

RELAY.

929,844.

Patented Aug. 3, 1909.



A. Andersen.

A. B. Sperry

Inventor:
John Erickson,
By Bulkeley & Durand
Attorneys.

UNITED STATES PATENT OFFICE.

JOHN ERICKSON, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO FIRST TRUST AND SAVINGS BANK, TRUSTEE, OF CHICAGO, ILLINOIS.

RELAY.

No. 929,844.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN ERICKSON, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Relays, of which the following is a specification.

My invention relates to relays for use in electrical apparatus, such, for example, as telephone or signaling systems, and may be used in various kinds of apparatus requiring the provision of one or more relays for controlling the circuits thereof.

Generally stated the object of my invention is the provision of an improved and highly efficient relay.

Special objects are to provide an improved mounting for the armature of the said relay; to provide an improved tubular relay having an L-shaped armature removably mounted upon one end thereof; and to provide certain details and features of improvement and combinations tending to increase the general efficiency and serviceability of a device of this particular character.

To the foregoing and other useful ends, my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings, Figure 1 is a plan of a relay embodying the principles of my invention. Fig. 2 is a side elevation of the same. Fig. 3 is a perspective of the armature of said relay. Fig. 4 is a perspective of the device for retaining the armature in place. Fig. 5 is a plan of a relay characterized by another form of my invention. Fig. 6 is a side elevation of the relay shown in Fig. 5. Fig. 7 is a perspective of the armature of the relay shown in Figs. 5 and 6. Fig. 8 is a perspective of the device for holding the armature of Figs. 5 to 7 in place on the end of the relay.

Referring to Figs. 1 to 4, inclusive, my improved relay comprises a tubular shell A for inclosing the electro-magnet. This shell, however, is preferably flattened on its upper side, so as to provide a flat supporting surface for the two groups of switch springs B and C. These switch springs are suitably mounted and secured in place by screws D, and the forward ends of said springs are arranged in position to be operated by the L-shaped armature E. This armature has a vertical portion e which hangs in front of the electro-magnet, and an upper framelike por-

tion e^1 provided with insulating knobs e^2 which engage and operate the said switch springs, as shown more clearly in Fig. 2. The upper edge of the portion e has a projection e^3 which in effect provides a couple of notches e^4 . (See Fig. 3).

The sheet metal device F shown in Fig. 4 is provided at its forward end with an upturned lip f , and is cut away at its center to provide an inclosed tongue or flexible portion f^1 having a screw opening f^2 . This formation also provides a couple of flexible side portions f^3 . A screw f^4 holds the said device in place. With this arrangement the armature E can be adjusted into place below the flexible or movable device F, the portion f^3 being adapted to engage the notches e^4 . The projection e^3 engages the rear edge of the lip-like forward end portion f , thus preventing dislodgment of the armature. At such time the straight upper edge a of the shell A engages in the corner or angle of the L-shaped armature, thus practically providing a knife-edge bearing upon which the armature can swing or tilt. The armature is held normally away from the electro-magnet by the said switch springs, as shown more clearly in Fig. 2.

In Figs. 5 to 8, inclusive, the construction of the electro-magnet and switch springs is substantially the same as that already described. In this case, however, the armature G has its vertical portion g provided with an upper knife-edge portion g^1 . Furthermore, with an armature of this character, the sheet metal holding device H has a forward end portion h located in a plane somewhat below the main body portion h^1 . Also, this device H is provided with flexible side portions h^2 bent downward at their forward ends to connect with the portion h , and providing corners or angle portions h^4 . The inner portion h^5 has a screw-hole h^6 and is held in place by the screw h^7 . The knife-edge g^1 engages in the corners or angle portions h^4 , as shown more clearly in Fig. 6. The inner corner or angle of the armature G rests upon the straight upper edge I of the tubular casing, in a manner previously described. With this arrangement the armature G practically tilts or swings upon a knife-edge bearing provided by the forward edge of the tubular casing, and in addition the knife-edge g^1 engages in a corner or angle on the holding device H. This arrange-

ment gives a good knife-edge bearing at all points—that is to say, the armature has a knife-edge bearing wherever it engages some part of the stationary structure.

5 It will be seen that the sharp edge of the portion g' is practically coincident with the sharp edge or corner I of the shell or casing, thus providing a knife-edge axis about which the armature can swing. Furthermore,
10 with this arrangement the relay can be turned upside down—that is to say, can be arranged in such a position that the switch springs J will be underneath instead of above. In this position the weight of the armature
15 will be sustained by the knife-edge g' resting in the corners h^4 of the holding device H.

In either form of my invention it will be seen, however, that the L-shaped armature rests merely upon the straight forward edge
20 of the tubular casing, and is removably held in place by a flexible sheet metal holding device. With this arrangement the armature is easily inserted and readily removed.

What I claim as my invention is:—

25 1. In a relay, the combination of an electro-magnet, a tubular shell or casing therefor, said casing provided with a straight upper edge at one end thereof, switch springs disposed on said casing, an L-shaped armature
30 having its inner corner or angle engaged by said edge on the casing, and a flexible sheet metal holding device secured to said casing and removably holding the armature in place on the fulcrum provided by said edge,
35 the rearwardly projecting portion of said armature being adapted to engage and operate the forward ends of said switch springs.

40 2. In a relay, the combination of an electro-magnet, a tubular shell or casing therefor, said casing provided with a flat side providing a straight edge at one end thereof, switch springs suitably mounted on said flat side, an L-shaped armature having its inner corner or angle engaged by said straight
45 edge on the end of the casing, one portion of said armature hanging in front of the end of the electro-magnet, the other portion of the

armature extending back to engage and operate the forward ends of said switch springs, and a flexible sheet metal device secured
50 upon the flat side of said casing and engaging an inner portion of the armature to hold the same in place.

3. In a relay, an electro-magnet, a tubular casing therefor, said casing provided with a
55 straight edge at one end thereof, an armature hung on said edge, a flexible sheet metal holding device engaging the armature to removably hold the same in place on the fulcrum provided by said edge, and switch contacts
60 secured at the other end of the casing and operated by said armature.

4. In a relay, an electro-magnet, a knife-edge bearing carried thereby, an armature
65 hung on said bearing, a sheet metal holding device secured to the magnet and engaging the armature to removably hold the same in place on the fulcrum provided by said edge, and switch contacts secured at the other end
70 of the casing and operated by said armature.

5. In a relay, an electromagnet, a tubular casing therefor, said casing provided with a
75 straight edge at one end thereof, an armature hung on said edge, a flexible sheet metal holding device engaging the armature to removably hold the same in place on the fulcrum provided by said edge, and suitable means secured at the other end of the casing and operated by said armature.

6. In a relay, an electromagnet, a knife-
80 edge bearing carried thereby, an armature hung on said bearing, a sheet metal holding device secured to the magnet and engaging the armature to removably hold the same in place on the fulcrum provided by said edge,
85 and suitable means secured at the other end of the casing and operated by said armature.

Signed by me at Chicago, Cook county, Illinois, this 16th day of August, 1906.

JOHN ERICKSON.

Witnesses:

EDWARD D. FALES,
BERNARD D. WILLIS.