ABSTRACT OF THE DISCLOSURE

A wall mount for a toilet flushing solenoid that can be recessed in or mounted behind a wall, partition or the like, enabling the plunger of the solenoid to be positioned adjacent to and in line with the end of the flushing valve handle and connected thereto by a flexible cable; the wall mount having a travel-limiting stop for the said plunger of the solenoid.

This invention relates to a wall mounted solenoid actuator for use with a flush valve. It is usual for flush toilets or urinals that utilize water main pressure rather than a gravity fed supply from a storage tank to be provided with a clearly exposed and easily accessible hand lever extending horizontally from the side of the valve. To provide for the automatic flushing of such a unit by an electronic, electro-mechanical or other actuating device that may be subject to the presence of a person in the area of the plumbing fixture and/or his departure therefrom, this invention contemplates the connection of the conventional flush valve handle to a solenoid subject to the control of such an actuating device.

An object of the invention is the provision of a solenoid wall mount that may be recessed in or installed behind a wall, partition or the like adjacent to the toilet flush valve.

A further object of the invention is the provision of a wall mounted solenoid whose moving part is connectible with the flush valve handle by a flexible cable.

A further object is the provision of a wall mounted solenoid for actuating the flush valve handle of a water main pressure supplied toilet unit wherein the reciprocation of the solenoid's moving part between retraction on the energizing of the solenoid and extension by the action of the flush valve handle is limited in the latter stroke by a travel distance stop.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the claims heretofore appended.

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings:

FIG. 1 is a plan view, partly in section, of an installation where the solenoid wall mount is recessed in the adjacent wall directly in line with the end of the flush valve handle;

FIG. 2 is a front elevation of the solenoid wall mount;

FIG. 3 is a side elevation thereof; and

FIG. 4 is an enlarged elevational detail of the connection of the solenoid's flexible cable with the flush valve handle.

Referring now to the drawings, the reference numeral:

1 represents a toilet unit supplied with water under pressure by a pipe 2 that is controlled by a valve 3 having a manually operable handle 4 extending horizontally therefrom.

In this invention the valve handle 4 may be actuated by an electric solenoid subject to the control of an automatic flushing device such as the known apparatus sold under trademark "Electroflush" (Palleon Electronics Limited, Cornwall, Canada) and not described herein. For mounting such a solenoid actuator in or behind a wall or such structure, a bracket 5 is employed, being of U-shape to define a rectangular pocket outlined by parallel arms of the U that serve as top and bottom walls 6 and a back 7 at right angles thereto. The ends of the arms or walls are flanged outwardly to provide coplanar wings 8 that are each provided with a pair of spaced perforations 9 to accommodate screws by which the bracket is secured in a recess in a wall 10, as seen in FIG. 1, or on the rear of a wall or in the pipe space as conditions dictate. In addition each wing has a centrally disposed threaded aperture 11.

A solenoid 12 is positioned in the pocket of the U-shaped bracket 5, and is secured to the lower arm or wall 6 by nuts and bolts 13, being so arranged that the plunger 14 slides horizontally being located midway on the height and centrally of the sides of the U-shaped bracket pocket. The free end of the plunger 14 is bifurcated having horizontally spaced arms 15, across which a split pin 16 extends, and inwardly of the bifurcated end, the plunger has upper and lower abutments 17 to limit the retraction of the plunger when the solenoid is energized.

To limit the outward travel of the plunger a stop 18 in the form of a vertical transverse plate is placed across the mouth of the U. It rises to a height just below the level of the bifurcated end of the plunger and is designed to be engaged by the lower abutment 17, stopping the extreme end of the spaced arms 15 so that they do not pass beyond the plane of the front of the attaching wings 8. The stop 18 has a flat stem 19 extending in at right angles from the lower edge of the vertical face plate and to one side thereof, as seen in FIGS. 2 and 3; such stem overlying the base of the solenoid 12 and being fastened in place by the solenoid securing nuts and bolts 13 along one side.

A keeper 20 is rotatably carried on the split pin 16 anchoring the end of a flexible cable 21 that issues from the wall 10, passing through the central aperture 22 in a bracket covering plate 23 that is secured to the bracket wings 8 by machine screws that thread into the apertures 11 previously mentioned. The extended end of the cable attaches to the toilet valve handle 4, passing around the screw 24 threaded axially in the end thereof and being terminally caught in a tight clamp 25.

The solenoid wall mount bracket 5 is positioned in the wall or partition adjacent to and directly in line with the end of the toilet valve handle and when installed and the cover plate applied thereto, the cable issuing from the wall, through the central aperture in the plate is run around the screw 24 and pulled taut, so that the solenoid's plunger abutment 17 engages the travel-limiting stop 18, then the cable clamp 25 is tightened in place, after the fashion shown in FIG. 4.

In use, the flush valve handle of the conventional toilet unit that is connected by flexible cable with the plunger of the solenoid holds such plunger in extended position engaging the travel-limiting stop 18. On the energizing of the solenoid 12, by the method desired, the sliding plunger 14 is retracted thus pulling on the flexible cable 21 attached thereto and that is connected at its remote end to the flush valve handle 4 of a toilet unit 1. This causes the flushing of the toilet in the usual way, following which the automatic resetting of the toilet valve handle draws...
the plunger of the deenergized solenoid back to its original extended position.

It will be obvious that the connection of the wall mounted solenoid actuator to a toilet valve handle will not preclude the usual manual operation of such valve but it will be no less obvious that this device is so simple and well concealed, with only a small length of thin cable exposed, that the casual user of the toilet unit may well be unaware of the existence of the automatic actuator.

From the foregoing description taken in connection with the accompanying drawings, it will be manifest that a wall mounted solenoid actuator is provided that will fulfill all the necessary requirements of such a device, but as many changes could be made in the above description and many apparently widely different embodiments of the invention may be constructed within the scope of the appended claim, without departing from the spirit or scope thereof, it is intended that all matters contained in the said accompanying specification and drawings shall be interpreted as illustrative and not in a limitative or restrictive sense.

What is claimed as new is:

1. A solenoid wall mount for use in combination with a toilet unit having a pressure type flush valve with a manually operable handle extending therefrom, comprising a U-shaped bracket for insertion in or mounting behind a wall, partition or the like having the ends of the arms of the U flanged outwardly in coplanar wings; a solenoid positioned therein and secured to one arm of said bracket, said solenoid having a slidable plunger; a travel-limiting stop for said plunger disposed transversely in the mouth of the U of said bracket; and a flexible cable affixed by one end to said plunger of the solenoid and its end remote from the solenoid secured to the end of said flush valve handle.

References Cited

UNITED STATES PATENTS

1,637,154 7/1927 Mark.
2,388,990 11/1945 Nelson et al. 355—257
2,428,712 10/1947 Kipke 335—257
2,459,078 1/1949 Jeffery 335—257
2,692,354 10/1954 Fisher 335—257 XR
2,877,390 3/1959 Trombetta 335—257 XR
3,058,811 10/1962 Chester 248—27 XR

JORDAN FRANKLIN, Primary Examiner
G.H. KRIZMANICH, Assistant Examiner

U.S. Cl. X.R.