Jan. 16, 1934. H. L. MEARKLE 1,944,099

STEPLADDER

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Fig. 1.

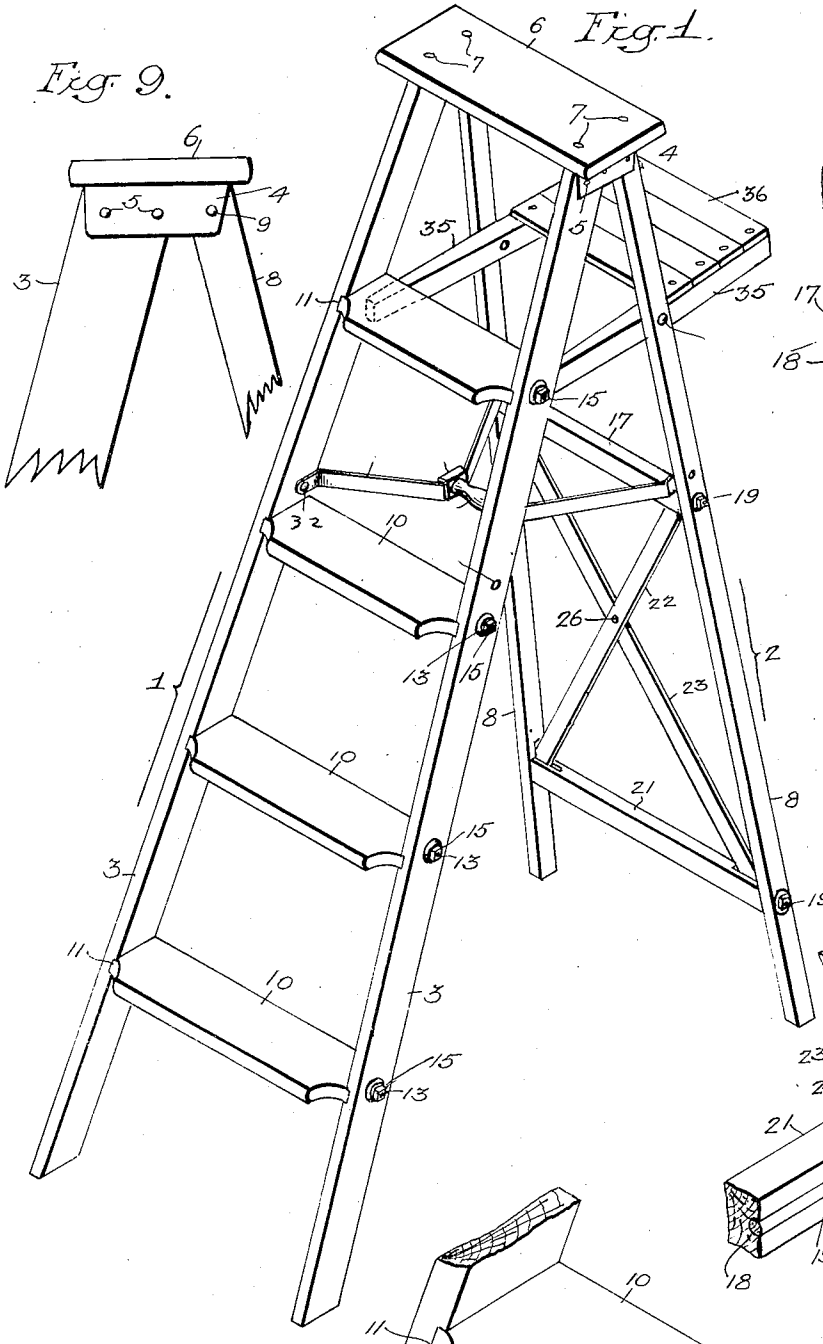


Fig. 9.

Fig. 4.

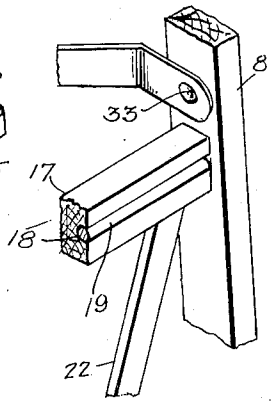


Fig. 5.

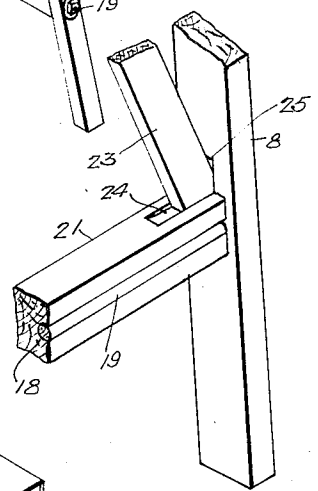
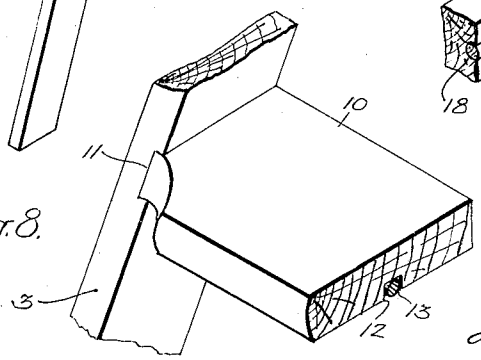


Fig. 8.



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Fig. 2

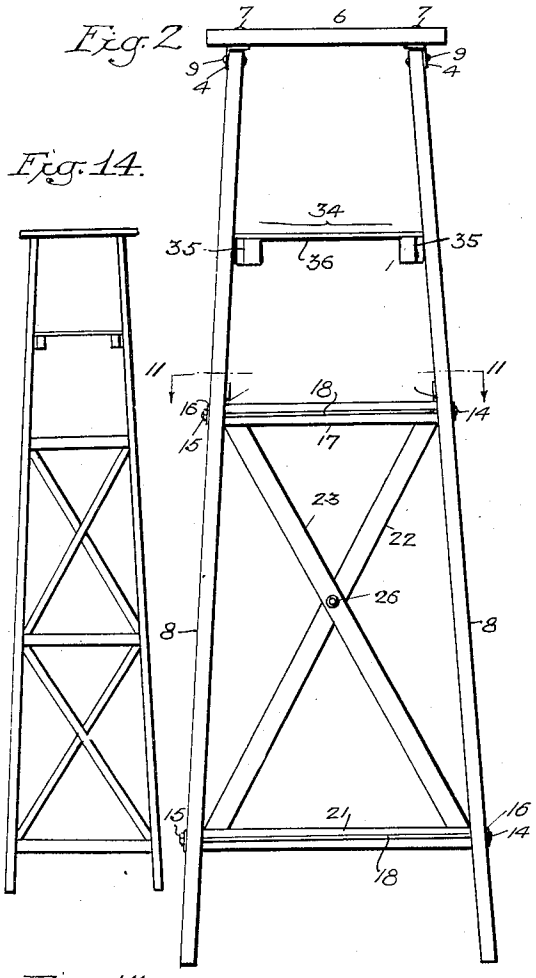


Fig. 14.

Fig. 3.

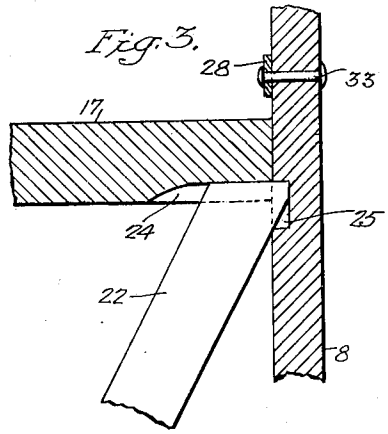


Fig. 6.

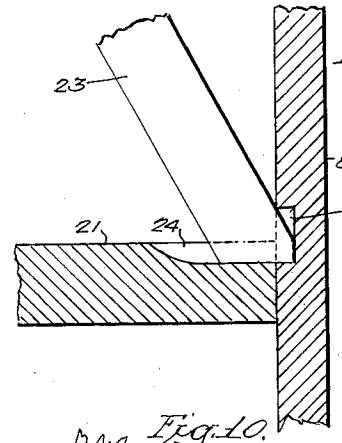


Fig. 10.

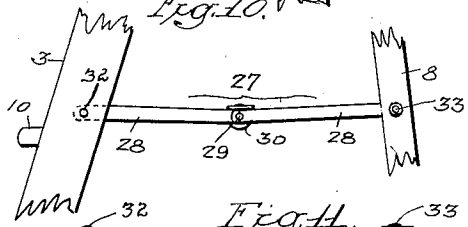


Fig. 13.

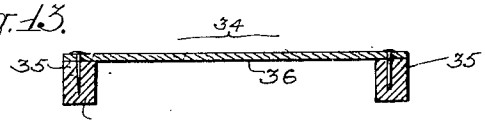


Fig. 7.

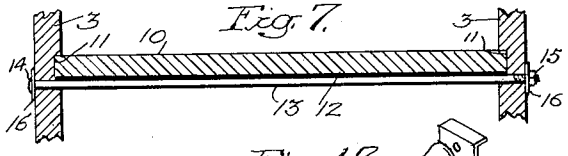


Fig. 12.

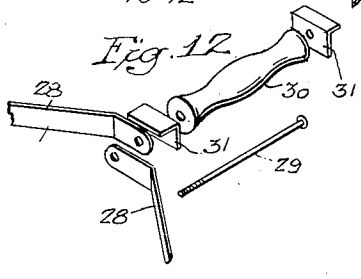
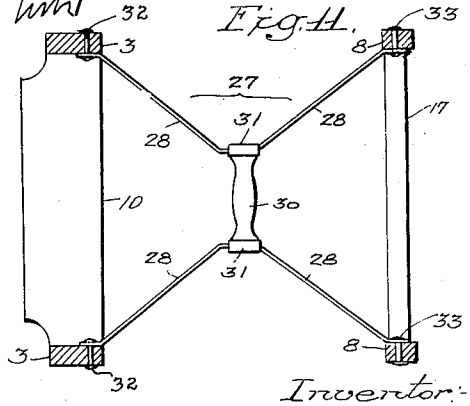


Fig. 11.



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UNITED STATES PATENT OFFICE

1,944,099

STEPLADDER

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Application April 12, 1933. Serial No. 665,825

5 Claims. (Cl. 228—59)

This invention relates to new and useful improvements in the manufacture of step ladders and has particular relation to certain details of construction for securing the several component parts of a ladder in their assembled relation.

The principal object of the present invention is to provide a step ladder which is manufactured substantially free of nails or like securing means, and to secure the several fixed elements of the ladder by means of through bolts.

Another object of the invention is to provide a ladder of the stated character embodying novel construction to afford a substantial and firm brace for the back legs of the ladder.

These and other objects and details of construction are set forth hereinafter and disclosed in the accompanying drawings, in which:

Figure 1 is a perspective view of my improved step ladder;

Fig. 2 is a rear view showing the improved manner of staying the back legs;

Fig. 3 is an enlarged sectional view showing the upper stay of the back legs and the upper end of a cross brace;

Fig. 4 is a sectional perspective view of the construction of the upper stay;

Fig. 5 is a perspective view showing part of the lower stay;

Fig. 6 is an enlarged sectional view of the lower stay;

Fig. 7 is a sectional view of one of the steps and side members of the front legs;

Fig. 8 is a detached sectional perspective view of one of the steps;

Fig. 9 is a side view of the upper portion of the ladder;

Fig. 10 is a side view of the spreader;

Fig. 11 is a sectional view on line 11—11, Fig. 2 of the front and back legs and the spreader;

Fig. 12 is a detached sectional view of some of the elements of the spreader;

Fig. 13 is a sectional view of the pivoted shelf; and

Fig. 14 is a rear view in elevation showing the construction contemplated by the present invention incorporated in a ladder of greater height.

Referring now more particularly to the drawings, the front or step portion and the back support of the ladder are designated generally as 1 and 2 respectively. In the present instance the step portion 1 comprises the customary legs 3 which are securely fastened to an angle plate 4 by means of rivets 5. The angle plates 4 are secured to the under side of a top member 6 of the ladder by rivets 7 and the legs 8 of the back support are pivotally connected to the said angle plates by rivets 9. The customary steps 10 of the ladder are secured in grooves 11 formed in the inner faces of the legs 3 of the step portion and the under side of each of said steps has a longitudinal groove 12 formed therein arranged to receive a through bolt 13 which extends through legs 3. In the present instance the through bolts 13 are headed at one end as at 14 and threaded at the opposite end to receive nuts 15. It is desirable that means be provided to prevent the bolt heads and nuts from cutting into the wood and in the present instance washers 16 of any suitable type may be employed for this purpose. It will be obvious that as the nuts 15 are tightened on the bolts 13, the legs 3 of the step portion 1 of the ladder firmly hold the steps 10 in the grooves 11 and the through bolt 13 residing in the step groove 12, prevents any lateral movement of the step so that nails or other fastening means may be dispensed with and in the event of shrinkage or loosening of any of the component parts of the assembly, the bolts 13 may be readily tightened.

The legs 8 of the hinged back support 2 of the ladder are rigidly connected by means of upper and lower stay members 17 and 21 respectively and are provided with grooves 18 in the center of one side face thereof to receive a through bolt 19 which extends through the legs 8 and is provided with a head at one end and is threaded to the other to receive a nut 20.

In order that the back support 2 may be rendered substantially rigid, cross braces 22 and 23 extend between the legs 8 of the back portion as shown in the drawings. In the present instance the ends of the cross braces 22 and 23 extend into notches 24 in the upper and lower stays 17 and 21 and also into notches 25 formed in the legs 8. It will be noticed that when the bolts 19 are tightened, the cross braces 22 and 23 are held firmly in the notches 25 in the legs 8. By extending the extremities of the cross stays 22 and 23 into the notches 25 of the legs 8, a very rigid construction is provided which is vastly superior and more stable than back supports in the majority of step ladders heretofore, and in which, if cross braces were used at all, they were merely tacked onto the rear legs, often becoming loose and making the step ladder very unstable.

If it is desired, the overlapping portions of the cross braces may be secured together by a rivet 26. A spreader 27 is provided and comprises four bars 28 bent into shape as shown in Fig. 11 and the inner ends of the bars 28 are connected

by a rivet 29 which extends through a hand hold 30 and stop plates 31, as shown in Fig. 12 of the drawings.

In the present instance the outer ends of the front bars 28 are bent so as to lie flush with the inside surface of the front legs 3 and are pivotally connected thereto by means of rivets 32. In similar manner, the rear bars 28 are formed to lie flush against the inner faces of the rear legs 8 and are pivotally connected thereto by means of rivets 33.

As will be noticed, the stop plates 31 are angular in shape and loosely mounted on the rivet 29, the horizontal flange of each stop plate 31 extending over the ends of the flat bars 28 so as to limit downward movement of the spreader 27 when the ladder is open, and, as will be noticed, by referring to Fig. 10 of the drawings, this limit of downward movement of the spreader is a small distance below a line drawn through the outer pivot points afforded by the rivets 32 and 33 so that the spreader may be firmly locked in the open position during the time the ladder is set up, and may be readily broken and the ladder permitted to close by merely grasping the hand hold 30 and raising the latter to a point above dead center.

The customary pivoted shelf or bucket support designated generally at 34 is mounted intermediate the legs 8 of the back support 2 and comprises side members 35 and platform 36 secured thereto. The free ends of the side members 35 extend under the upper step 10 of the ladder when the latter is in open position and the platform 36 is supported in horizontal position. When the ladder is closed or folded, it can be folded with the back support in well known manner.

It will be seen by the above construction that nails or similar securing means, commonly used in ladders of this type are entirely dispensed with, with the exception of the few used to secure the bucket platform 36 to its side supporting members 35, and the novel construction embodied in the present invention and the means for securing the component parts in their relative assembled relation, secures the steps and the members of the back support section rigidly in position and affords a firm and substantial step ladder which can be inexpensively constructed.

What is claimed is:

1. The combination in a step ladder, of a step section, a back section pivotally connected at its upper end to the step section, said back section having two legs spaced apart, upper and lower stays extending from one leg to the other, cross braces extending into notches formed in said stays and legs, and through bolts in the stays for firmly securing the several parts of the back section together.

2. The combination in a step ladder, of a step section, a back section pivoted to the step section at its upper end, said back section having two legs spaced apart; upper and lower stays, the legs being notched to receive the ends of the stays, each stay having a longitudinal groove therein; through bolts extending through the side legs and through the grooves in the upper and lower stays, the said stays being notched near their outer end; and cross braces extending from one stay to the other, the ends of the cross stays being located in the notches so that when the through bolts are drawn tightly the several parts are rigidly held in position.

3. The combination in a step ladder, of a step section, a back section pivoted to the upper end of the step section, a spreader, rivets pivotally securing the spreader to the step section, a stay located between the two legs of the back section, through bolts extending through the legs and a groove in the stay, the stay being notched and the rear ends of the spreader extending into the notches and perforated for passage of the through bolt.

4. The combination in a step ladder, of a step section and a back section pivoted at its upper end to the step section, the legs of the front section having notches for the steps, steps located in the notches, through bolts extending through the legs and under the steps and in engagement therewith, the back section having legs, a plurality of stays extending between the legs and having grooves formed therein, through bolts extending through the legs and through the stays of the back section, and cross braces notched into the stays.

5. The combination in a step ladder of a step section, a back section pivoted to the step section at its upper end, said back section having two legs, upper and lower stays extending between said legs, each having a longitudinal groove therein, through bolts extending through the legs and grooves in said stays, the said stays and legs being notched at their points of jointure, and cross braces extending from one leg to the other and having their ends located in the notches in the stays and legs to prevent turning of the stay about the through bolt.

HARRY L. MEARKLE.