C. M. WAGGONER.

LADDER.

APPLICATION FILED DEC. 26, 1919.

1,346,518. **Patented July 13, 1920.**

Fig. 1.

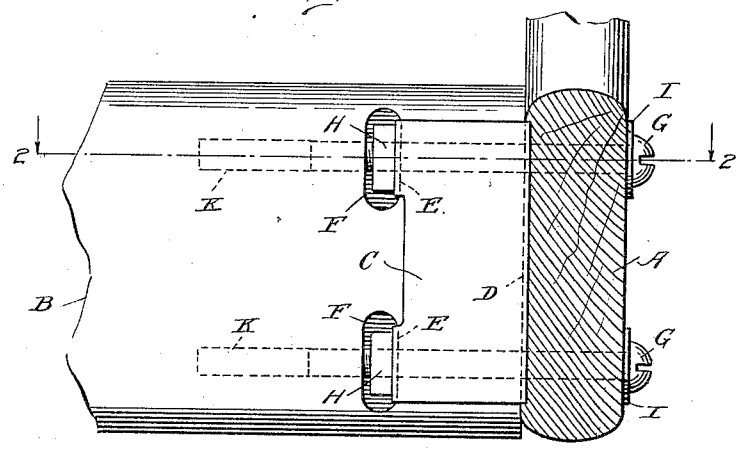


Fig. 2.

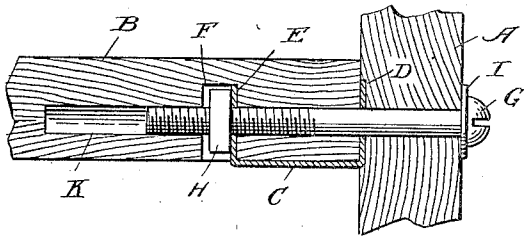


Fig. 3.

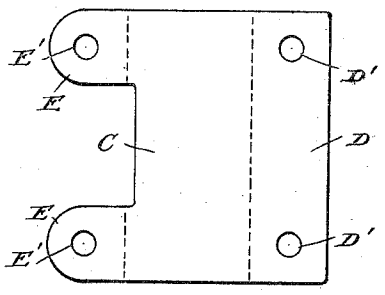


Fig. 4.

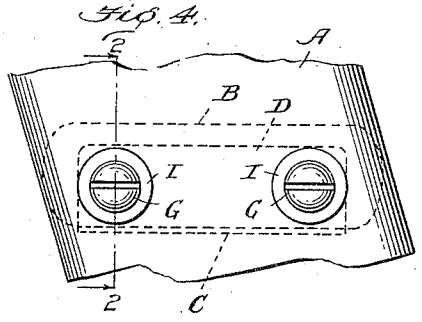
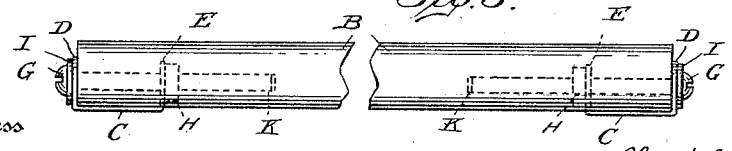


Fig. 5.



Witness

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LADDER.

1,346,518. Specification of Letters Patent. Patented July 13, 1920.

Application filed December 26, 1919. Serial No. 347,268.

To all whom it may concern:

Be it known that I, CLAUDE M. WAGGONER, a citizen of the United States, and resident of Riverside, in the county of Riverside and State of California, have invented certain new and useful Improvements in Ladders, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to ladders and particularly to step ladders having steps which can be quickly replaced.

My invention provides a ladder which is easily taken apart for shipment, can be readily assembled by unskilled workmen, is strongly reinforced against failure from the possible splitting of an end of a step and with the exception of a joint plate, utilizes stock materials.

In the drawings:

Figure 1 is a view of the under side of a ladder step and stile provided with my joint, parts of the step and stile being broken away.

Fig. 2 is a view on the section line 2—2, Figs. 1 and 4, the step and stile being broken away.

Fig. 3 shows an outline of a blank for the preferred type of my joint plate.

Fig. 4 is a view of the stile and step from the right of Fig. 2.

Fig. 5 shows a step as shipped.

In these drawings: A stile A is joined to a step B of the same cross section by a joint plate C, preferably made of sheet steel. This joint plate is bent to a channel-like form, one side D of the plate being continuous and having two perforations D′, while the opposite side of the plate is cut out to leave two wings E each having a perforation E′ alining with the corresponding perforation D′ in the side D.

On the lower side of the step B at a distance from its end equal to that between the sides D and E of the joint plate, recesses F are cut for the reception of the wings E and nuts H. Through the stiles A and steps B are drilled holes to aline with the perforations D′ and E′ of the joint plate C, to receive bolts G having slotted heads. Washers I of suitable size distribute the pressure of the bolts on the stiles.

My joint plate C serves as a stirrup and also reinforces the step. As a stirrup it distributes the load over the under side of the step-end and will hold the step even though the latter be split longitudinally through one or both bolt holes. The wings E serve as washers against which the nuts H bear, while the side D of the reinforcing member C is preferably countersunk in the stile A to give additional strength to the joint.

On account of the decreased bulk and the practical elimination of any breakage, I prefer to ship my ladders as separated stiles and steps. By continuing the hole in the step to a depth beyond the recess F, as shown in dotted lines at K, I can remove the stiles A and replace the bolts G with their heads against the sides D thus compactly securing every element against loss, and protecting against serious damage due to careless handling in shipping, as the steps and stiles can be tied in compact bundles. A screwdriver is the only tool needed to take my ladder apart for shipment, and the bolts and nuts if lost or damaged can be easily duplicated at a hardware store.

My devices are especially useful with ladders used in picking fruit, and permit the safe temporary use of a ladder having an imperfect step that might be unsafe without my joint plate. The quickly made substitution of any part from one of my ladders for a broken part of another of my ladders of the same style and size makes the question of repairs a very simple matter while at the same time my ladder is stronger than other ladders provided with detachable steps.

What I claim is:

1. In a ladder, the combination with a stile, a step, and a joint plate engaging the lower side of said step and having on one side a flange extending over the end face of the step and on the other side a projection extending into a recess in the lower side of the step, of a bolt extending through the stile, said flange, said projection and the intervening portion of the step to bind stile and step together.

2. In a step ladder, the combination with a joint plate of channel-shape having perforated flanges to receive a threaded bolt passing through a stile and into a step and said step having a recess cut in the under side to receive one flange of said joint plate.

3. In a step ladder, a joint plate of channel-shape having one of its flanges recessed into the under side of a step and its other

side clamped between one end of said step and a stile, and a threaded bolt passing through a stile, a step and both flanges of said joint plate.

4. In a step ladder, the combination with a stile and a step having a recess in its lower side, of a point plate lying across the under side of the step, having a perforated flange between the stile and the end of the step and a perforated tab extending into said recess, a nut in said recess, and a bolt passing through the stile, flange, and tab and the intervening part of the step and engaging said nut.

5. In a step ladder, a step and stile joint plate adapted to lie flatwise across the end portion of the lower face of a step and provided at one side with a flange in position to extend over the end face of the step and at the opposite side with a flange in position to extend into the body of the step, said flanges being perforated to receive a bolt passing through the stile, flanges and intervening portion of a step.

6. A ladder joint plate having perforated tabs to extend into recesses in the lower side of the ladder step and also a flange adapted to lie between the stile and step end and perforated in alinement with the tab perforations, and nut bearing bolts passing through the alining perforations in the flange and tabs, the step allowing the bolts to be screwed inwardly when the stiles are not present.

In testimony whereof I hereunto affix my signature.

CLAUDE M. WAGGONER.