

Feb. 20, 1951

F. MEHRINGER
SHIFTABLE LADDER SUPPORT

2,542,256

Filed March 22, 1948

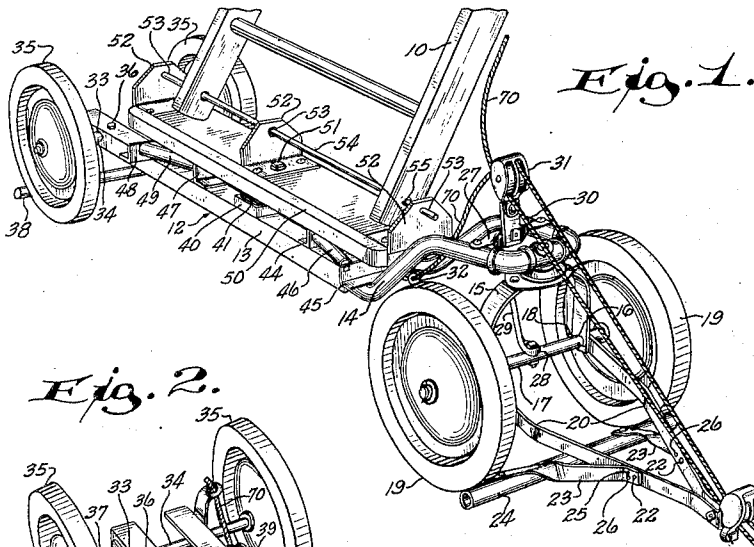


Fig. 1.

Fig. 2.

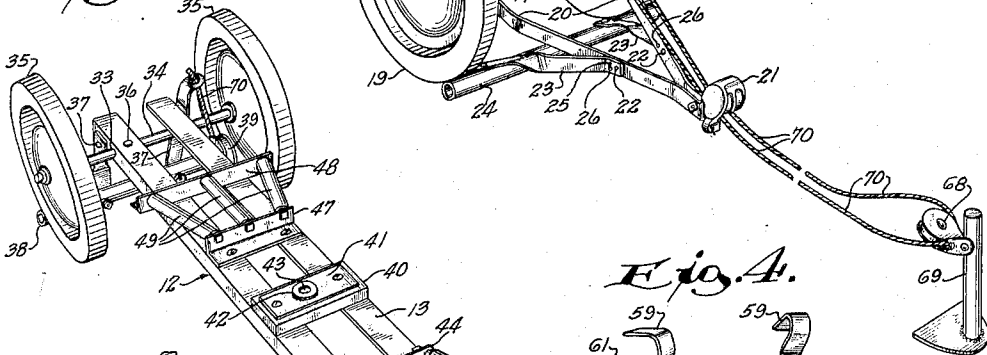


Fig. 4.

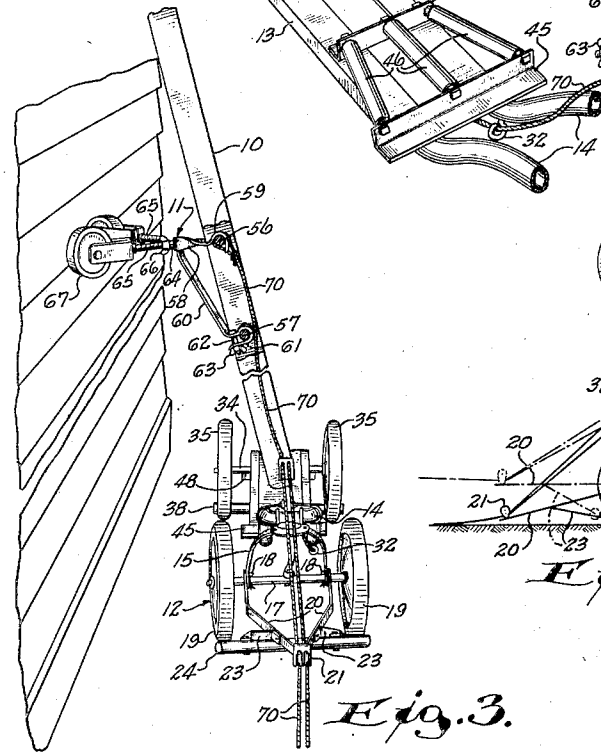
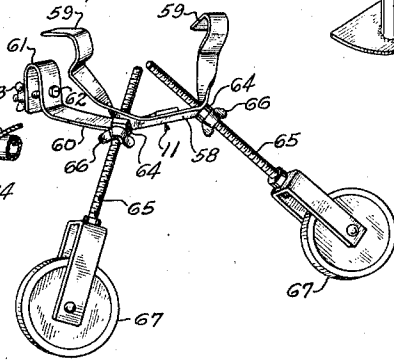


Fig. 3.

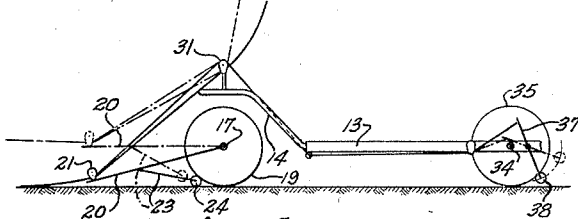


Fig. 5.

INVENTOR.
Frank Mehringer
BY
Mossell & Mossell
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,542,256

SHIFTABLE LADDER SUPPORT

Frank Mehringer, Milwaukee, Wis.

Application March 22, 1948, Serial No. 16,377

4 Claims. (Cl. 228-5)

1 This invention relates to improvements in shiftable ladder supports.

Painters, window cleaners, maintenance men, and the like, find it necessary to make extensive use of ladders. When using the conventional non-ambulant type of ladder the workman is required to climb down from the ladder each time it becomes necessary to shift it to a new location. Upon arriving at the bottom of the ladder he must then move it to the changed position and then again ascend in order to continue working. This procedure is not only tiresome and time consuming, but is also dangerous. A misstep in ascending or descending a ladder can result in a very serious accident, and the greater the frequency of such ascent or descent, the greater the possibility of accidents occurring therefrom.

It is therefore a general object of the invention to provide a shiftable support for a ladder whereby a workman can move a ladder longitudinally of any wall against which it is supported, without having to descend from his position on the ladder.

A further object of the invention is to provide a shiftable ladder support, the lower or carriage portion of which is provided with brake means which automatically locks the carriage against movement when it is not positively actuated by the workman.

A further object of the invention is to provide a shiftable ladder support of the class described which permits turning of the ladder to conform to irregularities, such as bays and the like, which form part of the wall against which the ladder is supported.

A further object of the invention is to provide a shiftable ladder support for use in conjunction with a conventional ladder which comprises a wheeled support for the base of the ladder, as well as a wheeled support for the top or intermediate portions of the ladder.

A further object of the invention is to provide a shiftable ladder support which may be quickly attached to or disconnected from a conventional ladder.

A further object of the invention is to provide a shiftable ladder support which includes a wheeled support for an upper or intermediate portion of the ladder, which wheeled support is connectable to any selected pair of adjacent ladder rungs and is provided with extensible legs for supporting the ladder at a selected distance spaced away from the wall against which the ladder is positioned.

2 A further object of the invention is to provide a shiftable ladder support having a wheeled support for an upper or intermediate portion of the ladder, the wheels of which may be selectively turned to a position permitting travel laterally along a wall or to a position at right angles to the first-mentioned position wherein movement along the wall is prevented.

With the above and other objects in view, the invention consists of the improved shiftable ladder support, and all of its parts and combinations, as set forth in the claims, and all equivalents thereof.

In the drawing accompanying and forming a part of this application, wherein is illustrated one complete embodiment of the preferred form of the invention, and wherein the same reference characters represent the same parts in all of the views;

20 Fig. 1 is a fragmentary perspective view showing the wheeled support for the bottom of the ladder, the upper portions of the ladder being broken away;

25 Fig. 2 is a fragmentary perspective view on a slightly larger scale showing the lower wheeled support or carriage with the turntable platform removed and with the front portions of the carriage broken away;

30 Fig. 3 is a front end perspective view of the carriage on a smaller scale, showing the invention attached to and supporting a ladder adjacent a wall, part of the ladder being broken away and shown in section to better show the upper support;

35 Fig. 4 is a top perspective view of the upper wheeled support; and

40 Fig. 5 is a diagrammatic side elevational view of the lower wheeled support or carriage showing the operation of the brakes and brake levers.

Referring more particularly to Fig. 3 of the drawing, the numeral **10** indicates a conventional ladder, to an intermediate portion of which is connected an upper wheeled support **11**. The ladder **10** is supported at its base on a lower wheeled support or carriage **12**.

In the preferred form, the carriage **12** comprises a frame formed of a pair of substantially parallel angle members **13**. Projecting forwardly and upwardly from the forward ends of the members **13**, as is clearly shown in Fig. 1, is a tubular frame member **14**, having a substantially U-shaped configuration in top view. Connected to a central portion of the forward end of the member **14**, for pivotal movement on a vertical axis, is a U-shaped yoke **15**, the arms of which project

downwardly and are apertured adjacent the ends thereof, as at 16 (see Fig. 1). Mounted in the apertures 16 of the yoke 15 is a front axle 17 which is locked against axial movement by a pair of diametrically extending cotter keys 18 projecting therethrough adjacent the inner surfaces of the arms of the yoke 15. A pair of wheels 19 are mounted for rotation on the outer ends of the axle 17.

Pivotally mounted on the axle 17, preferably between the arms of the yoke 15 and the wheels 17, and extending forwardly therefrom, are the arms of a substantially V-shaped tongue member 20. Fixed to the forward end of the member 20 is a double sheave pulley 21. Pivotally connected to the arms of the member 20, as by the pins 22 (see Fig. 1), are a pair of downwardly and rearwardly extending brake arms 23. Connected to the lower ends of the brake arms 23 is a horizontal transverse brake member 24. The swinging movement of the arms 23 is limited by a transverse slot 25 in each of said arms, in which slot pins 26 are adapted to travel, the latter being fixedly connected to the arms of the member 20.

Spaced rearwardly of the forward end of the member 14 and connected transversely to both of the arms thereof, is a strap member 27. Rigidly connected to the strap member and extending forwardly and downwardly to pivotally connect with the axle 17, as at 28, is a brace 29. Spaced above the strap 27 and supported thereon by a connecting member 30, is a double sheave pulley 31. Connected to the underside of the left hand arm of the member 14 and adjacent the forward end of the left hand frame member 13 is a guide loop 32, the function of which will become apparent hereinafter.

The frame members 13 are formed with corresponding apertures 33 adjacent the rear ends thereof, and mounted in said apertures transversely of the frame members 13 is a rear axle 34. Mounted for rotation on the outer ends of the rear axle 34 is a pair of wheels 35. The axle 34 is locked against rotation or axial movement by a bolt 36 which rigidly connects it to one of the frame members 13.

Pivotally connected to each of the frame members 13 rearwardly of the axle 34 is a brake arm 37. The arm 37 connected to the left hand frame member 13 extends upwardly beyond said frame member as shown in Fig. 2. Connected to the lower ends of the brake arms 37 is a horizontally extending brake member 38. Mounted on the outer side of the left hand frame member 13 forward of the axle 34 is a single sheave pulley 39.

Positioned intermediate the length of the frame 12 and preferably supported on and connected to the frame members 13 is a transverse frame member 40. Superimposed on the member 40 and fixed thereto is a bearing plate 41, preferably formed with a bearing collar 42. The plate 41, as well as the member 40, are apertured as at 43.

Mounted on the forward ends of the frame members 13 are a pair of spaced transversely extending angle brackets 44 and 45 (see Fig. 2). Rotatably supported between the angle brackets 44 and 45 are preferably three spaced rollers 46 which extend substantially radially with respect to the aperture 43 in the plate 41.

Spaced rearwardly from the member 40, approximately the same distance therefrom as are the brackets 44 and 45 and mounted on the frame members 13 are a pair of spaced transverse

angle brackets 47 and 48. Rotatably carried by the brackets 47 and 48 are preferably three spaced rollers 49 which also extend substantially radially with respect to the aperture 43 in the plate 41. The upper surfaces of the rollers 48 and 49 project above the brackets 44 and 45 and above the brackets 47 and 48 respectively.

Supported on the rollers 46 and 49 is an elongated platform 50. Extending downwardly through the central portion of the platform 50 and through the aperture 43 of the plate 41 and member 40 is a pivot bolt 51. The platform 50 is susceptible of turntable movement about the bolt 51, and the disposition of the rollers 46 and 49 provides for support of the ends of the platform 50 in any position thereof within the limits of its turning range. Experience has shown that a turning range of about 10° in either direction from the neutral longitudinal position of the platform 50 shown in Fig. 1 is safe and is sufficient for most purposes. Extending upwardly from each end of the platform 50 and from the central portion thereof are bearing plates 52. The plates 52 are formed with aligned apertures 53. A rod 54 is removably supported in the apertures 53 of the plates 52 as shown in Fig. 1.

A conventional ladder 10 may be mounted on the platform 50 by forming corresponding apertures 55 adjacent the lower end of each leg thereof and by placing the apertured portions of the ladder on the platform 50 with the rod 54 extending through the apertures 53 of the plates 52 as well as through the apertures 55 of the ladder 10. In this relationship, the ladder 10 is locked in position on the platform 50, as is evident from Fig. 1.

Preferably prior to the attachment of the ladder 10 to the platform 50 of the carriage 12, the upper ladder support 11 is attached to a pair of adjacent rungs 56 and 57 of the ladder 10. Referring to Figs. 3 and 4, the support 11 preferably includes a generally U-shaped horizontally extending member 58, the ends of which are bent to form rung engaging members 59. The rung engaging members 59 are adapted to engage the rung 56, which is the upper of the two rungs mentioned. Projecting angularly downwardly from a central portion of the member 58 is a bracket 60, the lower end of which is formed with a rung engaging member 61. The member 61 is provided with a bolt 62 and wingnut 63 to lock the member 61 to the rung 57 as shown in Fig. 3, thereby locking the upper wheeled support 11 to the ladder 10 in the manner shown.

The member 58 is formed with a pair of spaced bosses 64 on the outer side of an intermediate portion thereof (see Fig. 4). The bosses 64 and the member 58 are apertured, and threaded into said aperture are a pair of elongated threaded arms 65, each of which is provided with a winged lock nut 66. Mounted for rotation on the outer ends of the arms 65 are a pair of wheels 67. By reason of the threaded connection between the arms 65 and the bosses 64 the distance away from the member 58 at which the wheels 67 are supported may be readily varied. In addition, the arms 65 with the wheels 67 may be selectively turned so that the wheels 67 extend either in substantially the same plane (as shown in Fig. 4) or in planes at right angles thereto (as shown in Fig. 3), and the wingnuts 66 may be used to lock the arms 65 in any desired position of longitudinal and rotative adjustment.

In use of the invention the apparatus as shown in Fig. 3 is positioned alongside one end of the wall which the workman wishes to traverse. The carriage 12 is spaced away from the wall and is preferably positioned substantially parallel thereto, as shown. Preferably beyond the end of the wall and remote from the carriage 12 a single sheave pulley 68 is suitably mounted, as for example, by being connected to a stake 69 driven into the ground. A relatively small rope or line 70 is then tied at one end to the upper end of the left hand rear brake lever 37 as shown in Fig. 2. The line 70 is then brought forwardly and threaded through the pulley 39, through the guide loop 32, through one sheave of the pulley 31, through one sheave of the pulley 21, and is then carried to the sheave 68. The line 70 is threaded through the sheave 68, is carried back through the second pulley of sheave 21, through the second pulley of sheave 31, and is then extended up the ladder 10 to any rung which is convenient to the workman on the ladder. The line 70 is preferably secured to said rung as shown in Fig. 3.

With the apparatus in the relationship shown in Figs. 1 and 3, the ladder 10 is firmly supported by the carriage 12 and by the upper support 11, and the workman can stand on the ladder anywhere he chooses to do his work. The carriage 12 is prevented from moving longitudinally by reason of the action of the brakes 24 and 38 against the wheels 19 and 35 respectively. Referring to the solid line showing in the schematic diagram of Fig. 5, it is apparent that the front brake 24 prevents forward movement of the carriage 12 and the rear brake 38 prevents rearward movement. The wheels 67 of the upper support 11 are shown in Fig. 3 to extend in a vertical plane, and thereby lock the support 11 and the upper portions of the ladder 10 against lateral movement along the wall.

When the workman desires to move the ladder laterally along the wall in the direction toward the sheave 68, he may do so without descending from his position on the ladder. All he need do is loosen the wingnuts 66 on the arms 65, turn the arms 65 and the wheels 67 so that the wheels extend in substantially the same plane (as shown in Fig. 4), tighten the wingnuts 66 to lock the arms 65 against rotation, and then pull upwardly on the line 70. An upward pull on the upper end of the line 70 will have two main effects. First, as shown by the dot and dash lines of Fig. 5, the tension causes a raising of the tongue member 20, which permits the brake arm 23 and the brake 24 to swing downward relative to the member 20 and away from the front wheels 19. Substantially simultaneously with the release of the front brake 24, the tension on the line 70 causes an upward and rearward swinging movement of the rear brake levers 37 and the rear brake 38. As is clearly shown in Fig. 5, this swinging movement brings the rear brake 38 out of contact with the rear wheels 35. Upon the release of the front and rear brakes, further tension in the line 70 will pull the carriage 12 toward the sheave 68. As the carriage 12 moves, the wheels 67 roll along the wall and permit movement of the ladder 10 along with the carriage.

When the assembly has been moved a desired distance, release of the tension on the line 70 will immediately permit the tongue member 20 and the rear brake levers 37 to swing downwardly and to thereby bring the brakes 24 and 38 into contact with the front and rear wheels respectively, lock-

ing the carriage 12 against longitudinal movement in either direction. The wingnuts 66 should then be loosened and the wheels 67 turned to again extend in vertical planes as shown in Fig. 3, to lock the upper support 11 against lateral movement.

By reason of the longitudinal adjustability of the arms 65 relative to the frame 58, the ladder 10 may be held by the upper support 11 in a position spaced any desired distance away from the wall. For example, if it is desired to have the ladder positioned outwardly from the eaves of a house, an extension of the arms 65 will so permit. It will be noted, in this regard, that when using the invention it is never necessary to lean the ladder against eavestroughs or other easily damaged portions of a building. The support 11 can be selectively attached to the ladder at a height where, in traversing the wall, it will not come in contact with windows, doors or the like, but instead will have a clear surface against which to travel throughout the length of the wall.

When the carriage travels toward the sheave 68 and the wheels 67 of the upper support 11 roll along the wall and come to a bay window, the wheels 67 will traverse the bay in the same manner as if it were a flat wall. By reason of the turntable feature of the platform 50, the ladder and the platform will turn relative to the carriage 12 in order to conform to the irregularity in the wall caused by the bay. The carriage, however, will continue to travel in a straight line toward the sheave 68, while the platform 50 and the ladder 10 are turning in their travel forward, as above described.

To disassemble the improved ladder support it is only necessary to remove the rod 54 from the apertures 55 of the ladder, take the ladder off of the platform 50, and then remove the upper support 11 from the ladder, after first removing the bolt 62 and the wingnut 63 from the member 61. This can be done very quickly and easily. The apparatus is safe, compact, and strong, and accomplishes marked savings in both time and labor. By reducing the frequency with which a workman must ascend and descend a ladder, the danger of accidents therefrom is correspondingly reduced.

Various changes and modifications may be made without departing from the spirit of the invention, and all of such changes are contemplated, as will come within the scope of the claims.

What I claim is:

1. In a supported ladder assemblage, a shiftable carriage comprising: a frame for supporting the base of said ladder; a pair of spaced coaxial wheels rotatably mounted at the front end of said frame; a pair of spaced coaxial wheels rotatably mounted at the rear end of said frame; an anchor remote from the carriage; a brake member pivotally mounted on the front end of said frame and normally urged by gravity into braking engagement with both of said front wheels; a brake member pivotally mounted on the rear end of said frame and normally urged by gravity into braking engagement with both of said rear wheels; and a line accessible from an elevated position on the ladder and connected to said front and rear brake members and to said anchor for pivoting said brake members out of engagement with said wheels and for thereafter moving said carriage toward said anchor in response to a pull on said line.

2. In a supported ladder assemblage, a shiftable carriage comprising: a main frame for sup-

porting the base of said ladder; an auxiliary frame pivotally connected to the front end of said main frame and rotatable in a horizontal plane; a pair of spaced coaxial wheels rotatably mounted on said auxiliary frame; a pair of spaced coaxial wheels rotatably mounted at the rear end of said main frame; an anchor remote from the carriage; a brake member pivotally mounted on said auxiliary frame and normally urged by gravity into braking engagement with both of said front wheels; a brake member pivotally mounted on the rear end of said main frame and normally urged by gravity into braking engagement with both of said rear wheels; and a line accessible from an elevated position on the ladder and connected to said front and rear brake members and to said anchor for pivoting said brake members out of engagement with said wheels and for thereafter moving said carriage toward said anchor in response to a pull on said line.

3. In a supported ladder assemblage, a shiftable carriage comprising: a turntable for removably supporting the base of said ladder; a frame for supporting said turntable; a pair of spaced coaxial wheels rotatably mounted at the front end of said frame; a pair of spaced coaxial wheels rotatably mounted at the rear end of said frame; an anchor remote from the carriage; a brake member pivotally mounted on the front end of said frame and normally urged by gravity into braking engagement with both of said front wheels; a brake member pivotally mounted on the rear end of said frame and normally urged by gravity into braking engagement with both of said rear wheels; and a line accessible from an elevated position on the ladder and connected to said front and rear brake members and to said anchor for pivoting said brake members out of engagement with said wheels and for thereafter moving said carriage toward said anchor in response to a pull on said line.

4. In a supported ladder assemblage, a shiftable carriage comprising: a turntable for supporting the base of said ladder; a main frame for supporting said turntable; an auxiliary frame pivotally connected to the front end of said main frame and rotatable in a horizontal plane; a pair of spaced coaxial wheels rotatably mounted on said auxiliary frame; a pair of spaced coaxial wheels rotatably mounted at the rear end of said main frame; an anchor remote from the carriage; a brake member pivotally mounted on said auxiliary frame and normally urged by gravity into braking engagement with both of said front wheels; a brake member pivotally mounted on the rear end of said main frame and normally urged by gravity into braking engagement with both of said rear wheels; and a line accessible from an elevated position on the ladder and connected to said front and rear brake members and to said anchor for pivoting said brake members out of engagement with said wheels and for thereafter moving said carriage toward said anchor in response to a pull on said line.

FRANK MEHRINGER.

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