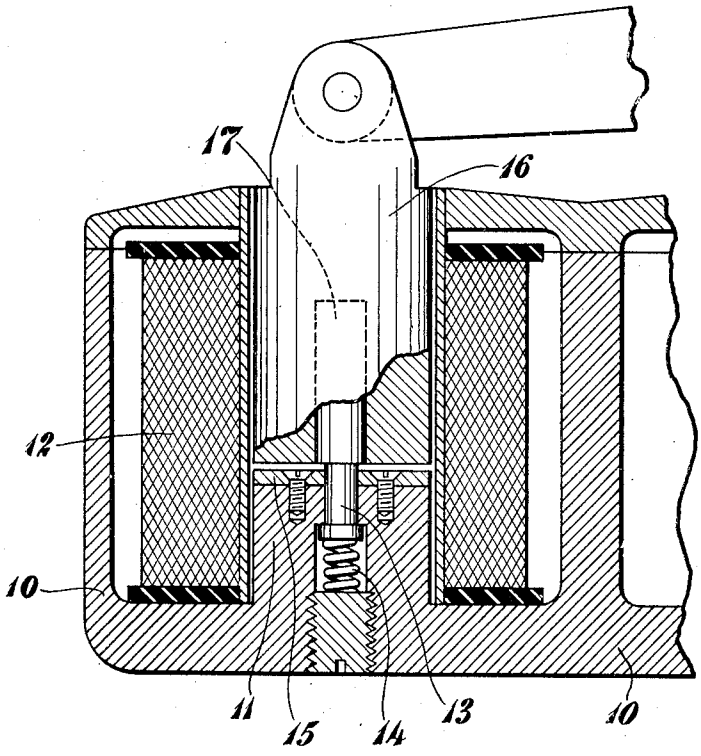
No. 893,305. PATENTED JULY 14, 1908.

H. W. CHENEY.

ELECTROMAGNET.

APPLICATION FILED NOV. 14, 1907.



Witnesses

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UNITED STATES PATENT OFFICE.

HERBERT W. CHENEY, OF NORWOOD, OHIO, ASSIGNOR TO ALLIS-CHALMERS COMPANY, A CORPORATION OF NEW JERSEY, AND THE BULLOCK ELECTRIC MANUFACTURING COMPANY, A CORPORATION OF OHIO.

ELECTROMAGNET.

No. 893,305. Specification of Letters Patent. Patented July 14, 1908.

Original application filed June 8, 1906, Serial No. 320,757. Divided and this application filed November 14, 1907. Serial No. 402,103.

To all whom it may concern:

Be it known that I, HERBERT W. CHENEY, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Electromagnets, of which the following is a full, clear, and exact specification.

My invention relates to the structure of electromagnets, particularly as applied to operating short-circuiting devices in the manner set forth in my co-pending application Serial No. 320,757, filed June 8, 1906, of which this application is a division.

It is the object of my invention to provide an electromagnet which shall be able to give certain results not hitherto obtained.

My invention may be briefly described as consisting of an electromagnet comprising a winding and paramagnetic parts movable relatively to each other, each of said parts having inserted in it a plug of higher magnetic retentivity to hold the relatively movable parts together after the winding has been deënergized. Preferably one of said plugs is spring mounted to take up the hammer-blow as the parts come together and for other purposes.

The various novel features of my invention will appear from the description and drawing and will be particularly pointed out in the claims.

The single figure of the drawing is a sectional view of one embodiment of my invention.

The magnet shown is of the iron-clad solenoid type and may be one of a pair of magnets for operating any desired mechanism oppositely. The iron frame 10 of the magnet is shown as extending slightly to the right to receive the coil and form part of the companion magnet if there is one. From the lower part of the frame 10 a projection 11 projects upwardly within the coil 12, and at the inner end of this projection is a steel plunger 13, pressed upwardly by an adjustable spring 14. The inner surface of the projection 11 has a facing 15 of non-magnetic material through which the plunger 13 extends. The core 16 of the magnet has embedded in its center a steel plug 17, which engages with the spring-pressed plunger 13 when the magnet is energized. The plunger 13 and plug 17 serve a threefold purpose:—first, to take up the shock of the hammer-blow when the core 16 reaches the end of its movement; second, by reason of higher retentivity of the parts 13 and 17, to retain the core 16, once it has been attracted, in said attracted position after the coil 12 has been deënergized, the magnet thus having an electromagnetic actuating part and a permanently magnetic retaining part; and third, of special advantage when the magnet is used to operate a short-circuiting device, to allow the movement of such short-circuiting device to be completed when the magnet is energized, whatever the position of the motor shaft in its end-play, but after the magnet has been deënergized to return the actuating lever of said device to such a position that the sides of the groove of the short-circuiting device will not come into contact with the pin in said lever during the end-play of the shaft, the short-circuiting device remaining fully closed or fully open as the case may be.

In the claims I aim to cover all such modifications of the precise arrangement here shown and described which may be made without departing from the spirit and scope of my invention.

What I claim as new is:—

1. An electromagnet comprising a winding, and paramagnetic parts movable relatively to each other, each of said parts having inserted in it a plug of higher magnetic retentivity to hold the relatively movable parts together after the winding has been deënergized.

2. An electromagnet comprising a winding, and paramagnetic parts movable relatively to each other, each of said parts having inserted in it a steel center to hold the relatively movable parts together after the winding has been deënergized, one of said steel centers being spring-mounted.

3. A solenoid electromagnet comprising a winding, an iron frame extending partly within said winding, and a movable core, said inward extension and said core having steel centers to hold the core in attracted position after the magnet is deënergized.

4. A solenoid electromagnet comprising a winding, an iron frame extending partly within said winding, and a movable core, said inward extension and said core having

plugs of higher magnetic retentivity to hold the core in attracted position after the magnet is deënergized, one of said plugs being spring-mounted.

5. A solenoid electromagnet comprising a winding, an iron frame extending partly within said winding, a movable core, a plate of non-magnetic material between said core and said inward extension, and plugs of higher magnetic retentivity in said extension and said core respectively for holding the core in attracted position after the magnet is deënergized.

6. A solenoid electromagnet comprising a winding, an iron frame extending partly within said winding, a movable core, a perforated plate of non-magnetic material between said core and said inward extension, and steel centers in said extension and said core respectively for holding the core in attracted position after the magnet is deenergized, one of said steel centers being spring-mounted and one extending through said plate.

7. An electromagnet comprising a winding and paramagnetic parts movable relatively to each other, a plate of non-magnetic material between said parts, and steel centers inserted in said relatively movable parts to hold them together after the winding has been deënergized, one of said steel centers extending through said plate.

8. An electromagnet comprising a winding and para magnetic parts movable relatively to each other, a plate of non-magnetic material between said parts, and plugs of higher magnetic retentivity inserted in said relatively movable parts to hold them together after the winding has been deënergized, one of said plugs extending through said plate and one of said plugs being spring-mounted.

In testimony whereof I affix my signature, in the presence of two witnesses.

HERBERT W. CHENEY.

Witnesses:
GEO. B. SCHLEY,
FRED J. KINSEY.