

No. 847,197.

PATENTED MAR. 12, 1907.

R. H. MANSON.

RELAY.

APPLICATION FILED MAY 25, 1904. RENEWED FEB. 11, 1907.

Fig. 1.

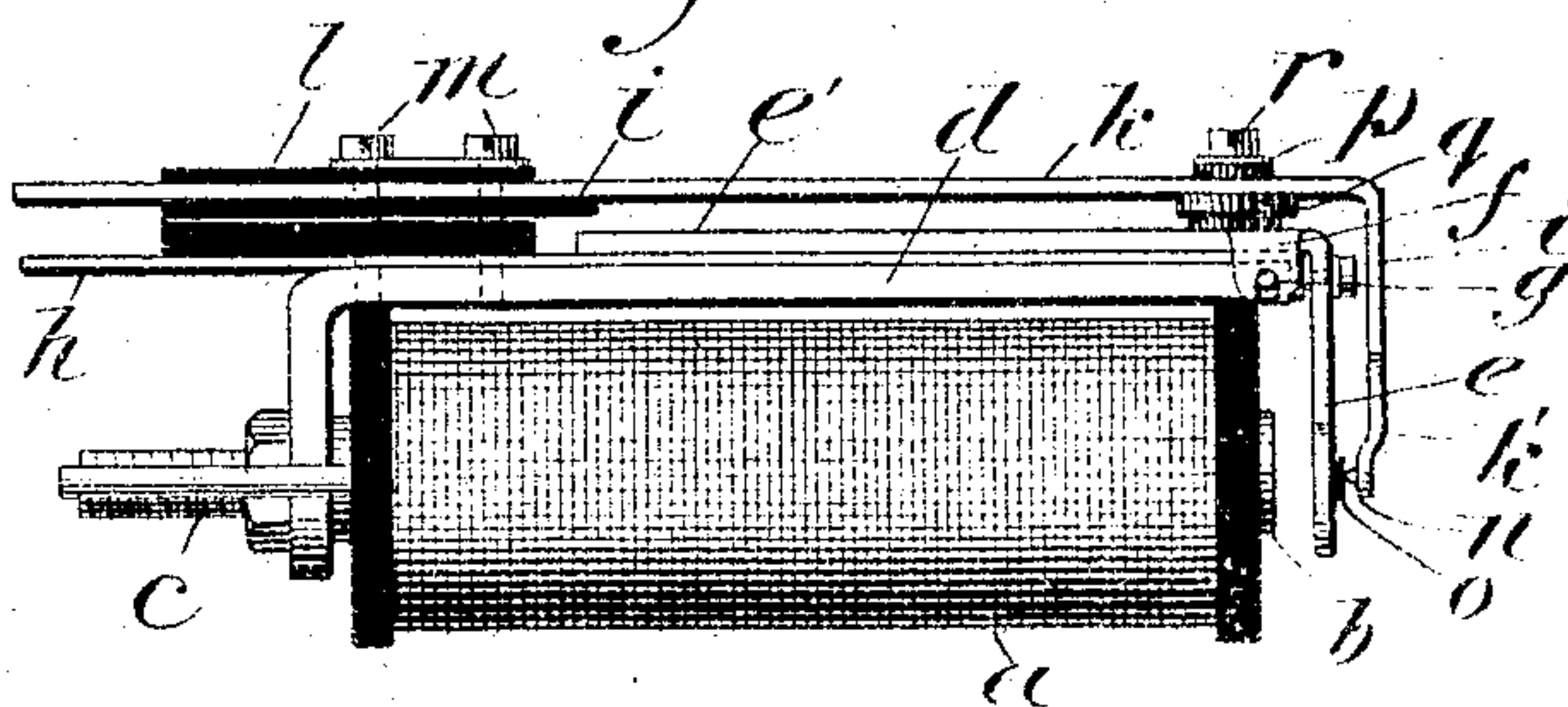


Fig. 2.

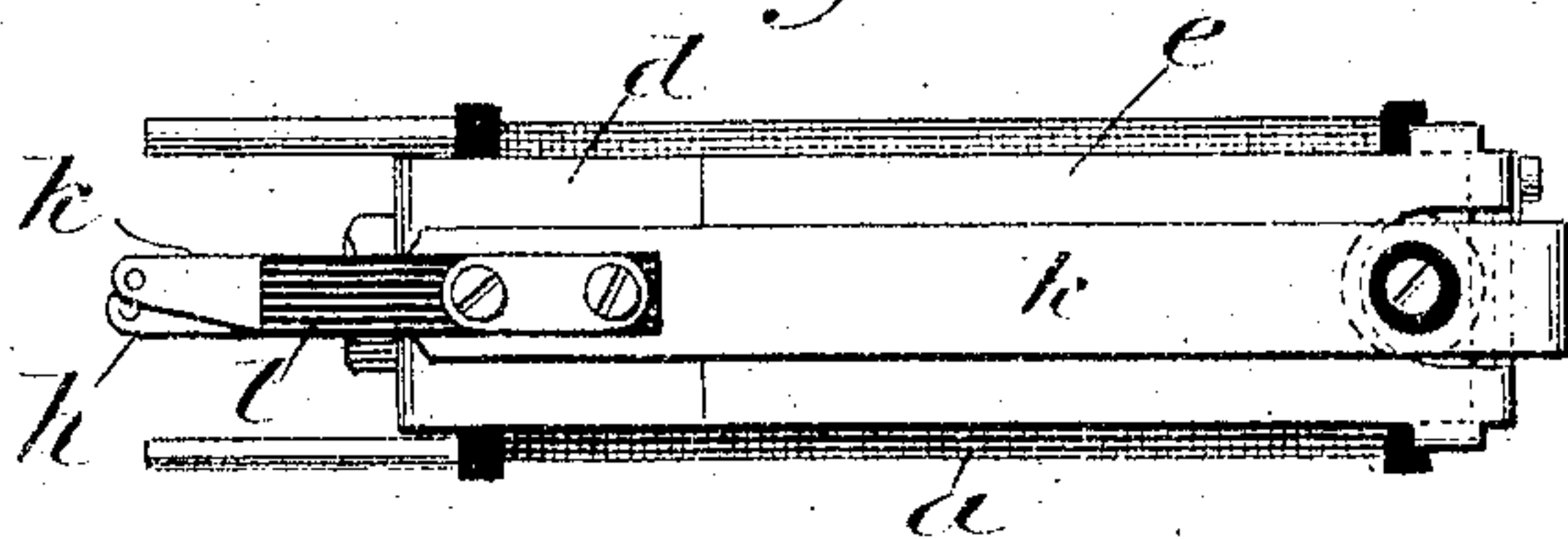


Fig. 3.

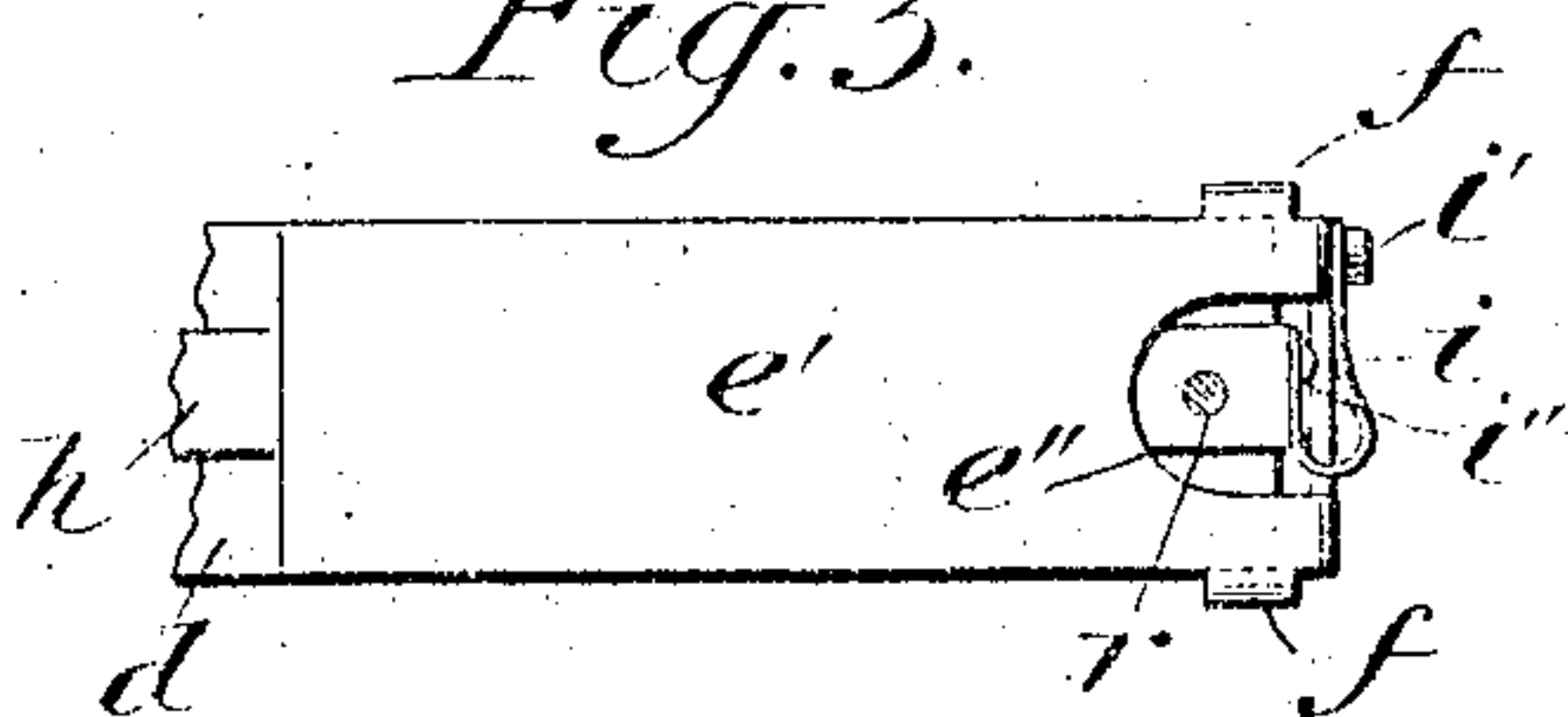


Fig. 4.

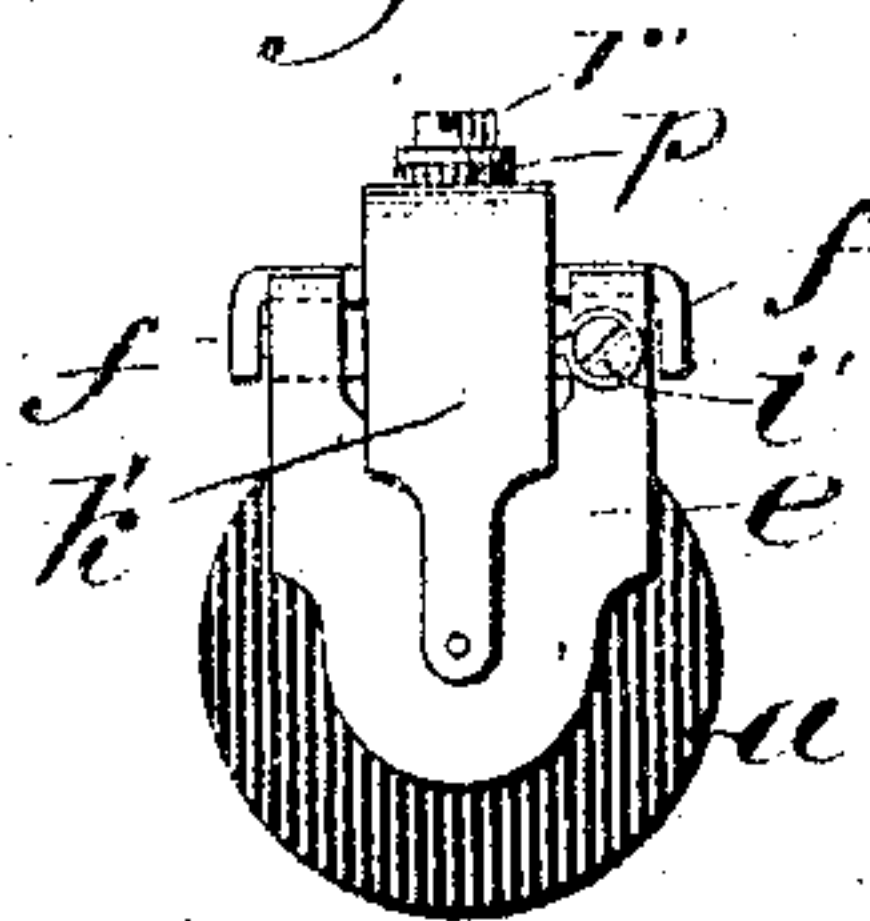
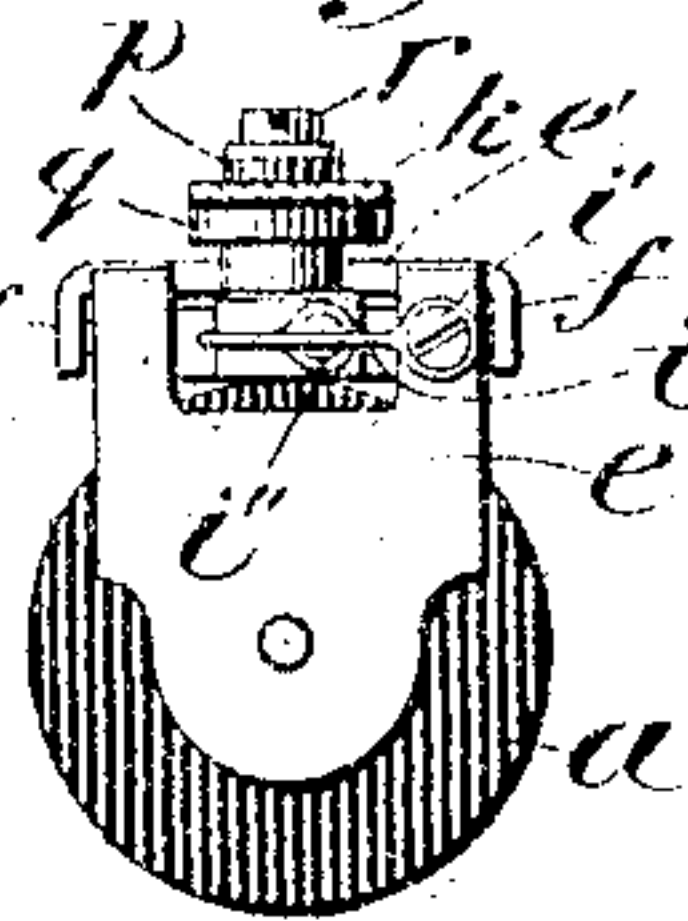


Fig. 5.



Witnesses:

O. W. Edellie.

James A. Marr.

Inventor.

R. H. Manson.

By Edward E. Blumenthal.

Atty.



# UNITED STATES PATENT OFFICE.

RAY H. MANSON, OF ELYRIA, OHIO, ASSIGNOR TO THE DEAN ELECTRIC COMPANY, OF ELYRIA, OHIO, A CORPORATION OF OHIO.

## RELAY.

No. 847,197.

Specification of Letters Patent.

Patented March 12, 1907.

Application filed May 25, 1904. Renewed February 11, 1907. Serial No. 356,872.

*To all whom it may concern:*

Be it known that I, RAY H. MANSON, a citizen of the United States, residing at Elyria, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in Relays, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to relays, and more particularly to cut-out relays, and has for its object to provide an improved relay for the purpose aforesaid having a relatively large air-gap between the pole-piece and the armature to render the relay insensitive to small currents without interfering with the positive action of the relay under the influence of a local-circuit current, said relay also having an armature provided with an elongated angularly-disposed portion serving as a counterweight to produce a positive electrical contact with an angularly-disposed contact-strip overlying the armature without the interposition of spring action, the armature having a special form of loose pivotal support at the front end of the relay, so that the armature may be quickly adjusted in position or removed for purposes of inspection or repair.

Other features of the invention will appear more particularly in the annexed specification, the claims appended thereto, and in the drawings, in which—

Figure 1 represents the relay in side elevation. Fig. 2 is a plan view thereof. Fig. 3 is a fragmentary plan view with the contact-strip removed. Fig. 4 is a front elevation. Fig. 5 is a similar view with the angular end of the contact-strip cut away.

Referring to the drawings, *a* indicates the coil of the relay, which is made up of the usual fine-wire windings mounted upon a bobbin or spool and surrounding the soft-iron core, which projects a short distance from the forward face of the bobbin to form the pole-piece *b*, while the rear end is extended and provided with screw-threads *c*, by means of which the relay is secured to the usual form of rack or frame.

Mounted on the screw-threaded end of the core and screwed thereto by a set-nut is a soft-iron bar *d*, of rectangular form, serving as a conductor for the external magnetic flux. Secured to the upper side of said bar *d* by screws *m m* are contact-strips *h* and *k*, which

are insulated from each other by the usual insulating-blocks *l*. Strip *h* lies along the top of said bar *d* and terminates at a point a little beyond the forward end thereof when said strip is bent over the end of said bar. Contact-strip *k* extends along the bar *d* and projects some distance beyond the end thereof and is bent down at right angles and terminates in a reduced end provided with a platinum contact *n*, approximately in line with the axis of the coil *a*. The forward ends of the contact-strips *h* and *k* are separated by an insulating stud or block *p*, secured to the bar *d* by a screw *r* and provided with an annular flange *q*, upon which strip *k* rests, said strip being provided with a circular orifice, through which the upper end of stud *p* is passed to retain the strip in proper alignment.

The forward end of the bar *d* is provided with two laterally-projecting pins or studs *g*, serving as pivots for the armature *e*, which is a rectangular stamping of soft iron, having a relatively long rear end *e'* running longitudinally of and normally resting upon the top of contact-strip *h* and bar *d* and serving to counterbalance the forward end of the armature and hold the platinum contact *o* thereon against the point *n* of contact-strip *k*.

Near the bend of the armature are lateral depending lugs or ears *f f*, having notches or recesses in the lower edges which are slipped over and engage the pins *g g*, and it is to be noted that this construction affords an efficient and convenient pivotal mounting for the armature, permitting the latter to be readily adjusted or removed by merely lifting contact-strip *k* and slipping the armature on or off of the pins *g g* and over the stud *p*. To permit the armature to swing freely about the stud *p*, a section of the former is cut away to form a recess *e''*, extending around said stud and for a short distance into the front face of the armature. The space between the armature and the pole-face is relatively large to provide a wide air-gap which is sufficient to render the relay insensitive to small line-currents, but nevertheless to permit a positive action of the relay under the influence of a local-circuit current. To limit the movement of the armature toward the pole, the insulation *l* below strip *k* is extended to form a shoulder *l'*,



against which the end of the horizontal portion  $e'$  of said armature abuts as the latter swings upward.

In order to establish an efficient electrical connection between contact-strip  $h$  and the armature  $e$ , a flexible U-section, of metal wire or other good conductor, is secured by screws or rivets  $i' i''$ , passed through suitable loops in the ends thereof and tapped into the armature and the strip  $h$ , respectively, near the bends thereof.

In order to prevent the armature from being lifted off its pintles or pivots during ordinary use, the flange  $g$  on the post  $p$  is extended out so that it overlies the rear edge of opening in the armature. It may also overlie the side pieces; but I find the former construction (shown in dotted lines in Fig. 2) to be sufficient.

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

1. A relay comprising an electromagnet having a flux-bar extending longitudinally thereof, an angular armature pivoted thereto, and contact members carried by said flux-bar, one of which is electrically connected to said armature, and the other of which makes electrical contact therewith.

2. A relay comprising an electromagnet, having a flux-bar extending longitudinally thereof, contact members carried by said flux-bar, means for connecting one of said contact members to said armature independent of the pivotal connection, and means on the other contact member which connects with the armature.

3. A relay comprising an electromagnet having a flux-bar extending longitudinally thereof, an angular armature removably pivoted to said flux-bar, a contact member, flexible means connecting said contact member to said armature, another contact member normally in electrical contact with said armature, and means supporting said last-named contact member and insulating it from said armature when the magnet is energized.

4. A relay, comprising an electromagnet having a soft-iron flux-bar extending along the top thereof, insulated contact-strips extending along said bar, one of said strips having an angular end provided with a contact, and an angular armature loosely and liftably pivoted on said bar and having a contact at its forward end cooperating with the contact on the angular-ended strip, substantially as described.

5. A relay, comprising an electromagnet, a soft-iron flux-bar extending along the top thereof, insulated contact-strips extending longitudinally of said bar, one of said strips having an angular end depending in front of the magnet-pole and provided with a contact, an insulating-stud on the forward end of said bar passing through said strip, serving to align and space the same, and an angular armature loosely and liftably pivoted on said bar and between said contact-strips, said armature having a contact on its forward end cooperating with the contact on the angular-ended strip, substantially as described.

6. A relay, comprising an electromagnet, a soft-iron flux-bar extending along the top thereof, insulated contact-strips extending longitudinally of said bar, one of said strips having an angular end depending in front of the magnet-pole and provided with a contact, an insulating-stud on forward end of said bar passing through said strip serving to align and space the same, an angular armature loosely and liftably pivoted on said bar and between said contact-strips, said armature having a contact on its forward end cooperating with the contact on the angular-ended strip and a flexible conductor connecting said armature and the other contact-strip, substantially as described.

7. A relay, comprising an electromagnet having a flux-bar extending longitudinally thereof, a pivot-pin on the forward end of said bar, an armature having a vertical and a horizontal member, the latter extending along said bar and serving to counterbalance said armature, and depending lugs on said armature having open slots engaging said pivot-pins, substantially as described.

8. A relay, comprising an electromagnet having a flux-bar extending longitudinally thereof, contact-springs mounted on said bar, insulation spacing said springs, and an armature pivoted to forward end of said bar and having a counterweight member extending rearwardly along said bar, said insulation between the springs having a shoulder extending in the path of the counterweight member to limit the movement of the armature toward the magnet-pole, substantially as described.

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

RAY H. MANSON.

Witnesses:

WILLIAM W. DEAN.

S. A. BEYLAND.