



(51) International Patent Classification:

E04G 5/14 (2006.01) *E04G 7/06* (2006.01)
E04G 7/20 (2006.01) *E04G 7/24* (2006.01)
E04G 7/22 (2006.01)

(21) International Application Number:

PCT/IB2016/052971

(22) International Filing Date:

20 May 2016 (20.05.2016)

(25) Filing Language:

Italian

(26) Publication Language:

English

(30) Priority Data:

102015000016769 21 May 2015 (21.05.2015) IT

(71) Applicant: METAL-FORM S.R.L. [IT/IT]; Via M.E. Agnoletti, 19/21, 56025 Pontedera (PI) (IT).

(72) Inventor; and

(71) Applicant : MARTELLI, Giuliano [IT/IT]; Via De Gasperi, 33, 56025 Pontedera (PI) (IT).

(74) Agent: ITALBREVETTI S.R.L.; Leotta Alfio, Leotta Antonio, Via Salvo D'acquisto, 40/N, 56025 Pontedera (PI) (IT).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: SUPPORT DEVICE FOR TEMPORARY RAILS IN A SCAFFOLDING SYSTEM

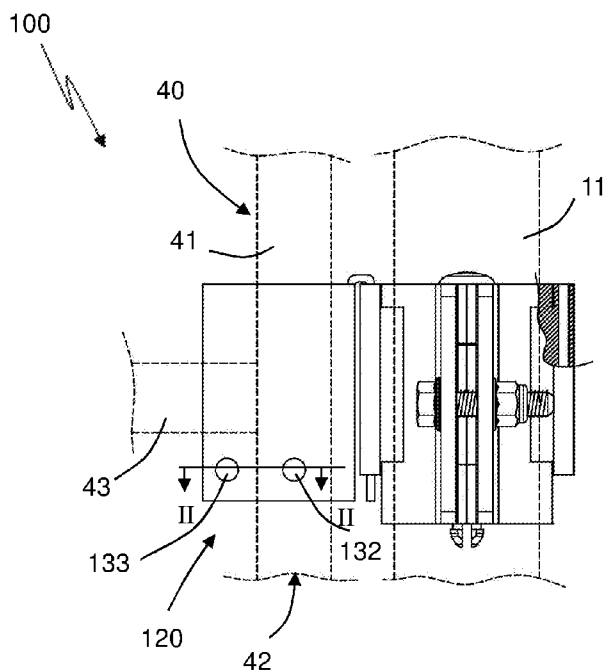


FIG. 1

(57) Abstract: A guiding and support device of temporary rails in scaffolding for the building industry is constituted by a fastening means for fastening to the upright and a guide element of the rail associable to this in such a mode as to ensure maximum portability of the scaffolding and at the same time great reliability of the device thanks to the fact that the two elements that compose it can be connected to one another in a very quick but equally precise and stable way.

Published:

— *with international search report (Art. 21(3))*

TITLE

SUPPORT DEVICE FOR TEMPORARY RAILS IN A SCAFFOLDING SYSTEM

DESCRIPTIONTECHNICAL FIELD

5 The present invention relates to a guide device for scaffolding rails of the type comprising means of fasten to a scaffolding upright, guiding means adapted to guide the sliding in the vertical direction of a rail and support means to support the rail to a determined height.

10 The present invention also relates to a safety scaffold comprising at least a pair of uprights to each of which is bound at least one driving group of a temporary rail in which the support and guide groups have vertically elongated guiding means which cooperate with sliding means, also vertically elongated, of the temporary rail, and support means which support the rail at a determined height preventing it to fall downward.

STATE OF THE ART

15 In the field of building construction is particularly felt the problem of workers' safety because the industry statistics show very high mortality and accident rates. In this sector for the construction or maintenance of buildings they are usually used scaffolding for the realization of temporary walkways at various height levels. The scaffolding for building industry are structures constituted by components with a high level of standardization.

20 Typically, a scaffold comprises a plurality of portals, each consisting of two tubular uprights, of a crossbar which connects the uprights in their upper part and of two diagonal reinforcing elements which connect the crossbar to each of the uprights. In the initial assembly two portals are arranged facing at a certain distance and connected with horizontal and/or diagonal connection elements that also constitute anti-fall protection barriers. Thus, a

25 walkway is supported on the crossbars of the two portals so as to extend from one to

another. Subsequently, additional portals can be put beside to the previous one or inserted over it so as to continue the construction of the scaffolding in length and in height.

The problems for the safety of the scaffolding occur during the related assembly and disassembly phases as an operator is forced to operate on the walkway between two portals
5 for mounting the upper level before they are anchored and working the horizontal and diagonal anti-fall protection barriers.

To allow the operator to work safely up to the positioning of the anti-fall barriers there are basically two types of solutions: the adoption of individual anti-fall systems constituted by horizontal anchor points or lines to which workers are anchored by means of harnesses and
10 connecting devices between the anchors and the harness itself; or the use of temporary rails that can be brought in position by operators that are on the level of the scaffold lower than the one the temporary rail must protect.

A scaffolding system provided with temporary rails is described for example in WO 2013030805 in which to the uprights of two facing portals are associated guiding and
15 support devices for temporary rails of scaffolding. Each guide device is provided with means for fastening to an upright of a scaffold, with guiding means for a temporary rail shaped so as to form a guide or a vertical sliding track of the rail, and with rail support means capable of preventing the rail to scroll down with respect to the device. The guide device described in the cited international application is very efficient because it can be associated with existing
20 traditional portals and allows a very high safety in the assembly operations of a scaffold because it allows to realize temporary protection parapets in correspondence of the last level of the scaffold (the one on the top) operating from the lower level, so without having to climb on the top level itself. However, the above mentioned device has found poor diffusion due to transport problems of the portals with the paired device. In fact, the portals for the

construction of scaffoldings are usually transported lying horizontally and stacked one on the other staggered by a small amount, so as to guarantee stability during transportation. With this mode of transportation it becomes particularly harmful the encumbrance of the guiding means of the above mentioned devices which protrude considerably from the vertical of the tube which constitutes the upright of the portal, considerably reducing the number of portals that can be transported in the same total available volume. A solution to this problem is to release the devices from the portals each time a transport should be performed. However, although quick release systems can be provided, the release operations of all the devices are still time consuming so as to make not desirable the adoption of the devices. Another solution to the problem is given in the same cited patent application WO2013030805, in which in the figure 11 is shown the possibility of providing the restraining means to the scaffold and the guiding means of the rail in two structurally distinct elements associable in use but that can be rendered independent in phase of transport of the scaffold. This last solution is certainly the most advantageous from all points of view and, however, in the above cited international application is only suggested in a generic way.

It is therefore felt the need to develop guide devices for temporary rails composed of two distinct elements, one for fastening to the portal and one for guiding the rail, that have an optimized structure.

SUMMARY OF THE INVENTION

The object of the present invention is to propose a guide device for temporary rails of scaffolding able to overcome the above described limitations of the known art.

The object of the present invention is to propose a guide device for temporary rails of scaffolding of great effectiveness, reliability, with reduced manufacturing costs, easy and quick to install.

A further object of the present invention is to propose a scaffolding system with temporary rails optimized in relation to manufacturing costs, easiness and speed of assembly, versatility of use and reliability.

Conventionally, a guiding and support device for temporary scaffolding rails provided
5 with means for fastening to a tubular upright of a scaffold, guiding means for temporary rails shaped so as to form a guide or a vertical sliding track of said rail, and support means of said rail, in which the restraining means and the guiding means are constituted by separate elements associable with each other via the coupling means comprising a male coupling profiles and corresponding female coupling profiles that allow vertical reciprocal sliding of the
10 guiding means compared to the restraining means.

According to a characteristic aspect of the present invention the above-mentioned coupling means comprise at least a first substantially horizontal surface of end stroke associated with the male coupling profile and a corresponding second substantially horizontal surface of end stroke associated with the female coupling profile intended to abut
15 against the first substantially horizontal surface of end stroke.

Thanks to the presence of the horizontal surfaces of end stroke the guiding means may be associated with the fastening means very quickly and accurately without there being the risk of having the two elements associated in a not complete manner and therefore unstable.

20 Advantageously, the female coupling profiles are constituted by a substantially rectangular section channel extending vertically and the male coupling profiles are constituted by a tongue with a substantially rectangular section extended vertically from the first substantially horizontal surface of end stroke for a length equal to or greater than the length of the female coupling profile channel.

Advantageously, the male coupling profile is associated to the guiding means, with the substantially horizontal surface of end stroke disposed facing downward at the top of the guiding means and the said tongue extending downwardly, the second substantially horizontal surface of end stroke it is disposed at the top of the said channel of the female sliding profiles associated with the fastening means.

Advantageously, the guiding means comprise a first pair of holes for the support means aligned with each other in height and in distance from the fastening means, suitable to house the support means in a position such as to interfere with the base of an upright of a temporary rail, and a second pair of holes for the support means aligned with each other in height and in distance from the restraining means, staggered in distance from the fastening means with respect to the first pair of holes, suitable for housing the support means in a position such that it interfere with a transverse element extending from an upright of a temporary rail.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will be more easily understood thanks to the following description of preferred embodiments thereof, provided as non-limitative examples, with reference to the attached drawings in which:

- Figure 1 shows a front view of a device according to the invention in operative configuration in which by dotted lines are shown a portion of an upright of a portal and a temporary rail in a scaffold in which the device is installed;
- Figure 2 shows a top view of the device of Fig. 1, in partial section, taken along the section line II-II of Fig.1;
- Figure 3 shows a further front view of the device of Fig. 1 wherein is shown a phase of association of the guiding means to the fastening means.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to the figures, a guiding and support device 100 comprises fastening means, 110, to an upright 11, of a portal, guiding means, 120, of the sliding of a temporary rail, 40, and support means, 130, to prevent the sliding down of the temporary rail 40. The fastening means 110 are constituted by two fastening portions, 111, 112, to each of which is associable one of two guiding means 120. The fastening portions 111, 112 are connected each other by hinge means, 113, with vertical axis and they form a clamping fasten with a form suitable to close itself around the upright 11. In diametrically opposite position with respect to the hinge means 113 are present clamping means, 114, constituted by a bolt that connects and allows to bring together close two perforated flaps, 115, 116, of the fastening portions, respectively 111, 112. In a different embodiment of the device of the invention the fastening portions 111 and 112 have perforated flaps 115, 116 both on one side and on the diametrically opposite side (in place of the hinge means 113). In this embodiment the fastening means 110 are then constituted by two fastening portions 111 and 112 perfectly identical and symmetrical which are clamped together around the upright 11 by two clamping means 114.

The two portions of fasten 111 and 112 separable between them have an even more reduced size during transport.

The guiding means 120 are constituted by guide portions 121 that form a "U" profile vertically elongated so as to have an extension between 5 cm and 30 cm, preferably between 8 cm and 10 cm. Obviously, the internal "U" profile of the guiding means is the most suitable to adapt to the most common type of rails which have side tubular vertical elements with circular or rectangular cross-section, however, the profile of the guiding means may be of any form suitable to cooperate with a corresponding shape of side vertical elements of the

rail. The fastening means 110 and the guiding means 120 are constituted by two separate and distinct bodies which can be coupled with coupling means, 182, constituted of male coupling profiles, 183, made in the guiding means 120 and corresponding female coupling profiles, 184, realized in the fastening means 110, which allow vertical mutual sliding. The coupling means also comprise a first substantially horizontal surface of end stroke, 191, associated to the male coupling profile 183 and a corresponding second substantially horizontal surface of end stroke, 192, associated with the female coupling profile 184 intended to abut against the first substantially horizontal surface of end stroke 191 to determine an end stroke position in correspondence of which the guiding means 120 are completely and stably associated to the fastening means 110. The female coupling profiles 184 are constituted by a substantially rectangular section channel extending vertically and the male coupling profiles 183 are constituted by a tongue with a substantially rectangular section extended vertically from the first substantially horizontal surface of end stroke 191 for a length equal to or greater than the length of the female coupling profile channel 184. The male coupling profiles 183 are associated with the guiding means 120 and are fixed to these by a connecting flap, 193, disposed at the top of the guide portion 121 so that the first substantially horizontal surface of end stroke 191 is constituted by the lower surface of the connecting flap 193 and the tongue that constitutes the male coupling profiles extends itself vertically downwards from the latter. The second substantially horizontal surface of end stroke 192 is constituted by the top of the outer wall of the channel which constitutes the female coupling profiles 184. The surface 191 which is the lower surface of the connecting flap 193 abuts on the surface 192 that the top of the outer wall of the channel 184, so that it is exactly determined a position of complete and stable association of the guiding means to the fastening means. The tongue 183 extends itself for a length equal to or greater than the

length of the channel 184 so that it is exploited the entire length of the latter for guiding the placement of the guiding means. Advantageously, the tongue 183 is welded to the guide portion 121 and the tubular element of rectangular section which constitutes the channel 184 is welded to the connecting means 110. In this way, their length can be chosen in the most
5 suitable manner so as to ensure the mutual positioning guide of the guiding means 120 to the fastening means 110, regardless of the height of the guide portion 121 and of the fastening means 110. Furthermore, the structural strength of the connection can be ensured by adjusting the longitudinal and transversal dimension of the tongue 183 and of the tubular element of rectangular section that constitutes the channel 184, minimizing their thickness,
10 so that the fastening means 110 protrude in width of a very limited entity from the profile of the upright 11.

The device 100 thus conceived allows to stably fasten the fastening means 110 to the upright 11, while the guiding means 120 can be easily removed each time the rail is moved, and is no longer required the guiding and supporting action of the guiding means
15 120. The fastening means 110, which once installed on the upright 11 must not be removed anymore exactly define the height and the angular position that the guiding means 120 must assume, which instead are removed every time the temporary rail 40 is moved upstairs. The fastening means 110 have overall dimensions reduced to a minimum and yet allow a very stable and safe connection of the guiding means 120.

20 The presence of guiding means arranged specularly with respect to a centreline plane of the guiding and support device 100 obviously allows to exploit the modularity of the scaffolding structure using the same device for two adjacent and aligned rails on the same level.

The support means 130 comprise a support element, 131, which consists of a pin dimensioned to fit into appropriate pairs of holes provided in the guide portion 121. A first pair of holes for the support means, 132, aligned with each other in height and in distance from the fastening means 110, suitable for housing the support means 131 in a position such as to interfere with the base, 42, of an upright , 41, of the temporary rail 40, and a second pair of holes for the support means, 133, aligned with each other in height and in distance from the fastening means 110, staggered in distance from the fastening means 110 with respect to the first pair of holes 132, suitable for housing the support means 131 in a position such as to interfere with a transverse element 43, extending from one upright 41 of a temporary rail 40. The provision of a double pair of holes as above described allows to properly support any type of temporary rail because if the latter is not provided with transverse elements 43 it can be at least supported from below the base 42 of the upright 41, while if it provides transverse elements 43 arranged at different heights it is possible to support it beneath these allowing various adjustments in height of the temporary rail 40. Furthermore, the possibility of providing a greater number of positions in height of the rail allows to find the best position in height of the rail to make sure that the skirting, usually associated to the rail, is at the correct distance from the decking.

All the elements of the device, i.e. fastening means 110, guiding means 120, support means 130 and coupling profiles 183 and 184 between the fastening means and the guiding means are advantageously made of steel as this material offers superior mechanical characteristics compared to other, in particular to plastics, and therefore it allows to minimize the thickness and the size of the device with the same overall mechanical strength of the device 100.

In addition, since also the portals of scaffolding are made of steel, they are avoided the sealing problems of the fastening means which may arise due to the thermal expansion differences between these and the upright of the portal to which they are associated.

Certainly, changes and modifications of practical and applicational nature can be made to the guiding and support device for temporary rails of scaffolding of the present invention without prejudice to the advantages above outlined therefrom derived, and always remaining within the scope of protection provided by the claims that follow.

In fact, the above made description of specific embodiments is useful to illustrate the basic concept of the invention, so that experts in the field may carry that out modifying and adapting the above mentioned embodiments to the various applications; such adaptations and modifications will be therefore considerable as equivalent to the exemplified embodiments. It is understood that the phraseology or numbering used have purely describing and aiding purposes in the understanding of the inventive concept and not limiting purpose.

CLAIMS

1 Guiding and support device (100) for temporary rails of scaffolding provided
with fastening means (110) to an upright of a scaffold, guiding means (120) for temporary
rails shaped so as to form a vertical sliding track of the rail, and support means (130) of the
5 rail, in which the fastening means (110) and the guiding means (120) are constituted by
separate elements associable with each other via coupling means comprising a male
coupling profiles (183) and a corresponding female coupling profiles (184) which permit
vertical mutual sliding of the guiding means (120) with respect to the fastening means (110)
characterized in that said coupling means comprise at least a first substantially horizontal
10 surface of end stroke (191) associated with said male coupling profile (183) and a
corresponding second substantially horizontal surface of end stroke (192) associated with
said female coupling profile (184) intended to abut against the first substantially horizontal
surface of end stroke (191).

2 Guiding and support device (100) according to claim 1 **characterized in that**
15 said female coupling profiles (184) consist of a channel of substantially rectangular section
extending vertically and said male coupling profiles (183) are constituted by a tongue of
substantially rectangular section extended vertically from the first substantially horizontal
surface of end stroke (191) for a length equal to or greater than the length of the channel of
the female coupling profile (184).

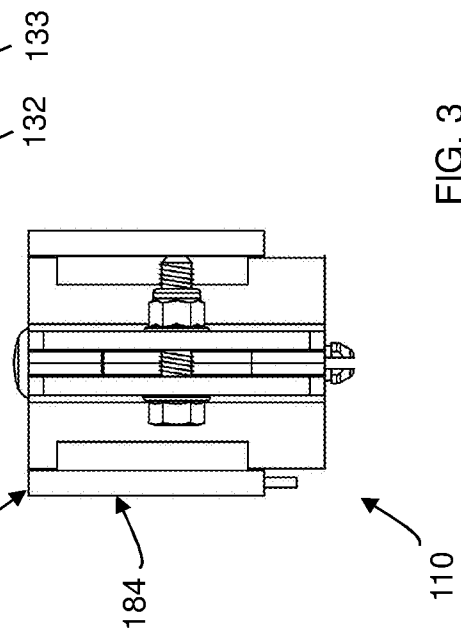
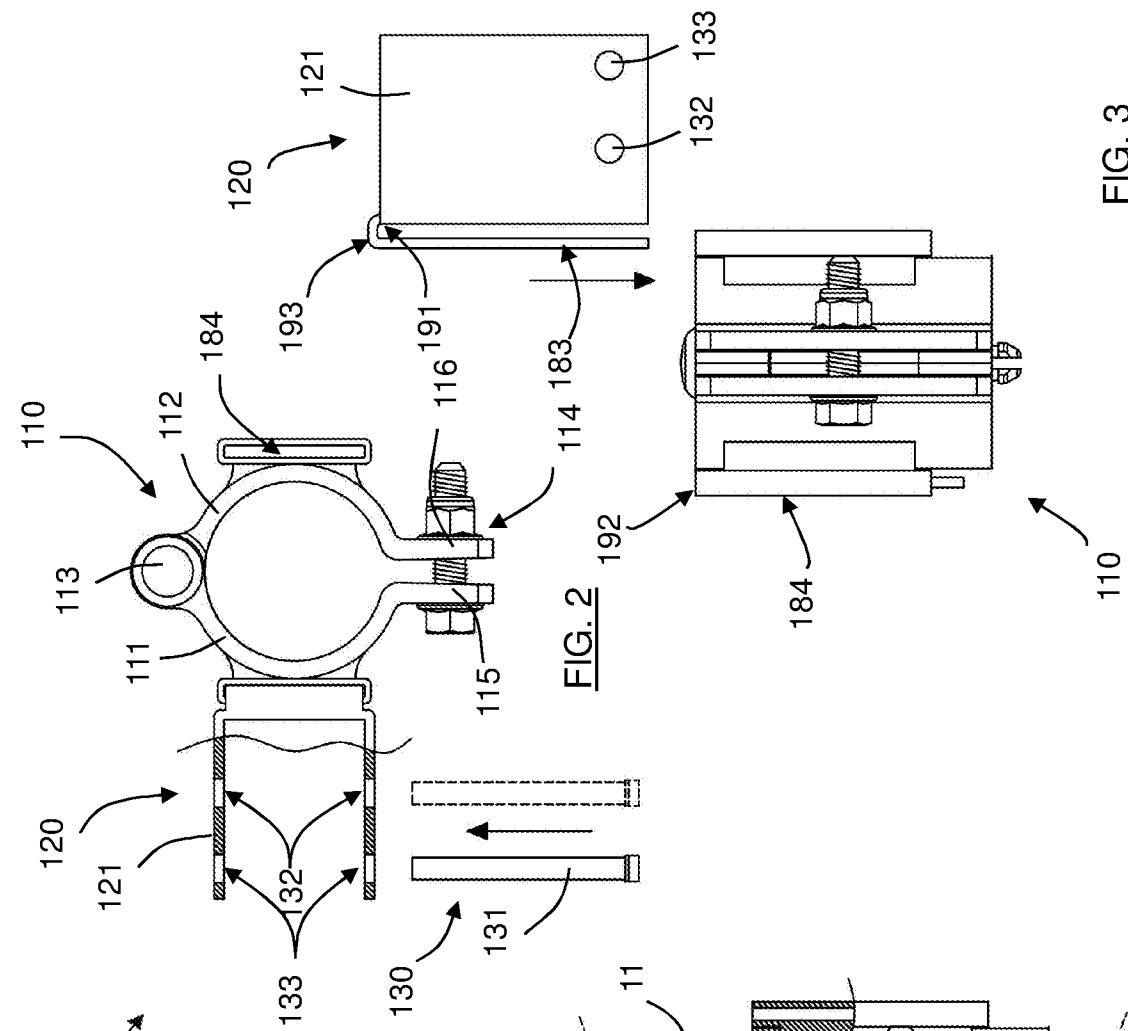
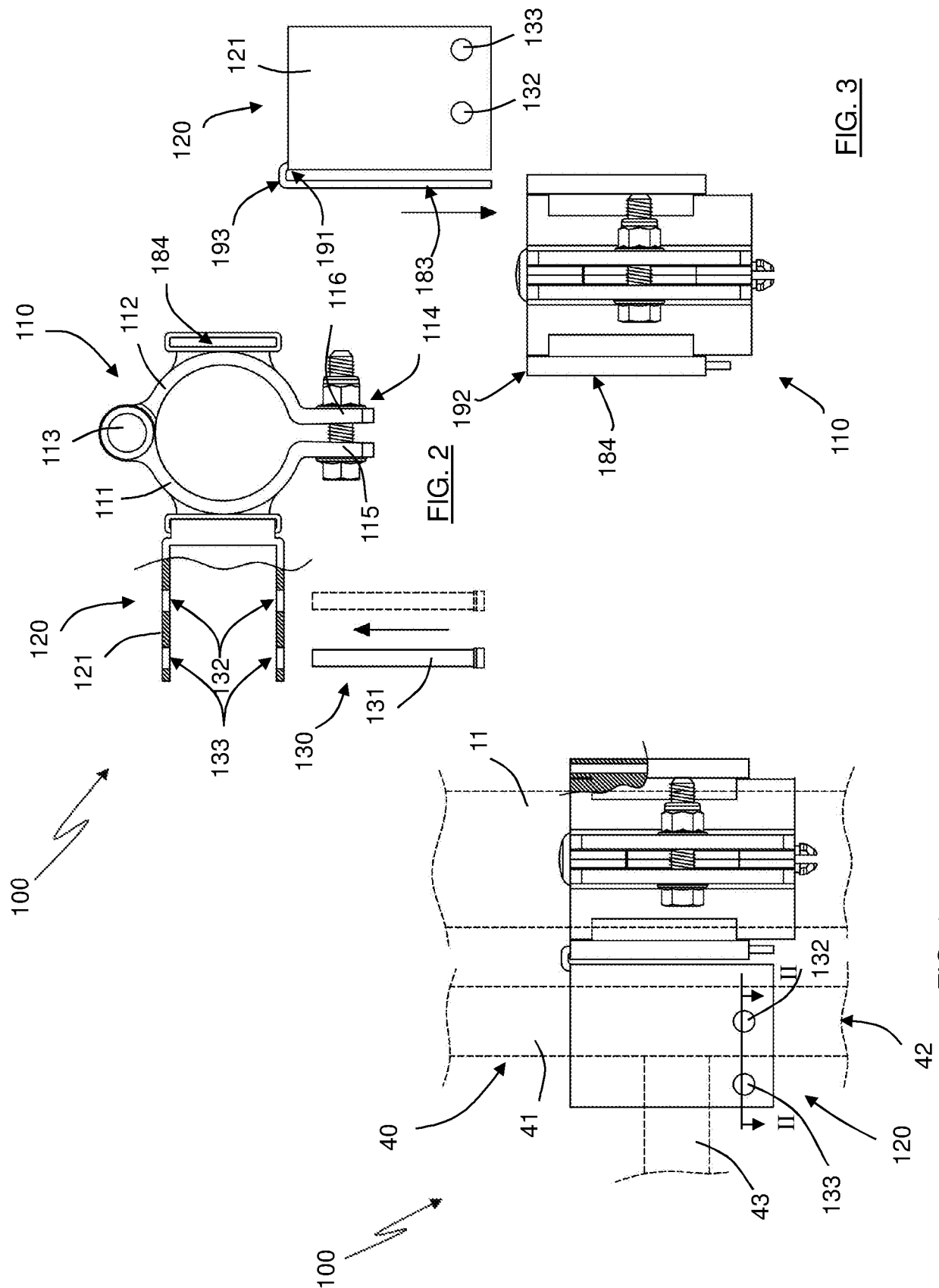
20 3 Guiding and support device (100) according to the previous claim
characterized in that said male coupling profile (183) is associated with said guiding means
(120), with said substantially horizontal surface of end stroke (191) disposed facing
downwards at the top of said guiding means (120), said tongue extending downward, said
second substantially horizontal surface of end stroke (192) being disposed at the top of the

said channel of said female coupling profiles (184) which are associated to said fastening means (110).

4 Guiding and support device (100) according to one of the previous claims **characterized in that** said guiding means (120) comprise a first pair of holes for the support

5 means (132) aligned with each other in height and in distance from said fastening means (110), suitable for housing said support means (130) in a position adapted to interfere with a base of an upright of the temporary rail, and a second pair of holes for the support means (133) aligned with each other in height and in distance from said fastening means (110), staggered in distance from said fastening means (110) with respect to the first pair of holes

10 (132), suitable for housing said support means (130) in a position adapted to interfere with a traverse element extending from an upright of a temporary rail.



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2016/052971

A. CLASSIFICATION OF SUBJECT MATTER		
INV. E04G5/14	E04G7/20	E04G7/22 E04G7/06 E04G7/24
ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) E04G		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2013 194500 A (STEP UP KK) 30 September 2013 (2013-09-30) the whole document -----	1-4
X	JP H09 242330 A (TEC BIRUDO KK; SANYO SANGYO KK) 16 September 1997 (1997-09-16) the whole document -----	1-3
X	AU 2010 201 982 A1 (SCAFFOLD LOGISTICS PTY LTD) 16 December 2010 (2010-12-16) figures 1,2,5 -----	1
X	FR 2 474 087 A1 (HUSSOR ERECTA SA [FR]) 24 July 1981 (1981-07-24) figures 1-5 -----	1,4
	-/-	
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 25 August 2016		Date of mailing of the international search report 31/08/2016
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Garmendia Irizar, A

INTERNATIONAL SEARCH REPORT

International application No

PCT/IB2016/052971

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2004 190356 A (SUMITOMO FORESTRY) 8 July 2004 (2004-07-08) the whole document -----	1,2,4
X	FR 2 484 507 A1 (MILLS ECHAFAUDAGES [FR]) 18 December 1981 (1981-12-18) pages 6-8; figures 1-6 -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2016/052971

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2013194500 A	30-09-2013	NONE	
JP H09242330 A	16-09-1997	NONE	
AU 2010201982 A1	16-12-2010	NONE	
FR 2474087 A1	24-07-1981	NONE	
JP 2004190356 A	08-07-2004	JP 4012056 B2 JP 2004190356 A	21-11-2007 08-07-2004
FR 2484507 A1	18-12-1981	AT 375715 B FR 2484507 A1 IE 51656 B1 PT 72993 A	10-09-1984 18-12-1981 04-02-1987 01-06-1981