

June 9, 1959

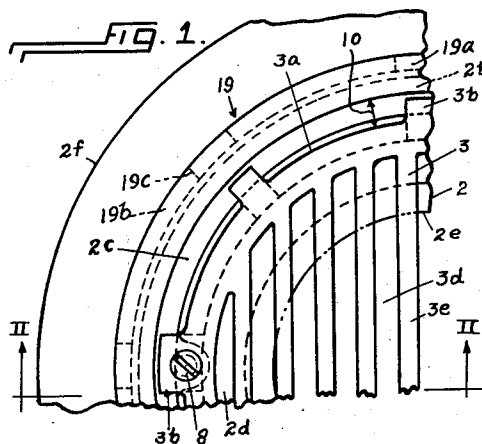
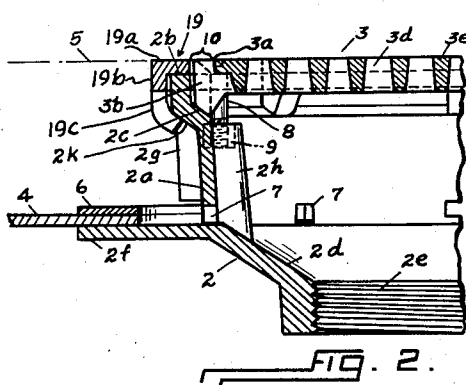
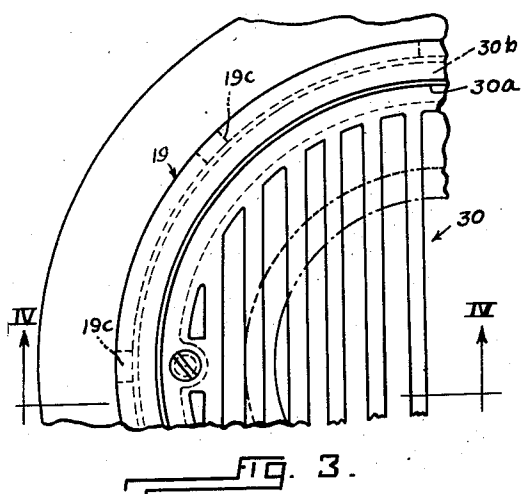
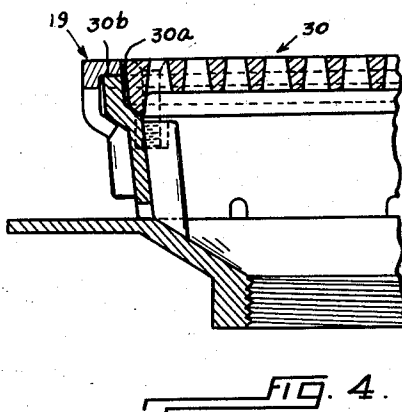
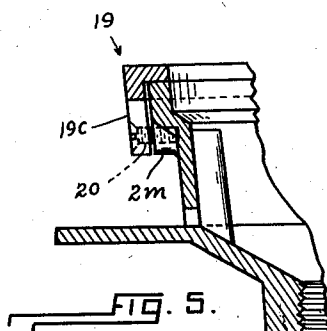
M. A. SISK

2,889,928

FINISH RIMS FOR SURFACE DRAINS

Filed July 30, 1954

2 Sheets-Sheet 1



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FINISH RIMS FOR SURFACE DRAINS

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2 Sheets-Sheet 2

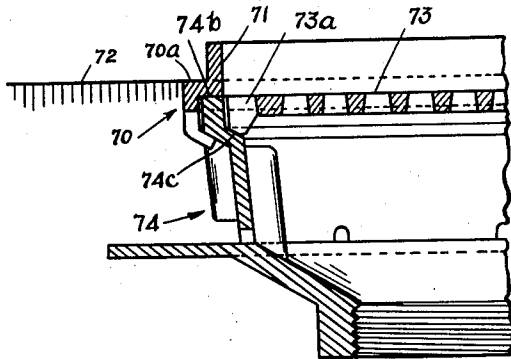


FIG. 7.

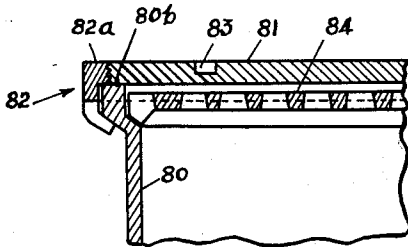


FIG. 8.

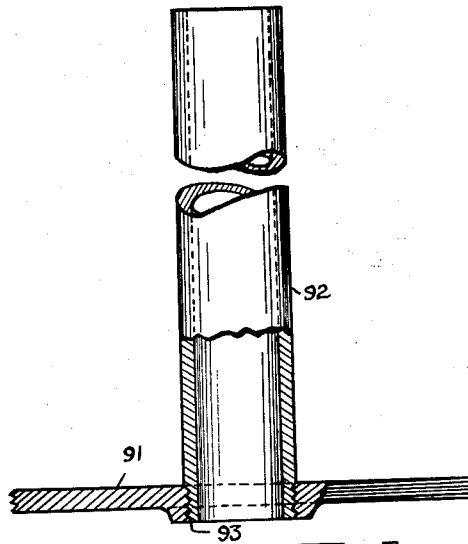


FIG. 9.

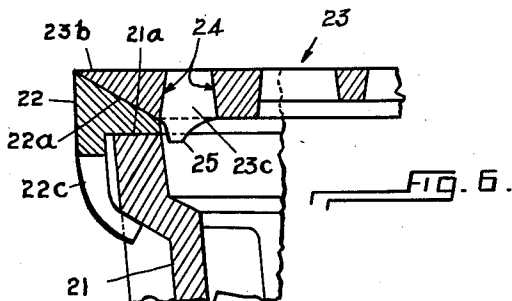


FIG. 6.

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FINISH RIMS FOR SURFACE DRAINS

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Application July 30, 1954, Serial No. 446,696

1 Claim. (Cl. 210—163)

My invention relates to surface access devices or 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 for access openings in floors, such as the inlets of drain openings, or ducts and drain pipes, and the like. The structure of the invention will also find utility as a guard for pipes and openings of any sort, particularly those 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.

In general, an access 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 or cover whose upper face lies flush with such surface.

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 greater part of the water entering the drain does so through holes or openings in the grate that are located inwardly from the rim of the drain body, with the result that the flowing water 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.

In accordance with the objects of my invention, I provide a finish or adapter rim that is particularly though not exclusively adapted for use in drain structures that have a peripheral slot whose outer periphery is vertically aligned, or substantially so, with the inner surface of the body of the drain structure.

The application for these Letters Patent comprised a continuation-in-part of my copending United States application, Serial No. 174,935, filed July 20, 1950, now Letters Patent No. 2,695,677, dated November 30, 1954.

In the accompanying drawings,

Fig. 1 is a fragmentary view in plan of a structure embodying my invention;

Fig. 2 is a fragmentary view in vertical section of the structure, as seen on the plane II—II of Fig. 1;

Figs. 3 and 4 are views corresponding to Figs. 1 and 2, respectively, showing my finish or adapter rim as it may be applied to structures of less specialized form than that shown in Figs. 1 and 2;

Fig. 5 is a fragmentary vertical section of a structure, showing a modified form of my finish or adapter rim;

Fig. 6 is a fragmentary view in vertical section of a

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structure having a finish or adapter rim of one of the several different types contemplated by my invention;

Fig. 7 is a view comparable with Figs. 2 and 4, showing a finish or adapter rim of further modified form;

Fig. 8 is a fragmentary view, showing in vertical section an access or drain body, equipped with an adapter or finish rim of still further modified form and adapted to cooperate with a removable cover; and

Fig. 9 is a view partly in side elevation and partly in vertical section of an elaborated form of cover plate and stand pipe.

Referring to Figs. 1 and 2 of the drawings a drain body 2 will be understood to comprise a hollow metal body, such as an integral casting, a casting of iron, ordinarily, having a peripheral side wall 2a that may be cylindrical or polygonal as viewed in horizontal section, terminating in a peripheral rim 2b, of comparable form in plan, that defines the inlet of the drain structure.

The rim 2b is offset outwardly adjacent to the top of the side wall, to form a downwardly inclined seat 2c which extends in uninterrupted continuity around the periphery of said side wall. The inlet of the drain body is covered by grate 3, the grate being disposed within the inlet. Medially of its vertical extent the side wall is tapered inwardly, as at 2d, and extends downwardly to a threaded opening 2e which forms the outlet of the drain, and provides for the attachment of the drain body to the threaded end of a drain pipe on the inlet side of the conventional trap (not shown). Extending laterally from the drain body is a circumferential flange 2f, and integrally cast on the outer surface of the portion 2a of the side wall are four lugs 2g.

In the installation of the drain in accordance with the usual practice, the upper portion of the drain body is arranged to extend upward through an opening in the membrane or flashing sheet 4 of lead or tar paper provided in the floor structure beneath the floor surface indicated at 5. The edge of the flashing sheet rests on the surface of flange 2f, and upon the edge of such flashing sheet a ring 6 is tightly secured (by conventional means), forming a water-tight union of the flashing sheet with the flange 2f. Any water which might seep from the floor surface 5 downward between the drain body and the adjacent body of the floor, or which may leak through the body of the floor, is caught and drained through weep or seepage holes 7 into the drain body.

Turning now to a more detailed consideration of the features of the invention, it will be perceived that the grate 3 comprises a body having a peripheral edge 3a, from which lugs 3b extend radially as shown in Fig. 1, and by means of which the grate is supported on the seat 2c as shown in Fig. 2. The grate will be seen to comprise a perforate plate enclosed by a rim, or may be said to comprise a perforated body encompassed by a horizontally extending plate-like rim or edge which is relatively thin with respect to the depth of the drain body above the outlet within the peripheral edge 3a, the body of the grate includes a system of slots 3d forming ribs 3e, and providing a perforate structure for the admission of drainage water and solids of permissible size. Two of the lugs 3b, arranged diametrically opposite, are each formed to receive a grate-securing screw 8 that extends downward through the lug into threaded engagement with a non-corrosive metal bushing 9 locked in a boss 2h integrally formed on the internal wall of the drain body. This provision of threaded bushings in the lugs 2h for the grate-securing screws 8 avoids the problem of the screws rusting tight in the cast iron body of the drain, thus insuring ready removability of the grate if the need arises.

In the drain structure described it will be perceived that the internal surface or inside of the drain body side

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wall extends downward from the rim 2b in a series of smooth surface areas; that is, the surface above the downwardly sloped seat 2c, the surface of such seat, the surface of the side wall 2a below the seat, and the surface of the inclined wall portion 2d. This vertical succession of internal side wall surfaces provides a continuous downsweep that is entirely unobstructed, having no recesses nor ledges, it being noted that the two bosses 2h extend with smooth surfaces all of the distance from the grate lugs 3b to the inclined wall portion 2d. Hence, there are no restrictions or obstructions within the drain body upon which solids included in the drainage water can accumulate. Cooperating with this unrestricted downsweep form of the internal surface of the drain body is the provision of a flushing slot 10 which comprises a plurality or series of unobstructed and relatively long auxiliary slots disposed outwardly from the grate; the succession of auxiliary slots provides in practical effect a single slot that extends without interruption around the entire periphery of the inlet of the drain body, since the widely spaced, narrow lugs 3b do not interfere with the operation or functioning of the drain in the manner described below. As shown, the slot 10 is formed by and between the peripheral edge 3a of the grate body and the adjacent edge of the rim 2b of the inlet. The outer edge of this slot 10 is coincident or flush with the internal surface of the drain body, whereby water entering the drain body flows directly downward upon and around the entire periphery of the drain body, at the floor or drainage area level, and subjects all of the internal surface areas of the drain body, all of the way downward from the rim of such body, to an effective downsweep of water. All of the internal surface areas of the drain body are downwardly extending, and under the flushing flow of water it is impossible for the drain to become fouled by accumulations of dirt, grease or other sediment.

The peripheral slot 10 and system of openings 3d in the grate provide an effective inlet area that is substantially fifty percent greater than usual, whereby greater than usual quantities of water can be handled in a drain of given size. If it is desired to flush out the drain pipe and trap with a bucket of water or a hose, it is not necessary, as it is in the prior structures, to remove the grate, since an adequate flow of water through the drain can be obtained to remove sediment from the drain pipe and trap, if indeed sediment collects therein when the drain of this invention is used. The drain serves substantially the same purpose as the more costly flushing rim drains that are provided with a hollow rim into which water is piped under pressure. Furthermore, the tapping of such flushing water from city supply lines is undesirable because it necessitates cross connections with the city supply, with the danger of back syphonage and contamination of the city water.

Another point may be mentioned. Since the grate 3 is supported by lugs located outward from the peripheral edge 3a of the grate rim, the tendency is negated for the grate to tilt when pressure or load is applied to the rim of the grate. Indeed, the grate tends to seat tighter and to be more resistant to tilting when load is applied to its rim, located as it is within the limits of the points of support.

It will be noted that the grate-supporting lugs are of relatively small circumferential extent with respect to the intervening peripheral slots that form the peripheral or auxiliary slot 10. The grate-supporting lugs engage the drain body (on seat 2c) over relatively small areas, and the internal surface of the drain body, between the narrow radial supporting lugs, is sharply inclined downward all of the way from the top of the rim to the outlet. The outwardly extending radial lugs not only support the grate on the drain body, but space the grate with its rim away from the wall of the drain body.

In accordance with my present invention, a finish rim

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19 is provided. This finish rim is formed of brass, stainless steel, or other highly finished and attractive material, which may be relatively costly when compared to the cast iron of which the drain body is formed.

The finish rim is preformed or separately formed, as will be understood from the drawings, comprising a ring 19 preferably of inverted angle shape, but in any event having a peripheral top portion 19a positioned to overlie and snugly engage the top of the rim 2b of the drain body and extending to the outer edge thereof. From such top portion 19a a second or vertical flange portion 19b extends outwardly and thence downwardly over the outer side edge of the drain body rim 2b, and, at occasional or spaced-apart points around the outer periphery of the finish rim, fastening means comprising ductile legs 19c, formed on the second portion 19b, extend downward, and the lower ends of these legs are deformed into secure engagement with cooperating fastener-receiving means formed on the external face of the wall of the drain body below its rim, in this case the lower ends of the legs being peened or clinched inward beneath the peripheral external shoulder 2k on the external surface or outside of the drain body 2 below its rim. A secure and rigid assembly of the finish rim upon the top of the drain body rim is obtained.

Alternately, the second portion 19b of the finish rim may be carried downward in place of the legs 19c, and the lower end of this second portion may be burnished or peened into secure engagement with the offset or shoulder 2k in the side wall of the drain body. The use of this type of finish rim dispenses with the necessity of machining the rim of the drain body in order to provide a proper engagement of a finish rim therewith. Neither the top surface of the drain body rim nor the nether surface of the finish rim need be machined.

Another alternate is illustrated in Fig. 5, wherein screws 20 may be passed through the legs or skirt portion 19c into threaded engagement with the lugs 2m on the side wall of the drain body, to secure the finish rim 19 in desired assembly with the rim of the drain body.

The grate 3 will ordinarily be formed of the same highly finished material as that of which the finish rim 19 is formed. The simple method of forming the grate 3, as well as the finish rim in a green sand mold may be practiced, followed by such plating and polishing steps as may be required. The finish rim will be seen to comprise a preformed substantially solid ring of angular shape in cross section.

The drain body 2 of standardized form may be converted when desired to the more specialized "high finish" structure, and this with a minimum of labor and expense. The stock or inventory which a dealer is required to carry to meet the various demands of the trade are manifestly smaller than heretofore, and economy in the cost of production is realized.

Referring to Fig. 2 it is to be noted that the inner edge of the finish rim is flush with the inner edge of the rim 2b of the drain body, and that the peripheral slot 10 is formed between such inner edge of the finish rim and the peripheral edge 3a of the grate, whereby there is no loss of the advantages and good results described.

Figs. 3 and 4 illustrate that the "finish rim" structure may be incorporated in drain structures of less specialized construction; that is to say, for example, in drain structures in which there is not necessarily a drainage slot formed between the outer peripheral edge of the grate rim and the inner peripheral edge of the drain body rim 30b. The peripheral edge 30a of the grate 30 may nest immediately adjacent to the inner peripheral edges of the finish rim 19 and of the rim 30b of the drain body, and, while admittedly such structural organization is subsidiary to the structure first described, the practical advantages of the finish rim 19 per se are no less to be enjoyed in one structure than in the other.

Fig. 6 illustrates an adapter rim 22 that is applied to

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the conventional flat rim 21a of an access or drain body 21, whereby a more or less standard line of drain bodies may be adapted to the use of renewable grates or covers in accordance with my invention. The adapter rim 22 is secured upon the rim of the drain body by means of peened-under or clinched portions 22c, after the manner that the portions 19c or their equivalents of Fig. 2 are clinched under the external shoulder 2k on the body 2. Again, the applied adapter rim 22 of Fig. 6 may be secured to the top edge or rim 21a of the body 21, by means of screws, such as shown in Fig. 5. The upper edge 22a of the adapter rim 22 is tapered downwardly and inwardly, and the grate 23 is provided with an outer rim or flange portion 23b that is carried at the outer ends of lugs or spokes 23c which extend outwardly from the outer circumferential edge of the grate body. Between said latter edge and said flange portion of the grate an auxiliary or flushing slot 24 is formed. The nether surface of the outer rim portion 23b of the grate 23 is tapered to seat snugly upon the tapered face 22a of the adapter rim 22, and the lugs 23c of the grate extend downward within the inner peripheral edge of the adapter rim, as at 25, and thus align the edges of the grate with the edges of the adapter rim 22. This integrally formed grate comprises all of the structure which in service is exposed in the surface of the floor in which the installation is made, wherefore only the grate 23 need be formed of the relatively expensive and highly finished material. It will be understood, of course, that screws (not shown) may be passed through the outer rim portion 23b of the grate and anchored in the adapter rim portion 22 applied to the drain or access body 21, to secure the grate in service position. When in service the grate becomes worn or disfigured, it may readily be replaced by a new one, without marring the adjacent floor surface, and thus the effect of an entirely new drain is obtained.

The adapter rim 22, as in the case of the rims 19 first described, is of angle shape in cross section, having the top beveled or tapered portion that seats upon and overlies the edge 21a of the drain or access body 21, and a portion that extends angularly downward therefrom and carries the clinching or securing elements 22c. To the extent that the adapter rim 22 is applied to and overlies the top edge or rim 21a of the drain body and provides a finished seat 22a for a grate or cover, the adapter rim may also be properly considered to be a finish rim. Furthermore, to the extent that the finish rims of the other structures illustrated herein adapt the access or drain bodies, to which they are secured, to special installations of grates or covers, the said finish rims may be properly considered to be adapter rims. Whereas in the structure of Fig. 6 of the drawings the adapter or finish rim 22 is unexposed in the floor surface when the grate 23 is applied, in the structure of the other figures of the drawings the adapter or finish rims are exposed. And, of course, in the case of the structure of Fig. 6, if a grate of the general form shown in plan in Fig. 1 were adapted for use with the adapter rim 22, the top surface of the rim 22 would be exposed in the interval between the peripheral edge of the grate, from which the supporting lugs (3b, Fig. 1) extend, and the outer periphery of the adapter rim.

In the modification of Fig. 7 a "safe waste drain" is illustrated. In this structure the adapter or finish rim 70, otherwise of the structure of the rims 19 of Figs. 2 and 4, is elaborated by the provision of a raised collar portion 71. The top of the portion 70a of the rim 70 lies flush with the surrounding surface 72 of the floor, and the collar portion 71 rises a sufficient distance from the plane of such surface. A grate 73 is seated across the inlet of the drain body 74, upon whose top edge the finish or adapter rim 70 is secured, and the supporting lugs 73a of the grate are so relatively proportioned with respect to the seat 74c on the drain body that the top of the grate lies below the plane of the floor surface, and in

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this case flush with the top of the rim 74b of the drain body. While the grate 73 is shown to be flat in this case, it will be understood that it may be dished or of bucket shape. The structure of Fig. 7 is particularly effective for service where water or waste liquid drips from ice boxes or other fixtures, such as water coolers. The raised collar or rim portion 71 avoids the splashing of liquid on the surrounding floor, thus allowing the installation of drains for such purposes in practically any type of floor construction, even in the conventional wood flooring.

Turning to Fig. 8, there is illustrated an access or drain body 80, whose mouth or inlet opening is desired normally to be securely covered or closed, as by a cover 81. The adapter or finish rim 82 of this modified construction is of angular cross section as in the case of all of the adapter or finish rims described herein, and the rim is secured upon the top edge or rim 80b of the access or drain body 80 in any of the ways described in the foregoing specification. As distinguished from the structures hereinbefore described, however, the top flange portion 82a, need only partially cover the said top edge 80b of the access or drain body, and the inner peripheral edge of said flange portion 82a is threaded, as shown, and the outer peripheral edge of the cover 81 is threaded for engagement with the so-threaded adapter or finish rim 82. The cover 81 may, as shown, be applied and screwed tightly in place upon the top of the access or drain body 80, and holes 83 in the cover body are provided, to receive a spanner wrench for applying and removing the cover. Beneath the cover 81, a grate 84 (or a strainer bucket) may be supported, in order to exclude solids of objectionable size when the cover 81 is removed and water is drained from the surface in which the drain or access structure is installed. If the structure is intended to serve only to enclose fixtures (such as clean-outs, or valves, etc.) installed below the floor surface, the grate 84 may be omitted.

Fig. 9 serves to illustrate that the cover 91 for use with the structure of Fig. 8 may be equipped with a stand pipe 92 removably secured to the cover by a threaded connection 93. The drain or access structure with the stand pipe feature, may be installed in the floors of wading or swimming pools, and the like, and the pipe 92 will reach to the height of the water level desired, whereby the structure will manifestly serve to prevent the body of water from rising above the level specified. The grate 84 (Fig. 8) may be omitted when cover 91 is installed.

In the structures contemplated by Figs. 8 and 9, a finish or adapter rim 82 is secured to the access or drain body 80, and a solid cover 81 (or 91) is secured to the said adapter or finish rim. In Fig. 8 is shown a grate or strainer located immediately below the cover and supported on the body 80. While the cover 81 (or 91) is shown to be secured by a threaded connection to the finish or adapter rim 82, other conventional means for the purpose are in mind, such as a hinge connection, or by means of screws, noting screws 8 in Fig. 2. The structure of Fig. 8 is designed for service where there are only occasional flushings of the floor surfaces, and where constant drainage is not encountered. The structure of Fig. 8 is also intended for service where there is danger of entry or back-flow of water from the sewer pipes (due to floods) to which the drain is connected. The cover 81 may be readily removed and replaced for such service. In some cases my adapter or finish rim need not be constructed of the relatively costly high finish ductile metals mentioned, but it may be of inexpensive non-ductile material, such as grey cast iron, in which event the rim may be secured to the drain or access body by screws, as illustrated in Fig. 5.

Within the terms of the appended claims a number of other variants and modifications than those described are held in contemplation. For facility of expression in the claim the word "cover" shall be used to embrace a

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solid cover, such as shown in Fig. 8, and perforate covers or grates, such as are shown in the other figures of the drawings.

I claim:

In a structure of the class described having a hollow cast metal body to be installed within a floor structure, a peripheral rim on said body defining an inlet, a peripheral body side wall extending downward from said inlet and having an outer face formed with fastener receiving means, the combination therewith of a removable rigid finish ring overlying said body peripheral rim in substantially vertical alignment with the inner peripheral edge of said rim, a rigid depending portion on said finish ring enclosing the peripheral body side wall, and spaced ductile extensions on said depending portion for locking engagement with said body fastener receiving means.

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