

May 19, 1959

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2,887,260

COMBINATION STEP AND EXTENSION LADDER

Filed May 6, 1957

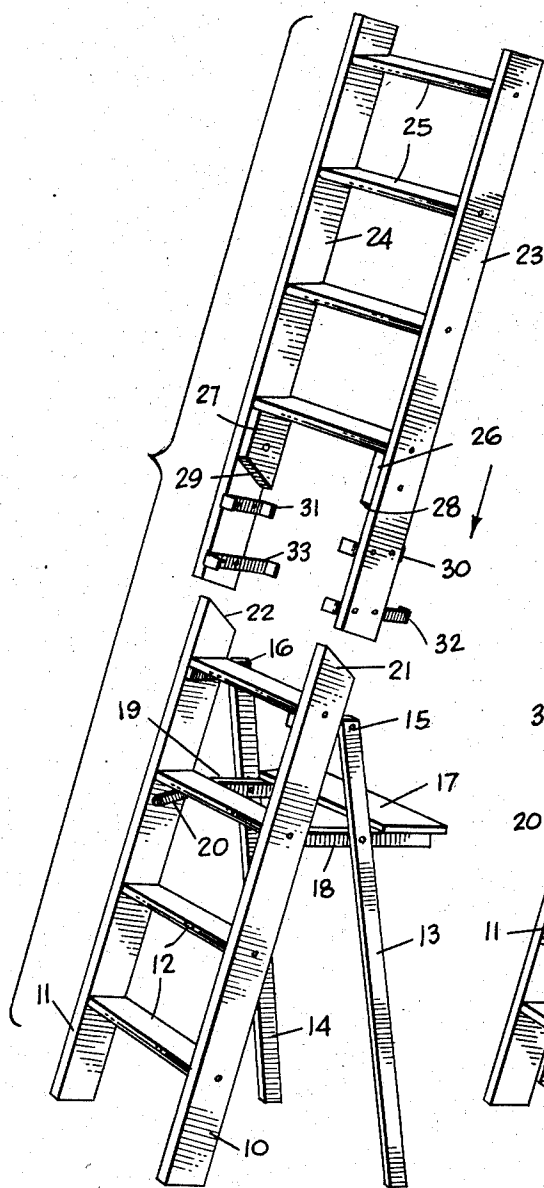


FIG. 1.

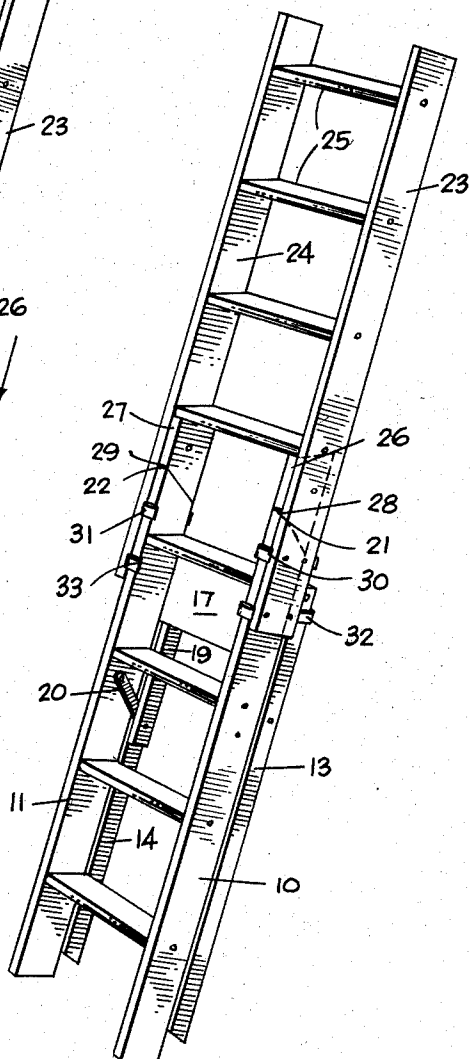


FIG. 2.

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2,887,260

COMBINATION STEP AND EXTENSION LADDER

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Application May 6, 1957, Serial No. 657,375

2 Claims. (Cl. 228—26)

This invention relates generally to ladders and more particularly to an improved combination step and extension ladder.

For general household chores, there are relatively few instances in which a ladder any longer than a conventional step ladder is necessary. Nevertheless, a separate longer ladder has usually been purchased for the few instances that it may be required. More recently, combination step and extension ladders have been proposed in various forms to avoid the expense of two separate ladders. Such combination step and extension ladders, however, are still more expensive than a simple step ladder alone. It would be highly desirable, accordingly, to provide a simple step ladder which costs no more than conventional step ladders but which may be used in combination with an extension ladder specifically designed to co-operate with the step ladder to provide a relatively long ladder. The design should be such that only the step ladder itself need be purchased and should the occasion arise for the use of an extension ladder, the extension portion thereof may subsequently be bought and used in conjunction with the step ladder.

By such an arrangement of the above type, the step ladder itself need be no more expensive than a conventional step ladder inasmuch as it need include no compound structure for enabling it to be formed into an extension ladder, whereas the extension ladder portion itself, inasmuch as it is integrally separable from the step ladder, may be manufactured relatively inexpensively. Accordingly, for those instances in which an extension ladder is only occasionally required, the slight added inconvenience of having to assemble the step and extension ladder portion together would be more than overcome by the economies afforded and the convenience of a simple step ladder structure alone, not employing complicated folding and extension mechanisms thereon.

With the above advantages in mind, it is a primary object of the present invention to provide an economical combination step and extension ladder in which the extension portion thereof may be sold individually and separate from the step ladder portion and in which the step ladder portion itself is no more complex nor expensive to manufacture than a conventional step ladder.

More particularly, it is an object to provide a combination step and extension ladder of the above type including novel fastening means therefor in which it is not possible to secure the extension ladder portion safely to the step ladder portion without first making sure that the step ladder portion is folded to its closed position, whereby the possibility of the step ladder portion unfolding while the same is being used with the extension ladder is avoided.

More general objects of the invention are to provide a combination step and extension ladder which is extremely rugged, safe in operation, employs a minimum number of movable parts, and which may be assembled or disassembled with great facility.

These and other objects and advantages of this in-

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vention are attained briefly by providing a step ladder portion in conventional form with the exception that the front legs of the step ladder extend beyond the uppermost step thereof and terminate in end surfaces inclined forwardly and downwardly. Preferably, the step ladder also includes the conventional pail shelf which may also serve as a spreader support for the rear legs. The pail shelf portion is disposed further forwardly than is conventional in order that toe room will be provided for the steps adjacent the pail shelf when the step ladder is in a folded position.

The extension ladder portion includes a pair of extension legs supporting several steps therebetween. The lower ends of these extension legs are spaced somewhat further apart than the upper end of the front legs of the step ladder such that the lower ends of the extension legs may straddle the upper ends of the front legs of the step ladder. Suitable blocks are secured to the inside of the extension ladder legs and include inclined lower ends adapted to seat on the inclined upper ends of the front legs of the extension ladder whereby the load of the extension ladder is carried by these blocks. Finally, the lower inside ends of the extension legs include bracket means adapted to encompass the upper ends of the front legs in a secure position only when the rear legs of the step ladder portion are folded against the front legs. Thus, the bracket means serves the additional function of also preventing accidental unfolding of the step ladder when the step and extension ladder portions are used together as an overall long ladder. The entire assembly and disassembly of the step and extension ladder is extremely simple and may be performed by anyone without need of special tools or skill.

A better understanding of the invention will be had by referring to a preferred embodiment as illustrated in the accompanying drawings in which:

Figure 1 is a perspective exploded view of the step and extension ladder of this invention; and,

Figure 2 is a view similar to Figure 1 illustrating the extension ladder portion secured to the step ladder portion when the two portions are to be used as a single extended ladder.

Referring to Figures 1 and 2, there is shown a conventional step ladder comprising a pair of front legs 10 and 11 supporting a plurality of steps 12 therebetween. Rear legs 13 and 14 are pivoted at their upper ends as at 15 and 16 to the upper end portions of the front legs 10 and 11. These rear legs 13 and 14 also include a conventional pail shelf 17 pivotally secured between the rear legs by suitable braces 18 and 19 terminating under one of the steps and secured by conventional shelf lock braces such as the brace 20. The arrangement is such that the rear legs may be spread from the lower portions of the front legs to provide a stable support for the step ladder, the pail shelf 17 simultaneously swinging down to a horizontal position all as is well known in the art.

In accordance with one feature of the invention, the upper ends of the front legs 10 and 11 extend beyond the top step and terminate in forwardly and downwardly inclined end surfaces 21 and 22. With this exception, the step ladder described in Figure 1 is in all other respects entirely conventional.

Also, shown in the exploded view of Figure 1 is an extension ladder adapted to co-operate with the step ladder, comprising a pair of extension legs 23 and 24 supporting a plurality of steps 25 therebetween. The lower end portions of the legs 23 and 24 are spaced apart a greater distance than the upper ends of the front legs 10 and 11 of the step ladder such that these extension legs may straddle the step ladder legs as clearly illustrated in Figure 2. As shown, there are provided support blocks 26 and 27 on the inside portions of the

extension legs 23 and 24, each of these blocks terminating short of the ends of the extension legs in ends 28 and 29, inclined to seat on the inclined surfaces 21 and 22 when the extension ladder is secured to the step ladder. A first pair of brackets 30 and 31 of general U-shape are also included on the insides of the extension legs 23 and 24 to receive the upper width of the front legs 10 and 11. Also, included are enlarged brackets 32 and 33 of U-shape in which the distance between the engaging U-legs is purposely made of such value as to encompass both the width of the front legs 10 and 11 of the step ladder plus the width of the rear legs 13 and 14. These widths can only be accommodated by the brackets 32 and 33 when the rear legs of the step ladder are folded against the front legs thereof as illustrated clearly in Figure 2. It will be evident, therefore, that the extension ladder portion cannot be secured to the step ladder portion until the step ladder has been folded. At this time, the extension ladder may be inserted onto the step ladder and the seating surfaces 28, 29 and 21, 22 properly engaged.

The operation of the combination step and extension ladder will be clear from the above description. When it is desired to use the step ladder only, the rear legs 13 and 14 may be spread to the position illustrated in Figure 1, the pail shelf 17 simultaneously swinging down from its vertical folded position shown in Figure 2 to the horizontal position, the rear ends of the braces 18 and 19 resting under the second step.

When it is desired to use the step ladder as an extension ladder, the step ladder is first folded to the position shown in Figure 2 and the extension ladder portion then simply positioned over the top portions of the legs 10 and 11 to straddle these legs. The lower ends 28 and 29 of the blocks 26 and 27 will then seat on the surfaces 21 and 22. It will be noted from Figure 2 that because of the inclination of these surfaces forward and downwardly, any tendency for the extension ladder portion to slide rearwardly as a result of a person's weight on the ladder can only be accommodated by the blocks, such as the block 27, sliding upwardly on the surface 22 thereby tending to raise the extension ladder portion. Since the weight of a person on this extension ladder portion opposes this tendency to raise, the two latter portions are effectively securely locked together. Also, the main front legs of the step ladder carry the load rather than the rear legs. Further, the brackets 30, 31, 32 and 33 are such that the bending moments established between the ladder portions are borne by the brackets rather than by the main legs.

Because of the prolonged extension of the front legs 10 and 11 on the step ladder portion, no special rivets are required for the top step as is the case with conventional step ladders and thus there is no added expense in the manufacture of the step ladder over that involved in manufacturing conventional step ladders. Finally, it will be evident that the extension ladder portion can only be attached when the step ladder portion is in closed position and that once the extension ladder is attached, there is no possibility of the step ladder portion inadvertently spreading to open position. As will be evident from Figure 2, the pail shelf 17 is positioned sufficiently forward on the braces 18 and 19 such that toe room is

provided whereby the combination step and extension ladder may be effectively used as an overall regular ladder of similar length.

Various modifications within the scope and spirit of the present invention will occur to those skilled in the art. The combination step and extension ladder is, therefore, not to be thought of as limited to the particular embodiment set forth for illustrative purposes.

What is claimed is:

1. A combination step and extension ladder comprising: a pair of front legs having a plurality of steps supported therebetween; a pair of rear legs pivoted adjacent to the upper ends of said front legs, respectively, and adapted to be swung from a folded position against said front legs to a spread apart position to provide a step ladder, the upper ends of said front legs extending beyond the top step of said step ladder; an extension ladder comprising a pair of extension legs spaced apart a greater distance than the upper ends of said front legs so that said extension legs are adapted to straddle said front legs; a plurality of steps supported between said extension legs; a first pair of brackets of general U-shape secured to opposite inside portions, respectively, of said extension legs below the lowest step thereof and above the extreme lower ends of said extension legs, the spacing between the U-arms of said brackets being substantially equal to the width of each of said front legs measured from the front to the rear thereof, whereby said brackets receive said front legs respectively when said extension legs are positioned to straddle said front legs; and a second pair of brackets of general U-shape secured to opposite inside portions respectively of said extension legs at a given spacing below said first pair of brackets, the spacing between the U-arms of each of said second pair of brackets being greater than that between the U-arms of each of said first pair of brackets by an amount substantially equal to the width of each of said rear legs measured from the front to the rear thereof so that said second pair of brackets receive both said front and rear legs only when the same are folded together, whereby said second pair of brackets holds said step ladder in said folded position when said extension legs are positioned to straddle said front legs and said given spacing between said pairs of brackets maintains said extension legs in stable alignment with said front legs.

2. The subject matter of claim 1, in which the extreme upper end of each of said front legs terminates in a single surface inclined forwardly and downwardly; and in which a pair of blocks are secured to the inside opposite surfaces of said extension legs between said first pair of brackets and the underside of the lowest step thereof, each block terminating in a lower end surface inclined upwardly to seat on the extreme upper end of each of said front legs when said extension legs are positioned to straddle said front legs.

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