Oct. 23, 1962 C. ROUSE 3,059,722

FOLDING COMBINATION STEP LADDER AND STOOL

Filed Dec. 16, 1960 2 Sheets-Sheet 1

Fig. 4.

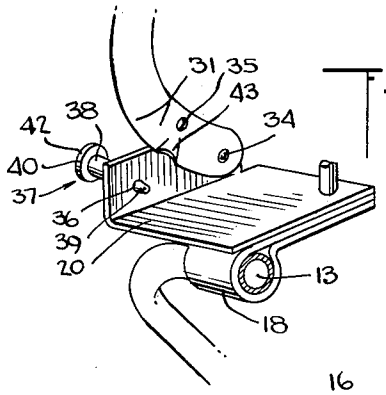


Fig. 1.

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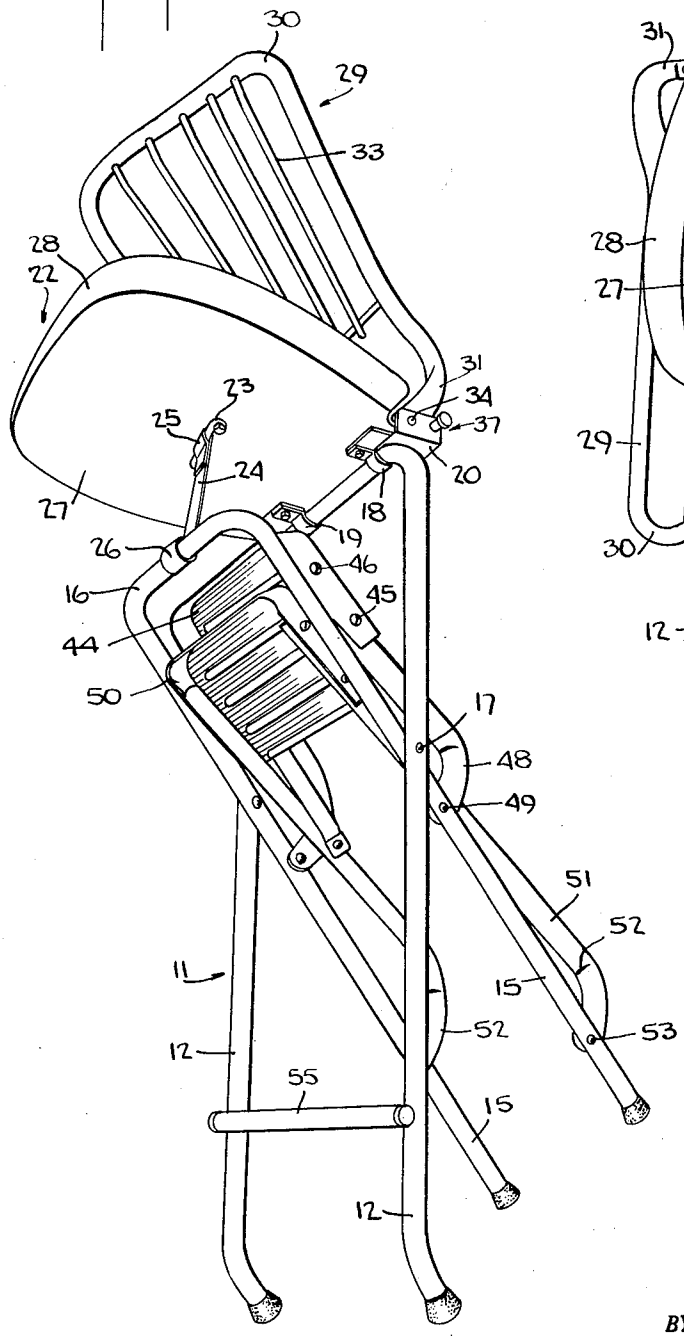
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Fig. 2.



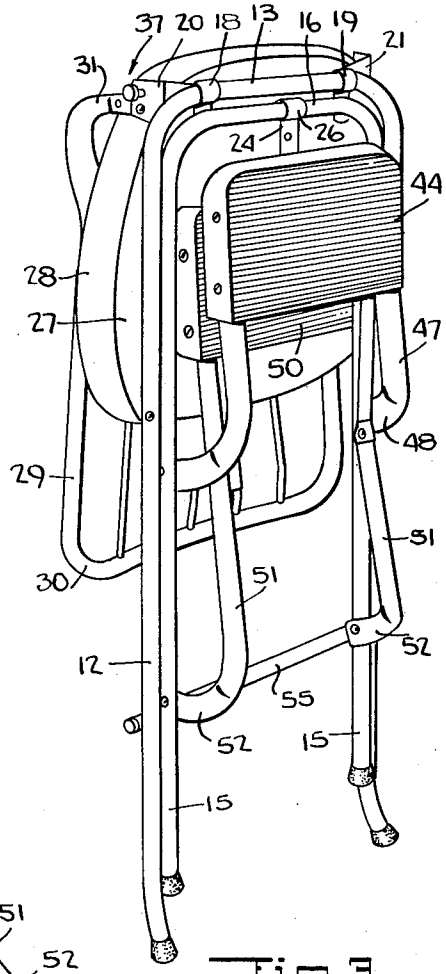


Fig. 3.

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United States Patent Office 3,059,722 Patented Oct. 23, 1962

3,059,722
FOLDING COMBINATION STEP LADDER AND STOOL

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Filed Dec. 16, 1960, Ser. No. 76,312
2 Claims. (Cl. 182—33)

This invention relates to folding furniture and more particularly to a folding combination step ladder and stool.

Conventional forms of folding step ladders and folding stools or combinations thereof are generally bulky articles of furniture which rarely save enough space even when folded to make their foldable characteristic worthwhile. An even more common problem in the same general area of step ladder and stool furniture is that shipping costs are high because of the bulk involved in shipping assembled articles of this sort. It is not considered a satisfactory solution to this problem to ship such articles in an unassembled form because of consumer resistance to difficult assembly procedures.

It is an object of my invention to provide a combination step ladder and stool which can be readily folded so as to be extremely compact for storage. It is another object of my invention to provide a combination step ladder and stool which can be shipped economically in its folded position, and it is a particular object to provide such an article which can be shipped by Parcel Post service of the U.S. Mail, which has strict requirements governing the maximum size of articles acceptable for mailing. It is still another object to provide a combination step ladder and stool which can be shipped to the ultimate consumer in a completely assembled form, ready for use as soon as unfolded. It is a further object to provide a combination step ladder and stool of a simple construction which is strong and stable and therefore safe to use.

Briefly, my invention embodies a seat and back set upon a pair of crossed U-shaped members which form legs. The U-shaped members are pivotally connected to each other and, by hinges, to the seat. Steps are also pivotally connected to the legs, and can be folded within the legs. When the legs are folded together and the steps are folded within the legs, the seat and back are foldable over them.

Other objects and features may be inferred from the following description of specific examples of this invention, illustrated by the accompanying drawings in which:

FIG. 1 is a perspective view of a combination step ladder and stool of my invention in its unfolded position, with a seat of the stool shown in shadow form;

FIG. 2 is a perspective view of a combination step ladder and stool of my invention in a semi-folded position;

FIG. 3 is a perspective view of a combination step ladder and stool of my invention in its completely folded and most compact position; and

FIG. 4 is a detailed view of a mechanism adapted to secure the backrest on the stool in an upright position when the stool is in its unfolded position.

In FIG. 1, a combination step ladder and stool is shown generally at **10**. A first U-shaped frame **11** of tubular metal construction comprises front legs **12** and a rear cross portion **13**. A second U-shaped frame **14** comprises rear legs **15** and a front cross portion **16** and is smaller than frame **11**. The frames **11** and **14** are pivotally connected at the points where they cross each other, more than midway on their respective leg portions, by rivets **17**. Back hinges **18** and **19** are pivotally connected to the rear cross portion **13** of the frame **11**. Brackets **20** and **21** respectively are fixed by conventional means (not shown) to hinges **18** and **19** respectively. A seat **22** (shown in FIG. 1 in shadow form) is fixed by conventional fastening means (not shown) to brackets **20** and **21**. A bracket **23** is fixed by conventional fastening means (not shown) to

approximately the center portion of the seat **22**. A metal strap hinge **24** is pivotally connected at **25** to the bracket **23** and is pivotally connected at **26** to the cross portion **16** of the frame **14**. The distance between pivot point **25** and pivot point **26** is less than the distance between pivot point **25** and cross portion **13** of frame **11** by an amount at least equal to the diameter of the tubular frame material used. The seat **22** consists in a preferred embodiment of a base **27** and upholstery **28** of conventional materials.

In the preferred embodiment a latch is attached to the underside of the seat **22** near the forward edge thereof adapted to latch the seat to the cross portion **16** to hold the seat in the position shown in FIG. 1.

A back, indicated generally at **29**, consists of a U-shaped back frame **30** with angled ends **31** and **32** and connecting members **33**. The angled ends **31** and **32**, respectively, are pivotally connected to the brackets **20** and **21**, respectively by rivets **34**. Angled ends **31** and **32** are broad enough so that they rest on brackets **20** and **21** when the back **29** is in an upright position, to limit backwards pivotal movement of the back **29**.

A hole **35** is located in angled end **31**. Another hole **36** is located in bracket **20** and is aligned with hole **35** when the back **29** is upright (holes **35** and **36** are most clearly shown in FIG. 2). A retractable stud assembly, indicated generally as **37**, is fixed to hole **35** to prevent pivotal movement of the back **29** when the back **29** is upright and hole **36** is engaged with the stud assembly **37**.

The retractable stud assembly **37** is shown most clearly in FIG. 4. A tubular sleeve **38** is aligned with and fixed to hole **35**. A stud **39** is inside and aligned with the tubular sleeve **38** and projects past the hole **35** engaging hole **36** when the back **29** is erect. A cap **40** is fixed to the stud **39** to permit manual withdrawal of the stud **39** from the hole **36**. A spring (not shown) is inside the sleeve **38** and operates to keep the stud **39** engaged with hole **36**, when the back **29** is erect, unless manually pulled out. A bumper washer **41** engages the stud between tubular sleeve **38** and cap **40**. The retractable stud assembly is used in a preferred embodiment of the invention so that someone who stands on one of the steps **44** and **49** and who holds onto the back **29** for balance will not cause the back to pivot forward. However, any method of holding the back upright during use may be used.

A grooved lip **43** is located in angled end **31** so that as the chair is unfolded and the back **29** is pivoted to an erect position, the lip **43** will push the stud **39** out of the way until the hole **35** is aligned with stud **39** at which point the spring **41** causes the stud **39** to engage the hole **35** and hold the back **29** erect.

An upper step **44**, formed of stamped metal in a preferred embodiment, is fixed by screws **45** and rivets **46** to upper support bars **47**, having angled end portions **48**. The angled end portions **48** are respectively pivotally connected to the rear legs **15** by rivets **49**, at a point below the rivets **17** which form the pivotal connection of the frames **11** and **14**. A lower step **50**, also formed of stamped metal in a preferred embodiment, is fixed by screws **45** to lower support bars **51**, having angled end portions **52**. The angled end portions are respectively pivotally connected to the rear legs **15** by rivets **53** at a point below the rivets **49** which form the pivotal connection of the upper support bars **47** and the rear legs **15**.

When the chair is fully opened as in FIGURE 1, the outer edge **54** of lower step **50** does not overhang the line between the lower ends of the two front legs **12** to assure stability when used as a ladder.

A cross bar **55** is welded between the front legs **12** in a position selected so as to limit downward pivotal movement of the lower support bars **51** and hold the lower step **50** in a horizontal position when the support bars **51** are resting on the cross bar **55**.

Each upper support bar 47 is connected to corresponding lower support bar 51 on the same side by a support element 56, which is pivotally connected to the upper support bar 47 by a rivet 46 and to the lower support bar 51 by a rivet 57. The support bars 47, support bars 51, support elements 56 and rear legs 15 approximately define parallelograms, and the pivotal interconnections cause any pivotal movement of one step and its support bars to be coupled to the other steps and its support bars. In any position of the steps 44 and 50, their substantially parallel relationship will be maintained due to the parallelogram defined by the structural elements and their pivot points.

In order to fold the stool 10 from the position shown in FIG. 1 to the position shown in FIG. 3, the steps 44 and 50 are pivoted from the horizontal position shown in FIG. 1 to the position between the frame 14 shown in FIG. 2. As described above, pivotal movement of either step 44 and 50 is coupled to the other step, so that both can be folded up between the frame 14 with one movement. The lower support bars 51 frictionally engage support elements 56 when folded as shown in FIG. 2 to retain steps 44 and 50 in the folded position against gravitational force. Due to the shapes of the angled end portions 48 and 52, the steps 44 and 50 and support bars 47 and 51 will occupy a position predominantly behind the frame 14 when they are in their extreme folded position.

After the steps 44 and 50 are folded, the seat 22 is lifted to the position shown in FIG. 2, and the frames 11 and 14 are pivoted together. When the frames 11 and 14 are in the extreme folded position, as shown in FIG. 3, the seat 22 is folded on the pivotal connections 22 and 23 over the frames 11 and 14 and the back 29 is then pivoted down over the seat 22. The cross portion 16 of the frame 14 is directly under the cross portion 13 of frame 11. Frame 14 fits entirely within frame 11 so as to occupy a minimum of space. The angled ends 31 and 32 of the back frame 30 permit the back 29 to lie flat over the folded seat 22.

In its unfolded position, a preferred embodiment of the stool 10 has the following dimensions: total height 37 inches, seat height 24 inches, depth 23 inches, and width 14¼ inches. All the foregoing dimensions are within a normal range for conventional stools and folding step ladders. However, in a folded position, it is a feature of my invention that the longest dimension plus the peripheral dimensions of a cross section is 70 inches, well within the maximum limit of 72 inches, which is the largest total of longest dimension plus cross sectional peripheral dimensions acceptable for mailing as Parcel Post by the U.S. Post Office.

The folding combination step ladder and stool of my invention is ideally suited to a tubular metal construction, but it could as well be constructed of wood, plastic or non-tubular metal structural elements. Also, the seat may be upholstered or not as desired, and the back may be upholstered or not.

While one embodiment of the present invention has been shown and described, it is to be understood that certain changes and additions can be made by those skilled in the art without departing from the scope and spirit of this invention

I claim:

1. A folding combination step ladder and stool comprising a larger inverted U-shaped frame having leg portions and a cross portion; a smaller inverted U-shaped frame, having leg portions and a cross portion, fitted inside and pivotally connected to said larger inverted U-shaped frame at a point on the leg portions of each that is substantially closer to said cross portions than said leg portions so that leg portions of said larger frame extend to the front and its cross portion is at the rear, and leg portions of said smaller frame extend to the rear with its cross portion to the front; two back hinges pivotally connected to said rear cross portion of said larger frame; two back brackets, having horizontal and vertical portions, fixed, one each, to said back hinges on said horizontal bracket portion; a back, having flat vertical ends, pivotally connected to each of said vertical portions of said two back hinges at said ends so that said horizontal portion of said hinges obstructs backward rotation of said seat past an erect position; a bracket fixed to the central portion of said seat; a rigid, strap-shaped hinge pivotally connected at one end to said center-of-the-seat bracket and pivotally connected at the other end to said front cross portion of said smaller frame, the length of said strap-shaped hinge from pivot to pivot being less than the distance between said center-of-the-seat bracket pivot point and the pivot line of said seat around said cross portion of said larger frame; two horizontal support bars for an upper step, each pivotally connected to the inside of a separate one of said rear legs of said smaller frame at a point below said pivotal connection of said U-shaped frames; an upper step fixed to said upper step support bars; two lower step support bars, parallel to said upper step support bars and each pivotally connected to the inside of a separate one of said rear legs of said smaller frame; two vertically inclined upper step support bars, parallel to said rear legs of said smaller frame, each pivotally connected at one end to the inside of a separate one of said lower step horizontal support bars and pivotally connected at the other end to the inside of a separate one of said upper step horizontal support bars; a cross bar fixed between said front legs of said larger frame at a point to come into contact with the lower edges of said lower step support bars so as to obstruct downward rotation of said lower step past a horizontal position; and means to hold said back erect in the unfolded position.

2. A folding combination step ladder and stool as defined by claim 1 wherein said means to hold said back erect in the unfolded position is a retractable stud assembly comprising a sleeve fixed to said vertical portion of one of said back brackets, a spring loaded stud within said sleeve and projecting past said sleeve, a spring within said sleeve to maintain the stud in an extended position past the opening of said sleeve, a hole in said vertical portion of said bracket to receive the extended stud, a hole in the adjoining one of said vertical ends of said back located so as to align with said hole in said bracket when said back is erect to receive the extended stud; a cap attached to said stud at the non-extended end to permit manual removal of said stud from said hole in said back end; a lip on the bottom edge of said vertical back end to engage said extended stud when said back is rotated to an erect position and to force said stud to a flush position with said hole in said bracket to permit the rotation of said back until said hole in said back and aligns with said stud.

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