SELF-CONNECTING WATER CLOSET FLOOR FLANGE

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SELF-CONNECTING WATER CLOSET FLANGE

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This invention relates to flange arrangements for connecting water closet pipe stubs terminating at the floor level of a room, a primary object of the invention being to provide a novel and improved floor flange which is adapted to be quickly and easily connected to a conventional cast iron sewer pipe which terminates at or slightly below the floor level of the room wherein the floor flange is to be installed, and which invention will be called a "self-connecting floor flange," or simply referred to as a "floor flange.

Another object of the invention is to provide a novel and improved self-connecting floor flange for a water closet which may be mounted upon and connected to the end of a cast iron sewer pipe and then tightly affixed to the pipe without the need of laboriously caulk ing and leading the flange in place.

Another object of the invention is to provide a novel and improved floor flange for connection with a cast iron sewer pipe stub such as is used in concrete floor construction, and which provides for a quick, water-tight connection to the stub without the need for expensive and laborious preparations such as drilling into the concrete or presetting the flange, and which permits the pipe stub to be cut off a short distance below the finished floor level so that the concrete finishing operations of the floor surface may be completed without the necessity of making special allowances for the water closet sewer connection, other than plugging the sewer line with waste cloth or the like so that it may be easily opened after the floor is completed.

Another object of the invention is to provide a novel and improved self-connecting closet floor flange which is a simply-constructed, neat-appearing, low-cost rugged and durable unit which requires no special skill to install.

With the foregoing and other objects in view, all of which more fully hereinafter appear, my invention comprises certain constructions, combinations and arrangements of parts and elements as hereinafter described, defined in the appended claims and illustrated in the accompanying drawings, in which:

FIGURE 1 is a diametrical, sectional elevational view of a sewer pipe stub in a concrete floor, terminating slightly below the floor level and a sectional view of the improved, self-connecting floor flange set over the pipe opening and being connected to the pipe therein.

FIGURE 2 is a part-plan, part-sectional view of the arrangement illustrated at FIG. 1, as taken from the indicated line 2—2 at FIG. 1.

FIGURE 3 is a sectional elevational view of the self-connecting floor flange per se as taken substantially from the indicated line 3—3 at FIG. 1.

FIGURE 4 is a fragmentary sectional detail as taken from the indicated line 4—4 at FIG. 3.

The present invention was conceived and developed to meet a need for quickly and securely connecting a water closet floor flange to the end of a cast iron pipe stub in constructions where lead pipe bends are not used. For example, in concrete floor construction, it is usually necessary to install a cast iron drainage system before the floor is poured and finished, and the drain pipe for a water closet extends upwardly in the floor as a stub or short length of pipe which terminates at the surface of the floor.

The conventional connection of a floor flange to such pipe is accomplished in various ways and the flange may be even bolted to the concrete floor. This requires cutting or drilling into the concrete floor about the stub. To avoid such cutting, the floor flange may be affixed to the pipe stub before the concrete is poured. Again, this is undesirable especially where the concrete floor is machine finished. With machine finishing, the best mode of preparing for the concrete floor is to cut off the pipe stub a quarter to a half inch below the finished floor surface so that it will not interfere with concrete finishing operations.

The stub is stuffed with waste cloth or other filler which is removed after the floor is finished. However, this mode of preparation does not provide satisfactory connections where lead pipe bends are not used. For example, in concrete floor construction, it is usually necessary to install a cast iron drainage system before the floor is poured and finished, and the drain pipe for a water closet is extended upwardly through the concrete floor and terminates a short distance below the surface of the floor. In preparation for the connection of the flange F, the concrete is cleaned out of the pipe and cut away from the top of the opening to expose the top edge of the pipe 10 which forms a shelf 12 wherein a gasket seals as hereinafter explained. It is to be noted that this upper edge will be irregular and rough especially when it is cut by a cold chisel as is ordinarily done.

The self-connecting floor flange F includes a conventional flat, ring-shaped flange ring 20 whose outer peripheral edge 21 is sized to fit within the base of a standard water closet. This flange face is formed with a depending rim bead 22 at its edge 21 which sets slightly upon the floor 10 with the center annular portion of the face being above the floor level. This permits a conventional T-shaped water closet connecting bolts, not shown, to be mounted in holding slots 23 which are spaced in diametrical opposition in the face of the flange ring 20.

It is to be noted that the flange ring 20, with its edge 21, is compressed or fitted upon the shelf 12 as hereinafter described. This inside portion of the flange ring 20 forms an overhanging ledge 25 which is in spaced opposition with the shelf formed by pipe end 12 and the ledge 25 may be either bead-shaped as illustrated or flat if desired. A resilient tube-like packer ring 26, of sponge rubber or similar material, is positioned between the upper inside of the flange ledge 25 and the top of the pipe end 12 to be compressed between this shelf and ledge with a watertight fit, as in the manner illustrated at FIG. 1.
It is to be noted that the packer ring 26 will easily fill all irregularities in the end 12 of the pipe.

The holding means attached to the inner edge 24 of the flange ring 20 consists of a short gripper tube 30, held by a pair of diametrically opposed arms 31, in axial alignment with the polar axis of the ring 20, and a short distance below the ring to extend within the pipe stub 10 when the ring is placed on the floor 11. The arms 31 consist of short flat members having their upper ends affixed to the ring edge 24 and their lower ends affixed to the top edge of the gripper tube 30. It is contemplated that the tube 30 will have an outside diameter slightly less than the inside diameter of the pipe 10 and that in use it will be inserted into the pipe stub and then expanded to grip the pipe. It is also contemplated that the flange unit F will be formed as a unitary member, as of a single casting of a high quality cast iron or brass so as to permit slight flexure without undue stress at any point. To facilitate such construction, the points where the arms 31 connect with the flange ring 20 and the gripper tube 30 are suitably filleted.

The gripper tube 30 is formed with a comparatively wide, tapered slot 32 at one side thereof, substantially between the opposing arms 31, to provide the general appearance of a C-shaped member when viewed in section. A like tapered wedge 33 is mounted in this slot and is adapted to be forced into this slot to spread the slot and in turn to increase the internal diameter of the tube 20. To facilitate fitting the wedge 33 in the slot 32, the sides of the slot are formed with a single bevel 34 and the mating sides of the wedge are grooved as at 35 to register with the bevel.

Installation of this unit is a simple matter. After the concrete floor 11 is finished with the stub 10 being slightly below the floor level and with excess concrete being removed to expose the shelf 12, the flange is simply pushed into position with the gripper tube 30 being inserted into the pipe 10, with the packer ring 26 being compressed to close the gap between the under ledge 25 and the shelf 12 and with the flange ring 20 being seated on the concrete floor 11. Next, the wedge 33 is inserted into the slot 32 and is forced, as by pounding into the slot to the point where the gripper tube 30 expands to tightly grip the pipe.

Several variations of the structure are possible without departing from the spirit of the invention. In the first place, in order to accommodate variations of the internal diameter of several types of sewer pipes, as in the difference between standard and extra heavy pipe, the unit may be formed with the tube being adapted to fit into a pipe of minimum internal diameter and a simple tubular sleeve may be wrapped about the gripper tube 27 whenever it is used in a pipe having a slightly larger internal diameter. Also, as shown in the drawing, a preferred construction uses arms 31 which space the gripper tube 30 about an inch below the flange ring 20 (when 4-inch diameter pipe is used) but it is recognized that such spacing could vary from merely a slot to several inches if desired.

I have now described my invention in considerable detail; however, it is obvious that others skilled in the art can build and devise alternate and equivalent constructions which are nevertheless within the spirit and scope of my invention. Hence, I desire that my protection be limited, not by the construction illustrated and described, but only by the proper scope of the appended claims.

I claim:

1. A water closet floor flange adapted to be set upon a floor and to connect with a sewer pipe extending upwardly from the floor and terminating substantially at and slightly below the floor level and comprising:
(a) a flange ring adapted to be set upon the floor over the sewer pipe opening, having an external diameter sized to fit within the base of a water closet to be set thereover and an internal diameter substantially the same as the internal diameter of the sewer pipe and having means therein adapted to hold the water closet connecting bolts; (b) a pair of diametrically opposed arms at the inner edge of the ring and depending therefrom to extend into a sewer pipe when the ring is set in position; (c) a short tube depending from the arms and within the sewer pipe, having an external diameter slightly less than the internal diameter of the sewer pipe and having a tapered slot at one side thereof; (d) a like-tapered wedge adapted to be fitted into the slot and to expand the ring by being driven into the slot; and (e) a packer ring at the underside of the flange ring adapted to set upon the top edge of the sewer pipe and the underside of the flange ring.

2. A water closet floor flange of cast iron or like material adapted to connect with a sewer pipe, extending upwardly from beneath the floor and terminating substantially at and slightly below the floor level and comprising:
(a) a flange ring adapted to set upon a floor over a sewer pipe opening, having an external diameter sized to fit within the base of the water closet to be set thereover, an internal diameter substantially the same as the internal diameter of the sewer pipe and means thereon adapted to connect with a water closet set thereover; (b) at least one arm at the inner edge of the ring depending therefrom to extend into the sewer pipe when the ring is set in position upon the floor; (c) a short tubular segment depending from the arm having an external diameter slightly less than the internal diameter of the sewer and being of a segmental arc configuration substantially greater than 180 degrees, whereby expansion of the segment causes the same to expand against the internal wall of the sewer pipe; and,
(d) means substantially flush with the inner periphery of said sewer pipe to engage said tubular segment on each of the longitudinal sides thereof to forcibly expand the segment to cause it to tightly grip the internal wall of the sewer pipe.

3. In the segregation set forth in claim 2, wherein said expansion means includes a wedge adapted to be driven into the space between the tube and the pipe wall whereby to press portions of the tube and the wedge against the pipe wall.

4. In the organization set forth in claim 2, wherein the ends of said tube segment form a slot and said expansion means includes a wedge adapted to be driven into the slot thereof, whereby to increase the diameter of the tube and thereby press portions of the wedge and the tube against the pipe wall.

5. In the organization set forth in claim 2, wherein the ends of said tube segment form a tapered slot and said expansion means includes a tapered wedge adapted to fit into the slot, said tapered slot being wider at the upper edge adjacent to the ring, whereby to effect spreading by the wedge by driving it downwardly.

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