

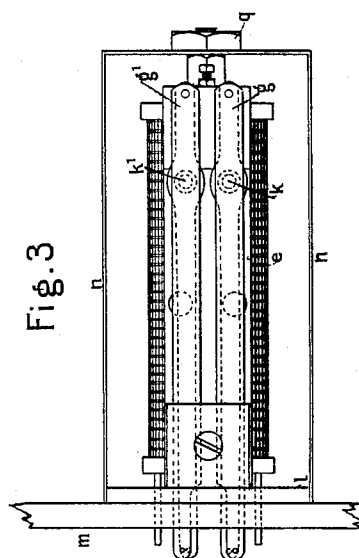
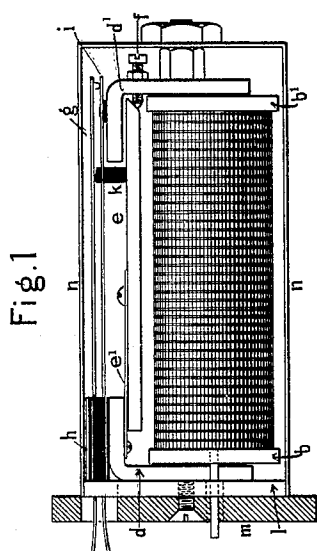
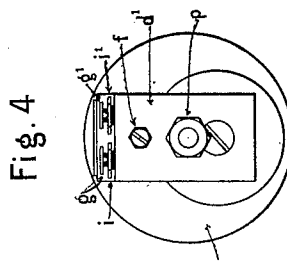
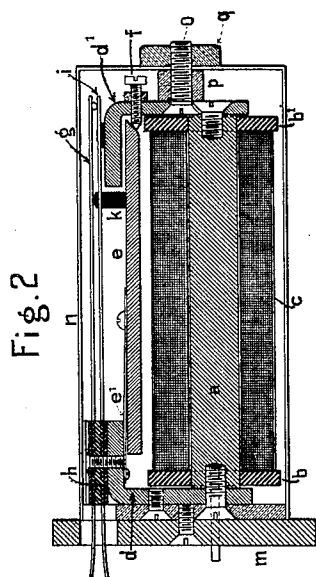
(No Model.)

F. R. McBERTY.

CUT-OFF RELAY FOR TELEPHONE SWITCHBOARDS.

No. 592,432.

Patented Oct. 26, 1897.



Witnesses:

John W. Sinclair
A. C. Langer

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by

Barton & Brown his Attys

UNITED STATES PATENT OFFICE.

FRANK R. McBERTY, OF DOWNER'S GROVE, ILLINOIS, ASSIGNOR TO THE
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CUT-OFF RELAY FOR TELEPHONE-SWITCHBOARDS.

SPECIFICATION forming part of Letters Patent No. 592,432, dated October 26, 1897.

Application filed March 11, 1897. Serial No. 626,941. (No model.)

To all whom it may concern:

Be it known that I, FRANK R. McBERTY, a citizen of the United States, residing at Downer's Grove, in the county of Du Page and State of Illinois, have invented a certain new and useful Improvement in Cut-Off Relays for Telephone-Switchboards, (Case No. 52,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention concerns relays or electromagnetic switches for breaking two or more circuits. Its aim is to produce a cheap and efficient appliance for this purpose. It is designed especially for use in telephone-switchboards for severing the normal earth connections of telephone-lines when excited by current in circuits closed during the use of the line.

The invention consists in certain details of construction, among which are a novel arrangement of pole-pieces and the armature for producing an outward movement of the armature when the magnet is excited, a new mode of arranging and supporting the armature to maintain the magnetic circuit with but a single break, an arrangement of parts for communicating motion from the armature to the switch-springs designed to open the circuits, and other minor features which will be pointed out in the claims.

In constructing this relay a straight core having a suitable winding is furnished with bent pole-pieces extending toward each other parallel with the core of the magnet, and an armature is arranged adjacent to the inner faces of the pole-pieces and also parallel with the core. The armature is connected with one of the pole-pieces by a flexible strap or plate of iron and lies in contact with the strap, which itself lies in contact with the pole-piece, the other extremity of the armature being free to move toward the corresponding pole-piece, but being normally withdrawn therefrom. The switch-springs are mounted parallel with the armature and are connected with it through the agency of insulating-pins. Suitably-supported contact-anvils are carried upon one of the pole-pieces to form resting-stops for the switch-springs. A tubu-

lar covering is provided for the relay, together with means for supporting the cover removably upon the relay. This appliance is shown in the attached drawings, whereof—

Figure 1 is a side elevation, the cover being shown in section. Fig. 2 is a longitudinal central sectional view. Fig. 3 is a plan. Fig. 4 is a front elevation, the cover being removed.

The usual straight core *a*, of iron, carries heads *b* and *b'*, between which wire *c* is wound upon the core. At each extremity of the core pole-pieces *d* and *d'* are fixed, their free extremities being extended toward each other and lying in the same plane. The armature *e* lies in the space between the spool and the inner faces of the pole-pieces. One extremity of the armature is connected with pole-piece *d* through a flexible strip *e'*, of iron, this strip being fixed to the armature and to the pole-piece at its extremities, respectively, by screws. The other extremity of the armature is free from the pole-piece *d'* and normally rests at a short distance therefrom against a stop *f*. This stop is a screw passing through the pole-piece *d'* and having a conical point which registers with the beveled extremity of armature *e*, the arrangement being thus adapted for the adjustment of the range of movement of the armature.

Two switch-springs *g* and *g'* are provided, supported at their rear extremities between blocks *h*, of insulating material, secured to the pole-piece *d* by a screw passing therethrough. The forward extremities of the switch-springs rest upon contact-anvils *i* and *i'*, respectively, mounted on the terminals of contact-strips of similar designation, which also are carried between the blocks *h*. The armature *e* carries two studs *k* and *k'*, of insulating material, which register with the two switch-springs *g* and *g'*. These studs should be of such length that while the armature is in its lower position the studs separate to a slight distance from the springs *g* and *g'* and permit these springs to rest firmly on their anvils *i* and *i'*.

The excitement of the magnet causes the attraction of the free extremity of armature *e* to pole-piece *d'*, whereby studs *k* and *k'* are thrust against the springs *g* and *g'*, respectively, and lift these springs from their con-

tact-anvils. Since the armature *e* is in continual magnetic contact with the pole-piece *d*, there being thus a single break in the magnetic circuit between the armature and the pole-piece *d'*, this appliance operates with a high degree of efficiency.

The electromagnet and its switch-contacts are mounted on a circular base *l*, the terminals of the switch-springs *g* and *g'* and of their anvils *i* and *i'*, and also of the winding *c*, being led through openings in the plate *l*, the space about the terminals being filled with insulating material. Several of the plates *l* may be mounted on a common support *m*, which is designed to be secured in a frame carrying a great number of relays. An object of the peculiar construction of this relay is that the appliance may occupy but little space laterally and that its switch-springs and the parts for adjusting its armature may be accessible from the presented extremity when thus mounted with others in the frame.

The relay is inclosed in a cylindrical case *n*, which fits closely over the circular plate *l*. The case is secured in place by means of a screw *o*, passing outward through the pole-piece *d'*, and surrounded by a nut *p*, screwed against the pole-piece, which serves as a distance-piece, together with a second nut *q* on the screw *o* outside the case.

I claim as the invention—

1. The combination with a straight core and the winding thereof, of pole-pieces for the core extending at right angles thereto and bending toward each other, an armature between the core and the pole-pieces overlapping the pole-pieces, a switch-spring parallel with the armature outside the pole-pieces and a normal resting-anvil therefor, and a stud connecting the armature with the switch-spring, substantially as described.

2. In combination in a rectangular magnetic circuit, a core with a winding thereon, pole-pieces for the core extending toward each other, and an armature lying between the inner faces of the pole-pieces and the core and overlapping the pole-pieces, one extremity of the armature being connected with the corresponding pole-piece through a flexible strap of magnetic material, substantially as described.

3. In combination, a straight core, pole-pieces therefor extending at right angles thereto and having their extremities presented toward each other, an armature lying between the core and the inner faces of the pole-pieces and overlapping the pole-pieces, one extremity of the armature being secured to one of the pole-pieces by a flexible strap of iron, switch-springs extending parallel with the armature and carried on the pole-piece which is connected with the armature, con-

tact-anvils for the other extremities of the springs, and studs upon the armature adapted to engage the switch-springs when the armature is attracted to raise them from their contact-anvils, substantially as described.

4. In combination, the core *a* and its winding, the pole-pieces *d* and *d'*, the armature *e* lying within the said pole-pieces, the anvil-straps *i* and *i'* secured to the pole-piece *d* and resting upon but insulated from the pole-piece *d'*, the switch-springs *g* and *g'* secured to the pole-piece *d* and insulated therefrom and resting on the said anvils, and the studs *k* and *k'* of insulating material on the armature adapted to engage the switch-springs to move them, as described.

5. The combination with the base-plate carrying several relays, of the core projecting at right angles thereto, the armature parallel with the core, pole-pieces for the core bent to overlap and inclose the extremities of the armature, a switch-spring parallel with the armature and a contact-anvil therefor, said switch-spring being fixed near the base-plate and the movable extremity and contact-point thereof being presented near the other end of the magnet, as described.

6. The combination with the core *a* and its winding, of pole-pieces *d* and *d'* formed as shown, the armature *e* supported near the pole-piece *d* and the adjusting-screw *f* passing through pole-piece *d'* and having a beveled extremity engaging said armature as a stop, substantially as described.

7. The combination with the core *a* and its winding, pole-pieces *d* and *d'*, the armature *e* and the flexible strap *e'* of iron securing it to the pole-piece *d*, anvil-straps *i* and *i'* secured at their opposite extremities to pole-pieces *d* and *d'*, respectively, by insulating material, the switch-springs *g* and *g'* secured to pole-piece *d* and insulated therefrom and resting on the said anvils *i* and *i'*, and the studs *k* and *k'* of insulating material carried by the armature and adapted to raise the switch-springs from their anvils when attracted, substantially as described.

8. In combination, the core *a* with its winding, the pole-pieces *d* and *d'*, the armature *e*, the switch-springs controlled by the armature, the screw *o* and distance-piece *p* carried on the pole-piece *d'*, the circular base-plate *h* fixed to pole-piece *d*, the cylindrical casing *n* inclosing the appliance and embracing the plate *h* and the screw *q* retaining the casing in place, as described.

In witness whereof I hereunto subscribe my name this 12th day of February, A. D. 1897.

FRANK R. McBERTY.

Witnesses:

ELLA EDLER,
LUCILE RUSSELL.