Jan. 22, 1957 M. E. MITCHELL 2,778,694

MOBILE SWINGING LIFT PLATFORM EQUIPMENT

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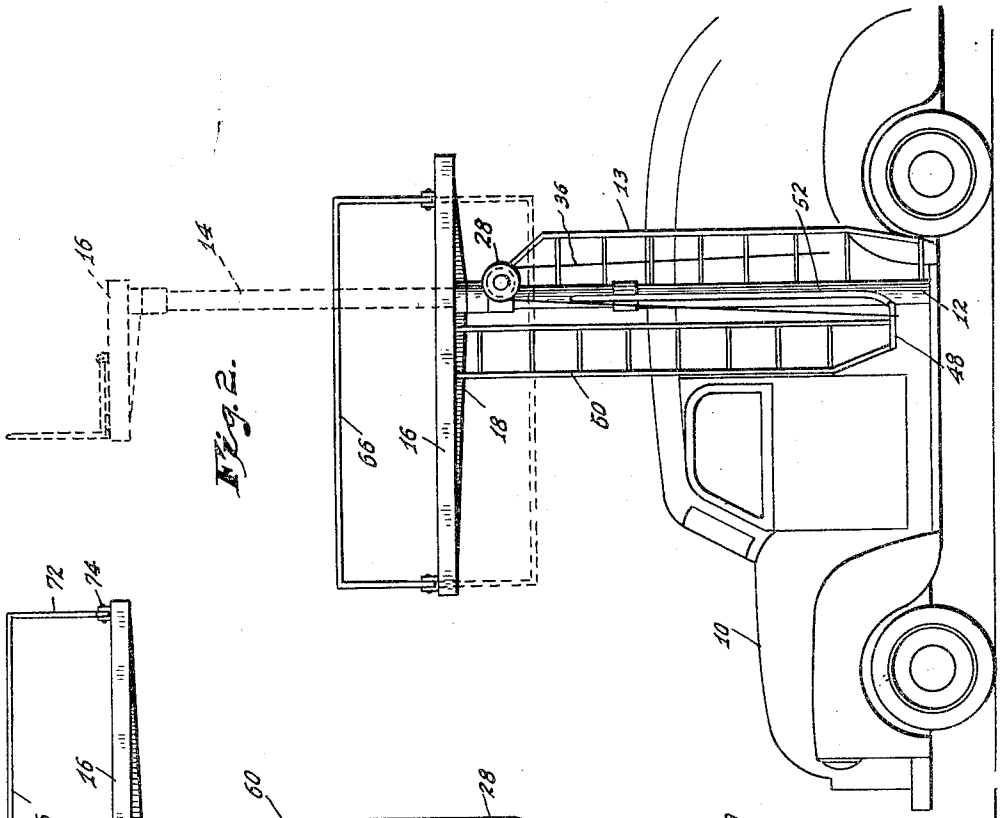


Fig. 2.

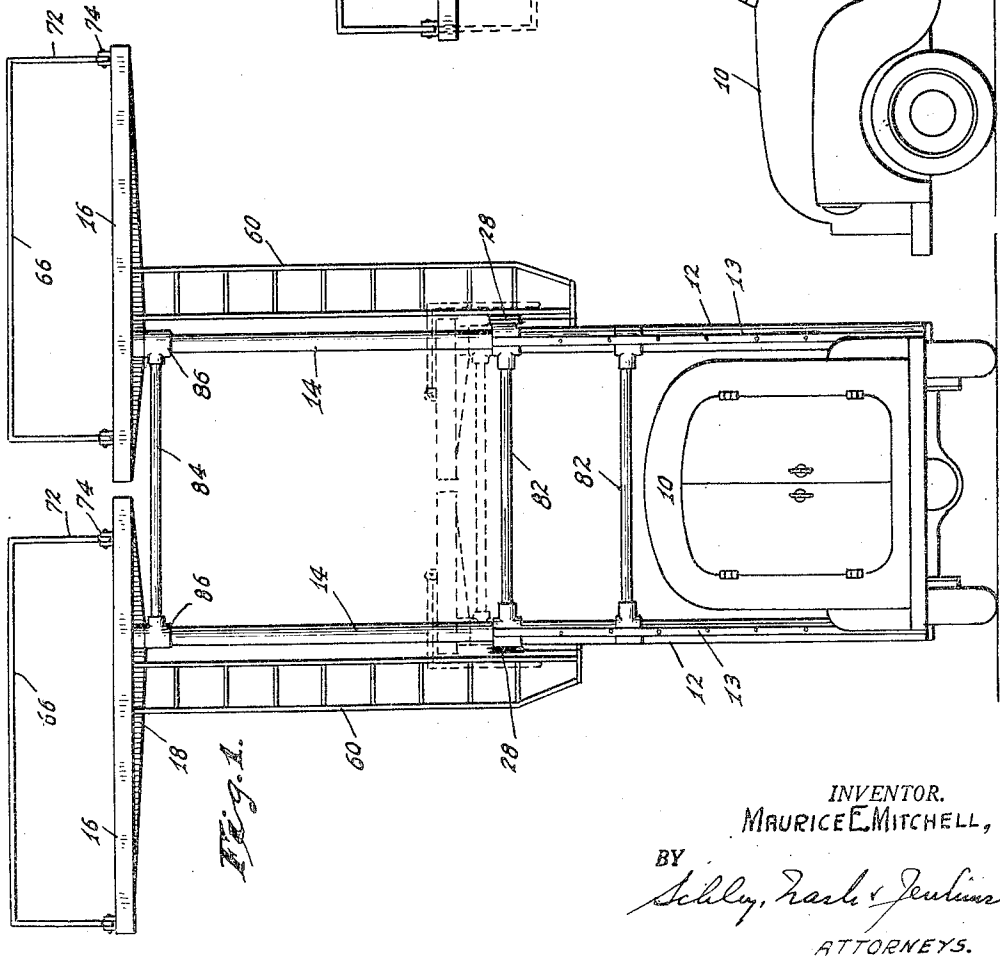


Fig. 1.

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Fig. 6.

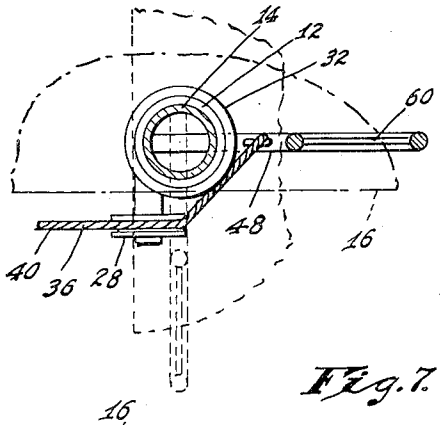


Fig. 9.

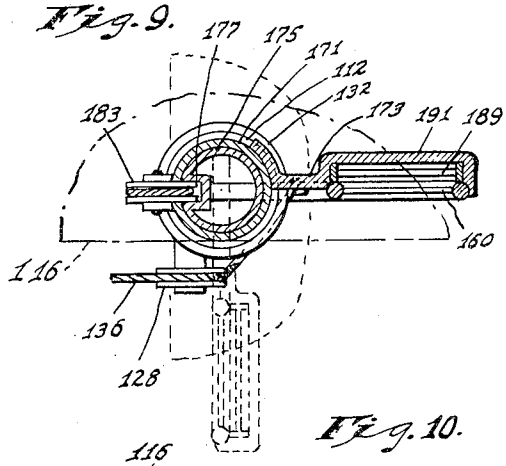


Fig. 7.

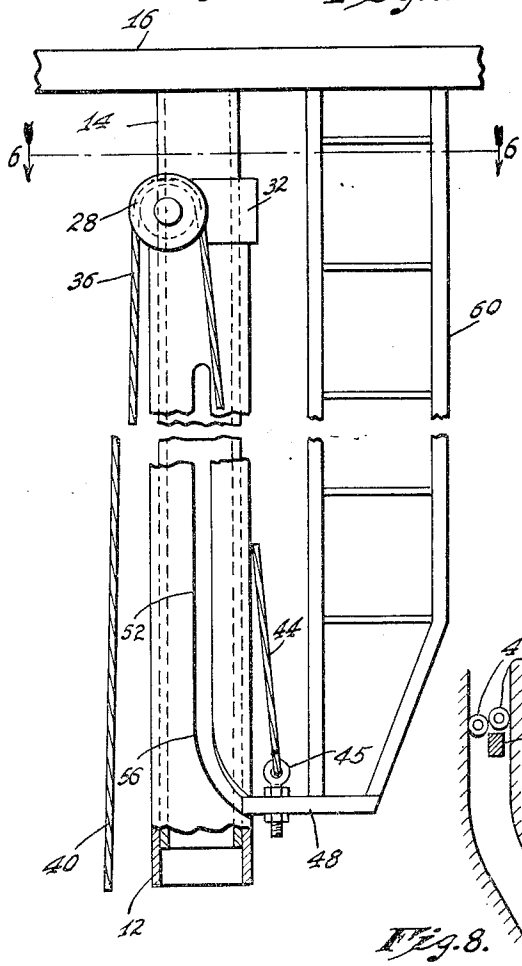


Fig. 10.

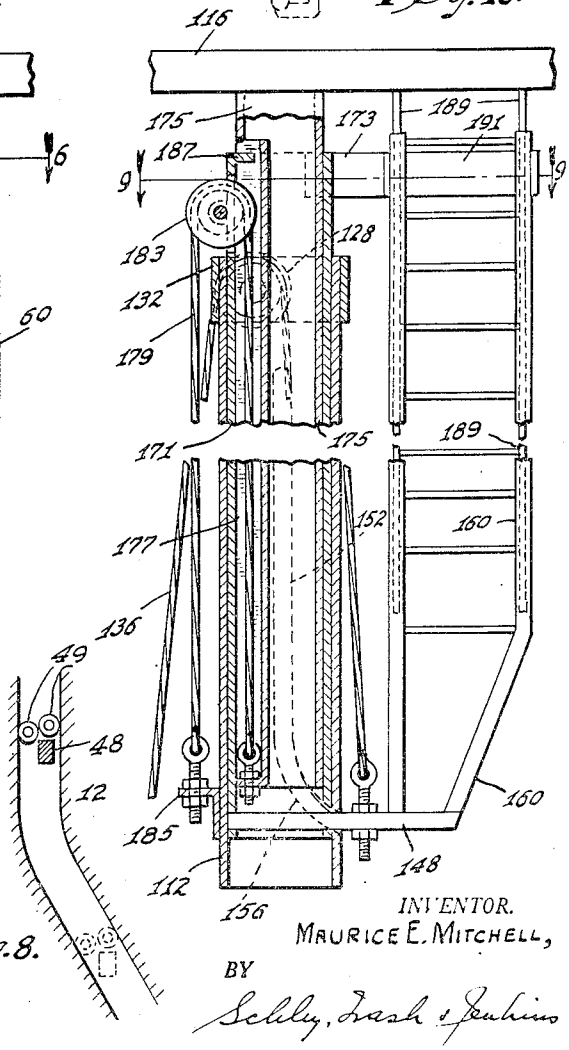


Fig. 8.

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Fig. 3.

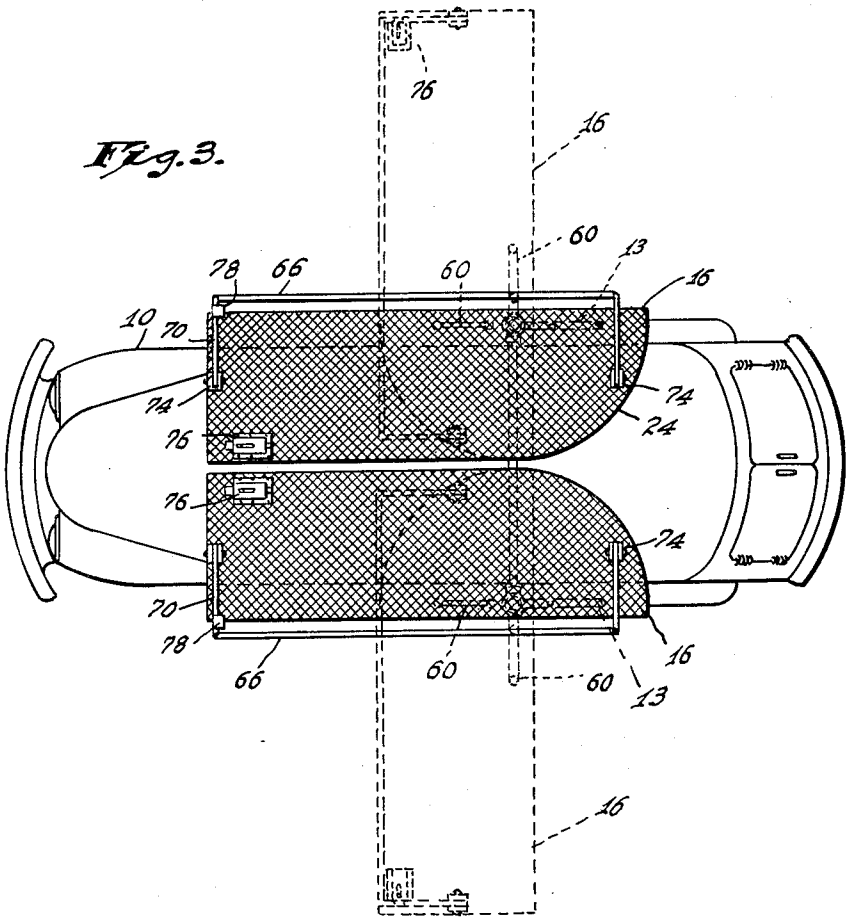


Fig. 4.

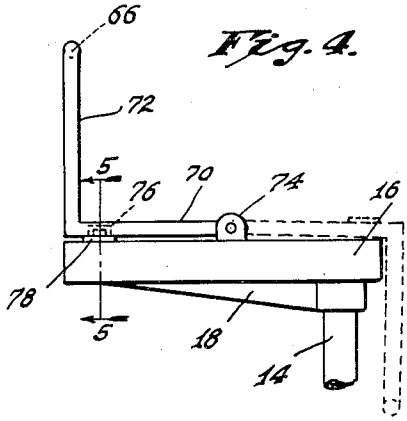
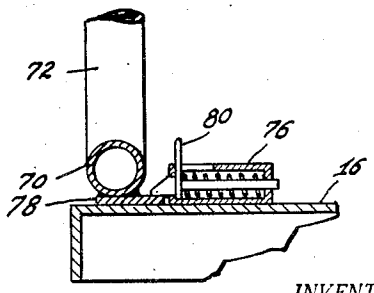


Fig. 5.



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MOBILE SWINGING LIFT PLATFORM EQUIPMENT

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Application August 15, 1952, Serial No. 304,588

2 Claims. (Cl. 304—29)

This invention relates to equipment for servicing elevated objects, such as mast arms of utility poles, bridge ceilings, elevated wires and supports and cables, and the like; and to the combination of such equipment with a mobile truck.

Servicing such elevated objects, as by painting, is tedious and time-consuming, and involves a high labor cost. In the case of many elevated objects, such as is usually the situation with the particular examples mentioned above, such objects are either not sufficiently rigid to support a ladder or there is no abutment against which the upper end of a ladder may rest. Even where such support is available, it is usually impractical to erect any scaffold-like structure having a work-platform of any appreciable horizontal extent, and much of the serviceman's time and effort is wasted in setting up the equipment used and moving it to successive portions of the elevated object or to successive objects which are to be serviced. The disadvantages are exemplified by the widely used practice of taking down mast arms for painting. The usual result is that proper servicing is wholly omitted or left undone for extended periods.

It is an object of my invention to provide self-supported means for service access to elevated objects. Another object is to provide such means in combination with a mobile vehicle. A further object is to provide a service platform which will have in its operative position considerable horizontal extent transversely of the carrying vehicle, yet which is retractable to an out-of-the-way position substantially within a vertical projection of the vehicle itself. A further object is to provide such means which are readily adaptable to differing applications and requirements of height.

These and other objects will become apparent from the following description.

In accordance with the preferred form of my invention I provide a pair of horizontal platforms mounted on interrelated column-like members supported vertically on opposite sides of a truck. These columns are extensible, as in synchronism, and means are desirably provided to rotate each supported platform through 90° during a portion of its vertical movement. In the retracted low position of the platforms, they lie longitudinally of the truck and substantially within the vertically-projected area of the truck. As they are elevated, and desirably during the first or lower portion of their elevation, they are swung horizontally through 90° so that the two platforms move to a cooperative end-to-end position to provide an elevated, substantially continuous walkway extending transversely of the truck and projecting considerable distances beyond the sides of the truck. Thus I provide a service walkway extending transversely across and beyond the sides of the truck, which can be raised or lowered through a considerable range of adjustment, and which when completely lowered moves to a low and retracted position permitting the truck to be moved readily from place to place. Power driven mechanism for elevating and lowering the platform is carried by the truck.

For accessibility to the platforms, I provide ladders carried thereby or by the columns and extensible therewith. Guardrails are preferably mounted on each platform and desirably are swingable between a latched, operative, upward position, and a retracted storage position.

The extensible columns may have one or more stages of extension. Desirably, the columns are interconnected and braced one from the other and the elevating means is such that both platforms rise and lower in unison, but the two platforms may be independently operable, as for service work in which only one platform is required. Ground-engaging stabilizing struts may be mounted on the truck if desired.

The accompanying drawings illustrate the invention. In the drawings:

Fig. 1 is a rear elevation of a truck equipped with a preferred form of platform apparatus, and including single-stage elevating mechanism. The solid lines show the platforms, rails, and ladders in an elevated and extended position, and the dotted lines show such parts in retracted position;

Fig. 2 is a side elevation of the equipment shown in Fig. 1, with the platforms shown in solid lines in retracted position and in dotted lines in elevated position;

Fig. 3 is a plan view of the apparatus shown in Fig. 2;

Fig. 4 is an end elevation of a platform showing in solid lines the guardrail in operative or upward position, and in dotted lines its folded-down or retracted position;

Fig. 5 is a fragmental detail taken on the line **5—5** of Fig. 4 showing latch means for holding the handrail in upright position;

Fig. 6 is a horizontal section taken on the line **6—6** of Fig. 7;

Fig. 7 is a side elevation of the platform-supporting column carried at the right side of the truck shown in Fig. 1, showing the parts in retracted position;

Fig. 8 is a fragmental developed view showing a cam-follower arrangement which is preferably employed in the lift mechanism.

Fig. 9 is a horizontal section taken on the line **9—9** of Fig. 10;

Fig. 10 is a view similar to Fig. 7, showing a modified lift column having a two stage lift.

In the single-stage lift apparatus shown in Figs. 1–7, a panel truck **10** is provided with a pair of slotted sleeves or tubes **12** rigidly attached to the truck and disposed vertically at opposite sides of the truck at points between the door openings and the rear fenders. These tubes **12** extend from the bottom of the truck body upward to a point above the truck body; their actual over-all length being dependent upon the elevation capacity desired and the minimum over-all height desired for clearance purposes. The two tubes **12** are symmetrical, as generally are the other elements of the platform and lift apparatus, each member of the apparatus at the right side of the truck having a counterpart at the left-side of the truck.

Telescoping within each tube **12** and upwardly extendable therefrom is a platform-supporting post or rod **14**, on the top of which is firmly supported a horizontal, long narrow work platform **16**. Each platform is a rigid unit, comprising suitable beams **18** and an overlying floor. As is shown in Fig. 3, the platform **16** is desirably not geometrically centered over the axis of the post **14** and sleeve **12**, but instead, the post is at that side of the platform which lies outermost when the platform is in lowered position, and at a point spaced from one end of the platform substantially equal to one-half the distance between the right-hand and left-hand supporting rods **14**.

With each platform so supported, the lowered position of the platforms disposes them substantially wholly within the vertically projected area of the truck, which condi-

tion is desirable for road travel. Each platform extends forward from the supporting post **14** a considerable distance, and as the platforms are raised, their forward ends swing horizontally outward of the truck to provide an extended walk-way extending transversely of the truck and well beyond its sides. The shorter ends of the platforms, which in retracted position lie rearwardly of the supporting post **14** swing inwardly over the truck to a position in which they substantially meet. The two platforms then cooperate to provide a substantially continuous walkway extending transversely above the truck. To provide clearance during the inward swinging movement of the platforms, the inner rear corner of each platform is rounded off on a radius about the axis of the rods **14**, as indicated at **24**.

For elevating the platforms between their lowermost retracted position and their elevated work positions, lift means is provided to rotate and extend the posts **14** with respect to the tubes **12**. As shown, the lift means is cable operated. A pulley **28** is mounted on a horizontal axis on a collar **32** secured to the top of each vertical tube **12**, and a cable **36** passing over such pulley **28** has one end **40** operatively connected to a powered windlass (not shown) carried by the truck, and the other end **44** is attached to an eye-bolt **45** which is connected to a stud **48** projecting laterally and outwardly from the lower end of the post **14**, through a guide slot **52** cut in the tube **12**.

When the platforms are to operate in unison, both the right and left cables **36** are connected to the same windlass drum or to interconnected drums.

The slot **52** in each tube **12** extends substantially the full height of the tube, and except at the very bottom, each slot is straight and parallel with the axis of the extensible supporting column **12—14**. The slot **52** and the stud **48** are so related to the angular position of the platform that when the stud is in the straight portion of the slot the platform lies in its transverse position with respect to the truck. To provide the 90° horizontal swinging of the platform, I form the lowermost portion of the guide slot **52** as a cam **56** extending 90° around the tube **12** over a distance of about 18 inches at the bottom of the tube **12**. The stud **48** may be considered to be a cam follower so that its vertical movement through the cam portion **56** of the slot **52** causes the post **14** and platform **16** to swing through 90° from the longitudinal retracted position of the platform **16** to the transverse position thereof. The cam portions **56** in the two tubes **12** at opposite sides of the truck are symmetrical but of opposite hand, so that both platforms swing forward in retracted position.

Since the cam portion **56** of each slot is at the bottom thereof, the swinging movement of the platforms will occur during the first movement thereof from their fully retracted positions. The platforms thus move immediately to the cooperating transverse positions in which they form a substantially continuous walkway, and such walkway can be lifted as such to any desired elevation and held therein for use.

Instead of using the stud **48** itself as a cam follower, separate cam-following rollers are desirably provided. As shown in Fig. 8, the stud **48** is rectangular in section, and a pair of cam-following rollers **49** are mounted on the post **14** immediately above that stud **48** and positioned respectively to engage the opposite sides of the slot **52** and of its cam portion **56**.

To provide access to the walkway, two ladders or ladder sections are associated with each lift column **12—14**. A lower ladder **13** is fixed to each lower section or tube **12** of each lift column, preferably in a position flat against the truck and at the rearward side of the tube **12**. An upper ladder **60** is fixed to, and hence swingable and elevatable with, the platform **16**. The ladder **60** is connected at the top to the platform itself, and at the bottom to the stud **48**. When the platform is in retracted position, the ladder lies ahead of the sleeve **12** and flat against the truck-side. As the platform swings outwardly 90°, the ladder **60** moves with it, to a position in a vertical plane at 90° to the plane of the stationary ladder **13**, where the serviceman can conveniently use the ladders **13** and **60** in series to climb from the ground to the work platform. The connection of the lower end of the ladder **60** to the stud **48** serves to brace each from the other.

Each platform **16** is desirably provided with a guardrail **66** along at least one long side, and the guardrails desirably fold down when the platforms are in retracted position. The handrails shown are supported on L-shaped posts (see Fig. 4) having a horizontal bottom leg **70** and an upright leg **72**. The free ends of the bottom legs **70** of the L-posts **70—72** on each platform are pivoted in aligned bearings **74** at the ends of the platform, at points slightly offset from the mid points of those ends. In the raised operative position of each handrail, as shown in solid lines in Fig. 4, it is desirably locked at at least one end by a spring-pressed latch **76** mounted on the platform **16** and engaging a keeper **78** secured to the horizontal bottom leg **70**. Upon release of the latch **76** as by its knob **80**, the handrail and its supports can be pivoted about the common axis of its bearings **74** through 180° to the retracted position shown in dotted lines in Figs. 1 and 4. The vertical legs **72** of the supports then lie in a depending position, clearing the side of the platform, and positioning the rail below the outer side of the retracted platform.

Desirably, the elevating apparatus and platforms on opposite sides of the truck are tied together and braced from each other. As shown in Figs. 1–3, the two tubes **12** are interconnected at their tops by two spaced tie rods **82** extending transversely across the truck top, and the two posts **14** are interconnected by a tie rod **84** connected at its ends to sleeves **86** which rotatably receive the platform-supporting posts **14**.

Where greater elevation capacity is desired than can conveniently be obtained with the single-stage lift apparatus shown in Figs. 1–7, multi-stage lift means may be used, such as that shown in Figs. 9 and 10. The multi-stage lift shown, like that of Figs. 1 to 7, comprises a fixed tube **112** having a slot **152** with a lower cam portion **156**, and supporting a pulley **128** on a collar **132** at the top. A cable **136** extending over the pulley is operatively connected at one end to a windlass and at the other end to a stud **148** projecting through the cam slot in the fixed sleeve **112**. In this case, the stud **148** is fixed to an intermediate lift tube **171** telescopically received in the fixed tube **112**. A top lift post **175** is telescopically received within the intermediate tube **171** and platform **116** is mounted on the upper end of the post **175**. This inner post **175** is provided with a longitudinally extending groove **177** parallel with the axis of the rod, to receive a secondary lift cable or chain **179**. The secondary cable is fastened to the bottom of the top lift post **175**, and extends upward in the groove **177**, over a pulley **183** carried by the top of the intermediate lift tube, and then downward outside the lift assembly to a fixed bracket **185** on the fixed tube **112**. So far as lift motion alone is involved, the bracket **185** could be at any point on the tube **112**, but to allow for the desired 90° rotation of the two upper lift sections in the fixed tube **112**, the bracket **185** is positioned well below the pulley **183** so that there is a considerable stretch of cable between them.

To prevent relative rotation of the top post **175** with respect to the intermediate tube **171**, a finger **187** is mounted on the intermediate tube **171**, above the pulley **183**, and rides in the groove **177**.

As the intermediate tube **171** of this lift mechanism is raised by the main cable **136**, that intermediate section raises the pulley **183**, and causes the secondary cable **179** to lift the top post **175** with respect to the intermediate tube **171**.

With three sections in the lift columns, three-section

ladders are provided. The lower fixed section is the same as that in the construction of Figs. 1 to 7, and is fixed to the truck or to the fixed tube **112** in a position lying to the rear of the lift column. An intermediate ladder section **160** is carried by the intermediate tube **171**, its lower end being secured to and supported by the stud **148** and its upper end being held by a bracket **173** on the upper end of the intermediate section **171**. As shown in Fig. 9, the bracket is formed to provide a trackway **191** for the top ladder section **189**. The top ladder section is carried by the platform **116**, and is received in guiding relationship in the trackway **191**, so that it lies against the back side of the intermediate ladder section **160**. The upper two ladder sections extend with respect to each other as the upper two lift sections are extended, and are lifted and swung 90° with respect to the bottom ladder section as the intermediate tube **171** is lifted and rotated 90° with respect to the fixed lift tube **112**.

With three sections **112**, **171**, and **175** in each elevator column, a higher extension of the platform is possible than with the single-stage lift mechanism of Figs. 1–7. Otherwise the operation of the modified construction is similar to the first construction shown.

With the platforms in retracted position, they lie substantially within the vertically projected area of the truck, the ladders lie flat against the side of the truck, and the whole assembly is of a height which permits the truck to be driven on the roads in a normal way and with adequate clearance to pass under wires, bridges, trees, etc. Where service work is to be done, the truck is stopped in a suitable position, and the windlass is operated to lift the platforms. As they start to rise, they swing to their transverse positions to form the elongated transverse walkway above the truck, and they can then be raised to the height required for the work. The access ladders rise and swing with the platforms, to provide access at any elevation. The lateral extension of the walkway beyond the sides of the truck permits the servicemen to reach areas spaced from the side of the truck. For example, in painting streetlight mast arms, the supporting poles are frequently positioned a considerable distance from the roadway, yet with the equipment of this invention, the truck may be parked at the edge of the roadway and the whole length of the mast arm, and the top of the pole, may be painted in one setting.

The lift mechanism operates quickly, and the apparatus is easily movable from one setting to another. The poles and mast arms of a series of spaced street lights, for example, can be painted with little effort and time wasted in moving apparatus between poles or from one position to another at any one pole.

I claim as my invention:

1. Platform apparatus, comprising a generally rectangular platform, a guardrail carried by L-shaped supports pivotally mounted at the extreme end of the horizontal leg thereof on the platform on a central longitudinal axis, said rail structure being movable about said axis between a storage position in which the vertical portions of said support depend past one side of the platform and an operative position in which the vertical portions upstand adjacent the opposite side of the platform.

2. Platform lift apparatus, comprising a fixed column section, an intermediate column section, means to elevate the intermediate section, an upper section slidably movable with respect to the intermediate section, and a tension member fixed at one end to the top member, extending over a pulley carried by the intermediate member, and fixed at the other end to the fixed section, whereby elevation of the intermediate section extends the top section therewith and with respect thereto, and guiding means to hold said sections against rotation during a major portion of their relative movement and to rotate the upper section with respect to the fixed section during a minor portion of their relative movement, and a platform supported on the upper lift section.

References Cited in the file of this patent

UNITED STATES PATENTS

1,412,159	Bolte	Apr. 11, 1922
1,638,611	Baldwin	Aug. 9, 1927
1,664,613	Royer et al.	Oct. 4, 1927
1,685,144	Austin	Sept. 25, 1928
1,736,419	Smith	Nov. 19, 1929
2,196,511	Wagner et al.	Apr. 9, 1940
2,601,092	Cardiff	June 17, 1952
2,614,893	Merrill et al.	Oct. 21, 1952
2,672,319	Nelson	Mar. 16, 1954

FOREIGN PATENTS

470,163	Germany	Dec. 20, 1928