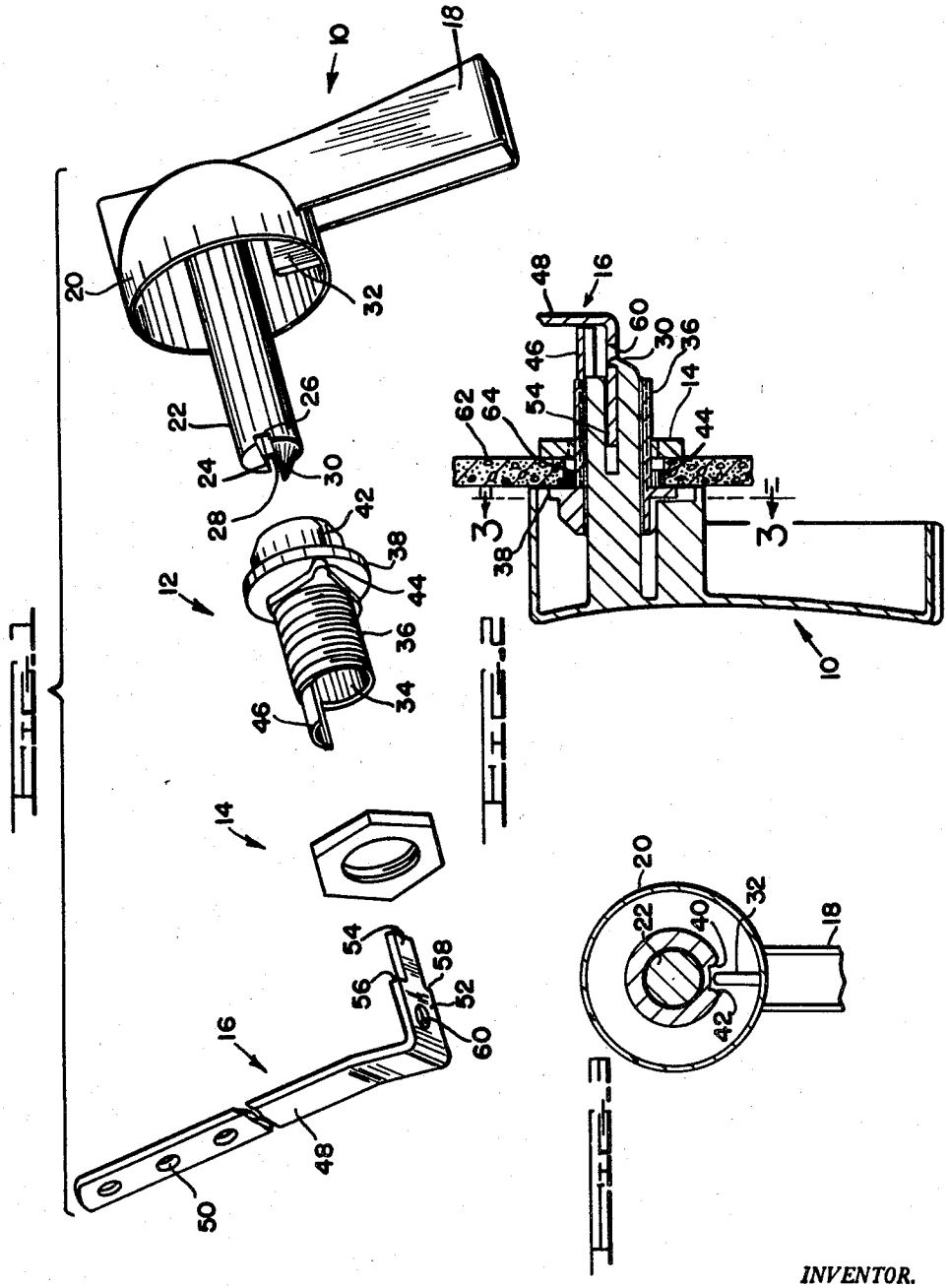
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HANDLE ASSEMBLY FOR FLUSH TANK

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HANDLE ASSEMBLY FOR FLUSH TANK

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The present invention relates to a toilet flush tank, and more particularly to the construction and arrangement of a handle assembly for use in opening the flush valve of the toilet flush tank.

It is an object of the present invention to provide an assembly including a handle and tank lever for use in a flush tank, said assembly being constructed and arranged so that it can be readily inserted in place in the tank by an operation which is characterized by its simplicity and one which assures a permanent and sturdy mounting of the assembly.

It is another object of the present invention to provide an assembly of the foregoing character which is constructed and arranged so that it can be manufactured and assembled as a unitary structure and at a relatively low cost.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawing:

Figure 1 is an exploded perspective view illustrating the several elements which form the handle assembly;

Figure 2 is a fragmentary sectional view illustrating a portion of the wall of a flush tank with the handle assembly mounted in place thereon; and

Figure 3 is a fragmentary section taken on the line 3—3 of Figure 2.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring now to the drawing, the invention will be described in greater detail. The handle assembly comprises the four elements shown in Figure 1, which are the handle 10, the sleeve-like part or spud 12, the nut 14 and the tank lever 16. The handle 10 has a conventional lever portion 18 and a cup portion 20 which is designed to enclose and conceal the opening which is formed in the wall of the flush tank with which the handle assembly is adapted to be used. Projecting axially from the cup portion 20 and at a right angle to the lever portion 18 is a rod 22 which has formed in its free end a transverse slot 24. The slot 24 extends substantially deeper into the central portion of the rod 22 than at the peripheral edges of the same so as to form a pair of diametrically opposed shoulder-like formations 26 and 28 in the slotted or cut away portion of the rod 22. Also projecting from the end of the rod 22 is an axial projection 30, the purpose of which will presently be described. The handle 10 also has a flange-like element 32 formed in the cup portion 20 which functions to limit the extent to which the handle can be turned in a manner also to be described presently.

The sleeve-like part or spud 12 is a hollow member having an opening 34 therein adapted to fit over the rod 22. The spud 12 is externally threaded, as can be seen at 36, and has an enlarged annular portion 38 of substantially greater diameter than the threaded portion 36. On the opposite side of the enlarged annular portion 38 from the threaded portion 36 are a pair of circumferentially spaced limit stops 40 and 42 between which the element 32 is adapted to fit when the spud 12 is in its assembled position on the rod 22. By virtue of this arrangement, a limited rotational movement of the handle 10 may be had with respect to the spud 12 so as to provide a small amount of slack movement between the handle 10 and the flush valve (not shown). The spud 12 also has a pair of lugs 44 on the one face of annular portion 38 and an axial extension 46 which projects beyond the end of the threaded portion 36. The purpose of these parts will be described hereinafter.

The tank lever 16 has a relatively long body portion 48 which has a plurality of holes 50 at its one end to which a linkage (not shown) extending to a flush tank discharge valve (not shown) may be connected. The tank lever 16 has at its opposite end an end portion 52 which is bent at a right angle to the main body portion 48. The end portion 52 is designed so that it may be connected directly to the rod 22 thereby permitting the handle 10 and the tank lever 16 to function as an integral unit. For this purpose, the end portion 52 has a central tongue 54 of reduced width so as to provide side abutments 56 and 58. The tongue 54 is shaped and dimensioned so that it will fit into the slot 24 and will extend a substantial distance into the central portion of the slot 24. The end portion 52 is of sufficient width so that the side abutments 56 and 58 will seat on the portions 26 and 28 of the rod 22, thereby limiting the extent to which the end portion 52 can penetrate the slot 24. The end portion 52 also has an aperture 60 therein which is located so that when the tank lever 16 has its end portion 52 inserted into the rod 22 the axial projection 30 of the latter will be adjacent the aperture 60. The handle 10 and the tank lever 16 can then be securely fastened together merely by staking the axial projection 30 into the aperture 60, as can be seen in Figure 2.

One of the features of the present invention is the ease and simplicity with which the described elements can be secured together. In carrying out this assembly operation, it is only necessary that the spud 12 be fitted over the rod 22 with the limit stops 40 and 42 passing on opposite sides of the flange element 32. The free end of the rod 22 will then project a small distance beyond the end of the threaded portion 36 of the spud 12. The end portion 52 of the tank lever 16 is then inserted into the slot 24 until the side abutments 56 and 58 seat on the slotted portions 26 and 28 of rod 22. The main body portion 48 of the tank lever 16 will be in a direction away from the projection 30 and will overlie the free end of the extension 46 of the spud 12. With the handle 10, spud 12, and tank lever 16 in this position, the axial projection 30 will be staked into the opening 60, thereby locking these three parts together in a rigid unitary structure.

Thereafter, when it is desired to mount the handle assembly in place in the flush tank with which the assembly is adapted to be used, the entire assembly can be secured in place merely by passing the free end of the tank lever 16 through the opening in the tank and thereafter passing the nut 14 over the free end of the tank lever 16 and threading the nut 14 onto the threaded portion 36

of the spud 12, thereby clamping the wall 62 of the tank between the nut 14 and the enlarged annular portion 38 of the spud 12. For a brief description of this assembly operation, attention is directed particularly to Figure 2 wherein a fragmentary portion of a tank wall 62 can be seen having an opening 64 therein for receiving the handle assembly. As previously stated, the tank lever 16 can initially be passed through the opening 64 from the left side as seen in Figure 2 until the handle is in the position illustrated in this figure. Thereafter, the nut 14 can be passed over the end of the tank lever 16 and screwed onto the threaded portion 36 until the annular enlargement 38 is drawn tightly against the wall 62. In order to assure that the handle will always be in its proper position, the lugs 44 are provided to be received in grooves in the opening 64 so that the spud 12 can not turn about its axis.

From the foregoing it can be seen that a handle assembly has been provided which can be assembled and secured together by a minimum of operations, thereby assuring a low cost item, and at the same time the construction and arrangement of the assembly is such that it will be a rigid unitary structure free from trouble when in use. The invention is also constructed and arranged so that it can be readily and easily assembled in place in the water tank by a minimum of operations, thereby, providing further economy in its installation.

Having thus described my invention, I claim:

1. In a toilet flush tank, a handle assembly for operating the flush valve through an opening in the upper portion of the wall of said tank, said assembly comprising a spud mounted in said opening, a handle positioned on the outside of said tank and including a rod projecting through said spud and rotatable with respect thereto, said rod having a transverse slot in its inner end and an axial projection therefrom, and a tank lever extending generally normal to the axis of said rod and having an end portion directed into said slot with an aperture in said end portion, said axial projection being staked into said aperture to secure said handle and said tank lever together so that they operate as an integral unit.

2. In a toilet flush tank, a handle assembly for operating the flush valve through an opening in the upper portion of the wall of said tank, said assembly comprising a spud mounted in said opening, a handle positioned on the outside of said tank and including a rod projecting through said spud and rotatable with respect thereto, said rod having an axial projection and a transverse slot in its inner end with the slot having greater axial depth at the center of the rod than at the outer periphery so as to provide diametrically opposed shoulder-like formations, and a tank lever extending generally normal to the axis of said rod and having a flat end portion directed at a right angle into said slot, said end portion having a central tongue of reduced width fitting into the slot at the center of the rod and side abutments seated on said shoulder-like formations, said end portion also having an aperture therein into which said axial projection is staked to secure said handle and tank lever together.

3. In a toilet flush tank, a handle assembly for operating the flush valve through an opening in the upper portion of the wall of said tank, said assembly comprising a spud extending into said opening and having an annular enlargement limiting inward movement of the spud and a pair of circumferentially spaced stops adjacent the outer end of the spud, a nut threadedly connected to the axially inner end of said spud for securing the wall of the tank between said enlargement and said nut, a handle positioned on the outside of said tank and including a rod projecting through said spud so as to be rotatable with respect thereto, said handle having an element adapted to engage said stops so as to limit rotational movement of said handle relative to said spud, said rod having a transverse slot extending axially into the inner end thereof and an axial projection projecting from said inner end, and a tank lever extending generally normal to the axis of said rod and having a flat end portion directed at a right angle into said slot, said end portion having an aperture into which said axial projection is staked so that the tank lever and handle can rotate as a unit the limited extent permitted by said stops.

4. In a toilet flush tank, a handle assembly for operating the flush valve through an opening in the upper portion of the wall of said tank, said assembly comprising a spud extending into said opening and having an annular enlargement limiting inward movement of the spud and a pair of circumferentially spaced stops adjacent the outer end of the spud, a nut threadedly connected to the axially inner end of said spud for securing the wall of the tank between said enlargement and said nut, a handle positioned on the outside of said tank and including a rod projecting through said spud so as to be rotatable with respect thereto, said handle having an element adapted to engage said stops so as to limit rotational movement of said handle relative to said spud, said rod having a transverse slot extending axially into the inner end thereof and an axial projection projecting from said inner end, and a tank lever extending generally normal to the axis of said rod and having a flat end portion directed at a right angle into said slot, said end portion having an aperture into which said axial projection is staked so that the tank lever and handle can rotate as a unit the limited extent permitted by said stops, said spud having an axial extension beyond its threaded portion in engagement with said tank lever to space said lever from the wall of the flush tank.

5. In a toilet flush tank, a handle assembly for operating the flush valve through an opening in the upper portion of the wall of said tank, said assembly comprising a spud extending into said opening and having an annular enlargement limiting inward movement of the spud and a pair of circumferentially spaced stops adjacent the outer end of the spud, said spud also having at least one radially outwardly projecting lug adapted to be received in said wall to hold said spud against turning in said wall, a nut threadedly connected to the axially inner end of said spud for securing the wall of the tank between said enlargement and said nut, a handle positioned on the outside of said tank and including a rod projecting through said spud so as to be rotatable with respect thereto, said handle having an element adapted to engage said stops so as to limit rotational movement of said handle relative to said spud, said rod having a transverse slot extending axially into the inner end thereof and an axial projection projecting from said inner end, and a tank lever extending generally normal to the axis of said rod and having a flat end portion directed at a right angle into said slot, said end portion having an aperture into which said axial projection is staked so that the tank lever and handle can rotate as a unit the limited extent permitted by said stops.

6. In a toilet flush tank, a handle assembly for operating the flush valve through an opening in the upper portion of the wall of said tank, said assembly comprising a spud extending into said opening and having an annular enlargement limiting inward movement of the spud and a pair of circumferentially spaced stops adjacent the outer end of the spud, a nut threadedly connected to the axially inner end of said spud for securing the wall of the tank between said enlargement and said nut, a handle positioned on the outside of said tank and including a rod projecting through said spud so as to be rotatable with respect thereto, said handle having an element adapted to engage said stops so as to limit rotational movement of said handle relative to said spud, said rod having a transverse slot extending axially into the inner end thereof with the slot having greater axial depth at the center of the rod than at the outer periphery

so as to provide diametrically opposed shoulder-like formations, said rod also having an axial projection from said inner end, and a tank lever extending generally normal to the axis of said rod and having a flat end portion directed at a right angle into said slot, said end portion having an aperture therein and a central tongue of reduced width fitting into the slot at the center of the rod and side abutments seated on said shoulder-like formations, said axial projection being staked into said aperture so that said handle and said tank lever operate as an integral unit.

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