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(54) Scaffolding with canopy elements

(57) Scaffolding (100) comprising a load-bearing structure (105, 110, 120) which can be dismantled is provided with at least one canopy element (125) associated removably with the load-bearing structure (105, 110, 120) to protect the load-bearing structure (150, 110, 120) from atmospheric precipitation.

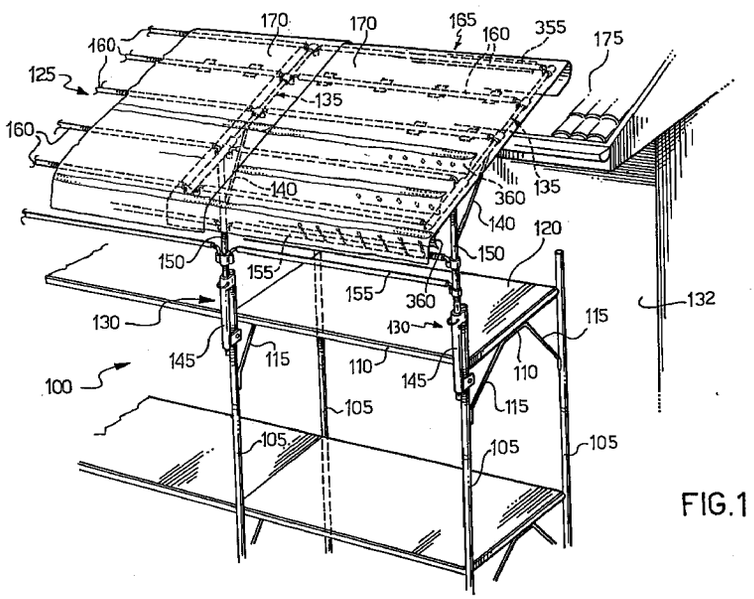

FIG.1

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Description

The present invention relates to scaffolding and particularly to scaffolding according to the preamble to the first claim.

Scaffolding (or staging) is equipment used to support people, materials and apparatus above ground level; scaffolding is typically used as a temporary, auxiliary structure on building sites during construction work. Scaffolding is generally formed by suitably connected tubular elements supporting wooden planks or perforated metal plates which form the work platforms.

A disadvantage of known scaffolding is that it cannot be used in the open in poor weather conditions since people are exposed to atmospheric precipitation such as rain, snow or hail; it should be noted that this problem occurs not only on the top work platform (without any protection), but also on the lower work platforms, since the upper wooden planks or perforated metal plates act solely as supports but do not offer adequate covering. This means that it is impossible to use the scaffolding and work is consequently interrupted on many days of the year (estimated at about 30% in a country with quite a favourable climate, such as Italy), which results in delays in the work and in considerable economic losses; moreover, the periods when the scaffolding is not in use cannot generally be foreseen and the interruptions may also be unexpected (for instance, because of a storm) so that it is difficult to use the time lost for other activities.

In addition, the fact that the work platforms are exposed to atmospheric precipitation renders them extremely slippery and dangerous, with a high risk of personal accident.

The object of the present invention is to prevent the aforementioned problems. To achieve this object, scaffolding as described in the first claim is proposed.

The scaffolding of the present invention can be used in any weather conditions, even with rain, hail or snow; in addition, it is protected from the sun, which is particularly useful in summer.

Moreover, the scaffolding according to the present invention is safer, since the work platforms remain dry and are therefore not slippery.

Further characteristics and advantages of the scaffolding according to the present invention will become clear from the following description of a preferred embodiment thereof, given by way of non-limiting example, with reference to the appended drawings, in which:

Figure 1 shows scaffolding according to the present invention;

Figure 2 shows, in detail, the fixing means of the canopy element of Figure 1;

Figure 3 is a detailed view of the frame of the canopy element of Figure 1.

With reference, in particular, to Figure 1, this illustrates a detail of scaffolding 100 including a load-bearing structure which can be dismantled and which comprises vertical tubular elements 105 (standards) between which horizontal tubular elements 110 (ledgers) extend, the tubular elements having, for example, circular cross-sections with an outside diameter of 4.8 cm and an inside diameter of 4.4 cm; diagonal reinforcing elements 115 are also fixed between the standards 105 and the ledgers 110. Metal plates 120 with upwardly-embossed anti-slip holes are supported on the ledgers 110 and form the work platforms. The scaffolding 100 is constituted by prefabricated, modular elements (trestles or frames) in which the elements 105-115 are welded together. The scaffolding 100 is set up by suitably arranging several trestles side by side, connected by suitable couplings (not shown in the drawing); further trestles are then piled up by coupling the standards 105 substantially end to end until the desired height is reached. However, the present invention is also suitable for implementation with different scaffolding, for example, of the type with tubes fixed by means of suitable couplings (known in Italy as "Innocenti" scaffolding).

One or more canopy elements 125 associated removably with the load-bearing structure of the scaffolding 100 are intended mainly for protecting the load-bearing structure of the scaffolding 100 from atmospheric precipitation. In a preferred embodiment of the present invention, each canopy element 125 is fixed to two standards 105 disposed in an outer plane relative to a work wall 132 against which the scaffolding 100 typically bears.

In particular, the canopy element 125 includes, in the region of each of the two outer standards 105, a substantially T-shaped element comprising a standard 130 to which is fixed a tubular element 135 which extends transversely relative to the outer plane of the scaffolding 100; a diagonal reinforcing element 140 is also fixed between the standard 130 and the cross member 135. The standard 130 preferably has a telescopic structure with a lower, outer element 145 (for example 2.5 m long) and an upper, inner element 150 (with an outside diameter, for example of 4.2 cm) slidable within it.

As shown in greater detail in Figure 2, (the elements already shown in Figure 1 are identified by the same reference numerals) a shorter tubular element 205 (typically 10 cm) which is coupled to the corresponding standard 105 in conventional manner is fixed (for example, by welding) parallel to an upper end of each outer element 145. In detail, the upper end of the standard 105 terminates in a locating pin 210 (with an outside diameter slightly smaller than the inside diameter of the standard 105), onto which the tube 205 is fitted; alternatively, for different standards without the locating pins 210 described above, a suitable pin (for example, 20 cm long) is used, fitted into the tube 205 and into the standard 105. Close to a lower end of the

outer element 145, there are two parallel flanges 215 and 220 which extend around the standard 105. The free ends of the flanges 215 and 220 project beyond the standard 105 and include two coaxial holes 225 and 230, respectively; a bolt 235 is fixed to the flange 215 in the region of the hole 225 (for example by welding). A clamping screw 240 is inserted in the holes 230 and 225 and is screwed into the bolt 235 in order to clamp the flanges 215 and 220 around the standard 105. This coupling system between the canopy element and the standards of the scaffolding offers effective, safe and reliable clamping with a stable rigid and vibration-free connection between the parts; moreover, it is suitable for pre-existing scaffolding without the need for any modification of the trestles. The structure described above renders assembly and dismantling of the canopy elements extremely quick and does not therefore significantly affect the overall time taken to set up and remove the scaffolding. The canopy element may, however, be associated with the load-bearing structure of the scaffolding of the present invention in a different manner, for example, with four tubular elements coupled to the corresponding standards of the trestle, with couplings fixed to the same standards, with support brackets bearing on the plates which form the work platform, or with other equivalent fixing means.

A plurality of pairs of coaxial holes 250 is formed in the inner element 150; the corresponding holes of each pair are aligned vertically and suitably spaced, for example, 10 cm apart. As the element 150 slides inside the element 145, the holes 250 are disposed facing a pair of corresponding holes 255 formed close to an upper end of the outer element 145. A transverse pin 260 inserted in the holes 255 and in a selected pair of holes 250 stops relative sliding of the elements 145 and 150, permitting a height adjustment of the standard 130, in the embodiment in question, every 10 cm; preferably, a clamp 265 is also provided, and is closed onto the inner element 150 through a threaded hole in the outer element 145. This structure enables the height of the canopy element 125 relative to the work platform to be modified quickly and easily for adaptation to various operative requirements. Alternatively, equivalent adjustment means, such as, for example, solely the clamp 265 closed onto the inner element 150 may be used; the present invention may, however, also be implemented with non-adjustable standards 130 with a fixed height, for example, of 1.8 m.

With reference again to Figure 1, the standards 130 of the two T-shaped elements are connected to one another by means of ledgers 155 associated removably therewith. Typically, an upper ledger is fixed to the inner elements 150 at a distance of about 50 cm from an upper end thereof, and the lower ledgers (which form a safety parapet) are slidable along the inner elements 150 to allow for the height adjustment of the standards 130. In particular, each ledger 155 has, at each of its ends, an L-shaped safety coupling which engages a corresponding eye on a sleeve; these sleeves are slidable on the inner element 150 and are clamped by screw clamps in conventional and known manner. The cross-members 135 are joined together by means of tubular spacers 160; the spacers 160 are associated removably with the cross-members 135 (as described in detail below) and extend perpendicular thereto so as to define a rectangular frame 165.

The set of elements described above forms a support structure for a cover 170 supported on the frame 165; alternatively, a single, longer cover 170 is supported by more than two T-shaped elements (for example, four). The cover 170 is advantageously made of waterproof material, for example, PVC or nylon, which can easily be rolled up to facilitate its transportation; the present invention may also, however, be implemented with covers of other types, and even with rigid covers. Preferably, the width of the frame 165 (for example, 1.8 m) is substantially equal to that of the corresponding trestle and its height (for example, 1.5 m) is greater than the height thereof; the frame 165 is fixed to the standards 130 in a manner such that its outer edge projects (for example, by 50cm) beyond the outer plane of the scaffolding 100 to define eaves which advantageously protect the operators when tools such as a winch (not shown in the drawing) disposed outside the scaffolding 100 are used. In a preferred embodiment of the present invention, the material 170 is wider than the frame 165 so as to project, for example, by 20 cm from each of the side edges thereof; each of these projections overlaps a corresponding projection of a further canopy element disposed beside it so as to ensure continuity of the covering of the scaffolding 100 and so as to form a valley for the drainage of the water collected. The cover 170 is advantageously inclined outwardly relative to the scaffolding 100 to favour the drainage of atmospheric precipitation; the angle of inclination to a horizontal plane is preferably between 10° and 25°, for example 15°. This value of the angle of inclination is particularly advantageous when the canopy element 125 is fitted above a roof 175, which generally has a slope of 30°; the cover 170 thus contacts the roof 175, ensuring maximum protection of the load-bearing structure of the scaffolding 100.

In a preferred embodiment of the present invention, the frame 165 can be extended inwardly relative to the scaffolding 100 to form a cover 170 of variable length. This characteristic is particularly useful for scaffolding formed with two or more rows of trestles, for example, in order to fit projections (such as terraces or balconies) of the wall 132; in this case, a single row of canopy elements 125 may be used, fixed to the trestles of the outermost row of scaffolding, the cover 170 being extended as appropriate until the inner rows of trestles are also covered.

As shown in detail in Figure 3, (the elements already shown in Figure 1 are identified by the same reference numerals) each cross-member 135 has a tele-

scopic structure with an outer element 305 (for example 1.5 m long), fixed to the standard 130, and an inner element 315 (for example 1.5 m long) with a smaller cross-section, slidable inside it. This telescopic structure is continuously adjustable, the axial sliding of the inner element 315 being locked by means of a screw clamp 320; the clamp 320 is operable by means of a knob and acts on the inner element 315 through a hole in a lower surface of the outer element 305 close to an end thereof, from which the inner element 315 projects. The spacers 160 are fixed to the outer elements 305 directly and are fixed to the inner elements 315 in the region of sleeves 330 disposed thereon; in particular, each end of each spacer 160 terminates in an L-shaped safety coupling 335 which, in conventional manner, engages an eye 340 in an inner wall of an element 305 or of a sleeve 330. The sleeves 330 (with the possible exception of those disposed in the region of the free ends of the inner elements 315) are slidable continuously on the inner elements 315 and are locked by means of further screw clamps 345 which act on the inner elements 315 through holes in a lower surface of the sleeves 330; this structure allows the spacers 160 to be moved freely to adjust their positions to different sizes of the frame 165.

The length of the material 170 (for example 3m) is slightly greater than the maximum length of the frame 165. Pairs of fabric strips 355 are sewn or welded to a lower surface of the material 170, their free ends being joined together by pressure, by means of a "Velcro" fastening in order to be wrapped around a corresponding spacer 160. In particular, a pair of fabric strips 355 having a width (for example 1.5 m) slightly smaller than that of the spacer 160, is fixed in the region of the spacer 160 which is disposed close to the free ends of the inner elements 315 so as to be wrapped around almost the whole of the spacer 160 except for its ends with the safety couplings 335; in the region of the other spacers 160, the pairs of fabric strips 355 are preferably narrower and, for example, several pairs are provided for each spacer 160. Alternatively, equivalent means, for example, pairs of laces which can be tied together, may be used for connecting the material 170 to the spacers 160.

Fabric strips 360 parallel to the outer edge of the frame 165, for example, three strips spaced 50cm apart, are sewn or welded to the lower surface of the material 170 along one of their major edges; one of the strips 360 (according to the length of the frame 165) will be positioned in the region of the outer edge of the frame 165. It will be noted that, in this structure a double piece of material is supported on the outer edge of the frame 165 so that the strip 360 acts as reinforcement against rubbing (caused, for example, by the wind) of the material 170 against the spacer 160 which defines the outer edge of the frame 165. The strips 360 have fixing rings 365 spaced, for example, 50cm apart, on a major free edge of the strips; corresponding resilient hooks 370 on the upper ledger 155 are hooked into the rings 365.

In a preferred embodiment of the present invention, further fabric strips 375 are sewn or welded along one of their major edges parallel to the outer edge of the frame 165 to an upper surface of the material 170 in the region of the strips 360; the strip 375 disposed close to the outer edge of the frame 165 acts as a drip-catcher preventing water from running along the material 170.

At the assembly stage, once the T-shaped elements 130, 135 have been fixed to the standards 105 and adjusted for height, they are connected by means of the ledgers 155 and the spacers 160. The material 170 is spread out on the frame 165 until it falls beyond an eaves line and is fixed to the spacers 160 by means of the pair of fabric strips 355. The setting-up of the canopy element 125 is completed by the stretching-out of the material 170 by means of the resilient hooks 370 on the upper ledger 155 in the region of the rings 365. If the length of the frame 165 is less than the maximum, the excess portion of the material 170 which extends beyond the eaves line is preferably rolled up and fixed by means of suitable laces (not shown in the drawing). For dismantling, it suffices to repeat the steps described above in reverse order.

The canopy element described above is particularly simple and cheap and is formed with the use of standard materials already present on the market and can therefore be mass-produced at low cost; this canopy element can also be fully dismantled and is therefore extremely practical. In addition, the structure thus defined can be adapted very easily to the most varied and difficult conditions of use and to scaffolding of any type.

Naturally, in order to satisfy contingent and specific requirements, an expert in the art may apply to the scaffolding described above numerous modifications and variations all of which, however, are included within the scope of protection of the invention as defined in the following claims.

Claims

1. Scaffolding (100) comprising a load-bearing structure (105, 110, 120) which can be dismantled, characterized in that it includes: at least one canopy element (125) associated removably with the load-bearing structure (105, 110, 120) in order to protect the load-bearing structure (105, 110, 120) from atmospheric precipitation.

2. Scaffolding (100) according to Claim 1, in which the load-bearing structure includes a plurality of tubular standards (105), and in which each canopy element (125) includes means (205) for fixing the canopy element (125) to two of the standards (105) disposed in an outer plane of the scaffolding (100).

3. Scaffolding (100) according to Claim 2, in which each canopy element (125) includes, in the region

of each of the two standards (105), a substantially T-shaped element (130, 135) comprising a further tubular standard (130) and a tubular cross-member (135) fixed to the further standard (130) transversely relative to the outer plane of the scaffolding (100), the T-shaped elements (130, 135) being joined together by means of a plurality of tubular spacers (160) fixed removably between the cross-members (135) to form a frame (165).

4. Scaffolding (100) according to any one of Claims 1 to 3, in which each canopy element (125) is adjustable in height.

5. Scaffolding (100) according to Claim 4, in which each further standard (130) has a telescopic structure comprising an outer tubular element (145) having a plurality of first pairs of coaxial holes (250), the corresponding holes of each of the first pairs (250) being aligned vertically, an inner tubular element (150) slidable inside the outer element (145) having a second pair of holes (255) each aligned with the corresponding hole of the first pair (250), and a pin (260) inserted in the holes of the second pair (255) and in the holes of a selected first pair (250) to prevent the inner element (150) from slipping out of the outer element (145) axially.

6. Scaffolding (100) according to Claim 5, in which an upper end of each of the two standards (105) terminates in a locating pin (210), the fixing means corresponding to each T-shaped element (130, 135) comprising a tubular element (205) which is parallel and fixed to the first outer element (145) and which is fitted on the locating pin (210).

7. Scaffolding (100) according to Claim 6, in which the tubular element (205) is fixed to the first outer element (145), close to an upper end thereof, the fixing means further comprising a first flange (215) and a second flange (220) parallel to one another, fixed to the outer element (145) close to a lower end thereof, and disposed around the standard (105), the first and second flanges (215, 220) having free ends which project beyond the standard (105) and which have a first hole (225) and a second hole (230), respectively, a bolt (235) fixed to the first flange (215) in the region of the first hole (225), and a clamping screw (240) inserted in the first hole (225) and in the second hole (230) and screwed into the bolt (235) in order to clamp the flanges (215, 220) around the standard (105).

8. Scaffolding (100) according to any one of Claims 1 to 7, in which each canopy element (215) includes a covering element (170).

9. Scaffolding (100) according to Claim 8, in which the covering element (170) projects beyond the outer plane of the scaffolding (100) to form eaves.

10. Scaffolding (100) according to Claim 8 or Claim 9, in which the covering element (170) is inclined outwardly relative to the scaffolding (100) at an angle of between 10° and 25° to a horizontal plane.

11. Scaffolding (100) according to any one of Claims 8 to 10, in which the covering element comprises a length of waterproof material (170).

12. Scaffolding (100) according to Claim 11, in which the material (170) projects beyond a first and a second side edge of the frame (165) in order partially to overlap a length of material of an adjacent canopy element in the region of each side edge.

13. Scaffolding (100) according to any one of Claims 8 to 12, in which the covering element (170) can be extended inwardly relative to the scaffolding (100).

14. Scaffolding (100) according to Claim 13, in which the frame (165) has a telescopic structure which can be extended inwardly relative to the scaffolding (100) and the length of the material (170) is at least equal to a maximum length of the frame (165), the covering element comprising a plurality of strips (360) each fixed along one of its major edges to the lower surface of the material (170) parallel to an outer edge of the frame (165) and having a plurality of rings (365) along its free major edge, the rings of one of the strips (360) disposed close to the outer edge of the frame (165) being engaged by corresponding resilient hooks (370) fixed to a tubular ledger (155) disposed between the further standards (130).

15. Scaffolding (100) according to Claim 14, in which the covering element comprises a plurality of further strips (375) each fixed along one of its major edges to an upper surface of the material (170) parallel to the outer edge of the frame (165) in the region of one of the strips (360), one of the further strips (375) being disposed close to the outer edge of the frame (165) to favour drainage.

16. A canopy element (125) for use in the scaffolding (100) of any one of Claims 1 to 15.

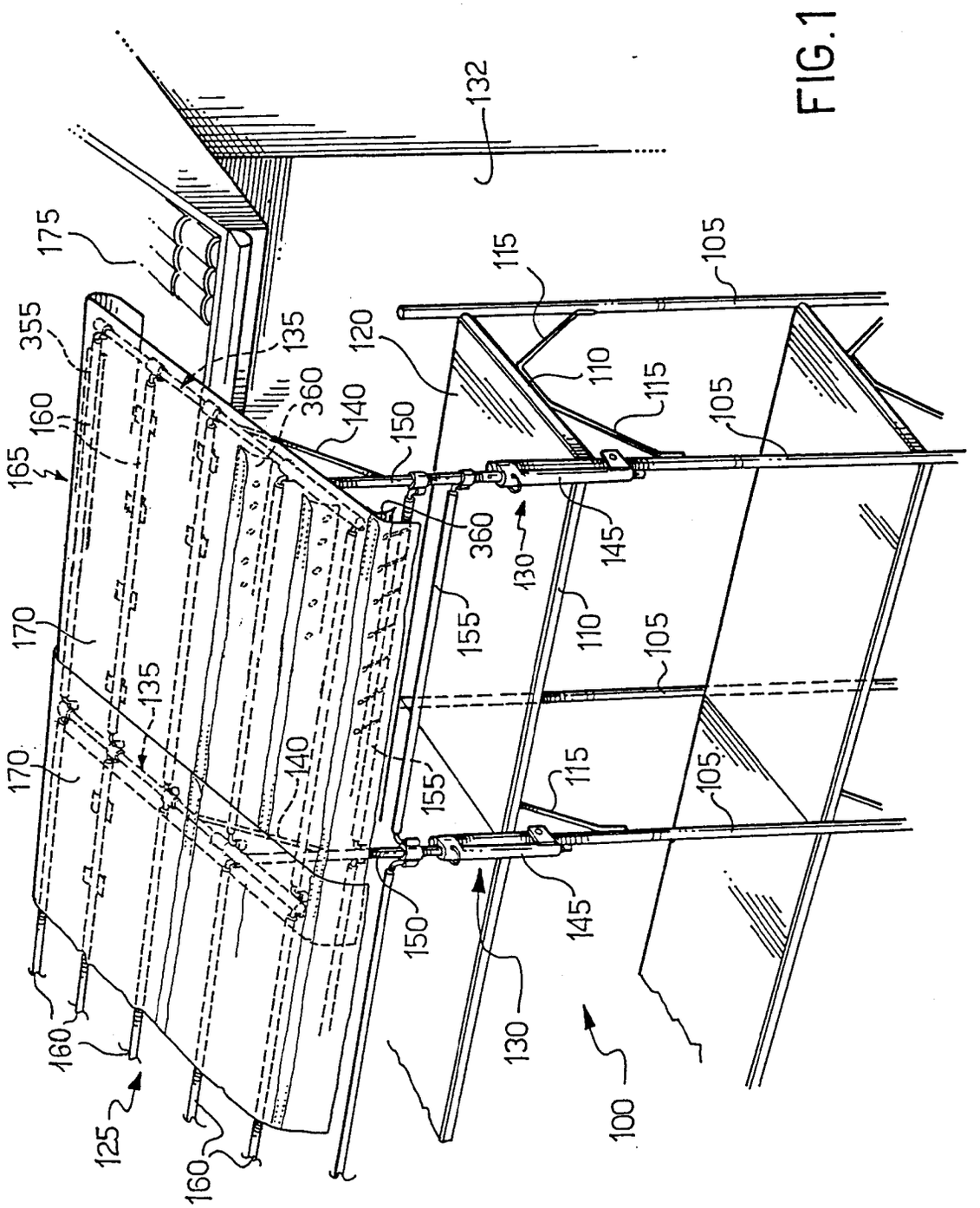
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FIG.1

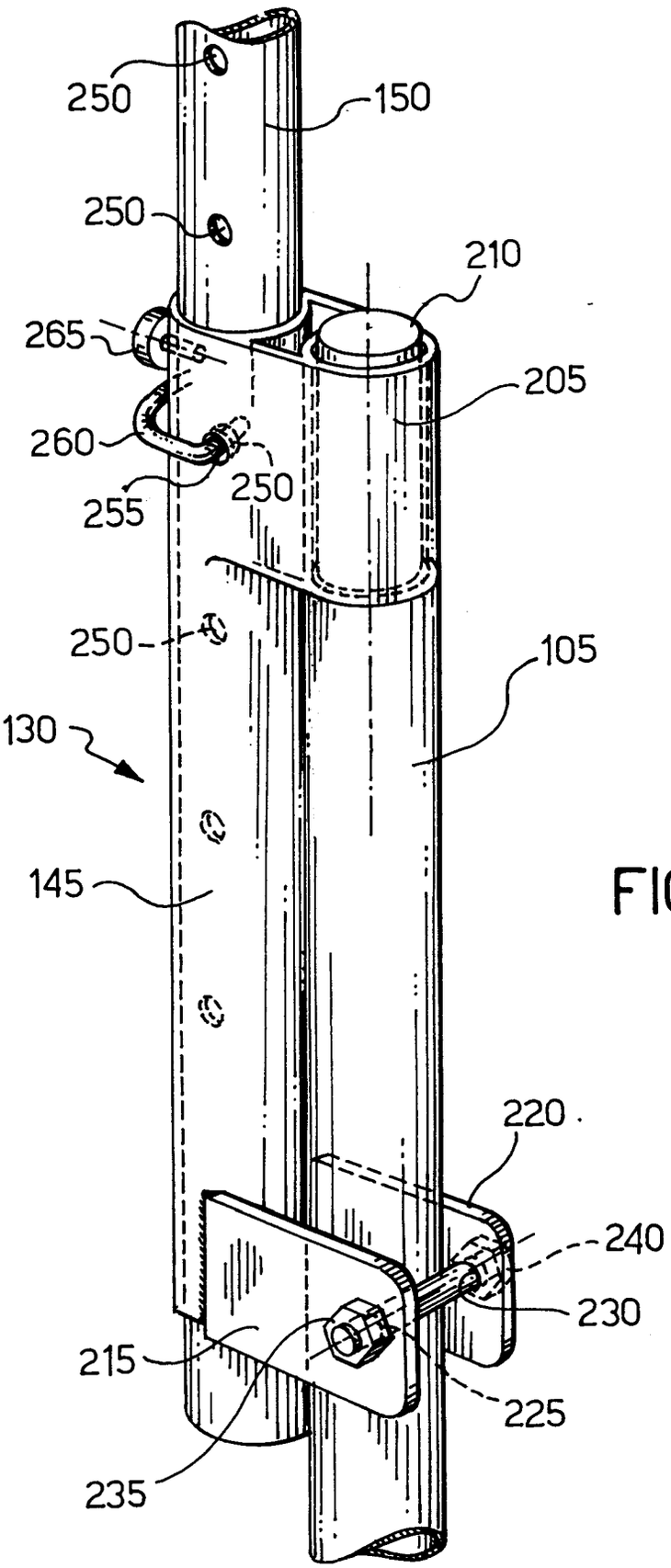
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FIG.2

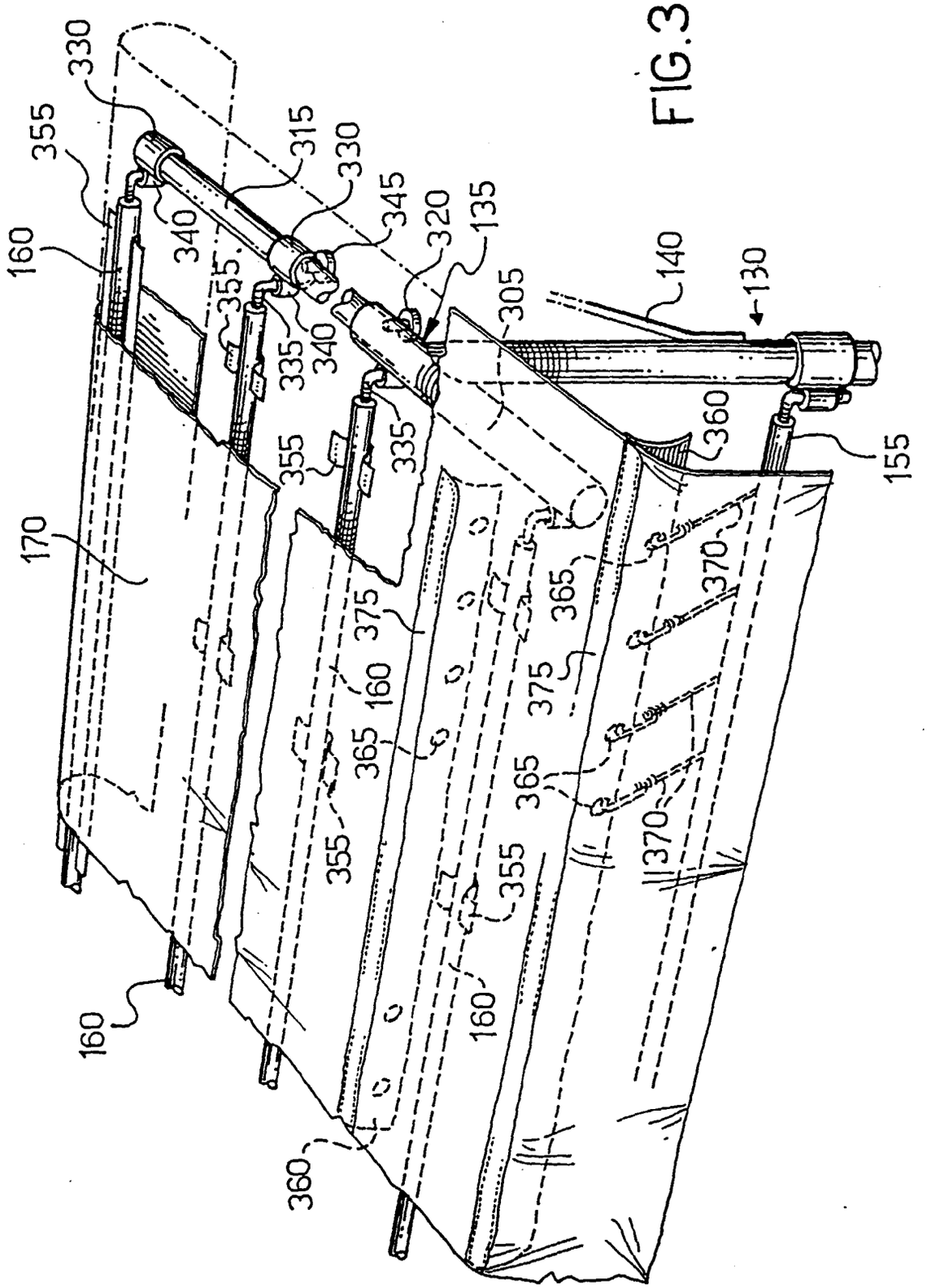
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FIG.3

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EUROPEAN SEARCH REPORT

Application Number
EP 97 83 0137

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE 26 37 298 A (SONNAUER)	1-4, 8-10,13	E04G1/00 E04G1/26
A	* page 3 - page 7; figures *	6,7	
X	DE 32 44 905 A (MÜLLER & BAUM)	1,2,4,8, 10,11,13	
A	* page 7 - page 12; figures *	3,6,7,14	
X	DE 43 18 678 A (V. D. MEIRACKER)	1-5, 8-10,13	
A	* the whole document *	6,7	
X	NL 8 700 036 A (FISCHER) * page 2 - page 6; figures *	1-5	
A	GB 2 283 046 A (LANGER)		
A	EP 0 207 008 A (DEL PILAR BAGUENA MOLINA)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E04G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 August 1997	Vijverman, W

CATEGORY OF CITED DOCUMENTS

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