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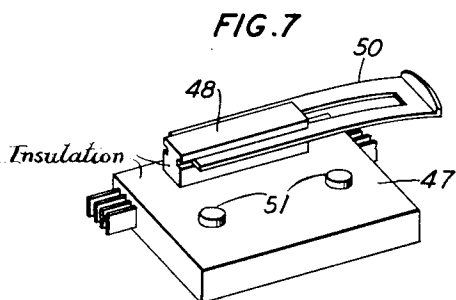
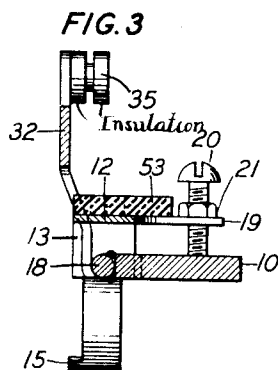
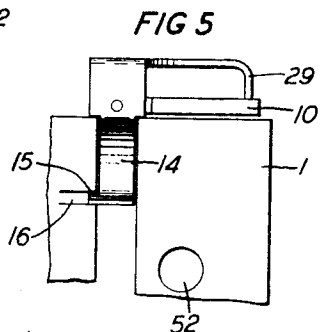
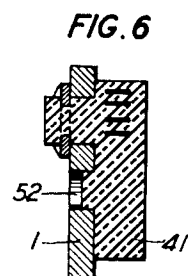
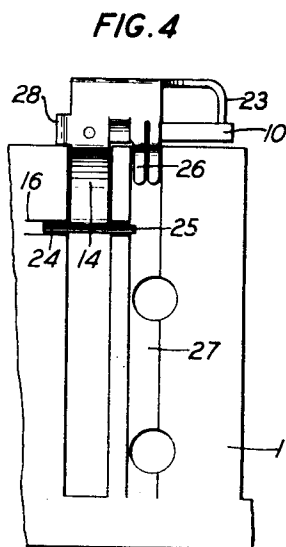
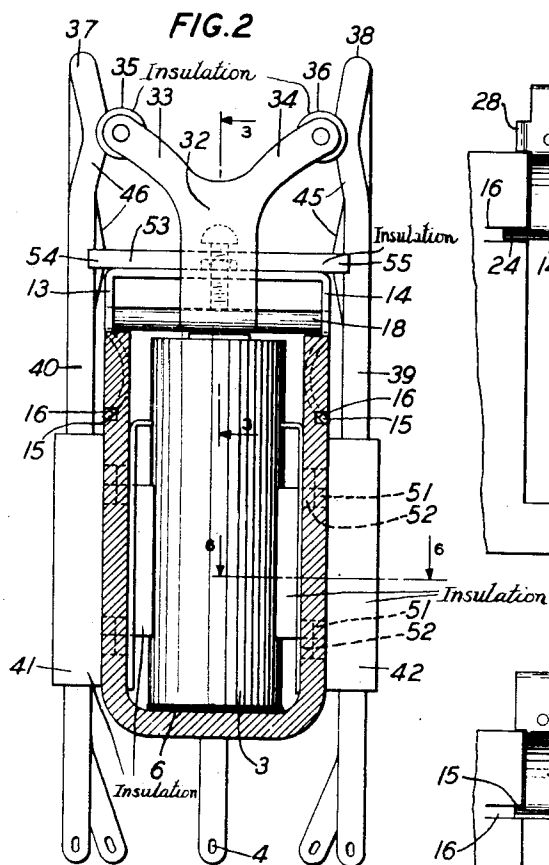
J. N. REYNOLDS

1,958,640

MULTIUNIT RELAY

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2 Sheets-Sheet 2



INVENTOR
J. N. REYNOLDS
BY *[Signature]*
ATTORNEY

UNITED STATES PATENT OFFICE

1,958,640

MULTIUNIT RELAY

John N. Reynolds, Princeton, N. J., assignor to
Bell Telephone Laboratories, Incorporated, New
York, N. Y., a corporation of New York

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11 Claims. (Cl. 200—98)

This invention relates to electromagnetic relays of the multi-unit type.

An object of this invention is to simplify the manufacturing and assembling of relays of this type.

Ordinary relays are manufactured individually with individual pole pieces, coils and operating springs and armatures and then assembled in units of a plurality of relays on mounting plates secured to racks for use in the telephone art.

A feature of the present invention is a multi-unit relay structure comprising a plurality of independently operating relay units having a common return pole piece and individual cores, windings and armatures.

Another feature is a relay structure of this kind in which the common pole piece consists of a U-shaped or channel-shaped piece of magnetic material with the cores attached to the center portion. On these cores are mounted form-wound coils, and to the two sides of the U-shaped pole piece are mounted the individual armatures. These armatures cross the upper free ends of the cores and are pivoted between the sides of the pole piece. The two sides of the pole piece therefore serve as return paths for the electromagnetic flux passing through the core and the armatures.

Another feature is the means for mounting the armatures which consists of mountings to which the armatures are individually pivoted. These mountings have clip-shaped members registering with slots in the sides of the pole piece to secure the armatures in proper positions in front of the cores.

Another feature is the means for mounting and controlling the operating springs which consists of insulating blocks in which the springs are embedded. These blocks are secured in slots in the sides of the pole piece by means of easily detachable spring clips. The operating springs are controlled by projections or operating members secured to the armatures and having insulating knobs at their ends to engage the springs located on both sides of the armature. Each operating member and a pivot are spot-welded to an armature, the pivot serving as the mounting means for the armature in its individual mounting. A suitable adjusting means may be provided on the armature mountings to regulate the air gap of the armature in relation to the core.

Another feature is the means for mounting the unit in the telephone exchange consisting of a lug welded to the U-shaped pole piece at each end thereof so that the unit may be secured to

the relay rack by merely attaching these lugs by screws to the upright frame members of the rack. The usual mounting plates employed for this purpose, when each relay is manufactured as a single unit are thereby eliminated.

Another feature is the means for mounting a cover for the unit consisting of an extension on the mounting lugs at each end provided with spring clips for securing the dustproof cover which may be slipped over these extensions to enclose the unit completely.

Referring now to the drawings, Fig. 1 shows in perspective a relay unit mounted on a relay rack with the cover partly removed.

Fig. 2 is a cross-section taken approximately on line 2—2 of Fig. 1 showing an individual relay with the common pole piece in cross-section.

Fig. 3 is a cross-section taken approximately on line 3—3 of Fig. 2 showing the armature and the mounting means for the armature of an individual relay.

Figs. 4 and 5 show modified forms of mounting means for armatures.

Fig. 6 is a cross-section taken approximately on line 6—6 of Fig. 2 of the mounting block for the operating springs and the spring for securing this block to the pole piece.

Fig. 7 shows an individual mounting block for the spring and its securing spring in perspective.

Referring now to the drawings and particularly to Figs. 1 and 2, the multi-unit relay structure consists of a U-shaped common pole piece member 1 of magnetic material having cores 2 attached to its bottom portion. All of these cores have been shown without spools or windings except at one place where a spool 3 is shown mounted on its core. These spools may be of the form-wound type and may either fit tightly on the cores or secured by suitable washers with terminals 4 extending through apertures in the bottom portion of the common pole piece. To keep the terminals properly spaced and to prevent them from short-circuiting on the bottom portion of the common pole piece, a plate of insulation material 6 is fitted on the inside with suitable slots 7 for the location of the terminals. The bottom portion of the pole piece is also provided with slots 5 for the unobstructed passage of the terminals 4. The upright sides of the common pole piece may be slotted transversely as shown at 8 to more or less concentrate the magnetic flux produced by the individual winding to pass through the corresponding armatures, with the two side members of the common pole

piece and the corresponding bottom portion serving as return paths for the magnetic flux.

Referring now to the armature 10 and the mounting 11 therefore, the mounting for the armature may consist of a U-shaped member, the central portion 12 and the side portions 13 and 14. The portions 13 and 14 may be curved at their ends and provided with projections 15 registering in slots 16 in the sides of the common pole piece. Between the portions 13 and 14 may be mounted rotatably the armature 10 on a pivot 18, registering in holes in 13 and 14. This pivot consists of a pin welded to the armature. The central portion 12 narrows down in front portion 19, which is provided with a screw 20 and adjusting nut 21 to adjust the armature air gap which relates to the core. Figs. 4 and 5 show different forms of armature mountings. Fig. 4 has instead of the portion 19 and screw 20 and nut 21 a portion 23 bent down towards the tip of the armature. This portion may be bent or otherwise adjusted to regulate the air gap. The sides 13 and 14 of the armature mountings shown in Fig. 4 may be provided with projections 24 and 25 registering in slots in the sides of the common pole piece and in addition the mounting may have projecting springs 26 that register in transverse slots 27 of the pole piece. Sides 13 and 14 may also be provided with lugs 28 that extend over the upper edge of the sides of the common pole piece. These lugs 28 and springs 26 may serve as additional means to hold the mounting in rigid position. Fig. 5 shows a mounting identical with that shown in Fig. 3 with the exception of the modified end portion 29 which is the same as portion 23 in Fig. 4 to adjust the armature air gap.

To the armature 10 and pivot 18 is welded a right-angle extension 32 which may terminate in two arms 33 and 34 having insulating washers 35 and 36 respectively that may engage the operating springs such as 37 and 38 to operate these springs to engage with other operating springs in any suitable manner. These spring-pile-ups have been shown in Fig. 1 comprising groups 39 and 40 one on each side moulded in mounting blocks 41 and 42, respectively. These springs may be made from ordinary round wire bent at different positions and pressed out flat. These bent portions or knees are shown as 45 and 46 and are provided to enable the adjustment of the springs in relation to each other from the front of the unit when secured to a relay rack.

The mounting block 47 for the springs, as shown in Figs. 6 and 7 in particular, is provided with a projection 48 that extends through a transverse slot in the side of the common pole piece. This projection has longitudinal slots provided in its sides for the insertion of a spring 50 to lock the block to the side of the pole piece. The block 47 may also be provided with round projections or knobs 51 that register with holes 52 in the sides of the pole piece to locate the operating springs in proper position in relation to the arms 33 and 34. The armature mounting may also have an insulating plate 53 riveted on its central portion 12. This insulating plate having projections 54 and 55 on both sides to engage the operating springs in various manners, such as for example, two of the operating springs in the pile-up of four and may rest against the edges of these projections while the others may be free to move by the washers 35 and 36.

The U-shaped common pole piece may be provided with lugs 56 and 57 at each end thereof

for the securing of the unit to the upright members 58 and 59 of the ordinary relay rack in telephone exchanges. These lugs may extend at right angles on each side into extensions such as 60, which are provided with clip springs 61 for the mounting and securing of the dust-proof cover 62.

It should be understood that all the parts of these relay units are either detachably mounted or spot-welded together. For example, the armature and the mounting therefor are detachable as a unit and so are the mounting blocks and spring assemblies, while the cores are welded to the bottom central portion of the U-shaped pole piece and the lugs for mounting the units on the relay rack and for mounting of the cover are spot-welded to the common pole piece. If therefore different spring pile-ups are required for the individual relay units, it is an easy matter to remove the mounting block and the armature and mounting from any individual relay and replace them by other spring pile-ups and armature and mounting having suitable operating knobs 35 and 36 for the controlling of the operating springs. As the windings 3 are also detachably mounted individual relay units may be added to the common pole piece as needed by mounting the windings on the cores with suitable armature and mounting and spring pile-ups.

The particular advantage of mounting the armature in the manner shown is that when a winding is energized, the magnetic flux will build up rapidly through the return pole pieces and the portion of the armature near the pivot where it is close to the pole pieces and thus cause the quick operation of the relays. It should be understood further that while but a single form of the relay unit has been illustrated in the drawings, with the exception of the armature mounting, it should be understood that this invention may take a number of other forms without departing from the spirit thereof and that the present disclosure is merely illustrative of one embodiment of the invention.

What is claimed is:

1. A multi-unit relay comprising a plurality of independently operating relay units including a U-shaped common return pole piece.
2. A multi-unit relay comprising a plurality of independently operating relay units having a U-shaped common return pole piece and individual cores and windings.
3. A multi-unit relay comprising a U-shaped common return pole piece, a plurality of cores connected to said pole piece, a coil winding on each of said cores, an armature mounted on the pole piece for each coil, contact springs mounted on said pole piece, and means attached to each armature for operating independent groups of spring contacts.
4. A multi-unit relay comprising a U-shaped pole piece, a plurality of cores connected to the central portion of said pole piece, a form wound coil winding on each of said cores, an armature mounted on the pole piece for each coil, spring assemblies mounted on the pole piece, and means attached to each armature for operating independent spring assemblies.
5. A multi-unit relay comprising a common return pole piece, a U-shaped plurality of cores connected to said pole piece, a coil winding on each of said cores, an armature detachably mounted on the pole piece for each coil, spring assemblies detachably mounted on the pole piece,

and means attached to each armature for operating independent spring assemblies.

6. A multi-unit relay comprising a U-shaped pole piece, a plurality of cores connected to the central portion of said pole piece, a form wound coil winding detachably mounted on each of said cores, an armature detachably mounted on the sides at the pole piece for each coil, insulating blocks detachably mounted on the sides of said pole piece, spring assemblies embedded in said insulating blocks, and means attached to each armature for operating independent spring assemblies.

7. A multi-unit relay comprising a U-shaped common return pole piece, a plurality of cores connected to said pole piece, a coil winding on each of said cores, an armature mounted on the pole piece for each coil, spring assemblies mounted on the pole piece, means attached to each armature for operating independent spring assemblies, a plate welded to each end of the common return pole piece for mounting the multi-unit relay to racks, and a cover mounted on said metal pieces serving as a dust-proofing cover for said relay.

8. A relay comprising a U-shaped return pole piece, a core having one end secured to the central portion of the pole piece, an energizing winding and an armature, said armature being pivotally secured between the two sides of the pole piece and extending across the surfaces of the upper free ends of said sides and the free end of the core.

9. A relay comprising a U-shaped return pole piece, a core having one end secured to the central portion of the pole piece, an energizing winding and an armature, said armature being

pivotally secured between the two sides of the pole piece with the pivotal line running parallel to a line drawn across the center of the free end of the core and the free ends of the two sides of the pole piece to one side of said central line along the outer edges of the two sides of the pole piece, and on which said armature extends across the surfaces of the upper free ends of said sides and the free end of the core.

10. A relay having a core, a U-shaped return pole piece, having its side portions of a rectangular cross-section with one portion located on one side and the other on the other side of the core with the long rectangular sides of these portions parallel to each other, an energizing winding, and an armature, said armature being pivoted between said portions with the pivotal line running at right angles to said longitudinal sides and located near one of the short rectangular sides of said portions and with the armature overlapping the upper free surfaces of said portions and said core.

11. A multi-unit relay comprising a plurality of independently operating relay units having individual cores, individual armatures and operating magnets, a U-shaped common return pole piece having one of its side portions on one side of said core and the other side portion on the opposite side of said core with the individual armatures extending from one of said portions to the other across the corresponding cores and pivoted at right angles to said side portions and with one pivotal point in one of said portions at the other pivotal point in the other of said portions.

JOHN N. REYNOLDS.

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