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REVERSIBLE STRUCTURE FOR SURFACE DRAIN

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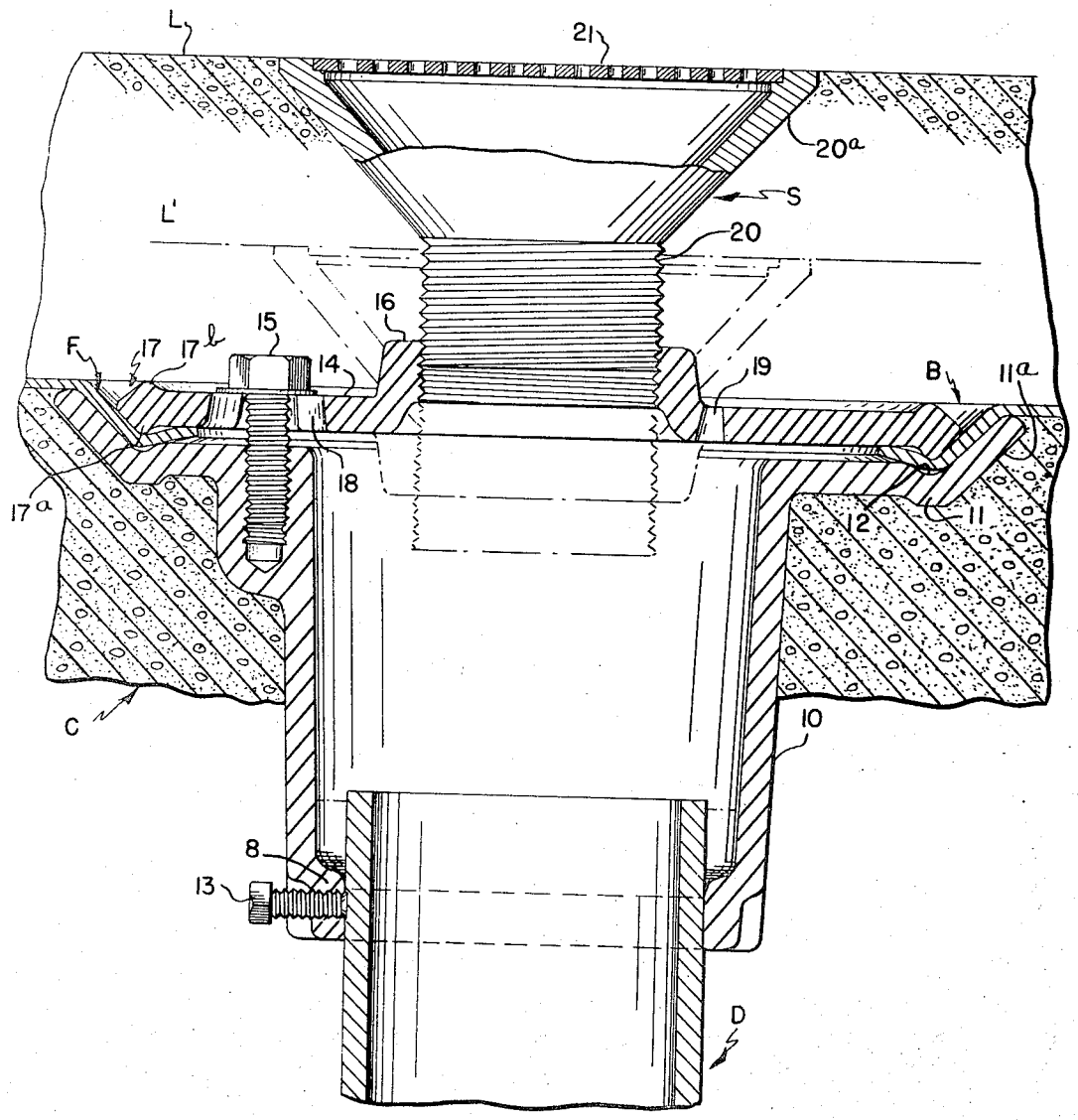

FIG. 1

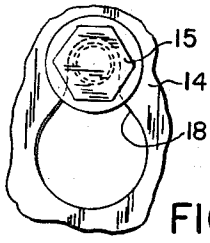

FIG. 2

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REVERSIBLE STRUCTURE FOR SURFACE DRAIN

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ABSTRACT OF THE DISCLOSURE

A height-adjustable strainer type drain having a body bowl and a top plate. The top plate is bossed on one face and is internally threaded to vertically adjustably receive a male-threaded portion on a strainer; the plate also has a circumferential rim rib on each face to cooperate with a corresponding groove in a body bowl flange to clamp flashing therebetween. The plate is reversible to increase the effective adjustment range. Key-hole slots are arcuately positioned in the plate for engagement by clamping bolts threaded into the body bowl.

The present invention is concerned generally with surface drains of types used, for example, in concrete surfaces; and more particularly with improvements in a drain having a two-piece drain body into an upper part of which there is vertically adjustably threaded a strainer sub-assembly; the upper part, serving also as a device for clamping flashing or water-proofing material and the like, further being reversible to provide an increased range of available vertical adjustment.

In drains used, for example, in concrete slab floors, especially in showers, it is common practice to provide vertical adjustment of a grated drain inlet opening relative to the drain body, whereby the drain body may be roughed in with appropriate securement in the environment and connection to a drainage line before a rough pour or cast of concrete, and thereafter the grate surface or top inlet opening adjusted to a precise level desired or required for the finish surface of the floor. For this purpose, the effective drain opening is provided by a strainer assembly comprised of a lower male threaded cylindrical portion threaded into the drain body and having either an integral or a removable grate at its top portion.

Moreover, in better construction, flashing material, sheet-like water-proofing material, clamped and sealed to a drain body flange and extending outwardly therefrom, is incorporated in the floor structure to afford a barrier conducting water, leaking from the floor surface downwardly between the drain and surrounding concrete, to so-called flange "weep holes" opening into the drain interior.

Drains of this character already have been produced with the drain body fabricated in two pieces bolted together in a flashing-clamping relation; a main lower body portion including a flashing flange at its top part and an upper centrally apertured flashing clamping collar or plate having a female threaded portion offset to one side to receive the threaded bottom of the strainer. In this arrangement for a given threaded axial length of the strainer, an increased range of vertical adjustment is afforded if the clamping plate may be used in either of the two relatively inverted positions whereby the offset threaded portion may be located above or below the horizontal plane of clamping.

By the present invention, in a drain of the character described, the top surface of the drain body flange is provided with a circumferential groove cooperating with a corresponding bead on the downwardly disposed or flashing engaging side of the clamping plate to achieve a firmer and more certain clamping and water-proof sealing of the flashing to the drain body. Preferably the clamping plate has such a bead on both sides whereby the improved clamping is obtained with the plate in either of its possible positions; and such beading is located at the extreme periphery of the clamping plate, minimizing the required plate diameter, and the plate apertures for clamping bolts passed therethrough into aligned corresponding threaded blind apertures in the underlying body flange are spaced radially inwardly at a position where no interference with the normal installation of flashing need occur. The effective clamping thus achieved minimizes the area of flashing required to be engaged between flange and plate, thereby allowing, without increase of dimensions of the parts, the clamping bolts to be so located that penetration of the flashing is not required. Moreover, the clamping bolt location and engagement with the clamping plate at slotted formations of the latter affords not only a convenient mode of installation but also additional area for a double drainage function of seepage water.

The general object then of the present invention is to provide in drains of the character described an improved flashing-clamping structure, in which one clamping element is provided by a reversible strainer-receiving clamping plate. Another object is to provide in drains of the character described a two-piece body with clamping bolts so located as to minimize or obviate mutual interference of flashing sheeting and the bolts while obtaining a well sealed clamped relation, thereby to facilitate installation. Other objects and advantages will appear from the following description and the drawings wherein:

FIG. 1 is a vertical axial section showing one form of the drain embodying the present invention; and

FIG. 2 is a fragmentary detail of a clamp bolt and the cooperating slot in the clamping plate.

In the drawing, the invention is embodied in a drain comprised of a two-piece body assembly B, here shown as having a central bottom outlet connected to a vertical portion of a drain line D by an appropriate means, and a top portion bearing a drain inlet structure provided by a strainer S, threaded into a top opening of the drain body; whereby, after the drain body is appropriately secured in the environment connected to the line D by roughing-in procedures, and usually after the concrete floor slab C has been at least partially emplaced by a rough pour and the flashing is clamped, then the level of the effective drain inlet opening afforded by the grated strainer may be adjusted to the precise desired finished floor level L by screwing the strainer into or out from the drain body. This adjustable drain structure, however, is useful with the different procedures used in constructing various types of floor slabs.

In the embodiment here shown as one expedient for securing to the drain body an appropriate flashing material F to be embedded in the final concrete slab, the draing body B is comprised of an assembly of a lower main bowl-like body portion **10** here shown as having a bottom outlet adapted for a conventional caulked connection to the drainage pipe D, the making of which, however, is facilitated by set screws **13**, threaded through spaced inward bosses **8** formed in the caulking lip or flange at the bottom of the outlet opening. It is understood, of course, that in accordance with common practice the drain outlet could as well be of a form adapted for a threaded joint or further that a lateral outlet of either type could be used.

An integral circumferential flange **11** extending generally radially outward from the top bowl portion to an outwardly upwardly flared flange rim **11***a* provides a circumferential flat area circumscribed by a shallow arcuate

circumferential groove **12** into which the inside sloping top surface of **11***a* merges. This grooved region is adapted to cooperate with the clamping plate or collar **14** forming the upper portion of the two-piece body, secured thereto by a plurality of clamping bolts **15** with washers, passed through suitable slotted apertures **18** in the plate and threaded into corresponding aligned blind apertures angularly spaced along the inner margin of the flat area of the drain body flange.

The clamping plate **14** is a centrally apertured generally disc-like element, conveniently a casting, having the central region thickened on one face to provide a central opening surrounded in effect on one side by an axially extending offset **16** and internally threaded vertically adjustably to engage the lower end of the male threaded cylindrical portion **20** of the strainer assembly S. The upper end of the latter is outwardly flared in the form here shown at **20***a* to afford a seat for a grate member **21** received flush with the top end surface of the flared portion **20***a*.

A peripheral enlargement **17**, with divergent bevels terminating in rounded circular elevations above each flat face of the plate, provides on opposite sides of the disc portion **14** similar circular rib or bead formations **17***a* and **17***b* adapted in cross-section to cooperate with the groove **12** of the body flange for secure clamping and effective sealing engagement therebetween of the circumferential margin of the flashing F carried downwardly over the straight slope of the flange rim **11***a*. It is to be noted that as, in cross-section, the arcuate groove **12** sweeps outwardly and upwardly to merge into the tangent surface of the rim **11***a*, so also in the beads **17***a*, **17***b* of corresponding cross-section and overall diameter, the arcuate surfaces merge outwardly into tangent surfaces, so that the bead effective in clamping has surfaces disposed parallel to or complementary to those of the groove region. The groove and rib engagement does not present a sharp breaking edge to weaken the flashing; and the opposed flat areas between the flange portions of **14** and **11** have no interposed formations interfering with clamping approximation.

The bolt receiving apertures in plate **14**, as more clearly seen in FIG. 2, preferably take the form of arcuately elongated slots **18** of a key-hole shape, enlarged at their respective counterclockwise ends sufficiently for the bolt heads to pass therethrough; whereby the plate may be dropped into place over the bolts onto the flashing, rotated to bring the narrower parts of the slots accommodating the shanks under the heads, and then the bolts tightened to clamp the flashing.

The effective clamping engagement here provided by cooperating bead and groove permits a suitable clamping and sealing by engagement of a relatively small circumferential area of the flashing between body flange **11** and the flange-like plate **14**, whereby without enlargement, in fact with diminished diametric size of the disc, there is afforded clear location for the clamping bolts **15** without need of penetration of the flashing by the bolts or interference by the flashing with the bolts. Moreover, the bolt slots **18** in addition to providing an expeditious installation afford areas additional to weep holes **19** for drainage of seeping water from the flashing and flange region into the drain interior.

The clamping plate **14** may be positioned over the flashing F laid in place on the flange **11** as may be required in either of the dispositions represented in solid or dashed lines, i.e., with the offset **16** on the top or on the bottom side. The extremes of adjustment are indicated by the line L at maximum height for the solid line representation with the strainer body drawn out to a minimum acceptable threaded engagement with the plate threaded offset on top; and on the other hand, for the minimal level by the line L′ where the plate **14** is reversed with the offset turned downward into the bowl, and the strainer assembly S threaded downwardly as far as possible into the plate.

I claim:

1. In a drain having a two-piece drain body constituted by a bowl as a lower part with an outlet adapted for a drainage line connection and with an integral circumferential outward flange at the upper bowl end.

and having an upper part including a reversible disc-like clamping plate portion bolted to the bowl flange cooperatively to clamp therebetween flashing in sealed relation to the body and supporting a strainer as a central drain inlet structure discharging downwardly into the bowl, said clamping plate portion being centrally apertured and female-threaded and on one face centrally thickened to provide an offset, to one side of the disc-like clamping plate portion, of female threads vertically adjustably receiving a hollow male-threaded discharge portion of said strainer, the improvement comprising:

said flange having a flat top surface extending outwardly from the bowl cavity and a circumferential groove concentric with the bowl circumscribing and terminating the flat surface, said clamping plate portion providing a flange-like portion presenting on one side a flat surface terminating at a circumferential rib opposed to said top surface and groove for sealing clamping engagement therebetween of a flashing margin and on the other side a similar flat surface and rib opposable to said top surface and groove upon reversal of the plate,

and a plurality of clamping bolts through said flange-like portion threaded into blind holes at spaced locations in the bowl flange adjacent the bowl cavity whereby effectively sealingly to clamp flashing to the bowl with avoidance of flashing penetration by, or flashing interference with, the bolts.

2. The drain improvement as described in claim **1**, wherein said flange has an upwardly outwardly flared rim portion, said groove has an arcuate cross-section with the top surface of the rim merging downwardly into the groove, and said disc-like clamping plate portion has a peripheral edge enlargement providing said ribs in cross-section complementary to said groove and an adjacent merging portion of the rim top surface.

3. The drain improvement as described in claim **2** wherein said disc-like clamping plate portion is provided with similarly oriented, key-hole shaped slots extending along a common circle as apertures for respective clamping bolts, whereby the heads of bolts assembled to the bowl flange may be received through the enlarged parts of the slots, and upon rotational shifting of the disc-like clamping plate portion and bolt tightening, may engage upon the narrow slotted regions for flashing clamping.

4. The drain improvement as described in claim **3**, wherein seepage drainage apertures to the bowl interior are afforded at least in part by said key-hole slots.

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