

Oct. 4, 1927.

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EXTENSION TOWER

Filed June 14, 1924

5 Sheets-Sheet 1

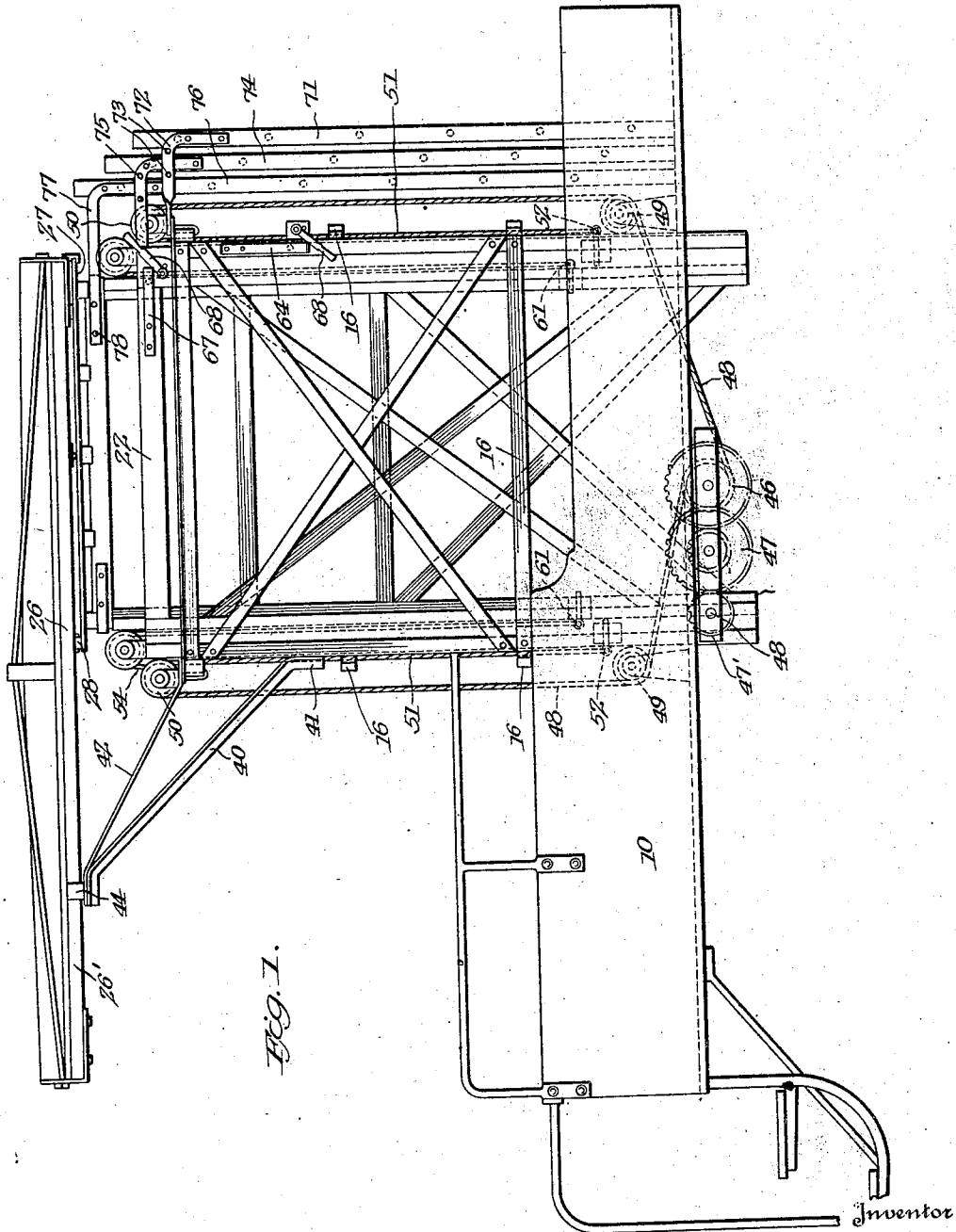


Fig. 1.

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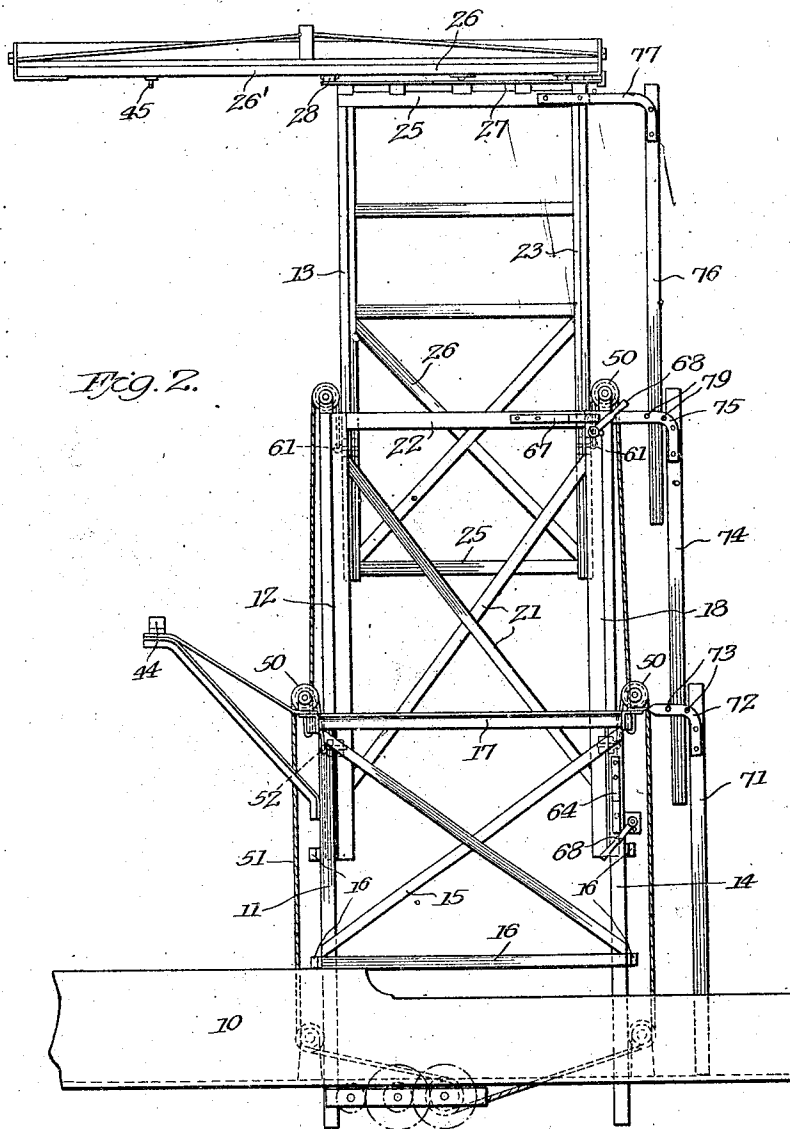
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5 Sheets-Sheet 2



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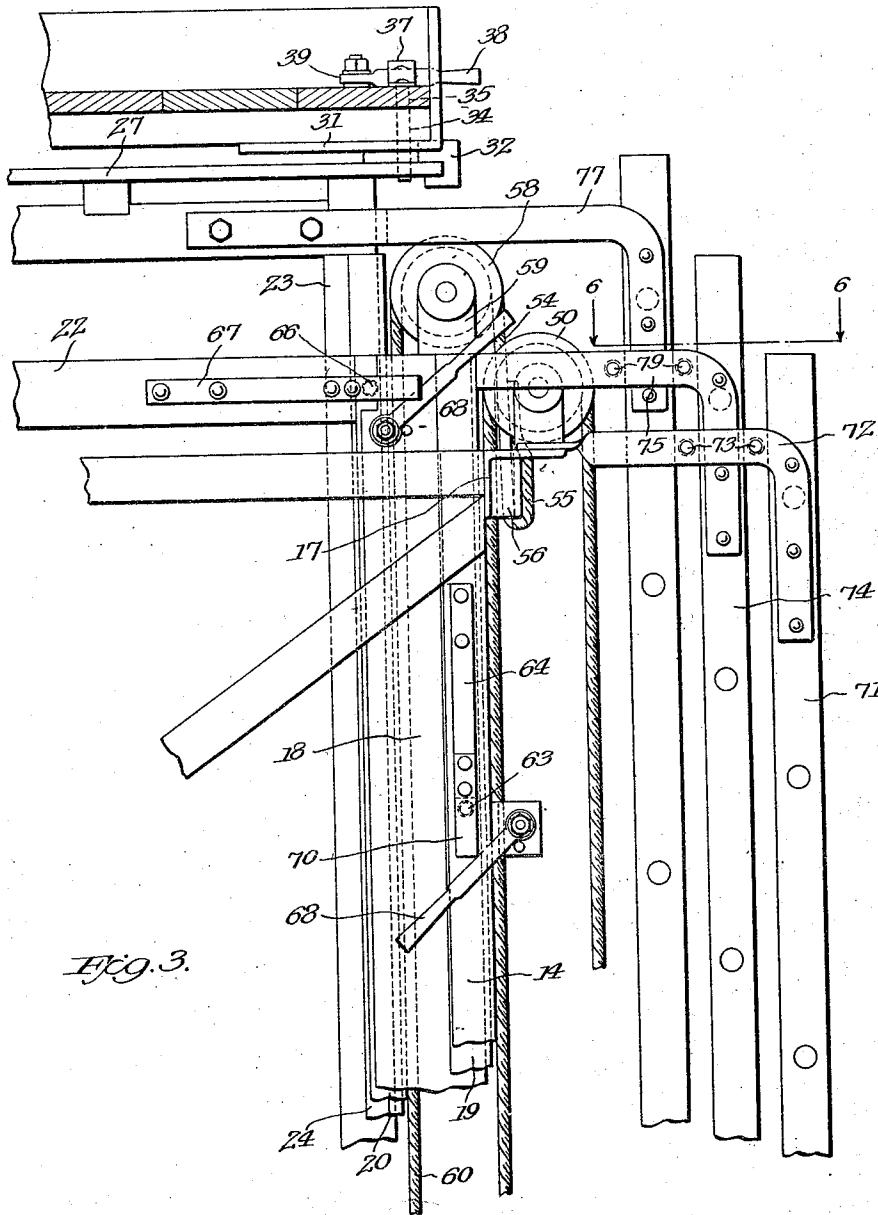
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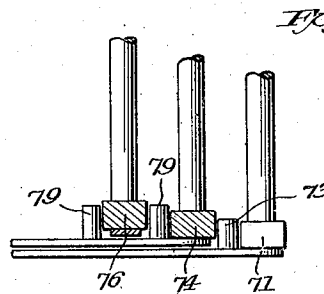
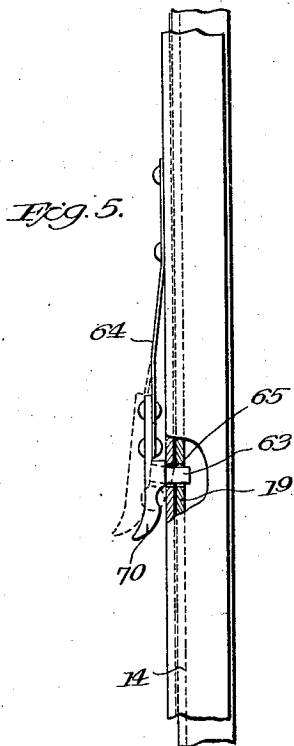
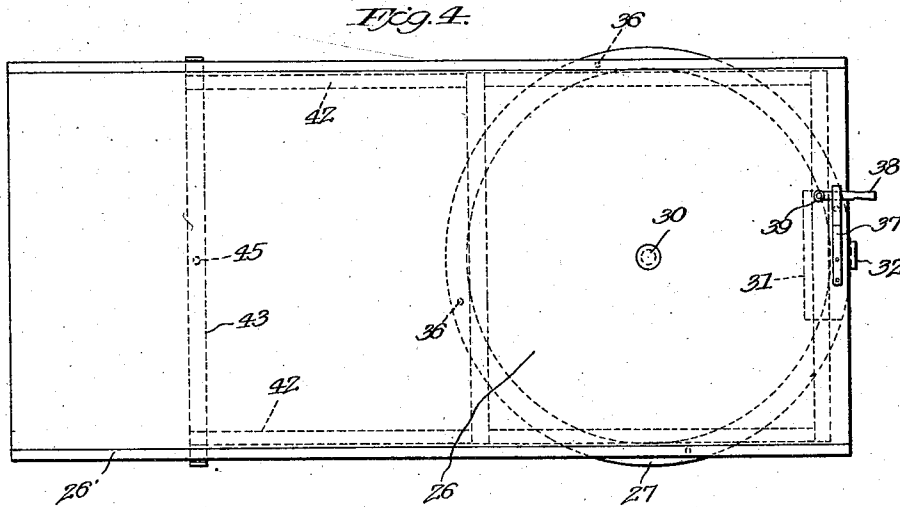
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EXTENSION TOWER

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5 Sheets-Sheet 4



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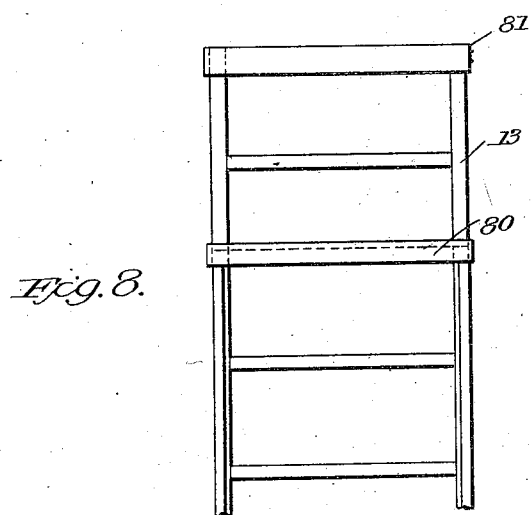
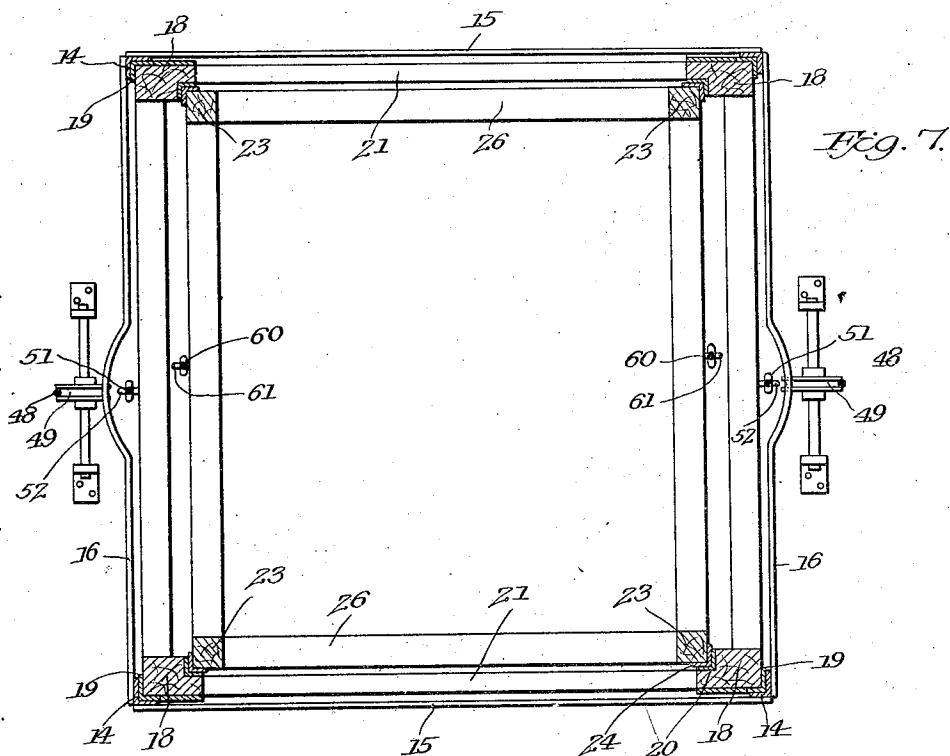
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EXTENSION TOWER

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE.

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EXTENSION TOWER.

Application filed June 14, 1924. Serial No. 720,042.

The present invention relates to tower structures of the extensible type intended for use in erecting or repairing elevated structures, such as the trolley wires of electric railways.

The invention relates to towers of the general type described in the patent to McCordell et al., 534,075, February 12, 1895, which discloses the tower employed before the present invention.

An object of the invention is to provide a tower having, preferably, at least three sections, and including a hoisting rigging or mechanism, which will permit the raising or extension of the tower very quickly, and, which, when collapsed, has a center of gravity relatively close to the vehicle body or support upon which it is mounted.

A further object of the invention is to provide in connection with the tower a ladder structure, which may be quickly collapsed or extended as the tower is raised or lowered, whereby workmen may readily ascend the tower to a working platform positioned upon its top section.

Other objects of the invention relate to improved means for locking and supporting the working platform against movement, to the construction of the several sections, and to means for locking the tower in extended or raised position independently of the hoisting mechanism, all of which will become clearer as the description proceeds in connection with a preferred embodiment of the invention disclosed in the accompanying drawings, wherein

Figure 1 is a side elevational view,

Figure 2 is an elevational view of the tower when raised or extended,

Figure 3 is an enlarged fragmentary view of a portion of the tower,

Figure 4 is a top plan view,

Figure 5 is an enlarged detail of the locking structure,

Figure 6 is a fragmentary sectional view on the line 6—6 of Figure 3, looking in the direction of the arrows,

Figure 7 is a horizontal section through the tower on the line 7—7 of Figure 1, and

Figure 8 is a side elevational view of a modified top section construction showing a different type of platform.

Referring to the drawings for a more detailed description, 10 indicates a conventional type of truck or vehicle body upon which

the tower is positioned. The tower comprises, preferably, at least three sections which may be identified as a stationary base section 11, an intermediate section 12, and a third top section 13. The three sections telescope one within the other, the base section being preferably outermost, and the top section 13 upon the interior of the structure when the tower is collapsed and the sections arranged in nested relation. All of the sections are preferably rectangular or square, but, obviously, of slightly different dimensions so as to permit the same to fit one within the other. The stationary or base section comprises corner posts 14, preferably of angle iron, which, upon each side of the section, are braced by diagonal struts or braces 15. Horizontal braces 16 at the sides as well as the front and rear of the section hold the corner pieces in fixed relation, and a top binding piece 17, preferably of angle iron, encircles the section to provide a base of substantial rigidity. The section 11 may be mounted upon and secured to the vehicle body in any suitable manner so as to receive for a substantially close sliding fit the intermediate section 12 provided with corner posts 18, the inner and outer surfaces of which are faced with strips of angle iron 19, 20 (Figure 3) when the section is of wooden construction, as indicated in the drawings. Diagonal braces 21 upon each side of the section, together with top horizontal strips 22, suitably strengthen the section.

The top section 13 is similar in construction to the intermediate section and includes corner posts 23, the outer faces of which may be covered by strips of angle iron 24, which fit tightly against the facing strips 20 upon the intermediate section. This section is suitably strengthened by top and lower horizontal braces 25 and diagonals 26.

When the tower is collapsed, the three sections are arranged in nested relation, as indicated in Figure 1. It will be noted that the intermediate section is slightly higher than the base section and that the top section 13 projects above the intermediate section a sufficient distance to enable the same to carry a working platform 26, which is provided with a lateral extension 26' and is mounted upon a circular track 27, rigidly positioned upon the top section. The platform 26 has on its under surface a series of

rollers 28 which ride upon the track and has a king or pivot pin 30, which serves as a center for the revolving movement of the platform. In order to balance the platform properly, a plate 31 is secured adjacent one end and is provided with a hook portion 32 extending around one edge of the track 27 and beneath the same. The plate 31 permits free movement of the platform, but prevents tilting of the platform away from the track when weight is placed upon the lateral extension 26. This arrangement relieves the pivot or king pin 30 of the supporting strain and permits the same to function freely as a pivot.

The platform may be locked in any suitable position by means of a pin 34, which projects through an opening 35 in the platform and is adapted to fit into one end of a number of sockets or openings 36 in the supporting track. The pin 34 is normally pressed downwardly by means of a leaf spring 37, which may be raised to hold the pin retracted by means of a cam lever 38 adapted to be interposed between the platform and the leaf spring, the lever being pivoted at 39. Obviously, when the platform is to be locked, the lever 38 may be swung from position between the leaf spring 37 and the platform, and this will permit the spring to move the locking pin 34 into one of the openings or sockets 36 in the track whenever the pin is moved into registry therewith.

Additional locking and supporting means for the platform, when the tower is collapsed, may be provided which will thereby prevent accidental swinging of the platform while the carrying vehicle is traveling from place to place. This means is preferably mounted upon the base section and comprises, in the illustrated embodiment of the invention, outwardly extending bracket arms 40 (Figures 1 and 4) secured at ends 41 to the corner posts of the base section, and suitably braced by means of strips 42 secured to the top of the frame binding iron 17 and to the free ends of the brackets 40. The brackets 40 carry a cross bar 43, the ends of which are turned upwardly as at 44 to form a seat or rest for the platform extension when the tower is collapsed, the upturned ends preventing lateral movement of the platform. Before the tower is lowered, the platform must be moved to the position indicated in Figures 1, 2 and 4, and may be locked in this position by means of the locking pin 34. When the tower is then lowered, the platform extension will rest upon the bar 43, and may be locked against lateral movement by the upturned ends 44 thereon, as well as by a pin 45 on the under-surface of the platform which fits into an opening in the bar 43. This supporting bracket properly balances the tower by supporting the platform and locks the latter against accidental move-

ment during the travel of the carrying vehicle. It will be noted further that although the tower is formed in three sections, it has a relatively low center of gravity, and is not topheavy.

The tower may be raised and lowered by means of a windlass 47 positioned upon the vehicle 10 and adapted to be driven through suitable gearing 47, either from suitable power mechanism or, manually, by the application of a lever to the axle 48 of the gear 47'. A power operated mechanism for the windlass need not be described in detail, since the same constitutes no part of the present invention, and, further, is shown in the patent referred to above, as well as in co-pending application Serial No. 598,889, filed November 3, 1922, by William M. Baldwin.

From the windlass 46, extend in opposite directions, cables 48, which traverse sheaves 49 mounted adjacent the base of the stationary section, and sheaves 50 positioned adjacent the top of the section. The sheaves 49 are rotatably and slidably mounted upon shafts 49' which are supported by brackets 49''. As the cable is wound upon or unwound from the windlass the sheaves may slide freely along the shafts 49' while rotating, thereby avoiding lateral bending of the cable at the sheaves. The cables 48 have downward runs 51, positioned between the cross bars 16 of the bottom section and the intermediate tower section and are secured by means of eye bolts 52 to the intermediate section 12 adjacent its lower end. As will be understood, turning of the windlass 46 will result in the lifting of the intermediate section by means of cables 48 which are wound upon the windlass. The third or top section is preferably lifted simultaneously and by means of separate cables 54 which have their ends 55 extended through openings or eyes 56 in the binding iron 17 and turned upwardly to be fastened to the bodies of the cables, thus securing the ends to the base or stationary section. These cables are positioned on opposite sides of the tower and are looped over sheaves 58 mounted in brackets 59 at the top of the intermediate section 13. They have downward runs 60 within the intermediate section, which runs are secured by means of eye bolts 61 to the third or innermost section adjacent its lower end. Obviously, as the intermediate section is raised, this will cause a simultaneous lifting or raising of the top section 13 from within the section 12, due to the fact that the cables 54 are secured to the stationary section and are looped over the sheaves 58 on the intermediate section. Thus, as the windlass 46 is turned, both the sections 12 and 13 are raised simultaneously.

The invention contemplates the provision of a safety locking mechanism which will

assist the hoisting cables in maintaining the tower extended. Suitable locking means is shown in the drawings and comprises a pin 63, carried by a leaf spring 64 which is secured to one corner of the base section adjacent its top, the pin being adapted to fit into registering apertures 65 in the post 14 of the base section and the corner post facing strip 19 of the intermediate section. The leaf spring 64 will automatically throw the pin 63 into these apertures when they are brought into registry with the raising of the intermediate section.

A similar locking pin 66 may be carried by a leaf spring 67 positioned upon the top horizontal brace 22 of the intermediate section. The pin 66 is adapted to project through a suitable opening (not shown) into a socket adjacent the base of the top section when the latter is raised, as indicated in Figure 2. The locking pins 65 and 66 thus constitute a safety mechanism. When the tower is to be lowered, they may be retracted by means of levers 68 which are adapted to be moved between the pin carrying finger 70 and the face of the tower section to retract the pins, as indicated in dotted lines in Figure 5.

In constructions heretofore employed it has been customary to provide upon the tower section suitable cross bars which may be employed as a ladder to permit the operator to ascend to the working platform or to descend. The present invention contemplates the provision of a sectional ladder, the separate sections of which are supported upon the tower sections so that the ladder may be extended or collapsed with the tower. For this purpose, a ladder section 71 is supported by means of brackets 72 carried by the base section on opposite sides of the ladder, only one of these brackets being shown in Figure 3. The brackets are suitably secured to the binding angle iron 17 and carry a pair of spaced guide and steadying pins 73 which straddle a second ladder section 74 secured by means of brackets 75 to the intermediate tower section. A third ladder section 76 is mounted upon brackets 77 secured at 78 to the top tower section. The ladder section 76 is guided as the tower is lowered or raised by means of pins 79 upon the bracket 75. When the tower is collapsed, as indicated in Figure 1, the ladder sections are arranged one in front of the other and in parallelism, and, upon extension of the tower, the three sections constitute a complete ladder, permitting ascent to and descent from the working platform, and are rigidly held in relation by the supporting brackets, as well as the pins 73 and 79 upon these brackets.

Referring to Figure 8, there is shown a modified platform construction for the top tower section. Instead of providing a re-

volving platform, a stationary floor or platform 80 may be positioned somewhat below the upper end 81 of the top tower section 13 so that the sides of the section may serve as a railing.

It should be understood that numerous modifications may be made in the structure illustrated and described without departing from the invention which is defined in the following claims.

We claim:

1. A portable extension tower comprising a plurality of telescoping sections adapted to be positioned in nested relation when the tower is collapsed, a platform carried by one of said sections, brackets fixedly secured to the several sections adjacent their upper ends and extending outwardly therefrom, and an extension ladder arranged at one side of said tower having a plurality of sections each independently and fixedly supported adjacent one end by said tower brackets and by a separate tower section.

2. A portable extension tower comprising a plurality of telescoping sections adapted to be positioned in nested relation when the tower is collapsed, a platform carried by one of said sections, brackets fixedly secured to the several sections adjacent their upper ends and extending outwardly therefrom, and an extension ladder arranged at one side of said tower having a plurality of sections each independently and fixedly supported adjacent one end by said tower brackets and by a separate tower section, and the individual brackets having means adapted to cooperate with and guide a ladder section other than the one they carry when the ladder is extended and collapsed.

3. A portable extension tower comprising a plurality of telescoping sections adapted to be positioned in nested relation when the tower is collapsed, a platform carried by one of said sections, brackets fixedly secured to the several sections adjacent their upper ends and extending outwardly therefrom, and an extension ladder arranged at one side of said tower having a plurality of sections each independently and fixedly supported at its upper end by said tower brackets and by a separate tower section, and the individual brackets having projecting guide pins disposed on opposite sides of and adapted to cooperate with and guide a ladder section other than the one they carry when the ladder is extended and collapsed.

4. A portable extension tower comprising a plurality of telescoping sections adapted to be positioned in nested relation when the tower is collapsed, means for extending the tower, a plurality of vertically aligned openings in the adjacent tower sections adapted to be brought into horizontal alignment when the tower is extended, pins carried by the adjacent tower sections adapted to be

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5 inserted through said openings when the latter are horizontally aligned, spring means for normally urging said pins into said openings, and a lever adapted to be interposed in the path of said spring means for withdrawing the pin from said openings.

10 5. A portable extension tower comprising a plurality of telescoping sections adapted to be positioned in nested relation when the tower is collapsed, means for extending the tower, a plurality of vertically aligned openings in the adjacent tower sections adapted to be brought into horizontal alignment when the tower is extended, pins carried by

the adjacent tower sections adapted to be 15 inserted through said openings when the latter are horizontally aligned, substantially flat springs anchored to the sections and carrying said pins, said pins having finger elements adjacent the same and levers arranged 20 to fit beneath said finger elements and to withdraw and maintain the pins out of said openings.

In testimony whereof we have hereunto set our hands.

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