No. 705,092. Patented July 22, 1902.

W. KAISLING.

SUPERVISORY RELAY.

(Application filed Feb. 4, 1901.)

(No Model.)

Fig. 1.

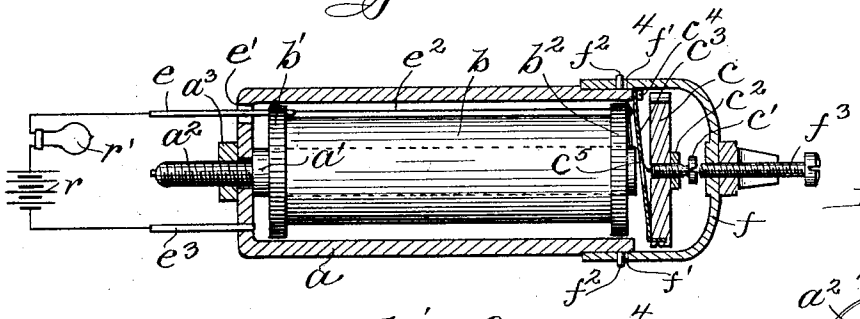


Fig. 3.

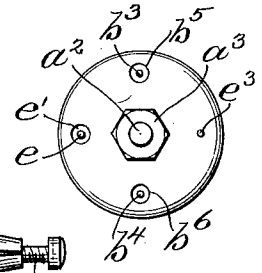


Fig. 2.

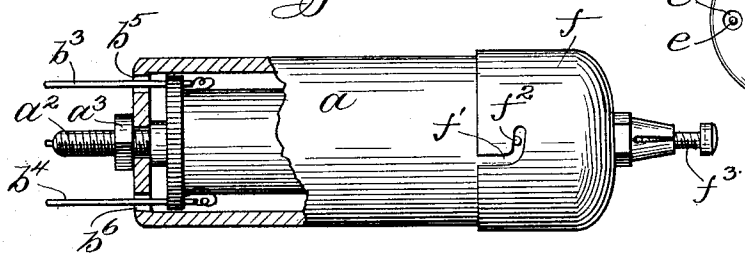


Fig. 4.

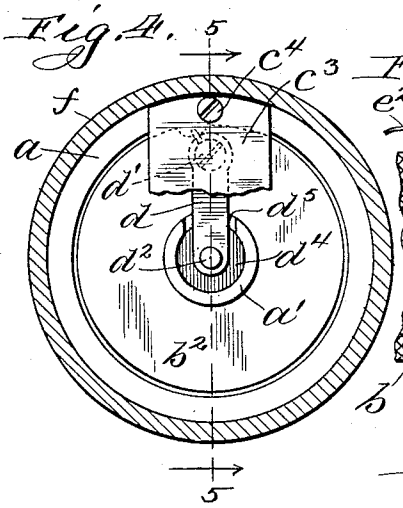


Fig. 5.

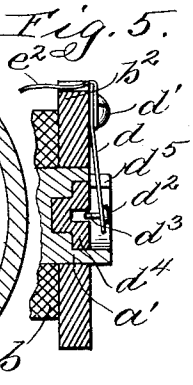


Fig. 6.

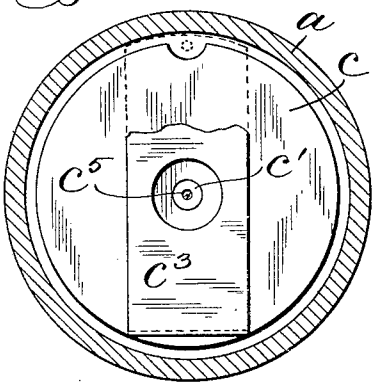
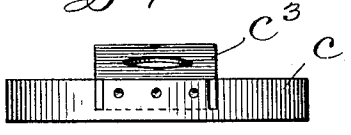


Fig. 7.



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UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

SUPERVISORY RELAY.

SPECIFICATION forming part of Letters Patent No. 705,092, dated July 22, 1902.

Application filed February 4, 1901. Serial No. 45,964. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Supervisory Relays, (Case No. 16,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a supervisory relay more particularly designed for telephone purposes, although equally applicable to other uses.

The object of my invention is to provide a compact and efficient relay, and more particularly to provide means for mounting the armature of the relay.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of the relay of my invention. Fig. 2 is a view thereof, partially in section. Fig. 3 is an end view of the relay. Fig. 4 is an end view of the relay, the cap f being in section and the armature c, together with the greater portion of its supporting-strip c^3, being removed. Fig. 5 is a detail view of one of the relay-contacts and the mounting therefor. Fig. 6 is a detail view showing the armature and the mounting therefor. Fig. 7 is a detail view showing the manner of securing the armature to the suspending-spring.

Like letters refer to like parts in the several figures.

The relay is surrounded by a shell a of magnetic material, and within this shell the core a' is mounted, the core having a threaded shank a^2, adapted to pass through an opening in the rear of the shell a and adapted to be secured in position by means of a jam-nut a^3. Upon the core a' the winding b of the relay is mounted, the winding being held between insulating end pieces b' b^2. The ends of the winding b are connected, respectively, with the leading-in conductors or rods b^3 b^4, which pass freely through holes b^5 b^6 in the end of the shell a.

The armature c is preferably made circular in form and carries at the center a tapped hole adapted to receive a screw c', secured in position by a jam-nut c^2. The end of the screw carries a contact-point c^5, preferably of platinum, which is adapted to serve as one of the contacts of the relay. The armature c is suspended opposite the end of the core a' by means of a strip c^3, preferably of copper, and adapted to serve as a spring. One end of the strip c^3 is secured to the end of the shell a by means of the screw c^4, and the opposite end of said strip c^3 is adapted to rest in a saw cut or slot provided in the face of the armature c near the periphery thereof. The end of the strip c^3 is bent substantially at right angles for insertion in said saw cut or slot, and after the said end has been inserted in the saw-cut the circumference of the armature directly over the slot is prick-punched to secure the armature to the strip. The strip c^3 serves to normally maintain the armature a short distance from the end of the core, and when the armature is attracted the same is drawn toward the core to close together the relay-contacts. When the armature is attracted, the metallic circuit is completed from the shell-terminal e^3, through the shell and suspension-spring c^3, to the armature-contact c^5, thence to the back contact d^2 and by wire e^2 to terminal e. By this means of suspension the weight of the armature is balanced, and therefore the only strain to be exerted by the magnet is against the spring copper strip c^3. Moreover, this strip serves to make a good electrical contact between the armature and the shell of the relay.

Upon the front insulating-plate b^2 a spring or strip d is secured by means of a screw d'. The lower end of said strip d carries a platinum contact d^2, adapted to be engaged by the relay-contact carried upon the armature c. The platinum contact d^2 carries a shank d^3, extending to the rear of the strip d, said shank being guided in an opening provided in an insulating-block d^1, inserted in a bore in the end of the core a'. The face of the insulating-block d^1 rests at a distance from the end of the core, so that the contact d^2 rests wholly within the end of the core. A slot d^5 is provided at one side of the core to accommodate the passage of the strip d. An opening is pro-

vided through the strip c^3, supporting the armature, to thereby permit the contact c^5 to engage the contact d^2.

A leading-in wire or rod e is secured to the head b' and passes through the end of the shell a, being insulated therefrom by means of a bushing e'. Said rod e is electrically connected with the strip d by means of a conductor e^2. A rod or wire e^3 is mounted upon the end of the shell a, being in electrical contact therewith. The wires e and e^3 form the terminals of the circuit adapted to be controlled by the relay-contacts. For the purpose of illustration I have shown a battery r and a lamp r' in circuit with the wires e and e^3. The circuit may be traced from the battery through the lamp r', wire e, conductor e^2, strip d, relay-contact d^2, thence, when the armature is attracted, to contact c^5, armature c, strip c^3, to shell a, thence through wire e^3 to the opposite pole of the battery.

Upon the end of the shell a is mounted a cover or cap f, said cover having upon opposite sides the bayonet-channels f' f', adapted to engage, respectively, the pins f^2 f^2, carried upon the shell a. The cap f carries a screw f^3. By turning this screw the same may be caused to engage the head of screw c' to limit the distance to which the spring may retract the armature.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with an electromagnet, of an armature situated opposite the pole thereof, and a mounting for said armature comprising a spring passing across the inner face of said armature and secured at one end to the armature and at the opposite end to a suitable support, substantially as described.

2. The combination with an electromagnet, of an armature situated opposite the pole thereof and adapted to occupy an upright position, of a mounting for said armature comprising a spring passing across the face of the armature and secured at one end to the lower edge of said armature and to a suitable support at the upper end, substantially as described.

3. The combination with an electromagnet and the core thereof, of an inclosing shell of magnetic material, an armature situated opposite the ends of said core and shell and a mounting for said armature comprising a spring passing between the poles of the magnet and the armature and secured at one end to the edge of said armature and at the other end to the end of said shell, substantially as described.

4. The combination with an electromagnet, of an armature situated opposite the pole thereof, and a mounting therefor comprising a spring located between the pole and the armature and having one end inserted in a slot provided near the edge of the armature and having the other end secured to a suitable support, substantially as described.

5. The combination with an electromagnet, of an armature situated opposite the pole thereof, and a mounting therefor comprising a spring placed between the pole and armature and having one end inserted in a slot provided near the edge of said armature the periphery of said armature being prick-punched in the vicinity of said inserted end to secure the same in position, the opposite end of said spring being mounted upon a suitable support, substantially as described.

6. The combination with an electromagnet, of an armature situated opposite the pole thereof, a mounting for said armature comprising a spring passing across the face thereof and secured at one end to the armature and at the opposite end to a suitable support and a pair of contacts one carried upon said armature and the other upon the end of the core of said electromagnet and adapted to be closed together when the armature is attracted, substantially as described.

7. The combination with an electromagnet, of an armature situated opposite the pole thereof, a mounting therefor comprising a spring secured at one end to the armature and at the other end to a suitable support, a pair of contacts one carried upon said armature and the other upon the end of said core, said spring being provided with an opening to permit said contacts to engage when the armature is attracted, substantially as described.

8. The combination with an electromagnet, of an insulating-block mounted upon the end of the core thereof, a contact mounted upon said block, an armature situated opposite the end of said core, a mounting for said armature comprising a spring passing across the face of the armature and secured at one end to the edge of said armature and at the other end to a suitable support and a contact carried upon said armature and adapted to engage the contact on the core when the armature is attracted, substantially as described.

9. The combination with the core of an electromagnet, of a winding mounted on the core, and an insulating-block surrounding the end of said core, an insulating-piece inserted in an opening in the end of said core, a spring secured at one end to said insulating-block and carrying a contact adapted to rest against said insulating-piece, a shell of magnetic material surrounding the winding of said electromagnet, an armature situated opposite the pole of said electromagnet and a mounting for said armature comprising a spring secured at one end to the edge of said armature and at the other end to the end of said shell, substantially as described.

10. The combination with an electromagnet, of an armature situated opposite the pole thereof, a mounting for said armature comprising a strip of metal located between the pole and armature and serving as a spring and secured at one end to the armature and at the opposite end to a suitable support, a contact carried upon said armature, and an

electrical circuit adapted to include said contact, the metal of said armature and said spring, substantially as described.

11. The combination with an electromagnet, comprising a core and a winding surrounding the same and a shell of magnetic material surrounding said winding, of a contact carried upon the end of said core, an armature situated opposite the end of said core, a mounting therefor, comprising a spring passing across the face of the armature and secured at one end to the armature and at the other end to the end of said shell, a contact carried upon said armature and adapted to engage the contact on the end of said core, a leading-in conductor mounted upon and electrically connected with the rear end of said shell, and three leading-in conductors passing through and insulated from the end of said shell, two of the same being connected with opposite ends of the magnetic winding and the third being connected with the contact mounted upon the end of said core, substantially as described.

12. The combination with an electromagnet, of an armature situated opposite the pole thereof, and a mounting for said armature comprising a spring secured to said armature and to a suitable support and contained wholly within the periphery of the armature, substantially as described.

13. The combination with an electromagnet and the core thereof, of an inclosing shell therefor, an armature situated opposite the ends of the core and armature, a mounting for the armature comprising a spring-strip extending across the end of the magnet and between the poles thereof and the armature, said strip being confined within the limits of the armature and shell substantially as described.

14. The combination with an electromagnet and the core thereof, of an inclosing shell of magnetic material, an armature situated opposite the ends of said core and shell and a mounting for said armature comprising a spring secured at one end to the edge of said armature and at the other end to the end of said shell, substantially as described.

15. The combination with an electromagnet and the core thereof, of an inclosing shell, an armature situated opposite the ends of said core and shell, and means for permanently securing said armature directly to the shell, substantially as described.

16. The combination with an electromagnet, and a core therefor, of an inclosing shell of magnetic material forming a portion of the magnetic circuit of the magnet, an armature situated opposite the ends of said core and shell and adapted to be attracted thereby, said armature being permanently secured to said shell so as to be carried directly thereby, substantially as described.

17. The combination with an electromagnet and the core thereof, of an inclosing shell, an armature situated in front of the ends of said core and shell, a removable cap fitting upon the end of the shell and adapted to inclose the end of the same and the armature, said armature being mounted independently of the cap, whereby the latter is removable without disturbing the armature in its relation to the shell, substantially as described.

18. The combination with an electromagnet and the core thereof, of an inclosing shell of magnetic material forming a part of the magnetic circuit, an armature situated opposite the ends of said core and shell, and a mounting for said armature adapted to permit it to move bodily in a right line opposite the poles of the magnet, substantially as described.

19. The combination with an electromagnet and a core therefor, of an inclosing shell of magnetic material, an armature situated opposite the ends of said core and shell and a mounting for said armature comprising a spring of non-magnetic material passing across the inner face of said armature and secured at one end to the armature and at the opposite end to a suitable support, substantially as described.

20. The combination with an electromagnet, of an armature situated opposite the pole thereof, and a mounting for said armature comprising a spring passing across the inner face of said armature and secured at the opposite end to a suitable support, substantially as described.

21. The combination with an electromagnet and the core thereof, of an inclosing shell, an armature situated in front of the ends of said core and shell, means for mounting said armature directly upon the shell, and a removable cap for closing the end of the shell and inclosing the armature, said cap being entirely independent and free from the armature, substantially as described.

22. The combination with an electromagnet and the core thereof, of an inclosing shell of magnetic material forming a portion of the magnetic circuit for the magnet, an armature situated opposite the ends of said core and shell and adapted to be attracted thereby, said armature being directly carried by the shell, and a removable cap for closing the end of the shell and inclosing said armature, said cap being entirely independent and free from the armature, substantially as described.

23. The combination with an electromagnet and the core thereof, of an inclosing shell, an armature situated in front of the ends of said core and shell, a removable cap fitting upon the end of the shell and adapted to inclose the end of the same and the armature, said armature being mounted independently of the cap, whereby the latter is removable without disturbing the armature in its relation to the shell, and an adjustable stop for the armature carried by the cap, substantially as described.

24. The combination with an electromagnet and the core thereof, of an inclosing shell of

magnetic material forming a part of the magnetic circuit, an armature situated opposite the ends of said core and shell, a spring-mounting for said armature adapted to permit it to move bodily in a right line opposite the poles of the magnet, and a stop for the armature, substantially as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:
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KEMPSTER B. MILLER.