April 7, 1942. N. LARSON 2,278,887

WATER CLOSET

Filed Nov. 1, 1940

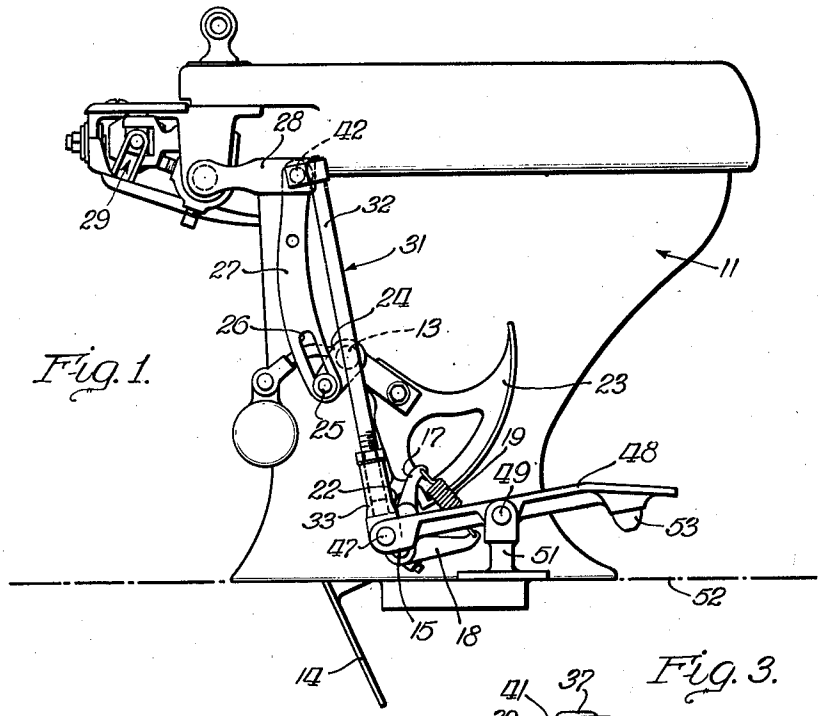


Fig. 1.

Fig. 2.

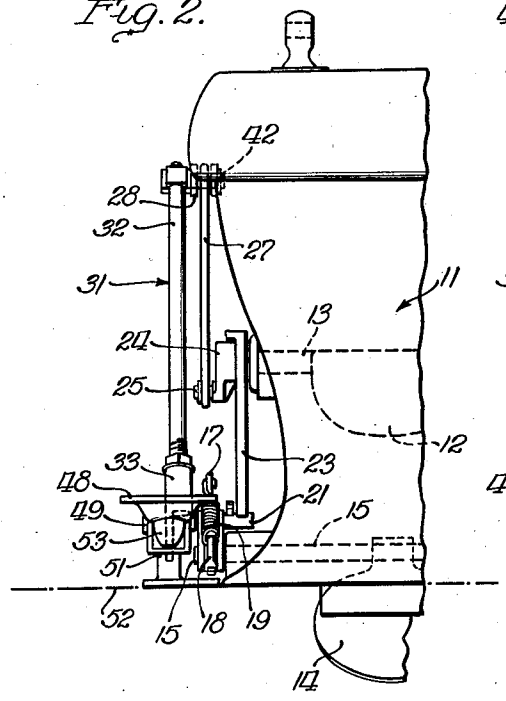


Fig. 3.

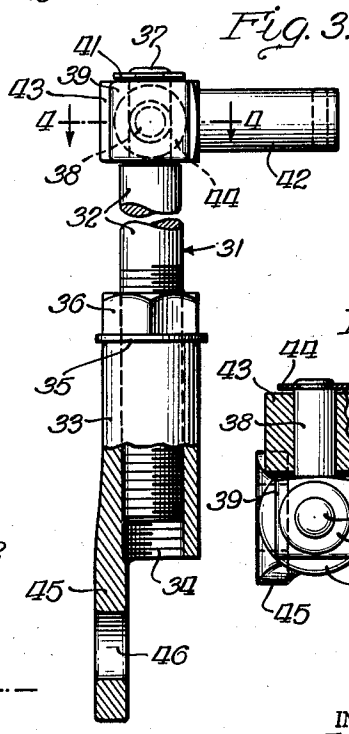
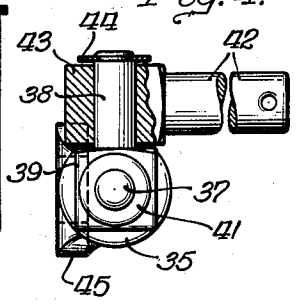


Fig. 4.



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WATER CLOSET

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3 Claims. (Cl. 74—512)

This invention relates in general to improvements in water closets, and more particularly to the type of water closet in use in railway cars, and the like.

In the prior art water closets employing foot operated mechanism for actuating the dump pan, draft plate and flushing valve, difficulties have been encountered in the installation and operation of such mechanism. United States Letters Patent No. 2,167,645, issued August 1, 1939, to Sven Duner, discloses this type of mechanism. The difficulties involved result from initial inaccurate or improper mounting of the foot operated actuating mechanism, which may be due to unevenness or irregularities of the floor or other closet supporting structure, and from wear caused by extensive use. The link connecting the foot operated lever and the actuating mechanism in the device shown in the patent above referred to is a one-piece casting, so that binding and faulty operation will result if the foot operated lever is not properly and very accurately located relative to it. Also, if the bumper on the foot lever strikes the floor or supporting structure too soon, the dump pan will not fully open, and, conversely, if the pan is fully opened before the bumper on the foot lever contacts the floor, the pan takes the shock of stopping the mechanism and the bumper does no good.

A principal object of the instant invention, therefore, is the provision of a link for connecting the foot lever and the actuating mechanism of such a water closet which is so constructed as to obviate all of the difficulties hereinbefore referred to.

Another important object of the invention is the provision of such a connecting link which includes a swivel arrangement or universal joint at one end to permit the foot lever to be set at an angle relative to the water closet without in any way interferring with the operation of the mechanism.

A further important object of the invention is the provision of such a connecting link which may be readily adjustable for length to accurately compensate for different locations of the foot lever or for unevenness in the closet supporting structure.

Another object of the invention is the provision of a link for connecting the foot lever and the operating mechanism of a water closet which may be equally well employed when the mechanism is mounted on either side of the closet or hopper.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, when taken in connection with the accompanying drawing, discloses a preferred embodiment thereof.

In the drawing:

Figure 1 is a side elevation of a water closet embodying the features of the invention;

Figure 2 is a front elevational view of part of the device of Fig. 1;

Figure 3 is a front elevation of the connecting link, with the central part broken away and the lower end shown in section; and

Figure 4 is a top plan view of the connecting link, with part of the horizontal pin shown in section substantially on the line 4—4 of Fig. 3.

Referring more particularly to the drawing, reference numeral 11 indicates in general a water closet or hopper of standard construction which may be made of vitreous china, similar to that disclosed in Patent No. 1,992,653, issued February 26, 1935, to Sven Duner, or to that shown in Patent No. 2,167,645 hereinbefore referred to. It is to be understood, of course, that the hopper 11 may be made of any other desired material and shape, since the instant invention relates to the operating mechanism associated therewith, and not to the specific construction of the hopper. The hopper 11 comprises a hollow bowl and stand portion, interiorly of which is disposed an upper pan or dump pan 12 rigidly secured to a transverse shaft 13 extending through the hopper adjacent the lower end of the bowl. A draft plate 14 is mounted on a shaft or shafts 15, disposed adjacent the lower end of the stand portion.

In the normal position of the parts, as shown in the drawing, the dump pan 12 is closed and the draft plate 14 is open. Means are provided for successively opening a flushing valve, raising or closing the draft plate 14, lowering or opening the dump pan 12, raising or closing the dump pan 12, opening or lowering the draft plate 14, and shutting off the valve, in order to perform a complete flushing operation. This means comprises similar mechanism to that disclosed in the two patents previously cited, particularly the foot operated mechanism of No. 2,167,645, the mechanism of No. 1,992,653 being hand operated. Consequently, the major portion of the operating mechanism will be only briefly described herein, a more complete and detailed description being given in said patents of similar mechanism for performing the same functions.

The shaft 15, upon which the draft plate 14 is mounted, carries an arm 17 which is rigidly secured to one end thereof, and an arm 18 loosely mounted thereon. The arms 17 and 18 are yieldably interconnected by a spring 19. A pin 21 projects laterally from the arm 18 (Fig. 2), and normally rests in a recess 22 (Fig. 1) provided in the outer surface of a segment 23. The segment 23 is rotatably mounted upon the outer end of the shaft 13, and is rigidly connected in any suitable manner to a crank arm 24 having a pin 25 extending outwardly therefrom. The members 23 and 24 are so arranged on the shaft 13 as to be capable of a slight degree of rotation relative thereto in a clockwise direction, viewing Fig. 1, before picking up the shaft and rotating the same therewith. This mechanism is similar in function to that disclosed in Patent No. 1,948,101, issued to John C. Duner on February 20, 1934.

The pin 25 extends through a slot 26 provided in the lower end of a link 27. The upper end of the link 27 is pivotally connected to a lever 28 which controls the actuation of flush valve mechanism, indicated generally by reference numeral 29. The flushing valve 29 may be of any desired construction, and is provided for the usual purpose of delivering water to the interior of the hopper 11. All of the mechanism so far described herein is disclosed in greater detail in the patents previously cited.

The instant invention contemplates the provision of novel means for operating the mechanism hereinabove described. This means comprises a link, indicated generally by reference numeral 31. The main body portion of the link 31 comprises an upper part or rod 32 and a lower part 33 adjustably connected together. As will be seen in Fig. 3, the upper portion of the lower part 33 is provided with a tapped bore 34 into which the lower threaded end of the rod 32 is screwed. A washer 35 and lock nut 36 are mounted on the rod 32 for cooperation with the upper end of the lower member 33 to retain the parts in any desired adjusted position.

The upper end of the rod 32 is reduced in circumference to provide a pin portion 37. A pin member 38 (Fig. 4) is provided with an enlarged head portion 39 which is rotatably mounted upon the pin portion 37 of the rod 32. A washer 41 is rigidly secured to the pin 37 in any suitable manner to retain the pin member 38 thereon. A second pin member 42 is provided with an enlarged head portion 43 which is rotatably mounted upon the pin 38 and retained thereon by a washer 44 rigidly secured in any suitable manner to the outer end portion of the pin 38. This arrangement provides a universal joint in which the first pin 38 is mounted for rotation on the rod 32 in a plane normal to the axis thereof, and the second pin 42 is mounted for rotation on the first pin 38 in a plane parallel to the axis of the rod 32. The pin 42 comprises the pivotal connection for the link 27 and lever 28, as shown in Figs. 1 and 2.

The lower member 33 of the link 31 terminates at its lower end in a flat portion 45 (Fig. 3) having an aperture 46 extending therethrough. A pin 47 (Fig. 1) extends through the aperture 46 and a similar aperture provided in the rear end of a foot lever 48 to pivotally interconnect the latter and the link 31. The foot lever 48 is pivotally mounted intermediate its ends on a pin 49 which is supported by a bracket 51. The bracket 51 is secured in any suitable manner to the floor or other supporting surface upon which the hopper 11 is mounted, such surface being diagrammatically indicated in Figs. 1 and 2 by the broken line 52. The forward end of the foot lever 48 is provided on its under surface with a bumper 53 of any suitable resilient material.

The normal position of the above described parts is that shown in the drawing. The sequential operation of the flushing valve 29, the draft plate 14 and the dump pan 12, as hereinbefore described, is performed by downward movement of the forward end of the foot lever 48. In such operation, the bumper 53 should contact the supporting surface 52 just prior to movement of the dump pan 12 to fully lowered or opened position. In the prior art devices shown in the patents previously cited, positioning of the foot lever 48 and bracket 51 to insure such operation was extremely difficult, without impairing the actuation of the operating mechanism. With the present construction, the length of link 31 may be readily adjusted by means of the threaded connection between the rod 32 and the lower member 33 to insure that the bumper 53 will contact the supporting surface 52 at the proper time in relation to the operation of the dump pan 12, regardless of any irregularities or unevenness of the suporting surface 52. As has also been pointed out hereinbefore, the prior art constructions necessitated the absolutely accurate positoning of the bracket 51 in order to prevent binding or other misoperation of the actuating mechanism. With the present construction, the bracket 51 and foot lever 48 may be disposed at an angle relative to the hopper 11, without in any way impairing the operation of the actuating mechanism, because of the provision of the universal joint mechanism comprising the pins 38 and 42. This is of particular importance in the installation of a water closet in a railway car or the like, because of the limited space normally provided therefor. The link 31 also has the distinct advantage over the connecting links of the prior art of being adapted for use on either side of the hopper 11. In the prior art constructions, it was necessary to provide "left hand" and "right hand" connecting links in order to permit the installation of the operating mechanism on either side of the hopper. With the link 31, however, the parts may be installed on either side of the hopper because of the provision of the rotatable pins 38 and 42.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim.

1. In a water closet having dump pan mechanism, operating mechanism therefor, and a foot operated lever; a link pivotally connected at one end to said lever and adapted to be moved longitudinally thereby to compressively transmit movement of said lever to said operating mechanism, a pin mounted for rotation on the other end of said link in a plane normal to the axis thereof, and a second pin mounted for rotation on said first pin in a plane parallel with the axis of said link and pivotally connected to said operating mechanism.

2. In a water closet having dump pan mech-

anism, operating mechanism therefor, and a foot operated lever; means connecting said lever and said operating mechanism to transmit compressive forces from the former to the latter, comprising a link pivotally connected to said lever at one end and having a journal portion at the other end extending axially thereof, and a pin pivotally connected to the said operating mechanism and freely rotatable on said journal portion normal to the axis of said link.

3. In a water closet having dump pan mechanism, an operating member therefor, and a foot actuated member; means interconnecting said members to transmit compressive forces from the latter to the former, comprising a rod pivotally connected to said foot operated member at one end and having the other end reduced to provide an axially extending journal portion, and a bolt pivotally connected to said operating member and freely rotatable on said journal portion normal to the axis of said rod.

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