

E. R. CORWIN & C. A. BALS.

RELAY.

APPLICATION FILED SEPT. 21, 1908.

941,761.

Patented Nov. 30, 1909.

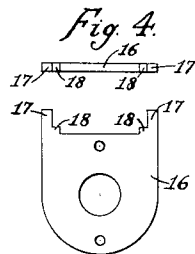
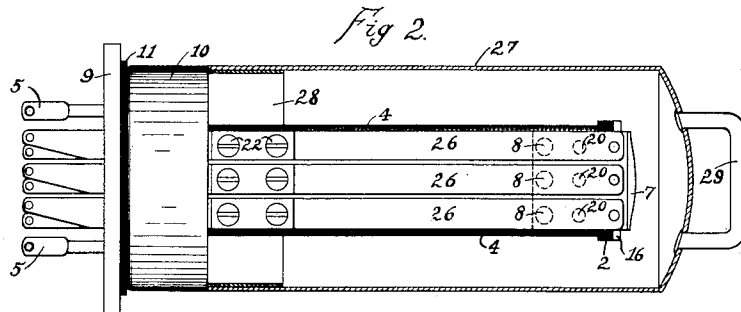
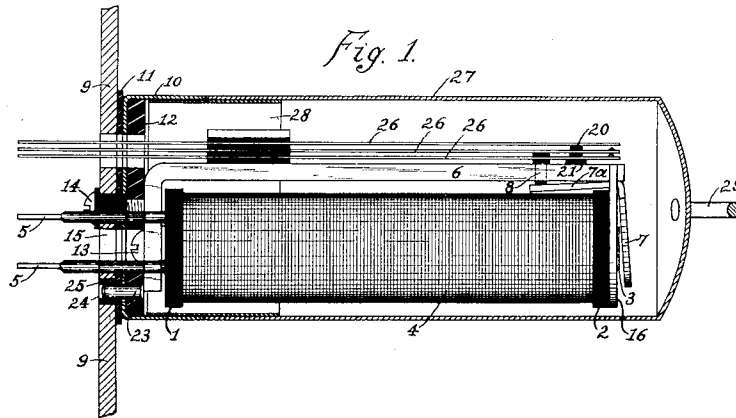


Fig. 3.

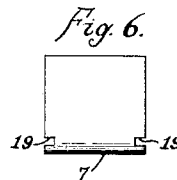


Fig. 5.

WITNESSES:

Frank J. Ryan.
R. G. Parker.

INVENTORS:

Elmer R. Corwin
Charles A. Bals
BY Frederick R. Parker
ATTORNEY.

UNITED STATES PATENT OFFICE.

ELMER R. CORWIN AND CHARLES A. BALS, OF CHICAGO, ILLINOIS, ASSIGNORS TO CORWIN TELEPHONE MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

RELAY.

941,761.

Specification of Letters Patent.

Patented Nov. 30, 1909.

Application filed September 21, 1908. Serial No. 454,059.

To all whom it may concern:

Be it known that we, ELMER R. CORWIN and CHARLES A. BALS, citizens of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Relay, of which the following is a specification, reference being had to the accompanying drawings, illustrating same.

Our invention relates to electrically-operable relays.

The principal objects of our invention are, to provide an improved arrangement of the armature on electrically-operable relays; to provide improved means for mounting the relay as a whole, and to provide improved means for removing the coil of the relay when desired without dismantling the relay as a whole.

Other objects and improvements in construction will be apparent from the following specification.

In the accompanying drawings Figure 1 is a side elevation of the relay of this invention, with the inclosing casing and mounting portions shown in vertical cross-section to show the construction of the relay inside of the casing and the arrangement of the members extending through the mounting portions; Fig. 2 is a plan view of Fig. 1, with portions of the inclosing casing shown in horizontal cross-section to show the construction of the relay inside of the casing; Fig. 3 is an elevation of the armature-supporting member, showing the details thereof; Fig. 4 is a plan view of the portion shown in Fig. 3; Fig. 5 is an end elevation of the armature of the relay; and Fig. 6 is a plan view of the armature shown in Fig. 5, showing the details thereof. Like characters refer to like parts in the several figures.

The relay comprises a spool formed of end portions 1 2 and a core 3; one or more coils 4 wound upon the spool and having terminals 5 5 extending from the coil or coils through the end portion 1 of the spool; a bar 6 of magnetic material forming a return magnetic path for the core 3; an armature 7 suitably pivoted so as to be attracted to the end of core 3 when the latter is magnetized by current in the coil or coils 4; sets of spring members 26 26 suitably mounted on the bar 6 and suitably insulated from each other; and pins 8 8 of insulating mate-

rial adapted to be operated by the armature 7 for controlling contacts between the spring members 26 26. At the rear of the relay is a mounting plate 9, a cup-shaped portion 10 forming a portion of the relay casing, an insulating disk 11 insulating the cup-shaped portion 10 from the plate 9, and a second insulating disk 12 placed within the cup-shaped portion 10 for insulating the bar 6 and the core 3 from the cup-shaped portion 10, all of these portions 9, 10, 11 and 12 being provided with suitable holes therethrough through which the terminals 5 5 and the rear ends of spring members 26 26 extend, whereby they are kept out of contact with the portions 9, 10, 11 and 12. The core 3 is secured to the bar 6 by a screw 13 at the back end of the core 3, and the bar 6 is mounted to the mounting plate 9 by a screw 14 which is suitably insulated from the portions 9 and 10 as shown, so as to mount the relay as a whole. A hole 15 is provided through the portions 9, 10, 11 and 12 so that the screw 13 may be loosened from the rear of the plate 9 and the spool 1 2 3 and the coil or coils 4 removed when desired without dismantling the relay as a whole. This construction of allowing the spool and the coil or coils of the relay to be removed is very advantageous in rewinding or replacing coils on the spool.

On the front of the end portion 2 of the spool is secured a plate 16 having side extensions 17 17 and projections 18 18 thereon at the top thereof. The armature 7 is provided with notches 19 19 in the sides thereof which notches are placed loosely over the projections 18 18 of the plate 16, thus hinging the armature at the notches 19 19. The bar 6 fits in between the extensions 17 17 of the plate 16 as shown, so as to hold the armature 7 from being raised out of position. The armature is attracted to the end of core 3 when the latter is energized, the armature being normally held away from the end of core 3 by pins 8 8 which are pressed downwardly by the middle springs of the several sets of spring members 26 26. It will be readily seen that when the armature 7 is attracted to the end of core 3 the portion 7* of the armature will be moved toward the bar 6, thus tending to close the magnetic circuit at the end of core 3 and also between the bar 6 and the portion 7* of the armature.

This is a great improvement over other relays in which the pivoted armature while tending to close the magnetic circuit at the end of the core also tends to open the magnetic circuit at some other portion, as between the return magnetic bar corresponding to bar 6 and the upper portion or arm of the armature. Thus it will be seen that the arrangement of applicants' armature provides a much more efficient relay. When the screw 18 is loosened and the spool and coil or coils of the relay are removed as a unit from the relay, the plate 16, being secured to the portion 2 of the spool, is also removed with the spool, the end of the bar 6 then slipping out of the recess between the extensions 17 17 on the plate 16.

27 is the relay casing, and 28 is a flexible ring secured to the inner portion of the open end of the casing 27 and adapted to slide inside of the cup-shaped portion 10 so as to securely hold the portion 27 to the portion 10 and completely inclose the relay. On the outer end of the portion 27 is a ring or staple 29 by which the casing 27 and the portion 28 may be removed from the relay when desired.

The relay shown in the drawings has two windings on the spool, but we do not wish to limit this invention to any particular number of windings on the spool.

Each set of the spring members illustrated comprises an upper spring normally held in position by a pin 20, a middle spring adapted to be operated by a pin 8 when the armature 7 is operated, and a lower spring normally held in position by a head 21 on the lower end of the pin 20. With this construction, when the armature 7 is attracted to the core 3 a contact is broken between the lower spring and the middle spring of each set, and another contact is made between the middle spring and the upper spring of each set. We do not, however, wish to limit this invention to any particular arrangement of the spring members or to any particular number of sets thereof, as various arrangements and sets of spring members may be utilized in the relay. Spring members 26 26 are mounted to the bar 3 by screws 22 22, which screws are located in front of the cup-shaped portion 10 so that they may be removed at any time it is desired to remove the spring members 26 26, without disassembling the relay from its mounting or without taking the portion 6 out of the cup-shaped portion 10.

Extending through the portions 10, 11 and 12 at the rear of the relay is a pin 23 which extends into a hole 24 in the mounting plate 9 so as to properly position the relay when the latter is mounted to the mounting plate 9, the hole 24 having an insulating bushing 25 therearound to insulate the pin 23 from the plate 9. The pin 23 is remov-

able from the plate 9 with the remainder of the relay, when the latter is dismounted.

We do not wish to limit this invention to all of the particular details of construction herein shown, as various modifications of same may be made without departing from the scope of the appended claims.

What we claim as our invention is:

1. A relay of the character described comprising a U-shaped magnetizable structure, a coil for magnetizing said magnetizable structure, an armature pivoted between the ends of said U-shaped structure so as to be removable with the coil, and adapted to be operated toward both limbs of said U-shaped structure when the latter is energized, to close the magnetic circuit, and switching mechanism arranged to be operated by the armature.

2. A relay of the character described comprising a core and a return magnetizable bar, the said core being removable, means for magnetizing the core and bar, an armature pivoted between the said core and bar and having two limbs arranged so that when one limb is attracted to the core the other limb is moved toward the said bar, the armature being pivoted so as to be removable with the core, and switching mechanism arranged to be operated by the armature.

3. A relay comprising a core and a return magnetizable bar, a coil for magnetizing said core and bar, the coil and core being removable, an armature having two limbs forming an angle, said armature being pivoted near one end of said core and bar and between same so as to be removable with the coil and core and whereby when said core and bar are magnetized one limb of the armature is attracted to the end of the core while the other limb thereof is attracted to the said bar near one end thereof, and switching mechanism arranged to be operated by the armature.

4. A relay comprising a spool and a coil wound thereon, a magnetizable bar carrying the spool and extending substantially parallel therewith, a plate secured to one end of the spool, an armature having two limbs forming an angle and pivoted between said limbs by the said plate apart from the said bar, so that one limb of the armature is attracted toward the end of the spool and the other limb is attracted toward the said bar when the relay is energized, and switching mechanism arranged to be operated by the armature.

5. A relay comprising a spool having a coil thereon, a return magnetizable bar, an armature, switching mechanism arranged to be operated by the armature, a mounting plate for the relay, means for mounting the relay as a whole to the mounting plate, and means at the relay mounting whereby the spool and coil thereon may be removed from

the said return bar and the said switching mechanism without dismounting the said bar and switching mechanism.

6. A relay structure of the character described, a core and a coil for magnetizing the core carried by the relay structure, a mounting plate, means for mounting the relay structure to the plate, and means near the mounting plate whereby the said core and coil may be removed from the relay structure without dismounting the latter from the mounting plate.

7. A relay having a core and a magnetizing coil therein, a returned magnetizable member secured to one end of the core and extending substantially parallel therewith, a mounting plate, means for mounting the said return magnetizable member to the mounting plate whereby the relay as a whole is mounted to the mounting plate, and separate means for detaching the core from the said return magnetizable member without dismounting the latter, whereby the said coil may be removed as desired.

8. A relay of the character described comprising a core and a coil or coils thereon, a return magnetizable member secured to one end of the core and extending substantially parallel therewith, an armature near the other end of the core arranged to close the magnetic circuit when attracted by the core, a mounting plate, a cup-shaped portion, a disk of insulating material between the said cup-shaped portion and the mounting plate and another disk of insulating material within the cup-shaped portion, a mounting bolt or screw extending through the mounting plate, the said disks of insulating material and the said cup-shaped portion, into the said return magnetizable member, whereby the relay as a whole is mounted to the mounting plate, a pin extending through the said disks of insulating material and the said cup-shaped portion, into the said mounting plate but being insulated from the latter, whereby the relay is suitably positioned when mounted to the mounting plate, suitable terminals from the said coil or coils extending through holes in the said disks of insulating material, the said cup-shaped portion and the said mounting plate, out of contact therewith, switch springs mounted on the said return magnetizable member and extending substantially parallel therewith; the said springs being arranged to be operated by the armature and having ter-

minals extending through the said disks of insulating material, the said cup-shaped portion and the said mounting plate, out of contact therewith, a bolt or screw holding the said core and the said return magnetizable member together, the said disks of insulating material, the said cup-shaped portion and the said mounting plate having a passage therethrough whereby the last mentioned bolt or screw may be loosened when desired, so that the said core and coil or coils may be removed from the relay, the latter having a suitable casing fitting the said cup-shaped portion to inclose the relay, substantially as described.

9. A relay structure having a magnetizable member carrying switching members, a core and a coil therefor carried by the said structure and removable therefrom, and an armature for operating the switching members, said armature having one limb extending across one end of the core and adapted to be attracted thereto, and another limb extending along the said magnetizable member of the structure and adapted to be attracted thereto, the armature being pivoted between the core and the said magnetizable member of the structure apart from the latter so as to be removed with the core and coil for purposes substantially as described.

10. A relay structure, a core and coil carried by the structure, means for mounting the said structure whereby the relay as a whole is mounted, and means near the mounting whereby the core and coil may be taken from the said structure without dismounting the latter.

11. A relay of the character described comprising a U-shaped magnetizable structure, means for magnetizing said structure, an armature pivoted between the limbs of the said structure and adapted to be operated toward both limbs thereof when said structure is energized, and switching mechanism adapted to be operated by the said armature.

As inventors of the foregoing we hereunto subscribe our names in the presence of two subscribing witnesses, this 18th day of September, 1908.

ELMER R. CORWIN.
CHARLES A. BALS.

Witnesses:

FREDERICK R. PARKER,
H. ROY COOK.