H. PÖSER.

RELAY.

APPLICATION FILED SEPT. 21, 1908.

966,764. Patented Aug. 9, 1910.

Fig. 1.

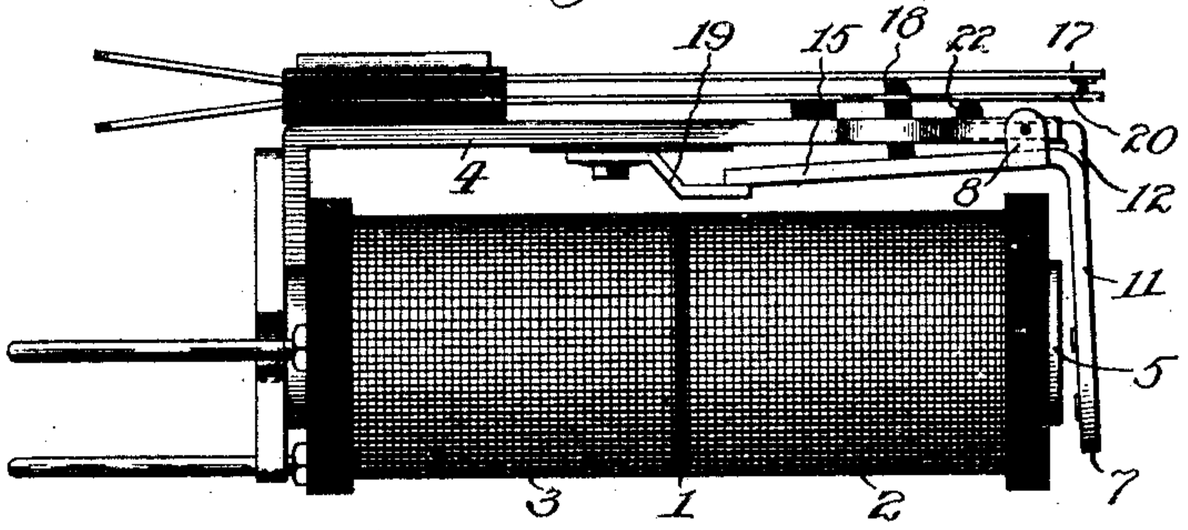


Fig. 2.

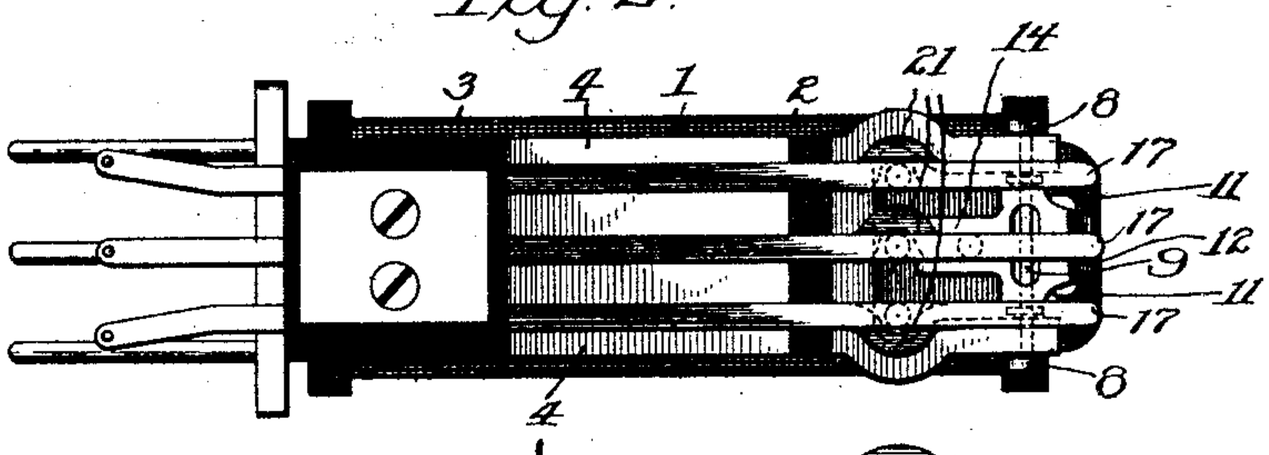


Fig. 3.

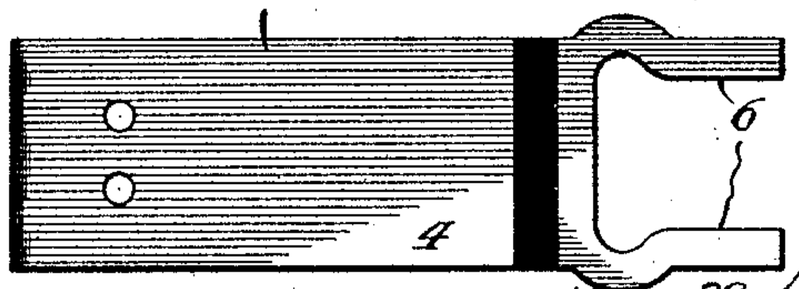


Fig. 4

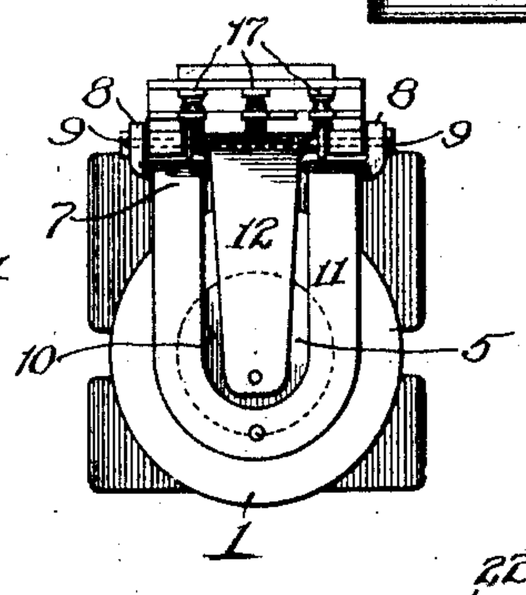


Fig. 5.

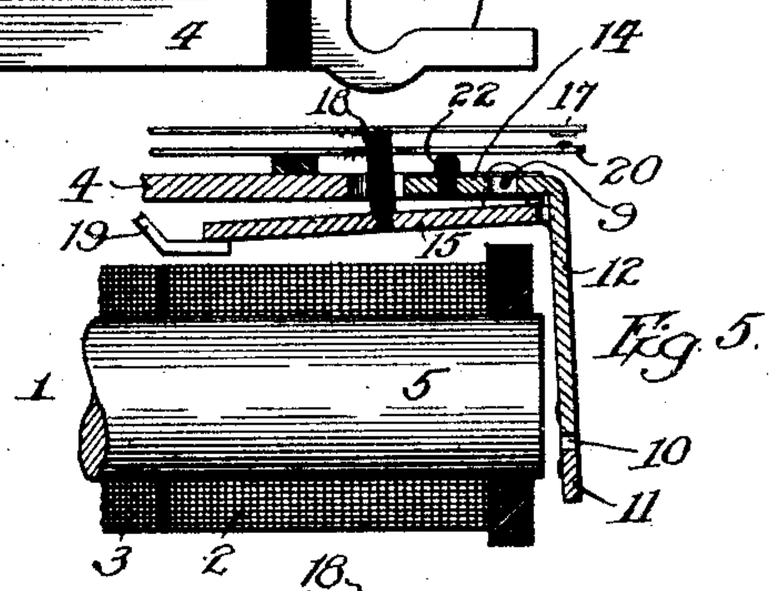


Fig. 7.

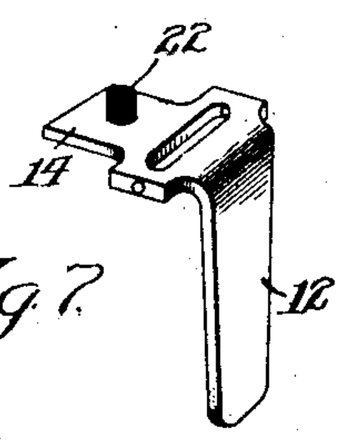
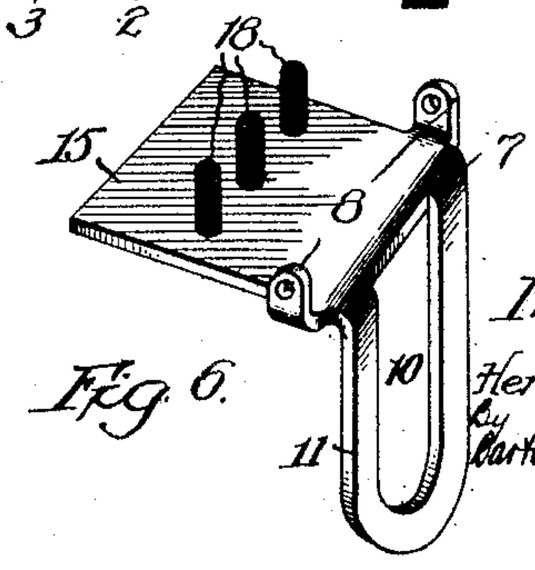


Fig. 6.



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UNITED STATES PATENT OFFICE.

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RELAY.

966,764. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed September 21, 1908. Serial No. 454,025.

To all whom it may concern:

Be it known that I, HERMANN PÖSER, a subject of the Emperor of Germany, residing at Hermsdorf, near Berlin, in the Kingdom of Prussia, Germany, have invented a certain new and useful Improvement in Relays, of which the following is a full, clear, concise, and exact description.

My invention relates to relays, and its object is to provide in a single structure a relay which performs the functions commonly performed by two independent relays.

The structure of my invention is capable of advantageous use in a telephone system to serve as a combined line and cut-off relay.

The advantageous feature of my relay, as used in a telephone system, resides in the structure whereby a main armature and a supplemental armature coöperating with the electromagnet and the different switch springs or contact devices are adapted to perform the work of two relays such as have been heretofore employed in such systems. The two armatures are adapted to operate under different degrees of energization of the electromagnet, and hence the electromagnet is preferably wound with two coils, one adapted to magnetize the core under a small current sufficiently to attract the supplemental armature. The other coil, when brought into circuit, as when the operator plugs in to answer a call, decidedly increases the magnetic power of the electromagnet to cause it to operate to attract the main armature also.

In the preferred embodiment of my invention the main armature and the supplemental armature are mounted upon the same pivotal axis. The face of the main armature is cut away in the form of a loop to admit the supplemental armature between the legs of the loop, so that normally the two armatures lie substantially in the same plane.

In the drawing which is illustrative of my invention, Figure 1 is a side elevation of a relay embodying my invention; Fig. 2 is a plan view thereof; Fig. 3 is a plan view of the return pole piece upon which the various movable parts are mounted; Fig. 4 is a front elevation of the relay; Fig. 5 is a fragmentary longitudinal vertical section of the front end of the relay; Fig. 6 is a detail perspective view of the main armature; and Fig. 7 is a perspective view of the supplemental armature.

Like parts are indicated by similar characters of reference throughout the different figures.

The electromagnet 1 is preferably provided with two windings 2, 3. The return pole piece 4 is in the form of an L-shaped plate secured at one end to the rear of the core 5, the longer arm of the plate lying above and parallel with the core and terminating approximately directly above the end thereof. The forward end of the plate comprises forked arms 6, 6, as shown most clearly in Fig. 3.

The main armature 7 is provided with perforated ears 8, 8, to receive a pivoting pin 9. Said pin 9 extends through the forked arms 6, 6, and serves to pivotally mount the armature 7 upon the end of the return pole piece 4. The armature 7 is cut away to form an opening 10, the portion of the armature facing the core 5 being thus in the form of a loop 11. The opening 10 is designed to receive the supplemental armature 12. Said supplemental armature is pivoted between the forked arms 6, 6, of the return pole piece upon the pin 9. In this method of mounting the two armatures, it will be noted that they are pivoted upon a common pivoting pin 9, and that the armatures proper lie in approximately the same plane. Each of the armatures 7 and 12 is provided with an angular extension or arm, 15 and 14, respectively, the entire structure, including the arm, being approximately in the form of an angle plate bent at right angles. The horizontal arm 14 of the supplemental armature lies between the forks 6, 6, and the horizontal arm 15 of the main armature extends beneath the arm 14 and the return pole piece 4.

The relay is shown as provided with three pairs of contact springs, the upper spring 17 of each pair resting upon the top of a stud 18 of insulating material carried by the arm 15 of the armature 7. The tension of the springs 17 normally presses the arm 15 against a stop 19 mounted on the under side of the plate 4. The studs 18 project through the opening between the arms 6 at the rear of the arm 14. The lower contact springs 20 of each pair of contact springs is bowed or curved about the studs 18 as shown at 21.

The arm 14 is provided with a stud 22 of insulating material, and the lower spring 18 of the middle pair of contact springs rests thereon and normally holds the armature 13 in its retracted position.

It is obvious that the springs can be arranged so that they are normally opened or closed as desired. When the relay is used in a telephone system to serve as a combined line and cut-off relay, the middle pair of springs controlling the circuit of the line lamp would be normally open as shown in Figs. 4 and 5, and the other two pairs performing the functions commonly performed by such contacts as are controlled by the cut-off relay would be normally closed as shown in Figs. 1 and 4.

When the circuit is closed through one of the windings, as for example, the winding 2, the armature 12 is drawn toward the end of the core 5, whereupon the arm 14 is raised and the pin 22 presses the middle contact spring 20 into contact with the spring 17. When the relay is used as a combined line and cut-off relay, said middle contact would be used to control the line signal. When a current is sent through the other winding, as for example, in the usual manner, by the operator plugging in, the main armature 11 is attracted to the core 5, and the studs 18 carried by the arm 15 of the armature, raising the several contact springs 17 out of contact with their coöperating springs 20.

It will be noted that the armature 7 extends over the end of the spool, in the form of a loop 11, and that the armature 12 lies within said loop, and is thus mounted within the armature 7.

I claim:

1. The combination with an electromagnet having a return pole piece, of two L-shaped armatures pivoted upon said pole piece with their vertices one within the other, and contact mechanism controlled by said armatures.

2. The combination with an electromagnet having a return pole piece, of two L-shaped armatures mounted thereon one within the other, said armatures being responsive respectively to different attractive forces of said magnet caused by different current strengths, and contact mechanism operated by the said armatures.

3. In an electrical responsive device, the combination with an electromagnet having two windings, of a return pole piece for said magnet, two armatures mounted thereon, one within the other, one of said armatures responsive to the attractive force due to a current in one winding, the other armature responsive to the attractive force produced by a current in the other winding, and a set of contacts arranged to be closed by the response of one armature and opened by the response of the other armature.

4. In an electrical responsive device, the combination with an electromagnet having two windings, of a return pole piece for said magnet, two L-shaped armatures mounted thereon, one within the other, one of said armatures responsive to current in one winding and the other armature responsive to current in the other winding, and a set of contacts closed in the response of one armature and opened in the response of the second armature.

5. In an electrical responsive device, the combination with an electromagnet having a return pole piece, of two armatures mounted upon said pole piece and provided with extensions, contacts actuated by said extensions, one armature being arranged to respond to a current in the said electromagnet to close said contacts, and the other armature being arranged to respond to an increase in current in the said electromagnet to open the contacts closed by the armature previously operated.

6. In an electrical responsive device, the combination with an electromagnet having a return pole piece and two armatures pivotally mounted thereon upon a common pivot, one armature responsive to a small current in the said electromagnet, and the other armature responsive to an increase in the said current, and contact mechanism operated by said armatures.

7. In an electrical responsive device, the combination of an electromagnet having a return pole piece and two L-shaped armatures mounted thereon, contacts controlled by said armatures, one armature arranged to respond to current in said electromagnet to close said contacts, and the other armature being arranged to respond to an increase in current in the said electromagnet to open the contacts closed by the armature previously operated.

8. In an electrical responsive device, the combination with an electromagnet having two windings, of a return pole piece for said magnet, two armatures mounted thereon one within the other, one of said armatures responsive to current in one winding and the other armature responsive to current in the other winding, and contact mechanism operated by said armatures.

9. In an electrical responsive device, the combination with an electromagnet having two windings, of a return pole piece for said magnet, two armatures mounted thereon, one within the other, contacts controlled by said armature, one of said armatures being responsive to current in one winding to close a set of said contacts, the other armature being responsive to current in the other winding to open the contacts closed by the armature previously operated.

10. In a electrical responsive device, the combination with an electromagnet having two windings, of a return pole piece for said

magnet, two L-shaped armatures mounted thereon, one within the other, one of the said armatures responsive to the attractive force of a current in one of the said windings, and both of said armatures responsive to the attractive force of a current in the other winding, and contact mechanism operated thereby.

11. The combination with an electromagnet and its core, of a magnetic extension from said core forming a return pole piece, two armatures mounted one within the other before the said core, one armature responsive to current in the said magnet, the other armature responsive to an increase of current in the said magnet, and contact mechanism operated by said armatures.

12. The combination with an electromagnet and its core, of a magnetic extension from the core of said magnet forming a return pole piece, two L-shaped armatures mounted one within the other before the said core, one armature being responsive to current in the said magnet and the other armature being responsive to an increase of current in the said magnet, and contact mechanism operated thereby.

13. The combination with an electromagnet having a return pole piece, of an L-shaped armature mounted thereon, a second armature mounted within the said first mentioned armature, said armatures being responsive to different current strength in said electromagnet, and contact mechanism operated by said armatures.

14. In a relay, the combination with an electromagnet and its core, of a return pole piece having a bifurcated end extending above the end of said core, an armature pivoted within the forks of said bifurcated end, a second armature pivoted at its edges upon the outer sides of said bifurcated return pole piece, and contact mechanism controlled by said armatures.

15. In a relay, the combination with an electromagnet and its core, of a return pole piece having a bifurcated end extending above the front end of said core, a pin extending transversely through said bifurcated end, an armature pivoted upon said pin within said bifurcation, a second armature pivoted upon said pin upon the projecting ends of the pin, and contact mechanism controlled by said armatures.

16. In a relay, the combination with an electromagnet and its core, of a return pole piece having a bifurcated end extending above the end of said core, a pin extending transversely through the end of said bifurcated pole piece, an L-shaped armature pivoted upon said pin outside of said bifurcation, one end of said armature depending in front of said core and having a portion of said depending end cut away to form an opening, a second L-shaped armature pivoted upon said pin within said bifurcation and having its depending end extending in the opening of said first mentioned armature, and contact mechanism controlled by said armatures.

In witness whereof, I hereunto subscribe my name this 4th day of September A. D., 1908.

HERMANN PÖSER.

Witnesses:
HENRY HASPER,
WOLDEMAR HAUPT.