April 19, 1955 F. R. HOLYCROSS, JR 2,706,298

POP-UP BATH WASTE

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FIG. 1

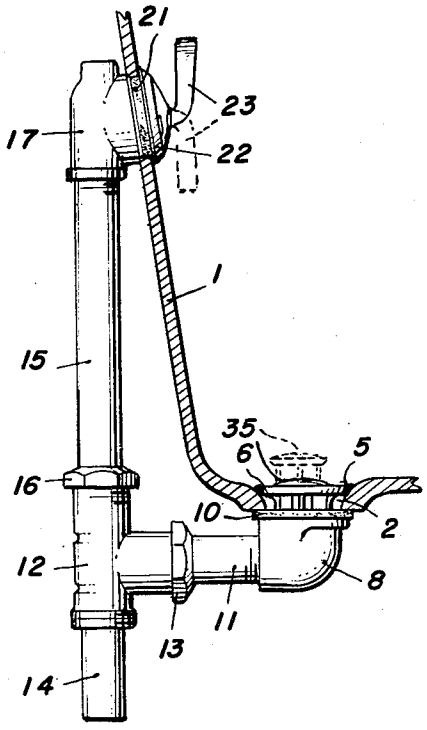


FIG. 2

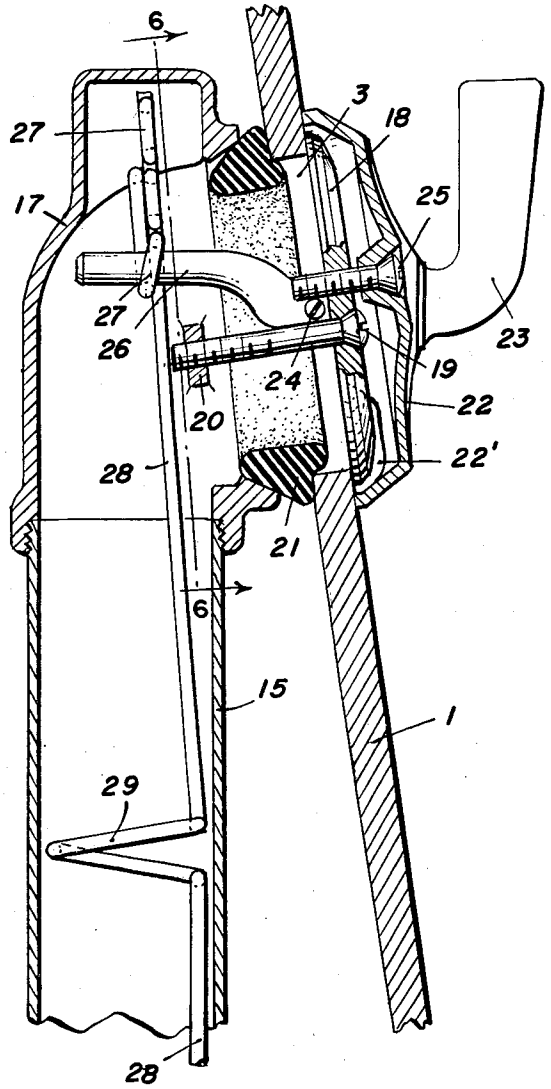
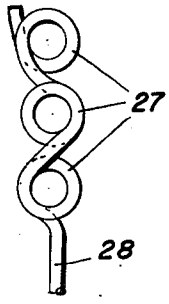


FIG 8



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FIG. 3

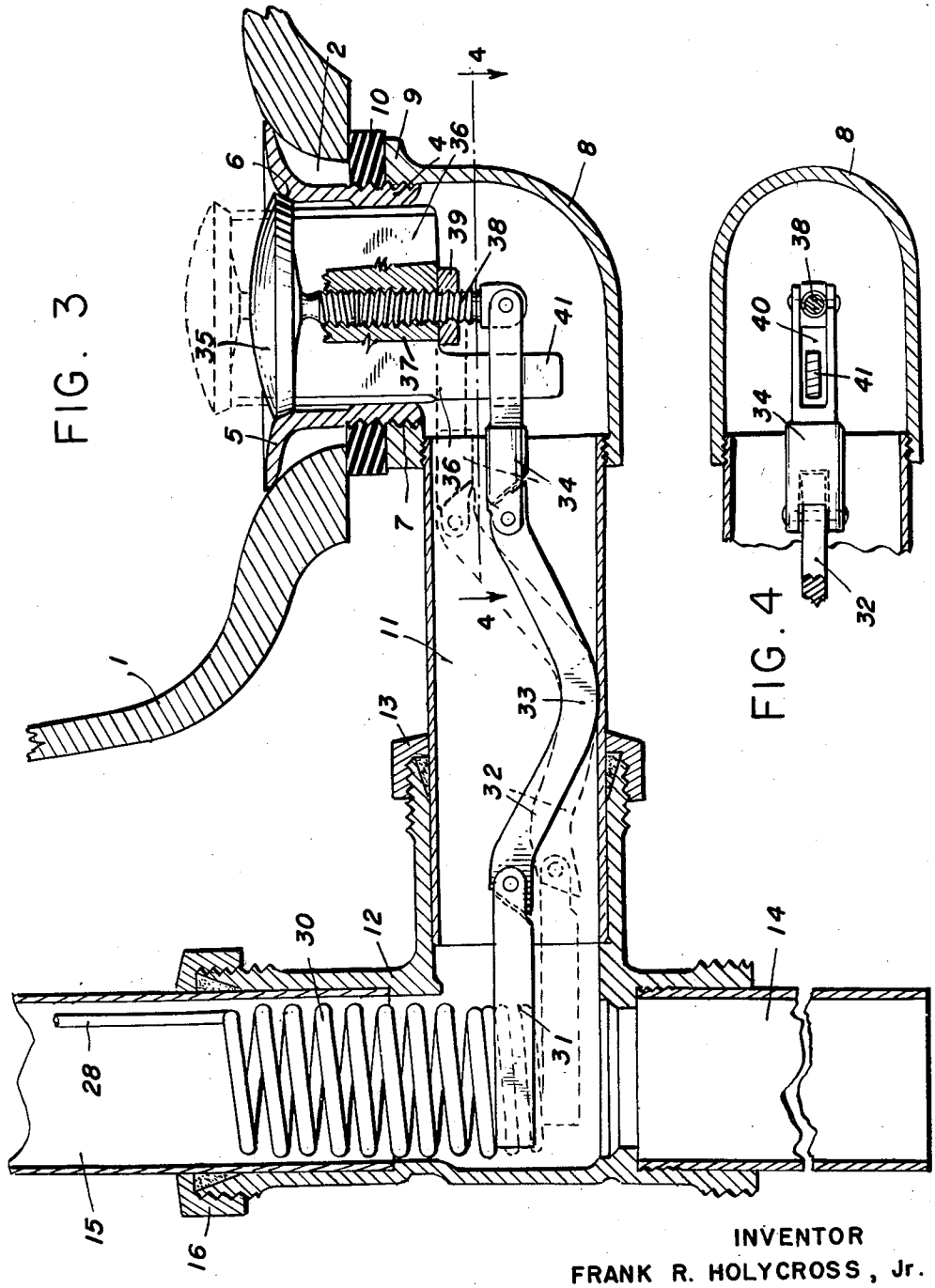


FIG. 4

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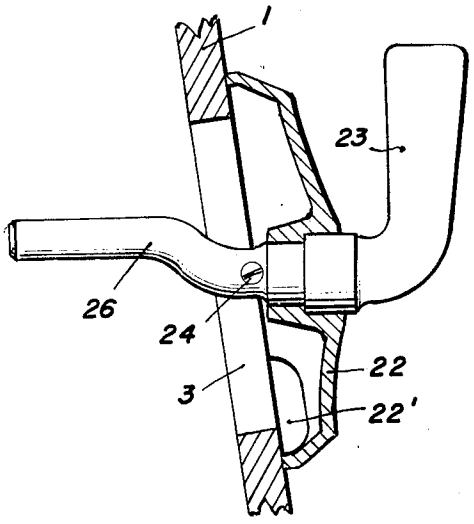
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FIG. 5



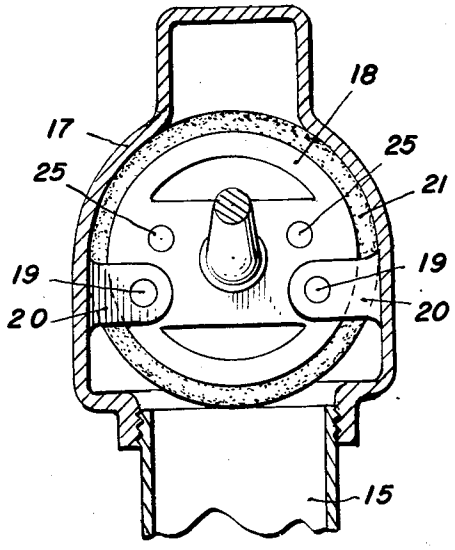
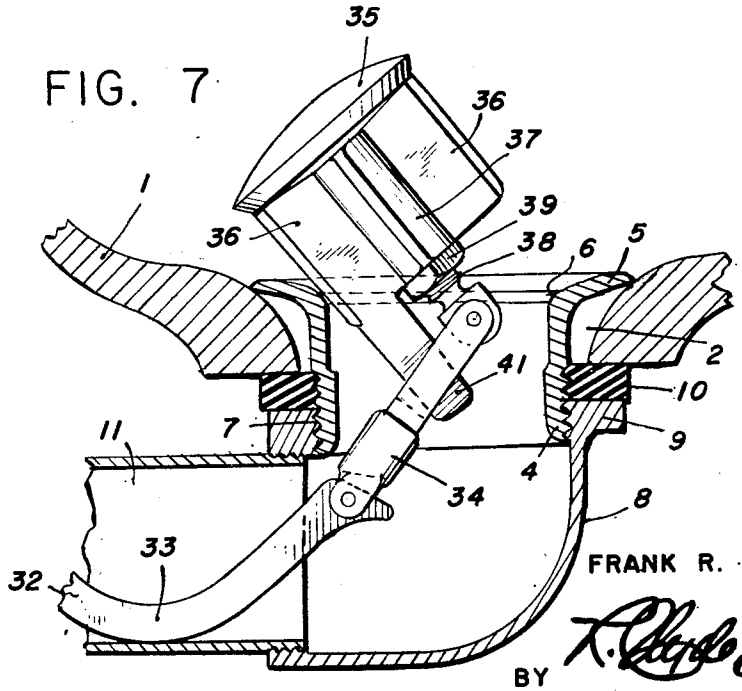


FIG. 6

FIG. 7



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2,706,298

POP-UP BATH WASTE

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Application October 22, 1951, Serial No. 252,471

5 Claims. (Cl. 4—203)

This invention relates to certain improvements in waste valves for bath tubs and the like, known in the trade as pop-up valves, and more specifically to a novel means for operating said valves to produce a cushioning action between the operating means and valve stopper or plug.

The present valve structure and its operating means broadly is the type adapted to be used in connection with a sanitary fixture provided with a combination overflow and drain, where said operating parts are mounted and enclosed within the piping or passageways of said combined overflow and drain.

These various parts comprising the valve, connecting linkage and operating means, including the operating handle and its mounting, are sold as a unit to the trade and assembled and attached by the plumber to the sanitary fixture which could be either a tub, lavatory bowl, or sink.

The object of the invention is to provide a pop-up waste valve and operating means that can be installed by inserting the same, partly through the overflow and partly through the drain after said overflow and drain pipes have been set up and assembled with respect to the sanitary fixture.

Further, these valve parts can also be removed for cleaning, replacement or repair, through the overflow and drain without mechanically disconnecting any portion of the operating mechanism or disturbing any pipe connections of the overflow or drain.

This is important with present day built-in installations, where most of the fittings and pipes are concealed within the walls of the fixture, making repairs, cleaning and replacement of parts a difficult problem, especially where no removable panels are provided in the back wall. With applicant's construction and arrangement no removable panels are required or necessary.

Another important object and chief novel feature of applicant's invention, resides in the construction and form of valve operating means, with particular reference to the flexible or cushioning connection between the operating handle and the pivoted linkage and lever mechanism associated with the valve stopper or plug per se, whereby, when said stopper is in its raised or open position the valve and operating mechanism cannot be damaged by one stepping on or forcibly pushing down the stopper or plug.

A further object of the invention is the production of a novel mechanism of the type indicated whereby the valve stopper and also the valve operating means can be properly adjusted after the parts have been inserted and assembled in the overflow and drain piping to adapt the device to various sizes of standard sanitary fixtures.

Another feature of the invention resides in the construction of the valve stopper or plug whereby the guide portion or spider of said stopper is provided with a downwardly projecting reduced portion or flat pin extending through a slot formed in the link secured to the bottom of the stopper, to act as a key to prevent the axial turning of said link and its pivoted linkage during the operation of the device and at the same time also prevent a rotation of the stopper.

For the purpose of illustration and description, the present invention has been shown associated with a bath tub and throughout the specification the "sanitary fixture" will be referred to as a tub.

Referring to the drawings in detail—

Figure 1 is a view partly in elevation and partly in section showing the various parts in assembled form as applied to a bath tub.

Figure 2 is an enlarged and substantially full size vertical sectional view of the overflow opening and associated fittings comprising the upper portion of the valve actuating rod and its connection to the operating handle.

Figure 3 is a continuation of Figure 2 illustrating the lower portion of the valve actuating means, the valve plug and connecting lever linkage, said plug being in closed position.

Figure 4 is a top plan view on the line 4—4 of Figure 3 showing the pin and slot interlock between the valve plug and connected link.

Figure 5 is a view partly in section and partly in elevation of the operating handle and a means of mounting the same in the cover plate for the overflow opening.

Figure 6 is a rear view partly in section and partly in elevation on the line 6—6 of Figure 2.

Figure 7 is substantially a full size view showing the manner of inserting the stopper and connected linkage in position or the withdrawing of same through the waste opening and associated elbow and pipe fittings; and

Figure 8 is a detail view of the upper end of the valve actuating rod more clearly illustrating the spaced loop arrangement to provide for various lengths of adjustments of said rod.

Referring to the drawings in detail, the present invention is illustrated in connection with a conventional bath tub **1** provided with a waste opening **2** and an overflow opening **3**.

With particular reference to Figure 3, the waste opening **2** is provided with the usual spud or stopper casing **4** having an upper clamping flange **5** provided with a valve seat **6**. The lower end of the casing **4** is provided with an externally threaded portion **7** adapted to receive a waste elbow **8**. Interposed between the upper flange portion **9** of the elbow **8** and the tub **1** is the usual gasket **10**, whereby the spud or casing **4** is clamped in position in a water-tight and conventional manner.

Threaded into the other end of the elbow **8** is the horizontal pipe **11** extending into a T **12** with the usual water-tight seal or joint **13**.

The lower leg of the T **12** is connected to a waste discharge pipe **14** and the upper leg is adapted to receive the lower end of an overflow pipe **15** also provided with the usual packing or seal **16**.

The upper end of the overflow pipe **15** is threaded into a waste elbow **17** positioned at the overflow opening **3** and secured thereto by a perforated clamping ring **18** provided with clamping screws **19** adapted to engage internally threaded lugs **20** extending inwardly from the side walls of the overflow elbow **17**. In order to provide a water-tight joint at this point, a gasket **21** is clamped between said elbow and the rear face of the tub **1**. Positioned over the clamping plate **18** is a cover plate **22** and journaled in said plate is a rotatable valve operating handle **23** (see Figure 5), said handle being secured therein by a set screw **24** and adapted to be manually operated to control the valve plug to be hereinafter referred to.

This cover plate **22** is secured in position by a pair of screws **25** extending into threaded openings in the waste elbow clamping plate **18** as clearly shown in Figures 2 and 6.

The handle **23** has an eccentric inner end or crank extension **26** adapted to be inserted in one of the properly selected loops **27** formed on the upper end of the valve operating rod **28** (Figures 2 and 8). This rod **28** is provided with a series of vertically spaced loops **27** as shown more clearly in Figure 8, whereby said rod **28** may be adjusted as to length to adapt the same to fixtures of various sizes.

This operating rod **28** extends downwardly within the overflow pipe **15** and is preferably guided therein during operation of the device, by a bent offset portion **29** as clearly shown in Figure 2.

Referring to Figure 3, the valve operating rod **28** extends downwardly to the lower end of the overflow pipe **15** and into the T **12** and the lower end of said rod is formed into a compression spring coil **30** adapted to engage and normally rest on a one-way pivoted link **31** and provide a cushioning element for the valve operating

linkage to be hereinafter described. This spring coil **30** also acts as a guiding means for the lower end of the operating rod **28**. The link **31** is pivoted to a downwardly curved link **32** having a fulcrum portion **33** normally resting on the bottom inner face of the horizontal pipe **11** and the opposite end of said link **32** has a one-way pivotal connection with a link, all clearly shown in Figure 3.

Positioned in the spud or stopper casing **4** is a vertical movable valve plug or stopper **35** provided with a depending spider or guide wings **36** to ensure the proper alinement and position of said plug in both open and closed positions. These wings extend outwardly from an internally threaded stem **37** (Figures 3 and 7) to receive an adjusting screw **38** provided with a lock nut or the like **39**, whereby said plug can be vertically adjusted with respect to the valve seat **6** to ensure the proper seating of the valve plug or the stopper during the operation of the device.

Pivotally connected to the lower end of the adjusting screw **38** is the outer end of the link **34**. It will be noted upon referring to Figure 4 that the outer end of this link **34** is bifurcated to straddle the lower end of the screw **38** and at the same time provide a slot **40**, for the purpose to be hereinafter more fully described.

Referring to Figure 3, this linkage comprising links **31, 32** and **34** simply rests and is freely positioned within the pipe **11** and some means therefore must be provided to prevent axial rotation thereof and also prevent a rotation of the stopper. In the present instance, this is provided in a novel manner by a reduced portion **41**, of one of the webs **36** of the stopper, extending downwardly into the slot **40** as clearly shown in Figures 3, 4 and 7, whereby in both open and closed position this pin and slot combination will always function to prevent a rotation of the stopper and an axial rotation of the linkage.

With the various parts assembled as above described and as illustrated in combined Figures 2 and 3, a rotation downwardly of the eccentric operating handle **23** will cause a downward movement of the operating rod **28** which will, through the compression spring **30** on the lower end of said rod, exert a cushioned downward pressure on the end link **31** and in turn cause an upward movement of the opposite end link **34** through the fulcrum center link **32** due to the one-way hinged construction of the linkage. This upward movement of the link **34** will in an obvious manner lift the valve plug or stopper off its seat **6** a sufficient distance to open the valve and a reverse movement of the operating handle will permit a seating of the valve plug, said plug being maintained in operative position and guided in its movements by the spider or wings **36**.

With this cushioned arrangement of the valve plug operating means, the various parts cannot be damaged by one stepping on said plug or forcibly pushing the same down when the operating handle is in down position and the said valve plug is raised to open position.

The present construction not only provides a novel type of operating device for wastes, but one that can be, in a simple manner, inserted and removed without disturbing any of the drain and overflow piping used in connection with conventional bath fixtures.

After the various pipe fittings have been clamped to the tub, the stopper with its connected linkage is inserted into the waste elbow **8** as clearly shown in Figure 7.

As hereinbefore described, the one-way hinged construction of the linkage will cause said linkage to act as a solid rod when pressure is applied for opening the waste valve, but permit said linkage to pivot in the opposite direction, the individual links **31, 32** and **34** being of such length and shape as to allow the whole assembly, comprising the stopper and linkage, to be removed by simply lifting out the stopper and these parts can be inserted by a reverse operation as clearly shown in Figure 7.

The cushioned operating rod **28** can be inserted and removed through the overflow opening **3**, said rod being flexible enough to bend to permit these operations. After rod **28** has been inserted, the overflow cover plate **22** with assembled handle **23** is secured in position, the crank portion **26** being inserted in the loop **27** nearest to the correct operative position. If the stopper or plug **35** does not seat properly when the handle **23** points upwardly as shown, the lock nut **39** is loosened and the stopper screwed up or down as required until the correct seating is obtained, after which the nut **39** is re-tightened.

After all adjustments are made, to open the valve plug or stopper, the handle **23** is rotated and through its eccentric extension **26** pushes down the spring rod against the outer end of the lever linkage, lifting the stopper to open position, the curved center link bearing on the bottom of the piping, acting as a fulcrum.

The three loops **27** on the upper end of the rod **28** together with the adjustment of the stopper, adapt this waste valve for use on practically all tubs of regular manufacture of all the different manufacturers.

This feature of insertion and removal of the valve plug and operating parts is not only important with respect to installation, but makes it very easy and simple to clean, replace or repair said parts without disturbing any of the pipe connections of the sanitary fixture with which they are associated.

Furthermore, in view of the novel contact between the lower end of the operating rod **28** and the link **31** of the valve lifting lever, no mechanical or positive connection is required, whereby these respective parts can be separated and withdrawn in the manner stated.

Having thus described the invention, what I claim is:

1. The combination with a sanitary fixture provided with a waste opening, a valve plug mounted in said opening, a manually operated control member for said valve plug, cushioned valve plug operating linkage connecting said plug to said operated member and a pin and slot connection between said plug and linkage to prevent the axial rotation of said linkage.

2. The combination with a sanitary fixture provided with a waste opening, a valve plug mounted in said opening, a manually operated control member for said valve plug, pivoted linkage comprising a lever, having one end pivotally connected to said valve plug, a cushioned valve plug operated member engaging the other end of said lever and connected to said manually operated control member, and a pin and slot connection between said plug and linkage to prevent axial rotation of said lever, and rotation of said plug.

3. The combination with a sanitary fixture provided with a waste opening, a valve plug mounted in said opening, a manually operated control member for said valve plug, pivoted linkage having one end adjustably attached to said plug, a pin and slot connection between said plug, and linkage for preventing an axial rotation of said linkage and a rotation of said plug, and a flexible rod interposed between said operated member and linkage, said rod at one end being provided with a series of integrally formed spaced loops for selectively connecting the same to said operated member and its opposite at its point of contact with said linkage being constructed in the form of a coil compression spring to provide a cushioned connection with said linkage.

4. The combination with a sanitary fixture provided with waste and overflow openings, communicating horizontal and vertical piping connecting said waste and overflow openings, a valve plug mounted in said waste opening, a valve operating handle mounted in said overflow opening, a three link lever freely positioned in said horizontal pipe having the intermediate link curved downwardly to provide a fulcrum engaging the inner wall of said horizontal pipe, one end of said lever being provided with a slotted link pivotally and adjustably connected to said valve plug, and said valve plug being provided with a downwardly extending flat pin-like portion extending through the slot in said link to prevent axial rotation of said linkage, a flexible rod mounted in said vertical pipe having its upper end provided with a series of spaced loops for selectively connecting the same to said operating handle, and a compression spring coil formed on the lower end of said rod for centering the rod in said vertical pipe and contacting the other end of said lever with a downward cushioned pressure for lifting said valve plug.

5. The combination with a sanitary fixture provided with waste and overflow openings, communicating horizontal and vertical piping connecting said waste and overflow openings, a valve plug mounted in said waste opening, a valve operating handle mounted in said overflow opening, a lever freely positioned in said horizontal pipe having an intermediate downwardly curved portion providing a fulcrum engaging the inner wall of said horizontal pipe, one end of said lever being pivotally and adjustably

connected to said valve, said end also being provided with a slot to receive a pin projecting downwardly from said plug to prevent axial rotation of said lever, a flexible rod freely mounted in said vertical pipe having its upper end formed with a series of vertically spaced loops for selectively connecting the same to said operating handle, means integrally formed with the intermediate portion of said rod for guiding the rod in said vertical pipe and a compression spring coil integrally formed on the lower end of said rod for further centering the rod in said vertical pipe and contacting the other end of said lever with a downward cushioned pressure for lifting said valve plug upon the operating of said handle.

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