

(No Model.)

2 Sheets—Sheet 1.

G. E. CHITTENDEN.
STEP LADDER.

No. 520,202.

Patented May 22, 1894.

Fig. 1.

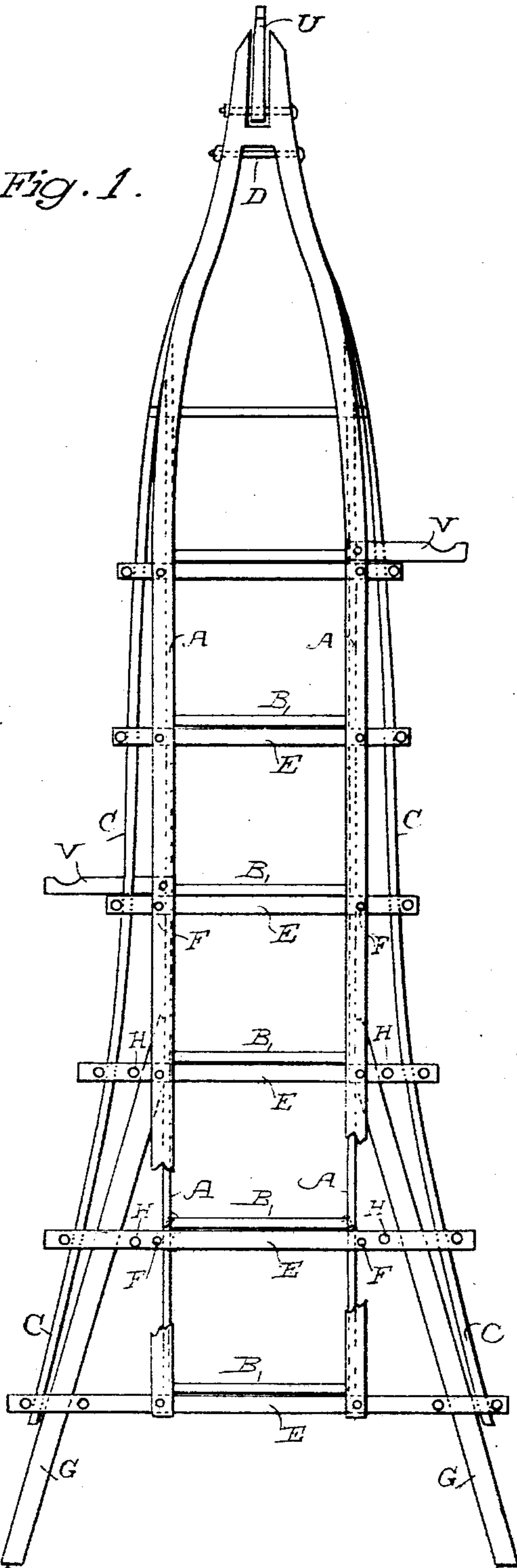
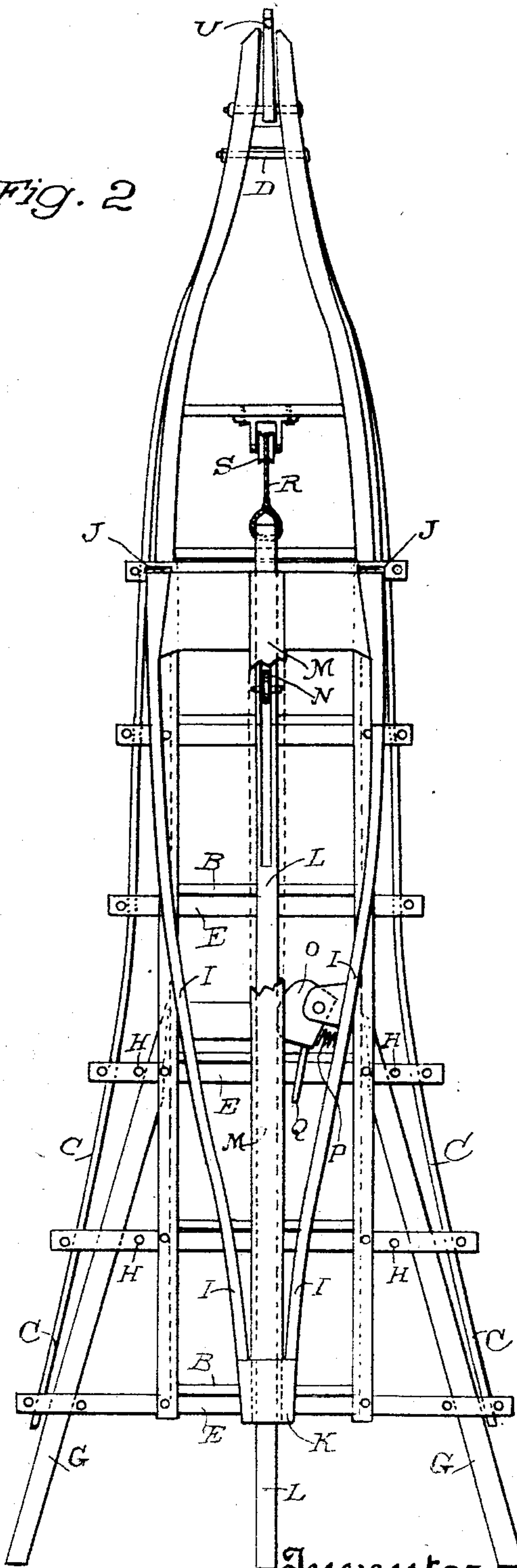


Fig. 2.



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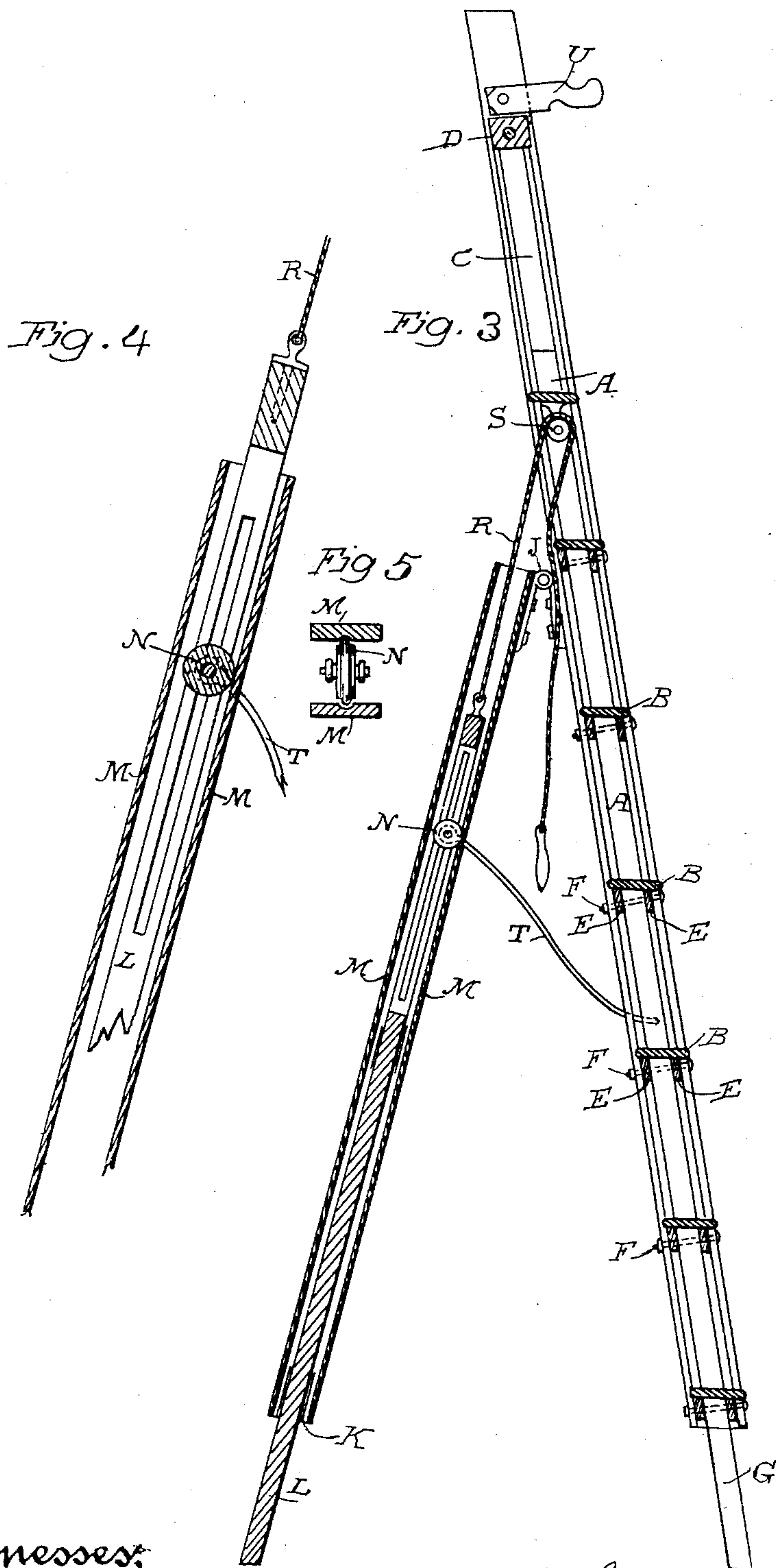
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2 Sheets—Sheet 2.

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STEP LADDER.

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UNITED STATES PATENT OFFICE.

GILES E. CHITTENDEN, OF NILES, CALIFORNIA.

STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 520,202, dated May 22, 1894.

Application filed January 15, 1894. Serial No. 496,979. (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 Step-Ladders; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in step ladders. It consists in certain details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a front view of the ladder. Fig. 2 is a rear view. Fig. 3 is a side sectional elevation. Figs. 4 and 5 are sectional views of part of the extension leg.

The object of my invention is to provide an improvement in step-ladders which enables them to be used in either indoor or orchard work, and to provide simple adjustments by which the relative position of the feet and supports may be regulated, and the width of the base altered to suit the position and height of the ladder.

A A are the sides of the main portion of the ladder and B are the steps. The sides are made in any suitable or desired manner. I have found that for lightness and strength thin strips having a considerable depth from front to rear will make a sufficiently rigid apparatus when the proper bracing and other parts are connected together.

The main or body portion of the ladder, consisting of the sides and steps, is contained between the supplemental side strips C which form a frame and support for the ladder proper. These side strips extend from about the level of the lower step to a point considerably above the upper step of the main portion of the ladder. At the base these sides are separated to a considerable distance from the lower ends of the ladder as shown. From this point they converge, gradually approaching the sides of the ladder, until at the upper ends of the sides A, they unite with these upper ends, and continuing to converge above this point, are brought together at the upper end, where they are united by a bolt or bolts, as shown at D, at a point considerably above the upper step of the main ladder. This extension may be made sufficient

for four or more additional steps, if desired, as will be hereinafter described. By thus constructing the ladder with this pointed extension, it is possible to use it to the greatest advantage in orchard work, as this point is easily introduced among and between the limbs and branches of the tree, and the ladder may be set in any convenient position for picking fruit, pruning, and other purposes which would be impossible with the ordinary broad-topped step-ladder.

The steps B are supported by thin transverse strips E having sufficient depth vertically, and these strips are bolted upon the front and rear edges of the sides A, and also the supplemental sides C, the strips extending across both front and rear of these sides as shown, and when the nuts are drawn tight upon the bolts F, these strips will be secured with the necessary firmness, and they also serve as braces to hold the sides A and C together, and give firmness to the structure. The upper edges of the transverse strips E are fixed to the sides to suit the angle at which the ladder would ordinarily stand, and the steps B are then placed so as to rest upon the upper edges of these strips which thus form a solid and firm support for both front and back edges of the steps. The ends of the steps which abut against the inner faces of the sides A are simply secured by any suitable fastenings which will secure the ends of the steps to the sides A sufficiently to prevent the steps from being displaced. The steps, however, are entirely supported by the transverse bars E as before described. This construction enables me to replace the steps when at any time they become worn out, and as the steps are the parts of the ladder which first become broken or worn, it is important to be able to replace them without tearing the ladder to pieces, and when thus replaced the ladder is as good as new.

In order to give the ladder a firm base which is also adjustable in width to suit the height to which the workman desires to ascend, or the unevenness of the surface upon which the ladder is placed, I have shown supplemental foot bars G, the upper ends of which are adapted to fit into sockets which are made upon the sides A of the ladder, or formed as shown in the present case by bolts

H passing through the strips E a short distance outside the sides A. From these sockets the bars G diverge and pass down below the bottom of the ladder just inside of the lower ends of the sides C, and are held in this position by the clamping bolts and thumb nuts which hold the bars E in place. As will be seen by this construction, the supporting bars G diverge widely from the sides of the ladder, and the amount of their divergence, as well as the length to which they project below the lowest step of the ladder, depends upon which of the sockets H their upper ends are fitted into. When fitted into the lowermost of these sockets, these bars will diverge at a sharp angle, and form a very wide base for the support of the ladder, so that the lower step is a considerable distance above the ground, and the whole height of the ladder is increased to that extent. When it is desired to have a narrower base and a shorter ladder, these bars are transferred to the sockets higher up, and as they are raised, the outer ends are drawn nearer to each other and the ladder is lowered. If the ladder is to stand upon uneven ground, one of these foot pieces may be adjusted so as to be shorter than the other, and thus level the ladder side-wise.

In order to properly support the rear end of the ladder, I have shown a hinged extension brace which is composed of two side bars I, the upper ends of which are hinged at or near the top of the sides A of the step-ladder, as shown at J. The hinges may be of any suitable or desired construction which allows the extension leg to swing about them. These sides converge and are united at their lower ends so as to form an open channel or guide K through which the single supporting extension leg L is allowed to slide. The sides I are suitably braced to each other at intervals, and midway between them extend the strips M in line with, and above and below the slidable leg or brace L, and at such a distance therefrom as to form a sort of channel within which this leg is allowed to travel. The upper end of this extension leg is slotted at any suitable point, and within the slot is journaled an antifriction roller N, the diameter of which is a little less than the distance between the two guide strips M. These guide strips may be grooved on their adjacent faces and the roller N may have its outer periphery rounded so that it will travel in these grooves. When the leg or extension is drawn toward one side of the channel formed by the strips M the roller will travel upon that strip, and will thus reduce the friction caused by moving the leg in its guides. When the pressure comes upon the leg so as to force it against the other strip, the roller travels upon that, and thus the single roller serves the purpose of reducing the friction upon which ever side it may bear. In order to retain this extension leg at the proper length to suit the position and angle of the ladder

portion I have shown a clamp consisting of a cam-shaped or clutch lock O which is actuated by a spring P of any suitable or desired construction, and this cam is forced against the extension leg L by the spring, so that it is prevented from sliding upward as long as the pressure is brought upon it.

Q is a handle by which the locking device may be drawn back so as to release the leg and allow it to be moved in either direction to extend or shorten it. To the upper end of this extension leg is attached a cord R which passes over a pulley at S, and hangs down upon the other side within convenient reach of the operator. By this construction of the converging sides I and the movable extension leg L it will be seen that the ladder forms a tripod, the three legs of which will always stand steadily upon whatever surface they may be placed, and by reason of their independent adjustments their lengths may be altered with relation to each other so that the ladder may be set upon uneven ground or hillsides and the extension legs lengthened or shortened according to the position in which the ladder is to be set. The range of motion is sufficient to allow the ladder to be set upon almost any incline upon which it can be used.

When the ladder is to be used in orchard work, it is simply closed up with the extension leg lying against the lower side of the ladder, and the upper pointed end may then be introduced between the limbs to any desired advantageous point for the work to be done. The base or feet of the ladder are then planted upon the surface of the ground, and lastly the extension leg is swung out until it occupies the proper position relative to the angle at which the ladder is to stand when the extension bar or foot is allowed to slide down until it strikes the ground by simply releasing the clutch which holds it, and its own weight will cause it to slide down to the proper point. This extension leg is suitably connected with the main portion of the ladder, by means of a rod or rods T, the outer ends of which are pivoted upon the ends of the axle of the pulley S, while the opposite ends are appropriately connected with the sides A of the ladder. When the extension leg and the pulley move upward, and the extension is closed against the bottom of the ladder this connection T follows the movement, and in the same manner when the leg is extended and set outward from the ladder portion, this connection also follows it in its movements. The upper converging portion of the sides C may extend to any desired distance above the hinge connection J, where the extension leg connects with the upper end of the ladder proper, and between these sides I introduce as many steps as the length of the device will admit. These steps may be used upon occasions of necessity when it is desirable to go above the top of the main portion of the ladder, and by reason of the great breadth

of the base and the steadiness formed by the triangular or tripod form of the whole ladder, the operator may safely go up two, three or four steps above the point of connection between the extension leg and the top of the ladder proper. This is a great advantage in the ordinary work of an orchard, and in other places where it is desirable to reach the highest point without unduly extending the main portion of the ladder and making it heavy and bulky.

In order to provide a convenient means for supporting a bucket or basket, when fruit is to be picked, I have shown an arm U which is hinged or pivoted upon a pin between the sides C, and suitably clamped in place so that it may be turned either to the front or the back and project so as to support the basket or utensil which is being used in the most convenient position. I preferably inclose the pivoted end of this bar or rest, with a lining of sheet metal which is fitted between the two sides C C at this point, so that when the sides are bolted together, the arm U is pressed between these metal surfaces.

V is another arm which is suitably pivoted to the sides A and as many of these arms may be employed along the latter as may be found desirable. These arms normally fold up so as to lie parallel with the sides A and out of the way, but when they are to be used they are turned down so as to project out from either side of the ladder at right angles, and they rest upon any suitable stop upon the outer sides C so that the utensil may be hung up upon the projecting arm and the hands of the operator be free for picking fruit.

It will be manifest that the sides A may be reinforced if desired by similar strips secured transversely to their edges so as to give the T or I form in cross section, and other variations may be made in the details of construction without materially altering the character of my device.

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

1. In a step ladder, the combination, with the main portion composed of sides and steps, of a supplemental exterior frame composed of sides converging from points opposite the lower end of the main portion of the ladder and extending at a distance above the upper portion of said main portion.

2. The combination, with the sides and steps of the main portion of a ladder, of a supplemental frame the upper end of which is made converging and extends to a point at a distance above said main portion.

3. In a step-ladder, the main portion con-

sisting of side bars, transverse steps and supplemental side bars converging from points opposite the lower end of the main portion of the ladder which is supported between these sides, intersecting the upper ends of the sides of the ladder and converging thence to a point at a distance above the upper portion of the ladder, substantially as herein described.

4. In a step-ladder, the main portion consisting of the sides, transverse steps, the supplemental sides exterior to the main side bars, transverse strips secured across the two sets of side bars and clamped thereto at the front and rear, said strips forming supports upon which the front and rear edges of the steps rest, and also serving as braces to unite the main ladder and supplemental sides together, substantially as herein described.

5. In a step-ladder, the main portion consisting of the sides, the steps, the supplemental converging sides exterior to the main portion of the ladder, transverse bars uniting the main ladder with these sides and forming supports for the steps, extension feet or legs, and sockets secured to the side bars of the ladder within which the upper ends of these extension legs are fitted, while the lower portion diverges therefrom below and outwardly from the outer side bars to which they are clamped, substantially as herein described.

6. In a step-ladder, the sides and transverse steps in combination with supplemental exterior converging sides within and between which the main portion of the ladder is supported, and supplemental adjustable legs whereby the height of the ladder and the width of the base is varied as described.

7. In a step-ladder, the main portion consisting of the side bars, and the transverse steps, a hinged brace connected with the upper end of the ladder, and composed of side pieces converging from their hinged ends downwardly, and provided with an open guide at the point where the side pieces meet, and a single extension leg slidable in said guide, and a clamp or clutch whereby said leg is retained in any position as described.

8. In a step-ladder, the main portion consisting of the sides, transverse steps and extension brace hinged to the upper end having a bar slidable therein, and a clamp whereby it is held at any point, and an anti-friction roller traveling between guides, substantially as herein described.

In witness whereof I have hereunto set my hand.

GILES E. CHITTENDEN.

Witnesses:

S. H. NOURSE,

H. F. ASCHECK.