(No Model.)

E. HARTER.

STEP LADDER.

No. 424,782 Patented Apr. 1, 1890.

Fig. 1.

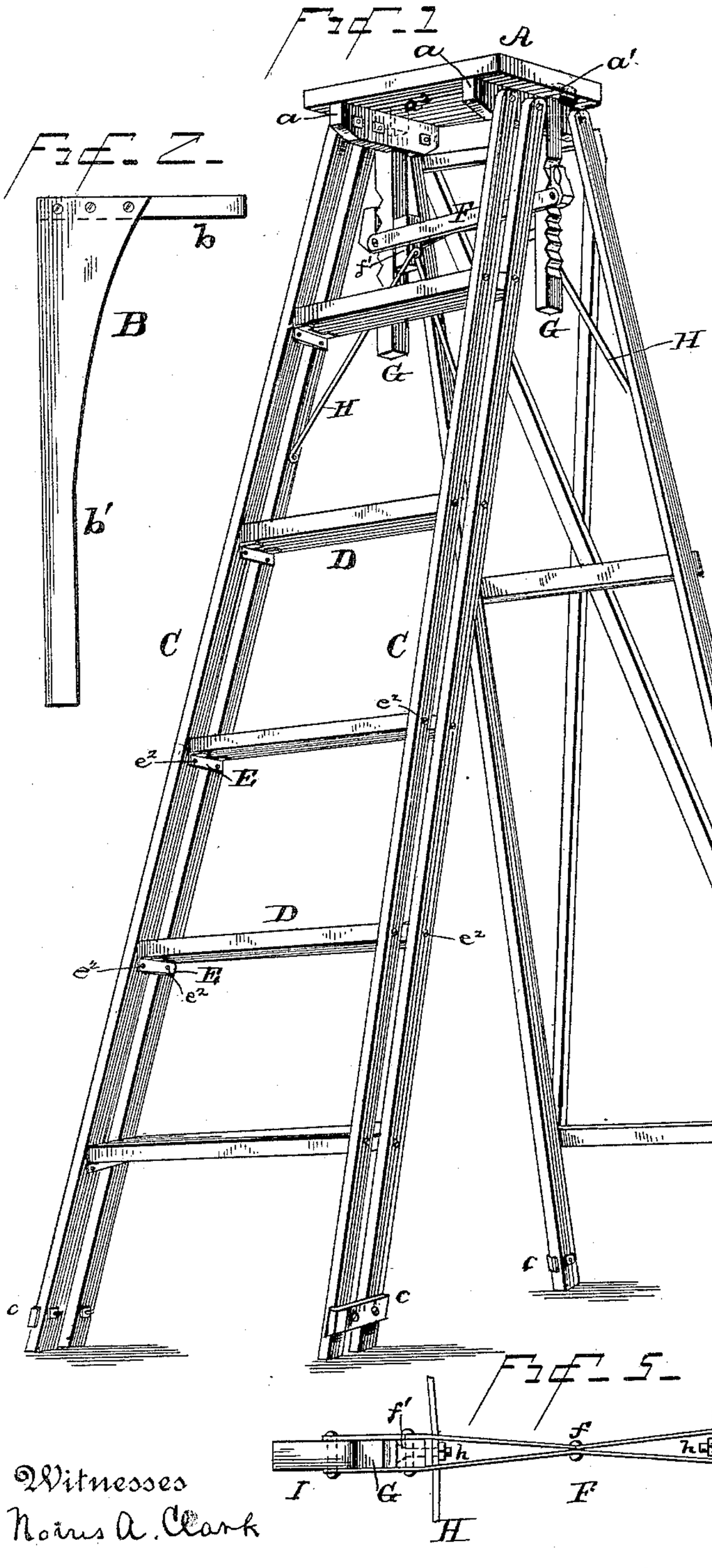

Fig. 2.

Fig. 3.

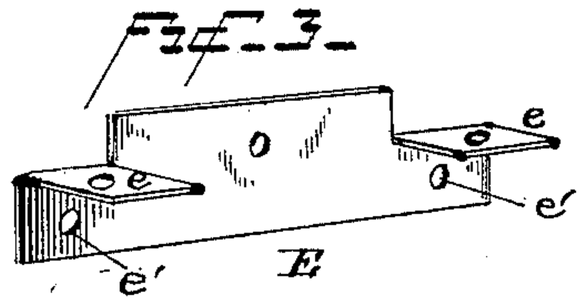

Fig. 4.

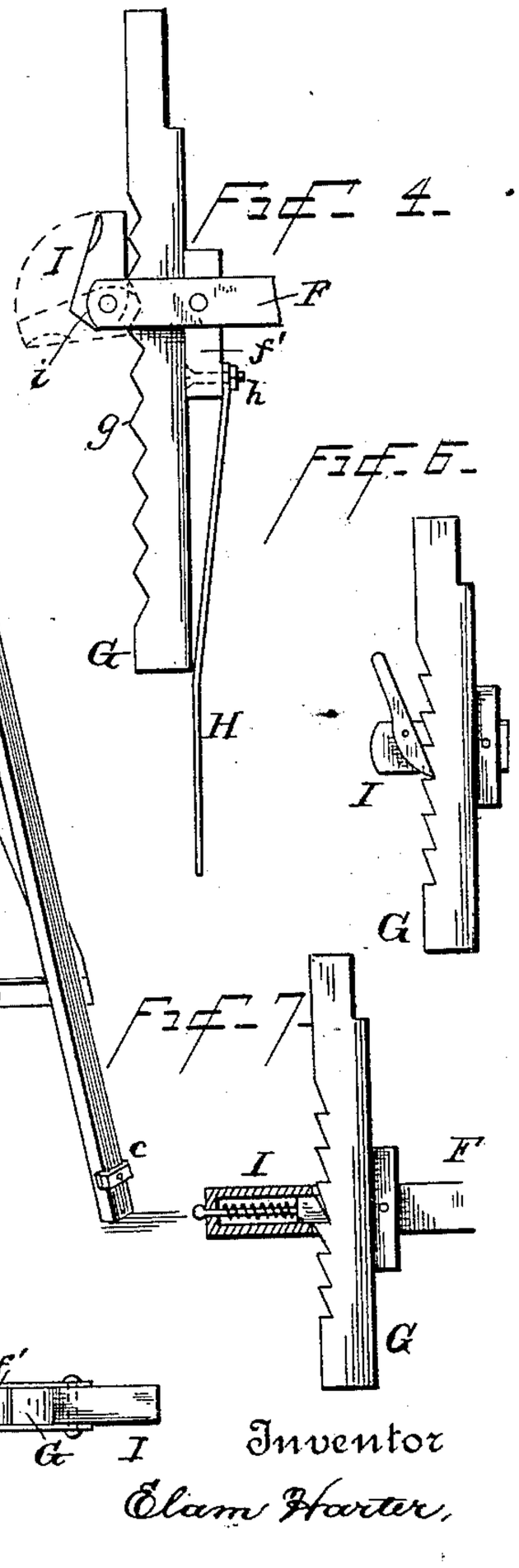

Fig. 5.

Fig. 6.

Fig. 7.

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STEP-LADDER.

SPECIFICATION forming part of Letters Patent No. 424,782, dated April 1, 1890.

Application filed July 17, 1889. Serial No. 317,789. (No model.)

To all whom it may concern:

Be it known that I, ELAM HARTER, a citizen of the United States, residing at San Diego, in the county of San Diego and State of California, have invented certain new and useful Improvements in Step-Ladders; and I do 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

My invention relates to step-ladders, and aims to improve the devices which govern the spread of the legs when separated, the manner of attaching the steps to the side rails, and other details of construction.

In the use of the step-ladder for gathering fruit or other purposes it is necessary to be able to adjust the spread of the legs to suit the various spaces in which the ladder may be placed, and yet to lock them securely when so adjusted. Moreover, it is important to preserve the horizontality of the steps under all circumstances to secure a firm and comfortable foothold. In soft ground the legs must be prevented from sinking deeply and unevenly, which is a matter of great annoyance, while some convenient and quickly-adjusted support for the basket or other fruit receptacle is frequently of assistance.

My invention consists in certain constructions and arrangements of parts which make a step-ladder fulfilling all these requirements, as hereinafter set forth, and particularly pointed out in the claims.

In the drawings, Figure 1 is a perspective view of my step-ladder. Fig. 2 is an end view of the removable basket-support. Fig. 3 is a detail showing the iron for attaching the steps to the side rails. Fig. 4 shows the device for locking the leg-braces. Fig. 5 is a plan view of the locking devices, and Figs. 6 and 7 are modifications of the locking device.

The top A of the ladder consists of a flat board of convenient size, upon the under side of which are cleats *a*, to which the legs are pivoted. In the table, either outside or inside of the cleats *a*, are holes *a'* a^2 to receive the legs of the removable basket-support B, which consists of a shelf *b* large enough to support a basket or other fruit-receptacle and mounted on legs *b'* of sufficient length to hold it at a convenient height above the top of the ladder. This removable support is to be used when the picker stands upon the upper steps or on the top of the ladder.

The back legs of the ladder may be of any suitable construction. The front legs C are preferably each composed of two parallel rails, pivoted at their upper ends to the cleats *a*. The steps D are attached to these side rails by means of irons E, which are preferably composed of a plate of metal having an ear *e* projecting at right angles from each end thereof, the ears lying in substantially the same plane, as shown. The upper portion of the plate is fastened to the end of the step, the ears *e* projecting under the same and being fastened there, suitable holes being made in the plate and ears for the passage of screws or nails. The lower portion of the plate has two holes *e'* for the screws or nails or bolts e^2, by means of which the plate is loosely fastened to the side rails C, one screw or other fastening passing into each rail. The plates E are so arranged that the steps D lie parallel with the top A of the ladder, and since the side rails are independently pivoted to the cleats *a* and to the plates E by the fastenings e^2, the steps will always remain parallel with the top irrespective of the angle the legs make therewith, the steps bearing the same relation to each other and to the top A as the parts of a parallel ruler.

My improved locking device, by which the legs can be securely locked at any angle of divergence, consists of a cross-head F, adjustable vertically upon two fixed parallel hangers G and connected by rods or braces H with the legs of the ladder. The cross-head is preferably composed of two strips of suitable material—wood, metal, or the like—firmly united together at *f* and attached to two blocks *f'*, to which the braces H are pivoted at *h*. The blocks *f'* lie against the inner faces of the hangers G and guide the cross-head in its movements thereon. The strips F straddle the hangers G, and between their projecting ends are held the locking devices I. These are adapted to engage with the outer faces of the hangers G and can be released therefrom at pleasure, as by an up-

ward movement of the cross-head, produced by forcing together the legs C, and thereby acting upon the braces H, which lift the cross-head by a toggle-joint action, or the locking devices can be released by manipulating them directly.

I do not confine myself to any special locking device, but may employ any that is capable of the functions above described, such as a pawl, Fig. 6, or a spring-latch, Fig. 7, engaging with the inclined teeth of a rack. I prefer, however, a combination of cam-lever and rack, as shown, Figs. 1, 4, and 5. The teeth of the rack are formed by shallow-pointed serrations, and the locking-lever has a flat face *i*, which comes to a firm bearing against the upper face of one of the teeth when the lever is turned down to the dotted-line position in Fig. 4. The top of the lever is rounded off at its inner end to meet the flat face *i*, so that it will offer no resistance to being turned up to the full-line position to unlock the cross-head. In this position the cross-head can be slid freely up or down the hangers G; but when the locking-levers are turned down the cross-head is locked against downward movement, though free to be raised, the lever being readily unlocked by an upward movement of the cross-head, such as that produced by shutting the legs together. From the manner in which the braces H are connected to the cross-head F it is evident that when the cross-head is locked against downward movement the legs are firmly held from separating.

In order to prevent the legs from sinking too far or unevenly in soft ground, each leg is provided with a cleat *c*, fastened across it near its foot and projecting on each side a sufficient distance to afford an increased bearing-surface when the leg sinks into the ground.

My improved step-ladder is not only especially convenient for picking fruit, but is adapted for all other purposes to which step-ladders may be put.

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

1. The combination, with the top of a step-ladder and the legs pivoted thereto, of suitable serrated hangers attached to the top, a cross-head sliding thereon, braces uniting the cross-head with the legs, and an independently-operated locking device carried on each end of the cross-head and adapted to engage with the serrations, substantially as described.

2. The combination, with the top of a step-ladder and the legs pivoted thereto, of suitable hangers attached to the top, a cross-head sliding thereon, braces uniting the cross-head with the legs, and an independently-operated locking device carried on each end of the cross-head and adapted to engage with the hangers, substantially as described.

3. The combination, with the top of a step-ladder and the legs pivoted thereto, of suitable serrated hangers attached to the top, a cross-head sliding thereon, braces uniting the cross-head with the legs, and a locking device carried by the cross-head and adapted to engage with the upper face of the serrations, whereby the cross-head will be locked against downward movement, but will be free to move upward, substantially as described.

4. The combination, with the top A of a step-ladder and the legs C, pivoted thereto, of suitable hangers G, attached to the top and provided with serrations *g*, the cross-head F, sliding on the hangers, braces H, uniting the cross-head with the legs, and the locking-levers I, pivoted to ends of the cross-head and having a flat face *i* to engage with the serrations *g*, substantially as described.

5. The combination, with the top A, having pivoted to it the legs C, composed of the two parallel side rails, of the steps D and the irons E, attached to the ends of the steps and loosely attached to the side rails by the fastenings e^2, substantially as described.

6. The device for securing the step to the side rails of a step-ladder, consisting of the plate E, having at each end an ear *e* projecting at right angles and both lying in substantially the same plane, the plate and ears having suitable holes for the passage of screws and other fastening devices, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ELAM HARTER.

Witnesses:
CALVIN H. FREW,
FRANK. M. THOMAS.