Nov. 8, 1949 C. E. RACKLEY 2,487,372

ELECTROMAGNETIC RELAY

Filed Nov. 5, 1945

FIG. 1

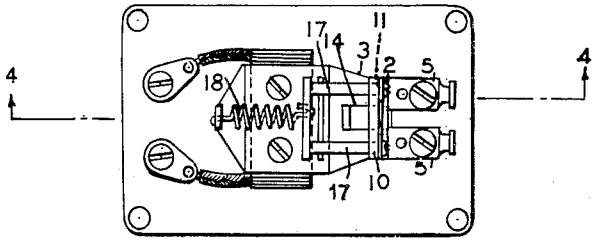


FIG. 2

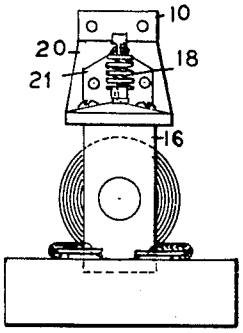


FIG. 4

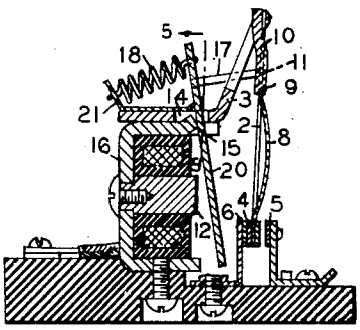


FIG. 3

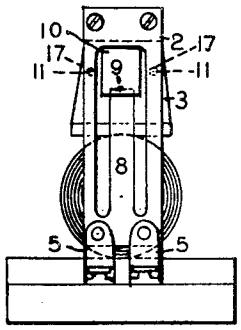


FIG. 5

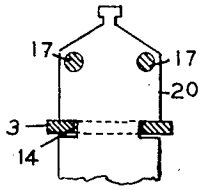


FIG. 7

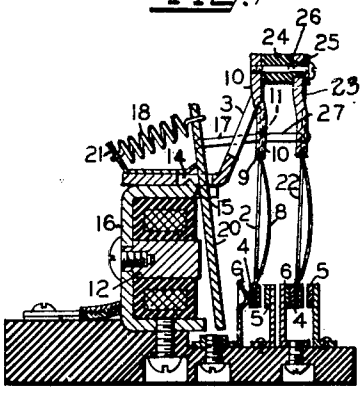
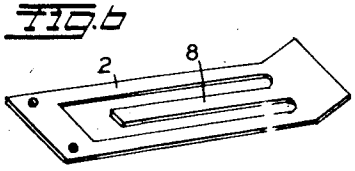


FIG. 6



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ELECTROMAGNETIC RELAY

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Application November 5, 1945, Serial No. 626,715

1 Claim. (Cl. 200—87)

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This invention relates to an electromagnetic relay for use primarily in telephone systems, electronic devices, and such other devices wherein sensitivity together with physical and electrical size are factors, and which may be installed in either a horizontal or vertical plane.

An object of this invention is the provision of a relay wherein the spring element or contactor requires but slight operating pressure and movement from the actuator, thus permitting the use of an electromagnet and armature assembly having a definite mechanical advantage in excess of one to one and giving the contactor element or spring a very fast and wide "make" and "break" of the circuit being controlled.

A further object is the provision of a relay wherein the contactor element or spring is of such shape as to permit the construction of a relay with a series of said contact elements to be stacked thus effecting a multiple contact relay for controlling a group of circuits simultaneously, and where there is a very fast and wide opening and closing of all circuits.

A still further object of this invention lies in the provision of a relay wherein the ease of action of the contactor spring mechanism and the leverage of the electromagnet and armature assembly over the metallic resistance of the spring contact makes the relay extremely sensitive to change in the operating current.

This invention resides substantially in the the combination, construction, arrangement and relative location of parts all in accordance with the disclosure herein.

In the accompanying drawings,

Figure 1 is a plan view of a relay embodying this invention.

Figures 2 and 3 are end views thereof.

Figure 4 is a section on the line 4—4 of Figure 1.

Figure 5 is a fragmentary section on the line 5—5 of Figure 4 illustrating the pivotal arrangement of the armature assembly.

Figure 6 is a perspective view of the contactor element of this invention.

Figure 7 is a sectional view similar to Figure 4 illustrating an alternative structure of this invention wherein there are stacked contact elements.

The true nature of a device in accordance with this invention will be best understood by a detailed description of the form thereof shown in the drawings in an illustrative sense.

The dominant feature of this invention resides in the contactor element or spring 2, which may be formed from a sheet or strip of spring metal, a closed end of which is mounted upon an angular

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portion of the bracket 3 which is formed from a sheet or strip of non-magnetic material, the opposite closed end thereof, being contact bars 4, free for movement between stops 5 and fixed contacts 6. This end is angular to compensate for the angular position of the spring in assembly and provide uniform contact with contacts 6.

In the mounting of the spring contact upon the bracket the central portion or leaf thereof 8 is placed under a tension by engagement in a V-shaped recess 9 in the lower end of the hanger arm portion 10 of the bracket 3. This causes the entire spring to be under a longitudinal strain. Force is applied to the points of pressure 11 by means of an armature assembly comprising an oblong plate 20 of magnetic material having oppositely disposed notches for transverse support engagement of same upon the bracket 3 and permitting swinging movement of said plate, in conjunction with the magnetizing and demagnetizing of the electromagnet 12 within a slot 14 in said bracket 3 upon a knife edge fulcrum point 15 provided by the angular outer end edge of a lateral portion of the U-shaped magnet frame 16. An arm 17 of non-magnetic material is fixedly engaged with said plate 20 and extends lateral thereto for abutment on the spring contact at point of pressure so that when the coil is energized and the upper end of the armature assembly is swung outward pressure is brought to bear on said spring causing the free end thereof to snap from open to closed position.

When a "make" is concluded by the demagnetizing of the electromagnet the armature assembly is retracted by retractile spring 18 engaged at its respective ends with upper end of the armature plate 20 and an upward extended angular end portion of a plate 21 engaged upon the horizontal portion of the bracket 3, the opposite angular end portion of the plate 21 forming a stop for the backward swing of the upper portion of the armature plate 20, on the occasion of a break.

In Figure 7 is illustrated an alternate form of my invention which is made possible thru the use of my type of contactor element or spring 2 and wherein said element is stacked and although I have only shown one stacked element 22 it is understood that any number may be stacked according to the number of circuits to be served.

In this structure the additional contactor element is engaged on a supporting arm 23 which is spaced from arm of bracket 3 by spacing member 24 and washer 25 both of which are of insulating material, said arm being in engagement

with supporting arm of bracket 3 by means of screw 26, or a rivet or other like or suitable means.

In this structure when pressure is exerted by the armature assembly thru the agency of arm 17 upon contactor element 2 at pressure point 11 this pressure is communicated in like fashion upon contactor element 22 thru means of a bar or rod 27 of non-magnetic material, one end of the member 27 being fixedly engaged with the contactor element 22 at a point corresponding to pressure point 11, the opposite end freely abutting the contactor element at point of pressure 11.

From the above description it will be apparent to those skilled in the art that the details of construction illustrated herein may readily be varied without a departure from the novel subject matter herein disclosed. I do not, therefore, desire to be strictly limited by the disclosure but rather by the claim granted me.

What is claimed is:

In an electromagnetic relay assembly, an electromagnet, a non-magnetic bracket having a recessed horizontal portion superimposed on the electromagnet and also an outwardly inclined upstanding hanger portion, the recessed portion being formed with a knife edge, a magnetic plate swingingly supported by the bracket through its

recessed portion in confronting relation to the magnet and fulcrumed against the knife edge, a springy strip-like contactor suspended from the hanger portion and having a tensioning leaf intermediate thereof engaged by said hanger portion, an arm fixedly engaged with the said magnetic plate and abutting said spring-like contactor, a retractile spring above the bracket next to its knife edge and engaged with the magnetic plate and said bracket, respectively, spaced contacts having the contactor working therebetween, and a stop on the bracket in the path of the magnetic plate to limit its throw in one direction.

CARLE E. RACKLEY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
267,711	Peck et al.	Nov. 21, 1882
1,312,514	Blessing	Aug. 12, 1919
1,471,878	Bickell	Oct. 23, 1923
2,246,724	Eaton	June 24, 1941
2,374,986	Fetter	May 1, 1945
2,404,874	Wohl	July 30, 1946