

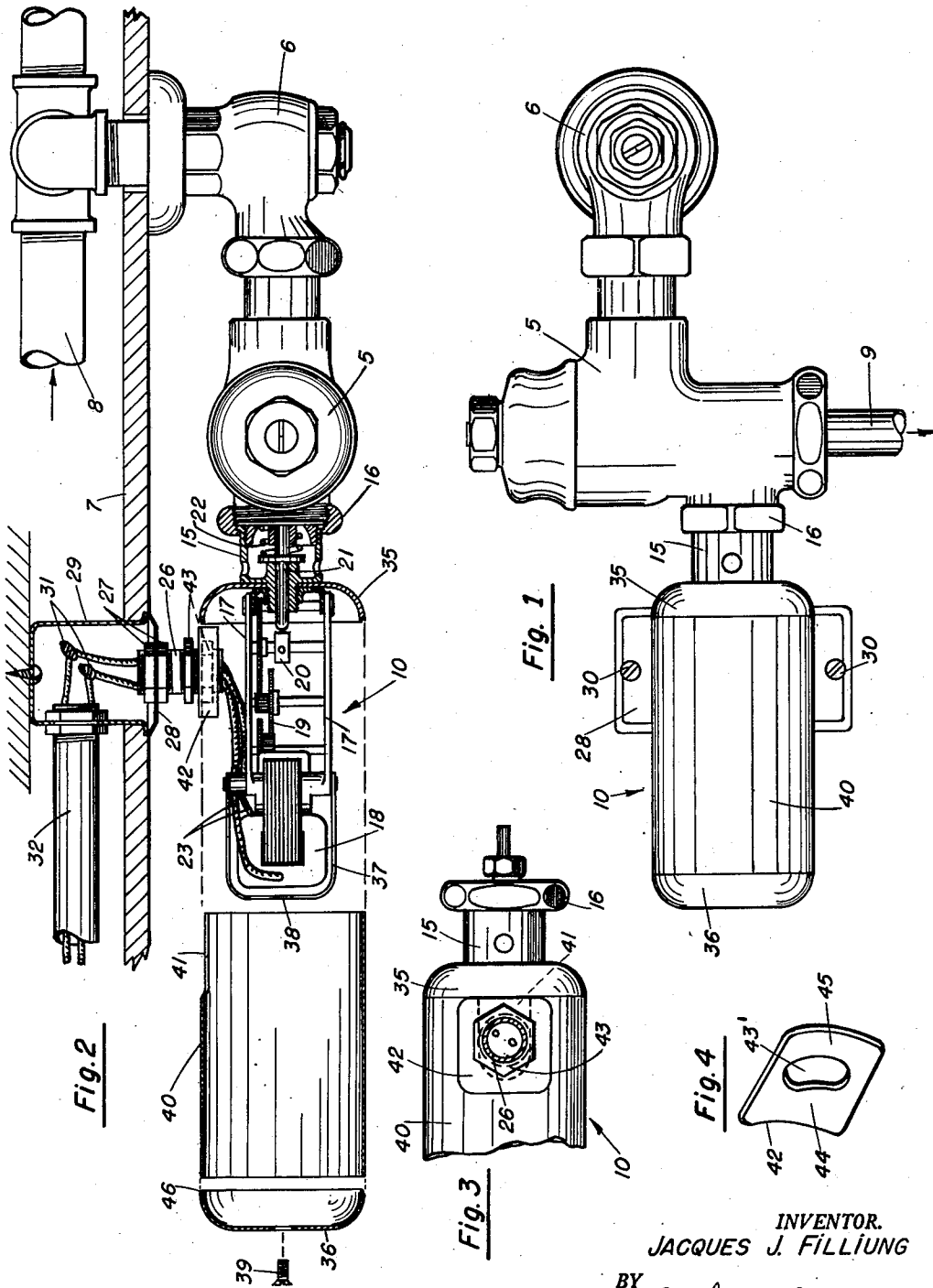
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FLUSH VALVE OPERATING ARRANGEMENT

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FLUSH VALVE OPERATING ARRANGEMENT

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This invention relates in general to plumbing installations, but more particularly to the arrangement and installation of electric devices for automatically operating flush valves, and the principal object of the invention is to provide a new and improved mounting arrangement for an electric flush valve operating device.

A further object is to provide a new and improved mounting arrangement for an electric device mounted on a flush valve in which the enclosing casing is readily removable to expose the electric device for inspection and lubrication without removing the same from its support on the flush valve and without disturbing the electrical connections to the device.

Another object is to provide an enclosing casing for an electric device which is arranged to protect the same and tend to lessen attempts of malicious persons to tamper with the device.

A still further object is to provide a slotted portion on the enclosing casing for an electrical device which is adapted to engage an electric conduit so that any slight variations in the location of the conduit are readily compensated for when the conduit connection is made.

Other objects, novel features, and advantages of the invention will be apparent from the following description which taken together with the accompanying drawings discloses a preferred embodiment of the invention.

In the drawings:

Fig. 1 shows a front elevation of a flush valve installation together with the associated electric operating device;

Fig. 2 is a top view of Fig. 1, but with the enclosing casing of the electric device shown laterally removed from the device;

Fig. 3 is a fragmentary rear view of the electric device showing the conduit connection, while

Fig. 4 is a perspective view of the cover plate on the casing.

Referring specifically to the drawings, which illustrate a preferred embodiment of the invention, the reference character 5 indicates a conventional flush valve of the piston type hydraulically operating to discharge a measured quantity of water into a plumbing fixture with which it is associated. A throttle or stop 6 is connected on the inlet side of the flush valve and both are usually arranged adjacent a wall surface 7 behind which the inlet water supply piping 8 is arranged. The water pipe 8 has a branch which extends through the wall surface 7 to connect with the throttle 6 while the outlet end 9 of the flush valve may dis-

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charge the water into a plumbing fixture such as a urinal, not shown.

Flush valves such as shown are usually provided with an operating handle for manually controlling the operation of the same, but many objections are advanced against their use, principally on account of sanitary reasons, and it is therefore desirable that some means be provided for automatically causing the operation of the flush valve. As shown here, this automatic operating means takes the form of an electric device indicated generally at 10 which may be a motor operator of the type disclosed in applicant's Patent 2,552,625, issued May 15, 1951. This motor operator may be controlled by a timing device to periodically actuate the flush valve.

The motor operator 10 is rigidly supported in position upon the flush valve 5 by means of the hollow coupling member 15 and coupling nut 16, the coupling member 15 being screwed into the front bracket of the motor side frames 17, as shown. The motor operator includes the coil winding 18 and associated core which upon energization drives a train of gears 19 journaled in the side frames 17. The final gear shaft is provided with a cam 20 which upon each rotation at a speed of 10 R. P. M. forces inward the plunger pin 21 to effect the actuation of the flush valve. A restoring spring 22 returns the plunger pin 21 after each operation of the flush valve. It will be understood that the motor operator 10 is rigidly supported upon the flush valve 5 by the coupling nut 16 in the same manner and location as the usual manually operated handle and that the construction and operation of the flush valve per se has not been altered in any manner.

Since the motor operator 10 is spaced from the wall surface 7, it is necessary to provide a conduit connection for the electrical wires 23 leading to the coil winding 18 of the motor. This conduit comprises a short nipple 26 cut to the right length, one end of which is clamped by nuts 27 to the wall plate 28 covering the conduit box 29. Wall plate 28 is fastened as by screws (see Fig. 1) to the conduit box 29, as is well known, so that the conduit nipple 26 is securely supported in the approximate correct position with respect to the location of the motor operator 10. The electric motor wires 23 are spliced as at 31 in the conduit box 29 to the control wires passing into the box from the conduit 32 located behind the wall surface 7.

At the front or right-hand end of the motor operator a cup-shaped enclosing member 35 is arranged which is clamped between the front motor bracket and coupling member 15. At the

opposite end, a second similar cup-shaped enclosing member 36 is removably supported upon a U-shaped bracket 37 as by a single screw 39 passing through the cup member 36 and threaded at 38 into the bracket 37. Between the two cup members 35 and 36 an enclosing casing 40 is clamped when screw 39 is threaded in place. An overlapping shoulder 46 on the cups 35 and 36 serves to hold the casing 40 in position. This casing 40 completely surrounds the motor operator 10 to protect the same, except for a slot 41 formed in the rear side thereof. The slot 41 is so arranged that when the casing 40 is slid onto the motor operator, the conduit nipple 26 readily fits into the slot regardless of any slight variations in the location of the nipple 26 with respect to the position of the motor operator and its wires 23. The slot 41 is sufficiently wide and long enough so that the nipple does not have to be positioned exactly correct on the wall plate 28 with respect to the casing slot, as illustrated in Fig. 3.

In order to cover up the portions of the slot 41 not occupied by the nipple 26 and to present a finished appearance to the casing, a cover plate 42 having a hole 43 therein is provided which is slipped over the nipple 26 and arranged on the outside rear surface of the casing. On opposite sides of this cover plate 42, clamping nuts 43 are provided on the nipple 26 for rigidly clamping the plate 42 and casing 40 together after the casing is slid into position on the motor operator. The hole 43 is not centrally located on cover plate 42, but offset to provide a relative wide surface 44 and narrow surface 45 (see Fig. 4) on each side of the hole 43, so that the cover plate can be placed on the conduit nipple with the narrow surface 45 on either end of the casing slot 41, in order to cover the exposed portion of the slot when the roughing-in of the conduit is slightly off-center horizontally. This is illustrated clearly in Fig. 3. With the casing 40 in place upon the motor operator, the outside clamp nut 43 on the nipple 26 is turned down upon the cover plate 42, thereby firmly holding the casing in place. The end cup member 35 is then tightly clamped onto the bracket 37 by screw 39 and the complete unit is thereby completely enclosed and rendered substantially tamper-proof. The device, it is noted, is rigidly supported in position by the coupling nut 16 upon the flush valve 5 and at another point by the clamping nuts 43 upon the conduit nipple 26. The nut 43 being arranged on the rear of the motor operator as viewed in Fig. 1, it is not visible or accessible to persons who may attempt to tamper with the internal motor mechanism.

In the event it is desired of inspecting the motor operator 10 for the purposes of checking its operation or for lubricating the gear train 19 and cam 20, the clamping nut 43 is first backed off the cover plate 42 on the conduit nipple 26. Then the screw 39 is removed, after which the end cup member 36 is taken off. The casing 40 can then be laterally slid off the motor operator. The motor operator consequently remains suspended upon the flush valve and the motor wires 23 and nipple 26 remain undisturbed.

What is claimed is:

1. In a mounting arrangement for an electric device for periodically operating a flush valve, both being spaced apart and mounted closely adjacent a wall surface, said flush valve having a water supply pipe and said electric device a short rigid wire enclosing conduit extending

through openings in said wall surface, coupling; means for rigidly supporting said electric device at one end from said flush valve, an enclosing casing for said electric device, means at the other end of said electric device from said flush valve for fastening said casing to said electric device, said electric wire enclosing conduit extending from the wall and fastened to said casing at a point adjacent the supporting end of said electric device, said casing having a slotted portion engaged by said wire enclosing conduit whereby said casing is adapted to be removed laterally from said electric device when its fastening means is removed to expose said electric device, said slotted portion being elongated to allow for variations in the relative spacing of said flush valve pipe and said wire enclosing conduit.

2. In a mounting arrangement for an electric device arranged to periodically operate a flush valve both being spaced apart and mounted closely adjacent a wall surface, said flush valve having a water supply pipe and said electric device a short rigid wire enclosing conduit extending through openings in said wall surface, coupling means on one end of said electric device for rigidly supporting said electric device upon said flush valve, an enclosing casing for said electric device, means on the other end of said electric device from said flush valve for supporting said casing on said electric device, said casing having a slotted portion on one end thereof for accommodation of said electric wire conduit, means for clamping said conduit to said casing slot, said casing adapted to be slid laterally from said electric device to provide access to the same without disconnecting the electric device from the flush valve, said slotted portion being elongated to allow for variations in the relative spacing of said flush valve pipe and said wire enclosing conduit.

3. In a mounting arrangement for an electric device arranged to operate a flush valve, both being spaced apart and mounted closely adjacent a wall surface said flush valve having a water supply pipe and said electric device a wire enclosing conduit extending through openings in said wall surface, coupling means on one end of said electric device for rigidly supporting said electric device upon said flush valve, a cup-shaped enclosing member attached to each end of said electric device and an enclosing casing clamped therebetween, said enclosing casing having a slot formed therein adjacent the supported end of the casing to which said electric wire enclosing conduit is attached, said slotted portion being elongated to allow for variations in the relative spacing of said flush valve pipe and said wire enclosing conduit; and a cover plate for said casing slot attached to said electric conduit arranged to compensate for variations in the position of said electric conduit, with respect to said water supply pipe to cover the portion of the casing slot not occupied by said rigid wire enclosing conduit.

4. In a mounting arrangement for an electric motor arranged to operate a flush valve, both being spaced apart and mounted closely adjacent a wall surface said flush valve having a water supply pipe and said electric device a wire enclosing conduit extending through openings in said wall surface coupling means on one end of said motor for rigidly supporting the motor upon said flush valve, said motor including a mounting frame and a motor winding supported upon the same, a U-shaped bracket attached to the motor frame and surrounding the motor winding, a cup-

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shaped enclosing member attached to one end of said motor frame, a second cup-shaped member attached to said bracket, and an enclosing casing for the motor clamped between both of said cup-shaped members, said enclosing casing having a slot formed therein, said slotted portion being elongated to allow for variations in the relative spacing of said flush valve pipe and said wire enclosing conduit means for attaching the electric conduit to said casing slot including a cover plate over said slot, said cover plate also being arranged to cover the portion of said casing slot not occupied by said rigid wire enclosing conduit, said enclosing casing adapted to be laterally slid off of said motor when the second cup-shaped enclosing member is removed from said bracket whereby said motor is exposed without removing it from said coupling means on the flush valve or disconnecting the electric conduit wires.

5. In a mounting arrangement for an electric device arranged to operate a flush valve, both being spaced apart and mounted closely adjacent a wall surface said flush valve having a water supply pipe and said electric device a wire enclosing conduit extending through openings in said wall surface; a coupling means on one end of said electric device for rigidly supporting the same upon said flush valve, said electric device having side frame members and separate brackets across the front end and rear ends thereof, a front cup-shaped enclosing member clamped to said front bracket by said coupling means, a rear cup-shaped enclosing member clamped to said

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rear bracket, an enclosing member for said electric device held in position thereon between the lips of said cup-shaped members, said enclosing member having a slot on one end thereof, said wire enclosing conduit extending from said wall surface and through the slot in said enclosing casing, said slotted portion being elongated to allow for variations in the relative spacing of said flush valve pipe and said wire enclosing conduit, means for clamping said wire enclosing conduit rigidly to said enclosing casing, and a cover plate on said conduit connection covering said slot and clamped to said enclosing casing, said cover plate having an offset opening therein for said wire enclosing conduit and arranged to cover said slot irrespective of variation in the position of said wire enclosing conduit and said slot.

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