Nov. 29, 1927. 1,650,799

T. L. LEE

ELECTRIC SOLENOIDS

Filed May 17, 1924

Fig. 1.

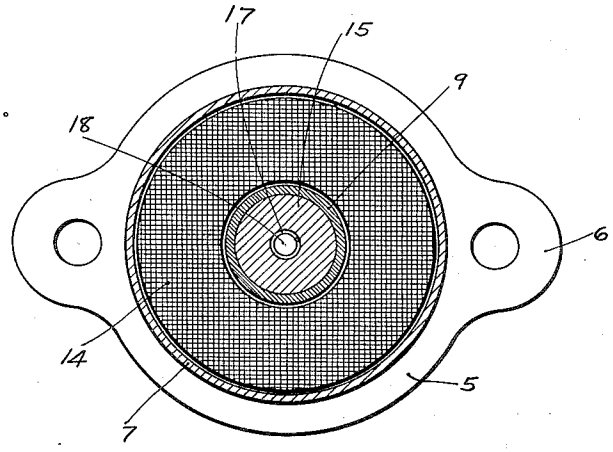
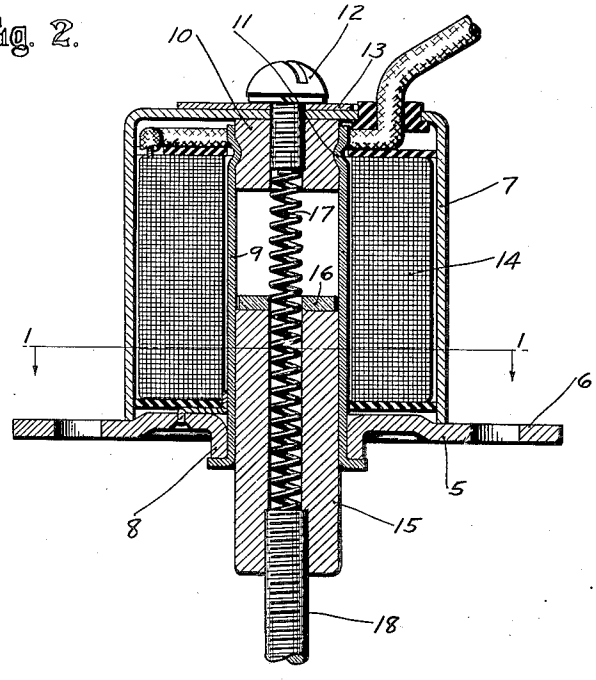


Fig. 2.



Inventor:
Thomas L. Lee
by his attorney
Farnum F. Worsey

Patented Nov. 29, 1927. 1,650,799

UNITED STATES PATENT OFFICE.

THOMAS L. LEE, OF ROCHESTER, NEW YORK, ASSIGNOR TO NORTH EAST ELECTRIC COMPANY, OF ROCHESTER, NEW YORK, A CORPORATION OF NEW YORK.

ELECTRIC SOLENOID.

Application filed May 17, 1924. Serial No. 714,136.

The object of this invention is to produce an electric solenoid magnet of compact and efficient form, with a structure which is inexpensive, easy to assemble, and yet rugged.

To the foregoing end the invention consists in the solenoid illustrated in the accompanying drawings and hereinafter described, as it is defined in the attached claims.

In the drawings Fig. 1 is a cross-section of a solenoid embodying the present invention on the line 1—1 in Fig. 2, and Fig. 2 is a longitudinal section of the same.

The illustrated embodiment of the invention comprises a base-plate 5, of sheet steel or iron, provided with perforated lugs 6 by which it may be attached wherever the solenoid is to be used. The base-plate, together with a cup-shaped shell 7, also of steel or iron, constitute a housing for the other parts of the solenoid. To secure these members together, and to provide also a guide for the plunger, the base-plate is centrally perforated and provided with an integral neck 8 in which one end of a central guide-tube 9 is fitted, the end of the tube being flanged over as shown. The guide-tube is of brass or other non-magnetic material.

At the upper end of the guide-tube is a plug 10 of iron or steel, which is grooved circumferentially and is fixed in place in the tube by a head 11, in the wall of the tube, pressed or rolled into the groove. This plug is engaged by a screw 12, passing through the shell 7, and through a plate 13 of iron or steel.

The winding 14 of the solenoid is enclosed within the shell. The armature or plunger 15 slides within the guide-tube, and is provided, at the top, with a buffer 16 of non-magnetic material. A spring 17, seated in perforations in the plug 10 and the plunger, tends to move the plunger in the opposite direction to that in which it moves when the solenoid is energized. The plunger may be connected, as by a rod 18, with any part or device which is to be actuated by it.

It will be apparent that an efficient magnetic circuit is provided through the base, the shell, the plug 10 and the plunger. The plate 13 is used to increase the permanence of the circuit at a point where the cross-sectional area of the metal would otherwise be relatively small. The neck 8 on the base-plate serves to reduce the reluctance at the gap between the base and the plunger, and also to provide an extended support for the guide-tube.

The assembling of the solenoid is simple, as all of the parts go together loosely, and are then drawn into firm engagement by the single screw at the top.

The invention claimed is:

1. A solenoid comprising: a centrally perforated plate of magnetic material; a guide-tube, of non-magnetic material, outwardly flanged at one end and closed, at the other end, by a plug of magnetic material fixed to the guide-tube, the guide-tube being seated, at its flanged end, in the perforation in said plate; a winding surrounding the guide-tube; a cup-shaped shell, of magnetic material, enclosing the winding and resting, at its edge, against said plate; and screw-threaded means connecting the closed end of the shell with said plug in the guide-tube, whereby the shell and the base-plate are secured together through the agency of the plug and the guide-tube.

2. A solenoid comprising: a base-plate with a central opening and integral neck at said opening; a guide-tube seated in and secured to said neck, said tube being of non-magnetic material; a plug, of magnetic material, fixed in the end of the guide-tube remote from the base-plate; a winding surrounding the guide-tube; a cup-shaped shell, of magnetic material, enclosing the winding; and a screw passing through the closed end of the shell and threaded into said plug, whereby the shell and the base-plate are secured together through the agency of the plug and the guide-tube.

THOMAS L. LEE.