Sept. 16, 1952 H. L. WHEELDEN 2,610,875

EXTENSION LADDER

Filed March 26, 1948

Fig. 1.

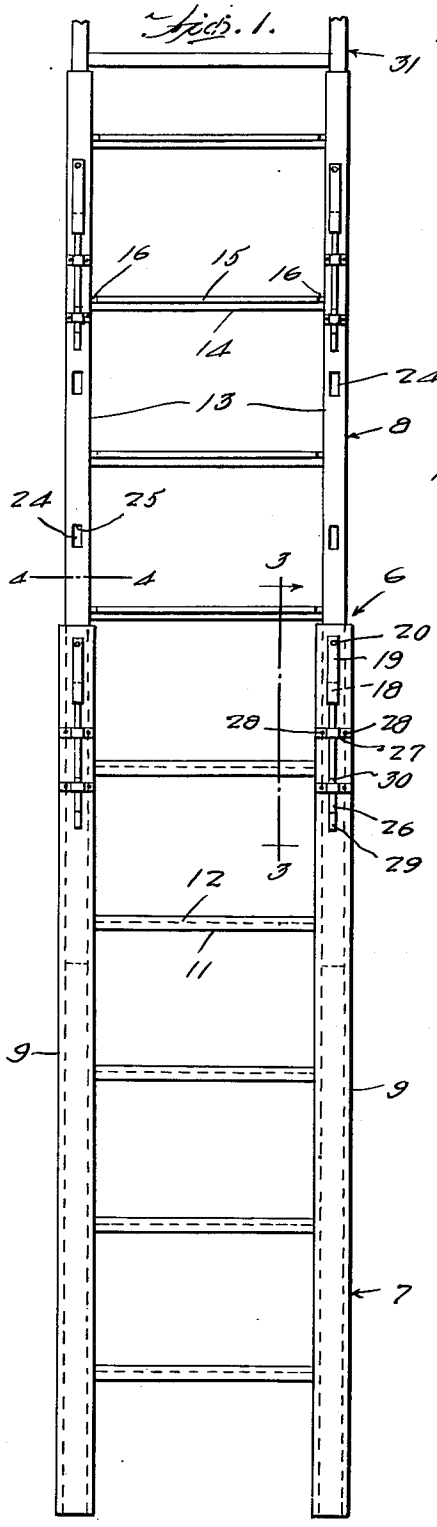


Fig. 2.

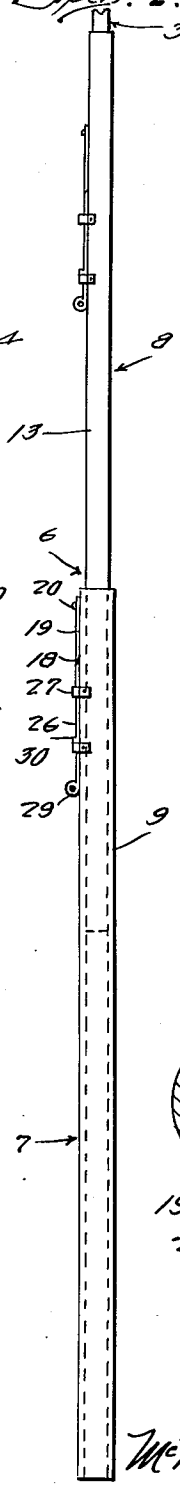


Fig. 3.

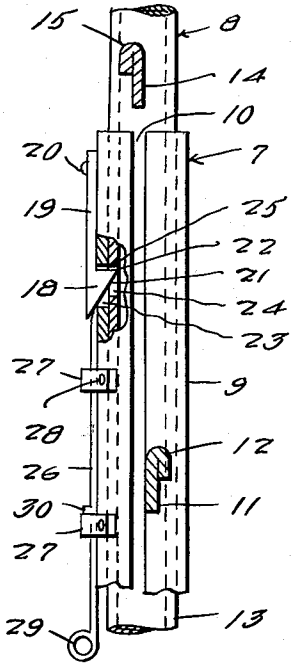
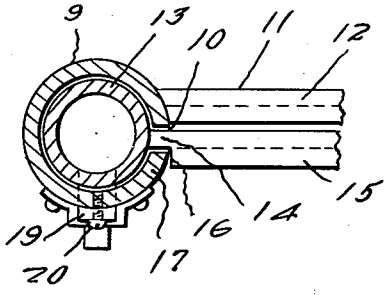


Fig. 4.



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EXTENSION LADDER

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1 Claim. (Cl. 287—58)

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This invention relates to extension ladders, and particularly to that type of extension ladder wherein the longitudinal side members or uprights thereof are telescoped in idle condition of the ladder.

The main object of the invention is to provide an extension ladder of simple, effective and economical construction, which may be made of metal, plastics or other suitable material, and be certain and effective in operation despite the simplicity of its construction.

Another object is to have a special extension ladder wherein the longitudinal side members or uprights are tubular and telescope when collapsing the ladder.

A further object is to have such an extension ladder provided with automatically-engaged supporting catches or latches which retain the ladder sections in extended position when the ladder sections are drawn or pushed apart.

It is also an object to have the extension ladder provided with manually-operated release members for releasing the extended ladder sections and allowing telescoping or collapsing thereof.

Other objects and advantages will be more fully disclosed hereinafter as the specification proceeds.

In order to bring out comprehensively the features of the invention, the latter is illustrated in the accompanying drawings forming a part hereof, and in which:

Figure 1 is a front elevation of an extension ladder embodying the invention in a practical form and displaying the salient features thereof;

Figure 2 is a side elevation of the same extension ladder;

Figure 3 is an enlarged fragmentary section taken on line 3—3 of Figure 1;

Figure 4 is also an enlarged fragmentary section taken on line 4—4 of Figure 1.

In the four views, the same reference numerals indicate the same or like parts.

Extension ladders are very convenient in many situations and frequently a necessity, being used in emergencies and especially at fires and other disasters. Such ladders are all too often bulky and unwieldy, expensive, and far from simple in construction and operation, and by virtue of such drawbacks sometimes defeat the very purpose of their use. Moreover, such ladders are almost always made in large sizes and are therefore limited in their field of use.

However, by adopting a new approach to this

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problem, I have found it readily possible to provide an extension ladder which fulfills the foregoing objects and in addition may be made not only in large, but also in medium and small sizes, and thus even tend to displace ordinary stepladders, as will immediately be described in detail.

Hence, in the practice of my invention, and referring now again to the drawings, the ladder, generally indicated at 6, primarily includes a main ladder section indicated at 7 and a secondary or upper extensible ladder section 8 connected thereto in special manner. The longitudinal side sections or uprights 9, 9 of the main ladder section 7 are split upon their inner facing sides by an open longitudinal slot 10 for a purpose which will presently appear. Linking the two uprights 9, 9 are a series of steps or rungs 11, 11 having the upper edges thereof doubled over at 12, 12 to reinforce the same and render them rigid, the ends of the rungs being riveted, brazed or welded to these uprights close to slot 10 on each member 9. Obviously, the ends of the rungs could terminate in tongues or lugs extending downwardly through slots in the inner sides of the ladder uprights, or any conventional connection between the ends of the rungs and the uprights may be used.

In the ladder as actually illustrated, the uprights 9 are tubular and hollow, and although shown round, they may, of course, be oval, square or rectangular in section, if desired, but in any case, into these hollow members project tubular uprights 13, 13 of secondary ladder section 8 provided with rungs or steps 14, 14 having the reinforced upper edges 15, 15 similar to rungs 11 with their upper edges 12 already described, and preferably riveted, brazed or welded at their ends to the uprights 13 just described. These last-mentioned rungs at points adjacent to their ends have clearance slots 16, 16 of sufficient length to allow for the thickness of the metal or other wall 17 of main ladder upright 9, as best seen in Figure 4. On the other hand, the single thickness of the metal remaining of rungs 14 at the slotted portions 16 is accommodated by open longitudinal slots 10 in uprights 9 of main ladder sections 7, these rungs sliding down into the slots when the upper ladder section 8 is allowed to descend into collapsed or coextensive relation with main section 7.

In order to retain the extension attained by the secondary or upper ladder section 8 when raising the same, the stiles 9 of the main section 7 are individually provided with pendent, triangular latch heads 18 on the lower ends of resil-

ient arms 19 extending longitudinally of the stiles secured at their upper ends by rivets or screws 20 to the stiles and tensioned toward the stiles so as to urge the latch heads inwardly. The inwardly positioned, inclined working faces 21 of the latch heads terminate at their upper ends at the inward ends of the right-angular transverse locking faces 22. The latch heads normally project inwardly through slots 23 in the stiles 9 and into slots 24 in the stiles 13 of the upper ladder section 8, with the locking faces 22 of the latch heads engaging with the tops 25 of the slots 24. The arrangement is such that as the upper ladder section 8 is raised while the main section remains on the ground, the inclined working faces 21 of these latches slide over the front surfaces of uprights 13 of the secondary section and jump out of slots 24 in succession in the manner of a ratchet action until the secondary section has been raised to the desired position. At this point, the upper resilient tail portions 19 of the latches force the latter into the final slots 24 to retain the upper ladder section in its raised position. This, however, does not prevent further extension of the ladder as the ratchet action of the latches in slots 24 while locking the upper ladder section in an attained position, automatically releases the same for further extension. The engagement of the latches in the mentioned slots is thus automatic and is arranged to be released by special means for collapse of the ladder.

In other words, in order to release the latches from engagement with the slots 24 in the upper or secondary ladder section, and allow the ladder to descend into the telescoped idle position with respect to the main or lower ladder section, the uprights 9 of the ladder also carry individual release sliders 26, 26 slidably mounted in guides 27, 27 secured to said uprights by rivets or screws 28, 28. The lower ends of the sliders are furnished with finger pieces 29, 29 by which to manipulate these members, while at an intermediate point on each slider is a stop 30 projecting therefrom and preventing it from accidentally dropping out of the guides. The upper end 31 upon each slider is inclined and abuts the inclined working face 21 of the respectively adjacent latch 18, but normally does not interfere with the regular operation of the latches in holding the upper ladder section in attained raised positions.

When the upper ladder section is to be lowered, however, the latches are released by pushing the sliders 26 upward by means of finger piece 29, which will push the latches sufficiently far out of slots 24 to clear the latter and the upper ladder uprights 13 and allow the ladder to telescope into lower uprights 9 while rungs 14 of said upper section enter slots 10 and pass some of the rungs 11 of the main ladder section 7.

As indicated in Figures 1 and 2, a further ladder section 31 could be added to the ladder in order to lengthen the same, and in this case the secondary ladder section 8 is provided with latches and release sliders as before so that the further ladder section is controlled thereby even as section 8 is supported or released by the latches 18 and released by sliders 26. The latches and sliders on section 8 are given the same references as those which were described for the main ladder section 7.

Due to the compact structure which results when the ladder sections are collapsed or telescoped, the entire ladder is portable and readily placed beneath small trees out in the country or in orchards or within buildings or against the latter and readily extended as required.

From the foregoing, it is evident that the extension ladder described is both simple, compact and effective in construction and operation, and involves no complex manipulation or difficulties, but operates smoothly to be quickly extended and used or to be as quickly telescoped or collapsed and put aside until again needed for use.

Manifestly, variations may be resorted to and parts and features may be modified or used without others within the scope of the appended claim.

Having now fully described my invention, I claim:

In combination, an outer member, an inner member, means assembling said members for longitudinal movement relative to each other, said outer member being formed with an opening exposing a side of said inner member, a longitudinal resilient latch arm secured at one end to said outer member, said latch arm being tensioned toward said inner member, a latch head on the other end of said latch arm yieldably held in said opening by the tension of said arm, said latch head having a transverse locking face on one end thereof and a cam face, said cam face being inclined with respect to the longitudinal axis of the latch arm, said side of the inner member being formed with longitudinally spaced slots into which said latch head is adapted to be selectively engaged so as to lock the outer and inner members against longitudinal movement relative to each other in one direction, the inclined cam face of the latch head being arranged to be engaged by an edge of a slot in the inner member upon relative longitudinal movement of the members in the opposite direction whereby the latch head is cammed out of the slot in the inner member so as to permit further relative longitudinal movement of the members in said opposite direction, said outer member having a slider mounted for longitudinal movement therealong at the end of the latch head remote from the transverse locking face thereof, said slider being normally out of contact with the latch head and being movable along the outer member to engage the cam face of the latch head so as to cam the latch head out of a slot of the inner member and free the outer and inner members for relative longitudinal movement in either direction.

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