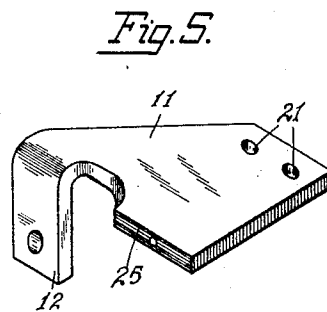
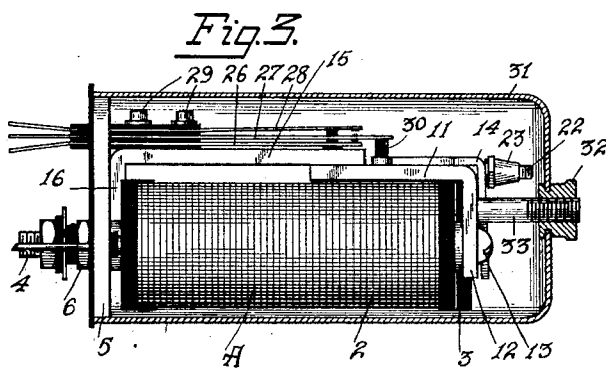
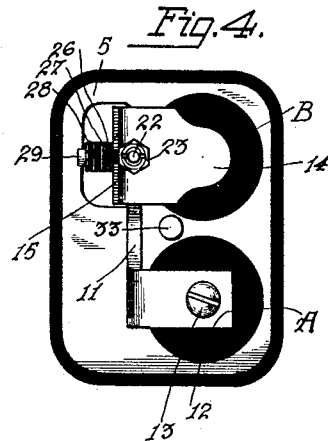
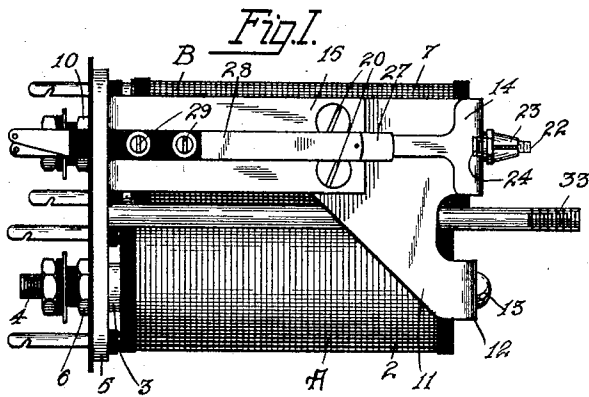
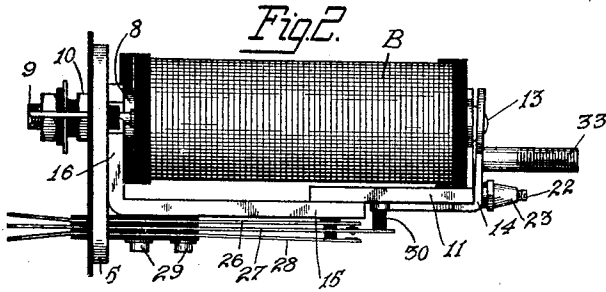


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RELAY.

APPLICATION FILED OCT. 25, 1917.

1,396,072.

Patented Nov. 8, 1921.



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UNITED STATES PATENT OFFICE.

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RELAY.

1,396,072.

Specification of Letters Patent.

Patented Nov. 8, 1921.

Application filed October 25, 1917. Serial No. 198,401.

To all whom it may concern:

Be it known that I, CHARLES SPARKS, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Relays, of which the following is a specification.

My invention relates to electromagnetic devices for use in electrical circuits, and has to do more particularly with relays, operating in connection with telephone circuits. Various types of relays, operating on different strengths of current, having different resistances and offering different impedances to alternating current, are required to fulfil the various duties that are required of them in telephone work, and to save mounting space and to have uniformity, the telephone relays in a telephone exchange system are generally all of the same size. In connection with toll work, it is particularly desirable, under certain operating conditions, to provide a relay that will operate on very feeble currents but which offers very high impedance to alternating currents. Heretofore, it has been impossible to devise a standard sized relay that operated efficiently and had the above requisites.

It is the object of my invention to devise a relay that has the above requirements, which operates efficiently and can be manufactured cheaply.

It is the further object of my invention to produce an improved relay of the class above described, which will obviate all objectionable features and that embodies desirable features all in a simple, efficient and economical manner, and to accomplish this object and others to be pointed out in the ensuing specification and in the appended claims, my invention consists in the novel details of construction, parts and combination of parts as will be hereinafter more fully described.

For a better understanding of my invention, reference may be had to the accompanying drawing, in which I have illustrated the preferred embodiment of my invention, the like parts in the several views being indicated by like reference characters, and in which:

Figure 1 is a plan view of the preferred form of my invention;

Fig. 2 is a top view of Fig. 1;

Fig. 3 is a bottom view of Fig. 1 looking in the opposite direction of that of Fig. 2, and showing a protective shell in section;

Fig. 4 is a right end view of Fig. 1; and

Fig. 5 is a perspective view of the connecting plate.

Referring now more in detail to my invention as illustrated, it comprises a pair of magnet coils A and B. The magnet A is provided with an energizing winding 2 wound upon a suitable core 3. For mounting the said core 3 and winding 2, as a whole, I provide a threaded extension 4 for the core 3. The threaded extension 4 passes through a suitable opening in a mounting plate 5, and the core 3 and winding 2, as a whole, are secured to the plate 5 by means of a nut 6 which has screw-threaded engagement with the extension 4. The magnet B is also provided with an energizing winding 7 wound upon a core 8. For mounting purposes, I provide a threaded extension 9 for the core 8. The threaded extension 9 also passes through a suitable opening in the mounting plate 5, and the winding 7 and the core 8, as a whole, are secured to the plate 5 by means of a nut 10 which has a screw-threaded engagement with the threaded extension 9.

The two cores 3 and 8, fastened to the plate 5 in the manner just described, form a horseshoe electromagnet, the said cores 3 and 8 forming the limbs of the horseshoe magnet, and the plate 5 forms the bridge connecting portion of the horseshoe magnet.

The relay of my invention makes use of two energizing windings 2 and 7 wound upon separate cores, and to bridge the free extremities of the two cores of the horseshoe magnet, I provide a connecting plate 11 having an angular extension 12 fastened to the free end of core 3 by means of a screw 13. The plate 11 is triangular in shape and extends rearwardly and parallel with the cores 3 and 8, and forms a mounting means for the armature 14. An angular supporting member 15 of non-magnetic material, such as brass, for supporting the plate 11 is also provided. The member 15 has an angular portion 16 which is provided with a suitable orifice through which the extension 9 of the core 8 extends. The member 15 is clamped between the end of core 8 and the mounting plate 5 by means of the

nut 10. The member 15 extends forward, parallel with the core 8 of magnet B, and its forward end is provided with suitable openings through which screws 20 pass into threaded orifices 21 in the plate 11. It is thus seen that the plate 11 is supported in position by means of the member 15 and by means of the screw 13. The angular armature 14 is pivotally supported upon the member 11 by means of the stud 22 and lock nut 23, the said stud 22 passing through a suitable opening 24 in the angular armature 14. The armature 14 when pivoted in this position rocks upon the edge 25 of the plate 11 as a fulcrum. The connection plate 11 extends the one pole of the horseshoe magnet in proximity with the other, thus producing a relay using two windings mounted on separate cores, but which has but one air gap. The relay, thus constructed, operates on a very feeble current and offers a high impedance to alternating currents, thus adapting it especially for toll work.

A set of contact springs 26, 27 and 28 is insulatingly mounted upon the member 15 by means of screw 29. The spring 27 is adapted to be engaged by the buffer 30 carried by the armature 14 to move the said spring 27 from engagement with spring 26 to engagement with spring 28.

In Fig. 3, I show the protective casing 31, cup-shaped in form, supported by the plate 5, due to the opening in the said casing being of the size to receive the said plate 5. A nut 32 is provided in the closed end of the said casing 31, the said nut having screw-threaded engagement with the threaded end of the rod 33, which rod has one end threaded in the plate 5.

In illustrating my invention, I have shown an embodiment worked out for commercial purposes, but it will be obvious to those skilled in the art that minor changes may be made without departing from the spirit of my invention. Therefore, I do not wish to be limited to the exact structure as shown, but aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent is:

1. A relay structure of the character described including a pair of electromagnets provided with cores, a connecting bridge to which one end of said cores are secured, a strip of magnetic material firmly connected to the free end of one of said cores, and an armature fulcrumed upon said magnetic strip extending across and in front of the free end of the other of said cores.

2. A relay structure of the character described including a pair of electromagnets provided with extended cores, a magnetic strip to which said electromagnets are secured by means of their extended cores, a

member formed of magnetic material connected to the core of one of said electromagnets, and extending over the core of the other of said electromagnets and an armature supported by said member and adapted when actuated to complete the magnetic circuit of said pair of electromagnets.

3. A relay structure of the character described including a pair of electromagnets provided with extended cores, a magnetic strip to which said electromagnets are secured by means of their extended cores, a member formed of magnetic material connected to the core of one of said electromagnets, an armature supported by said member and adapted when actuated to complete the magnetic circuit of said pair of electromagnets, and a heel iron of non-magnetic material secured to the core of one of said magnets for use in holding said member of magnetic material in position.

4. A relay structure of the character described including a pair of electromagnets provided with extended cores, a magnetic strip to which said electromagnets are secured by means of their extended cores, a member formed of magnetic material connected to the core of one of said electromagnets, an armature supported by said member and adapted when actuated to complete the magnetic circuit of said pair of electromagnets, a heel iron of non-magnetic material secured to the core of one of said magnets for use in holding said member of magnetic material in position, and contact springs secured to the said heel iron adapted to be actuated by said armature.

5. A relay structure of the character described including a pair of electromagnets provided with cores, a bridging member, said electromagnets being secured to said bridging member by their extended cores and having the free extremities of their cores extending forward, a connecting member of magnetic material firmly connected to the free extremity of one of said electromagnets and extending over the core of the other of said electromagnets, and an armature supported by said connecting member extending across and in front of the free extremity of the core of the other of said electromagnets.

6. A structure of the character described including a pair of electromagnets, a bridging member extending across one end of said electromagnets, a supporting element attached to the free end of one of said electromagnets and extending toward the free end of said other electromagnet, a non-magnetic strip extending forward from said bridging member and connecting to said supporting member, and an armature carried by said supporting element in position to be attracted by the other of said electromagnets and included in the magnetic circuit.

cuit of said pair of electromagnets, an arm of said armature lying in a plane parallel to the plane of said supporting element.

7. A device of the character described including a pair of electromagnets, a bridging member to which said electromagnets are secured, a connecting member of magnetic material attached to the core of one of said electromagnets and extending over the core of the other of said electromagnets, and an armature supported by said connecting member adapted to engage the core of the other of said electromagnets when attracted to complete the magnetic circuit of said electromagnets.

8. A device of the character described including a pair of electromagnets, a bridging member to which said electromagnets are secured, a connecting member attached to the core of one of said electromagnets, an armature supported by said connecting member adapted to engage the core of the other of said electromagnets, when attracted, to complete the magnetic circuit of said electromagnets, and a non-magnetic heel iron to which said connecting member is secured.

9. A device of the character described including a pair of electromagnets, a bridging member to which said electromagnets are secured, a connecting member attached to the core of one of said electromagnets, an armature supported by said connecting member adapted to engage the core of the other of said electromagnets, when attracted, to complete the magnetic circuit of said electromagnets, a non-magnetic heel iron to which said connecting member is secured, and contact springs fastened to said heel

iron and adapted to be actuated by said armature.

10. A relay structure of the character described including a pair of electromagnets, a bridging member connected to said electromagnets, a second bridging member attached to one of said electromagnets and extending in juxtaposition with the other of said electromagnets, a contact operating member adapted to complete the magnetic path of said electromagnets, a connecting strip of non-magnetic material connecting said first bridging member to said second bridging member.

11. A relay structure of the character described including a pair of electromagnets, a bridging member connected to said electromagnets at their one ends, a second bridging structure attached to the free end of one of the said electromagnets, a non-magnetic member connected to said last bridging member for supporting purposes, and an armature carried by said second bridging structure adapted to be attracted by the free end of the other of said electromagnets.

12. A device of the character described in claim 1 having a non-magnetic strip extending from said magnetic strip to said connecting bridge.

13. A device of the character described in claim 10 having a set of contact springs connected to said non-magnetic strip and operable by said contact operating member.

Signed by me at Chicago, in the county of Cook and State of Illinois, this 23rd day of October, 1917.

CHAS. SPARKS.