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(71) **Applicant** *(for all designated States except US):* LOT-QUICK LIMITED [GB/GB]; Downing Road, Meadows Industrial Estate, Derby DE2 6HA (GB).

(72) **Inventors; and**

(75) **Inventors/Applicants** *(for US only):* MARRIOTT, Leslie, James [GB/GB]; 31 Pingle, Allestree, Derby (GB). WRIGHT, Christopher, Leslie [GB/GB]; 23 Dalebrook Road, Winshill, Burton on Trent, Staffordshire DE15 0AA (GB).

(74) **Agents:** SMITH, Philip, Antony et al.; Reddie & Grose, 16 Theobalds Road, London WC1X 8PL (GB).

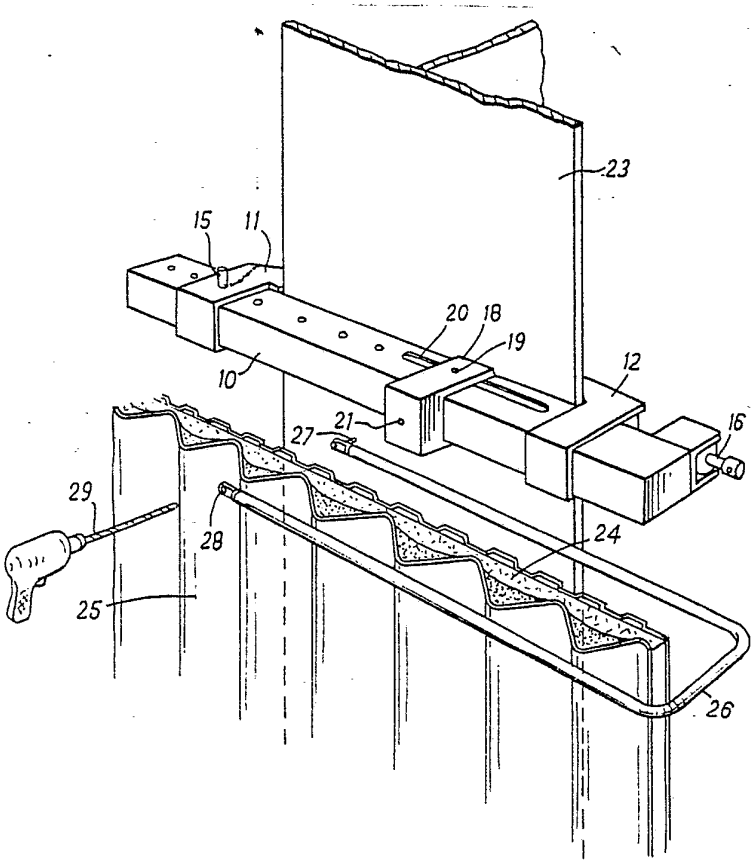
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(54) **Title:** CLAMP FOR ATTACHMENT TO STRUCTURAL STEELWORK

(57) **Abstract**

The clamp comprises a bar (10) with jaws (11) and (12) to embrace the flange of a girder (23). Jaw (11) is adjustable in steps by locating peg (15) in one of a row of holes in the bar (10) which jaw (12) is adjustable continuously by a screw (16). A sliding block (18) has a screw-threaded hole (21) to receive an anchor pin. The pin preferably has a tubular head similar in diameter to a scaffold pole, enabling a conventional coupler to be used for attachment of the scaffolding. In attaching a cladding panel (24) to the frame, the anchor pin is removed, a hole is drilled through the panel (24) with the aid of caliper (26), and the pin is re-attached by passing it through the panel. For attaching safety netting a fixed anchor point may replace the slider (18).



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CLAMP FOR ATTACHMENT TO STRUCTURAL STEELWORK

The present invention relates to a clamp unit for clamping to a metal frame structure of a building to serve as an anchorage for scaffolding, netting or other equipment which is to be temporarily attached to the frame.

For example it may be desired to attach safety nets to a steel-framed building for the protection of workers engaged in roofing work. It is essential in such a case that the means of attachment is simple and convenient in use because the workers may otherwise be tempted to do without it, thus exposing themselves and others to danger. Also such a clamp unit may be used for securing scaffolding to a steel framework, thus avoiding the need for buttressing which is required if the scaffolding is free-standing. Because of the expense of scaffolding equipment and of the skilled labour required for erection of scaffolding this can lead to major economies in building costs.

In accordance with the present invention there is provided a clamp unit for clamping to a metal frame structure of a building comprising a bar and first and second jaws mounted on the bar to engage with a member of the frame, the first jaw being adjustable in steps by means of a locating member engageable with any one of a series of locating formations spaced along the bar, and the second jaw being continuously adjustable over a limited range.

The first jaw may be located by a peg engaging one of a series of holes in the bar. The second jaw may be adjusted by a screw device comprising a nut member fixed to the bar and screw threaded through the nut member and rotatably coupled with the jaw.
The jaws preferably have projections to engage behind the flanges of a profiled frame member such as an H-section beam, the projections being bounded by respective faces which incline towards each other in a direction away from the bar.

The bar may carry an anchor member which is permanently or temporarily fixed to the bar or is movable relative thereto and which serves for the attachment of scaffolding, safety netting or any other equipment. In particular the bar may carry a slider with

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a screw-threaded hole into which a threaded anchor member may be screwed. Preferably the anchor member may be screwed into engage the bar and thereby secure the slider in a desired position along the bar. In a construction intended for attaching scaffolding to the framework the anchor member comprises a threaded pin with a head formed by a length of tube of a diameter similar to that of conventional tubular steel scaffold poles.

The invention will now be described in more detail with the aid of example illustrated in the accompanying drawings, in which:-

Fig. 1 is a plan view of a clamp unit in accordance with the invention for attachment of scaffolding to a steel framework of a building,

Fig. 2 is a perspective view of a clamp unit in position on a building framework, together with a caliper for guiding the drilling of a hole through a cladding panel to receive the anchor member,

Fig. 3 is a view similar to Fig. 1 of a clamp unit intended for anchoring safety netting to structural steelwork of a building, and

Fig. 4 is a section on the line IV-IV of Fig.3.

Referring first to Fig.1 the clamp shown comprises a square-section bar 10 on which are slidably mounted clamping jaws 11 and 12. The jaw 11 has a hole 13 which can be brought into register with any one of a series of holes 14 in the bar. The jaw 11 is then fixed in position by a pin 15, shown in Fig.2, which passes through the registering holes. The jaw 12 is adjustable in position along the bar 10 by a screw 16. The screw 16 passes through a captive nut 17 fixed at the end of the bar 10.

The bar 10 carries a slider 18 which is secured to the bar by a pin 19 which is displaceable along the length of a slot 20 in the bar. Thus the slider 18 can execute a limited displacement along the bar 10. The slider 18 has an internally-threaded bore 21 to receive an anchor member 22. When the anchor member 22 is screwed in it engages the bar 10 to fix the slider in position.

The anchor member 22 has a threaded end section 22A, a plain shank 22B of a length sufficient to accommodate various thicknesses of cladding panel, and a cylindrical tubular head member 22C. The

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head member has a diameter similar to that of a conventional scaffold pole but is preferably made from thick-walled aluminium tubing to reduce its weight as compared with a steel tube of comparable strength.

The scaffolding can now be attached to the head of the pin by conventional scaffold couplers or clamping devices, thus minimizing the need for additional equipment.

The cylindrical head, which may if desired be a solid rod instead of being tubular, preferably has a transverse bore 22D for the insertion of a tommy bar to facilitate screwing of the pin into the clamp.

In a specific embodiment the shank of the pin is of high tensile steel with a diameter of 12.5 mm and a length of 300 mm while the head is of aluminium tube of 50 mm diameter and a length of 300 mm.

As shown in Fig. 2, the clamp is fixed to the steel framework of a building by fitting the jaws 11 and 12 around the flange 23 of one of the girders forming the framework. The position of the jaw 11 is first adjusted and set by means of the pin 15 and the jaw 12 is then tightened by means of the screw 16. The head of the anchor member 22 then provides for the attachment of scaffolding erected around the framework.

When cladding panels are to be attached to the framework they have to be placed between the scaffolding and the framework. For this operation the coupling of the scaffolding to one or more anchor members is released and the anchor members are removed from their clamps. A cladding panel 24 is then fitted in position. In the example shown the outer surface of the panel 24 is a corrugated sheet 25. A U-shaped caliper 26 having a transverse peg 27 at the end of one arm and an aligned hole 28 in the end of the other arm is used to locate the position at which a hole is to be drilled in the cladding panel. The peg 27 is placed in the bore 21 of the slider 18 of the clamp and with the caliper 26 embracing the panel 24 a drill 29 is placed in the hole 28. The slider 18 can be adjusted with the caliper to bring the hole 28 into register with one of the peaks of the corrugated sheet 25 before a hole is drilled through the panel. The anchor member 22 is now passed through the hole in the panel 24

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and screwed into the bore 21 and the scaffolding can then be re-attached to the anchor member before proceeding with the next cladding panel.

When the cladding has been completed and the scaffolding is dismantled, the anchor members are removed and the holes in the panels filled with a conventional plug and washer. The clamps are removed from inside the building.

The clamp unit of Figs. 3 and 4 closely resembles that of Figs. 1 and 2 in respect of many basic features which have been given the same reference numerals and will not be further described.

The screw 16 is rotatably coupled at one end to the jaw 12 to displace the jaw along the bar when screwed through the nut 17. The nut 17 is pivotally mounted in a bracket 30 fixed to the bar 10. The jaws 11 and 12 have projections 31 and 32 extending towards one another and bounded by faces 33 and 34, respectively, which incline towards one another in a direction away from the bar at angles of about 45° to the bar. The jaws 11 and 12 are mounted on the bar by means of straps 35 and 36 respectively which surround the bar 10.

Between the jaws the bar 10 carries a bracket composed of two plates 37 and 38 welded to opposite sides of the bar. Each of the plates has two apertures 39 which are in alignment with the apertures in the other plate. A headed stud 40 is fitted through two aligned apertures and secured by means of a washer 31 and spring clip 42. A second stud can similarly be fitted in the other two aligned apertures to provide two anchor points to which safety nets can be tied.

Obviously the bracket formed by the plates 37 and 38 may have a single pair of aligned apertures to receive a stud 40. Preferably the netting is attached by a conventional snap link pivotally mounted on the stud 40. This consists of a metal loop with a spring-biassed hinged portion which forms a gate through which a strand of the netting can be passed.

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CLAIMS:-

1. A clamp unit for clamping to a metal frame structure of a building comprising a bar and first and second jaws mounted on the bar to engage with a member of the frame, the first jaw being adjustable in steps by means of a locating member engageable with any one of a series of locating formations spaced along the bar, and the second jaw being continuously adjustable over a limited range.

2. A clamp unit as claimed in claim 1 in which the locating member for the first jaw is a locating peg and the locating formations are holes in the bar in which the peg can be engaged.

3. A clamp unit as claimed in claim 1 or 2 in which the second jaw is adjustable by a screw device.

4. A clamp unit as claimed in claim 3 in which the screw device comprises a screw rotatably coupled to the jaw and a nut member fixed to the bar, the screw engaging in the nut member such that rotation of the screw moves the jaw relative to the nut member.

5. A clamp unit as claimed in any of claims 1 to 4 in which the jaws have projections extending towards one another with faces inclined towards each other in a direction away from the bar such that the projections may engage behind flanges of a profiled beam forming part of the building frame.

6. A clamp unit as claimed in any of the preceding claims in which the bar carries an anchor member located between the jaws and serving for the attachment of scaffolding, netting or other equipment.

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7. A clamp unit as claimed in claim 6 in which the anchor member comprises a bracket fixed to the bar and at least one pin mounted on the bracket.

8. A clamp unit as claimed in claim 6 in which the anchor member comprises a slider mounted on the bar for limited sliding movement and an anchor pin removably secured in a bore in the slider.

9. A clamp unit as claimed in claim 8 in which the anchor pin is in threaded engagement with the bore and the bore opens against a face of the bar whereby the pin when screwed in will engage the said face of the bar to secure the slider in position on the bar.

10. A clamp unit as claimed in claim 8 or 9 in which the anchor pin has a cylindrical tubular head to which scaffold couplers may be attached.

11. A method of temporary attachment of scaffolding, netting or other equipment to the steel frame of a building wherein the equipment to be attached is coupled to a clamp unit which is secured to one of the frame members, the clamp unit being in accordance with any of the preceding claims.

12. A method of attachment of cladding panels to the framework of a building when using scaffolding attached to the framework by means of clamp units as claimed in claim 8, 9 or 10 wherein each anchor pin is removed from its clamp unit when a cladding panel is to be placed over the clamp and the pin is thereafter replaced in its clamp unit by way of a hole in the panel, and the scaffolding is re-attached to the framework by way of the anchor pin.

13. A method as claimed in claim 12 in which the hole in the panel is formed with the aid of a caliper having arms to embrace the panel, one arm having a peg for location in the bore in the clamp in place of the pin and the other arm having a guide for location of a hole-forming tool in alignment with the said bore.

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14. Equipment for use in the attachment of scaffolding to the framework of a building comprising a clamp as claimed in claim 8, 9 or 10 and a caliper of generally U formation to embrace the faces of a cladding panel, the caliper having on one arm a peg for engagement in the bore in the slider in place of the pin and on the other arm a guide to align a hole-forming tool with the said peg and bore whereby a hole may be made in the panel for reinsertion of the pin into the bore in the slider.

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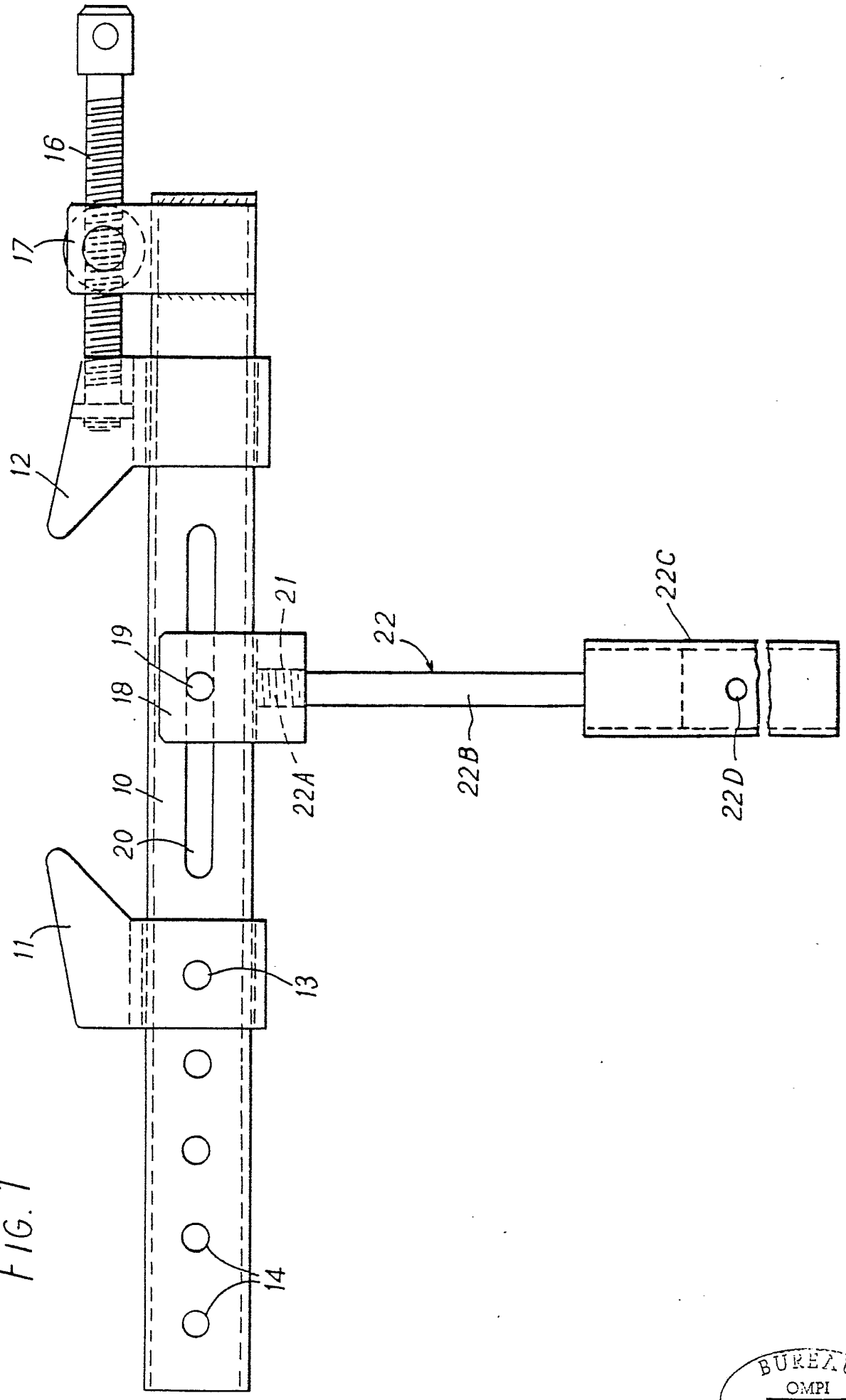
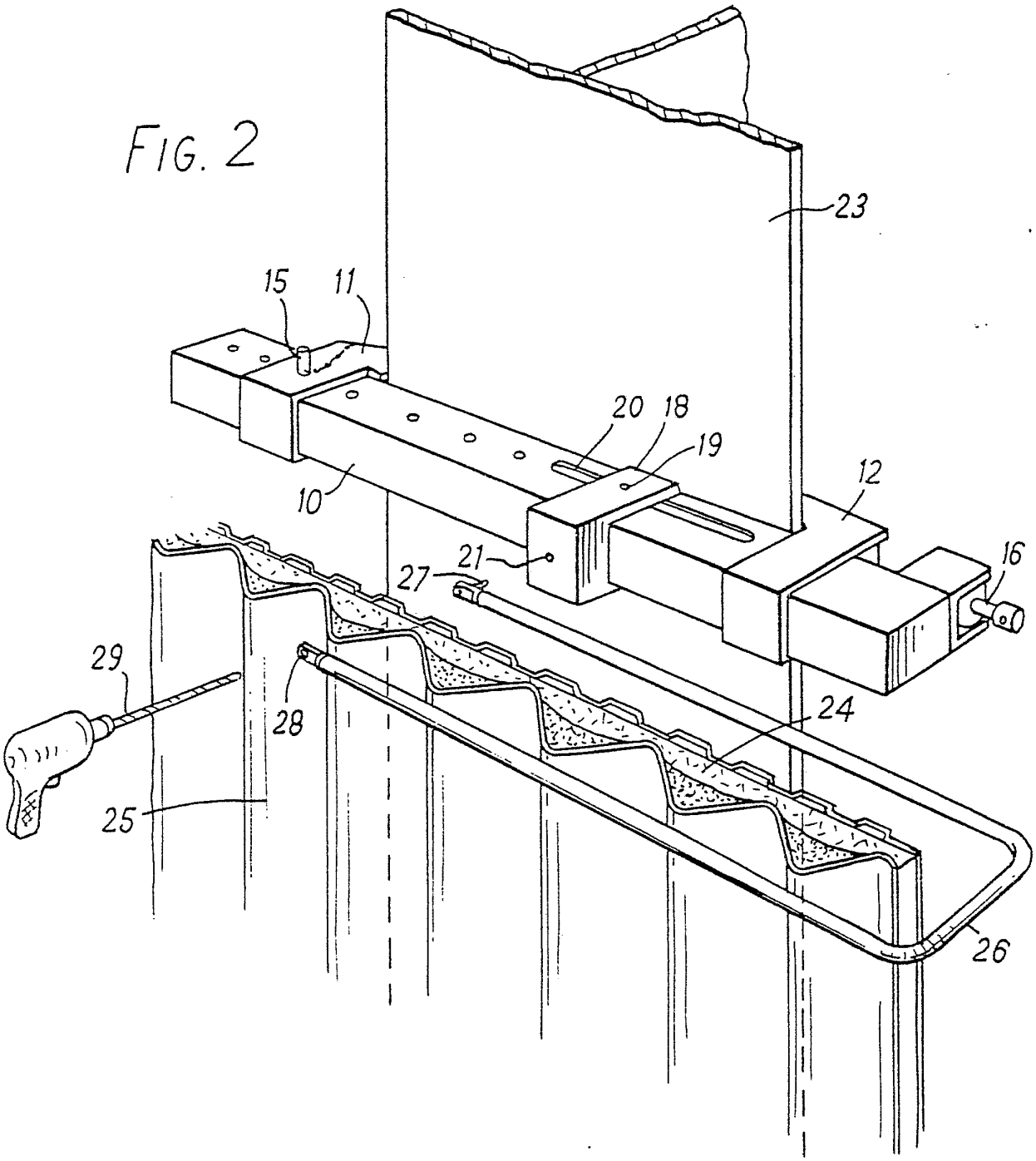


FIG. 1

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FIG. 2



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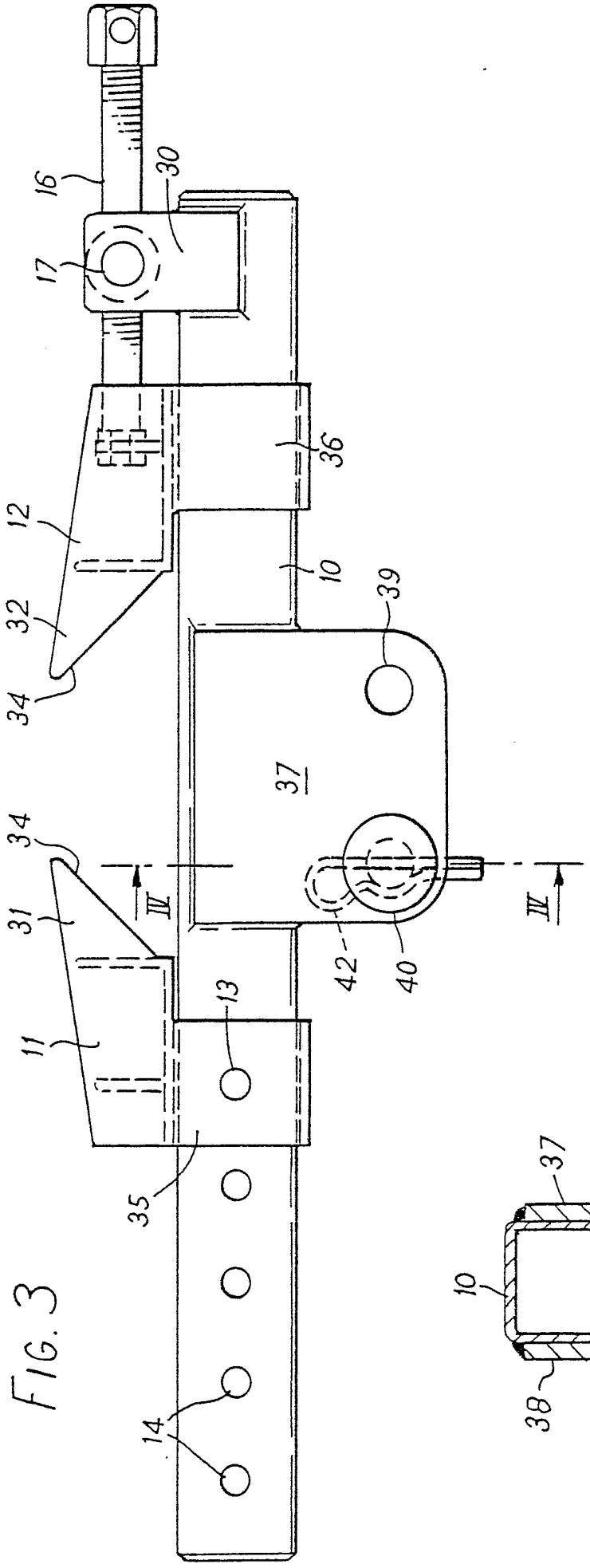


FIG. 3

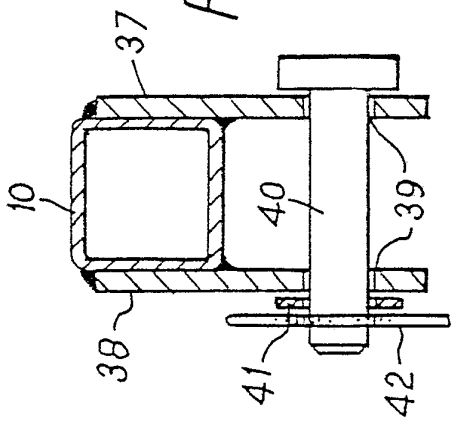


FIG. 4

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INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 80/00068

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl.[3] E 04 G 5/04

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
Int.Cl.[3]	E 04 G

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	US, A, 2049893, published August 4, 1936 see page 1, column 1, lines 51-55; page 2; page 3, column 1, lines 1-40; figures 1 to 4, Chicoine	1,3,5,6,11
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	GB, A, 903114, published August 9, 1962 see page 1, lines 30-65; figures, Scaffold Products Ltd.	1,3,4,11
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IV. CERTIFICATION

Date of the Actual Completion of the International Search [3]	Date of Mailing of this International Search Report [3]
21st June 1980	27th June 1980
International Searching Authority [1]	**Signature of Authorized Officer [20]**
European Patent Office	G.L.M. Kruydenberg

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