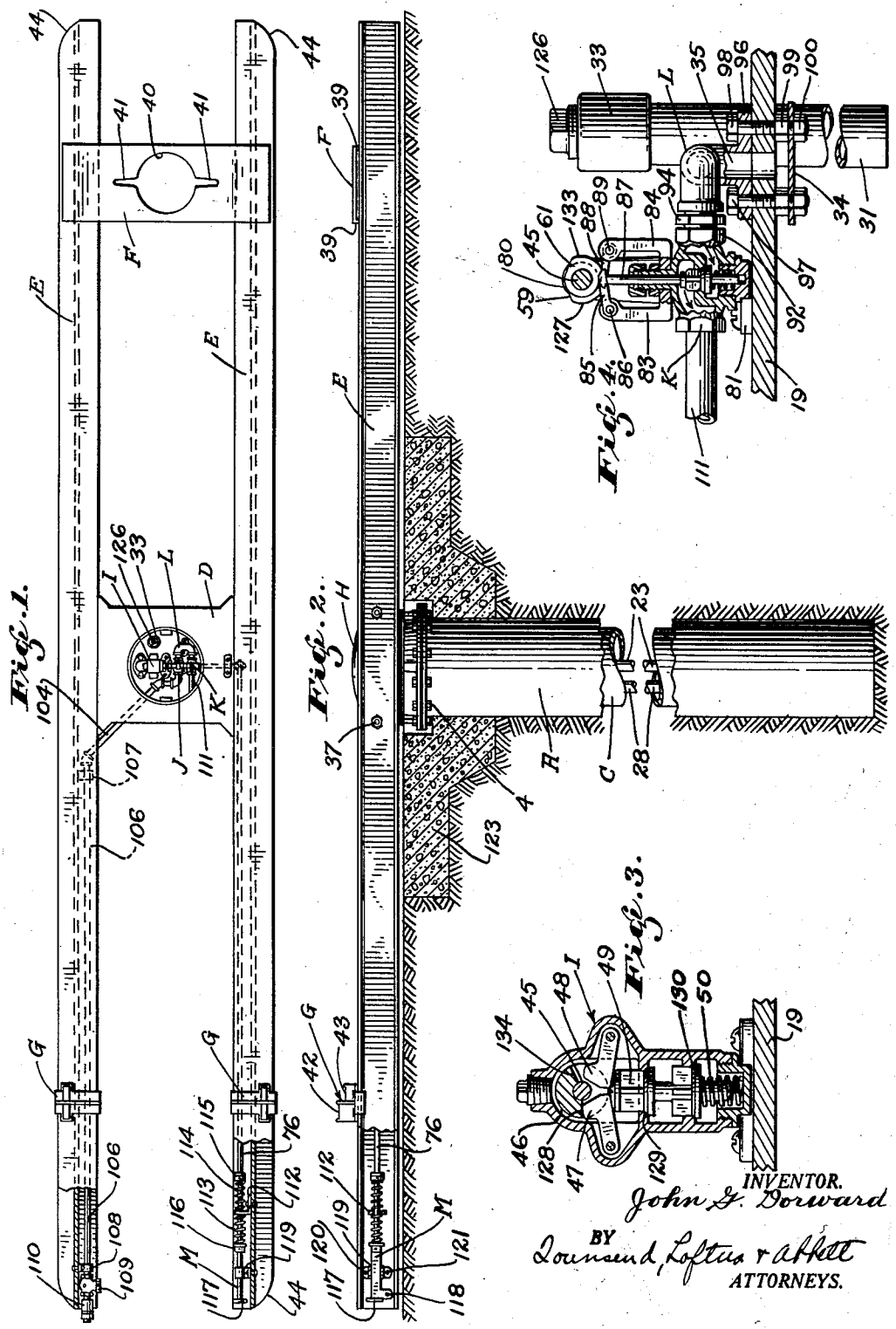
July 6, 1937. J. G. DORWARD 2,085,961

HYDRAULIC LIFT

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HYDRAULIC LIFT

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Fig. 5.

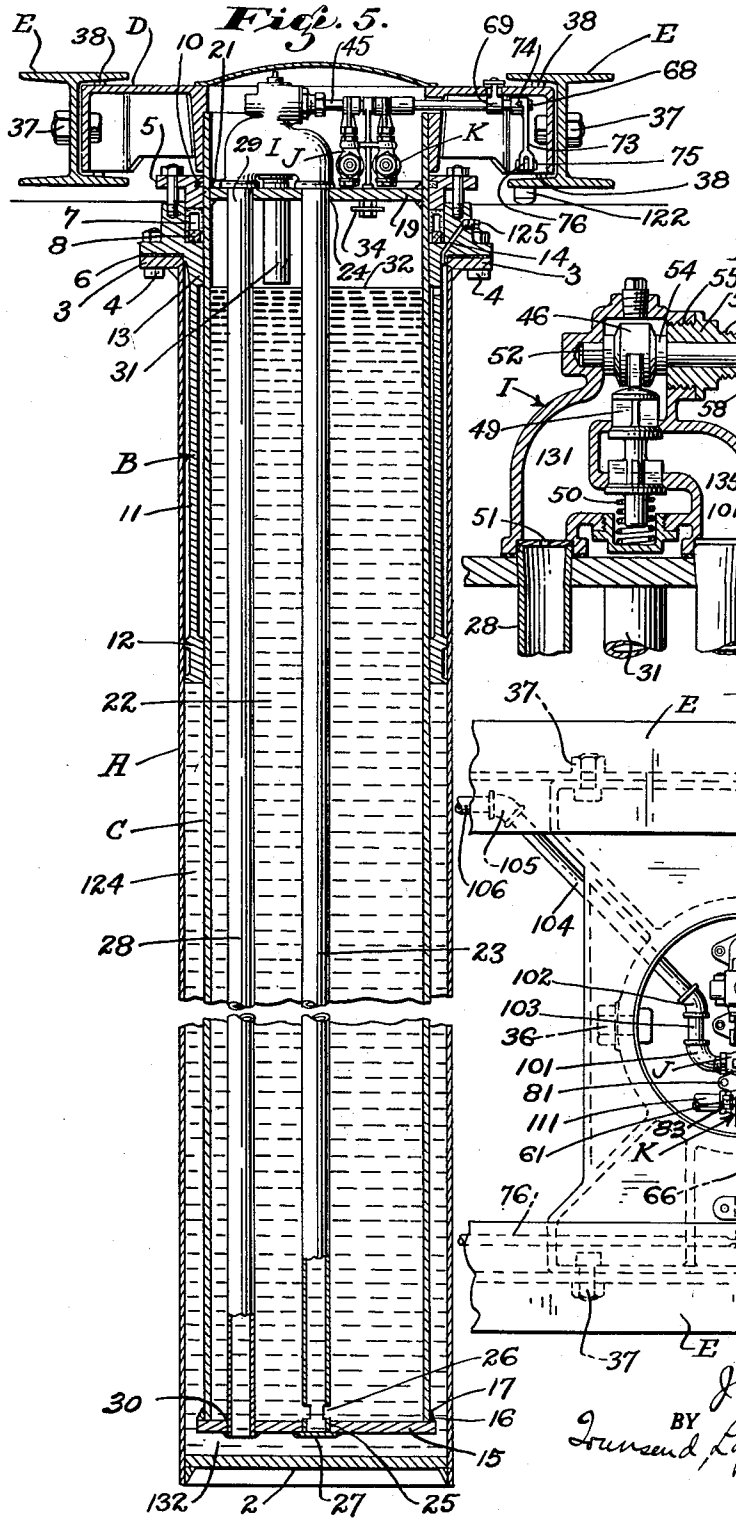


Fig. 6.

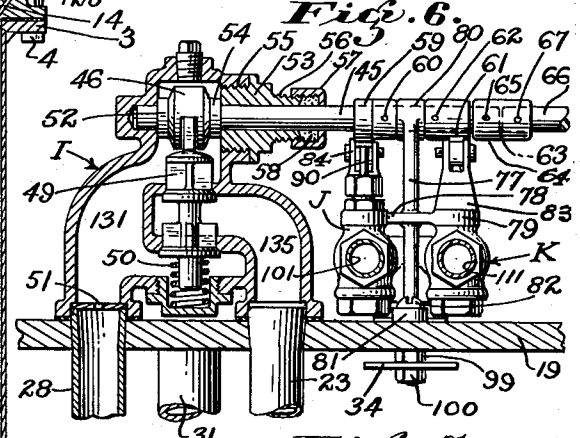


Fig. 7.

INVENTOR.
John G. Dorward
BY
Townsend, Loftus & Abbett
ATTORNEYS.

Patented July 6, 1937 2,085,961

UNITED STATES PATENT OFFICE

2,085,961

HYDRAULIC LIFT

John G. Dorward, Alameda, Calif.

Application April 3, 1929, Serial No. 352,087

10 Claims. (Cl. 121—46)

This invention relates to hydraulic lifts, and especially to a self-contained full hydraulic lift.

There are several types of full hydraulic and semihydraulic lifts which are used for raising automobiles off the ground to give access to the running gear and counterparts. In the full hydraulic type the ram rests on oil, while in the semihydraulic type the ram rests on compressed air, and while both types have been approved by the industrial accident commission of several States, it is nevertheless generally conceded that the full hydraulic type is preferable as a safety factor, when considering possible accidents caused by breaks in the lines, leaks, etc.

Full hydraulic lifts require remote oil storage or pressure tanks, connecting pipe lines both for oil and air under pressure, and one or more valves whereby the movement of the lift is controlled and while the pipes may be buried the control valves and tanks must be above ground, and so must the pipes connecting the valves and tanks be above the floor line.

The exposed tanks, piping and valves are liable to damage by automobiles backing or turning. The comparatively long pipe lines between the lift, the tanks and control valves may burst or leak, and if the ground surface is covered with concrete great difficulty is encountered in locating the source of the trouble, not to mention the time and cost of breaking up the concrete enclosing the pipe lines and tanks, re-laying the concrete etc.

The object of the present invention is to overcome the objections above enumerated, to generally improve and simplify the construction and operation of lifts of the character described; to provide a lift which is full hydraulic in operation; to provide a lift in which all remote tanks, pipe line connections, valve controls etc., are eliminated; and further to provide a lift which is self-contained and complete in every detail, first by providing a ram which contains an oil reservoir, secondly by providing a ram which carries all pipe connections required, and third by providing a ram which carries and encloses the control valves whereby the lift is operated.

The lift is shown by way of illustration in the accompanying drawings in which:

Fig. 1 is a plan view of the lift, one end being partially broken away and shown in section,

Fig. 2 is a side elevation of the lift showing it buried in the ground, said view being also partially broken away,

Fig. 3 is a cross section of the by-pass valve,

Fig. 4 is a cross section of the exhaust valve,

Fig. 5 is a central vertical section of the ram and the cylinder in which it is mounted,

Fig. 6 is a longitudinal section of the by-pass valve, said view also showing the position of the inlet and exhaust valve,

Fig. 7 is an enlarged plan view of the ram head showing the position of the several valves, pipe lines connected therewith, and the mechanism whereby the valves are operated.

Referring to Fig. 2, A indicates an outside cylinder or shell which consists of either pipe or casing, or a steel shell rolled to pipe form and welded on the butt joint. A steel plate 2 is welded in the bottom to form a substantial head, a steel flange 3 is welded onto the upper end of the cylinder A, and is drilled to receive bolts 4 which hold a combined flange, packing gland, and extension guide B. The flange serves for sealing the top joint at 6, a gasket of approved material being used between the faces of both flanges. The gland is counterbored to receive packing in the form of a U leather 7, in conjunction with an expanding ring of flax packing 8. Compression of the packing is made through a follower 5. To keep dirt and foreign matter from following the ram down, a wiper ring 10 made of felt is inserted in the groove of the follower 5. A long extended sleeve or skirt is provided at 11, which terminates in a guide 12 at the lower end, it being also provided with a guide 13 at the upper end. These guides are bored inside and turned on the outside to a smooth finish which serves as a double guide for the ram on the inside, and to form an alignment guide on the outside. An air vent hole 14 conveniently plugged is provided for the escape of the air when the cylinder and ram is to be filled with oil.

Special attention is called to the construction of the ram C. It consists of a pipe of large size and heavy, and of convenient length. It is turned to a true and smooth finish on the outside surface to facilitate easy sliding or reciprocating through guides 12 and 13 and the packing gland follower 5. On the lower end a heavy steel plate 15 is secured and extended sufficiently to allow for welding at 16. When the outside of the ram C is turned to a smooth finish the cut is run into the weld 16 sufficiently to provide a shoulder at 17. This shoulder 17 contacts on the lower end of guide 12 and forms a stop for the ram C when it reaches its maximum uppermost position of travel.

Near the upper end of the ram C another steel plate 19 is set in a depressed position. This steel plate is welded at 21 and in conjunction with the

lower plate 15 makes a pressure chamber or oil reservoir 22 within the ram. Through the center of both the top and lower plates holes are drilled for the accommodation of a boiler tube 23. This tube is expanded in the upper plate 19 as at 24, and also expanded in lower plate 15 as at 25. At the lower end of the boiler tube 23 there are perforations or holes 26 and the lowermost end of tube 23 is capped against the lower plate 15 with a plate 27 which seals off the bottom of the tube 23 and plugs same. This makes a by-pass tube out of boiler tube 23 and the oil leaves the reservoir 22 through the holes 26, and passes up through the tube 23. Adjacent to, and running parallel with tube 23 is another boiler tube 28. This tube 28 is expanded in the upper plate 19 at 29 and also expanded in the lower plate 15 at 30. This leaves a clear passage through the interior of the ram C and oil reservoir 22, and brings the exteriors of plates 15 and 19 into communication.

For the purpose of filling the oil reservoir with oil an oil filler pipe 31 is screwed into the upper plate 19 and projects sufficiently below the plate 19 to form an air pocket to maintain an oil level at 32. This oil filler pipe 31 also projects above the plate 19 to a position about level with the upper end of ram C and terminates with a pipe coupling 33 and plug 126 (see Fig. 4).

On the lower side of upper plate 19 an air baffle plate 34 is provided and fastened to the plate in an approved manner, and this baffle plate 34 is in line with an air inlet 35 and serves to scatter the air and keeps the air from blowing straight down and churning up or aerating the oil which would cause the oil to foam and expand and pass out through the air exhaust which is an objectionable feature with the majority of auto lifts now in existence.

Fitted on the top end of ram C is a ram saddle or head D, which surrounds the end of ram C. It is securely fastened with bolts 36. This ram head is in the form of a rectangular plate with ribs radiating from the center collar to the four corners and sides. The sides are used for supporting the lifting rails E.

One thing of importance on the ram head D is the eight bosses or knobs 38 which are placed on the top and bottom sides of the four corners. These knobs 38 are machined or faced off on the proper angle to suit the taper of the lifting rails E and as the facing of these knobs is done while the ram head is being bored to accommodate the ram C, they automatically line up the two lifting rails E in a parallel and level manner which causes the ends of the lifting rails to be in proper alignment. The lifting rails E are fastened to the ram head D with bolts 37.

The lifting rails E are composed of H beams and are sufficiently strong to support an automobile weighing for instance, ten thousand pounds or more. To protect automobile tires from injury the four corners of the lifting rails E are rounded off, as shown at 44.

Across one end of the parallel lifting rails E is a slidable differential plate F. This plate F is made of channel iron with the ends of the webs at the four corners removed to allow the channel to sit down to a position so that the flat of the channel is within about one inch of the top of the lifting rails E, as shown at 39. A hole 40 is cut in the slidable differential plate F to catch or fit the differential housings of automobiles and when truss rods are used on automobile differential housings slots 41 are provided in the slidable differential plate F which accommodates the truss rods.

On the opposite ends of the parallel lifting rails E axle blocks G are provided for accommodating the front axles of automobiles. These axle blocks G are preferably made of cast iron and are made right and left-handed to fit over and be slidable on the lifting rails. These axle blocks are step-down blocks and the automobile axles can rest on either step at 42 and 43.

One important feature of this invention lies in the placing of a combination automatic air inlet and air exhaust, and a double acting by-pass valve on the top head of the ram C. This places all control valves in the depressed end of the ram C and they are covered over and protected by the cover plate H.

Referring to Fig. 3 attention is directed to the double acting flanged return by-pass valve I. Through oscillating motion of a shaft 45 a double faced cam 46 contacts alternately with the valve levers 47 and 48. The bottom of the valve levers 47 and 48 contact with the crown face on the top of an inner valve 49. It will be noted that when the shaft 45 is rotated the face of cam 46 contacts with the top of valve lever 47 and the bottom of valve lever 47 contacts with the crown face of inner valve 49, with the result that practically a straight downward push is given to inner valve 49. This is a very important feature as any rotary cam motion acting directly on top of the inner valve 49 has a tendency to push the valve sideways on the seat of the valve and causes excessive wear and leaky valves in a short time. It will also be noted that the valve is held shut at all times by the action of valve spring 50.

The by-pass valve I, being in the shape of a return bend, (see Fig. 6) and having flanges for connections, straddles the end of boiler tubes 23 and 28 and is connected thereto.

On the top end of boiler tube 28, and held in place by the flange of the by-pass valve, there is a disc 51 with a certain size hole in same which restricts the flow of oil and regulates the up and down speed of the ram C. This also acts as a safety to keep the auto lift from falling in case of an accident as all the oil for raising or lowering the ram must pass this restricted orifice.

The operating cam 46 is milled out to receive the valve levers 47 and 48 and is guided for end thrust against the housing of the balanced valve I at 52, and against the face of the packing gland nut 53, as at 54. This packing gland nut 53 is threaded to fit the housing of the by-pass valve, as at 55, and also threaded at 56 to receive the packing nut 57 which holds the packing 58 against the oscillating shaft 45. The shaft 45 carries the inlet air valve operating cam 59 which is secured by a taper pin 60. The shaft 45 also carries the air exhaust valve operating cam 61 which is secured in proper position by the taper pin 62. The shaft 45 ends at 63 midway in a shaft coupling 64 which is held in position securely by a taper pin 65. An extension shaft 66 starting at the point 63 midway in the coupling 64 and held in the coupling 64 by a taper pin 67 extends within a short distance of the ram head D at 68. It is supported by the shaft bearing bracket 69.

On the end of extension shaft 66 is an operating lever 73 which is secured on the shaft 66 with the taper pin 74. This operating lever is slotted at one end and has a keeper pin 75 for accommodating a push rod 76 (see Fig. 5). On the shaft 45 between the cams 59 and 61 is a valve-sup-

porting bracket 77. This bracket supports the inlet air valve J at 78, and the air exhaust valve K at 79, and surrounds the shaft 45 at 80. This valve supporting bracket 77 terminates at the bottom in a right angle base 81 which contacts with the plate 19 and is held in position with a holding screw 82. The valve supporting bracket 77 also carries the cam lever supports 83 and 84 (see Figs. 6 and 7). The lever support 83 carries the cam lever 85 held in position with a pin 86, and this cam lever 85 contacts with the cam 61 and pushes down the valve stem 87 of the air exhaust valve K. The valve support bracket 77 also carries the lever support 84 which holds the cam lever 88 held in position by a pin 89. This cam lever 88 contacts with the cam 59 and pushes down a valve stem 90 of the air inlet valve J. The supporting bracket 77 was designed with the idea of holding two standard valves known as whistle valves and which are common stock and easily replaceable, and are shown at J and K, and are therefore independent of the by-pass valve. These valves could, of course, be replaced at any time by a special design of valve incorporating the two valves as one unit, or in fact making them part of the by-pass valve, these changes to be at the discretion of the manufacturer.

Screwed into valve J as at 91, and into valve K as at 92 are connecting nipples 93 and 94 which connect up the side outlet flanged return bend L. This return bend L serves the dual purpose of leading air into and out of the reservoir within the ram C through the hole 95 in the plate 19. The return bend L is fastened to the plate 19 by the flange and a gasket, and is held in position by screws 97 and 98. On the under side of the ram head 19 is the air baffle plate 34 held in position by the screws 97 and 98, and double nuts 99 and 100. On the inlet side of valve J is a street elbow 101 connected to the 45° elbow 102 by a pipe nipple 103. An air pipe 104 leads to 45° elbow 105 which connects to an extension air pipe 106. This air pipe runs along the inside of one of the lifting rails E and is supported by pipe brackets 107 and 108. On the end of air pipe 106 is an air check valve 109. This check valve 109 is shown in this position, but may be placed anywhere along the line as may best suit the installation. Attached to the air check valve 109 is a quick detachable hose coupling 110. This hose coupling 110 is preferably of the quick detachable type and when the connection is made the air is also automatically turned on. The plain quick detachable coupling can be used but if so a manually operated air valve on the hose is necessary.

On the discharge side of air exhaust valve K is a pipe nipple 111. This air pipe line can either terminate at the nipple 111 or be led off to any desired point of discharge.

The push rod 76 that connects to the operating lever 73 at 75 runs along the opposite lifting rail E and is supported by a spring bracket 112. On opposite sides of this bracket is a push spring 113, and a pull spring 114. To hold tension on the pull spring 114 a collar 115 is placed and fastened on the push rod 76. The tension on the push spring 113 is made automatically by a flange 116 on the operating handle M. This operating handle is made of a casting of flat rectangular section terminating at one end with a round flange 116 which serves as a tension collar and also as a tapped coupling for screwing into the end of push rod 76. On the opposite end of the operating handle M is a knob 117 which acts as a convenient handle for the operator. Directly below the knob 117 is an extension with a hole 118 in it which is for accommodating a hood rod which would serve as an extension handle when required.

In order to hold the operating handle M in alignment and keep same from turning, a guide bracket 119 is provided and fastened to the inside of the lifting rail E by screws 120 and 121, and this allows the operating handle M to slip or slide through same.

To provide a stop for the ram on the bottom of its stroke and to keep the rails off of the ground, a stop 122 is provided which is fastened to the bottom side of one of the lifting rails.

The operation of the auto lift is as follows:

With the cylinder A set in the ground in a proper and plumb position and imbedded in concrete 123, the lifting rails E and all other parts as shown completely assembled, the interior of the ram C and the annular space 124 between the outside of the ram C and the inside of the outer cylinder A is filled with fluid preferably a light grade of cheap oil which is put in through the oil filler pipe 31. The by-pass valve I is opened in either the ascending or descending position which opens either one of the air valves J or K. The opening of these valves is accomplished by pushing or pulling on the operating handle M and blocking same in an open position. The air vent 14 and the vent plug 125 on top of the by-pass valve are opened to allow the air to escape and the space to fill with oil or fluid. When the lift is completely filled to the proper level 32, the plug 126 on the top of the oil filler pipe 31 is replaced and screwed up tight and the air vents 14 and 125 closed, and the blocking of the operating handle M removed to allow the oil and air valves to close, when the auto lift is ready for operation. After the lift is once filled with oil the above operation is not necessary again unless the packing leaks or oil or fluid escapes and has to be replenished.

With the lift in its lowermost position the automobile is driven over the top of the lift and the wheels straddle the two lifting rails E. The auto is then stopped in a position about central and equal distance from each end of the lifting rails E. The slidable differential plate F is then slid or pushed along in a position placing the hole in the plate F in line with the differential housing of the rear axle of the automobile. The operator then moves to the front end and slides the two axle blocks G is a position directly under the front axle of the automobile.

A short and convenient air hose with half of the quick detachable coupling 110 on the end of the hose, is attached quickly and as the coupling has an air valve within the same, it is automatically opened and puts full air pressure in the air pipe 106 which leads up to the air inlet valve J.

One of the biggest advantages I claim in conjunction with this invention is the fact that when the operator is down on his knees adjusting the axle blocks G the control of raising and lowering the auto lift should be right handy so that he sees the proper contact with the front axle and if he is obliged to lower the lift to readjust the axle blocks he does not have to run twenty or thirty feet to the usual position of control valves on existing makes of auto lifts.

With the air on in full force up to the valve J the operator places his hand on the knob 117

and by pushing on the operating lever M, the push rod 76 is moved forward which, in turn gives forward movement to the valve operating lever 73. This in turn gives rotary motion to the shaft 66 and 45 and the first effective action is to operate the cam 59 (see Fig. 6) which quickly pushes down the valve lever 88 and forces the valve stem 90 down and opens the inlet air valve J. This action allows air to enter the side outlet flanged return bend L and the air passes through the hole 95 in the plate 19 and scatters against the baffle plate 34 when entering the interior of the ram C in the space above the oil level 32. This keeps the air from churning up and foaming the oil. This puts full pressure of air on top of the oil thereby giving full oil pressure in the inside oil reservoir 22 of the ram C.

With the full pressure in the oil reservoir 22 there is still no movement to the ram and the ram does not move until further forward motion is given to the push rod 76 by pushing on the knob 117. It will be noted that when the cam 59 opens the valve J quickly it holds the valve open through the concentric shape of the cam 59 as noted at 127, and by more forward movement of the control rod the increased rotation does not affect the air valve J as it is being held wide open by the cam 59 but the increased rotation brings the cam 46 of the by-pass valve into play and the face of the cam 46 at 128 contacts with the top of the valve lever 47 and pushes down on the head of the inner valve 49, and immeditely opens the by-pass valve by pushing the valve 49 off of the double seats 129 and 130.

The ram then immediately begins to move as the oil or fluid under pressure in the oil reservoir 22 and the tube 23 begins to flow from the oil reservoir 22 through the holes or perforations 26 at the bottom of tube 23, and the oil or fluid passing up the tube 23 then passes through the by-pass valve and the valve seats 129 and 130, and allows the oil or fluid to enter the chamber 131 of the by-pass valve. The oil or fluid then passes through the disc or restricted orifice 51 and moves down through the tube 28 and enters the outer chamber or cylinder at 132.

The pressure therefore being exerted under the ram causes the ram C to raise as the outer chamber is filled with oil, as all air was excluded when the lift was first charged with oil.

This independent control of the air inlet valve J and the by-pass valve is one of the features of this invention because while the operator is manipulating the by-pass valve I and controlling the upward movement to the ram, the air valve is automatically held open to keep constant pressure on the oil reservoir 22 which is the source of supply.

While on this subject, and before describing the downward movement it may be stated that the same valve effect is imminent on the down stroke, that is, the operator by pulling on the control handle, automatically closes the air inlet valve and the by-pass valve, and the first part of the pull action opens the exhaust valve K and holds it open so it exhausts all the air under pressure in the oil reservoir 22.

Attention is called to the fact that with the air exhausted there is still no movement of the ram as the by-pass valve is still closed but by further pulling on the control handle the by-pass oil valve opens at the will of the operator.

To be full hydraulic in effect there has to be a decided difference in relationship between the operation of the air valves and the by-pass valve as this valve absolutely must control the movement of the ram, so therefore to be full hydraulic the air must be admitted to the oil reservoir independently of the by-pass valve, not alone in the ascending of the ram but likewise in the descent of the ram, as will hereinafter be explained.

When the operator takes his hand off the knob 117 the control rod 76 immediately assumes a neutral position through the aid of push spring 113, and pull spring 114, which automatically returns all valves to closed position.

This type of control is known as a deadman control and is required in some States, but notches can be cut in the operating lever M to hold the valves neutral and also in positions controlling the air valves J and K, and the by-pass valve I when the ram is going up or coming down.

When the operator wishes to lower the ram he pulls on knob 117 which, through the control rod 76 and valve lever 73 gives reverse rotary motion to the shaft 66 and 45 and moves the cam 61. This cam 61 contacts with valve lever 85 which pushes down the valve stem 87 of the exhaust valve K, and this valve is then held open by the concentric surface 133 of the cam 61. The air in the interior of the ram C above the oil level 32 then leaves through the hole 95 and the side outlet flanged return bend L, and through the connecting nipple 94 and through the exhaust valve K, and the pipe nipple 111 to the atmosphere. The ram does not move, however, until the operator pulls out further on the control handle 117 and by additional rotation to the shaft 45 the face of the cam 46 at 134 of the by-pass valve is timed to contact with the crowned top of the valve lever 48 and the bottom of the valve lever 48 contacts with the crown top of inner valve 49 and gives almost straight downward movement to the double seated inner valve 49 and pushes the valve off the valve seats 129 and 130, and allows the oil or fluid to pass from the chamber 131 of the oil valve I into a chamber 135 of the oil valve I, and allows the oil or fluid to pass down through the tube 23 and out through the holes 26 and back into the oil reservoir 22. The oil or fluid is therefore passed from the outside chamber 132 back into the inside chamber or oil reservoir 22 and by so doing the ram naturally settles or descends and lowers the auto lift.

If it is desired to turn the auto lift or revolve same, the air hose which has been used for the purpose of raising the ram can be quickly disconnected and the hose can be hung up on a convenient hook or otherwise, then the auto lift can be turned around like a turntable for convenience of handling, and for turning the automobile end for end and allowing it to run off the auto lift without having to back off.

If the operator wants to he can operate the auto lift with an extension hook which is attached at 119 and by pushing or pulling he can control the lift from a standing position. This, however, is only a matter of convenience and has no bearing on the actual operation.

While I have shown the control mechanism terminating at the end of the lifting rails, it can also be located at the side of the auto lift directly opposite the ram itself, or in any other handy location.

The auto lift as shown and described herewith is not the locked in ram type. That is, if damaged or scored, the ram can be removed from the outside cylinder or shell without having to dig the whole unit out of the ground as is

the case where the lower guide for the ram is fastened permanently and is a part of the outside shell.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims, similarly, that the materials and finishes of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

I wish it understood that the lift, as shown, is not limited to any particular form of superstructure or lifting rails and while I have shown the well known long pair of parallel I or H beams as lifting rails, commonly in use as supporting means for elevator cages and platforms and for carrying and supporting landing platforms or aprons used in connection with the upper decks of ferry boats, etc., the lifting rails as described have proved to be more effective and of greater utility than some forms of special channel iron lifting rails now in use on auto lifts, where the auto wheels are run on top of the channel rails and the automobile lifted bodily by the wheels. However, the type and form of superstructure or lifting rails is a matter which is subject to change at the discretion of the manufacturer and therefore can in no way effect the utility of the lift described.

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

1. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, said ram having an oil reservoir formed interior thereof, a head on the ram, a plurality of valves carried by the head, and a single manually actuated member within the head of the ram for actuating the valves successively to transfer oil under pressure from the reservoir to the cylinder to raise the ram.

2. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, said ram having an oil reservoir formed interior thereof, a head on the ram, a plurality of valves carried by the head, a single manually actuated member within the head of the ram for actuating the valves to transfer oil under pressure from the reservoir to the cylinder to raise the ram, said means permitting a reverse flow of oil from the cylinder to the reservoir when lowering the ram, and means restricting the flow of oil in either direction to limit the raising and lowering speed of the ram.

3. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, said ram having an oil reservoir formed interior thereof, a head on the ram, a by-pass valve, an air inlet valve and an exhaust valve mounted on the head of the ram, said by-pass valve communicating with the oil reservoir and the cylinder, said inlet valve communicating with the oil reservoir and a source of air supply under pressure and said exhaust valve communicating with the oil reservoir and the atmosphere, and a single manually actuated member for selectively opening either the air inlet valve or the exhaust valve and successively opening one of the valves and the by-pass valve.

4. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, said ram having an oil reservoir formed interior thereof, a head on the ram, a by-pass valve, an air inlet valve and an exhaust valve mounted on the head of the ram, said by-pass valve communicating with the oil reservoir and the cylinder, said inlet valve communicating with the oil reservoir and a source of air supply under pressure and said exhaust valve communicating with the oil reservoir and the atmosphere, and manually actuated means carried by the ram head for selectively opening either the air inlet valve or the exhaust valve and successively opening one of these valves and the by-pass valve.

5. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, said ram having an oil reservoir formed interior thereof, a head on the ram, a by-pass valve, an air inlet valve and an exhaust valve mounted on the head of the ram, said by-pass valve communicating with the oil reservoir and the cylinder, said inlet valve communicating with the oil reservoir and a source of air supply under pressure and said exhaust valve communicating with the oil reservoir and the atmosphere, a shaft journalled adjacent the valves, a plurality of cam members secured on the shaft, one cam for each valve, manually actuated means whereby movement is transmitted to the shaft and the cams, and means whereby movement of the shaft and cams is transmitted to open the valves, said cams being so positioned that movement of the shaft in one direction will first, open the inlet valve, and secondly the by-pass valve, while movement of the shaft in the other direction will first, open the exhaust valve and secondly the by-pass valve.

6. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, said ram having an oil reservoir formed interior thereof, a head on the ram, a by-pass valve, an air inlet valve and an exhaust valve mounted on the head of the ram, said by-pass valve communicating with the oil reservoir and the cylinder, said inlet valve communicating with the oil reservoir and a source of air supply under pressure and said exhaust valve communicating with the oil reservoir and the atmosphere, a shaft journalled adjacent the valves, a plurality of cams on said shaft, a stem on each valve, a pivotally mounted lever interposed between each cam and valve stem, and manually actuated means whereby rotary movement is transmitted to the shaft and the cams in one direction or another, said cams being so positioned that movement of the shaft in one direction will first open the inlet valve and secondly the by-pass valve, while movement of the shaft and cams in the other direction will first open the exhaust valve and secondly the by-pass valve.

7. In a device of the character described a cylinder, a tubular ram slidably mounted in the cylinder and extending downwardly into the cylinder and spaced therefrom, an upper and a lower plate secured to the tubular ram to form an interior oil reservoir, a pair of combination by-pass and staybolt tubes connecting the plates and extending through the tubular ram, a by-pass valve secured to the upper plate, one of the tubes communicating with the upper end of the by-pass valve and at the lower end with the interior of the ram and the other tube connecting at its upper end with the by-pass valve and at its opposite end with the cylinder, an air inlet and an exhaust valve carried by the upper plate, the exhaust valve communicating with the interior of the ram and with the atmosphere, and the inlet valve communicating with the interior of the ram and with a source of air supply under pressure, and manually actuated means for open-

ing and closing the several valves selectively and successively so that oil under pressure may be transferred from the cylinder through the by-pass tubes and the by-pass valve back to the interior of the tubular ram or vice versa.

8. In a device of the character described a cylinder, a ram slidably mounted in the cylinder, an upper and a lower pressure head on the ram forming an interior pressure oil reservoir, a plurality of valves carried by the upper head, a single manually actuated member within said head for actuating the valves successively to transfer oil under pressure from the reservoir to the cylinder to raise the ram, said lower head member projecting beyond the face of the ram and forming an annular shoulder and a stop member within the cylinder with which the shoulder engages to limit upward movement of the ram.

9. In a device of the character described a cylinder, a guide sleeve removably secured in the upper end of the cylinder and extending a substantial distance down into the cylinder, a tubular ram slidably and rotatably mounted in the guide sleeve and extending downwardly into the cylinder, a pair of guide surfaces formed on the guide sleeve on its inner surface, one at the upper end thereof and one at the lower end, a third guide on the exterior surface of the sleeve and at the lower end thereof, and a stuffing box mounted in the upper end of the sleeve.

10. An elevator comprising a hollow fluid containing casing, a hollow fluid containing ram mounted in the casing and adapted for vertical movement therein, the interior of said ram and the interior of said casing having fluid communication therebetween, check valve mechanism for controlling a fluid flow between ram and casing, air control mechanism for selectively introducing to and exhausting from said ram air under pressure, and a single manually operable member adapted for actuating said fluid control mechanism and said air control mechanism.

JOHN G. DORWARD.