Feb. 20, 1934. J. K. HOLDEN 1,947,647

EXTENSIBLE PLATFORM

Filed Nov. 23, 1931 3 Sheets-Sheet 1

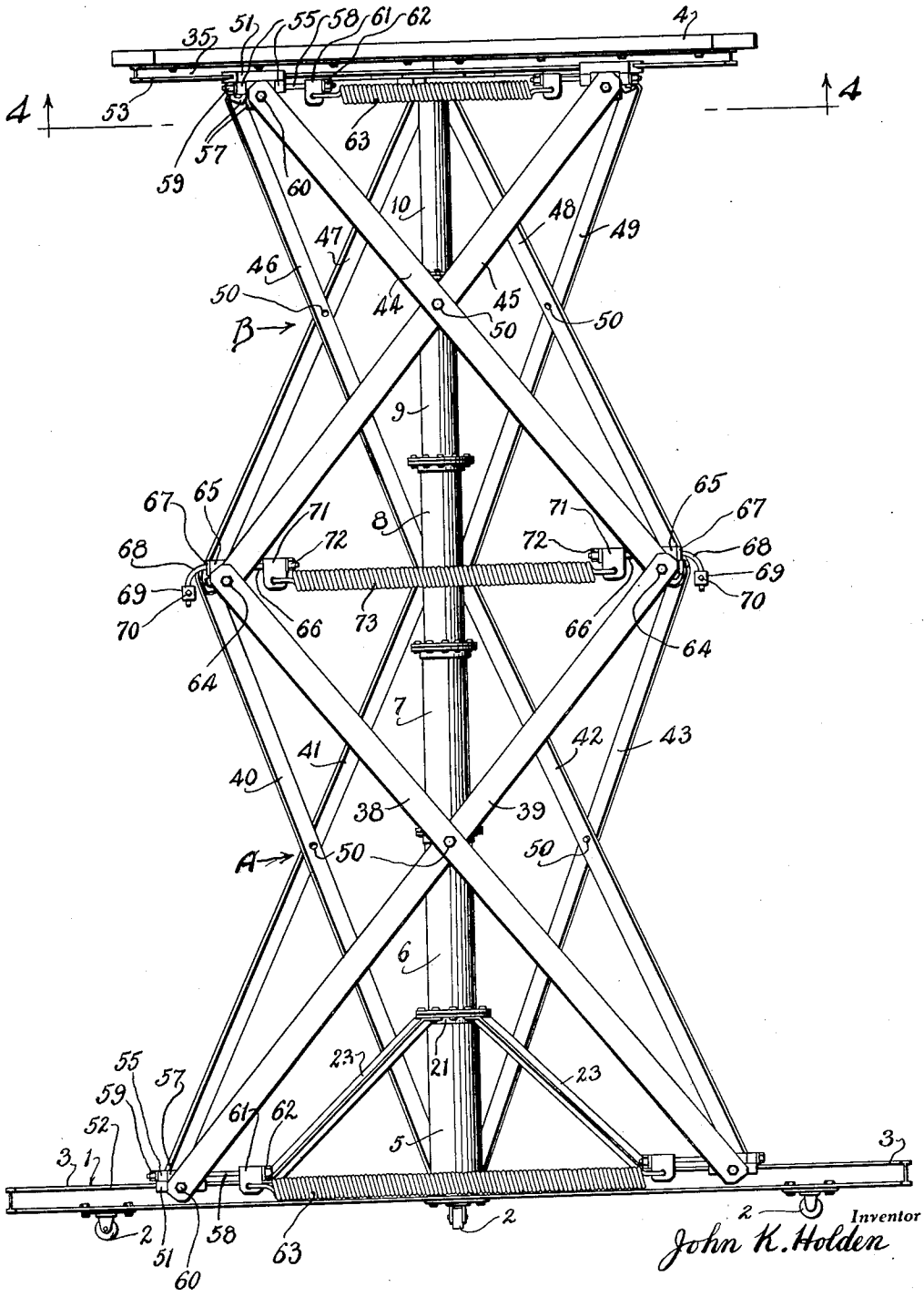


Fig. 1

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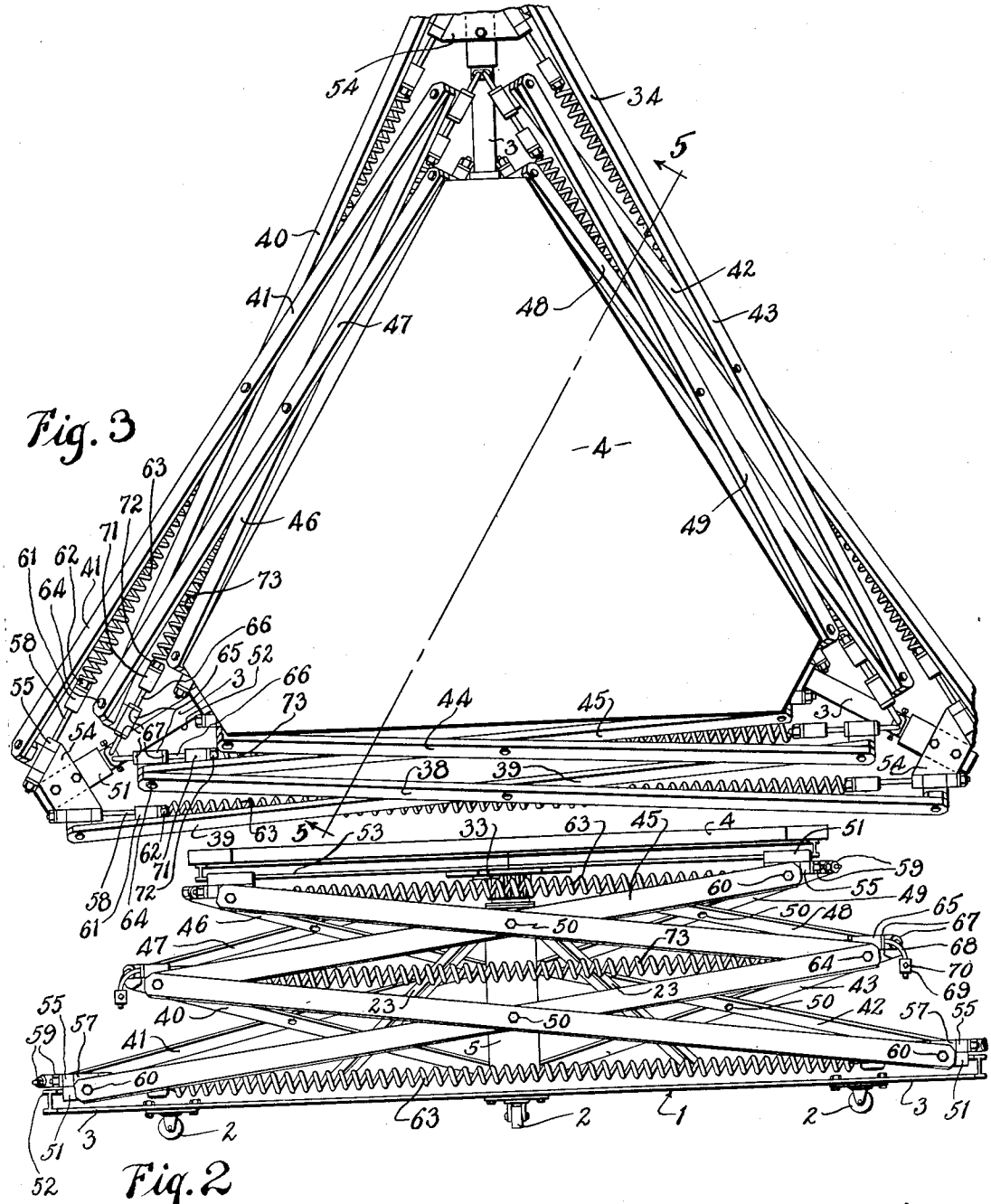


Fig. 3

Fig. 2

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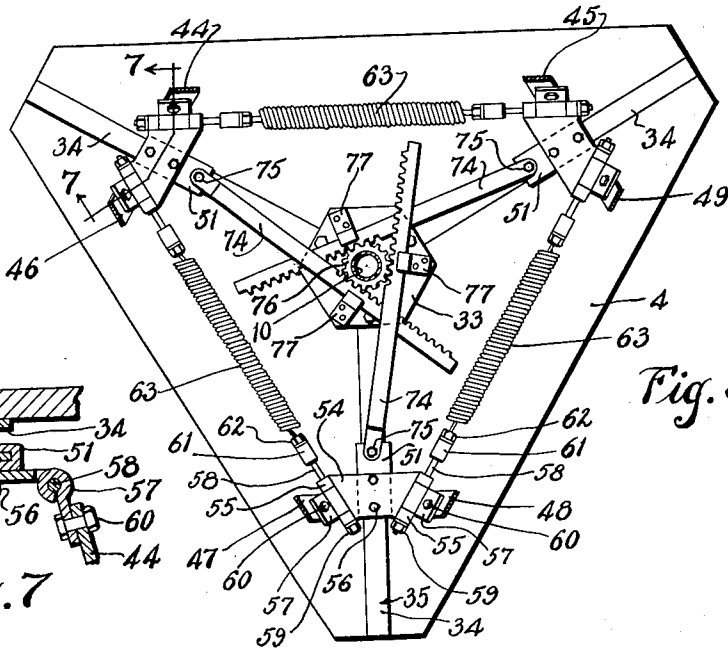


Fig. 4

Fig. 7

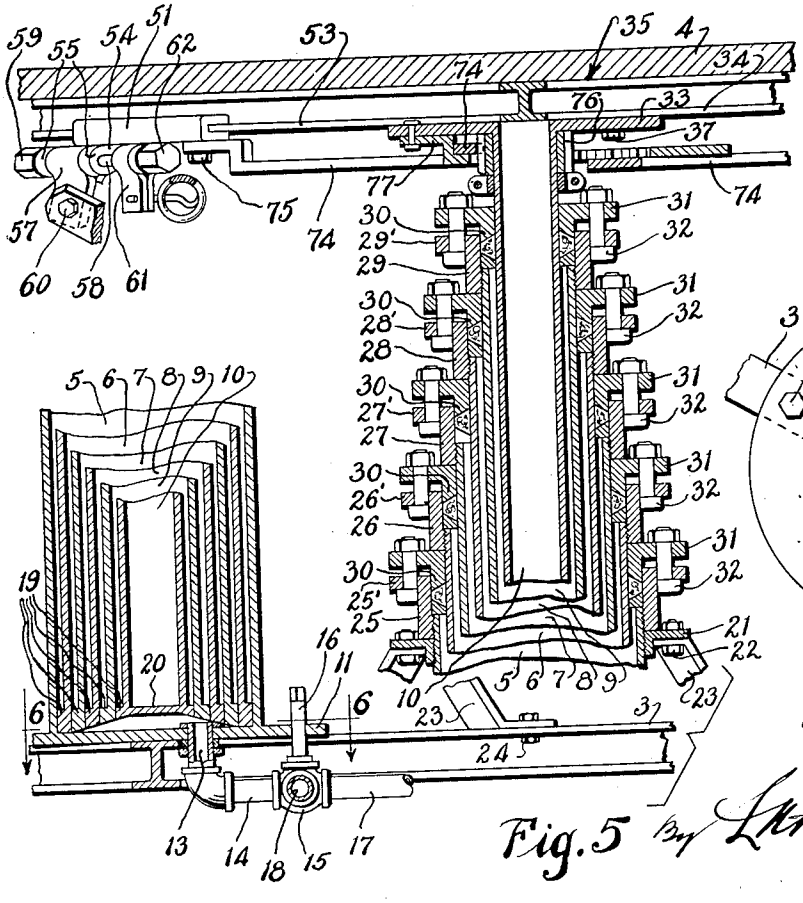


Fig. 5

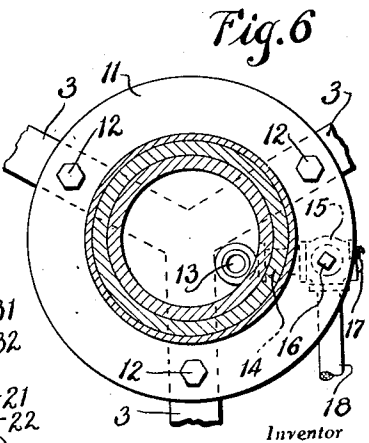


Fig. 6

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UNITED STATES PATENT OFFICE

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EXTENSIBLE PLATFORM

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Serial No. 576,797

8 Claims. (Cl. 304—29)

This invention relates to and has for an object the provision of a platform which is extensible and collapsible at will to variable extent for operatively supporting workmen for any purpose, still or motion picture cameras either together with or without an operator at desired elevations, or for other purposes.

This invention contemplates the provision also of means for applying power to the platform for raising and lowering the same, and means for rigidly bracing and supporting the platform with an operator thereon.

To this end the invention includes a portable truck or frame preferably mounted on rollers or castors with a central column composed of graduated telescoping pipes to the uppermost section of which a platform is secured, and sections of braces, preferably of the lazy tong type, arranged in pairs and interconnected and also connecting the truck with the platform for affording stability and rigidity and for permitting the extension and collapsing of the structure at will.

A further object is to provide means for equalizing and tensioning the supporting frame at different elevations, together with specially designed fittings to permit the ready operation and relative movement of the braces when the frame is extended and collapsed.

It will be understood that while I have shown and will describe in this application a form of device adapted to be power operated and particularly arranged for supporting a motion picture camera and operator on a platform, similar standards may be provided in smaller size for still and motion picture cameras where the range of adjustment is substantially less than that of the structure shown and described herein.

Other objects will appear as the description progresses.

In the accompanying drawings I have shown a preferred form of device in which,

Fig. 1 is a side elevation of my extensible structure shown extended to a substantially maximum extent for use.

Fig. 2 is a side elevation of the same showing the structure collapsed to a maximum extent.

Fig. 3 is a top plan of the view of the structure collapsed.

Fig. 4 is a sectional plan of the same on line 4—4 of Fig. 1.

Fig. 5 is an enlarged composite sectional elevation on line 5—5 of Fig. 3, showing in a single view the upper and lower extremities of the power operated hydraulic column for operatively connecting the supporting truck with the camera platform.

Fig. 6 is a sectional plan of the lower portion of said column on line 6—6 of Fig. 5.

Fig. 7 is a transverse section on line 7—7 of Fig. 4, of one of the corner fittings slidably mounted on the truck and on the platform for lateral movement as the structure is extended and collapsed.

As generally arranged, my improved structure is supported on a portable frame or truck 1 having castors 2, 2 etc. rotatably mounted thereon. Said frame is preferably of Y shape and is formed with three radially disposed members 3, 3, 3 intersecting and either integrally formed of cast metal or otherwise welded or secured together at the axis of the frame. Preferably the members 3 are of I cross section so as to provide strength and rigidity and for other reasons to be hereinafter explained.

I prefer to employ hydraulic power for raising the platform 4 and to this end provide a central column composed of a plurality of sections of pipe 5, 6, 7, 8, 9 and 10 of gradually decreasing size, each of which sections respectively telescopes into the section of next largest size, as shown in Figs. 1 and 5. The lowermost and largest section 5 is provided with an enlarged flange 11 which closes the lower end of said section and is welded to the pipe 5 and forms a support for the column on the frame 1. Said section 5 is rigidly secured to the members 3 of frame 1 by means of bolts 12, 12 etc., as shown in Fig. 6.

Water under pressure is supplied to the lowermost section 5 thru a single port 13 which is connected by means of a pipe 14 with a three-way valve 15 having an operating member 16 extending upwardly thru the flange 11 of pipe 5, as shown in Fig. 5. Said valve is connected with a water service pipe 17 and a discharge pipe 18. Thus the operation of the valve 15 for affording communications between pipes 14 and 17 will admit water under pressure to the hydraulic column and the operation of said valve for closing pipe 17 and for affording communication between pipes 14 and 18 will relieve the pressure in the column and exhaust the water therefrom, as in other types of hydraulic rams.

The lower ends of the sections 6, 7, 8, 9 and 10 are provided with annular external flanges 19 which closely fit the inner peripheries of the sections of next larger size, as shown in Fig. 5, and the innermost and uppermost section 10 is closed at its end 20 to form an abutment against which pressure is applied for extending the column into

the position shown in Fig. 1. The sections 6, 7, 8 and 9 are open at their lower ends for obvious purposes.

The lowermost section 5 is provided with a flange 21 near its upper end to which is secured, as by means of bolts 22, a trio of inclined braces 23, the lower ends of which are secured to the members 3 of the truck frame by means of bolts 24. The pipe sections 5, 6, 7, 8 and 9 are provided with external collars 25, 26, 27, 28 and 29 respectively, which are threaded onto the upper ends of said sections and are provided with annular flanges 25', 26', 27', 28' and 29' respectively. Each of the sections 25, 26, 27, 28 and 29 is also provided with a packing gland, as at 30, which telescopes into the collars 25, 26, 27, 28 and 29 and has an annular flange 31 overlying the flanges of said collars and attached thereto by means of bolts, as at 32. (See Fig. 5.)

Thus the glands of each of said sections frictionally engage the outer periphery of the next smallest section so as to thoroly pack said sections against leakage.

The upper end of the innermost section 10 is provided with an enlarged plate 33 which is attached to members 34 of a Y shaped supporting frame 35 for the platform 4. Said frame 35 corresponds to and the members 34 thereof register with the members 3 of the lower frame 1 and radiate from the axis of the structure as in the cast of the frame 1. The plate 33 is held on the frame 35 by means of bolts 37.

It may be understood that the frames 1 and 35 are formed of Y shape so as to accommodate and support an intermediate collapsible frame composed of a plurality of sections having three sides, but said intermediate frame work may be formed with four or more sides if desired and the frames 1 and 35 correspondingly changed.

The intermediate frame is composed of a plurality of sections disposed between the frame 1 and platform 4, but preferably a single structure is composed of but two of such sections and if necessity demands two complete units may be superposed one on the other with the frame 1 of the superposed unit suitably secured to the platform 4 of the lower unit. To this end a suitable structure of preferred form includes a lower section A and an upper section B of similar form but of different size. The lowermost section A is composed of three pairs of braces 38 and 39, 40 and 41, 42 and 43, while the section B is composed of similar but shorter pairs of braces 44 and 45, 46 and 47, 48 and 49. The braces of each pair in each of the sections A and B are pivotally connected intermediate their ends at points 50, 50 etc. after the fashion of lazy tongs. The lower ends of the braces of section A are adjustably secured to the frame 1 while the upper ends of the braces of section B are similarly secured to the frame 35 of the platform 4, and the upper ends of the braces of section A and the lower ends of the braces of section B are pivotally connected as shown and hereinafter described so as to extensibly and collapsibly connect the platform 4 with the truck 1.

As shown in Figs. 2 and 3, it will be noted that the braces of section A spread apart at their lower ends and the braces of section B at their upper ends as the frame is collapsed. To this end said braces are necessarily slidable on the frames 1 and 35 respectively by means of specially designed fittings such as are shown in Figs. 1 and 4. Each of said fittings includes a slide 51 which is adapted to embrace and slide on the upper web 52 of the truck frame 1 or on the lower web 53 of the platform frame 35, as the case may be.

To the upper side of the braces on frame 1 and to the lower side of the braces on frame 35 I attach fittings 54 which have pairs of spaced lugs 55, 55 formed thereon at angles and attached to the slides 51 by means of cap screws 56. Between each pair of lugs 55 a swivel 57 is hingedly mounted on a rod 58 which extends thru the lugs 55 and is held at its outer end by means of a nut 59, and the lower ends of the braces of section A and the upper ends of the braces of section B are pivotally connected to said swivels at 60.

Section A is provided with three of the slides 51 one of which is adjustable on each of the members 3 of frame 1 and adjacent braces of each of the pairs of section A are connected to the opposite pairs of lugs 55 on the fittings 54 attached to each of said slides. Thus the lower ends of braces 39 and 41, as shown in Figs. 1 and 3, are attached to the member 54, as indicated to the left of Fig. 3, while the lower ends of braces 38 and 42 are similarly attached to the member 54 shown at the right of Fig. 3, and the lower ends of the braces 40 and 34 are attached to the member 54 shown at the top of Fig. 3.

In a corresponding manner the upper ends of the braces of section B are attached to the members 54 on frame 35 beneath the platform 4.

The rods 58 which are supported in the fittings 54 are extended inwardly therefrom and carry swivel members 61 which bear against the heads 62 of said rods and tension springs 63 laterally connect the opposite swivels 61 and normally serve to retract the slides 51. Similar but shorter springs are provided at the top of the section B for laterally connecting the fittings 54 of the braces in said section. The upper ends of the braces of section A and the adjacent lower ends of the braces of section B are pivotally connected together at points 64, 64 etc., and also are hingedly secured to swivels 65 which are carried on rods 66 intermediate spaced pairs of set collars 67 either formed on or secured to said rods. The outer ends of the rods 66 are bent downwardly at 68 and extend thru blocks 69 in which they are held by means of set screws 70. Thus at each corner of the frame the two angularly disposed rods 66, as shown in Fig. 3, will be commonly held by a single one of the blocks 69 and the adjacent overlapped ends of the upper and lower braces are hingedly secured together by bolts, as at 64. The inner ends of the rods 66, as in the case of the rods 58, are provided with swivels 71 which bear against nuts 72 secured to the inner ends of said rods and tension springs 73 connect the laterally opposite swivels 71, 71 on each side of the frame.

The function of the springs 63, 63 and 73, a set of which is provided on each of the three sides of the structure, is to normally urge the lazy tong braces into the extended positions shown in Fig. 1, but the tension of said springs is not sufficient to overcome the weight of the platform and structure superposed on the frame 1. Thus when the hydraulic pressure is relieved in the central column gravity will operate to collapse the structure into the position shown in Fig. 2 against the combined tension of all of the springs 63 and 73.

The pivotal and sliding connection of the lazy tong braces of sections A and B with each other and also the braces of said sections with the frame 1 and platform 4 are such that the extension and collapse of the frame may be accomplished

readily and quickly without binding and the springs 63 and 73 tend to equalize to a certain extent and to cushion the operation of the structure.

I prefer, however, in addition to said springs, to more perfectly equalize the operation of the lazy tongs by means of a plurality of racks 74, 74 and 74, as shown in Fig. 4, which are pivotally attached at their outer ends by means of bolts or pins 75 to the inner ends of each of the slides 51 and commonly engage at their inner toothed portions a pinion 76 which is rotatably mounted beneath the plate 33 on the periphery of the innermost pipe 10 of the column.

The racks 74 are arranged in different planes, as shown in Fig. 5, and are held in engagement with the pinion 76 by means of guide blocks 77 attached to the plate 33. Thus the three slides 51 associated with the platform 4 will move on their guides 34 to a corresponding extent when the frame is being extended or collapsed, and due to the interconnections of sections A and B the guides 51 on the frame 1 will be correspondingly moved.

In operation it will be apparent that when power is applied to the lowermost section 5 of the hydraulic column pressure created therein will operate to extend the sections 5, 6, 7, 8, 9 and 10 from concentrically nested positions shown in Fig. 5 to the extended positions shown in Fig. 1, and on the operation of the valve 15 for relieving the pressure in the column the weight of the structure, together with that on the platform 4, will evacuate the column of water thru the pipe 18 and collapse the structure into the position shown in Fig. 2.

The objects and advantages of a structure such as I have shown and described herein will be readily apparent to those skilled in the art of still and motion picture photography, and altho I have shown a preferred form of structure for illustrating my invention, I may modify the same within the scope of the appended claims without departing from the spirit thereof.

What I claim is:

1. A structure of the character described comprising a base, a platform vertically adjustable thereon, means on the base connected with the platform for supporting the platform at selected elevations, foldable braces on each of the sides of the structure connecting the outer portions of the platform with corresponding outer portions of the base for stabilizing the platform, a gear rotatable on said platform supporting means, and means connected with corresponding extremities of said braces and meshing with said gear for equalizing the movement of the braces on the several sides of said structure.

2. A structure of the character described comprising a base, a platform vertically adjustable thereon, means on the base connected with the platform for supporting the platform at selected elevations, foldable braces on each of the sides of the structure connecting the outer portions of the platform with corresponding outer portions of the base for stabilizing the platform, means for slidably and pivotally connecting said braces with said base and with said platform to permit the folding of the braces, a gear rotatable on said platform supporting means, and means connected with corresponding extremities of said braces and meshing with said gear for equalizing the movement of the braces on the several sides of said structure.

3. A structure of the character described comprising a base, a platform vertically adjustable thereon, means on the base connected with the platform for supporting the platform at selected elevations, foldable braces on each of the sides of the structure connecting the outer portions of the platform with corresponding outer portions of the base for stabilizing the platform, tensioning means on each side of the structure cross connecting the extremities of said braces and tending to urge said braces into extended position, a gear rotatable on said platform supporting means, and means connected with corresponding extremities of said braces and meshing with said gear for equalizing the movement of the braces on the several sides of said structure.

4. A structure of the character described comprising a base, a platform vertically adjustable thereon, a central column composed of telescoping sections supported on the base and forming a support for the platform, means for applying pressure for introducing a fluid under pressure to said column for elevating the platform to a desired extent, said platform and said base having a plurality of sides, pairs of braces on each of the sides of the structure pivotally and laterally adjustable on the base and on the platform, the braces of each pair being hinged together intermediate their ends, the corresponding extremities of the adjacent braces on the several sides of the structure being commonly connected with the base and with the platform, all of said braces being foldable and adjustable for stabilizing the platform when held at selected elevations, means comprising a gear on said column, and racks connecting the corresponding extremities of said braces and meshing with said gear for equalizing the movement of said braces when the structure is extended and collapsed.

5. A structure of the character described comprising a base, a platform vertically adjustable thereon, a central column composed of telescoping sections supported on the base and forming a support for the platform, means for applying pressure for introducing a fluid under pressure to said column for elevating the platform to a desired extent, said platform and said base having a plurality of sides, pairs of braces on each of the sides of the structure pivotally and laterally adjustable on the base and on the platform, the braces of each pair being hinged together intermediate their ends, the corresponding extremities of the adjacent braces on the several sides of the structure being commonly connected with the base and with the platform, all of said braces being foldable and adjustable for stabilizing the platform when held at selected elevations, tensioning means on each side of the structure cross connecting corresponding extremities of said braces and tending to urge the braces into extended position, means comprising a gear on said column, and racks connecting the corresponding extremities of said braces and meshing with said gear for equalizing the movement of said braces when the structure is extended and collapsed.

6. A structure of the character described comprising a portable base, a platform vertically adjustable thereon, a central supporting column for said platform mounted on said base and including a plurality of telescoping sections, means for introducing a fluid under pressure to said column for raising the platform to selected elevations, said structure being of triangular cross section, a plurality of pairs of braces on each of the sides of said structure, means for pivotally and slid-

ably connecting the lowermost extremities of the lowermost pairs of braces to said base, and the uppermost extremities of the uppermost pairs of braces to said platform, means for pivotally connecting the uppermost extremities of the lowermost braces and the lowermost extremities of the uppermost braces for stabilizing the platform at different elevations, the braces of each of said pairs being hinged together at points of intersection, means comprising a gear on said column, and racks connected with adjacent extremities of certain pairs of said braces meshing with said gear for equalizing the movement of said braces when the structure is extended and collapsed.

7. A collapsible structure of the character described comprising a base having guides thereon, a sectional supporting member on the base, a platform carried by said supporting member, a pair of braces on each side of the structure hinged together at points of intersection, the upper extremities of the braces on each side being adjustably connected with said platform, and slides adjustable on the guides of said base and pivotally connected with adjacent extremities of said braces at the junctions of the sides of the structure permitting the extension and collapse of the structure, a gear on said column, and racks operatively connecting certain of adjacent extremities of said braces with said gear for equalizing the movement of said braces.

8. A collapsible platform comprising a base, a platform, and a plurality of telescoping pipe sections mounted on said base centrally of the platform and base, said base formed of laterally disposed members connected together at their extremities and constituting slides, said platform having correspondingly disposed members also forming slides, and a lazy tong structure operatively connecting said base and platform with the uppermost lazy tong members slidably engaging the slides of the platform and the lowermost members thereof slidably engaging the slides of the base, braces secured to the members of said base and to the lowermost pipe section whereby when a fluid is introduced under pressure into said pipe sections the platform may be elevated and rigidly supported in raised position, a gear rotatably mounted on the uppermost pipe section, and racks connected with said lazy tong structure and with said gear for equalizing the operation of the lazy tong members.

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