July 19, 1949. A. BIERY 2,476,650

STEP LADDER

Filed Jan. 14, 1948 2 Sheets-Sheet 1

Fig. 1.

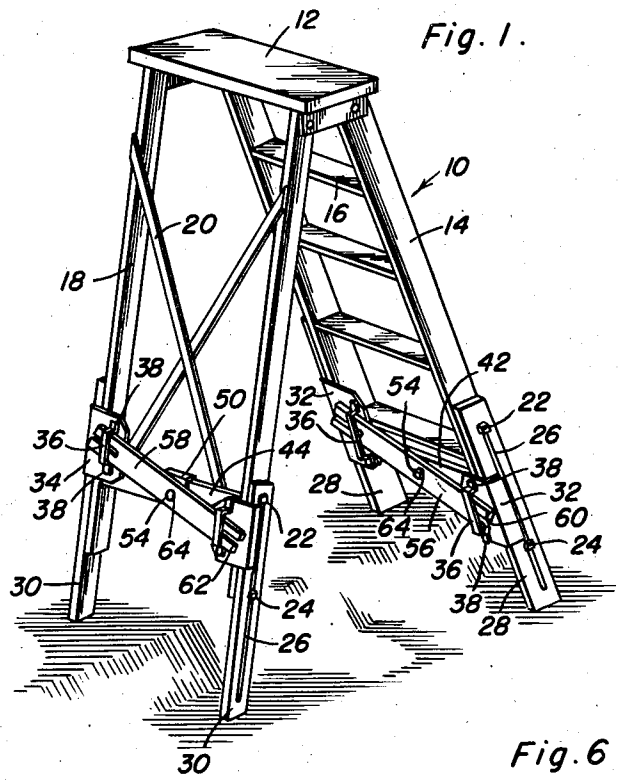


Fig. 6.

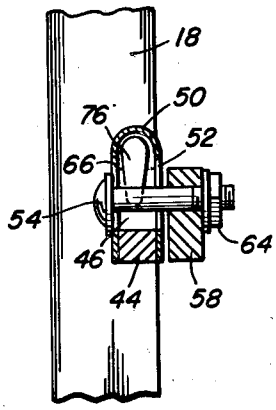
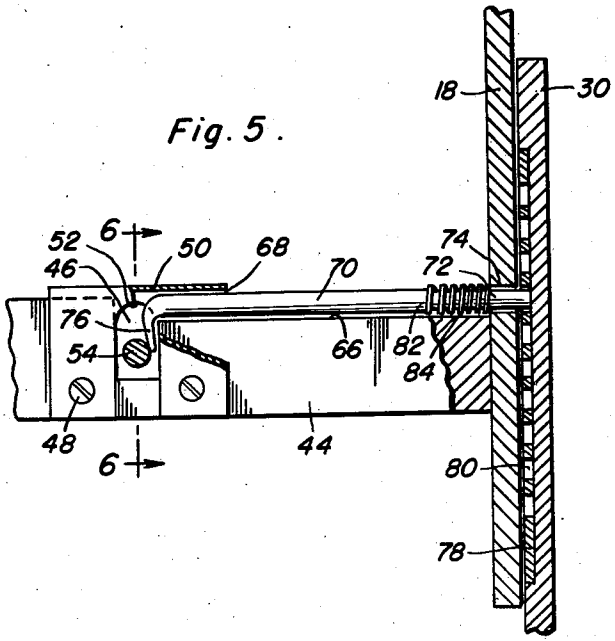


Fig. 5.



Arthur Biery

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

July 19, 1949. A. BIERY 2,476,650

STEP LADDER

Filed Jan. 14, 1948 2 Sheets-Sheet 2

Fig. 2.

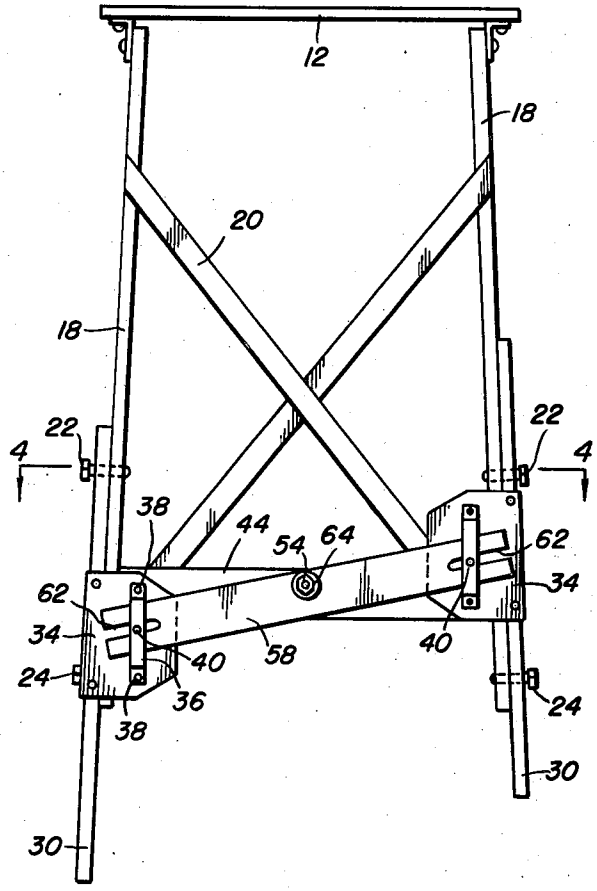


Fig. 3.

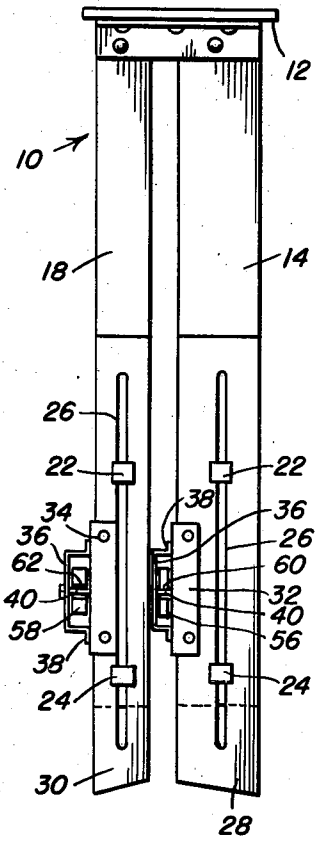


Fig. 4.

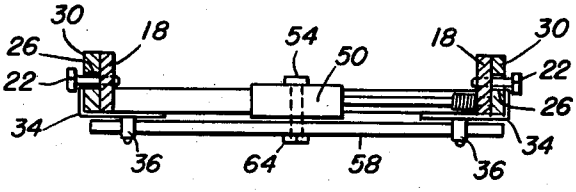
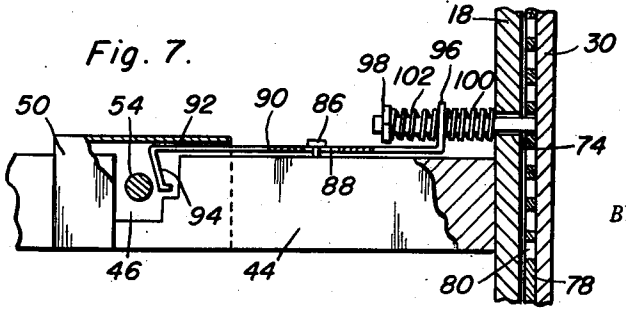


Fig. 7.



Arthur Biery

INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson

Attorneys

Patented July 19, 1949

2,476,650

UNITED STATES PATENT OFFICE

2,476,650

STEPLADDER

Arthur Biery, Pine Island, Minn.

Application January 14, 1948, Serial No. 2,250

4 Claims. (Cl. 228—63)

1

This invention relates to new and useful improvements in stepladders and the primary object of the present invention is to provide a step ladder having adjustable extensions or supports so designed as to facilitate the said step ladder to be used on uneven or irregular supporting surfaces.

Another important object of the present invention is to provide a step ladder having pairs of side rails, pairs of extendable supports slidably carried by the side rails and embodying novel and improved means for simultaneously actuating said extendable supports in opposite directions.

A further object of the present invention is to provide a step ladder including pairs of extendable supports and novel and improved means for locking said supports in selected adjusted positions relative to the side rails of the step ladder.

A still further aim of the present invention is to provide a step ladder that is simple and practical in construction, strong and reliable in use, small and compact in structure, neat and attractive in appearance, relatively inexpensive to manufacture, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a perspective view of the step ladder constructed in accordance with the present invention;

Figure 2 is a rear elevational view of the rear half of the present step ladder;

Figure 3 is a side elevational view of the present step ladder; and showing the same in a folded position;

Figure 4 is a transverse horizontal sectional view taken substantially on the plane of section line 4—4 of Figure 2;

Figure 5 is an enlarged fragmentary rear elevational view of the present step ladder showing the means for adjusting the extendable supports to the same, and with parts broken away and shown in section;

Figure 6 is a transverse vertical sectional view taken substantially on the plane of section line 6—6 of Figure 5; and,

Figure 7 is an enlarged fragmentary rear elevational view of the present step ladder, and showing the means for lockably adjusting the extendable supports to the same in slightly modified form.

2

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents the present step ladder generally, comprising a platform or seat 12 to which there is pivotally secured a pair of spaced parallel, forward or main side rails 14 having steps 16 disposed therebetween in spaced intervals. Also pivotally secured to the platform 12, is a pair of spaced parallel, rear side rails or prop legs 18 which are connected to each other by cross bracing 20.

Removably secured to and projecting outwardly from each of the side rails 14 and 18, is an upper guide pin or bolt 22 and a spaced lower guide pin or bolt 24 that are slidably received in longitudinal slots or guide openings 26 provided in a forward pair of extendable supports 28 that are used in conjunction with the forward side rails 14, and a pair of extendable rear supports 30 that are used in conjunction with the rear side rails 18.

Removably secured to the outer faces of the forward extendable supports 28 and the rear extendable supports 30 respectively, is a pair of forward angular base plates 32 and a pair of rear angular base plates 34, each of which rigidly support a U-shaped guide strap 36 having outturned ends 38 that are fixed to the said base plates. Guide pins 40 extend through the web portions of these guide straps and into the base plates.

Suitably secured between the forward side rails 14 and the rear side rails 18 respectively, adjacent the lower free ends of these rails 14 and 18, is a forward cross member 42 and a rear cross member 44 which are provided with central notches 46. Removably secured to each of these cross members 42 and 44, by fasteners or the like 48, are substantially inverted U-shaped guide and retaining plates 50, having opposed openings 52 in their leg portions that register with the notches 46 provided in the cross members 42 and 44. Extending loosely through the notches 46 in each of the cross members 42 and 44 and through the opposed openings 52 in each of the guide and retaining plates 50, are slidable pivot bolts 54 that pivotally engage central portions of a forward shifting or actuating bar 56 and a rear shifting or actuating bar 58. The ends of the forward actuating bar 56 are provided with longitudinal slots 60 that slidably receive the guide pins 40 carried by the guide straps 36 of the forward base plates 32 and the end portions

of the rear actuating bar 58 are provided with longitudinal slots 62 that slidably receive the guide pins 40 carried by the guide straps 36 of the rear base plates 34. Receivably engaged on the threaded ends of the pivot bolts 54 are nuts 64 that retain the actuating bar relative to the bolts 54 and which may be tightened for retaining the actuating bars in a selected adjusted or shifted position.

The upper portion of cross members 42 and 44 are each provided with a longitudinal notch 66 adjacent one of their ends that communicate with the notches 46, so that there will exist a guide opening 68 between the cross members and the web portions of the guide and retaining plates 50. Slidably mounted in each of the guide openings 68 are the inner ends of a pair of locking or latch bars 70, the reduced outer ends 72 of which are slidably received in openings 74 provided in one of the forward side rails 14 and a similar opening provided in one of the rear side rails 18. The inner ends of the locking bar 70 are provided with arcuate extensions or cams 76 that extend into the notches 46 for a purpose which will later be more fully described.

Recessed in the inner face of one of the forward extendable supports 28 and in the inner face of one of the rear extendable supports 30, are substantially rectangular plates 78 which are provided with a plurality of longitudinally spaced openings 80 that are adapted to register with the openings 74 provided in one of the forward side rails and one of the rear side rails and which receive the reduced ends 72 of the locking bars 70 for holding the extendable supports in an adjusted position. Loosely mounted on each of the locking bars 70 and biased between annular shoulders 82 on the locking bars and the inner faces of the side rails having the openings 74, are coil springs 84 that urge the reduced ends 72 of the locking bars 70 out of the openings 80 in the plates 78.

In practical use of the present invention, for adjusting the rear extendable supports 30, the nut 64 is loosened so that the pivot bolt 54 may be pulled downwardly in the notch 46 provided in the rear cross bar 44. The rear actuating bar 58 is then pivoted, effecting an extension or downward movement of one of the rear supports 30 and a simultaneous shortening or upward movement of the other of said rear supports 30. After the rear supports 30 have been adjusted to a selected position, the bolt 54 is pushed upwardly in the notch 46 so that the same will engage the arcuate end 76 of the locking bars 70 to force the reduced ends 72 of the locking bar into one of the openings 80 in the plate 78. The nut 64 is then tightened to retain the supports in a locked position. A similar procedure is followed for adjusting the forward supports 28.

Reference is now directed to Figure 7, wherein there is disclosed the means for locking the forward and rear supports 28 and 30 relative to the side rails of the step ladder in slightly modified form. In this embodiment, the notches 66 are not provided in the cross members 42 and 44 and the locking bars 70 are not employed. Fixed on the upper ends of the cross members 42 and 44, are guide pins 86 that are slidably received in guide slots 88 provided in support arms 90. The inner ends 92 of the support arms 90 are provided with integral, angular extensions 94 that are loosely positioned in the notches 46 formed in the cross bars. The outer ends of the arms 90

are turned upwardly and are formed with suitable apertures to provide support ears 96 for locking bars or bolts 98, a portion of which is slidably received in the opening 74 provided in one of the forward side rails and one of the rear side rails. A pair of coil springs 100 and 102 are loosely carried by each of the locking bolts 98 and urge the arm 90 from the side rails and the bolts 98 from the openings 80 provided in the plates 78.

In practical use of the device in modified form, the pivot bolts 54 are pulled downwardly in the notches 46, so that the locking bolts 98 disengage one of the openings provided in the plates 80. The rear and forward supports are then adjusted a selected length relative to the side rails of the step ladder. The pivot bolts 54 are forced upwardly in the notches 46 so that the extensions 94 engage the bolts 54, the support arms 90 are forced away from the guide and retaining plates 50, and the locking bolts 98 are urged into the openings in the plates 78 that oppose openings 74. The nut 64 (not shown in Figure 7) is then tightened to hold the forward and rear supports in an adjusted position.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the construction, operation and advantages of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claims.

Having described the invention, what is claimed as new is:

1. In a ladder having a pair of side rails, a cross member extending between said side rails, a pair of slidable supports carried by said side rails, means for guiding the sliding movement of said supports, an actuating member pivotally carried by said cross member, means operatively connecting said actuating member to said supports for simultaneous sliding movement of said supports in an opposite direction, a slidable locking bar carried by said cross member, means carried by one of said supports for lockably engaging said bar, means normally retaining said locking bar in a retracted position disengaged with said means carried by one of said supports for engaging said bar, and means carried by said actuating member for forcing said locking bar into a locked position.

2. The combination of claim 1 wherein said last mentioned means includes a pivot pin connecting said actuating member to said cross member.

3. In a ladder having a pair of side rails, a cross member extending between said side rails, a pair of slidable supports carried by said side rails, means for guiding the sliding movement of said supports, an actuating member, a pivot pin slidably secured to the cross member and pivotally supporting the actuating member, means operatively connecting said actuating member to said supports for simultaneous sliding movement of said supports in an opposite direction, a slidable locking bar carried by said cross member and actuated upon sliding movement of said pivot pin in one direction, means carried by one of said supports for lockably engaging said bar, and

means normally retaining said locking bar in a retracted position disengaged with said means carried by one of said supports for engaging said bar.

4. The combination of claim 3, and a cam carried by said locking bar for contacting the pivot pin during sliding movement of the latter in one direction.

ARTHUR BIERY.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
294,199	Cloyes	Feb. 26, 1884
854,152	De Cook	May 21, 1907
1,177,069	Verow et al.	Mar. 28, 1916