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(54) Folding step stool

(57) Folding step stool comprising a pair of substantially "U"-shaped tubular frames (1,3) supporting a plurality of steps (4) and hinged to each other, the rear frame (3) being provided at its upper ends with a pair of forks (13), preferably realised in rigid or semi-rigid plastic, so that, when the step stool is open, the user can insert by pressure into the front frame (1) said forks which allow to lock the step stool, thereby avoiding its accidental closure.

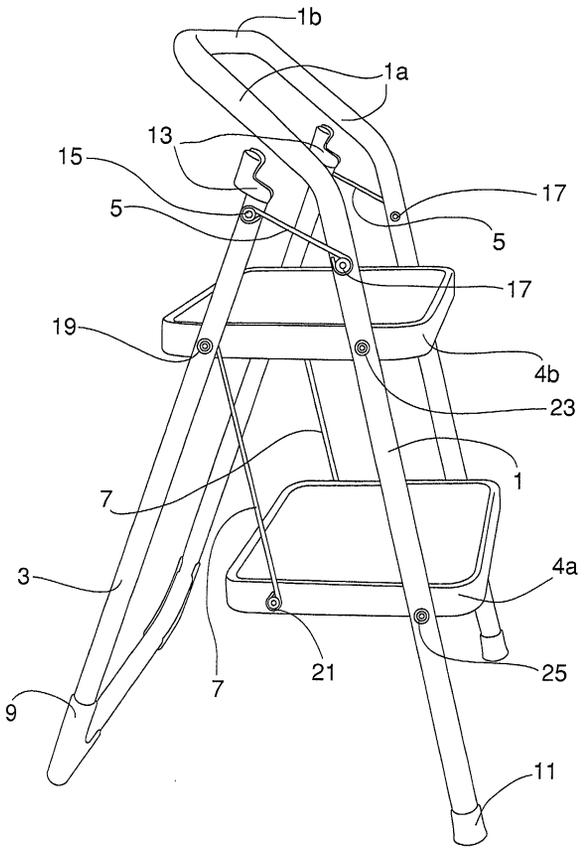

Fig. 1a

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Description

[0001] The present invention refers to folding step stools.

[0002] An 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 and said front frame, said fork 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 second frame 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.

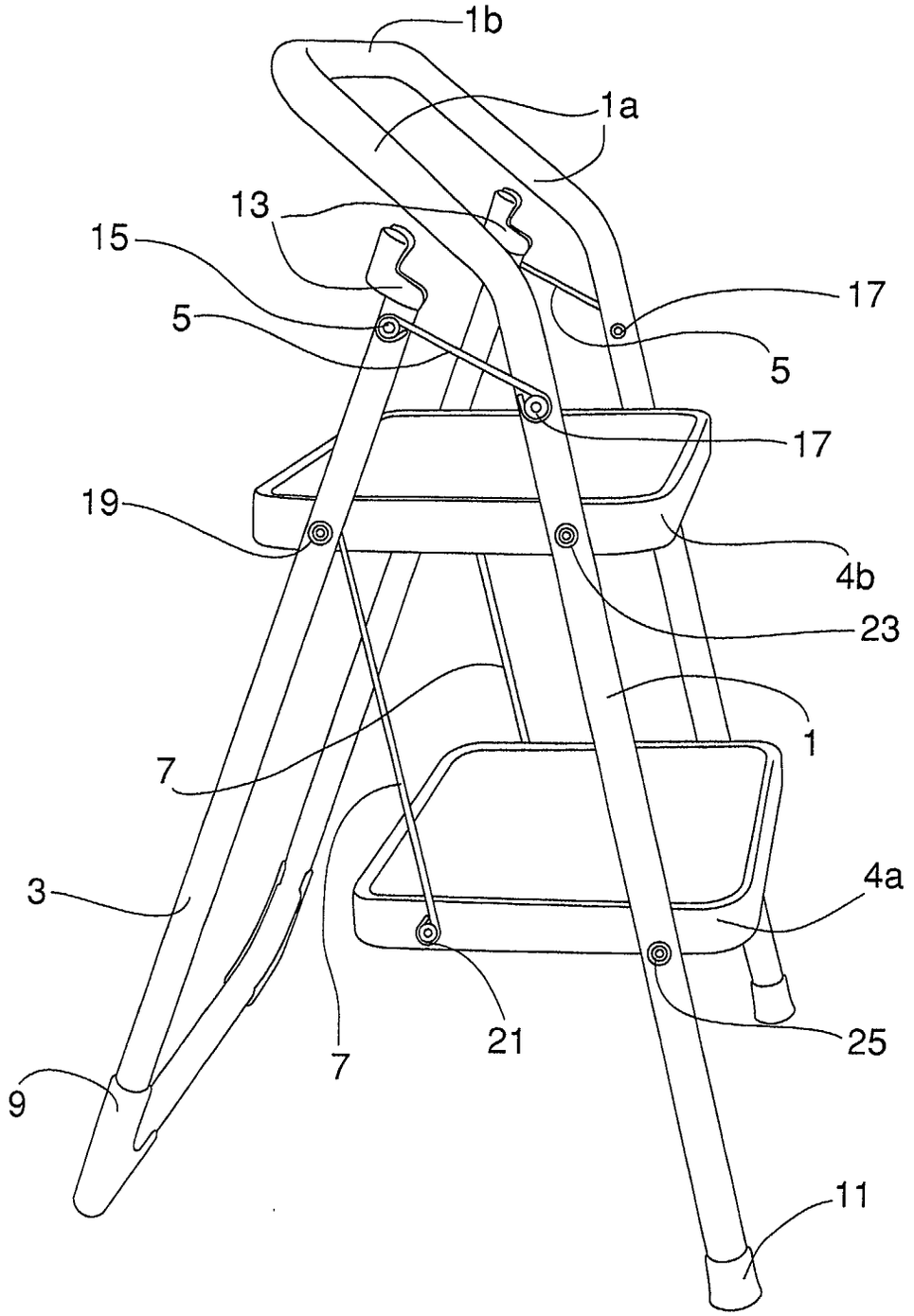

Fig. 1a

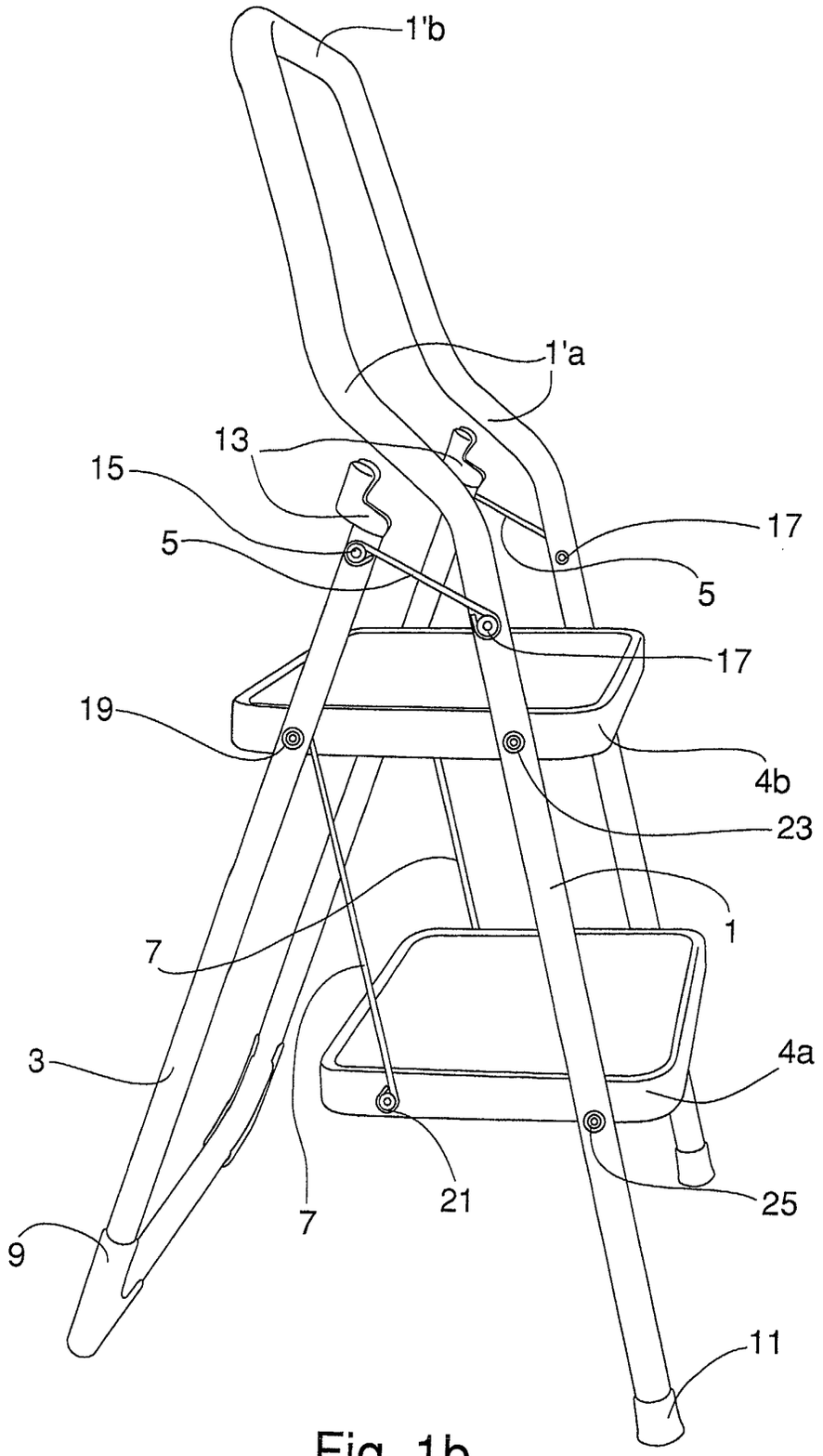

Fig. 1b

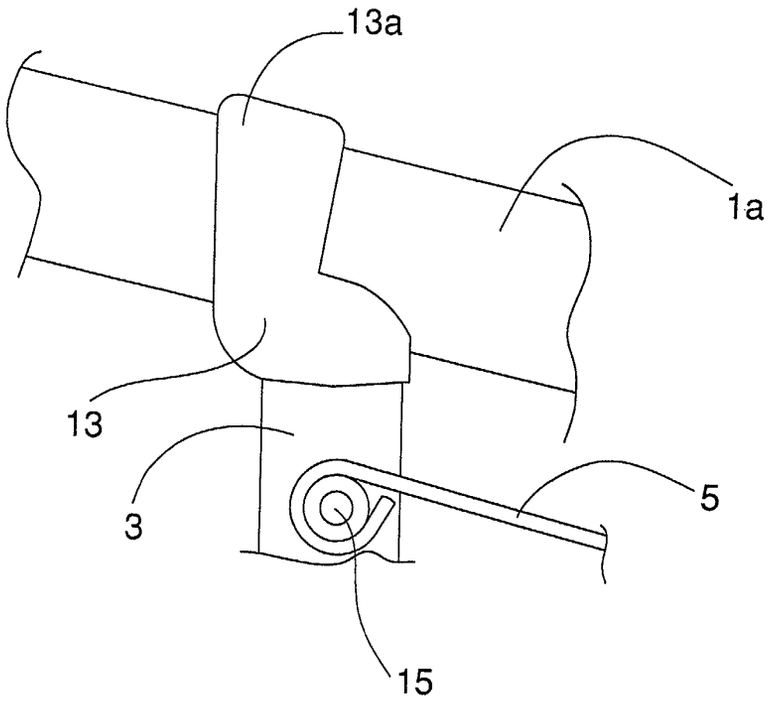

Fig. 2

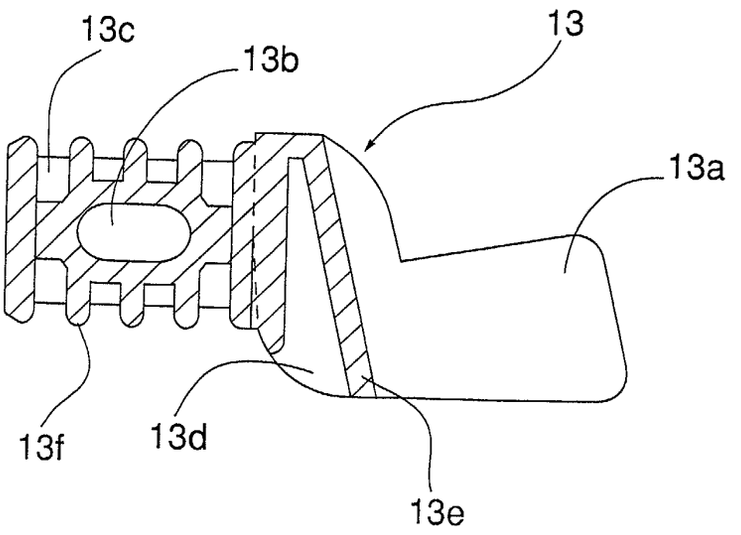

Fig. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5139

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.7)
A	FR 1 257 779 A (PIEDECOQ RENE) 7 April 1961 (1961-04-07) * page 1, column 2, last line - page 2, column 1, paragraph 1; figures * * page 2, column 1, line 30 - line 32 *	1	E06C1/393 E06C1/387
A	GB 1 295 004 A (HIENZ KETTLER METALLWARENFABRIK) 1 November 1972 (1972-11-01) * page 2, line 23 - line 41; figures 1-3 *	1	
A	GB 1 547 243 A (HUNTER DOUGLAS IND BV) 6 June 1979 (1979-06-06) * figures *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E06C
A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 July 2002	Demeester, J

CATEGORY OF CITED DOCUMENTS

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