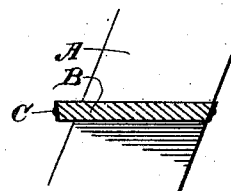
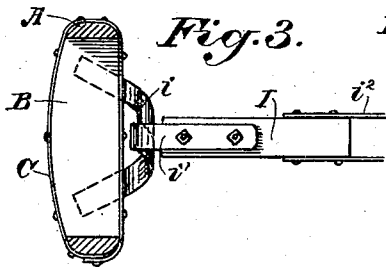
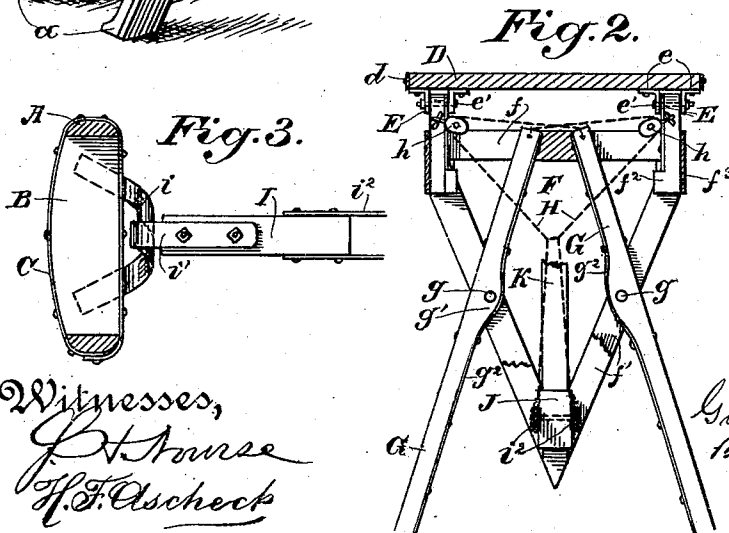
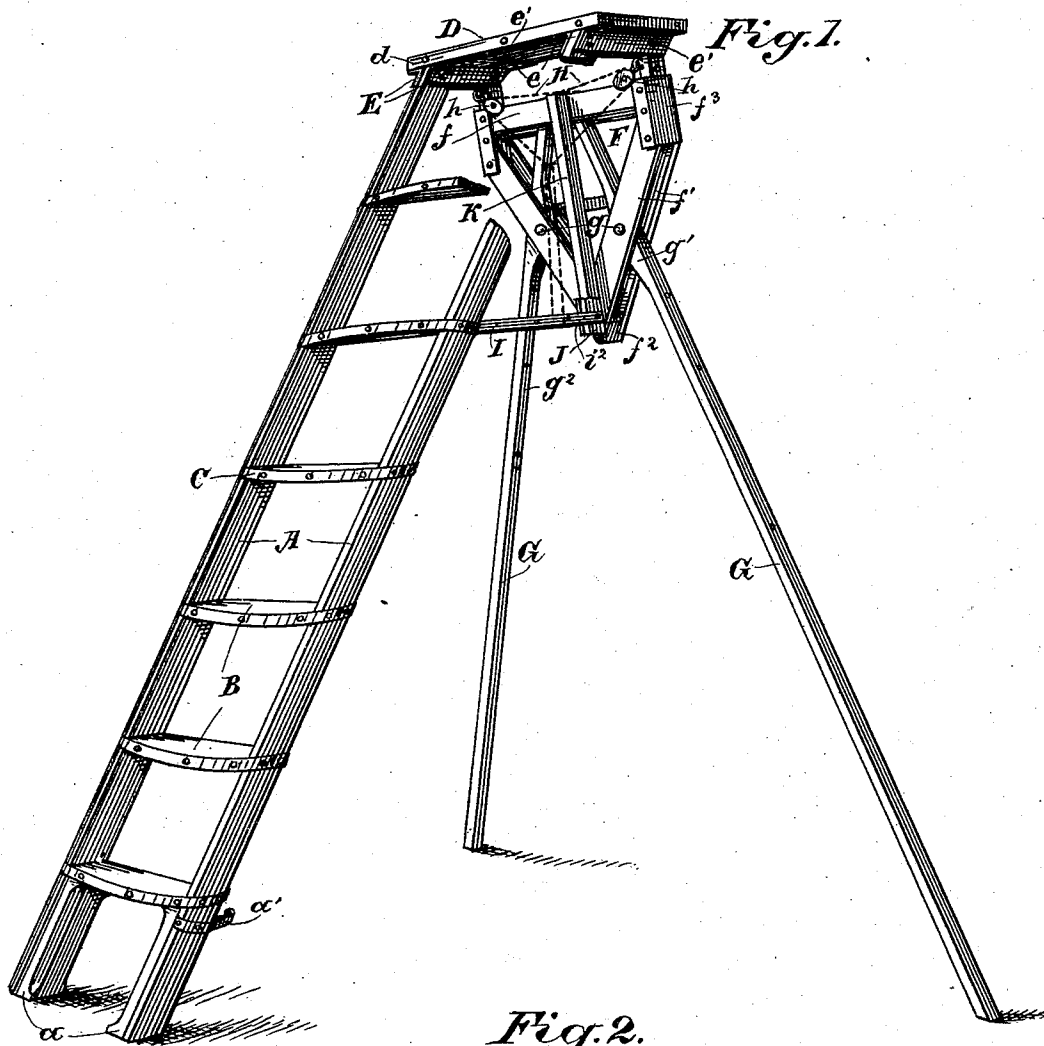


(No Model.)

G. E. CHITTENDEN.
LADDER.

No. 572,693.

Patented Dec. 8, 1896.



Witnesses,
J. H. Hourse
H. F. Alscheck

Inventor,
Giles E. Chittenden
By Dancy & Co. attys

UNITED STATES PATENT OFFICE.

GILES E. CHITTENDEN, OF NILES, CALIFORNIA.

LADDER.

SPECIFICATION forming part of Letters Patent No. 572,693, dated December 8, 1896.

Application filed August 5, 1896. Serial No. 601,715. (No model.)

To all whom it may concern:

Be it known that I, GILES E. CHITTENDEN, a citizen of the United States, residing at Niles, county of Alameda, State of California, have invented an Improvement in Ladders; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to the class of ladders; and it consists in the novel constructions, arrangements, and combinations of parts which I shall hereinafter fully describe.

The object of my invention is to provide a serviceable, strong, and durable ladder capable of being readily set up and adjusted firmly and evenly and easily folded again.

Referring to the accompanying drawings, Figure 1 is a perspective view of my ladder. Fig. 2 is an elevation showing the arrangement of the legs. Fig. 3 is a plan showing the hinged brace I. Fig. 4 is a cross-section of one of the steps.

A are the side strips or uprights, and B are the steps of the ladder. The steps are secured to and supported by the uprights solely by the metallic straps C. These encircle the uprights and the steps both in front and the back and are secured to both uprights and steps in suitable manner, as by nails. In fitting these parts the metallic strap is first riveted to form an endless band and is then caused to encircle the uprights. It fits quite snugly even then. Now the step, which, it should be noted, is made wedge-shaped in thickness, that is, its top surface is wider than its bottom surface, is fitted to the strap C and is driven in tightly. In thus entering it tightens the strap both on the uprights and upon itself, so that when in place the parts are all tight. Then the strap is nailed to the step, front and rear, and is also nailed to the uprights. This provides a firm connection and support without any of the disadvantages of cutting or puncturing the uprights, as when steps are mortised or grooved in and nailed. The uprights are thus left intact and as strong as possible. The straps are additionally secure in that the uprights being inclined and the steps horizontal said straps cramp and bind on the upright under a weight or downward pressure imposed upon the step. Moreover, the steps are metallic-bound and will last longer, especially under the excessive

wear which in some uses, such as orchard use, they receive.

The lower extremities of the uprights may be provided on their inner surfaces with pieces *a*, nailed to them and serving to widen the foot of the upright and give it a firmer bearing.

The upper extremities of the uprights are secured to the top D of the ladder through the intervention of parallel-spaced metallic plates E, having angle-flanges *e*, by which they are secured by means of rivets or otherwise under the top. Between the members of each pair of these strips the upper ends of the uprights fit and are secured rigidly therein by rivets or other suitable fastenings. Between the rear extremities of these metallic strips E are fitted and pivoted by the bolts *e'* the upper ends of the swinging guide-frame F, which moves about its pivotal center to and from the ladder-front. This guide-frame F is of the shape of an inverted gable and is constructed of parallel-spaced strips constituting its top cross-piece *f* and its downwardly-converging sides *f'*. These strips are suitably secured together and strengthened and braced properly, as by means of the intervening blocks *f''* and the metallic angular clamp-plates *f'''*, or otherwise.

G are the back legs of the ladder. These are pivoted in the sides of the guide-frame F at *g*, enabling them to swing sidewise. Their upper ends extend above their pivotal centers and play and are guided in the cross-piece *f* of frame F, whereby meeting a stop-block in the middle they are limited, thus defining the divergence of their lower extremities. In closing up again the upper ends of the legs are limited by the sides of the frame, at which time the legs are about parallel and are separated by about the width of the ladder, being capable, however, of being sprung inwardly sufficiently to engage behind the catches *a'* on the ladder-uprights A near the bottom, whereby said legs are held when the ladder is closed or folded. These catches *a'* consist of metallic strips secured to uprights A and thence extending backwardly and curled up together inwardly to form the catch-head.

H are lines or cords which pass through small pulleys *h* and thence extend to oppo-

site upper ends of legs G, whereby when said lines are pulled upon they will draw together the upper ends of the legs and thus effect the divergence of said legs below their pivotal centers. These lines are attached to a brace I, so that in setting up the ladder the operator in forcing down the brace thus adjusts the legs to their proper divergence while he is still in front and placing it in position.

10 I is the brace. This is hinged at its front end to the ladder, and at its rear end it has a slide-sleeve J, which is fitted to and adapted to move vertically upon a fixed bar or track K, secured to the frame F.

15 The hinge connection of the brace is formed by means of a bracket *i*, constructed of a twisted piece of strap-iron and secured to one of the steps B. Another strap, *i'*, is bolted above and below to the brace, and its projecting bight fits over and turns upon the bracket, thus forming the hinge. The slide-sleeve J is constructed of a block fitted with a bent metallic plate forming between them the socket which fits the guide-bar K, and said sleeve is secured to the brace by side straps *i''* of metal. As stated, the lower ends of lines H are attached to brace I.

In setting up the ladder the legs being relieved of the catches *a'* will swing backwardly with the pivotally-hung frame F, and the brace I will slip down on the bar K toward a horizontal. Then by forcing the brace down to the horizontal the lines H will be pulled down and the legs will swing sidewise to proper angles and the whole ladder will be evenly and firmly supported. For the sake of durability the top D is encircled by a metallic strap *d*.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a ladder, the means for securing the steps to and between the uprights, consisting of metallic straps encircling the steps and uprights and secured to both.

2. In a ladder, the means for securing the steps to and between the uprights, consisting of an endless metallic strap secured to and extending between the uprights, and into which between said uprights, the step is fitted and secured.

3. In a ladder, the combination of the uprights, the metallic straps secured to and between said uprights, and the wedge-shaped steps fitted tightly into said straps and secured thereto.

4. In a ladder, and in combination with its uprights and top, a guide-frame hinged to said top and adapted to swing to and from the uprights and legs pivoted in said frame and adapted to swing sidewise, said legs ex-

tending above their pivotal centers, with the extended portions guided in the hinged frame.

5. In a ladder, and in combination with its uprights and top, a guide-frame hinged to said top and adapted to swing to and from the uprights and legs pivoted in said frame and adapted to swing sidewise, said legs extending above their pivotal centers and a line attached to their upper ends whereby they may be drawn together to cause the legs to diverge to position.

6. In a ladder, and in combination with its uprights and top, a guide-frame hinged to said top and adapted to swing to and from the uprights, legs pivoted in said frame and adapted to swing sidewise, said legs extending above their pivotal centers, a brace hinged at its forward end and slidably connected at its rear end with the guide-frame, and lines connected with said brace and with the upper ends of the legs whereby when the brace is moved down, the legs are spread to position.

7. In a ladder, and in combination with its uprights and top, a guide-frame hinged to said top and adapted to swing to and from the uprights, legs pivoted in said frame and adapted to swing sidewise, said legs extending above their pivotal centers, a brace hinged at its forward end and having a sleeve at its rear end, a guide-bar on the guide-frame and upon which the sleeve of the brace is adapted to slide up and down, and lines connected with said brace and with the upper ends of the legs whereby when the brace is moved down the legs are spread to position.

8. In a ladder, and in combination with its uprights and top, a guide-frame hinged to said top and comprising parallel-spaced strips, and adapted to swing to and from the uprights, legs pivoted in said frame, between said strips, having their upper ends extended above their pivotal centers and guided between the strips, said legs adapted to swing sidewise, and a brace hinged at its forward end and slidably connected at its rear end with the guide-frame.

9. In a ladder and in combination with its uprights and top, a guide-frame hinged to said top and adapted to swing to and from the uprights, legs pivoted in said frame and adapted to swing sidewise, a brace hinged at its forward end and a sleeve at its rear end, and a guide-bar on the guide-frame and upon which the sleeve of the brace slides up and down.

In witness whereof I have hereunto set my hand.

GILES E. CHITTENDEN.

Witnesses:

S. H. NOURSE,

JESSIE C. BRODIE.