Aug. 19, 1952 M. A. SISK 2,607,434

SURFACE DRAIN

Filed Feb. 23, 1946 2 SHEETS—SHEET 1

Fig. 1.

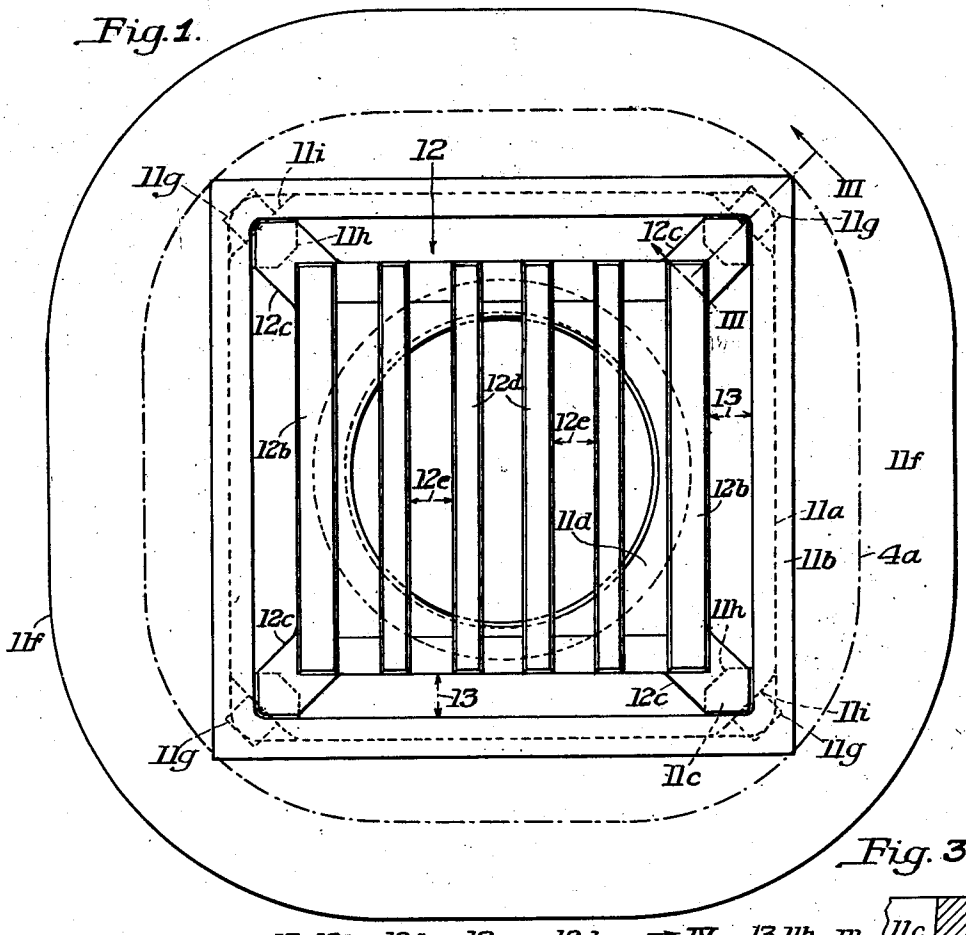


Fig. 3.

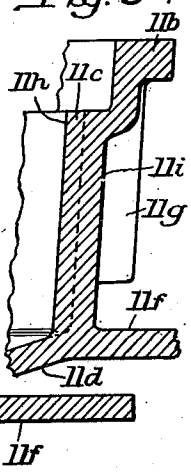
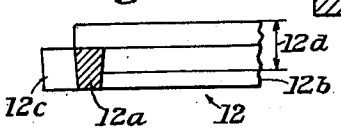


Fig. 2.

Fig. 4.



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Fig. 5.

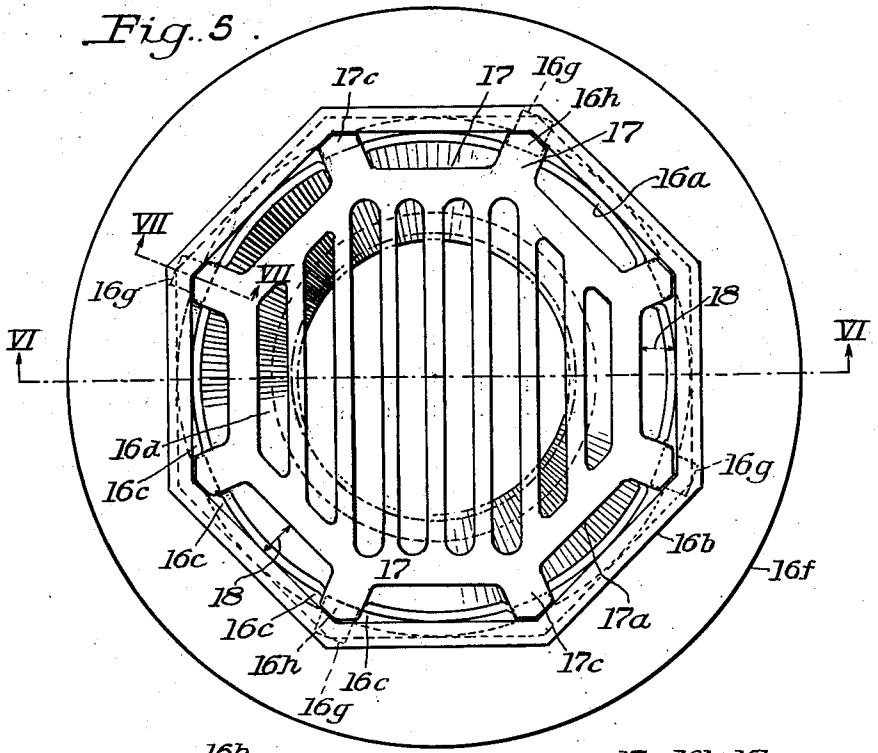


Fig. 6.

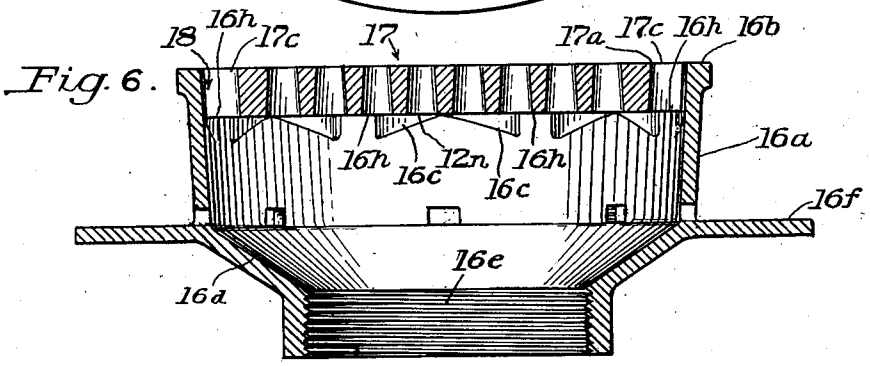
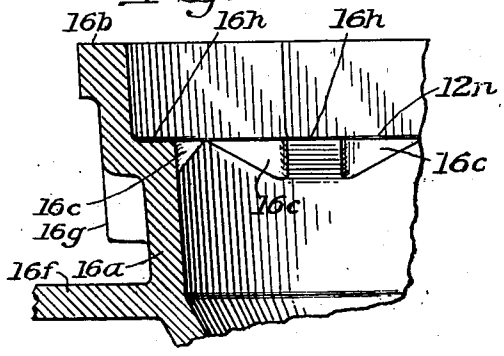


Fig. 7



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2,607,434

SURFACE DRAIN

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8 Claims. (Cl. 182—31)

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My invention relates to surface drains for use in the floors of shower baths, roadways, decks of ships, floors and roofs of buildings, and the like, to provide debris-excluding protection at the inlets of drain openings or pipes. The structure of the invention will also find utility as a guard for pipes and openings of any sort in which liquid is received, and in the operation of which it is desirable to exclude solids of a size that might clog the opening, or the pipe leading therefrom.

The invention consists in certain new and useful improvements in drain construction, by virtue of which mechanical superiority is obtained, installations facilitated, conditions of sanitation improved, and maintenance rendered more economical.

The improvements of the invention will, by way of example and not limitation, be described as they have been perfected for surface drains that are used in floors. In the accompanying drawings:

Fig. 1 is a view in plan of a square or rectangular drain embodying the invention;

Fig. 2 is a view in cross section of the structure of Fig. 1, as seen on a medial vertical plane;

Fig. 3 is a fragmentary view, showing in vertical section, on the plane III—III of Fig. 1, the structure of one of the corners of the drain of Figs. 1 and 2;

Fig. 4 is a fragmentary sectional view of the grate of the drain structure of Figs. 1 and 2, as seen on the plane IV—IV of Fig. 2;

Fig. 5 is a view in plan of an octagonal drain embodying the improvements of the invention;

Fig. 6 is a sectional view of the octoganal drain, on the plane VI—VI of Fig. 5; and

Fig. 7 is a fragmentary sectional view of the drain body of Figs. 5 and 6, as seen on the section plane VII—VII of Fig. 5.

In general, an outlet or floor drain of the type in mind consists in a cup-shaped body that is embedded in the floor structure whose surface is to be drained, and the inlet of the body is covered by a removable grate whose upper face lies flush with such surface. The body of the drain forms a belled terminus at the end of a drain pipe laid beneath or within the floor structure.

In the usual prior structures the grate, consisting in a perforate plate of metal, rests at its periphery in a rabbeted seat formed in the rim of the cup-shaped body of the drain, and the water enters the drain through holes in the grating that are located inwardly from the rim of the drain body and/or are restricted at the rim of the grate, with the result that the flowing water

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does not completely flush or wash the inner surface of the side wall of the drain body. Consequently, debris carried by the waste water tends to accumulate on such surface of the drain body, especially just below the grate, and between the seat and the edge of the grate. The accumulated debris over a period of time is subject to decomposition, creating foul odors and unsanitary conditions. In order to cleanse such drains, it is necessary to remove the grate and scrub or scrape away the accumulations—manifestly a disagreeable task. An important feature of this invention resides in the elimination of these objectionable conditions.

Referring to Figs. 1 and 2 the drain is of square or rectangular form as viewed in plan. The side wall 11*a* of the drain body above the flange 11*f* is square, providing a square rim 11*b* that encompasses the inlet of the drain, while the inclined portion 11*d* of the drain body slopes to the threaded outlet 11*e*, by means of which the drain body may be secured to the threaded terminal of a drain pipe on the inlet side of a conventional trap (not shown). In lieu of the threaded outlet 11*e* the drain body may be shaped below the tapered wall portion 11*d* to form a bell-and-spigot joint with the terminus of a drain pipe. Alternatively, the drain outlet may open laterally instead of downwardly through the walls of the drain body below the side wall portion 11*a*. Such details are well known to the art. In the installation of the drain in accordance with usual practice the upper portion of the drain body is arranged to extend upwardly through an opening formed in the usual membrane of flashing sheet (not shown) of lead or tar paper provided in the floor structure beneath the floor surface, with which floor surface the top edge 11*b* of the drain body lies flush. The edge of the flashing sheet rests on the surface of the flange 11*f*, and any water which might seep from the floor surface downward between the drain body and the adjacent surface of the floor is caught and drained through weep or seepage holes 7 into the drain body. The flange 11*f* has rounded corners as shown in Fig. 1, and the flashing sheet has a correspondingly shaped opening, whereby the edge of the flashing sheet, indicated by the broken line 4*a*, may be clamped to the flange to provide a liquid-tight union for the purpose already described. At the corners the drain body has four lugs 11*g* to cooperate with clamping devices, with which this invention is not immediately concerned.

The drain body is provided with a boss 11*h* in each corner to support the grate 12, these

bosses being cast integrally in the drain body, with the drain body inset (save for the lugs 11g) at the corners, as shown at 11i in Figs. 1 and 3, to conserve metal. The bosses 11h extend with smooth surfaces from the grate downward to the inclined wall 11d, whereby there are no obstructions to receive and retain debris or sediment. The internal surfaces of this square drain provide an unrestricted continuous downsweep for flushing water.

The grate 12 is formed as an integral casting, including two bearer bars 12a and a series of six spaced cross bars, the two outer cross bars 12b being heavier and thicker than the medial cross bars 12d, and in a sense constitute bearer bars as well as cross bars. The outer cross bars 12b form with the bearer bars 12a a square frame, from the corners of which supporting lugs 12c extend to seat upon the top faces 11c of the bosses 11h on the drain body to support the grate. Between the square frame and the adjacent rim 11b of the drain inlet a drainage slot 13 is formed, this slot being in effect continuous throughout the peripheral extent of the drain inlet, whereby in service the entire internal surface of the side wall of the drain body is flushed by an unrestricted downsweeping flow of drainage liquid, with the good effects noted.

It will be understood that the top faces of the grate lugs 12c lie in common plane with the upper edges of the bearer bars 12a, and that such plane is arranged at an interval below the plane of the rim 11b of the drain body, while the upper edges of the cross bars 12b and 12d lie in the plane of said rim 11b. This affords what may be termed a cleansweep grate, for by virtue of such structure a broom may be used readily to sweep the slots 12e between the cross bars of the grate and the peripheral slot 13 clean of any debris that may tend to accumulate on or between the bars of the grate or between the grate and the rim of the drain body.

Considering the matter of manufacture, it is to be noted that both the square drain body and square grate may be easily cast in green sand molds, with the use of only one dry sand core moldable in a one-part core-box. It is particularly to be noted of the grate 12 that all the side surfaces of the bearer bars 12a, cross bars 12b and 12d, and lugs 12c, which extend below the plane of the upper edges of the bearer bars 12a, are drafted downwardly, while all sides of the cross bars 12b and 12d above such plane are drafted upwardly. Accordingly, the parting line or plane of the green sand mold may be coincident with the common plane of the tops of the lugs 12c and the upper edges of the bearer bars 12a. Thus it is that all of the surfaces of the cross bars 12b and 12d which are exposed at the top of the drain are surfaces that in the casting operation are formed within matrix portions of the mold removed from the parting line, whereby it is only smooth cast surfaces, free from any fins or flashing, that are exposed at the top of the drain. No machining or finishing is required to adapt the cast grate for service.

It will be understood that a drain having a flat sided rim particularly adapts itself for use in a floor having a tiled surface, since the laying of individual tiles against the straight sides of the drain rim may be done more easily and neatly than against a curved drain rim. The advantages of a flat sided rim may be had in a drain rim having a greater number of sides than four, say in an octagonal rim 16b, as shown in Figs. 5 to 7, which approximates and in some installations excels the appearance of a circular drain.

The side wall 16a of the drain body of Figs. 5 to 7 is provided with clamping lugs 16g, and in the interval between the flange 16f and the horizontal plane denoted by the line 12n the side wall is substantially cylindrical. At such plane the side wall is offset outwardly to provide the octagonal form of the rim 16b. This offset in side wall 16a is provided at the corners of the octagon only, forming flat seats 16h for the grate 17, and from the opposite sides of these flat seats the adjacent internal surfaces 16c of the drain body are sloped downwardly, and are curved in such manner as to merge with the cylindrical internal surface of the side wall portion 16a. Thus, except for the flat seats 16h, there are no ledges or the like to interfere with the continuous, smooth internal surface of the drain body above the flange 16f, and below the flange the drain body converges, at 16d, to the threaded outlet 16e. Since the octagonal structure affords more grate-supporting points than the square or rectangular structure, the octagonal structure is more durable for larger and heavier types of drains.

The grate 17 is provided with supporting lugs 17c located at the corners of the octagon. The grate 17 does not have any of its lugs 17c formed to receive the grate-securing screws, such screws being unnecessary in most instances, but may be used if required. It is important to note that the lugs 17c cover the entire surface areas of the seats 16h which they engage, and thus it is that within the drain body there are in fact no ledges, recesses or other obstructions to the clear downsweep which the internal surface of the drain body presents to the flushing flow of water that streams immediately from the rim 16b into the slot 18 formed by and between the rim of the drain body and the peripheral edge 17a of the grate.

The grate 17 is manifestly designed for production in a simple casting operation, employing a green sand mold.

In all of the drain structures disclosed herein the general features of my invention will be found. My drain structure is self-cleansing, and to what has already been said I may add that the essential advantages of the costly flushing type drains are obtained in a relatively inexpensive construction which avoids the need of running pipes for flushing water to the drain installation.

In the several forms of the drain disclosed herein, the inlet of the drain body, and the grate covering the same, are shown to be arranged in horizontal position, but it will be understood that the inlets and grates of the various surface drain structures may be inclined to the horizontal, and/or may be of angular construction, as the well-known curb and corner drains are now constructed.

Notice is hereby given of my application Serial No. 288,774, filed May 20, 1952, forming a continuation-in-part of the application for these Letters Patent. Other species of my drain structure than those herein described are covered in my divisional applications for Letters Patent, Serial No. 174,935 and Serial No. 174,936, both filed on July 30, 1950.

From the foregoing specification, it will be understood that many modifications and variations are permissible without departing from the invention defined in the appended claims.

I claim:

1. In a surface drain comprising a drain body provided with an inlet and having a peripheral side wall extending downward from the rim of said inlet to a circular outlet, said side wall comprising a peripheral succession of flat wall portions extending downward from said rim and fairing smoothly with an annular peripheral wall portion that slopes downwardly to said outlet, forming an internal surface in the drain body that provides a continuous downsweep that is substantially unrestricted throughout the peripheral extent of the side wall, a grate supported on the drain body in position across said inlet; said grate comprising a disk-like body having within its peripheral edge a system of perforations to provide for the drainage of liquid into said drain body, grate-seating means provided on said drain body within and below said rim, said grate being supported on and covering said seating means with said peripheral edge of the grate spaced at an interval inward from the adjacent edge of said rim of the drain body and forming therewith a drainage slot that opens between said edge of the rim and said edge of the grate and extends in substantial continuity throughout the periphery of said inlet, whereby in service the entire internal surface of said side wall is flushed by an unrestricted downsweeping flow of drainage liquid.

2. In a surface drain comprising a drain body provided with an inlet of polygonal form as viewed in plan and having a peripheral side wall extending downward from the rim of said inlet to an outlet, grate-supporting means on the drain body within and below said rim, and a polygonal grate supported on said means in position across said inlet; the invention herein described wherein said grate comprises a plurality of spaced cross bars cast integrally with and supported at their ends upon bearer bars, the bodies of said cross bars and the bodies of said bearer bars, as the bars are severally viewed in cross section, being convergently tapered or drafted in opposite directions from a plane extending medially of the grate structure and parallel to the plane of expanse thereof.

3. In a surface drain comprising a drain body provided with an inlet of rectangular form, as viewed in plan, and having a peripheral side wall extending downward from the rim of said inlet to an outlet, grate-supporting means located on the drain body at the corners of said inlet and within and below the rim thereof, and a grate comprising a rectangular disk-like perforate body having an integral lug extending diagonally outward from each corner of the rectangle, said lugs seating severally on the grate-supporting means at the corners of the drain body, with the perimeter of the grate spaced at an interval inward from the adjacent edge of said rim of the drain body and forming therewith a drainage slot that opens between said edge of the rim and said edge of the grate and that extends in substantial continuity throughout the periphery of said inlet, whereby in service the entire internal surface of said side wall is flushed by an unrestricted downsweeping flow of drainage liquid.

4. In a surface drain comprising a drain body provided with an inlet and having a peripheral rim of polygonal shape in plan and a side wall extending downwardly to an outlet, and a grate supported on the drain body in position across said inlet; the invention herein described wherein the side wall of the drain body comprises an internal surface formed of flat portions that extend downward severally from the straight inner edge portions of said peripheral rim and fair with an internal surface portion of circular form in horizontal section, said internal surface portions providing a downsweep that is substantially unrestricted throughout the peripheral and vertical extent of said side wall, grate-seating means provided on said drain body within and below said rim and in the corner regions between the straight inner edge portions of the rim, said grate comprising a medially perforate body having a polygonal rim and means extending outwardly from such rim for engaging and covering said seating means, said grate rim being substantially flush with the surface to be drained, the straight outer edge portions of said grate rim being severally spaced inward from the straight inner edge portions of the drain-body rim and forming therewith a continuous peripheral succession of straight drainage slots that are flush with the surface to be drained, that in depth substantially equal the thickness of the grate rim, and that communicate directly with the drain outlet, whereby in service the entire internal surface of said side wall is flushed by an unrestricted downsweeping flow of drainage liquid.

5. The structure of claim 4, wherein said grate is polygonal as viewed in plan and comprises a plurality of spaced cross bars cast integrally with and supported at their ends upon bearer bars, the bodies of said cross bars and the bodies of said bearer bars, as the bars are severally viewed in cross section, being convergently tapered or drafted in opposite directions from a plane extending medially of the grate structure and parallel to the plane of expanse thereof.

6. In a surface drain comprising a drain body provided with a polygonal inlet having a rim adapted to lie flush with the surface to be drained, said drain body having a peripheral side wall extending downwardly from said rim to an outlet, and a grate of polygonal form corresponding to said inlet supported on the drain body in position across the inlet; the invention herein described wherein the side wall of the drain body is formed with an internal surface that extends downwardly from the polygonal inner edge of said rim to said outlet, providing a continuous downsweep that is smooth and substantially unrestricted throughout the peripheral and vertical extents of said side wall, said grate comprising a disk-like body having within its polygonal peripheral edge a system of perforations for the drainage of liquid into said drain body, grate seats formed only in the corners of said side wall of the drain body within and below said rim, said grate having at the corners of its polygonal body a plurality of lugs extending outwardly from the edge of the grate, said lugs being supported on and covering said grate seats in the corners of the side wall of the drain body, with said peripheral edge of the grate flush with said rim and with the surface to be drained, and with said edge of the grate spaced at an interval inwardly from the adjacent edge of said rim of the drain body and forming therewith a relatively wide drainage slot that extends in substantial continuity throughout the periphery of said inlet, whereby in service the entire internal surface of the drain body is flushed by an unrestricted downsweeping flow of drainage liquid.

7. In a surface drain comprising a drain body provided with an inlet of polygonal form as viewed in plan and having a peripheral side wall

extending downward from the rim of said inlet to an outlet, a grate, and means for supporting said grate in position across said inlet; the invention herein described wherein said grate includes a body having a peripheral edge disposed substantially at the drain surface and spaced inward from said rim of the side wall of the drain body, and a relatively wide slot between said edge of the grate and said rim of the drain body for the entrance of a flushing flow of drainage water to the internal surface of the drain body, said grate-supporting means comprising elements of relatively narrow width extending across said slot at widely spaced intervals in the grate-encompassing extent of the slot, the internal surface of said drain body between said grate-supporting means being smooth and continuous, and said slot being in vertical extent substantially equal to the thickness of the body of said grate, whereby the flow of drainage water effects an unrestricted downsweep flushing of the internal surface of said drain body.

8. The structure of claim 7, wherein said elements of relatively narrow width comprise lugs that are disposed below the rim of the drain body and the top of the grate to provide against the tilting of the grate, as described.

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