

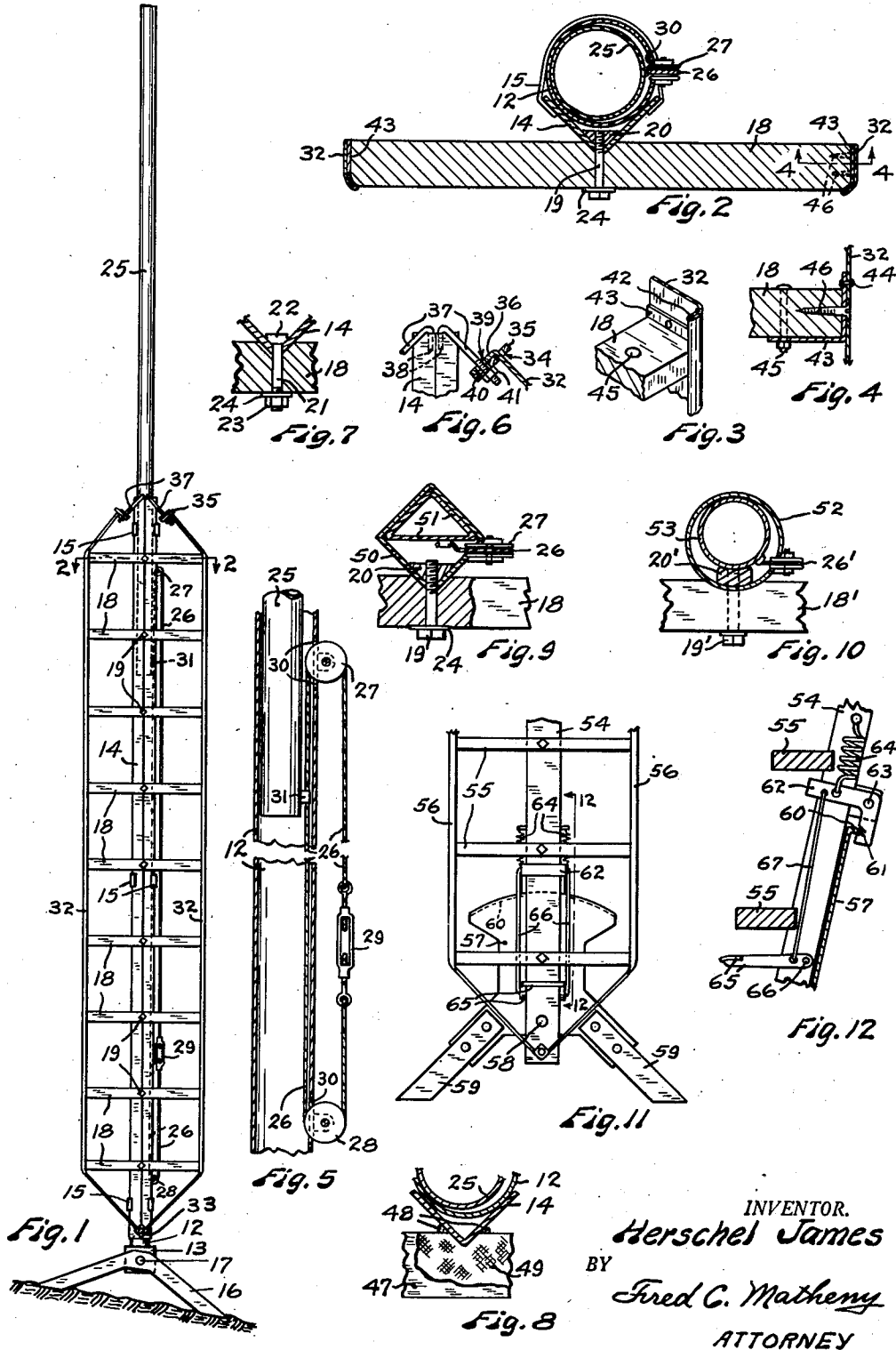
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LADDER

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LADDER

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This invention relates to a ladder and an object of this invention is to provide a ladder which is especially well adapted for orchard use but which can be used in other work.

Another object of this invention is to provide a ladder having a single medial tubular post and having an extension arm slidably and telescopically disposed in said post and having endless belt type extension arm adjusting means connected with said extension arm providing for quick and easy adjustment of the extension arm between a position within the post and positions in which the arm extends above the post.

Another object of this invention is to provide a ladder having a single medial post provided with cross steps and having sheet metal side rail straps secured to the ends of said cross steps at both sides of the ladder to brace and support said steps, said straps being secured to said post beyond the two end steps of the ladder and said straps having tensioning means connected therewith and said straps having curved forward edges which extend around the forward edges of the steps to provide fruit bag supporting rails.

Another object of this invention is to provide a ladder having a single medial post and having a self leveling self locking base pivotally connected with the lower end portion of said post.

Other objects of this invention are to provide a ladder of strong and rugged construction which is not expensive to manufacture, is safe to use, is not heavy to handle and one on which the user can stand on the top step and work without danger of falling due to the provision of an extension arm extending above the ladder proper.

Other objects of this invention will be apparent from the following description and appended claims taken in connection with the appended drawings which disclose preferred embodiments of the invention by way of example.

In the drawings Figure 1 is a front elevation of a ladder constructed in accordance with this invention showing an extension arm thereof in a raised or extended position.

Fig. 2 is a sectional view taken substantially on broken line 2-2 of Fig. 1 and on a larger scale than Fig. 1.

Fig. 3 is a detached fragmentary perspective view, partly in section, showing a sheet metal truss strip which is secured to the ends of the steps of the ladder.

Fig. 4 is a fragmentary sectional view on a larger scale than Fig. 2 taken substantially on broken line 4-4 of Fig. 2 and showing a method of attaching a side rail strap to the ends of the ladder steps.

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Fig. 5 is a detached fragmentary view showing cable means for raising and lowering a telescopically disposed extension arm.

Fig. 6 is a fragmentary view partly in elevation and partly in section showing adjustable tensioning means for anchoring side rail straps.

Fig. 7 is a fragmentary sectional view showing alternative means for securing ladder steps to an angle bar.

Fig. 8 is another fragmentary view partly in plan and partly in cross section showing a metal step welded to an angle bar post and having a tread portion of rubber or like material secured thereto.

Fig. 9 and 10 are two views partly in cross section and partly in plan, similar to Fig. 2, and showing two different modified forms of ladder post and extension arm means.

Fig. 11 is a fragmentary view in front elevation showing a pivotally connected self leveling self locking ladder base.

Fig. 12 is an edge view of the apparatus shown in Fig. 11.

Like reference numerals designate like parts throughout the several views.

Figs. 1 to 6 inclusive show a ladder of a type adapted to be rested on the ground and leaned against any suitable support and sometimes referred to as a "lean up" ladder. This ladder comprises an upright tubular post 12 having a flat plate 13, Fig. 1, welded or otherwise rigidly secured to its lower end portion. An angle bar 14 fits over and receives the post 12 and is rigidly secured to said post 12 with the post parallel to the angle bar and disposed within the concave side of the angle bar. A plurality of metal bands or straps 15, as shown in Figs. 1 and 2, may be used to secure the tubular post 12 and angle bar 14 together or said post 12 and angle bar 14 may be welded together.

A ladder base 16 which is capable of self adjustment to conform to sloping and uneven surfaces or side hills is pivotally secured, as by a pivot member 17, to the plate 13 on the lower end portion of the tubular post 12. If desired the ladder base shown in Figs. 11 and 12 and hereinafter described, may be used in place of the ladder base 16 on the ladder shown in Figs. 1 to 6.

The angle bar 14 has spaced apart cross steps 18, which may be of wood, rigidly secured to the apex portion thereof as by cap screws 19. Preferably the steps 18 are not positioned exactly at right angles to the angle bar 14 and post 12 but are inclined slightly so that they will be substantially level when the ladder is inclined

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from the vertical at about the angle at which a ladder is ordinarily used.

I show the cap screws 19 to be threaded into a member 20 of triangular cross section which is positioned in the vertex portion of the angle bar 14 and may be welded to said angle bar 14. The member 20 can be a continuous strip of metal or it can be in the form of a plurality of nuts welded to the angle bar 14. Obviously bolts 21, Fig. 7, having tapered heads 22 thereon can be used in the angle bar 14 and nuts 23 can be provided on the outer ends of these bolts to hold the cross steps 18 thus dispensing with the member 20. Preferably washers 24 are used on the cap screws 19 and bolts 21.

An extension arm 25 is slidably and telescopically disposed within the tubular post 12 and can be adjusted so that it extends variable distances above the top end of said tubular post 12. This arm 25 can be placed in the crotch of a tree or against a tree branch or against any suitable support for the purpose of holding the ladder in a generally upright position and to serve as a hand hold for the user when he is on the upper steps of the ladder.

An endless belt type cable 26 is provided for longitudinally adjusting the extension arm 25 in the tubular post 12. The cable 26 is operatively disposed on two sheaves 27 and 28 with one lap of said cable positioned within the tubular post 12 and the other lap of said cable positioned on the exterior of the tubular post 12. A turnbuckle 29 is interposed in the lap of the cable 26 which is on the outside of the tubular post 12 to provide for taking up slack in the cable 26 and to serve as a hand hold in adjusting the extension arm 25. The sheaves 27 and 28 are rotatively mounted on the exterior of the tubular post 12 and the cable passes into and out of said post 12 through openings 30, Fig. 5. The cable 26 is welded or otherwise fixedly attached to the lower end portion of the extension bar 25 by attachment means 31, Fig. 5. The extension arm 25 is of a diameter sufficiently smaller than the internal diameter of the tubular post 12 to afford clearance for operation of the cable 26. The friction tending to resist movement of the arm 25 and cable 26 and sheaves 27 and 28 is preferably sufficient to hold the arm 25 in an extended position when the ladder is upright but said arm 25 is easily raised or lowered by manual manipulation of said cable 26. The cross steps 18 of the ladder are trussed and supported and held rigid by metal side rail straps 32 which extend lengthwise of the ladder and are secured to the ends of the steps at both sides of the ladder. These metal side rail straps 32 converge below the lowermost cross step 18 and are secured, as by bolt means 33 to the angle bar 14. Obviously the straps 32 may be two pieces of sheet metal secured as by the bolt means 33 to the upright post structure formed by angle bar 14 and tubular post 12 or they may be in the form of a single piece of metal anchored as by the bolt means 33 to the upright post structure.

Preferably the two upper end portions of the two side rail straps 32 are converged and secured to the upper end portion of the upright post structure of the ladder by means which provides for taking up slackness and exerting tension on the side rail straps. One way of doing this, see Fig. 6, is to have each side rail strap 32 passed through a slot 34 in a washer plate 35 and to bend over the end portion 36 of the strap 32 so it will be approximately parallel with the washer plate 35.

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A bolt 37, which has a hook shaped upper end portion 38 is passed through registering holes 39 and 40 in the bent over end portion 36 of each strap 32 and in the adjacent washer plate 35 and has a nut 41 threaded onto its lower end portion. The hook shaped upper end portions 38 of the two bolts 37 are hooked over the upper end of the angle bar 30 and the nuts 41 are tightened thereon to evenly tension the side rail straps 32 and support the cross steps 18 at right angles to the angle bar 14.

Preferably at least the forward edge portion 42 of each side strap 32, see Fig. 3, is hemmed or reversely bent underneath the strap and the overlapping forward edge of each strap, provided by this reverse bending, is curved to fit around the corner portions of the steps, see also Fig. 2. These reversely bent forward edge portions 42 thus form smooth side rails against which a fruit picker can rest and slidably move a bag of fruit as he descends the ladder. Obviously the rear edge portions of the straps 32 can be reversely bent and curved similarly to the front edge portions if desired.

Preferably each end of each step 18 is secured to the adjacent side strap 32 by an angle bracket 43, Fig. 4, which is attached to the side strap as by one or more rivets 44 and is attached to the step by at least one cross bolt 45 and by preferably two screws 46. The screws 46 extend through the side strap 32 and through the angle bracket 43 and into the end of the step 18.

Fig. 8 shows a metal step 47 which is secured to an upright angle bar 14 by weld means and which has a covering or coating 49 of tread material such as rubber or plastic on its upper surface, the tread material 49 preferably having a high coefficient of friction.

The ladder shown in Figs. 1 to 6 may be used as an ordinary "lean up" ladder without extending the arm 25 or said arm 25 may be extended any desired amount to reach a suitable support or to provide a convenient hand hold by which the user may balance himself when on the upper steps. Obviously this arm 25 may extend above the support against which it rests to provide a hand hold at a convenient height. This hand hold makes it safe and convenient for a person to ascend the ladder entirely to the top step and to work from the top step or steps.

The ladder structure shown in Fig. 9 is similar to the structure shown in Figs. 1 to 6 inclusive except that upright post and extension arm means of different shape and form is used. This different post and extension arm means comprises a tubular metal post 50 of substantially square cross section having a tubular metal extension arm 51 of substantially triangular cross section slidably and telescopically disposed therein. The cross steps and cross step attaching means and side rail straps and cable and sheave devices for vertically adjusting the extension arm 51 in the Fig. 9 construction are similar to those previously described and shown in Figs. 1 to 6 and are similarly numbered. The cross steps 18 of Fig. 9 are secured to a corner portion of the square post 50. The extension arm 51 is of triangular cross section and is of the correct size to fit slidably within and occupy approximately one half of the internal space in the post 50. This leaves ample space in post 50 for operation of the extension arm adjusting cable 26 and for the member 20 into which the step securing cap screws 19 are threaded and makes it possible to provide free and easy sliding fit of the extension

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arm 51 and at the same time to hold said arm 51 in accurate alignment with the post 50.

Fig. 10 shows another modified form of upright post and extension arm for a ladder. In the Fig. 10 structure the post 52 is a cylindrical tube and cross steps 18' are secured directly to this post 52 as by cap screws 19' which thread into an upright bar 20' within the post 52. A tubular cylindrical extension arm 53 of substantially smaller diameter than the post 52 is slidably and telescopically disposed within said post and one side of the arm 53 is supported by the upright bar 20'. This leaves room within the post 52 for the operation of an extension arm adjusting cable 26' similar to the previously described cable 26.

Figs. 11 and 12 show a self leveling self locking ladder base which can be used on the ladder shown in Fig. 1, or on a ladder like the ladder shown in Fig. 1 but which does not have the extension arm 25, or on a "tripod type" ladder which has a single supporting leg to hold it in an upright position so that it does not need to be leaned against a tree or like support.

The ladder shown in Figs. 11 and 12 comprises an upright medial post 54 having cross steps 55 and side rail straps 56 which correspond to the parts 12, 18 and 32 of Fig. 1. A base plate 57 is pivotally secured to the post 54 by a pivot member 58 and has two divergent legs 59 rigidly secured thereto. The top edge portion of base plate 57 is curved on an arc which has as its center the pivot 58 and said top edge portion has a rearwardly extending flange 60 provided with notches 61. A latch member 62 is adapted to engage within the notches 61 to hold the base plate 57 in any position in which it is placed. The latch member 62 shown in Figs. 11 and 12 is of bell crank shape in side elevation, is fulcrumed on a pivot member 63 and has a spring 64 connected therewith to hold it in engagement with the flange 60. Preferably the latch member 62 straddles the post 54 and engages with the flange 60 in two locations at opposite sides of said post for more secure holding of the base plate 57. The latch member 62 may be pivotally moved to release the base plate 57 by exerting a pressure on a foot pedal 65 which is fulcrumed on a pivot 66 and connected with the latch member 57 by links 67.

The foregoing description and accompanying drawings disclose preferred exemplary embodiments of this invention but it will be understood that changes in the same may be made within the scope and spirit of the following claims.

I claim:

1. In a ladder a medially disposed longitudinally extending ladder supporting tubular post; cross steps rigid with and carried by said post; an extension arm slidably and telescopically supported within said post and adjustable through the top end of said post in substantial alignment with said post to any desired position within a predetermined distance above the top end of said post; and endless cable extension arm moving means connected with said extension arm.

2. In a ladder a medially disposed longitudinally extending ladder supporting tubular post;

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cross steps rigid with and carried by said post; an extension arm slidably and telescopically supported within said post and adjustable through the top end of said post in substantial alignment with said post to any desired position within a predetermined distance above the top end of said post; two sheaves rotatively supported by said post adjacent the opposite ends of said post; and an extension arm adjusting cable extending in endless belt fashion over said two sheaves, said cable having one lap positioned within said tubular post and secured to the lower end portion of said extension arm and the other lap positioned outside of said tubular post in a readily accessible position for manual adjustment of said extension arm.

3. In a ladder a tubular post; cross steps rigid with and carried by said post; an extension arm slidably and telescopically supported within said post for projection above said post; two sheaves rotatively supported by said post adjacent the upper and lower ends respectively of said post; an extension arm adjusting cable extending in endless belt fashion over said two sheaves, said cable having one lap positioned within said tubular post and secured to the lower end portion of said extension arm and having the other lap thereof positioned outside of said tubular post; and a turnbuckle in the outer lap of said cable providing a hand hold and cable tensioning means.

4. In a ladder, an angle bar; spaced apart ladder steps extending crosswise of said angle bar and rigidly secured to the apex portion of said angle bar; a tubular post positioned within the trough shaped side of said angle bar and rigidly secured to said angle bar; an extension arm telescopically and slidably supported by said tubular post and adapted to extend beyond the upper end of said post; and flexible endless belt type extension arm adjusting means carried by said tubular post and connected with said extension arm, whereby said extension arm can be longitudinally adjusted to any desired upwardly protruding position within a predetermined distance above the top end of said tubular post.

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