April 9, 1940. J. P. WAGNER ET AL 2,196,511

TOWER WAGON

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Fig. 1

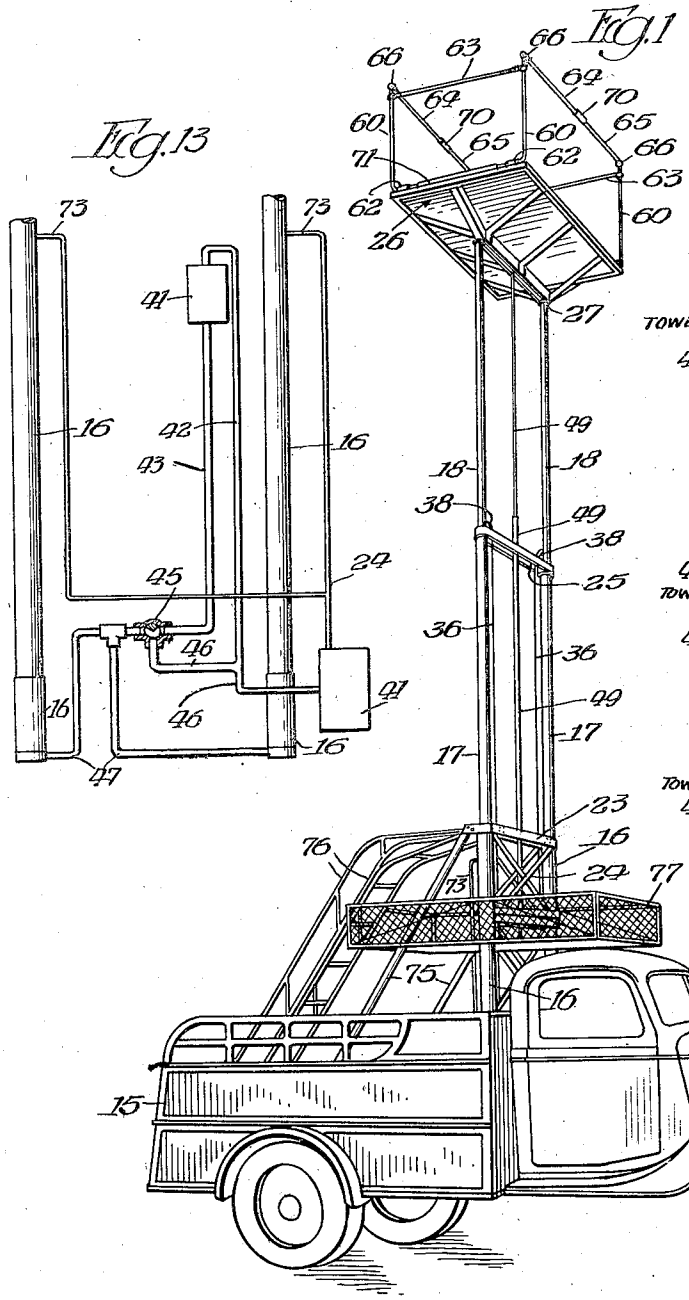


Fig. 13

Fig. 10

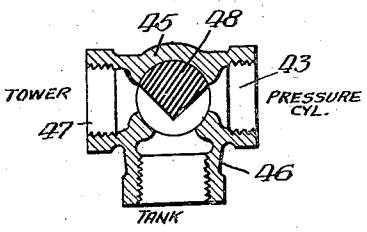


Fig. 11

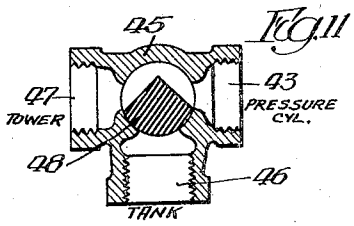
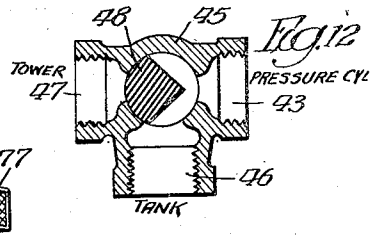


Fig. 12

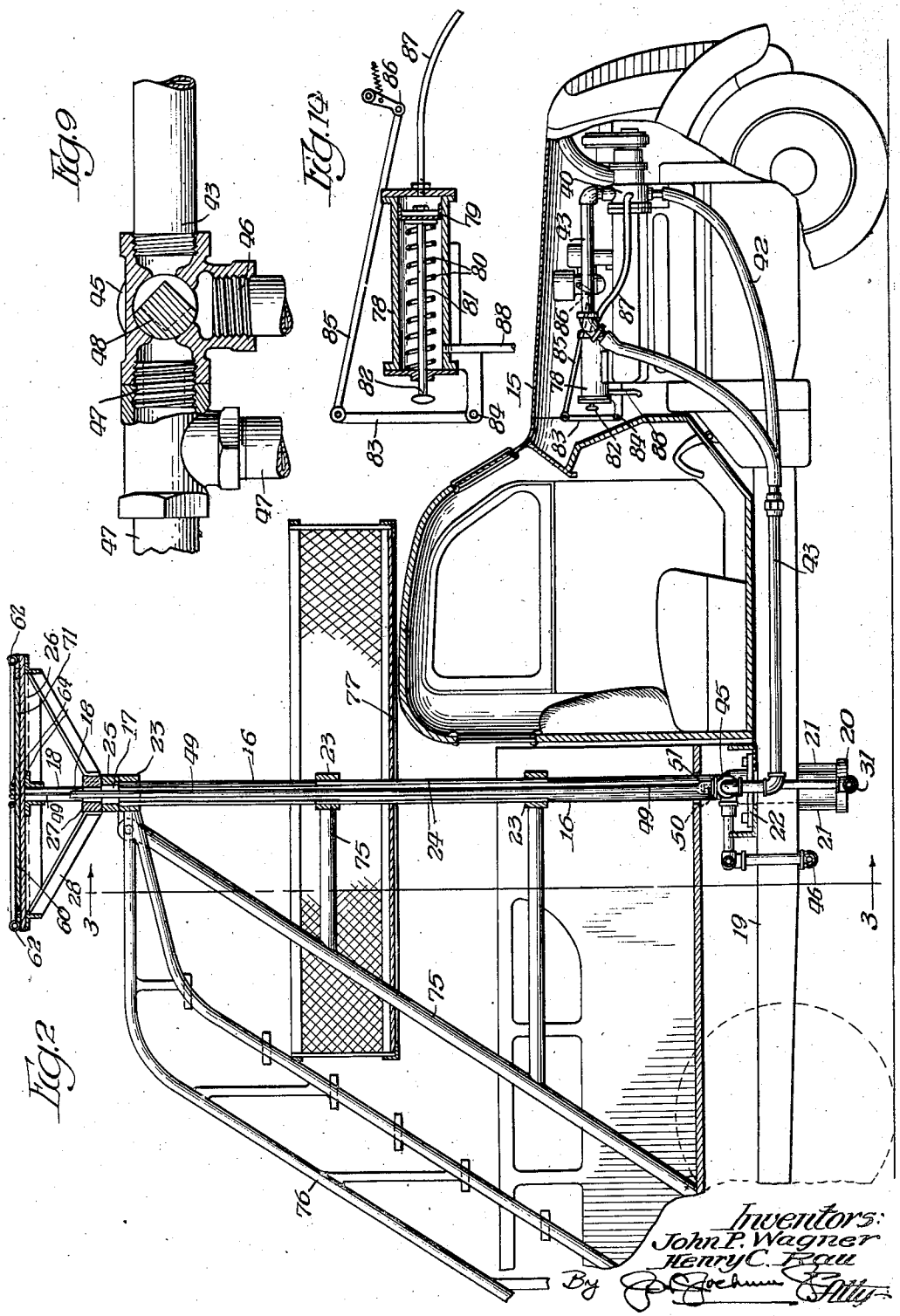


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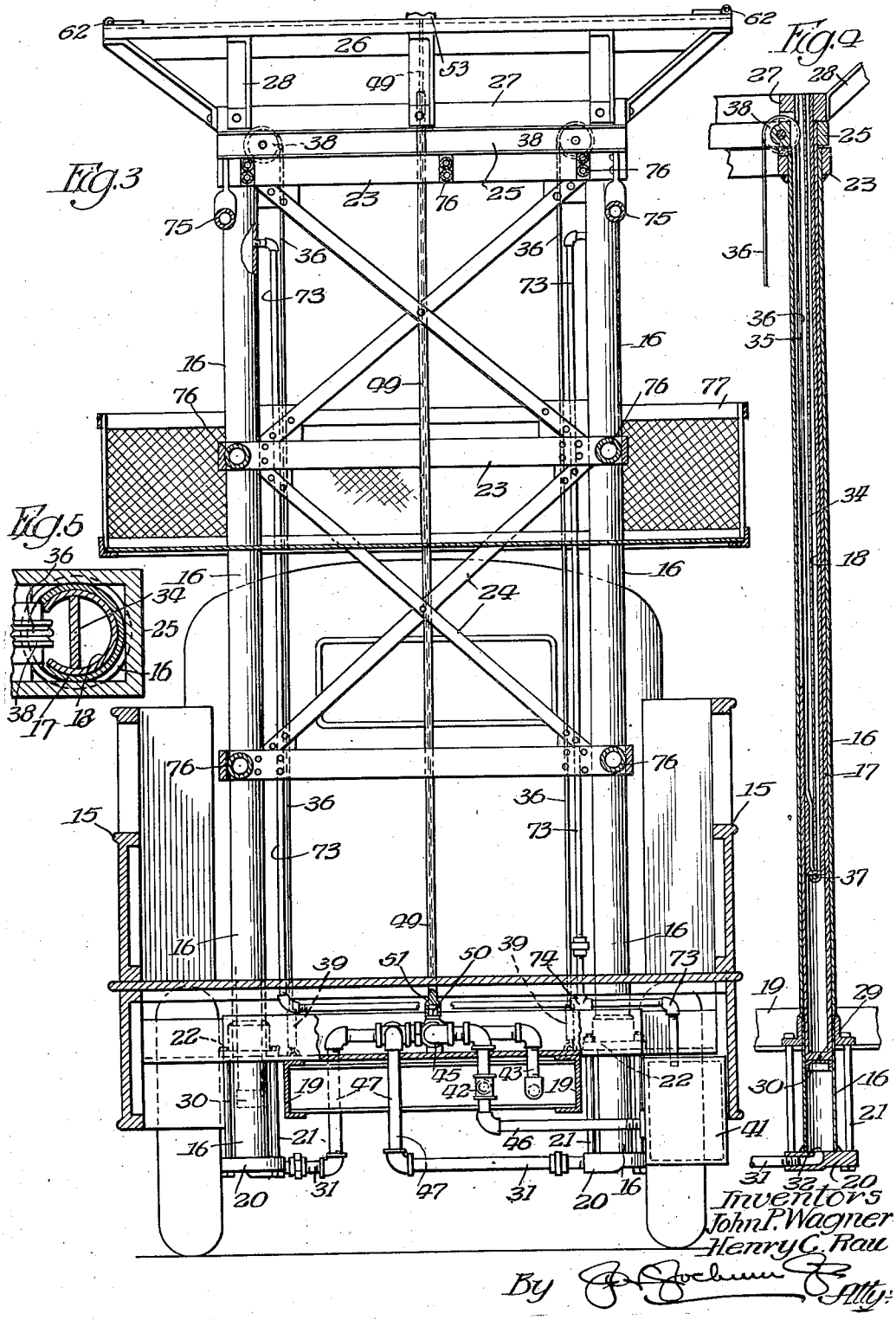
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TOWER WAGON

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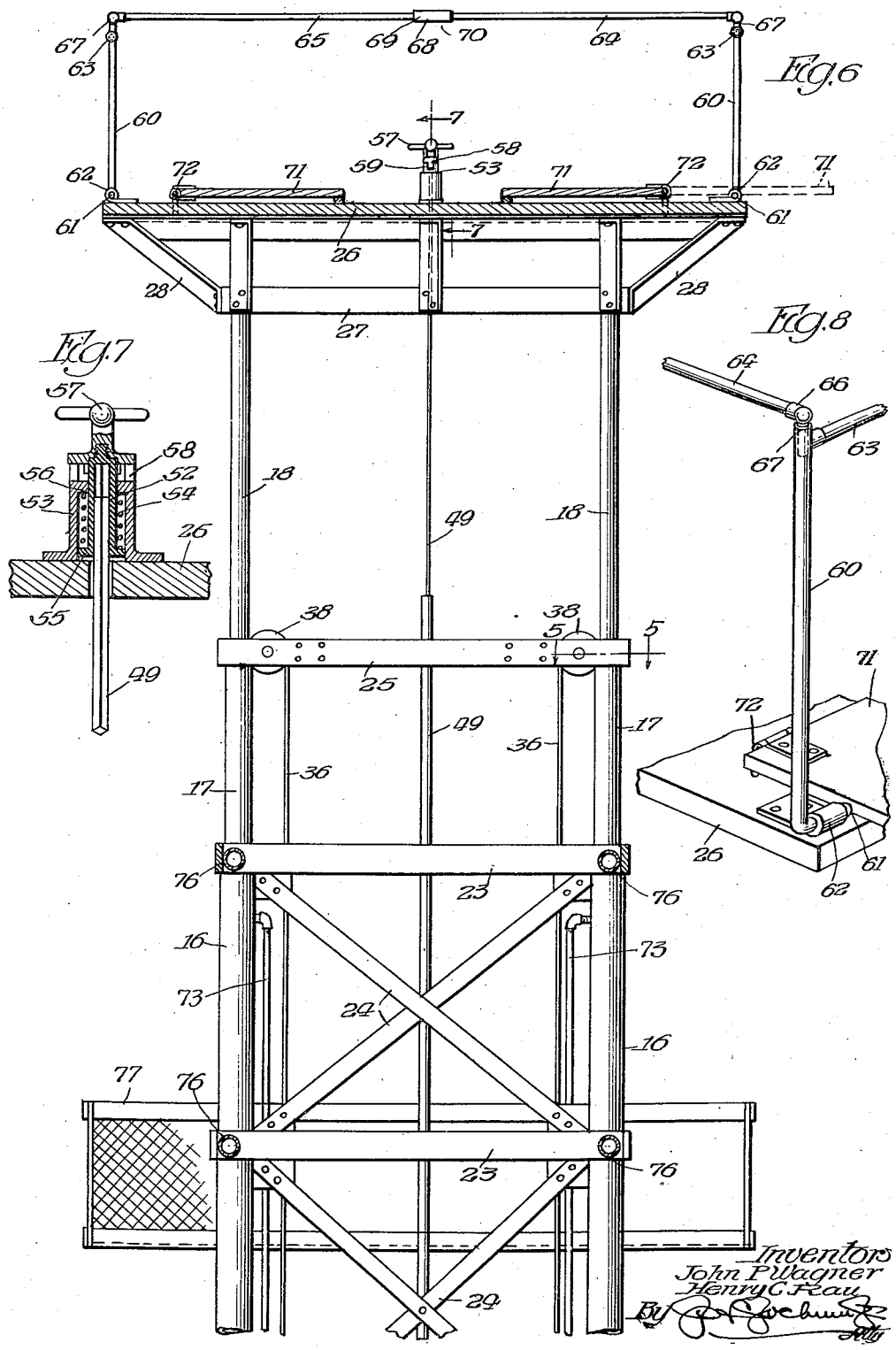
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TOWER WAGON

Filed March 5, 1938 4 Sheets-Sheet 4



Patented Apr. 9, 1940 2,196,511

UNITED STATES PATENT OFFICE

2,196,511

TOWER WAGON

John P. Wagner and Henry C. Rau, Chicago, Ill.

Application March 5, 1938, Serial No. 194,040

9 Claims. (Cl. 189—11)

This invention relates to improvements in tower wagons or trucks and one of the objects of the same is to provide an improved tower construction which is composed of a plurality of cooperating sections, certain of the sections being raised by fluid pressure and others of the sections being raised by mechanical means, the two raising means cooperating with each other to quickly and simultaneously raise or elevate the sections.

A further object is to provide improved means whereby the raising and lowering operation may be controlled from a platform carried by the outermost section.

A further object is to provide an improved structure of this character in which the fluid pressure creating means is operated from the motor of the vehicle, and improved means for rendering the fluid pressure means active and inactive with respect to the tower.

A further object is to provide an improved structure of this character which will be of a comparatively simple, light, compact and durable construction, and which will be effective and efficient in operation.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention and in which:

Figure 1 is a perspective view of a truck or wagon of this character constructed in accordance with the principles of this invention and showing the working platform elevated with respect to the truck.

Figure 2 is a view partly in elevation, partly in section and partly broken away, of the structure shown in Figure 1, on an enlarged scale, and with the working platform in its lowered position with respect to the truck.

Figure 3 is a vertical sectional view taken on line 3—3 Figure 2, and on an enlarged scale.

Figure 4 is a detail vertical sectional view showing the telescoping elevating members.

Figure 5 is a detail sectional view, on an enlarged scale, as taken on line 5—5 Figure 6.

Figure 6 is a view partly in elevation and partly in section of the platform raising and lowering means.

Figure 7 is a detail sectional view, on an enlarged scale taken on line 7—7 Figure 6.

Figure 8 is a detail perspective view of a portion of the railing for the platform.

Figure 9 is a view partly in elevation and partly in section of the control valve for the circulating fluid.

Figures 10, 11 and 12 are detail sectional views showing the valve in different positions.

Figure 13 is a diagrammatic view of the piping system.

Figure 14 is a sectional view of the fuel supply controlling means.

Referring more particularly to the drawings, the numeral 15 designates a wheel supported truck or wagon of any desired or suitable construction upon which the tower mechanism is arranged.

The raising mechanism consists essentially of a plurality of tubular members 16, 17 and 18 preferably arranged in pairs one of which telescopes into the other, and the lowermost section of each series is supported preferably by the chassis 19 of the truck by a plate 20, the plate being held in position in any suitable manner preferably by means of tie rods 21 passing through the plate and also through a portion of the supporting frame 22.

These telescoping sections may be of any desired length, diameter and configuration, the lowermost pair being connected together in any suitable manner, such as by means of crossbars 23 and braces 24, while the sections 17 are connected together by a crossbar 25.

Supported by the sections 18 at the free ends thereof is a platform 26 and the platform is secured to the sections 18 in any suitable manner preferably by means of a crossbar 27 and braces 28.

The members 16, 17 and 18 are preferably tubular, the member 16 being closed at its lower end by the plate 20. On the closed lower end 29 (see Figure 4 of the drawings) of the section 17 is arranged a packing or piston element 30 which operates in the member 16, the latter forming a cylinder so that when fluid pressure is directed into the member 16 beneath the piston 30 by means of a pipe 31 through the opening 32 in the plate 20, the section 17 will be raised.

The section 18 is also tubular and arranged therein and extending thereacross is a partition 34 and is held in position in any desired or suitable manner.

A portion of the body of the section 18 is cut away or removed as at 35, to form an opening, so as not to interfere with the operation of a cable 36. This cable 36 projects into the member 18 through the opening 35 and is anchored at its lower end as at 37, to the bottom of the section 18 and passes over a pulley 38 journaled in the crossmember 25. The cable after passing over the pulley 38 extends downwardly and is anchored as at 39, in any desired or suitable manner to the chassis 19 of the truck.

It will thus be seen that with this construction when fluid is forced into the member 16 beneath the piston 30 it will elevate section 17 with re-

spect to the section 16. During this elevating movement, and by reason of the fact that the cable 36 is secured at one end to the section 18 and is anchored at its other end to the chassis 19, and as the crossmember 25 with the pulley 38 will be raised with the section 17, the cable will be caused to travel over the pulley 38 and this will correspondingly raise the outermost section to elevate the platform 26. Likewise when pressure of the fluid beneath the piston 30 is relieved, the sections 16, 17 and 18 will be telescoped together.

As the section 18 descends the cable 36 will move over the pulley 38 in the opposite direction and at the same time the section 17 being lowered will lower the cross bar 25 and the pulley 38.

Fluid pressure to raise and lower these sections with respect to each other may be derived in any manner and from any suitable source but preferably by means of a pump 40 which is connected to the engine or motor, the pump receiving its supply of fluid from a sump 41 through a pipe 42, connected with the intake side of the pump.

Leading from the discharge side of the pump is a pipe 43 to which another pipe 44 is connected and this pipe 44 is connected to a valve chamber 45.

Leading from the valve chamber 45 is a pipe 46 that discharges back into the sump 41.

Leading also from the valve chamber 45 are pipes 47 that connect with the pipes 31 that discharge into the section 16 through the plate 20 and below the piston 30 so that when the valve 45 is open so as to permit the fluid to be circulated by the pump into the section 16, the sections 16, 17 and 18 will be elevated, but when the valve 48 which is in the valve casing 45 is positioned to cut off the supply of fluid to the section 16, the pipe 46 leading to the sump will be connected to the pipe 44 leading from the pump, so that in this position the fluid will be held against escape from the sections 16 and the platform 26 will be held elevated.

During this time and while the pump is operating there will be an idle circulation of the fluid from the sump 41 through the pipe 42 through the pump through the pipes 43—44, valve casing 45, pipe 46 back to the sump.

The valve 48 when in the position shown in Figure 10 will be in a neutral position, i. e., in the position so that there will be an idle circulation of the fluid when the sections are telescoped or what might be termed a down position, that is, with the platform in its lowered position with respect to the truck, so that there will be a free circulation of the fluid.

When the valve 48 is in the position shown in Figure 11 it will be positioned so as to connect the pipes 43—44 with the pipe 47 to permit the fluid to enter the section 16 and raise the telescoping sections. At this time the pipe leading to the sump from the valve casing 45 will be closed.

After the sections and the platform 26 have been raised to the desired position with respect to the truck, the valve 48 may be positioned as shown in Figure 12 so as to hold the parts in such position. In this position of the valve the pipe 47 will be closed and the fluid will be confined in the cylinder section 16 to hold the platform in its elevated position. At this time the pipes 43—44 leading from the pump to the valve casing 45 will be put into communication with the pipe 46 leading from the valve casing back to the sump 41, thereby positioning the valve so that there will be an idle circulation of the fluid from the sump through the pump and back to the sump.

Therefore, by adjusting or positioning the valve 48 the raising and lowering of the platform may be controlled and the platform may be arrested in its movement at any desired height with respect to the truck by controlling or positioning the valve 48.

This valve may be of any desired or suitable construction and may be controlled from the platform 26 at will and in any of the positions of the platform.

To that end there is provided a series of telescoping rods designated generally by the reference numeral 49, any number of which may be provided, preferably one for each of the sections 16, 17 and 18. These rod sections may be of any desired configuration but are preferably angular in cross-section so that they will not only be free to telescope but so that they may be rotated so as to adjust the valve 48, in any suitable manner. To that end the valve may be provided with an angular stem 50 (see particularly Figure 3) and the lower end of one of the rod sections 49 may be provided with a socket 51 fitting over this projection by means of which the valve may be turned.

The upper section of the rod 49 passes through the platform 26 (see particularly Figures 6 and 7) and enters a member 52 which may also be angular in cross-section so as to move longitudinally with respect to the rod. This member 52 slides in a bearing member 53 and a spring 54 encompasses the member 52, one end of the spring resting upon a shoulder 55 on the member 52 and the other end of the spring resting against a shoulder 56 of the member 53. A handle 57 may be connected to the member 52 and this handle may be provided with a pin or lug 58 which is adapted to be seated in a recess 59 in the end of the member 53.

Thus by grasping the handle 57 and raising it to unseat the pin or lug 58 from the recess 59 the rod section 49 may be rotated thereby turning the valve 48. When the valve has been properly positioned, and the handle 57 released, the spring 54, which has been placed under tension by the raising of the handle 57, will cause the handle 57 to be moved so that the lug or pin 58 will enter the seat 59. This operation may be performed in any position of the platform.

The platform is provided with protecting rails which preferably comprise uprights 60, one located preferably at each corner of the platform and each being mounted for pivotal movement preferably by one end 61 thereof being bent at an angle to the body portion and journaled in a suitable bearing 62 on the platform. The members 60 may be connected in pairs by means of a crossbar 63 which forms a crossrail. The respective members of the opposite pairs may be connected together by rod sections 64 and 65, one end of each section being mounted in a bearing 66 which is loosely journaled in the upper end of the member 60, as at 67. Secured to the free end of one of the sections, such as the section 65, is a sleeve 68 preferably pinned to the section 65. This sleeve 68 projects beyond the end of the section and is adapted to receive the end of the other bar or rail section 64, as shown more clearly in Figure 6. When the end of the section 64 is telescoped into the sleeve 68 it may be temporarily held in any suitable manner such

as by a fastening pin 70 passing through registering apertures.

When it is desired to fold the rails, the pins 70 are removed and the sections 64—65 moved lengthwise of their axis with respect to each other causing the members 60 to turn about their pivots. The respective sections 64—65 are then turned upon their pivots 67 so that they will be disposed substantially parallel with the cross rail 63. The end members 60 together with the respective members 64—65 may then be folded inwardly upon the platform 26, about the pivots 61.

If desired, extension members 71 may be provided for the platform. These members may be of any desired size and construction and are preferably pivotally mounted by one end as at 72 and supported by the platform 26, and are adapted to be folded from the full line position shown in Figure 6 to the dotted line position when it is desired to form an extension to the platform.

The member 62 and bars 63 are so positioned and the extension 71 are of such a length that the swinging of the extension 71 into and out of an operative position will not be interfered with.

In order to arrest the movement or elevation of the platform at a predetermined height with respect to the truck, the sections 16 of the elevating members are provided at predetermined points in their length with outlet openings to which pipes 73 are connected and these pipes constitute overflow pipes which may be connected together as at 74 and lead back to the sump 41.

These outlet pipes 73 are so arranged that until the platform has been raised to the desired extent no fluid will escape therethrough, but as soon as the piston 30 passes these outlets any further pressure created upon the fluid beneath the pistons will cause the fluid to overflow through the pipes 73 and back to the sump 41.

Suitable braces 75 may be provided for the elevating members and a ladder or steps 76 may also be provided extending from the bottom or chassis of the truck to a position to permit ready access to the platform when the latter is lowered.

Another platform or receptacle cage 77 may also be provided if desired, as a storage space and may be of any desired size and configuration and supported in any desired or suitable manner preferably from the lower or immovable section 16 of the elevating members and also beneath the platform 26, in such a position that it will not interfere with the operation of the platform and will be out of the way.

When the valve 48 is set so that the pump is operating or forcing the oil or liquid into the cylinder 16 to raise the platform 26, it is necessary to supply an additional amount of fuel to the engine to increase the speed of the engine to effect a faster lifting.

To accomplish this there is provided a cylinder 78 mounted in any suitable or convenient position and in which cylinder a piston 79 operates. A spring 80 tends normally to force the piston in one direction and a piston rod 81 is connected to the piston and extends through the end of the cylinder. On the end of the piston rod may be provided a head or enlargement 82 which is adapted to contact a lever 83 that is pivotally mounted as at 84. To the end of the lever is connected a bar or link 85 which in turn is pivotally connected to the carburetor valve control arm 86.

Leading from the discharge side of the pump 40 is a pipe 87 which discharges into the cylinder 78 on that side of the piston 79 which is opposite to the side on which the spring 81 is arranged.

Leading from the cylinder 78 is an open vent pipe 88 which may discharge below the engine apron or at any other desired point, so that in the event any oil or liquid should find its way past the piston 79 in the cylinder, it will not drip or spray on the engine or any of the parts of the mechanism.

In operation and when the valve 48 is set to the lifting position with the engine running so that the pump will force the liquid into the cylinder 16 to raise the tower, oil or liquid will also be forced into the cylinder 78 against the piston 79 to move it against the stress of the spring 80, thereby causing the head 82 on the piston rod 81 to contact and move the lever 83 and rock it about its pivot 84, thereby actuating the arm 86 of the carburetor to permit an additional supply of fuel to the engine.

When this increased flow of fluid from the engine is relieved, that is, when the control valve 48 is so positioned as to hold the tower lifted, or even in its down position, the oil pressure in the cylinder 78 will be relieved through the pipe 87 and beneath the piston 79, with the result that the spring 81 will then force the piston 79 back into the cylinder so that the end 82 of the piston rod 81 will be retracted thereby permitting the carburetor arm 86 and the valve controlled thereby (not shown) to be moved back to normal position. This will result in the engine resuming its idling speed as the additional supply of fuel to the engine will then be cut off.

While the preferred form of the invention has been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:

1. A tower wagon of the character described embodying a series of telescoping sections, one of said sections anchored upon the wagon, a platform supported by another of said sections, fluid pressure actuated means embodying a motor driven device for creating fluid pressure for raising certain of said sections with respect to other sections, mechanical means automatically rendered active by and simultaneously with the fluid pressure actuated means for raising certain of said sections with respect to others of said sections, means to control said fluid pressure means, and means operating automatically to augment the operation of the motor at predetermined times in the relative movement of said telescoping sections.

2. A tower wagon of the character described embodying a series of telescoping sections, one of said sections anchored upon the wagon, a platform supported by another of said sections, fluid pressure actuated means for raising certain of said sections with respect to other sections, mechanical means automatically rendered active by and simultaneously with the fluid pressure actuated means for raising certain other of said sections with respect to others of said sections, means to control said fluid pressure means, and an escape passage controlled by one of said sections for limiting the raising movement of the last said section, the said escape passage being normally maintained closed against the escape of the fluid pressure, until the last recited

section assumes a position with respect thereto to open the passage to the escape of the fluid.

3. A motor driven tower wagon of the character described embodying a series of telescoping sections, one of said sections anchored upon the wagon, a platform supported by another of said sections, fluid pressure actuated means for raising certain of said sections with respect to other sections, mechanical means automatically rendered active by and simultaneously with the fluid pressure actuated means for raising certain other of said sections with respect to others of said sections, means to control said fluid pressure means, the said fluid pressure means embodying a pump operatively connected with said motor, a sump for containing a supply of liquid and to which sump the inlet side of the pump is connected, certain of said sections constituting a cylinder and a piston, the pressure side of the pump being connected to said cylinder, said cylinder also connected to said sump, and a valve for controlling the circulation of the liquid, said valve also operable to maintain the piston section against movement under fluid pressure with respect to the cylinder section, while the pump maintains a circulation of the liquid from and back to the sump.

4. A tower wagon having mounted thereupon a vertically adjustable platform, a lateral extension for said platform, said extension embodying a member hingedly connected by one edge to the upper face of the platform, said hinge disposed a substantial distance from one edge of the platform whereby when said extension is folded it will rest upon the surface of the platform within the confines of said edge, said extension when unfolded resting for a substantial extent upon the top face of the platform to be supported thereby to project beyond said edge.

5. A tower wagon embodying a platform thereupon for raising and lowering movements with respect thereto, a guard rail for the platform, said rail embodying laterally spaced uprights pivotally connected to and projecting above the platform, rail members pivotally connected to the respective uprights and extending towards and terminating short of each other, a sleeve connected to one of the proximate ends of adjacent rail members and into which sleeve the proximate end of the other rail member is adapted to telescope, the axes of the pivots between the uprights and the platform being disposed transverse to the axes of the pivots between the rails and the uprights, adapting the rails to be positioned with respect to the uprights so that the rails and uprights may be folded substantially flat against the platform by moving the uprights about their points of pivotal connection with the platform.

6. A tower wagon of the character described embodying a truck, a series of telescoping members one of which is anchored upon the truck, fluid pressure means for raising one of said members with respect to the said anchored member, said fluid pressure means embodying a circulatory pump, a motor to which the pump is connected, a valve for controlling the circulating of the fluid, means for supplying fuel to the motor, and means controlled by the pressure of the fluid for automatically augmenting the supply of fuel to the motor at predetermined times in the relative movement of the said telescoping members one with respect to the other.

7. A tower wagon of the character described embodying a truck, a series of telescoping members one of which is anchored upon the truck, fluid pressure means for raising one of said members with respect to the said anchored member, said fluid pressure means embodying a circulatory pump connected to a motor to which the pump is connected, a valve for controlling the circulating of the fluid, means for supplying fuel to the motor, means controlled by the pressure of the fluid for automatically augmenting the supply of fuel to the motor at predetermined times in the relative movement of the said telescoping members one with respect to the other, the said augmenting means embodying a cylinder connecting with the pressure side of said pump, a piston in the said cylinder, a piston rod connected to the cylinder, and means tending normally to move the piston and piston rod in one direction, fluid pressure in said cylinder operating in opposition to the last said means for moving the piston to actuate the control valve of the motor fuel supplying means.

8. A tower wagon of the character described embodying a truck, a series of telescoping members one of which is anchored upon the truck, fluid pressure means for raising one of said members with respect to the said anchored member, said fluid pressure means embodying a circulatory pump, a motor to which the pump is connected, a valve for controlling the circulating of the fluid, means for supplying fuel to the motor, means controlled by the pressure of the fluid for automatically augmenting the supply of fuel to the motor at predetermined times in the relative movement of the said telescoping members one with respect to the other, the said augmenting means embodying a cylinder connected with the pressure side of said pump, a piston in the said cylinder, a piston rod connected to the cylinder, means tending normally to move the piston and piston rod in one direction, fluid pressure in said cylinder operating in opposition to the last said means for moving the piston to actuate the control valve of the motor fuel supplying means, and a vent in the cylinder on the side of the piston opposite the fluid pressure side thereof.

9. A tower wagon of the character described embodying a series of telescoping sections one of which is anchored upon the wagon, a platform supported by another of said sections, fluid pressure actuated means embodying a motor driven device for creating fluid pressure for raising certain of said sections with respect to other sections, mechanical means automatically rendered active by and simultaneously with the fluid pressure actuated means for raising certain of said sections with respect to others of said sections, means to control the fluid pressure means, means operating automatically to augment the operation of the motor at predetermined times in the relative movement of said sections, and means operating automatically to render the relative movement of the telescoping sections inactive with respect to the operation of the fluid pressure thereon to arrest such relative movement.

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