Sept. 1, 1925. 1,551,593

C. A. WALKER

SWITCH OPERATING SOLENOID

Filed Feb. 21, 1924

Fig. 1.

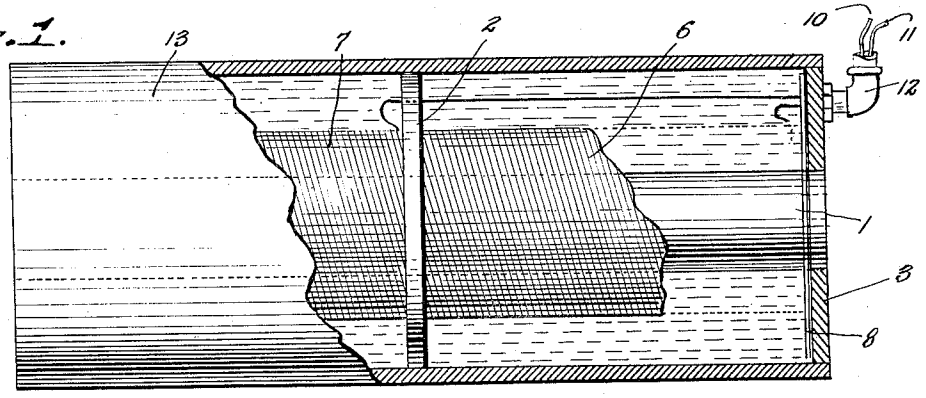


Fig. 2.

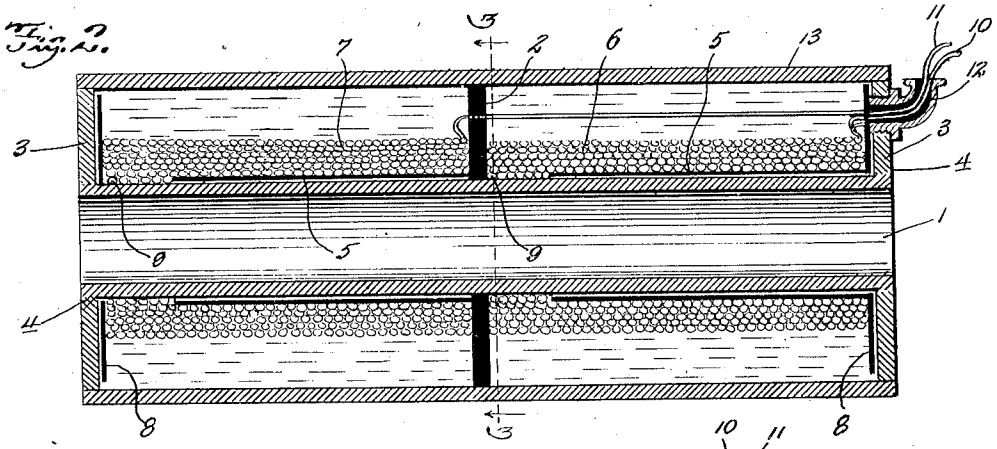


Fig. 3.

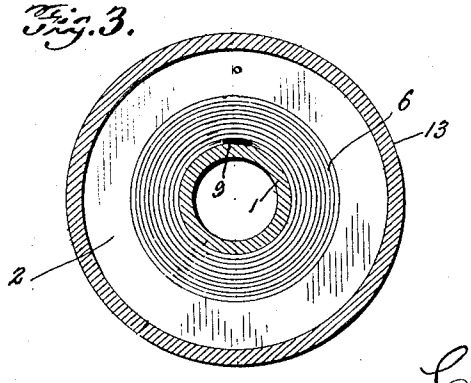
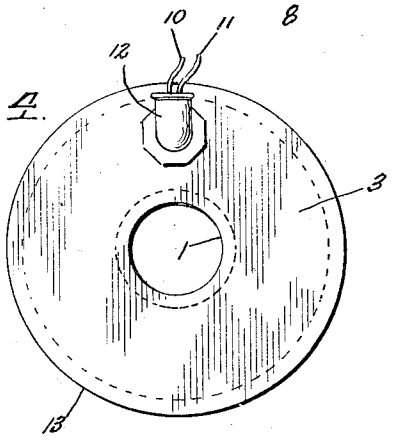


Fig. 4.



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UNITED STATES PATENT OFFICE.

CHARLES A. WALKER, OF KNOXVILLE, TENNESSEE.

SWITCH-OPERATING SOLENOID.

Application filed February 21, 1924. Serial No. 694,374.

To all whom it may concern:

Be it known that I, CHARLES A. WALKER, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented certain new and useful Improvements in Switch-Operating Solenoids, of which the following is a specification.

This invention relates to improvements in the construction of solenoids for operating switches of railway or street car tracks.

It is now common practice to operate the tongues of street car track switches by a magnet or solenoid receiving energy from the power line operating the street car by means controlled by the movement of the car and parts carried thereby. These solenoids are usually mounted between the track rails and below the surface of the street and the rails, and in this position are subjected to the full force of the elements which frequently interferes with the efficient operation of the solenoid of the switch tongues.

An object of this invention is to provide a solenoid structure for resisting the effects of the elements and other disadvantages of present structures having a non-magnetic casing for the solenoid windings which are sealed in the casing.

Another object of the invention is to provide a non-magnetic sealed casing containing the solenoid winding which is substantially larger than the winding and which has the remaining portion about the winding filled with oil in order to provide a solenoid assembly which will be free from interior corrosion and also from the effects of change in weather conditions usually causing the coil to sweat and thereby providing a solenoid structure which will overcome present disadvantages experienced in electric switch operation.

The invention also comprehends other objects and improvements in the details of construction and arrangement and assembly of the parts which is particularly pointed out in the following description and claims, it being understood, however, that variations in the construction of these parts and the arrangement thereof may be made within the scope of the following description and claim.

In the drawing, forming a part of this application:

Figure 1 is a side elevational view of the complete solenoid structure having a portion of the outer casing broken away to show portions of the interior coil mounting.

Figure 2 is a longitudinal sectional view through the solenoid.

Figure 3 is a sectional view taken on the line 3—3 of Figure 2.

Figure 4 is an end elevation of the assembled solenoid structure.

1 indicates a tubular core member which receives an annular insulating disc 2, the core member being preferably of brass or other nonmagnetic metal. A pair of end discs are indicated at 3, which are also preferably formed of brass and brazed at their central portions to the ends of the tubular core as indicated at 4. A pair of sleeves formed of insulating material are indicated at 5, which are positioned over the core 1 as clearly illustrated in Figure 2 of the drawings and which are of a length shorter than the distance between the insulating discs 2 and the end plates 3. Magnet windings are provided at 6 and 7 on each side of the insulating disc 2 and extending to the end disc 3, insulating disc members 8 being provided adjacent each end disc 3 and on the inner side thereof for insulating the windings adjacent the end discs therefrom. These windings 6 and 7 are also wound throughout the greater portion of their length on the insulating sleeve 5, while the portion beyond the end of the insulating sleeve is wound directly on the core 1, and the corresponding ends of each coil are soldered as indicated at 9 to the core, and clearly shown in Figure 2 of the drawings. The outer coil of each magnet winding at the opposite corresponding end to the ends which are soldered to the core, is provided with independent and insulated wire connections 10 and 11 with the coils 6 and 7 respectively, which are led outwardly through one of the end walls 3 for connection with a proper circuit closing member used in connection with solenoid operated switch tongues for alternately positioning one or the other of the coils in circuit to operate the switch tongues in a desired manner. The wire 11 extends through the insulating disc 2 and to the opposite end wall 3, each of the wires 10 and 11 extending through an elbow fitting mounting in an opening formed in the end wall, the fitting being indicated at 12. After the windings 6 and 7 are placed on the insulating sleeves 5 and the core 1 as shown in Figure 2, par-

ticularly, and the wires 10 and 11 extended through the elbow 12, said elbow is plugged with brass or other suitable material for sealing the wires in the elbow in insulated relation. An outer cylindrical casing 13 receives the entire assembly and has the end disc 3 brazed thereto, this casing being preferably formed of brass to form an integral sealed unit. The concentric space beyond the coil windings 6 and 7 is filled with oil, prior to the sealing of the elbow fitting 12 and after the outer housing 13 has been properly assembled and brazed on the end disc.

This solenoid is mounted below the track and under the surface of the ground in a similar manner to that now in use for mounting switch tongue operating solenoids, and the usual connections are provided with the wires 10 and 11, so that either coil 6 or 7 may be interposed in the circuit to operate the switch tongue in a desired manner.

From the foregoing description, it will be clear that a unit solenoid structure has been provided in which the coils are mounted in a non-magnetic casing which is air-proof, liquid proof and weather proof, and that the oil within the casing excludes air from the interior thereof, protects the magnet winding and prevents corrosion interiorly of the unit, at the same time not interfering in any manner with the efficient operation of the magnet winding in receiving current for the operation of the switch tongue. Sweating, which is usual in the types of solenoid structures now used, in this connection, is also prevented by mounting the coils in a non-magnetic and sealed casing filled with oil which overcomes a serious disadvantage experienced in present construction, as the sweating of the coils affects their efficient operation and materially shortens the life of the solenoids. By mounting the coils in a non-magnetic oil filled casing, the usual disadvantages which have been experienced in the mounting of the coils on magnetic substances are also overcome, and a greater power is derived from the magnet coils by this structure.

What is claimed is:

A solenoid structure especially adapted to be used for throwing a switch tongue comprising an exterior casing, a hollow core located within the casing and traversing the length thereof, and being concentrically positioned within the casing, end discs carried at the ends of the core and inserted in the ends of the casing, a partition disc of insulating material located within the casing and mounted upon the core at a point between the ends thereof, said disc dividing the interior of the casing into compartments, sleeves located in the compartment and circumscribing the core, and partially covering the exterior surface of the core in each of the compartments, a sealing agent enclosed within the compartment, and conductors entering the casing through one of the discs and being wound about the sleeves and the exposed area of the core.

In testimony whereof I affix my signature.

CHARLES A. WALKER.