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(54) A panelling system and a support stringer therefor.

(57) A wall or ceiling panelling system and a support stringer therefor in which the stringer (10) has a body (12) with flanges (16) on which are formed spaced apart support lugs (20), each having a pair of hooks (26) thereon and preferably a second pair of hooks (34), at least the hooks (26) having inclined surfaces (30) which are adapted to deflect inwardly, during mounting, outwardly directed beads (60) formed on side flanges (58) of a panel (52), the side flanges then springing out again to allow the beads (60) to become engaged in these hooks (26).

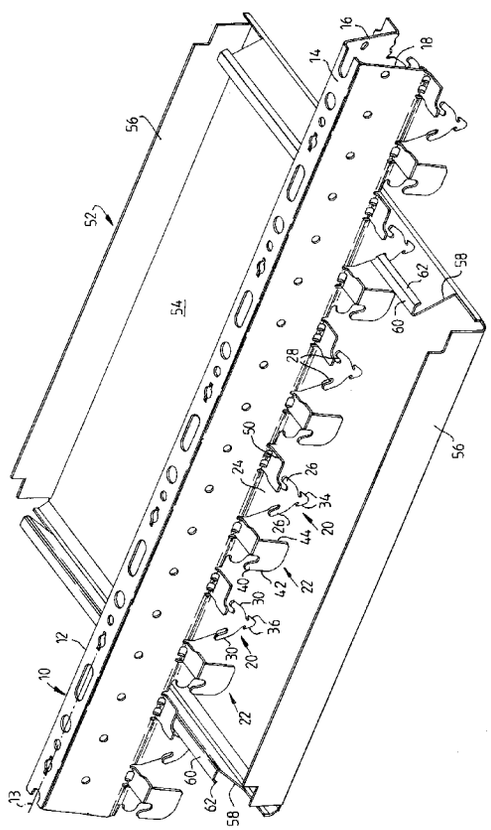

Fig.1.

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The present invention relates to a panelling system and to a support stringer therefor.

There are many well known different types of panelling system for covering walls or ceilings of buildings, vehicles or vessels. Most of these employ a plurality of panels, each having a pair of side flanges extending transversely from the panel in the same sense as one another and an outwardly directed bead at the free edge of each flange and a plurality of support stringers extending transversely, usually perpendicularly, to the length of the panels, the support stringers having lugs engageable by the beads of the flanges.

One example of such a structure is that shown in DE-O-2409709. This discloses one particular form of support stringer for a panelling system which comprises an elongate body having an axis, said body being provided with a plurality of support lugs at longitudinally spaced locations, each support lug having at least one hook, having an inner surface extending at an acute angle to the axis of the body and adapted to be engaged by an out-turned bead on the edge of a flange of a panel.

While such a structure is reasonably satisfactory, it can be quite difficult readily to mount the panels and dismount the panels as and when necessary.

The support stringer of the present invention is characterised in that each support lug hook has an outer surface spaced from the inner surface, which extends at an acute angle to the axis of the body in the same sense as that of the acute angle of the inner surface.

With such a structure, the bead associated with one of the side flanges of the panel can readily be engaged with the hook surface and then the panel can be pushed towards the support stringer at the other side thereof, the acute angle of the outer surface engaging the bead on the other flange and forcing it inwardly until the side of the panel has been pushed sufficiently for the bead to get beyond the hook whereupon the bead will spring outwardly and engage the hook.

Preferably each lug includes a stem portion connecting the hook to the body and the stem portion has an inclined surface on one or each side extending at an acute angle to the axis of the body in the same sense as that of the acute angle of the inner surface. Thus, when one wishes to demount the panel, one can then push the panel further towards the elongate body and the bead will ride along the inclined surface of the stem portion deforming the panel adequately for the bead to be pushed inwardly adequately for the bead to be disengaged from the hook.

It is also contemplated that each of the support lugs could include two hooks, one on each side, the two hooks having diverging inner surfaces and diverging outer surfaces. Thus, each lug could be used for support two panels in closely adjacent relation.

Preferably each of the support lugs is a generally triangular form and comprises a further hook on one or both sides, the further hook or hooks each having an outer surface extending at an acute angle to the axis of the body. The further hook or hooks could have an inner surface inclined at an acute angle to the axis of the body. Such an arrangement enables panels of a variety of different configurations to be mounted on the same form of support stringer.

In each instance the acute angle is advantageously between 55° and 65° and is preferably 60°.

The invention of the present application also contemplates a wall or ceiling panelling system comprising a plurality of panels, each having a pair of side flanges extending transversely from the panel in the same sense as one another, an outwardly directed bead at the free edge of each flange and a plurality of support stringers according to the invention, secured to said wall or ceiling with the axes in parallel spaced apart array, the outwardly directed beads of the panels engaging in the support lug hooks.

The side flanges can comprise a first portion extending from the panel and an inwardly inclined portion extending from the first portion to the bead. With such a structure the first portion may be connected to the panel by a further inclined portion, such that the first portion is located outwardly of the side of the panel and the further inclined portion and the inclined portion are preferably dimensioned relative to the dimensions of the support lugs, such that, when two adjacent panels are mounted on the support stringers, with the beads engaged in the hooks, the first portions of the flanges of adjacent panels are immediately adjacent one another.

Such an arrangement provides for a pleasing appearance with the panels very close to one another, but enables easy dismounting of the panels.

Advantageously the inwardly inclined portions extend at an acute angle substantially equal to the acute angle at which the outer surfaces of the lugs extend to the axis of the associated stringers.

In order that the present invention may more readily be understood, the following description is given, merely by way of example, reference being made to the accompanying drawings in which:-

Figure 1 is a perspective view of one embodiment of stringer according to the invention shown with a panel mounted thereon;

Figures 2 and 3 are schematic end elevations of panels mounted on the stringer showing the effect of wind suction and wind pressure respectively;

Figure 4 is a similar view showing a panel being mounted;

Figures 5 and 6 are further views showing the panel being demounted;

Figure 7 is a further similar view showing some locking lugs.

Figures 8, 9 and 10 are schematic views showing how a stringer similar to that shown in Figure 1 may be used for mounting several different forms of panel, and

Figures 11 to 13 are further similar views showing how a somewhat modified version of stringer can be used for mounting several different forms of panel.

If reference is now made to Figure 1, it can be seen that an elongate stringer 10 comprises a body 12 of inverted channel form having a web 14 and two side flanges 16,18 which diverge slightly away from the web 14. Each flange 18 is provided with a plurality of longitudinally spaced first lugs indicated by the general reference numeral 20 and these have interposed between them second lugs indicated by the general reference numeral 22.

Each of the first lugs 20 comprises a stem portion 24 and a pair of upper lug hooks 26 having an inner surface 28 extending at an acute angle to the longitudinal axis 13 of the elongate body 12 of the stringer. This angle is between 55° and 65° and advantageously is 60°.

The outer surface 30 is spaced from the inner surface 28 and also extends at an acute angle to the axis of the body in the same sense as that of the acute angle of the inner surface 28. As shown, these two acute angles are the same, i.e. about 60°.

Stem portion 24 connects the two hooks 26 to the associated flange 18 of the body 12 and this also has an inclined surface 32 (see Figure 2) on each side, the angle of inclination again being approximately 60° to the longitudinal axis 13.

Each lug 20 also has a second lower hook 34 on each side which each again have an outer surface 36 which extends at an acute angle, preferably the same acute angle, to the axis of the body.

As mentioned the support stringer 10 also includes second lugs 22 which are of a more conventional shape having a single hook 40, the outer surfaces 42 and 44 of the lugs being substantially parallel to one another and substantially perpendicular to the longitudinal axis 13.

Intermediate each first lug and one of the adjacent second lugs is a locking lug 50.

As can be seen from Figure 1, the stringer 10 is used to support a panel 52 which is shown having a main panel web portion 54 and two end flanges 56, as well as two side flanges 58 each having, at their upper edge, an outwardly turned bead 60 with a downwardly turned rim 62. These rims are engaged in the upper hooks 30 to retain the panel in place.

As can be seen in Figure 2, each lug 22 has, facing each of the hooks 26, 30, a projection 64, forming the bottom edge of the inclined surface 30 of the stem portion 24. This serves to assist in retaining the bead 60 and rim 62 in engagement with the hook.

As shown, each of the side flanges comprises a first portion 66 which located outwardly of the side of the panel by an outwardly inclined portion 68, while an inwardly inclined portion 70 connects the first portion 66 to the outwardly extending bead 60.

Figure 2 illustrates how wind can have a suction effect on the panel and cause the main web portion 54 to bow downwardly and tend to pull the rims 62 and bead 60 firmly into contact with the hooks 30.

Figure 3 shows how the wind can also produce an upward force tending to bow the web portion 54 upwardly and urge the juncture between the bead 60 and rim 62 against the projection 64. During each of these distortions, however, the first portion 66 of the side flanges remain immediately adjacent one another.

Figure 4 illustrates the panel being mounted. As shown on the left hand side of the panel 52 the bead 60 and rim 62 are engaged over the hook 30 of one of the lugs. The right hand rim will, however, be arranged initially below its associated lug 20 and then it is pushed upwardly as indicated by the arrow A. Two positions are shown here and it can be seen that in the first or lower position the bead 60 is engaging the inclined surface 30 of the lug 26 and as pushing is continued, the bead moves up with its rim 62 contacting this inclined surface 30, thereby to distort, resiliently, the side flange 58 inwardly until the rim passes over the top of the hook 26. While this is happening, as shown in Figure 4, the centre part of the main panel 54 deflects downwardly.

Once the rim 62 is above the hook 26, it will spring outwardly and engage in the hook.

Figures 5 and 6 illustrate the demounting of the panels. One first of all pushes up, as shown in Figure 5, in the direction of the arrow B still further and a similar deflection will occur, but to a greater extent. It will be seen that the first portion 66 and the outwardly inclined portion 68 also engage the inclined surface 30 on the outer side of the hook and the rim 60 and bead 62 are deflected even further to the left until the left hand side of the bead 60 abuts the surface 44 of the adjacent second lug 22. An operator can then manually hold the panel in this distorted state and can pull it down as indicated by the arrow C and then the panel can be allowed to drop down to disengage as shown in Figure 6.

It is interesting to note here that the configuration of the first portion 60 of the flange on the left hand side shown in Figure 6 abutting the lower part of the lug 20 will automatically dislodge the bead 60 and its rim 62 on that left hand side as indicated by the arrow D.

It will thus be appreciated that no special tools are required for mounting or dismounting the panel, despite the fact that the panels may be arranged very closely adjacent to one another in their mounted state. All that is necessary is for an operator to push one side of the panel upwardly firmly, allow the panel

to be distorted by the inclined surfaces, to hold the panel in that distorted state and then pull it downwardly.

In order to prevent unwanted dislodging, the stringer nearest to one side of the panel can have the locking lugs 50 bent downwardly as shown in Figure 7.

Figure 8 illustrates use of a stringer similar to that shown in Figure 1 to mount a panel having a different side flange configuration, the inturned beads 70 of the side flanges being engaged in the lower or second hooks 34.

Figure 9 shows an arrangement in which a slightly modified version of the side flanges and outwardly turned beads are engaged in the upper hooks 26.

Figure 10 shows an alternative arrangement in which on one side of a panel there is an inturned bead 75 engaged in a hook, and on the other side of an adjacent panel there is a flat outwardly direct flange portion 76 disposed thereabove and engaged under a different form of second lug 78.

In Figures 11, 12 and 13 a slightly modified version of the first lugs 20 is shown in which there is only a single hook on each side, each hook being formed by a bent out lug portion 80 having two outwardly inclined arms 82 which will provide an inclined outer surface similar to the outer surface 30 shown in the Figure 1 structure and an inclined inner surface parallel thereto. Figures 12 and 13 simply illustrate different forms of panel which can all be engaged on these alternative forms of lugs.

Claims

1. A support stringer for a panelling system, said support stringer comprising an elongate body having an axis, said body being provided with a plurality of support lugs at longitudinally spaced locations, each support lug having at least one hook, having an inner surface extending at an acute angle to the axis of the body and adapted to be engaged by an out-turned bead on the edge of a flange of a panel, characterised in that each support lug hook has an outer surface spaced from said inner surface, which extends at an acute angle to the axis of the body in the same sense as that of the acute angle of the inner surface.

2. A support stringer according to claim 1, characterised in that each lug includes a stem portion connecting the hook to the body, and in that the stem portion has an inclined surface on one or each side extending at an acute angle to the axis of the body in the same sense as that of the acute angle of the inner surface.

3. A support stringer according to claim 1 or 2, characterised in that each of said support lugs includes two hooks, one on each side, the two hooks having diverging inner surfaces and diverging outer surfaces.

4. A support stringer according to claim 1, 2 or 3, characterised in that each of said support lugs is of generally triangular form and comprises a further hook on one or both sides, the further hook or hooks each having an outer surface extending at an acute angle to the axis of the body.

5. A support stringer according to claim 4, characterised in that said further hook or hooks have an inner surface inclined at an acute angle to the axis of the body.

6. A support stringer according to any preceding claim, characterised in that said acute angle is between 55° and 65°.

7. A support stringer according to any preceding claim, characterised in that it includes additional lugs interposed between said support lugs, said additional lugs including hooks having outer surface extending substantially perpendicular to said axis of the body.

8. A wall or ceiling panelling system, comprising a plurality of panels, each having a pair of side flanges extending transversely from the panel in the same sense as one another, an outwardly directed bead at the free edge of each flange, and a plurality of support stringers according to any preceding claim, secured to said wall or ceiling with the axes in parallel spaced apart array, the outwardly directed beads of the panels engaging in said support lug hooks.

9. A system according to claim 8, characterised in that said side flanges comprise a first portion extending from the panel, and an inwardly inclined portion extending from said first portion to the bead.

10. A system according to claim 9, characterised in that said first portion is connected to the panel by a further inclined portion, such that the first portion is located outwardly of the side of the panel, and in that said further inclined portion and said inclined portion are dimensioned relative to the dimensions of the support lugs, such that, when two adjacent panels are mounted on said support stringers, with the beads engaged in said hooks, said first portions of the flanges of adjacent panels are immediately adjacent one another.

11. A system according to claim 9 or 10, characterised in that said inwardly inclined portions extend at an acute angle substantially equal to the acute angle at which the outer surfaces of the lug hooks extend to the axis of the associated stringer.

12. A system according to claim 8, characterised in that said support stringers are of a type set forth in claim 2, 3 or 4, characterised in that some panels have their flanges dimensioned whereby the beads thereon are engaged in said further hooks.

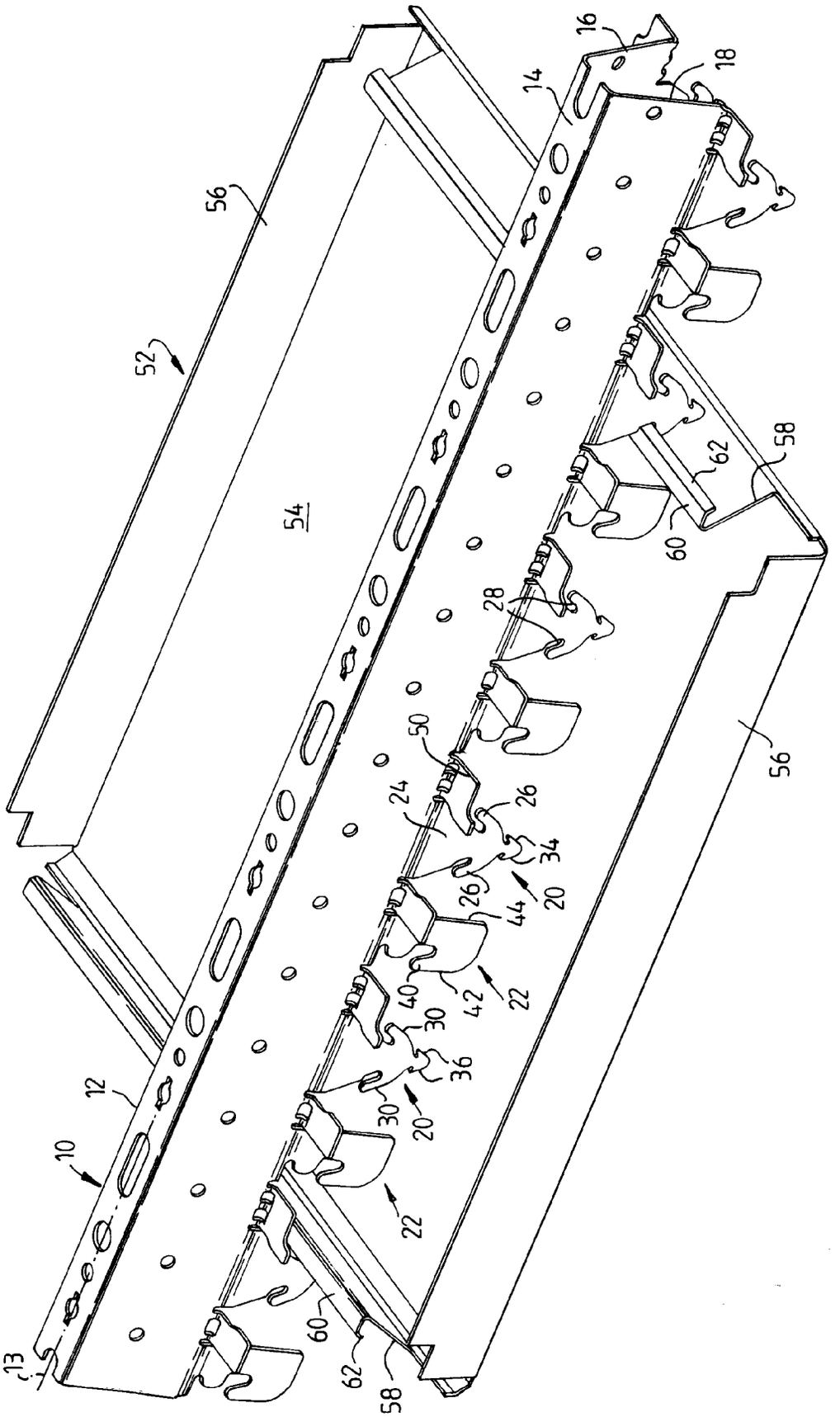


Fig.1.

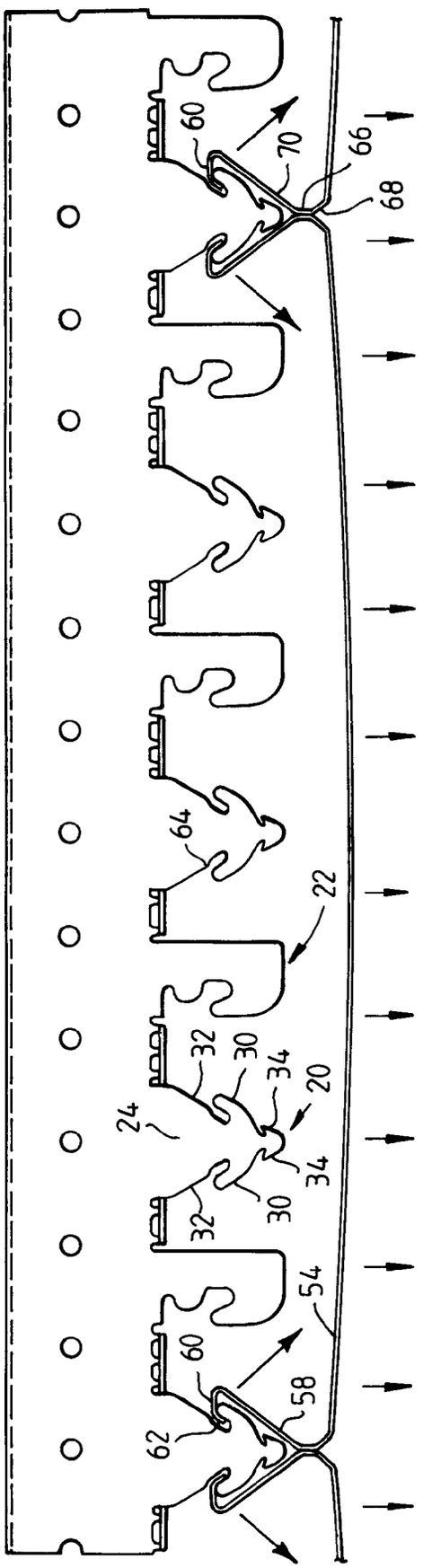


Fig.2.

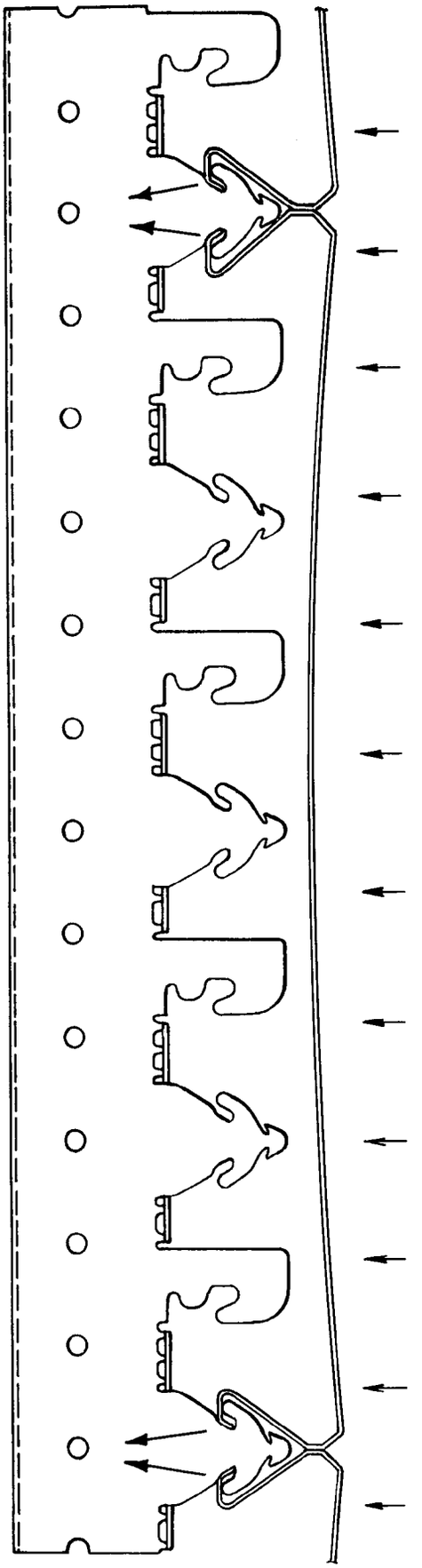


Fig.3.

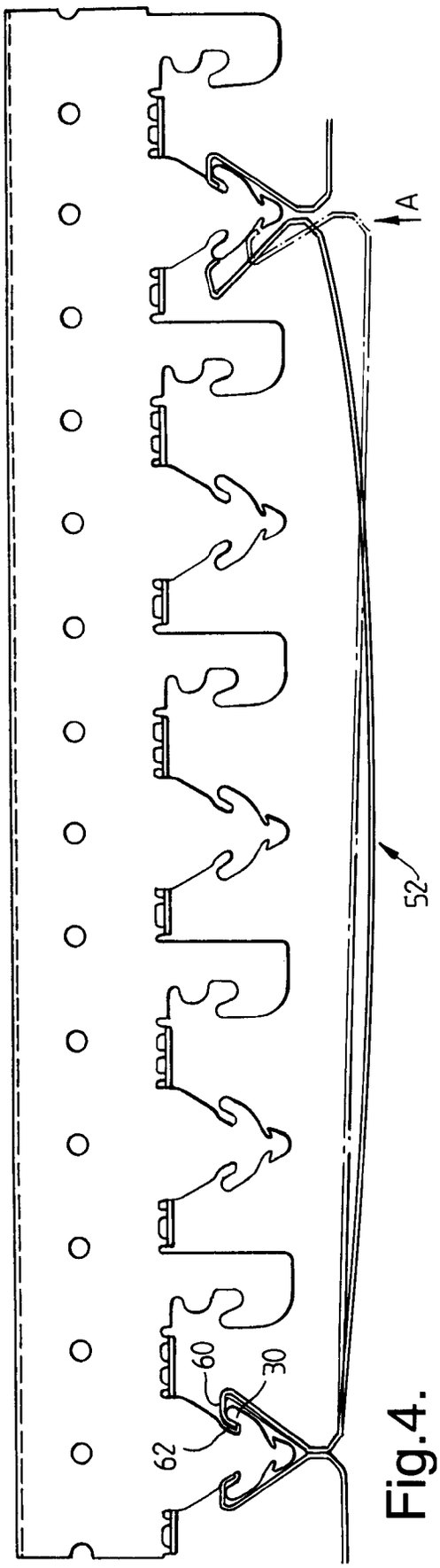


Fig.4.

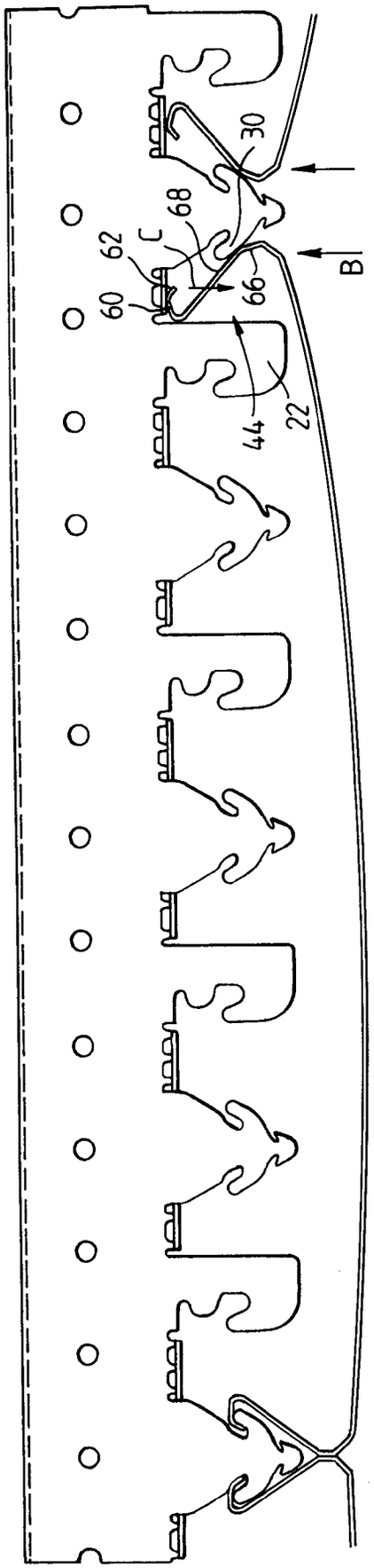


Fig.5.

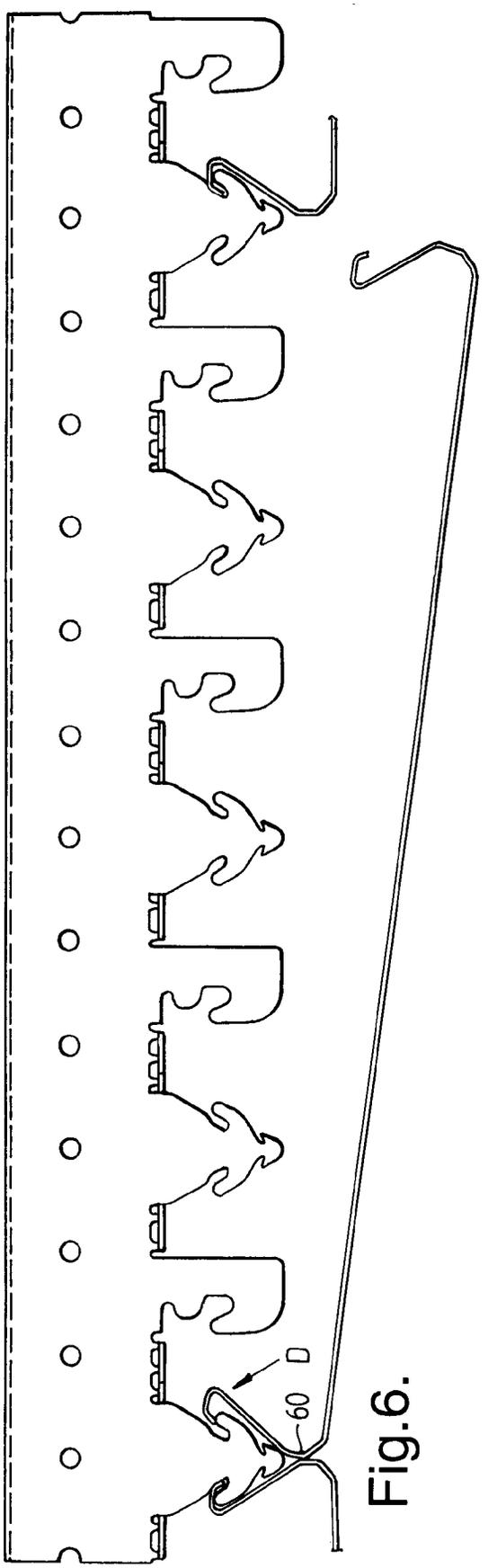


Fig.6.

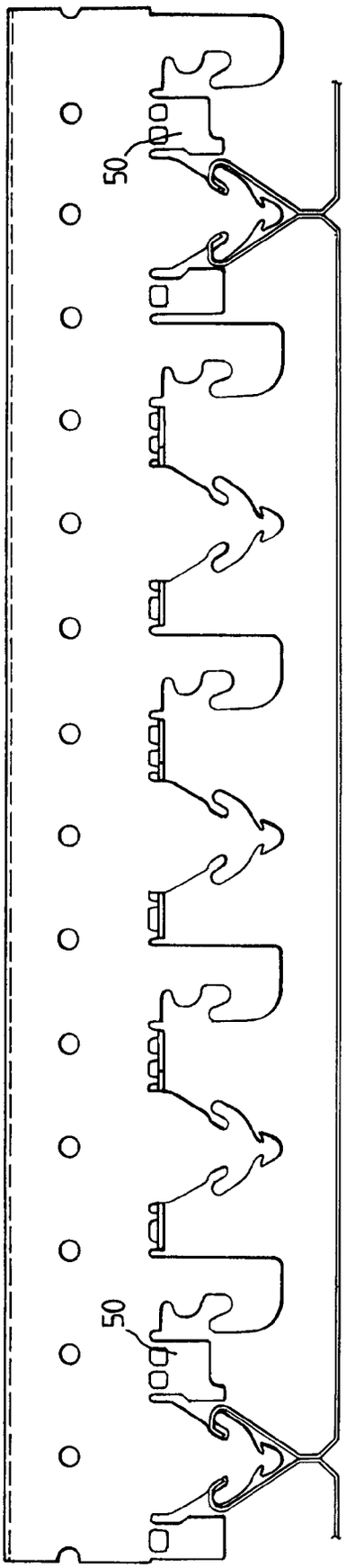


Fig.7.

Fig.8.

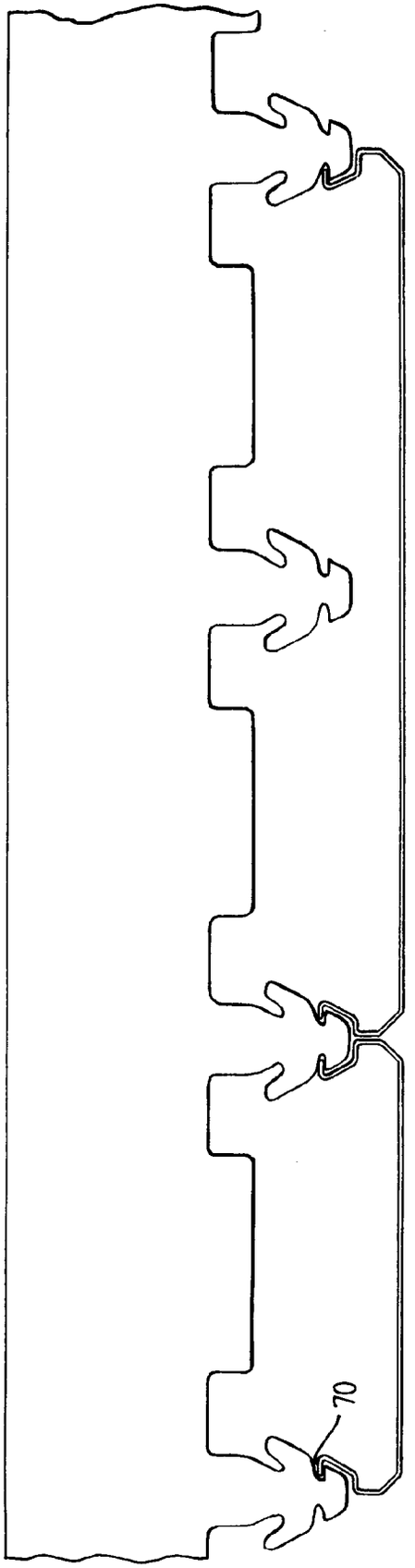


Fig.9

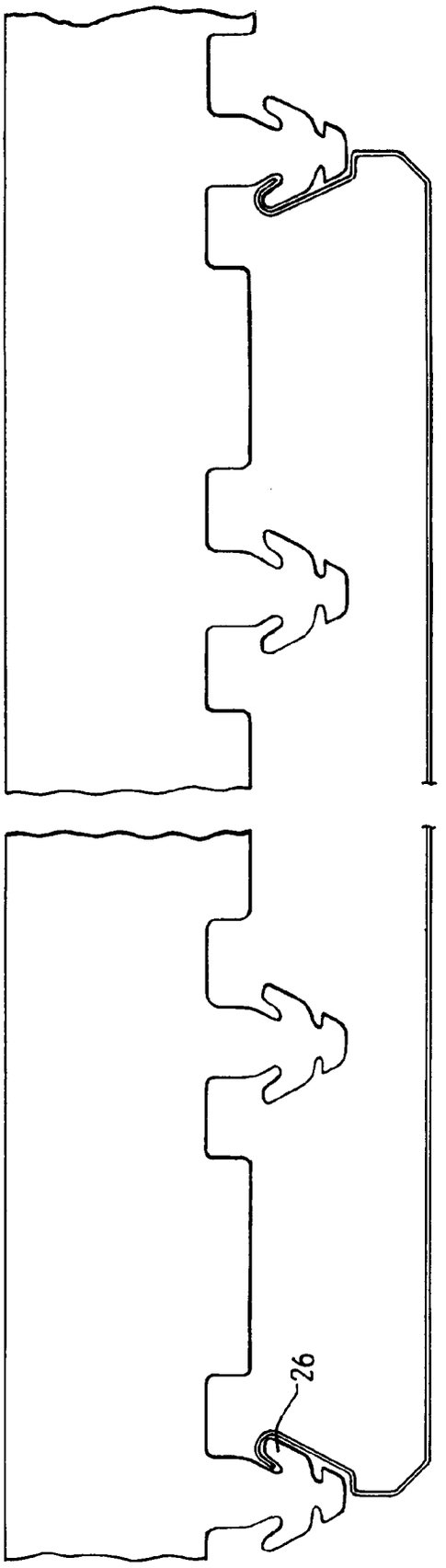


Fig.10

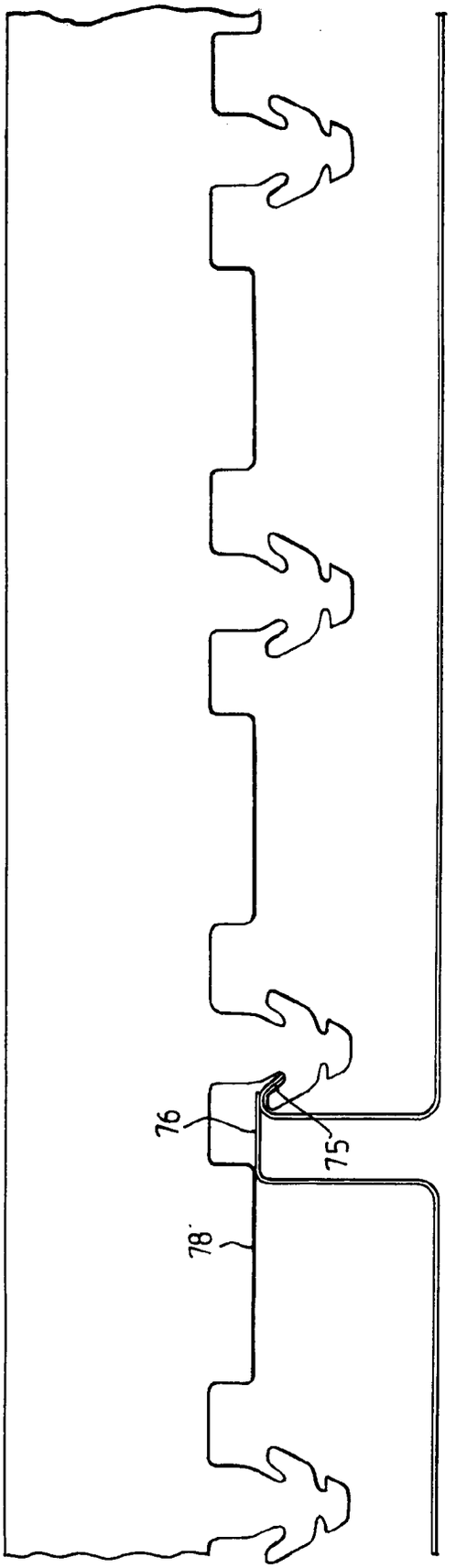
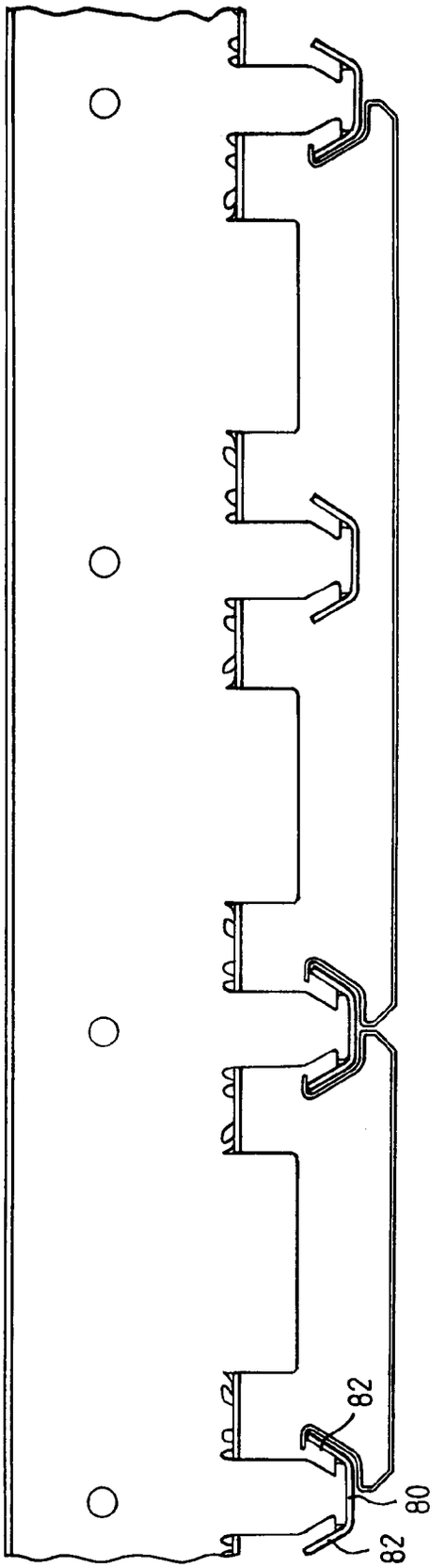


Fig.11



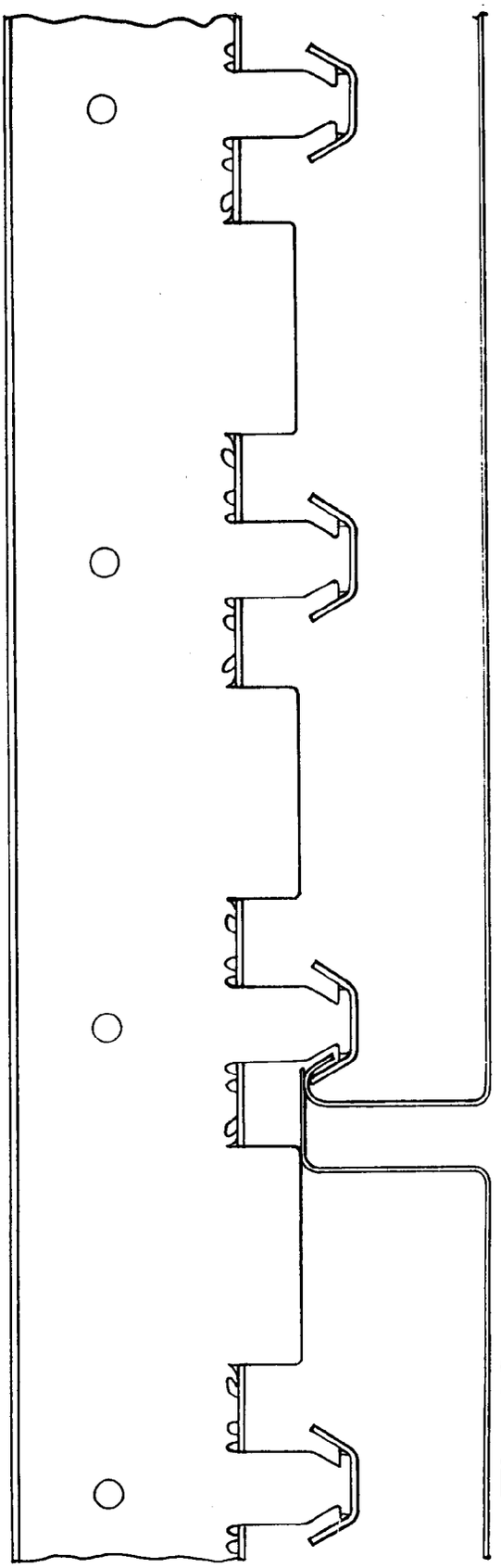


Fig.12.

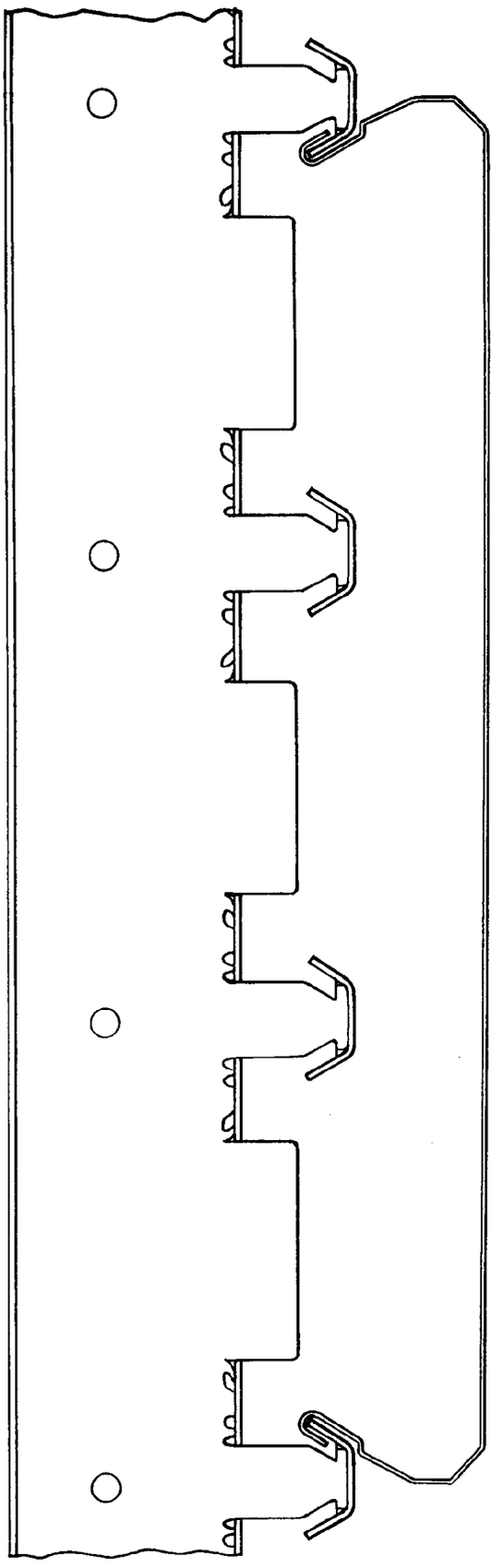


Fig.13.