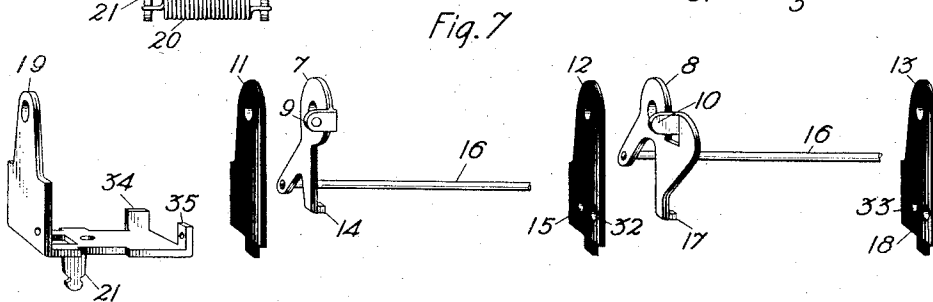
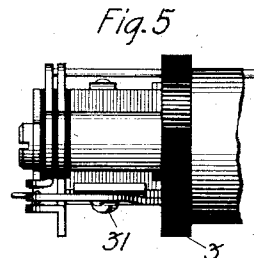
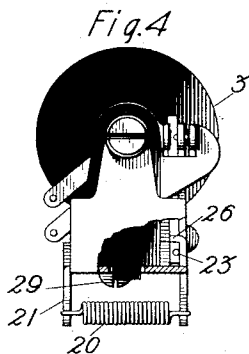
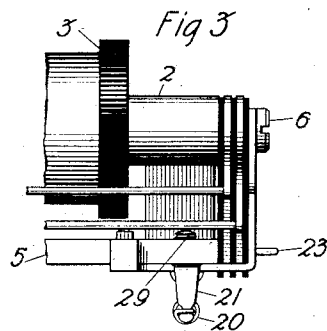
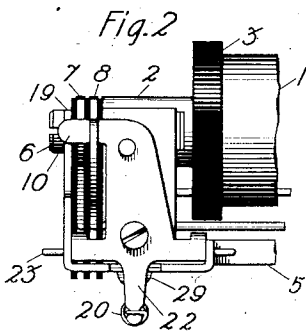
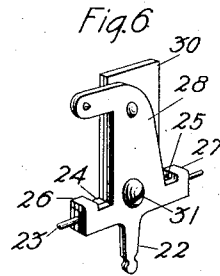
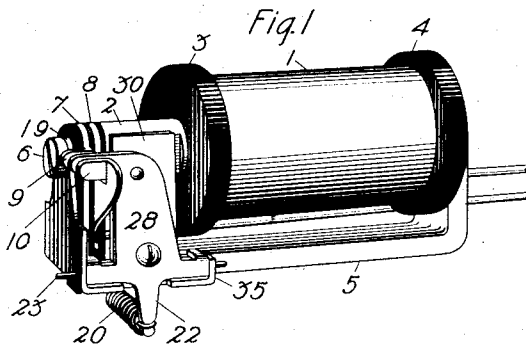


F. R. McBERTY.
RELAY.
APPLICATION FILED FEB. 26, 1910.

1,107,536.

Patented Aug. 18, 1914.



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UNITED STATES PATENT OFFICE.

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RELAY.

1,107,536.

Specification of Letters Patent.

Patented Aug. 18, 1914.

Application filed February 26, 1910. Serial No. 546,136.

To all whom it may concern:

Be it known that I, FRANK R. McBERTY, citizen of the United States, residing at New Rochelle, in the county of Westchester and State of New York, have invented a certain new and useful Improvement in Relays, of which the following is a full, clear, concise, and exact description.

This invention relates to relays and more particularly to relays of the type adapted for use with telephone exchange systems.

Relays adapted for service in circuits where they are required to respond to comparatively feeble current, or to work on narrow margins of current, must be extremely accurate in adjustment, and it is desirable that such relays be permanently adjusted when assembled, and rugged enough to maintain their original adjustment despite considerable handling and use.

It is the purpose of this invention to provide a relay construction from machine-made parts which will fulfil these conditions. Heretofore, it has been found very difficult to construct efficient relays of this type with machine-made parts, for the reason that it is impossible to produce similar parts exactly alike, even with the greatest care. Consequently, upon the assembling of the various machine-made parts into a finished relay, these minor differences tend to become cumulative, and many are found to be out of adjustment and inoperative.

The invention contemplates a relay construction wherein the circuit terminals which control the range of movement of the armature as well as its distance from the pole face shall each be fitted directly over a common uniform support carrying the helix, which becomes in effect a datum plane.

The invention may be carried out by extending the core beyond the forward end of the helix and fitting over said core the metallic plates wherein terminate the circuits to be controlled, an armature being suitably mounted to rock between said metallic plates. As shown, the plates may have circular recesses whereby they are fitted over a cylindrical core extension of less cross-sectional area than the core itself, and the contact plates may have ears struck off at

right angles and lying in different vertical planes so as to accommodate between them a contact carried by an armature mounted at the side of the core.

The various features of my invention will be more readily understood when particularly described with reference to the appended drawings, wherein—

Figure 1 is a perspective view of a relay constructed in accordance with my invention; Fig. 2 is a side elevation thereof; Fig. 3 is a side elevation of the relay reversibly as to that of Fig. 2; Fig. 4 is an end elevation; Fig. 5 is a plan view; Fig. 6 is a view of the armature removed from its support; and Fig. 7 illustrates the bridge, contact plates and insulating plates in the relative positions they assume before assembly.

The same reference characters are used to designate like parts throughout the drawings.

The energizing winding 1 of the relay is wound upon a cylindrical core 2 provided with the usual heads 3, 4 of insulating material, such as fiber or the like, the said core protruding for some distance beyond the forward end of the helix. The yoke or return pole-piece 5 is secured at the rear to the core and is then bent at right angles, passing parallel to the core and terminating near the forward end thereof. The extended forward end of the core may be reduced in cross section and may directly support a pair of metallic plates 7, 8 forming circuit terminals, but in order to provide a more efficient relay in which the magnetic circuit is completed solely by way of the armature, I prefer to form the forward extension of the core with a central longitudinal recess into which is fitted a pin 6, preferably of brass or other suitable non-magnetic material, which together with the core 2 forms a support for the plates 7, 8, also of brass, mounted directly upon, but insulated from, the periphery of said pin, and for the helix 1, a non-magnetic bridge 19 being provided for supporting the armature 30 at the side of the core, said armature having a contact playing between the lugs 9 and 10 of said plates. With a view to compactness the upper portion of the plates and bridge are

so shaped as to conform to the contour of the core, the same when assembled forming practically a continuation thereof. Each of the plates 7, 8 is provided with a rearward spring extension 16 to enable convenient connection to be made at the rear to the circuits with which the relay may be associated.

In order to prevent lateral displacement of the metallic plates and to anchor them centrally over, but clear of, the mounting pin 6, lugs 14, 17 are provided on said plates 7, 8 adapted to register with slots 15, 18 respectively in the insulating plates 12, 13, and it will be noted that since the openings in the metallic plates are considerably larger than those of the insulating plates, the liability of said pin short-circuiting said plates is eliminated. The remaining openings 32, 33 in the respective insulating plates 12, 13 are idle, not having any function, their presence being due to an advantage in manufacture whereby the cost is cheapened.

In assembling the relay, the bridge 19, insulating plates 11, 12, 13 and contact plates 7, 8 are placed together in the relative positions shown in Fig. 7 with their openings aligned and the lugs 14 and 17 registering with openings 15 and 18 respectively. The mounting pin 6 is then passed through the bridge and plates and threaded into the core, the tightening of said pin firmly binding the various parts together and to the end of the core 2. A screw 29 secures said bridge to the yoke, the ears 34, 35 passing on either side thereof.

The armature 30 is fulcrumed to the bridge 19 at the side of the core extension by means of a pin 23 and serves to complete the magnetic circuit. The said armature carries platinum contacts adapted to rock between the contacts of the plates 7, 8. A convenient armature mounting for this type of relay is the one shown, which consists of a brass plate 28, provided with an arm, having platinum contacts on each face, adapted to rock between the lugs 9, 10, the said plate being secured to the armature by a screw 31 and coöperating with it to provide a longitudinal groove in which is tightly wedged a pin 23 by means of which the said armature and plate are fulcrumed to the bridge 19. The engagement of arms 24, 25 of said armature with the ears 26, 27 of said plate prevents relative movement between said armature and plate. A spring 20 serves to maintain the armature normally retracted and is anchored at one end to a downward extension 21 of the bridge, and at its other end to a similar extension 22 of the plate 28, the bridge 19 being cut away to admit of the passage of said extension 22.

Having described my invention, I claim:

1. In a relay, a helix, a member extending through said helix, a plurality of contact

plates and an armature-support each surrounding said member and being mounted side by side thereon, and an armature movable upon said armature-support.

2. In a relay, a helix, a supporting member of magnetic material extending through said helix, a bracket mounted upon said supporting member, an armature mounted upon said bracket and moving in a direction transverse to the axis of said helix and co-operating therewith, and contacts mounted upon said support and controlled by said armature in its movement.

3. In a relay, the combination with a helix, of a core projecting beyond the forward end thereof and provided with an axial opening, a pin secured in said opening and supporting a plurality of contact plates insulated from each other and from said core, and an armature having an arm adapted to rock between said plates.

4. In a relay, the combination with a helix, of a core projecting beyond the forward end thereof and having an axial opening, of a cylindrical pin secured in said opening and adapted to insulatively engage a pair of contact plates, each of said plates having a lug bent at right angles to the plane of said plates and lying in different vertical planes on one side of the said core, and an armature mounted alongside said core extension and having an arm adapted to rock between said lugs.

5. In a relay, the combination with a helix, of a cylindrical core extending beyond the forward end thereof, of a cylindrical pin of non-magnetic material fitted in an opening in the forward end of said core, a yoke of magnetic material secured to the rear of said core and extending longitudinally of said core, a pair of non-magnetic plates fitting over but insulated from said pin and having extensions passing longitudinally to the rear of the relay, a non-magnetic armature mounting secured to said yoke at its forward end and to said pin, an armature fulcrumed to said mounting and lying in a plane parallel with the core axis, said armature having a laterally extending arm adapted to engage said insulated plates.

6. In a relay, the combination with a cylindrical core projecting beyond the forward end of the helix, of a cylindrical pin of non-magnetic material fitted centrally in an opening in the forward end of said core, a magnetic yoke connected to the rear of said core and terminating near the front of said core, a pair of non-magnetic plates fitted over but insulated from said pin and from each other and each having an ear struck off at right angles thereto and lying to one side of said core in different vertical planes, a bridge-piece secured at one end to said pin and at its other end to the forward

end of said yoke, an armature fulcrumed
upon said bridge-piece and lying in a plane
parallel to the core axis, and a non-magnetic
plate secured to said armature and having
5 an arm adapted to rock between said ears.
In witness whereof, I hereunto subscribe

my name this 25th day of February A. D.,
1910.

FRANK R. McBERTY.

Witnesses:

IRVING MacDONALD,

MORGAN WASHBURN, Jr.
