W. A. SMITH.

EXTENSION LADDER.

APPLICATION FILED OCT. 3, 1916.

1,248,189.

Patented Nov. 27, 1917.

2 SHEETS—SHEET 1.

FIG. 1.

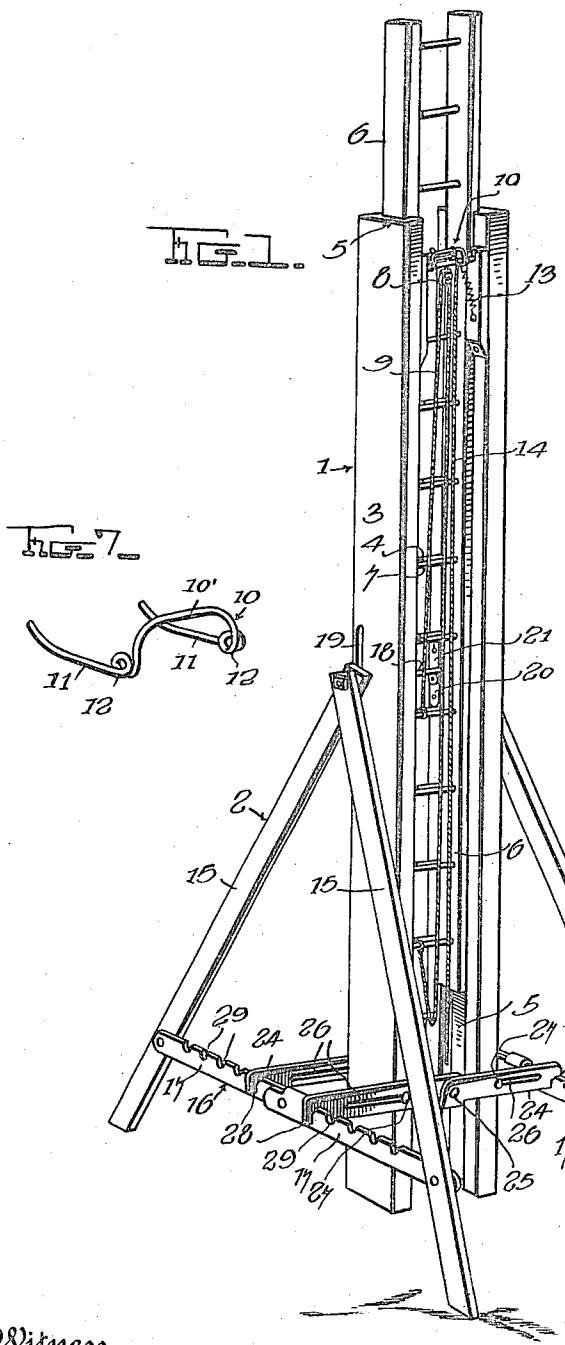


FIG. 2.

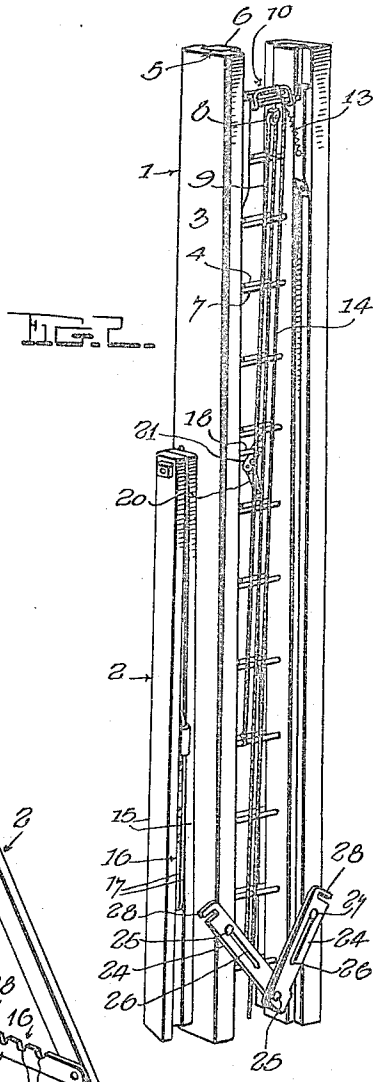


FIG. 7.

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2 SHEETS—SHEET 2.

FIG. 3.

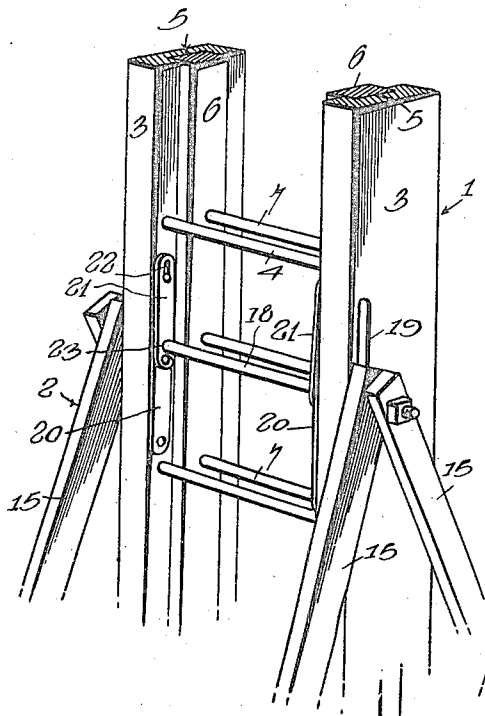


FIG. 4.

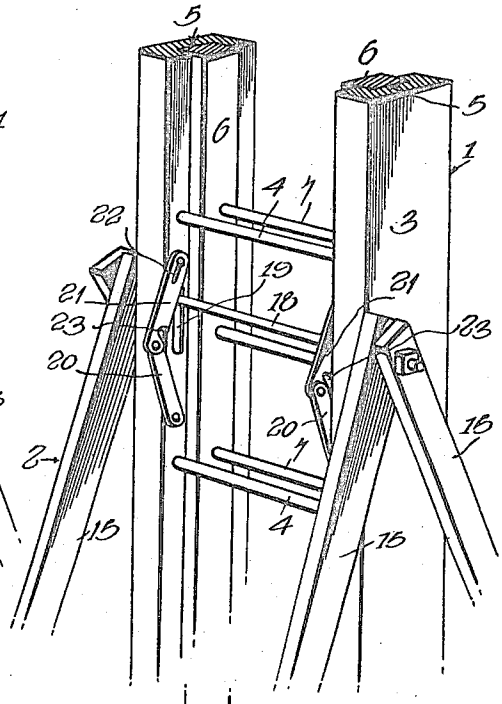


FIG. 5.

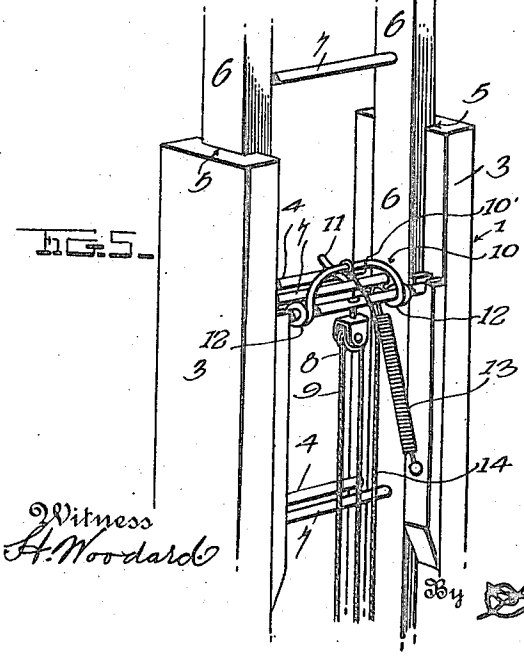
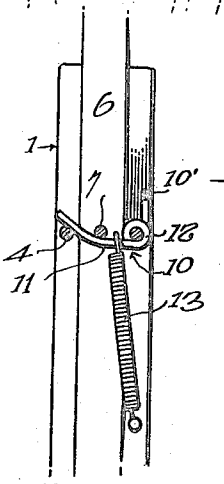


FIG. 6.



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EXTENSION-LADDER.

1,248,189. Specification of Letters Patent. Patented Nov. 27, 1917.

Application filed October 3, 1916. Serial No. 123,559.

To all whom it may concern:

Be it known that I, WILEY A. SMITH, a citizen of the United States, residing at Meridian, in the county of Lauderdale and State of Mississippi, have invented certain new and useful Improvements in Extension-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.

This invention relates to improvements in extension ladders, and one of the objects is to provide a device of this character which can be quickly and easily folded into a compact article for shipping or storage purpose.

An additional object is to provide a ladder which is so supported that its angle of inclination can be readily varied.

Still another object is to provide a novel arrangement for holding the extensible portion of the ladder in elevated positions.

A still further object is to provide a very simply constructed ladder which can be inexpensively manufactured and one which will be very efficient in operation.

With the above and other objects in view, the invention resides in the novel features of construction, combination and arrangement of parts which will be hereinafter more particularly described and claimed.

In the accompanying drawings:

Figure 1 is a perspective view of a ladder constructed in accordance with my invention, the same being set up in operative position and the extensible portion slightly raised;

Fig. 2 is a similar view showing the parts folded into inoperative position;

Figs. 3 and 4 are enlarged detail perspective views showing the locking means which is used for holding the ladder portion stationary relative to its supporting means;

Fig. 5 is a similar view showing more particularly the means for holding the extensible portion of the ladder in elevated position;

Fig. 6 is a vertical transverse section also showing the parts illustrated in Fig. 5; and

Fig. 7 is a detail perspective view of the retaining latch removed.

This improved ladder comprises a ladder portion 1 and a pair of supporting members 2 with which the first mentioned portion is pivotally connected. As in devices of similar nature, the ladder portion 1 consists of a pair of side pieces or bars 3 connected by rungs 4 spaced suitable distances apart. The side pieces of the present device have their inner adjacent faces longitudinally grooved as shown at 5 to slidably receive the side bars 6 of an extension ladder, said side bars being also connected by rungs 7. The extension ladder 6 is normally retracted, and when in this position its ends coincide with the ends of the main side bars 3.

Any suitable means may be employed for raising the extension ladder and for holding the same in its elevated position. I have provided a very simple means for accomplishing this purpose, which consists in attaching a pulley or the like 8 to one of the upper rungs 4 and extending a cable 9 around the wheel of this pulley, the ends of said cable being suitably attached to the extension ladder at any desired points, so that when the cable is pulled, the ladder 6 will be elevated to any desired height.

It is held in this raised position by means of a latch 10, the specific structure of which is clearly shown in Fig. 7. This latch is formed from a single piece of heavy wire bent into substantially U-shape, the intermediate portion thereof being bent into a plane substantially at right angles to the plane of the arms 11. This intermediate portion which is numbered 10′ in the drawings forms a trip member whereby the arms 11 may be raised as will hereinafter appear. The arms 11 adjacent their connection to the intermediate portion 10′ are bent to form eyes 12 for the reception of one of the rungs 4, preferably that with which the pulley 8 is connected. This arrangement pivots the latch to the bars 3, and the springs 13 connected with the arms 11 to hold the latter in a substantially horizontal plane, the ends of said springs remote from their connection with the arms 11 being attached to the side bars 3.

When the extension ladder is raised by a pull on the cable 9, the rungs 7 of said ladder force the arms 11 of the latch 10 upwardly out of their path of movement, but just as soon as each rung is raised out of engagement with the latter, the springs 13 force the latch back into operative position so that when the cable 9 is released, the arms 11 will be engaged by one of the rungs 7 to hold the extension ladder in its raised position. When it is desired to retract the ex-

tension, the same is raised slightly by the usual means and the cable 14 connected with the portion 10′ is pulled downwardly to move the arms 11 out of the path of movement of the rungs 7, these arms being held in this position until the extension ladder has been lowered a sufficient extent.

The supporting members 2 of my improved ladder each consist of a pair of legs 15 pivotally connected together at one end so that when their other or lower ends are spaced apart, each member will be in the form of an inverted V. Each of the supporting members has its legs 15 held in extended position and braced by means of a foldable bar 16. Each of the brace bars is formed of a pair of links 17 pivotally connected together at one end and at their other ends to the legs. From Fig. 2 it will be seen that when the device is folded the legs 15 and the links 17 will be substantially alined and thereby occupy only a very small space.

The apices of the supporting members are connected together and to the side bars 3 by means of a transversely extending pivot rod 18. The side bars 3 have longitudinally extending slots 19 for the reception of the pivot rod 18 so that the ladder will have a rotatable and also a limiting sliding connection with its supporting members. The purpose of these slots 19 is to allow the parts of the device to be folded into a more compact article. It may be here mentioned that it is necessary to dispose the lower end of the ladder above the ground when it is in operation so that it may be disposed at different angles with the horizontal, but because of this construction, the legs 15 when folded, will extend below the bottoms of the side bars 3. The side bars 3 are therefore slotted to allow the pivot rod 18 by which they are connected to the supporting members to move upwardly and thus permit the ends of the legs 15 to be disposed in the same plane as the bottom of the ladder, as in Fig. 2.

In order to hold the ladder 1 against shifting on the rod 18 when the parts are arranged in operative position, a pair of locks is provided, each of which consists of a pair of links 20 and 21. These links are pivotally connected together at one end and the link 20 is also pivoted to one side bar 3, while the other link 21 which is longitudinally slotted as at 22 adjacent one end is slidably and pivotally connected to said side bar 3. This arrangement allows the links to be moved toward and away from the rod 18, said links being connected to the side bars on each side of said rod. A seat 23 is formed in each of the links 21 so that when the links are moved inwardly toward the rod 18, and the same disposed in said seats, the ladder and its supporting members will be in operative position. When the parts are in this position, the rod is at the bottom of the slots 19. The two positions of the lock are shown in Figs. 3 and 4.

Another feature of my invention which is operative when the parts of the device are in use, resides in the means for holding the ladder portion 1 at various angles to the horizontal. This consists of two pairs of arms 24, each pair of which is disposed on opposite sides of the ladder 1. Each pair of arms 24 is pivotally connected together at one end as shown at 25, and each arm of each pair is slidably mounted upon one of the side bars 3. These arms are slotted as shown at 26 to receive studs 27 on the bars 3 in order that they may be slidably connected thereto. When the parts of the device are inoperative, the arms 24 are arranged as shown in Fig. 2, but when the device is operative, these arms are disposed in longitudinal alinement as shown in the other figures. When in the latter position, the hooked ends 28 thereof are engaged with notches 29 formed in the links 17 of the braces 16. By disposing the hooks in various notches, the ladder may be held securely at various angles of inclination. This construction is very advantageous inasmuch as it permits the ladder to be held either vertical or at a considerable angle without danger of its falling over. It may be used very successfully by fruit pickers, painters, and others, because of its improved construction.

From the foregoing description taken in connection with the accompanying drawings, it is believed that further information in regard to the operation and use of the device is unnecessary. The position of the parts as they will appear when folded and when in operative position are clearly shown in Figs. 1 and 2.

I claim:

1. In a device of the class described, a pair of inverted V-shaped supporting members, the legs of each being pivoted together, foldable brace bars connecting the legs of each of said members, a ladder pivoted intermediate its ends between said members, laterally extensible arms carried by said ladder and means on the ends of said arms for locking engagement with said brace bars, whereby to dispose said ladder at various angles to the horizontal.

2. In a device of the class described, a pair of inverted V-shaped supporting members, the legs of each being pivoted together, foldable brace bars connecting the legs of each of said members and having notches therein, a ladder pivoted intermediate its ends between said members, and laterally extending pivotally connected extensible arms carried by said ladder and having hooks on their opposite ends for locking

engagement with said notches whereby to angle said ladder.

3. In a device of the class described, a pair of inverted V-shaped supporting members, the legs of each being pivoted together, foldable brace bars connecting the legs of each of said members, a ladder pivoted intermediate its ends between the same, and a pair of longitudinally slotted arms pivoted together and slidably connected to said ladder, said arms being movable into longitudinal alinement to dispose the ends thereof into engagement with said brace bars.

4. In a device of the class described, a pair of supporting members, a pivot rod connecting the same, a ladder having a sliding movement on said pivot rod and limited thereby, and a lock on the ladder for engagement with said rod to hold the former against sliding movement.

5. In a device of the class described, a pair of supporting members, a pivot rod connecting the same, a ladder having a limited sliding movement on said pivot rod, and a pair of links pivoted together at their adjacent ends, the other end of one of said links being pivoted to the ladder, the other end of the other link being slidably and pivotally connected to the ladder, one of said links having a seat to receive said rod to hold the ladder against sliding movement.

6. In a device of the class described, a pair of supporting members, a pivot rod connecting the same, a ladder having a longitudinally extending slot in each of its side bars, said pivot rod being slidably and rotatably disposed in said slots, and a pair of links pivoted together at their adjacent ends, the other end of one of said links being pivoted to the ladder, the other end of the other link being slotted and slidably and pivotally connected to the ladder, one of said links having a seat to receive said rod to hold the ladder against sliding movement.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILEY ANCEL SMITH.

Witnesses:
J. A. TREADAWAY,
W. H. FORBES.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."