

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number:

0 163 326
A2

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 85200528.9

(51) Int. Cl.⁴: **A 47 K 1/14**

(22) Date of filing: 02.04.85

(30) Priority: 30.05.84 JP 80275/84 U

(43) Date of publication of application:
04.12.85 Bulletin 85/49

(84) Designated Contracting States:
DE FR GB IT NL

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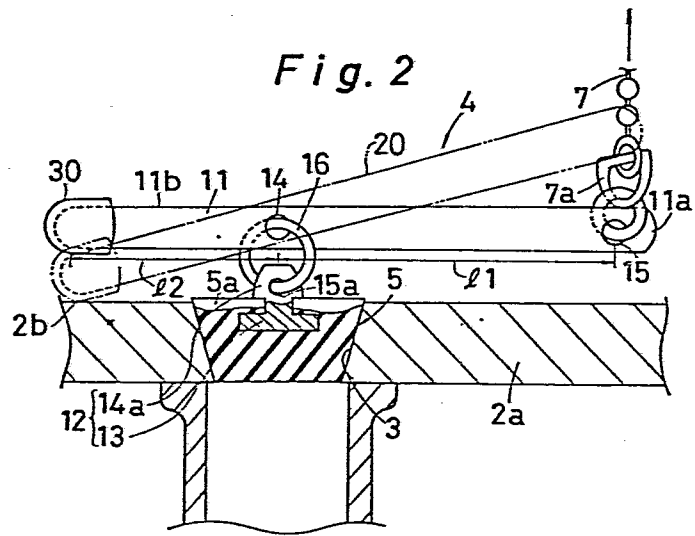
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(54) Drain plug unit.

(57) A drain plug unit (4) including a connecting bar (11) having a hole (14) in a position slightly remote from the center in the longitudinal direction thereof toward one end (11b) on the side opposite to the other end (11a) in the longitudinal direction thereof, a holding member (7) connected to the other end (11a) of the connecting bar (11), and a plug member (5) connected to the hole (14) by means of a ring (16) and removably fitted into a drain outlet (3). The plug member (5) is pulled out from the drain outlet (3) when extremely small pulling force is applied to the holding member (7) and hence the one end (11b) of the connecting bar (11) is caused to abut against a fixed position (2b) adjacent to the hole (14)

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Fig. 2



DESCRIPTIONDRAIN PLUG UNIT

The present invention relates to a drain plug unit preferably employed as a plug fitted tightly into a bathtub outlet or the like.

It has conventionally been known to use a plug member removably fitted into a bathtub outlet in order to fill a bathtub with water or exhaust the bath water. The plug member is connected to a fixed position remote from the bathtub by means of a chain-shaped holding member. To exhaust the water within the bathtub, the plug fitted tightly into the outlet is pulled out therefrom by pulling the holding member. As readily understood from the aforementioned description, relatively great force is required to pull out the plug member from the outlet against water pressure of the bathtub water. Furthermore, the repetition of such pulling action extending to a long period of time can frequently cause breakage or damage of the holding member or of the connection of the holding member with the plug member.

In order to solve the aforementioned problems, it is an object of the invention to provide an improved drain plug unit.

It is another object of the invention to provide a drain plug unit whose plug member may be pulled out by applying extremely small force to a holding member and which can last a long period of time in use.

To accomplish the above objects, a drain plug unit in accordance with the invention comprises a connecting bar having one end and the other end in the longitudinal direction thereof, the connecting bar having a hole formed in a position thereof relatively remote from the center in the longitudinal direction thereof toward the other end on the side opposite to the one end, a holding member connected to the one end of the connecting bar, a plug member associated with the hole of the connecting bar and removably fitted into a drain outlet, the plug member being pulled out from the drain outlet when the holding member is pulled and hence the other end of the connecting bar is caused to abut against a fixed position adjacent to the hole.

Consequently, in accordance with the invention, the plug member may be readily pulled out from the drain outlet by applying extremely small pulling force to the holding member and the function of connecting the holding member and the plug member can be maintained for a long period of time, because the holding member is connected to the one end of the connecting bar in the longitudinal direction thereof and the plug member is connected to the posi-

tion relatively remote from the center of the connecting bar toward the other end thereof.

These and other objects, features and advantages of the invention will become more apparent upon a reading of the following detailed specification and drawings, in which:

Fig. 1 is a sectional view illustrating an embodiment according to the invention; and

Fig. 2 is a sectional view showing the state of the drain plug unit in accordance with the invention being actually used.

Referring now in detail to drawings, an embodiment of the invention is described below.

Fig. 1 is a sectional view illustrating an embodiment according to the present invention. There is formed an outlet 3 at the bottom 2a of a bathtub 2 to be filled with water 1. A plug member 5 of a drain plug unit 4 according to the invention is removably fitted tightly into the outlet 3, thereby filling the bathtub 2 with water 1. The plug member 5 is fixedly connected to the lower end 7a of a chain-shaped holding member 7 by means of a connecting bar 11. While the upper end 7b of the holding member 11 is secured to a fixed bracket 8 positioned above the bathtub 2.

To exhaust the water 1 contained in the bathtub 2, the plug member 5 connected to the connecting bar 11 is pulled out from the outlet 3 by pulling the holding member

7. As a result, the water 1 within the bathtub 2 is introduced into a main pipe 10 from the outlet 3 through a drain pipe 9.

Fig. 2 is a sectional view showing the state of the drain plug unit 4 according to the invention practically fulfilling its function. The drain plug unit 4 comprises the plug member 5 removably fitted into the outlet 3, the connecting bar 11 connected to the plug member 5, and the holding member 7 coupled to the connecting bar 11. The plug member 5 is made of soft elasticity material such as rubber or the like and its diameter is equal to that of the outlet. A fixing piece 12 is fixedly inserted into a top 5a of the plug member 5. The fixing piece 12 comprises a flange part 13 buried in the plug member 5 and a projection part 14a projecting from the top 5a. The flange part 13 has the function of preventing the fixing piece 12 from being extracted from the plug member 5. While the projection part 14a has a hole 15a formed therein, through which a ring 16 loosely passes. The ring 16 also loosely passes through a hole 14 formed in the connecting bar 11 which will be mentioned below. The ring 16 effects the integral connection of the fixing piece 12 of the plug member 5 and the connecting bar 11.

The connecting bar 11 is made of stainless steel or the like. At one base end 11a of the connecting bar 11

(on the right-side of Fig.2), there is formed a hole 15 to be connected to the holding member 7. Whereas in a position slightly remote from the center in the longitudinal direction of the connecting bar 11 toward the other end 11b on the side opposite to the base end 11a (toward the direction of left-side of Fig. 2), there is formed another hole 14 through which said ring 16 passes. There exists the relation between length from the hole 14 to the hole 15 and length from the hole 14 to the end 11b, which is expressed by the following equation :

$$l_1 : l_2 = 2 : 1 \quad \dots(1)$$

Where l_1 is the length measured from the hole 14 to the hole 15, and l_2 is the length measured from the hole 14 to the end 11b. When the hole 14, the hole 15, and the end 11b are determined to be spaced at such intervals as above, and the holding member 7 is so pulled as to cause such a shift of the base end 11a away from the bottom 2a on the fulcrum 2b against which the end 11b is allowed to abut during the shifting action as indicated by imaginary lines 20 in Fig. 2, the plug 5 connected to the ring 16 can be readily pulled out from the outlet 3 against water pressure of the water 1 according to the principle of lever. Moreover, the force applied to the holding member 7 in order to

pull out the plug 5 can be reduced to one-third of that applied to the holding member in order to the conventional plug member to which the holding member is directly connected. Consequently, besides, it is possible to maintain the sound connection of the holding member 7 and the plug member 5 for a long period of time.

A rubber cap 30 is provided at the end 11b of the connecting bar 11. The rubber cap 30 thus provided prevents the end 11b from making direct contact with the bottom 2a of the bathtub 2 when the holding member 7 is pulled to extract the plug member 5 from the outlet 3. Accordingly the bathtub 2 can be free from any damage which would result from the pulling operation.

By the use of the ring 16, the plug member 5 is pulled upward (upward of Fig. 2) so as to be extracted from the outlet 3, thereby prohibiting the plug member 5 from being deformed even if it is utilized for a long period of time. Since the plug member 5 is integrally connected with the connecting bar 11, it follows that the plug member 5 is pressed downward by the connecting bar 11 when the connecting bar 11 lies down on the bottom 2a of the bathtub 2, thereby ensuring positive closure of the plug member 5 even with its outer periphery worn away. Consequently, water leaking from the outlet 3 is prevented.

The ratio between the lengths l_1 and l_2 with

respect to the connecting bar 11 is not restricted to the aforementioned embodiment, and the overall length and the diameter of the connecting bar 11 may be determined according to the diameter of the outlet 3.

The drain plug unit in accordance with the invention can be not only applied to the outlet of the bathtub as in the foregoing, but also widely employed in other various technical fields.

CLAIM

A drain plug unit (4) is characterized in that :

a connecting bar (11) has one end (11a) and the other end (11b) in the longitudinal direction thereof and also a hole (14) formed in a position thereof relatively remote from the center in the longitudinal direction thereof toward the other end (11b) on the side opposite to the one end (11a);

a holding member (7) is connected to the one end (11a) of the connecting bar (11); and

a plug member (5) is associated with the hole (14) of the connecting member (11) and removably fitted into a drain outlet (3), and is pulled out from the drain outlet (3) when the holding member (11) is pulled and hence the other end (11b) of the connecting bar (11) is caused to abut against a fixed position (2b) adjacent to the hole (14).

