March 28, 1950 R. C. SCHENCK 2,501,971

FLOOR DRAIN

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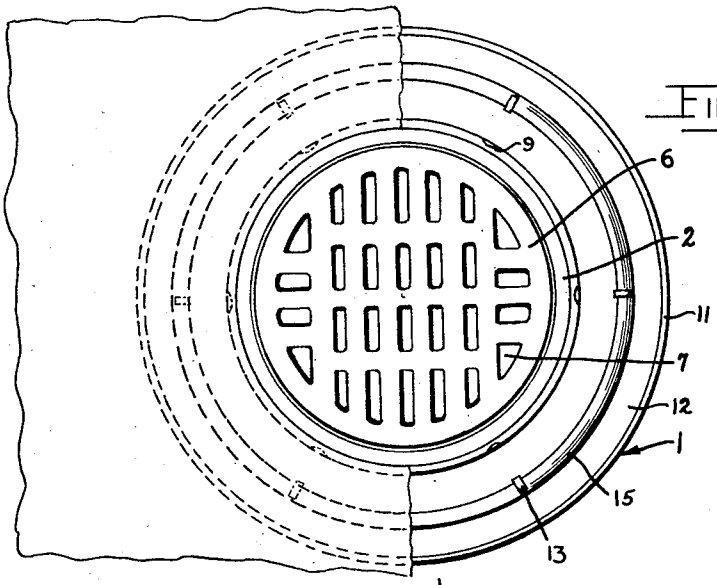
Fig. 1



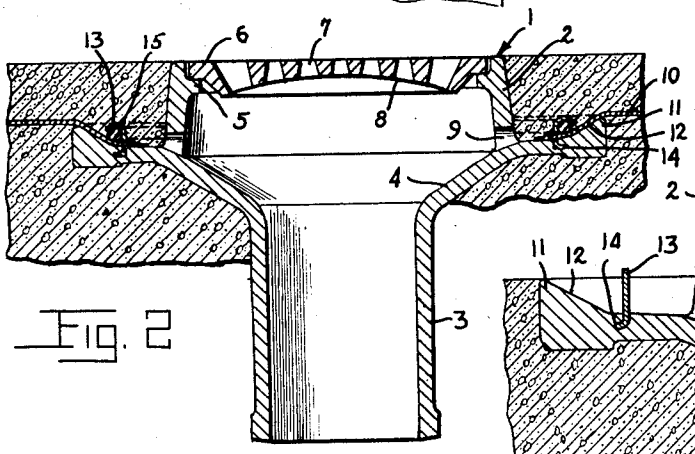


Fig. 2

Fig. 3

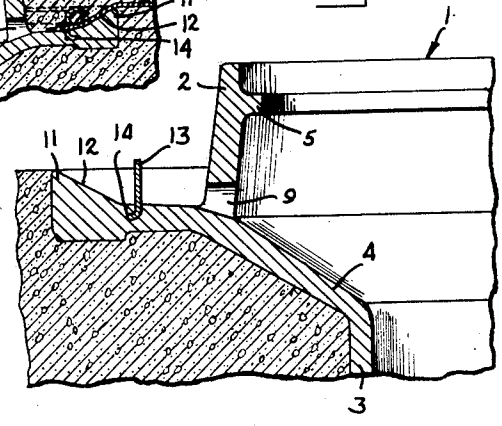
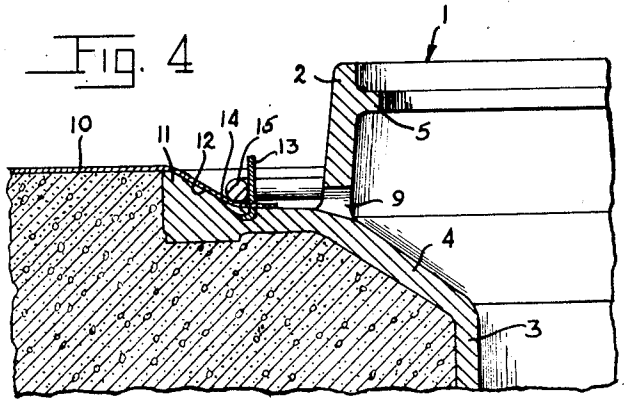


Fig. 4



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FLOOR DRAIN

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The present invention relates to acid-handling apparatus, more particularly to drainage system for directing superfluous or spilled acid to a drain.

In rooms containing apparatus which utilizes corrosive fluids such as acid concentrators, it is customary to provide drains at the lowest point in the floor to conduct spilled or superfluous acid as quickly as possible to the sewer. The floors are usually made of heavy concrete to sustain maximum weight and it has been found that when the concrete hardens there is a tendency for it to pull away from the peripheral surface of the drain to leave circular openings. Moreover, cracks in the concrete are apt to develop in the immediate vicinity of the drain due to curing stresses.

Consequently the acid in moving toward the drain may flow into these spaces or cracks and seep into the floor below and also perhaps cause crumbling or other deteriorating effects on the concrete. In order to avoid this undesired flow of the corrosive fluid it has been proposed to provide the drain with a plurality of side openings under the floor level in an attempt to collect the seepage fluid and direct the same into the same drain as the main portion of the fluid which enters the drain from the top.

A tar paper ring has been employed to direct the fluid into these side openings, the ring being secured to an annular flange extending outwardly from the drain. However, difficulty has been encountered heretofore in securing all parts of the tar paper ring to the flange so that cracks were still left through which the acid could creep and be diverted away from the side openings.

The primary object of the invention is to provide an improved floor drain for use in concrete floors and of the type employing a tar paper ring for diverting all of the migratory fluid about the drain into the side opening thereof.

Another object is to provide a new method and structure for fastening the diverting ring of tar paper to the annular flange of the drain.

The above objects are attained in brief by positioning the annular ring of a flexible non-corrodible material such as tar paper edgewise of the side openings of the drain, and supporting the ring in an improved manner to facilitate receiving and directing the seepage fluid into the annular openings.

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Other objects and features will be apparent as the specification is perused in connection with the accompanying drawings in which:

Fig. 1 represents a plan view of the improved drain, partly broken away, to show the normally hidden parts.

Fig. 2 is a sectional view of the drain and improved tar paper accessory embedded in the concrete surrounding the drain.

Fig. 3 depicts a fragmentary sectional view showing a portion of the tar paper-retaining device in place while Fig. 4 is a view similar to Fig. 3, but showing the tar paper guide and also its complete retaining device in full detail.

Referring to Figs. 1 and 2, reference character 1 generally designates the improved floor drain which may be made entirely of cast corrosive resistant material such as high silicon iron. The drain takes the form of two cylindrical bodies indicated at 2, 3, of different diameters and connected together through a tapering portion 4. The upper cylindrical portion 2 of the drain has an inverse taper as indicated, so that when the concrete is poured about the drain the latter is held rigidly in position. This portion at the interior is provided with an inwardly projecting flange 5, which forms a ledge for supporting the drain disc 6, also cast out of a corrosive-resistant metal, the disc being formed with openings 7 of any suitable shape which serve as outlets for liquid reaching the top surface of the drain. If desired the lower surface of the disc may be given a curvilinear shape indicated at 8 in order to impart strength to the periphery. This disc rests on the ledge 5 and is removable for cleaning and replacement purposes.

At the base of the tapered portion 2, i. e. where it merges with the conical connecting portion 4, there is provided a number of equidistantly spaced radially extending auxiliary openings 9, 6 as shown, these openings serving the purpose of receiving acid which collects about the exterior surface of the drain and is not in a position to reach the main openings 7.

The drain is usually positioned at the lowest point in the floor and is connected to a sewer or other disposal line. It is usually embedded in concrete at the time that the floor is laid. It has been found that during the setting and curing of the concrete, spaces may be formed between

the outside surface of the drain and the adjacent concrete mass, these spaces extending up to the floor level. Again, over continued use, no doubt due to excessive stress in the concrete as when acid concentrators are being supported, chinks or cracks may develop in the concrete short distances away from the drain and obviously, all of the acid flowing toward the drain will first reach these openings and cracks. Even if the cracks do not extend through the entire thickness of the floor, the liquid becomes lodged within the concrete and attacks the lime, causing the concrete to deteriorate or at least cause other continuous cracks to develop. The result is that the concrete in the immediate vicinity of the drain becomes normally checked with cracks, all of which receive their proportion of the fluid and in extreme cases the acid finds its way through the entire floor thickness to seep into the floor below. The auxiliary openings 9 are intended to collect this harmful fluid and to pass the same into the drain in the same manner as if the fluid had reached the main openings 7. For this purpose there is provided an annular ring or sheet 10, of a bendable material which resists acid corrosion, and in this connection extra heavy tar paper is satisfactory. For supporting the tar paper in line with the openings 9, the drain element is provided with an annular flange 11 extending radially outward, the flange having an upturned lip indicated at 12 in order to shape the tar paper ring to a gradual downwardly extending incline leading to the openings.

When laying the floor the concrete is poured up to the level of the uppermost edge of the lip 12, assuming that the drain has been placed in position, at which time the tar paper ring 10 is then applied. It becomes necessary to secure this ring in position preparatory to laying the upper course of concrete and for this purpose an improved retaining element is employed. As shown in Figure 3 a number (six as illustratively exemplified) of upright tabs 13 of any heat resisting metal or alloy, are molded in the flange member 11, the tabs being provided with an outward extending hook 14, in order more rigidly to be retained within the metal of the flange. The tar paper ring 10 is provided with slits or openings corresponding to the position of these tabs 13 so that the ring can be pressed over the tabs and held thereby in the transverse direction. In order that the ring will have no tendency to move in the vertical direction, thus creating a space between the paper and the upper surface of the flange 11, I provide a clamping ring 15, preferably of circular cross section and having an internal diameter such as snugly to fit about the outer surfaces of the tab as shown in Fig. 4. Inasmuch as the function of this ring is merely to hold the tar paper down while the upper course of concrete is being poured, after which the concrete will hold the tar paper rigidly in position, the ring need not be made of an acid-resisting metal and for this purpose cold rolled steel is suitable. With the ring in place, the tabs 13 can then be bent tightly over the ring as indicated in Fig. 2 in order to press the tar paper closely against the flange 11. Thus the ring and the bent effect of the tabs 13 create a downward clamping pressure on the tar paper. When the upper course of concrete is laid, the weight of this course will serve to press all parts of the tar paper ring tightly against the flange so that the ring serves as a virtual guide for any fluid that may seep through the concrete or between the concrete and the metal drain, causing this fluid to flow through one or more auxiliary openings 9 into the drain. The ring 10 may extend outwardly as far as desired and no space between the tar paper and the concrete will develop on account of the weight of the mass of concrete resting on the ring.

Thus the ring 10 constitutes an absolute barrier to the passage of deleterious acid which may tend to flow through any passages in the concrete and which might not normally find its way to the sewer ducts. It should be noted that the use of the tabs 13 offer the unique advantage in this connection in that they can be readily secured as by molding in the flange 11, made of high silicon iron. Metal of this character is extremely hard, practically entirely unmachinable so that it would not be feasible to use ordinary fastening means such as screws for holding the tar paper in position. If it is attempted to mold nuts in the flange member for receiving headed bolts, it will be found that the heat of the molten metal has ruined the threads of the nuts or the silicon of the molding sand has damaged these threads. But by providing a tab cut from sheet metal and having a planar surface with simply a hook at the bottom convenient devices for fastening the tar paper are readily applied to this unmachinable metal. The ring 15 can be readily applied by the workmen laying the concrete as it requires very little skill in the machine art and merely the use of a hammer.

From the foregoing it is evident that I have disclosed an improved form of drain including the tar paper fluid-directing accessory and its improved clamping or holding device. The drain not only accommodates the bulk of the fluid that reaches the main opening therein but also the fluid which would normally seep between the tar paper disc and its supporting flange in the absence of the improved ring clamping structure. Inasmuch as the main parts of the drain are made of acid resisting metal such as high silicon iron, the drain element has considerable life and the tar paper, together with its clamping device is practically indestructible since any acid reaching this element is immediately directed toward the openings 9 and is not permitted to remain in the immediate vicinity of the drain.

It will be understood that various modifications and arrangements in structure could be made without departing from the spirit of my invention and, accordingly, I desire to comprehend such modifications and substitutions of equivalents as may be considered to come within the scope of the appended claims.

Having thus fully described my invention what I claim as new and desire to secure by Letters Patent, is:

1. A drain for passing corrosive fluid, said drain being adapted to be embedded in a concrete floor in which crevices appear near the drain and collect seepage, said drain comprising a hollow member provided with an outwardly extending flange, auxiliary openings positioned about the member in the region of the flange, and means including a tar paper disc of approximately the same shape as the drain but of larger size, presented edgewise to the auxiliary openings of the drain, and a one-piece detachable device for holding said disc tightly to said flange whereby all of the seepage fluid is directed through said auxiliary openings into the main opening of the drain.

2. A drain for passing corrosive fluid, said

drain being adapted to be embedded in a concrete floor in which crevices may appear and collect seepage, said drain comprising a circular member provided with a radially extending flange, auxiliary openings positioned about the member in the region of the flange, and means for directing the seepage fluid through said auxiliary openings into the main openings of the drain, said means including a tar paper annular disc, and means including a clamping ring for securing the disc to said flange.

3. A drain for passing corrosive fluid, said drain being adapted to be embedded in a concrete floor in which crevices may appear and collect seepage, said drain comprising a circular member provided with a radially extending flange, auxiliary openings positioned about the member in the region of the flange, and means for directing the seeping fluid through said auxiliary openings into the main opening of the drain, said means including a tar paper annular disc, and means for securing the disc to said flange, said last mentioned means including tab uprights moulded in the flange and located in a circular path, and openings in the tar paper disc for snugly receiving the tabs.

4. A drain for passing corrosive fluid, said drain being adapted to be embedded in a concrete floor

in which crevices may appear and collect seepage, said drain comprising a circular member provided with a radially extending flange, auxiliary openings positioned about the member in the region of the flange, and means for directing the seepage fluid through said auxiliary openings into the main opening of the drain, said means including a tar paper annular disc, and means for securing the disc to said flange, said last mentioned means including tab uprights moulded in the flange and located in a circular path, openings in the tar paper disc for snugly receiving the tabs, and a metal ring fitted tightly about said tabs over which the tabs are bent to hold the tar paper permanently in position.

ROBERT C. SCHENCK.

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