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

(11) EP 1 344 892 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
08.10.2003 Bulletin 2003/41

(51) Int Cl.[7]: **E06C 1/393**, E06C 1/387

(21) Application number: **02425139.9**

(22) Date of filing: **11.03.2002**

(54) **Folding step stool**

Zusammenklappbare Trittleiter

Escabeau pliant

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE TR

(43) Date of publication of application:
17.09.2003 Bulletin 2003/38

(73) Proprietor: **Framar S.p.A.**
15020 Mombello Monferrato (AL) (IT)

(72) Inventor: **Coggiola, Davide**
15020 Mombello Monferrato (AT) (IT)

(74) Representative: **Robba, Pierpaolo et al**
Interpatent,
Via Caboto 35
10129 Torino (IT)

(56) References cited:
FR-A- 1 257 779
GB-A- 1 295 004
GB-A- 1 547 243

EP 1 344 892 B1

Printed by Jouve, 75001 PARIS (FR)

Description

[0001] The present invention refers to folding step stools. FR 1 257 779 discloses a folding step stool having all the features of the preamble of claim 1.

[0002] A further example of a folding step stool is described in the patent application EP 0961006.

[0003] This type of step stool generally comprises two parallel, tubular, rectangular and load bearing frames having circular or polygonal cross section, hinged to each other at their upper ends that can be opened with a calliper-like movement, one of said two frames being provided with a series of hinged steps.

[0004] One of the problems connected with said type of step stools is due to the fact that, once they have been opened, they must prove to be safe and stable for the user, so as to prevent the risk of an accidental closure.

[0005] It is therefore an object of the present invention to provide a step stool of the above mentioned type solving the above mentioned problem and proving to be safe and stable for the user.

[0006] This and other objects are obtained by means of the step stool according to the present invention as claimed in the hereby attached claims.

[0007] It is clear that the step stool can be equipped with any number of steps different from the number of steps shown in the cited example.

[0008] Further characteristics and advantages of the step stool according to the present invention will be described in the following with reference to the attached drawings showing preferred and non-limiting embodiments of the invention, wherein:

- Figure 1a is a perspective view of a step stool realised according to an embodiment of the present invention, in a partially open position;
- Figure 1b is a perspective view of a step stool realised according to an alternative embodiment of the present invention, in a partially open position;
- Figure 2 is a detail showing the insertion of the fork onto the front frame of the step stool, the step stool being in its usage position;
- Figure 3 is a partial cross sectional view of the fork of Figure 2.

[0009] With reference both to Figure 1a and Figure 1b, it is shown a foldable step stool formed by a pair of front and rear frames, respectively indicated with 1 and 3, to which a pair of lower and upper steps, respectively 4a and 4b, is hinged.

[0010] For ease of description, the front frame 1 has been defined as the frame facing the side from which the step stool is used and the other frame 3 as the rear frame.

[0011] Said frames 1 and 3 are respectively provided with lower support feet 11 and 9.

[0012] Each step 4a,4b is constituted by a metal plane having raised ribs or an embedded plastic mat in order to assure an anti-slip function, and is perimetrically bounded by a folded edge in order to assure higher sturdiness and safety for supporting a user's foot.

[0013] Said frames 1 and 3 are hinged to each other so that the step stool can assume a closed (or rest) configuration and an open (or operative) configuration.

[0014] The link between said front frame 1 and said rear frame 3 is obtained by means of a first pair of upper stays 5, having a first end hinged to the rear frame 3 in 15 and a second end hinged to the front frame 1 in 17, and a second pair of lower stays 7, having a first end hinged to the rear frame 3 in 19 and a second end rearly hinged to the flank of the lower step 4a in 21, said flank of the lower step 4a being frontally hinged to the front frame 1 in 25.

[0015] The upper step 4b results to be frontally hinged to the front frame 1 in 23 and rearly to the rear frame 3 in correspondence with the hinge point 19 of said second pair of stays 7.

[0016] The lower step 4a results to be frontally hinged to the front frame 1 in 25 and rearly to the lower stays 7 in 21.

[0017] Said frames 1 and 3 are preferably constituted by metallic tubular elements having circular or polygonal cross section, also having different cross sectional areas, for instance respectively the one bigger than the other, wherein the front frame 1 has the shape of an "upside-down U" and the rear frame 3 is "U"-shaped. Besides, said frames can be painted or realised in a material that does not need to be painted, like for instance aluminium.

[0018] More precisely and with reference to the Figure 1a, in correspondence with the hinge points of the upper stays 5 to the front frame 1, the front frame 1 results to be bent towards the rear frame 3 until it forms the inclined and parallel arms 1a that, together with the linking arm 1b, constitute a loop projecting towards the back of the step stool, in order to advantageously realise, when the step stool is open that is to say in its usage position, a useful safety rim, leaving completely free and practicable the surface of the tread plane of the topmost step 4b.

[0019] With reference now to Figure 1b, in correspondence with the hinge points of the upper stays 5 to the front frame 1, the front frame 1 results to be bent towards the rear frame 3 until it forms the inclined and parallel arms 1'a that, together with the linking arm 1'b, constitute a loop projecting towards the back of the step stool, in order to advantageously realise, when the step stool is open that is to say in its usage position, a useful safety handrail; in fact, said arms 1'a and 1'b extend vertically, in correspondence with the hinge points of the upper stays 5, towards the rear frame 3 for such a length that the user can grasp the linking arm 1'b with his/her hand. Also in this second embodiment of the present invention the surface of the tread plane of the topmost step 4b is left completely free and practicable.

[0020] With reference again to Figure 1a or Figure 1b

indifferently, each of the upper ends of the rear frame 3 is provided with a fork 13, preferably in rigid or semi-rigid plastic, conveniently shaped for assuring the locking of the step stool as a result of the insertion realised by pressing said fork 13 into the parallel arms 1a or 1'a of said loop formed by the front frame 1 beyond the topmost step.

[0021] The locking system comprising two forks 13 and realised in this way is such to prevent an accidental closure of the step stool, while preserving the characteristics of easy handiness, minimal dimensions, lightness, simplicity of construction and inexpensiveness of the step stool itself.

[0022] A fork 13, shown in detail in a lateral view of Figure 2, is hooked to the part 1a or 1'a of the frame 1 in its usage position, that is to say when the step stool is open.

[0023] Said fork 13 comprises a hooking portion 13a, a fixing portion 13c inserted into the end of the tube of the rear frame 3 and a linking portion 13d linking the two above mentioned portions.

[0024] The hooking portion 13a of the fork 13 is suitable for insertion into the part 1a or 1'a of the frame 1 and has the form of two parallel elastic fins having a trapezoidal shape with rounded corners.

[0025] It must be observed that the action of hooking the frame 1 into the forks 13 is made easier by the fact that the user is positioned on one of the steps since he contributes with his/her weight to insert the frame 1 into the forks 13 completely, thereby assuring the maximum safety during the use of the step stool, the closure of the step stool being obtained only by overcoming the elastic force that said fins 13a exert against the tube of the front frame 1.

[0026] Figure 3 is a longitudinal section of the fork 13 pointing out the part suitable for the hooking, comprising the fins 13a and the cylindrical portion 13c arranged for fixing the fork 13 to the rear frame 3 by means of insertion realised by pressing into the corresponding tube of said rear frame 3.

[0027] Said cylindrical portion 13c is locked in 15 inside the rear frame 3 thanks to a rivet crossing the tube 3 and the cylindrical portion 13c thanks to the bore 13b there provided and to which the upper stay 5 is hinged.

[0028] Advantageously, said fixing portion 13 comprises a series of parallel circular ribs 13f that, interfering with the internal wall of the tubular frame 3, assure that the forks 13 engage stably with respect to said frame 3.

[0029] The linking portion 13d comprises an inclined wall 13e linked to the edge of the cylindrical portion 13c and laterally to the fins 13a.

[0030] The fork is realised by means of known molding techniques.

[0031] Even though the step stool according to the present invention has been described as a two-steps foldable stool, it is clear that in any case the invention may be realised with foldable step stools having any number of steps.

Claims

1. Folding step stool comprising a pair of tubular frames (1,3), one of which is frontal (1) and has the shape of an upside-down "U" and the other one is rear (3) and "U"-shaped, said frames being hinged to each other and supporting a plurality of steps (4) so that said step stool can assume a folded or rest position and an open or operative position, **characterised in that** at least a fork (13) is interposed between said rear frame (3) and said front frame (1), said fork (13) being provided with a fixing portion (13c) in order to make said fork (13) integral with one of said frames (1,3) and a hooking portion comprising a pair of substantially parallel elastic fins (13a), a part of the tube of the other of said frames being received between said fins when the step stool is in the operative position and said other of said frames being separable with respect to said part by overcoming the elastic force of said fork (13) when the step stool must be folded up again.

2. Folding step stool according to claim 1, **characterised in that** it comprises a pair of said forks (13) and **in that** said forks (13) are fixed to said rear frame (3) and can receive a part of said front frame (1).

3. Folding step stool according to claim 2, **characterised in that** said fins (13a) have a substantially trapezoidal form.

4. Folding step stool according to claim 3, **characterised in that** said fixing portion (13c) has a plurality of projections (13f) that, interfering with the internal wall of said tubular frame, assure that the forks (13) engage stably with respect to said frame.

5. Folding step stool according to claim 4, **characterised in that** the top part of the front frame (1) forms a loop (1a,1b) projecting towards the rear frame (3) and constituting a safety rim with respect to the topmost step, said loop (1a,1b) defining a pair of parallel parts (1a) that are received into said forks (13) when the step stool is open.

6. Folding step stool according to claim 4, **characterised in that** the top part of the front frame (1) forms a loop (1'a,1'b) projecting towards the rear frame (3) and constituting a safety handrail with respect to the topmost step, said loop (1'a,1'b) defining a pair of parallel parts (1'a) that are received into said forks (13) when the step stool is open.

7. Folding step stool according to any of the preceding claims, **characterised in that** said fixing portion (13c) is locked inside the rear frame (3) thanks to a rivet crossing the tube of said frame and said fixing

portion (13c) is locked thanks to a hole (13b) there provided.

Patentansprüche

1. Zusammenklappbare Trittleiter mit zwei Rohrrahmen (1,3), nämlich einen vorderen (1) in Form eines umgekehrten "U" und einen hinteren (3) in Form eines "U", wobei die Rahmen gelenkig miteinander verbunden sind und mehrere Stufen (4) tragen, so daß die Trittleiter eine zusammengeklappte oder Ruheposition und eine geöffnete oder Betriebsposition einnehmen kann, **dadurch gekennzeichnet, daß** mindestens eine Gabel (13) zwischen dem hinteren Rahmen (3) und dem vorderen Rahmen (1) angeordnet ist, wobei die Gabel (13) mit einem Befestigungsabschnitt (13c), um die Gabel (13) fest mit einem der Rahmen (1,3) zu verbinden, und einem Hakenabschnitt versehen ist, der ein Paar von im wesentlichen parallelen elastischen Rippen (13a) aufweist, wobei ein Rohrabschnitt des anderen Rahmens zwischen den Rippen aufgenommen ist, wenn die Trittleiter im Betriebszustand ist, und wobei durch Überwinden der elastischen Kraft der Gabel (13) der andere Rahmen von dem Rohrabschnitt getrennt werden kann, wenn die Trittleiter wieder zusammengeklappt werden muß.

2. Zusammenklappbare Trittleiter nach Anspruch 1, **dadurch gekennzeichnet, daß** sie ein Paar der Gabeln (13) aufweist, und dadurch, daß die Gabeln (13) an dem hinteren Rahmen (3) angebracht sind und einen Abschnitt des vorderen Rahmens (1) aufnehmen können.

3. Zusammenklappbare Trittleiter nach Anspruch 2, **dadurch gekennzeichnet, daß** die Rippen (13a) im wesentlichen trapezförmig sind.

4. Zusammenklappbare Trittleiter nach Anspruch 3, **dadurch gekennzeichnet, daß** der Befestigungsabschnitt (13c) mehrere Vorsprünge (13f) hat, die, indem sie mit der Innenwand des Rohrrahmens im Eingriff sind, sicherstellen, daß die Gabeln (13) stabil bezüglich des Rahmens im Eingriff sind.

5. Zusammenklappbare Trittleiter nach Anspruch 4, **dadurch gekennzeichnet, daß** der obere Abschnitt des vorderen Rahmens (1) eine Schleife (1a,1b) bildet, die zum hinteren Rahmen (3) ragt und einen Sicherheitsrand bezüglich der obersten Stufe bildet, wobei die Schleife (1a,1b) ein Paar paralleler Abschnitte (1a) definiert, die in den Gabeln (13) aufgenommen sind, wenn die Trittleiter geöffnet ist.

6. Zusammenklappbare Trittleiter nach Anspruch 4, **dadurch gekennzeichnet, daß** der obere Abschnitt des vorderen Rahmens (1) eine Schleife (1'a,1'b) bildet, die zum hinteren Rahmen (3) ragt und einen Sicherheitshandlauf bezüglich der obersten Stufe bildet, wobei die Schleife (1'a,1'b) ein Paar paralleler Abschnitte (1'a) definiert, die in den Gabeln (13) aufgenommen sind, wenn die Trittleier geöffnet ist.

7. Zusammenklappbare Trittleiter nach einem der vorstehenden Ansprüche, **dadurch gekennzeichnet, daß** das Befestigungsteil (13c) mittels einer Niete, die durch das Rohr des Rahmens und das Befestigungsteil (13c) hindurchgeht, und mittels eines darin bereitgestellten Lochs (13b) innerhalb des hinteren Rahmens (3) verriegelt ist.

Revendications

1. Escabeau pliant comprenant une paire de structures tubulaires (1, 3), dont l'une se présente à l'avant (1) et a la configuration d'un "U" inversé et l'autre se trouve à l'arrière (3) et est configurée en "U", lesdites structures étant articulées l'une par rapport à l'autre et supportent une pluralité de marches (4) de façon que ledit escabeau puisse supporter une position de repos ou pliée et une position ouverte ou opérationnelle, **caractérisé en ce que** une fourche (13) au moins est interposée entre ladite structure arrière (3) et ladite structure avant (1), ladite fourche (13) étant dotée d'une partie de fixation (13c)afin de rendre ladite fourche (13) solidaire de l'une desdites structures (1, 3) et d'une partie d'accrochage comprenant une paire d'ailettes essentiellement élastiques parallèles (13a), une partie du tube de l'autre desdites structures étant reçue entre lesdites ailettes lorsque l'escabeau est en position fonctionnelle et l'autre desdites structure pouvant être séparée par rapport à ladite partie en annulant la force de rappel de ladite fourche (13) lorsque l'escabeau doit être de nouveau replié.

2. Escabeau pliant selon la revendication 1, **caractérisé en ce qu'**il comporte une paire desdites fourches (13) et **en ce que** lesdites fourches (13) sont fixées à ladite structure arrière (3) et peuvent recevoir une partie de ladite structure avant (1).

3. Escabeau pliant selon la revendication 2, **caractérisé en ce que** lesdites ailettes (13a) présentent une forme essentiellement trapézoïdale.

4. Escabeau pliant selon la revendication 3, **caractérisé en ce que** ladite partie de fixation (13c) possède une pluralité de parties en saillie (13f) qui, en intervenant avec la paroi interne de ladite structure tubulaire, assure que les fourches (13) s'engagent

de façon stable par rapport à ladite structure..

5. Escabeau pliant selon la revendication 4, **caractérisé en ce que** la partie supérieure de la structure avant (1) forme une boucle (1a, 1b s'avançant vers la structure arrière (3) et constituant un bord de sécurité par rapport à la marche la plus élevée, ladite boucle (1a, 1b) définissant une paire de parties parallèles (1a) qui sont reçues dans lesdites fourches (13) lorsque l'escabeau est ouvert.

6. Escabeau pliant selon la revendication 4, **caractérisé en ce que** la partie supérieure de la structure avant (1) forme une boucle (1'a, 1'b) s'avançant vers la structure arrière (3) et constituant un garde-corps de sécurité par rapport à la marche la plus haute, ladite boucle (1'a, 1'b) définissant une paire de parties parallèles (1'a) qui sont reçues dans lesdites fourches (13) lorsque l'escabeau est ouvert.

7. Escabeau pliant selon l'une quelconque des revendications précédentes, **caractérisé en ce que** ladite partie de fixation (13c) est verrouillée à l'intérieur de la structure arrière (3) grâce à un rivet traversant le tube de ladite structure et ladite partie de fixation (13c) est verrouillée grâce à un trou (13b) prévu à cet endroit.

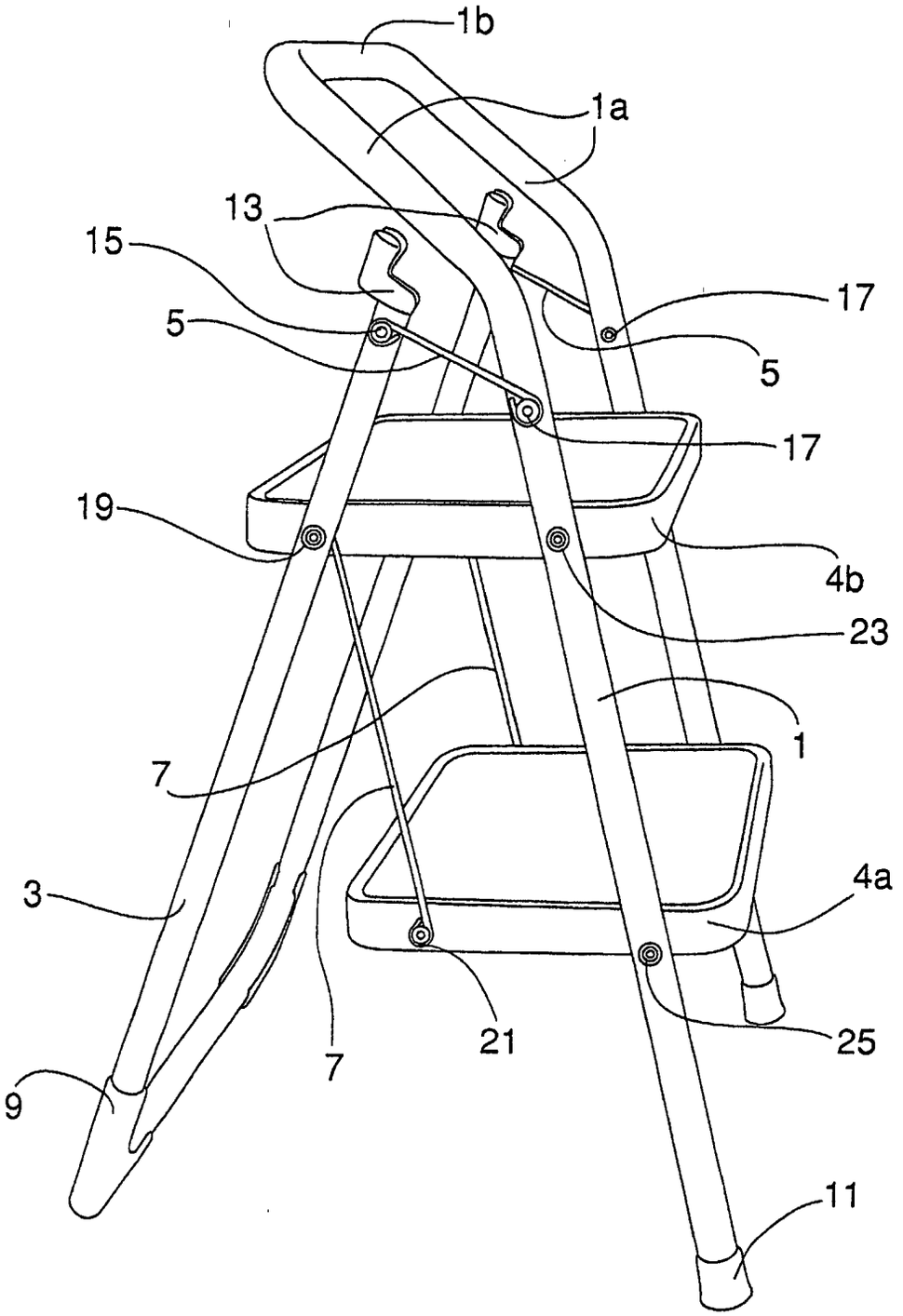

Fig. 1a

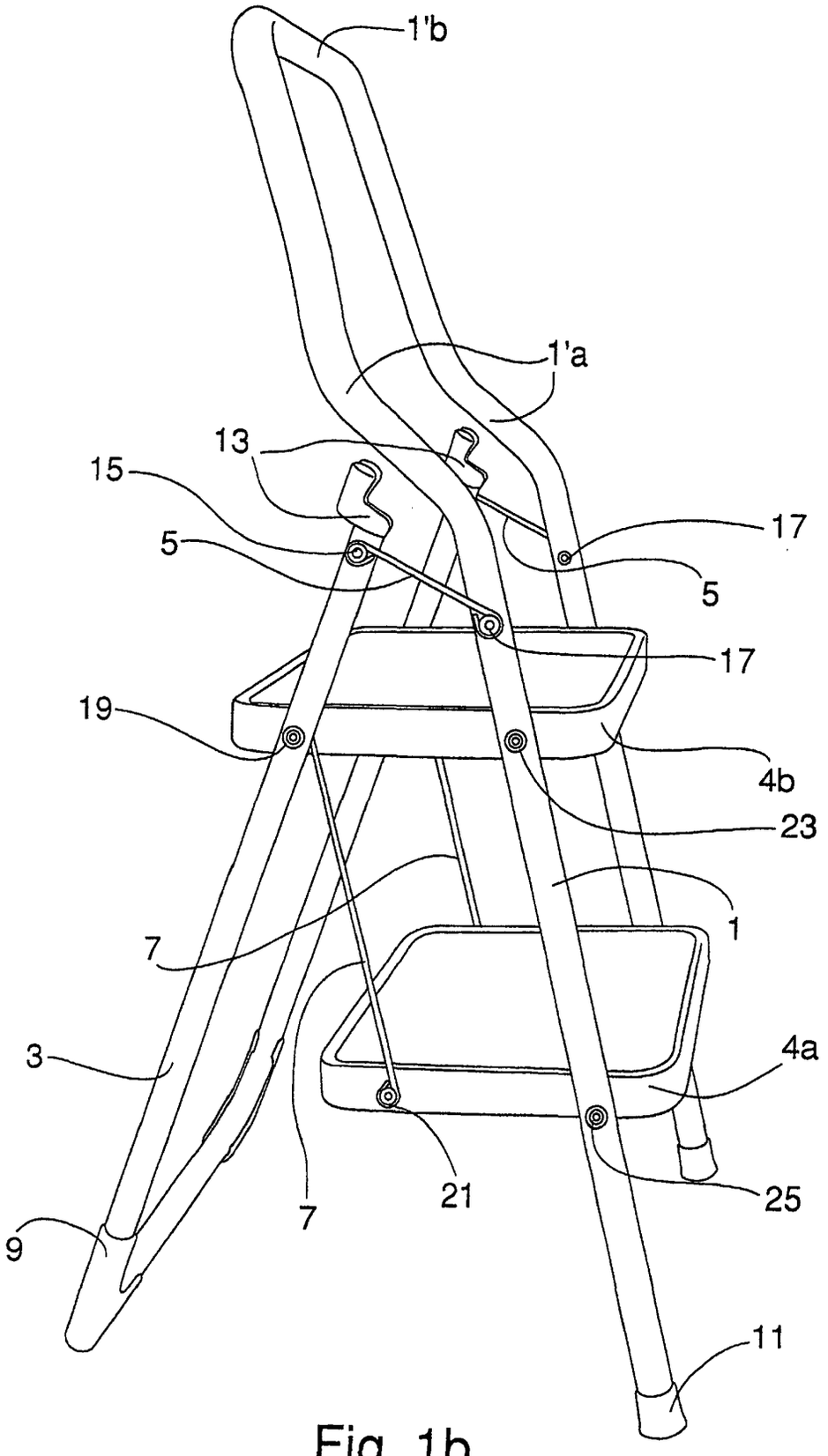

Fig. 1b

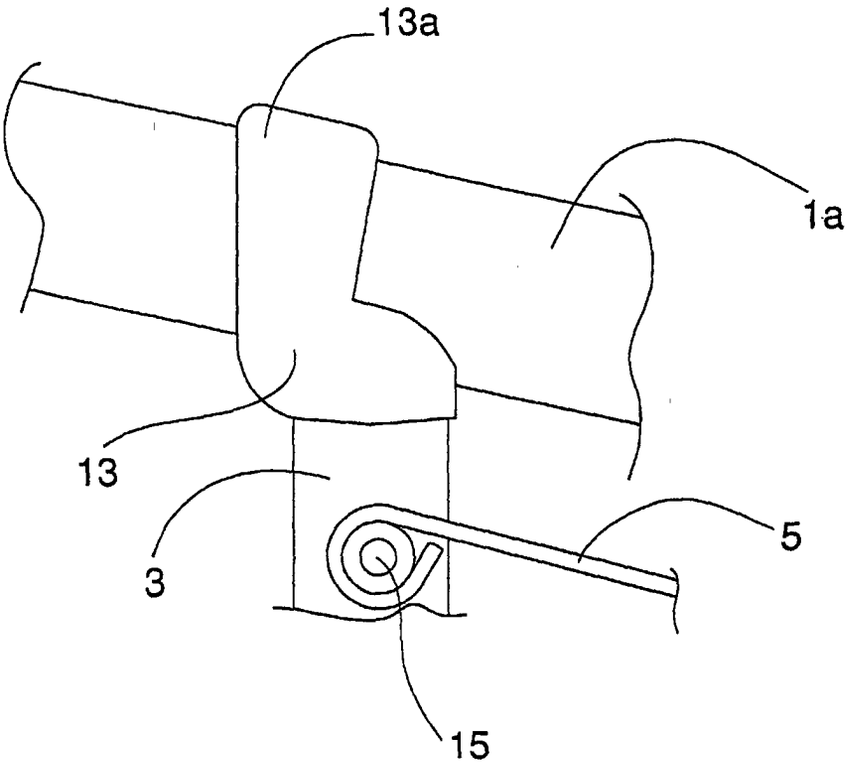

Fig. 2

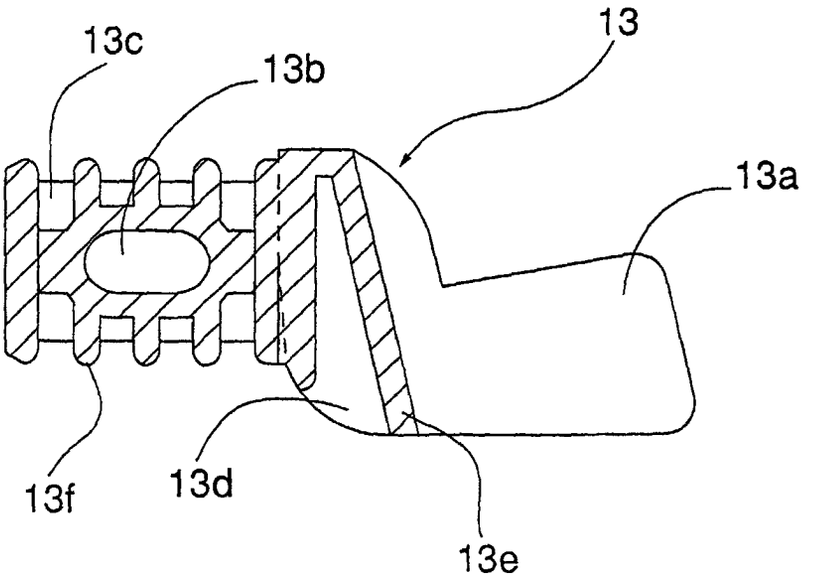

Fig. 3