Nov. 3, 1964 A. C. BORGMAN 3,155,190

WHEEL MOUNTED LADDER

Original Filed Oct. 10, 1961 2 Sheets-Sheet 1

Fig. 1.

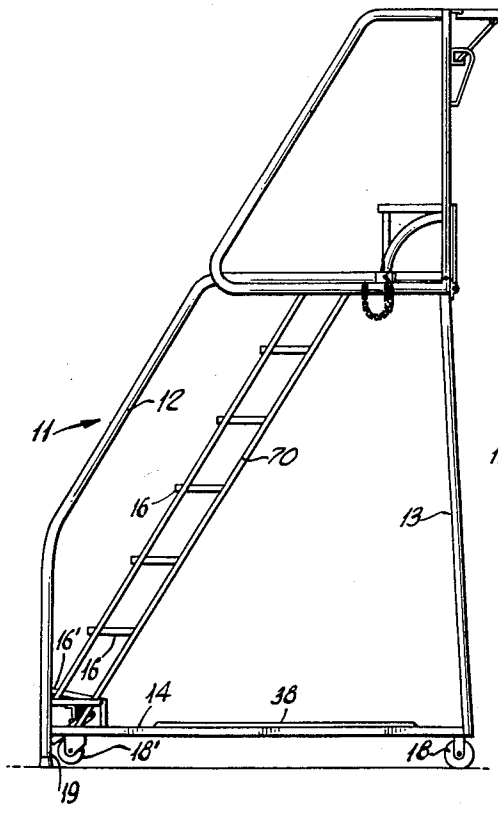
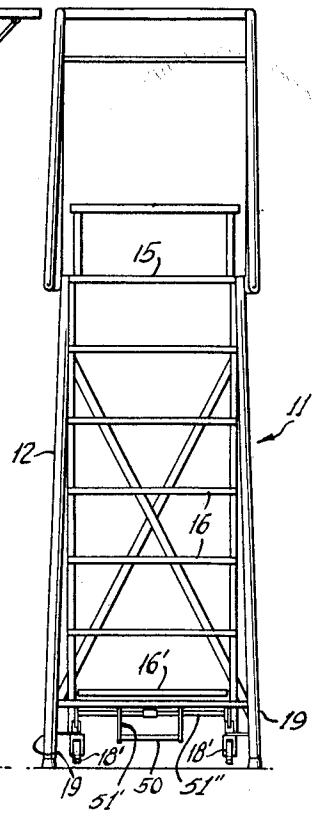


Fig. 2.



INVENTOR

ARTHUR C. BORGMAN

BY Curtis, Morris & Safford

ATTORNEY

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Fig. 3

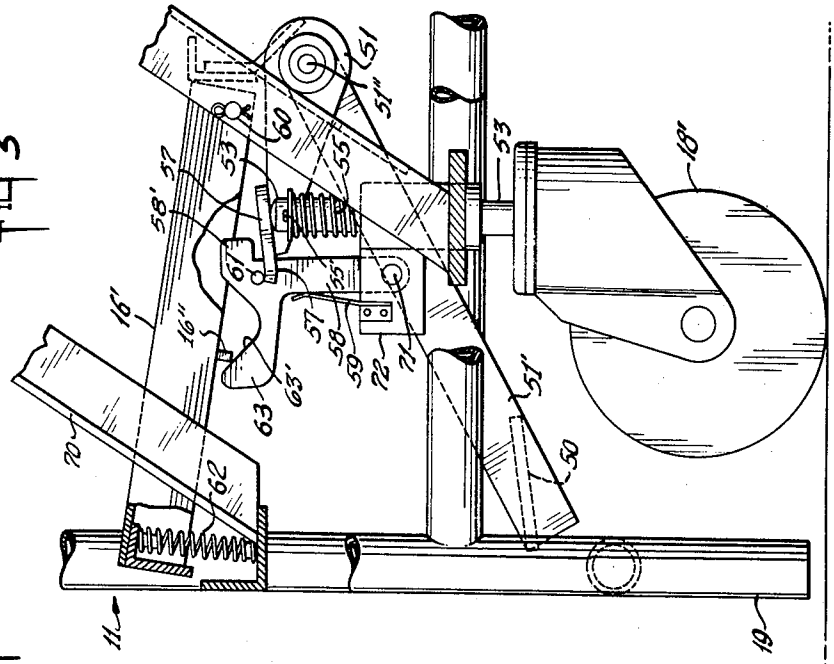


Fig. 5

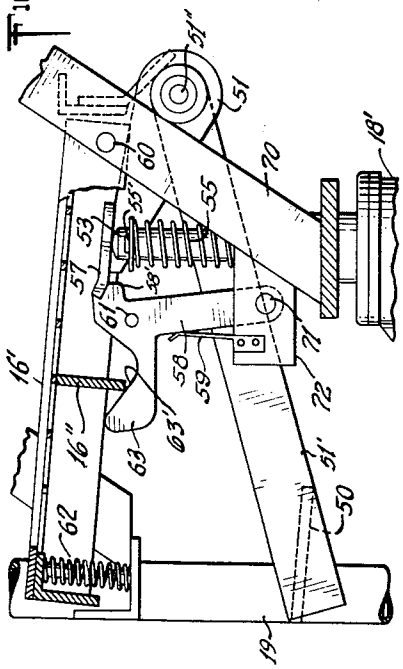
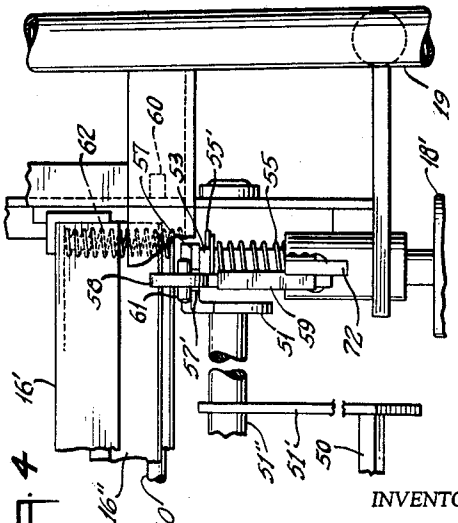


Fig. 4



INVENTOR

ARTHUR C. BORGMAN

BY Curtis Morris & Safford

ATTORNEY

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WHEEL MOUNTED LADDER

Arthur Carl Borgman, Franklin Square, N.Y., assignor to The Patent Scaffolding Co., Inc., Long Island City, N.Y.

Continuation of application Ser. No. 144,183, Oct. 10, 1961. This application May 28, 1963, Ser. No. 287,459
4 Claims. (Cl. 182—15)

This invention relates to a floor lock for wheel mounted ladders or mobile ladder assemblies of the type wherein a ladder is mounted on a frame supported continuously at one end on wheels and optionally at the opposite end on leg portions of the frame or on wheels.

Different forms of apparatus having, in general, a similar purpose are illustrated, for example, in U.S. Patents No. 2,897,910 to Steely et al. and No. 2,798,652 to Easton.

Known forms of mobile ladders provide devices for supporting one end optionally on legs or on wheels. However, under some conditions, the means for locking the wheels at that end in up position are inadequate and unreliable so that accidental release can easily occur with consequent danger to an operator on the ladder. Also, the locking devices are in some instances unduly heavy and ponderous or are expensively complex. It has accordingly been an object of the present invention to provide in a mobile ladder relatively simple inexpensive and reliable locking devices for releasably and securely immobilizing the ladder while permitting effective shift to mobility quickly and easily.

Having in view the objects among others as above stated, the present invention is embodied for example in a mobile ladder assembly including a frame having a pair of spaced legs at one end thereof, a vertically adjustable wheel or caster adjacent to each of said legs, and a ladder supported on said frame, the opposite end of the ladder being continuously wheel supported. Each of said vertically adjustable casters is provided with a spring biased stem slidable vertically between up and down positions in relation to said legs and the frame; and means are provided to engage said stem and press the same toward down position. Locking means cooperate with said stem pressing devices to releasably maintain the casters either in down position for mobility of the ladder, or in up position to ensure that the ladder remains supported on said legs and immobile, as required by the operator. Structure for pressing down the caster stems and raising the adjacent frame legs includes a treadle actuated lever arm having a portion bearing on the upper end of said stem. Locking means are provided which include a spring pressed pivoted latch cooperating with said arm to hold the stem in pressed down position. Means for releasing said locking devices include a cam on the latch effectively engaged by a portion of the lower step of the ladder and adapted to rock said latch out of locking engagement with said arm when said lower step is pressed down, as by an operator stepping on it.

Other objects and advantageous features of the invention, not above referred to, will appear from the following description and claims and from the embodiment of the invention as illustrated in the appended drawings which are supplied for purposes of illustration and are not intended to be either exhaustive or limiting in effect.

In said drawings:

FIGURES 1 and 2 are side and front end elevations, respectively, of an embodiment of the invention as applied to a mobile ladder;

FIG. 3, a fragmentary view on enlarged scale of a front end portion of the ladder shown in FIGS. 1 and 2, partly in side elevation and partly in longitudinal vertical

section showing a front wheel or caster locked in down or mobile position;

FIGURE 4, a fragmentary view on enlarged scale of said front end portion partly in front elevation, with parts broken away and partly in transverse vertical section, showing the caster in the same position as in FIGURE 3; and

FIGURE 5, a fragmentary view on enlarged scale similar to FIGURE 3 but showing the positions of the parts when the caster or wheel is locked in raised or immobilized condition, as when the ladder is in position for use.

Referring to the drawings, the present invention is shown embodied in a ladder assembly comprising a rigid frame **11** having transversely spaced front end legs **19**, here indicated as extensions of rails **12**, FIGURES 1 and 2, and other appropriate structural members, as rear uprights **13** and longitudinal tie pieces **14**. A ladder having steps **16** supported between inclined rails, as **70**, is mounted within frame **11**.

The rear end portion of frame **11** is supported on wheels **18**, and the front end portion thereof, when the ladder is mobile, on swivelling wheels or casters **18'** one of which is adjacent to each leg **19**. Each of the casters **18'** is provided with a spring biased stem **53**, FIGURE 3, mounted to slide vertically in the frame. Said stem has at its upper end a cross pin **55'**, FIGURE 5, which retains spring **55** in compression against a rigid portion of the frame, the arrangement being such that said stem and thus the caster **18'**, are biased toward the up or immobile position seen in FIGURE 5. It will be understood that when the casters **18'** are raised as hereinafter described, the front end of frame **11** is simultaneously lowered by gravity; and legs **19** are brought to rest on the floor, as seen in FIGURE 1, thereby tending to prevent sliding movement or displacement of the ladder while in normal use.

The upward adjustment of stem **53** to FIG. 5 position occurs automatically when the operator steps on the lowermost step **16'** of the ladder. Downward adjustment of stem **53** is effected by pressing treadle **50** down to the position shown in FIG. 3; and means are provided for releasably locking stem **53** in said two end positions.

Locking and actuating mechanism for this purpose includes a latch **58** pivoted at **71** on a bracket **72**. A spring **59** biases latch **58** toward a head **57** at the free end of and having a portion laterally offset from the free end of the short arm **51** of a bell crank lever which includes a longer arm **51'** and a transverse shaft **51''** pivotally supported at its ends between the ladder rails **70**, FIG. 2, and to which said arms **51** and **51'** are rigidly secured. The treadle **50** is mounted between the free ends of long arms **51'** in a position underneath ladder step **16'** and therefore relatively well protected against accidental actuation which would depress stems **53** and casters **18'**, thus leaving the ladder assembly free to roll.

Said head **57** of arm **51** has a notch **57'**, FIG. 4, in its front edge position to receive and embrace edge portions of latch **58** including the rearwardly extending edge of nose **58'**, as seen in FIG. 5, and the rear edge of the shank portion of said latch, as seen in FIG. 3. When the parts are in said FIG. 5 position, nose **58'** of latch **58** retains head **57** in up position, or such that each stem **53** and corresponding caster is also locked in up position by pressure of springs **55** until released by depressing treadle **50**.

Step **16'** is provided at its under side with a transverse plate **16''** having its bottom edge extending downwardly into engagement with an upwardly exposed cam edge **63'** of arm **63** of latch **58**. Thus, to raise casters **18'** from their FIG. 3 to their FIG. 5 position, the operator mounts step **16'** which forces plate **16''** down with its bottom edge bearing on the cam edge **63'** and rocks the

free end of latch 58 outwardly (left) (FIG. 3), out of the position there shown to the FIG. 5 position thus freeing head 57 from engagement with detent 61 on said latch 58. The ensuing upward thrust of stem 53 carries head 57 up to its FIG. 5 position where it is releasably held as above described.

For the reverse operation, i.e. to again mobilize the ladder assembly, the operator presses down on treadle 50 thus rocking the lever arm 51 counter-clockwise, FIG. 5, to release head 57 from nose 58' of latch 58 and depressing stems 53 until the free end of head 57 comes under detent 61 on latch 58 as seen in FIG. 3 whereby it is locked against return movement until step 16' is again pressed down by an operator against resistance of springs 62. In a portion of said reverse operation and after casters 18' make contact with the supporting floor, further pressure on treadle 50, causes shaft 51'' and with it the front end of frame 11 to be lifted by lever arms 51 fulcrumed on the top ends of stems 53, thus raising legs 19 sufficiently to allow free rolling movement of the casters 18'.

Upper portions of the assembly shown in FIGS. 1 and 2 of the drawings herein embody an invention of Robert Mihalik as claimed in a copending application Ser. No. 144,184, filed October 10, 1961, now Patent No. 3,113,010. This application is a continuation of my pending application Serial No. 144,183 filed October 10, 1961, and now abandoned.

I claim:

1. A mobile ladder assembly wherein a ladder having a pivotally mounted bottom step with a portion spring biased toward up position is carried on a frame of which one end is supported on wheels and the other end is supported in position for use on spaced legs of the frame, or, for transport on caster means mounted on said frame and including a spring biased stem movable downwardly against said spring bias to frame supporting position, said assembly comprising a spring pressed latch pivoted on the frame and having a cam arm positioned to be actuated by movement of the spring biased portion of said bottom step, said latch being rocked against resistance of said latch spring when said portion of the bottom step is depressed, a bell crank pivoted to rock on said frame and having a long lever arm arranged with its free end extending under said bottom step and a short lever arm arranged with its free end bearing against the top end of said stem, and means arranged and adapted to releasably retain said short lever arm in stem depressing condition and thereby retain said stem and its caster in down position and said legs in up position when the free end of the long lever of the bell crank is rocked downwardly, and to release said stem and caster from down position and said legs from up position when said portion of the bottom step is depressed against said cam arm of the latch to rock said latch against resistance of said latch spring.

2. A mobile ladder assembly including a frame having spaced legs, a bottom step pivotally mounted at one edge on said frame and with its other edge spring biased upwardly, a caster mounted in said frame below said step and having a stem slidably adjustable in said frame between up and down end positions and being spring biased toward up position, and means operatively interposed between said frame and said stem to releasably retain the caster in said end positions, said means including a bell crank pivoted on said frame and having a long lever arm and a short lever arm the free end of which extends across and is arranged with portions of its lower surface bearing on the top end of said stem, a spring biased latch pivoted on said frame in position for its free end to rock toward and from said free end of the short lever arm, and a detent movable with the latch into and out of position to engage the free end of said short lever arm, a cam arm extending from said latch and presenting an upwardly exposed cam edge, and cam actuating means on said step operatively engaging said cam edge and movable with downward deflection of said other edge of the step to rock the cam and said latch in a direction to move said detent out of short lever arm engaging position.

3. A mobile ladder assembly according to claim 2 and wherein said bell crank includes a transverse shaft to which said lever arm is rigidly attached and which is journaled in an end portion of said frame whereby said shaft and said end portion of the frame are lifted to raise the legs from the floor when the free end of said long lever arm is deflected downwardly with the casters in floor engaging position.

4. A mobile ladder assembly wherein a ladder having a pivotally mounted bottom step with a portion spring biased toward up position is carried on a frame of which one end is supported on wheels and the other end is supported in position for use on spaced legs of the frame, or, for transport, on caster means mounted on said frame and including a spring biased stem movable downwardly against said spring bias to frame supporting position, said assembly comprising a spring pressed latch pivoted on the frame and having a cam arm positioned to be actuated by movement of the spring biased portion of said bottom step, said latch being rocked against resistance of said latch spring when said portion of the bottom step is depressed, a bell crank pivoted to rock on said frame and having a long lever arm arranged with its free end extending under said bottom step and a short lever arm arranged with its free end bearing against the top end of said stem and having a slot arranged to embrace edge portions of said latch, and a detent on the latch arranged in position to engage said short lever arm in stem depressing condition and thereby retain said stem and its caster in down position and said legs in up position when the free end of the long lever of the bell crank is rocked downwardly, and to release said stem and caster from down position and said legs from up position when said portion of the bottom step is depressed against said cam arm of the latch to rock said latch against resistance of said latch spring.

No references cited.