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SIMPLIFIED LAVATORY DRAIN PIPE ASSEMBLY

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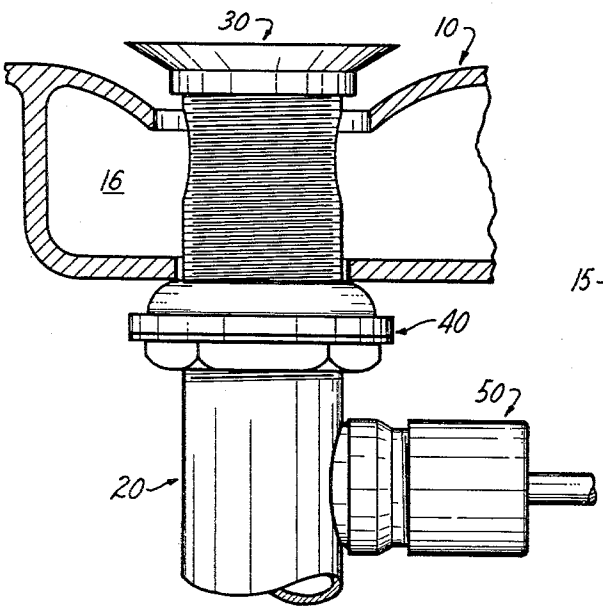


Fig. 2

Fig. 1

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SIMPLIFIED LAVATORY DRAIN PIPE ASSEMBLY

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2 Claims. (Cl. 4—203)

This invention relates to an improved drain pipe assembly for use in wash basins, tubs and the like. It is more specifically directed to an improved drain pipe assembly having primarily a unitary pipe member provided with a valve operating mechanisms integrally connected thereto.

In the plumbing art, it is a common and established practice to provide lavatory drain pipe asesmblies with remotely-actuatable waste valves for selectively preventing or permitting the discharge of waste water. Such valves are operated through a linkage that is supported either by an especially formed portion of an associated basin, or more commonly, by an especially constructed pipe fitting that is installed as a separable part of the drain pipe assembly.

The especial pipe fittings in use are preconstructed as a unit separate from other parts of the drain pipe assembly. Thus, a separate operation is required to connect the fitting to the other drain pipe parts, in addition to the operation of attaching the assembly to the basin. The especial fitting must usually be threaded onto the drain pipe after the drain pipe is secured in place on the wash basin, and a careful tightening operation is required to align the operative elements of the fitting with the cooperating structure on the wash basin while insuring a tight pipe joint.

The plumbing art has always thought in terms of a separate fitting for housing the valve operating mechanism. Accordingly, cast fittings having integrally-formed, actuating-mechanism support structure are usually employed.

We have determined that manufacturing costs and assembly difficulties encountered with known drain pipe assemblies can be significantly reduced by constructing the drain pipe assembly as a substantially integral unit, and by developing a new and improved drain pipe assembly to take full advantage of the simplicity of an integral construction.

It has thus been an object of our invention to provide an improved, easy to install, drain pipe assembly for use with lavatory apparatus and the like;

Another object of our invention has been to provide an improved drain pipe assembly having simple curvatures that can be completely press-formed if desired;

Another object of our invention has been to provide an improved drain pipe assembly that supports a waste valve actuating mechanism and that is constructed to permit simple alignment of the opening mechanism with cooperating structure of the lavatory apparatus;

A further object of our invention has been to provide an improved drain pipe assembly that can be substantially completely assembled prior to installation in an associated lavatory apparatus;

A further important object of our invention has been to provide a drain pipe assembly wherein the construction of the assembly itself minimizes the cost of producing the necessary decorative and protective plating of the assembly.

These and other objects of our invention will appear to those skilled in the art upon reading and understanding the following description of our construction and the underlying inventive concept.

A primary concept of our invention relates to the provision of a single integral tubular body member that forms substantially the entire drain assembly. By such provision, the number of major parts requiring separate manufacturing processes is materially reduced. Another concept of our invention relates to the provision of a two-flange mounting construction that makes possible the use of an integral pipe and valve apparatus that is organized substantially independently from the associated wash basin to simplify the installation of the drain assembly. By providing a removable upper clamping flange it becomes possible to insert the integral pipe inwardly into a basin, which assembly procedure is impossible with the constructions of currently-employed drain assemblies.

The provision of a removable, upper, clamping flange also permits the most efficient plating of the drain assembly. The upper clamping flange must be heavily plated to withstand frequent scourings, etc., and to still retain its appearance for fifty years or more. A light plating will suffice for the remainder of the assembly, which is visible, but is not subject to a frequent abrasive scouring. By constructing the upper clamping flange separately from the remainder of the assembly, selective plating of the parts becomes greatly simplified.

We have recognized that many existing drain pipe assemblies are supported in part by a direct, threaded connection between the drain pipe body and the basin, itself. The assembly of such construction can be quite difficult, as the drain pipe must be tightened and simultaneously aligned with cooperating valve operating linkages mounted on the basin.

An important object of our invention has been to simplify drain pipe installation, and we have conceived and developed a simple, removable, clamping flange support that provides the entire supporting connection between the basin and the integral drain pipe body member. Also, by our construction, the tightening operation for mounting the drain assembly on the basin is independent of any alignment considerations necessary for proper operation of the valve operating mechanism.

Referring now to the accompanying drawing:

FIGURE 1 is a vertical cross-sectional view of an embodiment of our drain pipe assembly as it is installed in a wash basin; and

FIGURE 2 is an operational view illustrating a method of installing our drain pipe assembly in a wash basin in accordance with a preferred embodiment of our invention.

In FIGURE 1 there is shown a wash basin, lavatory apparatus, or sink 10 having an inner or liquid-retaining wall 11 that provides an inner curved surface 11*a*, and having a lower, outer or exterior overflow wall 12 that provides an outer substantially planar surface 12*a*. The inner and outer walls are constructed to define or form open portions or holes 13 and 14, respectively, that constitute the receiving openings for the drain pipe assembly. The basin 10 is also shown as including a spill opening or overflow drain port 15 in the inner wall 11 that communicates with a spacing or overflow chamber or passageway 16 between the inner basin wall 11 and the outer wall 12.

A drain pipe assembly 20 is mounted vertically in the hole portions 13 and 14, through the inner and outer basin walls 11 and 12. Drain pipe assembly 20 has a movably-supported and remotely-actuatable, drain valve or waste-water control element 18. The drain pipe assembly 20 also includes a portion of the mechanism for actuating the valve 18, as hereinafter described.

The drain pipe assembly 20 has an elongated tube, tubular cylinder or vertical body member 21 provided with an upper-end mounting or neck portion 22 that extends through the upper and lower walls 11 and 12. The

neck portion 22 is threaded along its length to receive opposed first and second clamping flanges 30 and 40 which respectively engage the upper and lower surfaces 11*a* and 12*a* of the basin.

The upper clamping flange 30 includes a sharply-tapered, peripheral, radially-outwardly-extending rim portion or annular edge 31 for engaging the inner basin surface 11*a* in a flush-like cooperative relationship. An internal, annular, upper surface 32 of the flange 30 diverges upwardly to provide a valve seat for receiving a substantially complementary, seating or valving surface 18*a* of the drain valve 18.

As the flange 30 is relatively small and completely separable from the remainder of the drain assembly, the cost of providing a high quality plating on the flange 30 will be relatively small. The quality of the plating is quite important, since the flange 30 is exposed to repeated chemical and abrasive scrubbings during use.

The second or lower clamping flange unit 40 is threadably-mounted on a lower or intermediate part of the neck portion 22. The second flange has a flexible or mack-type sealing washer or resilient portion 41, a bearing washer or pressure plate 42 of a suitable metal such as steel, and a lock nut or clamp-adjusting element 43. The lock nut 43 and bearing washer 42 force the sealing washer 41 into sealing engagement with the outer basing surface of the lower basing wall 12. The inner and outer flanges 30 and 40 thus cooperate to provide opposed clamping forces that securely connect the drain assembly 20 to the basin.

As the holes or open portions 13 and 14 in the bottoms of the upper and lower basin surfaces are substantially larger than the neck portion 22 of the drain pipe assembly body member 21, it will be apparent that the thus-described, opposed, clamping flanges 30 and 40 provide the sole securing or supporting connection between the basin 10 and the drain pipe assembly 20.

Below the threaded neck portion 22 of the tubular body member 21, at an intermediate location therealong, there is provided an outwardly-offset support boss or footing 24 for supportingly-receiving a mechanism 50 for operating the valve 18. The boss 24 is offset a relatively small amount and therefore it can be conveniently and economically formed from the member 21 by a hot or cold forging operation, employing a comparatively small and inexpensive press.

The drain valve or waste water control element 18 is positioned within the upper end portion of the drain pipe assembly 20 where valving surface 18*a* can selectively-engage the valve seat portion 32 of the upper flange 30. The valve 18 includes a sleeve or actuating part 18*b* that extends downwardly along the tubular body member 21 into the region of the boss 24, where it is engaged by an operating mechanism 50.

The operating mechanism 50 includes a valve-operating lever or actuator part 51 whose forward end portion is shown extending through and that is adapted to operatively-engage the actuating part 18*b* of the valve 18. The lever 51 is operatively-positioned to extend through opposite ends of the housing within which it is pivotally-movably supported. As shown in FIGURE 1, the housing 53 has a short tubular member or connecting collar 52 that is expanded at one end or otherwise adapted to telescopically receive, fit around and be supported on the boss 24. The tubular member or collar 52 is securely mounted on the boss 24 as by soldering or brazing. The other or reduced, outermost end of the collar 52 is provided with an exernally-threaded portion 55 which removably-receives a retaining cap or housing cap 53.

The outermost end of the collar 52 is rolled inwardly or otherwise formed to provide a bead or seat 56 for a slightly flexible or resilient, spherical, pivot portion or lever support means 57 of the valve actuating lever 51. The spherical pivot portion 57 is held in frictional contact with the rolled seat 56 of the collar 52 by a spring or resilient pivot-retaining means 58 that is positioned about and between the pivot portion 57 of the operating lever 51 and the retaining cap 53. The spring 58 exerts a force on the spherical portion 57 that frictionally holds the lever 51 against the rolled seat 56, so as to maintain the lever in any desired angular position.

In addition to the lever 51 and its associated support mechanism, the valve-operating mechanism includes a linkage 60 having a control hnadle or knob 61 that is conveniently positioned above the basin 10 and is securely-connected to an extending control rod or link member 62. The link 62 moves vertically in a stationary, basin-mounted bushing or guide means 19 and is adjustably-securely connected by suitable connecting means 63 at its outer end to the lever 51, so that vertical motion of the link 62 causes the lever 51 to pivot about the ball 57. The connecting means 63 shown in FIGURE 1 is mounted on the rod 62 by a set screw 63*a*, whereby it can be adjustably-positioned along the length of the control rod 62 to accommodate basins of various size.

In accordance with another embodiment of our invention, the link 62 can be threaded along its lower portion and the connecting means 63 can be provided with a female-threaded portion for engaging the link 62. In such embodiment, the necessity for the set screw 63*a* is eliminated and the point of junction between the link 62 and the lever 51 may be varied simply by rotation of the link from above.

As shown in FIGURE 1, the knob 61 is pushed downwardly (see the dash lines) towards the basin 10, whereby the linkage 60 positions the lever 51 so that its left-hand end locates the valve member 18 upwardly-away from the valve seat 32. The valve 18 may be closed by lifting or pulling the knob 61 away from the basin 10 to rotate the lever 51 countercloskwise and thus move its left-hand end downwardly to lower the valve 18 onto the valve seat 32 and prevent the flow of drain water past the valve.

The installation of our improved drain pipe assembly is accomplished as follows: The drain pipe assembly 20 including the operating mechanism 50 is assembled. The lower flange unit 40, including the flexible washer 41, the bearing plate 42 and the adjusting nut 43 are positioned in their lowermost position on the threaded neck portion 22. The upper flange 30 at this time has not been installed.

The threaded neck portion 22 of the drain pipe body member 21 is inserted upwardly, first, through the open portion 14 provided in the lower basin wall 12, and then through the open portion 13 provided in the upper basin wall 11. The neck portion 22 of the drain pipe is then moved to a position such that its uppermost end extends upwardly beyond its final position with respect to the upper surface of the upper basin wall 11, as shown in FIGURE 2. While the drain pipe assembly 20 is maintained in this convenient position, the upper flange 30 is screwed finger-tight onto the upper end 23 of the threaded neck portion 22.

The drain assembly 20 is next lowered until the flange 30 engages the surface 11*a* of the upper basin wall 11 adjacent the hole 13 in the bottom of the upper basin wall. The connecting means 63 and the control rod 62 can now be assembled with the pivotal lever 51, since the body member 21 is free to rotate about its longitudinal axis. Finally, the lower clamping flange unit 40 is tightened-upwardly by hand and tool movement of the threaded nut 43 until the flexible washer 41 sealingly-engages the lower exterior basin surface 12. Thus, it will be apparent that our improved drain assembly can be completely connected to the basin at a job site with the use of a single pipe wrench.

From the foregoing description, it will be seen that we have provided an improved drain pipe construction that eliminates the necessity of employing a plurality of independent pipe elements in drain assemblies and even in complex drain assemblies of the type having a remotely

operable valve member. It will also be seen that we have provided a simply constructed and easily installed drain pipe apparatus that will perform all the functions of known drain apparatus at a considerable savings of manufacturing and installation trouble and expense.

Having thus described our invention, we claim:

1. In lavatory apparatus including a basin having inner and outer surfaces and an open portion that extends through the inner and outer surfaces for receiving a drain pipe assembly, an improved drain pipe assembly comprising: an elongated integral thin-walled, press-deformable tubular body member, said body member having a neck portion at one end thereof, said body member further having an integral outwardly offset support boss located at an intermediate location therealong; first clamping flange means removably-connected to said neck portion at one end thereof, said first clamping flange means having an outwardly-extending rim portion that engages the inner surface of the basin and an inwardly-facing valve seat portion; second clamping flange means adjustably-connected to an intermediate part of said neck portion, said second flange means having a resilient portion that engages the outer surface of the basin; a valve member movably-supported within said body member for movement into and out of cooperative engagement with said valve seat portion of said first clamping flange means; an actuating lever for moving said valve member, said actuating lever having a spherical surface portion intermediate its end, means for supporting said actuating lever on said body member, said supporting means having a tubular mounting part at one end which surroundingly-receives and is securely connected to said support boss and includes an integral annular lever support bead adjacent its other end for supportingly receiving said spherical surface portion, a housing cap securely-connected to said tubular mounting part, and resilient means operatively-engaging said spherical portion and said housing cap for urging said spherical portion into frictional-pivotal engagement with said lever support bead.

2. In lavatory apparatus including a basin having inner and outer surfaces and an open portion that extends through the inner and outer surfaces for receiving a drain pipe assembly, an improved drain pipe assembly comprising: an elongated integral, thin-walled press deformable tubular body member, having an opening punch formed therein at an intermediate location therealong, said body member having a neck portion at one end thereof, said body member further having a footing formed integrally thereon at an intermediate location therealong and surrounding the opening in said body member; first clamping flange means removably-connected to said neck portion at one end thereof, said first clamping flange means having an outwardly-extending rim portion that engages the inner surface of the basin and an inwardly-facing valve seat portion; second clamping flange means adjustably-connected to an intermediate part of said neck portion, said second flange means having a resilient portion that engages the outer surface of the basin; a valve member movably-supported within said body member for movement into and out of cooperative engagement with said valve seat portion of said first clamping flange means; an actuating lever for moving said valve member, said actuating lever having a spherical surface portion intermediate its ends, a fitting for supporting said actuating lever on said body member, said supporting fitting having a mounting part at one end thereof that is shaped complementary to said footing; said mounting part overlying said footing and being securely connected thereto, said supporting fitting further having, adjacent its other end, a tubular portion that includes an integral outwardly-facing annular bead for supportingly receiving said spherical surface portion, a housing cap securely connected to said tubular portion, resilient means positioned within said housing cap, and said spherical portion of said actuating lever being positioned between said bead and said resilient means to be frictionally held in position thereby.

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CERTIFICATE OF CORRECTION

Patent No. 3,169,254 February 16, 1965

George H. Lantz et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 13, for "mechanisms" read -- mechanism --; line 56, for "opening" read -- operating --; column 3, line 61, strike out "53"; column 4, line 8, for "hnadle" read -- handle --; line 34, for "countercloskwise" read -- counterclockwise --.

Signed and sealed this 6th day of July 1965.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

EDWARD J. BRENNER
Commissioner of Patents