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(54) **Grating for drain channel**

(57) Grating for drain channels comprising one or more interference-fit members (2) that are adapted to removably engage a drain channel (3) to secure the grating to said channel; the grating comprises at least a free profiled edge (4) defining a fastening bracket (5), which therefore is made integral, i.e. as a unitary piece with

said grating and is adapted to extend along an inner surface (6) of the drain channel (3), said interference-fit member (2) comprising a coupling end portion (7) adapted to engage said bracket (5), and an elastic portion (8) adapted to engage a fit-in receptacle (9) provided on said inner surface (6) of said channel (3) by snap-fitting thereinto.

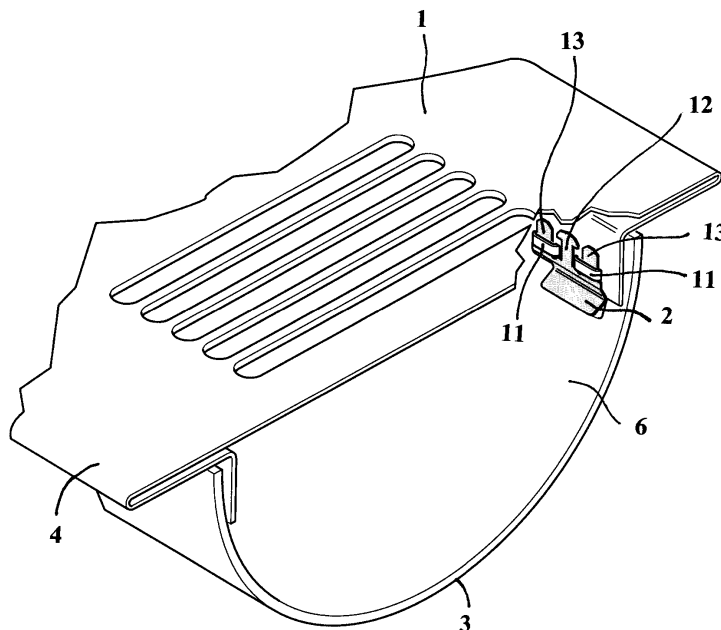


fig.2

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Description

[0001] The present invention refers to a grating for drain channels, as well as a method for manufacturing the same.

[0002] Gratings of the above cited kind are usually constituted by planar metal plates provided with slits, adapted to be applied to drain channels, which are usually formed by structures with a U-shaped cross-section made of concrete and/or synthetic resins intended for collecting and carrying away liquids.

[0003] These gratings may be secured to the drain channels with the aid of screws or similar fastening devices, by means of which said gratings are fastened to a bracket that is provided to extend transversally between the two opposite walls defining the channel, which said bracket is usually made integrally with.

[0004] Other fastening concepts call for the use of a movable bracket connected to the grating by means of a screw or similar fastening device. Once the grating is positioned on the channel, the bracket is then rotated by acting upon the screw that is accessible externally at or through the slits, in such a manner as to cause it to arrange itself across the channel so that the end portions thereof are able to engage appropriate receptacles provided in the walls of the channel to that purpose, thereby locking the grating in position.

[0005] Furthermore, some prior-art gratings are also known to comprise adjustable arms that are actuatable by means of screws, or the like, so as to define a widened position, in which said arms are brought into abutting against the walls of the channel, where they catch hold of said walls so as to secure the grating to the channel.

[0006] These fastening methods, however, share a drawback in that the brackets, or the arms, as the case may be, are likely to be a hindrance to a smooth outflow of the liquid by forming a kind of barrier on which debris and dirt carried by the outflowing liquid may collect and be retained.

[0007] Furthermore, actuating the screws may prove quite difficult and awkward an operation owing to the wear and tear of the parts used to fastening purposes, as well as the oxidation that the materials used to make the grating and the other pertaining parts are normally subject to.

[0008] According to a further fastening concept, clip-like or similar kinds of clamps are hooked on to the longitudinal edges of the grating along the upper portions of the walls of the channel.

[0009] This solution, however, has a major drawback in that said clamps are accessible externally of the grating and the channel, thereby proving particularly vulnerable to shocks and other stresses that may not only impair the tightening and locking capability of such clamps, but also lead to the clamps themselves coming off, so as to eventually cause the grating to become loose and separate from the channel.

[0010] In addition, no reference points or other marks are provided either on the grating or the channel as an

aid to positioning said clamps, so that securing the grating to the channels proves in this case quite difficult and scarcely accurate an operation.

[0011] As a result, prior-art gratings of the above mentioned kind are in all cases difficult to install and secure to the channel, requiring complicated, awkward and time-consuming operations to do that.

[0012] Even bigger problems are encountered when the gratings have to be removed in view of the necessary maintenance and cleaning of the channel, or for the gratings themselves to be replaced. As a matter of fact, all above-mentioned securing techniques are such as to make it rather difficult and awkward to loosen and separate the gratings from the channel.

[0013] It therefore is the object of the present invention to provide a grating for drain channels, which does away with the afore-indicated drawbacks and disadvantages of prior-art approaches.

[0014] Within this general object, it is a purpose of the present invention to provide a grating that is capable of being secured to and removed from the channel in a simple and quick manner.

[0015] Another purpose of the present invention is to provide a grating that is simple in its construction and reliable in its use, as well as capable of being manufactured at competitive costs.

[0016] Yet a further purpose of the present invention is to provide a method for manufacturing such grating.

[0017] According to the present invention, these aims, along with further ones that will be apparent from the following description, are reached in a grating for drain channels incorporating the features and characteristics as recited in the appended claims 1 et seq.

[0018] Features and advantages of the present invention will anyway be more readily understood from the description of a preferred, although not sole embodiment that is given below by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a perspective exploded cross-sectional view of a grating according to the present invention;
- Figure 2 is a similar view as the one appearing in Figure 1, which however shows the grating secured to the channel;
- Figure 3 is a front elevational view of the grating associated to the interference-fit members according to the present invention.

[0019] With reference to the above-cited Figures, the grating for drain channels according to the present invention - indicated generally at 1 - comprises one or more so-called interference-fit members 2 that are adapted to removably engage a drain channel 3 to secure the grating 1 to said channel 3.

[0020] The grating comprises at least a properly profiled free edge 4 defining a fastening bracket 5, which

therefore is made integral, i.e. as a unitary piece with said grating and is adapted to extend along an inner surface 6 of the drain channel 3.

[0021] The interference-fit member 2 comprises a coupling end portion 7 adapted to engage said bracket 5, and an elastic portion 8 adapted to engage a fit-in receptacle 9 provided on said inner surface of said channel 3 by snap-fitting thereinto.

[0022] The grating itself is constituted by a flat metal plate provided with slits 10 and adapted to close on top a drain channel 3 that may be formed, for example, by a structure made of concrete and/or synthetic resin, with a concave inner wall and free ends adapted to support the grating. Along the inner wall there are provided a plurality of fit-in receptacles 9, in which there are received the interference-fit members 2 to secure the grating in position.

[0023] The grating according to the present invention has on its sides two profiled free edges 4, each one of which forms a planar portion folded into a U, which is adapted to rest on the free end portions of the channel 3 and from which there extends the portion forming the fastening bracket 5.

[0024] The fastening bracket 5 extends perpendicularly to the profiled edges 4 and the same grating, so that, when the grating is secured to the channel 3, the fastening bracket 5 expands over the inner surface 6 of the channel 3. Coupling means are provided on the fastening bracket 5 to enable it to connect with the interference-fit member 2. These coupling means comprise a pair of loops 11 obtained from the fastening bracket by a drawing operation and arranged so as to define, between them, an engagement receptacle adapted to be engaged by the coupling end portion 7 of the interference-fit member 2. Said coupling end portion 7 comprises a middle retaining tooth 12 juxtaposed on both sides thereof by a pair of tabs 13, each one of which is adapted to slide into a respective one of said two loops 11.

[0025] The middle retaining tooth 12 has a T-shaped head portion adapted to snap-fit into and engage the above-mentioned engagement receptacle that is defined between said two loops 11.

[0026] The elastic portion 8 of the interference-fit member 2 defines an arc that extends downwards when the interference-fit member 2 is associated to the fastening bracket 5, said arc being in the shape of a V with the apex facing outwards, so as to be capable of being deformed elastically by the inner surface 6 of the channel 3 and snap-fitting into the fit-in receptacle 9 to engage it, as this shall on the other hand be explained in greater detail further on in this description.

[0027] The interference-fit member 2 is attached to the fastening bracket 5 by introducing the pair of tabs 13 into the loops 11, with the fastening portion 5 arranged in such a manner as to ensure that the apex of the V-shaped arc is oriented towards the free profiled edge 4. By letting the tabs 13 slide through the loops 11, the middle retaining tooth is forced into and along the corresponding fit-in

accommodation so as to eventually snap into engaging the latter with its T-shaped head portion as soon as the tabs are completely inserted in the respective loops 11.

[0028] The grating is secured in place in the following manner.

[0029] In the first place, the grating is positioned onto the channel 3, in such a manner as to cause the interference-fit members 2 to come to lie close to the related fit-in receptacles 9. The fastening bracket is then allowed to slide along the inner surface 6. The elastic portion is forced inwards by the wall of the channel 3 so as to enable the apex of the V-shaped arc to slide along the inner surface 6 until it reaches the snap-fit accommodation 9, into which the plastic portion 8 is then able to snap owing to the springback action generated by the V-shaped arc, and this obviously causes the grating to become removably secured to the drain channel 3 it is intended to cover.

[0030] Manufacturing a grating according to the present invention includes: punching or cutting a plurality of central portions of slots 10, as well as holes at the extremities of said central portions, in a flat metal plate; forming a plurality of non-slip bulges, or the like, as well as the cross extremities of the plate; subjecting the plate to a drawing operation to complete the slits 10 and the cross extremities thereof, as well to form the loops 11 for the interference-fit members 2; roll-forming, i.e. profiling the edges 4 of the plate to form the U-shaped portion and the fastening bracket 5.

Fully apparent from the above description is therefore the ability of the the present invention to effectively reach the afore cited aims and advantages by providing a grating that is simple to install and remove from the drain channel.

[0031] As a matter of fact, the grating is adapted to be secured to the drain channel by a simple snap-fit coupling.

[0032] Furthermore, the grating preferably comprises four interference-fit members for coupling to a corresponding number of loop pairs, so as to enable it to be secured to the drain channel in an extremely convenient manner, without any possibility of error, i.e. misplacement.

[0033] In addition, owing to them being situated and accommodated in correspondence to the fastening bracket, and therefore close to the inner surface of the channel, the interference-fit members are not of hindrance to the regular, smooth flow of the liquid being carried away.

[0034] Finally, the grating according to the present invention is particularly simple from a construction point of view.

[0035] It shall be appreciated that the grating according to the present invention is subject to a number of modifications and may be embodied in a number of different manners without departing from the scope of the present invention as defined in the appended claims. It should further be noticed that all pertaining details as described and illustrated above may well be replaced by technically

equivalent elements.

[0036] It will also be appreciated the materials used, as well as the sizing thereof, may each time be selected so as to more appropriately meet the particular requirements or suit the particular application.

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Claims

1. Grating for drain channels comprising one or more interference-fit members (2) that are adapted to removably engage a drain channel (3) to secure the grating to said channel, **characterized in that** said grating comprises at least a free profiled edge (4) defining a fastening bracket (5), which therefore is made integral, i.e. as a unitary piece with said grating and is adapted to extend along an inner surface (6) of the drain channel (3), said interference-fit member (2) comprising a coupling end portion (7) adapted to engage said bracket (5), and an elastic portion (8) adapted to engage a fit-in receptacle (9) provided on said inner surface (6) of said channel (3) by snap-fitting thereinto. 10
15
2. Grating according to claim 1, **characterized in that** said profiled free edge (4) comprises a planar portion folded into a U, which is adapted to rest on said channel (3), said fastening bracket (5) extending from an extremity of said U-folded portion. 25
30
3. Grating according to claim 1 or 2, **characterized in that** said fastening bracket (5) extends perpendicularly to the profiled edge (4) and the grating itself. 35
4. Grating according to claim 3, **characterized in that** coupling means are provided on the fastening bracket (5) to enable the grating to connect with the interference-fit member (2). 40
45
5. Grating according to claim 4, **characterized in that** said coupling means comprise at least a pair of loops (11) obtained from the fastening bracket (5) and arranged so as to define a fit-in receptacle adapted to be engaged by said coupling end portion (7). 50
6. Grating according to any of the preceding claims or combination thereof, **characterized in that** said coupling end portion (7) comprises a middle retaining tooth (12) juxtaposed on both sides thereof by a pair of tabs (13), each one of which is adapted to slide into a respective one of said two loops (11), said middle retaining tooth (12) being adapted to snap-fit into and engage said fit-in receptacle. 55
7. Method for fabricating a grating for drain channels according to any of the preceding claims 1 to 6 or combination thereof, **characterized in that** it comprises following steps:

- punching or cutting a plurality of central portions of slots (10), as well as holes at the extremities of said central portions, in a flat metal plate;

- forming a plurality of non-slip bulges, or the like, as well as the cross extremities of the plate;

- subjecting the plate to a drawing operation to complete the slits (10) and the cross extremities thereof, as well to form the loops (11) for the interference-fit members (2); roll-forming, i.e. profiling the edges of the plate to form the U-shaped portion and the fastening bracket (5).

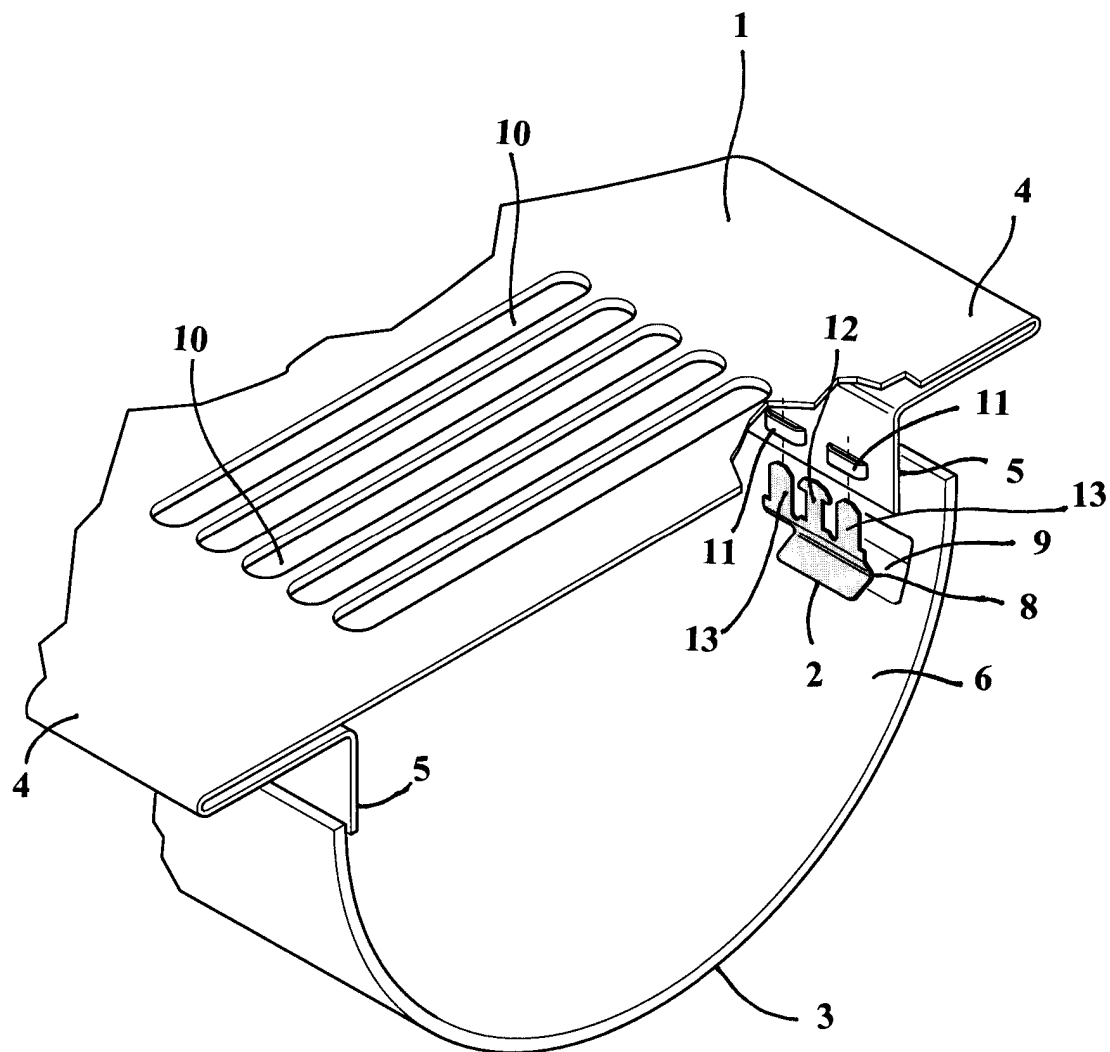


fig.1

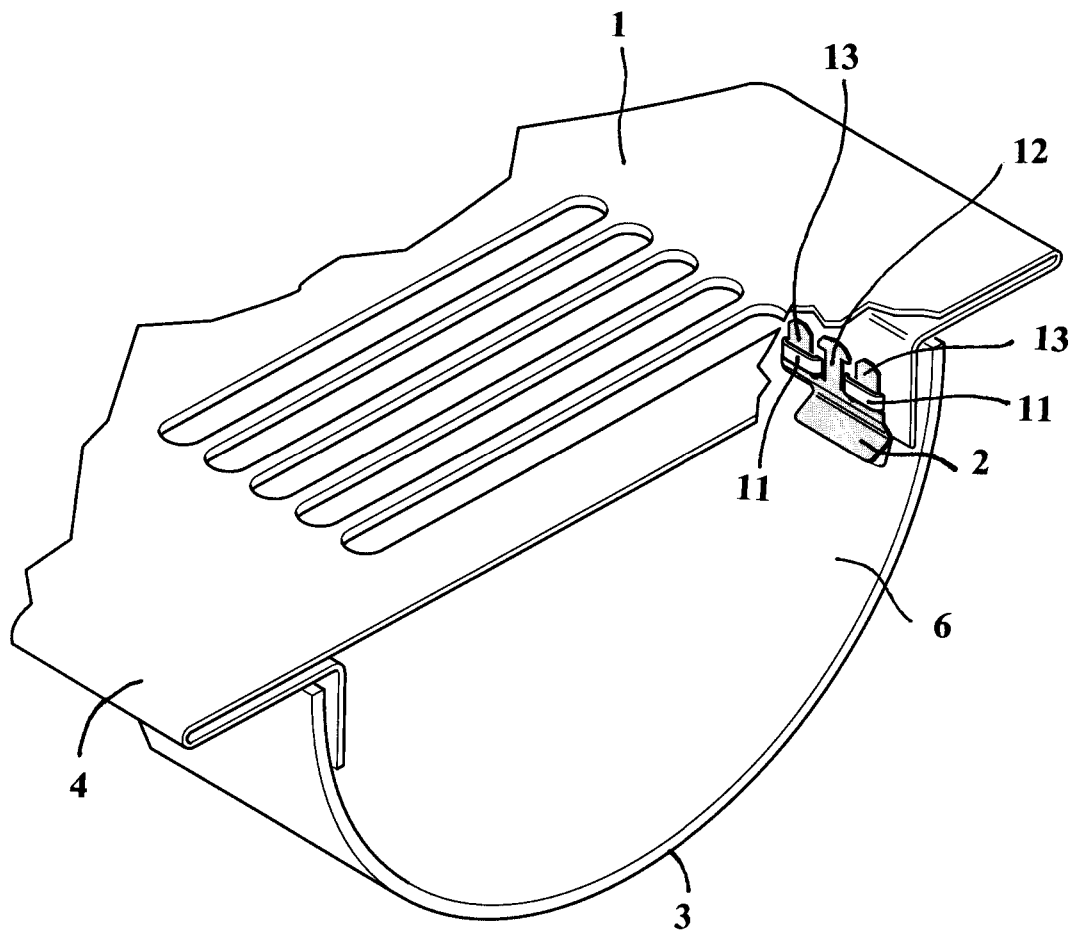


fig.2

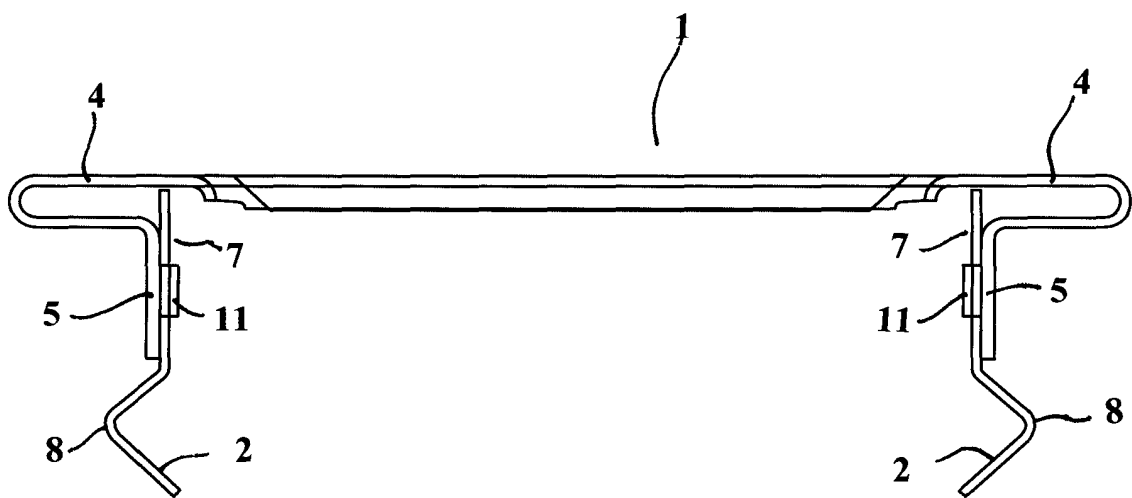


fig 3