United States Patent [19]

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[11] **3,722,692**

[45] **Mar. 27, 1973**

[54] DRAIN FITTING FOR A BATH TUB

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[22] Filed: **July 6, 1971**

[21] Appl. No.: **159,677**

[30] **Foreign Application Priority Data**

July 9, 1970 Germany ..... P 20 34 054.9

[52] **U.S. Cl.** **210/314**, 4/289, 210/429, 210/477

[51] **Int. Cl.** **B01d 35/04**

[58] **Field of Search** 210/314, 429, 431, 432, 463, 210/459, 477; 4/287, 288, 289

[56] **References Cited**

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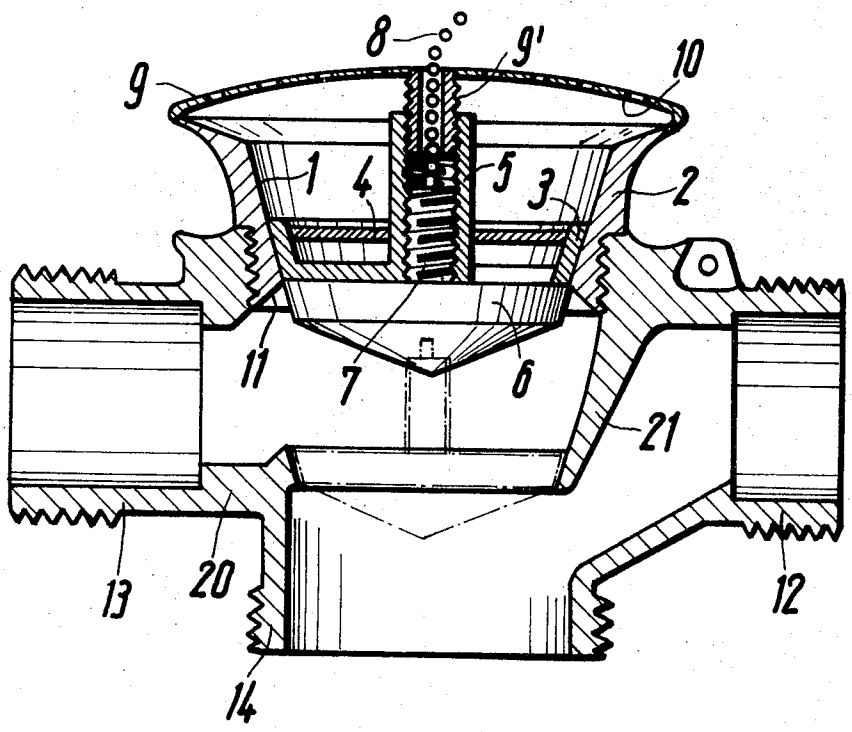
[57] **ABSTRACT**

A drain fitting for a bath tub or the like has four ports. The first port of the installed fitting leads into the bottom of the tub, a second port is connected with a pump that discharges water from the tub through a shower head, a third port is connected with the overflow of the tub, and a fourth port leads to the drain. A partition in the shell of the fitting is provided with a valve seat and separates the first and second ports from the third and fourth ports when the valve seat is sealed by a plug. A second valve seat in the first port may receive a filter carrier equipped with a coarse filter and a fine filter. The plug and the filter carrier are provided with threads which permit the plug to be attached to the filter carrier and to block passages in the same so as to close the first port and hold water in the tub. When the plug is unscrewed from the filter carrier and dropped into the valve seat of the partition, water may be drawn from the tub by the pump through the filters for the shower head, clogging of the shower head being prevented by the filters.

7 Claims, 6 Drawing Figures



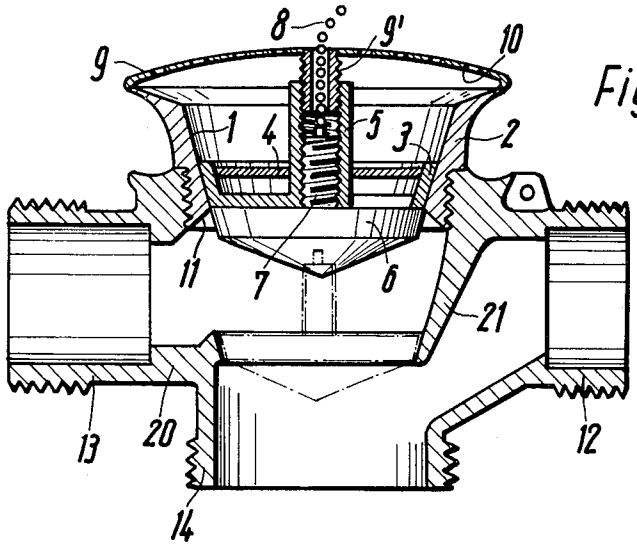


Fig. 1

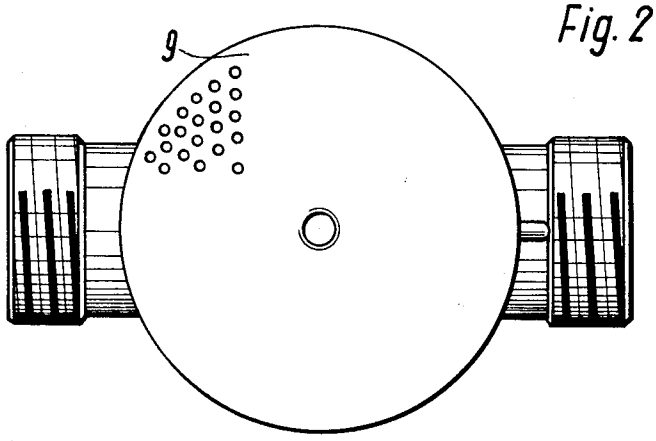


Fig. 2

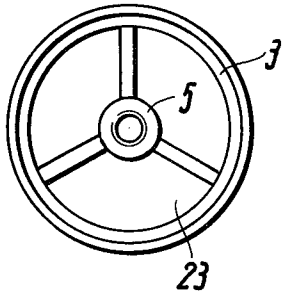


Fig. 3

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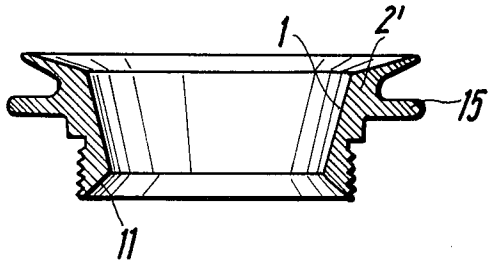


Fig. 4

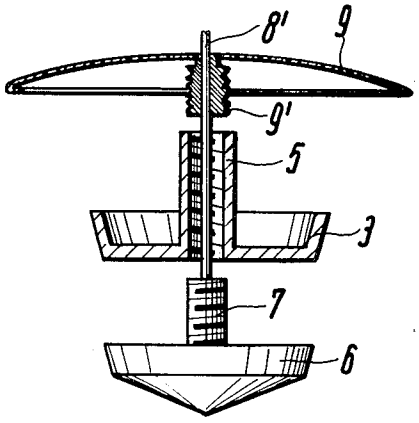
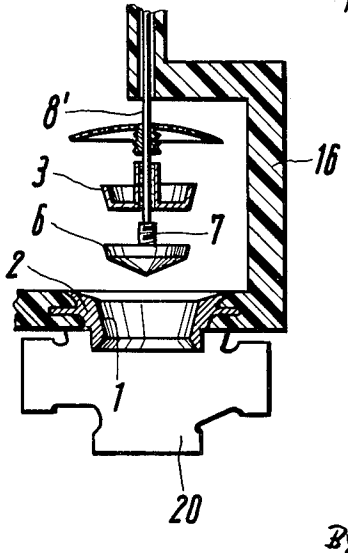


Fig. 5

Fig. 6



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DRAIN FITTING FOR A BATH TUB

This invention relates to drain fittings for bath tubs and the like,and particularly to a drain fitting for a bath tub from which water may optionally be drawn by a circulating pump for discharge from a shower head.

Showers not connected to a water system under pressure, and particularly showers employed where water is in relatively short supply, as in mobile homes while not connected to a public water system, are frequently operated by means of circulating pumps which draw the water from a bath tub and return it to the tub through a shower head.

The known fittings which permit the tub to be used alternatively for a bath or as a source of circulating water for the shower head are complex and do not permit a quick change from one mode of operation to the other followed by draining of the used water.

The object of the invention is the provision of a drain fitting which may be connected simultaneously to a bath tub, to a circulating pump, and to a drain and permits the same body of water to be used sequentially for a bath and for a shower in a simple and convenient manner.

With this object and others in view, as will hereinafter become apparent, the invention provides a fitting whose shell contains an internal partition dividing the cavity in the shell into two compartments. The shell has four ports of which the first and second lead into one of the compartments, the third and fourth into the other. The partition is formed with a first valve seat connecting the compartments. A second valve seat is provided in the first port. A filter carrier may be moved by an operating device inward of the first port into an operating position, and outward of the port away from the operating position in which it conformingly engages the second valve seat. A passage through the filter carrier is blocked by a filter to particles which exceed a certain size, and the passage has an orifice in a face of the carrier which is directed inward of the one compartment in the operative position of the carrier. A plug member shaped for conforming sealing engagement with the valve seat in the partition may be releasably fastened to the filter carrier so that it seals the orifice of the passage in the carrier while being remote from the first valve seat.

Other features, additional objects, and many of the attendant advantages of this invention will readily be appreciated as the same becomes better understood from the following detailed description of preferred embodiments when considered in connection with the appended drawing in which:

FIG. 1 shows a drain fitting of the invention in elevational section;

FIG. 2 is a top plan view of the fitting of FIG. 1;

FIG. 3 illustrates the filter carrier of the same fitting in plan view;

FIG. 4 shows a modified valve seat insert in elevational section;

FIG. 5 is a partly exploded view of a modified plug assembly for the fitting of the invention; and

FIG. 6 illustrates a bath tub equipped with a drain fitting including the valve seat insert of FIG. 4 and the plug assembly of FIG. 5 in fragmentary elevational section.

Referring initially to FIG. 1, there is seen a drain fitting having a shell 20 whose cavity is divided into two

compartments by a partition 21 provided with a conically tapering valve seat 22. An upwardly directed port in the shell 20 is provided with a threadedly mounted valve seat insert 2 whose bore has a wall portion 1 tapering conically inward of the shell 20 and followed by a flaring wall portion 11. As will be shown with reference to FIG. 6, the bore of the insert 2 communicates with the bottom of the bath tub in the installed condition of the fitting. The overflow of the bath tub is connected to another port of the shell 20 by a threaded, integral nipple 12 of the fitting, and yet another nipple 13 is connected to the suction intake of a non-illustrated circulating pump for the shower head above the tub. The compartment of the shell 20 into which the nipple 12 leads is permanently open to a drain nipple 14 on yet another port of the shell 20. The other two ports are disconnected from the drain nipple 14 when the valve seat 22 is sealed.

The plug assembly which holds the water in the tub, not itself seen in FIG. 1, includes a filter carrier 3 shown in sealing engagement with the second valve seat provided by the lowermost part of the wall portion 1. The filter carrier 3 has the shape of a dish whose bottom is reduced to three radial ribs integral with an internally threaded sleeve 5 coaxial with the frustoconical rim of the dish, as is best seen in FIG. 3. A filter disc 4 is set into the dish and blocks the passages 23 between the ribs to particles exceeding a size selected smaller than the openings in the non-illustrated shower head.

In the illustrated condition of the device, the orifice of the passages 23 in the flat bottom face of the filter carrier 3 are sealed by a plug 6 fastened to the filter carrier 3 by a threaded pin 7 fixed on the plug and matingly received in the lower end of the sleeve 5. A conical circumferential face of the plug 6 is shaped for sealing engagement with the valve seat 22 when released from the filter carrier 5, as shown in FIG. 1 in broken lines.

A dished, perforated plate 9 is provided with an externally threaded, tubular stud 9' which is received in the upper end of the sleeve 5. A bead chain 8 is attached to the pin 7 in the bore of the sleeve 5 and passes through the stud 9'. The plate 9 carries a coarse filter or screen 10.

When the plug 6 is attached to the filter carrier 3 in the operative position of the latter, as shown in fully drawn lines in FIG. 1, the plug assembly 3, 4, 5, 6, 7 retains water in the tub for a bath. Excess water may flow from the overflow of the tub through the nipples 12, 14 to the drain. The plug assembly together with the plate 9 and the coarse filter or screen 10 may be lifted from the valve seat insert 2 by means of the operating chain 8.

When it is desired to take a shower, the plug assembly is lifted from the shell 20 by means of the chain 8, the pin 7 is unscrewed from the sleeve 5, and the plug 6 is dropped into the valve seat 22, as is shown in broken lines. The remainder of the plug assembly is returned to the illustrated operative position. When the circulating pump is energized, water is drawn from the pump through the coarse filter or screen 10, through the finer filter 4, and through the nipple 13 to reach the tub again through the shower head.

If the tub is filled with water when it is decided to switch to a shower, a little water is lost down the drain while the plug assembly is being withdrawn and the plug is being unscrewed from the sleeve **5**. However, this operation takes only a few seconds, and the amount of water lost will be insignificant under many conditions.

The modified drain fitting shown in FIGS. **4** to **6** permits switching from a tub bath to a shower practically without loss of water. FIGS. **4** and **6** illustrate a valve seat insert **2'** provided with a circumferential flange **15** which provides firm anchorage for molding the insert **2'** into a plastic tub **16**. The valve seat **2**, not otherwise different, is preferred for use with a metal tub whose bottom is clamped between the flaring upper end of the insert **2** and the shell **20**.

Instead of an operating chain **8**, the pin **7** of the plug **6** is provided with a fixedly fastened, coaxial operating rod **8'** which passes through the sleeve **5**, the tubular stud **9'**, and a guide bore in the tub **16**. The upper end of the operating rod **8'**, not seen in the drawing, carries a knob or handle.

When the filter carrier **3** is in its operative position in the valve seat insert **2'**, and the plug **6** is threadedly attached to the carrier and seals the passages in the carrier, the drain fitting may be made ready for shower operation by turning the handle or knob on the rod **8'** to unscrew the plug **6** from the carrier **3**, and by depressing the rod **8'** when the plug is free from the sleeve **5** to position the plug in the valve seat **22** of the partition, not itself seen in FIGS. **4** to **6**. Water escapes from the tub during this operation only through a narrow gap opening between the apertured bottom face of the filter carrier **3** during the unscrewing of the plug.

To revert to a tub bath, the steps described in the preceding paragraph are taken in reverse order. When it is desired to drain the tub, the rod **8'** is pulled up to lift the entire plug assembly, the plate **9** and the coarse filter or screen **10** from the valve seat insert **2**.

During shower operation, relatively coarse particles are retained on the screen **10**. Because of the upwardly convex shape and relatively large diameter of the plate **9**, particles tend to collect at the lowermost peripheral portion of the screen **10**, leaving the center portion free for flow of water. Finer particles which pass through the screen **10**, but could clog the shower head (not shown), are retained by the filter disc **4**.

If the tub **16** is not provided with an overflow, or if the overflow is connected directly to the drain, the drain fitting of the invention requires only three ports and corresponding nipples or other connections. Other modifications and variations of the illustrated embodiments of the invention will readily suggest themselves to those skilled in the art without exceeding the scope and spirit of the invention as set forth in the appended claims.

What is claimed is:

1. A drain fitting for a bath tub and the like comprising, in combination:

a. a shell defining a cavity therein;

b. a partition in said shell dividing said cavity into two compartments,

1. said shell being formed with at least three ports, a first port and a second port leading into one of said compartments, the third port leading into the other compartment,

2. said partition being formed with a first valve seat connecting said compartments;

c. valve seat means defining a second valve seat in said first port;

d. a filter carrier formed with a passage therethrough;

e. a filter member mounted on said carrier and blocking said passage to particles exceeding a predetermined size;

f. operating means for moving said filter carrier inward of said first port into an operating position and outward of said first port and away from said operating position,

1. said filter carrier, when in said operating position, conformingly engaging said second valve seat, and a face of said filter carrier being directed inward of said one compartment, said passage having an orifice in said face;

g. a plug member shaped for conforming sealing engagement with said first valve seat; and

h. fastening means for releasably fastening said plug member to said face of said carrier in a position in which said plug member seals said orifice and is remote from said first valve seat when said filter carrier is in the operative position thereof.

2. A fitting as set forth in claim **1**, wherein said valve seats are aligned in the direction of movement of the filter carrier into and out of said operating position.

3. A fitting as set forth in claim **2**, wherein said valve seat means includes a valve seat insert mounted in said first port and formed with a bore leading into said one compartment, a first portion of said bore tapering inward of said cavity, and a second portion of said bore flaring from said first portion inward of said cavity, said insert constituting said second valve seat in said first portion of the bore thereof.

4. A fitting as set forth in claim **2**, wherein said fastening means include mating threads on said filter carrier and on said plug member.

5. A fitting as set forth in claim **4**, wherein said operating means include an elongated operating member having a longitudinal axis and an end portion attached to said plug member, said filter carrier being formed with a bore receiving said operating member.

6. A fitting as set forth in claim **5**, wherein the common axis of said threads, when engaged, substantially coincides with said longitudinal axis, another end portion of said operating member being located outside said cavity in the operative position of said filter carrier, and a portion of said operating member intermediate said end portion being movably received in said bore of the filter carrier.

7. A fitting as set forth in claim **1**, further comprising a coarse filter secured to said filter member and engaging a portion of said valve seat means spaced from said valve seat outward of said cavity for limiting access to said filter member, said coarse filter, said filter carrier, said filter member, and said plug member being moved jointly by said operating means when said plug member is fastened to said face of the filter carrier.

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