

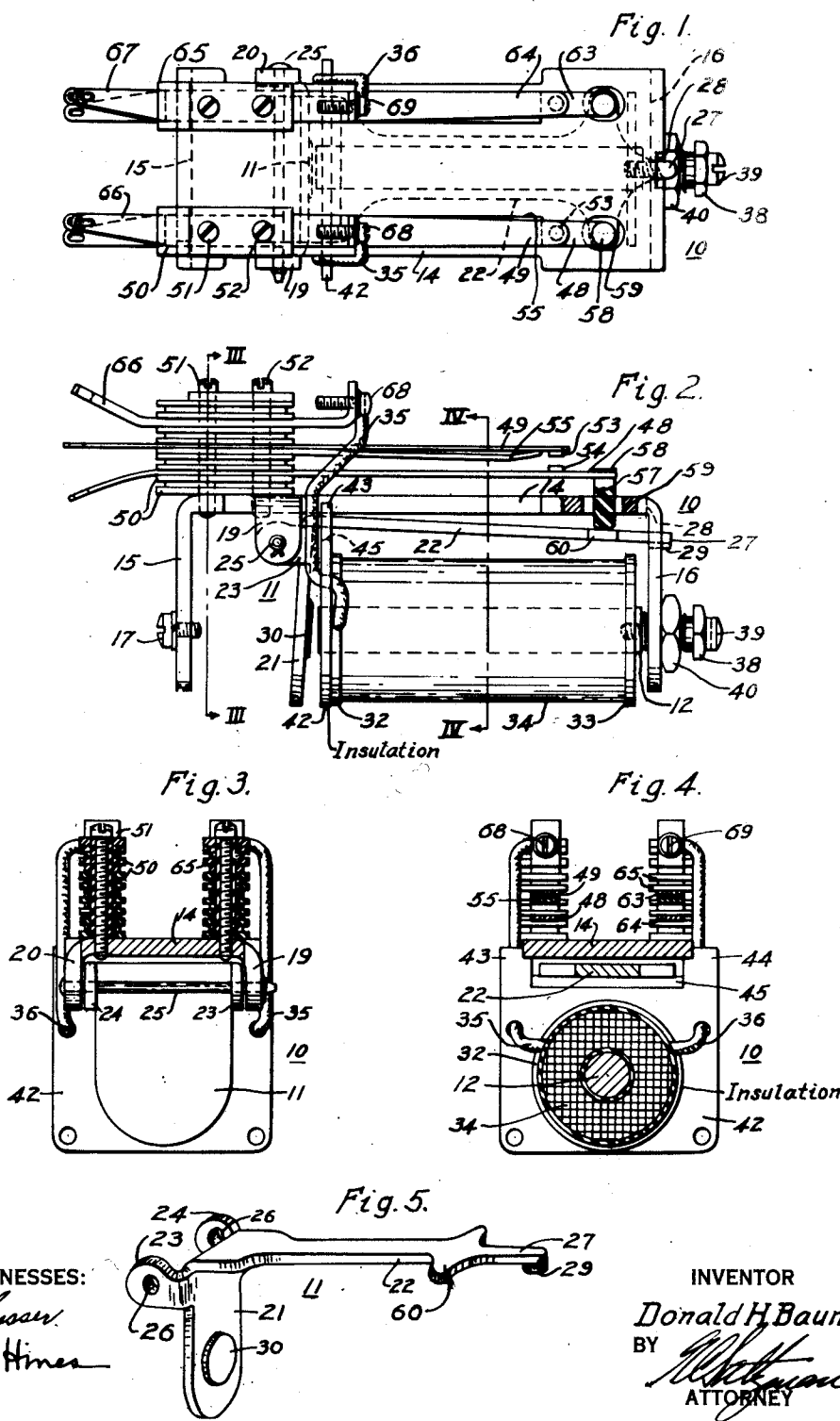
Jan. 7, 1941.

D. H. BAUM

2,228,069

RELAY

Filed Oct. 21, 1938



UNITED STATES PATENT OFFICE

2,228,069

RELAY

Donald H. Baum, Ridgewood, N. J., assignor to
Westinghouse Electric Elevator Company,
Jersey City, N. J., a corporation of Illinois

Application October 21, 1938, Serial No. 236,219

5 Claims. (Cl. 175—336)

My invention relates to electromagnetic relays of the telephone type for receiving or controlling a plurality of electric circuits.

One object of the invention is to produce a reliable and accurate relay which may be economically manufactured and assembled.

Another object is to provide a relay in which the core and coil may be removed and replaced as many times as desired without the necessity of readjusting the position of the core with reference to its armature.

A further object is to reduce the number of parts usually required in constructing relays of the telephone type.

For a better understanding of the invention, reference may be had to the accompanying drawing, in which:

Figure 1 is a top plan view of a relay embodying my invention;

Fig. 2 is a view in side elevation of the relay shown in Fig. 1;

Fig. 3 is a view taken on the line III—III of Fig. 2;

Fig. 4 is a view taken on the line IV—IV of Fig. 2; and,

Fig. 5 is a view in perspective of the armature embodied in the relay.

Referring more particularly to the drawing, the relay comprises a frame 10 in which is mounted an armature 11 and an energizing core 12. The frame is shown as constructed of suitable metal plate cut and pressed into a substantially U-shaped form having a body portion 14 with end arms 15 and 16. The end arm 15 is bent at approximately right angles to the body 14, and is provided with suitable means such as machine screws 17 for mounting the relay upon any suitable support (not shown). The arm 16 is also bent at approximately right angles to the body 14 and in the same direction and approximately parallel to the arm 15.

The body 14 is also provided at its sides with a pair of bent-over lugs 19 and 20, which extend inwardly and parallel to the sides of the frame to form a supporting means for the armature 11. The armature 11 may be constructed of suitable flat metal plate cut and pressed into a substantially L-shape and having a short arm 21 and a long arm 22. A pair of lugs 23 and 24 are bent rearwardly at the base of the arm 22, so that the armature may be pivotally mounted in its operative position in the relay frame by running a pin 25 through apertures 26 in the lugs on the frame and on the armature. The armature is provided with a narrow extension 27 on its arm

22 which extends through an aperture 28 in the arm 16, when the armature is pivotally mounted in the frame. The side walls of the aperture 28 act as a suitable means for limiting the pivotal movement of the armature. A boss 29 of non-magnetic material is welded upon the face of the armature extension 27 to rest against the wall of the aperture 28 when the armature is in its released position. The short arm 21 of the armature is likewise provided with a boss 30 of non-magnetic material on its inner face for engagement with the relay core 12 when the core is energized.

The core is provided with suitable insulating washers 32 and 33 near its ends which serve to provide a spool for a magnetizing coil 34 wound upon the core, so that it may be energized whenever the ends 35 and 36 of the coil are connected to a suitable source of electrical energy.

The core with the coil thereon is mounted in the relay by means of an adjusting screw 38 and a holding screw 39. The adjusting screw is mounted in the core arm 16 of the frame with its inner end disposed inside the arm in position to be engaged by one end of the core 12. The holding screw 39 extends through the adjusting screw 38 and into the end of the core, so that when the holding screw is tightened in its position in the core, it will hold the end of the core firmly against the inner end of the adjusting screw. A lock nut 40 is disposed on the adjusting screw to lock it firmly in the position in the core arm 16 to which it has been adjusted.

With this construction, it will be apparent that the core 12 may be mounted with its free end disposed adjacent to the boss 30 on the armature, and that the distance between the free end of the core and the boss 30 may be adjusted by rotating the adjusting screw 38 in the arm 16 until the core is in the desired position, and then turning the nut 40 to lock the adjusting screw in that position. It will also be apparent that the core may be released from its support by unscrewing the holding screw 39, and that the core or another similar core may be again replaced in operative position by merely screwing the holding screw 39 into its mounting end. Inasmuch as the adjusting screw will hold its position unless the lock nut 40 is loosened, it will be seen that the adjusting screw positions the core or any similar core in its correct position at all times with reference to the armature, and that no new adjustment is necessary when the core is removed and replaced, or when a new core is substituted for the old core.

In order to maintain the free end of the core in correct operative position with reference to the armature arm 21, a bracket or bridge 42 of suitable insulating material is mounted thereon with its feet 43 and 44 extending into engagement with the body 14 of the frame. The feet 43 and 44 may be provided with notched corners which fit over the corners of the body 14 to prevent any sideway movement of the bridge. A suitable aperture 45 between the feet of the bridge permits the armature to have free-play in its pivotal movement when it is operated by the core 12.

A pair of spring switch arms 48 and 49 are mounted on the outer face of the body 14 by means of a plurality of insulation blocks 50 and a pair of screws 51 and 52. The spring arms are provided with suitable contact members 53 and 54 which are spaced apart a suitable distance by means of a stiff spacing arm 55. An insulating plug 57 is mounted upon the under-side of the free end of the spring arm 48 by means of a rivet 58. The plug extends downwardly through a hole 59 in the frame 14 in position to be engaged by an extension 60 on the operating arm 22 of the armature. A similar group of spring arms 63 and 64 are mounted on the other side of the outer face of the frame body 14 by means of similar insulating blocks 65 in the same manner as the spring arms 48 and 49 are mounted, and are disposed to be operated by the armature arm 22 in the same manner as it operates the spring arm 48. A pair of terminal members or binding posts 66 and 67 are mounted above the spring switch arms and tightly held in the groups of insulating blocks 50 and 65 to constitute suitable fastening means for the leading ends 35 and 36 of the coil on the core 12. The ends 35 and 36 may be secured to the binding posts by suitable screws 68 and 69.

From the foregoing description it will be apparent that, if the terminal members 66 and 67 are connected to a suitable source of electric energy, the coil 34 will be provided with power to energize the core 12, and cause it to attract the short arm 21 of the armature. This movement of the short arm of the armature causes its long arm 22 to rise against the insulating plugs 57 on the under-sides of the spring arms 48 and 63, and thereby close the contact members mounted on the arms 48 and 49 and the contact members mounted on the spring arms 63 and 64. When the coil 34 is disconnected from its source of power, the core will be deenergized, the armature arm 21 will be released, and hence the armature arm 22 will be moved downwardly by the spring action of the spring arms 48 and 63, thus opening the contact members mounted on the cooperating spring arms.

By the foregoing description it will be apparent that I have provided a very simple relay construction having few parts and parts that are easily and economically pressed into form, and that I have also provided a relay in which the core and coil may be renewed, replaced or changed without the necessity of any adjustment of its mounting means except the adjustment necessarily made when the relay is first assembled and made ready for operation.

Although I have illustrated and described only one embodiment of my invention, it is to be understood that modifications thereof and changes therein may be made without departing from the spirit and scope of the invention.

I claim as my invention:

1. A relay for operating a switch comprising a metal frame having a body portion and an arm on one end extending at approximately right angles to said body portion, a magnetizable core, an energizing coil disposed on the core, means for securing one end of the core to the inner side of the arm to cause the core to extend along but separate from the body portion of the frame, an insulating bracket fixed on the free end of the core with its feet disposed against the body portion of the frame to support and brace the free end of the core, an L-shaped armature having one arm disposed operatively adjacent to the free end of the core and its other arm disposed between the core and the body portion and extending between the feet of the bracket, and a pin for pivotally supporting the armature in its operative position.

2. A relay comprising a frame of flat metal plate pressed into approximately U-form and having a pair of lugs bent inwardly on its central body portion, an armature of flat metal plate pressed into L-shape with a short arm and a long arm and provided with a pair of lugs bent backwardly away from itself at the corner of its arms for cooperation with the lugs on the frame, a pin disposed in the lugs on the frame and the armature for pivotally mounting the armature with its long arm extending along the inner face of the central portion of the frame and its short arm extending approximately parallel to and between the arms of the frame, a magnetizable core, an energizing coil on the core, means for adjustably mounting the core on the frame comprising an adjusting screw disposed in one of the frame arms to space the core at a correct operative distance from the short arm of the armature, a holding screw mounted in the adjusting screw and extending into the end of the core engaged by the adjusting screw to hold the core with its free end extending toward the short arm of the armature, thereby permitting adjusting of the position of the core with reference to the armature, and an insulating bracket mounted on the core near its free end and having feet disposed to straddle the long arm of the armature and rest against the inner face of the central body portion of the frame to steady and brace the free end of the core in its position adjacent to the short arm of the armature.

3. A relay for operating a switch comprising a one-piece frame of metallic plate material pressed into substantially U-shape and having an inwardly extending lug on each side of its central portion and an armature-limiting aperture in the one of its arms, a magnetizable core having its one end mounted on the inner side of one of the arms of the U-shaped frame and its other end extending toward the other arm of the frame, a coil disposed on the core, an L-shaped armature provided with a pair of lugs bent away from itself for cooperation with the lugs on the frame and having its one end disposed operatively adjacent to the free end of the magnetizable core and its other end disposed along the inner central portion of the frame between the core and the frame and extending into the limiting aperture in the frame, and a pin disposed through the lugs of the frame and the armature to provide a pivotal support for the armature.

4. A relay having a mounting frame comprising a body portion and an electromagnet-supporting arm extending therefrom at right-angles thereto, said arm being provided with a slot, an

electromagnet having a core, means for mounting one end of the electromagnet core on the inner face of the arm, an armature having an operating arm extending across the other end of the electromagnet and having a lever arm for operating an associated mechanism extending along said electromagnet toward the coil supporting arm, means for pivotally supporting said armature on said mounting frame, an extension on said lever arm extending into said slot to limit the movement of the armature, and nonmagnetic means for spacing a portion of said lever arm extension from a wall of said slot.

5. A relay having a mounting frame comprising a body portion and an electromagnet-sup-

porting arm extending therefrom at right-angles thereto, said arm being provided with a slot, an electromagnet having a core, means for mounting one end of the electromagnet core on the inner face of the arm, an armature having an operating arm extending across the other end of the electromagnet and having a lever arm for operating an associated mechanism extending along said electromagnet toward the coil supporting arm, means for pivotally supporting said armature on said mounting frame; and an extension on said lever arm extending into said slot to limit the movement of the armature.

DONALD H. BAUM. 15