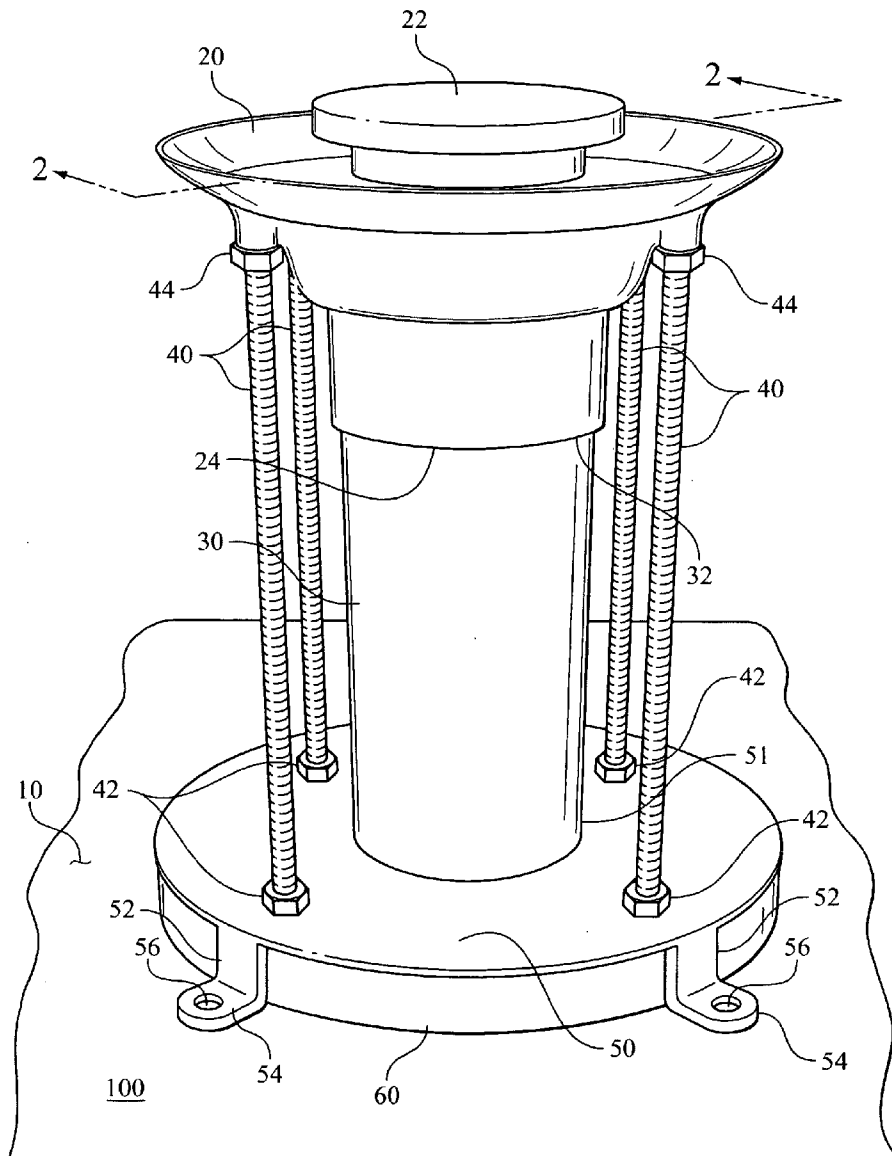




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(19) **United States**(12) **Patent Application Publication**
Priester(10) **Pub. No.: US 2010/0133159 A1**(43) **Pub. Date: Jun. 3, 2010**(54) **FLOOR DRAIN ASSEMBLY****Publication Classification**(75) Inventor: **Donald E. Priester**, Deatsville, AL
(US)(51) **Int. Cl.**
E03F 9/00 (2006.01)(52) **U.S. Cl.** **210/163**(57) **ABSTRACT**Correspondence Address:
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Company, Montgomery, AL (US)(21) Appl. No.: **12/315,415**(22) Filed: **Dec. 3, 2008**

An exemplary embodiment providing one or more improvements includes an assembly which fixes and supports a floor drain at the appropriate position before a concrete floor is poured. The assembly is adjustable for floors of varying thickness. The lower or second end of the drain pipe is protected against contamination by wet concrete by a resilient disk. In addition a cavity on the bottom of the floor concentric with the drain pipe is formed. After the concrete floor has hardened and the form removed the resilient disk is removed exposing a clean uncontaminated drain pipe end for connection to a riser pipe.



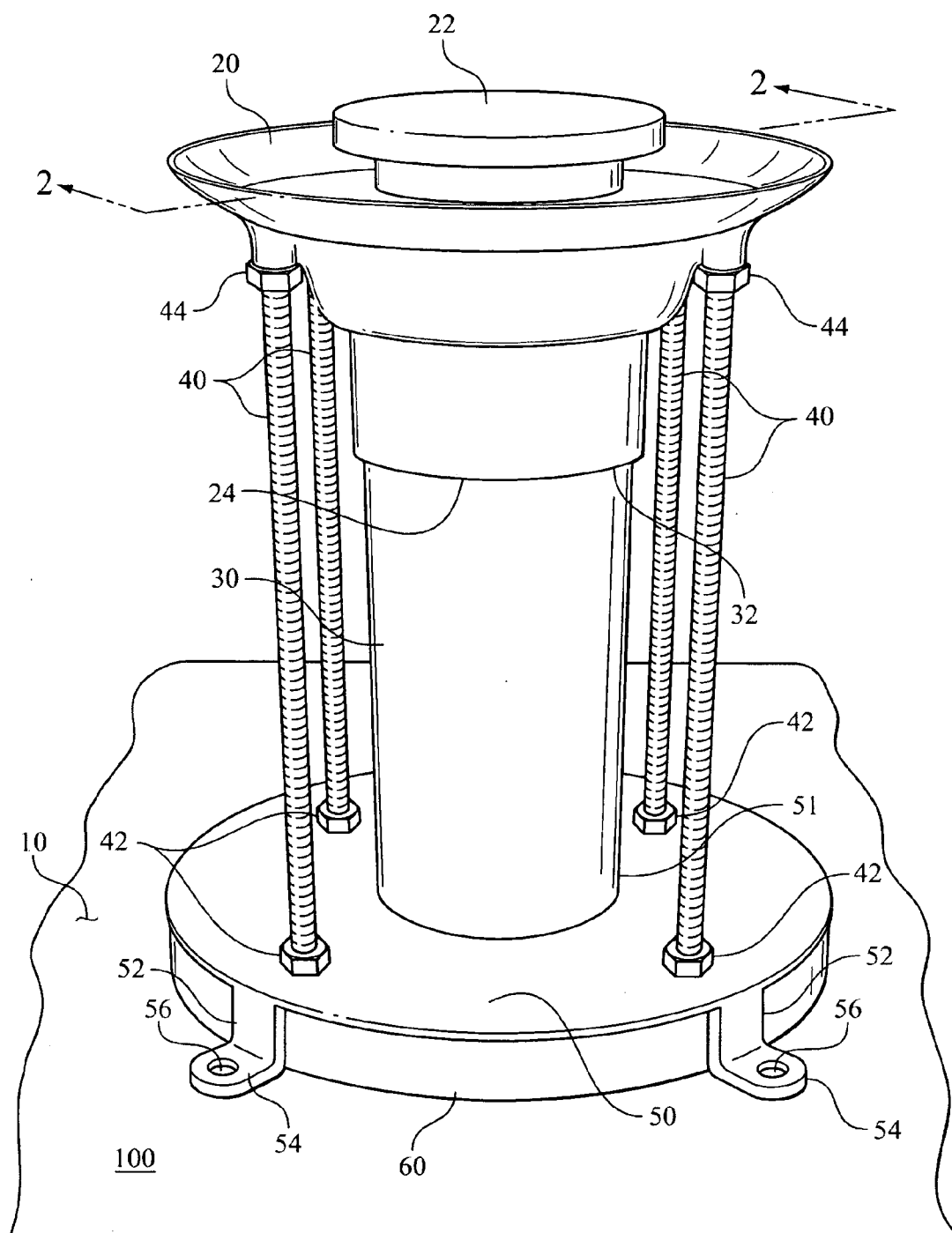


FIG. 1

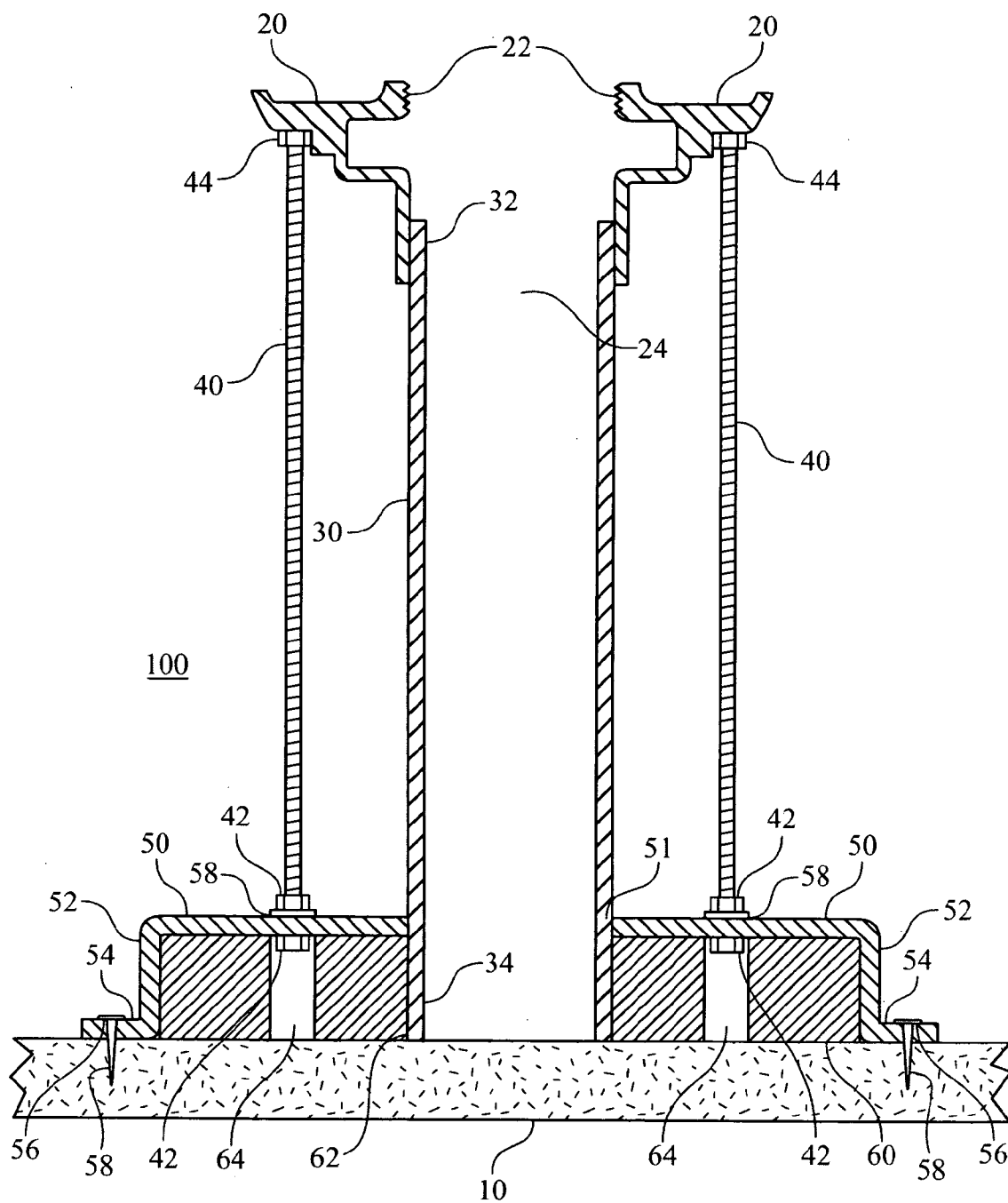


FIG. 2

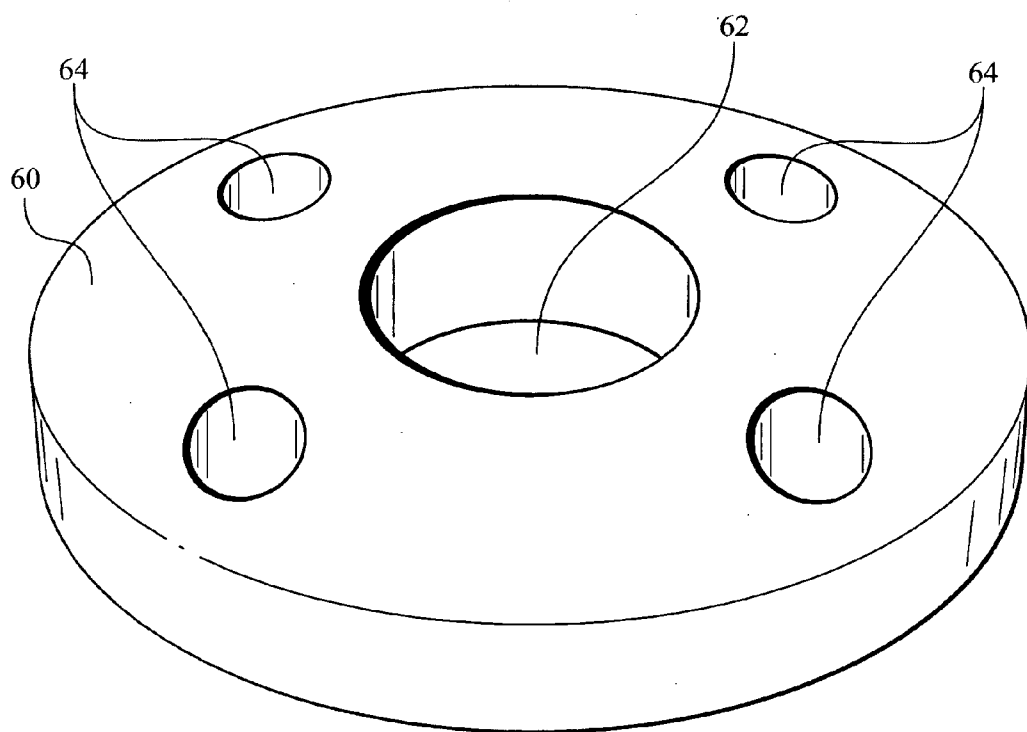


FIG. 3

FLOOR DRAIN ASSEMBLY**CROSS-REFERENCES TO RELATED APPLICATIONS**

[0001] Not applicable.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not Applicable.

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

[0003] Not Applicable.

REFERENCE TO A "SEQUENCE LISTING," A TABLE, OR A COMPUTER PROGRAM LISTING APPENDIX

[0004] Not Applicable.

BACKGROUND**Description of Related Art Including Information Disclosed Under 37 CFR 1.97 and 37 CFR 1.98**

[0005] Embodiments of the present application meet the long-felt need of a drain support system for use in pouring concrete floors. The support system can be vertically adjusted to accommodate the pouring of concrete floors of various thicknesses, prevents the contamination of the end of the drain pipe with concrete residue, prevents concrete contamination of the cavity surrounding the end of the drain pipe, and is preassembled and easily used in the sometimes tumultuous and untidy environment of a concrete floor pour. This system embeds the drain pipe in the concrete matrix while protecting the end of the drain pipe. In addition, the system provides a cavity which facilitates joining of the drain pipe with a riser pipe.

[0006] U.S. Pat. No. 4,423,527 discloses a fabricated floor drain which extends through a floor and includes a impervious membrane surrounding the drain and between two layers of concrete or a layer of gravel and a layer of concrete. Weep holes in the drain receive moisture from the membrane.

[0007] U.S. Pat. No. 5,099,887 discloses a drain collar for maintaining an annular space in a poured concrete floor surrounding a riser pipe. The collar consists of inner and outer sleeves with knock-out webs separating the sleeves and a cap which prevents entry of concrete during pouring. After the concrete is poured and hardened the cap, inner sleeve, and knock-out webs are removed, leaving a riser pipe with a 1 inch annular space about the pipe. This space facilitates the installation of appliances such as a toilet.

[0008] U.S. Pat. No. 5,216,767 discloses a drainage enhancer for double seepage drains. The enhancer is a donut-like disk comprised of porous bonded aggregate which allows drainage of water through a shower floor into weep holes in the drain.

[0009] U.S. Pat. No. 5,623,971 discloses a drain and cleanout spacer which are placed to cover a vertically adjustable drain and cleanout port before concrete pouring. The spacers are removed and the heights of the drain and port adjusted after the concrete has hardened.

[0010] U.S. Pat. No. 7,013,927 discloses a sleeve for toilet flanges and drains consisting of a sleeve surrounding the soil pipe concentric with a larger sleeve and separated from the

larger sleeve by three spacers. An annular ring covers the annular space during the concrete pour. After the concrete has hardened the ring and spacers are removed.

[0011] U.S. Pub. Pat. App. No. 2004/0016190 discloses a modular device for passing cables and pipes through partitions such as a floor. The device includes firestop material which expands when heated and fills the passage. Transverse bands are manually attached and removed to adjust the length of the device.

[0012] U.S. Pub. Pat. App. No. 2004/0231742 discloses a sleeve which surrounds a riser pipe. Spacers are used to maintain a space between the concentric riser pipe and sleeve. The spacers are removed after concrete is poured and hardened.

[0013] U.S. Pub. Pat. App. No. 2005/0055916 discloses a box-like form assembly for a rough-in floor drain line which projects upward from an earthen ground location. The interior of the assembly is filled with sand aggregate and a lid placed on the assembly before pouring concrete in order to protect the drain line from inadvertent contact with concrete.

[0014] U.S. Pub. Pat. App. No. 2005/0166315 discloses two systems for supporting a floor drain before a concrete pour on a wooden form. A prior art system uses a foam block with a hole to accommodate the bottom of the drain to support the drain before the pour. The height of the foam block may be altered to accommodate the various depths of the poured floor. The block and drain are retained in place before and during the pour by wires which cross the top of the drain and are secured by nails to the wooden form. The foam block is chiseled away after the concrete hardens thereby giving access to the bottom of the drain.

[0015] Another system uses a number of threaded rods to connect the floor drain to a inverted pan-shaped drain support plate which rests on the wooden form. The height of the drain is adjusted using the threaded rods. A flange about the circumference of the plate rests on and is attached to the wooden form. A hole in the center of the plate accommodates the connection pipe extending from the bottom of the drain into the open space under the drain support plate. A plastic pipe spacer may be used to prevent penetration of liquid concrete through the space between the plate and connection pipe into the open area under the inverted plate. Such penetration contaminates the end of the connection pipe with concrete, thereby causing difficulties in connecting the connection pipe with a drain pipe. Rubber or foam sealant also may be used to prevent penetration of concrete into the open space.

[0016] U.S. Pub. Pat. App. No. 2007/0056088 discloses a shower drain adapter which attaches a bondable waterproof membrane with a shower pan drain system.

[0017] The foregoing examples of the related art and limitations related therewith are intended to be illustrative and not exclusive. Other limitations of the related art will become apparent to those of skill in the art upon a reading of the specification and a study of the drawings.

BRIEF SUMMARY

[0018] The following embodiments and aspects thereof are described and illustrated in conjunction with systems, tool and methods which are meant to be exemplary and illustrative, not limiting in scope. In various embodiments, one or more of the above described problems have been reduced or eliminated, while other embodiments are directed to other improvements.

[0019] Embodiments include a floor drain assembly for supporting a floor drain and drain pipe during the pouring of a concrete floor on a form. Embodiments comprise a floor drain body, a drain pipe having a first and a second end with the drain pipe attached at the first end to the bottom of the drain body and extending to the form at the second end. In addition there are a multiplicity of spacer rods, the spacer rods attached at a first end to the bottom of the drain body, and a support plate, the spacer rods attached at a second end to the support plate. The support plate has a hole through the center of the plate through which the drain pipe extends to the form at the second end of the drain pipe. The support plate has legs which extend downward from the circumference of the support plate to the form, the legs holding the plate above the form, thereby forming a cavity between the bottom of the support plate and the form. There is a disk comprised of resilient material, the disk inserted into the cavity between the bottom of the support plate and the form, the disk having a hole through the center of the disk, the hole through the disk having a diameter slightly less than the outside diameter of the drain pipe, and the drain pipe force fitted through the hole in the disk at the second end of the drain pipe.

[0020] In addition to the exemplary aspects and embodiments described above, further aspects and embodiments will become apparent by reference to the drawings and by study of the following descriptions.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] FIG. 1 is a perspective view of an embodiment floor drain assembly sitting on a form prior to the pouring of concrete.

[0022] FIG. 2 is a cross sectional view of the embodiment floor drain assembly of FIG. 1 taken along the line 2-2.

[0023] FIG. 3 is a perspective view of the disk of an embodiment floor drain assembly.

DETAILED DESCRIPTION

[0024] FIG. 1 is a perspective view of an embodiment floor drain assembly 100 sitting on a form 10 prior to the pouring of a concrete floor. The drain body 20 is at the top of the assembly and has provisions 22 for the attachment of a drain strainer (not shown in FIG. 1) at the top of the assembly. A multiplicity of threaded rods 40 are connected to the drain body 20 at a first end and to the support plate 50 at a second end. The threaded rods 40 are secured to the support plate 50 by adjusting nuts 42 on both sides of the support plate. Washers (not shown in FIG. 1) may be interspersed between the adjusting nuts and support plate. The threaded rods 40 are attached to the drain body by threaded holes in the drain body (not visible in FIG. 1) and secured to the drain body by lock nuts 44.

[0025] A drain pipe 30 is attached at a first end 32 to the drain body and removes liquids from the drain body at an opening 24 at the lower portion of the drain body. The second end of the drain pipe is passed through a central hole 51 in the support plate 50. The drain pipe also passes through a central hole (not visible in FIG. 1) in the disk 60 through a force fit in the resilient disk 60. The length of the drain pipe extends from the form 10 to the connection with the drain body.

[0026] In the embodiment of FIG. 1 four legs 52 are arrayed about the circumference of the support plate 50. The legs extend approximately perpendicular to the support plate toward the form 10. A flange 54 extends away from each leg 52 and each flange has a hole 54 for the passage of fasteners

such as nails used to fasten the assembly 100 to the form 10. The legs 52 support the assembly 100 and fasten it to the form 10.

[0027] A disk 60 fits under the support plate between the legs. A central hole (not visible in FIG. 1) in the disk receives the second end of the drain pipe 30 in a force fit.

[0028] FIG. 2 is a cross sectional view of the embodiment floor drain assembly of FIG. 1 taken along the line 2-2. Visible at the top of the assembly is the drain body 20 and the threaded connector 22 for a strainer head at the top of the drain body. The spacer rods 40 are attached to the bottom of the drain body and secured in place by lock nuts 44. A drain pipe 30 is secured at a first end 32 to the bottom of the drain body. In this embodiment the first end of the drain pipe is threaded and interacts with corresponding threads on the inner surface at the inside of the opening 24 at the bottom of the drain body. The drain pipe extends from its connection at the first end 32 to the drain body to the form 10 at the bottom of the assembly 100 at the second end 34 of the drain pipe.

[0029] At the bottom of the assembly a support plate 50 is connected to the spacer rods 40 through rod holes 58 and adjusting nuts 42 on both sides of the support plate 50 secure the spacer rods to the support plate. Washers (not visible in FIG. 2) may be interspersed between the adjusting nuts 42 and support plate 50. Legs 52 are distributed about the circumference of the support plate 50 and extend down from the support plate. Flanges 54 extend away from the support plate approximately perpendicular to the legs 50. A fastener hole 56 in each flange is used to secure the flange to the form 10. In this embodiment nails 58 are used to secure the flanges 54 to the wooden form 10.

[0030] The second end 34 of the drain pipe 30 extends through the central hole 51 in the support plate 50 and is force fit into the disk central passage 62 in the disk 60. The disk is manufactured of a resilient material. Spacer rod holes 64 in the disk 60 are arrayed about the spacer rods 40 and accommodate the portion of the spacer rods 40 and adjusting nuts 42 which extend below the support plate 50.

[0031] FIG. 3 is a perspective view of the disk of an embodiment floor drain assembly. Visible in FIG. 3 is the disk 60, central passage 62, and spacer rod holes 64.

[0032] In the embodiment shown in FIGS. 1-3 four spacer rods are arrayed equidistant about the drain pipe. In this embodiment there are four legs arrayed about the circumference of the support plate. Other embodiments will have other numbers of these elements.

[0033] In the embodiment shown in FIGS. 1-2 the spacer rods are threaded to facilitate adjustment of the length of the assembly. Other means of adjusting the length of the spacer rods and fixing the rods to the spacer plate are specifically contemplated, such as unthreaded rods secured to the spacer plate using clamps. In addition, embodiments in which the length of the assembly is not adjustable and the spacer rods are fixed to the spacer plate such as by welding are specifically contemplated.

[0034] In the embodiment shown in FIGS. 1-2 the length of the assembly is adjustable before the assembly is installed by adjusting the position of the spacer plate using the adjusting nuts. If necessary, excessive length of spacer rods may be cut off so the spacer rods do not extend below the level of the flanges. Excessive rod length would not allow attachment of the assembly to the form. The length of the assembly from flange to top of drain body is the same as the thickness of the concrete floor.

[0035] The assembly is manufactured by suitable strong materials such as iron, aluminum, or steel. In embodiments the drain body is cast iron the spacer rods and nuts and support plate are steel. The disk is manufactured of suitable resilient and flexible materials, such as plastic foam, such as polystyrene or polyurethane foam, or rubber.

[0036] In some embodiments the disk has a diameter of 10.22 inches and thickness of 1.44 inches. The spacer rod holes are 1.00 inches in diameter and the central passage is 3.56 inches in diameter which accommodates a drain pipe of 3.75 inches outside diameter. The support plate, legs and flanges are of 11 gauge sheet steel. The support plate is 10.25 inches in diameter. The central hole in the support plate is 3.75 inches in diameter and the rod holes are 0.406 inches in diameter. In some embodiments the spacer rods are 0.312 inches in diameter and 12 inches in length. The drain body is 9 inches in diameter and 4.344 inches in length.

[0037] In use, enough assemblies for all the floor drains are adjusted in length to the planned thickness of the concrete floor. The assemblies are located at the appropriate sites on the forms and attached by nails or screws. Concrete is poured and allowed to harden. The forms are removed and the disk removed using pliers or other means of grasping the disks. The result is a cylindrical cavity in the bottom of the floor below the the support plate with the second end of the drain pipe in the center of the cavity. A riser pipe which will remove the water from the drain then may be connected to the second end of the drain pipe.

[0038] Embodiments are particularly useful in the sometime tumultuous environment of commercial concrete floor construction. Embodiment assemblies are firmly attached to the form and resist displacement. Use of embodiments results in drains in which the drain pipe is directly embedded in the concrete matrix, which provides maximum stability for the drain pipe. The force fit of the end of the drain pipe in the disk protects the end of the drain pipe from contamination by bleedwater from the unhardened concrete. Embodiments avoid the necessity of sealing the connection between drain pipe and support plate in order to protect the end of the drain pipe from concrete contamination, as in prior art assemblies.

[0039] In addition, the surface of forms often is not smooth but is marred by flaws such as knots, cracks or joins between form panels. These flaws allow penetration by concrete into of the cavity below the support plate in prior art assemblies. The concrete penetration fills the cavity and contaminates the end of the drain pipe, requiring expensive and time consuming chiseling away of the hardened concrete contamination. Embodiments of the present application avoid these problems through protection of the end of the drain pipe through force fit into the disk and by exclusion of concrete into the cavity by the disk.

[0040] While a number of exemplary aspects and embodiments have been discussed above, those of skill in the art will recognize certain modifications, permutations, additions and

subcombinations thereof. It is therefore intended that the following appended claims and claims hereafter introduced are interpreted to include all such modifications, permutations, additions and sub-combinations as are within their true spirit and scope.

I claim:

1. A floor drain assembly for supporting a floor drain and drain pipe during the pouring of a concrete floor on a form comprising:

a floor drain body,
a drain pipe having a first and a second end,
the drain pipe attached at the first end to the bottom of the drain body and extending to the form at the second end,
a multiplicity of spacer rods,
the spacer rods attached at a first end to the bottom of the drain body,
a support plate,
the spacer rods attached at a second end to the support plate,
the support plate having a hole through the center of the plate through which the drain pipe extends to the form at the second end of the drain pipe,
the support plate having legs which extend downward from the circumference of the support plate to the form, the legs holding the plate above the form, thereby forming a cavity between the bottom of the support plate and the form,
a disk comprised of resilient material,
the disk inserted into the cavity between the bottom of the support plate and the form,
the disk having a hole through the center of the disk,
the hole through the center of the disk having a diameter slightly less than the outside diameter of the drain pipe, and
the drain pipe force fitted through the hole in the disk at the second end of the drain pipe.

2. The assembly of claim **1** wherein the support rods are threaded and are adjustably attached to the support plate.

3. The assembly of claim **1** wherein the support plate legs have flanges which extend approximately perpendicular from the legs.

4. The assembly of claim **3** wherein the flanges have attachment holes for attachment of the flanges to the form.

5. The assembly of claim **1** further comprising holes in the resilient disk, the holes located under the second ends of the spacer rods.

6. The resilient disk of claim **1** wherein the disk is comprised of plastic foam, or rubber.

7. The resilient disk of claim **1** wherein the disk is comprised of polystyrene or polyurethane foam.

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