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(54) **Foldable scaffolding unit.**

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Description

The present invention relates to scaffolding, and more particularly to a foldable scaffolding unit for use in building construction, ship building or other construction work and provided with hook members on the rear side so that the gondola-like scaffolding unit may be suspended in a working position and may be folded into a compact size convenient to transport and to keep in storage.

Generally, in working at a position considerably above the ground or floor level, such as in constructing, repairing or disassembling a building or a ship, or constructing a tunnel, road or bridge, scaffolding is fixed or suspended on the working side of the construction to be worked on, on which scaffolding a workperson can stand. However, various conventional scaffoldings are composed of many single tubes joined together vertically and horizontally, and other parts which include relatively long parts with handrails. Due to the large number of components, the installation and dismantling of-the conventional scaffolding at the working site is laborious and time-consuming and hence expensive. Further, the conventional scaffolding is inconvenient to transport and to keep in storage.

The present invention relates more particularly to a foldable scaffolding unit of the type comprising, a rectangular bottom portion; a pair of front struts each pivotally connected at one end to a respective one of a pair of front corners of said bottom portion; a pair of rear struts each pivotally connected at one end to a respective one of a pair of rear corners of said bottom portion; at least one handrail pivotally connected at opposite ends to a respective one of said front struts and the corresponding one of said rear struts; a pair of cross-struts each connected at opposite ends to a respective one of said front struts and to the corresponding one of said rear struts, each said cross-strut being foldable or adjustable in length; and a pivotally-connected extendable hook member.

CH-A- 116763 discloses a foldable safety enclosure of this type which can be mounted on a windowsill, defining a working platform when open and is conveniently folded up for storage and transportation.

The present invention is characterised in that the cross-struts are connected to the other ends of the respective front and rear struts, in that a pair of such hook members are provided, each attached to a respective one of said rear struts via a hinge having a pair of hinge plates pivotally connected together by a pivot pin, each said hook member including a claw, a screw bolt connected to said claw, a tube mounted on said screw bolt arid provided with a hook formation, and a nut threadably mounted on said screw bolt.

Since the hook members are attached to the rear struts via the hinges, it is possible to install the scaffolding unit either at a right angle to the support or at a corner.

Since the hook members are attached to the rear struts via the hinges, no reaction due to fastening of the hook members acts on the rear struts, thus preventing the rear struts from being accidentally inclined or otherwise damaged.

An embodiment of the present invention will now be described, by way of example, with reference to the accompanying drawings in which:-

Figure 1 is a perspective view of a scaffolding unit embodying the present invention, showing the scaffolding unit attached to a horizontal I-section beam;

Figure 2 is a perspective view showing the scaffolding unit of Figure 1 attached to the corner between a pair of horizontal I-section beams disposed at right angles relative to each other;

Figure 3 is a side elevational view of the scaffolding unit when in the folded configuration;

Figure 4 is an exploded perspective view of a hinge and a hook member of the scaffolding unit; and

Figure 5 is a side elevational view, partially in cross-section, of the hinge and hook member of Figure 5.

The principle of the present invention is particularly useful when embodied in a scaffolding unit such as shown in Figures 1 and 2.

The scaffolding unit includes four horizontal base bars 4 connected together into a rectangle so as to surround a rectangular bottom portion 5, a pair of relatively short front struts 2 each pivotally connected at one end to the respective front corner of the rectangular bottom portion 5, and a pair of relatively long rear struts 3 each pivotally connected at one end to the respective rear corner of the rectangular bottom portion 5.

The principle of the present invention is particularly useful when embodied in a scaffolding unit such as shown in Figures 1 and 2.

The scaffolding unit includes four horizontal base bars 4 connected together into a rectangle so as to surround a rectangular bottom portion 5, a pair of relatively short front struts 2 each pivotally connected at one end to the respective front corner of the rectangular bottom portion 5, and a pair of relatively long rear struts 3 each pivotally connected at one end to the respective rear corner of the rectangular bottom portion 5.

Diagonal tie members 6 and a horizontal rail 7 are pivotally mounted between the front struts 2 so as to serve respectively as braces and a handrail. Pivotally connected to and extending between each of the front struts 2 and the corresponding rear struts 3 are a pair of horizontal rails 8, 9 which can serve as handrails.

A pair of hangers or supports 10 are supported between an upper portion of each rear strut 3 and an upper portion of the corresponding front strut 2 and

each hanger or support 10 is foldable each about an intermediate pivot a. As the hangers 10 are expanded or moved into a straight line form, the bottom portion 5 together with the front struts 2, are moved forwardly to form a gondola-type unit as shown in Figures 1 and 2. To the contrary, as the hangers 10 are folded about the respective pivots a, both the bottom portion 5 and the front struts 2, are pulled upwardly so that the entire scaffolding unit is folded into a compact size, as shown in Figure 3.

Alternatively, a telescopic rod or chain may be used in place of the foldable support or hanger 10.

Figures 4 and 5 shown an attaching device and a hook member 19. An attaching device and hook member 19 is fixedly secured to the upper rear surface or upper side surface of each of the rear strut 3, and is connected to each rear strut 3 via an attachment device.

The attachment device comprises a hinge 18 composed of a pair of hinge plate pieces 14, 15 pivotally connected together by a pivot pin 13, each hinge plate piece 14, 15 having holes 16, 17 for receiving bolts 35.

The attaching device and hook member 19 includes a claw 20, a screw-threaded bolt 21 connected to the claw 20, a tube 22 in engagement with the screw bolt 21, a hook 24 screw-threadedly mounted on the screw bolt 21.

The claw 20 has upper and lower supporting portions 25, 26 and a rear supporting portion 27, all formed integrally with the body of the claw 20. A spacer 28 is supported between these supporting portions 25, 26, 27 and is connected to the body of the claw 28 by a nut 30 and bolt 29. The spacer 28 has in its central portion a slot 31 (for a purpose described below) and in its rear portion a screw-threaded hole 32 into which the screw bolt 21 inserted through a hole 33 in the portion 27. Designated at 34 is a stop member which engages the bolt 21 and which prevents angular movement of the spacer 28.

The hinge plate piece 14 of the hinge 18 is fixedly secured to rear surface 3a of the rear strut 3 by bolts 35 and nuts 36. The other hinge plate piece 15 of the hinge 18 is inserted through the slot 31 in the spacer 28. The hinge plate piece 15, the body of the claw 20, and the spacer 28 are joined together as a unit by means of the bolt 29 and the nut 30.

It is important, though one hinge plate piece 14 of the hinge 18 is not-movably fixed to the rear strut 3, that both the other hinge plate piece 15 and the hook member 19 are pivotally movable in either direction as desired about the pivot pin 13 so that the scaffolding unit can be installed either horizontally at a right angle to an I-section beam or in a horizontal inclined position relative to an I-section beam.

Further, since the claw 20 is connected to the rear strut 3 via the hinge 18 there is no danger that when the claw 3 is hooked and fastened to an I beam for example, reaction of the fastening force could act on the rear strut 3.

For example as shown in Figures 1 and 5 where the scaffolding unit is to be attached to a front surface h1 of the I-section beam H horizontally, the rear surfaces 3a of the two rear struts 3 are abutted against the front surface h1 of the I-section beam H, then the claw 20 is hooked on the same front surface h1, and the hook 23 is moved until it reaches a rear surface h2 of the I-section beam H, whereupon the tube 22 is pushed forwardly by rotating the nut 24. As a result, the hook member 19 is connected to the I-section beam H via both the claw 20 and the hook 23; that is, the scaffolding unit when in the gondola form is installed on the front surface of the I -section beam H so that a workperson may stand on the scaffolding unit for work on or around the I-section beam H.

At that time as the nut 24 of the hook member 19 is tightened, the claw 20 is forced against the I-section beam H so as to bite into its front surface h1, but reaction of such force acts only on the hook 23 and does not act on the rear struts 3, thus preventing the rear struts 3 from being accidentally inclined.

In the example shown in Figure 2 where the scaffolding unit is to be attached to the corner between a pair of perpendicularly intersecting I-section beams H supported on a framework, the scaffolding unit is attached to the I-section beams H by the two hook members 19 one ater the other in the same manner as in the example described with reference to Figures 1 and 5.

In this example, the hook members 19 are mounted initially at an inclined position, and each of the hook members 19 is then shifted, by turning one of the hinge plate pieces 15 of a hinge 18 through a desired angle, so as to extend perpendicularly to the respective I-section beam H. Therefore, when the hook members 19 are fastened or tightened, no reaction due to such fastening is exerted on the respective rear struts 3, thus preventing the scaffolding unit from being damaged during installation.

With the scaffolding unit thus constructed, following advantageous results can be achieved.

1) As the hangers 10 are unfolded, the scaffolding unit can be easily shaped into a gondola form by gravity; and when the hangers 10 are folded, the front struts 2 together with the bottom portion 5 are moved towards the rear struts 3 so as to fold the scaffolding unit into a compact size.

2) Since it can be folded compactly without separating the individual components, the scaffolding unit is convenient to transport and to keep in storage, thus minimizing the space for storage.

3) Since the scaffolding unit can be installed and removed at the working site simply by attaching and detaching the hook members, it is possible to save time and labour in installing and removing the scaffolding unit.

4) Since the hook members are attached to the rear struts via the hinge, it is possible to install the scaffolding unit either at a right angle to a support or at a corner.

5) Since the hook members are attached to the rear struts via the hinge, no reaction due to fastening of the hook members acts on the rear struts, thus preventing the rear struts from being accidentally inclined or otherwise damaged.

Claims

1. A foldable scaffolding unit, comprising, a rectangular bottom portion (5); a pair of front struts (2) each pivotally connected at one end to a respective one of a pair of front corners of said bottom portion (5); a pair of rear struts (3) each pivotally connected at one end to a respective one of a pair of rear corners of said bottom portion (5); at least one handrail (8, 9) pivotally connected at opposite ends to a respective one of said front struts (2) and the corresponding one of said rear struts (3); a pair of cross-struts (10) each connected at opposite ends to a respective one of said front struts (2) and to the corresponding one of said rear struts (3), each said cross-strut (10) being foldable or adjustable in length; and a pivotally-connected extendable hook member (19); characterised in that the cross-struts are connected to the other end of the respective front and rear struts, and in that a pair of such hook members are provided each attached to a respective one of said rear struts (3) via a hinge (18) having a pair of hinge plates (14, 15) pivotally connected together by a pivot pin (13), each said hook member (19) including a claw (20), a screw bolt (21) connected to said claw (20), a tube (22) mounted on said screw bolt (21) and provided with a hook formation (23), and a nut (24) threadably mounted on said screw bolt (21).

Patentansprüche

1. Faltbare Gerüsteinheit mit einem rechteckigen Bodenteil (5); einem Paar von Fronstreben (2), die jeweils an ihrem einen Ende mit einem entsprechenden Ende eines Paares von Frontecken des Bodenteils (5) schwenkbar verbunden sind; einem Paar von Hinterstreben (3), die jeweils an einem Ende mit einem entsprechenden Ende eines Paares von Hinterecken des Bodenteils (5) schwenkbar verbunden sind; mindestens einer Geländerstange (8, 9), die an gegenüberliegenden Enden mit einem entsprechenden Ende der Frontstreben (2) und dem entsprechenden Ende der Hinterstreben (3) schwenkbar verbunden ist; einem Paar von Querstreben (10), die jeweils an gegenüberliegenden Enden mit einem entsprechenden Ende der Frontstreben (2) und dem entsprechenden Ende der Hinterstreben (3) verbunden sind, wobei jede Querstrebe (10) faltbar oder in der Länge einstellbar ist; und mit einem schwenkbar verbundenen, verlängerbaen Hakenteil (19); dadurch gekennzeichnet, daß die Querstreben mit dem anderen Ende der entsprechenden Front- und Hinterstreben verbunden sind und daß ein Paar solcher Hakenteile jeweils über ein Gelenk (18) mit einem entsprechenden Ende der Hinterstreben (3) angebracht vorgesehen ist, wobei das Gelenk (18) ein Paar von Gelenkplatten (14, 15) aufweist, die durch einen Schwenkstift (13) schwenkbar miteinander verbunden sind, jedes Hakenteil (19) eine Klaue (20), einen mit der Klaue (20) verbundenen Schraubenbolzen (21), ein auf dem Schraubenbolzen (21) angebrachtes Rohr (22), welches mit einem Hakengebilde (23) versehen ist, und eine Mutter (24) aufweist, die auf dem Schraubenbolzen (21) aufgeschraubt ist.

Revendications

1. Unité d'échafaudage repliable, comprenant, une base rectangulaire (5); une paire de montants avant (2) reliés chacun de manière à pivoter à une extrémité à un angle respectif d'une paire d'angles avant de ladite base (5); une paire de montants arrière (3) reliés chacun de manière à pivoter à une extrémité à un angle respectif d'une paire d'angles arrière de ladite base (5); au moins une barre de garde-fous (8, 9) reliée de manière à pivoter aux extrémités opposées à un montant respectif desdits montants avant (2) et au montant correspondant desdits montants arrière (3); une paire de croisillons (10) reliés chacun aux extrémités opposées à un montant respectif desdits montants avant (2) et au montant correspondant desdits montants arrière (3), chacun desdits croisillons (10) étant repliable ou réglable en longueur; et un crochet (19) extensible relié de manière à pivoter; caractérisée en ce que les croisillons sont reliés à l'autre extrémité des montants avant et arrière respectifs, et en ce qu'une paire de crochets sont prévus, chacun étant attaché à un montant respectif desdits montants arrière (3) via une articulation (18) comportant une paire de plaques-charnières (14, 15) reliées de manière à pivoter par un pivot (13), chacun desdits crochets (19) comprenant une griffe (20), un boulon fileté (21) relié à ladite griffe (20), un tube (22) monté sur ledit boulon fileté (21) et doté d'un élément en crochet (23), et d'un écrou (24) monté par vissage sur ledit boulon fileté (21).

FIG. 1

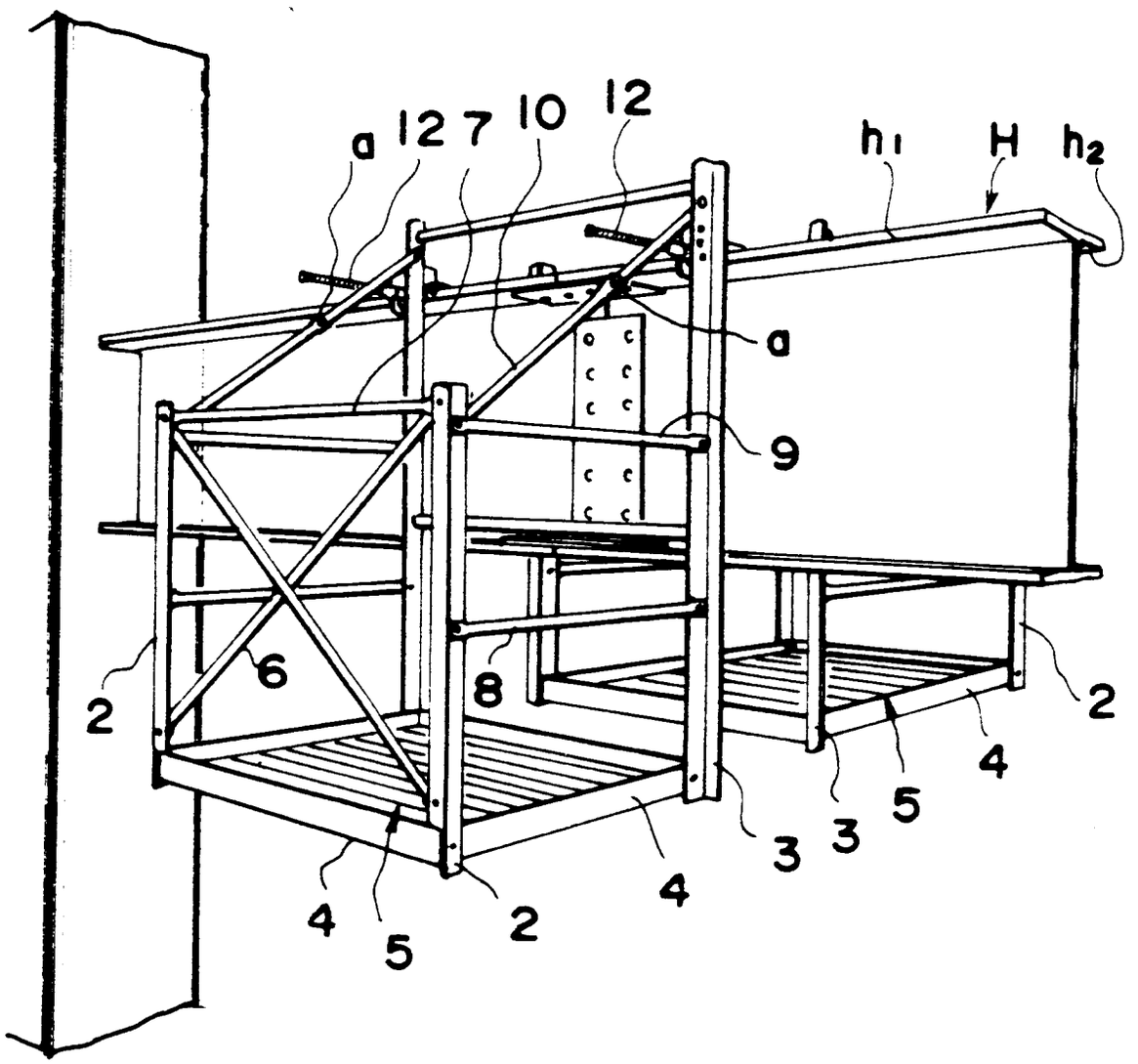


FIG. 2

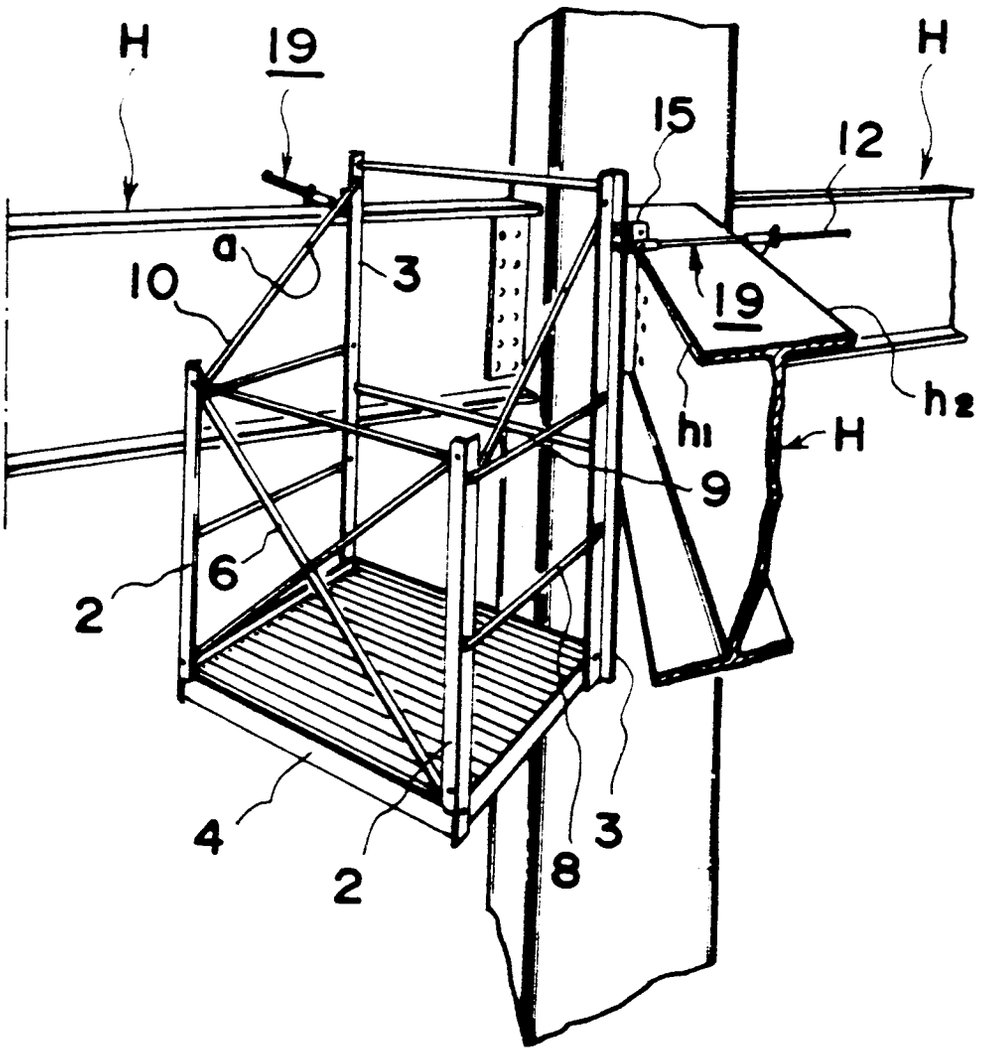
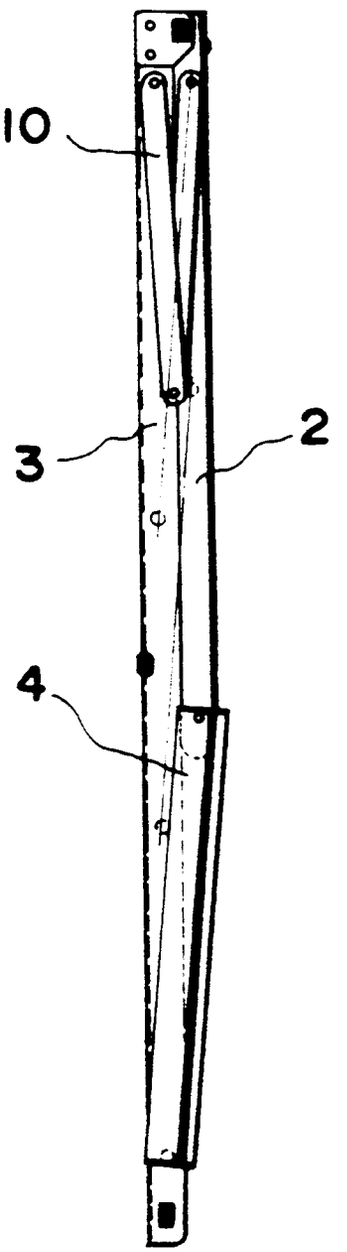
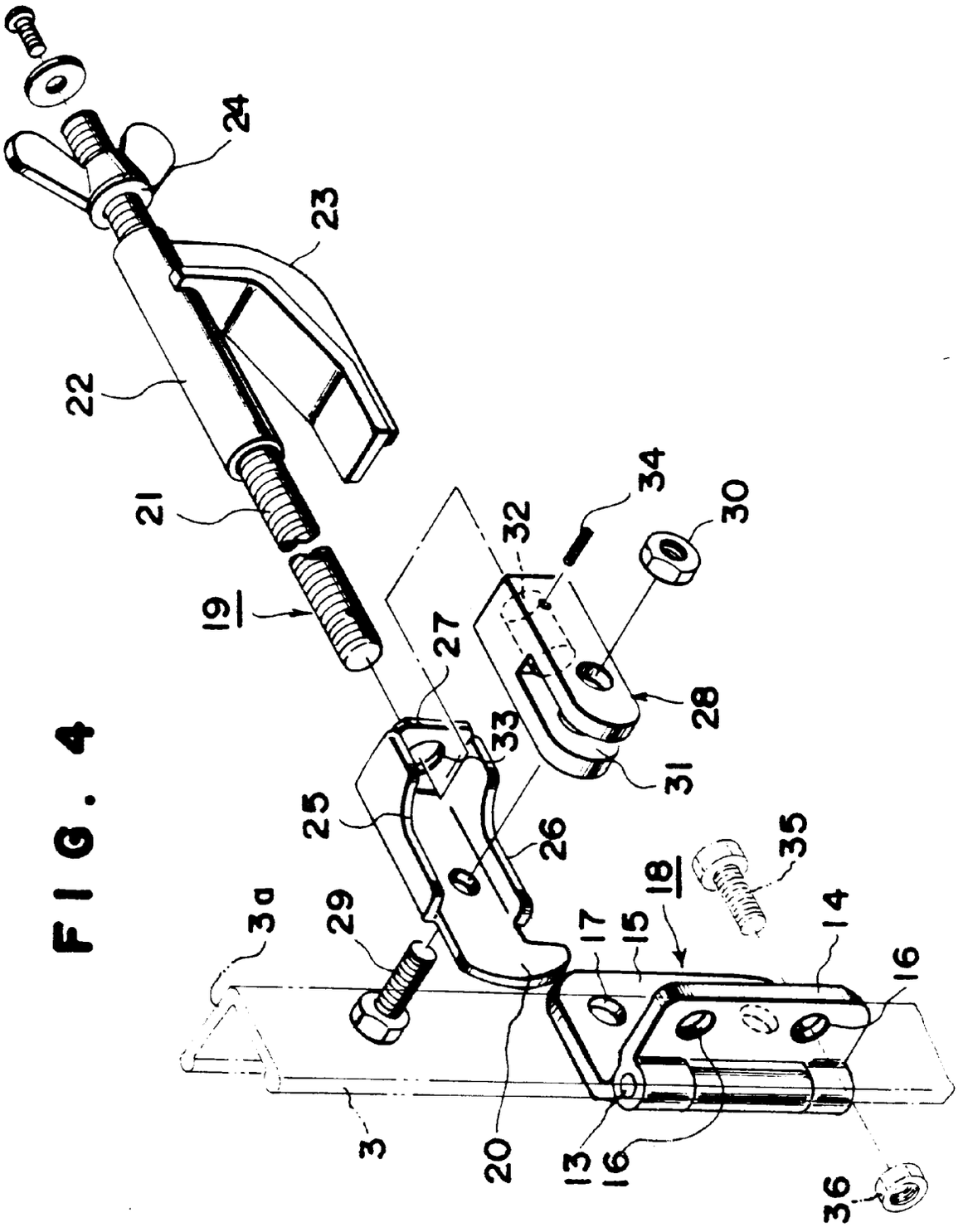


FIG. 3




24
23
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21
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34
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32
27
28
33
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25
26
35
18
3a
29
17
15
14
16
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13
16
36

FIG. 4

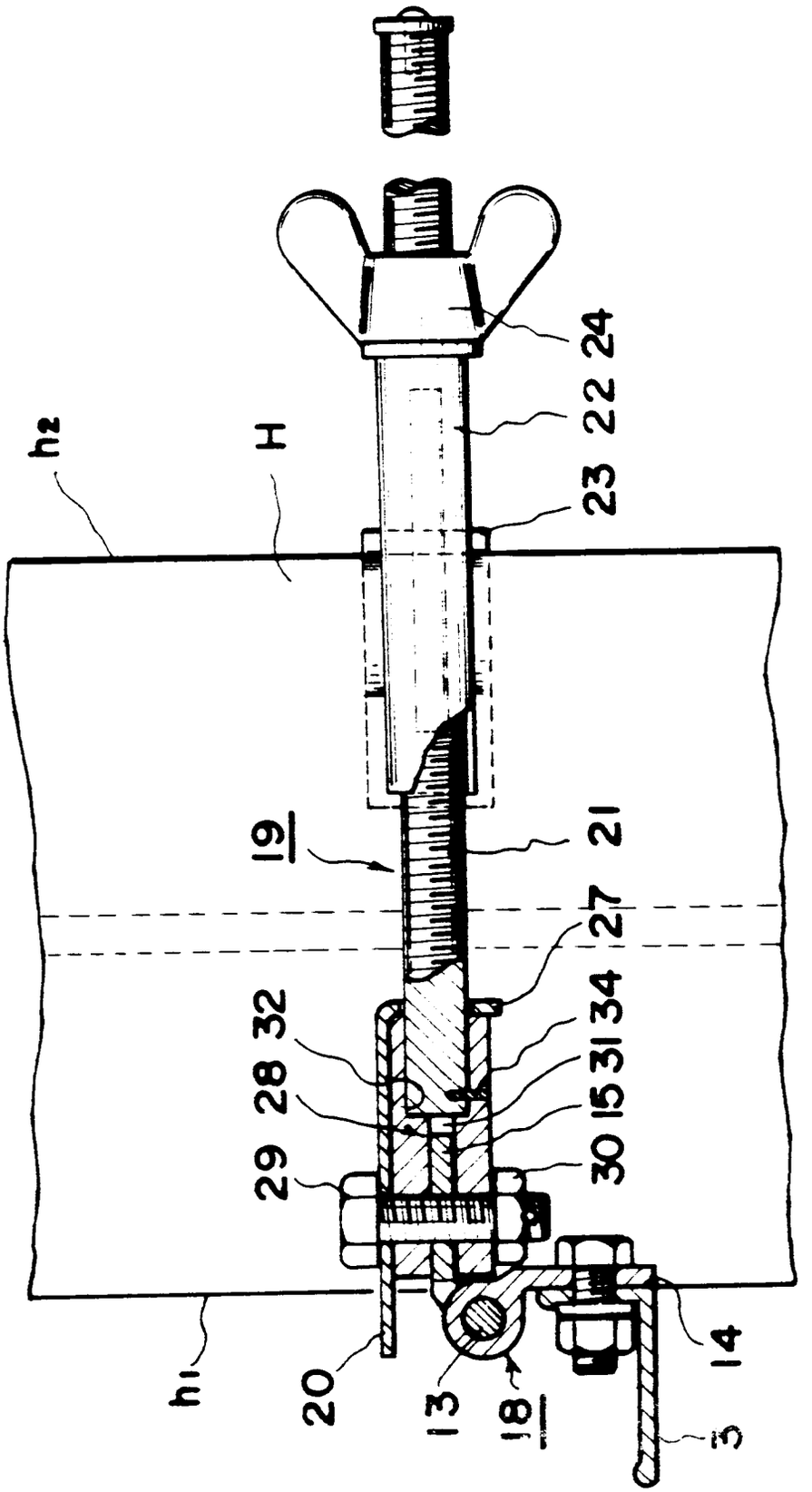

FIG. 8