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(54) Device in guard railings

(57) The invention relates to an arrangement for the assembly of guard rails (2) comprising poles (8;10), a screen arrangement (12) supported by the poles, and a fastening arrangement (14) for securing each guard rail pole (8;10) to a building frame (4,6). Each fastening arrangement (14) comprises a securing part (16) which can be anchored to the building frame, and a pole attachment (18) which can be coupled to the securing

part. The pole attachment comprises a framework of elongate first (28) and second (30) tube elements joined together at a distance from each other, and at least at one end it is designed to support a pole (8;10). In the assembled position, the pole attachment (18) is oriented with the elongate tube elements (28;30) lying in a vertical plane transverse relative to the screen arrangement (12).

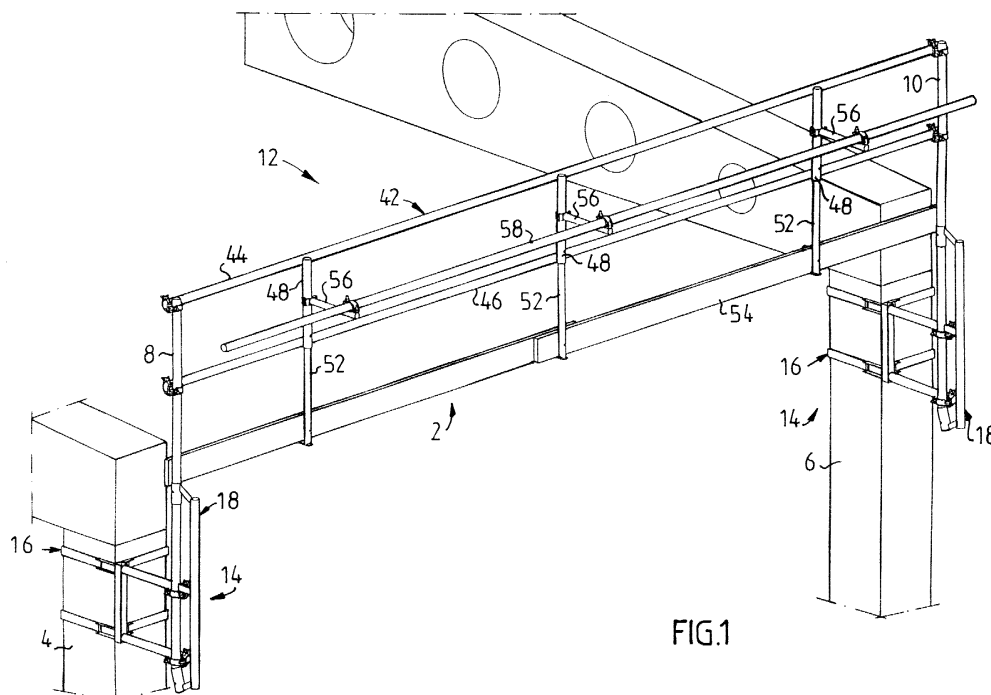


FIG.1

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Description

[0001] The invention relates to an arrangement for the assembly of guard rails in accordance with the preamble of Claim 1. It is known to assemble guard rails on building sites, among other reasons in order to prevent persons, building material or tools from dropping from one level to another as work on building frames progresses. Different building methods and frame constructions require different types of securing arrangements for poles and guard rail runners.

[0002] When constructing vestibules and industrial buildings around a pillar framework, there may be long spans where the distance between the pillars on which the pole attachments can be anchored often exceeds six metres and can sometimes be as great as ten metres or more. The maximum permitted c-c distance between the poles is determined by the admissible values of deflection and the demands concerning the maximum strength laid down by current building regulations. The regulations can vary between different countries.

[0003] It is an object of the invention therefore to make available guard rails with long spans which take account of the building regulations in force. This is made possible by the fact that the arrangement of the type set out above has the characteristic features in attached Claim 1. Advantageous refinements and improvements of the invention will be evident from the description and from the subclaims.

[0004] The invention is explained in greater detail below with reference to the attached diagrammatic drawings.

Figure 1 shows an example of a guard rail with a cantilever framework which, by means of securing parts with tensioning belts, is secured between two pillars in a building frame,

Figure 2a shows the guard rail from Figure 1 viewed from one end,

Figure 2b is a perspective view of a securing part and a pole attachment according to Figure 1 on an enlarged scale,

Figure 3 shows an example of a guard rail with a cantilever netting which, by means of securing parts with steel spar clamps, is secured between two steel pillars,

Figure 4 is an enlarged view of the securing arrangement in Figure 3,

Figure 5 shows the guard rail according to Figure 3 viewed from one end,

Figure 6 is a view, on an enlarged scale, of an alternative securing part with screw connections,

Figure 7 shows guard rails joined together on both sides of a corner,

Figure 8 shows a guard rail on one side of a corner with a stay, and

Figure 9 shows a guard rail on one side of a corner with a separately secured stay.

[0005] Tube parts and elements included in the guard rail can advantageously be made as scaffolding tubes of conventional type which in general have a diameter of 48.3 mm. By this means it is also possible to use standard tube couplings adapted to scaffolding tubes for the purpose of joining the guard rail together.

[0006] The guard rail 2 according to Figures 1 and 2 is mounted between a first pillar 4 and a second pillar 6 in a building frame with the aid of a first pole 8 and a second pole 10 for supporting a screen arrangement 12. A fastening arrangement 14 is anchored near the upper end of each pillar for supporting the lower end of a respective pole. Each fastening arrangement comprises a securing part 16 anchored to the respective pillar in the assembled state, and a pole attachment 18 coupled to the securing part.

The securing part 16 can be of different designs, of which one design which includes tensioning belts of a conventional type is described below, while other designs will be described later. The securing part 16 with tensioning belt is preferably intended for assembly on concrete pillars. It can also be mounted on other types of square pillars, for example steel pillars, with the exception of I-beams. It is made up of a square tube 20 on which two connection tubes 22 are welded one at each end. Two angle brackets 24 constructed from U-profiles are welded onto the opposite side of the square tube. At the free ends of the angle brackets there are holes which have been drilled for securing, for example, a pin for assembling of tensioning belts 26. The belt is secured to one branch, and the tensioner in the other. To assemble the securing part 16, the tensioning belts 26 are guided round the respective pillar 4, 6 and tightened and locked with the tensioner. An easily adjustable securing can be obtained quickly and simply without any need for welding or drilling work or casting of attachments.

[0007] The pole attachment 18 of the fastening arrangement 14 has a uniform configuration irrespective of the design of the securing part used in any given case. Conventional securing arrangements are often located far down on the building frame, for which reason the pole attachment 18 is designed as an elongate framework which continues the length of the pole from the securing part 16 and upwards. The pole attachment 18 can be coupled to the securing part 16 by means of conventional tube couplings, which permits adjustment inwards/outwards and upwards/downwards. In cases where rotatable tube couplings are used, it is also possible to mount the pole attachment at an inclination.

[0008] The framework of the pole attachment 18 comprises first 28 and second 30 tube elements joined together at a distance from each other, of which the first tube element is provided with a first pole sleeve 32 coaxial therewith at a first end and, at the other end, a second pole sleeve 34 angled towards the second tube element 30. The pole attachment can be coupled together to the securing part with either the first 32 or second 34

pole sleeve directed upwards. The straight first pole sleeve 32 is intended for a pole for the screen arrangement 12 which is designed as a framework, which will be described in more detail later. The second pole sleeve 34 can be angled as required but is intended to support a pole for a netting or guard net which will likewise be described in more detail below. New regulations which are expected will stipulate that a guard rail of this type must slope at least 15° , for which reason the second pole sleeve 34 can advantageously be angled at an angle α of 15° , 18° or 20° .

[0009] The pole attachment 18, the length of which between the pole sleeves can vary between ca. 1000 mm and ca. 1800 mm, is intended to support poles with a length of normally 1150 mm, although poles as long as 1800 mm are possible. The tube elements 28, 30 are parallel and welded together, preferably by means of first 36, second 38 and third 40 stiffening members of flat iron at a mutual spacing of about 100 mm at the first end and second end and at the approximate centre of the pole attachment, respectively. The first and second stiffening members 36, 38 each form an obtuse angle of approximately 120° to the second element 30, and the third stiffening member forms a right angle both to the first element and the second element. The mutual distance between the tube elements should be increased if greater torques are to be taken up than is customary for normal guard rails. Trials have shown that the ratio between the mutual distance of the tube elements and the length of the pole attachment between the pole sleeves should not be less than 1 to 20 in order to ensure good functioning.

[0010] The screen arrangement 12 comprises a cantilever framework 42 which is secured at each point of attachment to the building frame between two poles and which has upper 44 and lower 46 bars which are arranged at a distance from each other, approximately corresponding to a third to one half of a pole length, and near each end are connected to the first and second poles 8; 10, and with transverse stiffening tubes 48 arranged in a predetermined distribution between the poles. The distribution is such that for a defined length of six metres of the bars 44, 46, which gives a corresponding span, the stiffening tubes 48 are three in number, with one situated transverse to the centre of the bars, i.e. three metres from each end. The other two are then situated one metre from each end and therefore two metres from the centrally located stiffening tube 48. If a greater span is to be bridged between the poles, two frameworks 42 can be joined together by means of connector tubes 50 mounted in the ends of the bars. By this means, the total length of the connected frameworks is 12 metres and the number of stiffening tubes 48 is therefore six. The distribution here is once again two metres between all the stiffening tubes, and one metre between the stiffening tubes 48 located nearest to the poles and the respective first 8 and second 10 pole. A toe board holder 52 for supporting a toe board 54 of a conventional

type can be suspended from each stiffening tube 48 in such a way that each toe board is supported at the same level as is customary by means of a toe board bracket 55 arranged on the pole.

[0011] According to a preferred embodiment, the cantilever framework 42 additionally has, on the side of each stiffening tube 48 directed away from the building frame, a central bar 58 which is connected to the central portion of each stiffening tube by means of a connection tube 56 in such a way that the connection tube 56 is situated in a vertical plane transverse relative to the upper 44 and lower 46 bars. The central bar 58 is substantially parallel to the upper 44 and lower 46 bars and situated at a distance of approximately a third of a pole length from the stiffening tubes 48 in a horizontal plane transverse to the same. The coupling to the central bar 58 permits a greater c-c distance between the poles 8; 10, without permitted deflection values being exceeded or a greater c-c distance infringing on the requirements set in respect of maximum strength.

[0012] In the present case, the central bar 58 can also be connected to each first 8 and second 10 pole via its additional connection tube 56.

[0013] Figures 3 to 5 show a further embodiment of a guard rail 2' mounted between a first pillar 4' and a second pillar 6' in a building frame with the aid of a first 8' and a second 10' pole for supporting a screen arrangement 12'. As in the preceding embodiment, the fastening arrangement 14 is anchored near the upper end of each pillar for supporting the lower end of the respective pole. The fastening arrangement in this case also comprises the securing part 16' anchored to the respective pillar in the assembled state, and the previously described pole attachment 18 coupled to the same. The securing part 16' described here is in a form which comprises steel spar clamps of a conventional type, for example Combisafe®. The securing part 16' with steel spar clamps is preferably intended for mounting on steel pillars, preferably I-beams. It is made up of two steel spar clamps 60 on which two connection tubes 22' are mounted, for example with tube couplings or weld seams, in such a way that the connection tubes 22' project at substantially a right angle with respect to the screen arrangement 12'. For mounting the securing part 16', the steel spar clamps 60 are tensioned on the flanges of the respective steel pillar 4', 6' and the pole attachment 18 is mounted on the connection tubes 22' in the same way as before, but with the difference that the angled second pole sleeve 34 is now directed upwards. In this way, it is possible to obtain the inclination of at least 15° of the poles 8' and 10' which is needed for guard nets. Here once again, an easily adjustable securing can be quickly and easily obtained without any need for welding or drilling work or casting of the attachments. No work therefore has to be done on the pillar.

[0014] The screen arrangement 12' comprises a cantilever netting or guard net 62 which is secured between two poles at each point of attachment on the building

frame and which has a net 64 supported by means of upper 44' and lower 46' runners arranged at a distance from each other and in the form of, for example, a wire or a tensioning belt, which are connected near each end to each pole 8', 10' via tube couplings with knots which are not shown. In the present case, a wire or tensioning belt can be guided through the net 64 before assembly. If, for example, the wire runners are tensioned after assembly, problems can arise on account of the fact that the poles bend inwards under the effect of the wire tensioning.

[0015] In the case of two guard rails 12' on both sides of a pillar 6' in a corner, this can be countered by two poles 8', 10' in the corner being joined together at the bottom by means of another pole attachment 18 mounted on the steel spar clamps 60 of the securing part 16', and at the top by means of for example a connection tube 56' or the like, as is shown in Figure 7. In the case of guard rails on one side of a corner, the pole in the corner can be braced by means of a stay 70 anchored at the securing part 16 of the pole attachment 18 and extending to the top of the respective pole 8', 10', as is shown in Figure 8. Alternatively, in especially exposed positions where there is a risk of extremely high loading on account of snow and/or wind loads, for example, the stay 70 can be anchored in a further separate securing part 16, see Figure 9.

[0016] Figure 6 shows an alternatively designed securing part 16" with which the pole attachment 18 is coupled in the same way as in the previous embodiments. The connection tubes 22" are here provided with screws 66 which are screwed tightly into two securing seats 68 arranged in the pillar. Concrete pillars are prefabricated with the securing seats 68 in the form of cast threads. Alternatively, expander attachments are used which are mounted afterwards.

[0017] Steel pillars are provided with threaded holes directly in the steel or with welded-on nuts. The idea of this securing part 16" is that the screws are free and take up relatively little space, which means that it is possible to mount wall elements and leave the screws projecting from the joints. Holes for the screws are drilled in sheet metal walls. When disassembling the guard rail, the connection tubes 22" and screws 66 are unscrewed from the pillar and the securing seat 68 can be concealed by the joints between elements being covered over in the traditional way.

[0018] The securing parts 16, 16' and 16" combined in the various embodiments and the screen arrangements 12 and 12' are shown only as examples. Thus, every conceivable combination of framework 42 and netting 62 is possible with both the securing part 16 for assembly with tensioning belts 26, the securing part 16' for assembly with steel spar clamps 60, and the securing part 16" for assembly with screws 66.

Claims

1. Arrangement for the assembly of guard rails (2) comprising poles (8; 10), a screen arrangement (12) supported by the poles, and a fastening arrangement (14) for securing each pole to a building frame (4; 6), **characterized in that** each fastening arrangement (14) comprises a securing part (16) which can be anchored to the building frame, and a pole attachment (18) which can be coupled to the securing part and comprises a framework of elongate first (28) and second (30) tube elements joined together at a distance from each other, and which at least at one end is designed to support the pole (8; 10) and, in the assembled position, is oriented with the elongate elements (28; 30) lying in a vertical plane transverse relative to the screen arrangement (12).
2. Arrangement for the assembly of guard rails according to Claim 1, **characterized in that** the first tube element (28) has a first pole sleeve (32) coaxial therewith at a first end and, at the other end, a second pole sleeve (34) angled towards the second tube element (30), and **in that** the second pole sleeve (34) is angled by at least 15°.
3. Arrangement for the assembly of guard rails according to Claim 1 or 2, **characterized in that** the tube elements (28, 30) are substantially parallel and their distance from each other is related to the length of the pole attachment (18) between the pole sleeves in a ratio of at least 1 to 20.
4. Arrangement for the assembly of guard rails according to any one of Claims 1 to 3, **characterized in that** the first tube element (28) is joined to the second tube element (30) by means of at least first (36), second (38) and third (40) stiffening members at the first and second ends and at approximately the centre of the pole attachment (18), respectively.
5. Arrangement for the assembly of guard rails according to Claim 4, **characterized in that** the first (36) and second (38) stiffening members each form an obtuse angle to the second tube element (30), and the third stiffening member (40) forms a right angle to both the first (28) and the second (30) tube elements.
6. Arrangement for the assembly of guard rails according to Claim 5, **characterized in that** the obtuse angle lies between 110° and 130°.
7. Arrangement for the assembly of guard rails according to any one of the preceding claims, **characterized in that** the securing part (16) is made up of a square tube (20) on which two connection tubes

(22) are welded each at one end, **in that** welded on the opposite side of the square tube there are two angle brackets (24) which are constructed from U-profiles, for bearing against a corner of a square pillar (2, 4), and **in that** tensioning belts (26) with tensioners are fitted at the free ends of the angle brackets.

8. Arrangement for the assembly of guard rails according to any one of Claims 1 to 6, **characterized in that** the securing part (16') is made up of two steel spar clamps (60) on which two connection tubes (22') are mounted in such a way that the connection tubes (22') project substantially at right angles to the screen arrangement (12'), which securing part (16') is mounted by means of the steel spar clamps (60) being clamped tight on the flanges of the respective steel pillar (4', 6'). 10
9. Arrangement for the assembly of guard rails according to any one of Claims 1 to 6, **characterized in that** the securing part (16'') is made up of two connection tubes (22'') which are provided with screws (66) which are screwed tightly into securing seats (68) in the form of corresponding threaded holes arranged in the pillar (4''). 15
10. Arrangement for the assembly of guard rails according to any one of the preceding claims, **characterized in that** the screen arrangement (12) comprises a cantilever framework (42) which is secured at each point of attachment to the building frame (4; 6) between two poles (8; 10) and which has upper (44) and lower (46) bars which are arranged at a distance from each other and near each end are connected to each pole (8; 10), and with transverse stiffening tubes (48) arranged in a pre-determined distribution between the poles. 20
11. Arrangement according to Claim 10, **characterized in that** a toe board holder (52) for supporting a toe board (54) can be suspended from each stiffening tube (48). 25
12. Arrangement according to Claim 10 or 11, **characterized in that**, on the side of each stiffening tube (48) directed away from the building frame (4; 6), the cantilever framework (42) has a central bar (58) which is connected to the central portion of each stiffening tube (48) by means of a connection tube (56) in such a way that the connection tube (56) is situated in a vertical plane transverse relative to the upper (44) and lower (46) bars. 30
13. Arrangement according to Claim 12, **characterized in that** the central bar (58) is substantially parallel to the upper (44) and lower (46) bars and situated at a distance from the poles (8; 10) and the stiffening 35

tubes (48) in a horizontal plane transverse relative to the same.

14. Arrangement according to Claim 12 or 13, **characterized in that** the central bar (58) is connected to each pole (8; 10) via its connection tube (56). 40
15. Arrangement according to any one of Claims 1 to 9, **characterized in that** the screen arrangement (12') comprises a cantilever netting (62, 64) between two poles (8; 10) and secured at each point of attachment to the building frame (4'; 6'), which netting (62, 64) has upper (44') and lower (46') runners which are arranged at a distance from each other and which near each end are connected to each pole (8; 10). 45
16. Arrangement according to Claim 15, **characterized in that** both the upper (44') and the lower (46') runners consist of a wire. 50
17. Arrangement according to Claim 15, **characterized in that** both the upper (44') and the lower (46') runners consist of a tensioning belt. 55
18. Arrangement according to any one of Claims 15 to 17, **characterized in that** in the case of guard rails (12') which are arranged on both sides of a pillar (6') in a corner, the poles (8', 10') in the corner are joined together (56'). 60
19. Arrangement according to any one of Claims 15 to 17, **characterized in that** in the case of guard rails (12') on one side of a pillar (4) in a corner, the pole (8', 10') in the corner is braced by means of a stay (70) anchored at the securing part (16) of the pole attachment (18) and extending to the top of the pole. 65
20. Arrangement according to Claim 19, **characterized in that** the stay (70) is braced by means of a separate securing part (16). 70

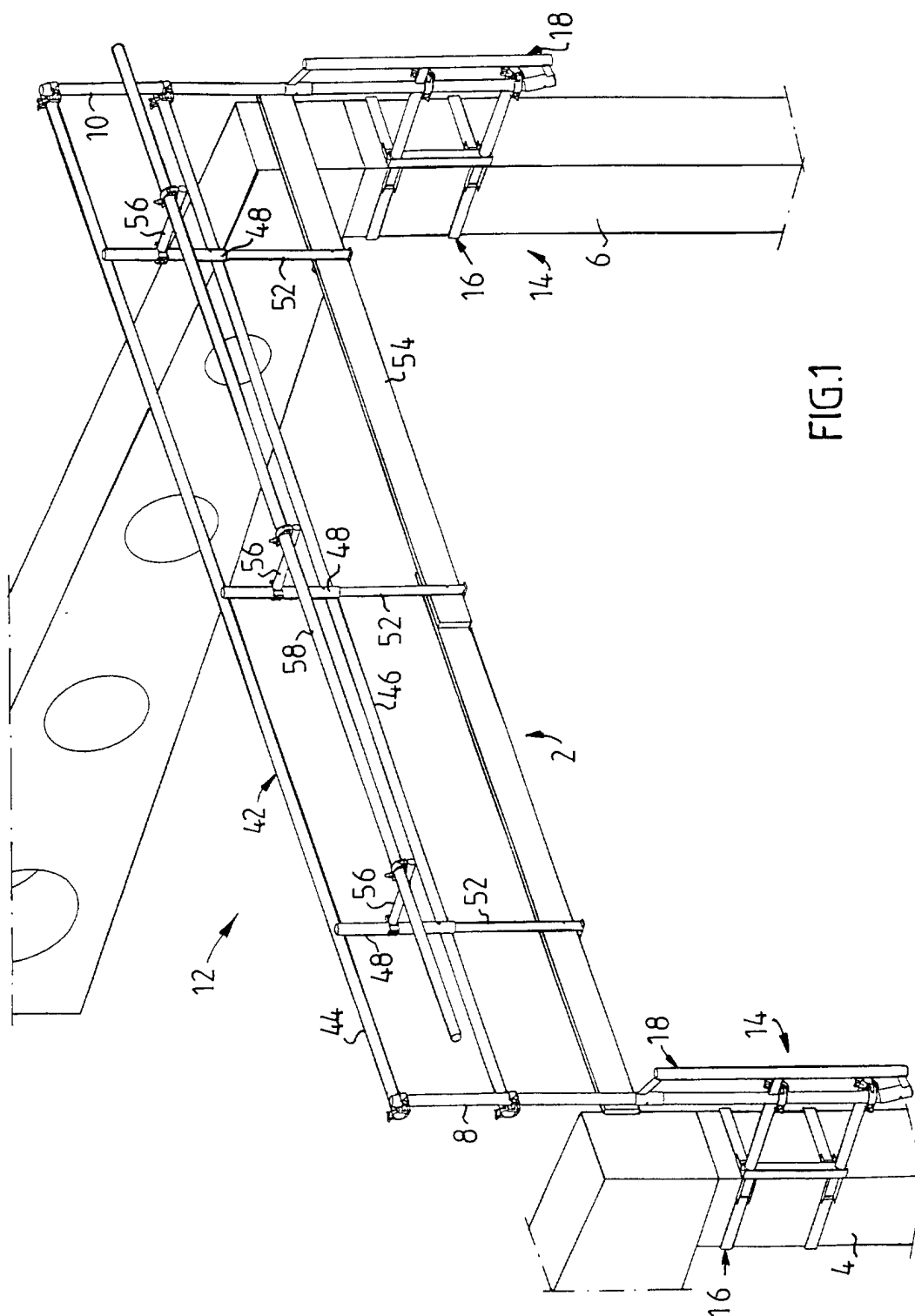


FIG. 1

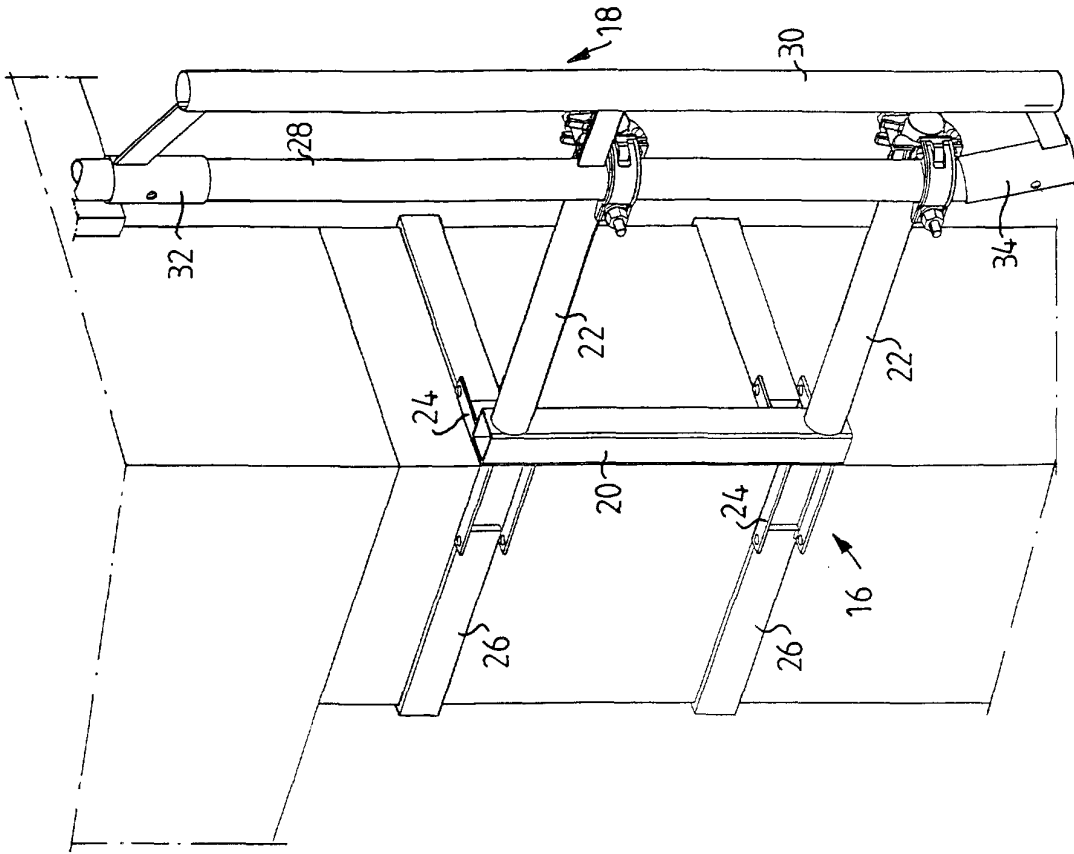


FIG. 2B

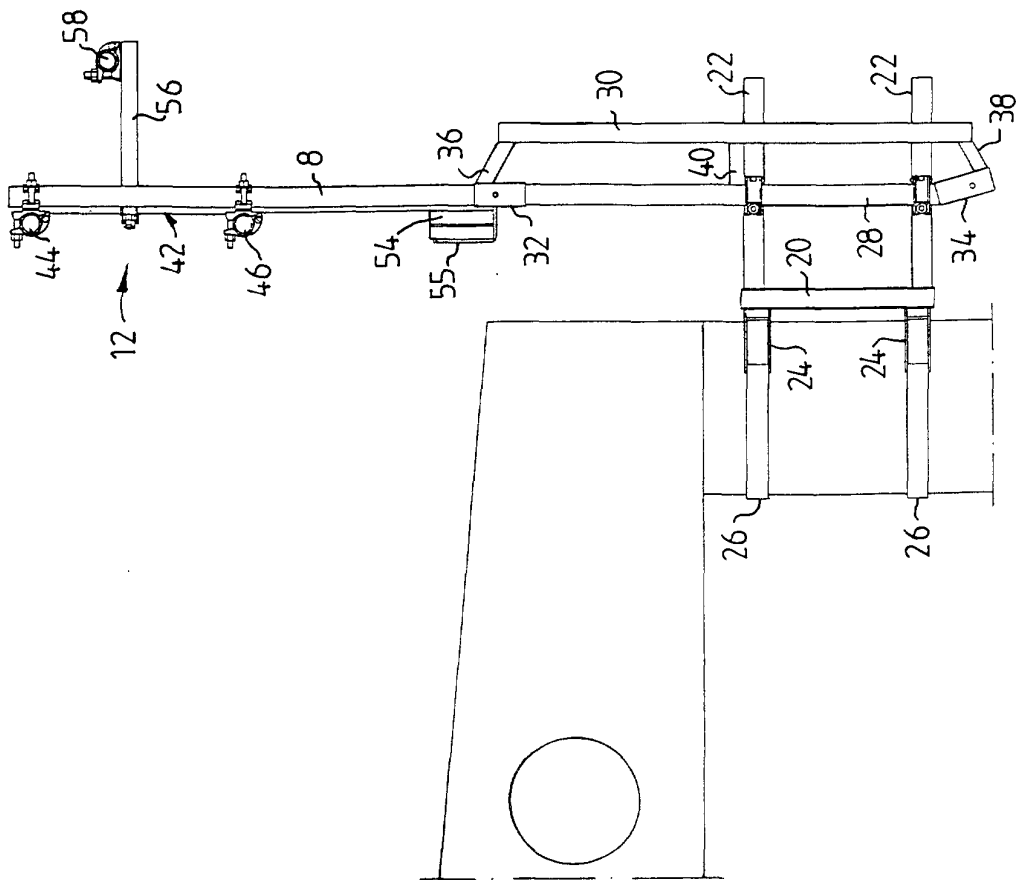


FIG. 2A

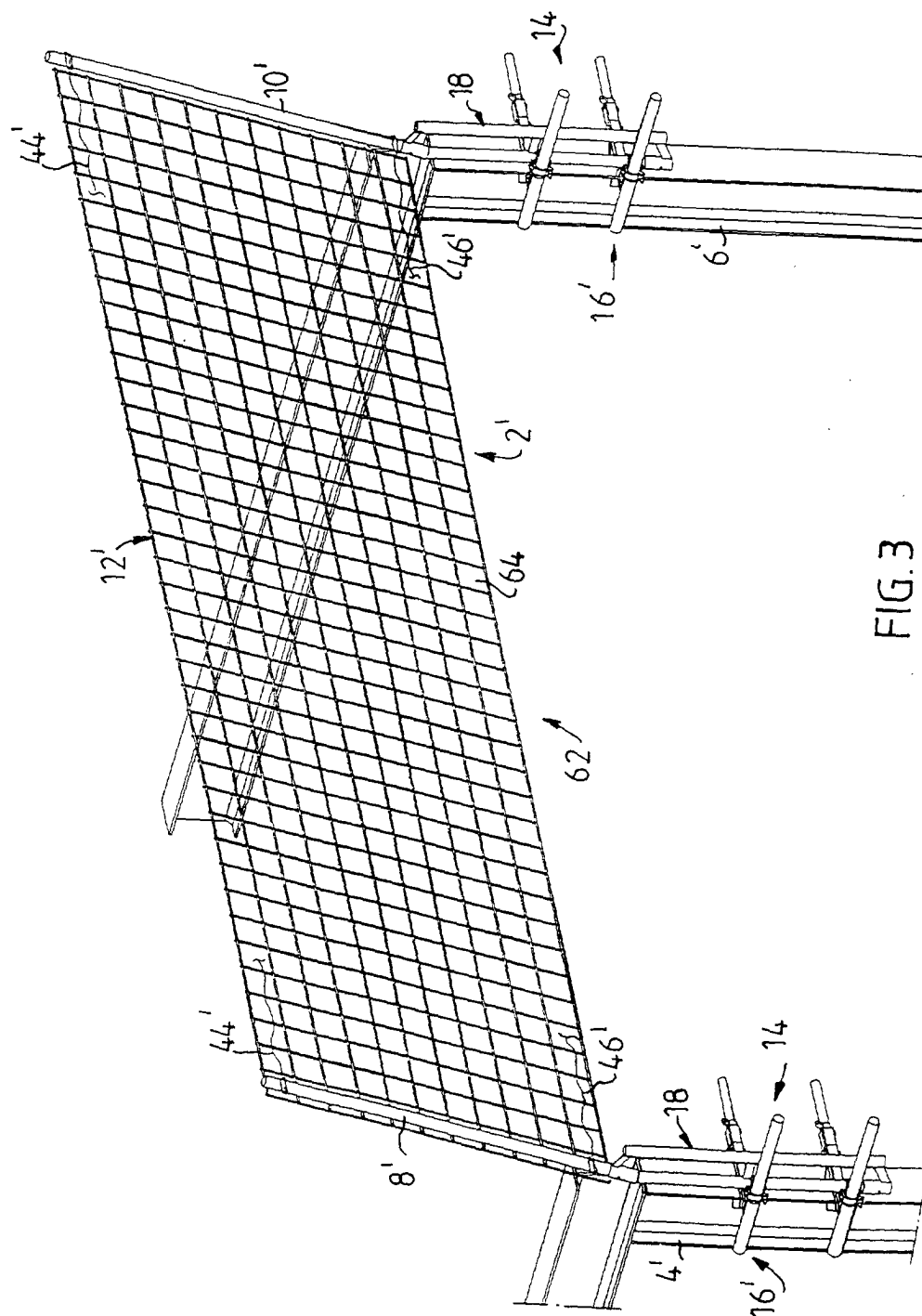


FIG. 3

