April 7, 1964 C. SHORE 3,127,953

SAFETY LADDER

Filed Feb. 17, 1960 3 Sheets-Sheet 1

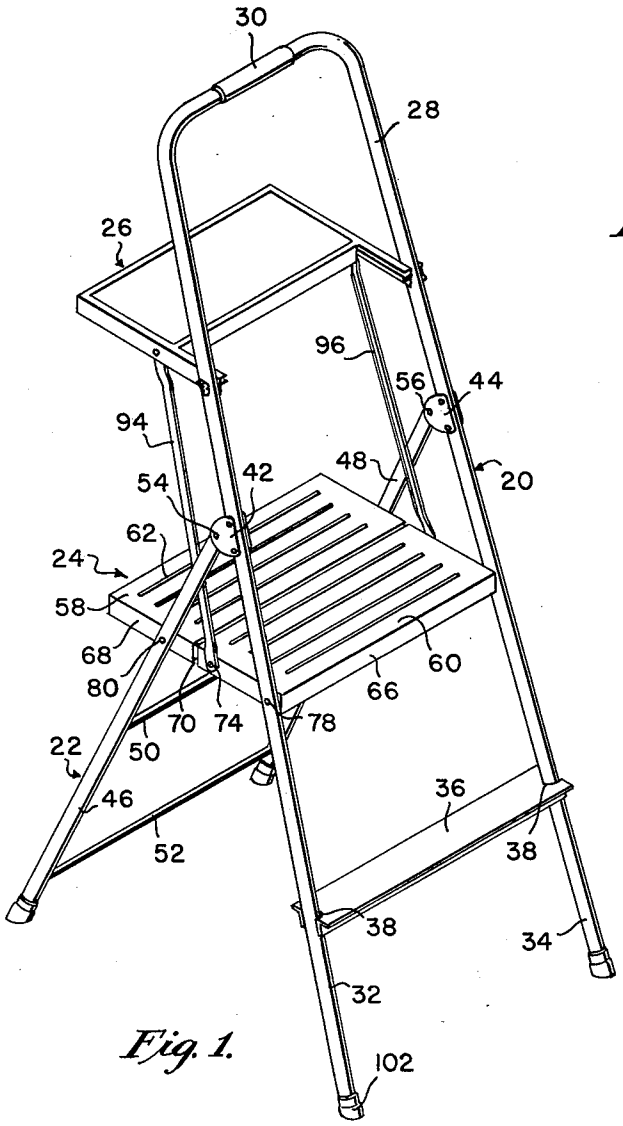
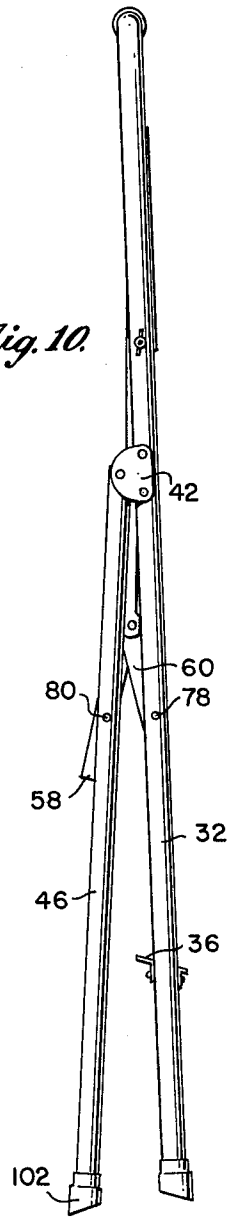


Fig. 1.

Fig. 10.



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Fig. 11.

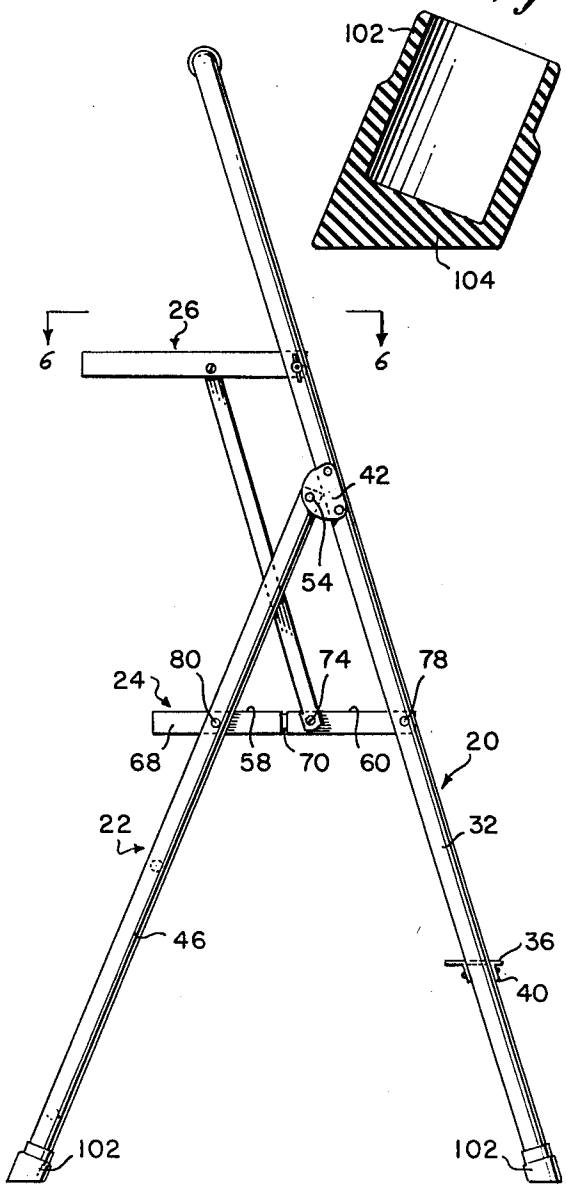


Fig. 2.

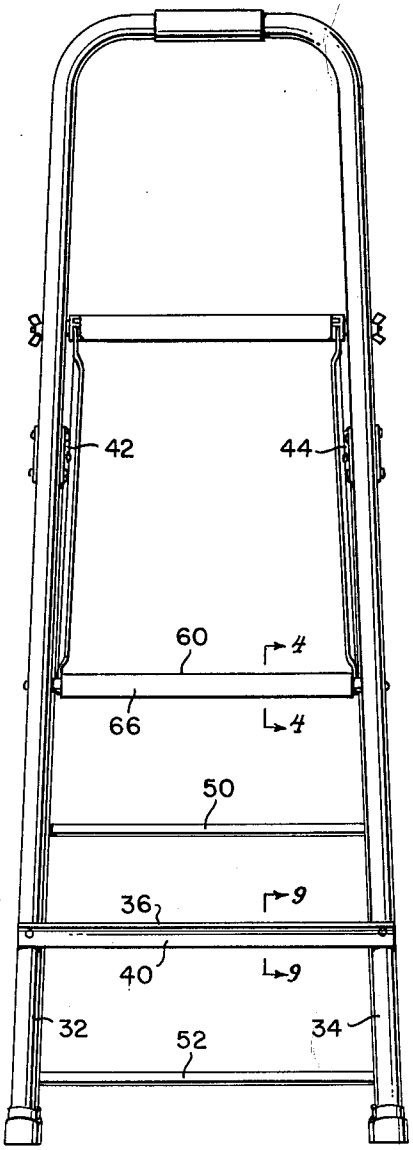


Fig. 3.

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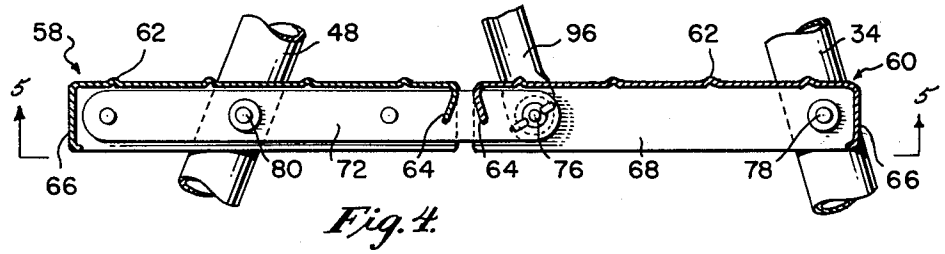


Fig. 4.

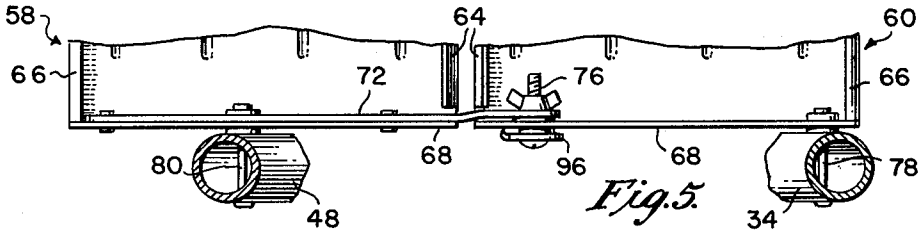


Fig. 5.

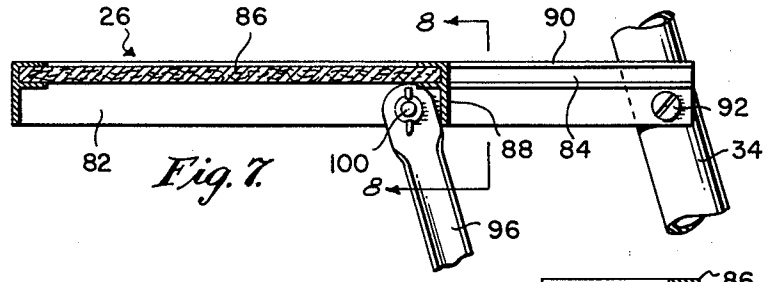


Fig. 7.

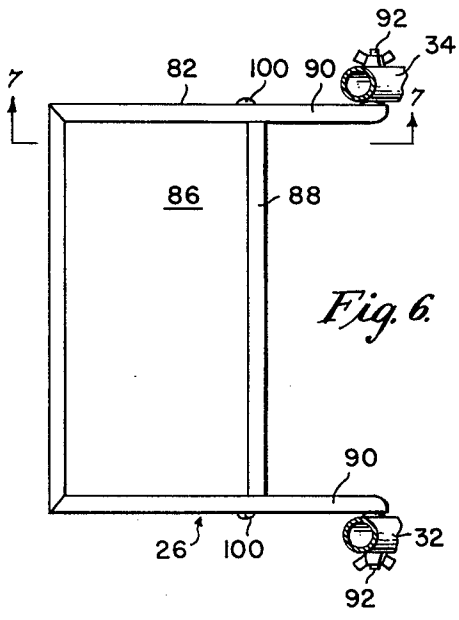


Fig. 6.

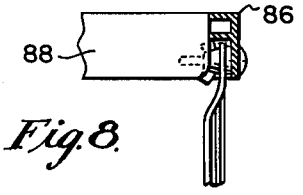


Fig. 8.

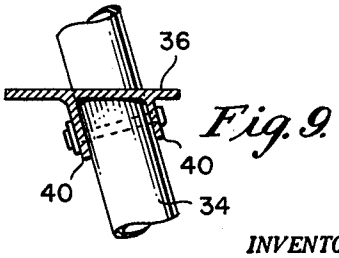


Fig. 9.

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SAFETY LADDER

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2 Claims. (Cl. 182—106)

This invention relates to folding ladders and particularly to such ladders constructed to assure the safety of the user.

It is an object of this invention to provide a new and improved folding ladder.

It is an object of this invention to provide a new and improved folding ladder having a large platform step and a guardrail.

Another object of this invention is to provide a new and improved folding ladder with a safety step that cannot be folded during use.

Another object of this invention is to provide a new and improved folding ladder with a safety shelf that cannot be folded during use.

Another object of this invention is to provide a new and improved folding ladder with a safety guardrail that a user can lean against and grip.

Another object of this invention is to provide a new and improved folding ladder that is light in weight, sturdy in construction, and convenient and safe in use and handling.

Another object of this invention is to provide a new and improved folding ladder that is economical to manufacture and can be readily assembled.

In accordance with this invention a folding ladder includes a guardrail formed by a tubular member bent in U shape. A platform step includes two pivoted step members that lie in the same plane when the ladder is opened. The weight of the user prevents folding of the ladder and is directed to the center of the ladder in a stable manner. A shelf is pivoted to the guardrail and linked to the step platform to fold with the step members so that the shelf can be manipulated to fold and open the ladder.

The foregoing and other objects of this invention, the features thereof, as well as the invention itself may be best appreciated from the following description when read together with the accompanying drawing in which:

FIGURE 1 is a perspective view of a folding ladder embodying this invention and shown in open position;

FIGURE 2 is a side elevation of the ladder of FIGURE 1;

FIGURE 3 is a front elevation of the ladder of FIGURE 1;

FIGURE 4 is an enlarged sectional view taken along the line 4—4 of FIGURE 3;

FIGURE 5 is an enlarged sectional view taken along the line 5—5 of FIGURE 4;

FIGURE 6 is a sectional view taken along the line 6—6 of FIGURE 2;

FIGURE 7 is an enlarged sectional view taken along the line 7—7 of FIGURE 6;

FIGURE 8 is an enlarged sectional view taken on the line 8—8 of FIGURE 7;

FIGURE 9 is an enlarged sectional view taken along the line 9—9 of FIGURE 3;

FIGURE 10 is a side elevation of the ladder of FIGURE 1 in closed position; and

FIGURE 11 is an enlarged side sectional view of a cap used on the legs of the ladder.

In the drawing, corresponding parts are referenced by the same numerals. The illustrated ladder comprises a front support structure 20, a rear support 22, a step platform 24 and a shelf 26. The ladder illustrated is constructed of aluminum, except where otherwise indicated.

The front support 20 includes a tubular member 28 bent in a U shape with a top, horizontal portion surrounded by a plastic handle 30 and two leg portions 32, 34. The space between the legs 32, 34 widens out going down towards their ends. A flat step member 36 is secured between the legs 32, 34 near the ends thereof. The step member 36 has cut out portions 38 at its ends that receive the legs 32, 34 and also has depending sectional members 40 (FIGURE 9) that form a channel for embracing the legs 32, 34, and through which suitable fasteners secure the step 36 to the legs. Pairs of bracket plates 42, 44 are secured to the legs 32, 34, respectively, at intermediate portions thereof.

The rear support 22 includes two straight tubular legs 46, 48 which are held rigidly in spaced relation by two tubes 50, 52 that are securely fitted into holes formed in the inside walls of tubular legs 46, 48. The spacing between the legs 46, 48 widens going down. The tops of the legs 46, 48 are respectively pivotably secured to the pairs of bracket plates 42, 44 by pivot pins 54, 56.

The step platform 24 includes two similar rectangular step members 58, 60 formed from sheet metal. The member 58 includes a ribbed central portion 62, a bent down inner side 64 (FIG. 4), a bent down outer side skirt 66, and bent down end skirts 68. The corners formed at the outer side skirt 66 with the end skirts 68 are generally closed; however, the corners formed at the inner side 64 with the skirts 68 are open (FIG. 5). Two bracing bars 70, 72 are respectively secured to the end skirts 68 of rear step 58. These bracing bars 70, 72 extend through the corners of the inner sides 64 of both step members 58 and 60 and are pivoted to the end skirts of the front step 60. Pivot pins 74, 76, shown as bolts with wing nuts and suitable washers, pivot the bars 70, 72 to the front step 60 at points set back from the inner edge thereof.

The top edges of the bars 70, 72 form stop surfaces that engage the undersurface of the front step 60 to position that step 60 in substantially the same plane as the rear step 58. Actually, the pivot axis is chosen so that the undersurface of the front step 60 is slightly elevated as compared to the rear step 58. This has the effect of affording a slight reverse pivot action and, thereby, an over center locking action. The front and rear steps 58, 60 are respectively pivoted to the legs of the front and rear supports 20, 22 by pins 78, 80. The step platform 24 is positioned substantially below the pivot brackets 54, 56 and between the front and rear ladder supports 20, 22 to provide a stable center of gravity in use.

The shelf 26 is formed from a flat strip 82 having a channel section 84 formed along the top edge thereof (FIG. 7). The strip 82 is bent in a rectangular U shape with the corners of the channel 84 suitably mitered. A rectangular board 86, such as composition board, is framed on three sides in the channel 84 of the U-shaped strip 82 and on the fourth side in the channel of a second strip 88, and suitably fastened therein. The extended arms 90 of the strip 82 are pivoted to the legs 32 and 34 by means of bolts 92 and suitable washers. Two supporting links 94 and 96 are pivoted at their upper ends by bolts 100 to the inside of strip 82 at an intermediate point beneath the board 86, and at their lower ends to the outside of the front step member 60 by the pivot bolts 74, 76. The links 94, 96 are respectively parallel to the legs 32, 34 to form a parallelogram linkage so that the shelf 26 is generally parallel to the front step 60. Movement of the shelf 26 up or down is followed by the front step 60.

The bottoms of the legs 32, 34, 46, 48 are covered with rubber caps 102. The upper portion of the cap 102 has a thin-walled sleeve portion that is attached to the

legs. The bottom 104 of the cap 102 has a wedge shape (FIG. 11). The angle of the wedge 104 corresponds to the inclination of the legs when the ladder is open so that the bottom surface thereof is in full contact with a floor surface when used. Thus, the legs may have a large inclination and a good grip on the floor still maintained.

In use, the ladder can be opened or closed by manipulation of the shelf 26 down or up. When the shelf is moved down to the horizontal position shown in FIGURES 1 and 2, the front step member 60 is moved to the same position. The back step member 58 is directly linked and pivots down and up with step 60. The pivoting of the steps 58, 60 to the horizontal open position spreads the pivot pins 78, 80 from the position shown in FIGURE 10 to that shown in FIGURE 1. Thus, the shelf 26 is effectively linked to the legs to open the ladder. This can be done by resting the ladder on its front legs 32 and 34 and pressing the shelf down, which action opens the rear legs. In a similar fashion, the shelf can be pressed up to close the ladder to the position shown in FIGURE 10. If desired, the ladder can be opened and closed by manipulating the steps 58, 60 directly or the ladder legs directly.

When open, the ladder is very stable due to the spread of the legs in the front and rear supports 20 and 22 and the inclination of the legs to the front and back as illustrated in FIGURE 2. The double-step platform 24, formed from the front and rear steps 60 and 58, effectively located close to the central axis of the ladder, and the user's weight is directed downward along this axis. A stable platform is provided even though the platform is located near the pivots 54, 56. The user can hold on to the guardrail 28 or lean against it in comfort and safety. In leaning against the guardrail, the shelf 26 is conveniently accessible to support a paint pail or other work materials. The ladder remains open safely in use, because the weight of the user prevents any accidental closing. Likewise, any weight on the shelf 26 is effective to keep the ladder open.

As seen from the foregoing description, an improved safety ladder is provided by this invention. A large stable step platform is afforded that cannot be folded during use. A shelf is conveniently located and can be manipulated to open and close the ladder. This shelf is safely constructed so that it cannot be folded during use.

The foregoing description of a preferred embodiment of this invention is not to be construed as a limitation on the scope of this invention. Various modifications of this invention, such as the use of different materials, will be apparent to those skilled in the art.

What is claimed as the invention is:

1. A safety ladder comprising a tubular member bent in a U-shaped guardrail, a spacer member secured between the legs of said guardrail member adjacent the ends thereof, two leg members pivotally secured in spaced relation to said guardrail legs, two step members respectively pivotally linked to said guardrail legs and to said leg members and a pair of bars fixedly connected to the undersurface of a first one of said step members and pivotally connected to the undersurface of the second step member at points intermediate the forward and rear edges thereof to permit folding thereof essentially only in an upward direction and affording a support for an undersurface of said second step member to position upper platform surfaces of said step members in substantially the same plane and a shelf pivotally linked to said guardrail legs above said step members and to one of said step members so that said shelf folds up with said step members, whereby said step members can be folded up by raising said shelf.

2. A folding ladder as recited in claim 1 wherein said shelf is pivotally linked to said second step member at the axis of pivoting of said step members.

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