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O. R. MILLER ET AL

1,763,172

ELECTRO POLARIZED RELAY

Filed Dec. 19, 1928

FIG. 1

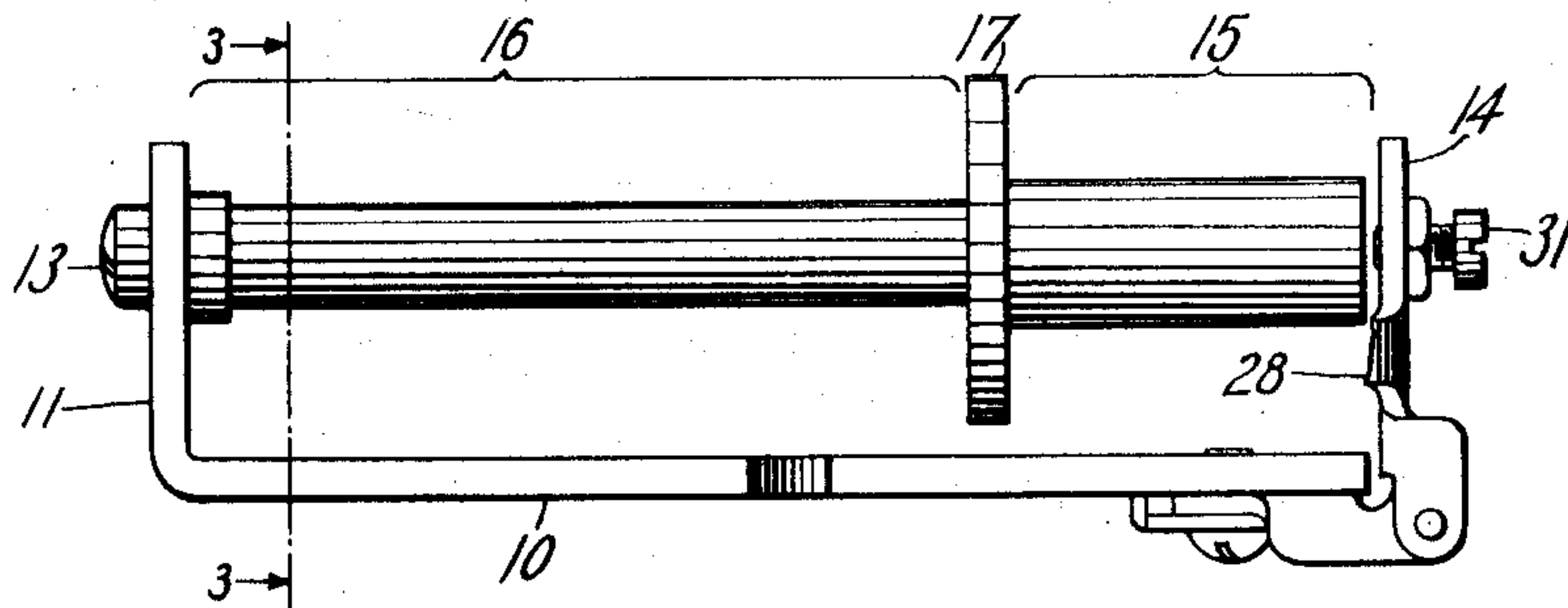


FIG. 2

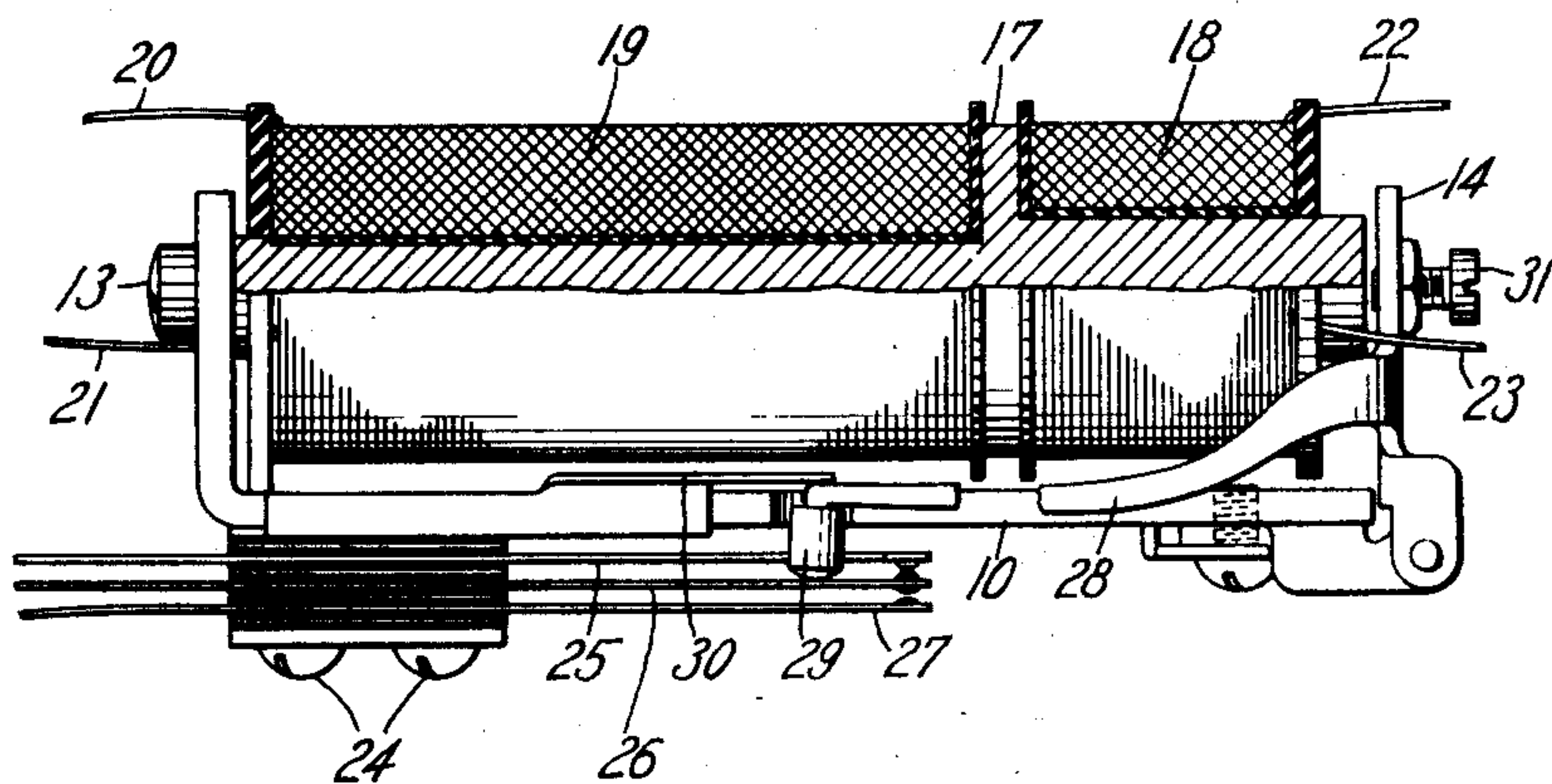
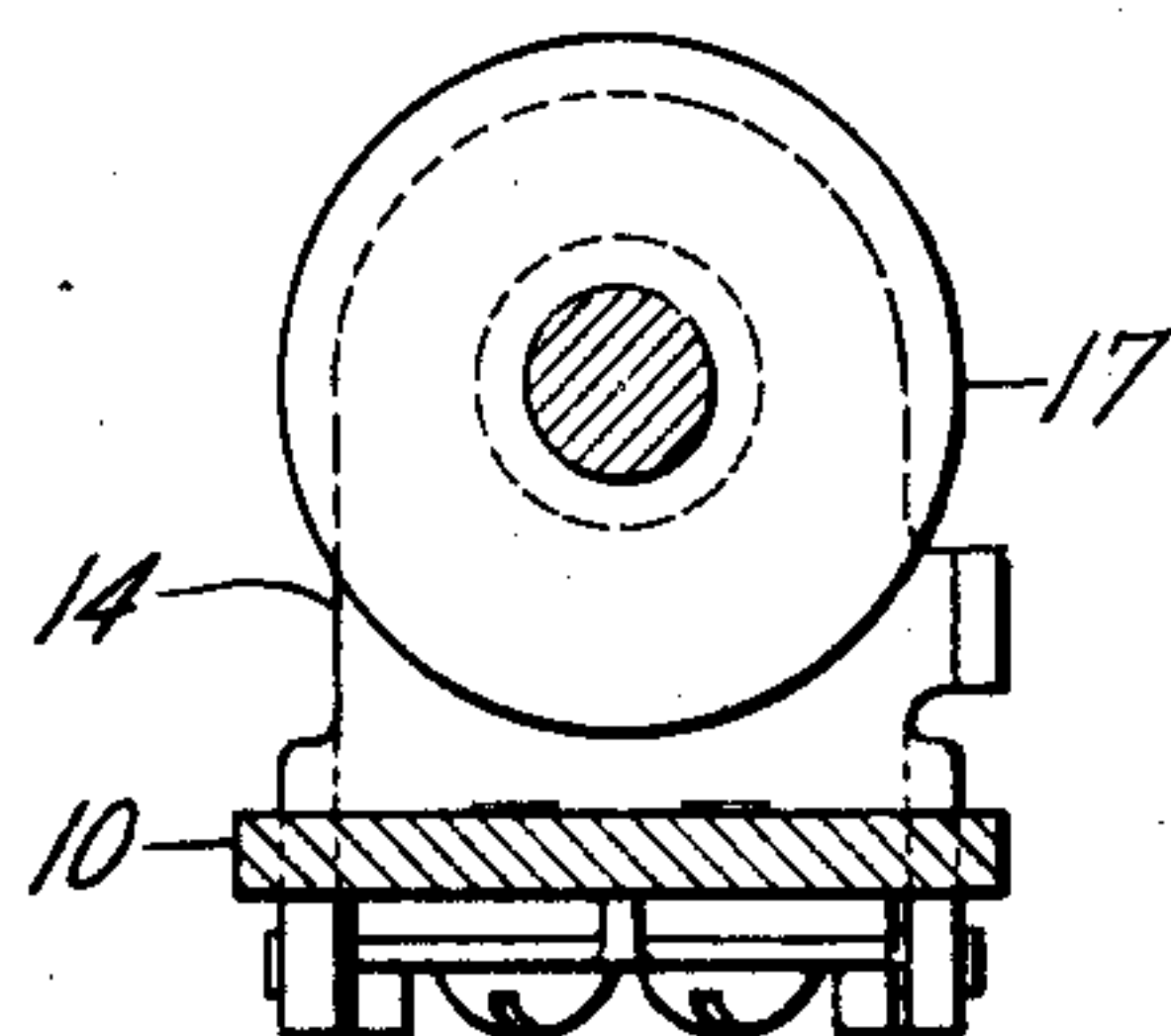


FIG. 3



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ELECTRO-POLARIZED RELAY

Application filed December 19, 1928. Serial No. 326,925.

This invention relates to electro-polarized relays and more particularly to relays of the type used in message register circuits where the response of the called party reverses the current flow in one winding to make both windings act cumulatively to operate the relay to count the call.

The object of this invention is to provide a relay of this type which will be simple, cheap to manufacture and which will operate in a positive manner upon a small aiding current but will not operate on a relatively large opposing current.

This object is accomplished by providing a winding section of large core area at the armature end of the spool, a section of smaller core area at the rear of the spool and separating the windings by an iron collar which cooperates with the magnet heel piece to form therewith a magnetic shunt around one of the coils.

In the drawings, Fig. 1 is a partial view of the relay;

Fig. 2 is an assembly view of the relay showing the spools and the magnet core partially in section; and

Fig. 3 is a cross-sectional view of the relay taken on the line 3—3 of Fig. 1.

In the figures of the drawing, 10 is a heel piece having an upright extension 11 on which a magnet core is secured at one end, as by screw 13. This core extends from the heel piece in a line parallel to the length of the heel piece 10, and an armature 14, which is pivoted on the heel piece, extends in attractable relation with the free end of the core. This core is divided into two sections 15 and 16 of unequal length by a collar member 17 which may be integrally formed with the core or secured thereon in any suitable manner. The collar member 17 extends to a relatively short distance from the heel piece 10 with which it cooperates to form a magnetic shunt, the function of which will be hereinafter described in detail.

On core section 15, which has a comparatively large cross-sectional area, is mounted a winding 18 as shown in Fig. 2 having wire terminals 22 and 23, and on core section 16 which is of smaller cross-sectional area is

mounted a winding 19 having terminals 20 and 21, the collar 17 serving as a common head piece for windings 18 and 19.

To the under side of heel piece 10 there is secured, as by screws 24, a pile-up of switch springs 25, 26 and 27 which are adapted to be actuated by a lever member 28 extending from the magnet armature 14, the armature being held in normal retracted position by the spring 26, tensioned against an insulating piece 29 carried by lever member 28. A stop member 30 secured to the heel piece 10 and a screw 31 carried by the armature 14 are provided for adjusting the back and forth movements of the armature 14 and thereby the opening and closure of springs 25, 26 and 27.

In operation, the switch spring 26 is so tensioned that the energization of winding 18 is ineffective to actuate the magnet armature but a small current in the rear winding in the same direction as the polarizing current is effective to overcome the tension of spring 26 for operating the springs 25, 26 and 27 through the attraction of the armature. However, a large reverse current in the rear winding will not cause the operation of the armature because of the opposing ampere turns of the front winding and the inefficiency of the rear winding due to its location, core area and the leakage path to the heel piece offered by the collar 17; that is to say due to the small cross-sectional area this part of the core becomes saturated by the leakage flux through collar 17 before sufficient flux is produced at the armature end to attract the armature. Any additional current above that which produces saturation only produces more leakage flux and therefore cannot cause the attraction of the armature. The relatively larger core section of the front winding aids in the attraction of the armature on a relatively weak aiding current in the rear winding as it provides a low resistance path to the flux produced by the rear winding.

Relays constructed in accordance with this invention have been found to operate in a positive manner on 30 ampere turns in the rear winding aiding 120 polarizing ampere turns in the front winding but do not operate on 600 ampere turns opposing the 120

polarizing ampere turns in the front winding.

What is claimed is:

1. In a polarized relay, an iron core of different cross-sectional areas, a winding mounted on each section, a heel piece for supporting said core and an iron member extending from said core in juxtaposition to said heel piece to form therewith a magnetic shunt around one of said windings.
2. In a polarized relay, an iron core, a heel piece for supporting said core, an armature pivoted on the heel piece in attractable relation with said core, windings of different sections mounted on said core, and a common magnetic headpiece for said windings mounted on said core and arranged to form a magnetic shunt around one of said windings.
3. In a polarizing relay, a core having portions of different lengths and different diameters, wire spools mounted thereon, a heel piece for supporting said core, an armature pivoted on the heel piece adjacent the shortest spool and an iron member extending from said core in spaced relation to said heel piece to form therewith a magnetic shunt around one of said windings to cause the core of the smaller diameter to be saturated with flux upon the passing of a large opposing current in its associated coil to prevent the operation of said armature.
4. An electromagnetic relay comprising a magnetic heel piece having a magnetic core mounted thereon, said core having winding sections of different areas, an armature movably attached to said heel piece and having a portion adjacent the end of said core of larger area, a magnetic projection on said core at the junction of said sections extending in juxtaposition to said heel piece, a polarizing winding on the front core section and an operating winding on the rear core section, whereby the flux produced by current in the rear winding when in opposite direction to that flowing in the front winding saturates the rear core section by the leakage flux through said projection before sufficient flux is produced at the armature end to attract the armature.

In witness whereof, we hereunto subscribe our names this 17th day of December, 1928.

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