

No. 732,851

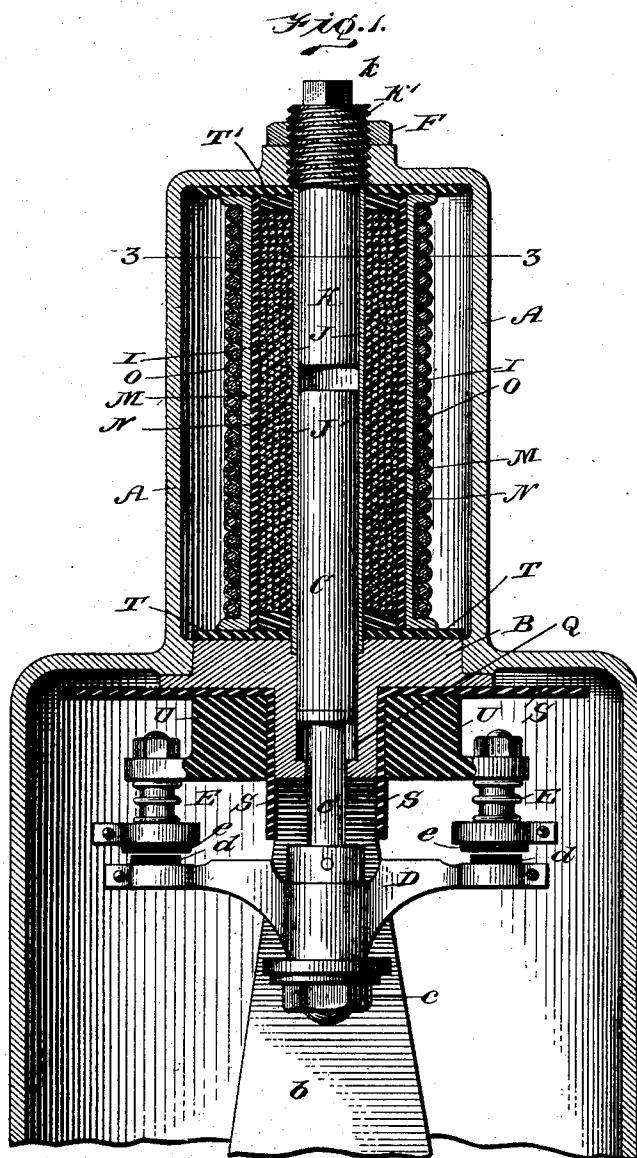
PATENTED JULY 7, 1903.

G. T. HANCHETT.
SOLENOID MAGNET.

APPLICATION FILED MAR. 19, 1901.

NO MODEL.

2 SHEETS—SHEET 1.



WITNESSES:

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Guy Worthington

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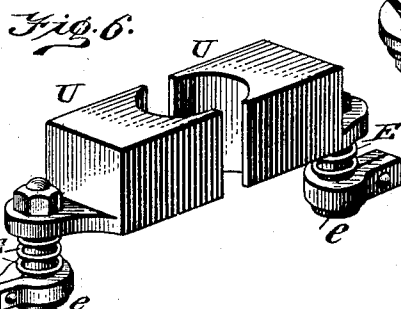
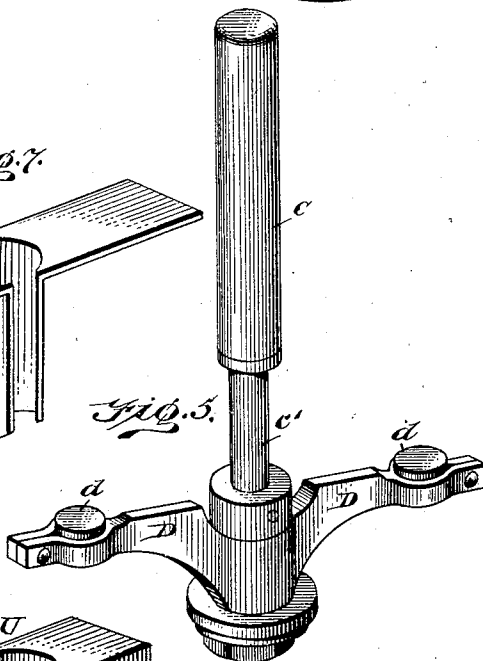
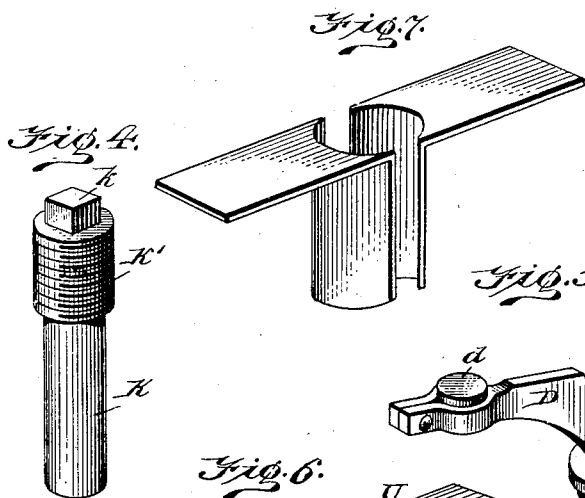
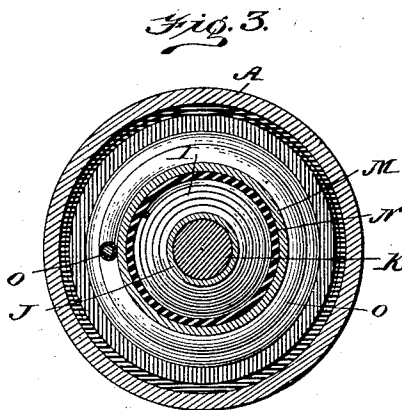
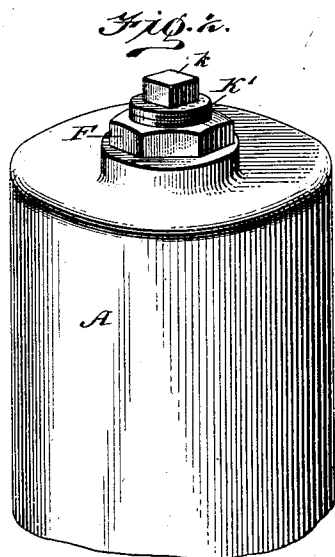
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UNITED STATES PATENT OFFICE.

GEORGE T. HANCHETT, OF HACKENSACK, NEW JERSEY, ASSIGNOR TO
DUDLEY FARRAND, RECEIVER, OF NEWARK, NEW JERSEY.

SOLENOID-MAGNET.

SPECIFICATION forming part of Letters Patent No. 732,851, dated July 7, 1903.

Application filed March 19, 1901. Serial No. 51,934. (No model.)

To all whom it may concern:

Be it known that I, GEORGE T. HANCHETT, of Hackensack, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Solenoid-Magnets, of which the following is a specification.

This invention is in the nature of an improved solenoid-magnet more especially designed for use on surface-contact conductor or third-rail electric systems, and it primarily seeks to provide a very simple, stable, and accurately-operating means whereby the pulling power of the magnet can be varied and balanced against the reaction power of springs or weights attached to the plunger connected therewith to shift same to its normal or open position.

The invention consists in certain novel features of construction and correlation of parts, all of which will hereinafter be fully described, and particularly pointed out in the appended claim, reference being had to the accompanying drawings, in which—

Figure 1 is a vertical section of an iron-clad solenoid-magnet embodying my improvements. Fig. 2 is a detail view of the upper end of the shell or casing with the adjusting-nut. Fig. 3 is a horizontal section taken on the line 3 3 of Fig. 1. Fig. 4 is a view of the upper plunger-section. Fig. 5 illustrates the lower plunger member and the contact-carrying bridge attached thereto and actuated thereby. Figs. 6 and 7 are detail views, respectively, of the upper contact-carrying members and the insulating members, hereinafter specifically referred to.

Referring to the accompanying drawings, in which like letters indicate like parts in all the figures, A designates the inclosing shell, B a cap-plate, which acts as a closure for the lower end of the solenoid, and C indicates a movable plunger which carries the member to be actuated, which member in the present instance is in the nature of a metallic bridge or cross-head (designated by D) and which carries at its opposite ends carbon contacts *d d*, adapted under a proper movement of the members C and D to engage the opposing contacts *e e* and close an electric circuit. While I have shown this style

of actuating member D, it is obvious that any device requiring such motion as would be imparted by plunger C may be attached to and actuated by the plunger C.

The plunger C when the magnet is placed in a vertical position is held to its dropped or open position by gravity, which movement is also aided by the springs E; but when in other than vertical positions said plunger is moved out by spring-pressure alone.

The plunger C is given magnetic force by the inner or high-resistance coils I and outer low-resistance coils O, which are separated from each other by the sleeves J and M, the inner coil I being wound on a bobbin or sleeve N, in which the upper and lower plungers K and C project.

The upper and lower ends of the coils I and O are protected by the insulator-plates T and T', as shown.

So far as described it will be apparent that the parts are coöperatively so arranged that when in an operative condition the magnetic circuit is completed by means of the upper plunger K, which is screwed into the shell by the thread K', and it can be locked in any position by the nut F. The adjustability of the member K forms the essential point of this invention for the reason that by making the plunger K adjustable and holding it at its different adjustments the desired mechanical and magnetic results are obtained, which are best explained as follows:

In the action of the device adjusting the plunger member C to a position higher than that shown will serve to increase the tension of the springs E E at such times as the two plungers are in contact by the additional compression of said springs, and the action of raising the upper plunger-section K, therefore, has the effect of imparting to the lower plunger C a greater tendency to fall, and in this way the mechanical tendency to fall may be readily balanced against the magnetic tendency to lift, or within certain limits any desirable ratio between these two tendencies may be obtained. This feature I have found very valuable in many classes of work. For instance, let it be supposed that it is found desirable to have plunger C fall when the magnetizing force of coils O and I reaches a

certain value. To do this, the proper current is caused to flow in the coils O and I and the plunger K is screwed upward until a point is reached where the plunger C just fails to hold.

It is obvious, then, that the device will be set so as to allow plunger-section C to fall at all magnetizing forces below this amount.

This type of solenoid finds many useful applications in electromagnetic mechanics, particularly for sectional conductor railway-switches, where it is often desirable to set the switches to fall open at predetermined minimum current values; but it will be understood that this invention also has a wide application for other kind of work. In its operation the upward movement of plunger K also has an effect on the magnetic pull beside creating mechanical effect due to increased tension on springs E E. This is caused, first, by reason of raising the working air-gap Q away from center of coil, thereby slightly increasing the magnetic leakage, and, second, by reason of its increasing reluctance of the magnetic circuit, it being plain that the higher adjusting of plunger K the greater the gap-space Q. Therefore the upward movement of the plunger K increases the mechanical reactive effect and diminishes the magnetic tractive effect also, and thereby simultaneously and in two distinct ways causes the desired ratios between the two effects obtained.

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

A solenoid-magnet as described, comprising in combination, a casing of magnetic material closed at the top, a cap-plate of magnetic material for closing the bottom thereof, said closed top having a screw-threaded aperture, a short core-piece of magnetic material having a screw-threaded portion for engaging the screw-threaded aperture in the casing-top, said core-piece being adapted for longitudinal adjustment, said cap-plate having an aperture therefor in alinement with the aperture in the top of the casing; a movable flange adapted for longitudinal movement in said cap-aperture and said casing, said flange having an extension projected out of the casing and provided with contact-carrying arms at its lower end, a solenoid-winding within said casing surrounding said flange and adjustable core, for magnetizing the same, a supplemental winding surrounding the other winding and connected in series with the contact-carrying arms, when the flange is in its drawn-up position, substantially as shown and described.

GEORGE T. HANCHETT.

Witnesses:

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CHAS. S. LONGHURST.