May 7, 1940. A. RONNING 2,199,673

DRAIN

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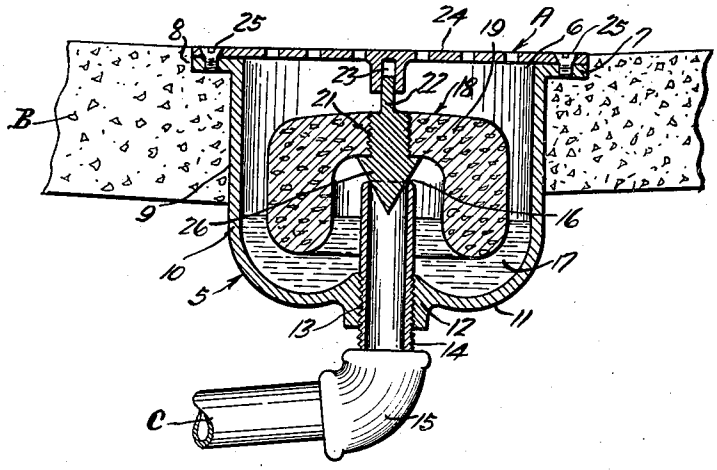


FIG-1-

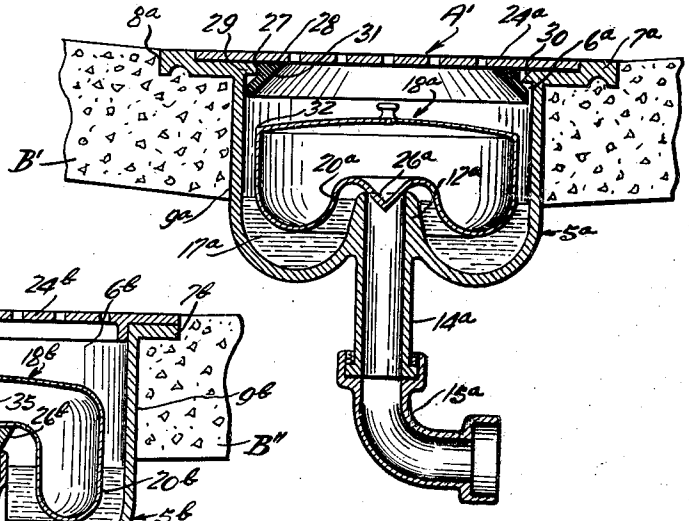


FIG-2-

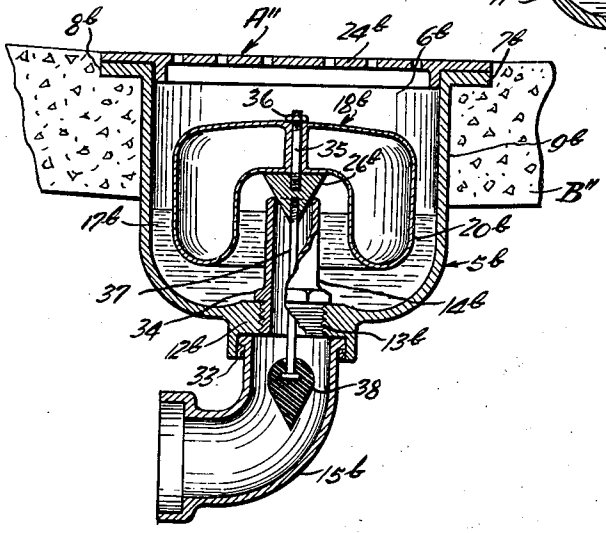


FIG-3-

INVENTOR
ADOLPH RONNING
BY
Andrew E. Berlin
ATTORNEY

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DRAIN

Adolph Ronning, Minneapolis, Minn.

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3 Claims. (Cl. 182—16)

This invention relates to improvements in drains or drain devices such as used in floors, sinks, tubs, and other places for draining off water to the sewer system. The primary object of the invention is to provide a drain for this purpose which will form a so-called seal to prevent the escape of gases and odors from the sewer and which, in addition, will have a positive mechanical valve device or seal effective to not only assist in preventing the escape of gases and odors, but also to prevent water insects of any kind from emerging from the sewer through the drain.

Another object is to provide a drain of this kind and for this purpose which also will include a positive sealing means or valve effective to prevent water from backing up from the sewer system through the drain as sometimes occurs with other drains, particularly when located in the floor, due to stoppage or other difficulties in the sewer, or during heavy rains.

Another object is to provide a drain as described wherein a single float is arranged to provide and effect both the water seal and the mechanical valve action to prevent the escape of gases, insects, and overflow water from the sewer and in which the action is entirely automatic and controlled by the water level in the drain device.

A further object is to provide a drain device including a drain bowl into which the drain water may flow, and which has an outlet communicating with the sewer for the passage of the drain water under control of a float device arranged in the bowl in such manner that a small quantity of water will at all times remain in the drain to serve as a water seal. The float device also normally seals the said outlet mechanically to prevent escape of insects, and this valve or seal will be opened by the normal flow of water through the bowl to the sewer. However, should the amount of water increase in the bowl due to the backing up of water from the sewer the float device will rise, and bring into effect a mechanical seal or overflow valve to cut off the flow of water upwardly from the sewer.

A further object is to provide a drain device in which the said sewer sealing and overflow valves are brought into play by opposite movements of the float device in such manner that the normal fall of the water level as the drain water finally escapes into the sewer will serve to mechanically seal the sewer while the overflow or rise of water from the sewer will raise the float and again seal the sewer to prevent the water from emerging upwardly from the drain. A heavier than normal flow of drain water to the drain will not, however, bring into effect the latter overflow sealing action since the water is at this time escaping into the sewer and the float, therefore, cannot rise far enough to close the said overflow valve.

A further object is to provide a drain device having the foregoing desirable and advantageous features, and which is of a simple and durable construction, convenient in installation and capable of being readily taken apart for cleaning or repair when necessary.

The foregoing and other objects of the invention, together with means whereby the same may be carried into effect, will best be understood from the following detailed description, reference being had to the accompanying drawing, wherein:

Fig. 1 is a vertical and diametrical cross section through a drain constructed in accordance with my invention, showing the drain connected to a sewer pipe, and mounted in a floor.

Fig. 2 is a similar view showing a modified form of my drain.

Fig. 3 is a similar view showing still another modification.

Referring more particularly and by reference characters to the drawing, in Fig. 1 the character A designates generally my improved drain device as mounted in and through the floor B to carry drain water to the sewer pipe C. While my invention is, for convenience sake, shown in the drawing as mounted in a floor, it is to be understood that many other installations are possible, such as in sinks, tubs, tanks or other places where a drain of this kind will be of advantage.

The drain A comprises a main housing, body portion, or bowl 5 formed of metal or suitable material, with the open top 6 provided with a marginal, outwardly turned flange 7 which is adapted to rest in a recess 8 formed in the floor B around the upper end of an opening 9 cut therein. The bowl 5, as it will be hereinafter termed, depends through the opening 9 and is supported therein by the flange 7. The bowl includes the annular side wall 10 and rounded bottom 11 having an upwardly extended central boss 12 which is bored and tapped as at 13 to accommodate a short length of pipe 14 threaded as shown into the bore 13. The lower end of this pipe 14 is connected by an elbow 15 or other suitable connection, to the sewer pipe C, and the upper end portion extends vertically upward into the cup as shown to thus form, in effect, an upward extension of the boss 12. In fact the tubular outlet member represented by this pipe 14 or boss ex-

tension might be formed integrally with the bowl 5 if so desired. In any event the arrangement and assembly is such that a substantial, annular water trap chamber is formed around the member 14 below the mouth 16 thereof and within the wall 10 of the bowl, and a quantity of water will remain at all time in the chamber, as clearly shown at 17.

A float device, designated generally at 18, is provided and same is made of some buoyant material such as cork, as shown in Fig. 1, in the form of a disk-like upper portion 19 having a marginal, downwardly turned, annular rim portion or sealing member 20. A plug 21 is screwed or otherwise mounted vertically through the center of the float 18, and has an upwardly extended guide finger or stud 22 which plays freely in a vertically elongated recess 23 formed in the underside of the grill or perforated cover plate 24, which is secured flatly over the upper end of the bowl 5 by screws 25 entering the flange 7. Thus mounted, the float 18 is freely supported and guided in the bowl 5 so that its rim portion 20 may enter and partially submerge in the water at 17, as shown. The lower portion of the plug 21 is enlarged and tapered downwardly to form an inverted, conical valve head or plug, as at 26, which may enter and seat in the open mouth 16 of the outlet member 14 and so seal the same.

The various parts are so proportioned and provided that the float rim 20 will penetrate the water 17 some distance, and the float will stand normally in such position that the valve 26 will enter and close the mouth 16 of the outlet member 14. In this manner, then, insects and the like will be prevented from emerging from the sewer through the drain, and at the same time gases and odors will be prevented from emerging by the valve 26 and, more particularly, by the water seal provided by the partial immersion of the float rim 20 in the water standing in the bowl. This rim 20 is, of course, of such thickness and diameter that a space will exist both inside and outside the rim, in which space the water will stand, as shown.

The foregoing is the normal position of the parts which they assume until drain water enters the bowl through the cover plate 24. As this occurs the buoyancy of the float 18 causes it to rise and withdraw the valve 26 from the mouth 16 of the outlet member. This movement is limited by the play of the finger 22 in the recess 23, and the water may thus run freely into the sewer C until the flow ceases. At this time the float again descends and the valve 26 closes the member 14 while the rim 20 enters the water remaining in the chamber around the member 14 to restore the water seal. The action is thus entirely automatic and under control solely of the water level in the drain bowl, as will be readily evident.

Referring now to Fig. 2, it will be seen that I have provided a somewhat different assembly which, however, operates in the same fashion. Here the bowl 5^a has the open upper end 6^a, the extended marginal flange 7^a fitted in a recess 8^a of the opening 9^a through the floor B' to thus retain the drain unit A' in place. In lieu of the pipe 14 the boss 12^a is enlarged upwardly to define the chamber for the water seal 17^a, and extends downwardly at 14^a to fit the elbow 15^a which leads to the sewer (not shown). The float 18^a is of hollow metallic construction to give it buoyancy, and has the downwardly extended rim portion 20^a which dips into the water in the bowl to form the water seal. The valve 26^a is formed as an integral depressed and inverted conical portion of the float and enters the mouth 16^a to seal the same. The operation and function of the parts thus far described are identical with their corresponding parts hereinbefore described.

The perforated cover plate 24^a, however, is provided with a soft rubber sealing ring 27 vulcanized at 28 to the underside of the plate, and formed to such outer diameter that it may just nicely enter the open upper end 6^a of the bowl 5^a. A narrow retaining lip 29 is extended inwardly from this end 6^a of the cup, and has its upper edge beveled or chamfered off at an inwardly and downwardly inclined angle, as shown at 30, so that the rubber ring 27, which is longer than the inner diameter of the lip, may be forced past the lip and will then expand outwardly therebeneath to yieldably and releasably retain the cover plate in place.

The inner surface of the ring 27 is likewise beveled or tapered off downwardly and outwardly to form an angular valve seat 31 and, as the float 18^a rises in the bowl 5^a, its upper margin 32 will contact and seat against this seat 31. This action will occur only under a condition when water might rise from the sewer and fill the bowl 5^a, and the seal thus formed will prevent the water from escaping from the drain as now occurs with certain other drains. Such overflow or "backing-up" of the water in the sewer may happen due to stoppage in the sewer or due to heavy rains, as is well known.

It may be noted that, so long as the sewer is open, the float cannot rise far enough in the bowl to contact the ring seat 31 due to the flow of drain water into the drain, for the reason that the water will continually escape into the sewer. Even should the first surge of water raise the float thus far, the flow would be momentarily shut off until the water in the bowl escaped, whereupon the float would fall and additional water would enter. The normal flow of water, however, would drain off to the sewer rapidly enough to prevent even this action.

The assembly shown in Fig. 3 operates in the same manner, and here the bowl 5^b has the open upper end 6^b receiving the cover plate 24^b which may be mounted in any desired manner. The bowl flange 7^b supports the drain unit A'' in the recess 8^b and through the opening 9^b in the floor B'', and the bowl bottom has the bored and tapped boss 12^b which receives a short length of pipe 14^b serving as the outlet member. The elbow 15^b leading to the sewer (again not shown) is mounted in the lower portion of the bowl 5^b and sealed therein at 33 in a well known manner so that it will communicate with the pipe 14^b. This pipe here takes the form of a nipple having an enlarged and angularly faced portion 34, so that it may be readily inserted in and removed from the boss 12^b by a socket wrench of suitable form. It is important that the pipe 14^b be readily removable, and for this reason it is made of brass or other non-corrosive material so that it will not become locked in place by rust or corrosion.

The float 18^b is also of hollow construction, and has the downwardly turned rim portion 20^b which dips into the water in the bowl 5^b, and provides the water seal 17^b, as above described. The valve 26^b is of the type, and operates as, described hereinbefore, but here the float is removable from the valve due to the use of a stud

35 screwed in the valve and penetrating the float as shown. A nut 36 screwed on this stud 35 normally holds the float in place but, by removing this nut, the float may be lifted off and the socket wrench aforesaid may be slipped downwardly over the pipe 14b to remove the same. The valve 26 is retained in place (by means which will appear) and will clear the wrench during this operation.

A valve rod 37 is screwed into the lower pivoted end of the valve 26 and depends loosely down through the pipe 14b, and extends some distance therebeneath into the elbow 15b. At its lower end the rod 37 carries a valve plug 38 which, in normal position of the parts, stands some distance below the lower end of the pipe 14b. However, should water start to back up in the sewer, the resulting rise of the float 18b would draw the plug 38 upwardly until it contacted the lower end of the pipe 14b and so shut off the overflow as will be readily evident.

The diameter of the plug valve 38 is such that it may be readily removed through the bore 13b when the pipe 14b is removed, as described.

Inasmuch as the water in the drain may evaporate, when the drain is not in use continuously or at regular intervals, the water seal may at times be lost, as will be understood. However, the valve 26, 26a or 26b will still seal the outlet of the drain and the gases or the like will at all times be prevented from escaping from the sewer.

It is understood that I may vary from the specific structures and assemblies herein described, provided that such variations fall within the spirit and scope of the appended claims.

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

1. In a drain, a bowl having a drain water inlet and a tubular water outlet disposed vertically in its bottom, a float disposed in the bowl and adapted to rise and fall therein over the outlet member responsive to the water level in the bowl, and valve devices carried by the float and adapted to seal the upper end of the outlet member in a lower position of the float and to seal the lower end of the member in an upper position of the float.

2. In a drain of the character described, a bowl having an inlet, a tubular outlet member extended vertically in the bowl, a float arranged over the outlet member and adapted to rise and fall in the bowl responsive to variations in the water level therein, a valve carried by the float and adapted to seat over the upper end of the outlet member in a lowered position of the float, a valve rod depended from this valve loosely through the outlet member, and a valve member at the lower end of the valve rod adapted to seat at the lower end of the outlet member in an upper position of the float.

3. In a drain of the character described, a bowl having an inlet, a tubular outlet member extended vertically in the bowl, a float arranged over the outlet member and adapted to rise and fall in the bowl responsive to variations in the water level therein, a valve carried by the float and adapted to seat over the upper end of the outlet member in a lowered position of the float, a valve rod depended from this valve loosely through the outlet member, a valve member at the lower end of the valve rod adapted to seat at the lower end of the outlet member in an upper position of the float, the said float being removable from the valves for access to the outlet member, and the said outlet member being removably mounted in the bowl.

ADOLPH RONNING.