



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 1 233 122 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.08.2002 Bulletin 2002/34

(51) Int Cl.7: **E04G 1/14**, E04G 1/15,
E04G 5/06, E04G 1/26,
E04G 7/30

(21) Application number: **02380022.0**

(22) Date of filing: **01.02.2002**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Ubinana Felix, José Luis**
08150 Parets del Valles (Barcelona) (ES)

(74) Representative: **Duran Moya, Carlos et al**
DURAN-CORRETJER
Còrsega, 329
(Paseo de Gracia/Diagonal)
08037 Barcelona (ES)

(30) Priority: **14.02.2001 ES 200100327**

(71) Applicant: **Ingenieria de Encofrados y Servicios,**
S.L.
08150 Parets del Valles (Barcelona) (ES)

(54) **Facade scaffolding**

(57) The facade scaffolding (1) comprises a plurality of dismantlable portals (10,12) and non-dismantlable rectangular frameworks (2',2''), in an arrangement transverse to the plane of the facade and linked to one another by means of horizontal and diagonal bars, by way of safety coupling devices (27,28,29,30), not spontaneously dismantlable, which portal (10,12) and frameworks (2',2'') directly support passage platforms (4,4',4'') and likewise support at one or other of the outer or inner sides of the frameworks (2',2''), vertically adjustable brackets (5,6) carrying other service platforms (7,8), which platforms (7,8) carry fixed base plates on at least one of their edges, the vertical members (47,48) of frameworks bounding facade openings being associated by means of girders (72) mounted directly thereon.

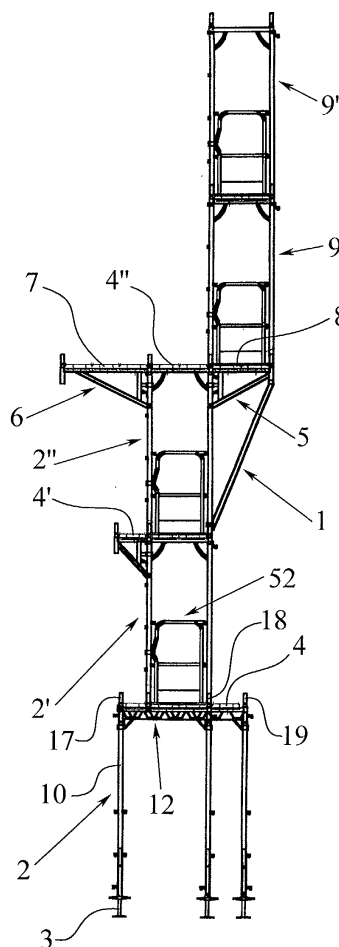


FIG. 2

Description

[0001] The present invention relates to so called facade scaffolding, providing characteristics of novelty and inventive step with respect to those known at present.

[0002] Facade scaffolds are associated with the facades of buildings in order to carry out repair work thereon, this being able to include complete restoration work on the facade.

[0003] The facade scaffolds known at present have the drawback of excessive constructional complexity, which increases their price and the time necessary for erecting and dismantling them. At the same time, in many cases they do not have the proper safety features for the personnel working on them.

[0004] The present invention is intended to disclose said facade scaffolds by means of which it is possible to achieve constructional and functional improvements which allow lower costs and greater safety for the personnel to be obtained.

[0005] The present invention extends to several aspects of the scaffold, which can be explained starting from the constitution of the portal legs by means of a plurality of easily dismantled constituent segments, especially three parts, reducing transport and storage space, being intended to constitute portals with fixed, prefabricated iron girders, of the Voith type or the like, carrying platforms and equipped with fixed rods receiving the tubular frameworks which will successively constitute the scaffold assembly. Said frameworks have a special structure, the vertical members being equipped with a plurality of rings for the suspension of the brackets for the service platforms, having the feature that the spacing between the suspension rings is double the spacing between the hooks of the brackets, thus permitting greater freedom of adjustment of the suspension height of the bracket. In addition, each bracket has an intermediate flange intended for fixing it to the corresponding vertical framework member. At the same time, the scaffolding frameworks have rapid, non-detachable couplings for the ends of bars, both reinforcing bars and other structural members, such as handrails, etc. Said couplings have tilting retaining tabs, capable of permitting the introduction of the end of the bar which it is desired to insert, effecting by their own means the automatic raising of the retaining tab, which is subsequently arranged such that it cannot be unfastened accidentally, requiring a deliberate manual action for this purpose, thereby providing greater safety in the device.

[0006] The service platforms, produced as is customary from non-slip sheet metal, for example perforated and swaged sheet metal, are equipped with end clamps capable of being centred directly on the tubular members of the frameworks of the structure, having safety devices which prevent their accidental disassembly. Similarly, the ends of the platforms are produced with a special highly rigid structure which prevents their deformation or damage in transport and likewise prevents accidental deformation of the platforms in service.

mation or damage in transport and likewise prevents accidental deformation of the platforms in service.

[0007] The platforms themselves have associated therewith bases inserted by means of protuberances in seatings of the platforms, by which means the proper coupling of the base to the platform is guaranteed for any dimensions of the latter and with independence of the members of the structure, guaranteeing at all times adequate closure of the lateral edges of the platform, preventing tools or other objects from falling.

[0008] Another feature of the present invention consists in that the fixed girders of the portals have upper rods fixed at the ends, and rods or members receiving the frameworks in an intermediate position which are displaceable on the girder itself, in order to permit adaptation of the scaffold to the facade line and to the different bodies protruding from the facade.

[0009] A further additional feature of the present invention lies in the form of assembly of the girders of the portals having a wide span, which is effected by suspension on special supports which are hung from the rings of the upright legs or frameworks, which bound the portal, permitting the positioning of the girders bearing on said supports and without end stop. In this way two objectives are fulfilled, firstly, maintaining the girder suspended while the work of fixing the girder on the upright legs or frameworks is carried out, and secondly, since there is no longitudinal stop, permitting the use of the same fixed girder for openings of reduced length, that is to say, smaller than the girder.

[0010] For greater understanding, some drawings of a preferred embodiment of the present invention are appended by way of non-limiting example.

[0011] Figure 1 shows a front view of a scaffold assembly according to the present invention.

[0012] Figure 2 shows a view in side elevation of the same scaffold of Figure 1.

[0013] Figure 3 shows an exploded view of a portal and a framework of the scaffold.

[0014] Figure 4 shows a detail, in perspective, of one of the upper vertices of a framework of the scaffold.

[0015] Figure 5 shows a variant of the bar retaining coupling of the scaffold.

[0016] Figures 6, 7 and 8 show views in side elevation, in plan, and from below, of a service platform.

[0017] Figures 9 and 10 respectively show a view in elevation from one end of the same platform and a section through the section plane indicated.

[0018] Figure 11 shows a view in elevation of a base to be used with the platforms of the present invention.

[0019] Figure 12 shows a detail in side elevation of the engagement of a platform with a tubular member of the structure.

[0020] Figure 13 shows in a perspective view the relative position of a service platform with respect to a tubular member of the structure.

[0021] Figure 14 shows a perspective view of an end of a platform, in an inverted position.

[0022] Figure 15 shows a detail of a safety coupling device for coupling a platform to a tubular structural member.

[0023] Figure 16 shows an exploded view of a girder for an opening with its upright support legs and supplementary assembly parts.

[0024] Figures 17 and 18 are views in side elevation and in front elevation of a supplementary support part for supporting the girders for the openings.

[0025] Figure 19 shows a perspective view in which can be seen the coupling of one of the supplementary parts of Figures 17 and 18 on a framework.

[0026] Figure 20 shows a view in front elevation of a provisional safety device to be used in the assembly of successive platforms.

[0027] Figure 21 shows a detail of a closure member for closing an end of a service platform.

[0028] Figures 22 and 23 shows views in side elevation and in plan of a retaining coupling device.

[0029] Figures 24 to 27 show the different stages of operation of the retaining coupling for retaining the reinforcing, handrail and other bars of the structure.

[0030] Figure 28 is a perspective view which shows the coupling of platforms on a scaffolding structure according to the present invention.

[0031] As can be observed in the drawings, a facade scaffolding according to the present invention has been indicated by the general number 1 in Figures 1 and 2 and comprises framework structures such as 2, 2', 2'', which make contact with the ground by means of the adjustable legs 3 and which constitute working levels by means of successive associated platforms such as 4, 4', 4'', on the upper ends of the frameworks. Lateral brackets, such as those indicated by the numbers 5 and 6, make it possible to couple other lateral platforms, such as 7 and 8, and also other structures, optionally at different heights and having a different depth with respect to the facade, such as shown by the frameworks 9 and 9' associated with the front brackets, which will be arranged with a spacing from the facade different from that obtained by means of the platforms 4 and 7.

[0032] As can be observed in Figure 3, portal legs indicated by the number 10 are formed by a lateral tubular member 11 detachably coupled to the adjustment legs or adjustment bases 3, and carrying coupled to the top a support structure 12 for supporting the portals which has bottom couplings such as 13 and 14, intended to fit on the upper rods 15 and 16 of the portal legs 11, and upper projecting rods such as those indicated by the numbers 17, 18 and 19, intended to receive the upper portals 2 and the platforms 4. The number of intermediate rods 18 will be variable, especially one or two, and their mounting on the girder will be displaceable in order to adapt to the facade line and to its projecting bodies. The structure 12 will preferably be produced by means of steel transverse girders of known type, such as those termed Voith girders.

[0033] The constitution mentioned permits easy dis-

mantling of the portals, thereby also simplifying their storage and transport.

[0034] The vertical members of the frameworks 2 have a plurality of suspension rings 20, 20', Figures 3 and 4, on which it is possible to suspend the brackets 5 or 6 by their hooks, the two hooks indicated by the numbers 21 and 22 for the bracket 5 being shown. The spacing between every two rings 20, 20' is double the spacing between the hooks 21 and 22 of the brackets, thus considerably increasing the possibility of adjustment in height of said brackets. For securing the brackets once suspended, they have rapid action flanges such as that indicated by the number 23 in Figure 3. Said flanges will be rigidly connected to the vertical members of the framework 2, providing perfect stability of the bracket carrying its own platform 8.

[0035] As can be seen in Figure 4, an upper point of junction of a framework 2 comprises a welded cross-member 24 and an upper projecting rod 25 intended to receive the tubular members of other frameworks in an upper position, other reinforcing members of varied shape, such as those indicated by the number 26, also being provided. On the vertical members of the framework 2 there are also arranged rapid coupling devices for bars, consisting, for example of projecting rods such as that indicated by the number 27, which has a retaining tab 28 for bars with flattened end provided with an aperture, or the structure shown in Figure 5, in which the support 29 for the retaining tab 30 has a substantially parallelepipedal structure, consisting, for example, of a narrow metal plate bent into a U-shape.

[0036] Figures 6 to 10 show some constructional details of one of the platforms 4. As will be observed in said drawings, each platform 4 comprises a top plate 67 provided with a non-slip profile, for example by means of swaged apertures 68, having in addition reinforced end-pieces at both ends, indicated by the numbers 31 and 32 and which have underneath the shape of a sector of a circle 33, Figure 12, to allow improved coupling thereof to a tubular member 34 of the structure. A safety device 35, which will be explained hereinafter, prevents accidental dismantling of a platform.

[0037] As will be seen in greater detail in Figure 14, each of the ends of the platforms 4 consists of a parallelepipedal box structure 69 carrying the coupling end-pieces 32 and which are fixed by welding to the lateral bent over flanges such as 36 and 37 of the platform 4, inner reinforcing plates 38 fixed to the same flanges indicated also being provided.

[0038] Figure 15 shows a detail of a coupling end-piece 32 in which can be seen the arrangement of the safety devices 35, which comprise a short rod or bar 70 equipped with stops, for example the bottom stop 39, and which passes through the lower and side walls of the box 69 by way of apertures 40 and 41, such that said rods can adopt the two positions shown: on the right, the service position in which they assist the retention of the platform on the tubular member 34 of the framework,

or the position shown by dashed lines on the left, in which said rods are arranged in the position for dismantling.

[0039] The platforms will carry associated base members, for which purpose they have apertures in their upper face which are arranged in proximity to their lateral edges, such as those indicated by the numbers 71 and 71', for one of the laterals of the platform 4 shown in Figure 7. In this way, the bases formed by flat plates of elongate rectangular shape 42, Figure 11, can be easily mounted by means of downwardly protruding rods 43 and 44 which are introduced into the apertures 71 and 71'. Said rods also penetrate into the flanges of the plate constituting the platform, such that they prevent its accidental removal, since it can be dismantled only by ensuring the verticality of the bases, which will prevent it from being dismantled accidentally. In addition, when the bases are engaged in the said platforms, the correct functioning of the bases will be ensured in any circumstances.

[0040] Another safety measure is that represented in Figure 13 of the drawings, in which it will be observed that each platform 4 has, at its end, stops such as 45 and 46 which will prevent overturning of the platforms and which also serve to avoid openings between the platforms on the same floor level.

[0041] According to the present invention, the formation of portals having a wide span, that is to say, a considerable opening in the gap, is effected by means of supporting end frameworks, such as those indicated by the numbers 47 and 48 in Figure 16, and a transverse girder 72 which is engaged with the aforesaid upright legs by means of supplementary parts 49 and 50 intended to couple it to rings of the upper part of the aforesaid upright legs, as a phase prior to it being mounted in position.

[0042] Figures 17, 18 and 19 show in greater detail the assembly of the supplementary parts 49 and 50, one of these being illustrated, that is to say the part 49, in which can be seen the arrangement of a top hook 73 intended to permit its suspension from one of the rings 74 of a framework 75, likewise having a "U"-shaped lower profile 76, intended to grasp the upright leg or framework 75 once suspension in the ring 74 has been effected. Cross-shaped lateral arms 77 and 78, equipped with strong lower consoles, make it possible to receive a girder, such as, for example, the girder 72 shown in Figure 16. By means of this arrangement it is possible to suspend the girder 72 and subsequently proceed in a convenient manner to secure the latter to the upright leg or framework 75, avoiding the difficult work which must be carried out at present by having to perform two functions simultaneously: supporting the girder 72 and at the same time fixing it by means of suitable flanges to the framework 75. At the same time, since there is no axial stop for the girder 72, since this is borne on the cross-shaped arms of the supplementary part 49, the girder can be used for openings smaller than its total length,

since the bearing point on the horizontal arms 77 or 78 will simply vary.

[0043] According to another feature of the present invention, special safety frameworks are provided, such as that indicated as a whole by the number 79 in Figure 20. Said framework comprises two vertical columns 80 and 81 which are coupled by means of hooks to the rings of two successive frameworks 82 and 83, bearing at the bottom by means of the arched supports 84 and 85 on the aforesaid frameworks, said framework 79 having cross-members such as 86 and 87 which constitute a guard rail. In this way, once a platform is mounted, such as that indicated by the number 88 in Figure 20, between the frameworks 82 and 83, there can be mounted from below said platform, that is to say, from the lower floor level determined by the platform 89, the framework 79, which will be firmly attached to the upper platform 88 and which will serve the purpose that, when the workers go up to said platform, they already have immediate provisional protection. After that, the members of the upper floor level will be mounted with the final guards, after which they will proceed to move the framework 79 upwards, towards the next floor level in height, and so on.

[0044] According to another feature of the present invention, on the end frameworks 51 which correspond to the end of a platform, guard closures will be engaged, consisting basically of frameworks of smaller dimensions 52, equipped with vertical members 53 and 54 and cross-members varying in number, as well as a lower base plate 55.

[0045] Figures 22 to 27 shows the actual embodiment of a bar connection device with retaining tab. In the version illustrated, which corresponds to an outer enclosure of substantially rectangular parallelepipedal shape, a support of folded over narrow metal plate 56 receives a tab 58 inside it, tilting on the transverse axis 57 and which has a complex profile shown in Figures 24 to 27, in which it can be seen that said tab 58 has two substantially parallel faces 59 and 60, which terminate in ends on which can be observed, on one side, a prominent sharp tooth 61 and a limb projecting towards the upper part 62, while the other end has two flat faces 63 and 64 forming an obtuse angle. With this arrangement, the introduction of a bar will force the tab to occupy the retaining position, and to release the coupling device a manual action of lifting the tab will necessarily be required. Thus, for example, Figure 27 showing the position for entry of the end of the bar 65, provided with the aperture 66, when the latter acts on the tooth 61 it will cause the tab to tilt, moving to occupy the position shown in Figure 26 until the extension 62 projects beyond the upper part of the support 56, which position is indicated in Figure 25. In this position and as the end of the bar continues to advance, the bar will push said projection 62, necessarily causing the tab to tilt downwards, assuming the position in Figure 24 in which, as can be seen, the same tooth 61 will prevent the withdrawal of the end of the bar 65, that is to say, a non-detachable

joint will have been formed.

Claims

1. Facade scaffolding, of the type composed of a plurality of members, especially tubular members, interconnected with one another, constituting a scaffold fixed on the facade and arranged parallel thereto, producing different working levels on the facade, determined by service platforms, **characterised in that** it comprises a plurality of dismantlable portals and non-dismantlable rectangular frameworks, in an arrangement transverse to the plane of the facade and linked to one another by means of horizontal and diagonal bars, by way of safety coupling devices, not spontaneously dismantlable, in which the portal and frameworks directly support passage platforms and likewise support, at one or other of the outer or inner sides of the frameworks, vertically adjustable brackets carrying other service platforms, which platforms carry fixed base plates on at least one of their edges, the vertical members of frameworks bounding facade openings being associated by means of girders mounted directly thereon, also having special safety guard rails that can be coupled to two successive frameworks of the structure in the part which corresponds to upper points of junction of the frameworks, providing provisional guard rails on an upper platform. 5 10 15 20 25 30
2. Facade scaffolding, according to claim 1, **characterised in that** the dismantlable portals are produced by means of dismantlable vertical members, on the upper ends of which can be optionally coupled service platforms or fixed girders carrying bottom couplings for the ends of said vertical members and other top couplings for receiving another framework, said vertical members of the frameworks having a plurality of rings distributed longitudinally, intended to receive brackets carrying service platforms. 35 40
3. Facade scaffolding, according to claim 2, **characterised in that** the number of top couplings of the girders is variable and said couplings are displaceable on the girder for adaptation of the scaffold to the line of the facade and to its projecting bodies. 45
4. Facade scaffolding, according to claim 1, **characterised in that** the brackets carrying service platforms are equipped on their vertical side with hooks for suspending them in the rings of the vertical members of the frameworks, the spacing of which is half the spacing of the rings of the frameworks, said brackets also having on the same vertical side a clamp for securing them to the corresponding framework. 50 55
5. Facade scaffolding, according to claims 1 and 2, **characterised in that** the vertical members of the portals are formed by a vertical tubular member that can be coupled at the bottom to an adjustable seating base on the ground and which has at the top projecting rods intended to receive the girder for interconnecting the two vertical members. 5
6. Facade scaffolding, according to claim 1, **characterised in that** the safety coupling devices have protruding circular or parallelepipedal journals in which are formed grooves for the tilting of articulated tabs preventing withdrawal, capable of being arranged in the retaining position by the actual passage of the terminal end of the bar. 10 15
7. Facade scaffolding, according to claim 1, **characterised in that** the service platforms consist of non-slip sheet metal members having a "C"-shaped cross-section and which have at the ends transverse reinforcing box structures, on the outer faces of which, corresponding to the ends of the platform, there are arranged supports for centring them on the upper tubular members of the frameworks, and additionally having protruding stops preventing overturning. 20 25
8. Facade scaffolding, according to claims 1 and 7, **characterised by** the arrangement of through rods which pass through the inner side and the lower side of the transverse rectangular boxes, said rods being provided with limiting end heads and being capable of assuming an assembly position in which the rod is suspended from the opening of the inner wall of the box and a service position in which the rod is pulled out, abutting at the bottom the tubular member of the portal and limited by the stop of the other end of the rod. 30 35 40
9. Facade scaffolding, according to claim 1, **characterised in that** the special safety frameworks comprise two vertical columns provided at the top with protective cross-members and which are capable of being suspended at the bottom by means of hooks in the rings of the upper part of the two successive frameworks, having supports at their lower ends capable of engaging laterally in the upright legs of the frameworks in which it remains coupled, permitting the mounting of the provisional guard rail on the upper platform from the lower part thereof and its subsequent movement to higher levels to obtain provisional guard rails. 45 50 55
10. Facade scaffolding, according to claim 1, **characterised in that** the girders mounted on frameworks bounding facade openings are coupled by suspension, at the longitudinally necessary point depending on the length of the opening, on the lateral arms

of a supplementary part coupled to each of the frameworks or upright legs of the ends, which supplementary parts are in turn suspended from the rings of said frameworks or upright legs.

5

11. Facade scaffolding, according to claim 10, **characterised in that** said supplementary parts have a central member provided at the top with a hook for suspension in the rings of the frameworks, having in the lower part an arched or "U"-shaped profile for centring them on the said framework and having in an intermediate region horizontal arms for the suspension of the girders of the portal.

10

15

20

25

30

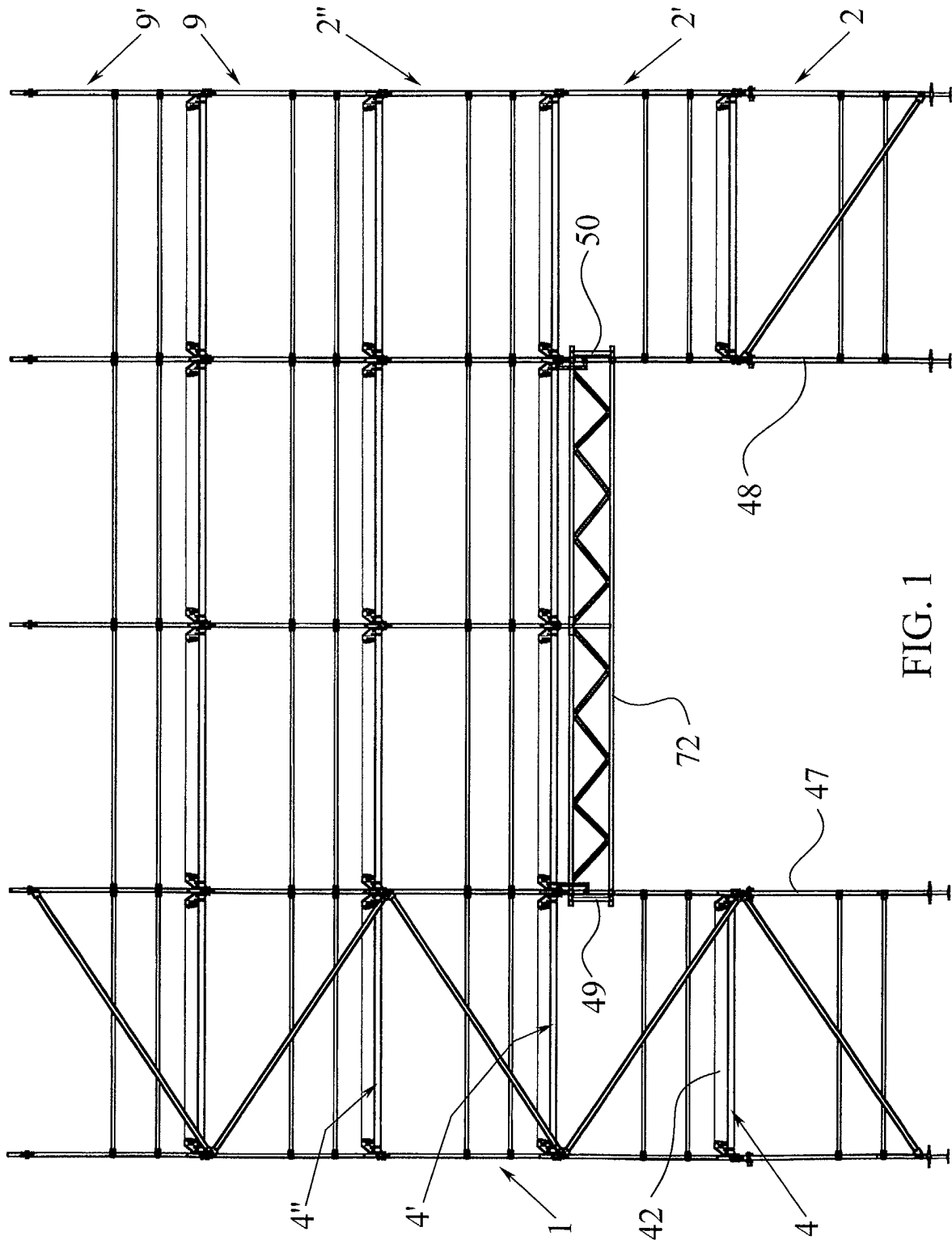
35

40

45

50

55



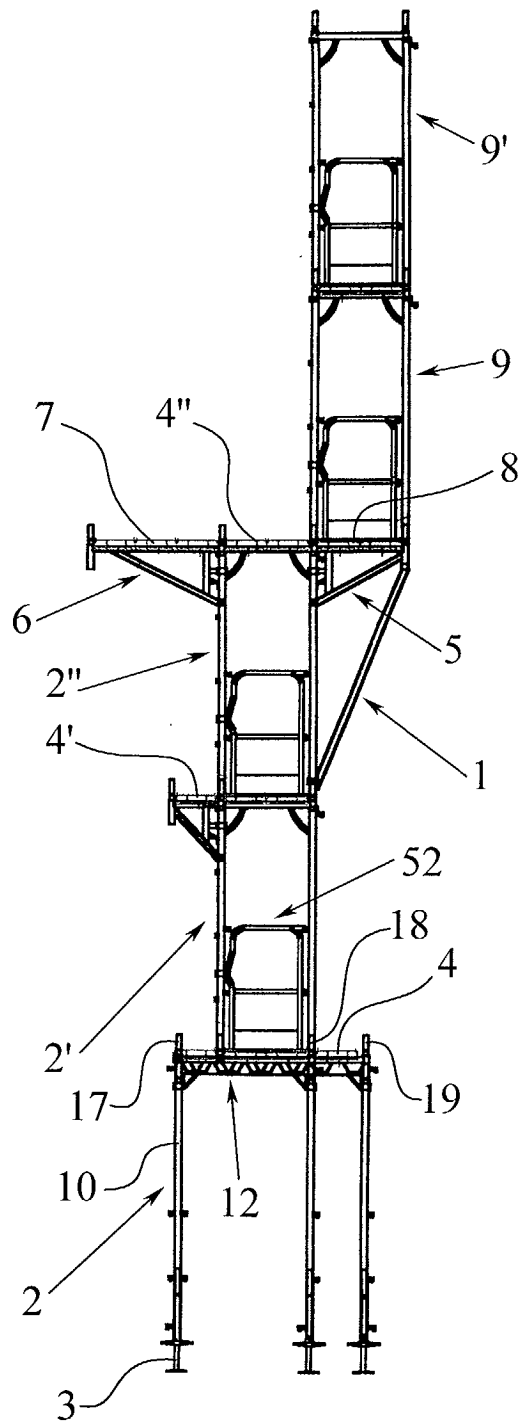


FIG. 2

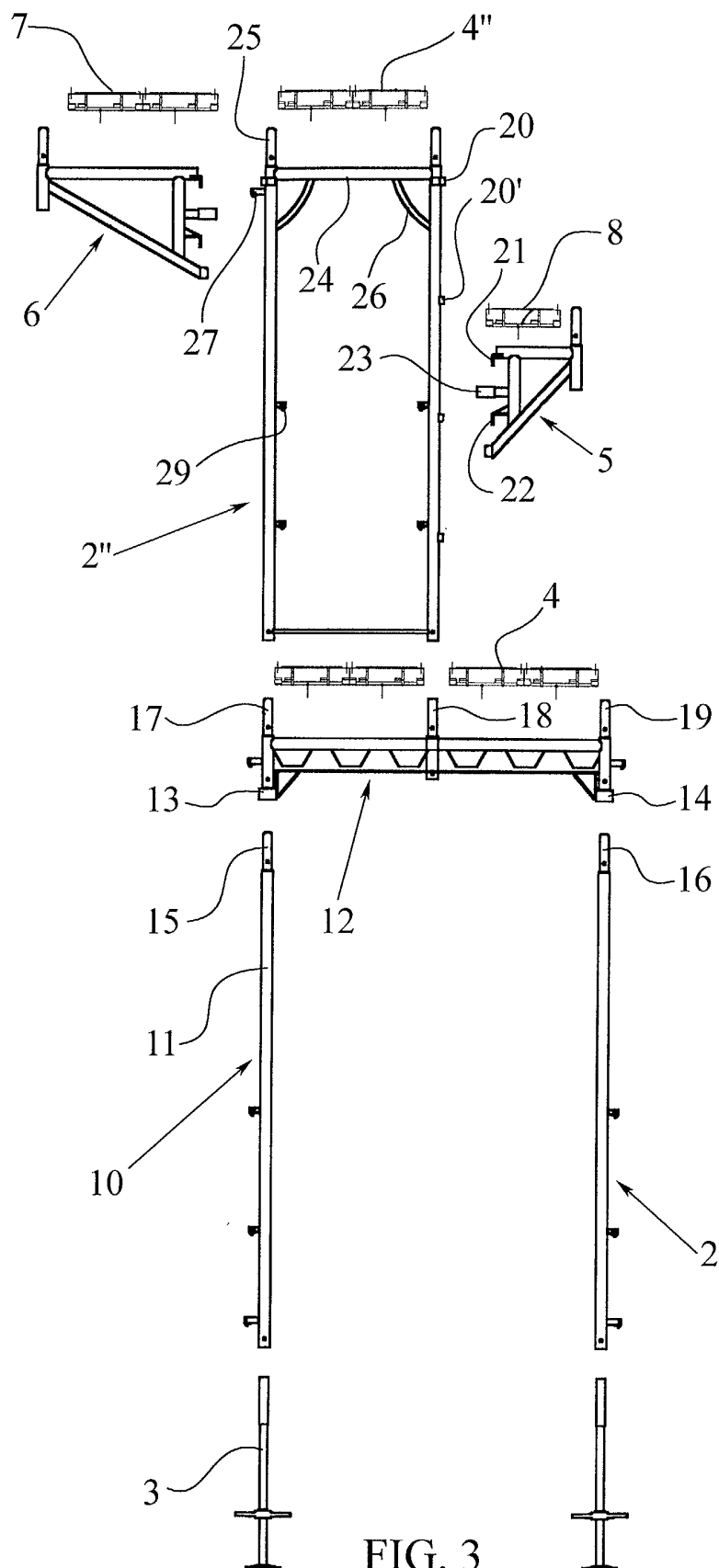


FIG. 3

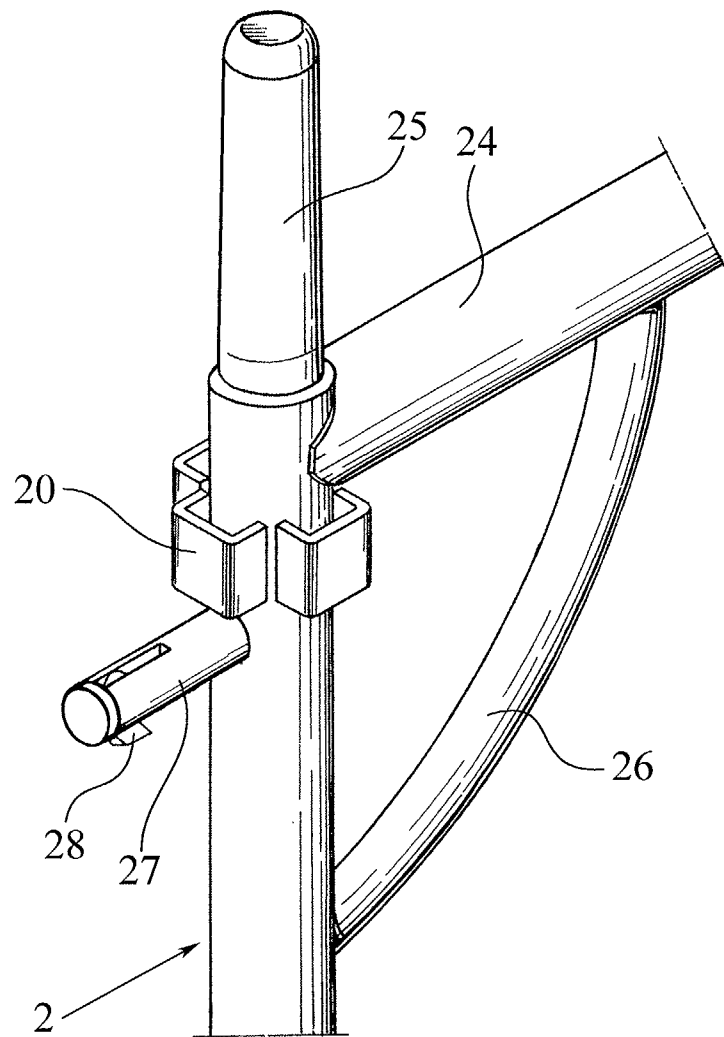


FIG. 4

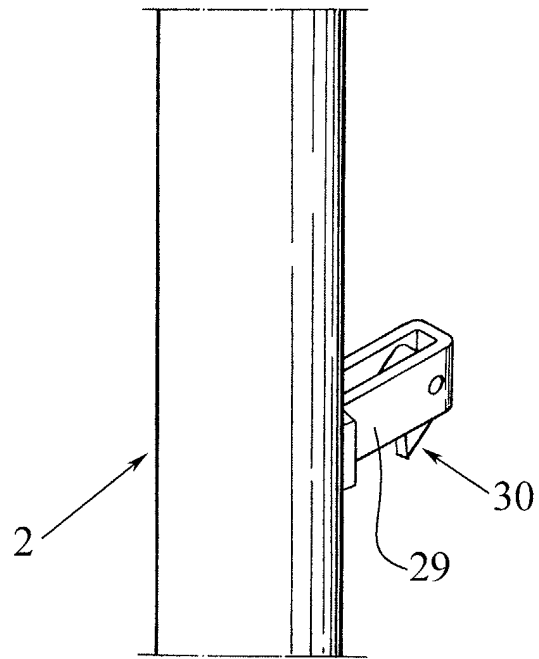
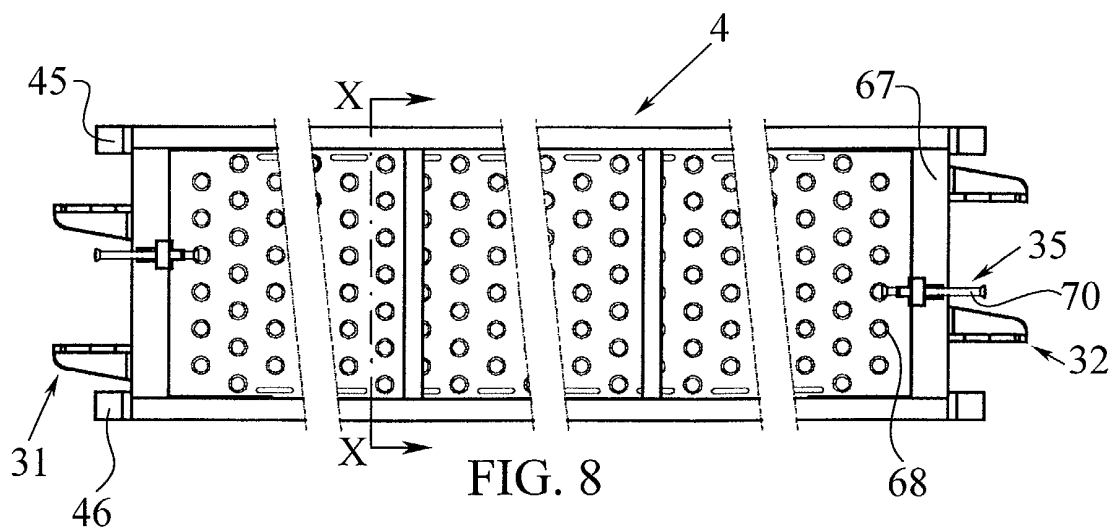
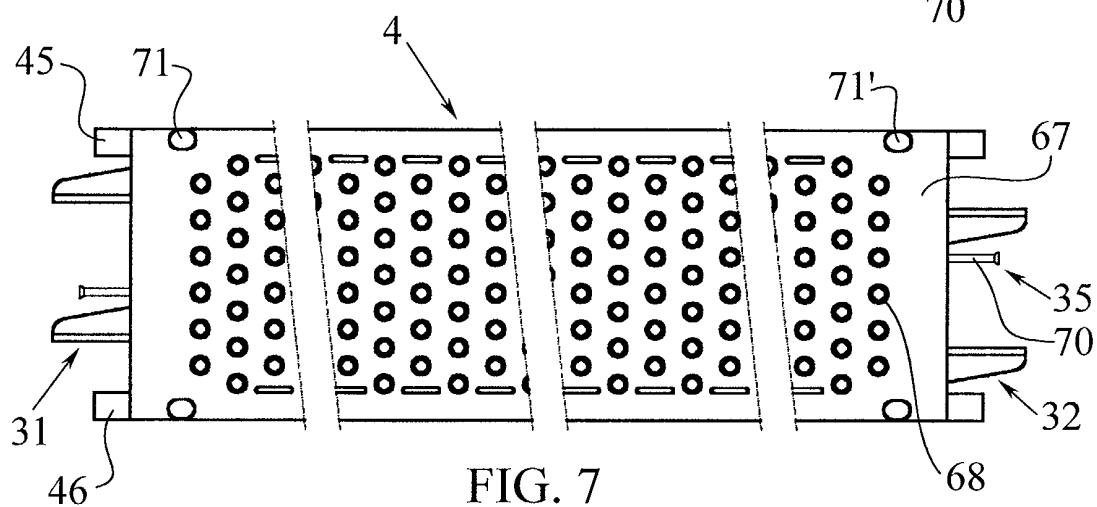
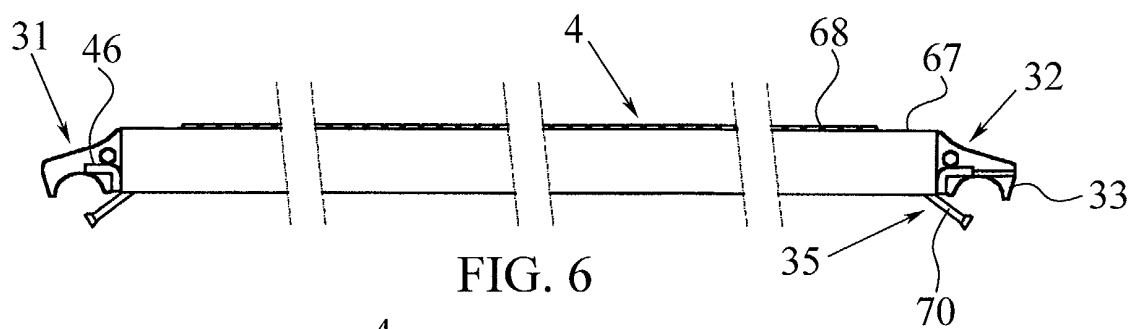


FIG. 5



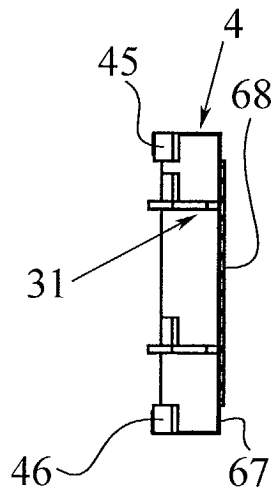


FIG. 9

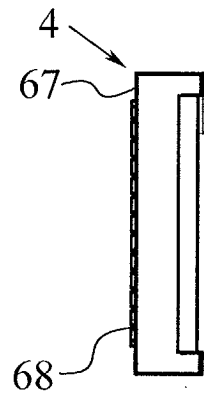


FIG. 10

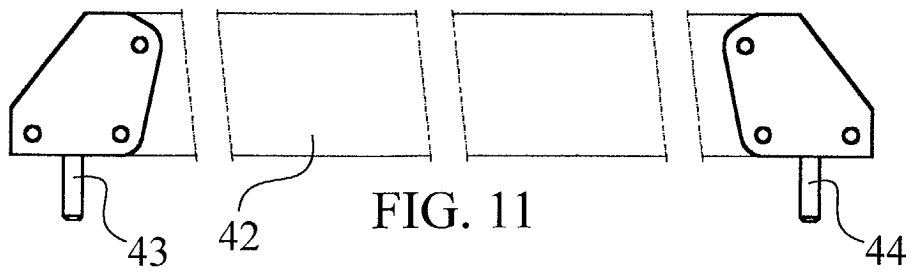
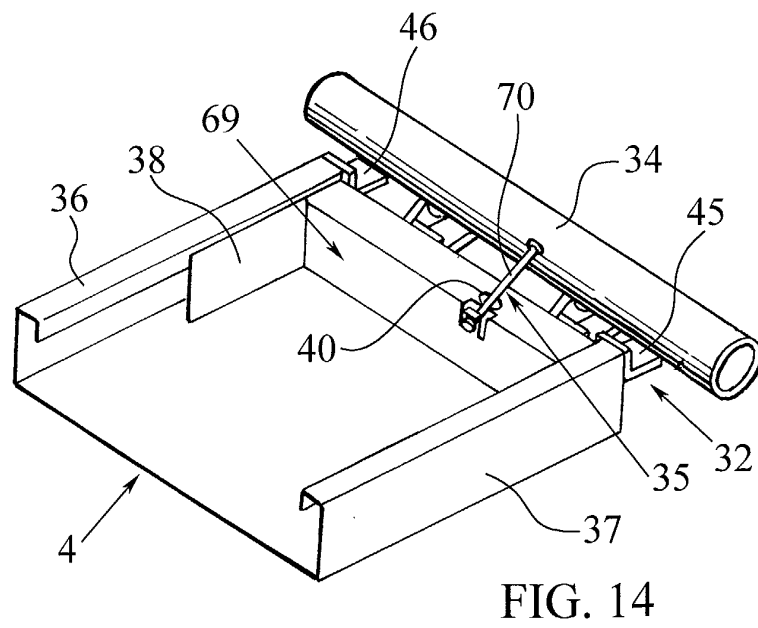
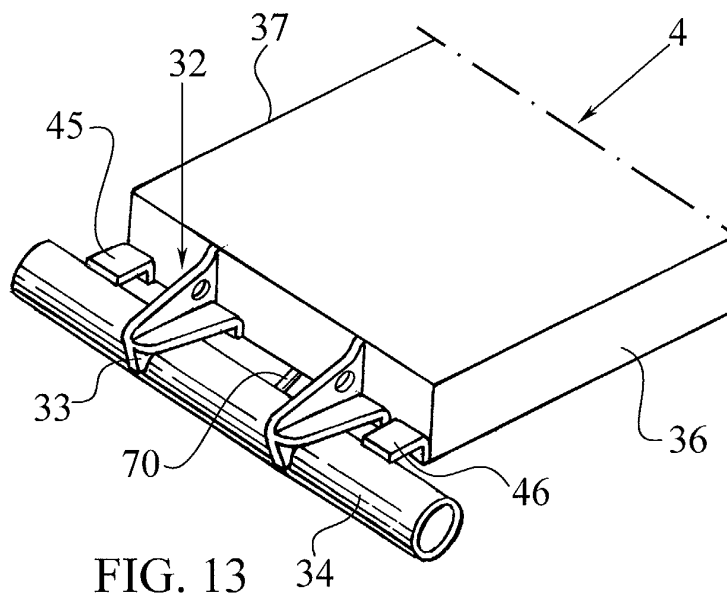
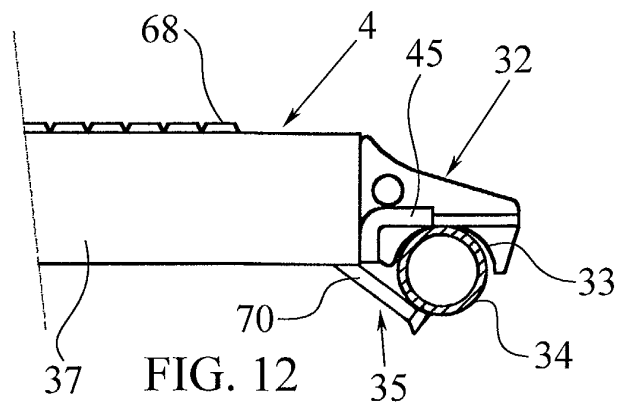


FIG. 11



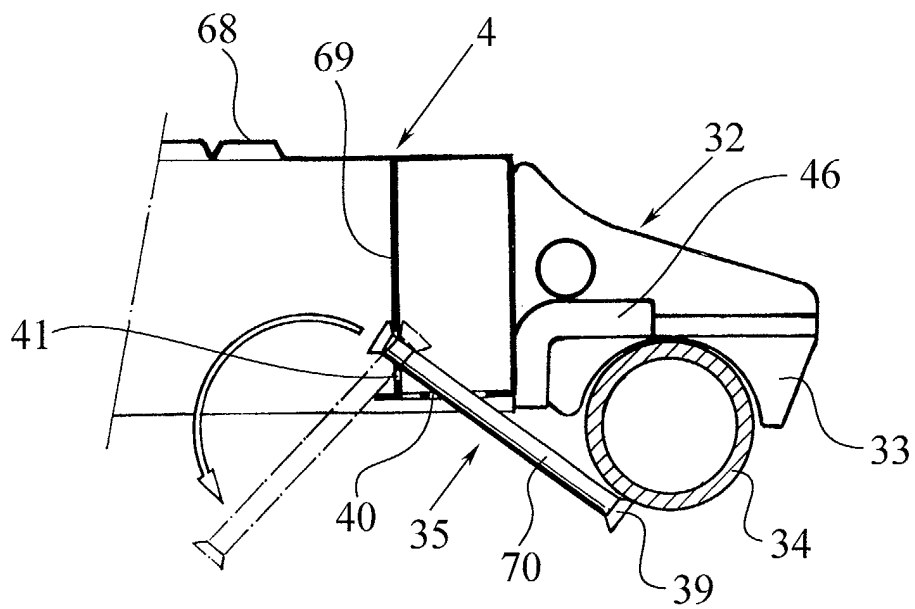


FIG. 15

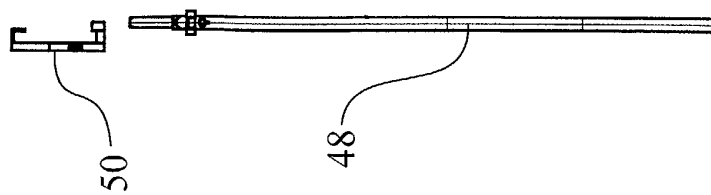
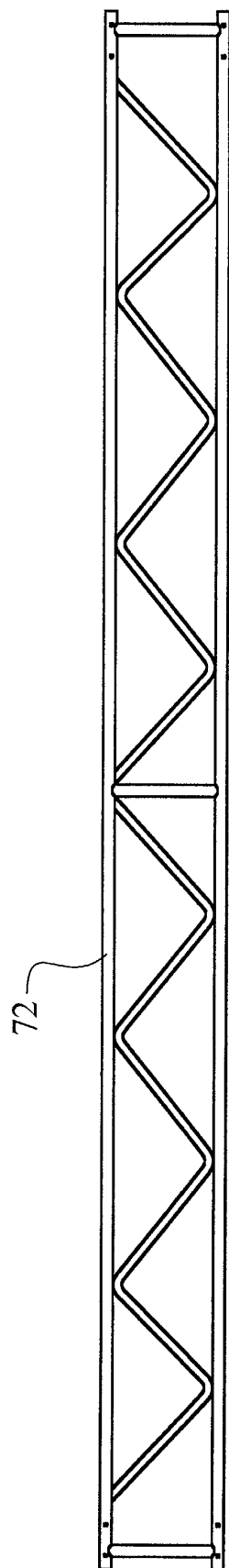
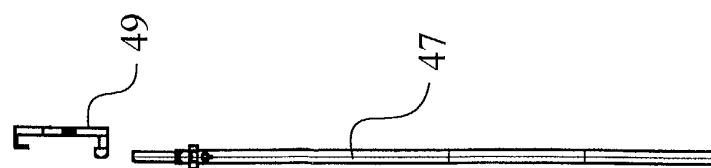


FIG. 16



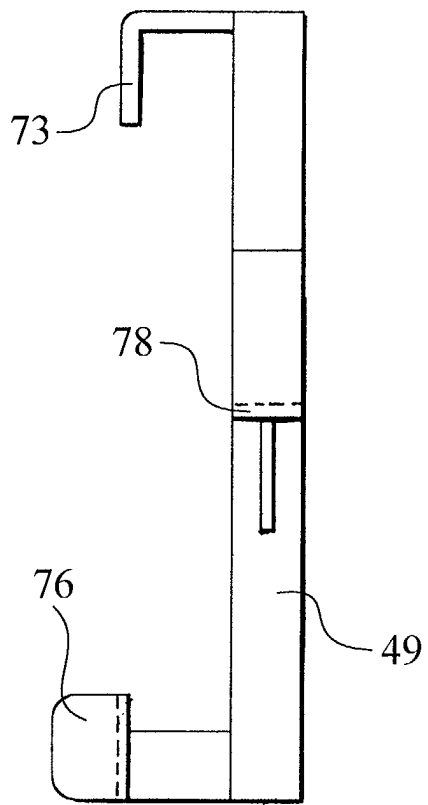


FIG. 17

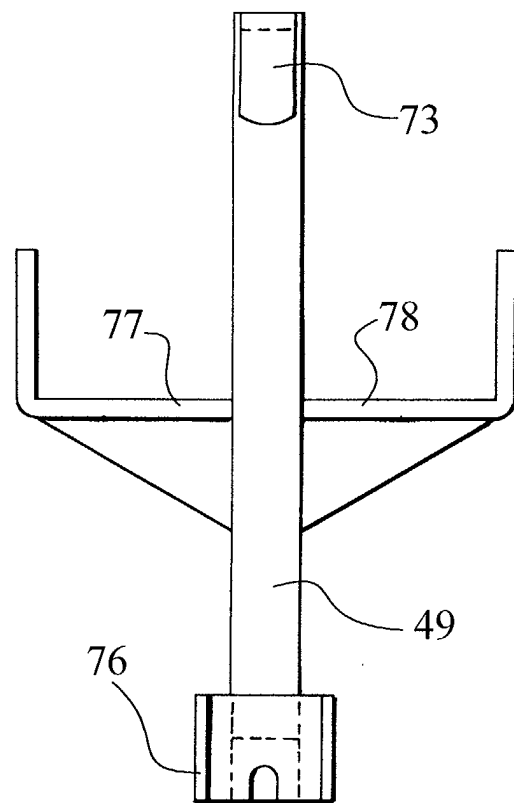


FIG. 18

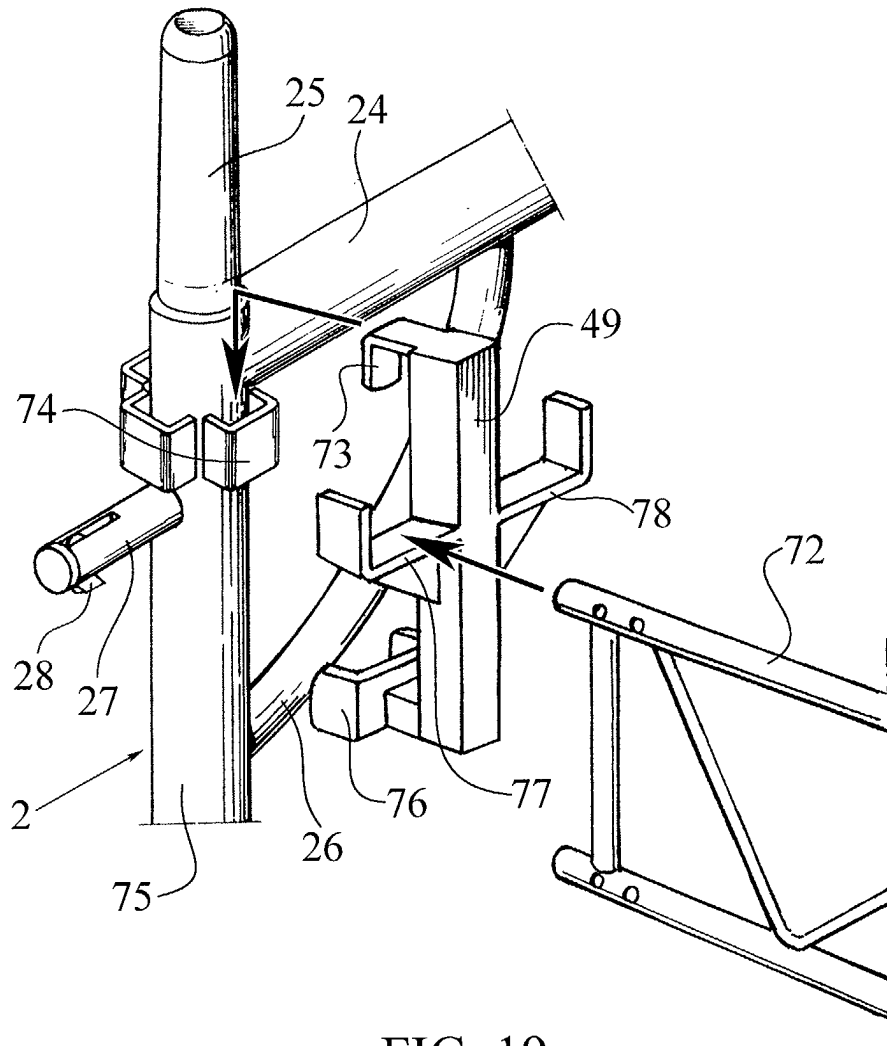


FIG. 19

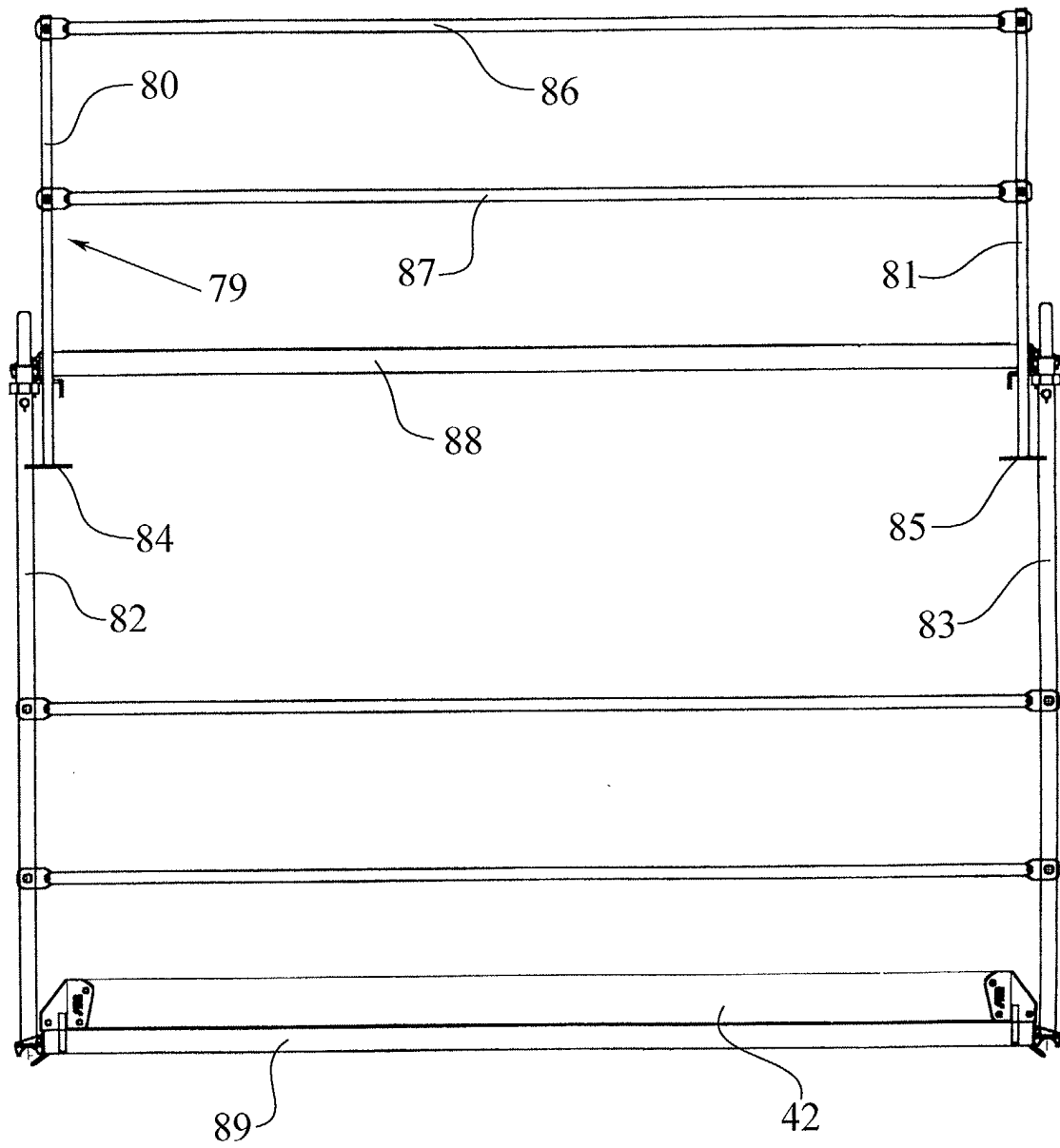
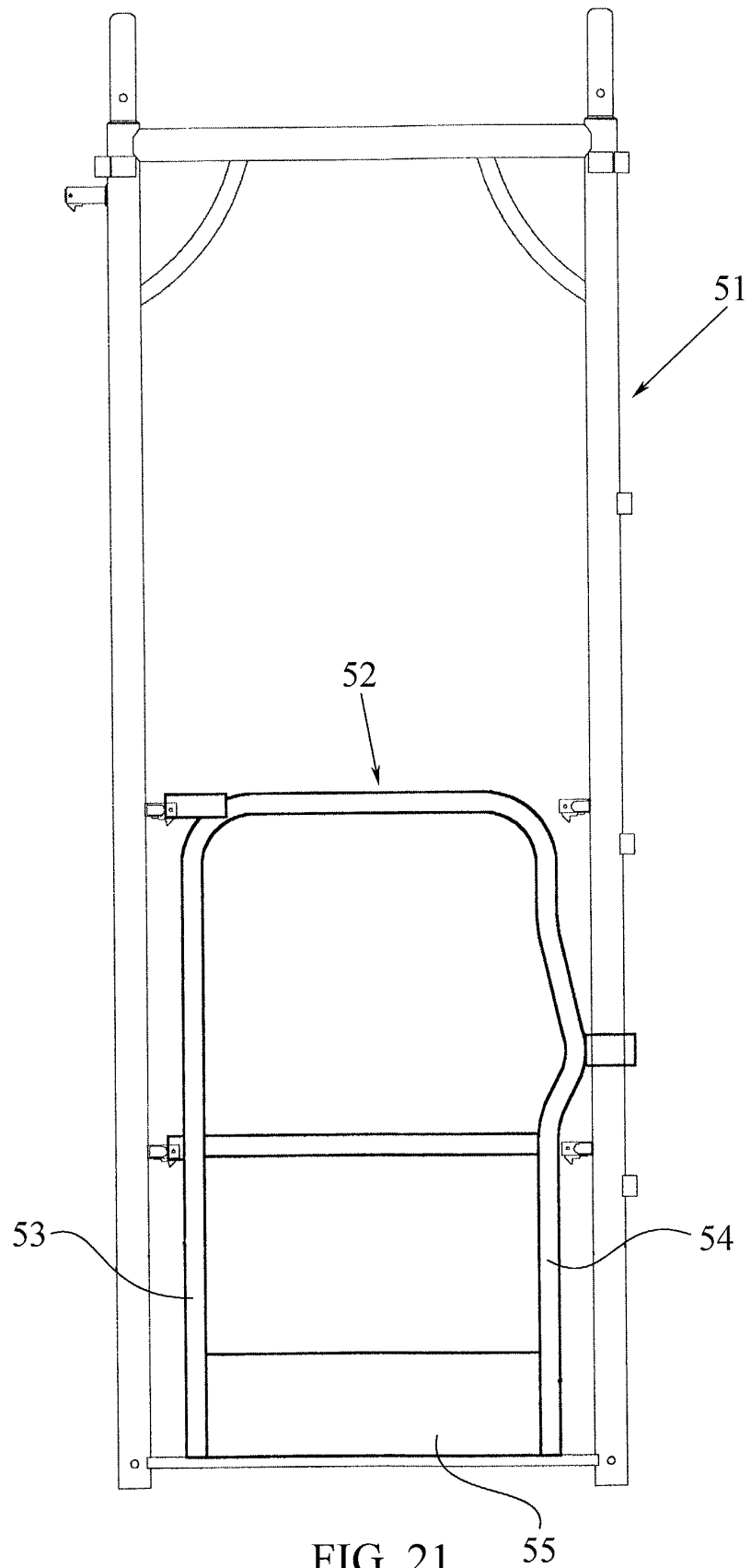


FIG. 20



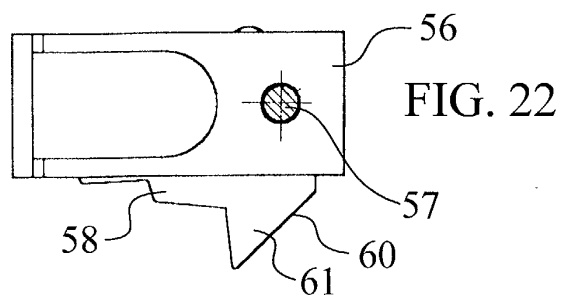


FIG. 22

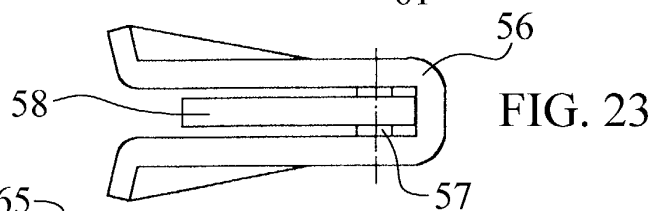


FIG. 23

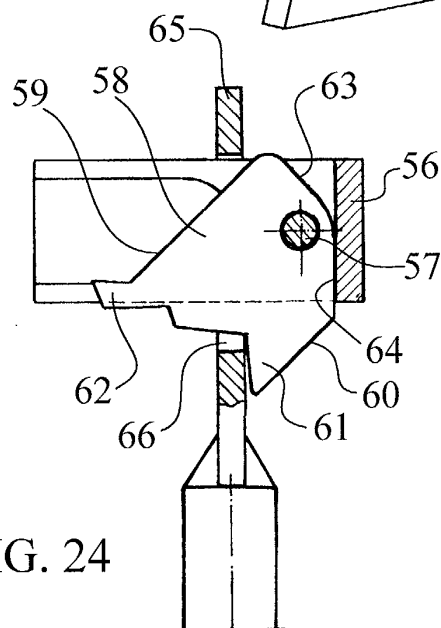


FIG. 24

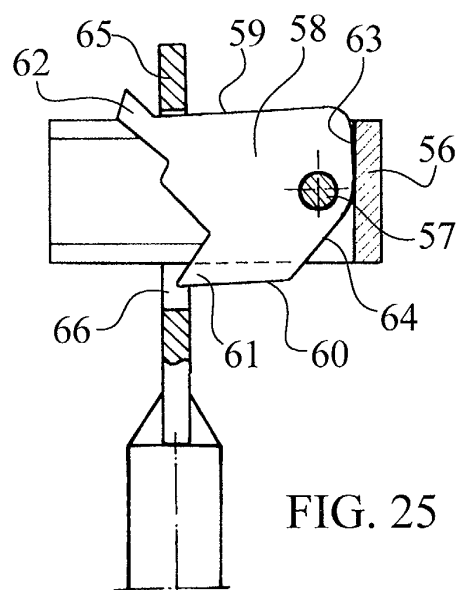


FIG. 25

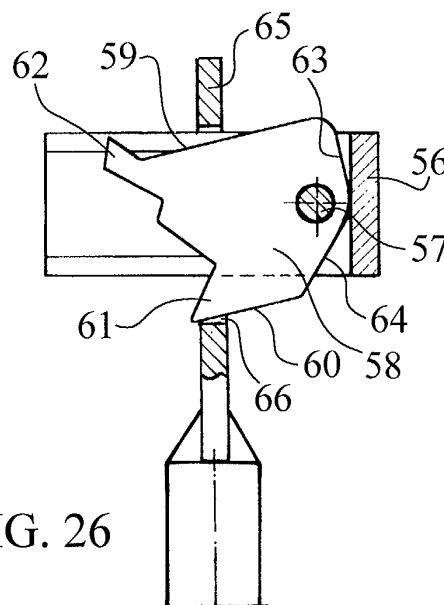


FIG. 26

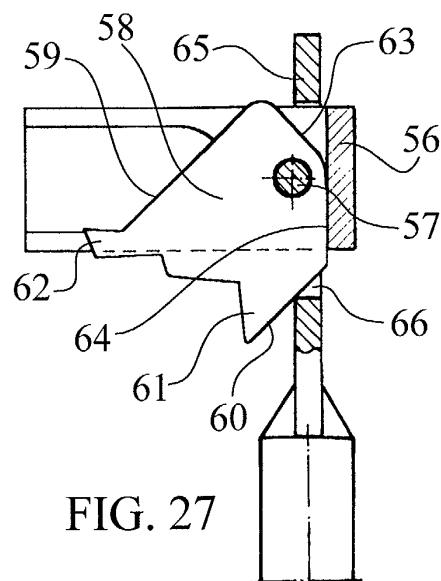


FIG. 27

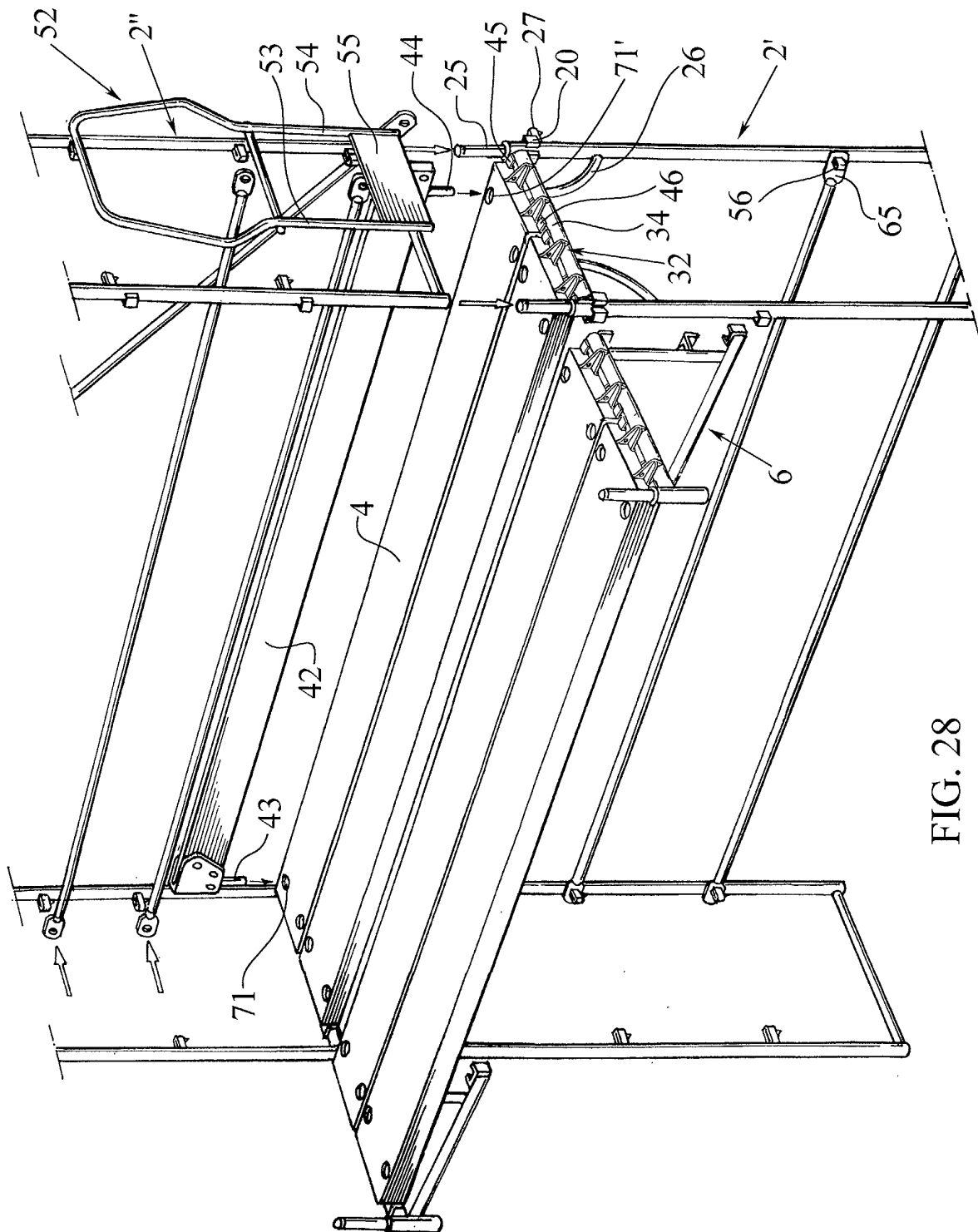


FIG. 28