O. C. DENNIS.

RELAY.

APPLICATION FILED DEC. 11, 1905.

965,877. Patented Aug. 2, 1910.

Fig. 1.

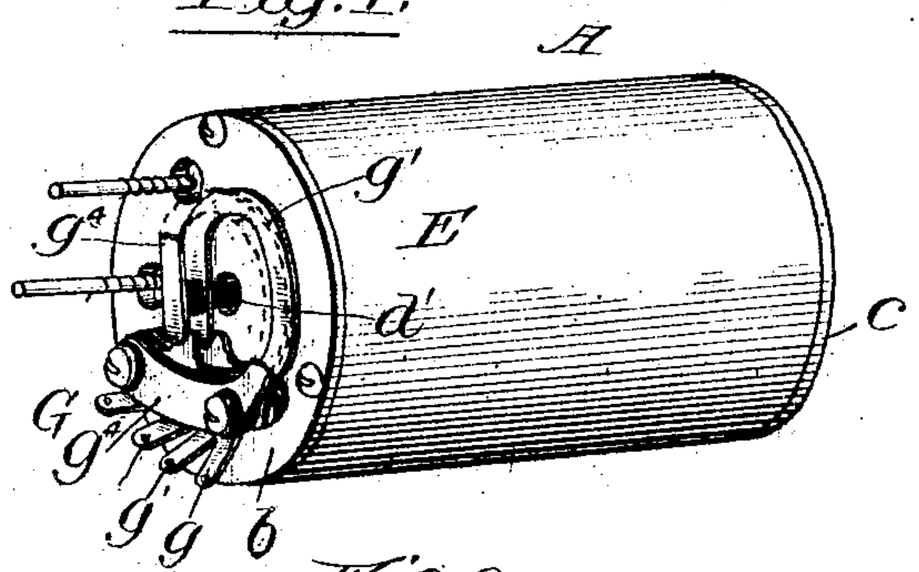


Fig. 2.

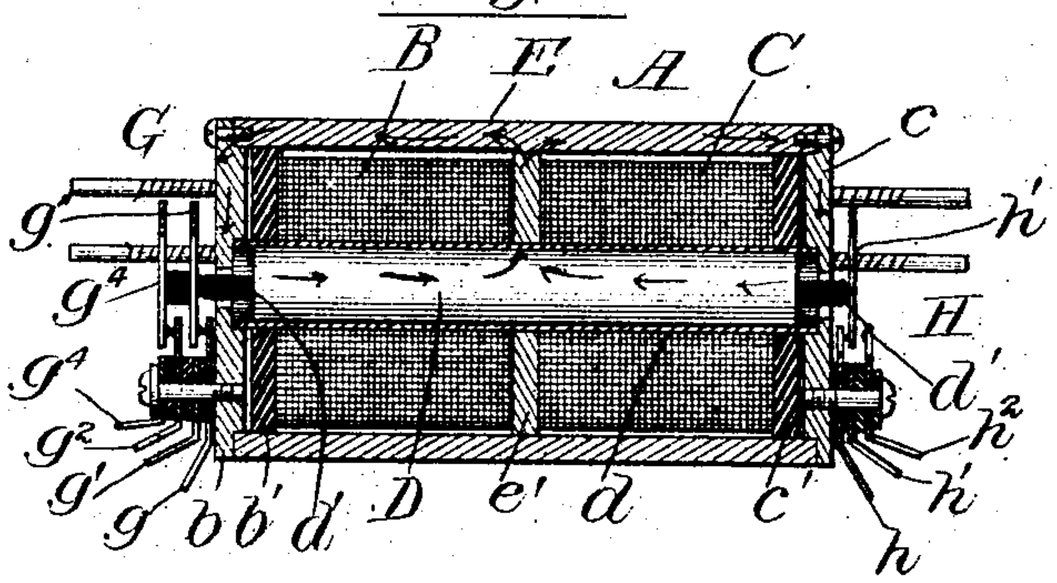
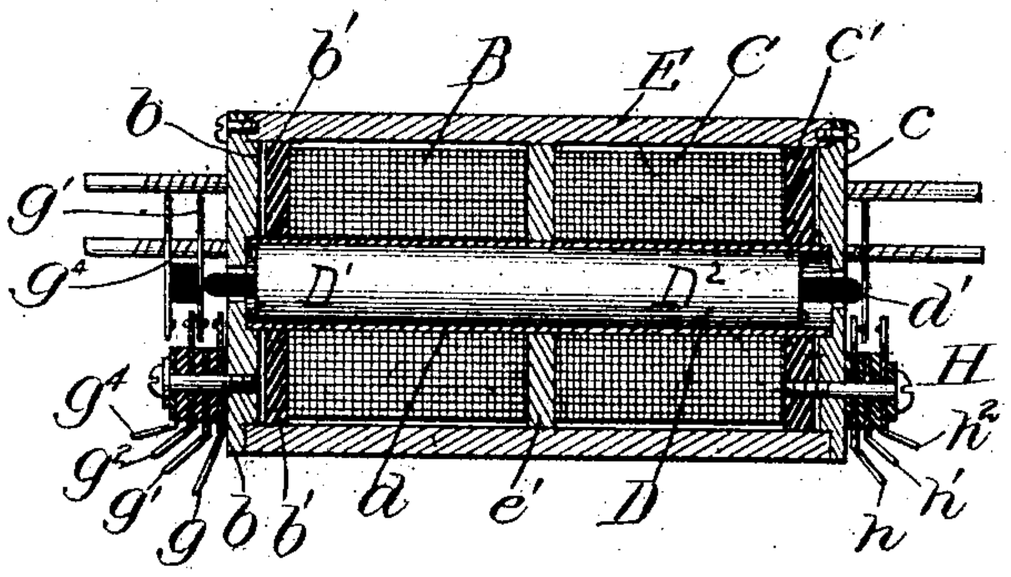


Fig. 3.



Witnesses:

O. M. Kennick

Lewis S. Russell

Inventor:

Oliver C. Dennis,

By Fred Gerlach,

his Atty.

UNITED STATES PATENT OFFICE.

OLIVER C. DENNIS, OF CHICAGO, ILLINOIS.

RELAY.

965,877. Specification of Letters Patent. Patented Aug. 2, 1910.

Original application filed October 29, 1904, Serial No. 230,475. Divided and this application filed December 11, 1905. Serial No. 291,273.

To all whom it may concern:

Be it known that I, OLIVER C. DENNIS, a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Relays, of which the following is a full, clear, and exact description.

The invention relates to relays and designs to provide an improved relay which is simple and compact, and which is susceptible of performing a plurality of functions, *e. g.* the alternative operation of a plurality of switches.

With these objects in view the invention consists in the several novel features hereinafter set forth and more particularly defined by claim at the conclusion hereof.

This application is a division of the subject-matter set forth in application filed by me October 29, 1904, Serial No. 230,475.

In the drawings: Figure 1 is a perspective of the improved relay. Fig. 2 is a central longitudinal section, the armature being shown in normal position. Fig. 3 is a similar view showing the armature in another of its positions.

A denotes a solenoidal relay comprising a helix B and a helix C, within which is slidably guided a core D, a jacket E and caps *b* and *c* and a central disk or pole-piece *e'*. Insulating ends *b'* and *c'* are respectively arranged at the outer ends of helices B and C. The caps, core, disk and jacket are made of iron to provide paths for the magnetic flux resulting from both helices. Core D is guided in tube *d* and is adapted to operate a switch G at one end of the relay and a switch H at the other end of the relay. Switch G comprises members *g*, *g'*, g^2 and g^4. Members *g'* and g^4 each have a resilient portion adapted to be shifted by, and to shift, the armature. Switch H comprises members *h* and *h'* which are normally in contact. Member *h'* has a resilient portion adapted to be shifted by and shift the core. The core is provided with studs *d'* of insulating material whereby the resilient switch members are respectively operated. The core is normally centralized by the resilient switch-members. One end or portion D' of the core D serves as an armature for the helix B and the other end or portion D^2 serves as an armature for the helix C, and thus the core serves as armatures for the helices respectively. The helices B and C are differentially wound or connected so that passage of current through one coil will operate the armature-core in one direction while energization of the other coil will operate it in the opposite direction. This differential operation is obtained by passage of current in opposite direction or by reversal of the helix windings, as well understood in the art.

The operation of the relay will be as follows: When the coil C is energized by passage of current therethrough, armature D^2 and the core will be shifted outwardly in direction to operate switch H, the magnetic path resulting therefrom will be through armature D^2, disk *e'*, jacket E and cap *c* as indicated in Fig. 2, thus effecting outward movement of core D in proper direction to operate switch H. When said helix is deenergized, resilient switch-member *h'* will restore the armature to its normal centralized position. When helix B is energized, the magnetic path will be through armature D', disk *e'*, jacket E and cap *b*, as indicated in Fig. 2, thus effecting outward movement of core D in proper direction to operate switch G. When said helix is deënergized, resilient ends of switch-members *g'* and g^4 will restore the core to its normal centralized position.

The improved relay can be used to advantage in many places where electrical switches are to be operated, *e. g.* as a combined line-switch and cut-out switch in a telephone system.

The invention is not to be understood as restricted to the details described, but may be modified without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices for independently operating the contacts respectively, and for holding the switches in the positions into which they are operated by the helices respectively when the latter are energized, and means for restoring said core to its inoperative position independently of the helices.

2. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts disposed a;

the ends of tne relay respectively, a pair of helices for independently operating the contacts respectively and for holding the contacts in the positions into which they are operated by the helices respectively, when the latter are energized, and means for restoring said core to its inoperative position independently of the helices.

3. In a selective solenoidal relay, the combination of an armature-core, spring-pressed in one direction, a pair of armature-operated switch-contacts disposed at the ends of the relay respectively, a pair of helices for independently operating the contacts respectively and for holding them in the positions in which they are operated by the helices respectively, and means for restoring said core to its inoperative position independently of the helices.

4. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated spring-pressed switches mounted at the ends of the relay respectively, a pair of helices for independently operating the switches respectively and for holding them in the position in which they are operated by the helices respectively, said core being restored to its inoperative position by one of the switches and independently of the helices.

5. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices for independently operating the contacts respectively and for holding the contacts in the positions into which they are operated by the helices respectively, means for restoring said core to its inoperative position independently of the helices, and a jacket inclosing the helices, said contacts being disposed at the ends of the helices respectively and mounted on the jacket.

6. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices for independently operating the contacts respectively and for holding the contacts in position into which they are operated by the helices respectively, means for restoring said core to its inoperative position independently of the helices, a jacket extending around both of the helices, and a cap at each end of the jacket, said jacket and said caps forming a part of the magnetic path.

7. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices for independently operating the contacts respectively and for holding the contacts in position into which they are operated by the helices respectively, means for restoring the core to its inoperative position independently of the helices, a jacket extending around both of the helices, and a cap at each end of the jacket, said jacket and said caps forming a part of the magnetic path, said contacts being mounted on said caps.

8. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices around said core for independently operating the contacts respectively and for holding the contacts in position into which they are operated by the helices respectively, means for restoring the core to its inoperative position independently of the helices, and a common pole-piece between the helices.

9. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices for independently operating the contacts respectively and for holding the contacts in position into which they are operated by the helices respectively, means for restoring the core to its inoperative position independently of the helices, a jacket around the helices, a common pole-piece between the helices, and a cap at each end of the jacket, said core, jacket, caps and pole-piece forming a magnetic path.

10. In a selective solenoidal relay, the combination of an armature-core, a pair of armature-operated switch-contacts, a pair of helices for independently operating the switches respectively and for holding the switches in position into which they are operated by the helices respectively, means for restoring said core to its inoperative position independently of the helices, a jacket around the helices, a common pole-piece between the helices, and a cap at each end of the jacket, said core, jacket, caps and pole-piece forming a magnetic path, said switches being mounted on said caps respectively.

OLIVER C. DENNIS.

Witnesses:
FRED GERLACH,
LESNE S. RUSSELL.