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**None**

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(54) Gully and trap assembly incorporating a bayonet-style fitting

(57) A gully (2) and trap (10) assembly in which the gully (2) has a cylindrical outlet (8) for connection to a sewer, said outlet (8) being defined by means of a cylindrical wall having an inwardly projecting pin (18), and a foul air trap (10) having a cylindrical end (12) adapted to fit within the gully outlet (8), said end (12) having a slot (20) to cooperate with the pin (18) said slot (20) being defined by an axial portion (22) extending from a free edge (21) of said end (12) and a circumferential portion (24) extending around the cylindrical end (12), and a seal retaining flange (28) located above the said end (12) in order to retain an "O" ring seal (30).

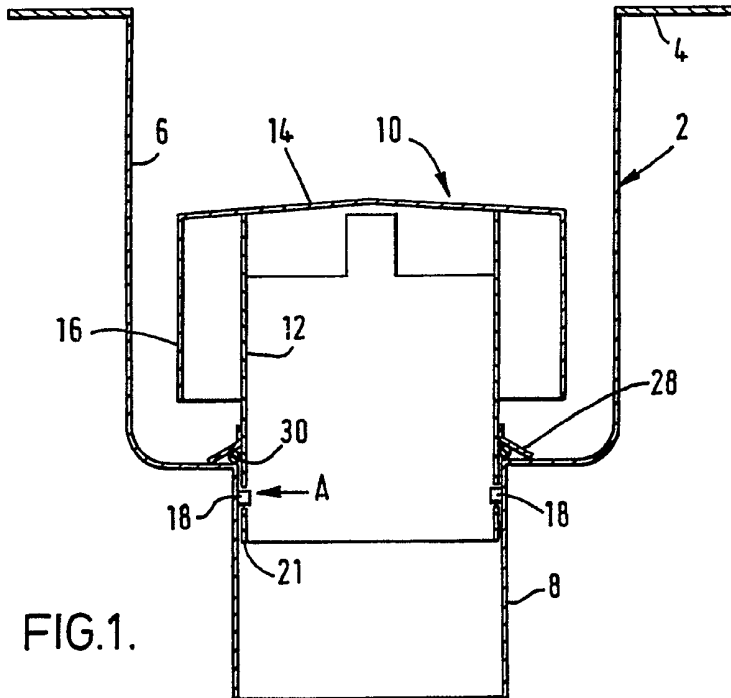


FIG.1.

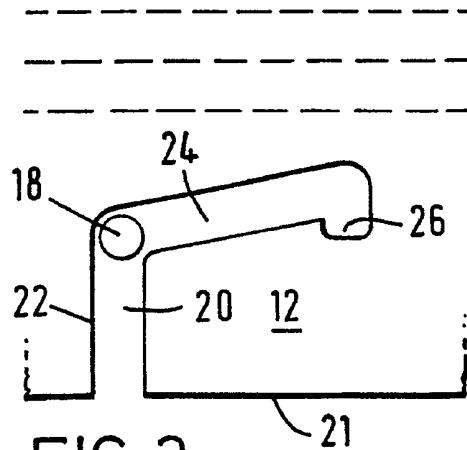


FIG. 2.

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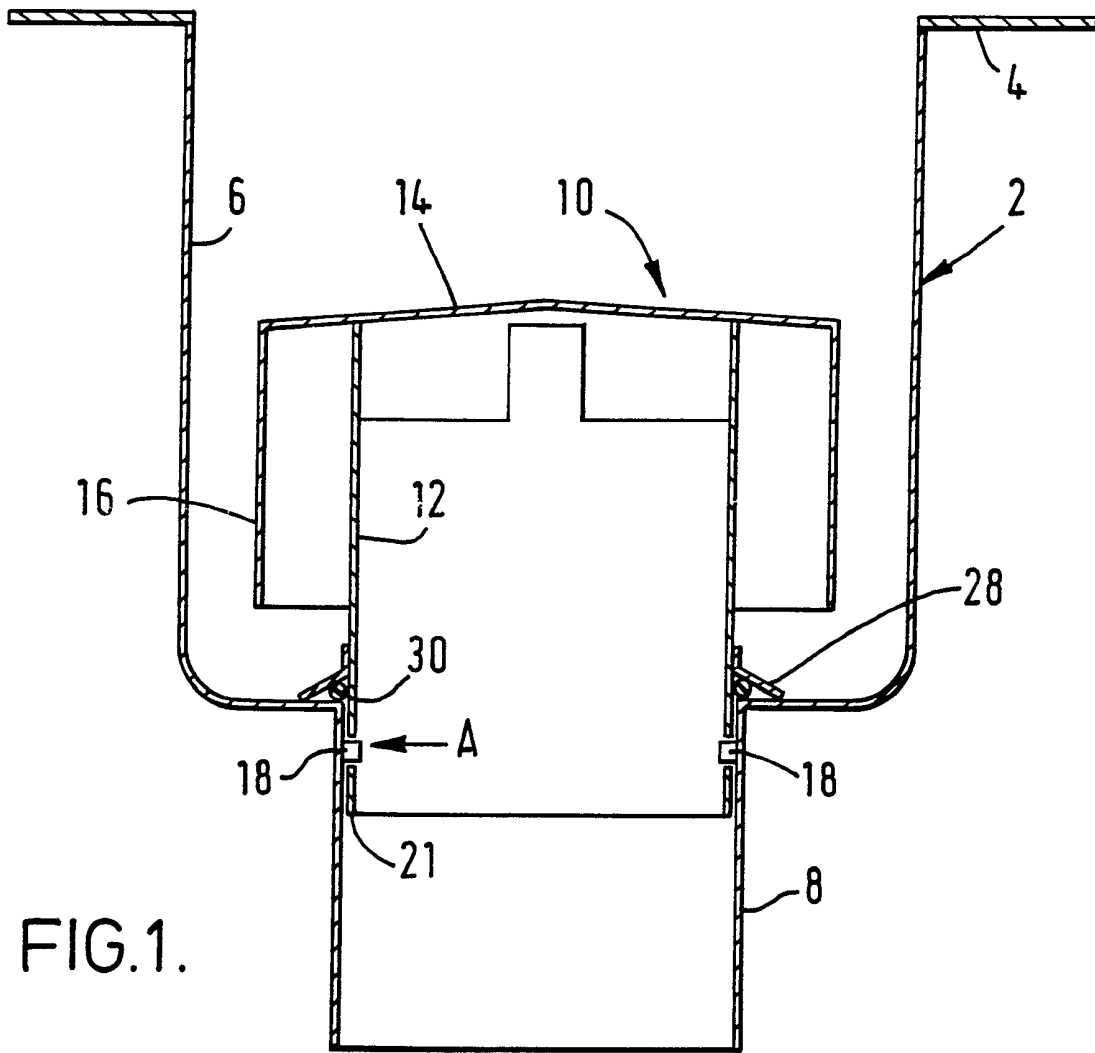


FIG. 1.

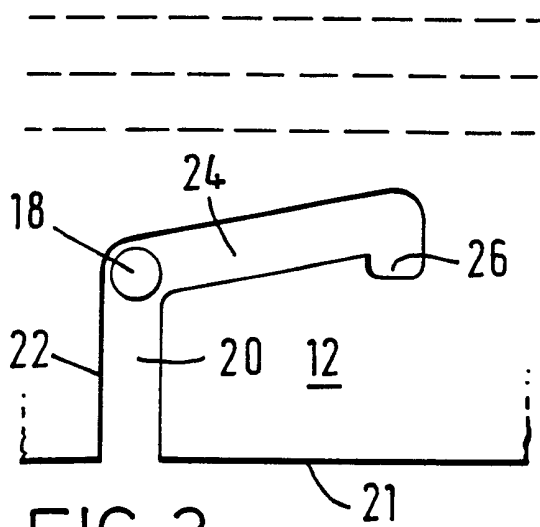


FIG. 2.

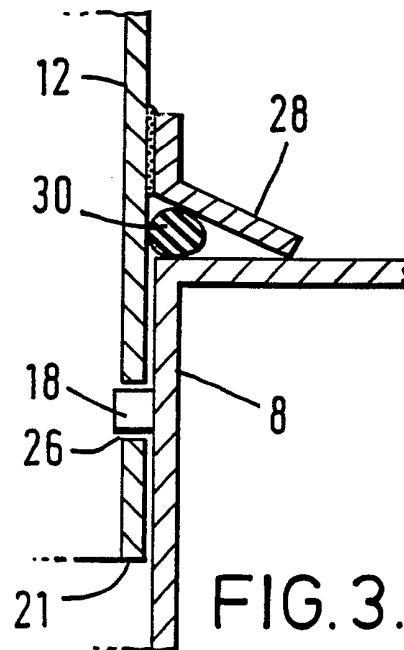


FIG. 3.

DRAINAGE SYSTEMS

The present invention relates to drainage systems and, more specifically, to an assembly of a foul air trap in a gully.

In surface drainage systems, surface water is collected in channels which converge at a gully where the surface drainage system is connected to a sewer. In order to prevent a backflow of foul air from the sewer into the drainage system which would pollute the environment, it is necessary to provide some manner of foul air trap at this connection between the sewer and the drainage system. Traditionally, this might be a "U" or "S" bend.

In stainless steel floor drainage system for use internally in, for example, shower areas, laboratories, factories and hospitals, a foul air trap which is mounted within the gully has been used. This type of trap fits in the outlet to the sewer at the base of the gully and consists of a perforated screen through which liquid can pass into the outlet. The perforated screen is surrounded by an overhanging flange which provides the foul air trapping function.

In floor drainage applications it is usually necessary to remove the foul air trap from time to time in order to clean it of debris which have accumulated on the screen as well as to clear out any accumulated debris in the gully. Since such traps are typically connected to the gully by means of nuts and bolts, this can be a time consuming operation. In some cases a push fit system has been used. However, such a system is susceptible of working loose or may become so tight that it is difficult to remove the trap except by the use of tools which could damage it. Moreover, because of the presence of the overhanging flange it is difficult to apply force to such a trap.

In order to prevent liquid from escaping around the foul air

trap into the surroundings rather than into the sewer inlet, it is necessary to provide some sort of sealing mechanism between the trap and the gully and sewer. There is therefore a conflict between the technical requirements of sealing and removability.

In order to solve this technical problem, the present invention provides a gully and trap assembly in which the gully has a cylindrical outlet for connection to a sewer, said outlet being defined by means of a cylindrical wall having an inwardly projecting pin, and a foul air trap having a cylindrical end adapted to fit within the gully outlet, said end having a slot to co-operate with the pin, said slot being defined by an axial portion extending from a free edge of said end and a circumferential portion extending around the cylindrical end, and a seal retaining flange located above the said end in order to retain an "O" ring seal.

Preferably when the trap is fitted into the gully with the pin engaged into the slot, a seal retained by the flange is compressed against the base of the gully.

With the arrangement described, where the foul air trap is fitted into the gully in substantially the same manner as a lightbulb is secured by means of a bayonet fitting, it is clear that the trap can readily be removed by a simple twist and pull operation. During reinsertion of the trap the flange automatically compresses the "O" ring seal.

Preferably a locking recess or notch is provided at the end of the circumferential portion of the slot with which the pin engages in the fully installed position to 'lock' the parts together. This prevents the trap becoming disconnected inadvertently as a result of the compression force in the "O" ring seal.

In a preferred embodiment two, preferably diametrically opposed, pins are provided at the mouth of the gully outlet and the cylindrical end of the trap is provided with two slots, each positioned to engage with a respective pin. Arrangements with more pins may be used to provide stable fittings for larger traps.

Preferably the circumferential portion of each slot is inclined upwardly away from the edge of the cylindrical end of the trap so that the "O" ring seal is automatically compressed as the trap is rotated. Preferably the angle of inclination is in the range  $5^{\circ}$  to  $15^{\circ}$  to a transverse (normally horizontal) plane through the cylindrical end. It would be appreciated that the length of the slot and the angle of inclination dictate the additional axial movement of the flange during a rotational phase of the installation.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a longitudinal section through a drain gully with a removable foul air trap fitted;

Figure 2 is a detail view in the direction of arrow A in Figure 1; and

Figure 3 is an enlarged sectional view of the connection between the trap and gully showing an "O" ring seal in position.

Figure 1 diagrammatically illustrates a gully 2 which would typically be part of a floor drainage system, ideally for internal use, though the arrangement described may also have exterior applications. The gully illustrated is formed from a stainless steel pressing and is made up of an upper surround flange 4, which is intended to be fitted flush with

the surface to be drained, a gully body 6, which has inlets (not shown) from at least one drainage channel, and a cylindrical outlet 8 in the bottom of the gully body 6. The outlet 8 is adapted to be connected to a sewer. The top of the gully is shown open but would be provided with a removable grid or grating in a conventional manner.

The foul air trap 10 may be of any suitable design. Here the trap consists of a cylindrical body 12, the upper part of which acts as a screen with inlets to allow water or other liquid to pass through from the body of the gully into the outlet 8. The cylindrical end of body 12 is sized to fit within the cylindrical outlet 8 of the gully. A top cover 14 with a depending cylindrical flange 16 surrounds the upper part of the cylindrical body 12 to provide the foul air trapping function. Air can only pass from the sewer up through the inlet 8 and through the outlets in the screen surrounded by the flange 16. Such air would have to then pass down to the bottom of the flange and round the U-shaped path defined between the flange 16 and the surrounding wall of the gully. Since there would only normally be still air within the gully any foul air rising from the sewer will not follow that path and will remain trapped underneath the cover 14 preventing pollution of the environment in the area of the surface to be drained.

As so far described, the function of the foul air trap is essentially conventional. However, in the arrangement illustrated the manner of connecting the trap into the gully and sealing the junction between the outside of the trap and the gully outlet 8 is novel.

Two outwardly projecting pins 18 are located in diametrically opposite positions adjacent to the top of the gully outlet 8. It will be appreciated that one or more than two pins could be provided and it is not essential that they be located in diametrically opposite positions but this configuration

facilitates easier coupling of the trap to the gully. The pins 18 are sized to be receivable within cut-out slots 20 formed in the bottom part of the cylindrical end 12.

As shown in Figure 2 each cut-out slot 20 consists of a substantially axial entrance portion 22 extending from a free edge 21 of the cylindrical end of the body 12. The axial portion 22 adjoins a circumferential portion 24 which extends around the periphery of the cylindrical body 12. The junction between the two portions is smoothed to facilitate relative movement of slot and pin around the junction. The circumferential portion 24 is preferably inclined slightly upwardly. For example, the junction between the entrance portion 22 and the circumferential portion 24 may be  $99^\circ$ , that is at an angle of  $9^\circ$  to a horizontal transverse plane through the end. At the end of the circumferential portion 24 a locking notch or recess 26 is provided into which the pin 18 engages on completion of the fitting process to resist inadvertent disconnection.

Above the end of the cylindrical body 12 in which the slots are positioned, there is provided a peripheral flange 28 which projects outwardly and downwardly and extends around the entire periphery of the cylindrical body 12 of the trap. The flange 28 retains an "O" ring seal 30 underneath it when the trap is fitted to the gully. The seal 30 prevents liquid passing down through the clearance between the cylindrical body 12 and the outlet wall 8. The seal 30, when not under pressure will be an annular seal of substantially circular cross-section. This section is compressed as illustrated in Figure 3, by the engagement of the flange 28 when the trap is connected to the gully.

In use, the trap and gully are assembled as follows. Initially, an "O" ring seal 30 is passed over the free edge 21 on the bottom of the cylindrical body and pushed manually up against the flange 28. The trap is then fitted to the

outlet 8 of the gully by locating the entrance portions 22 of the slots 20 over the pins 18. The trap is then pushed downwardly causing the slot to move relative to the pins 18. When the pins 18 are at the junction between the entrance portion and the circumferential portion 24, the trap is rotated until resistance is felt indicative of the pin having reached the end of the portion 24. During all or part of the rotational phase (depending on the exact dimensions of the parts) the "O" ring seal is compressed so that it provides a tight seal as shown in Figure 3 across the junction between the base of the gully and the cylindrical body 12. The amount of compression is also determined by the length and incline of the circumferential portion of the slot. The release of downward pressure from the trap then allows the trap to lift slightly causing the pin 18 to become engaged in the recess 26. The action of fitting the trap into the outlet is similar to the action of fitting a bayonet fitting lightbulb into a socket, though in this case it is the slotted member which is moved relative to the pins rather than the pins being moved relative to the slots.

Although the foul air trap fitting has been described for a gully with a vertical outlet, it will be appreciated that the same principle may be employed for gullies with horizontal outlets.



CLAIMS

1. A gully (2) and trap (10) assembly in which the gully (2) has a cylindrical outlet (8) for connection to a sewer, said outlet (8) being defined by means of a cylindrical wall having an inwardly projecting pin (18), and a foul air trap (10) having a cylindrical end (12) adapted to fit within the gully outlet (8), said end (12) having a slot (20) to co-operate with the pin (18) said slot (20) being defined by an axial portion (22) extending from a free edge (21) of said end (12) and a circumferential portion (24) extending around the cylindrical end (12), and a seal retaining flange (28) located above the said end (12) in order to retain an "O" ring seal (30).
2. An assembly as claimed in claim 1, further comprising an "O" ring seal (30) which, when the trap is fitted into the gully with the pin (18) engaged into the slot (20), is retained and compressed by the flange (28) against the base of the gully to seal the junction between the trap (10) and the gully (2).
3. An assembly as claimed in claim 1 or 2, wherein the gully outlet is provided with at least two spaced pins (18) and the cylindrical end of the trap is provided with a corresponding number of slots (20) each positioned to engage with a corresponding pin (18).
4. An assembly as claimed in any one of the preceding claims, wherein the or each slot has a locking recess (26) to engage the pin (18) at a remote end of the circumferential portion (24) of the slot (20).
5. An assembly as claimed in any one of the preceding claims, wherein the or each circumferential portion is inclined relative to a transverse plane through the cylindrical end at an angle in the range 5° to 15°.

6. A gully and slot assembly substantially as herein described with reference to the accompanying drawings.
7. A foul air trap adapted for use in an assembly as claimed in any one of the preceding claims.
8. A gully adapted for use in an assembly as claimed in any one of claims 1 to 6.

**Relevant Technical Fields**

- (i) UK Cl (Ed.M)      E1C (C11E; C18)
- (ii) Int Cl (Ed.5)    E03C 1/29; E03F 5/04

Search Examiner  
D HAWORTH

Date of completion of Search  
18 APRIL 1994

**Databases (see below)**

- (i) UK Patent Office collections of GB, EP, WO and US patent specifications.
- (ii) ONLINE DATABASE: WPI

Documents considered relevant following a search in respect of Claims :-  
1-6

**Categories of documents**

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- E:** Patent document published on or after, but with priority date earlier than, the filing date of the present application.
- &:** Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
	None	

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