

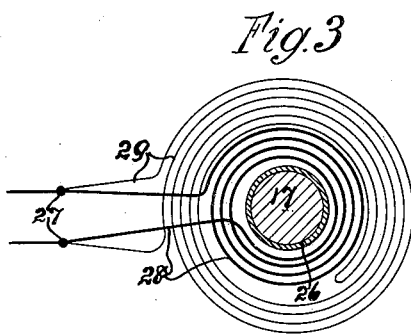
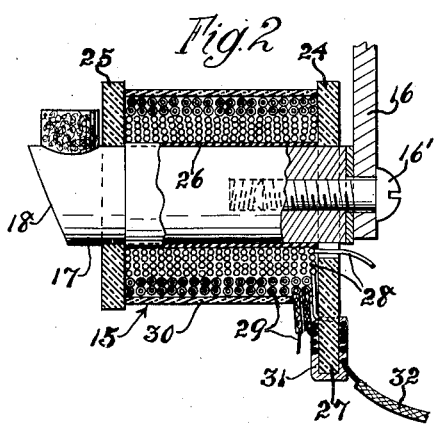
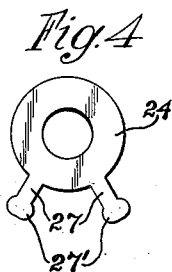
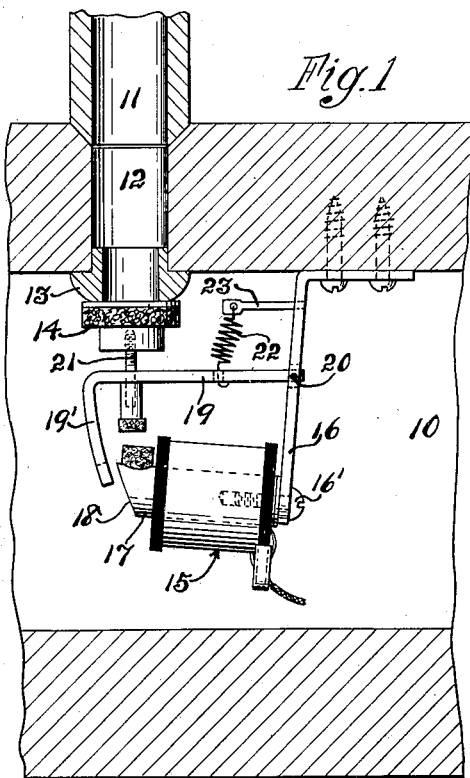
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L. J. WICK

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ELECTROMAGNET

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# UNITED STATES PATENT OFFICE

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## ELECTROMAGNET

Original application filed March 14, 1928, Serial No. 261,509. Divided and this application filed March 6, 1929. Serial No. 344,705.

This invention relates to electromagnets. This is a division of my application for patent, Serial No. 261,509, filed March 14, 1928, for valve operating mechanism for organs.

5 The main object of this invention is to provide a compact electromagnet which will positively prevent the occurrence of sparks at the contacts, and is especially suited for use in operating the valve of an organ pipe. 10 Another object is to provide an electromagnet having an inner winding, and an outer winding of looped insulated wire thereover and connected therewith, to function as a spark absorber and prevent sparking at the contacts. A further object is to provide a sparkless electromagnet having an insulator end piece with insulator ears thereon whereupon are wound the ends of the coil wires, to provide strong terminals. 20 A still further object is to provide such a sparkless electromagnet which has an end piece of insulating material provided with integral ears of the same insulating material extending radially outward from the end piece, and on which ears the ends of the coil wires are wound and preferably fastened with solder, to provide strong and efficient terminals. Still another object is to provide 30 such an electromagnet comprising an insulator end piece with integral ears, also having an inner coil wire wound on an insulator sleeve on the core, and an outer looped coil wire wound over said inner one and having its ends connected with the ends of said inner one and wound around said ears, to provide strong terminals and a compact sparkless electromagnet, which will perform the function of a combination electromagnet and 40 spark absorber.

These and other objects and advantages are attained with this invention, as will become apparent from the following description, taken in connection with the accompanying drawing, in which

Fig. 1 is a sectional view through an organ pipe and the air passage in which my electromagnet is mounted to operate the valve;

50 Fig. 2 is a sectional view through my improved electromagnet;

Fig. 3 is a diagrammatic view of the inner coil and the outer looped coil wound thereover and connected therewith at the terminals; and

Fig. 4 illustrates the insulator end piece 55 with its integral ears for receiving the ends of the coil wires to form terminals.

In the drawing the invention which forms the subject matter of this application is shown mounted, like in the parent application above referred to, in the air passage 10, to the upper wall of which is connected the organ pipe 11 to receive the air through port 12 and valve seat 13 from said passage 10. Said seat 13 is closed by the valve 14. 60

My improved electromagnet 15 is mounted on a bracket 16 by means of a screw 16' which enters the magnet core 17, and this bracket is suitably mounted in the air passage 10. This core has a slanting and slightly curved face 18 at its free end, for cooperating with the curved arm 19' of an armature 19 which is pivoted on the bracket at 20 and carries the valve 14 by a stem 21. 70

The valve is opened by energizing the magnet, and is closed automatically by a spring 22 connected to the armature and to a post 23 on the bracket, said post being bendable to accurately and readily adjust the tension of the spring for efficiently closing the valve. 75

The usual electromagnets in pipe organs are subject to the defect of emitting sparks at the contacts, unless condensers are used along with the electromagnets; but thereby a condenser member is added alongside the electromagnet, and in that manner the space in the air passage is over-crowded. This defect I overcome by the provision of my improved sparkless and compact unitary 80 electromagnet, as herein disclosed, which serves as electromagnet and condenser combined.

In electromagnets of this type the end wires of the coils were also liable to be broken off or pulled out; thus rendering the electromagnet defective, and making any further attaching of the circuit wires to the wires of the magnet coils impossible. Said defect is also remedied by my improved elec- 85 100

tromagnet; and I preferably accomplish this improvement by providing integral ears of insulating material on one of the insulator end pieces, and winding the ends of the coil wires thereon and then soldering them fast thereon.

The preferred form of construction of my improved electromagnet illustrated comprises, in addition to the metal core 17, an inner end piece 24 and an outer end piece 25 and a sleeve 26 therebetween, all of insulating material and fastened on said metal core. Said end pieces are preferably made of compressed fibre, and one thereof, preferably the inner one 24, is provided with integral lugs or ears 27 of the same insulating material and which extend radially outward from the disk-shaped end piece, as illustrated. An enlarged end or head 27' is provided at the end of each ear, to prevent outward slipping or removal of the ends of the coil wires from said ears.

The coil windings of the electromagnet comprise an inner winding 28 around the sleeve and an outer winding 29 surrounding the inner one. The inner winding is preferably of insulated copper wire surrounding the sleeve between the end pieces; and the outer winding is preferably of insulated German-silver wire which is doubled-over, or looped at the inner part of the winding, as indicated in Fig. 3, and is wound around the insulated copper wire, having its ends connected with the ends thereof on the terminals. Said German-silver wire is thinner than the copper wire and is insulated, as best shown in Fig. 2. A covering coat 30 of coil covering material or bookbinder's cloth is placed around the coil windings.

The improved terminals or contacts are provided by winding the ends of the coil windings 28 and 29 tightly around the pair of ears 27, and then placing metallic means as solder 31 thereover, thus providing a strong, metal-coated terminal or contact. The circuit wires 32 can then be fastened to these ears, over said wire ends, and the heads 27' on the ears will prevent said wires from slipping off, and if desired the ends of wires 32 may also be embedded in the solder, thus assuring a still more positive contact and a very strong terminal.

My construction and arrangement of coil windings entirely eliminates sparking at the terminals or contacts when the current is broken, as occurs by use of the ordinary electromagnets subject to secondary currents caused by induction and which the pipe-organ industry has heretofore endeavored to remedy by the use of condensers in cooperation with the electromagnets. Whereas my improved electromagnet, having the insulated German-silver wire winding looped at its inner part and being wound around the inner insulated copper wire winding, has

its outer winding serve as a spark absorber, and my construction thus performs the function of the former electromagnet and condenser cooperating therewith, and provides a combination electromagnet and spark absorber in one compact member.

What I claim as my invention and desire to secure by Letters Patent is:

1. A unitary mechanism, adapted for controlling a valve, comprising a bracket having an electromagnet mounted thereon, and an armature on the bracket for carrying the valve to be actuated by the electromagnet, said electromagnet including an inner coil and an outer looped coil wound thereover and connected therewith at the terminals, to provide a sparkless and compact construction.

2. A unitary mechanism of the class described comprising a bracket and an electromagnet mounted thereon, the latter including an insulator end piece having integral insulator ears, also including an inner coil and an outer coil wound thereover, said coils having their ends connected and being wound around said ears to form strong terminals.

3. An electromagnet comprising coil wire means thereon, and an insulator end piece having integral insulator ears thereon around which the ends of said coil wire means are wound and fastened to provide the terminals, there being heads at the ends of said ears to prevent slipping off of said coil wire means.

4. An electromagnet comprising insulator end pieces, coil means between said end pieces, and a pair of insulator ears which are integral with one of said end pieces and extend radially outward therefrom upon which the ends of the coil means are wound, said ears having enlarged ends and said coil means being secured inward of said ends to positively prevent removal, and to provide strong terminals and avoid sparking.

5. An electromagnet comprising a metallic core, an insulator sleeve thereon, insulator end pieces on said core at the ends of said sleeve, coil means around said sleeve between said end pieces, and a pair of ears which are integral with and are of the same insulating material as one of said end pieces, around which ears the ends of said coil means are wound and then covered and secured with solder to provide strong terminals.

6. An electromagnet comprising an inner winding, and an outer winding of insulated wire looped and mounted around said inner winding and being connected therewith at the terminals, to function as a spark absorber and eliminate all sparking at said terminals.

7. An electromagnet comprising an inner winding of insulated copper wire, and an outer winding of insulated German-silver wire doubled and mounted over said inner

winding, having the loop at its inward side and the ends connected with the ends of the inner winding on the terminals, said construction constituting a combination electromagnet and spark absorber.

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8. An electromagnet comprising a metal core, a sleeve and end pieces of insulating material mounted on said core, one of said end pieces having integral insulator ears thereon, an inner coil winding around said sleeve between said end pieces, and an outer coil winding of insulated and looped wire mounted around said inner one and having its ends connected with the ends thereof upon said ears to provide strong and sparkless terminals.

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9. An electromagnet comprising a metal core, a sleeve and end pieces of insulating material mounted on said core, one of said end pieces having integral insulator ears extending outwards therefrom, an inner winding of insulated copper wire around said sleeve between said end pieces, and an outer winding of insulated and doubled German-silver wire mounted around said inner winding and having the loop at its inner side and the ends connected with the ends of said inner winding upon said ears by the use of metallic means, thus providing strong and sparkless terminals.

In testimony whereof I have signed my name to this specification.

LOUIS J. WICK.

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