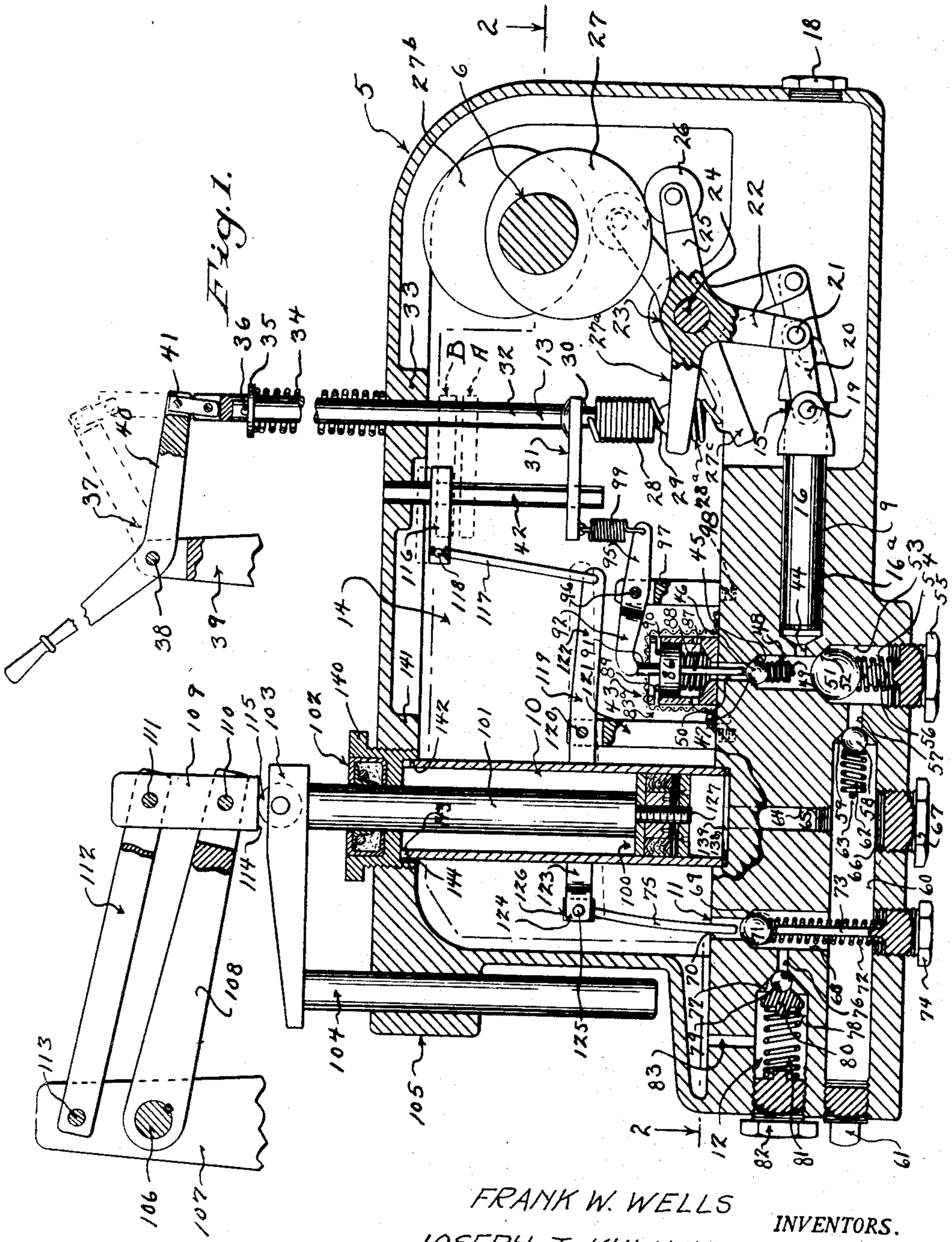
Nov. 17, 1953 F. W. WELLS ET AL 2,659,308

POWER LIFT

Original Filed Feb. 27, 1942 3 Sheets-Sheet 1

Fig. 1.



FRANK W. WELLS
JOSEPH T. KULHAVY
INVENTORS.
BY
Emerson B Donnell
ATT'Y.

Nov. 17, 1953

F. W. WELLS ET AL

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3 Sheets-Sheet 2

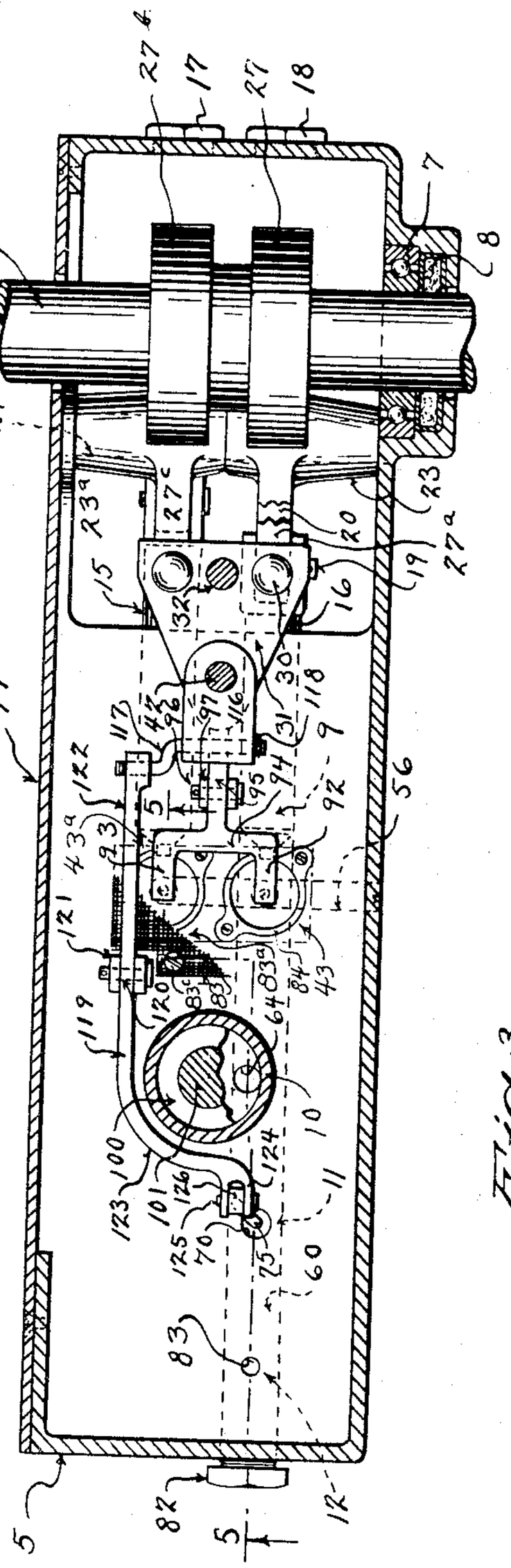

Fig. 2.

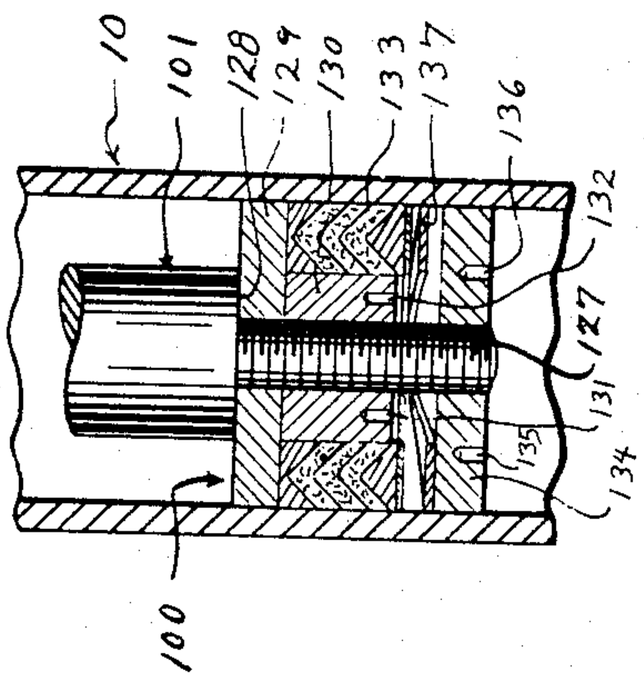

Fig. 4.

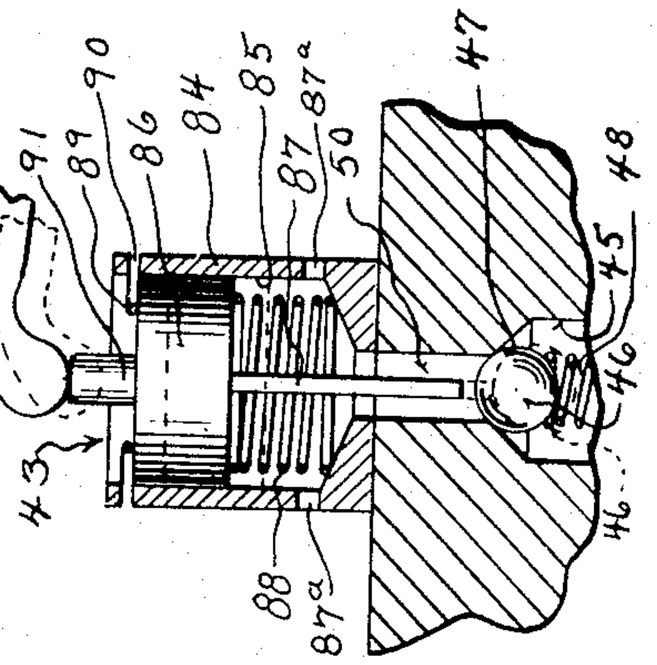

Fig. 3.

FRANK W. WELLS
JOSEPH T. KULHAVY
INVENTORS.

BY

Emerson B Donnell
ATT'Y.

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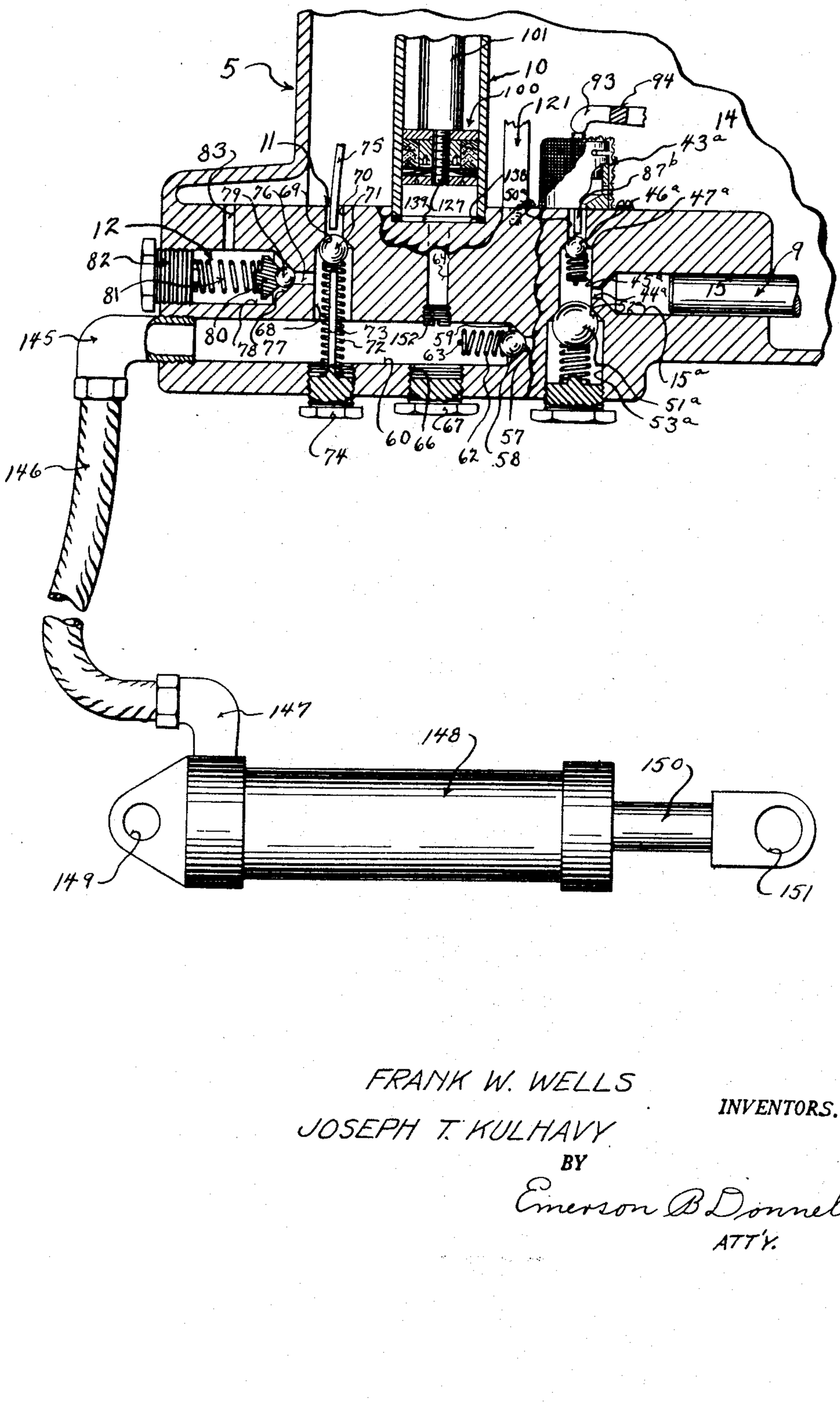
Fig. 5.



FRANK W. WELLS
JOSEPH T. KULHAVY
INVENTORS.

BY

Emerson B Donnell
ATT'Y.

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2,659,308

UNITED STATES PATENT OFFICE

2,659,308

POWER LIFT

Frank W. Wells, Pasadena, Calif., and Joseph T. Kulhavy, Rock Island, Ill., assignors to J. I. Case Company, Racine, Wis., a corporation of Wisconsin

Original application February 27, 1942, Serial No. 432,670. Divided and this application October 4, 1947, Serial No. 777,994

4 Claims. (Cl. 103—23)

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The present invention relates to power lift apparatus and particularly to such apparatus as is adapted for application to tractors. This application is a division of a co-pending application, Serial No. 432,670, filed February 27, 1942 and allowed April 9, 1947, now Patent Number 2,430,197.

An object of the invention is to generally improve the construction and operation of devices of this class. More particularly the invention relates to power lifts which are actuated by fluid pressure and a further object of the invention is to provide such a power lift operating upon a new and novel principle.

A further object of the invention is to provide expedients for the accomplishment of the novel objects.

Further objects are to provide such a power lift having a pump which operates only while power lifting operation is actually in progress and which is entirely stationary at other times; such a power lift which while subject to manual control at any point in its cycle nevertheless will cease operation at a predetermined point regardless of the actuation of the manual control; such a power lift in which implements or objects lifted by the power lift may be held at any point in the lifting movement or in the lowering movement; and such a construction in which undue wear on the parts is virtually eliminated.

A further object is to devise such a power lift providing a permanently located lifting element, but which is adapted to have one or more additional lifting elements at a distance from said location.

A further object is to provide such a power lift which may be actuated from any convenient power shaft normally in the tractor for another purpose.

Further objects and advantages of the invention will become apparent from a consideration of the following detailed description taken in connection with the accompanying drawings wherein a satisfactory embodiment of the invention is shown. However, it is to be understood that the invention is not limited to the details disclosed but includes all such variations and modifications as fall within the spirit of the invention as herein expressed. In the annexed drawings

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Figure 1 is a vertical sectional view of an illustrative embodiment of the invention.

Fig. 2 is a sectional view taken on the line 2—2 of Fig. 1 with parts broken away.

Fig. 3 is an enlarged detail of certain mechanism indicated in Fig. 1.

Fig. 4 is a similar view of another portion of Fig. 1.

Fig. 5 is a view of a part of the structure shown in Fig. 1, taken on the line 5—5 of Fig. 2, and showing a modified arrangement.

As seen in Fig. 1, the invention comprises a casing or housing 5 which may be bolted or otherwise fixed on a tractor (not shown) in any convenient location to become a part thereof. Housing 5 serves to enclose the mechanism of the power lift proper and also as a reservoir for fluid. A shaft 6 which may be, for example, a power take-off shaft extending from the tractor in any convenient or well-known location, traverses housing 5 and is supported therein in anti-friction or other suitable bearings as 7, an oil seal 8 of suitable or well-known type being provided for the usual purposes, it being desirable to locate housing 5 at such a point on the tractor that one of the well-known externally projecting power shafts commonly provided will pass through the housing 5 to serve as shaft 6. Shaft 6 actuates a pump unit generally designated as 9 which forces fluid from reservoir 5, when desired, into a ram cylinder 10 for accomplishing the usual purpose of a power lift, the fluid returning to reservoir 5 through an outlet valve generally designated as 11 when it is desired to lower the implements or objects connected with the lift. In the event that excessive pressure is developed for any reason by the action of pump 9, this is relieved by a relief valve generally designated as 12 and control means generally designated as 13 operate to start and stop the actuation of pump 9 by shaft 6 and also to actuate outlet valve 11, control means 13 being adapted to automatically return to a neutral position whenever released, whereupon pump 9 stops and any implement connected with the power lift remains in status quo.

Returning to a more detailed description of the construction, housing 5 comprises a shell-like member or casting having an open side

closed by a cover plate 14 which may be removed for access to the interior.

Most of the operative parts are supported on and carried by housing 5. For example, pump 9, in the present instance comprises plungers 15 and 16, Fig. 2, reciprocable in suitable bores in housing 5, in the present instance in a substantially horizontal position. The bores 15*a* and 16*a* for plungers 15 and 16 may be formed through suitable openings in housing 5 closed by plugs 17 and 18. Since plungers 15 and 16 are identical in function and construction, only one will be described in detail.

As seen in Fig. 1, plunger 16 has pivotally connected thereto as by a pin 19, a link 20 in turn pivotally connected as by a pin 21 with an arm 22 of a bell crank generally designated as 23. Bell crank 23 is journaled on a shaft 24 supported in housing 5 in any suitable manner and has an arm 25 carrying a roller 26 which may engage a cam element, eccentric, or other reciprocating or pulsating mechanism 27 fixed with above mentioned shaft 6. Other suitable or well-known cam follower means is contemplated as equivalent to roller 26 and the invention is not to be taken as limited to the use of a roller, or in fact in any manner except as defined in the claims. Bell crank 23 also has an arm 27*a* to which is connected in the present instance a spring 28 by an anchorage 29 of a character such that spring 28 may exert a downward or an upward force against arm 27*a* at will. A similar anchorage 30 is provided for the opposite end of spring 28 to connect the same to above mentioned control means 13, the function of which will be more easily understood after the hydraulic circuit is described. As shown in Fig. 1, spring 28 is in compression and tends to rotate bell crank 23 in a counter-clockwise direction. Rotation of shaft 6, as will be apparent, repeatedly rocks bell crank 23 in a clockwise direction against the compression of spring 28, the expansion of the spring causing the return movement of bell crank 23 so that roller 26 will follow cam member 27. This causes reciprocating or pumping movement of plunger 16 as will be apparent.

Anchorage 30 is fixed with a plate 31 which is fixedly connected with a rod 32 forming a part of control means 13 and extending upwardly through a guide portion 33 in housing 5. Rod 32 in the present instance has a spring 34 compressed between housing 5 and an abutment 35, fixed relatively to the rod by a pin or other suitable means 36. In the position of the parts shown, spring 34 has been overcome by the clockwise rotation of a hand lever generally designated as 37 fulcrumed at 38 on an anchorage 39 supported on the tractor at any desired or convenient point. Lever 37 has an arm 40 pivotally connected by a link or other appropriate means 41 with above mentioned rod 32. Spring 34 is so proportioned as to raise rod 32 upon release of lever 37, plate 31 sliding upwardly on a guide rod 42, fixed within housing 5, to dotted position A at which point spring 28 is no longer in compression but is in tension. Plunger 16 upon completion of a stroke by action of cam 27 on bell crank 23, will take a position at its innermost point in bore 16*a* and will remain stationary and pump no more fluid.

Plunger 15 is actuated in the present instance in an identically similar manner from a cam 27*b* actuating a bell crank 23*a* identical with bell crank 23, and the parts being returned by

a spring 28*a* connected to an arm 27*c* on bell crank 23*a*. Plunger 15, of course, also goes out of operation as above mentioned, and the action of pump 9 ceases.

The innermost position taken by plunger 16 will be such that cam 27 may lightly contact roller 26 upon each revolution of shaft 6, resulting in a slight ticking sound and possibly unnecessary wear on the parts. This may be avoided by any means allowing the escape of fluid from bores 15*a* and 16*a*, in the present instance valve unseating devices generally designated as 43—43*a*.

For a full understanding of this expedient, it is necessary to describe the fluid passageways at this point. A bore 44 extends from above mentioned cylinder bore 16*a* into a bore 45 constituting a pump valve chamber. Bore 45 has therein an intake valve in the present instance in the form of a ball 46 seated against a shoulder 47 by means of a spring 48 engaged between the ball and an abutment 49 of any suitable type. Shoulder 47 is defined between above mentioned bore 45 and a bore 50 forming the intake port for valve 46. An outlet or exhaust valve 51 is seated against a shoulder 52 defined between above mentioned bore 45 and a bore 53. Ball 51 is maintained against its seat by a spring 54 compressed between ball 51 and a plug 55 threaded or otherwise secured in bore 51.

It will be understood that a precisely similar arrangement is associated with above mentioned plunger 15, an inlet valve 46*a*, Fig. 5, being seated against a shoulder 47*a* formed between a bore 45*a* and a bore 50*a*, and an outlet valve 51*a* being seated against a shoulder 52*a* formed between bore 45*a* and a bore 53*a*, constituting an outlet chamber for pump cylinder 15*a*. Outlet chamber 53*a* corresponding to bore 53 is communicated or connected with bore 53 by a bore 56. A two-cylinder single acting pump is therefore provided by the utilization of connecting passageways, drilled or otherwise suitably formed in a portion of the wall of housing 5.

In the present instance leading from bore 51 is a bore 57. A non-return or check-valve 59 is seated on a shoulder 59 defined between above mentioned bore 57 and a bore 60 leading to the exterior of housing 5 and the end of which is closed in the present instance by a removable plug or the like 61. Valve 58 is seated by means of a spring 62 compressed between the valve and an abutment 63 of any suitable type.

A bore 64 leads upwardly from bore 60 into above mentioned ram cylinder 10 and in the present instance is threaded at 65 to provide for blocking of the bore when desired, and a bore 66 opposite bore 64 is closed by a plug 67 upon the removal of which access may be had to threaded portion 65 of bore 64.

It will now be apparent that reciprocating movement of plunger 16 will cause pumping of fluid inwardly through bore 50 past valve 46 and expelling of fluid past valves 51 and 58 into bore 60 and thence through bore 64 into ram cylinder 10.

In the present illustrative embodiment, a bore 68 leads upwardly out of above mentioned bore 60 and defines a shoulder 69 between itself and a bore 70. An outlet valve 71 is seated against shoulder 69 by a spring 72 encompassing a pin 73 or extension of an adjusting screw 74 threaded into housing 5. Valve 71 accordingly normally remains seated on shoulder 69 and prevents escape of fluid from bores 68 and 60. Ball 71, how-

ever, may be unseated by a finger **75** as will be presently apparent.

Relief valve **12** operates from bore **68** as follows: A bore **76** extends from bore **68** defining a shoulder **77** between itself and a bore **78** extending to the exterior of housing **5**. A ball valve **79** is seated against shoulder **77** by a fitting **80**, a spring **81**, and a screw **82**, in the present instance threaded in housing **5**. In this manner a relatively high unit pressure may be secured against a valve having a relatively small area exposed to fluid pressure. A bore **83** leads from bore **78** into the interior of housing or reservoir **5**. Thus in the event excessive pressure is developed by pump **9**, ball **79** will be forced away from shoulder **77** and fluid will escape through bores **76** and **83** and return to reservoir **5**. In the present instance, spring **81** is so compressed that this will occur normally when the desired limit of power lift movement is reached until such time as lever **37** is released.

A box like element **83***a* is preferably disposed over elements **43** and **43***a*, being fixed to housing **5** by flange **83***b* clamped by a screw or the like **83***c*, and having its walls made of screen material.

By virtue of the fact that fluid is pumped only during the time that lifting is actually being accomplished, there is no difficulty from heating of the fluid, and as a result, pump **9** and cylinder **10** may be made substantially larger in volumetric capacity than would be the case with any kind of a continuously pumping hydraulic circuit. As a result the present lift will perform a given lifting task with a correspondingly smaller fluid pressure than power lifts of known type. The pressure at which relief valve **12** is set to open need not be greatly in excess of the maximum pressure necessary to perform the work of the lift, and in no case is it sufficiently high to cause any undue stress in the parts. Thus, while valve **12** operates as an emergency relief valve, it is not exclusively an emergency valve, and actually operates for a short time each time the lift is operated. This tends to keep it in good operating condition so that it will not fail in case an emergency does arise. Furthermore, owing to the relatively low working pressure, no undue heating of the fluid will occur even if the relief valve operates longer than normal, as in the case of an inexperienced operator's holding lever **37** in the working position after the power lift has completed its lifting stroke.

Screw **82** may be adjusted to arrive at the desired degree of compression of spring **81**. Also screw **74** may be adjusted to provide for a desired amount of clearance between pin **73** and valve **71** so that the degree of opening of valve **71** may be positively controlled. In this way the return or dropping of implements or other objects acted upon by the power lift may be definitely predetermined, as will appear.

Returning to unseating device **43**, as more particularly shown in Fig. 3, the device comprises a shell **84** having a large bore **85** within which is reciprocable a guide portion **86** of an unseating pin **87**. Inlet bores **87***a*—**87***a* provide for entrance of fluid into the shell and accordingly into bore **50**. Guide portion **86** is forced upwardly by a spring **88** against a stop **89** of any suitable type, in the present instance anchored in a slot or slots **90** in shell **84**. Guide **86** has an abutment **91** extending upwardly for actuation by a finger **92**. Finger **92** presses downwardly upon abutment **91** forcing the parts to the dotted position shown

whereupon valve **46** is forced away from shoulder **47** thereby relieving the pressure in pump cylinder bore **16***a*, as will be apparent from Fig. 1.

Finger **92** has a counterpart **93**, the two being united by a portion **94** connected with a lever **95**. Lever **95** is fulcrumed on a pin **96** carried on a support **97** threaded or otherwise anchored in housing **5** as at **98**.

Lever **95** is actuated by a tension spring **99** connected between lever **95** and above mentioned plate **31** in any suitable manner. As will now be apparent, when lever **37** is released, spring **34** will expand, raising rod **32** and causing a tension in spring **28**, and also a tension in spring **99**. This will rock lever **95** and fingers **92** and **93** in a counter-clockwise direction as seen in Fig. 1, thereby pushing down unseating pin **87** and its companion pin **87***b*, Fig. 5, associated with plunger **15**. The several springs **34**, **28**, **28***a*, **99**, **88**, **88***a*, **48**, and **48***a* are so proportioned that springs **28**, **28***a* and **99** will be tensioned and springs **88**, **88***a*, **48**, and **48***a* will be compressed by the expansion of spring **34** when lever **37** is released, and plate **31** takes position "A." Pressure in the pump cylinders will be released and the tension in spring **28** will produce the extreme inward position of plunger **16**, the same thing happening in plunger **15** as will be understood. This removes bell cranks **23** and **23***a* from the path of movement of cams **27** and **27***b* and avoids any movement of the pump parts from the rotation of shaft **6**.

Ram cylinder **10** has a piston therein generally designated as **100** having a rod **101** extending upwardly through a suitable oil retainer of any well-known type **102**. A head **103** is fixed to rod **101** and extends to one side where it is fixed with a guide rod **104**, slidable in a guide portion **105** in the present instance forming part of housing **5**. In this manner piston **100** is definitely guided independently of cylinder **10** so that any side thrust reaction occasioned by implements connected to be lifted or the like is taken by guide rod **104** rather than the walls of cylinder **10**. Undue wear of the cylinder is thereby eliminated.

To minimize such side thrust, a connection to elements to be lifted is provided in the present instance in the form of a rock shaft **106** journaled in a suitable bearing **107** fixed with the tractor. Any well-known connection from rock shaft **106** to the various implements which it is desired to lift may be provided as will readily be understood by one skilled in the art. Rock shaft **106** has a bifurcated arm **108** extending to a region above piston rod **101** at which point it is pivotally connected with a thrust block **109** by a pin or the like **110**. Thrust block **109** is pivotally connected as by a pin **111** with a bifurcated or suitable guide arm **112** pivoted at **113** in the present instance to above mentioned bearing **107**. Thrust block **109** has a face **114** preferably at right angles to piston rod **101** and head **103** is provided with an anti-friction abutment, for example, a roller **115** in contact with face **114**.

In the present arrangement, pivots **110** and **111** are disposed in a plane parallel to rod **101**. Rock shaft **106** and pivot **113** are also disposed in a plane parallel to shaft **101**, arm **108** and guide arm **112** being of equal length. Consequently, during swinging movement of arm **106** and guide arm **112**, block **109** will in all positions remain parallel to rod **101**. Therefore, since face **114** is at substantially right angles to rod **101**, the reaction on rod **101** will always be axial to the

rod and no side thrust will be developed by the rod 101 against block 109. Any side thrust developed by friction roller 115 is taken up by guide rod 104. Other arrangements which will insure that face 114 will remain perpendicular to rod 101 are contemplated as within the scope of the invention.

It will now be apparent that clockwise movement of lever 37 will compress springs 34 and 28 and relax springs 99, 88, 48, etc., thereby releasing intake valves 46 and 46a to close, and retracting plungers 14 and 16. If shaft 6 is rotating, plungers 15 and 16 will be reciprocated by cams 27 and 27b and fluid will be pumped through passageway 60 into cylinder 10. This will raise piston 100 and rod 101 and block 109, rocking arm 108 and a rock shaft 105 in a counterclockwise direction. This action will continue as long as lever 37 is held in the above position, but will stop immediately if lever 37 is released, piston 100 being held in whatever position it has reached by a closing of non-return valve 58. If lever 37 is not released, but continues to be held, pump 9 will continue to run until piston 100 reaches the limit of its movement whereupon pressure in the several passageways will rise to a point to force valve 79 to open against spring 81, whereupon the fluid pumped will be returned through bore 83 to reservoir 5. The operator holds lever 37 until this condition occurs, which ordinarily takes only a few seconds, and no complications such as a cyclic clutch trip valve, or other expedients are necessary. Also, as above suggested, if for any reason the operator does not desire to lift the implements to their full extent, he may release lever 37 at any time during the upward movement, whereupon the parts will remain in the position attained.

Lever 37 also functions to allow the implements to drop as follows:

Above mentioned guide rod 42 has a slide block 116 adjacent the upper end thereof, connected by a link 117 pivoted to the block at 118, and connected with a lever generally designated as 119. Lever 119 is fulcrumed at 120 on a standard or support 121, fixed in any suitable manner with housing 5. Lever 119 has an arm 122 connected with link 117 and also an arm 123 in the present instance bending about cylinder 10. Arm 123 is preferably, although not necessarily, bifurcated at 124 and has a pin 125 pivotally connected to a block 126, carrying above mentioned finger 75.

It will be noted that in position "A" of plate 31, slide block 116 is unaffected. However, counter-clockwise movement of lever 37 beyond the position attained by merely releasing the lever will move plate 31 to position "B." This is permitted by further extension of springs 28, 28a and 99. Plate 31 in position "B" raises slide block 116 and rocks lever 119 in a counter-clockwise direction by means of link 117. This pushes down on finger 75 and unseats ball valve 74 to the extent determined by the position of lever 37, or permitted by pin 73. Fluid in cylinder 10 therefore escapes from cylinder 10 through bores 64, 60, 68 and 70, allowing piston 100 to fall at the rate determined by the adjustment of screw 74, which as above noted, governs the degree of opening of valve 71 by pin 73.

As in the case of the raising movement of piston 100 and the attached parts, this lowering movement may be arrested at any desired point by merely releasing lever 37. Plate 31 immediately returns to position "A" closing valve 71.

Since pump 9 is inoperative, in this position, piston 100 does not move either way.

Returning to a further description of certain mechanical details, piston 100, as more particularly shown in Fig. 4, is assembled in a stem portion 127, extending downwardly from above mentioned rod 101 and defining a shoulder 128. A plate 129 of suitable material, such for example as soft metal, rests against shoulder 128 and guides the piston within the wall of cylinder 110 and is locked in place against shoulder 128 in the present instance by a lock nut 130, nut 130 being threaded on stem 127, and provided with openings 131 and 132, for reception of a spanner or other tool for adjusting it. Disposed about lock nut 130 is a hydraulic packing assembly generally designated as 133 and preferably, although not necessarily, of the type known in the trade as "Chevron" packing. A lock nut 134 is also threaded on stem 127 for compressing packing 133 and has openings 135 and 136 to be engaged by a spanner or other suitable instrument for tightening the nut. Nut 134 exerts its pressure against packing 133 through a washer 137 of spring metal or the like and having an offset configuration, such that it is resiliently yieldable under pressure of nut 134. Therefore, washer 137 will follow up any shrinkage or normal wear of packing 133 so that it will remain tight during long periods of operation without adjustment.

Cylinder 10 may be secured in housing 5 in any suitable or desired manner, in the present instance the cylinder being seated against a gasket 138 in a counter-bore 139 by means of a nut 140 threaded in a boss 141 in housing 5. Nut 140 carries above mentioned oil retainer 102 and preferably has a bore 142 for receiving the upper end of cylinder 10. Cylinder 10 has a notch or opening 143 communicating with a clearance 144 provided in bore 142 for communication of the space above piston 100 with the interior of housing 5. This relieves any pressure or partial vacuum which might otherwise form above piston 100.

The modification shown in Fig. 5 is designed to be used for such purposes as would not be conveniently served by the location of ram cylinder 10 and piston rod 101 in or on housing 5, the pump and control means disclosed serving as a part of its function to control a similar ram cylinder at a distance from said housing 5. Examples of such use might be where a snow plow, or the like, was mounted in an overhanging position in front of the tractor. Such a plow could be controlled by lever 37 as follows. Plug 61, Fig. 1, is removed and in its place is inserted a fitting or portion 145, Fig. 5, of a flexible or suitable conduit 146 which leads to the desired point of operation. Conduit 146 is connected preferably at 147 to a ram cylinder generally designated as 148 which may be constructed along the lines of above mentioned ram cylinders 10 and 100, although any other suitable or well-known construction of ram is considered as within the scope of the invention. In the present instance ram 148 is provided with an anchorage 149, a piston rod 150 and a clevis or other suitable connecting means 151. Cylinder 148 is anchored by means of portion 149 on any convenient part of the structure and clevis 151 is connected with a portion of the structure where it is desired to have movement relative to the part to which 149 is fastened. Actuation of lever 137 will then cause actuation of piston rod 150 relatively to cylinder 148 in the manner above described in the case of piston rod 101, and the attached imple-

ment or parts will be controlled in the same manner.

In fact cylinder 148 need not necessarily be located on the tractor within the present invention, but might be for example on an implement drawn by the tractor and which had a part which was desired to be raised and lowered or otherwise adjusted by the operator on the tractor.

When cylinder 148 is in use, if it is desired that cylinder 10 shall become inoperative, plug 67 may be removed and a plug 152 may be inserted in above mentioned threaded portion 65, whereupon cylinder 10 will be blocked from passageway 60. With plug 67 replaced, cylinder 148 and piston rod 150 alone will respond to the control of lever 37.

It is thought the operation of the above described construction will be clearly apparent from the foregoing, it being noted that pump 9 operates only while lifting is actually in progress; that implements or other parts subject to the control of the device may be locked at any stage in the movement in either direction without other attention than to release the control levers; that no damaging side thrust is exerted on piston rod 101 to cause undue wear of cylinder 10 and that there is no danger of accidents to the mechanism in the event that movement is blocked for any reason or that pump 9 is allowed to operate too long through inattention or otherwise.

As to actual manipulation of the mechanism, no attention need be paid to the unit until it is desired, for example, to raise an implement carried by the tractor, all the power lift parts being completely at rest and subject to no wear (assuming shaft 6 to be in the tractor for another purpose, such as a power take-off or a belt pulley shaft). When it is desired to lift an implement, lever 37 is grasped and raised or rotated clockwise as seen in Fig. 1. Pump 9 immediately goes into action and extends ram piston rod 101, thus lifting the implement through appropriate connections from rock shaft 6. No particular attention need be paid this operation, since when the implement has reached its uppermost position, further movement of piston 100 will be blocked by plug 140 or by implements or other connected load, and fluid being pumped will escape through valve 12. The operator releases lever 37 when the implement is obviously at its uppermost position, when it is held there by the accumulation of fluid under piston 100. If the operator does not wish the implement to move to its uppermost position, he may release lever 37 at any time during the upward travel when the implement will be held in the new position. This is so because fluid cannot return to pump 9 because of non-return valve 58. Of course, the fluid could not get back to the pump cylinder because of outlet valves 51 and 51*a*, but non-return valve 53 makes it all the more certain that the fluid will be positively retained and prevent the implements from gradually returning to lowered position.

When it is desired to lower the implement, the operator presses down on lever 37, or rotates it counter-clockwise, as seen in Fig. 1, whereupon outlet valve 71 is opened, allowing escape of fluid from cylinder 10, and dropping of the implement.

As above noted, this movement may also be arrested at any desired point by releasing lever 37 if it is not desired to lower the implement to its full extent. Both of these conditions also apply to cylinder 148, in Fig. 5.

As above noted, the rate that the implement drops, may be regulated by adjusting screw 74, to determine the clearance between valve 71 and the end of pin 73.

The above being a complete description of an illustrative embodiment of the invention, what is claimed as new and desired to be secured by Letters Patent of the United States is:

1. In a power lift construction, means providing a fluid passageway, a valve element seated in said passageway for controlling the flow of fluid therethrough, a shell having a bore communicating with said passageway and co-axial therewith, an unseating element comprising a guide portion slidable in said bore, and having an unseating pin extending into said passageway and terminating adjacent said valve element, means providing for passage of fluid past said guide portion, an abutment on said guide portion protruding from said bore, resilient means in said bore contacting said guide portion and urging said pin in a direction away from said valve element, means to prevent removal of said unseating element from said bore, a perforate enclosure surrounding said shell and provided with an aperture for said abutment in the perforate portion thereof, and means outside said enclosure to depress said abutment to effect unseating of said valve by said unseating pin.

2. In a power lift construction, means providing a fluid passageway, a valve element seated in said passageway for controlling the flow of fluid therethrough, a shell having a bore communicating with said passageway, an unseating element comprising a guide portion slidable in said bore, and having an unseating pin extending into said passageway and terminating adjacent said valve element, an abutment on said guide portion protruding from said bore, resilient means in said bore, contacting said guide portion and urging said pin in a direction away from said valve element, means to prevent inadvertent removal of said unseating element from said bore, a screen surrounding said shell and said screen being provided with an aperture for said abutment and means exteriorly of said screen to depress said unseating element to effect unseating of said valve by said unseating pin.

3. In a power lift construction, means providing a fluid passageway, a valve element seated in said passageway for controlling the flow of fluid therethrough, a shell having a bore communicating with said passageway, an unseating pin extending into said passageway, an abutment on said guide portion protruding from said bore, resilient means in said bore, contacting said guide portion and urging said pin in a direction away from said valve element, means to prevent removal of said unseating element from said bore, a perforate enclosure surrounding said shell and provided with an aperture for said abutment in the perforate portion thereof, and means to depress said abutment to effect unseating of said valve by said unseating pin.

4. In a power lift construction, means providing a fluid passageway, a valve element seated in said passageway for controlling the flow of fluid therethrough, a shell having a bore communicating with said passageway, an unseating element comprising a guide portion slidable in said bore, and having an unseating pin extending into said passageway and terminating adjacent said valve element, an abutment on said guide portion protruding from said bore, resilient means in said

bore, contacting said guide portion and urging said pin in a direction away from said valve element, means to retain said unseating element in said bore, a perforate enclosure surrounding said shell and provided with an aperture for said abutment in the perforate portion thereof, and means to depress said abutment to effect unseating of said valve by said unseating pin.

FRANK W. WELLS.
JOSEPH T. KULHAVY.

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