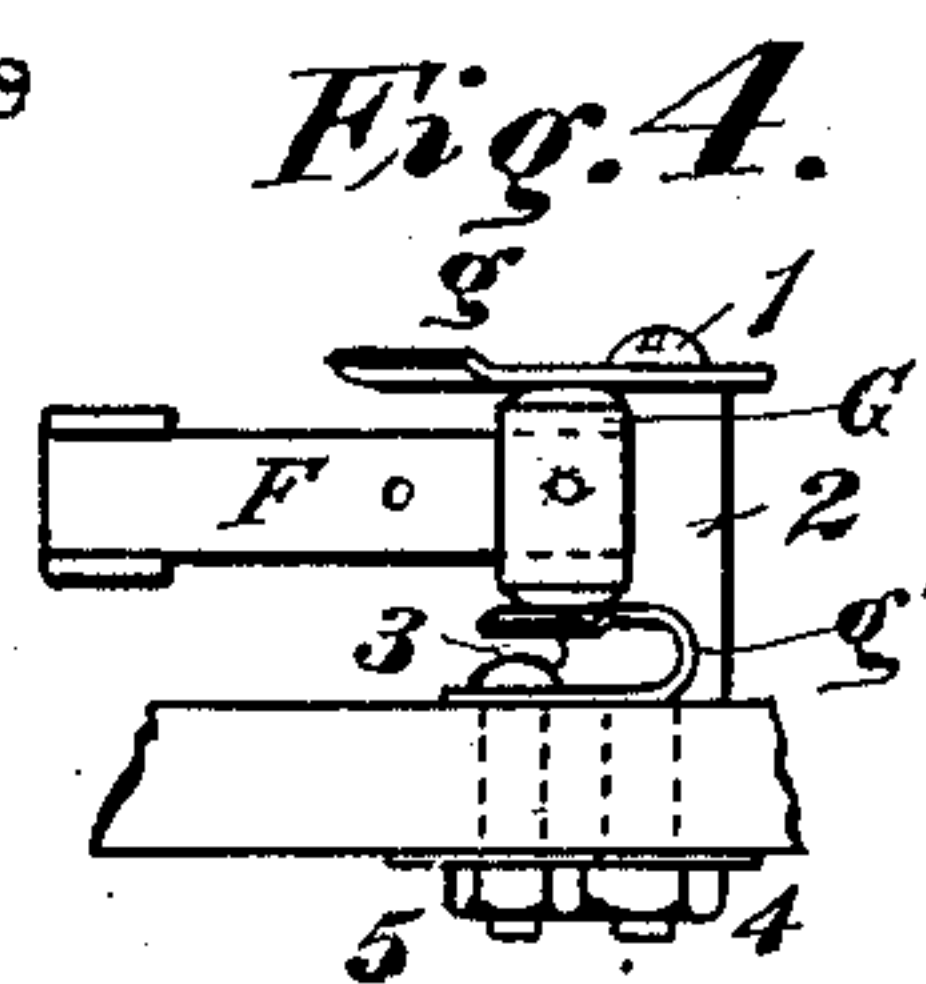
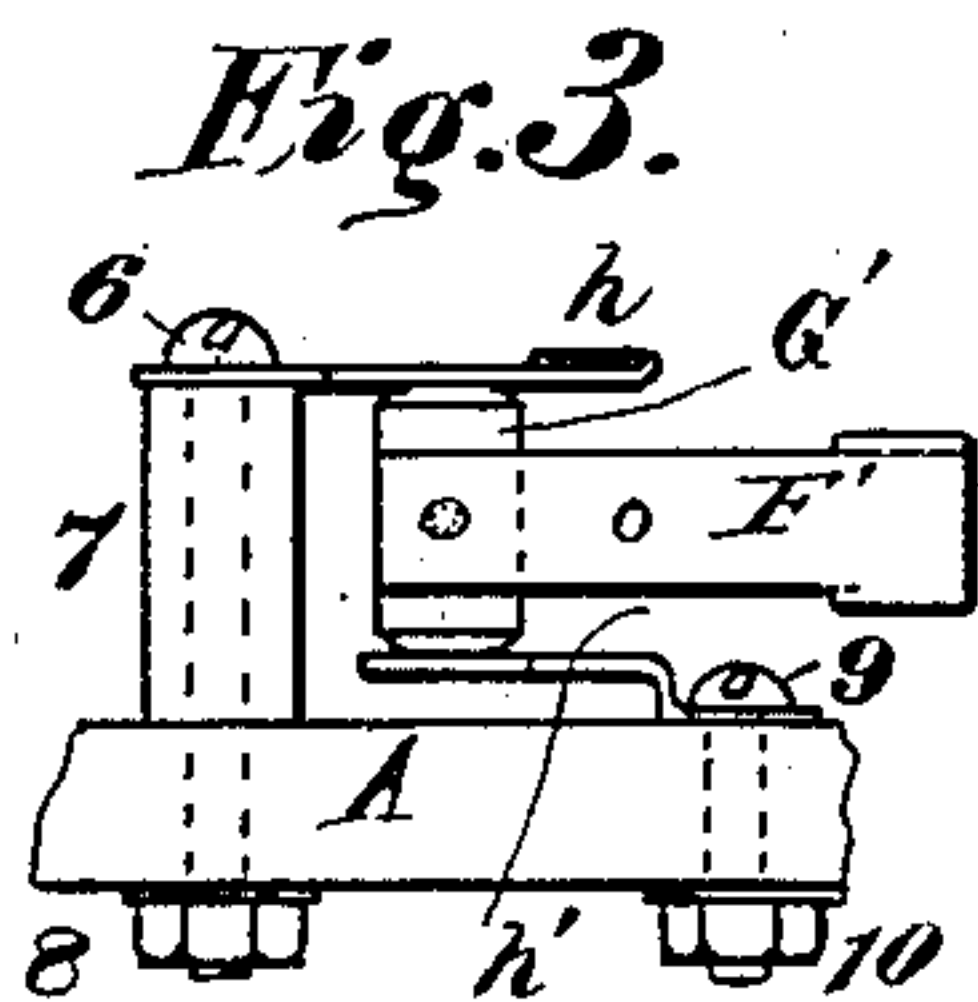
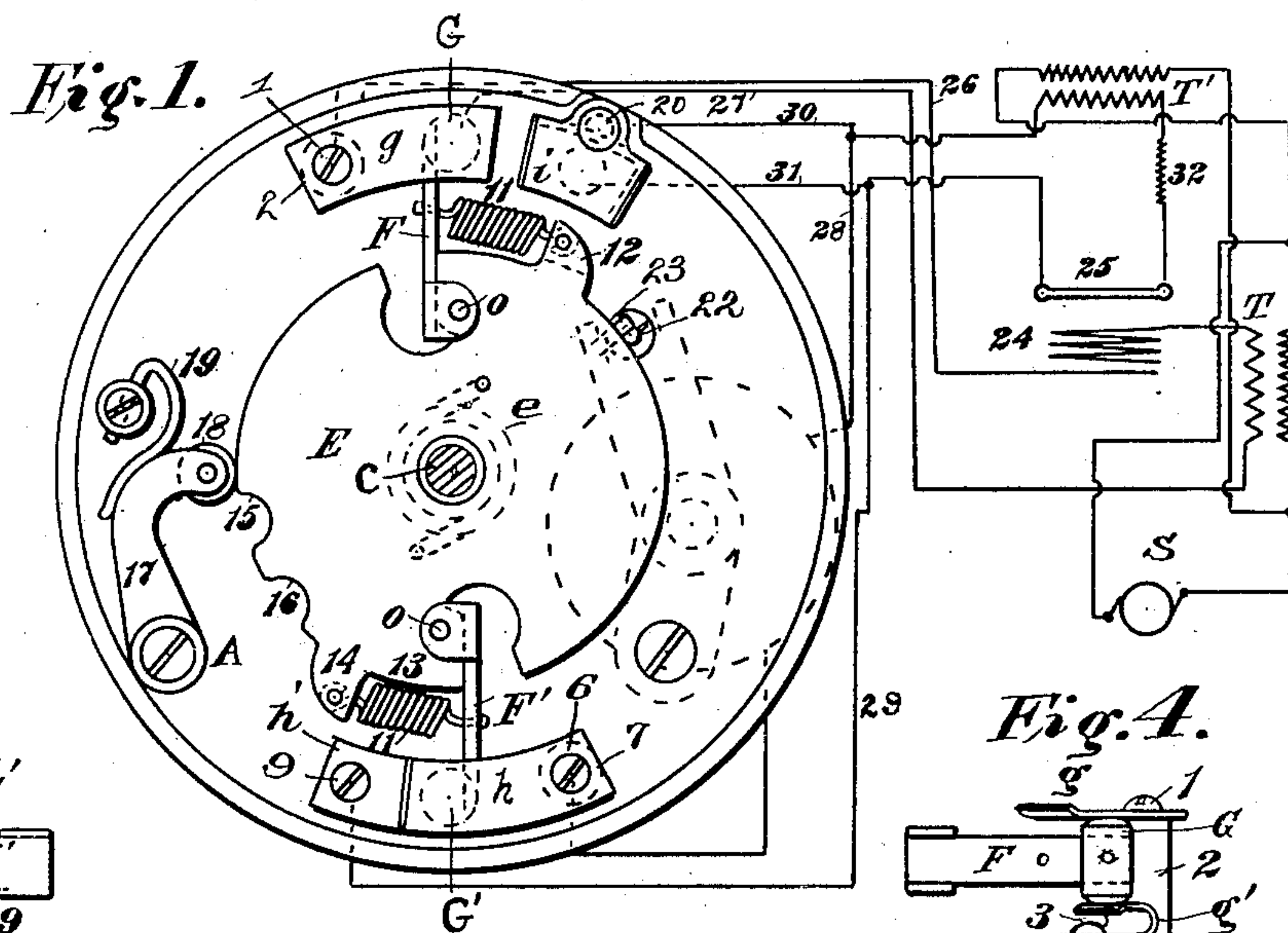


E. I. DODDS.
SWITCH FOR LAMP CIRCUITS.

(Application filed Sept. 9, 1899. Renewed May 14, 1900.)

(No Model.)



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ETHAN I. DODDS, OF AVALON, PENNSYLVANIA, ASSIGNOR TO GEORGE WESTINGHOUSE, OF PITTSBURG, PENNSYLVANIA.

SWITCH FOR LAMP-CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 652,597, dated June 26, 1900.

Application filed September 9, 1899. Renewed May 14, 1900. Serial No 16,688. (No model.)

To all whom it may concern:

Be it known that I, ETHAN I. DODDS, a citizen of the United States, and a resident of Avalon, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Switches for Lamp-Circuits, of which the following is a specification.

My invention relates to automatic switch devices adapted to be used in connection with lamps of the type in which the incandescing body or glower is at first a non-conductor of electricity and is brought to a conductive state by being heated from some external source.

The object of my invention is to provide a device through which the lamp can first be switched in, so as to close both the heater and the glower circuits, and which is so acted upon by the change in conductivity of the glower-circuit after the heater has done its work as to automatically break the heater-circuit and leave the glower-circuit complete.

In my present form of apparatus I employ a switch which is placed under spring tension impelling it in a certain direction, but which is held from movement in that direction by a catch or detent. I place in the glower-circuit an electromagnetic trip for the said catch, which trip acts when the glower-circuit allows enough current to pass to operate the electromagnet. When the trip has released the switch, the spring moves it far enough to break the heater-circuit and to establish a new circuit through the glower, cutting out the electromagnet. When it is desired to extinguish the lamp, the switch is moved still farther in the same direction by hand, thereby breaking the glower-circuit. The force of the spring is not completely spent when the switch has been brought to its second position, so that the spring assists the hand in this last operation and will maintain the switch in its third position after the hand has been used to break the lamp-circuit.

My invention will be understood by reference to the accompanying drawings, in which—

Figure 1 is a plan of my switch, together with a diagram of the circuits and electric lamp controlled thereby. Fig. 2 is a side view

of my switch, showing the same partly in section; and Figs. 3, 4, and 5 are detail views.

The operative parts of my switch are mounted upon a suitable disk A, of porcelain or other good insulating material, while the disk itself is supported upon standards B B, of metal. A shaft C is mounted centrally within the disk A and is provided with an insulating-handle D, secured to the said shaft by a pin *d*. Firmly connected to the shaft C is an insulating-plate E, to which is attached one end of a coil-spring *e*, the opposite end of which is attached to the disk A. When the handle D is turned to the left, it carries with it the plate E and puts the spring *e* under tension, so that the said spring after such a movement to the left is made tends to carry the plate E to the right.

To the plate E are secured, by means of pivots *o o*, arms F and F', to which contact-pieces G G', preferably of brass, are secured. The said contact-pieces G and G' are made cylindrical in shape, and the opposite ends thereof coöperate with contact-springs, as shown in Figs. 3 and 4. For example, the contact-piece G is so placed as to come into contact in its movements with the plate E with the contact-springs *g g'*, while contact-piece G' similarly makes contact with the springs *h h'*. The contact-spring *g* is held by a screw 1 to the top of an insulating-post 2, and the contact-spring *g'* is held to the insulating-disk A by means of a screw 3. Suitable nuts 4 and 5 hold the screws 1 and 3 in place, as will be readily understood. The spring *h* is similarly held by a screw 6 to the top of an insulating-post 7, a nut 8 being provided underneath the disk A for holding the screw 6 in place. The spring *h'* is held by a screw 9 and a nut 10. The arm F is pivoted within an opening in the plate E and is normally held against one wall of the said opening by a spring 11. This spring is attached at its opposite ends to the arm F and to the projection 12 on the plate E. A precisely-similar construction is employed in connection with the arm F', which is held by a spring 13 to a projection 14 on the plate E. In the periphery of the plate E, which is generally circular in shape, are notches 15 and 16, and pressing on the periphery of the plate is a dog

17, carrying a roller 18 at its free end. The said dog is pressed by a spring 19 against the plate E. In Fig. 5 I have illustrated the contact-piece G as being in contact with springs *i i'*. In this instance the springs are arranged, as before, to make contact with the ends of the contact-piece G, the spring *i* being supported upon a suitable post 20 and the spring *i'* upon the disk A.

10 The disk A is formed with a rim or flange *a* at its lower edge to receive a metallic cap *b*, which covers the main operating parts of the switch already described. Underneath the disk A is supported an electromagnet K, consisting of a coil of wire suitably held in an angular frame *k'*, of iron. The means for holding the magnet to the disk is a screw L, (shown in dotted lines in Fig. 2,) the said screw being passed down through the disk A and extending into the frame *k'*, with an interposed insulating-washer M. The electromagnet K has an armature N, pivoted to the frame *k'* at *k* and perforated outside said pivot, so as to surround a neck *p* on a vertical rod P, passing up through the disk A. At the bottom of the rod P is a head *q*, and the said head, together with a shoulder *r* on the rod P, constitutes surfaces between which the armature N rests with a slight intervening space. The rod P is normally forced upward by a spring 21, which rests upon the disk A and presses at its opposite end against a pin 22, projecting from the said rod. The upper end of the rod is in the path of a tooth or projection 23 on the periphery of the plate E.

35 The circuits controlled by the described switch start in the first instance from any suitable generator S, which I represent in this instance as supplying two separate converters T and T'. In the circuit of the converter T, I locate the heater 24 in proximity to a glower 25 in the circuit of the other converter. Now the heater-circuit includes two wires 26 and 27, running, respectively, to the contact-springs *g g'*. The glower-circuit is divided into branches, one of which is made up of two wires 28 and 29, the former of which extends through the electromagnet K to the contact-spring *h* and the latter of which extends to the contact-spring *h'*. The second branch of the glower-circuit passes by way of wires 30 and 31 to the contact-springs *i i'*, respectively.

55 The first operation of the switch consists in turning the handle D to the left until the tooth or projection 23 slips over the end of the rod P, the said end of the rod P being beveled off, so as to permit the said rod to be pressed down by the force of the hand movement which accomplishes the said first operation of the switch. The switch is then released, but is held from returning to its original position by the engagement of the catch formed by the top of the post P with the tooth 23. 65 The described operation brings the respective switch-contacts into the positions illustrated in Figs. 3 and 4, so that the heater-circuit is

completed and that branch of the glower-circuit is complete which passes through the electromagnet K. This last-named circuit is held inoperative by reason of the non-conducting quality of the glower 25 when in a cold state. However, the heater-circuit being closed, the heater is brought to so high a temperature as presently to make the glower 25 conductive through raising its temperature. Thereupon the branch circuit which includes the electromagnet K is energized, thus bringing the said magnet into operation and drawing up its armature N. This results in pulling down the rod P far enough to release the tooth 23, whereupon the plate E is thrown into power of the spring *e*. The first effect of this release is to cause the springs 11 and 13 to be stretched some, owing to the fact that the respective contact-springs *g g'* and *h h'* stand somewhat in the way of the contact-pieces G and G', whereby they tend to resist the free exit of said contact-pieces from the openings between the said springs. However, the spring *e*, being more powerful, overcomes the resistance of the contact-springs, and the separation of the contact-pieces G and G' from the said contact-springs takes place with a quick sudden movement. At the same time the roller 18 enters the opening 15, and through the force of the increased leverage which said spring-dog possesses when the roller is in the said opening and also through the fact that the springs *i i'* in like manner resist the free passage of the contact-piece G between them the moving parts of the switch are held in such position as to keep the contact-piece G in contact with the springs *i i'*. Meanwhile, however, the contact-piece G' has become separated from the contact-springs *h h'*, whereby the heater-circuit has been ruptured. Similarly, the branch circuit which includes the electromagnet K has been ruptured, and the resistance of the said electromagnet has been removed from the glower-circuit. The lamp will now operate without any unnecessary resistance being included in the circuit of the glower, although I do not exclude from the said circuit such ballast resistance as may be necessary to steady the action of the glower. A ballast resistance of this sort is shown at 32 in series with the glower. The lamp is permitted to burn as long as may be desired and is then extinguished by operating the switch still farther to the right by applying the hand to the handle D. All the lamp-circuits are then broken and the lamp is out of service.

The invention claimed is—

1. The combination with a glower of the type described and an electric heater therefor and separate circuits for the said glower and heater, of means for closing both circuits simultaneously, and automatic means for breaking the heater-circuit by a quick sudden movement when the glower-circuit has become active.

2. The combination with a glower of the type described and an electric heater therefor

and separate circuits for the said glower and heater, of a spring-actuated switch held by a suitable catch, a trip for the said catch included in the glower-circuit, means for putting the springs under tension and closing the circuits of both the glower and heater, and means for operating the said trip when the glower-circuit becomes energized.

3. The combination with a glower of the type described, and an electric heater therefor and separate circuits for the said glower and heater, of a spring-actuated switch held by a suitable catch, an electromagnetic trip for

the said catch included in the glower-circuit, means for putting the springs under tension and closing the circuits of both the glower and heater, and means for operating the said trip when the glower-circuit becomes energized.

Signed at New York, in the county of New York and State of New York, this 11th day of August, A. D. 1899.

ETHAN I. DODDS.

Witnesses:

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