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(54) **A step stool**

(57) A step stool wherein the upper step is provided with a manually releasable latch mechanism including a pivotal latch member (20) having a latch face (20a) that is arranged to catch under a crossbar (9) so as to retain the step stool in a use position. The pivotal latch member is operable manually by a user to disengage the latch member from the crossbar (9) and fold the frame to the storage position. The pivotal latch member is hinged to the lower side of the step body at a position inside the contour of the platform's peripheral skirt (10b), the latch member having a bridge portion (20b) extending from said latch face rearward, underneath the peripheral skirt, to an actuation portion (20c) of said latch member, said actuation portion extending adjacent the outer side of the peripheral skirt so as to be manually engagable by a users hand.

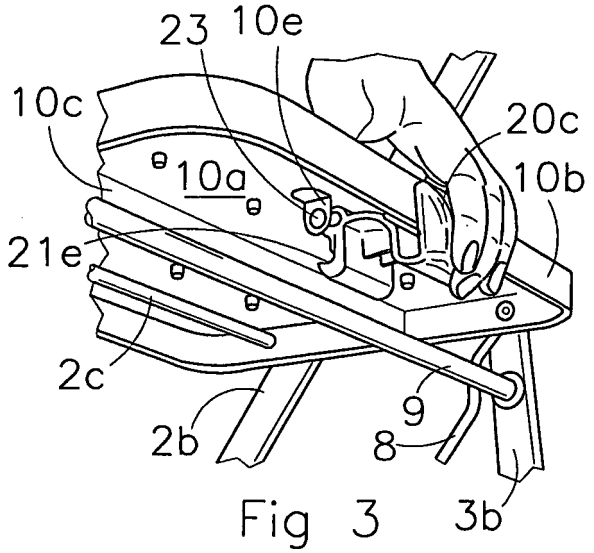

Fig 3

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Description

[0001] The present invention relates to a step stool having a folding frame and multiple steps that will move simultaneous upon movement of the folding frame between its opened use position and its collapsed storage position.

[0002] For safety reasons, in many countries on a mandatory basis, step stools are provided with a latch mechanism that retains the step stool in its opened use position. Only deliberate manual operation of the latch mechanism can release the latch member, so that a sudden and undesired collapse of the step stool is impossible.

[0003] In US 6 902 035 a step stool is disclosed wherein the upper step has a step body with a notch in the rear portion of the step body. With this notch the latch member is arranged in pivotal manner so that a user can grip the member with a hand, pull it upward and so effect release of the latch member from the crossbar.

[0004] A drawback of the US 6 902 035 is the complexity of the step body to create the notch and arrange the latch member in said notch. A further drawback is that the latch member has a major upper face which extends as a continuation of the upper surface of the step. Thereby a user standing on the step stool is likely to place a foot on the latch member, causing it to be overloaded, worn, or malfunction.

[0005] The same drawbacks are present in the US 6 427 805 and US 6 550 579 step stools.

[0006] In US 6 026 933 a step stool is disclosed wherein the latch mechanism is only accessible via openings in the upper face of the upper step. This is awkward for the user of the step stool.

[0007] In US 6 390 237 a step stool is disclosed, wherein the latch member is fitted through an opening in a downward depending skirt of the upper step body. In order to disengage the latch member from the crossbar, the user has to press down the actuation portion of the latch member. As collapsing of the ladder is usually done by the user through pulling the rear of the upper step towards him, the user is effectively required to make two motions in opposite directions at the same time, which is awkward.

[0008] The present invention aims to provide an improved step stool with manually releasable latch mechanism.

[0009] In particular the invention aims to provide design of the upper step and associated latch mechanism that can be efficiently manufactured at low costs, which is important as step stools are mass produced items. Also the invention aims to provide a latch mechanism that is easy to operate by the user upon collapse of the step stool and will remain reliable over the lifetime of the step stool.

[0010] The present invention provides a step stool according to claim 1, wherein the upper step comprises a metal step body having a platform and peripheral skirt extending below and around said platform, and wherein the pivotal latch member is hinged to the lower side of the step at a position inside the contour of the peripheral skirt, wherein the latch member has a bridge portion extending from said latch face rearward, underneath the peripheral skirt, to an actuation portion of said latch member, said actuation portion extending adjacent the outer side of the peripheral skirt so as to be manually engaged by a users hand.

[0011] As the skilled person will readily appreciate this design of the latch mechanism allows for intuitive actuation by the user and at the same time allows for an attractive design of the latch mechanism and upper step from a manufacturing point of view. Also it allows to create a latch mechanism that will be reliable throughout the life time of the step stool.

[0012] Further preferred details of the step ladder according to the invention are mentioned in the subclaims and will be explained in the description of a preferred embodiment.

[0013] In the drawings:

Fig. 1 shows a preferred embodiment of the step stool according to the invention,

Fig. 2 the upper step of the step stool of figure 1 in horizontal use position, wherein the latch mechanism engages the crossbar,

Fig. 3 the upper step as the latch mechanism is manually operated and has been released from the crossbar, the upper platform having been tilted forward in order to collapse the step stool,

Fig. 4 the upper step from above during the collapse of the step stool, and

Fig. 5 the latch member of the step stool of figures 1-4.

[0014] A preferred embodiment of the step stool 1 according to the invention will now be explained referring to the figures 1-5.

[0015] The step stool 1 has a folding frame with a pair of front legs 2a, 2b and a pair of rear legs 3a, 3b. The rear are coupled to the front legs at their upper ends in this example, via hinges 4a, b, so that the front and rear legs are relatively pivotable between an opened use position, wherein the front and rear legs in general define an A in side view of the step stool, and a collapsed storage position, wherein the front and rear legs are essentially parallel.

[0016] This step stool includes an upper step 10 and two lower steps 11, 12, each step 10,11,12 being arranged between and coupled to the front legs 2a,b for pivotable movement between a horizontal use position and a storage position, each step being adapted to support a person thereon.

[0017] In this example the front legs are interconnected at spaced positions by pivot shafts 2c (visible in figures 2, 3) which each rotatably support the front portion of a step. Also the legs 2a, b are here connected by a hoop portion at their upper ends.

[0018] As is common in step stools a linkage member arrangement is provided, which effects simultaneous movement of the steps 10-12 as the frame is folded to move between the use position and the collapsed position. Here the linkage member arrangement includes one or more linkage members 7 extending between the rear legs on the one hand and a step (here step 11) on the other hand, each linkage member 7 being hinged at its ends. Furthermore one or more linkage members 8 extend between the steps 11,12,13, each connection being pivotal. Upon collapse of the step stool the steps 10-12 are tilted to their vertical or storage position, here essentially parallel to the plane of the front legs.

[0019] The frame includes a crossbar 9 extending between the rear legs 2a,b and arranged so that a rear portion of the upper step 10 rests on said crossbar 9 when said upper step 10 is in its use position (see figure 2). A further crossbar 9b is fitted in this example at a lower level between the rear legs.

[0020] The upper step 10 is provided with a manually releasable latch mechanism including a pivotal latch member 20 having a latch face 20e that is arranged to catch under the crossbar 9 when the frame is folded to its use position so as to retain the step stool 1 in the use position (see figure 2).

[0021] The pivotal latch member 20 is operable manually by a user to disengage the latch member 20 from the crossbar 9 and to fold the frame to the storage position. This can already be appreciated from figures 2-4.

[0022] The upper step 10 has a metal step body with a platform 10a and peripheral skirt 10b extending below and around said platform 10a. As is preferred the upper step metal body is made from sheet metal by deep drawing. For reinforcement is reinforcement strip 10c is welded transversely under the platform.

[0023] The pivotal latch member 20 is hinged to the lower side of the upper step 10 at a position inside the contour of the peripheral skirt 10b as can be seen in the figures 2,3.

[0024] The latch member 20 has a bridge portion 20b extending from said latch face 20e rearward, underneath the peripheral skirt 10b, to an actuation portion 20c of said latch member 20. The actuation portion 20c extends adjacent the outer side of the peripheral skirt 10b so as to be manually engagable by a users hand, which grips from above over the actuation portion 20c.

[0025] As can be seen, in this practical embodiment, the latch member 20 includes a bore 20d for a pivot pin 23, the pivot pin 23 extending below the platform 10a. As is preferred two tabs 10e have been folded downwards from the sheet metal of the platform 10a, the tabs 10e supporting the pivot pin 23 at opposed ends.

[0026] The latch mechanism includes a spring (not shown here, in this example the spring will be arranged around the pivot pin 23 as a torsion spring engaging the underside of the upper step and the latch member) urging the latch member 20 to catch under the crossbar 9.

[0027] When a user desires to collapse the step stool 1 all that is needed for the user is to grip the actuation portion 20c and pull it upwards towards him. This simple action causes the latch member 20 to disengage from the crossbar 9 as the member 20 pivots about the pivot pin 23. Then the latch member 20 comes to bear against the upper step body so that continued pulling by the user causes the step 10 to tilt to its storage position, away from the crossbar 9. Due to the linkage member arrangement this motion of the upper step 10 simultaneously causes the frame to fold and all other steps to move towards their storage position.

[0028] It will be appreciated that the peripheral skirt 10b here is continuous all around, at least has a continuous rear portion, which enhances production of the step and gives good stability of the step at low costs. Also, which the same effects, the rear portion of the skirt 10b has a uniform height over its length. As is preferred the rear portion, at least in the vicinity of the latch member 20 is free of any notches or openings as in prior art designs.

[0029] To avoid contact between the shoes of a person standing on the upper step 10 and the latch member 20, it is preferred that the actuation portion 20c - with the step stool in use position - has an upper end below the upper face to the upper step, as can be seen in figure 2.

[0030] As is preferred, and as shown in figures 2-4, the actuation portion 20c includes depressions to accommodate one or more fingers of the user's hand.

[0031] As is preferred, and as shown in the figures 2-5, the latch member 20 is a monolithic member, preferably of plastic.

Claims

1. A step stool comprising:

- a folding frame having a pair of front legs (2a, b) and a pair of rear legs (3a,b), said rear legs being coupled to the front legs for pivotable movement between an opened use position and a collapsed storage position,
- an upper step (10) and one or more lower steps (11,12), each step (10,11,12) being arranged between and coupled to the front legs (2a,b) for pivotable movement between a horizontal use position and a storage position, each step (10,11,12) being adapted to support a person thereon,
- a linkage member arrangement (7, 8) effecting simultaneous movement of the steps (10-12) as the frame is folded to move between the use position and storage position,

wherein the frame comprises a crossbar (9) extending between the rear legs (3a,b) and arranged so that a rear portion of the upper step (10) rests on said crossbar (9) when said upper step is in its use

position,
the upper step (10) being provided with a manually releasable latch mechanism including a pivotal latch member (20) having a latch face (20a) that is arranged to catch under said crossbar (9) when the frame is folded to its use position so as to retain the step stool in said use position,
the pivotal latch member (20) being operable manually by a user to disengage the latch member (20) from the crossbar (9) and fold the frame to the storage position,
wherein the upper step (10) comprises a metal step body having a platform (10a) and peripheral skirt (10b) extending below and around said platform,
wherein the pivotal latch member (20) is hinged to the lower side of the step body at a position inside the contour of the peripheral skirt (10b),
the latch member (20) having a bridge portion (20b) extending from said latch face (20a) rearward, underneath the peripheral skirt (10b), to an actuation portion (20c) of said latch member (20), said actuation portion (20c) extending adjacent the outer side of the peripheral skirt (10b) so as to be manually engagable by a users hand,
so that - with the step stool (1) in its use position - when the user pulls the actuation portion (20c) upwards the latch member (20) is released from the crossbar (9), the latch member (20) then engaging the step body, and further upward pulling causes the step stool (1) to move to its storage position.

2. A step stool according to claim 1, wherein the peripheral skirt (10b) has a continuous rear portion.

3. A step stool according to claim 1 or 2, wherein the step body is deep drawn from plate metal.

4. A step stool according to claim 2, wherein the rear portion has a uniform height over its length.

5. A step stool according to one or more of the preceding claims, wherein the latch member includes a bore for a pivot pin (23), the pivot pin extending below the platform.

6. A step stool according to claim 5, wherein two tabs (10e) are folded downwards from the platform, the tabs supporting the pivot pin (23) at opposed ends.

7. A step stool according to one or more of the preceding claims, wherein the actuation portion (20c) - with the step stool in use position - has an upper end below the upper face of the upper step (10).

8. A step stool according to one or more of the preceding claims, wherein the actuation portion (20c) includes depressions to accommodate fingers of the user's hand.

9. A step stool according to one or more of the preceding claims, wherein the latch member (20) is a monolithic member, preferably of plastic.

10. A step stool according to one or more of the preceding claims, wherein the latch mechanism includes a spring urging the latch member (20) to catch under the crossbar.

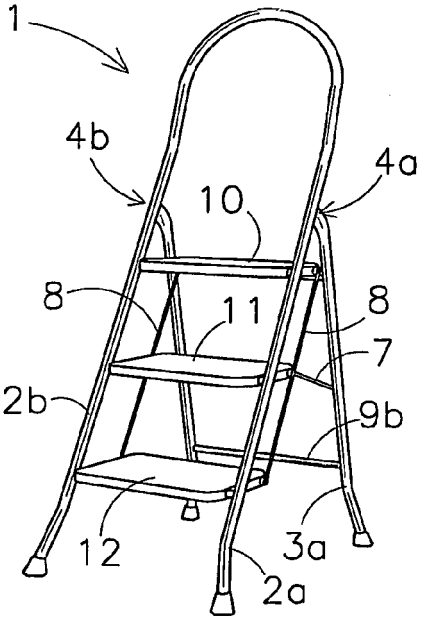

Fig 1

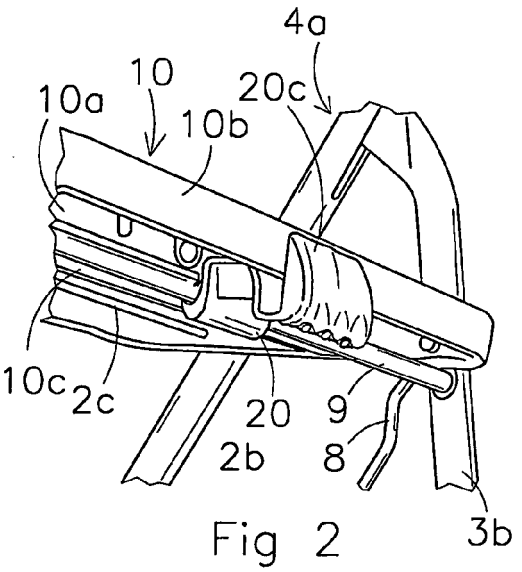

Fig 2

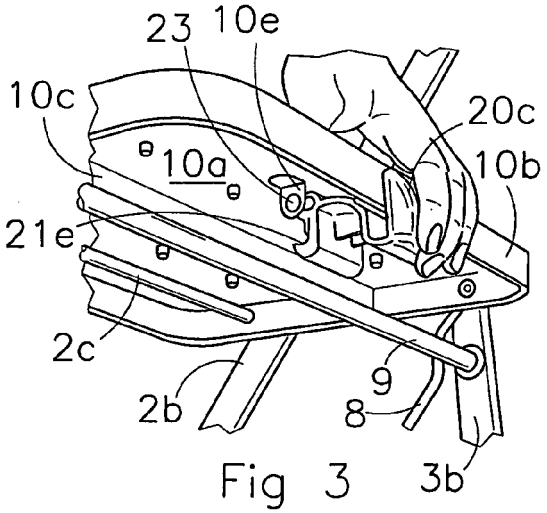

Fig 3

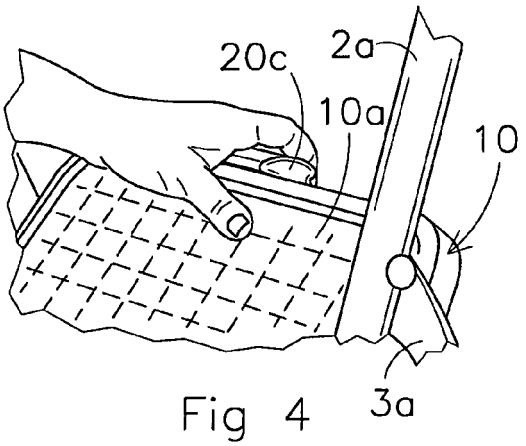

Fig 4

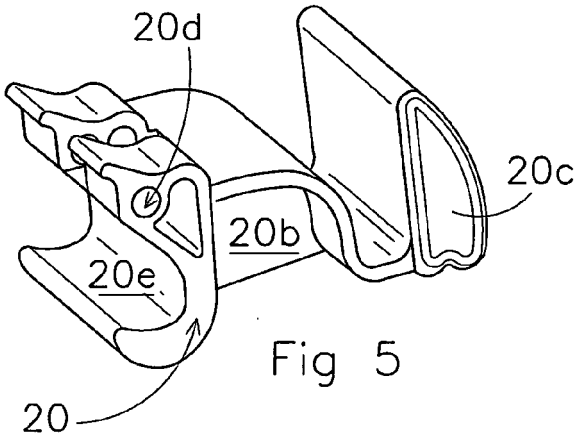

Fig 5

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EUROPEAN SEARCH REPORT

Application Number
EP 08 07 5109

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D,A	US 6 550 579 B2 (GIBSON WILLIAM R [US] ET AL) 22 April 2003 (2003-04-22) * column 2, line 33 - column 4, line 46; figures 1-5,7 *	1	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 August 2008	Bastian, Almut

CATEGORY OF CITED DOCUMENTS

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14-08-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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