Nov. 19, 1929. L. J. WICK 1,736,684

VALVE OPERATING MECHANISM FOR ORGANS

Filed March 14, 1928

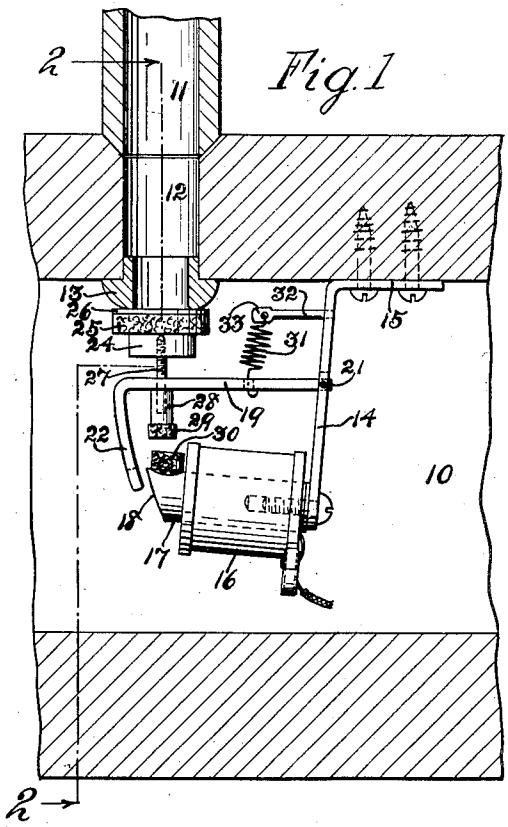


Fig. 1

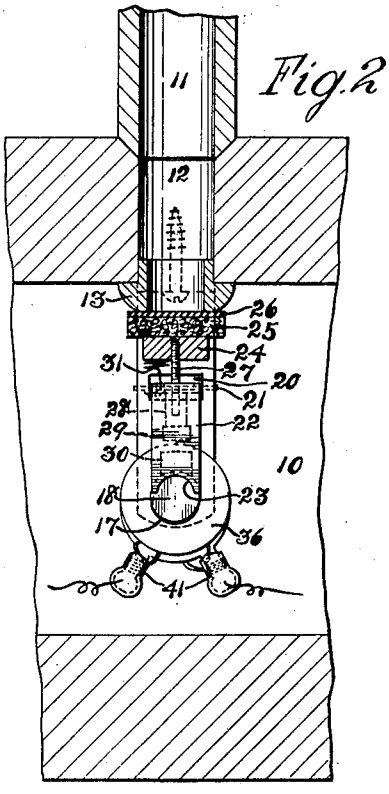


Fig. 2

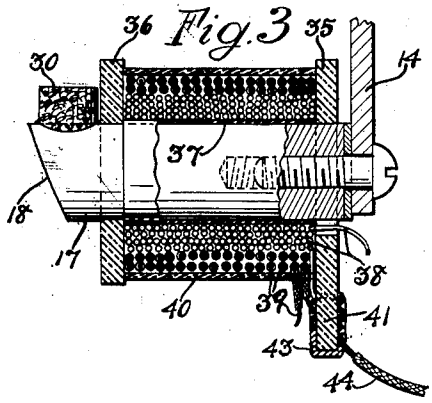


Fig. 3

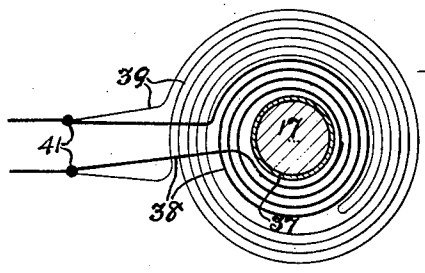


Fig. 4



Fig. 5

Inventor
Louis J. Wick,
by J. Daniel Stuwe
Attorney.

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UNITED STATES PATENT OFFICE

LOUIS J. WICK, OF HIGHLAND, ILLINOIS, ASSIGNOR TO WICKS PIPE ORGAN CO., OF HIGHLAND, ILLINOIS, A CORPORATION OF ILLINOIS

VALVE-OPERATING MECHANISM FOR ORGANS

Application filed March 14, 1928. Serial No. 261,509.

My present invention relates to valve operating mechanism for organs, and more particularly to valve means for controlling the inlet of air under pressure to the pipes of organs.

The main object of this invention is to provide a novel valve operating mechanism which is constructed as a unit, for readily mounting the same in position in the organ, and for readily removing and replacing it; and which will operate the valve positively and quickly, and is durable, economical and efficient. Another object is to provide such a unitary operating mechanism with a combination electro-magnet and spark-absorber constructed as one member or unit, to positively prevent the occurrence of any spark at the contact. A further object is to provide an electro-magnetic member which has an insulator end piece with integral ears or lugs whereon are wound the ends of the coil wires, to provide strong terminals. Still another object is to provide a combination electro-magnet and spark-absorber as one unit, which has an insulator end piece with integral ears whereon are wound and fastened, preferably with solder, the ends of the coil wires, thus providing strong and efficient terminals.

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

Fig. 1 is a sectional view taken through an air passage of an organ with an organ pipe communicating therewith, and showing my improved valve operating mechanism mounted in position for controlling the flow of air from the passage into the pipe;

Fig. 2 is a view of the structure shown in Fig. 1, but taken at a right-angle thereto;

Fig. 3 is a sectional view taken through the combination electro-magnet and spark-absorber;

Fig. 4 is a diagrammatic view of the combined windings of the inner electro-magnet coil and the outer spark-absorbing coil; and

Fig. 5 is a view of the insulator end piece having the integral ears or lugs thereon for receiving the ends of the coils to form terminals.

In the drawing my improved valve operating mechanism is shown in its preferred form of construction and mounted in position in the air passage 10, which is in practice in communication with a supply (not shown) of air under pressure. An organ-pipe 11 extends from the top wall of said passage 10 and receives the air under pressure therefrom, through the port or opening 12 in said wall. A valve seat 13 is provided at the inner end of said opening 12; and the channel extending through this seat 13, port 12, and pipe 11, provides an air channel or conduit which is controlled by my improved valve mechanism.

The improved unitary valve mechanism comprises an angle-shape bracket which includes a leg 14 having a foot 15 thereon wherewith the mechanism is mounted to the underside of the top wall of said passage 10, with suitable screws or other fastening elements. An electro-magnetic member 16, which preferably comprises an electro-magnet and a spark-absorber constructed as a unitary member, is mounted adjacent the lower end of said bracket leg 14, and has a core 17 provided with a slanting and slightly curved face 18 at its outer end. An armature 19 co-operates with said core and preferably includes a straight, main upper bar-portion which is pivotally supported on the bracket, preferably by mounting its inner end in a slot 20 cut in leg 14, and by having a pivot pin 21 extend through said end and said leg. Said upper bar-portion has its outer end bent down forming a depending arm 22 which is slightly curved and is movable across the curved end face 18 of core 17, said curved arm and face being preferably concentric with pivot pin 21. Said arm 22 has a semi-circular notch or recess 23 in its end, which is substantially concentric with core 17.

The valve provided for this mechanism is preferably a composite one including a lower disk 24 of sole leather having a disk 25 of soft felt secured thereon, and a disk 26 of soft leather secured over said felt disk, to firmly engage the valve seat and positively close the air channel. Said valve is carried by the armature, preferably by means of a

threaded rod 27 extending through said armature bar-portion and having the valve screwed on its upper end, thereby making it adjustable up and down on said rod. The lower end of this rod has a bumper adjustably mounted thereon, which preferably includes a sleeve 28 screwed on the rod and carrying a soft felt pad 29 which is located so as to co-operate with or bump against a soft felt pad 30 mounted on top of core 17, whenever the electro-magnet is energized for opening the valve. A coil spring 31 is attached with one end to the armature, as by hooking it in a small hole provided in the bar, and said spring has its other end mounted for convenient and prompt adjustment, as by the use of a post 32 of bendable material mounted or screwed in the leg 14 adjacent foot 15, and to the free end 33 of which the spring is attached. This spring may thus be readily tensioned by merely bending up said end 33 with a tool, as a screw-driver, or the like, to hold the valve normally closed with positive firmness; said bendable post and the spring thus providing readily adjustable means for retaining the valve closed.

This construction of readily adjustable post 32 and coil spring 31, for drawing the armature with the proper degree of force to hold the valve seated with the proper firmness, is a decided improvement over the type of spring arrangement formerly used and as shown in my Patent No. 1,403,930, granted January 17, 1922, on valve action for organs; wherein the spring 16 was not readily adjustable and needed a tongue 14 for mounting it, which tongue was not readily bendable.

The usual electro-magnets as used in pipe organs, and as disclosed in said patent, are also subject to the defect of emitting sparks at the contacts, unless condensers are used along with the electro-magnets, a condenser member along with a magnet member; thus over-crowding and jamming the space in the organ used by the many closely mounted electro-magnets for operating the many valves for the organ-pipes. I have overcome any such defect and have successfully solved this problem by providing a combination electro-magnet and spark-absorber or spark-preventing means constructed as one unitary member; and this I use instead of the formerly used electro-magnets, like that shown in said patent.

The end wires of the coils of the electro-magnets of this kind as here-to-fore used, and as indicated in my said patent, were also liable to be broken off or pulled out; thus rendering the electro-magnet defective, and making any further attaching of the circuit wires or line wires to the wires of the magnet coils impossible, since said ends of the coil wires or said terminals have been broken or pulled away. In this present invention I also remedy this defect; and I preferably do this by providing integral ears on one of the insulator end pieces of the magnet, and winding the ends of the coil wires thereon and soldering them fast thereon.

The preferred construction of my combination electro-magnet and spark-absorber as a unit comprises the core 17 with an inner end piece 35 and an outer end piece 36, and a sleeve 37 therebetween on said core, said end pieces and sleeve being of insulating material mounted on the metal core. Copper wire insulated in any approved manner provides the inner electro-magnet windings 38, placed around said sleeve and core; and insulated German silver wire which is doubled-over or looped at its innermost part as indicated diagrammatically in Fig. 4, is wound around the copper wire magnet winding to provide the spark-absorbing or spark-preventing means or windings 39. A covering coat 40 of coil-cover material or bookbinder's cloth is placed around the coil windings, between the end pieces, as indicated in Fig. 3. This provides a combined and unitary construction which is readily handled and mounted in place, the same as the former plain electro-magnet, requiring no more space or place for mounting it, especially beneficial in a pipe-organ and positively prevents any occurrence of sparks at the terminals or contacts.

The improved and durable terminals or contacts I provide preferably by constructing the insulator end piece or end flange 35 with integral ears or lugs 41 having enlarged ends or heads 42 thereon, as shown in Fig. 5. These end pieces and ears thereon are preferably made from compressed fibre, or similar suitable material. The ends of the windings or coils 38 and 39 are then wound closely and tightly around the pair of ears or lugs 41, and solder 43 is placed thereover, thus making a firm metal-coated terminal or contact. The circuit wires 44 can then be fastened to these ears or lugs, and the ends of these wires 38, 39, and 44 are held by the solder and by the enlarged ends or heads 42 firmly in position on said ears, the circuit wires 44 being preferably also embedded in the solder, to assure positive contact or connection at these terminals.

In use, the energization of the electro-magnet 16 will draw the armature arm 22 downward across the face 18 of the core, thereby pulling the valve away from the valve seat 13 and opening the air channel for the passage or flow of air from air passage 10 into organ-pipe 11. When the current through the circuit wire 44 and through the magnet is interrupted and the magnet de-energized, the spring 31 draws the armature and valve up against seat 13 and closes the air channel.

It will be apparent that with this im-

proved construction the valve can be properly adjusted with respect to the armature, and the position of the armature and its force normally exerted on the valve can be further adjusted by tensioning the spring 31 by bending post 32, thus providing exactly the required pressure on the valve for normally retaining it firmly seated against the valve seat. It is also apparent that this combined electro-magnet and spark-absorber in one member will prevent any chance of sparks occurring at the contacts and is exactly suited and adapted for use in pipe organs; also that with this construction of integral ears 41 on the end piece, and by fastening the wire ends thereon with solder, a very strong contact or terminal is provided whereby the usual trouble of tearing out the end portions of the magnet wires, formerly used for connecting with the circuit wires, during handling the device, is entirely avoided.

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

1. Valve mechanism for controlling the passage of air through a conduit, comprising a bracket carrying an electric member, a valve for closing the conduit, an armature pivotally mounted on the bracket and carrying the valve, which is opened by actuating the electric member, a spring connected to the armature for closing the valve, and a member for connecting the spring to the bracket, said member being secured with one end to the bracket and its main part being readily adjustable for varying the tension of the spring.

2. Valve mechanism arranged as a unit for controlling the passage of air through a conduit, comprising a bracket carrying an electro-magnetic member, a valve for closing the conduit, an armature pivotally mounted on the bracket and carrying the valve, which is opened by energizing said member, and a spring connected to the armature for closing the valve and having means for connecting it with the bracket, said means being bendable to provide ready adjustment to the spring.

3. Valve mechanism for a conduit, comprising a bracket having an electro-magnetic member secured thereon, a valve for closing the conduit, an armature pivotally mounted on the bracket and carrying the valve, which is opened by actuating said member, a coil spring attached with one end to said armature, for closing the valve, and a post of bendable material connected to the other end of said spring and mounted on the bracket, said post being bendable for readily adjusting the tension of said spring and its effect on the valve.

4. The combination, with an air passage having an air conduit leading therefrom, of a valve mechanism for controlling the passage of air through said conduit and comprising a valve for closing it, a bracket having a leg with a foot mounted on the wall of said passage, an electro-magnetic member mounted on said leg, an armature mounted on said leg and carrying the valve to open it by the action of said member, a coil spring attached with one end to the armature, for closing the valve, and a post of bendable material connected to the other end of said spring and mounted on the leg adjacent said foot, for readily adjusting the tension of said spring and its closing action on the valve.

5. Valve mechanism for controlling the passage of air through a conduit, comprising a bracket mounted adjacent said conduit, an armature pivoted on the bracket and carrying a valve for the conduit, a unitary member carried by said bracket and including an inner winding to serve as an electro-magnet and an outer winding mounted over the inner one and connected therewith to serve as a spark-absorber, for operating said armature and valve, and an adjustable spring means attached to said armature for retracting it with the valve.

6. Valve mechanism for a conduit, comprising a bracket, an armature mounted on the bracket and carrying a valve for the conduit, a unitary member carried by the bracket for operating said armature and valve, said member including an inner winding and an outer winding of looped wire having its ends connected with the ends of said inner winding on the terminals to provide a sparkless electro-magnet, and spring means for actuating said armature and valve.

7. Valve mechanism for a conduit, comprising a bracket, an armature on the bracket and carrying the valve for closing the conduit, and electro-magnet means carried by said bracket and including an inner winding and an outer winding thereover of looped wire which has its loop inwards, placed upon the inner winding, and has its ends connected with the ends of the inner winding on the terminals, to provide a spark-less unitary structure.

8. A unitary control mechanism for use in an organ, comprising a bracket, a unitary member mounted on said bracket and including an inner winding and an outer winding of looped wire thereover to provide a sparkless electro-magnet, an armature mounted on said bracket and carrying a control element of the sound-producing mechanism of the organ, said armature and element being actuated by said electro-magnet, spring means for retracting said armature, and means for connecting the spring means with the bracket and for adjusting its tension.

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

LOUIS J. WICK.