(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 251 222 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
23.10.2002 Bulletin 2002/43

(51) Int Cl.[7]: **E04G 11/48**

(21) Application number: **02380054.3**

(22) Date of filing: **11.03.2002**

(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

(30) Priority: **18.04.2001 ES 200100898**

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

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

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

(54) Recoverable shuttering

(57) The shuttering has shuttering panels (1,63,63', 63") provided with lateral flanges, adapted to be retained on retaining flanges (10,10',11,11') of the support beams (6,7,58) for supporting the panels (1), which beams bear on head parts (9,65,65',65") displaceable vertically on the ends of upright legs (16,64,64',64") adjustable between a high, shuttering position and a lower position for disassembly of the panels (1,63,63',63") in which it is possible to raise the latter at one side, prior to their lateral translation, releasing one of the support beams (6,7,58) and allowing the panel (1,63,63',63") to tilt so that it can be held suspended or can be removed.

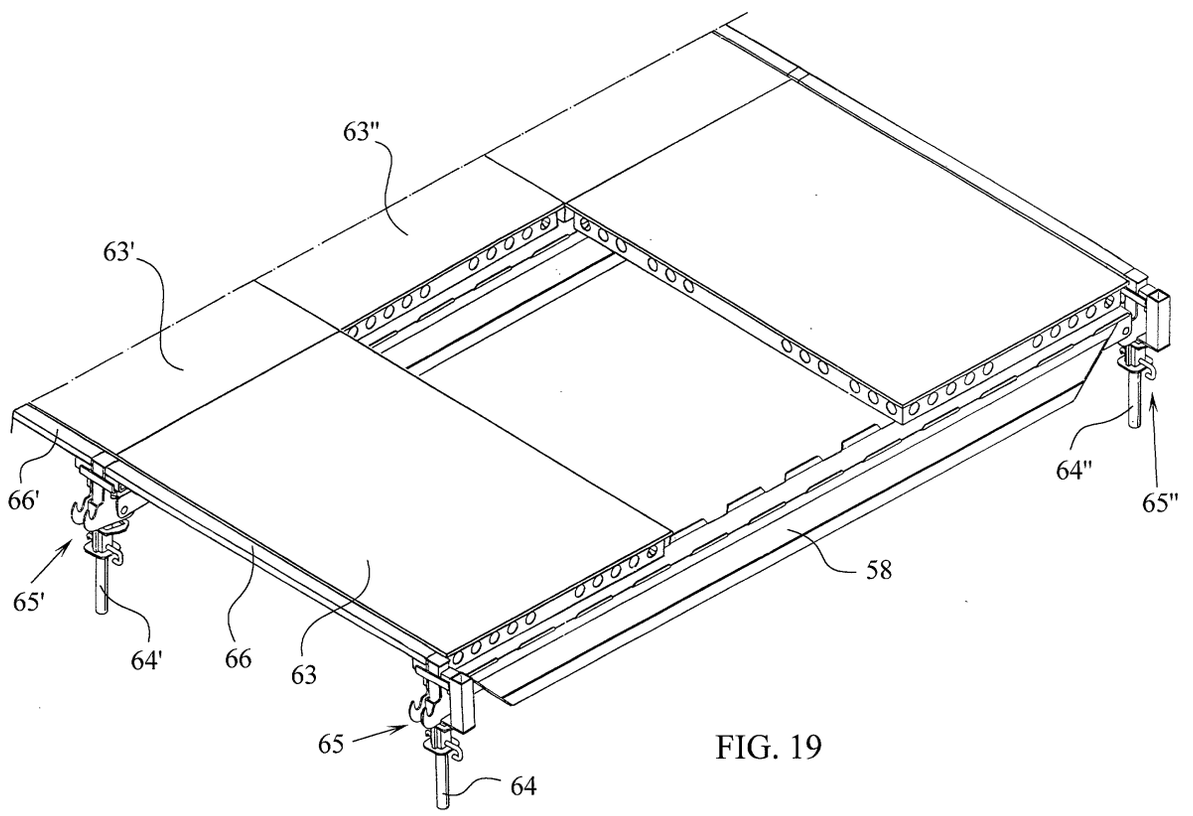

FIG. 19

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Description

[0001] The present invention relates to a recoverable shuttering, that is to say, of the type in which the panels and support beams of the shuttering are recovered after a certain partial setting period, being able to be used subsequently for other works or for other storeys of the same work.

[0002] In the recoverable shuttering systems known at present, use is made, above all, of the panels of the shuttering and also the support beams so that, after being used in one shuttering operation they can be used in other subsequent ones. This makes it necessary for the recoverable shuttering panels to have strength characteristics in order to guarantee a long service life, and to be very easy to dismantle in order to reduce the labour required. In the systems known at present, the centring and securing of the panels are solved by means of various devices, the dismantling of the panels with respect to the beams, which are dismantled after the panels, always being a relatively problematical operation.

[0003] The aim of the present invention is to disclose a recoverable shuttering having original features, which significantly facilitates the dismantling of the shuttering panels, reducing the labour necessary for this and significantly increasing the safety characteristics in the avoidance of accidents.

[0004] The recoverable shuttering of the present invention essentially comprises shuttering panels which bear on special beams equipped with projecting retaining edges, for example, edges castellated on their upper part, which are capable of retaining the edges of the shuttering panels and of holding the latter suspended in the final stage of dismantling, hanging from said retaining edges, while the aforesaid beams are engaged by means of end articulation pins in respective head parts carrying sets of vertically displaceable hooks and engaged in the upright legs. With this arrangement it is possible for the hooks receiving the beams to have a high working position in which the shuttering panels are arranged at the working height and another, lower, position which makes it possible, on lowering the aforesaid hooks, for the panel to be disengaged with respect to the floor slab and then slid transversely to allow it to be tilted and suspended from one of the aforesaid beams. The vertical displacement of the hooks is preferably effected by a system of wedges, so that it is actuated very easily, simply by introduction on the wedge or release of the latter from its working position.

[0005] In a preferred embodiment, the hook systems are incorporated in a head part engaged in the upper part of a conventional upright leg of the type which is adjustable in height and which has a vertical member or guide post for a sliding sleeve carrying the hooks and the fixing wedge.

[0006] The shuttering panels have reinforcing cross-members and a strong flange over their entire periphery to permit their proper functioning, which comprises centring on the retaining edges of the beams, displacement transverse to the latter for dismantling, and suspension by their flanges from the actual castellations of the beams.

[0007] For greater understanding, drawings of a preferred embodiment of the present invention are appended by way of non-limiting example.

[0008] Figures 1 to 6 show diagrammatically the relative position of a shuttering panel with respect to two upright legs in the successive stages from the active working position to the suspended or dismantling position.

[0009] Figure 7 shows a perspective view of a head part carrying a hook system for the suspension of lengths of beam.

[0010] Figure 8 is a view similar to Figure 7, in which can be seen the engagement of a support member for a handrail.

[0011] Figure 9 shows a perspective view of a support member for a handrail.

[0012] Figure 10 shows a perspective view of a head part according to Figure 8, with a beam used in the recoverable shuttering of the present invention.

[0013] Figure 11 shows a perspective view of a support beam for supporting the shuttering panels according to the present invention.

[0014] Figure 12 shows a perspective view of a panel-joining profile.

[0015] Figure 13 shows a cross-section through a beam according to Figure 11.

[0016] Figure 14 shows a view in elevation which shows the arrangement of a beam between two hook assemblies supported by respective head parts.

[0017] Figures 15 and 16 show perspective views, respectively from its upper part and from its lower part, of a shuttering panel according to the invention.

[0018] Figure 17 shows a detail of the placing of the shuttering panels with partial section.

[0019] Figure 18 shows diagrammatically a cross-section through a beam which shows the positioning of two adjacent shuttering panels.

[0020] Figure 19 shows a perspective view from the upper part of a panel assembly with one of them extracted to show the relative position with respect to the beams.

[0021] Figure 20 shows a perspective view of a handrail of the type used in the shuttering of the present invention.

[0022] As shown in the drawings, the recoverable shuttering of the present invention comprises metal panels 1 equipped with a top plate 2, intended to make contact with the concrete 8, and strong lateral walls 3 forming an open box having four faces and intended to rest on the upper parts 4 and 5 of respective beams 6 and 7, engaged on respective upright legs by way of head parts which are capable of sliding vertically from a working position, which is that shown in Figure 1, to a lower position, after its vertical displacement, which allows the

dismantling of the shuttering panel. The upper faces 4 and 5 of the beams have lateral flanges such as 10, 10' and 11, 11' which permit the lateral retention of the panels with respect to the beams.

[0023] The head parts which support the beams have been shown as a whole by the number 9 in Figure 7 and will be explained in more detail hereinafter. Said head parts are capable of vertical displacement upwards and downwards.

[0024] After partial setting of the slab 8 in the position shown in Figure 1, when it is desired to dismantle the shuttering panel, the four head parts that support a panel will be displaced vertically, the beams 6 and 7 being shown in Figure 2 in a lower position, like the panel 1, which will permit the release of said panel 1 after raising it, as can be seen in Figure 3 with the vector 13, displacing it afterwards according to the arrow 12 in Figure 4 towards the left until its side wall 14 abuts the opposite flange 10 of the beam engaged in the head part. Once this position is reached, the panel can tilt, as shown by the arrow 15 in Figure 5, finishing in the position shown in Figure 6, in which the panel 1 can be suspended by the flange corresponding to its side wall 14, on the flange 10' of the beam 6. In this position, the panel will remain supported by the aforesaid hook from its upper flange, being able to be dismantled easily. As will be observed, given the arrangement of elements which have been mentioned, rapid and safe manipulation of the panel is made possible, preventing unplanned falls of the latter and therefore preventing accidents from occurring.

[0025] Figure 7 shows in greater detail a head part, for example that previously indicated diagrammatically by the number 9. Said head part is detachably engaged in an upright leg 16 by means of a pin 17 and has a vertical member, for example rectangular prismatic 18 or some other shape, on which slides a member 19, equipped with the pairs of flat plate-like hooks 20, 20' and 21, 21'. The member 19 is displaceable vertically in response to the axial displacements of the wedge 22, which bears underneath on a fixed tubular member 23 through which passes the pin 17. By means of this arrangement, the hooks 20, 20' and 21, 21' are displaced upwards, by the thrust of the wedge, at most as far as the limit stops 24, determining the working position, and being displaced downwards when the wedge 22 is loosened, permitting the operation of dismantling of the panels which was explained previously in diagrammatic form. The pairs of hooks 20, 20' and 21, 21' form part of respective fixed narrow metal plates of the member 19 which are joined at the top by means of their upper extensions 25 and 25' to a "U"-shaped transverse profile 26 equipped with lateral webs 27 and 28 and in the horizontal portion of which, apertures 29 and 30 have been provided, intended for centring the intermediate joining profiles between shuttering panels in the position which corresponds to the upright support legs, and also the supplements for mounting handrails, which will be explained hereinafter.

[0026] According to the present invention, the beams are constituted as can be seen in Figure 11, in which can be observed top flanges inclined slightly outwards, formed, for example, by the castellations 31 and 31' on either side of the beam, said beam also having end articulation pins, for example the pin 32, which are mounted between small flat plates 33 and 34. Figure 13 shows the beam formed by two members, a tubular lower member 35 and another upper member in the shape of an upper narrow metal plate 36, provided with the castellations 31 and 31', although, as will be understood, said construction signifies only an exemplary embodiment of the invention.

[0027] As will be observed in Figure 14, a beam 35 constituted as indicated previously is engaged in the hooks of respective head parts 37 and 38 as the articulation pins 39 and 40 bear on said hooks.

[0028] Between every two panels there is engaged, in the position of the support legs, a joining profile, such as is shown in Figure 12, being indicated by the number 41. Said profile may be tubular, of rectangular cross-section, and has respective end feet of cylindrical or other shape 42 and 43 which are those which fit into the apertures 29 and 30 of the part 26, Figure 7.

[0029] The individual panels are constituted as will be seen in Figures 15 and 16, which show a panel 44 formed by the top plate 45 and the side walls 46, 46', provided with weight-reducing apertures 47 and which have bottom flanges 48 to obtain greater strength in articulation on the beams, and in addition having reinforcing cross-members 49 varying in number.

[0030] The flanges 48 of the side walls 46, 46', of the shuttering panels have at the comers small projections indicated by the numbers 55 and 56 which are intended to engage between the castellations of the beams, as can be observed in Figure 17, which shows the projections 55 and 56 engaged with one of the segments of the flange 60 of the corresponding beam. In the remaining corners of the other panels there is a similar arrangement, which has not been shown. Thus, for example, there can be seen in Figure 18 the beam 58 which supports by its upper castellations 59 and 60 respective shuttering panels 61 and 62.

[0031] For mounting guard rails, the present invention provides for the incorporation of special supports 50, Figures 8 and 9, consisting of a vertical tubular member 51 and a narrow metal bottom stop plate 52, having at the top a "U"-shaped part 53 carrying a centring stud 54, intended to be engaged in one of the apertures of the top part 26. When assembly has been carried out as can be seen in Figure 8, the tubular member 51 can be used for mounting support members of a handrail, as can be seen from Figure 20, which shows two vertical members 67 and 68 with their respective protective transverse members 69 and 70.

[0032] Figure 19 shows an example of shuttering consisting of a plurality of individual shuttering panels such as 63, 63', 63", which, as indicated previously, are

mounted on upright legs 64, 64', 64", by way of the hook-bearing head parts 65, 65', 65". At the points of coincidence with said head parts, joining profiles such as 66, 66', will be arranged.

[0033] The constitution which has been explained will allow very rapid and safe assembly and disassembly of the shuttering panels, ensuring an excellent technical output and safety in handling.

Claims

1. Recoverable shuttering, of the type which comprises shuttering panels mounted on support beams, being capable of being disassembled prior to the disassembly of the upright support legs, **characterised in that** it comprises shuttering panels provided with lateral flanges, adapted to be retained on retaining flanges of the panel support beams, which beams bear on head parts vertically displaceable on the ends of upright legs adjustable between a high, shuttering position and a lower position for disassembly of the panels, in which it is possible to raise them at one side, prior to their lateral translation, releasing one of the support beams and allowing tilting of the panel so that it can be held suspended or can be removed.

2. Recoverable shuttering, according to claim 1, **characterised in that** the head parts on which the beams bear comprise a central support detachably fixed on the upper part of an adjustable upright leg, on which central support there is slidingly coupled a member bearing hooks which are intended to receive end bearing pins of the beams.

3. Recoverable shuttering, according to claim 2, **characterised in that** the members bearing the hooks are displaceable upwards by the action of transverse wedges engaged in the respective displaceable sleeve.

4. Recoverable shuttering, according to claim 2, **characterised in that** the hooks are formed by respective pairs of plates parallel to one another and arranged one pair opposite the other, having hook notches intended to receive the end bearing pins of the beams and extending at the top in respective extensions joined to a "U"-shaped transverse member provided with apertures intended to receive the ends of join-covering profiles and supplements for mounting handrails.

5. Recoverable shuttering, according to claim 4, **characterised in that** the handrail receiving supplements comprise a hollow prismatic member provided with a narrow metal bottom stop plate and a "U"-shaped top part carrying a centring stud adapted to be inserted in the corresponding aperture of the "U"shaped top part rigidly connected to the narrow metal plates bearing the hooks.

6. Recoverable shuttering, according to claim 1, **characterised in that** the beams for supporting the shuttering panels have in cross-section a "U"-shaped structure consisting of a bottom profile and a top plate fixed to said "U"-shaped part provided with lateral flanges directed slightly outwards, preferably castellated.

7. Recoverable shuttering, according to claim 1, **characterised in that** the beams have at their ends pairs of straight plates between which are mounted respective transverse bearing pins, being adapted to make contact with the plates of the hooks to prevent unwanted lateral tilting thereof.

8. Recoverable shuttering, according to claim 1, **characterised in that** the shuttering panels have strong side walls ending in flanges directed inwards to allow them to be hooked and suspended on the retaining flanges provided on the beams along their top edges.

9. Recoverable shuttering, according to claim 8, **characterised in that** the shuttering panels have on their inwardly directed flanges and in the regions corresponding to the corners, small projections intended to engage, allowing them to be centred, with the castellated projections of the beams.

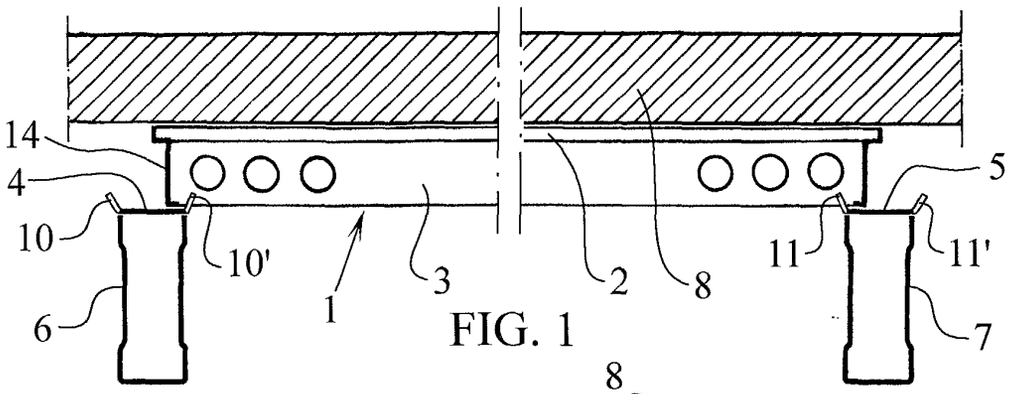

FIG. 1

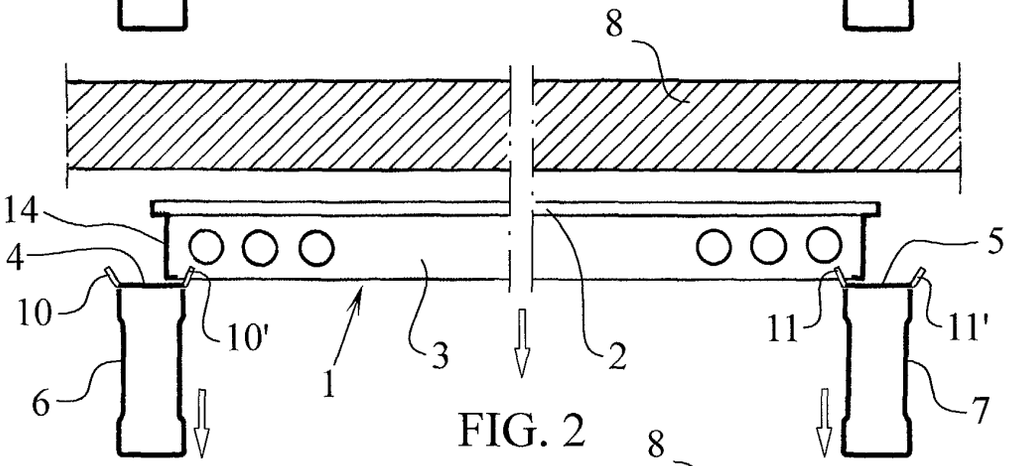

FIG. 2

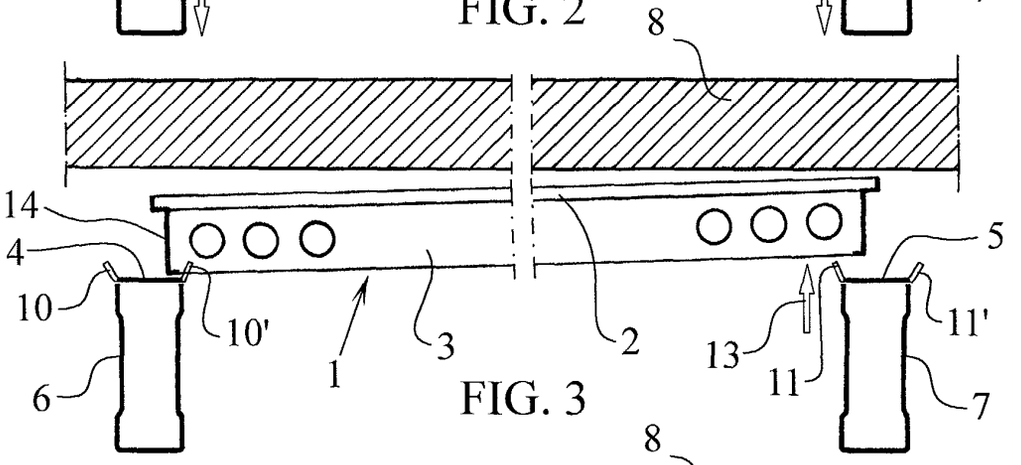

FIG. 3

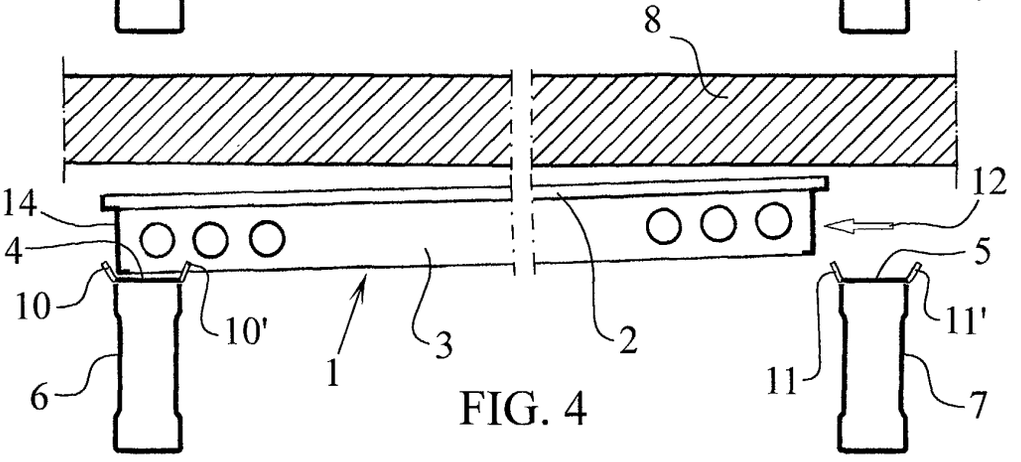

FIG. 4

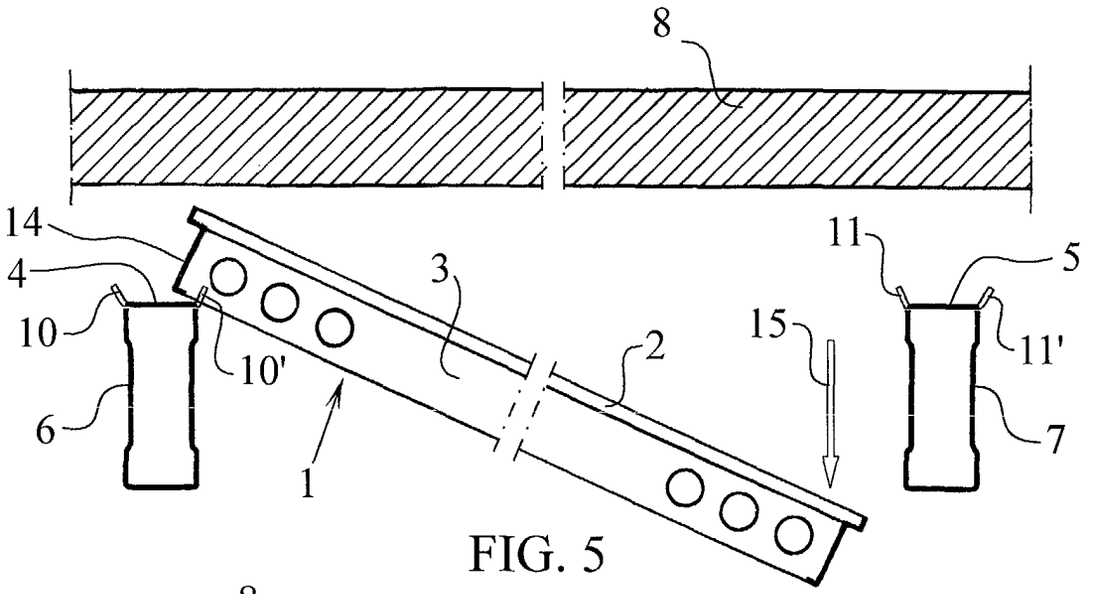

FIG. 5

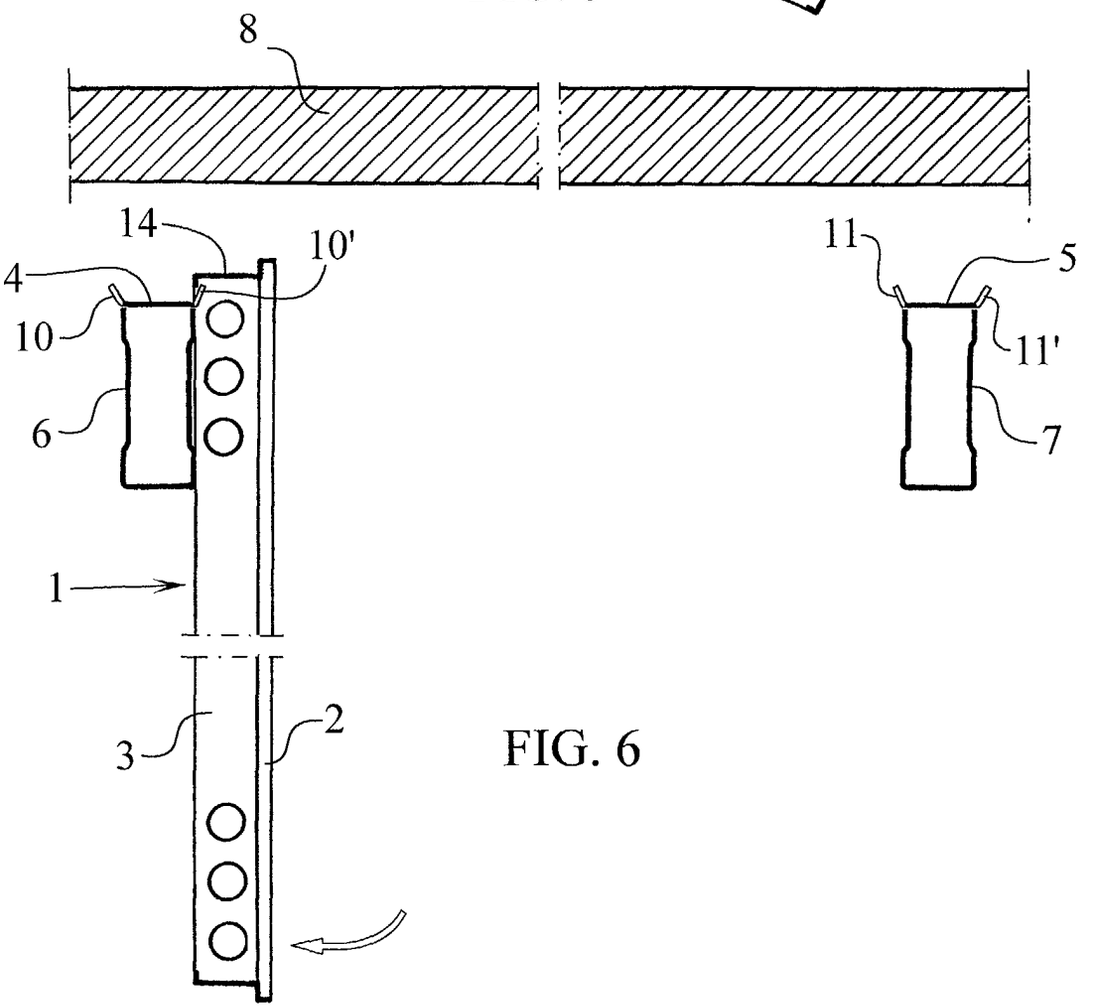

FIG. 6

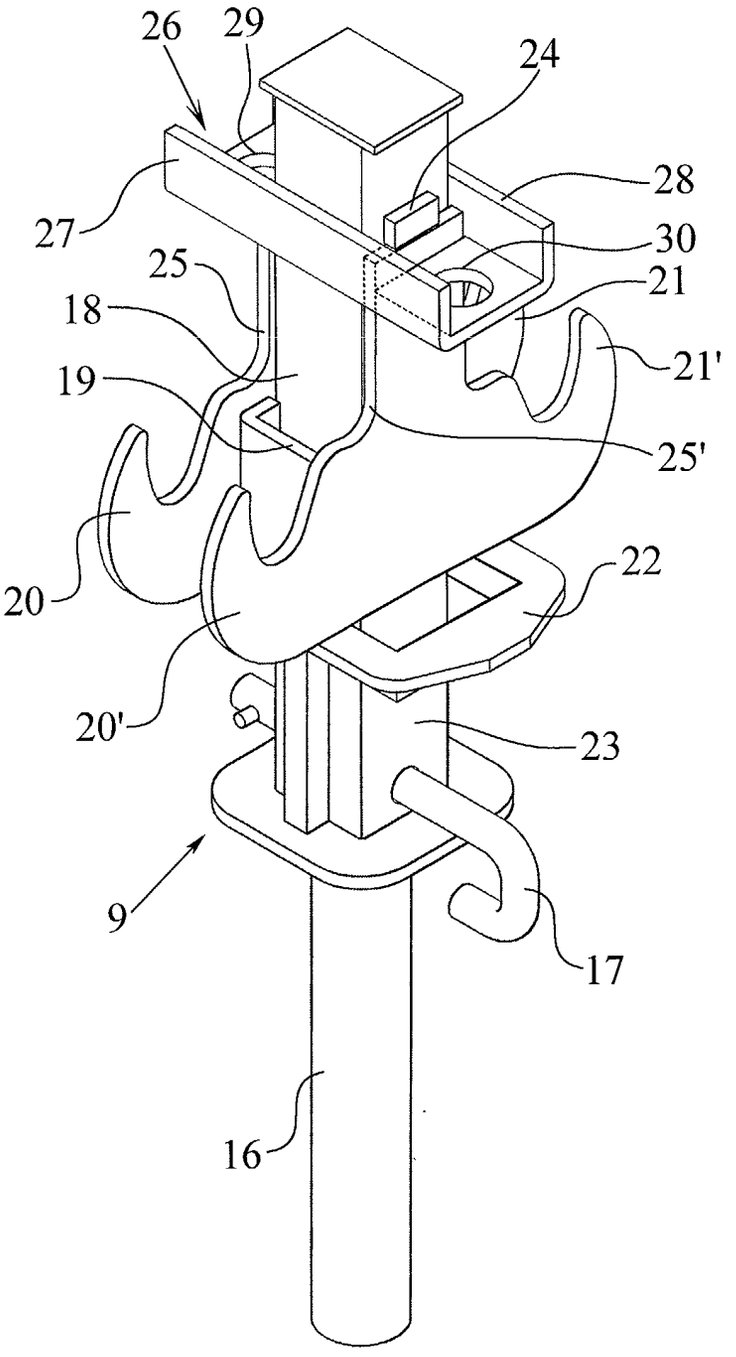

FIG. 7

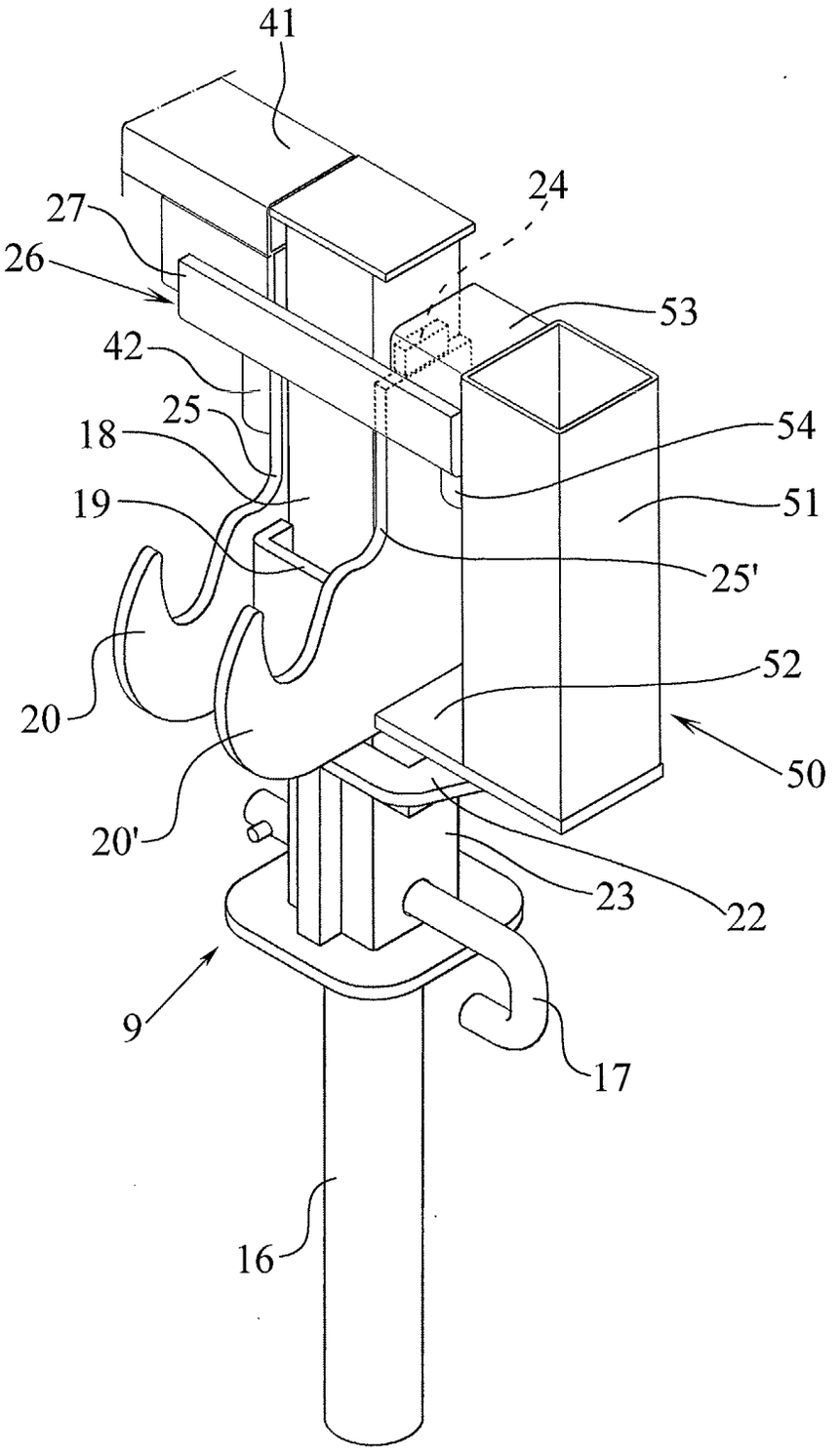

FIG. 8

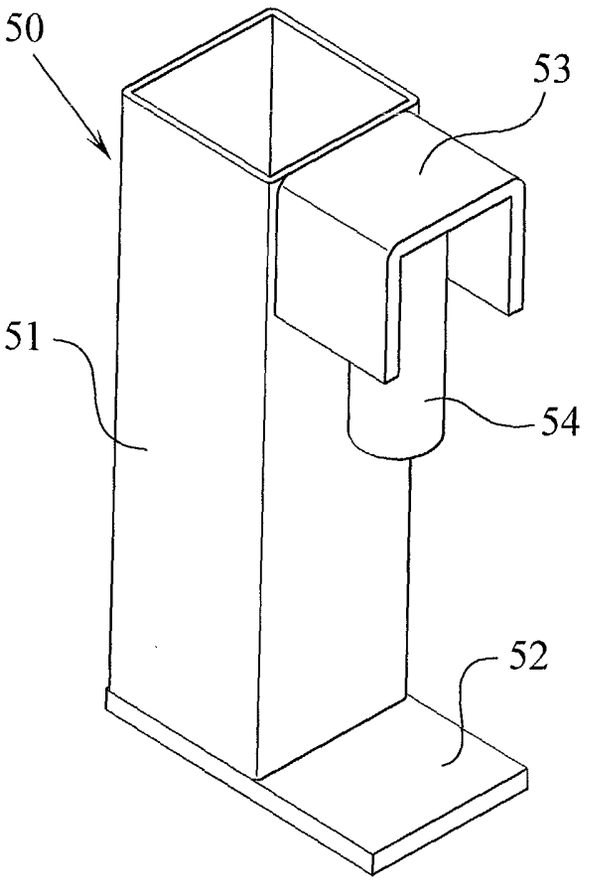

FIG. 9

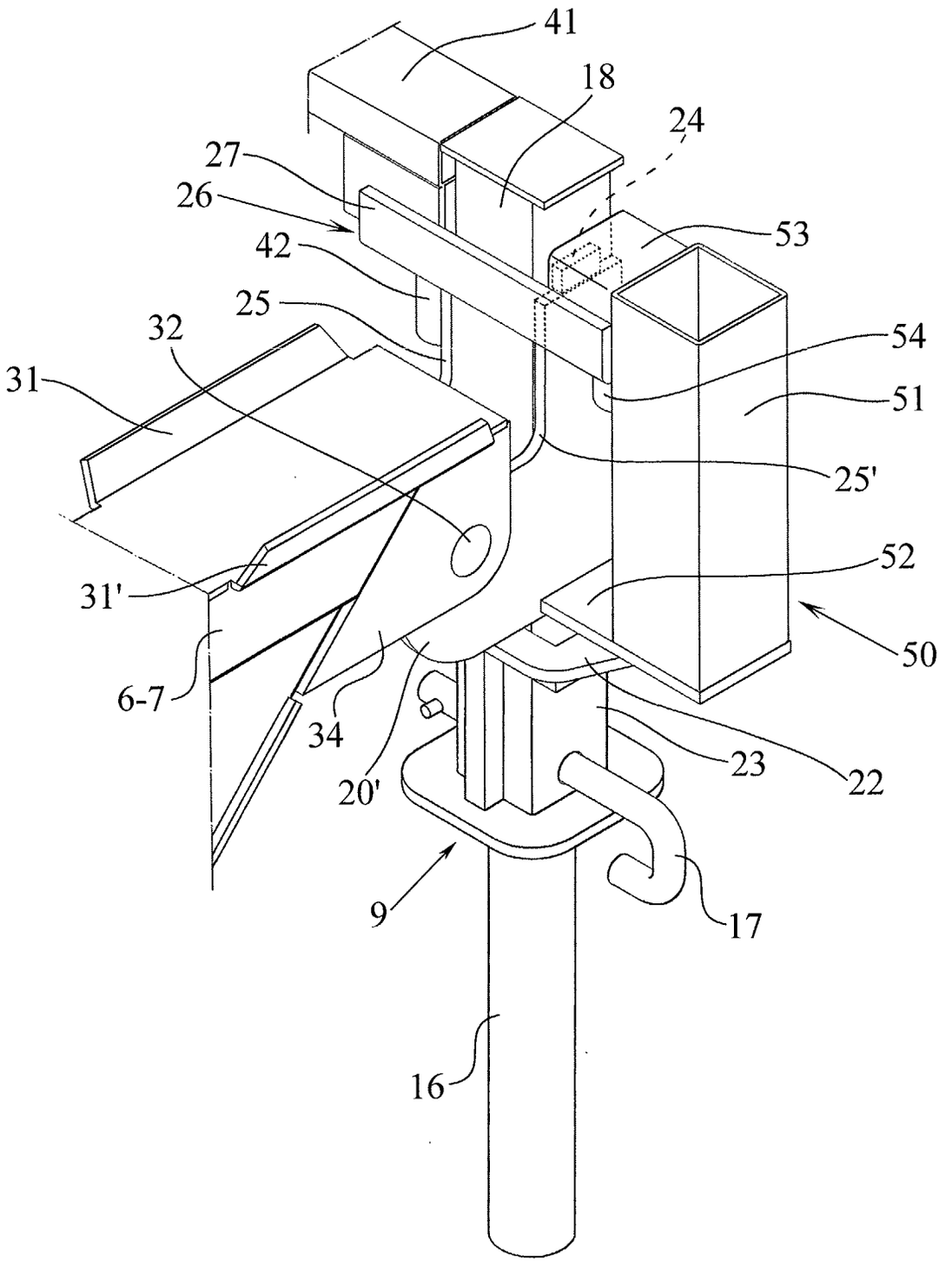

FIG. 10

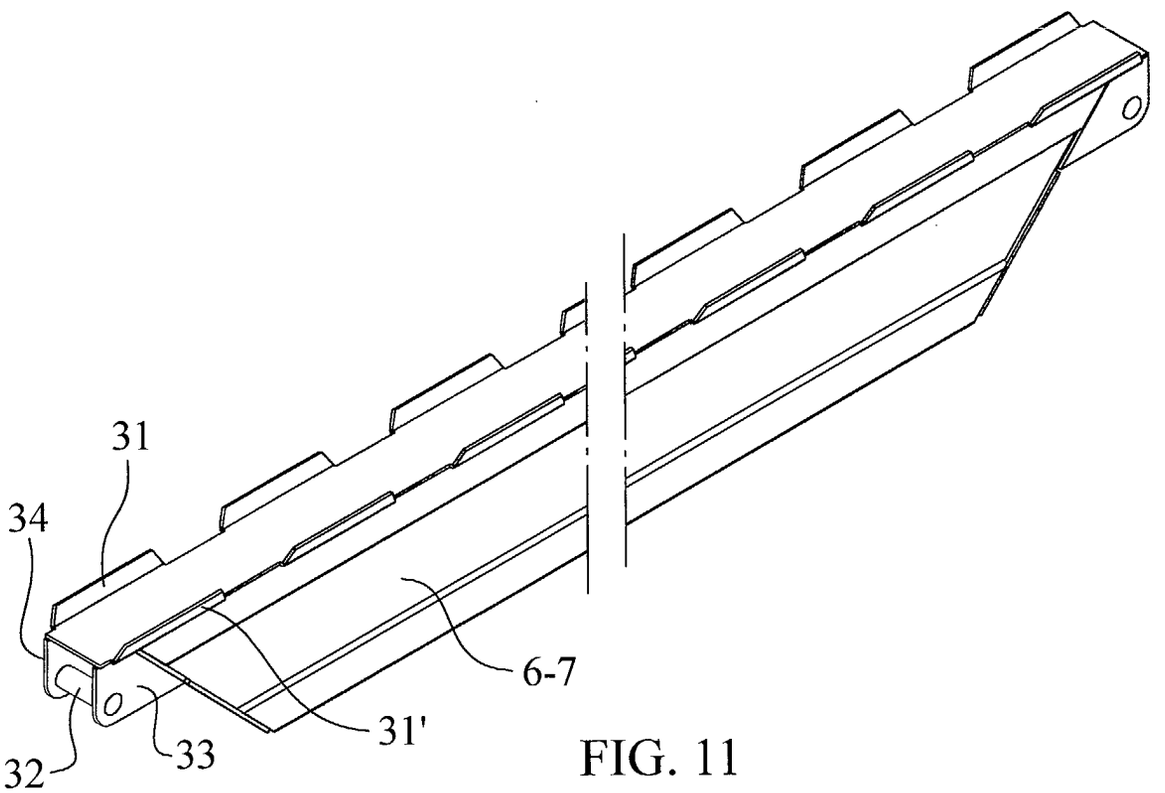

FIG. 11

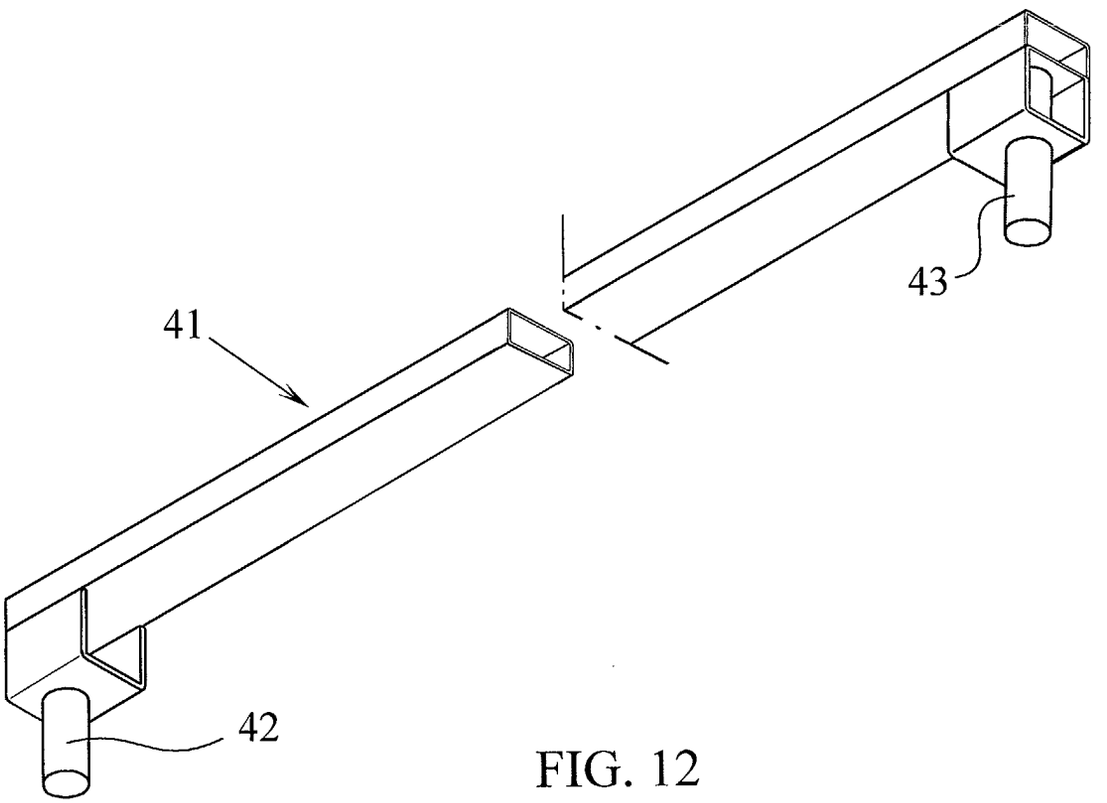

FIG. 12

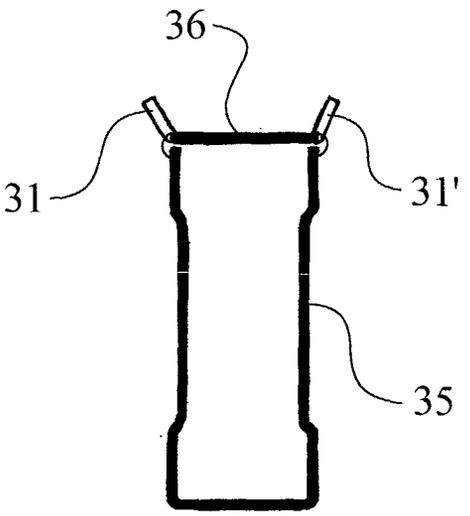

FIG. 13

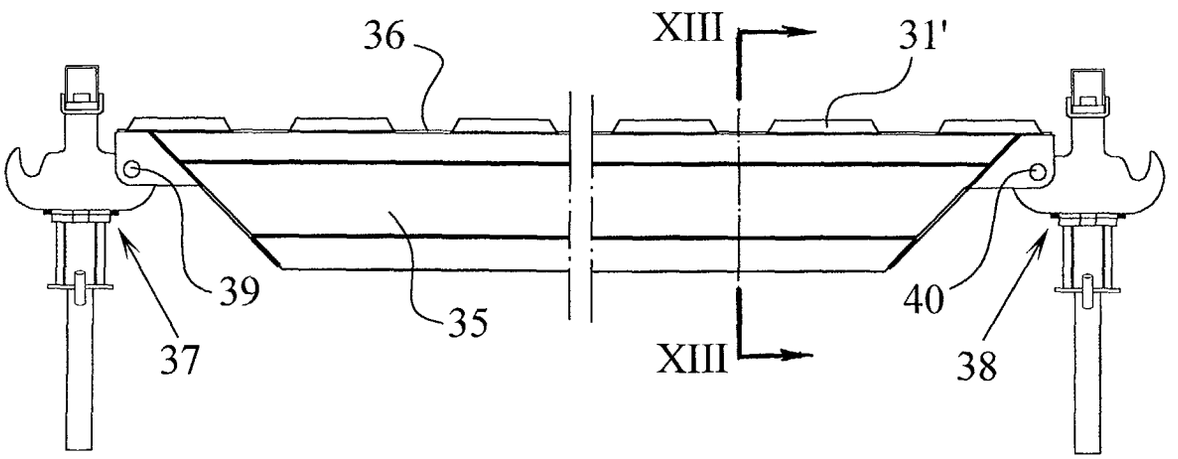

FIG. 14

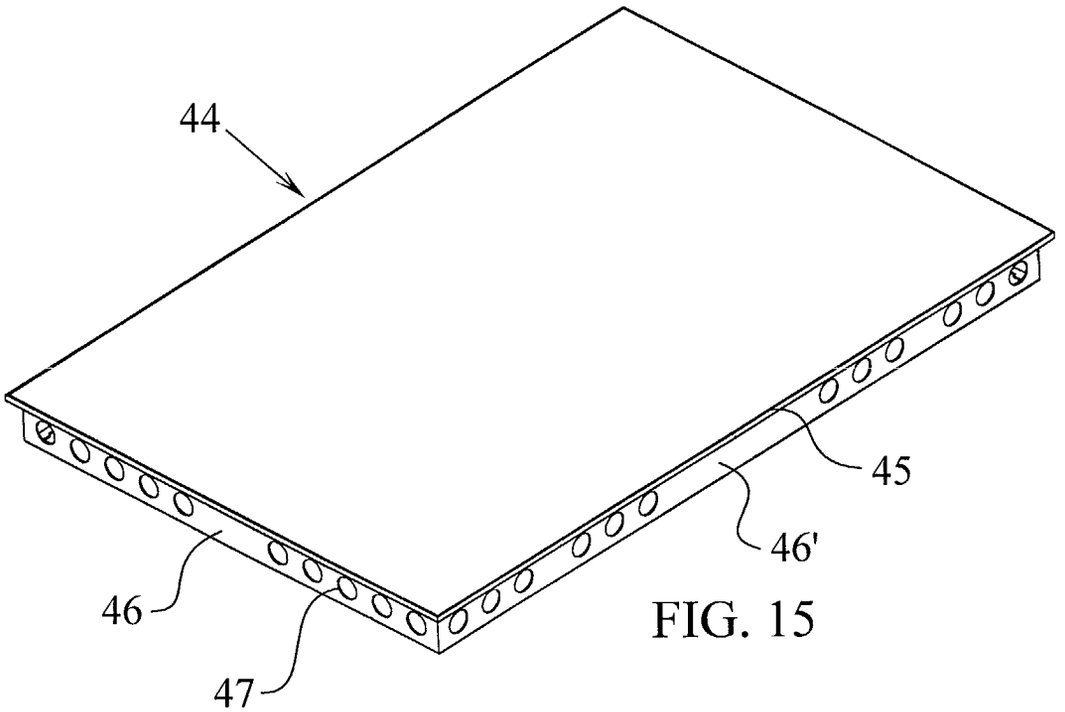

FIG. 15

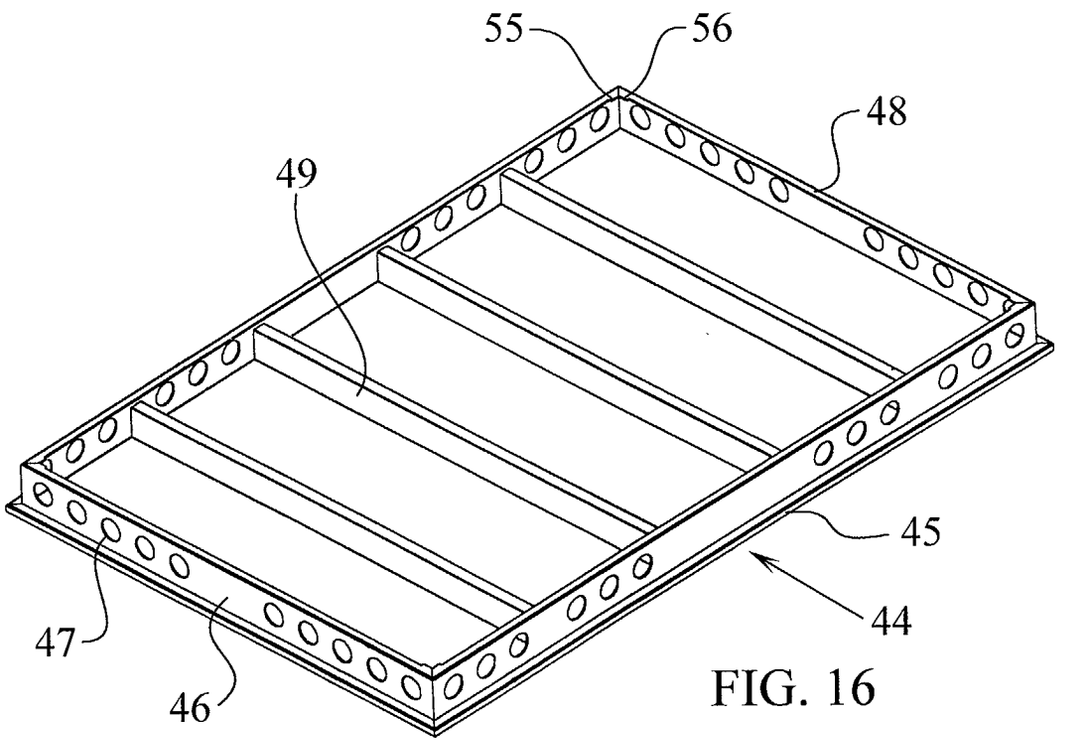

FIG. 16

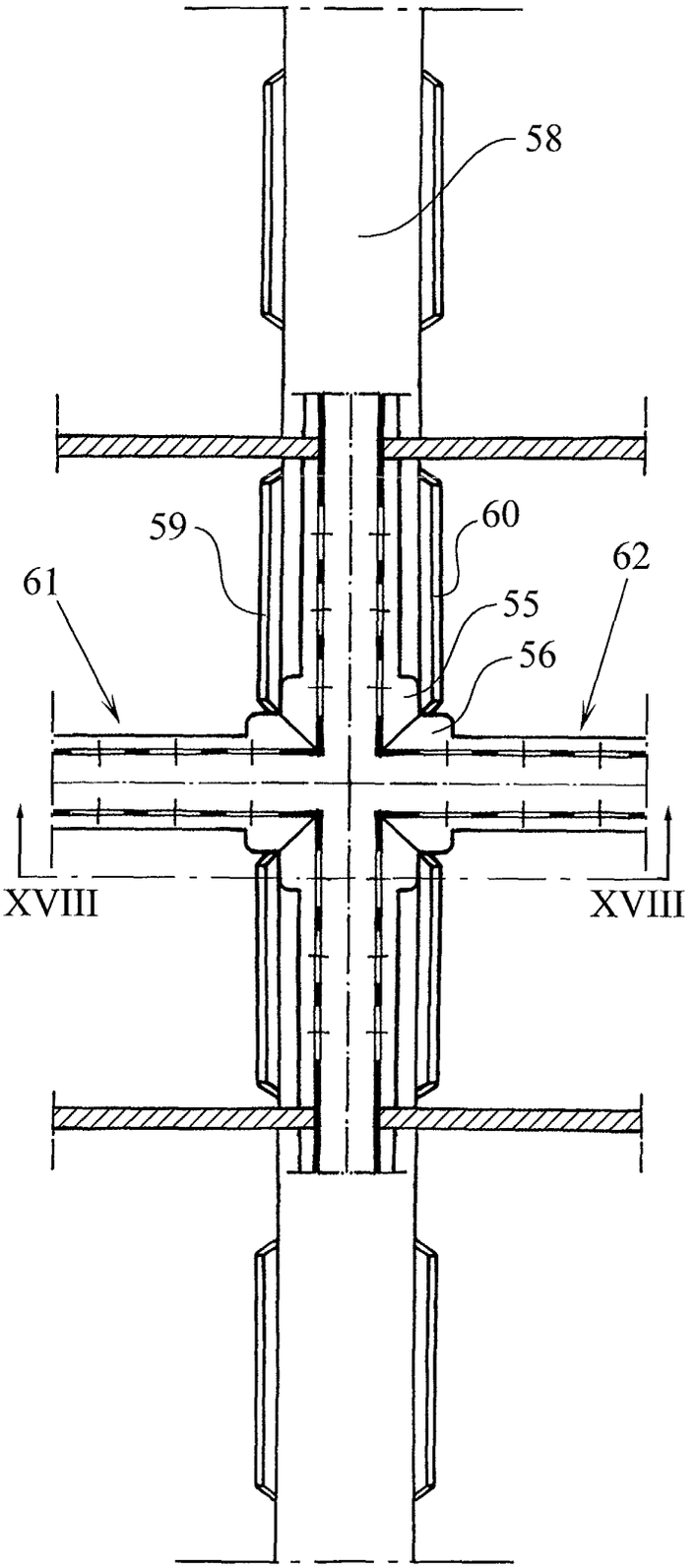

FIG. 17

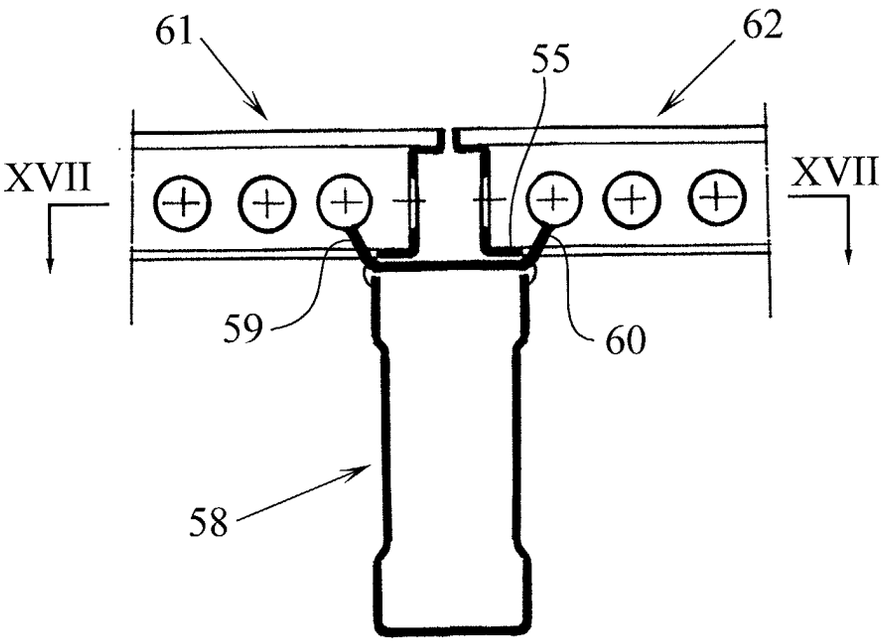

FIG. 18

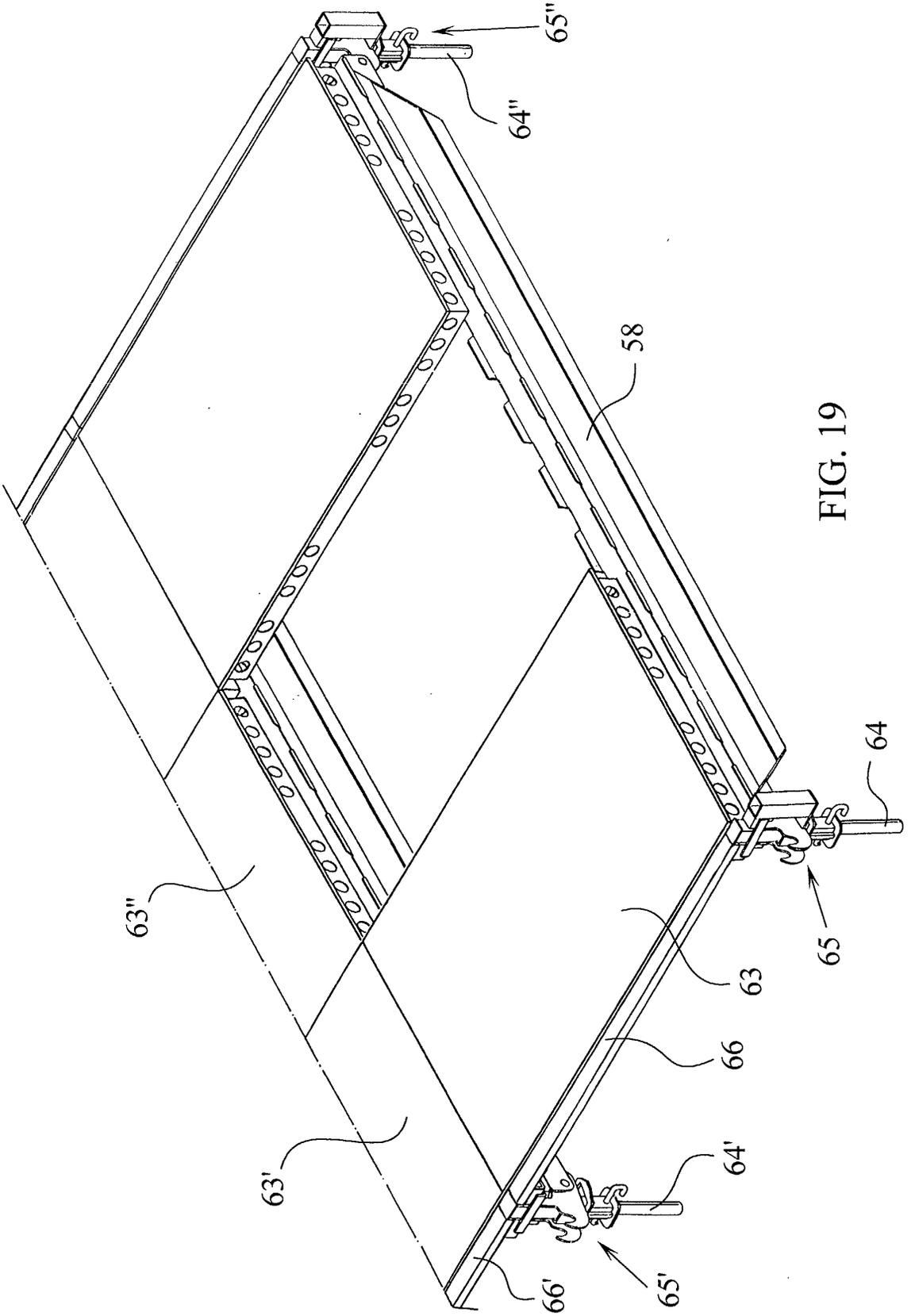

FIG. 19

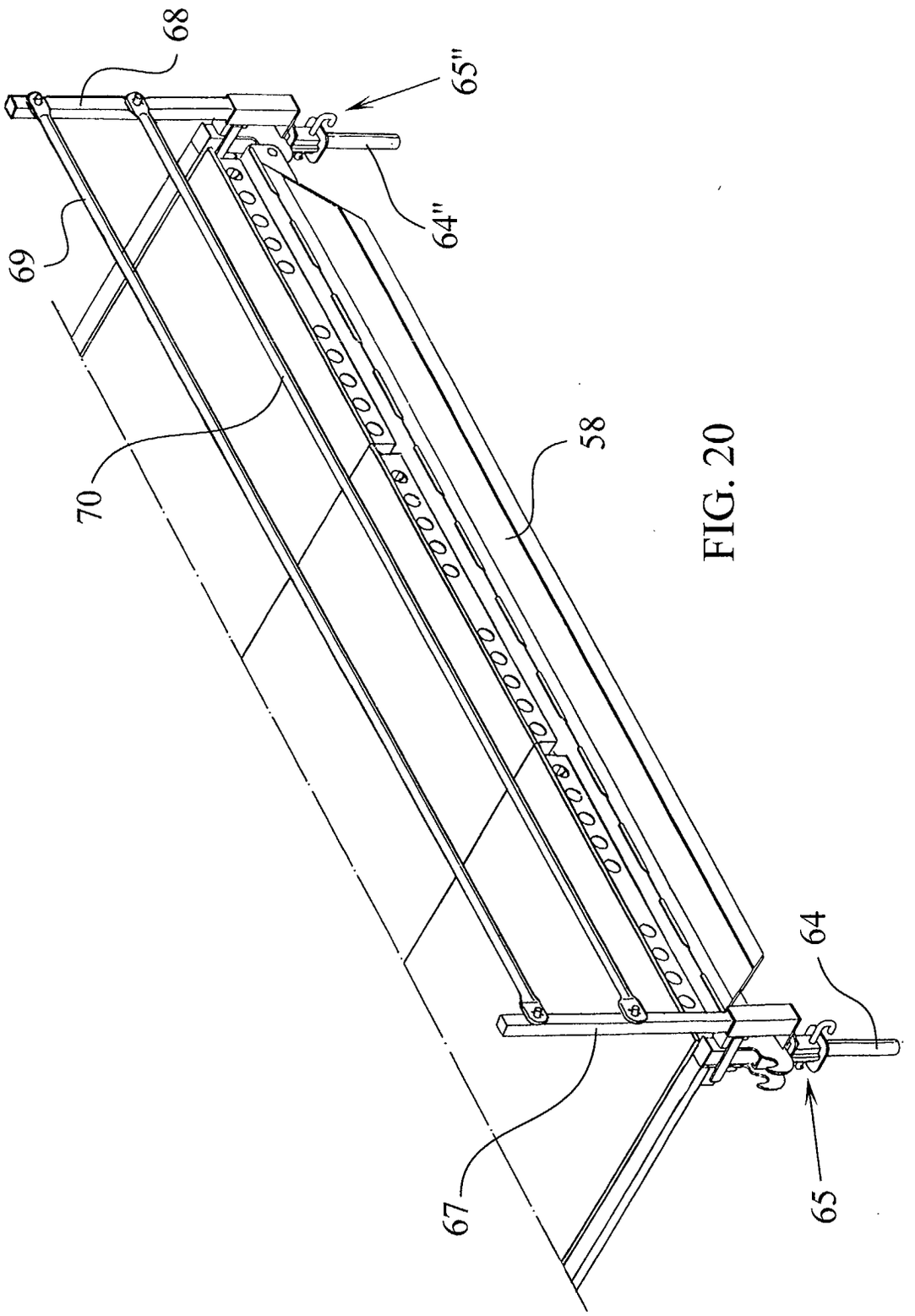

FIG. 20