Sept. 28, 1948. G. QUAYLE 2,450,354

CONTROL LEVER

Original Filed July 25, 1940 4 Sheets-Sheet 1

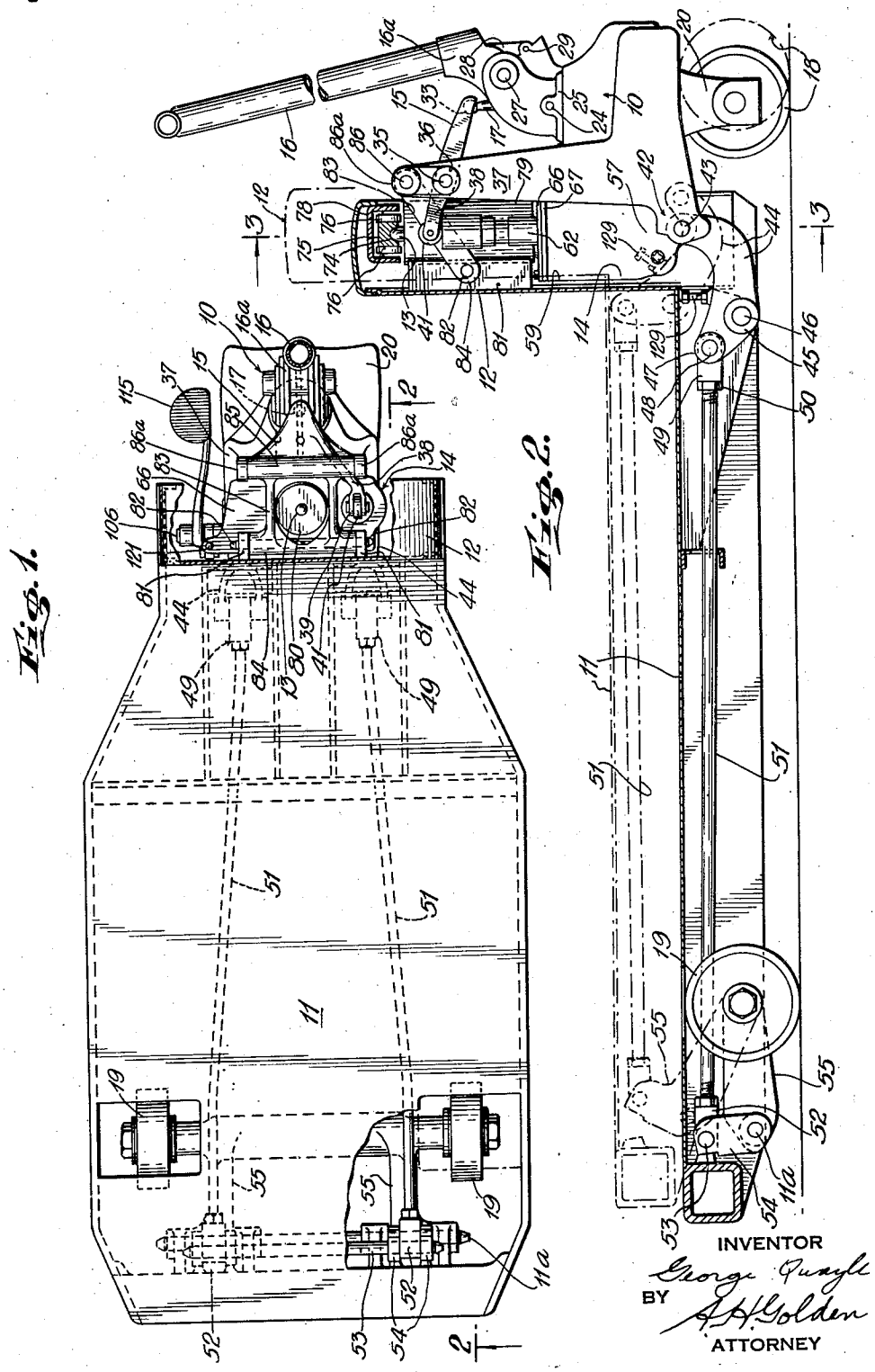


Fig. 1.

Fig. 2.

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Sept. 28, 1948. G. QUAYLE 2,450,354

CONTROL LEVER

Original Filed July 25, 1940 4 Sheets-Sheet 2

Fig. 4.

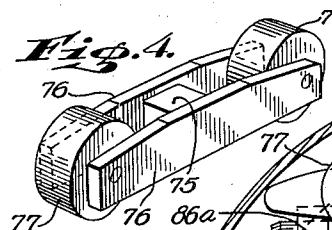


Fig. 3.

Fig. 7.

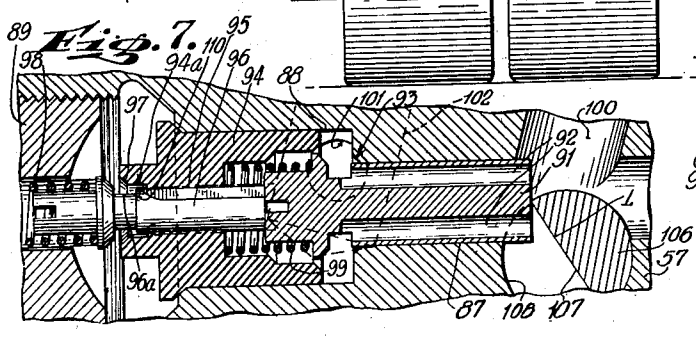


Fig. 8.

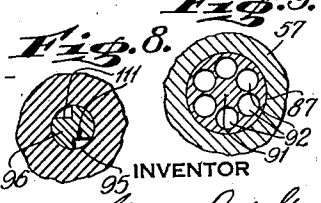


Fig. 9.

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Sept. 28, 1948. G. QUAYLE 2,450,354

CONTROL LEVER

Original Filed July 25, 1940 4 Sheets-Sheet 3

Fig. 5.

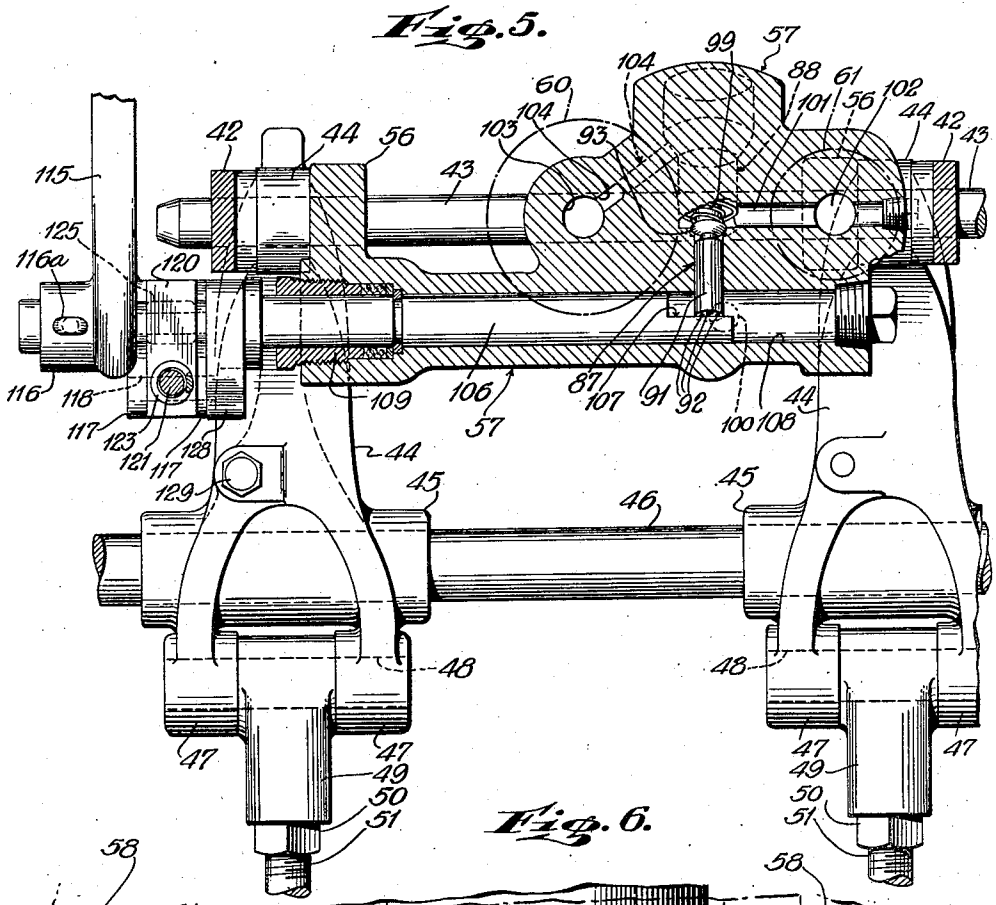
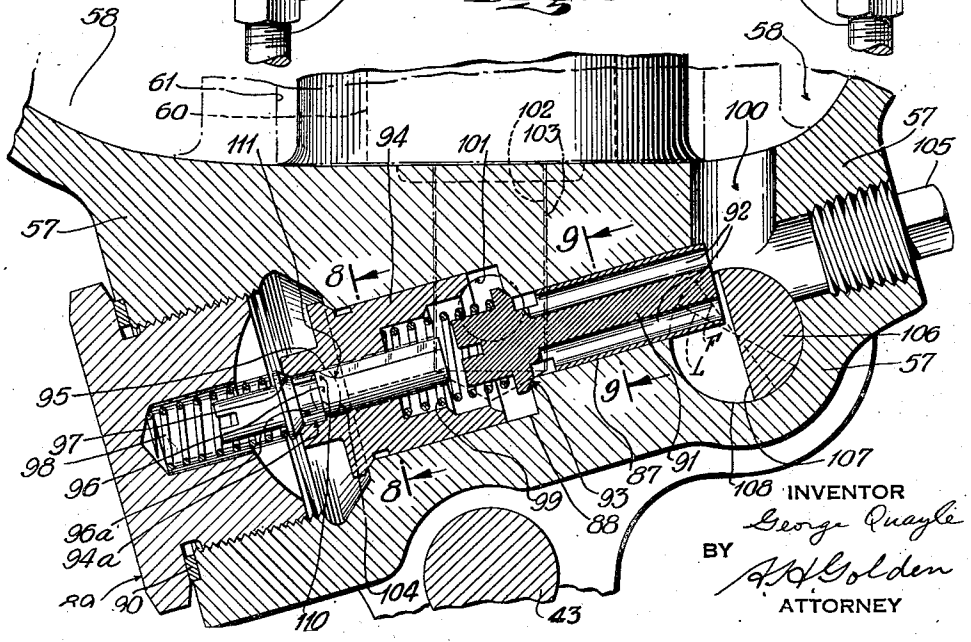


Fig. 6.



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Sept. 28, 1948. G. QUAYLE 2,450,354

CONTROL LEVER

Original Filed July 25, 1940 4 Sheets-Sheet 4

Fig. 10.

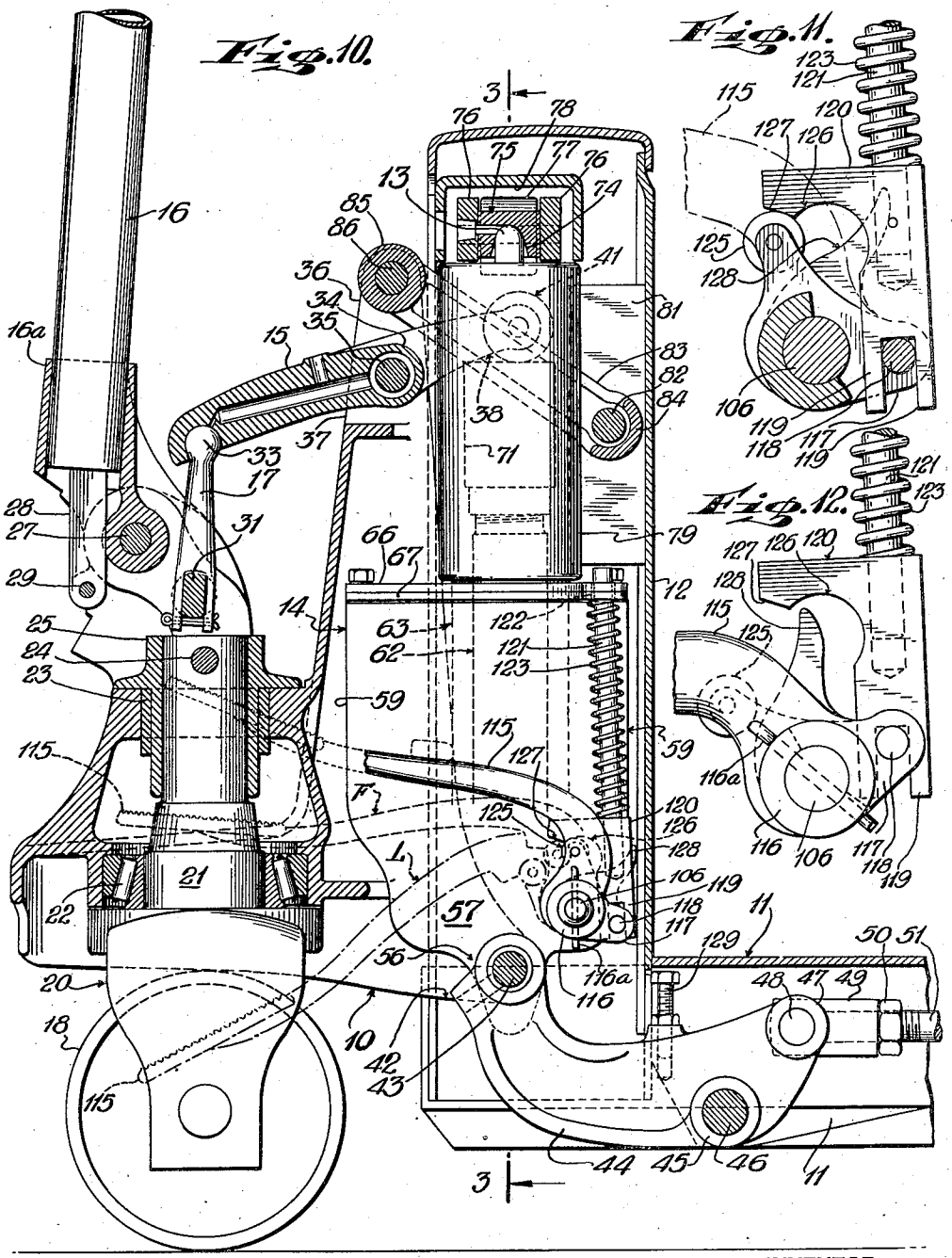


Fig. 11.

Fig. 12.

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Patented Sept. 28, 1948

2,450,354

UNITED STATES PATENT OFFICE

2,450,354

CONTROL LEVER

George Quayle, Philadelphia, Pa., assignor to The Yale & Towne Manufacturing Company, Stamford, Conn., a corporation of Connecticut

Original application July 25, 1940, Serial No. 347,466. Divided and this application May 2, 1942, Serial No. 441,417

4 Claims. (Cl. 74—533)

1

This application is a division of my application Serial No. 347,466, filed July 25, 1940, now Patent No. 2,309,138, January 26, 1943. My invention herein to be described and claimed relates to a hydraulic lifting mechanism and means whereby the said lifting mechanism is controlled, so that it is particularly adapted for use in an industrial truck of the type described in my earlier application.

For convenience in describing my invention and in emphasizing its value, I shall refer to the construction of an industrial lift truck in which my invention is particularly useful, and shall describe the manner in which my hydraulic mechanism is mounted so that the lifting ram thereof transmits lifting movement to a lifting platform mounted for lifting movement relatively to the lifting head of an industrial lift truck.

A feature of my invention resides in an exceedingly simple control mechanism for the valves of the hydraulic mechanism, whereby the operation thereof may be readily controlled. As a particular feature of the invention, the means for operating the valve mechanism are so arranged that when the valves are moved to allow the lowering of the ram of the hydraulic mechanism, and the lifting platform to which it imparts lifting movement, the said means may be operated at the conclusion of the lowering movement so that the valves will be restored for the lifting operation without any further operation by the operator. By a slightly different operation of the said means, the valves may be returned to what I term a free handle position, and which I shall later describe more in detail. The control features thus outlined are exceedingly important in speeding up the operation of an industrial lift truck.

My invention contemplates further a very unusual arrangement of the valves for controlling the hydraulic mechanism whereby the pedal operation of one of the valves of the mechanism, will effect the operation of the other of the valves, it being further contemplated that the pedal operation will also control the speed of lowering in a very simple manner. As a feature of my valve mechanism, I have devised a release valve arranged to unseat substantially before fluid flows past its seat, thereby slowing down erosion of the valve seat.

I have attempted to set forth generally the more important features of my invention, but a reading of the specification which follows will indicate that there are a considerable number of additional features that are of great importance and form valuable portions of my contribution to the

2

art. These additional features, together with those already discussed, will of course be set forth in the claims hereinafter, it being further understood, moreover, that claims should be granted me of a scope to prevent the utilization of my contribution to the art in specific forms other than those which I show and describe in this application.

For a description of my invention, I shall refer to the drawings wherein Fig. 1 is a plan view looking downwardly on a truck utilizing my invention, with certain parts cut away to better expose others of the parts. Fig. 2 is a side view of the truck of Fig. 1 with some of the parts cut away to better illustrate the operation of others of the parts. Fig. 3 is a view taken along lines 3—3 of Figs. 2 and 10. Fig. 4 is a perspective view of certain of the parts shown in Fig. 3. Figs. 5 and 6 are sections taken substantially along lines 5—5 and 6—6 of Fig. 3. Fig. 7 is a view of certain of the parts of Fig. 6 in another position. Figs. 8 and 9 are sections along lines 8—8 and 9—9 respectively of Fig. 6. Fig. 10 is a view along lines 10—10 of Fig. 3. Figs. 11 and 12 are enlarged views of parts of Fig. 10 in other operating positions.

I shall now refer to Figs. 1 and 2 with reference to which I shall present an outline of a truck particularly adapted for using my hydraulic mechanism. Thereafter, further details of that truck will be described with reference to the remaining figures as well as to Figs. 1 and 2. The truck comprises what I choose to call a lifting head 10, relatively to which is pivotally secured what I term a lifting platform 11, the lifting platform 11 having a front vertical standard 12 against which operates the thrust pin 13 of a hydraulic ram forming part of my hydraulic lifting assembly 14.

This hydraulic lifting assembly is actuated through means of a pivoting lever 15 by vertical swinging movement of the steering handle 16 connected to the lever 15 by a vertical strut 17. The steering handle 16 operates the lifting mechanism, and also steers the front steering wheels 18 of the truck, as will be understood by those skilled in the art. The rear wheels 19 of the truck are adapted for lifting movement relatively to the platform 11 whereby the rear end of the platform is elevated at the same time that the front end carrying the vertical standard 12 is elevated.

Referring now more particularly to Fig. 10, I shall first describe the lifting head 10 of my truck. This lifting head has mounted for rotation relatively thereto the wheel supporting forks 20, in

which are mounted the front wheels 18 already described. The forks 20 form part of what I term a steering head 21, which is rotatable relatively to the lifting head through means of the roller bearings 22 and the sleeve bearing 23. Pinned to the steering head 21 as at 24, and forming part of the steering head 21, is a collar 25, relatively to which is supported the lower main casting 16a of the steering and lifting handle 16 through means of the pin 27. A rod 28 extending from the steering handle casting 16a is pivoted at 29 to the collar 25 and forms part of the spring balancing mechanism for that handle, a construction which is not new in this application and need not be described therefore.

Formed as part of the handle casting 16a and movable integrally therewith is a pin 31, relatively to which is secured the strut 17 terminating in a ball 33 resting in a ball socket of the actuating pivoted lever 15, already described. The main portion of this lever 15 is substantially triangular in form, as can best be seen in Fig. 1, and has formed as part thereof a sleeve 34 whereby it is secured for rotation about a shaft 35 carried in bearings 36 formed in each of the two upwardly extending standards 37 of the lifting head 10, as is probably best seen in Figs. 2, 3 and 10.

As is probably best seen in Figs. 2, 3 and 10, the lifting head has a downwardly and somewhat rearwardly extending portion 42 at each side thereof, within which are formed bearings for the mounting of a shaft 43. Right and left hand front lifting links 44 are adapted for mounting at the right hand and left hand ends of the shaft 43 just inwardly of the lifting head portions 42 for rotation on the said shaft. Each of these links has a bearing portion 45 (Fig. 5) whereby it is secured about a shaft 46 supported at each side of the lifting platform 11 at points near the front end of that platform, as is quite apparent from Figs. 2 and 10.

Referring now again to Fig. 5, each of the links 44 is shown as bifurcated at one end, forming bearings 47 for a pin 48, whereby each of the links 44 is pivotally secured to a threaded rod connector 49. Each of the rod connectors 49 is threaded for the entry of a rod 51 which is secured thereto in adjusted threaded relation by a locking nut 50. As is best seen in Fig. 2, each rod 51 extends to the rear of the truck where it is secured to a second rod connector 52 in the same manner as it is secured to connectors 49. Each of the rod connectors 52 is in turn secured through a shaft 53 relatively to forks 54 forming the bifurcated ends of rear wheel supporting links 55. The links 55 in turn are pivoted at 11a to the platform frame 11 and support the rear load wheels 19.

It is now obvious that should the front vertical standard 12 of lifting platform 11 be moved vertically relatively to the lifting head 10, through the functioning of linkage and operating means not yet described, the shaft 46 on which are mounted the links 44 through their bearings 45, will cause the links 44 to rotate clockwise in Fig. 2 relatively to shaft 43 of the lifting head. This will cause the rods 51 to move to the right, thereby swinging the rear links 55 downwardly relatively to the lifting platform 11, effecting the movement of the lifting platform in a vertical direction to the position shown in dash and dot lines in Fig. 2.

For imparting lifting movement to the lifting platform 11 as just outlined, I utilize the hydraulic lifting assembly of my invention, indicated generally by reference numeral 14. This hydraulic assembly includes a hydraulic ram having the rounded pin 13 for imparting lifting thrust to the vertical standard 12 of the lifting platform as already discussed. Referring now to Figs. 3 and 10, my hydraulic lifting assembly 14 has a main base portion 57 from which extend ears 56 whereby the base portion, and therefore the entire hydraulic assembly, is secured for pivotal movement relatively to the shaft 43 already described is supported by the extensions 42 of the lifting head 10. The base 57 extends upwardly and to each side to form a relatively large reservoir chamber 58 defined by an outer wall 59.

Abutments formed within the chamber 58 of the base 57 are bored and threaded as at 60 and 61, there being secured relatively to the threads at 60 a sleeve-like member 62 forming the cylinder of the hydraulic pump of the hydraulic mechanism. Secured relatively to the threads 61, there is a sleeve-like member 63 forming the cylinder for a hydraulic ram 64, the ram being of any type well known in the art, and carrying a series of piston rings 65, as will be readily appreciated by those skilled in the art.

A pair of cover plates 66 and 67 are secured to the upper peripheral edge of the wall 59, whereby to completely enclose the reservoir 58, as best seen in Figs. 3 and 10. The cover plates 66 and 67 allow for the extension of the cylinders 62 and 63 therethrough, suitable sealing means being provided for sealing the openings through which the cylinders protrude, all as will be understood by those skilled in the art.

Mounted within the cylinder 62 is a pump rod 68, to the upper end of which is pinned an actuating collar 69 carrying a cap 70 which in turn has a skirt 71 surrounding the upper end of the cylinder 62. The lower end of the pump rod 68 carries a piston and a suitable leather or other type sealing washer 72, whereby reciprocation of the rod 68 will cause a pumping action within the cylinder, all as will appear clearly later.

A pair of telescoping compression springs 73 surround the pump rod 68 and lie between a washer 73a and the collar 69 whereby to urge pump rod 68 upwardly so as to bring the cap 70 against the pump actuating roller 41. The springs serve to press the cap against the roller 41, thereby pressing the roller 41 and the actuating lever 15 in a counter clockwise direction, as viewed in Fig. 10, and thereby bringing the ball socket of the actuating lever 15 against the ball end 33 of the strut 17 so as to take up any lost motion between the several parts, all as will be quite apparent.

The ram 64 carries at the upper end thereof the rounded pin 13, which has already been described, and which operates in a cooperating depression 74 formed within a block 75 that is secured as by welding or in any other manner, to parallel beams 76. The beams 76 have mounted between them and on each end thereof a roller 77 as best seen in Fig. 4, the rollers 77 in turn bearing against a plate 78 which is welded or otherwise secured to form an integral part of the forward vertical standard 12 of the lifting platform. This construction has certain advantages that are emphasized in my earlier application and which need not here be discussed.

There is of course a suitable stuffing box between the end of the hydraulic ram 64 and the cylinder 63 in which it is mounted, all as is well understood by those skilled in the art. For protecting the hydraulic ram, I employ a skirt 79 secured to the end of the ram through a cap 80,

with the said skirt surrounding the outer wall of the cylinder 63. As the hydraulic ram moves vertically from Fig. 3 to lift the platform, it is of course obvious that the skirt 79 will maintain the end of the ram covered at all times, thereby protecting it against picking up and carrying abrasive material into the cylinder 63. The skirt 71 of cap 70 of the pump rod 68 has a like function.

There was described earlier the linkage whereby the lower end of the platform 11 is mounted relatively to the lifting head 10. It will now be well to indicate that the upper end of the vertical standard 12 of the lifting platform is also secured by linkage to the lifting head 10. Thus, welded or otherwise secured to vertical standard 12 are spaced plates 81, between which is supported a shaft 82 (Figs. 1 and 10). A substantially H-shaped lever 83, best shown in Fig. 1, is equipped with a sleeve portion 84 at one end thereof whereby it is secured about the shaft 82. At its other end, the H-shaped lever 83 has formed thereon a sleeve portion 85 whereby it is secured relatively to a shaft 86 carried in bearings 86a at the upper end 37 of the lifting head 10. It is the function of the lever 83 to guide the upper end of the vertical standard 12 in its movement relatively to the lifting head, just as the lower links 44 guide the lower end of the standard and the platform 11 in their elevating movement.

Referring now to Figs. 3, 5 and 6, I shall describe the various passages formed within the base 57 of the hydraulic mechanism, and the valves positioned relatively to those passages whereby the operation and control of my hydraulic mechanism will be understood. A longitudinally extending main valve bore 87, 88 is formed in the base 57 inclined somewhat relatively to the horizontal, as best shown in Fig. 6. This main valve bore includes a bore 87 and a further bore 88, the two bores being coaxial. The valve bore 87, 88 is closed at one end through the screw threaded cap 89 holding in place the gasket 90, all as is best seen in Figs. 3 and 6. The opposite end is closed by a threaded plug 105.

Mounted within the bore 87 is a valve 91 having a series of holes 92 drilled therethrough, as is best illustrated in section in Fig. 9. This valve is formed to cooperate with a seat 93 at the left hand end of the bore 87. A plug 94 is mounted within the bore 88, and itself has a bore 95 therethrough forming a valve passage for cooperation with a valve 96. The valve 96 is seated relatively to a valve seat 97 formed on the plug 94, and is held against this seat by a spring 98, as is readily seen. A spring 99 lies between the plug 94 and the valve 91 to maintain the valve 91 normally against its seat 93.

A passage 100 leads through base 57 into the valve bore 87 from the reservoir chamber 58, while a bore 101 leads to the valve bore 88 from the pump cylinder 62, as can be seen by reference to Figs. 3, 5 and 6, the bore 101 communicating with the cylinder 62 through the bore 102. Through bores 103 and 104, communication is established between the ram cylinder 63 and the extreme left hand end of the main valve bore which is to the left of the valve 96. Thus, it may be said that in Fig. 6 the right end of valve bore 87, 88 communicates with the reservoir, the central portion communicates with the pump, and the left end communicates with the ram.

The operation of the several valves and passages so far described will now be explained. Upon upward movement of the pump rod 68 and its piston, pressure against the end of the valve 91 will naturally be relieved, whereby to move it away from its seat at 93 so that fluid will flow from the passage 100 through the holes 92 of the stem of valve 91 and through the passages 101, 102 into the pump. At the beginning of the downward pumping stroke, the valve 91 will become seated at 93, and all of the pump pressure will be introduced against the end of the valve 96. This will unseat valve 96 relatively to its seat at 97 and against the resistance of spring 98, whereby to force the fluid through the passages 104 and 103 into the ram cylinder, whereby to move the ram 64 vertically to lift the platform. Through a series of strokes, the ram will be moved to its completely elevated position.

If now it is desired to lower the lead, utilization is made of a cam operating shaft 106 and its cam surface 107. It will be noted that the cam operating shaft 106 is mounted within a transverse bore 108 formed in the base 57, as best illustrated in Figs. 5, and 6, the shaft extending outwardly of the base 57 through a suitable stuffing box 109. There will be described later the mechanisms which are mounted on the shaft 106 for operating that shaft and for controlling its movement. Suffice it to say at this time that when the shaft 106 is rotated in a counterclockwise direction to position F, as seen in Fig. 6, its surface 107 will move the valve 91 off its seat at 93, so as to establish low pressure communication between the pump and the reservoir 58 through passages 100, 101, 102. Thereafter, up and down movement of the pump will have no effect whatsoever on the pumping mechanism, since it will be impossible to generate sufficient pressure to move the valve 96 off its seat at 97, as is necessary when it is desired to admit fluid under pressure to the hydraulic ram. In this position of the parts, there will be had what is known in the art as a free operating handle, and which is obtained usually in mechanical structures by simply releasing the operating mechanism from the vertically swinging handle.

If in the position of the parts described, it is desired to lower the truck platform 11, rod 106 is rotated further, carrying cam surface 107 past the position F to the position L shown in Fig. 6. This rotation of rod 106 will bring the left hand end of the valve 91 against the right hand end of the valve 96, moving that valve off its seat at 97. Communication will then be established between the ram and the reservoir 58 through the valve passage 95, the open valve seat 93, and the bores of valve 91 whereby to effect the lowering of the load platform.

Those skilled in the art will fully appreciate that the initial withdrawal of the valve 96 from its seat at 97, especially with a heavy load on the ram, will cause an extremely swift movement of a small quantity of fluid past the valve seat 97. This extremely swift movement of fluid will gradually wear away the valve seat under the usual operating conditions. Therefore, I have arranged means whereby there is substantially no flow of fluid past the valve seat 97 until the valve 96 has been moved off its seat a sufficient distance to present a relatively large opening. The flow of fluid is then in relatively large volume, and as will be understood by those skilled in the art, the speed of the flow of the fluid will be considerably reduced.

As is best shown in Figs. 6, 7 and 8, the valve

plug 94 is counterbored at 94a to present a somewhat larger flow opening than the remainder of valve bore 95. The valve stem of valve 96 has a necked portion 96a which is normally opposite counterbore 94a and is defined at one end by a shouldered portion 110 which, in the normal position of the parts in Fig. 6, fully closes the bore 95 within which the valve 96 is adapted to slide. Extending from this surface 110 in valve 96 are gradually tapered grooves 111, shown in section in Fig. 8, the grooves 111 being entirely eliminated at the shouldered surface 110.

Because of this relation of the parts, it is readily seen that even if the valve 96 is moved off its seat 97 toward the position of Fig. 7, there still will be very little flow past the seat 97 because the surface 110 of the valve maintains substantially closed the valve bore 95. It is only after the valve 96 has been moved for a considerable distance, and somewhat further than shown in Fig. 7, whereby to space it from its seat 97 an appreciable amount, that the surface 110 is moved sufficiently out of the main portion of the bore 95 and opposite the counterbore 94a to expose part of the grooves 111 of the valve stem. An appreciable amount of fluid may then begin its flow past the valve seat 97, and at a speed which is comparatively low, so that the worst possible wear condition no longer exists. In effect, the valve bore 95 is thus controlled by two valves, the more critical of which is relieved of wear by the particular arrangement. It is well to indicate that the grooves 111 act to control the platform lowering speed, that speed being increased as the valve 96 is moved to the left in Figs. 6 and 7 to expose the deeper portions of the grooves to the fluid.

Referring now once again especially to Figs. 3, 5, 11 and 12, the end of the valve control rod 106 has secured thereto a foot treadle 115 through its sleeve portion 116 and cotter pin 116a, whereby the treadle will rotate the rod 106 to control the valve mechanism, as previously described.

Rotating with the treadle 115 and its sleeve 116 are a pair of ears 117 carrying a pin 118. Mounted on this pin 118 through bifurcated legs 119 is a cam piece 120. This cam piece 120 has secured thereto a rod 121 which slides at its upper end in holes 122 formed in the cover plates 66 and 67 of the reservoir 58. A spring 123 surrounds the rod 121 and bears between the lower cover plate 67 and the upper surface of the cam 120, whereby through the pin 118, it tends to rotate the treadle in a clockwise direction, looking at Figs. 11 and 12, and to maintain the valve control rod 106 in its full line position of Fig. 6. In this position of the parts, lifting movement of the hydraulic mechanism will be effected by the pumping action of the steering handle 16.

Movable also integrally with the treadle 115 is the roller 125 which, in the normal position of the parts, that is, in the position of the valve stem in Figs. 5 and 10, lies within a depression or cam surface 126 formed on the cam piece 120. It will of course be appreciated that the relation of the roller and cam surface may easily be reversed and that other cooperating parts may be used. With the truck platform in any particular elevated position, should it be desired to obtain a free handle by the moving of the valve control rod 106 and its cam surface 107 to the position F in Fig. 6, as already described, the operator steps on the treadle 115 and moves that treadle from the position of Fig. 10 to the position of Fig. 11 against the resistance of spring 123, whereby to move the roller 125 out of the depression or cam surface 126 to the position of Fig. 11. In this position of the parts, the spring 123 will tend, of course, to rotate the roller 125 and the treadle 115 back to the position of Fig. 10 but the surface 127 cooperating with the roller will prevent such movement.

If, in this position of the parts, it is now desired to rotate the valve control rod 106 to the position L in Fig. 6, whereby to release the load by the movement of the valve stem 96 off its seat as in Fig. 7, the operator will move the pedal 115 to the position of Fig. 12, thereby compressing the spring 123 even more than previously. Naturally, in this position of the parts, the ram and platform 11 will be lowered and the fluid will be moved back into the reservoir.

The operator now has a choice of two actions. If he wishes to have a free handle so that the truck may be hauled about, he may return the treadle slowly to the position of Fig. 11 where it is stopped by roller 125 striking surface 127. In this position of pedal 115, the valve 91 will be maintained off its seat at 93 and free communication is had between the pump and reservoir to yield the free handle desired. On the other hand, if the operator wishes to place the valve mechanism in its initial position of Fig. 6 so that operation of the lifting handle will elevate the truck platform, he has only to release the treadle in the position of Fig. 12 to allow the full action of the spring 123. The spring 123 will, in its then state of compression, rotate the treadle 115 rather swiftly towards the position of Fig. 11. The speed of movement is such that the surface 127 and cam piece 120 will merely be deflected upwardly by roller 125 and will be incapable of preventing the movement of the roller 125 back into the depression 126, as shown in full lines in Fig. 10. Therefore, the treadle will return to its initial position of Fig. 10, all as is quite apparent.

Also mounted for movement with the treadle 115 is a cam 128, the purpose of which will now be described. Referring also to Figs. 3, 5 and 10, it will be noted that the left hand front lifting link 44 has mounted thereon an adjustable screw bolt 129. It is the function of this bolt when the platform is in a fully elevated or other predetermined position, to strike the cam 128 so as to move the treadle from its position of Fig. 10 to the position of Fig. 11. The purpose of this action is to present a free handle immediately upon the elevation of the load platform to a predetermined position. This predetermined position may be varied, of course, by an adjustment of the bolt 129, all as is quite apparent.

It is thought that a further analysis and description of my invention is not necessary, especially since reference to the claims will further clarify the significance and value of various cooperating parts thereof.

I now claim:

1. In a combination of the class described, a control pedal, means mounting said pedal for movement into three controlling positions, a spring pressing said pedal into its first or normal position, said pedal being movable manually against said spring pressure to its second position, yielding detent means constructed and arranged for maintaining said pedal in said second position against the pressure of said spring tending to return it to its first position, said pedal being manually movable further against the pressure of said spring to its third position and being

free of detent control in its third position, said pedal when released for free movement from said third position to said first position moving swiftly under the pressure of said spring to said first position, said pedal in said movement striking and overcoming said yielding detent means by the momentum of said swift movement, and said yielding detent means halting the return of said pedal at said second position when said pedal is returned slowly under manual control from said third position.

2. In a combination of the class described, a control pedal, means mounting said pedal for movement into three controlling positions, a spring pressing said pedal into its first or normal position, said pedal being movable manually against said spring pressure to its second position, yielding detent means constructed and arranged for yieldingly maintaining said pedal in said second position against the pressure of said spring tending to return it to its first position, said pedal being movable against the pressure of said spring to its third position beyond said yielding detent means and adapted to be held only manually in said third position, said pedal when released for free movement from said third position to said first position moving swiftly under the pressure of said spring to said first position, said pedal in said movement striking and overcoming said yielding detent means by the momentum of said swift movement, and said detent means halting the return of said pedal at said second position when said pedal is returned slowly under manual control from said third position.

3. In a truck of the class described, a control pedal, means mounting said pedal for movement into three controlling positions, a spring pressed cam bearing against said pedal and yieldingly resisting its movement from a first or normal position, a roller on said pedal lying against a surface of said cam and further resisting the movement of said pedal from said first or normal position, said pedal when moved to a second position moving said cam against said spring pressure to withdraw said roller from said surface, whereupon a second surface of said cam through its spring will resist yieldingly the return of said roller from said second position into cooperation with said first surface, said pedal when moved even further to a third position against the resistance of the spring pressure and then released moving swiftly to said first or normal position by overcoming the yielding resistance of said second surface to the return of said treadle to said normal position, said second surface halting said roller and pedal against return to said first position when said pedal is returned slowly as under manual control from said third position.

4. In a truck of the class described, a control pedal, means mounting said pedal for movement under manual pressure into three controlling positions, a spring pressing against said pedal and yieldingly resisting its movement from a first or normal position to a second position and then to a third position, a yielding detent, means whereby said yielding detent yieldingly resists the return of said pedal to said first position by said spring when said pedal has been moved from said first position to said second position, said pedal being movable to said third position by manual pressure against the resistance of the spring pressure, said pedal being free of detent control in said third position and when released from said manual pressure moving swiftly under said spring pressure to said first or normal position from said third position, said pedal in said swift movement overcoming the yielding resistance of said detent at said second position, and said yielding detent halting said pedal at said second position when said pedal is returned slowly as under manual control from said third position toward said second position.

GEORGE QUAYLE.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
373,455	Gould	Nov. 22, 1887
608,342	McElroy	Aug. 2, 1898
1,480,508	Collis	Jan. 8, 1924
1,549,100	Maybach	Aug. 11, 1925
1,710,305	Gans	Apr. 23, 1929
1,842,790	Lindgren	Jan. 26, 1932
2,163,675	Germond	June 27, 1939

FOREIGN PATENTS

Number	Country	Date
89,018	Austria	1922