March 9, 1926. 1,575,689

J. E. KALGREN

STEPLADDER

Filed Sept. 10, 1924

Fig. 1

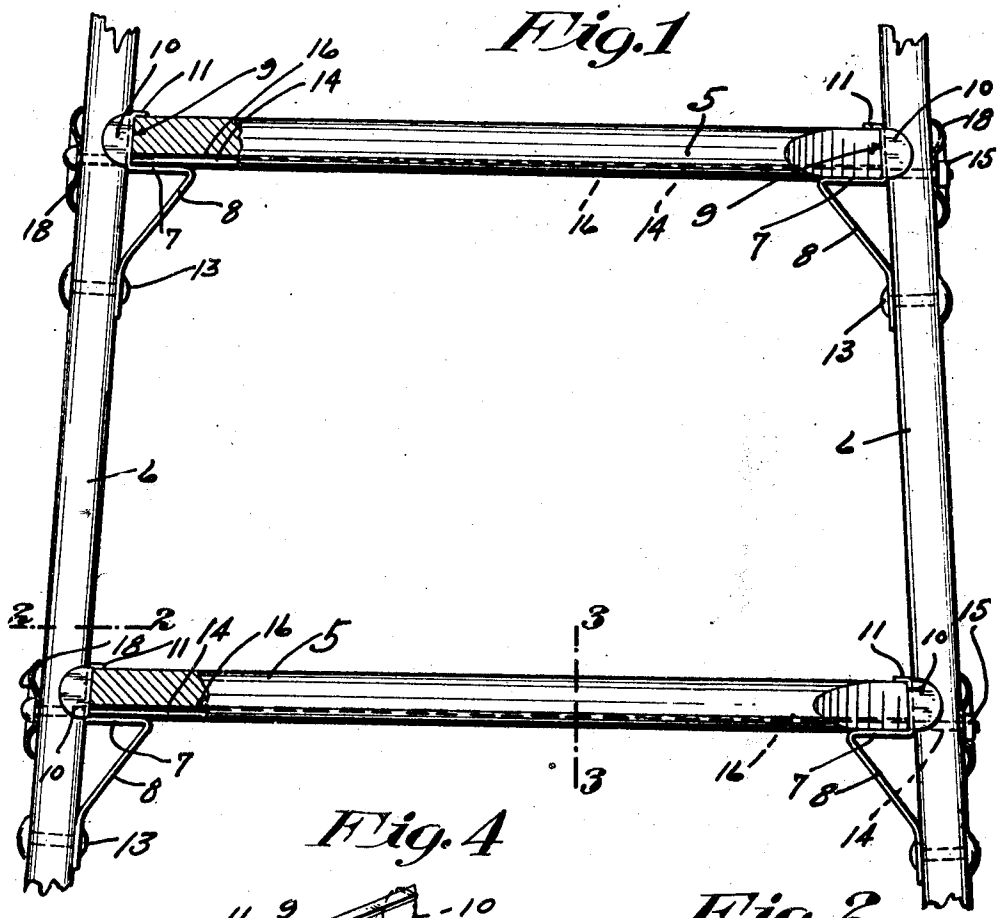


Fig. 4

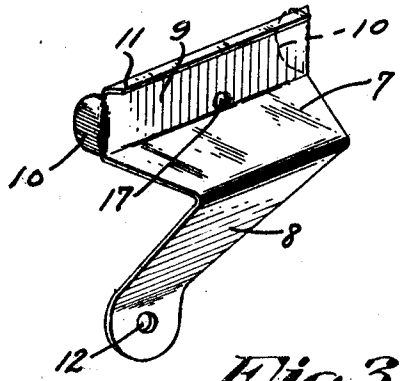


Fig. 2

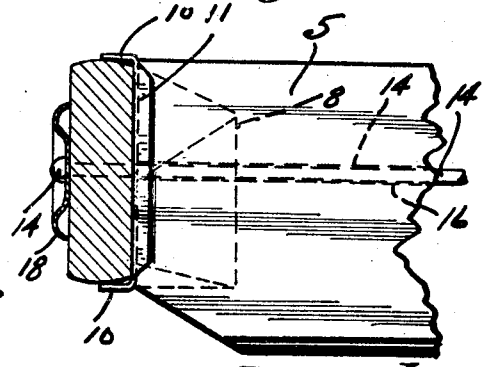
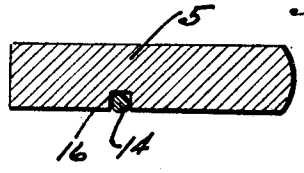


Fig. 3



Inventor
John E. Kalgren
By his Attorneys
Whittemore & Hulbert

Patented Mar. 9, 1926. 1,575,689

UNITED STATES PATENT OFFICE.

JOHN E. KALGREN, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO J. R. CLARK COMPANY, OF MINNEAPOLIS, MINNESOTA, A CORPORATION OF MINNESOTA.

STEPLADDER.

Application filed September 10, 1924. Serial No. 736,906.

To all whom it may concern:

Be it known that I, JOHN E. KALGREN, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Stepladders; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention provides an important improvement in step ladder construction whereby very great strength, rigidity and durability is obtained at comparatively small cost, and the elements of the ladder are so arranged that they may be very quickly and easily assembled.

Generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claim.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a view in front elevation with some parts broken away and some parts sectioned, showing a portion of a step ladder embodying my invention;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1;

Fig. 3 is a transverse section on the line 3—3 of Fig. 1; and

Fig. 4 is a perspective showing one of the step brackets removed from the ladder.

In the ordinary step ladder, the steps or treads 5 are usually of wood and at their ends are more or less rigidly connected to wooden ladder bars 6. My invention is directed to means for connecting the said steps and bars and it comprises step brackets preferably of stamped sheet steel bent to form shelves to support the steps and to interlock with the ends of the steps and with the ladder bars. These brackets are bent to form step-supporting shelves 7, obliquely depending legs 8 and upstanding end plates 9. The end plates 9 at their ends are bent to form ears 10 that closely embrace the edges of the ladder bars 6, and at their upper edges they are overturned to form lock flanges 11 that overlap the ends of the co-operating steps 5. The lower ends of the oblique legs 8 are turned straight downward for engagement with the inner sides of the bars 6 and they are perforated at 12 so that rivets or bolts 13 may be passed therethrough and through the legs 8. By the means already described, the brackets are locked to the ladder bars 6 in such a manner that they cannot swing laterally in the planes of said bars, and the steps are interlocked to said brackets so that they can neither move upward or downward nor can they tilt or oscillate.

To tie the steps, bars and brackets together, I use long rods or bolts 14 shown as headed at one end and provided at their other ends with nuts 15. These rods are countersunk into grooves 16 formed in the bottoms of their steps, and at their end portions said rods are passed through perforations 17 in the bracket end plates 9, through perforations in the bars 6 and through washers 18. The tie rods 14 are thus brought above the shelf-forming portions 7 of the step brackets so that the steps may rest upon said shelves, but the said rods not only tie the parts together against lateral spreading movements, but they also assist in supporting the steps and in anchoring the upper portions of the step brackets to the bars. In view of the interlocking of the upper portions of the brackets to the bars 6 at points in a line with the perforations through which the rods 14 are passed, the said brackets are caused to reinforce the bars 6 and strengthen the same at the points of perforation so that they are actually stronger at said perforated points than at any other place. Of course the rods 14 securely hold the steps against endwise, that is forward and rearward, sliding movements on the shelves of the step brackets.

By reference to Fig. 4 it will be noted that the step brackets are formed with horizontal channels to receive the ends of the steps and with vertical channels to receive the ladder bars 6 so that they thereby are given a double interlocking action with the other elements noted. The step brackets may, as is evident, be very cheaply and efficiently stamped from sheet steel or any other suitable metal for that matter, and of course the parts may be very quickly and accurately assembled since there is no possible way of getting the parts together incorrectly.

It is highly important to note that with

the construction herein described the following important results are obtained: (*a*) when the tie rod 14 is in position the step 5 will be locked against edgewise displacement from the supporting brackets; (*b*) when the tie rod is removed, the step may be slid edgewise from the co-operating brackets; and (*c*) even when the tie rod and step are removed, the brackets remain secured to the side bars 4 and properly positioned for the application of a new step. With the said arrangement, therefor, if one step be broken, a new step may be replaced without loosening up or removing any of the other tie rods or steps, and the brackets do not lose their positions while the substitution of steps is being made.

What I claim is:

In a ladder, the combination with ladder bars and steps, of metal brackets bent to form step-supporting shelves and oblique depending legs, end plates extending upwardly from the step-supporting shelves and interposed between said side bars and the adjacent ends of the co-operating step, said end plates having laterally bent ears that embrace the ladder bars and further provided with inturned upper flanges that overlap the ends of said steps, said steps having longitudinal channels in their under sides, and tie rods extended in the channels of said steps immediately above the shelf-forming portions of said brackets and passed through perforations in the end plates of said brackets and through perforations in said side bars, fastening devices other than said tie rods positively securing said brackets to said side bars, said rods serving to tie said side bars, steps and brackets together against lateral movements, said brackets having open ended seats into which and from which the steps may slide edgewise when said tie rods are removed, the said rods, when applied, serving to positively lock the steps against edgewise displacement.

In testimony whereof I affix my signature.

JOHN E. KALGREN.