(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 674 063 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **95103321.6**

(51) Int. Cl.[6]: **E04F 11/035**

(22) Date of filing: **08.03.95**

(30) Priority: **22.03.94 IT BO940121**

(43) Date of publication of application:
27.09.95 Bulletin 95/39

(84) Designated Contracting States:
DE ES FR GB

(71) Applicant: **ALBINI & FONTANOT S.p.A.**
Via Mentana, 19
I-47037 Rimini (Forli) (IT)

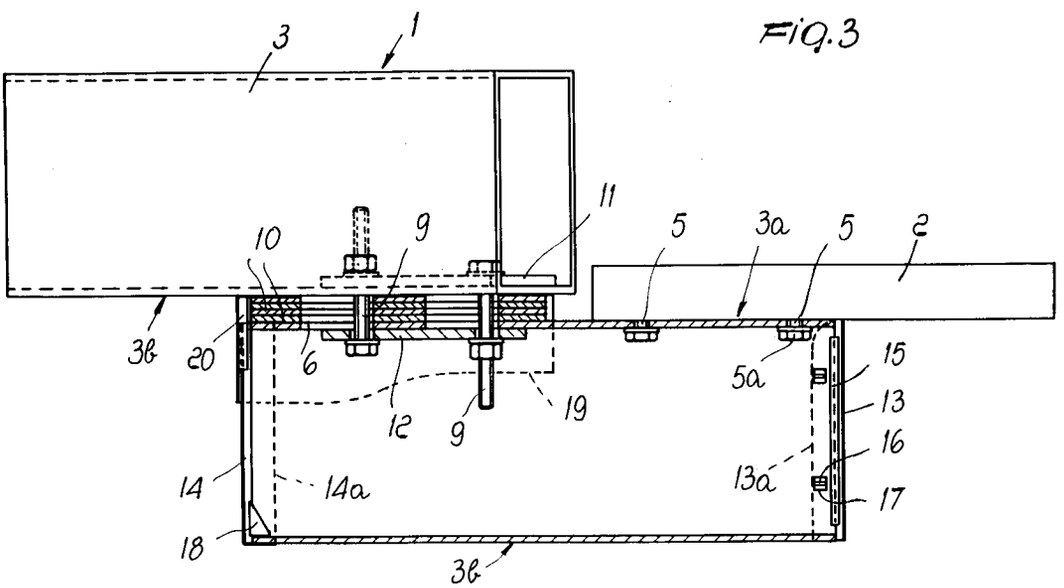
(72) Inventor: **Fontanot, Enzo**
Via IV Novembre, 22
I-47037 Rimini (Prov. of Forli) (IT)

(74) Representative: **Modiano, Guido, Dr.-Ing.**
Modiano & Associati S.r.l.
Via Meravigli, 16
I-20123 Milano (IT)

(54) Modular support for staircase steps.

(57) The modular support for staircase steps comprises an elongated hollow body (3) that is adapted to form an upper (3a) and a lower (3b) resting surfaces which are horizontal, flat, and parallel to each other. A plurality of longitudinal slots (6) and a plurality of concentric slots having a circular profile are formed respectively in a rear portion and in a front portion of said surfaces (3a,3b); the slots (6) are adapted to be crossed by through screw means (9) for coupling, in an angularly adjustable position, to corresponding surfaces of adjacent supports, by interposing optional spacer means (10). The upper surface (3a) furthermore has, in a front portion, a plurality of holes for fixing a corresponding step (2).

Fig.3



EP 0 674 063 A1

The present invention relates to a modular support for staircase steps.

So-called self-supporting staircases are currently known; their flights are constituted by a load-bearing floor slab on which the steps rest; said slab is rigidly coupled, at its ends, to the levels to be connected. The load-bearing slab is preferably formed in a modular manner by means of a plurality of supports for the individual steps. Said supports in fact allow to vary at will the path of the axis of the flight and to adjust the riser of said steps.

A known type of modular support includes a body which forms, in an upward region, a horizontal supporting surface for a corresponding step and two vertical cylindrical elements which are arranged at different levels and adapted to couple to complementarily shaped cylindrical elements of the adjacent supports. Said supports are locked to each other in the desired angular position by virtue of appropriate screw means.

The mutual axial position of the supports is adjusted for example by inserting appropriate spacer means.

Obvious aesthetic reasons generally require said screw means that mutually lock the supports not to be visible externally. However, this requirement often makes it difficult to position and lock conventional modular supports, and accordingly the installation of the staircase is complicated and expensive.

The longitudinal mutual arrangement of the steps must also sometimes be adjustable, so as to optimize the modularity characteristics of the staircase.

A principal aim of the present invention is to solve the above described problem by providing a modular support for staircase steps that allows to easily and continuously vary the longitudinal and angular mutual position of the steps and to adjust the distance between the treads of said steps.

Within the scope of this aim, an object of the present invention is to provide a modular support for staircase steps that is conceptually simple, easy to manufacture, versatile in use, and assuredly reliable.

This aim and this object are both achieved, according to the invention, by the present modular support for staircase steps, characterized in that it comprises an elongated hollow body that is adapted to form an upper resting surface and a lower resting surface which are horizontal, flat, and parallel to each other, and in which a plurality of longitudinal slots and a plurality of concentric slots having a circular profile are formed respectively in a rear portion and in a front portion, said slots being adapted to be crossed by through screw means for coupling, in an angularly adjustable position, to corresponding surfaces of adjacent supports, by interposing optional spacer means, said upper surface being furthermore provided, in a front portion, with a plurality of holes for fixing a corresponding step.

Further characteristics and advantages of the invention will become apparent from the following detailed description of a preferred embodiment of the modular support for staircase steps, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a plan view of a flight of stairs formed by means of the modular supports according to the present invention;

figure 2 is a partially sectional plan view, taken along a horizontal plane, of a pair of said modular supports associated with each other;

figure 3 is a corresponding partially sectional elevation view of said pair, taken along the plane III-III of figure 2.

With particular reference to the above figures, the reference numeral 1 generally designates the modular support according to the invention, which supports a single step 2 of a self-supporting flight of stairs.

The support 1 comprises a tubular body 3 having a rectangular cross-section and preferably made of sheet metal. The tubular body 3 forms two flat parallel supporting surfaces, respectively an upper surface 3a and a lower surface 3b, which are meant to be horizontal in the assembled position. Appropriate holes and slots are formed in said surfaces 3a and 3b for coupling to the adjacent supports and for fixing the step 2.

More particularly, a plurality of holes 4 is formed on a front portion of the upper surface 3a; said holes are arranged, for example, so as to form the vertices of a quadrilater, and allow the passage of respective screw elements 5 for fixing the step 2. Said screw elements 5 are inserted so that their head 5a is located inside the tubular cavity of the body 3.

The step 2 is arranged transversely to the tubular body 3 so as to rest on the upper surface 3a and protrude therefrom in a cantilevered manner. The steps can of course have a different shape according to the requirements, for example to provide curved regions in the flight of stairs, as shown by way of example in figure 1.

A plurality of longitudinal slots 6 is instead formed on the rear portion of the upper surface 3a. In particular, there are two pairs of said slots 6 arranged side by side at an appropriate distance.

On the front portion of the lower surface 3b of the tubular body 3 there are two oppositely arranged and concentric slots 7 with a circular profile whose convexity is directed towards the longitudinal sides of the body 3, and there is an additional slot 8 that has a circular profile, is concentric to the

previous slots 7, and has a greater radius of curvature than said slots; its convexity is directed towards the rear end of said body 3.

In particular, the slots 7 are portions of a circle whose diameter is equal to the transverse axial distance between said pairs of longitudinal slots 6, whereas the radius of the slot 8 is equal to the longitudinal axial distance between said slots 6. The radial axes of the slots 7 and 8 are furthermore at right angles to each other: the axis of the slot 8 coincides with the longitudinal axis of the tubular body 3.

The slots 7 and 8 are adapted to be engaged by respective screw elements 9 that pass through the longitudinal slots 6 of the underlying support to allow fixing and angular adjustment with respect to said support. Said supports are associated with each other, optionally interposing one or more spacer plates 10 between the tubular bodies 3 and optionally applying reinforcement plates 11 and 12 inside said bodies 3.

The spacer plates 10 have a plurality of longitudinal slots that match the longitudinal slots 6 of the upper surface 3a of the supports. Likewise, the lower reinforcement plate 11 and the upper reinforcement plate 12 are respectively provided with a plurality of circular slots that match the slots 7 and 8 of the lower surface 3b of the supports and with two pairs of holes whose longitudinal and transverse axial distance is equal to that of the longitudinal slots 6.

Conveniently, the tubular body 3 of the support is closed, at its front and rear ends, by respective plugs 13 and 14 which are preferably made of plastics. The closing plugs 13 and 14 are adapted to be fitted by pressing over the inlet formed at the front and at the rear by the tubular body 3 by means of corresponding rims 13a and 14a which are adapted to externally surround said body 3. The rims 13a run along two opposite sides, whereas the rims 14a run along three sides of the plugs 13 and 14.

The front closure plug 13 is internally provided with a pair of centering ribs 15; the corresponding rims 13a are internally provided with respective pairs of engagement lugs 16 which are adapted to fit, in a snap-together manner, inside matching holes 17 formed on the sides of the tubular body 3.

The rear closure plug 14 is internally provided with a pair of lugs 18 adapted to engage the internal lower surface of the tubular body 3 so as to retain said plug 14 in its engagement seat.

The spacer plates 10 are furthermore appropriately surmounted by a sort of cap 19 which is preferably made of plastics. Said cap 19 has a plurality of longitudinal slots that match the longitudinal slots 6 of the upper surface 3a of the body 3 and those of the spacer plates 10.

The cap 19 is internally provided, in a front portion, with two flaps 20 which are adapted to fit in corresponding slots formed in the rear closure plug 14.

Accordingly, by virtue of the above mentioned longitudinal slot 6 and circular slots 7 and 8, each support can be coupled, in the desired longitudinal and angular position, to the overlying and to the underlying supports of the flight of stairs. The longitudinal slots 6 in fact allow to continuously vary the longitudinal position of the support with respect to the overlying support, whereas the circular slots 7 and 8 allow said overlying support to continuously vary its angular position, as clearly shown in figure 2. The common center of the slots 7 and 8 forms the axis for the mutual angular rotation of said supports.

The fact should be stressed that adjacent supports are mutually locked simply by means of conventional through screw elements 9. Said screw elements 9 can be inserted and locked easily through the cavity of the tubular bodies 3.

In order to adjust the riser between the steps 2, one or more spacer plates 10 are instead optionally inserted between the coupled tubular bodies 3 of the supports of said steps. Of course, if the number of inserted spacer plates increases, the riser between the steps increases proportionally.

The described modular support allows, in summary, to easily and continuously vary the longitudinal and angular mutual position of the steps and to adjust the distance between the tread of said steps.

The modular support has a structure that is very simply both constructively and functionally, with proportionally reduced manufacturing and assembly costs. Furthermore, the application of the closing plugs 13 and 14 and of the cap 19 allows to conceal from sight all the connecting elements.

In the practical embodiment of the invention, the materials employed, as well as the shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. Modular support for staircase steps, characterized in that it comprises an elongated hollow body (3) that is adapted to form an upper resting surface (3a) and a lower resting surface (3b) which are horizontal, flat, and parallel to

each other, and in which a plurality of longitudinal slots (6) and a plurality of concentric slots (7) having a circular profile are formed respectively in a rear portion and in a front portion, said slots (6,7) being adapted to be crossed by through screw means (9) for coupling, in an angularly adjustable position, to corresponding surfaces of adjacent supports, by interposing optional spacer means (10), said upper surface (3a) being furthermore provided, in a front portion, with a plurality of holes (4) for fixing a corresponding step (2).

2. Support according to claim 1, characterized in that on said front portion of said lower surface (3b) of said body there are two oppositely arranged concentric slots (7) that have a circular profile and in which the convexity is directed towards the longitudinal sides of said body (3), and there is another slot (8) which has a circular profile, is concentric with respect to said first slots (7), has a greater radius of curvature than said first slots (7), and has its convexity directed towards the rear end of said body (3).

3. Support according to claim 2, characterized in that said first slots (7) having a circular profile are portions of a circle whose diameter is equal to the transverse axial distance between pairs of said longitudinal slots (6) formed on said upper surface (3a) of said body (3), whereas said additional slot (8) having a circular profile has a radius that is equal to the longitudinal axial distance between said pairs of longitudinal slots (6).

4. Support according to claim 1, characterized in that a first and a second pairs of longitudinal slots are formed on said rear portion of said upper surface of said body and are arranged side by side at an appropriate distance.

5. Support according to claim 1, characterized in that a lower reinforcement plate (11) and an upper reinforcement plate (12) can be applied inside said body (3) and are respectively provided with a plurality of circular slots that correspond to said circular-profile slots (7) of said body (3) and with two pairs of holes whose longitudinal and transverse axial distance is equal to the axial distance of said longitudinal slots (7) of said body (3).

6. Support according to claim 1, characterized in that said spacer means (10) are constituted by stackable plates having a plurality of longitudinal slots that correspond to said longitudinal slots (6) of said upper surface (3a) of said body.

7. Support according to claim 1, characterized in that said body (3) is adapted to be closed, at its front and rear ends, by respective closing plugs (13,14) which can be fitted on said ends by pressing and are provided with respective rims (13a,14a) adapted to externally surround the inlets of said body (3).

8. Support according to claim 7, characterized in that said closing plugs (14a) are internally provided with lugs (18) for centering and engaging in said inlets of said body.

9. Support according to claim 1, characterized in that a sort of cap (19) can be applied on said rear portion of said upper surface (3a) of said body (3), is adapted to surmount said spacer means (10), and has a plurality of longitudinal slots that correspond to said longitudinal slots (6) of said upper surface (3a) of said body (3).

10. Support according to claim 9, characterized in that said cap (19) is internally provided, in a front portion, with two flaps (20) which are adapted to fit inside corresponding slots formed in said rear closing plug (14a).

11. Support according to claim 1, characterized in that said body (3) has a tubular shape with a rectangular cross-section.

Fig. 1

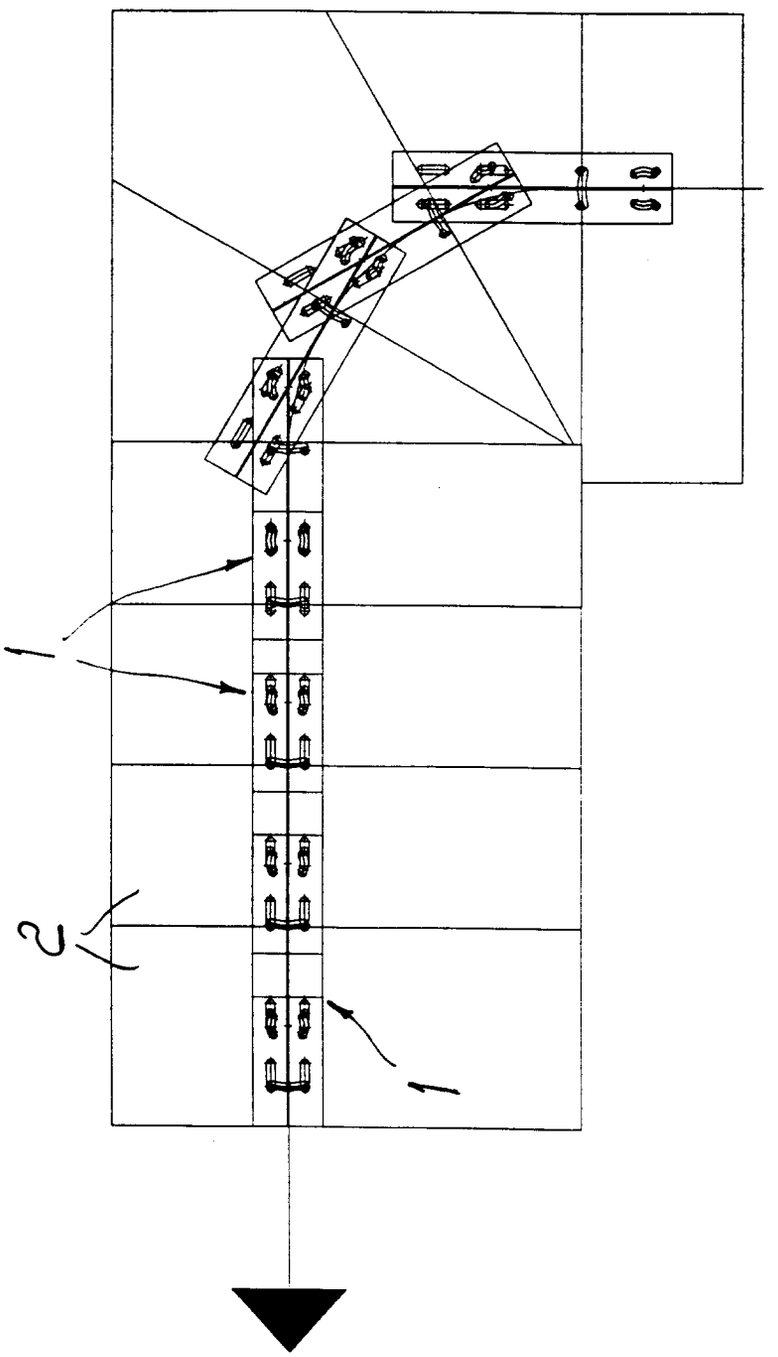


Fig.2

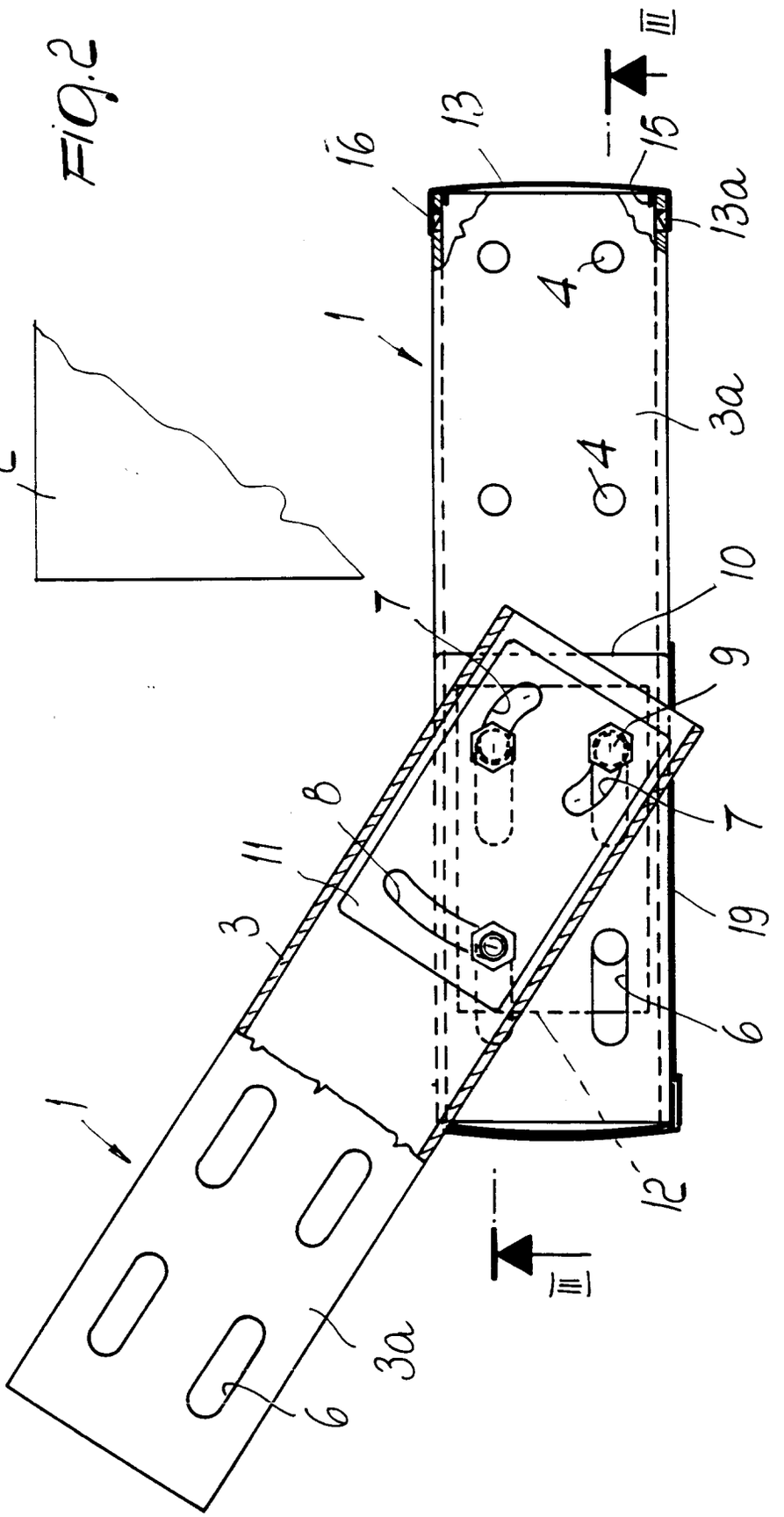
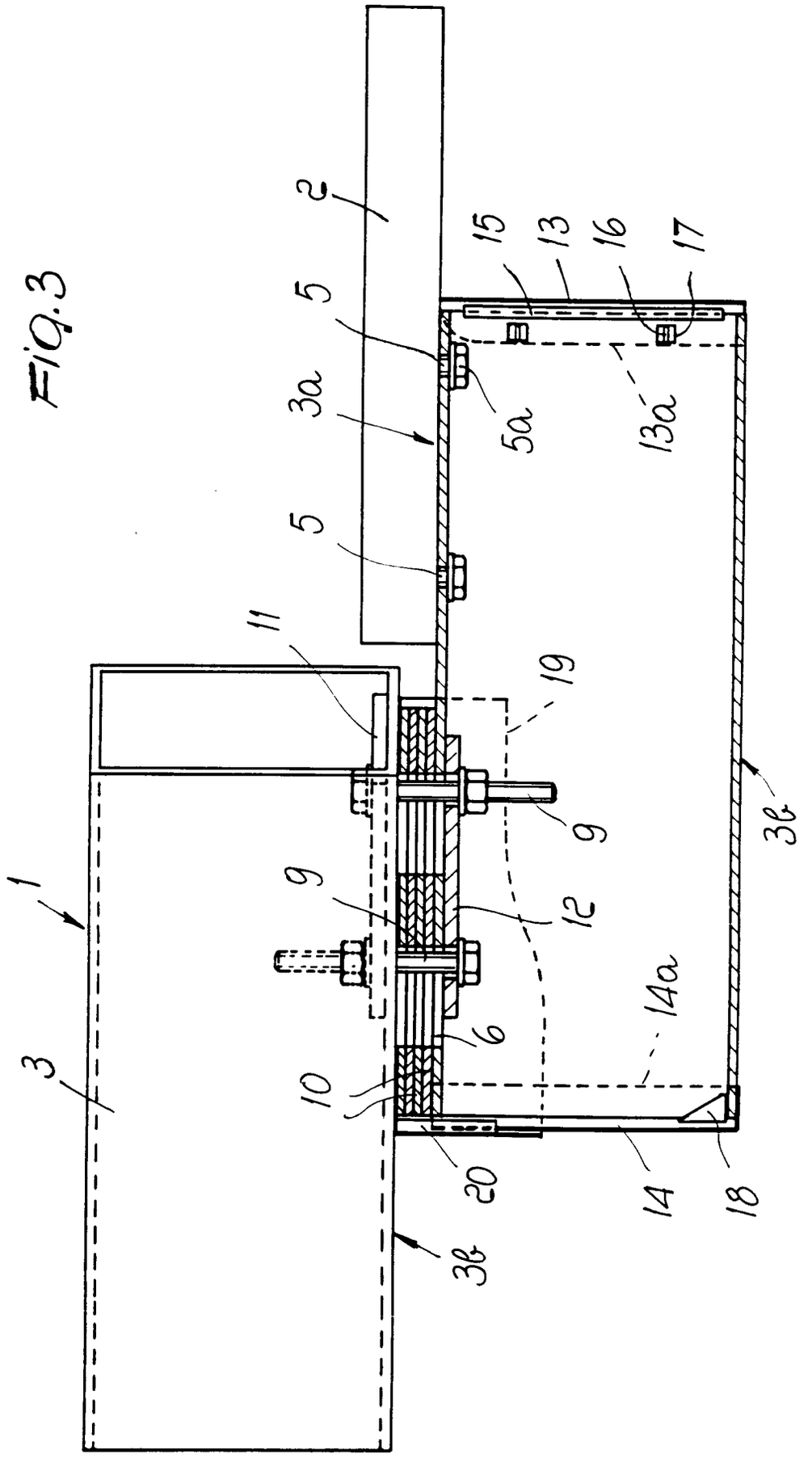


Fig.3



European Patent Office

EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT

EP 95103321.6

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
X	FR - A - 2 590 632 (GOVI) * Front page *	1,11	E 04 F 11/035
A	--	2,3,4	
X	DE - A - 2 256 555 (CARLSEN) * Fig. 3,7; page 6, lines 6-13 *	1,2,6, 11	
Y	--	3,4	
Y	DE - A - 2 249 280 (GRUPP) * Page 5, line 11; fig. 4 *	1,2,3, 4,6,11	
A	-- FR - A - 1 443 918 (DOMERGUE) * Fig. 4,5 *	1,6	
A	-- EP - A - 0 283 890 (ERNST) * Fig. 10,12,15 *		
	----		TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			E 04 F F 16 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	07-06-1995	GLAUNACH

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P0401)