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(54) **Security grating**

(57) A security grating (1) for securing shop windows is formed by a net of overlaid horizontal bars (4) and vertical bars (5). The security grating further comprises a vertical frame section (6) at each side edge. The frame section (6) has a U-section (9) with a recess (10) with a depth that may accommodate a bushing (14) provided at the end of a horizontal grating bar (4) or a

vertical grating bar (5). The U-section (9) is closed by a hinged lid (11). Hereby a net may always be cut off so that the outermost vertical bar or a bushing is situated in the recess (10). As there is only need for small space in the recess (10), there are no narrow requirements to the width of the frame for mounting the security grating (1).

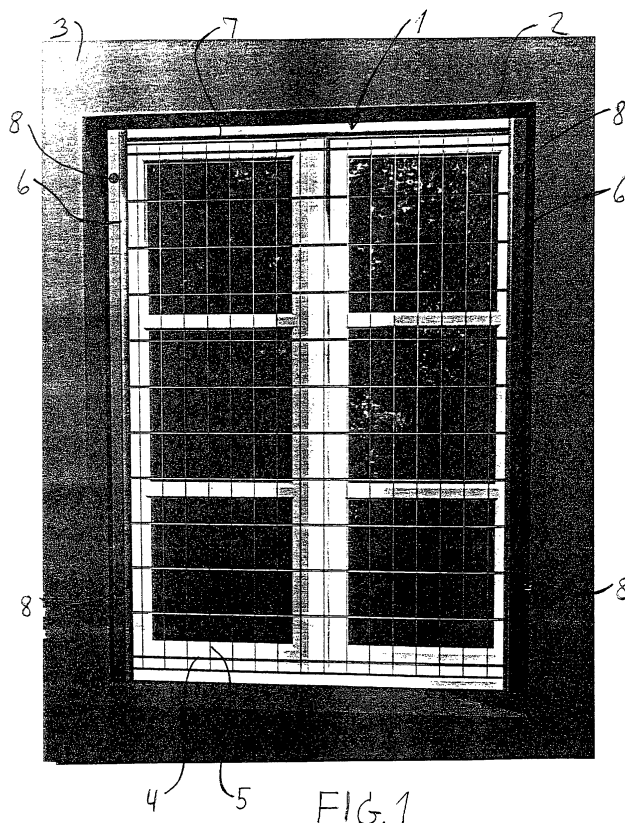


FIG. 1

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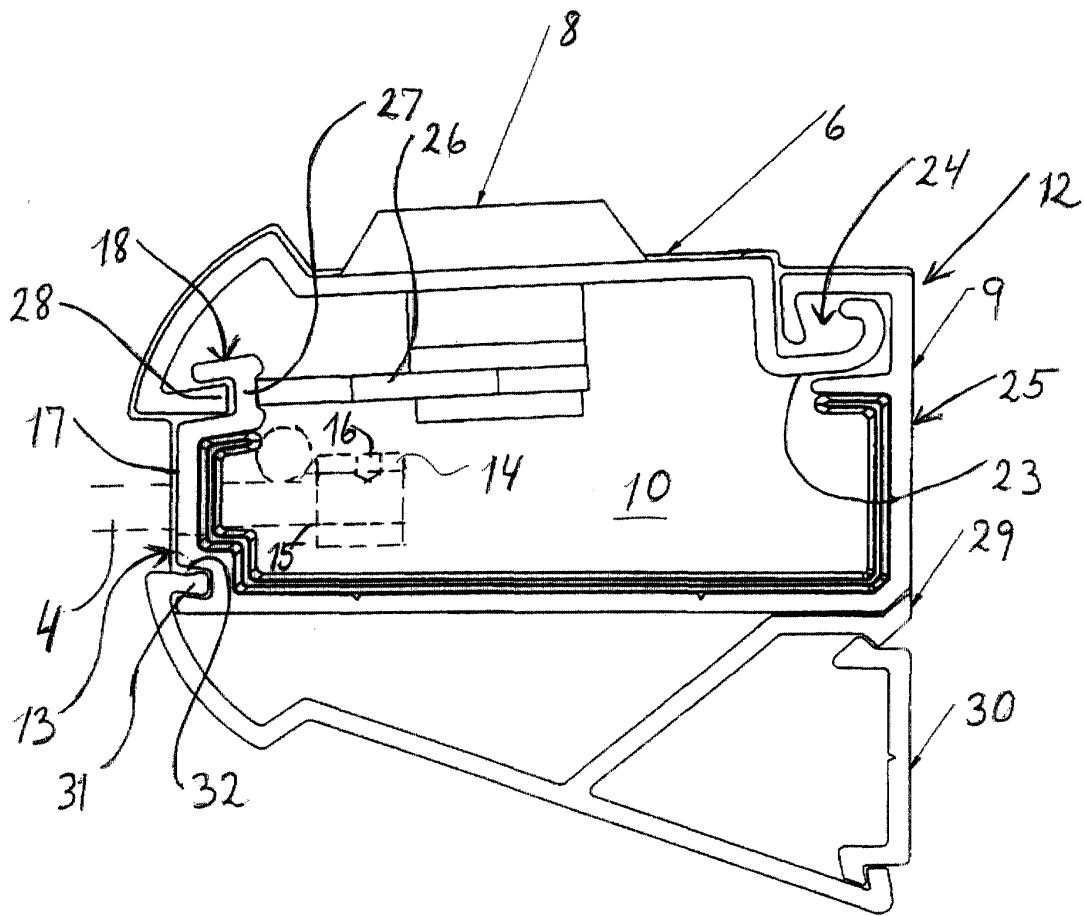


FIG. 4

Description

[0001] The present invention concerns a security grating, preferably for wall openings in a building, and particularly shop windows and doors, where a grating of crossing bars is mounted in a frame at least comprising two frame sections arranged at opposite sides of the grating and preferably so as to be placed with vertical orientation in use, and which are each made up of a U-shaped section having an elongate recess for loosely receiving parts of the grating, and comprising a dismountable lid covering the recess and which may be locked to the U-section, the U-sections being arranged for fastening to a support construction and having inlet apertures in one of the side walls for the passage of the bars into the recess.

[0002] Security gratings are primarily used for securing doors and windows against burglary. The frame is mounted on the masonry within the pane or door for securing wares and equipment in shops. Alternatively, the security grating may be used for forming security cages, e.g. around machines.

[0003] The gratings are typically used in that in the day-time, the gratings are hooked off so that customers may have free insight to the wares displayed in the shop. The security gratings are placed before panes and doors at night in order to secure the goods inside the shops. Thus it is suitable that such security grating may relatively easily be mounted on and dismantled from the building. Furthermore, it is important the securing of the grating on the building is relatively effective and safe so that a person breaking through a window can not lift the grating off the frame.

[0004] By commonly known security gratings, a fastening is made to the wall or to a mounting frame around the window by means of hooks which are placed in lugs. The grating may then be secured against lifting off by placing padlocks or similar through the hooks so that they can not be lifted free from the lugs.

[0005] Security gratings made from standard grids are thus known, typically having a mesh of 10 cm and which are made from mutually crossing and welded round irons. When a customer orders a security grating to fit a certain wall opening in the shape of a door or window, a desired dimension corresponding to the wall opening to be secured is cut from a net. After that, a frame is welded onto at least two vertical sides of the net in order thereby to form the security grating. Then hooks are welded or screwed to the two vertical frame members which are often made from flat bars.

[0006] This production process is disadvantageous as it is relatively slow and simultaneously requires individual adaptation of each single security grating. The individual adaptation of each security grating is necessary with respect to a precise positioning of the hooks relative to mounting lugs in the wall or a mounting frame around the pane or the door. The cutting up and the welding together of the single elements is time-consuming. Fur-

thermore, the final result will not have an aesthetically pleasing finish which may be desirable in many shops in order that the security grating appear with the same aesthetical look as the rest of the make-up of the shop.

[0007] An example of the gratings of the kind mentioned in the introduction and which may be adapted to the width of the wall opening are e.g. known from EP publication 860 576. A grating according to this publication consists of horizontal and vertical grating bars. The outer ends of the horizontal grating bars comprising a vertical bar may be loosely received in a recess in vertical frame elements at the outer sides of the grating. These gratings have had great success but it has been desired to be able making the frame with still less width than hitherto. This is particularly important when the grating is to be used in windows with narrow frames. With this grating it thus becomes possible to perform individual adjustment to width and height of the wall opening desired to be secured.

[0008] However, the construction is relatively cheap as it may be used for making gratings using standard nets. Furthermore, an indication has been made how a simple and easy fastening of the security grating on the building is achieved. This mounting principle may also be used together with a grating according to the present invention.

[0009] It is the purpose of the present invention to indicate a security grating of the kind mentioned in the introduction where the grating is made as a prefabricated net which may have a pre-defined mesh and which enables easy and rapid adapting to an actual opening as the frame may be made with a very narrow width. The grating is simultaneously to be relatively cheap in production and is to appear aesthetical and allow a secure fastening to the building or the mounting frame.

[0010] According to the present invention, this is achieved with a security grating being peculiar in that at least some of the grating bars are provided with one or more bushings at a first end designed to be received in the recess, the bushings having larger dimension than the inlet apertures and being provided with means for releasable engagement with the associated bars.

[0011] With this construction it is possible to stock nets in a few standard heights corresponding to standard heights on windows and doors, and also to stock frame sections with a length corresponding to these standard heights. The single nets may be stocked in lengths to be obtained from the producer. Of this length a part is cut up largely corresponding to the width of the desired security grating. These advantages are common to the grating known from the above EP publication.

[0012] As the recess only has to have a depth which is sufficient to receive the bushing or an outer vertical bar in a grating with crossing horizontal and vertical grating bars, it will be possible to provide a frame having a very narrow width. At the same time, it will be possible to perform an individual adaptation of the formed security grating.

[0013] Thus it will always be possible to cut up the grating in a desired width, and hereby the outermost, vertical bar at one side of the security grating will be disposed closest to the bottom of the recess or closest to the inlet aperture of the recess, depending on the exact position of the fastening means on the building. At the other side of the security grating, in certain cases there is placed a vertical bar but in most cases, one or more bushings are placed at free ends of horizontal bars. As these bushings have greater dimension than the inlet apertures, the grating will be safely held in the recess of the frame section when the lid is closed and blocks the inlet apertures.

[0014] It is noted that the grating bars do not have to extend vertically or horizontally. As an alternative, it is possible to dispose the grating bars slantingly relative to the frame sections. In such a situation it is advantageous if the inlet apertures are formed in the side wall of the U-section by breaking off flaps corresponding to the desired or necessary inlet aperture as weakening lines are provided in the side wall of the U-section.

[0015] The bushing or bushings may be provided as single bushings with cylindric or edged cross-section provided with a receiving aperture and through the side wall of which is provided releasable engagement means in the form of pointed screws which are screwed into the associated bar. Alternatively, a bar containing several receiving apertures for the bar may be provided. A pointed screw or similar to be screwed into the associated bar or bars is provided with each receiving aperture.

[0016] It will be possible to provide each bar passing into the U-section with a bushing. Alternatively, in certain situations it will be sufficient to retain the net by providing a bushing only on some of the grating bars passing into the U-section.

[0017] According to an embodiment, the inlet aperture of the recess is provided in the longitudinal direction of the frame section. In this embodiment, the frame section may be displaced down over the outermost vertical bar at each side of the grating and/or over the bushings which are mounted at the ends of the grating bars at one or both sides.

[0018] The making of the security grating is rapid as a frame section is only placed over the outermost vertical grating bar at one side of the grating. Then, fastening may be performed, e.g. by means of a screw screwed through the recess for preventing mutual displacing of the frame section and the grating in the vertical direction of the grating. A mutual movement in direction of the width for adjusting the security grating to the actual wall opening is possible. However, there is no need for much displacement in the direction of the width, and the frame may be placed within very close tolerances, e.g. on narrow window cases. This may be achieved as the width of the security grating can be adjusted very precisely without regard to the position of the vertical bars at both sides of the applied grating.

[0019] According to a second embodiment, the inlet

aperture of the recess is formed in the shape of one or more inlet apertures formed at the lateral edge of the U-section which may be closed with a lid which is releasably hinged at a lateral edge where the inlet apertures are disposed with orientation transversely to the recess. The making of a security grating of this kind may also happen quickly when the outermost vertical grating bar or bushing is placed inside the recess and the horizontal bars are placed in the inlet apertures. Then the grating may be fastened relative to the frame section by closing this with a hinged lid which is secured to the U-section.

[0020] The U-section may be provided for mounting directly on the building, for example by using coupling means in the shape of screws, expansion bolts or similar. Thus, only a cutting up of the net in a desired dimension is required. This net is placed in the U-section which is fastened directly on the building. After placing the net in the channel element, this is closed by means of the lid. After that, the grating has been mounted.

[0021] When the grating is to be removed, the user only has to unlock the lid and swing this to open position about the hinge. Then the grating may unhindered be taken out from the channel element.

[0022] It is preferred that the hinge is formed by the lid comprising a flange engaging a corresponding recess in the U-section. With such an engagement it is possible to swing the lid to an open position without unlocking the engagement between the turned-up flange and the recess. Thus the lid will remain sitting firmly on the U-section in an open position.

[0023] If a mounting frame is used around the wall opening, this will preferably be formed by sections also stocked in standard lengths corresponding to the standard lengths of the vertical frame sections of the grating. It will be easy to place the mounting frame at each side of the wall opening due to the adjusting possibility existing in the vertical frame sections of the security frame.

[0024] The grating is preferably made of welded round irons with a mesh between 5 and 15 cm, preferably between 8 and 12 cm and particularly 10 cm. Alternatively, the grating is made as a so-called press grating consisting of profiled grating bars which are braided and pressed together. Such a grating is particularly useful for making security gratings where the grating bars extends under an oblique angle relative to the used frame sections.

[0025] In a particular embodiment, the locking means for locking the lid and the U-section together are formed in the lid. The lock comprises a standard industry lock which at its internal side is provided with an eccentric plate arranged to be pressed against the side wall in the U-section disposed opposite to the hinge. Hereby, the lid is pressed against the opposite side wall in the U-section whereby the flange of the hinge is pressed into secure engagement in the bottom of the recess of the U-section. As the lid also comprises a locking flange, which can interact with a recess in the U-section, it is possible to let the eccentric plate act against the bottom

of the locking recess. Thereby, the locking flange of the lid is drawn into the locking recess, and the bottom of the locking recess is clamped between the locking flange and the eccentric plate. This provides a particularly stable and secure locking. It is noted that over the length of the frame section there may be provided a suitable number of locks depending on the desired strength.

[0026] In the following, the invention will be explained more closely with reference to the accompanying drawing where:

- Fig. 1 shows a security grating placed in a window opening,
 Figs. 2 and 3 show two alternative embodiments of a security grating according to the invention,
 Fig. 4 shows a section through an embodiment of a frame section for use in a security grating according to the invention,
 Fig. 5 shows a partial, perspective view of a frame section for use in a security grating according to the invention,
 Fig. 6 shows a series of sectional views for illustrating the opening of a security grating according to the invention,
 Fig. 7 shows a partial view of a detail of a security grating according to the invention,
 Fig. 8 shows a perspective view of a bushing for a security grating according to the invention, and
 Fig. 9 shows a bushing for receiving a row of grating bars in a security grating according to the invention.

[0027] In the different Figures, identical or corresponding elements are designated with the same numbers and will not be explained in detail in connection with each Figure.

[0028] A security grating 1 is shown positioned at a wall opening 2 in a building 3. In the shown embodiment, the wall opening is a window having relatively narrow, vertical case members. The grating comprises crossing bars 4,5 disposed horizontally and vertically, respectively. They are mounted in a frame which at least comprises two vertical frame sections 6 which may be placed at each side of the wall opening. At the top and the bottom of the security grating 1 there may also be provided a cover frame 7 which is primarily of aesthetical significance.

[0029] In each of the vertical frame sections 6 there are provided locks 8 intended for locking together a U-shaped section 9 with an elongate recess 10 together with a lid 11, which via a hinge connection 12 is hinged on the U-section 9 (see Fig. 4).

[0030] In Figs. 2 and 3, alternative embodiments of the security grating 1 are shown. In Fig. 2, there is pro-

vided another size of mesh than in Fig. 1. Thus the horizontal distance between vertical grating bars 5 is greater in Fig. 2 than in Fig. 1. However, it appears that the frame sections 6 at each vertical side of the grating 1 may be made with a relatively limited width, cf. explanation below. In Fig. 3 is illustrated a situation with crossing bars extending under a slanting angle relative to the vertical frame sections 6. The grating bars may extend under an angle between 15 and 60°. The bars may be provided as overlaid round irons welded together or may be provided as a press grating where bars 4,5 are braided with each other and pressed together.

[0031] At the bottom and top of the grating, a cover strip 7 is provided. Inside the cover strip 7 at bottom and top, there is provided a locking rail 37, see Fig. 7. The locking rail 37 is provided with an opening 38 which may be disposed over a bent projection 39 at the outer end of the bars 5 (and possibly the bars 4). A locking rail 37 is particularly advantageous in a press grating as fixation of the grating occurs in the given position. The locking rail 37 is passed in over the bent projection 39, and may, due to its own weight, rest at position 40 on the bars 5 (4, respectively) at the top of the grating. In the side wall 13 of the U-section 9 is formed a recess for receiving the ends of the locking rail 37. Hereby the locking rail 37 is secured, and inadvertent removal is impossible from the top as well as from the bottom of the grating.

[0032] In Fig. 4 is shown a cross-section through a frame section 6 for use in a security grating 1 according to the invention. A single bar 14 is indicated, passing through a side wall 13 in the U-section into the recess 10. For illustrative reasons, in the embodiment shown a vertical bar 5 is illustrated as placed inside the recess 10. However, this will be superfluous as a bushing 14 is provided at the inner end of the bar and which is more clearly shown in Fig. 8. The bushing 14 is largely cylindrical and provided with an opening 15 for receiving the outer end of the bar 4. Through the side wall there is provided a threaded hole with a pointed screw 16. The pointed screw 16 may be screwed into abutment against the bar 4 so that it is firmly mounted at the end thereof. The bushing 14 has a size so as to pass through an inlet aperture 17 provided for the passage of the bar 4 in the side wall 13. The aperture 17 will usually be an elongate aperture having a width corresponding to the thickness of the bar 4 and opening at the upper side 18 of the side wall 13. Alternatively, the aperture 17 may only be a boring in the side wall.

[0033] In Fig. 5 is seen a partial view of a U-section 9. The inlet apertures are preferably provided by weakening lines 19 in the side wall 13, thus enabling breaking off large or small pieces for establishing the desired inlet aperture. In a relatively simple way, it is thus possible to adjust the U-section 9 to receiving bars with different thickness or bars, which are oriented slanting into the recess 10, and which therefore require a larger inlet aperture than a bar extending perpendicular to the side

wall 13.

[0034] In order to achieve a secure fixation of the grating, as alternative to the bushing 14 there may be used an elongate or rod-like bushing 20 as illustrated in Fig. 9. The rod-like bushing 20 has a number of through-going or blind holes 21 for receiving a corresponding number of bars. With each of the holes 21 is associated a pointed screw 22 used for retaining the grating bar in the hole 21. By using the rod-like bushing 20 there is no risk that bars are passing out through the inlet apertures and simultaneously is achieved a better distribution of the load over the entire longitudinal extension of the recess 10 as the elongate bushing 20 rests on a greater or lesser part of the length of the side wall 13. The flat, plate-like bushing 20 may be arranged to cover all of the length of the recess or a part thereof.

[0035] As it particularly appears from Fig. 4, between the U-section 9 and the lid 11 there is disposed a hinge 12. The hinge 12 is formed by a turned-in flange 23 on the lid which interacts with a recess 24 at the upper part of the side wall 25 of the U-section provided opposite to the side wall 13. The hinge 12 is provided at the side of the recess 10 which is opposite to the inlet apertures 17. The lock 8 comprises an eccentric disc 26 which abuts on the bottom of a recess 27 provided at the upper side of the side wall 13. The recess 27 accommodates an inward directed flange 28 on the lid 11. When the eccentric disc 26 is turned into engagement to the position shown in Fig. 4 by locking, the flange 28 will be pressed into the recess 27, and the flange 23 will also be pressed into the bottom of the recess 24. Thus is achieved a secure locking and a strong construction which is difficult to break up.

[0036] In Fig. 4 is illustrated a special embodiment where the U-section is mounted together with a further section 29 closed by a lid 30. The section 29 engages the U-section 9 as a flange 31 engages a recess 32. The section 29 is used for reinforcing the U-section 9 in situations where this may be wanted. The section 29 may be used as a mounting section, or the section 9 may alternatively be mounted directly on the base, e.g. a window case via screws or expansion bolts which are screwed directly into case or wall.

[0037] It appears from the Figures that the width of the U-section 9 is primarily determined from the dimensions on the lock 8. Thus it is possible to make the frame section 6 with a very narrow width compared with hitherto unknown frame sections. The bushing 14 will also have influence on the dimension of the U-section. However, the bushing may be made with very limited dimension as it is alone to safeguard that the bar 4 can not pass out through the inlet aperture 17.

[0038] In Fig. 6, different steps during opening a frame section 6 is illustrated. For the sake of clarity, only the U-section 9 and the lid 11 are shown. From step A to step G unlocking and opening the lid 11 are illustrated. In step A, the lock 8 will be activated, and the flanges 23 and 28 are pressed to the bottom in the recesses 24

and 27, respectively.

[0039] By step B, an unlocking has been performed, and the lid 11 is displaced translationally relative to the U-section 9 for releasing the flange 28 from the recess 27.

[0040] In step C, a pivoting of the lid 11 about the hinge 12 is initiated as the flange 23 is engaging the recess 24.

[0041] In steps D, E and F are shown pivoting movements illustrating that an outer end 33 of the flange 23 is not brought past an outer end 34 of the outer limit of the recess 24. The flange 23 has a turned-in part 35 with a length corresponding to the outermost turned-in part 36 at the limit of the recess 24 so that the lid is kept in engagement all the time. This will also be the case in the fully open position as illustrated in step G. This means that the lid 11 remains in its position on the U-section 9 when dismantling the security grating, something which may be desirable with regard to cleaning or at daytime when there is to be open view to the area covered by the grating. This may e.g. be the case with shop windows.

[0042] With the hinge 12 constructed as shown in the Figures, mounting of the lid 11 on the U-section 9 will occur with a translational displacement of the two parts into each other. Such a mounting occurs before the frame section 6 comprising the U-section 9 and the lid 11 are mounted on a support in the shape of a wall or a case.

[0043] The invention is not limited to the above mentioned embodiments described with reference to the accompanying drawing. Within the scope of the following claims, alternative embodiments will be possible. For example, it will be possible to apply a recess on the lid 11 interacting with a flange on the U-section 9. It will also be possible to use a lock which instead of acting against the side wall 13 opposite the hinge is acting on the side wall 25 in order to establish engagement between flanges and recesses for securing the lid 11 on the U-section 9.

Claims

1. A security grating (1), preferably for wall openings (2) in a building (3), and particularly shop windows and doors, where a grating of crossing bars (4,5) is mounted in a frame at least comprising two frame sections (6) arranged at opposite sides of the grating and preferably so as to be placed with vertical orientation in use, and which (6) are each made up of a U-shaped section having an elongate recess (10) for loosely receiving parts of the grating, and comprising a dismantlable lid covering the recess and which may be locked to the U-section, the U-sections being arranged for fastening to a support construction and having inlet apertures in one of the side walls for the passage of the bars into the re-

cess, **characterised in that** at least some of the grating bars (5) are provided with one or more bushings at a first end designed to be received in the recess, the bushings having larger dimension than the inlet apertures and being provided with means for releasable engagement with the associated bars (5).

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2. A security grating according to claim 1, **characterised in that** the lid is hinged on the U-section at the side wall opposite to the inlet apertures as the lid comprises a flange arranged to interact with a corresponding recess in the U-section.

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3. A security grating according to claim 1 or 2, **characterised in that** the frame section is made by extrusion, preferably of aluminium, and that in the side wall of the U-section there are provided weakening lines for the inlet apertures for breaking off flaps corresponding to desired/necessary inlet apertures in a relevant security grating.

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4. A security grating according to claim 1, 2 or 3, **characterised in that** the grating is made from round bars welded together with a mesh between 5 and 15 cm, preferably between 8 and 12 cm, and particularly of 10 cm.

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5. A security grating according to any of claims 2 - 4, **characterised in that** the locking means for locking the lid and the U-section together is formed in the lid and comprise an eccentric plate pressing against the side wall opposite to the hinge so that the lid is pressed against the opposite side wall and is held fast as a locking flange is pressed to engaging a locking recess.

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6. A security grating according to claim 5, **characterised in that** the locking flange is formed in the U-section, and the locking recess is formed on the lid.

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7. A security grating according to any preceding claim, **characterised in that** the bushing is provided as an elongate, plate-like bushing with a length largely corresponding to the length of the recess, and that a number of holes corresponding to the number of bars are formed.

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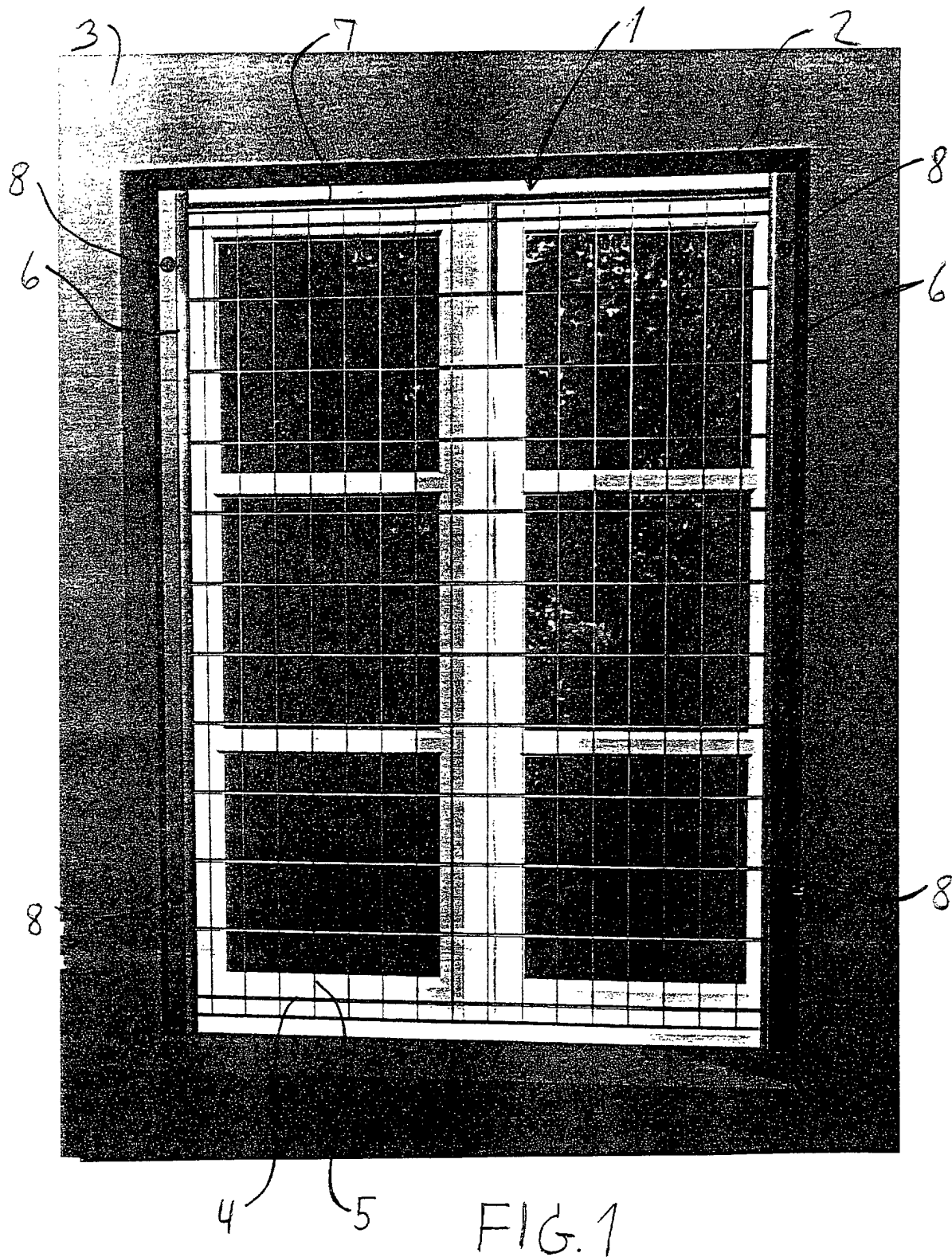
8. A security grating according to any of claims 1 - 6, **characterised in that** the bushing is provided as a tubular bushing with an inner hollow corresponding to the cross-section of the bars.

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9. A security grating according to any of claims 7-8, **characterised in that** the engagement means are pointed screws mounted in threaded holes in the bushings for engaging an associated bar.

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10. A security grating according to any preceding claim, **characterised in that** the bars extend under an angle between 15 and 60° relative to the frame sections.



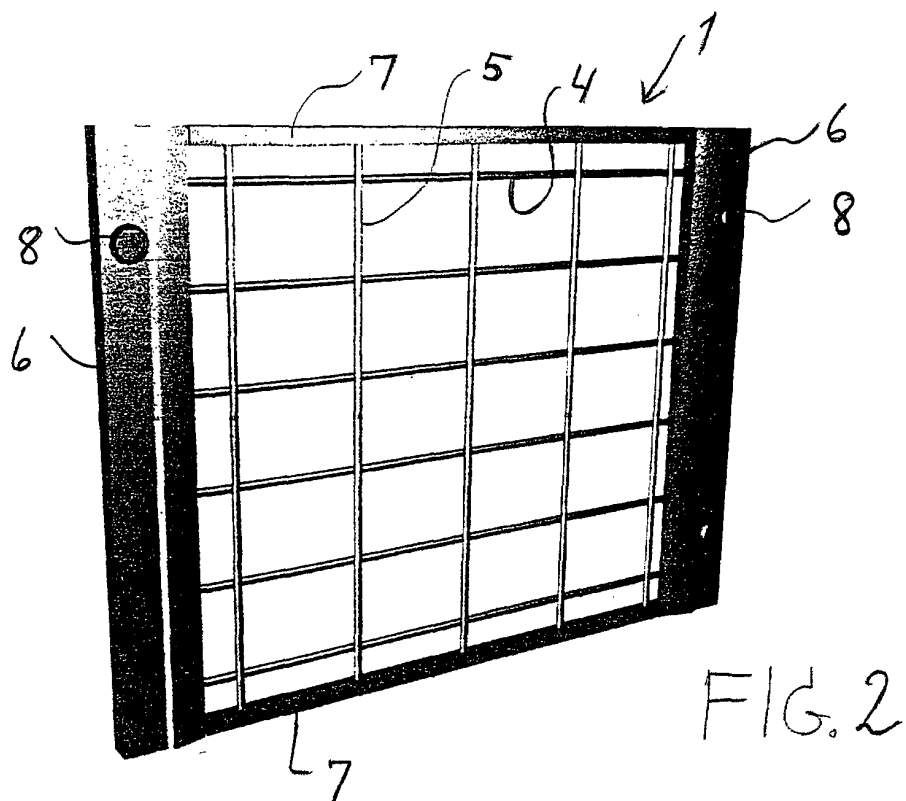


FIG. 2

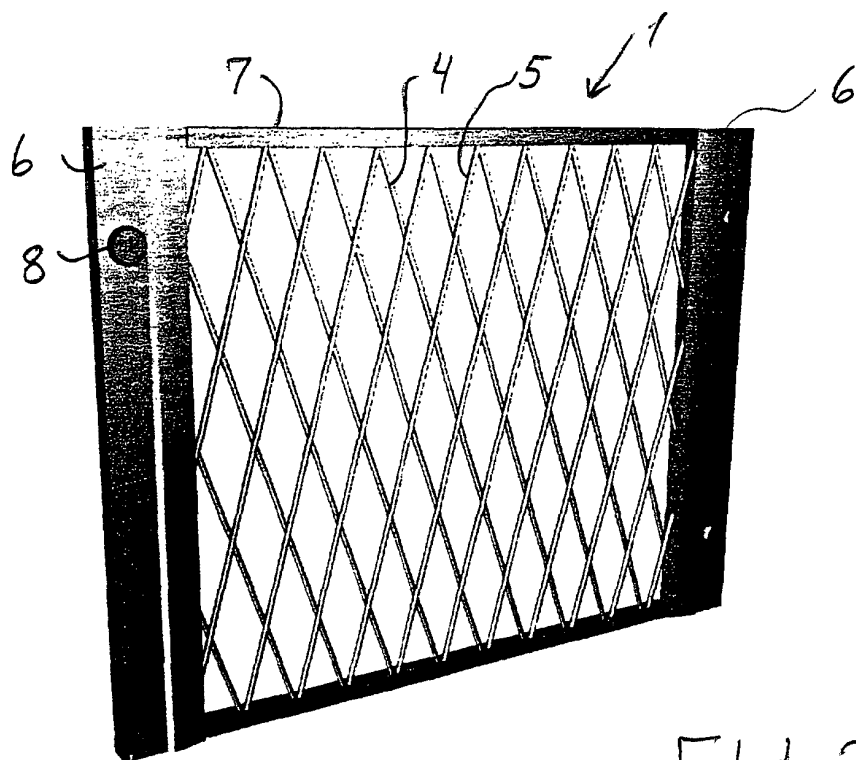


FIG. 3

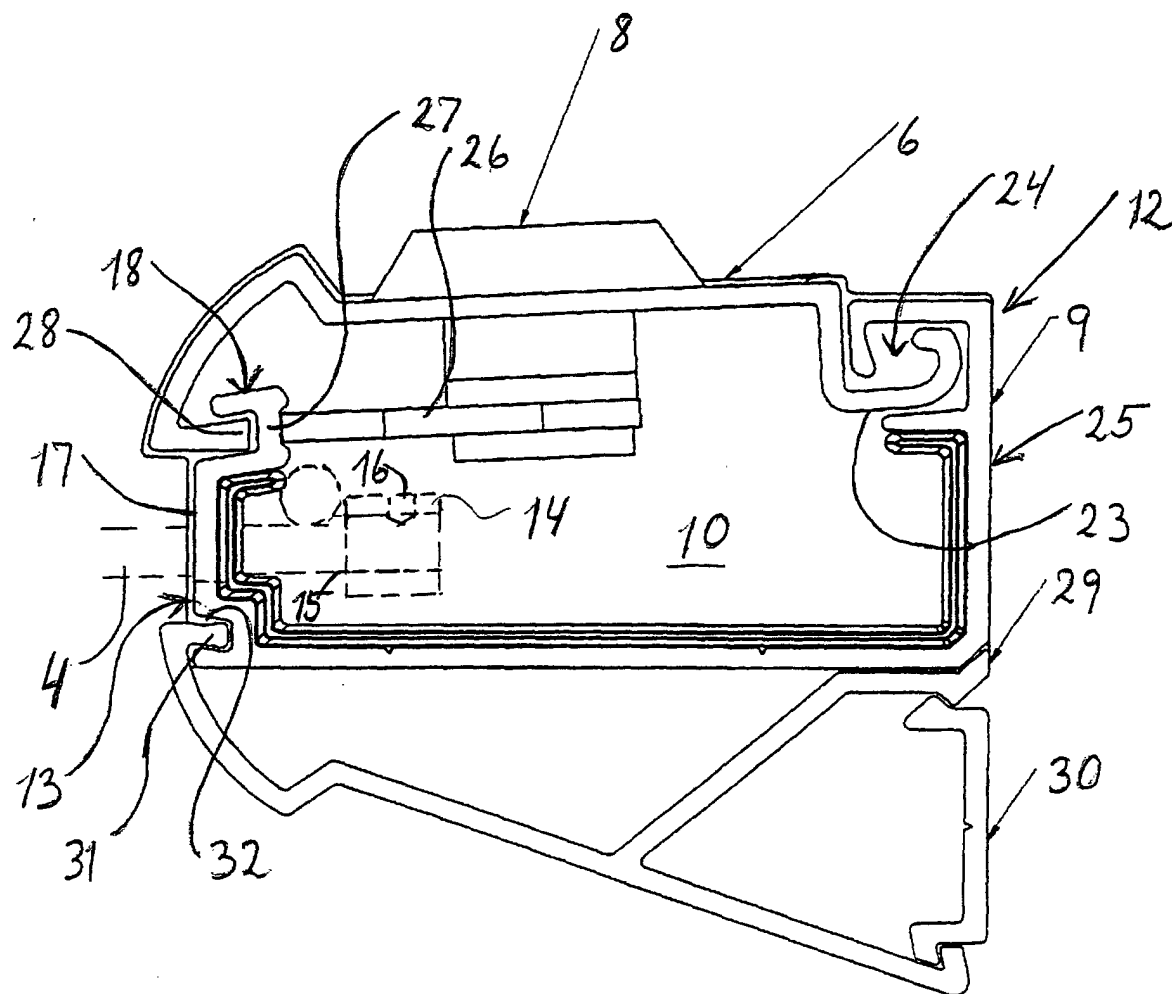


FIG. 4

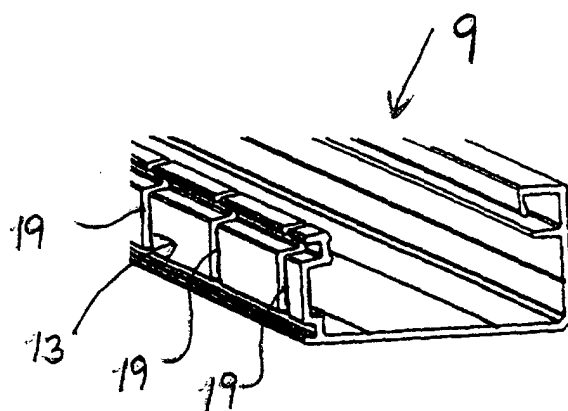


FIG. 5

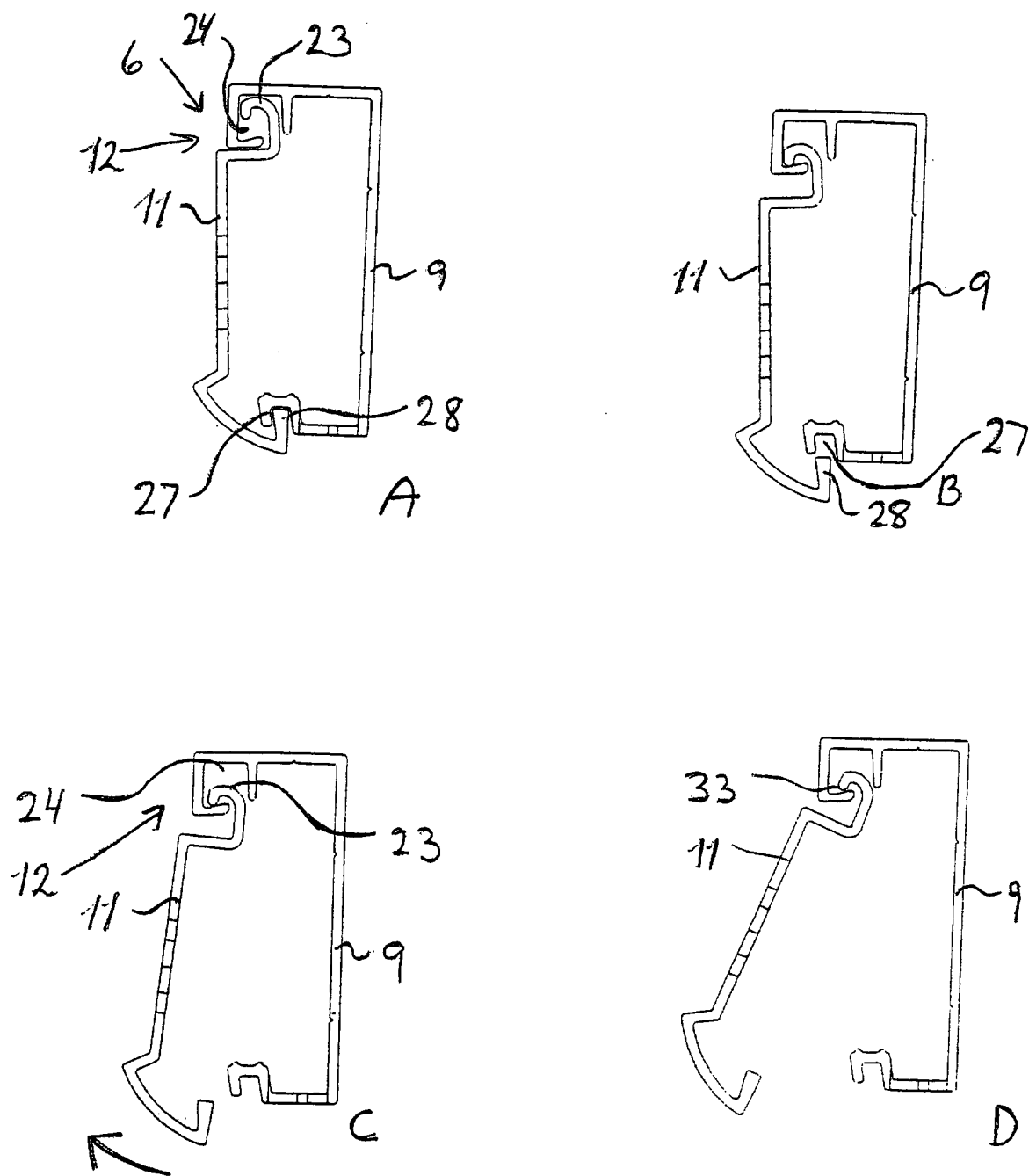


Fig. 6

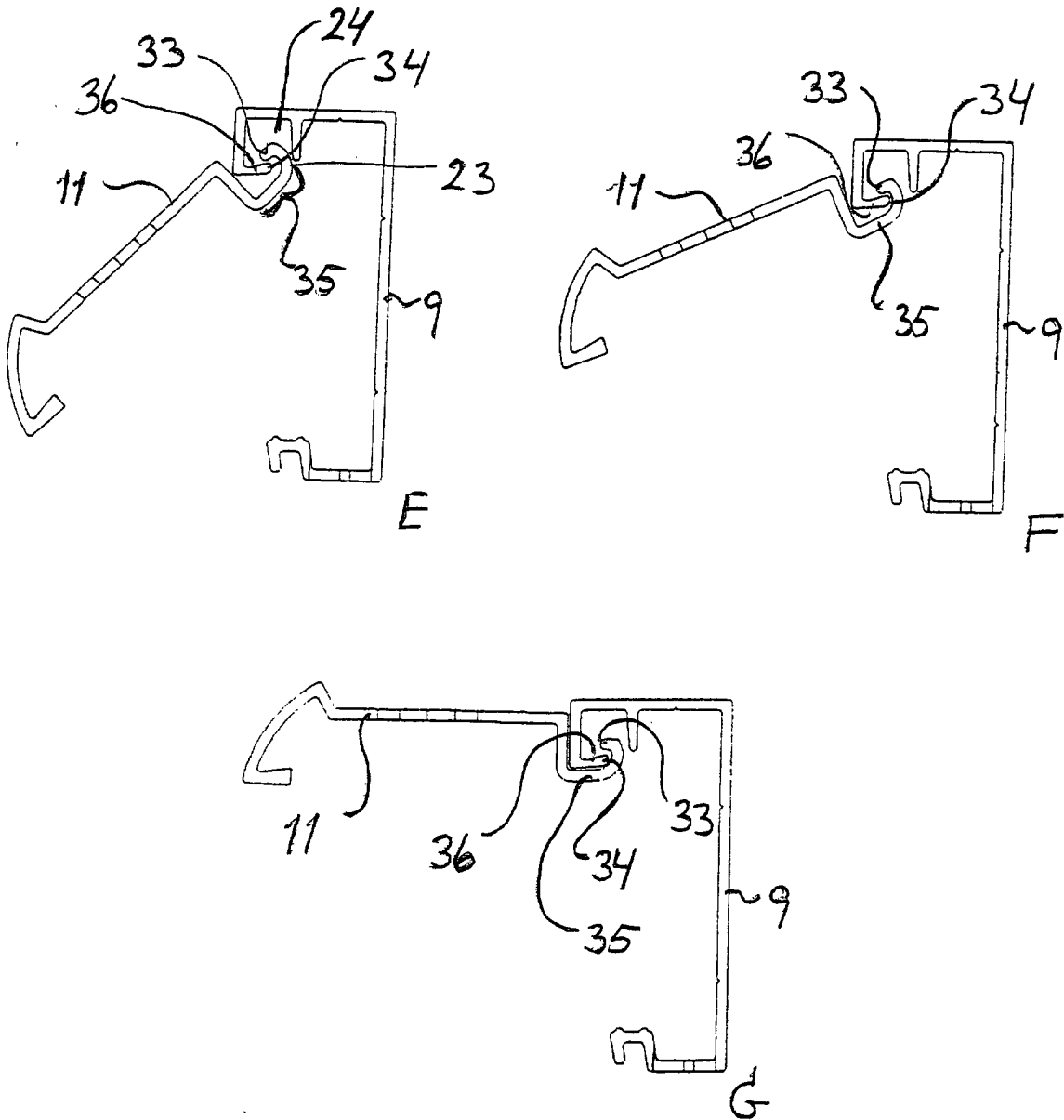


Fig. 6

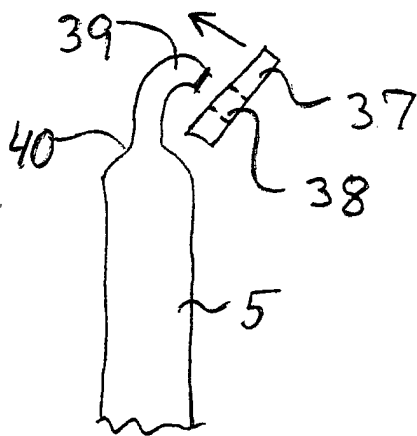


FIG. 7

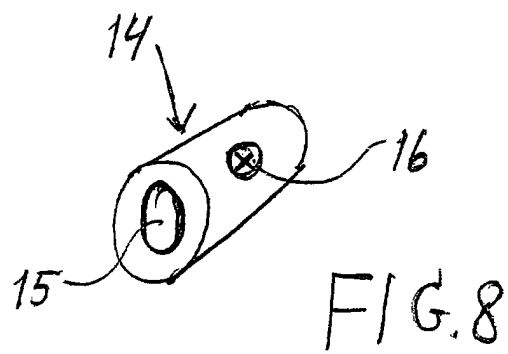


FIG. 8

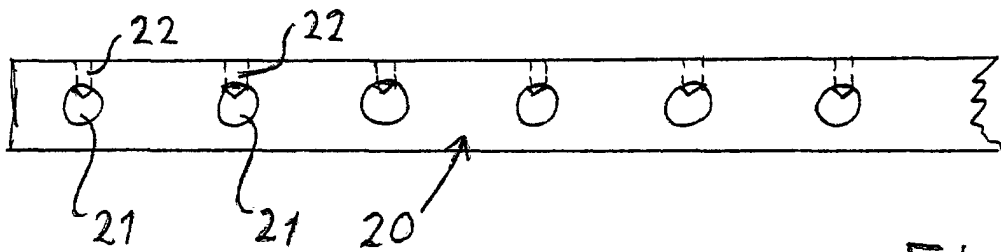


FIG. 9