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WATER CLOSET BOWL SETTING FLANGE AND SEAL

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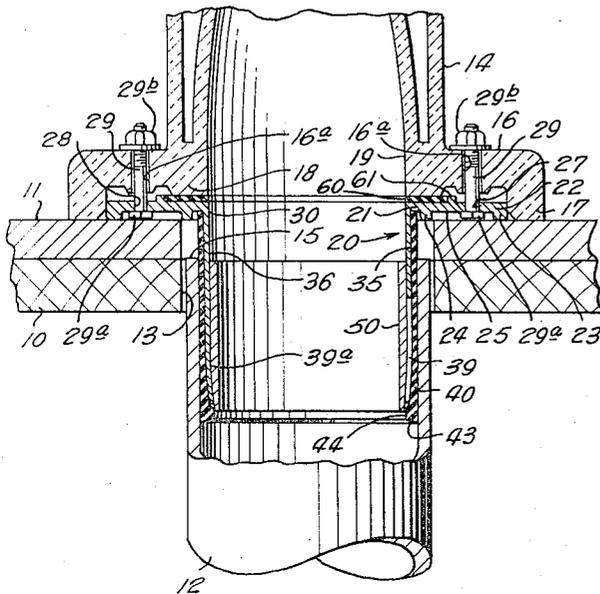


Fig. 1

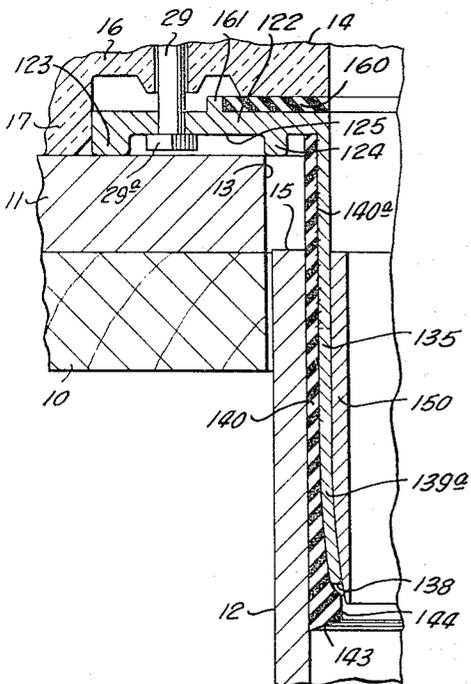


Fig. 3

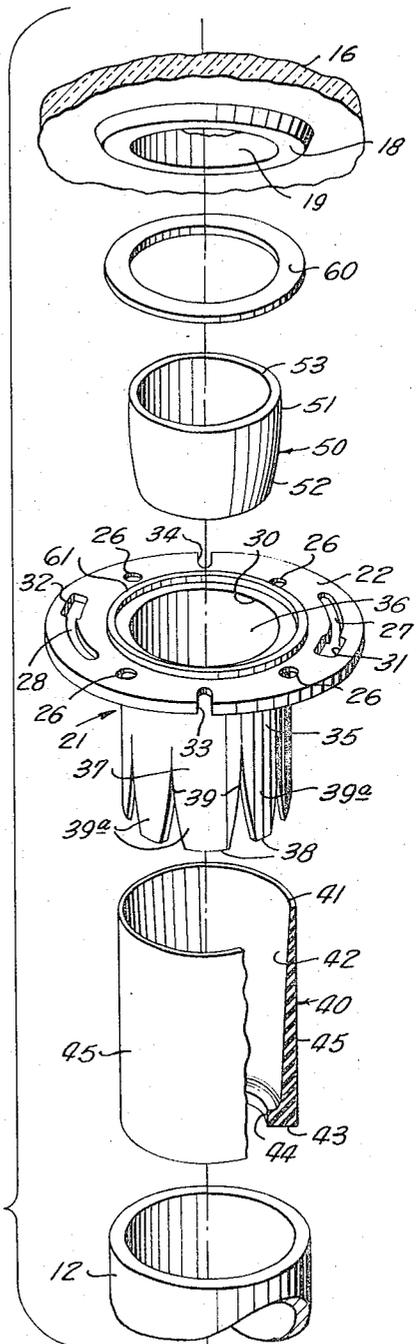


Fig. 2

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WATER CLOSET BOWL SETTING FLANGE AND SEAL

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This invention relates to new and useful improvements in water closet drain connections, and more particularly to water closet bowl setting flanges and seals.

It is an object of the invention to provide a closet bowl setting flange and water seal which is readily adaptable for use on cement or wood floors for quickly installing the water closet bowl in the bathroom and connecting the same to the sewer waste pipe.

A particular object of the invention is to provide a setting flange and seal assembly which will permit installation of the flange and seal and setting of the bowl without the use of special tools, whereby the bowl may be set without further trimming or adjusting of the sewer pipe or the application of wax type seals to the sewer pipe.

A still further object of the invention is to provide a setting flange and seal assembly which when mounted in place in the sewer waste pipe and on the floor of the building provides a firm supporting structure of the water closet bowl, to which the water closet bowl may be tightened firmly to prevent tilting or movement of the bowl.

Still a further object of the invention is to provide a setting flange and seal assembly which is so constructed that a firm and positive water and sewer gas-tight connection is provided between the water closet bowl and the sewer waste pipe.

Another object of the invention is to provide a setting flange and water seal which will accommodate variations in the size of the soil or waste pipe in the interior dimensions thereof and which will likewise effect a seal with the soil or waste pipe regardless of whether the upper end of the pipe is closely adjacent or aligned axially with the water closet bowl or surface of the floor.

Another object is to provide a setting flange and seal of the character described having a positive seal may be effected without special tools and which is adapted to accommodate slight misalignment of the waste pipe with the surface of the floor.

Another object of the invention is to provide a setting flange and water seal which eliminates the use of lead in open joints or wax seals, and which effects substantial savings and time and labor in connection with the making of the installation.

A particular object of the invention is to provide a setting flange and water seal which is adaptable for use with various sizes and types of water closet bowls and soil pipes and which will form a water and gas tight seal between the bowl and the waste pipe regardless of the variations in the dimensions and in alignment and position of the upper end of the pipe, and which is adaptable for various types and styles of closet bowls.

Additional objects and advantages of the invention will be readily apparent from the reading of the following description of a device constructed in accordance with the invention, and reference to the accompanying drawings thereof, wherein:

FIGURE 1 is a fragmentary vertical sectional view of the floor of a building showing the lower end of a water closet bowl and a setting flange and water seal connecting the same with a waste pipe in accordance with the invention;

FIGURE 2 is an exploded view of the setting flange and the water seal members together with the lower drain horn and upper end of the waste pipe and

FIGURE 3 is an enlarged fragmentary vertical sec-

tional view of a slightly modified form of the flange of the installation of FIGURE 1.

In the drawings, the numeral 10 designates the sub-floor of a building having a linoleum or similar finish floor surface 11 mounted thereon. A sewer or soil pipe 12 is disposed in an opening 13 formed in the sub-floor and finish flooring 11, and a conventional toilet bowl 14 is disposed above the open upper end 15 of the sewer waste pipe and is connected thereto by the setting flange and seal assembly indicated generally by the numeral 20. The water closet bowl is of typical construction having an outwardly extending base flange 16 with a depending outer marginal rim 17 which surrounds the opening in the floor and supports the bowl on the floor. Centrally disposed within the lateral depending rim 17 of the bowl is the usual annular outlet horn or drain 18 which surrounds the discharge duct 19 of the closet bowl.

A setting flange and water seal unit 20 includes a floor flange and expansion sleeve member 21 which has at its upper end an external annular floor flange 22 provided with two radially spaced depending annular supporting ribs 23 and 24, respectively, which define an annular groove 25 in the under surface of the flange 22. The ribs 23 and 24 are adapted to engage and be supported by the upper surface of the finish floor 11 and suitable circumferentially spaced apertures 26 are formed in the flange 22 by means of which the flange may be secured to the floor by wood screws or the like (not shown) extending downwardly through the apertures 26 and into the floor, in the usual manner. A pair of arcuate key-hole type mounting slots 27 and 28 are formed in the flange 22 between the depending ribs 23 and 24 for receiving bolts 29 by means of which the closet bowl is secured to the flange as shown in FIGURE 1. The slots 27 and 28 are diametrically opposed with respect to the central bore 30 of the flange and enlarged entrance openings or apertures 31 and 32, respectively, are formed at the diametrically opposed ends of the slots as shown in FIGURE 2. The openings 31 and 32 accommodate the heads 29a of the bolts 29 after the flange has been secured to the floor, whereby the bolts may be inserted in the slots and the toilet bowl may be properly positioned with respect to the surrounding structure by rotary movement about the axis of the sewer drain pipe 12 in the usual manner. A pair of diametrically opposed peripheral notches 33 and 34 are formed in the flange intermediate the slots 27 and 28, and these notches permit insertion of additional mounting bolts therein for securing the toilet bowl base to the setting flange 22 in the usual manner.

An elongate expander sleeve 35 is formed integral with and depends from the underside of the flange 22 surrounding the central opening or bore 30 of the flange, the inner wall or bore 36 of the sleeve defining a continuation of the opening in the flange. The sleeve is sufficiently long to extend substantially below the floor and into the open upper end 15 of the sewer pipe or drain pipe 12. The lower end portion 37 of the sleeve is provided with a plurality of elongate longitudinally extending slots 39 which extend upwardly from the lower end 38 of the sleeve a distance approximately one-half the length of the sleeve.

The slots 39 flare downwardly from their upper ends to provide a gradually increased opening between the adjacent fingers or leaflike sections 39a of the lower portion 37 of the sleeve, as is clearly shown in FIGURE 2, whereby such sections may flex inwardly to reduce the outside diameter of the lower portion of the sleeve for a purpose which will hereinafter be more fully explained.

An elongate substantially cylindrical elastomeric sealing sleeve or gasket 40 is disposed on the exterior of the expander sleeve 35, as clearly shown in FIGURE 1, with

its upper end abutting the under side of the flange 22 between the inner depending rib 24 and the sleeve 35. The sealing sleeve or gasket 40 is of such a length that its lower end 43 extends below the lower end 38 of the sleeve 35, as clearly shown in FIGURE 1. The bore 42 is reduced from the upper end 41 thereof downwardly, as best shown in FIGURE 2, whereby the wall thickness of the sleeve is increased substantially from the upper end 41 to the lower end 43 of the sleeve. Also, at the lower end of the sleeve an internal annular flange 44 is formed in the bore of the sleeve, and this flange is disposed slightly below the lower end 38 of the expander sleeve 35, as shown in FIGURE 1. When the sealing sleeve 40 is disposed on the exterior of the expander sleeve 35, the depending fingers 39a of the expander sleeve are biased inwardly by the resilient material of the sealing sleeve, and when the expander sleeve with the sealing sleeve thereon is inserted into the upper open end of the sewer pipe 12 the slots 39 permit the fingers 39a to flex inwardly and allow the sealing sleeve to enter the bore of the sewer pipe. The fingers, being flexed inwardly, by virtue of their inward flexing permit the sealing sleeve to retain its substantially cylindrical external shape, whereby the external sealing surface 45 of the sleeve may engage the wall of the sewer pipe throughout the length thereof telescoped into the sewer pipe. The returned flange 44 at the lower end of the sealing sleeve 40 provides a stop which engages the lower ends 38 of the fingers 39a and prevents upward displacement of the sleeve by pressure from within. The flange also provides a shoulder which is engaged by the fingers 39a in moving the sleeve 40 downwardly into telescoped position within the bore of the sewer pipe 12.

An inner lock sleeve or spread ring 50 which has an upper external surface 51 of a diameter conforming closely but slidably to the bore 36 of the expander sleeve 35 is slidable into the expander sleeve and downwardly therein. The lower portion 52 of the exterior surface of the sleeve is tapered inwardly with a slight curvature, so that as the lock sleeve moves downwardly in the bore of the expander sleeve 35, the lower tapered surface 52 of the lock sleeve will wedge the fingers 39a outwardly and compress the lower portion of the sealing sleeve 40 into tight frictional sealing engagement with the bore wall of the sewer pipe 12. The lock sleeve 50 may be driven downwardly in the bore 36 of the expander sleeve 35 as far as is desired, by means of a wooden block or any other suitable driving means engaging the upper end 53 of the lock sleeve and accessible through the central opening 30 of the flange 22 of the floor flange and expansion member 21. The lock sleeve 50 may be driven downwardly to compress the elastomeric sleeve to any desired degree, and such compression of the elastomeric sealing sleeve provides a frictional grip between the sealing sleeve and the bore wall of the sewer pipe and between the sealing sleeve and the exterior surface of the expander sleeve 35, whereby the expander sleeve and floor flange assembly 20 is held against displacement from engagement with the sewer pipe and a fluid and gas tight seal is effected between the pipe and the expander sleeve 21 by the sealing sleeve.

With the floor flange and expander sleeve 21 thus securely held in fluid and gas tight sealing engagement with the open upper end of the sewer pipe 12 and secured to the finish floor 11 by the screws extending through the apertures 26 in the flange 22, the device is in position to accept the water closet bowl. An annular seal ring 60 or gasket is disposed on the upper surface of the flange 22 surrounding the bore 30 in the flange and an upstanding annular rib 61 on the upper surface of the flange 22 concentric with the bore 30, retains the seal ring in place. The horn or drain 18 of the water closet bowl is set on the gasket with the bolts 29 extending upwardly through the usual apertures 16a in the base flange 16 of the closet bowl. The bolts 29 are disposed in the slots 27 and 28

and have their heads engaging beneath the flange 22 so that the nuts 29b threaded on the bolts will secure the base flange of the closet bowl to the floor flange, and expansion member 21 in sealing engagement therewith. Additional bolts (not shown) similar to the bolts 29 may be disposed with their heads below the flange 22 and with their shanks extending upwardly through the slots 33 and 34 in the flange 22 and through openings in the base flange 16 of the closet bowl similar to the opening 16a to further secure the base flange of the closet bowl to the floor flange and expansion member. By tightening the nuts 29b on the bolts 29 the closet bowl is drawn into tight sealing engagement of the horn 18 with the gasket 60 to provide a water and gas tight seal between the horn and the floor flange and expansion member 21, whereby the entire assembly is secured to and connected in gas and water tight sealing communication with the sewer pipe 12.

The elongate sealing sleeve or gasket 40 is preferably formed of a neoprene or similar material which is tough and which is likewise resistant to oil and corrosive materials. The sealing gasket ring 60 is likewise preferably formed of such material. The floor flange and expansion member 21 is preferably formed of brass or the like while the lock sleeve or spread ring 50 is likewise formed of brass or other material which is resistant to the action of water, rusting and the like.

In FIGURE 3 a modified form of the floor flange and expansion member is illustrated in which the numerals applied to the parts are identical with a prefix "1" before all such numerals. The expander sleeve 135 is generally the same in shape and configuration to the expander sleeve 35 but the elongate elastomeric sealing sleeve or gasket 140, while in configuration substantially the same as the sleeve 40, is cemented or vulcanized to the exterior surface of the upper portion of the expander sleeve 135 above the slots 139 formed therein, as indicated at 140a, whereby the sealing sleeve or gasket 140 becomes a unit with the expander sleeve and cannot be displaced therefrom. Other parts of the floor flange and expansion member and associated parts are identical with those previously described and bear the same numbers with the prefix "1" before each number.

From the foregoing it will be seen that a new and improved setting flange and water seal for connecting water closet bowls to the sewer soil or drain pipe, has been provided which is easily connectible or installed with a minimum of tools and without the need of experienced and highly trained personnel.

It will also further be seen that the setting flange and seal assembly provides a positive gas and water tight seal between the closet bowl and the sewer pipe, and that the assembly is adaptable to accommodate slight variations in length and size of the sewer pipe and misalignment with respect to the floor of the structure in which the closet bowl is being installed.

Furthermore, it will be seen that the setting flange and seal assembly provides for a tight gripping engagement between the assembly and the sewer pipe to prevent dislodgment of the assembly from its position and sealing engagement communicating with the sewer pipe.

It is further apparent that the setting flange and sealing assembly provides a positive seal which is easily installed without special tools or equipment.

The foregoing description of the invention is explanatory only, and changes in the details of the construction illustrated may be made by those skilled in the art, within the scope of the appended claims, without departing from the spirit of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A closet bowl floor connector and seal assembly for providing a water tight and gas tight seal between a tubular outlet horn depending from a closet bowl and the inlet end portion of a sewer pipe, said assembly com-

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prising: an elongated tubular expander sleeve having an external annular floor engaging flange at its upper end, and having the lower portion of the cylindrical sleeve provided with a plurality of longitudinal slots forming depending fingers in such lower portion of said sleeve, an elongate elastomeric sealing sleeve disposed exteriorly of said expander sleeve and adapted to be positioned in the open upper end of a sewer pipe for sealing between the sleeve and the sewer pipe; said sealing sleeve being of a length extending from a point on the upper portion of said expander sleeve adjacent the floor engaging flange to a point below the lower end of said depending fingers of said expander sleeve, the bore of said sealing sleeve being tapered inwardly from the upper end toward the bottom end to provide an increasing wall thickness from the upper end toward the lower end of said sealing sleeve, and an internal annular flange at the lower end of the bore of said sealing sleeve disposed below and adjacent the lower ends of said depending fingers of said expander sleeve, said flange on the lower portion of said sealing sleeve being engageable with the lower ends of said depending fingers of said expander sleeve to assure movement of said sealing sleeve into said sewer pipe as the same is positioned in the open upper end of said sewer pipe; and a substantially cylindrical tubular lock sleeve of lesser length than the length of said expander sleeve having an external diameter substantially conforming to the bore of the upper portion of said expander sleeve and having a tapered surface at its lower end, said lock sleeve being longitudinally

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slidably insertable in said expander sleeve and engaging said depending finger portions of said expander sleeve for expanding said finger portions outwardly to compress the sealing sleeve between said fingers and said sewer pipe to seal between the expander sleeve and the sewer pipe; and means on said flange adapted to connect said flange with a water closet bowl in a sealing flow communication with a water closet bowl.

2. The device of the character set forth in claim 1, including: means for bonding said elongate elastomeric sealing sleeve to the exterior of said expander sleeve between the annular floor engaging flange and the slots forming the depending fingers in the lower portion of the sleeve.

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