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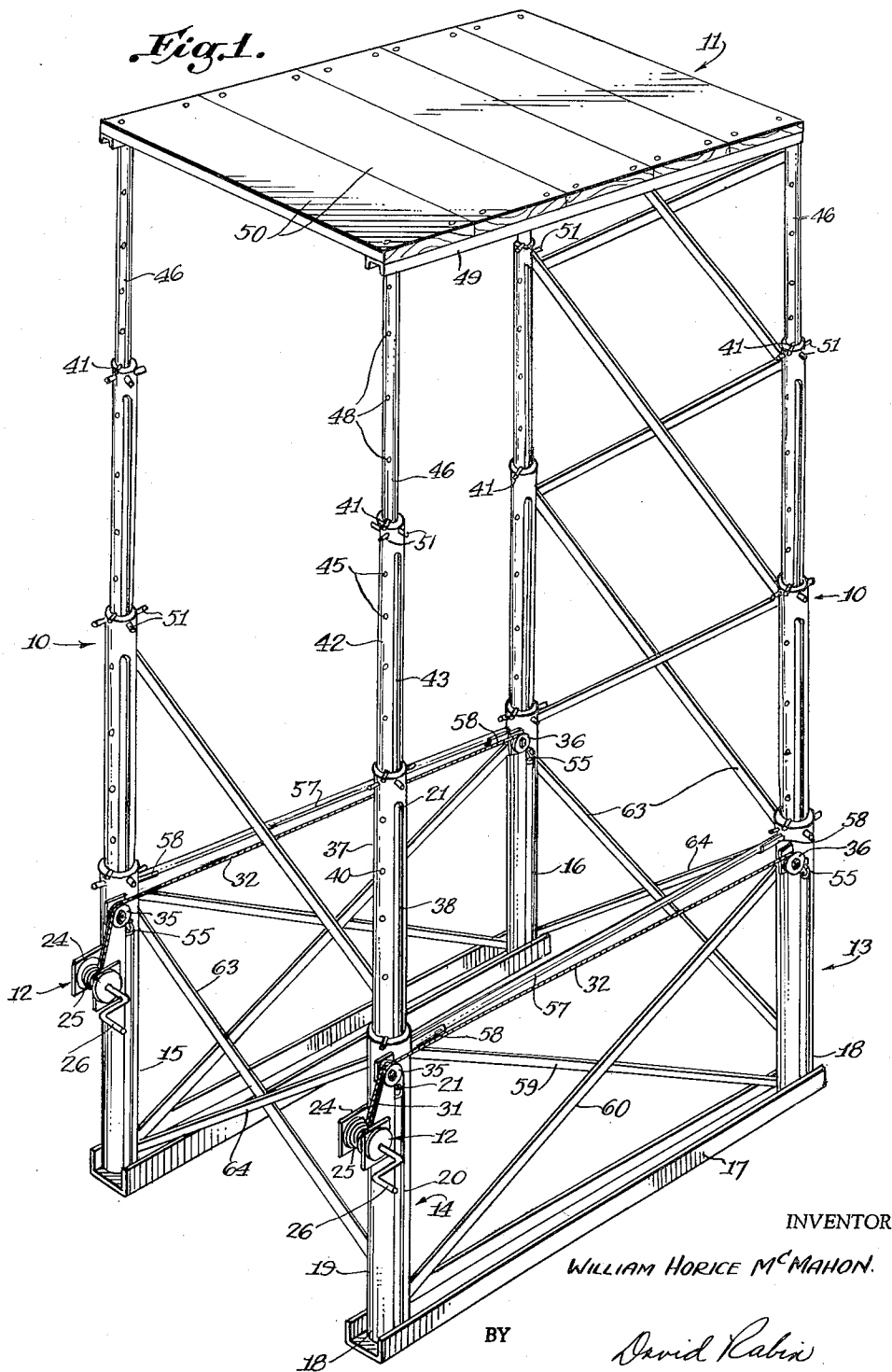
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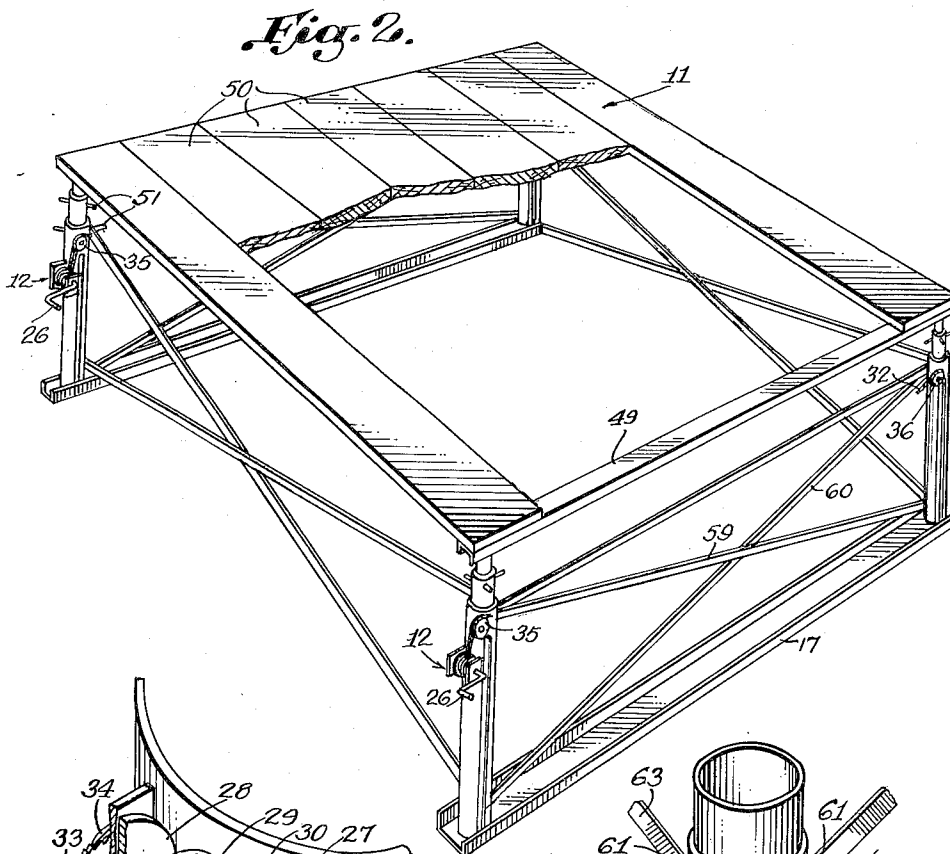
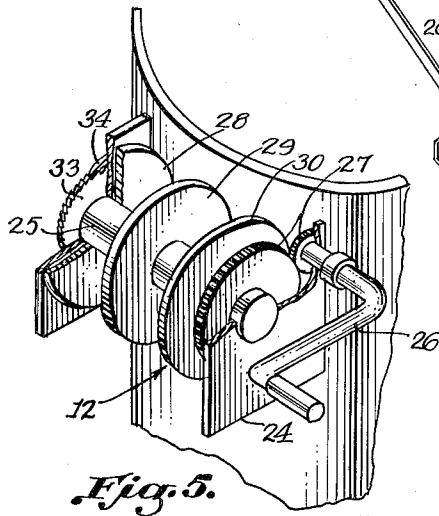
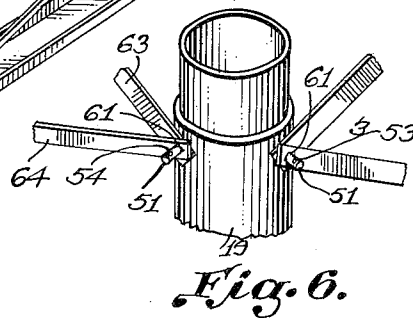
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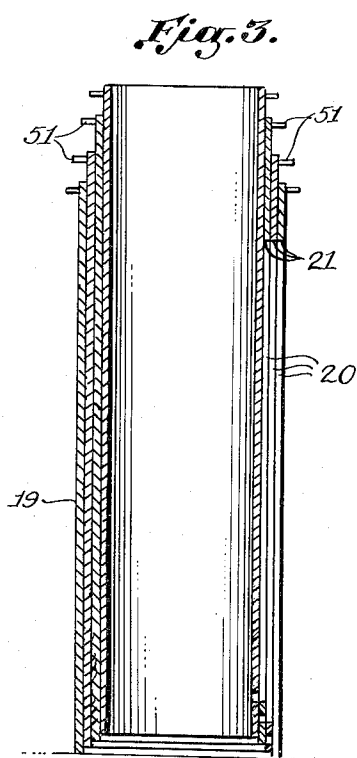
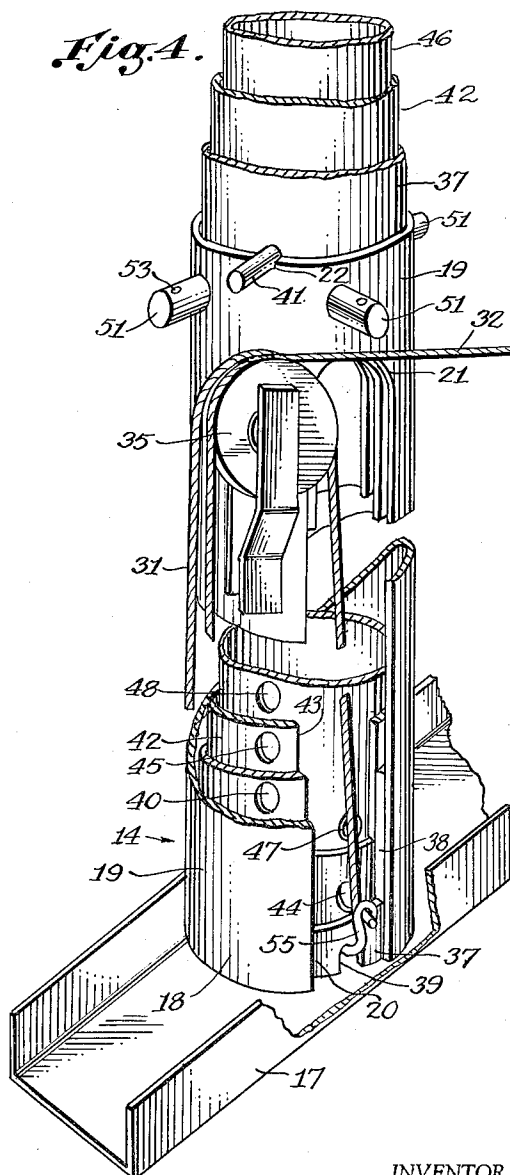
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The present invention relates to scaffolds that are vertically adjustable for supporting a worker and construction materials at an elevated position and relates more particularly to a knock-down type telescopically collapsible and extensible scaffold wherein individually scaffold sections may be extended vertically in selected intervals to receive fabricated cross-brace members for adding increased stability and safety to the scaffold.

In construction work of various types and particularly in masonry work, the necessity of elevating a load-bearing platform in increments at frequent intervals is very time consuming and costly as the material and workers will normally have to be unloaded from a working platform as intermediate elevating structural sections of scaffold framing are securely fastened in position to raise the work platform. Replacement of the construction materials at the new elevated position must then take place before work may be resumed. Frequently, an entire construction crew may remain idle as the scaffold is elevated to the next higher elevation.

Numerous hydraulic scaffolds and elevating platforms are available for raising a platform vertically, however, the prohibitive cost and the lack of safety features have made these units undesirable. Furthermore, scaffolds intended for outdoor use are normally subjected to the corrosive action of the elements and frequently the intricate mechanisms employed for raising or lowering a platform become inoperative. This has been particularly true of scaffolds employing hydraulic means for raising and lowering a platform as well as those scaffolds utilizing a folding, expanding or lazytongs type linkage.

Therefore, it is an object of the present invention to provide a scaffold in which a work or load supporting platform may be raised vertically in selected increments without removing the platform or work from the supporting structure.

Yet another object of the present invention is the provision of a scaffold in which a load supporting platform may be raised and supported by extensible telescopically nested members and wherein at selected intervals fabricated cross-brace members may be readily attached to the extended members to increase scaffold stability and to prevent collapse of the structure upon failure of the elevating means.

Another objective of this invention is the provision of an elevating scaffold that is vertically adjustable to various working levels by an elevating means and wherein fabricated spacer supporting cross-brace members may be releasably fastened to the scaffold undercarriage to maintain the selected working level and where additional cross-brace members may be added in vertical intervals as the working level is raised.

A further objective of this invention is the application of an elevatable scaffold in which the platform may be raised vertically by an elevating means to selective work levels and wherein cross-brace members are releasably fastened to the scaffold undercarriage to support the platform independently of the elevating means with the cross-brace members providing means to ascend the work platform from the ground level.

Still another object of the present invention is to provide individual sections or bucks in which a pair of spaced apart vertical, telescopically nested leg members may be extended by a single elevating means.

Still further objects of this invention are to provide

an inexpensive, sturdy elevatable scaffold that is simple in operation and requires a minimum of maintenance, one that is readily disassembled and movable readily in the knocked-down condition, one which embodies the greatest degree of safety and rigidity during use, and one in which an indeterminate number of sections may be attached.

Other and many of the attendant advantages of this invention will become more readily apparent as the invention becomes better understood from the following detailed description taken in conjunction with the accompanying drawings and in which like characters of reference designate corresponding parts throughout the several views, and wherein:

FIG. 1 is a perspective view of the assembled scaffold of this invention in the fully extended condition;

FIG. 2 is a perspective view of the scaffold of FIG. 1 in the collapsed condition at the lowest elevation;

FIG. 3 is an enlarged partial longitudinal view of the extended nested telescoping tubes per se in the collapsed condition;

FIG. 4 is a greatly enlarged partial perspective view, with a medial section removed, of one scaffold telescoping leg of the scaffold on a supporting base therefor;

FIG. 5 is an enlarged perspective view of an elevating winch mechanism mounted to a scaffold leg;

FIG. 6 is an enlarged perspective view illustrating a means for retaining a fabricated cross-brace member in position on the scaffold legs; and

FIG. 7 is a perspective view of a modification of the present inventive concept.

Referring to the drawings and particularly to FIG. 1 there is illustrated an elevating scaffold in which only a pair of two similar bucks or sections 10 are employed in parallel relation and wherein the working level of the platform 11 may be elevated in selected increments by means of individually operable cable winch means 12, one winch means being mounted on each buck, for operatively raising the telescopically nested leg members 13, 14 and 15, 16 constituting each of the pair of sections. Although only a single pair of bucks are shown and described it will become readily apparent and it is contemplated that any multiple of sections may be assembled and interconnected to each other to provide a scaffold walkway of indeterminate length. As the sections 10 are identical in construction a detailed description of one section will suffice to include both.

An upturned channel 17 serves as a rigid base for retaining the vertical leg members 13 and 14 that are spaced laterally from each other on the channel. It has been found desirable in most applications to weld the lower end 18 of each outer leg housing of the nested leg members 13 and 14 to the channel 17 to facilitate erection. However, in some applications it may be desirable, where knock-down compactness for transportation is preferred, to releasably fasten the outer leg housing to the channel or merely support the leg housing members temporarily until adequate cross-bracing is provided for the requisite initial stability.

Again, the nested leg members being similar to each other, a description of a single telescopically nested leg member will suffice to include each of the leg members 13, 14, 15 and 16. As more clearly shown in FIGS. 3 and 4, the nested leg member 14 includes a plurality of tubular members which are slidably nested within each other and within the outer leg housing 19. Leg housing 19 is vertically supported on the channel 17 either by welding or other suitable means and is provided with a longitudinally extending slot 20 which reaches from the base end 18 of the leg housing 19 to a position below the upper end of the leg housing to form a limiting stop 21. An open end slot 22 in the top end of the leg hous-

ing 19 is for a purpose to be described more fully herein-after. It will be readily apparent that although tubular legs or pipe leg members are described, the use of these structural elements is not intended in any limitative sense as other types of slidable telescoping structural members may be utilized.

Suitably fastened to one of the leg housings 19 in a fixed position intermediate the housing length at an accessible level for manual operation is a hoisting means or crank-operated winch 12. Winch 12 is provided with a housing 24 for rotatably supporting the cable drum 25 that is rotated by means of the crank-handle 26 through a pinion and gear 27 mounted on the handle and drum shaft respectively. Cable segregating plates 28, 29, 30 are mounted on the drum so as to separate the individual leg member hoisting cable reaches 31 and 32. It is also preferred in order to eliminate cable fraying, overlapping and cable wear to space the plates 28, 29 and 30 sufficiently close to each other to permit the cables 31 and 32 to form individual spiral convolutions between plates. A ratchet wheel 33 is rotatable with the drum and a pawl 34 is pivotally connected to the winch housing to limit or lock drum rotation by engaging the ratchet wheel.

The double but separated cable reaches 31 and 32 are guidably trained over the double track cable guide pulley 35 supported above the winch 12 on leg housing 19 in alignment with the winch drum take off to train the cable reaches therein. The cable reach 31 extends vertically along the leg housing 19 whereas the cable reach 32 extends horizontally across the section to the other leg housing of the section to be guidably trained over the single track pulley 36 rotatably mounted at the elevation of the double track pulley 35.

Within the leg housing 19 is a first nested slidable leg section 37 in which there is a slot 38 that reaches longitudinally from a position below the top of the section to a position adjacent to the bottom of the section. A slotted hook receiving opening 39 in the bottom extremity of the section 37 is exposed from within the leg housing slot 20 and at the bottom thereof in spaced relation to the slot 38. In addition to the leg raising hook-receiving slot 39 a series of vertically spaced openings 40 is also provided for the purpose of regulating the vertical incremental lift of each leg to a new level intermediate the length of the leg. It will be evident that the openings 40, when exposed as the section 37 is raised, will be in registry with the open slot 22 at the top edge of the housing member 19. A key or dowel pin 41 may be releasably inserted into the exposed opening 40 at the selected elevation to support the leg section in the telescoped position with the pin resting within the slot 22.

Telescopically slidable within the section 37 is a second leg section 42 having a longitudinal slot 43 which is closed at its ends and a hook receiving opening 44 is provided at the bottom thereof in vertical alignment with the slot 39. Section 42, like section 37, has vertically spaced openings 45 to retain the section 42 in telescopically extended condition above the section 37 at the desired elevation increment.

A third or inner leg section 46 is telescopically slidable within the second leg section 42 and although additional leg sections may be employed, this apparatus will include for the telescopically nested leg members only the housing leg 19, a first leg section 37, a second leg section 42, and a third leg section 46. Inner leg sections need not be slotted longitudinally but will include a hook-receiving opening 47 therein at the lower end of the leg section.

Vertically spaced openings 48 are drilled into the inner member 46 to receive a locking pin therein for supporting the leg section at intermediate levels as described above.

A platform supporting channel member 49 is retained by suitable conventional fastening means (not shown) on the top of the leg section 46 and reaches between a pair of nested leg members on the same buck to support

a group of planks 50 constituting the working platform 11 on the top thereof.

Mounted on each of the leg sections and the housing adjacent to the tops thereof is a single or a group of radially projecting studs 51 that are welded or otherwise securely fastened to the leg sections. Preferably each of the studs is provided with a transverse hole 53 therein to releasably retain a locking pin 54 therein for the purpose to be described more fully below.

The free ends of each cable have attached thereto a leg element engaging hook 55 for releasably engaging the leg raising openings 39, 44 or 47 for elevating each leg element individually.

Obviously upon applying any appreciable load that will exert a tension on the horizontal cable reach 32 between leg members of the same buck, the members will tend to converge. Therefore, a horizontally extending brace 57 is provided to extend between the tops of the leg members 13 and 14 and the brace 57 is preferably releasably supported in position by means of the projecting sleeves 58 fastened to each leg housing. For some installations the brace 57 may be welded in position on the leg members.

In operation, with the channels or other base supports oriented in location, the leg members 13, 14 and 15, 16 are positioned in spaced relation to each other and supported in a vertical position by means of brace members 57 that reach horizontally between a pair of leg members for each buck and brace members 59, 60 that extend in crossed relation, one end of each brace member 59 or 60 reaching from adjacent to the top of one leg housing to a position adjacent to the bottom of the other leg housing of the same buck. The brace members 59 and 60 are provided with openings 61 adjacent the ends of the brace members to engage the projecting studs 51 fastened to the housing. Once in position the locking pins 54 may be slidably inserted into the stud holes 53 to retain the braces in position.

Stability between bucks is provided when the bucks are properly positioned by means of the cross-buck brace members 63 and 64 in which stud receiving openings 65 are drilled to accommodate the studs 51 on the leg housings. Brace locking pins 54 are inserted into the pin receiving holes 53 after the braces are positioned.

For elevating the platform 11, the cable reaches 31 and 32 are extended by releasing cable from the cable drum sufficiently to permit cable hooks 55 to engage within the leg raising openings preferably in the order of the inner leg element opening 47, then 44 and finally 39. Upon engaging the hooks 55 into the openings 47 of the inner leg elements, the winch may be rotated to shorten the cable reaches thereby elevating the inner leg elements 46 on leg members 13 and 14. Another operator will normally operate the winch mechanism on an adjacent buck in order to elevate the platform while in a level condition, thus eliminating the necessity of unloading the platform of construction material.

Upon elevating the inner leg elements 46, the openings 48 will be exposed and locking pins 41 may be inserted into the openings of opposite leg elements to retain the leg elements in the desired intermediate position to prevent scaffold collapse despite the locking engagement of the ratchet wheel and pawl on the winch mechanism. In full leg element extension, brace members similar to the brace members 59 and 60 are releasably fastened, as described above with respect to the leg housings, to the studs 51 to provide the requisite stability and to prevent collapse of the scaffold. Further, cross-buck brace members 63 and 64 are added between bucks to increase stability and support between bucks.

As the inner leg element is extended its full length the elevating hooks are disengaged from the openings and then engaged within the next outer leg element and the procedure is repeated until the scaffold is elevated to the maximum vertical reach. Lowering of the scaffold will be

performed in the reverse order by lowering the lowest leg element initially and so on. As in elevating the platform, lowering will also be accomplished preferably by having operators work both buck winch mechanisms simultaneously.

A modification of the present invention concept is shown in FIG. 7 wherein a pair of telescopically nested leg members 70 and 71 forming a single buck is mounted on a base 72 with the leg members being spaced apart and supported by means of the horizontal brace 73 and the cross-braces 74 and 75 that are affixed as described above or in some other suitable manner. Each of the telescopically nested leg members 70 and 71 consists of a plurality of extensible leg elements 77, 78 and 79 within the housings 80. A horizontal platform supporting beam 81, without platform thereon, reaches between the tops of leg elements 79 and is fastened thereto. Each of the leg elements 77-79 has an elevating hook 82 projecting therefrom adjacent to the top of the element and suitably located on the inside between leg members.

Also fastened as by welding to each of the leg elements 77, 78 and to the housing 80 are individual auxiliary hoisting frame receiving sockets 84. Each of the sockets 84 is mounted longitudinally of the leg element, preferably adjacent to the upper end of each element, to receive the lower ends 85 of the telescopically extensible frame 86. The length of each socket 84 is sufficient to support, with stability, the lower ends 85 of the frame 86 therein.

Auxiliary frame 86 is an inverted U-frame in which the top rail 87 is attached to the vertical extensible rods 88 in which holes 89 are drilled to provide intermediate elevating positions. Pins 90 when inserted into suitable holes 89 in the rods 88 will rest against the top edge of the lower leg ends 85 to serve as a limiting stop.

A hoisting means 91, similar to the winch mechanism described above, is mounted at an operating level on one of the leg housings with individual cable reaches 92 and 93 extending over the double track pulley 94 and the single cable reach extending over the single track pulley 95 which pulleys are rotatably supported on the rail 87 of the auxiliary frame. Cables 92 and 93 have hook-engaging eyes 96 for engaging the hooks 82 on the leg elements.

The buck is illustrated in the nested condition preparatory for elevating the top elements 79. Hooks 82 on the leg elements 79 are engaged by the eyes 96 on the cable ends. With the auxiliary hoisting frame supported in the sleeves 84 on leg elements 78 the hoisting means 91 may be operated to elevate both leg elements 79 together to the desired level. Openings (not shown) similar to the openings 40, 45 and 48 may be furnished to lock the leg elements at intermediate levels. In the fully extended position, brace members, similar to members 74, 75 as well as 59 and 60, reach between leg elements to engage radially extending studs 97 similar to studs 51 for releasably securing the brace members in position prior to moving the auxiliary frame to the sleeves of the next lower leg elements 77.

It will be apparent that the buck section illustrated in FIG. 7 may be elevated either from the housing inwardly or from the inner element outwardly. By employing the bucks in multiples with cross-buck cross-brace members similar to those described above, a scaffold walkway of indeterminate length may be obtained.

Obviously, many modifications and variations may be made in the construction and arrangement of the telescopically nested leg members and the hoisting means for elevating a pair of leg members together in the light of the above teachings without departing from the real spirit and purpose of this invention. It is, therefore, to be understood that within the scope of the appended claims many modified forms of structure as well as the use of mechanical equivalents may be reasonably included and modifications are contemplated.

What is claimed is:

1. An elevating scaffold of the character described comprising, in combination, a first assemblage having a base, a pair of spaced apart vertical outer tubular leg members mounted on the base, cross-brace members for retaining said pair of leg members in spaced vertical relation to each other, each of said tubular leg members having telescopically nested therein a plurality of inner slidable tubular extension members, said outer and certain inner tubular leg members having a longitudinally extending closed end slot reaching for substantially the length of each slotted leg member, the inner leg members each having a hook receiving opening in spaced relation to the lower end of the slot, a manually operable winch mounted on at least one of the outer leg members, cable guide means mounted on the outer leg member in spaced relation to the winch, a cable reaching from the winch and through the cable guide means and having a hook thereon for engaging the hook receiving opening in the leg members whereby upon rotating said winch the inner nested leg members may be raised for substantially the length of a single leg member, a second assemblage similar to said first assemblage in spaced lateral relation and parallel to the first assemblage, and cross-brace members reaching between said assemblages and releasably connected thereto.

2. A telescoping scaffold of the character described comprising a base having spaced apart pairs of stationary leg members mounted thereon, each of said stationary leg members having a longitudinal slot therein for substantially the length of the leg member, cross-brace members for retaining said leg members in spaced relation to each other, each of said leg members including a series of concentrically nested and telescopically connected vertically extensible members, certain of said extensible members having a longitudinally elongated slot therein and an opening spaced from the slot at the lower end of each slotted extensible member, said elongated slots in the extensible members being in registry with each other and with the stationary leg member slot, and the openings being in progressively spaced vertical relation to each other, a guide pulley supported adjacent to the top of each stationary leg member, a crank-operated winch mounted on one of said stationary leg members of a pair of leg members, said winch having means for locking the winch, a cable having one end thereof encircling the winch and the free end thereof guidably retained on one of the stationary leg member guide pulleys, the free end of the cable having an opening engaging hook thereon, each of said telescopically extensible members having cross-brace retaining means projecting therefrom adjacent to the top end of each member, fabricated cross-brace members reaching horizontally between the spaced apart leg members and reaching vertically for a predetermined length to engage with a cross-brace retaining means on the next lower leg member as the telescoping extensible members are raised vertically for a distance equivalent to the vertical reach of a cross-brace member.

3. A knock-down type elevating scaffold of the character described comprising, in combination, an elongated base member, a pair of telescoping nested extensible leg members supported on the base, each of said telescopically extensible legs including an outer and an inner member, said outer member having a longitudinal closed end slot extending for substantially the length of the outer member, said inner member having an opening adjacent to the bottom of the inner member, said opening being in registry with the outer member slot, a manually operable winch mounted on the outer member and having a cable wrapped therearound, the free end of said cable having means for cooperatively engaging the inner member opening through the outer member slot, a cross-brace member reaching between a pair of spaced apart leg members and extending vertically from adjacent to the top of the extended inner member on one leg mem-

ber to adjacent to the top of the outer member of the other leg member, and means on the inner and outer members for releasably retaining a crossbrace member thereon to support an inner member vertically above an outer member.

4. A knock-down type elevating scaffold of the character described comprising a pair of spaced apart elongated and paralleling ground engaging base members, a pair of telescopically nested extensible leg members mounted for vertical support on each of said base members, each of said leg members having an outer leg member and a plurality of inner leg members slidably nested within each other, said outer leg member and certain inner leg members having a closed end elongated longitudinal slot therein, said slots being in registry with each other and extending for substantially the length of the leg member, each of said slotted inner leg members having a base opening in spaced relation to the terminus of the slot in each leg, a manually operable winch having a locking means thereon mounted on one of said leg members of a pair of leg members supported on a single base member, cables encircling said winch and guidably extending one to each leg member, a base opening attaching means fastened to the end of each cable at the free end thereof to engage the base opening of the leg members to raise each leg member vertically, each of said base openings being progressively spaced from each other, cross-brace members reaching across to opposite leg members, means on said leg members adjacent to the tops thereof for cooperatively receiving and releasably retaining the cross-brace members thereon, and a platform supporting beam reaching transversely between a pair of leg members on the same base for supporting a platform thereon.

5. A telescoping knock-down scaffold of the character described comprising spaced apart stationary base leg members, cross-brace members for retaining said leg members in spaced relation to each other, each of said leg members including a series of concentrically arranged and telescopically nested vertically extensible members, certain of said vertically extensible members having a longitudinally elongated closed end slot therein and a cable engaging opening in spaced relation to the slot at the lower end of each extensible member, said elongated slot in the extensible members being in registry with each

other and the cable engaging openings being in progressively spaced vertical relation to each other, a cable guide means supported adjacent to the top of each leg member, a winch mounted on at least one of the leg members of a pair of leg members and having a crank handle for rotating the winch and means for selectively locking the winch against rotation, cables having one end of each cable encircling the winch and the free ends thereof retained on the cable guide means, said free ends of the cables having a cable opening engaging means thereon, each of said telescoping extensible members having a cross-brace retaining means adjacent to the top thereof, crossbrace members reaching between the spaced apart leg members in vertically extended condition for releasably engaging the cross-brace engaging means as the telescoping extensible members are raised vertically in vertical intervals.

6. An elevating scaffold comprising pairs of spaced apart telescopically nested vertically extensible leg members, certain of said leg members having an elongated slot therein, a winch mounted on one leg member of a pair of leg members, cables encircling said winch and having free ends, said free ends of the cables having means thereon for cooperatively engaging with the lower end of each of the nested extensible members for raising each vertically independently, means for guiding said cables to each leg member of a pair of leg members, brace supporting means on the leg members, and brace members for releasably engaging the brace supporting means on opposite leg members, said brace members reaching vertically to prevent the leg members of a pair of leg members from collapsing within each other.

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