

July 29, 1947.

E. J. CHAMBERS

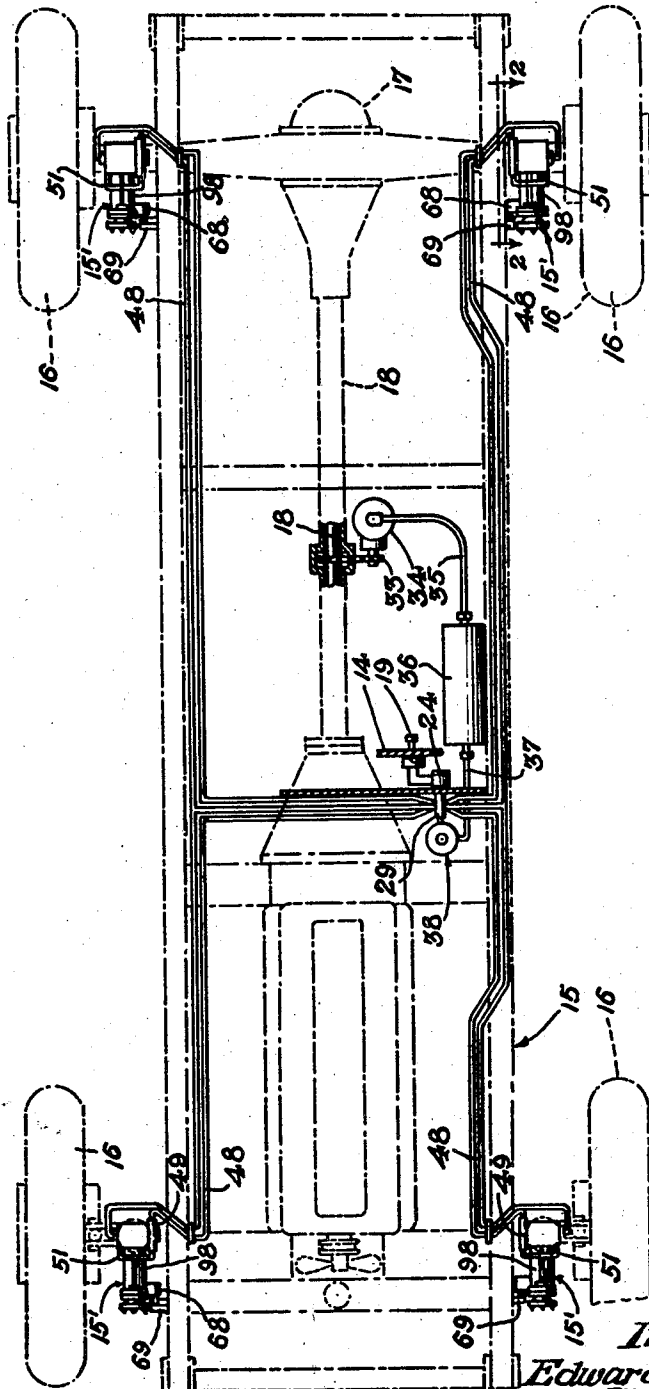
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AUTO JACK

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6 Sheets-Sheet 1

Fig. 1.



Inventor
Edward J. Chambers
By
David M. Lyndon
Attorney.

July 29, 1947.

E. J. CHAMBERS

2,424,741

AUTO JACK

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6 Sheets-Sheet 2

Fig. 2.

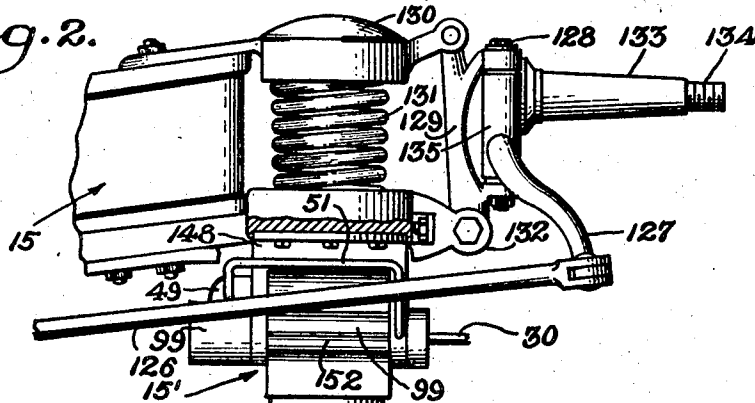
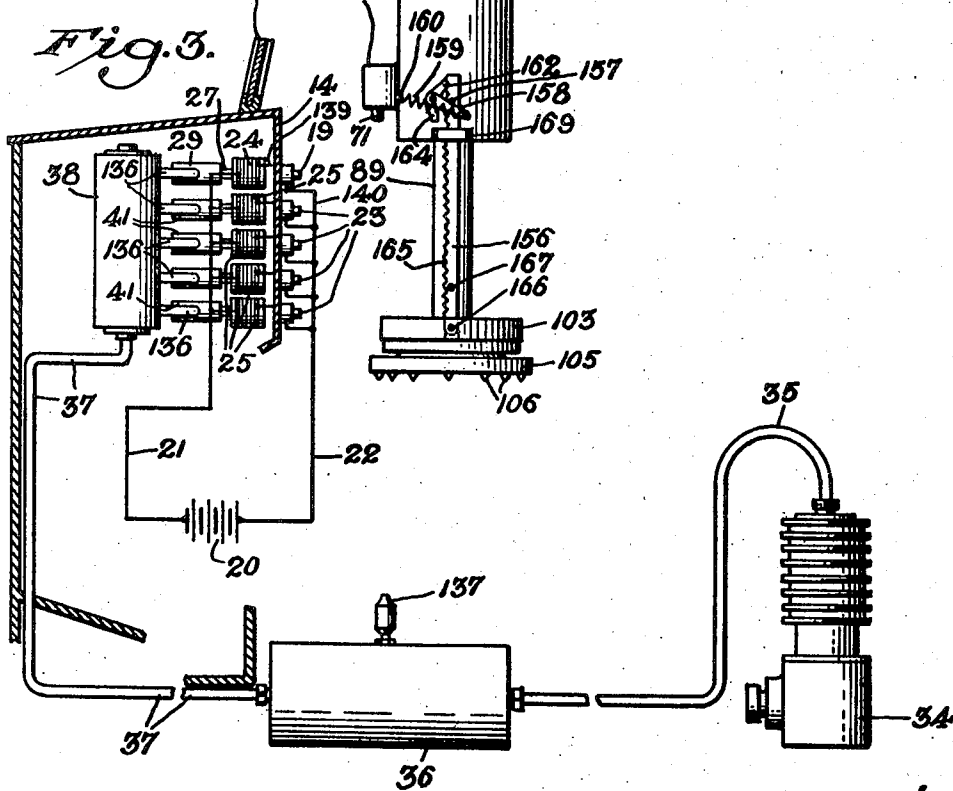


Fig. 3.



Inventor
Edward J. Chambers
BY
David M. G. Helms
Attorney.

July 29, 1947.

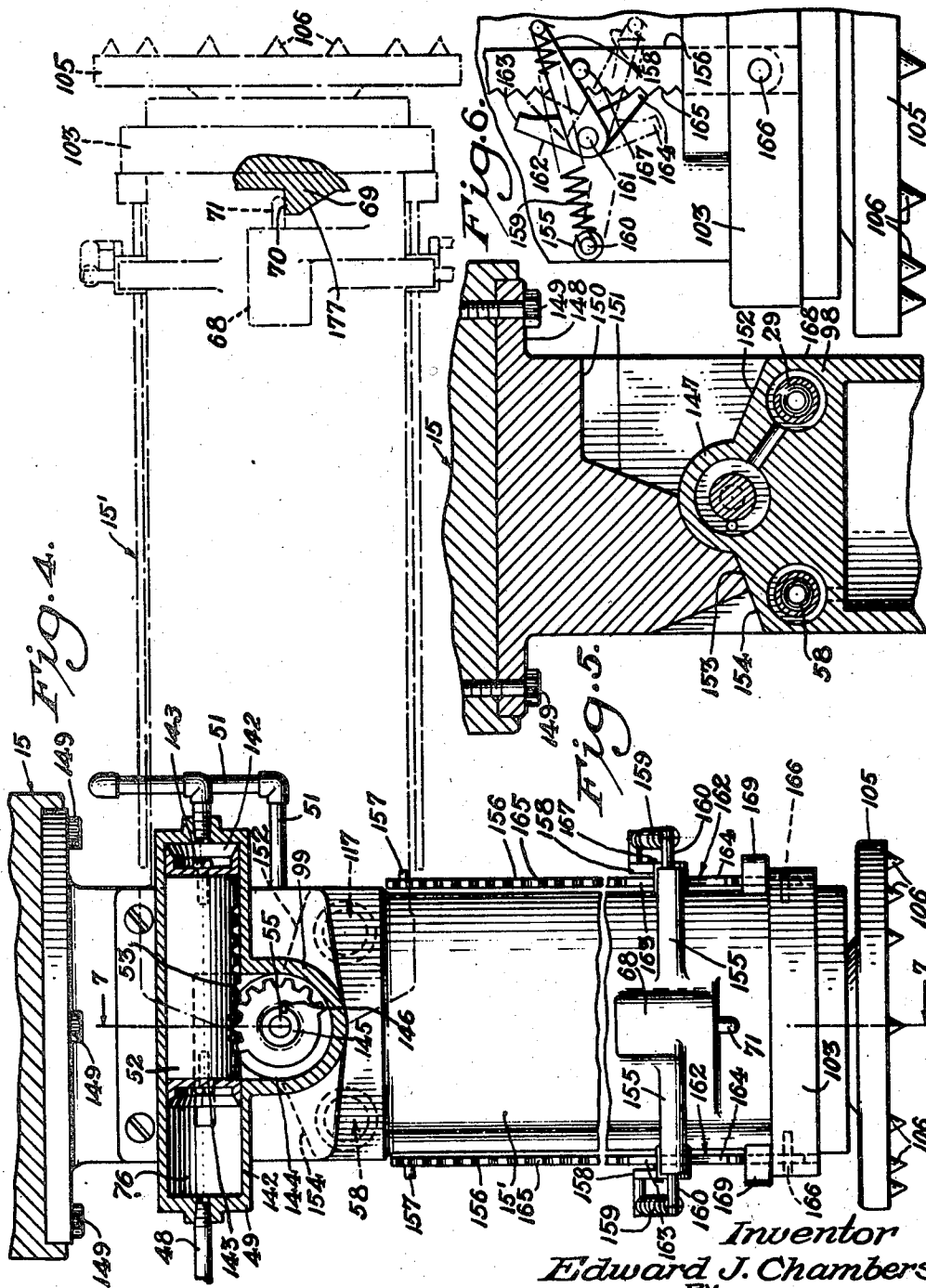
E. J. CHAMBERS

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AUTO JACK

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6 Sheets-Sheet 3



Inventor
Edward J. Chambers
By
David M. G. Allen
Attorney.

July 29, 1947.

E. J. CHAMBERS

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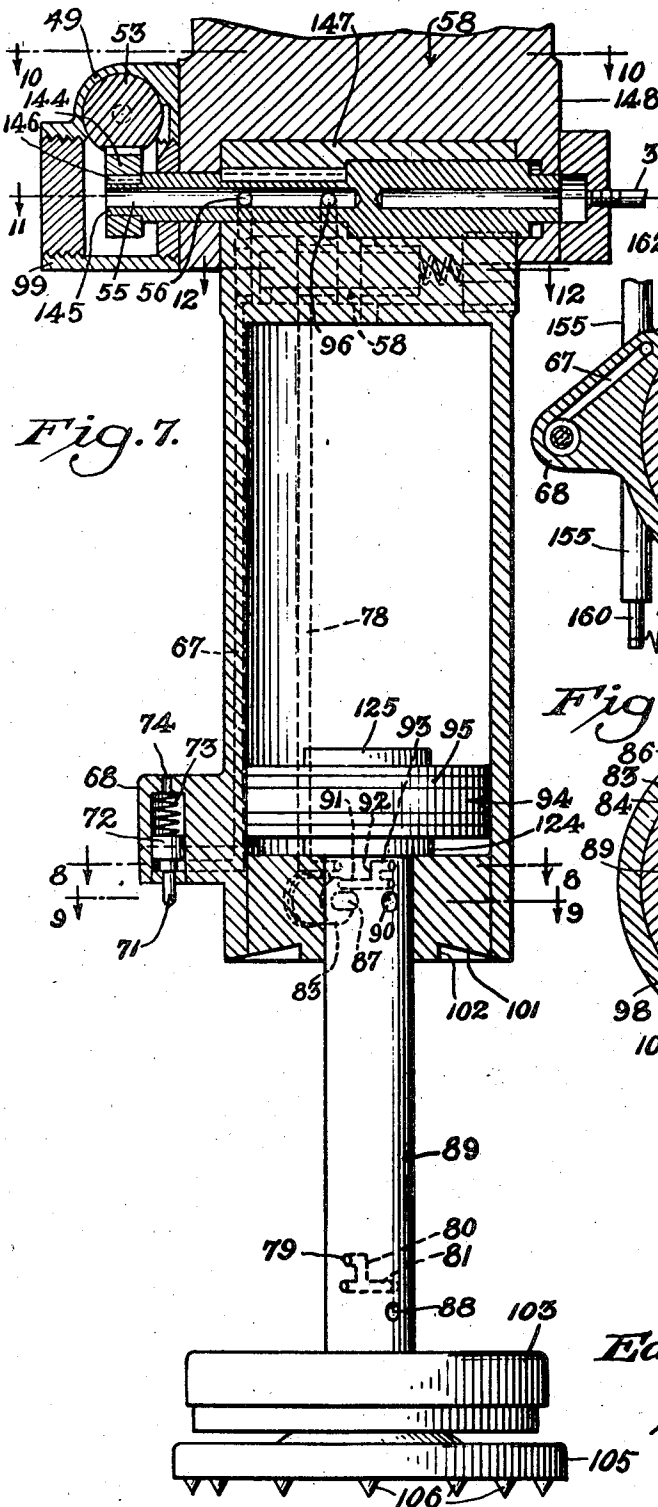


Fig. 7.

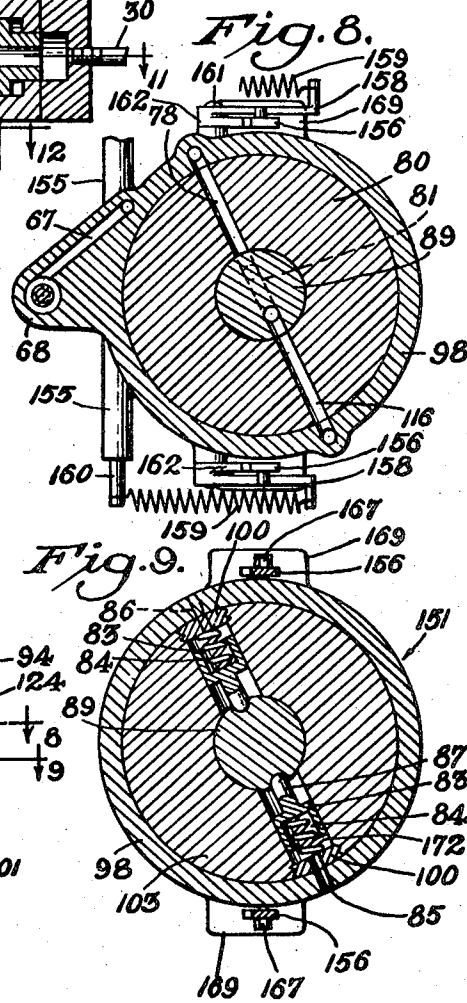


Fig. 9.

Inventor
Edward J. Chambers
By
Lawrence M. Hall
Attorney.

July 29, 1947.

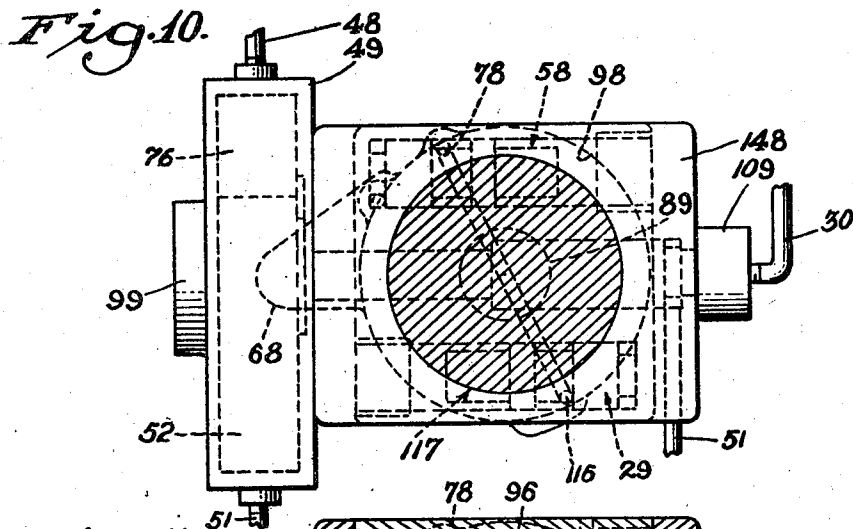
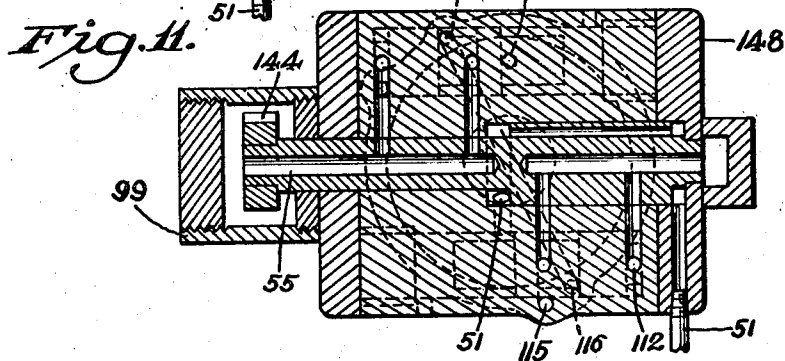
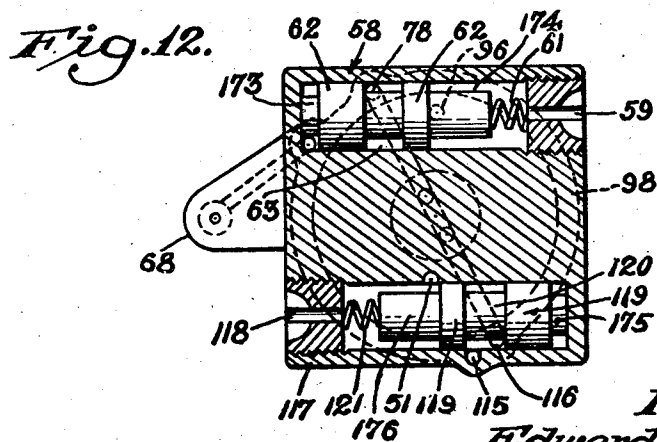
E. J. CHAMBERS

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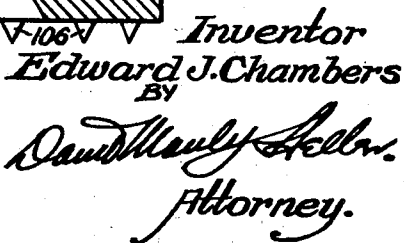
6 Sheets-Sheet 5



Inventor
Edward J. Chambers
BY
David Mauley Hill
Attorney.

2,424,741

6 Sheets-Sheet 6



UNITED STATES PATENT OFFICE

2,424,741

AUTO JACK

Edward J. Chambers, Chicago, Ill., assignor of
forty-nine per cent to John Breland Whigam,
Chicago, Ill.

Application September 26, 1944, Serial No. 555,813

19 Claims. (Cl. 254—86)

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My invention relates to multiple fluid jack structure used in association with a vehicle chassis, or mounting, adapting the same to be raised at four individual points adjacent its wheels, or permitting the simultaneous raising of the entire automobile by virtue of the jack structure adjacent each wheel, and being further provided with mechanism adapted to return all or as many of the said four jacks that are in extended position, to normal or inoperative position.

One object of my invention is to provide a jack structure which is articulately secured, and is adapted to be rotated thru an angular movement approximately, and substantially 90°, then the jack structure is adapted to be extended so as to furnish lift, or lifting movement, to a vehicle to which it may be attached, the said jack structure being further adapted to be retracted, and to be rotated thru an angle of substantially 90° to return it to normal or horizontal position.

Another object of my invention is to provide a fluid operated jack means which is provided with snap locking means in extended or contracted position of the piston or foot support structure of the said jack means.

Another object of my invention is to provide in a jack structure of the aforementioned character, rack and reversible pawl means adapted to safeguard the upward or downward movement of the extensible means of the said jack structure, preventing accidental drop of the load being supported, if for some reason the fluid operative mechanism of the jack structure should become ineffective or inoperative.

Another object of my invention is to provide electro-magnetic control means associated with fluid pressure means to automatically operate an individual jack structure to extended or operative position.

Another object of my invention is to provide a unitary electro-magnetic control associated with fluid pressure means adapted to retract one or more of the jack structures which had prior thereto been extended or elongated in order to support a load in raised position.

Another object of my invention is to provide fluid pressure operated keeper means associated with retaining means provided on the aforementioned type of jack structure which will retain the said jack structure in inoperative position or in normal position.

Another object of my invention is to provide electro-magnetic means cooperating with fluid pressure means, which will first operate valve means connecting the fluid conduit leading from

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the said jack means to the source of supply and cause the said fluid means to operate the retaining means freeing it from the keeper structure, then permit the fluid pressure to be built up so as to cause and produce movement of a rack structure in mesh with a pinion structure connected to the jack body, causing the same to rotate thru an angle of substantially 90°; the fluid pressure then being further built up in a valve means so as to shift the passage connection or conduit connection causing the fluid pressure to operate the piston structure within the said body causing the same to be moved downwardly, thus lifting the load supported thereon; and, simultaneously, or prior to the downward movement of the said jack body, the fluid being so controlled as to cause the disengagement of snap locking means enabling the piston structure to be extended downwardly and causing the same to be locked in fully extended position by the said locking means. A second electro-magnetically controlled valve means is also associated with the said mechanism and operates independently from the said first mentioned electro-magnetically controlled valve means for reversing the action of extending the said jack means to support a load, in other words, causing the retraction thereof in the following manner; the pressure being first directed so as to cause the said locking means to be disengaged freeing the piston for upward movement or travel, the pressure then being built up sufficiently, exerting it below the piston and forcing the same upward. When the piston reaches its upward position, the pressure continues to build up and thus causes communication between another conduit which will feed the pressure into the said rack and pinion mechanism causing the rack to be reversed in directional movement, which in turn will result in causing the jack structure to be rotated thru the angular movement it had originally been motivated, returning it to normal, or substantially, horizontal position, simultaneously therewith, causing the said retaining means to become engaged with the keeper means maintaining the entire arrangement by this mechanical keeper means to foolproof the entire construction and prevent accidental movement thereof.

Other objects, features and advantages inherent in my invention will become apparent from an examination of the accompanying drawings, translated in accordance with the ensuing description, wherein like numerals are used to designate like parts, and in which:

Fig. 1 designates a top view showing a vehicle

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chassis, wheels, and driving means in phantom, and the jack structure, comprising my invention, in full lines showing the relative connection for proper association and cooperation of the prime mover means embodied in a vehicle structure to operate the needed mechanism to furnish the necessary fluid pressure required to operate the mechanism of the jack structure comprising my invention, as will hereinafter be more clearly elucidated.

Fig. 2 is an enlarged fragmentary front view of a jack structure comprising my invention in extended position, preferably, that jack structure associated with the front support at the front wheels of an automobile.

Fig. 3 is a diagrammatic showing of an automobile dash structure indicating generally the electro-magnetic circuit utilized in cooperation with the fluid pressure system for operating my invention.

Fig. 4 is an enlarged view partly in cross-section showing the details of the elemental structure of one of the jack assemblies, showing also in dotted lines the arcuate movement thru which it is rotated to bring it to normal or inoperative position.

Fig. 5 is a longitudinal cross-sectional view taken on Figure 4 showing that fragmentary portion of the jack body which is provided with stop portions so as to definitely limit the arcuate or angular movement thereof.

Fig. 6 is a fragmentary side view of the lower portion of Figure 4 showing the detailed elemental structure of the mechanical safety and fool-proofing means which will prevent accidental disturbance of the extensibility or retractability of the jack structure comprising my invention in the event of failure of the fluid pressure system, in which event the jack structure will remain in mechanically locked engagement at the particular point where the said failure occurs causing no damage to the load supported thereby.

Fig. 7 indicates a longitudinal cross-sectional view taken substantially on the line 7—7 of Figure 4, with the exception that in this view the foot supporting structure of the jack is shown in extended position.

Fig. 8 is a transversal cross-sectional view on the line 8—8 of Figure 7.

Fig. 9 is a transversal cross-sectional view taken on the line 9—9 of Figure 7.

Fig. 10 is a transversal cross-sectional view taken, substantially, on the line 10—10 of Figure 7.

Fig. 11 is a transversal cross-sectional view taken, substantially, on the line 11—11 of Figure 7.

Fig. 12 is a transversal cross-sectional view taken, substantially, on the line 12—12 of Figure 7.

Fig. 13 is a diagrammatic, or schematic, view showing the arrangement of the particular portion of my fluid pressure operated jack system to which are attributable the results produced, related in the foregoing preamble of the description where the objects of the invention are enumerated.

Referring to Figure 1, the chassis of an automobile is, generally, designated 15 to which are secured in horizontal normal position the jack structures 15' adjacent each of the wheels 16 of the said automobile. The automobile structure is provided with suitable motive power means and a transmission shaft 18 connected to the differential gearing 17. The transmission shaft at a suit-

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able point is provided with chained transmission means 33 or other suitable transmission means, which will operate the pump or compressor 34 connected by virtue of conduit 35 to a suitable storage tank 36. The said storage tank is provided with a safety or blowoff valve 137 to release pressure that may accumulate beyond the safety factor of the container 36, causing such excess air pressure to be exhausted and thus maintain within the storage tank 36 suitable pressure at all times for operating the jack mechanism as will be hereinafter more clearly explained. The storage tank 36 is connected by virtue of conduit 37 to another fluid pressure feed tank 38 which is connected to the various electro-magnetic valve structures secured to the dash 14 of the automobile, and which are used for jointly or individually operating the individual jack means to extend the same and lift the load, or for retraction thereof relieving or releasing the load to rest on its support.

In Figure 2, where the chassis structure 15 is indicated, the necessary knee action usually present in automobiles is indicated thereon. It consists of the cap 130 and the bracket 132 confining therebetween a proper resilient means or spring means 131, the two being interconnected by the yoke member 129 which is provided with suitable bearings in order to articulately receive the support 135. The said support 135 has an extension 127 articulately secured to the tie rod 126, which in turn is connected thru proper gearing to the steering wheel of an automobile; the tapered shaft structure 133 is integral with the bracket 135 and the two are fulcrumed by virtue of the pivot 128; the shaft 133 being adapted to receive the hub of a wheel, and the reduced threaded extension thereof designated 134 equipped to receive the necessary locking means to maintain the front wheel for free rotation on the said shaft 133. The jack body is, generally, designated 98 and the piston extension thereof is designated 89. The said piston operates reciprocally therein, i. e. outwardly when extended, and inwardly when the mechanism is to be retracted.

In Figure 3, the automobile body, generally, comprising a dash 14 connected to the hood arrangement or body proper is also equipped with the customary windshield structure 141. This view also indicates how the fluid pressure feed tank 38 is connected by virtue of conduit 37 to the storage tank 36, then in turn to the compressor 34.

The electrical circuit indicates one of the electro-magnetic valve means operated by the switch 19 which happens to be the switch for returning the jack to normal position. The four electro-magnetic switches 23 are so arranged with the fluid pressure as to cause extension of the jack means, or lift of the load by the extension thereof. It can be seen in this view that the switch means 19 is connected to the valve means 29 and is connected in series by virtue of electrical conduits 21 and 22 to a source of electric supply 20. The switches 23 are connected in parallel in the same circuit so that any one of the said switches 23 can be operated independently to close the circuit thereof, the said switches being in parallel relation, hence if it is desired to raise the four jacks simultaneously, the four switches would be closed simultaneously. However, the entire system is set for retracting any or all of the jack structures by virtue of the single electro-magnetic control 19.

The jack structure, generally, comprises a body

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98 in which the greater portion of the mechanism is retained, the said body being articulately secured to a supporting bracket 148. The said bracket 148 in turn is secured to the chassis 15 by virtue of screws 149 (see Figures 4 and 5); the said bracket 148 is provided with a shoulder 153 to abut the shoulder 154 of the body 98, and is further provided with a recessed portion terminating in the shoulders 150 and 151 adapted to receive the corresponding edges or surfaces 168 and 152; the surface 168 resting against the portion 150, whereas the shoulder 152 abuts the shoulder 151 when the device is retracted or in horizontal and inoperative position.

As can be seen, to the bracket structure 148, an auxiliary bracket is secured which includes the cylindrical structure 49 having the substantially semi-circular housing portion 99 for confining a segmental gear 144 which cooperates with a rack 53 to the end of which are secured piston structures 142 held in place by virtue of screws 143.

The fluid conduit 51 is connected to the element 49 to cause the fluid pressure to actuate, or to operate, within the compartment 76 of the tubular structure 49, the said rack 53 in one direction, whereas the conduit 48 is disposed to cause the said rack 53 when the pressure is fed in from the opposite end to cause the rack 53 to return to normal position. The said rack 53, being in mesh with the segmental gear 144, mounted on shaft 145 and secured by key 146, will cause the same to be rotated thru an arcuate distance equivalent to that permitted by the confines of the shoulders 153 and 154 abutting one another or by virtue of the shoulder 153 abutting the shoulder 151 showing the two extreme positions of angular or arcuate operation. The securing cylindrical portion 147 acts as suitable bearing for the jack body 98 for angular rotation thereof.

In Figures 4 and 6 the means for making safe the operation of the jack means is also indicated. The said jack means is provided with extensions 155 into which are driven pin supports 160 furnishing anchorage to the springs 159 which in turn are connected to a lever 158 fulcrumed at 161 and having a suitable extension for retaining the opposite ends of the springs 159. The said levers 158 are integrally secured to the duplex pawl arrangement 162 having the terminal portions 163 of such angular configuration as to engage the teeth 165 of the rack 156, which is guided by the extensions 169 provided on the body 98 and secured firmly in place by virtue of pins 166 to the equalizer foot support means 103.

The foot 105 is caused to be moved downward as shown by the position indicated in Figure 6 in full lines, indicating that the said rack 156 is free to move downwardly, the rack 156 being in snap engagement with the tooth 164. When the travel has been about completed the pin 157 will be caused to engage the lever 158 causing the same to move downward. When it has passed the axis of the supporting pin 160 the said lever will snap downwardly and thus cause the portion 163 to become engaged with the teeth 165, whereas the portion 164 will become disengaged with respect to the teeth 165 as indicated by the dotted position in Figure 6. Now, if we consider that the foot 105 is to be extended downwardly, it can be seen how the rack is free to move downwardly, but will not be free to move upwardly, it being arrested by the toothed portion 164 of the duplex pawl 162. Conversely when

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the rack is free to move upwardly when the lever 158 is in the dotted position indicated, and the tooth 163 is in engagement with the rack 156, it can be seen how the tooth 163 will allow the rack to move upwardly but prevent it from moving downwardly. So that if failure of fluid pressure should occur at any time, the said positive automatic mechanical means will fool-proof the entire structure and prevent accidental damage to any portion of the load being supported thereby. When the rack 156 moves upwardly then the pin 167 will trip the lever 158 changing its position from dotted lines shown in Figure 6 to full lines to repeat the cycle.

It is also to be noted that the jack structures proper are provided with a portion 68 (see Figure 4) which contains the retaining means 71 which co-acts with the keeper means 69, attached to some static portion of the chassis 15, so that the the jack means 15' may be safely maintained in inoperative position, or in locked position when the jack structure is not being used.

For a clearer explanation of the jack structure, I will proceed to elucidate further the elemental structure thereof. It should be noted that the same is comprised of a body 98, as heretofore mentioned, which is bored out in order to receive the piston structure 94 having the customary piston ring means 95 on top and on bottom to furnish proper pressure sealing means therefor, preventing leakage. The said piston structure is also provided with shoulder means 125 and 124 so as to prevent the pistons from contacting the top or bottom cavity or housing within the body 98, for reasons later to be elucidated, namely to provide a small area for fluid pressure to apply its initial action to the movement of the said piston upwardly or downwardly as the case may necessitate.

The piston structure is provided with a rod guide 89 which is provided with locking recesses 90 at the top thereof and the h shaped passage (see Figure 7) comprised of an opening 91 and partial blind opening 93 connected to the opening 91 by means of the communicating recess 92. On the other end of the piston rod 89 a similar h passage in reverse rotation to the said first mentioned h passage is indicated and is comprised of the thru recess 81, and the partially drilled opening 79, interconnected by means of the recess 80. The lower portion of the piston rod 89 is suitably threaded as indicated at 104 in order to pass through the lower plug structure 101 which is provided with an extension 102 and an angular shoulder portion so as to locate the equalizer foot support means 103 which is secured to the thread 104 in locking engagement.

The foot element 105 is provided with a dome-shaped section which has a bore 171 and is held in place by the spherically-shaped washer 107 and the screw 108. The recess 171 provides equalization to the foot element 105 while the teeth 106 grip the pavement, furnishing equalization in the event the pavement should not be perfectly horizontal, or if it be irregular on its surface.

It can be seen also that the body 98 is provided with an extension 68 in which is housed a retaining means 71 which coacts with the slotted or shoulder portion 70 of the keeper means 69. The retainer 71 is provided with an enlarged head 72 held normally in extended position by the spring 73. The vent 74 is provided so as to permit evacuation of the air within the confines of the housing wherein the head 72 operates when

the said head is being moved upwardly so as to disengage the retaining means 71 from the keeper 69.

The piston rod 89 is likewise provided with two indentations designated 88 for engagement by the extensions 87 of the locking means 83. The said locking means is provided with a suitable recess 84 so as to receive compactly the springs 172. The vents 85 and 86 are provided thru the jack body 98 and the screwplugs 100 in order to permit expulsion of the air within the confines surrounding the springs 172 when the fluid pressure means causes the plungers 83 to be retracted for removing or releasing from engagement with the indentations 87 or 90 at either the retracted position preparatory for extension, or in the extended position preparatory to retraction. Each cylinder is also provided with valve portions 58 and 117, and also with electro-magnetically operable valve portions 41 and 29.

The structural arrangement of the valve portions 58 comprises a housing portion in which is confined a valve plunger moving therein having the enlarged shoulder portion 62, and undercut portions 173 and 174; the plunger is also provided with a bored opening 64 communicating with a vent 65, whereas the body or housing 58 is also provided with openings to receive the conduits 66, 78, 96, 56 and 57. The spring 61 is provided in order to maintain the valve plunger 62 in the position indicated in full lines in Figure 13. Associated with this valve-like extension 58 another member designated 41 is provided which has a valve body with two enlarged sections 45 and a reduced intermediate section 46. The said body has also a stem 26, integral with the core of the electro-magnetic solenoid 25, which is connected to the switch 23 by means of electrical conduits 138, 22 and 21 in series with the source of supply of electrical energy 20. To the said body 41 the pressure feed 136 coming from the fluid reservoir 38 is connected, and also the conduit 47 is connected thereto; vent openings 43 and 44 are provided for purposes which will hereinafter be more clearly elucidated in the operation of this device.

The fluid pressure system comprised of the unit portions 41 and 58 connected to the rack and pinion means 52 and 144, also is connected to fluid pressure means to simultaneously or consecutively operate the retainer 71 and the locking means 83. The control of the fluid means within that conduit or fluid pressure circuit is such as to control the unlocking or the release of the retainer means 71 from the keeper means 70, also to release the locking means 87 to permit the arcuate rotation of the jack body 98, and ultimately the extension of the piston structure 94 so as to relieve a load from the surface on which it is supported.

In order to complete the cycle of operation, and retract the extended pistons, the following structure is utilized. The portion 29 is connected to the conduits 30 from each jack structure also a valve structure 117 in co-action with an electro-magnetic solenoid 24 is provided which is connected in parallel to the electrical circuit indicated by conduits 21 and 22 by virtue of switch 19 and the electrical contacts 139 and 140. The structure 29 is similar to that indicated for the valve structure 41, namely, a duplex piston structure 28, having a relieved intermediate body portion 39, and terminating in a stem 27 which is integral with the core of the electro-magnetic solenoid 24. The portion 29 is provided with an opening 31, an opening for connection to the con-

duits 30, and also an opening for connection to the conduit 32 which in turn is connected to the conduit 170 providing fluid pressure for operating the valve portion 117 when the electro-magnetic solenoid 24 is energized.

In order to reverse the operation of the jack structure, it is mandatory to first release the locking means 87 from the indentations 90, then to build up the pressure to cause the jack to be retracted to its uppermost position, then to continue to build up the pressure so as to direct it toward the confines of the housing 50 below the piston 52 operating the rack to rotate the pinion in mesh therewith. The preceding operation will cause the jack structure to be rotated back to, substantially, horizontal position, at the same time causing the retaining means 71 to snap into engagement with the shoulder 70 by virtue of the cam-like portion 177.

The valve section 117 comprises a valve stem 119 having undercut portions 120, 175 and 176. The undercut 175 permits pressure to be built up to force valve 119 to compress the spring 121 and to bring about alignment between conduits 115 and 51, at the same time causing the venting orifice 123 to register with the passage 116. The undercut 176 permits communication of the chamber 50 with exhaust or vent 118 thru conduit 51 to permit rack piston 53 to move downwardly.

30 Complete cycle of operation having special reference to Figure 13

In Figure 13, the complete electro-magnetic valve arrangement for cyclic operation is indicated as embodied in the combination of the solenoids 24 and 25 as heretofore explained, co-acting with the valve structures 41 and 29, the valve structures 58 and 117 together with the plunger structures 83 and the locking structures 87, as well as the keeper 69 cooperating with the retainer structure 71.

The operation of the co-ordinated mechanism illustrated in Figure 13 is as follows: The compressor 34 is operated by the chain or belt drive 33 causing the same to provide sufficient air pressure in the intermediate storage tank 36 which is provided with the proper blow-off, or safety valve 137, thus providing a uniform pressure in the distributing cylinder 38. The said cylinder 38 is connected to the conduit 170 and to the four conduits 136 all of which are connected to electro-magnetic valve structures 41 similar to the one indicated. It is to be noted, when the switch 23 is actuated so as to complete the circuit of the conductors 21, 22 and 138, the circuit being closed, the electro-magnetic solenoid 25 becomes energized, its core being attached to the stem 26 of the valve head 45, will cause the same to be moved in a direction to the right of the full lines indicated in Figure 13 thus closing the vent 23 at the same time compressing the spring 42 and providing communication between the conduit 136 and the conduit 47 thru the chamber of the valve body 41.

It is also to be noted that the fluid pressure will then be distributed in two branches into conduits 57 and 48. To begin with, the fluid pressure will feed thru the conduit 57 which is connected to the valve structure 58 and which permits communication with the conduit 66 by virtue of the undercut shoulder 173 on the valve stem 62, so that the fluid pressure being directed thru the conduits 66 and 67 will be fed into the chamber of the extension 88 and the pressure building up sufficiently will cause the head 72 to be raised

compressing the spring 73 and ejecting the air beyond the head thru the vent or orifice 72, thus causing the retainer extension 71 to be retracted so as to clear the shoulder 70 of the keeper 69. At this time, the pressure continuing to build up under the head 72 which having travelled its maximum distance, will be directed toward the reduced extension 173 building up the pressure to the left of the valve stem 62, causing the same to move to the right expelling whatever air is in the confines of chamber 60 thru the vent 59.

When the valve stem has moved completely to the right compressing the spring 61, the conduit 57 will be caused to communicate with the conduit 78 feeding into the inlet 79 and thru the intermediate connection 80 into the passage 81 bringing the fluid pressure into the confines 82 and causing the plungers 83 to be moved outwardly in turn forcing the extensions 87 from disengagement with the indentations 88 in the piston rod 89. When this is accomplished, the pressure will continue to build up and at the same time the air pressure will also be caused to branch off from the conduit 47 into the conduit 48 connected to the upper portion of the chamber 76 of the cylindrical element 49. The piston 53 therein will be caused to move downwardly. After it has moved down to the bottom into the portion 50 of the chamber in the element 49, the air in the conduit 48 and within the chamber of the element 49 will be directed to the passage 55, and thru the orifice 77, into the conduit 56. Conduit 56 being in communication with the conduit 96 leading up to the top of the opening in the cylinder or jack body 98 and immediately contiguous to the shoulder structure 125 will cause the air pressure to build up in there forcing the piston 94 in a downwardly direction, until the shoulder 124 touches the top of the element 101. Then the passage-way comprised of the sections 93 and 91, intercommunicating by virtue of the interconnecting passage 92, will be brought in alignment with the confines of the chamber 82, while the locking means 88 will be caused to engage the indentations 90 thus maintaining the piston in a downwardly locked position. The foot 105 will then be extended so that the gripper teeth 106 will engage the surface of the support causing the load attached to the jack structure to be raised above the supporting surface. The recessed portion 171 provides articulation and equalization for un-evenness of surface. The air in the chamber portion 50 below the rack portion 53 will be vented thru conduit 51 in communication with chamber 122 and exhausted thru orifice 118.

When the piston is in the upward position prior to its movement downward, the air confined within the cylinder 98 below the piston must be exhausted in order to permit the pressure above the piston entering the conduit 97 to be effective. That is accomplished by the air within the chamber of the body 98 being caused to pass out and up thru the conduit 115. When the valve 119 is in normal position, the outlet 115 is in communication with the conduit 114 connected to the conduit 112, in turn connected to the chamber 111 and to the enlarged area 110, in turn connected to the conduits 30 which are in communication with the air relief or exhaust 31 when the solenoid 24 is in normal or inactive position.

In order to exhaust the pressure holding the locking plungers 83 so as to permit them to approach inwardly in locking engagement of their extensions 87 with the indentations 90, it is necessary to exhaust the air pressure from the chamber

82. Hence when the piston is at its downward position, the passages 93 and 91 communicate with the conduit 116, that is, the passage 93 is in alignment with conduit 116, whereas the passage 91 communicates with the chamber 82 thus permitting the compressed air within that chamber to be exhausted thru the conduit 116. The conduit 116 communicates with the conduit 114 which is connected to passages 112, 111, and 110 in section 109, and ultimately thru the conduit 30 to pass compressed air through the exhaust 31. Air comes in thru the vent holes 86 and 85 respectively to relieve the potential energy of the compressed springs 172 to cause engagement of the locking means 87 with the indentations 90.

After work has been done on the load which had been raised, for example, such as the chassis 15 in this particular instance, it is necessary now to retract and rotate angularly the jack structure in order to permit normal operation of the vehicle. In order to accomplish that, the fluid pressure means is associated cooperatively with another electro-magnetic solenoid 24 which operates in the following manner: When it is desired to complete the cycle of operation, and retract and rotate the jack structure to normal position, the switch 19 is closed thus closing the circuit by virtue of electrical conductors 139, 140, 21 and 22. This action permits the electric current to energize the solenoid 24, the core of which being integrally secured to the stem 27, will cause the valve heads 28 to move to the right compressing the spring 40, thus bringing about communication of the fluid pressure means from the reservoir 38 thru the conduit 107. The conduit 107 being in turn connected thru the conduit 32 to the valve structure 28, by virtue of reduced body 39, furnishes communication between the conduits 32 and 30. The conduit 30 causes the air pressure to build up within the confines of the passages of the areas 110 and 111, communicating with the passage-way or conduit 112, which branches off in two directions, namely, the conduits 113 and 114 connected to the valve structure 117. The fluid under pressure is then caused to pass thru the conduit 113 and also thru the conduit 114, which is in communication with the conduits 115 and 116, causing air pressure to come thru 115 directly below the piston and simultaneously therewith causing air pressure to be built up thru the conduit 116. The air pressure communicating thru the passages 93, 92 and 91 into the confines 82, causes the locking pins 87 to be disengaged from the indentations 90 preparatory to retraction of the piston. The pressure then continues to build up thru conduit 115 causing the piston to return to the upward position, and at the same time causing the air above the piston to be evacuated thru the passage 97. The passage 97 communicating thru the passage 96 and thru the confines 60 of the valve structures 58 ultimately exhausts the air above the piston thru the orifice 59.

As soon as the piston has reached the top, and the pressure continues to build up within the confines of the conduits 116 and 115, and since both said conduits are in communication with passage 114 by virtue of undercut 120, the spring 121 is further compressed by movement of plunger valve stem 119 in the chamber 122, ultimately causing the passage 115 to establish communication with the passage 51. The passage 51 in turn communicates, thru the opening 75, with the bottom 50 of the chamber within the element 49, whereby the piston 52 is caused to move upwardly, thus rotating the jack structure an angu-

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lar or arcuate distance of 90°. At this stage the retainer plunger 71, by virtue of the cam structure 177, is caused to be compressed and released, then brought to rest on the shoulder 70 of keeper means 69. The vent 118 permits free operation for valve 119.

The switches 23 are to be open when the switch 19 is operated, and vice versa when the switch 19 is open the switches 23 are closed.

Before the angular, or arcuate movement of the jack to inoperative position, chambers 82 are vented through passages 78, 56, 77, 55, 54, 48, 47 and port 43. Thus the extensions 87 of the plungers 83 will be ready to engage the indentations 88 when the piston rod 89 is completely retracted to normal position. The air in chamber section 76 above the rack piston 53 is evacuated thru the vented means 43 in the valve 41.

Tho, it has not been indicated, yet it is to be clearly understood that the piston and piston rod structure is to be keyed by a feather key arrangement to prevent rotation thereof as it is highly essential that the h passages remain in the same position for alignment, particularly with the conduits 78 and 116.

Altho, I have, herein, elucidated in rather succinct terms the nature of the construction and operation of my electromagnetically controlled fluid pressure lifting jack mechanism, and inasmuch as, the same is susceptible of many modifications, alterations, and improvements, I hereby reserve the right to all such alterations, and improvements coming within the scope and spirit of my invention, or those embraced suggestively or impliedly within the representation of the accompanying drawing, as well as those falling within the purview of the foregoing description; my invention to be limited only by the subjoined claims.

Having thus described and revealed my invention, what I claim as novel and desire to secure by Letters Patent, is:

1. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, and electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means.

2. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector

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of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted position, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, and secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation.

3. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted position, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, and thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, and secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means.

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4. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted position, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, and thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, and secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, the said keeper means being provided with cam means adapted to cause engagement automatically of the said retainer means with the said keeper means simultaneously with the completion of the cycle of operation.

5. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, equalizer foot support means secured to the terminus of the said jack piston, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from

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a source of supply to the said valve means and to the said fluid operable rack and pinion means, rack means having one end thereof secured to the said equalizer foot support means, its other end being slidably secured to the outer portion of said jack body, and duplex pawl means articulately secured to the said jack body adapted to alternately engage the said rack means to safeguard the load against damage upon failure of the fluid pressure system.

6. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, equalizer foot support means secured to the terminus of the said jack piston, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, rack means having one end thereof secured to the said equalizer foot support means, its other end being slidably secured to the outer portion of said jack body, and duplex pawl means articulately secured to the said jack body adapted to alternately engage the said rack means to safeguard the load against damage upon failure of the fluid pressure system.

7. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said

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retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, and secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means.

8. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, the said keeper means being provided with cam means adapted to cause engagement automatically of the said retainer means with the said keeper means simultaneously with the completion of the cycle of operation, rack means having one end thereof secured to the said equalizer foot support means its other end being slidably secured to the outer portion of said jack body, and duplex pawl means articulately secured to the said jack body adapted to alternately engage the said rack means to safeguard the load against

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damage upon failure of the fluid pressure system.

9. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said piston in extended and retracted position, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, and venting means provided within said jack body communicating with the said valve means to permit exhaustion of the air within the said jack body.

10. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, venting means provided within the said jack body communicating with the said secondary valve means and the said electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being moti-

vated to extended position, and secondary venting means provided within the said jack body communicating with the said first mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

11. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly, to cause the accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, venting means provided within the said jack body communicating with the said secondary valve means and the said secondary electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being motivated to extended position, and secondary venting means provided within the said jack body communicating with the said first mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

12. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated

with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passing of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, the said keeper means being provided with cam means adapted to cause engagement automatically of the said retainer means with the said keeper means simultaneously with the completion of the cycle of operation, venting means provided within the said jack body communicating with the said secondary valve means and the said secondary electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being motivated to extended position, and secondary venting means provided within the said jack body communicating with the said first mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

13. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, equalizer foot support means secured to the terminus of the said jack piston, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston in extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, rack means having one end thereof secured to the said equalizer foot support means, its other end being slidably secured to the outer portion of said rack body, duplex pawl means articulately

secured to the said jack body adapted to alternately engage the said rack means to safeguard the load against damage upon failure of the fluid pressure system, venting means provided within the said jack body communicating with the said secondary valve means and the said secondary electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being motivated to extended position, and secondary venting means provided within the said jack body communicating with the said first mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

14. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, equalizer foot support means secured to the terminus of the said jack piston, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, rack means having one end thereof secured to the said equalizer foot support means, its other end being slidably secured to the outer portion of said jack body, duplex pawl means articulately secured to the said jack body adapted to alternately engage the said rack means to safeguard the load against damage upon failure of the fluid pressure system, venting means provided within the said jack body communicating with the said secondary valve means and the said secondary electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being motivated to extended position, and secondary venting means provided within the said jack body communicating with the said first mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

15. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector

of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured to the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted position, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, venting means provided within the said jack body communicating with the said secondary valve means and the said secondary electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being motivated to extended position, and secondary venting means provided within the said jack body communicating with the said first-mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

16. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, equalizer foot support means secured to the terminus of the said jack piston, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-mag-

netic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, the said keeper means being provided with cam means adapted to cause engagement automatically of the said retainer means with the said keeper means simultaneously with the completion of the cycle of operation, rack means having one end thereof secured to the said equalizer foot support means, its other end being slidably secured to the outer portion of said jack body, duplex pawl means articulately secured to the said jack body adapted to alternately engage the said rack means to safeguard the load against damage upon failure of the fluid pressure system, venting means provided within the said jack body communicating with the said secondary valve means and the said electro-magnetic valve means to permit exhaustion of the air within the said jack body while the said jack piston is being motivated to extended position, and secondary venting means provided within the said jack body communicating with the said first mentioned valve means to permit exhaustion of the air within the said jack body while the said jack piston is being retracted to normal position.

17. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, and venting means provided within the said jack body and the said jack piston and communicating with the said piston locking means and the said valve means to permit exhaustion of fluid pressure freeing the said piston

locking means for engagement with the said jack piston.

18. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured within the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, primary valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the passage of said fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, and venting means provided within the said jack body and the said jack piston and communicating with the said piston locking means and the said primary valve means to permit exhaustion of fluid pressure freeing the said piston locking means for engagement with the said jack piston.

19. A fluid jack mechanism comprising, a bracket secured to a load to be raised, a jack body articulately secured to the said bracket and adapted to be motivated thru an arcuate sector of substantially 90°, fluid operable rack and pinion means secured within the said jack body and adapted to motivate the said jack body thru an arcuate sector of substantially 90°, a jack piston telescopically secured to the said jack body and adapted to be extended and retracted with respect thereto, piston locking means secured to the said jack body and adapted to lock releasably the said jack piston in extended and retracted positions, keeper means secured to the said load to be raised, retainer means secured to the said jack body adapted to engage releasably the said keeper means, primary valve means associated with the said jack body adapted to cause fluid pressure passing therethru to initially disengage the said retainer means from the said keeper means, secondly to cause accumulated fluid pressure to release the said piston locking means, and ultimately to cause the accumulated fluid pressure to motivate the said jack piston to extended position, electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said valve means and to the said fluid operable rack and pinion means, secondary valve means associated

with the said jack body adapted to cause fluid pressure to initially release the said piston locking means, secondly to cause fluid pressure to retract the said jack piston, thirdly to return the said fluid operable rack and pinion means to normal position completing the cycle of operation, secondary electro-magnetic valve means controllable remotely with respect to the said jack body and adapted to control the fluid pressure from a source of supply to the said secondary valve means and to the said fluid operable rack and pinion means, and venting means provided within the said jack body and the said jack piston and communicating with the said piston locking means and the said primary valve means to permit exhaustion of fluid pressure freeing the said piston locking means for engagement with the said jack piston.

EDWARD J. CHAMBERS.

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