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(54) Scaffolding plank

(57) A cold rolled formed steel plank (11) formed from elongate steel strip defines a base web (12) and parallel side walls (13, 14) at 90° to the web, respective free ends of the side walls being bent inwardly through 90° to define flanges (15, 16) parallel to web, the web bent between the side walls to define a longitudinal rib (17) of double strip thickness projecting from the web in the same direction as the side walls. At each of its ends the plank is provided with separately formed support fittings (21), each having a comprising a support plate (22) and a clamp hook (23) for gripping between them a scaffolding pole (20).

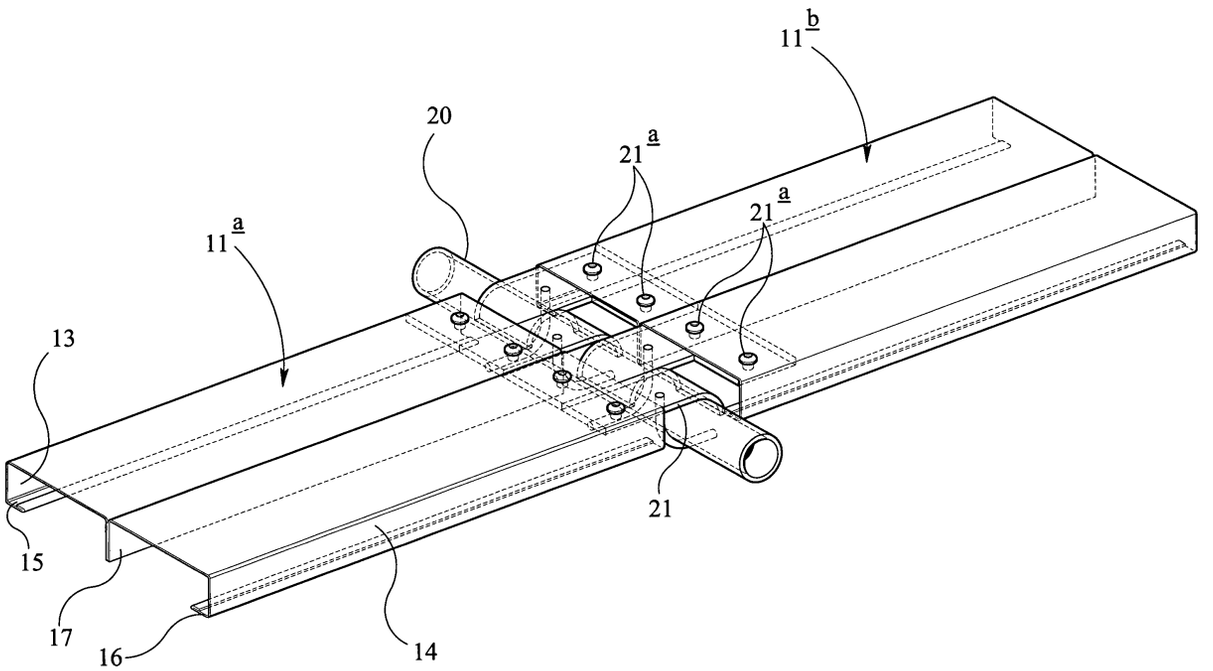

FIG 1

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Description

[0001] This invention relates to planks or battens primarily, but not exclusively intended for use in spanning horizontal members of a building scaffolding system to provide a generally horizontal surface from which work can be performed. Hereinafter such devices are referred to as "planks".

[0002] US Patent 6105723 illustrates a cold formed steel plank of multi-part construction. In particular in US Patent 6105723 there is a cold formed sheet steel element in which the longitudinal edges of an elongate steel strip are bent to form elongate, closed, box sections running along both marginal edges of the strip. It is an object of the present invention to provide a cold rolled steel plank in a more simple, economic, and convenient form.

[0003] In accordance with a first aspect of the present invention there is provided a cold rolled formed steel plank comprising an elongate steel strip marginal edge regions of which are bent substantially at right angles to the plane of the strip so that the strip defines a channel-section having a base web and substantially parallel side walls, and, the side walls being bent inwardly at their free ends to define flanges extending generally parallel to the web, whereby the channel is a C-shaped channel, and, the web being bent, intermediate said side walls, to define an integral, longitudinally extending rib intermediate said side walls, and projecting from said web in the same direction as the side walls.

[0004] Preferably free edges of said flanges of said side walls are turned back on themselves to define rolled edges or "Dutch Beads".

[0005] Preferably said rib protrudes from the plane of the web by an amount substantially equal to the height of the side walls, whereby said side walls and said rib terminate substantially in a common plane parallel to the plane of the web.

[0006] Preferably said rib is disposed equidistantly between said side walls.

[0007] Desirably the plank is provided at one, and preferably both, of its ends with separately formed support fittings, each support fitting being anchored to the plank and having a component projecting longitudinally beyond the end of the plank and curved to seat over a corresponding cylindrical scaffolding pole. In one embodiment each support fitting includes a clamping device for engaging said scaffolding pole beneath said component so that by operation of the clamping device said scaffolding pole can, in use, be gripped between said component and said device of the fitting.

[0008] Preferably said projecting component of each fitting has a width dimension calculated so that a corresponding protruding component of a next longitudinally adjacent plank can engage the same scaffolding pole, along side the protruding component of the first mentioned plank, and within the width of the plank so that the two longitudinally adjacent planks can be aligned.

[0009] Desirably the fittings of adjacent planks are arranged such that placing their respective protruding components side-by-side longitudinally aligns the planks.

[0010] Preferably at each end of each plank there is a respective fitting secured to the plank at each side of said rib, and more preferably each protruding component occupies approximately half of the width of its respective fitting.

[0011] Preferably said clamping devices are metal rods having a screw threaded shank at one end, and a curved region for engagement with the cylindrical surface of the scaffolding pole at their opposite end. In one embodiment each screw threaded shank cooperating with a screw threaded nut or the like to secure the device to the respective fitting.

[0012] Conveniently one side wall of each plank has one of an aperture and a corresponding protrusion therein and the opposite side wall of the plank has the other of said aperture and said corresponding protrusion therein whereby two planks in side-by-side abutment can interlock so that load on one plank can be shared with the adjacent plank.

[0013] The invention further resides in a fitting as defined above for use with a scaffolding plank.

[0014] One example of the invention is illustrated in the accompanying drawings wherein:-

Figure 1 is a diagrammatic perspective view of two scaffolding planks engaging a single horizontal scaffolding tube;
Figure 2 is a view similar to Figure 1, but from beneath the planks, and to a reduced scale;
Figure 3 is a plan view of the planks in Figures 1 and 2;
Figures 4 and 5 are views in the direction of arrows "A" and "B" in Figure 3 respectively;
Figure 6 is a diagrammatic transverse cross-sectional view of one of the planks of Figure 1;
Figure 7 is a scrap view illustrating a modification of the plank;
Figure 8 is a perspective view of part of an end fitting of each of the planks of Figures 1 to 5; and;
Figure 9 is a side elevational view of a clamping device associated with the fitting of Figure 8.

[0015] Referring to the drawings, each plank is cold roll formed from an elongate strip of mild steel which preferably, before or after forming, is provided with a protective coating. For example, the strip from which the plank is cold rolled may be a galvanised mild steel strip. Furthermore, each plank may be cold rolled as an individual item, but preferably the strip will be a substantially continuous strip drawn from a supply reel, and the cold rolling process will produce a continuous plank profile which, as it issues from the rolling line, is cut into predetermined plank lengths.

[0016] Each plank 11 has a substantially planar web 12 defining the width of the plank. The upper surface of

the web 12 can be ribbed, to provide an anti-slip surface, and additionally or alternatively the web 12 can be pierced to allow water to drain away. Integral side walls 13, 14 are formed by bending the marginal edge regions of the strip generally at right angles to the plane of the strip so that the strip has a channel-shaped cross-section. The free edge regions of the side walls 13, 14 are bent inwardly, at right angles to their side walls, to define inturned integral flanges 15, 16 extending towards one another throughout the length of the plank, and substantially parallel to the web 12. As is apparent from Figure 6, desirably longitudinally extending free edge regions of the flanges 15, 16 are turned back on themselves to define rounded edges or, as they are sometimes known, "Dutch Beads".

[0017] It will be recognised that the cold rolled forming of the strips so far described produces a profile having a C-shaped cross-section. During the rolling process, the mid-region of the web 12 is folded downwardly, parallel to the side walls 14, 15 to form a rib 17 of double strip thickness, extending along the longitudinal centre line of the web 12 and disposed mid-way between the walls 13, 14 parallel thereto. The rib 17 protrudes from the web 12 at right angles thereto by an amount equal to the protrusion of the side walls 13, 14 so that the flanges 15, 16 and the free edge of the rib 17 lie substantially in a common plane parallel to but spaced from the plane of the web 12.

[0018] It will be recognised that if the plank described above is placed on a flat surface, with the flanges 15, 16 supporting the web 12 spaced above that surface, then loading applied to the web 12 will not cause any significant outward splaying of the side walls 13, 14 because much of that load will be transmitted to the underlying surface by engagement of the rib 17 with that surface.

[0019] In a modification of the plank cross-section illustrated in Figure 6, the side walls 13, 14 are inclined inwardly by a small angle so that they converge, rather than being parallel to the rib 17.

[0020] In a further modification illustrated in Figure 7, the rib 17 is replaced by an integral hollow triangular rib formation 18 having side walls which diverge with respect to one another from the web 12 and are joined by an integral base wall the plane of which is continuous with the plane of the flanges 15, 16.

[0021] Figures 1, 2, 3 and 4 illustrate first and second identical planks 11a, 11b aligned end-to-end and supported by horizontally extending scaffolding poles only one of which is shown in the drawings at 20. It will be recognised however that in the most likely scaffolding application the planks 11 will be supported at their other ends on respective horizontal scaffolding poles.

[0022] In order to provide support and attachment of each plank end to a respective scaffolding pole 20, each of the planks 11a, 11b illustrated in Figures 1, 2, 3 and 4 has two identical support fittings 21 secured, in this embodiment, at each end of the plank. Each fitting 21 consists primarily of a support plate 22 and a clamp hook 23, illustrated in Figures 8 and 9 respectively. The fittings could be at one end only.

[0023] For the plank profile shown in Figure 6 each plank 11a, 11b has four support plates 22, two at each end of each plank. Each support plate 22 is formed from steel plate the gauge of which is significantly thicker than the gauge of the sheet steel from which the plank is cold rolled, so as to be rigid in its own right. Each support plate 22 includes an anchor region 24 the width of which is just less than half the width of the plank so that each anchor region can fit between a side wall and the mutually presented face of the rib 17, in facial contact with the under surface of the web 12. Each support plate is secured to the web 12 by welding or bolting, and spot welding the anchor region 24 to the web 12 at a plurality of points has proved satisfactory. The drawings show the use of bolts or screws 21a but spot welds at the same and/or additional points may be used. Each support plate 22 is, as can be seen from Figure 8, substantially L-shaped and includes an integral spanning component 25 which protrudes from the anchor region 24 across half the width of the anchor region 24. When the support plate 22 is secured to its respective plank the anchor region 24 is received beneath the web 12 and the spanning component 25 protrudes longitudinally beyond the end of the plank. It can be seen that each spanning component 25 includes a planar region 25a continuous with the planar anchor region 24 and a downwardly curved part cylindrical region 25b the radius of curvature of the under surface of which is equal to the radius of curvature of the outer surface of the scaffolding pole 20.

[0024] All of the support plates 22 are identical. Thus as is apparent from Figures 1 and 3, the two support plates attached to the one end of the plank 11b have their spanning components 25 disposed adjacent the side wall 13 and the rib 17 respectively whereas the two spanning components of the plates secured to the adjacent end of the plank 11a are adjacent to the rib 17 and the side wall 14 respectively. When the respective ends of the planks 11a, 11b are offered to the scaffolding pole 20 the spanning component 25 of the plank 11a adjacent the rib 17 sits between the spanning components of the plates of the plank 11b, and similarly the spanning component 25 of the plank 11b which is adjacent the rib 17 of the plank 11b sits between the spanning components of the plank 11a. Thus all four spanning components can fit over the same scaffolding pole 20 to support their respective plank ends on the pole 20 and the interdigitation of the components 25 and their width in relation to the plank width ensures that the planks 11a, 11b longitudinally aligned.

[0025] It will be recognised that the support plates 22 of the planks will distribute load applied to the planks, into the pole 20. However, as loading on the planks 11a, 11b changes, or as a result of wind lift, then the planks may bounce and lift relative to the pole 20 generating noise, and risking that a plank may become detached

from the pole 20, or may protrude upwardly into the path of someone working on the scaffolding. Thus in order to prevent lifting of the plank ends relative to the pole 20 each support fitting has a clamp hook 23 in the form of a length of steel rod shaped to define a rectilinear, screw-threaded shank 27 at one end and a curved hook formation 28 terminating in a rectilinear leg 28a at its opposite end. In use, the screw-threaded shank 27 is introduced through an aperture 26 in the region 25 of a respective support plate 22, from beneath the support plate 22 so that the hook formation 28 engages the surface of the pole 20 diametrically opposite the engagement of the region 25b of the respective plate 22. The threaded shank 27 protrudes upwardly through the aperture 26 and can receive a nut in screw-threaded engagement therewith. The nut bears against the upper surface of the region 25a of the plate 22 to pull the clamp hook 23 upwardly so gripping the pole 22 between the curved region 25b of the plate 22 and the hook formation 28 and preventing movement of the respective plank relative to the pole 20.

[0026] In a modification the upper surface of each support plate 22 is recessed around the aperture 26 so that the upper end of the shank 27 and the associated nut can be received within the recess and so do not protrude significantly above the upper surface of the web 12 of each plank in use. A socket spanner or the like can be used to operate the nut to clamp the fitting to the pole 20.

[0027] However in a preferred arrangement the aperture 26 in the plate 22 is threaded and the shank 27 is in screw threaded engagement with aperture 26, the nut mentioned above being dispensed with. When assembling the planks to poles 20 the hooks 23 are turned so that their plane is parallel to the pole 20 and after the respective component 25 has been seated on the pole, the respective hook is turned through 90°, using the leg 28a as a lever, so that the hook formation 28 engages the curvature of the pole and the leg lies beneath the pole opposite the component 25. The rotation of the shank through 90° screws the shank into the aperture 26 so that the leg 28a bears against the pole and further rotation of hook 23 would increase the binding of the leg 28a against the pole and is thus resisted, the binding of the leg against the pole resisting inadvertent return rotation of the hook 23 from the "locked" position. The depth of the aperture is such that in the "locked" position of each hook 23, its respective shank 27 terminates substantially flush with the upper surface of the plate 22. Generally it is preferred to assemble planks to scaffolding from below and the above arrangement is ideally suited to such assembly as the need to tighten a nut from above the plank is avoided.

[0028] In a further modification the clamping action of the fitting to the pole 20 is not a screw clamp action and instead the clamp hook 23 is permitted to rotate relative to the plate 22 through 90° from a position in which the hook component 28 extends parallel to the pole, to a position in which the hook component extends at right angles to, and partially beneath the pole. In effect this is a 90° "turn buckle" mechanism in which the clamp hooks 23 are positioned with their hook components 28 parallel to the pole during engagement of the plank fittings with the pole 20, and thereafter a tool is engageable with the upper end of the clamp hook 23, from the upper surface of the plate 22, to rotate the clamp hook 23 through 90° to engage the hook component 28 thereof beneath the pole 20 while the curved region 25b of the corresponding plates 22 engages over the top of the pole 20. Detent means of any convenient form may be provided for defining the rest and operative positions of the clamp hook 23 relative to the plate 22 so that the clamp hook 23 will remain in either the rest position or the operative position relative to the plate 22 against vibration in use.

[0029] Desirably one of the side walls 13, 14 of each plank is formed with one or more protrusions, conveniently a continuous, longitudinally extending, rib of 'V' or semi or part circular cross-section, and the other side wall has a corresponding one or more recess or aperture, conveniently a continuous, longitudinally extending, groove of mating, 'V' or semi or part circular cross-section. Thus planks positioned in side-by-side abutment (side wall 13 to side wall 14) can interlock and vertical component loads imposed on one plank will be distributed, by way of the interlock of protrusion in recess, also to the adjacent plank.

[0030] In a further modification the plank is formed with one or more additional ribs 17 and the fittings 21 are sized accordingly. Still further it is possible to produce a plank variant in which the rib 17 is replaced or augmented by a plurality of ribs which do not extend as far as the rib 17 towards the plane of the flanges 15, 16. The lesser ability of such a plank to withstand splaying of the side walls 13, 14 could be overcome by providing an end fitting which anchors to the plank and embraces or attaches to, the side walls 13, 14.

Claims

1. A cold rolled formed steel plank comprising an elongate steel strip marginal edge regions of which are bent substantially at right angles to the plane of the strip so that the strip defines a channel-section having a base web and substantially parallel side walls, and, the side walls being bent inwardly at their free ends to define flanges extending generally parallel to the web, whereby the channel is a C-shaped channel, and, the web being bent, intermediate said side walls, to define an integral, longitudinally extending rib intermediate said side walls, and projecting from said web in the same direction as the side walls.

2. A plank as claimed in Claim 1, wherein free edges

of said flanges of said side walls are turned back on themselves to define rolled edges.

3. A plank as claimed in Claim 1 or Claim 2, wherein said rib protrudes from the plane of the base web by an amount substantially equal to the height of the side walls, whereby said side walls and said rib terminate substantially in a common plane parallel to the plane of the web.

4. A plank as claimed in any one of Claims 1 to 3, wherein said rib is disposed equidistantly between said side walls.

5. A plank as claimed in any one of Claims 1 to 4, provided at one of its ends with separately formed support fittings, each support fitting being anchored to the plank and having a component projecting longitudinally beyond the end of the plank and curved to seat, in use, over a correspondingly cylindrical scaffolding pole.

6. A plank as claimed in Claim 5, wherein each support fitting includes a clamping device for engaging said scaffolding pole beneath said component so that by operation of the clamping device said scaffolding pole can, in use, be gripped between said component and said device of the fitting.

7. A plank as claimed in Claim 5 or Claim 6, wherein said projecting component of each fitting has a width dimension calculated so that a corresponding projecting component of a next longitudinally adjacent plank can, in use, engage the same scaffolding pole, alongside the projecting component of the first mentioned plank, and within the width of the plank so that the two longitudinally adjacent planks can be aligned.

8. A plank as claimed in Claim 7, wherein the fitting of adjacent planks are arranged such that placing their respective projecting components side-by-side, in use, longitudinally aligns the planks.

9. A plank as claimed in any one of Claims 5 to 8, wherein at the or each end thereof is a respective fitting secured thereto at each side of the rib.

10. A plank as claimed in any one of Claims 5 to 9, wherein each projecting component occupies approximately half of the width of its respective fitting.

11. A plank as claimed in Claim 6, wherein the clamping device is a metal rod having a screw threaded shank at one end, and at its opposite end a curved region for engagement, in use, with the cylindrical surface of the scaffolding pole.

12. A plank as claimed in Claim 11, wherein the screw threaded shank cooperates with a screw threaded nut or the like to secure the device to the fitting.

13. A plank as claimed in Claim 11, wherein the screw threaded shank is threadedly engaged with an internally threaded aperture in the support fitting.

14. A plank as claimed in Claim 6, wherein the clamping device is in the form of a 90° turn buckle mechanism being rotatable, in use, through said 90 by a tool to engage said scaffolding pole.

15. A plank as claimed in Claim 14, including detent means defining respective rest and operative positions of the clamping device.

16. A plank as claimed in any one of the preceding claims, wherein one side wall thereof has one of an aperture and a corresponding protrusion therein and the opposite side wall thereof has the other of said aperture and corresponding protrusion therein, whereby two planks in side-by-side abutment, in use, can interlock so that load on one plank can be shared with the adjacent plank.

17. A plank as claimed in either Claim 1 or Claim 2, wherein said rib protrudes from said base web by an amount less than the height of said side walls, and an end fitting is attached to the side walls and the base web.

18. A plank as claimed in any one of the preceding claims, wherein the base web has an anti-slip surface.

19. A plank as claimed in any one of the preceding claims, wherein the base web is pierced.

20. A fitting for use with a scaffolding plank as claimed in any one of Claims 1 to 4, comprising an anchor region for securement to the plank, and a projecting curved region adapted for engagement with a cylindrical scaffolding pole.

21. A fitting as claimed in Claim 18, comprising a clamping device engagable with said anchor region and having a part adapted to extend below said scaffolding pole and grip it between said projecting region and said part.

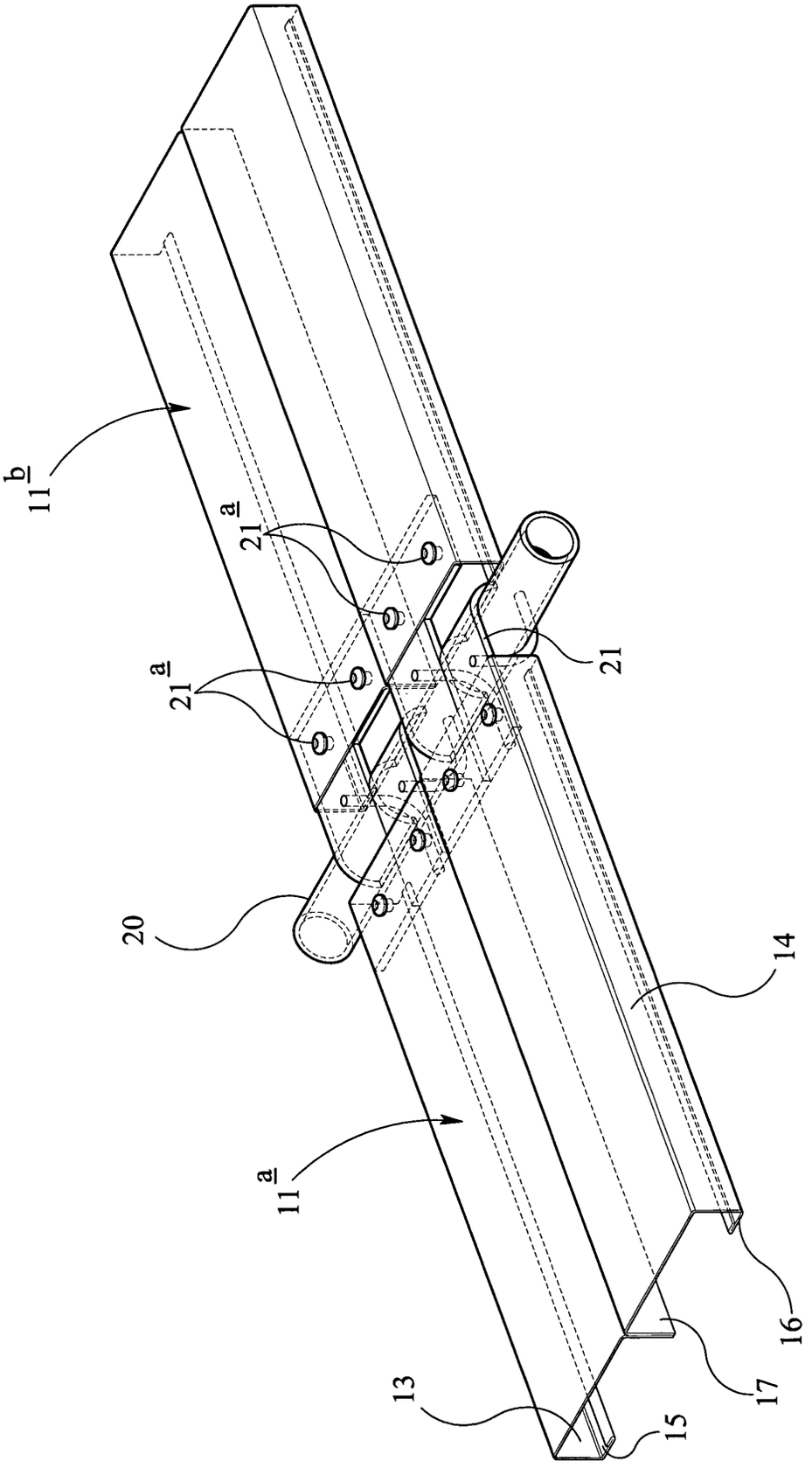

FIG 1

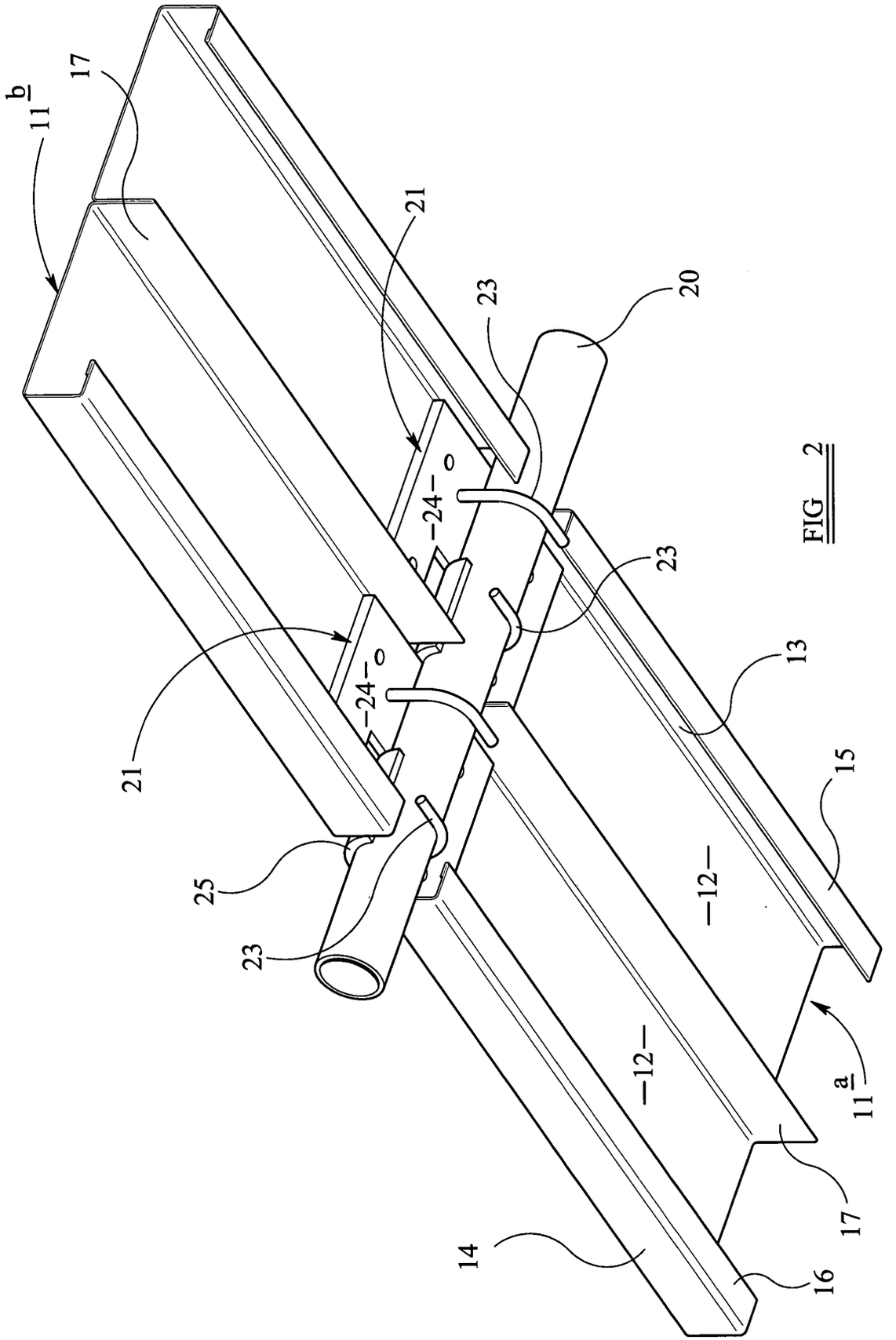

FIG 2

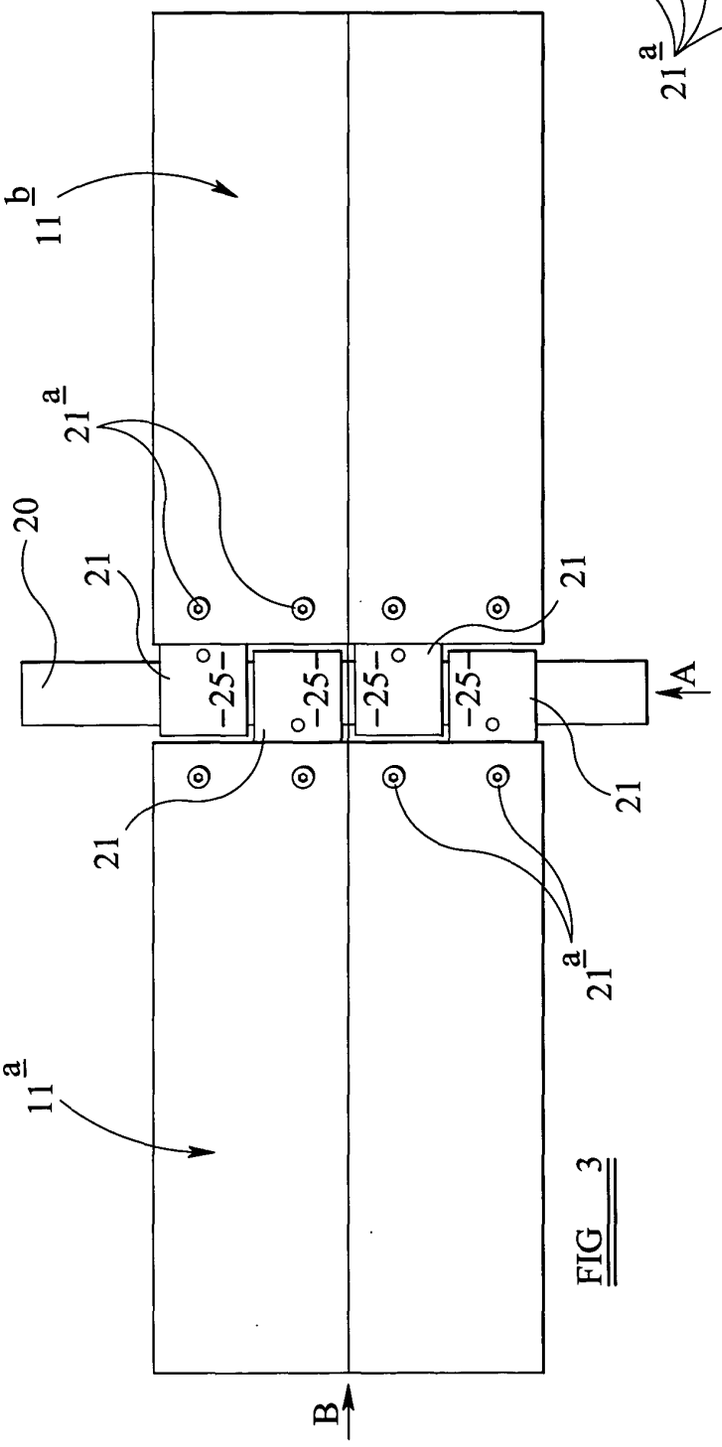

FIG 3

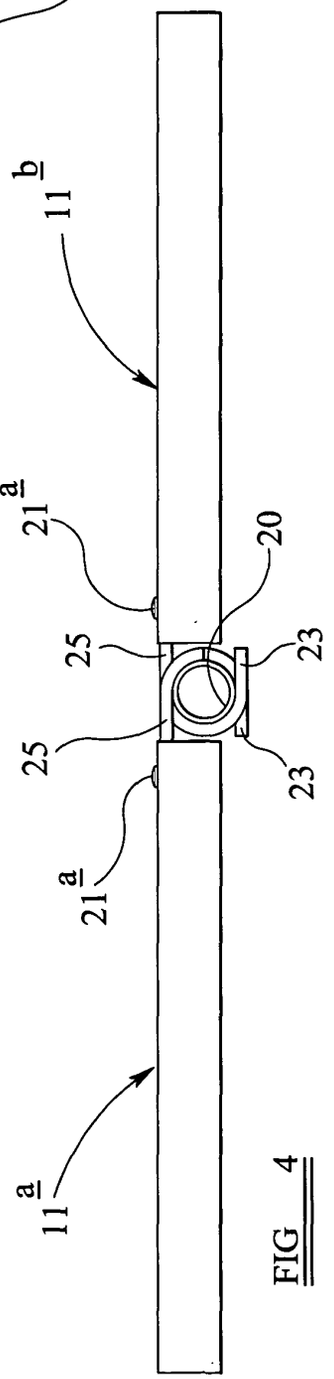

FIG 4

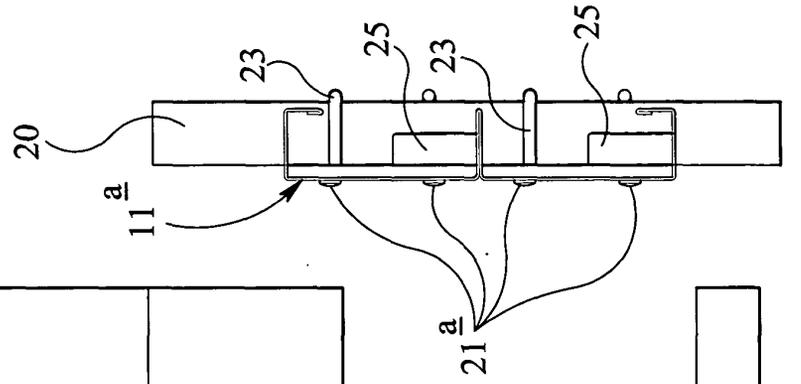

FIG 5

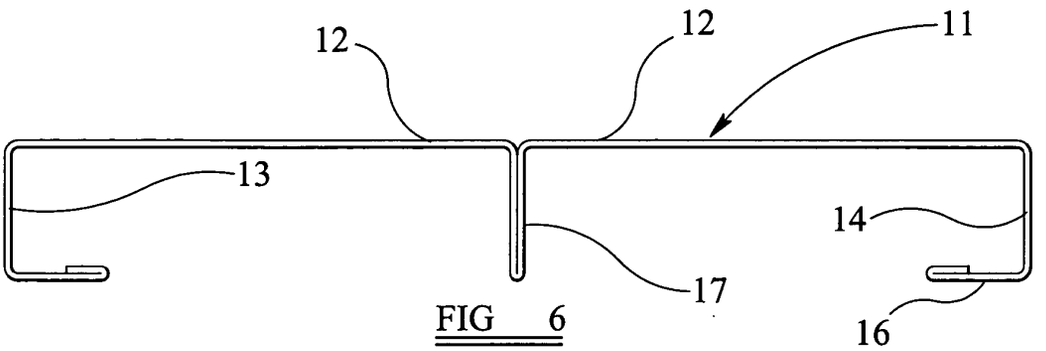

FIG 6

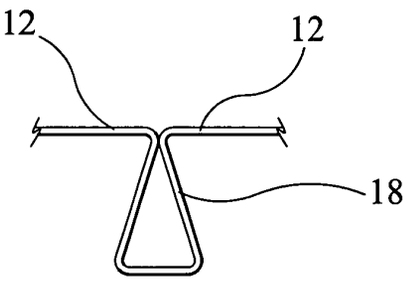

FIG 7

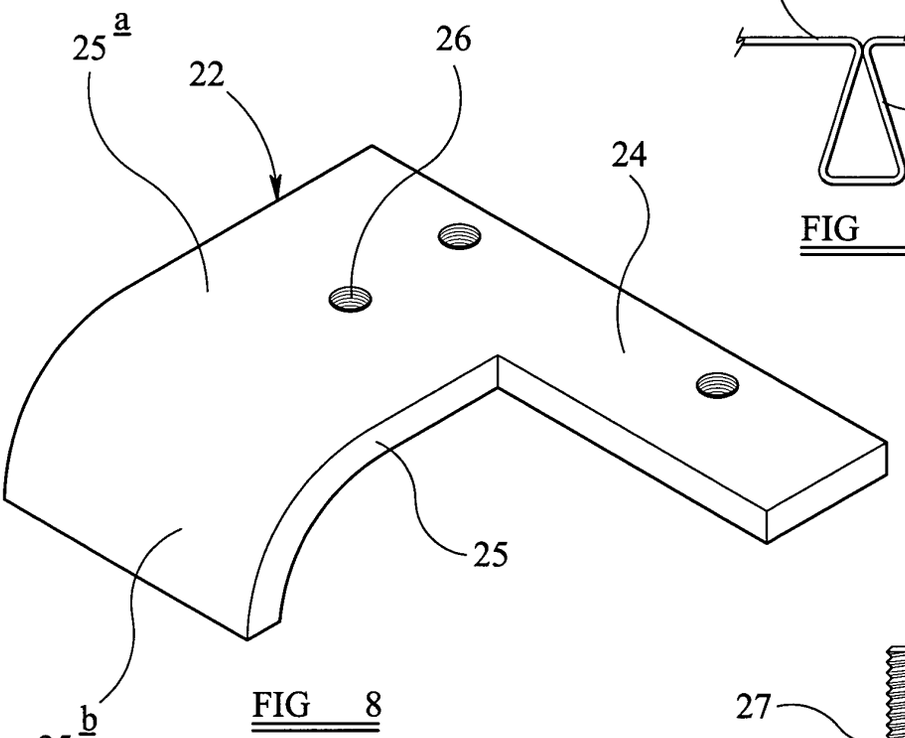

FIG 8

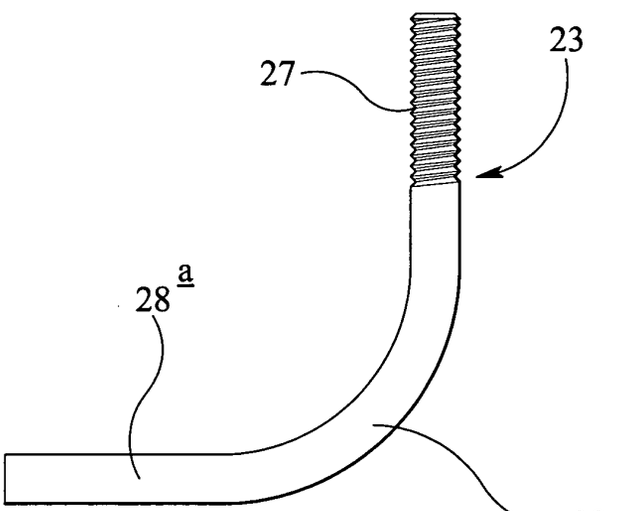

FIG 9