

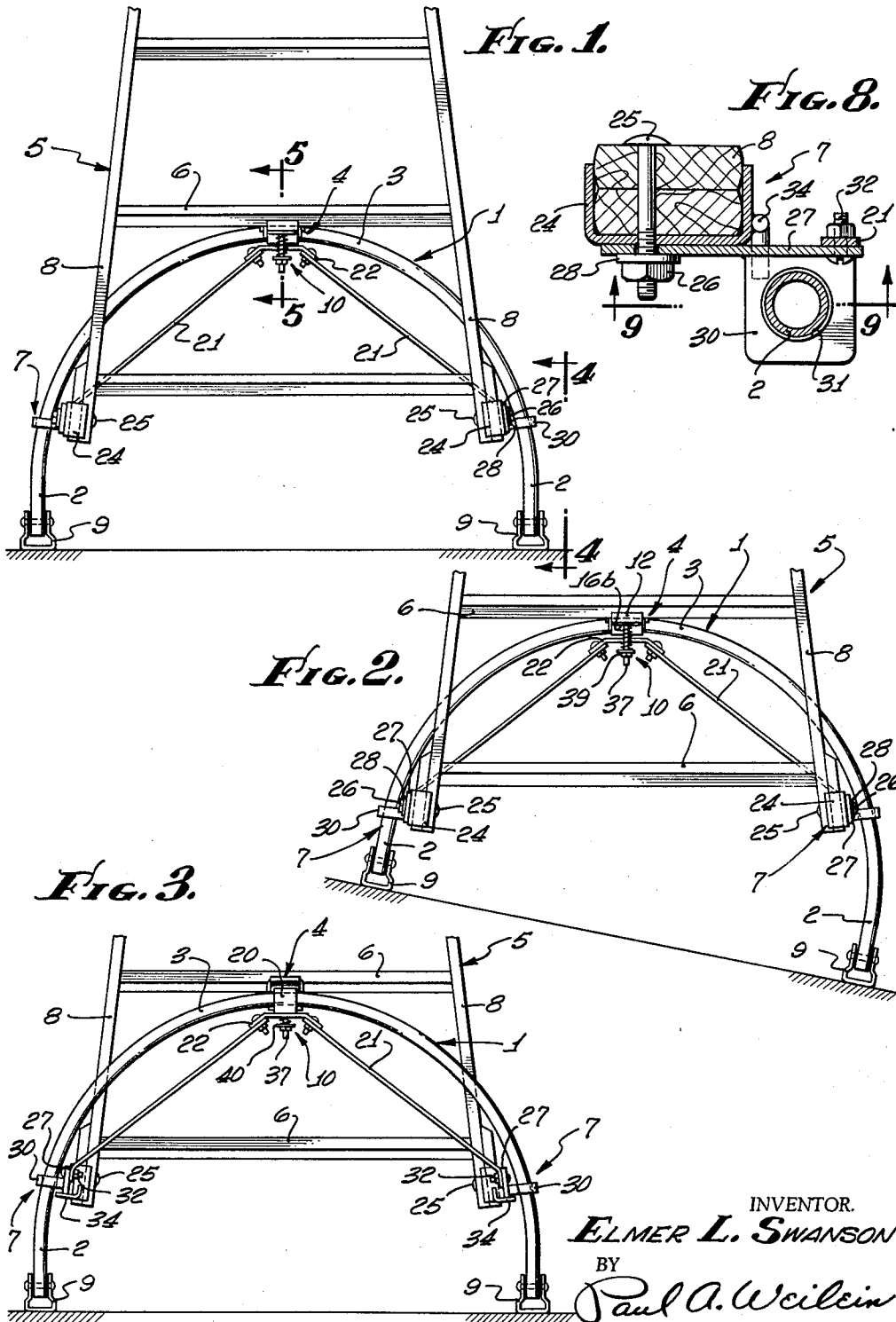
Nov. 15, 1960

E. L. SWANSON
LADDER SUPPORTING DEVICE

2,960,182

Filed May 12, 1958

2 Sheets-Sheet 1



Nov. 15, 1960

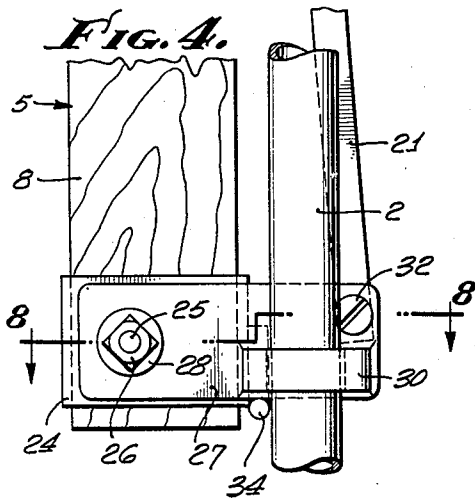
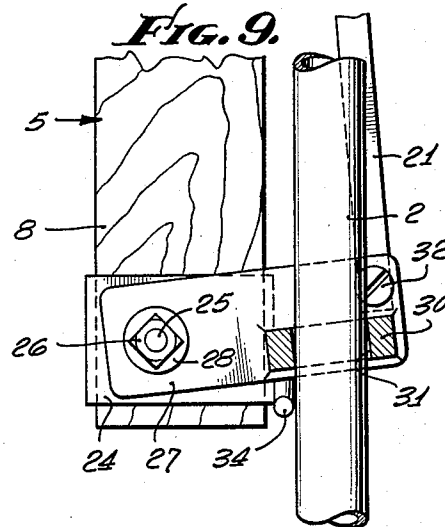
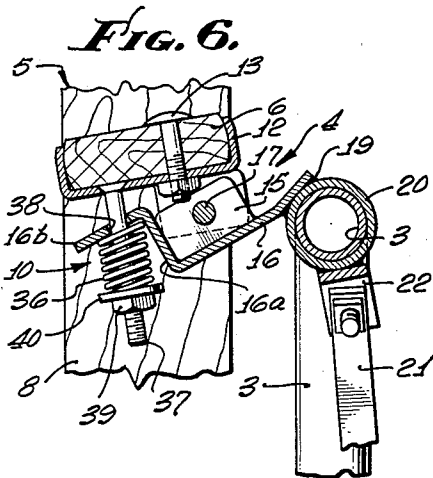
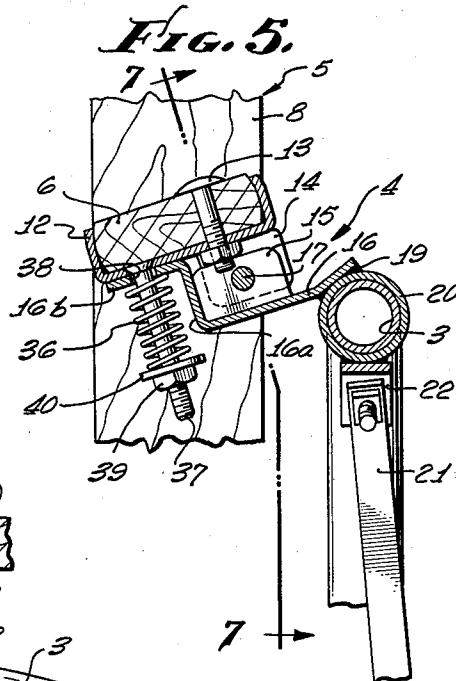
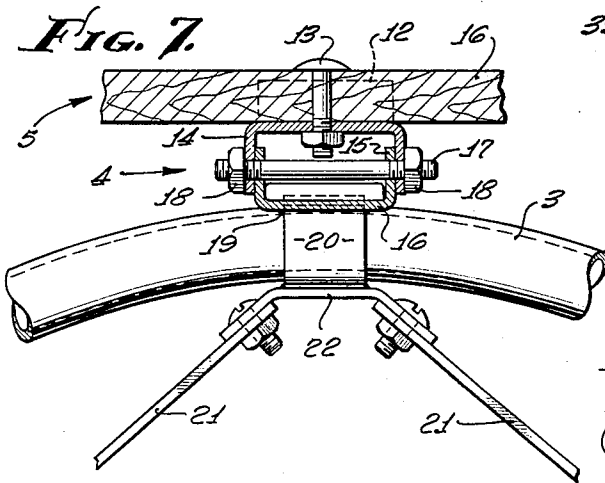
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2 Sheets-Sheet 2



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2,960,182

LADDER SUPPORTING DEVICE

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Filed May 12, 1958, Ser. No. 734,504

12 Claims. (Cl. 182—200)

This invention relates to ladders and more particularly to a device for supporting a ladder in upright position on sloping or uneven surfaces.

In instances where it is necessary to stand ladders on sloping or uneven surfaces, particularly in orchards for picking fruit, it is essential that the ladders be safeguarded against falling or tilting. It is also desired that such ladders be capable of being quickly stood on uneven ground in the desired position and so maintained without depending upon the trees or limbs against which they may be rested, to prevent sidewise tilting thereof. Not only in picking fruit but in carpentry, painting and similar work where ladders are frequently placed on uneven ground, it is also essential that the ladders be afforded a stable and reliable support permitting the occupants thereof to move freely and to lean therefrom without causing the ladders to tilt or fall to one side or the other.

Accordingly, it is an object of the present invention to provide an improved ladder supporting device which when embodied in a ladder will permit a quick and easy relative adjustment of the ladder and the device in a manner assuring reliable support of the ladder on sloping or uneven surfaces.

It is another object of this invention to provide a ladder supporting device such as described wherein locking means operates in response to downward pressure on the ladder, to lock the ladder and device against relative movement from the desired adjusted position. With this arrangement, once the ladder and device are adjusted with the device resting on the ground and the ladder disposed in the desired upright position, the locking of the ladder is effected incident to a person stepping on the ladder or by pushing downwardly on the ladder. The ladder is maintained in locked condition as long as it is occupied.

It is an additional object hereof to provide a supporting device such as described wherein resilient means operatively connected with the locking means and the ladder, permits the ladder to yield downwardly under the weight of a person standing thereon and actuate the locking means to releasably lock the ladder in upright position.

It is another object hereof to provide a ladder supporting device which includes a pair of legs, a portion joining the legs and means for connecting the device with the ladder in such a manner that the ladder readily may be adjusted to the desired upright position while the legs rest on uneven or sloping ground.

It is a further object hereof to provide in a device such as next above described, novel means for locking the legs of the device to side members of the ladder to maintain the ladder in the desired upright position.

It is another object of this invention to provide a ladder supporting device such as described which also will afford a stable support for the ladder in positions somewhat inclined sidewise from the usual upright position.

This invention possesses many other advantages and has other objects which may be made more easily apparent from a consideration of the embodiment of the inven-

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tion shown in the drawings accompanying and forming part of the present specification. This form will now be described in detail, illustrating the general principles of the invention; but it is to be understood that this detailed description is not to be taken in a limiting sense, since the scope of the invention is best defined by the appended claims.

Fig. 1 is a fragmentary front elevation of a ladder equipped with a supporting device embodying the present invention;

Fig. 2 is a view similar to Fig. 1 showing how the ladder and supporting device are positioned to support the ladder in upright position when the device rests upon a sloping surface;

Fig. 3 is a fragmentary rear elevation of the ladder and device shown in Fig. 1;

Fig. 4 is an enlarged fragmentary side elevational view looking in the direction of the arrows 4—4 in Fig. 1;

Fig. 5 is an enlarged sectional view taken on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view corresponding to Fig. 5 showing the parts in Fig. 5 substantially in the position to which they are moved when a force urging the ladder downwardly is applied to the ladder;

Fig. 7 is a sectional view taken on the line 7—7 of Fig. 5;

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 4; and

Fig. 9 is a sectional view taken on the line 9—9 of Fig. 8.

As shown in the accompanying drawings a supporting device embodying the present invention includes a ladder supporting member 1 having a pair of legs 2 joined by an arcuate portion 3. In the present instance the member 1 is semicircular or of an inverted U-shape, as this form makes it possible to construct the member 1 conveniently and inexpensively of steel pipe or rod stock. This shape of the member 1 also facilitates the joining of the member 1 to a ladder so that the ladder and member 1 are relatively slidably adjustable to permit the legs 2 to rest on uneven or sloping ground while providing a firm support for maintaining the ladder in the desired upright position.

Connecting means 4 provides for joining the ladder 5 and the arcuate portion 3 of the member 1, being here shown as mounted on one of the steps or rungs 6 of the ladder and as slidably embracing the arcuate portion 3.

Combined connecting and locking means 7 are provided to slidably connect the legs 2 to the lower ends of the upright side members 8 of the ladder, and to lock the legs against sliding movement. Connected in this manner to the ladder 5, the ladder supporting member 1 spans the lower end of the ladder with the legs extending downwardly along the outer sides of and below side bars 8 of the ladder to rest in widely spaced relation on a supporting surface. In this connection it should be noted that the U-shaped foot members or shoes 9 having wide and flat bottom surfaces, are pivoted on the lower ends of the legs 2 so as to readily accommodate themselves to uneven ground and to prevent the legs from sinking into soft ground.

The combined connecting and locking means 7 for the legs 2 is constructed and arranged to lock the legs and ladder against relative sliding movement responsive to a force developed when the ladder is urged downwardly as when a person pushes down on the ladder or steps on one of the rungs 6.

In order that the above noted locking action will take place and will be continued while the ladder is occupied, yieldable means 10 is interposed between the ladder and the supporting member 1, and as here shown is associated with the connecting means 4, whereby the ladder will

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be permitted limited downward movement relative to the member 1 sufficient to effect the aforesaid locking action.

Referring more specifically to the connecting means 4 for slidably connecting the ladder 5 to the member 1, it will be seen with reference to Figs. 5 and 6 that this means includes a U-shaped bracket 12 adapted to embrace one of the ladder steps or rungs 6 and to be secured thereto by means of the fastenings 13. Depending ears 14 on the bracket 12 are pivotally secured to upstanding ears 15 on a connecting arm 16, by means of the bolt 17 passing through these ears and held in place by nuts 18. The connecting arm 16 joins the bracket 12 to the arcuate portion 3 of the member 1, being welded as at 19 to the upper side of a sleeve 20 which slidably embraces the arcuate portion 3. The sleeve 20 is also subject to limited angular movement about the axis of the portion 3 for the purpose to be hereinafter described, but is restrained against unlimited angular movement about the axis of the portion 3 by means of bars 21 secured at their ends to a bracket 22 welded to the under side of the sleeve 20, and to the combined connecting and locking means 7, respectively. The aforesaid limited angular movement of the sleeve 20 is made possible by the manner in which the bars 21 are connected with the sleeve 20 and due to the position of these bars relative to the sleeve being such that the bars will flex somewhat. The bars 21 also cooperate with the combined connecting and locking means 7 in a manner which will be hereinafter described.

As shown in detail in Figs. 4, 8 and 9, the combined connecting and locking means 7 for each leg 2 of the supporting member 1 includes a U-shaped bracket 24 which embraces a side member 8 of the ladder and is rigidly secured thereto by means of the bolt 25 and nut 26. The bolt 25 serves also as a pivotal mounting for one end portion of a locking arm 27 which latter bears against a side of the bracket 24, being held in place between the bracket and the nut by means of a washer 28 on the bolt. The other end portion of the arm 27 has welded thereto so as to project laterally therefrom, a locking member 30 which slidably embraces the associated leg 2 of the supporting member 1. The member 30 is in the form of a plate or washer having therein an opening 31 through which the associated leg 2 is slidable. The outer end of the locking arm 27 is pivoted as at 32 to the lower end of the associated bar 21 as shown in Figs. 4 and 9, this being a stationary pivot point about which the locking arm 27 swings upon downward movement of the ladder relative to this pivot point. Fig. 9 shows how the locking member 30, as a result of the swinging movement of the arm 27, will be tilted to a position producing a binding and locking action on the leg 2 associated therewith. In order that the locking arm 27 will be normally held in a position such that the locking member 30 is maintained free from binding engagement with the leg 2 as shown in Figs. 4 and 8, whereby the ladder and member 1 may be freely relatively adjusted, a stop member 34 is welded or otherwise fixed, as shown in Fig. 8, to the bracket 24 and extends beneath the locking arm 27 as a support therefor.

The yieldable means 10 which permits of limited downward movement of the ladder relative to the member 1 for actuating the locking members 30 on the legs 2, is best shown in Figs. 5 and 6, and includes an extension 16a of the connecting arm 16. This extension projects upwardly and then outwardly from the arm 16, proper, and the outer end portion 16b thereof bears against the underside of the bracket 12 but is movable downwardly relative to this bracket, as indicated in Fig. 6. However, a coiled spring 36 supported on a bolt 37 depending from the bracket 12 yieldingly resists this downward movement. The bolt 37 extends freely through an opening 38 in the portion 16b of the extension 16a and has a nut 39 and washer 40 mounted thereon

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for supporting the spring 36. Axial adjustment of this nut regulates the force of the spring and it should be noted that the spring should have sufficient strength to prevent the weight of the ladder from causing a relative movement between the ladder and the supporting member 1, that would actuate the locking members 30 on the legs 2. In other words the spring normally supports the weight of the ladder and as long as no force is exerted downwardly on the ladder, the supporting member 1 and the ladder may be freely relatively adjusted.

When a force is intentionally applied to the ladder for moving it downwardly while the supporting member 1 rests on a supporting surface, for example when the user of the ladder steps on the lowermost step or grasps the ladder and pushes downward thereon in preparation for getting on the ladder, the locking members 30 on the legs 2 will be actuated to lock the ladder and member 1 against relative adjustment.

When an intentionally applied force urges the ladder 20 downwardly this force is transmitted through the bolt 17 (see Figs. 5 and 6), to likewise urge the connecting arm 16 downwardly. Due to the sleeve 20 being permitted limited angular movement about the axis of the portion 3, it serves as a pivot for the arm 16, thereby providing 25 for limited downward movement of this arm and the ladder relative to the supporting member 1, while the spring 36 resists such downward movement. Fig. 6 shows how the sleeve 20 is moved angularly about the portion 3 and how the arm 16 swings downwardly to 30 lower the ladder responsive to a force urging the ladder downwardly. A small amount of this downward movement is all that is required to actuate the locking members 30. It will be seen with reference to Figs. 4 and 9 that this small movement of the ladder will rock the locking arms 27 on the stationary pivots 32 whereby the locking members will be tilted from position as shown in Fig. 4 to the position shown in Fig. 9, for binding against and locking the legs 2.

When the force urging the ladder downwardly is removed, the spring 36 will raise the ladder and cause the locking arms 27 and locking members 30 to assume the unlocking position shown in Fig. 4, to permit free relative adjustment of the ladder and member 1.

It should be noted that the supporting device of the invention will also serve as a stable and reliable support for the ladder in instances where it may be desired that the ladder be inclined sidewise somewhat within reasonable limits from the usual upright position, as such inclined positions will enable the occupant of the ladder to reach 50 out laterally therefrom a greater extent than when the ladder is in the usual upright position.

I claim:

1. A ladder supporting device comprising: a ladder supporting member; said member including a pair of legs and an arcuate portion extending between and joined to said legs; a first member adapted to be fixed to the ladder; a second member slidably embracing said portion; means pivotally connecting said first and second members permitting relative vertical movement between said ladder 60 and said portion; other means connecting said first and second members for controlling said relative vertical movement; the lower ends of said legs being disposed at different levels according to adjustment of said arcuate portion relative to said ladder; and locking means connected with each leg and said ladder for locking said legs and ladder against relative movement in response to said relative vertical movement.

2. A ladder supporting device comprising: a ladder supporting member; said member including a pair of legs and a portion joining said legs; a first member adapted to be fixed to the ladder; a second member slidably embracing said portion; means pivotally connecting said first and second members permitting relative vertical movement between said ladder and said portion; other means connecting said first and second members for controlling said rela-

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tive vertical movement; means for slidably connecting said legs to the side members of the ladder with the lower ends of said legs positioned to rest upon a supporting surface; and means operatively associated to said last named means for locking each leg against sliding movement relative to the ladder.

3. A ladder supporting device comprising: a ladder supporting member; said member including a pair of legs and an arcuate portion joining said legs; a first member adapted to be fixed to the ladder; a second member slidably embracing said portion; means pivotally connecting said first and second members permitting relative vertical movement between said ladder and said portion; means slidably connecting said legs to the side members of the ladder with the lower ends of said legs positioned to rest upon a supporting surface; said last named means including locking members embracing said legs; and means operatively connected with the ladder and said locking members operable in response to forces directed downwardly on the ladder for actuating said locking members to hold said legs against sliding movement relative to the ladder.

4. A ladder supporting device comprising: a ladder supporting member; a first member adapted to be fixed to the ladder; a second member slidably embracing a portion of said supporting member; means joining said first and second members together for vertical movement; resilient means operatively associated with said first member and said second member operable in response to a force urging the ladder downwardly, to permit limited downward movement of the ladder relative to said supporting member; and locking means operable in response to said downward movement to releasably lock said ladder and said member against relative adjustment.

5. A ladder comprising: opposed side members and rungs therebetween; a ladder supporting member; a first member fixed to the ladder; a second member slidably embracing said supporting member; means pivotally connecting said first and second members; resilient means resisting pivotal movement of said first and second members; and locking members embracing portions of said supporting member; arms pivoted on said ladder and said locking member, respectively; and elements depending from said second member and pivoted on said arms.

6. A ladder comprising: opposed side members; rungs between the side member; a ladder supporting member; means joining said supporting member to a rung of said ladder and permitting relative bodily movement of said ladder and said supporting member; resilient means associated with said joining means operable to permit limited downward yielding of the ladder relative to said supporting member in response to downward pressure on the ladder; locking members embracing portions of said supporting member and movable relative thereto; and means connected with said joining means, said side members and said locking members respectively, and operable in response to said downward yielding to move said locking members to releasably lock said supporting members against movement relative to said ladder.

7. A ladder comprising: opposed side members; rungs connected to the side members; a ladder supporting member; means slidably embracing said supporting member; means pivotally joining said embracing means to a rung of said ladder and permitting relative vertical adjustment of said ladder and said supporting member; resilient means operatively associated with said joining means operable in response to the weight of an occupant of the ladder to permit limited downward movement of the ladder relative to said supporting member; and means connected with said side members and said supporting member, respectively, operable in response to said downward movement to lock said ladder and said supporting member against relative adjustment, said locking means releasing said ladder and said supporting member when the weight of said occupant is removed from the ladder.

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8. A ladder having a pair of opposed side members and rungs extending therebetween; a ladder supporting member having a pair of legs and a portion joining said legs; a sleeve slidably and rotatably embracing said joining portion; an arm fixed at one end to said sleeve; means providing a pivotal connection of said arm with a rung of the ladder at a point between the ends of said arm to permit relative vertical movement of said ladder and said ladder supporting member; means connecting said rung with the other end of said arm to control said relative vertical movement; said legs being extended downwardly along and below the lower ends of said side members in a position to rest on a supporting surface to support the ladder; and locking means connected with said legs and said side members operable in response to said relative vertical movement to lock said legs against movement relative to said side members.

9. A ladder having a pair of opposed side members and rungs extending therebetween; a ladder supporting member having a pair of legs and a portion joining said legs; means slidably embracing said joining portion; means pivotally connecting said embracing means with a rung of the ladder; said legs being extended downwardly along and below the lower ends of said side members in a position to rest on supporting surface to support the ladder; resilient means operatively associated with said pivotal means for permitting the ladder to yield downwardly relative to said supporting members in response to downward pressure on the ladder; and means on each leg operable in response to said downward yielding to releasably lock said legs against movement relative to said side members.

10. A ladder supporting device comprising: a ladder supporting member composed of a pair of legs and a portion joining said legs; means for connecting a ladder to said portion so that the ladder and supporting member may be relatively adjusted with said legs disposed alongside and below the upright side members of the ladder in position to rest upon a supporting surface; means associated with said connecting means operable in response to downward pressure on the ladder to permit limited downward movement of the ladder relative to said supporting member; locking arms; means mounting said arms on the side members of the ladder for movement relative to said side members; locking members on said arms slidably embracing said legs and operable to bind against and lock said legs against movement relative to said side members in response to movement of said arms; bars depending from said connecting means; and means providing stationary pivotal connections between said arms and said bars; said arms pivoting about said stationary pivotal connections and effecting said locking action of said locking members in response to said downward movement of said ladder.

11. A ladder supporting device comprising: a ladder supporting member composed of a pair of legs and a portion joining said legs; means for joining said portion with a rung of a ladder; said joining means providing for relative sliding movement between said supporting member and the ladder as well as providing, in response to a downward pressure on the ladder, for limited downward movement of the ladder relative to said supporting member; locking arms; means for pivotally connecting said arms with the upright side members of the ladder below said rung; locking members mounted on said arms and slidably embracing said legs; said locking members being operable to bind against and lock said legs against movement relative to the ladder in response to pivotal movement of said arms; and means depending from said joining means and connected with said arms to provide thereon stationary pivots on which said arms are movable to effect said locking action of said locking members in response to said downward movement of said ladder.

12. A ladder supporting device comprising: a ladder supporting member composed of a pair of legs and a

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portion joining said legs; a sleeve slidable on said portion; a bracket adapted to be fixed to a rung of a ladder; a rigid connecting arm fixed at one end to said sleeve; means pivotally connecting said arm at a point between the ends of said arm with said bracket; spring means 5 suspended from said bracket so as to resist movement of the other end of said arm relative to said bracket; locking arms; means for pivotally connecting said locking arms with the upright side members of the ladder; locking members fixed on said arms and slidably embracing 10 said legs; said locking members being operable to bind against and lock said legs against movement relative to the ladder in response to pivotal movement of said arms; said sleeve, said connecting arms and said spring means cooperating to permit limited downward movement of 15 the ladder relative to a supporting member in response to the application of a downward pressure on the ladder;

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a pair of bars connected at their ends with said sleeve and said locking arms respectively; said bars resisting rotation of said sleeve; the connections of said bars with said locking arms providing stationary pivots; said locking arms being moved on said stationary pivots to actuate said locking members in response to said limited downward movement of said ladder.

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