

Oct. 3, 1950

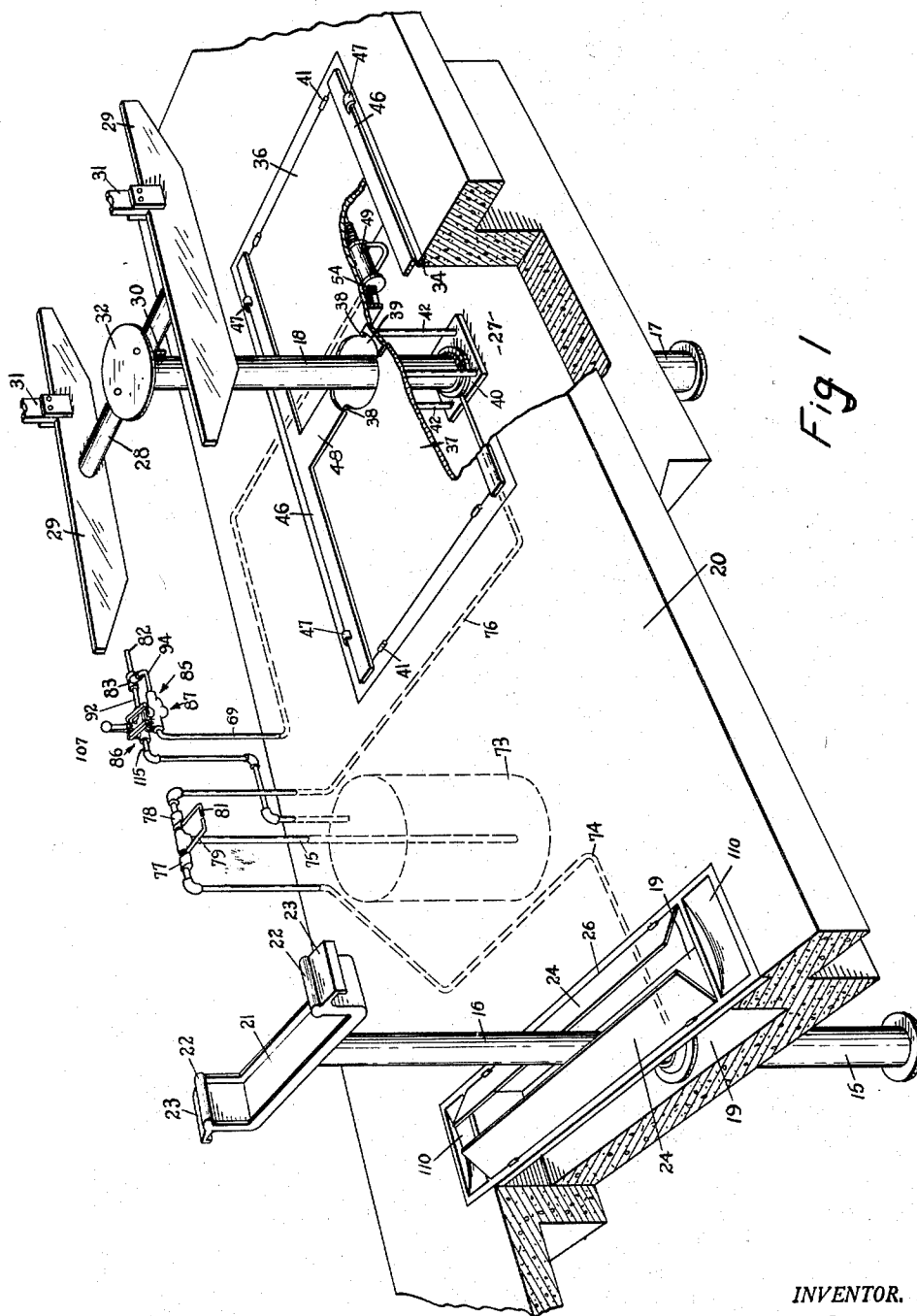
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2,524,237

VEHICLE HOIST

Filed April 9, 1948

3 Sheets-Sheet 1



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VEHICLE HOIST

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3 Sheets-Sheet 2

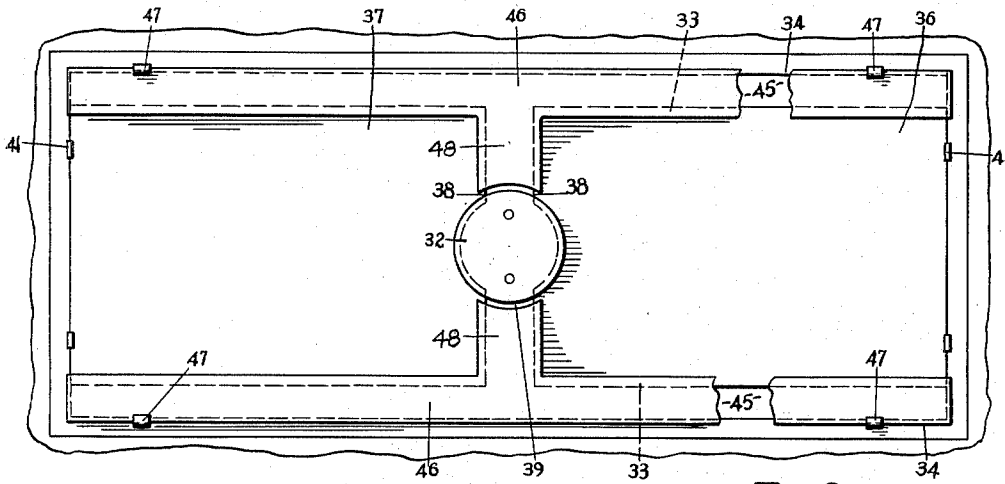


Fig 2

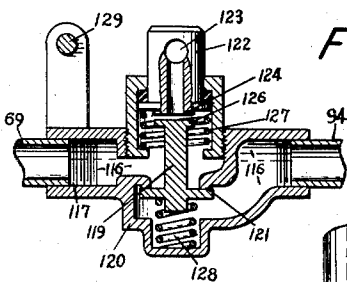


Fig 9

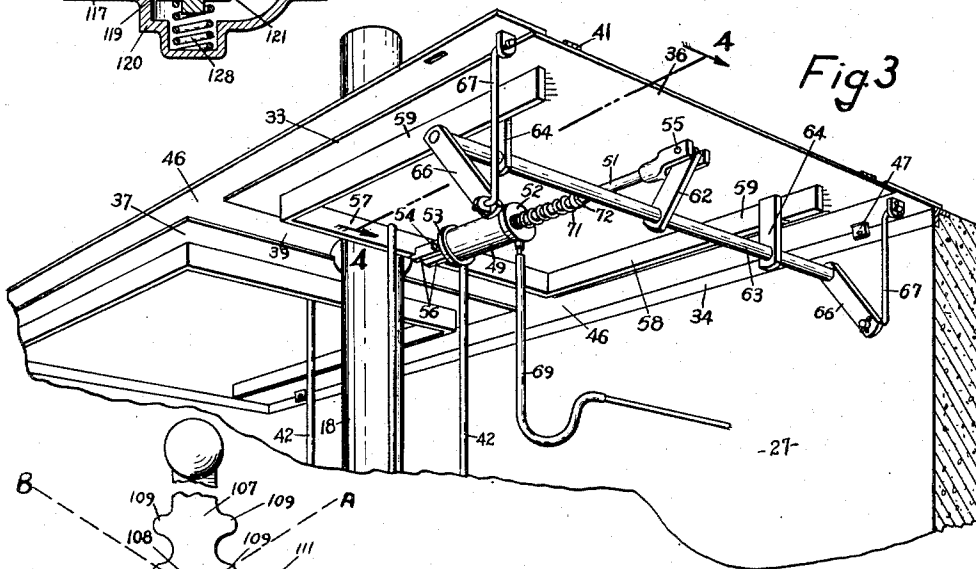


Fig 3

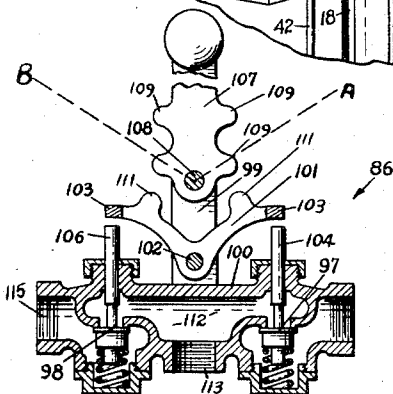


Fig 8

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3 Sheets-Sheet 3

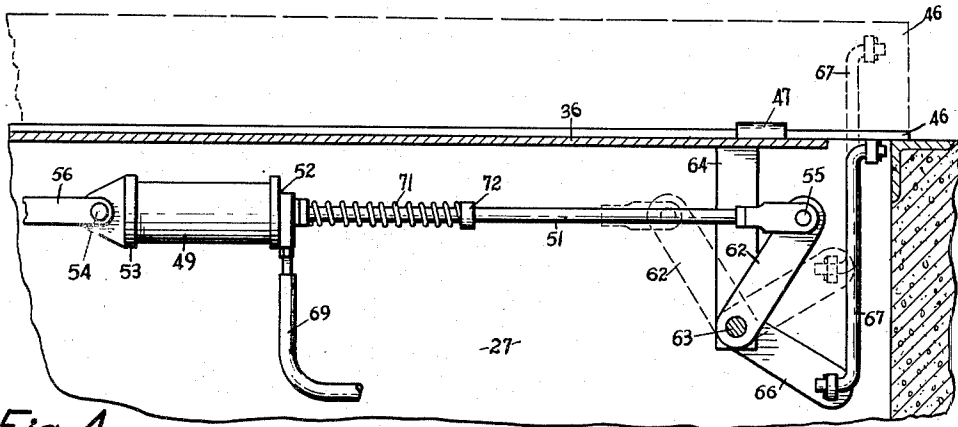


Fig. 4

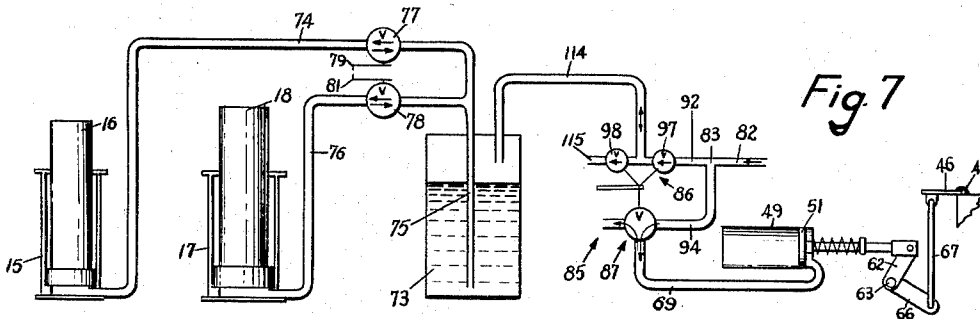


Fig. 7

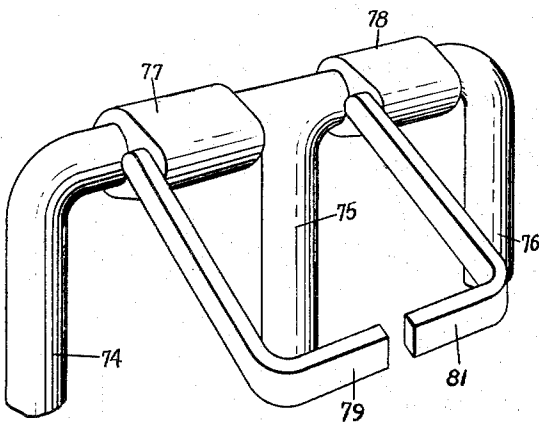


Fig. 5

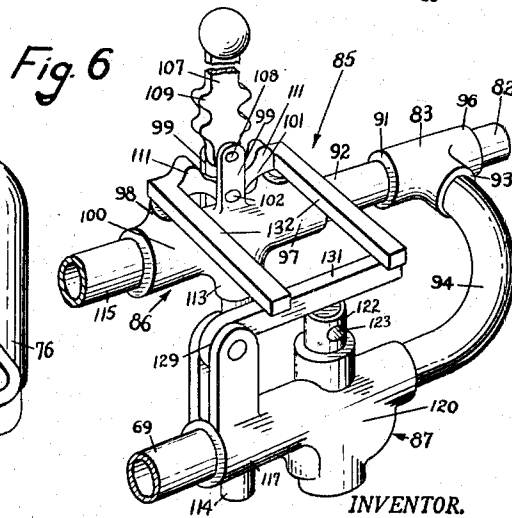


Fig. 6

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UNITED STATES PATENT OFFICE

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VEHICLE HOIST

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Application April 9, 1948, Serial No. 19,949

6 Claims. (Cl. 254—89)

1

This invention relates generally to vehicle hoists and in particular to a closure means for a vehicle hoist having a lift member mounted in a floor pit for movement to a lowered position below the level of the floor surface. The use of what might be termed a "pit mounted vehicle hoist" provides for a covering of the floor pit, when the hoist is in its lowered position, so that the floor space occupied by the hoist is free and unobstructed for the travel of automobiles and portable service equipment thereover.

An object of this invention is to provide an improved vehicle hoist of pit mounted type.

A further object of this invention is to provide a pit closure means for a pit mounted hoist, in which the closure means are movable to their open positions prior to the movement of the hoist from a lowered or raised position therefor, so that the pit is always open to receive the hoist or to permit the hoist being raised therefrom.

Another object of this invention is to provide a pit closure means for a pit mounted hoist of full hydraulic type in which air-operated means for moving the closure means to an open position is actuated concurrently with the supply of air to, or the release of air from, the usual oil reservoir adapted to supply oil under pressure to the hoist lift member.

Still another object of this invention is to provide a pit mounted hoist of full hydraulic type having an oil reservoir adapted to receive air under pressure to raise the hoist lift member, in which pit cover members are operable in response to the supply of air to the oil reservoir so as to be in their open positions when the hoist is being moved into or out of the pit, and in their closed positions at all other times.

A feature of this invention is found in the provision of a pit mounted hoist of full-hydraulic type in which a pair of oppositely arranged pit cover members are pivotally supported on side walls of the pit for movement toward each other to closing positions therefor. A rock shaft, within the pit, is connected with the cover members such that the covers are concurrently pivoted in response to a rocking movement of the shaft. Air-operated means are adapted to rock the shaft in one direction to move the cover members to their open positions, and yieldable means act on the rock shaft in an opposite direction to move the cover members to their closed positions. A source of air under pressure is connected with an oil reservoir for the hoist lift member and with the air-operated means for the rock shaft, through a valve structure having a single control lever and constructed and arranged such

2

that air is supplied to the air-operated means concurrently with the supply of air to or the release of air from the reservoir, whereby the cover members are moved to their open positions whenever the hoist is being lowered into or raised from the floor pit.

Further objects, features and advantages of this invention will appear from the following description when taken in connection with the accompanying drawings, in which:

Fig. 1 is a perspective view of a vehicle lift of two-post type embodying the pit closure means of this invention with the rear hoist thereof, with certain parts broken away to more clearly show the construction and assembly of the closure means;

Fig. 2 is an enlarged plan view of the rear hoist with the closure means in its pit closing position and showing parts broken away;

Fig. 3 is a fragmentary perspective view of the rear hoist looking in a direction generally upwardly and forwardly from a position within the pit, and with the closure means in a closed position;

Fig. 4 is an enlarged sectional detail view taken substantially along the lines 4—4 in Fig. 3;

Fig. 5 is a perspective view of oil valve units for controlling the supply of oil under pressure to the front and rear hoists of the vehicle lift;

Fig. 6 is a perspective view of an air valve structure forming part of the hoist air system;

Fig. 7 is a diagrammatic showing of the air and oil systems of the hoist;

Fig. 8 is a vertical longitudinal sectional view of an air control valve unit forming part of the valve structure in Fig. 6; and

Fig. 9 is a vertical longitudinal sectional view of a second air control valve forming part of the valve structure shown in Fig. 6.

With reference to the drawings, there is shown in Fig. 1 an automobile hoist of two-post type including front and rear hoists, with the front hoist having a cylinder 15 operatively associated with a piston or lift member 16, and a rear hoist including a cylinder 17 and associated piston 18.

The front hoist is located in a pit 19 formed in a floor surface, indicated generally as 20, and includes a front axle supporting structure or saddle 21, of a substantially U-shape, fixed to the top of the piston 16 and having a raised axle-engaging rib 22 at the free end of each of its legs. A support 23, for an automobile spring pad, also at the free end of each leg of the U-shape channel member 21, is extended outwardly from a corresponding rib 22.

The opening at the top of the pit 19 is of a size and shape such that the saddle member 21, at the lowermost limit of travel of the piston 16, is received within the pit below the surface of the floor 20. With the saddle 21 thus located within the pit 19, the pit opening is automatically closed or covered by a pair of floor or cover plates 24 hinged or pivoted at their outer sides 26 for pivotal movement upwardly and away from each other to their open positions, shown in Fig. 1, and for movement downwardly toward each other to closed and supported positions on the ribs 22.

When the piston 16 is initially raised, the cover plates 24 are pushed to their open positions by the saddle member 21. On a continued raising of the piston 16, the inner sides of the cover plates rest against the saddle member 21 and piston 16 so as to be upwardly inclined toward each other, as shown in Fig. 1, to constitute side guards for the pit opening. This relative position of the cover plates 24 is maintained until the saddle member 21 is lowered into the pit 19, at which time the plates 24 follow the saddle member to their closed positions. It is seen, therefore, that the front hoist, in its lower limit of travel, is located entirely within the pit 19, the opening of which is closed by the plates 24 to provide a floor surface over the pit continuous or flush with the floor 20. With the piston 16 in a raised position, the inclination of the plates toward each other over the opening of the pit 19 prevents any accidental slipping by a person into the pit 19.

The rear hoist is mounted in a floor pit 27 and includes a rear axle supporting structure having a transversely extended tubular beam member 28 fixed at its central portion to the top of the piston 18 (Fig. 1). Each end of the tubular beam 28 extends through the central portion of a flat upright longitudinally extended supporting member 29. The ends of the tubular beam 28 are fixed to a corresponding member 29 by welding and are substantially flush with the outer side surfaces of such members. Rear axle engaging blocks 31 are slidably carried on the top edge of each upright supporting member 29 for movement longitudinally thereof to axle engaging positions.

Adapted to rest on the top of the tubular beam 28, at a position above the piston 18, is a vertically movable cover plate 32 having downward extensions 30, one of which is shown in Fig. 1, arranged at opposite sides of the piston 18 and guidably extended through the tubular beam 28.

The opening of the rear pit 27 is of a size and shape such that when the piston 18 is at its lowermost limit of travel the rear axle supporting structure is receivable therein at a position below the level of the floor 20. A closing of the pit opening, when the rear hoist is in either a lowered or raised position, is accomplished by the provision of means including a pair of stationary cover members 36 and 37.

With reference to Figs. 1 and 2, it is seen that the cover plates 36 and 37 are of a substantially rectangular shape with their inner ends 38 spaced from each other to form a transverse opening 39 adapted to receive the transverse beam member 28 therethrough. The outer ends of the stationary plates 36 and 37 are connected, as indicated at 41, to the opposite end walls of the pit opening 27. The opposite sides 33 of the cover plates 36 and 37 are spaced from the adjacent side-walls 34 of the pit 27 to form longitudinally ex-

tended openings 45, open to the opposite ends of the transverse opening 39 and adapted to receive the support members 29 therethrough. Fixed adjacent to the inner end of each plate 36 and 37 and projected downwardly therefrom, are a pair of supporting rods 42 the lower ends of which rest on a square shaped flange member 40 mounted at the top of the cylinder 17. The plates 36 and 37 are thus firmly supported and positioned substantially flush with the floor 20.

With the rear hoist in its lowered position within the pit 27, the transverse opening 39 is covered over its central portion by the vertically movable cover member 32 which is guidably supported in the beam member 28. The remaining end portions of the transverse opening 39, and the longitudinal openings 45, are closed by a pair of oppositely arranged longitudinally extended pivoted cover members 46 having lateral ears or extensions 48 intermediate their ends which are extended inwardly toward each other at positions overlying the opening 39 at opposite sides of the piston 18. The covers 46 are pivoted at 47 on the upper ends of the pit side walls 34.

In the elevating of the rear hoist from within the pit 27, the cover members 46 are initially pivotally moved upwardly away from each other, whereby to open the longitudinal openings 45 and the transverse opening 39. On raising of the rear hoist, the cover member 32 is without movement until it is engaged by the transverse beam member 28. When thus engaged, the cover member 32 is moved upwardly with the rear hoist.

When the hoist is in an elevated position, the cover members 46 are returned to their closed positions, as illustrated in Fig. 1, whereby a garage or service man is free to move about below the rear hoist without danger of slipping into the pit 27.

When the rear hoist is to be lowered, the pivoted cover members 46 are initially moved to their open positions to provide for the passage of the cross member 28 and the support members 29 within the spaces 39 and 45, respectively. On a lowering of the rear hoist within the pit 27, the cover member 32 is engaged in a supported position on the stationary cover members 36 and 37. When the rear hoist is lowered entirely within the pit 27 below the level of the floor surface 20, the pivoted covers 46 are moved to their closed positions. Thus, as clearly appears in Fig. 2, when the rear hoist is in a lowered position within the pit 27, the stationary covers 36 and 37, pivoted covers 46, and the vertically movable cover 32 cooperate to completely close the pit opening 27.

In order to accomplish an operation of the pivoted covers 46, so that such covers are always in their open positions, when the rear hoist is to be received within, or raised from the pit 27, and closed at all other times, there is provided a single acting air cylinder 49 (Figs. 3 and 4) having a piston 51 extended outwardly from its end 52. The cylinder end 53 is pivoted at 54 between a pair of spaced support members 56 extended rearwardly from a frame member 57 carried adjacent the inner end and from the lower side of the stationary cover member 36. The frame member 57 forms the base of a substantially U-shape frame structure 53 which includes legs 59 arranged longitudinally of the cover member 36 and extended rearwardly from the frame member 57. It is seen, therefore, that the frame structure 58 and cylinder 49 are supported from

the under side of the stationary cover 36 so as to be located within the floor pit 27.

The free end of the piston 51 (Figs. 3 and 4) for the air cylinder 49, is pivoted at 55 to the free end of a rock arm 62 which is carried on a rock shaft 63 at a position intermediate the ends of the rock shaft. The rock shaft 63 is rotatably supported in a pair of oppositely arranged bearing members 64 projected downwardly from the legs 59 of the U-frame 58, at a position adjacent to the rear or free ends of the legs 59. The opposite ends of the rock shaft 63 project outwardly from their corresponding bearings 64 to positions below the pivoted cover plates 46 and are provided with rock arms 66. Links or levers 67 are pivotally connected between the free ends of the rock arms 66 and the pivoted cover members 46.

On the admission of air under pressure to the cylinder 49, through an air inlet connection 69 at its end 52, the piston 51 is moved forwardly, or to the left as viewed in Fig. 4, to in turn provide for a rocking movement of the shaft 63 in a counterclockwise direction, as also viewed in Fig. 4, whereby the rock arm 62 is moved from its full line position to its dotted line position, also shown in Fig. 4. This movement of the rock shaft 63 provides for an upward movement of the rock arms 66 from their full line positions to their dotted line positions (Fig. 4) whereby the links 67 are moved upwardly to provide for an upward pivotal movement of the pivoted cover members 46 away from each other to their open positions.

In their open positions, the pivoted cover members 46 are arranged in vertical planes common to the pivots 47 so that the transverse opening 29 at opposite sides of the lift member or piston 18, and the longitudinal openings 45 are completely open.

On the release of air from the cylinder 49, the covers 46 are initially moved toward each other to their closed positions by the action of a coil spring 71 mounted about the piston 51 and arranged in compression between the cylinder end 52 and a stop collar 72 on the piston 51. After this initial movement of the covers 46 to their closed positions, they are finally moved to their closed positions by the combined action of the spring 71 and the action of gravity.

The operation of the pivoted covers 46 to their open and closed positions in a timed relation or proper sequence relative to a raising and lowering of the rear lift member 18 will be best understood from a consideration of Figs. 1 and 7. As previously mentioned, the hoist illustrated is of full hydraulic type and the means for raising and lowering the lift members 16 and 18 includes an oil reservoir 73 connected with the front hoist cylinder 15 through an oil line 74 and with the rear hoist cylinder 17 through an oil line 75, with the oil lines 74 and 76 having a common connection 75 with the reservoir 73. Oil valves 77 and 78, for controlling the admission of oil under pressure to the cylinders 15 and 17, respectively, are connected in the oil supply lines 74 and 76, respectively, at positions adjacent to each other. The control handles 79 and 81 for the valves 77 and 78, respectively, are relatively constructed and arranged so as to be capable of being gripped and operated by one hand for simultaneous operation of the lift members 16 and 18.

Air under pressure is supplied to the oil reservoir 73 and the air cylinder 49 from a suitable

source of supply (not shown) through an air supply line 82 having a T-connection 83. A valve structure, indicated generally as 85, includes an air valve unit 86, for controlling the admission and release of air to the oil reservoir 73, and an air valve unit 86, for controlling the admission and release of air to the air cylinder 49. One end 91 of the T-connection 83 is connected with the air valve unit 86 through a pipe 92, a second end 93 of the T-connection is connected with the air valve unit 87 by a pipe 94, with the air supply line 82 being connected to the third end 96 of the T-connection. As shown in Figs. 1 and 6, the valve units 86 and 87 are arranged opposite each other in a substantially parallel relation.

The valve unit 86 (Figs. 6 and 8) includes a pair of like valve members 97 and 98 positioned to opposite sides of a pair of transversely spaced pivot supports 99 projected upwardly from the housing or casing 100 of the valve unit 86. An actuating member 101 of a substantially V-shape is pivoted at 102 between the supports 99 and has its free ends 103 arranged to alternately engage the valve stems 104 and 106 of the valve members 97 and 98, respectively.

An operating handle 107 is pivoted at 108 between the upper ends of the supports 99 and is integrally formed adjacent its pivoted end with oppositely arranged pairs of locking members 109, adapted to releasably engage therebetween coacting lock members 111 formed on the actuating member 101 at positions adjacent to the free ends 103 thereof.

The casing 100 is formed with a longitudinally extended air passage 112, common to the valve members 97 and 98, and provided between such valve members with a connection 113, which is connected with the oil reservoir 73 through an air line or pipe 114.

When the operating handle 107 is in its neutral or central position, shown in full lines in Figs. 6 and 8, both of the valve members 97 and 98 are closed and the actuating member 101 is out of contact engagement with the valve stems 104 and 106. To admit air under pressure to the oil reservoir 73, the handle 107 is moved in a clockwise direction to its dotted line position indicated at A in Fig. 8. This movement of the handle 107 through the actuating member 101 depresses the stem member 104 to open the valve member 97. Air under pressure is thus admitted from the air supply line 82 through the valve 97, passage 112 and air line 114 to the oil reservoir 73.

It is to be noted that the lift members 16 and 18 are not operated on this manipulation of the handle 107, by virtue of the fact that the oil valves 77 and 78 are closed. To maintain the oil in the reservoir 73 under pressure the handle 107 is returned to its neutral position.

When air is to be released from the oil reservoir, the handle 107 is moved in a counter-clockwise direction to its dotted line position indicated at B in Fig. 8, whereby the valve member 98 is opened. Air from the reservoir 73 is thus permitted to flow through the air line 114, passage 112 and valve member 98 to the atmosphere through the exhaust outlet 115 in the valve casing 100. This release or exhaust of air is stopped by returning the handle 107 to its neutral position.

The air valve unit 87 is of a commercially available type, and includes a casing 120 (Figs. 6 and 9) formed with a longitudinal air passage 116

connected at one end with the air line 94 and connected at its other end 117 with the air cylinder 49 through the connection 69. The air valve 87 includes further a double acting valve means comprised of a lower plunger 119 formed at its lower end with a valve member 121 and an upper plunger 122 of a hollow or tubular construction closed at its upper end but formed adjacent to such upper end with an exhaust port 123. The lower end 124 of the upper plunger 122 is adapted for sealing engagement with the upper end 125 of the lower plunger 119.

The lower end of the upper plunger 122 is normally held out of a seating engagement with the upper end 125 of the lower plunger 119 by a spring 127 and the valve member 121 is normally retained closed by a spring 128. Thus when the plungers 119 and 122 are in their normal or rest positions, shown in Fig. 9, air is released from the air cylinder 49 through the air connection 69, passage 116, upper plunger 122 and then to the atmosphere through the exhaust port 123.

To admit air under pressure to the air cylinder 49, the upper plunger 122 is depressed, whereby the lower end 124 of the upper plunger 122 is seated at the upper end 125 of the lower plunger 119, and the lower plunger is moved downwardly to open the valve member 121. Air from the supply line 94 is thus permitted to pass through the valve 121 and passage 116 to the air connection 69 for the air cylinder 49.

Pivoted at 129 on the valve unit 87, for up and down pivotal movement, is an actuating lever 131 (Fig. 6). In the arrangement of the valve units 86 and 87, the pivot 129 is at a longitudinally spaced position relative to the pivot 102 for the actuating member 101 of the valve unit 86. Extended laterally in the same direction from the free ends 103 of the actuating member 101 are control bars 132 having their free ends adapted for contact engagement with the actuating lever 131. Thus on movement of the handle 107 to either of its dotted line positions A and B, shown in Fig. 8, one of the control rods 132 engages and moves the actuating lever 131 in a downward direction. The under side of the actuating lever 131 is adapted for contact engagement with the upper end of the plunger 122 in the valve unit 87. Thus on either the admission or release of air from the oil reservoir 73, as controlled by the manipulation of the handle 107, the valve unit 87 is operated to supply air under pressure to the air cylinder 49. Whenever the handle 107 is in its neutral position, the plunger 122 is released by the actuating lever 131 to provide for the exhaust of air from the air cylinder 49.

In the operation of the hoist, assume the lift members 16 and 18 to be in their lowered positions within the floor pits 19 and 27, respectively. The vehicle to be elevated is then driven over the hoist to a centered position determined by the reception of its front wheels in the wheel depressions 110 (Fig. 1) arranged at opposite sides of the front hoist. To raise the lift members, the handle 107 is moved to its dotted line position A, shown in Fig. 8. Air under pressure is thus admitted to the oil reservoir 73 through the valve member 87, and to the air cylinder 49 through the valve member 121. In the manner previously described, the cover members 46 are moved by the air cylinder 49 to their open positions.

With the cover members thus opened, the handles 79 and 81 for the oil valves 77 and 78, respectively, are gripped in one hand and simultaneously moved to their open positions, it be-

ing understood that at this time the handle 107 is gripped by the other hand of the hoist operator, which handle 107 is arranged in close proximity to the oil valves 77 and 78, as illustrated in Fig. 1.

When the lift members 16 and 18 have been elevated to a desired position, the oil valves 77 and 78 are closed, and the handle 107 is returned to its neutral position. With the handle 107 in its neutral position, the oil in the reservoir 73 is retained under pressure and air is released from the air cylinder 49 to permit a return of the cover members 46 to their closed positions. The pit 27 is thus closed to permit service or repair work on the vehicle, without danger of having the service man slipping into any floor opening.

When the lift members 16 and 18 are to be lowered, the handle 107 is moved to its dotted line position B, shown in Fig. 8, to provide for an opening of the valve member 83 of the valve unit 86, and an opening of the valve member 121 of the valve unit 87. Air under pressure is thus again supplied to the air cylinder 49 to provide for an opening of the cover members 46 so that on opening of the oil valves 77 and 78 the rear hoist is free to be lowered within the pit 27. When the rear hoist is within the pit 27, the oil valves 77 and 78 are closed, and the handle 107 is returned to its neutral position. Air is thus again released from the air cylinder 49 to close the cover members 46.

From a consideration of the above description, it is seen that the invention provides a closure means for a full hydraulic hoist of pit-mounted type, which is operable in a timed relation relative to a raising or a lowering of the hoist, so that the pit is always open when the hoist is to be lowered therein, or raised therefrom. Further, the cover members 46 are of a size and construction to provide for the vehicle to be elevated being initially driven over the hoist, when the pit 27 is closed, and then moved to an open position without interference with any of the under structure of the vehicle.

Although the invention has been described and illustrated with respect to its application to the rear hoist, it is to be understood that it is also readily applicable in the same manner as above described, to the cover members 24 of the front hoist. It will be appreciated also that the cylinder 49 may be hydraulically operated, where oil under pressure is supplied from an oil pump (not shown), by merely directing the oil from the pump inlet through the valve structure 85 and fluid connecting the exhaust part 123 with the pump reservoir.

Further, although the invention has been described and illustrated with respect to a preferred embodiment thereof, it is to be understood that it is not to be so limited since changes and modifications can be made therein which are within the full intended scope of this invention, as defined by the appended claims.

I claim:

1. In a full-hydraulic hoist including a lift member mounted in a floor pit and movable to a lowered position within said pit below the level of the floor surface, means for closing said pit including a pair of oppositely arranged cover members pivotally supported on side walls of said pit for pivotal movement in opposite directions to opening and closing positions relative to said pit, a rock shaft within said pit arranged transversely of said cover members, an air cylinder in said pit having a piston extended longitudinally

of said cover members, means connecting said shaft for rockable movement in response to a movement of said piston, means connecting said cover members with said rock shaft for pivotal movement to pit opening and closing positions in response to a rockable movement of said shaft, means for supplying oil under pressure to said lift member including an oil reservoir, an air system for supplying air under pressure to said oil reservoir including a valve structure having air connections with said oil reservoir and air cylinder and air exhaust outlets for said reservoir and air cylinder, a pivoted actuating handle for said valve structure, said valve structure being of a construction such that when said handle is moved to a neutral position therefor air is exhausted from said air cylinder, when said handle is moved in one direction from said neutral position air under pressure is supplied concurrently to said oil reservoir and said air cylinder, and when said handle is moved in an opposite direction from said neutral position, air is supplied to said air cylinder and exhausted from said oil reservoir, and means operable independently of said valve structure for admitting oil under pressure from said reservoir to said lift member.

2. In a full-hydraulic hoist including a lift member mounted in a floor pit and movable to a lowered position within the pit, means for closing said pit including a pair of oppositely arranged pivoted cover members, means pivotally supporting said cover members at the outer sides thereof on a pair of opposite side walls of said pit for pivotal movement in opposite directions to pit opening and closing positions, means for opening and closing said cover members including a rock shaft in said pit arranged transversely of said cover members, means connected between said cover members and said shaft to pivotally move said cover members in response to a rocking movement of said shaft, yieldable means for rocking said shaft in one direction, air-operated means for rocking said shaft in an opposite direction against the action of said yieldable means, means for supplying oil under pressure to said lift member including an oil reservoir and source of air supply under pressure connected with said oil reservoir and said air-operated means, and means for relatively controlling the supply of air from said source to said oil reservoir and said air-operated means such that said cover members are moved to their open positions prior to the movement of said lift member away from raised and lowered positions therefor.

3. In a full-hydraulic hoist having a lift member mounted in a floor pit and movable to a lowered position within said pit below the level of the floor surface, a transverse beam carried adjacent the upper end of said lift member, longitudinally extended support members carried at the ends of said beam, means for closing said pit including a pair of stationary members arranged over said pit so as to cover the pit opening over those portions thereof defined by the space between said support members at opposite sides of said beam member, a pair of pivoted cover members arranged at opposite sides of said stationary members for closing those portions of the pit opening adapted to receive said support members therethrough, a rock shaft in said pit supported from one of said stationary cover members and extended between said pivoted cover members, means connected between said pivoted cover members and said rock shaft to open and close said pivoted cover members in response to

a rocking movement of said shaft, yieldable means within said pit for rocking said shaft in one direction, air operated means for rocking said shaft in an opposite direction carried on said one stationary cover member and arranged within said pit, means for supplying oil under pressure to said lift member including an oil reservoir and a source of air under pressure connected with said oil reservoir and said air-operated means, and means for relatively controlling the supply of air from said source to said oil reservoir and to said air-operated means such that said pivoted cover members are in their open positions prior to the movement of said lift member away from raised and lowered positions therefor.

4. In a full-hydraulic hoist having a lift member mounted in a floor pit and movable to a lowered position within said pit below the level of the floor surface, means for closing the pit opening including a pair of cover members pivotally supported on opposite side walls of said pit for pivotal movement toward each other to closing positions therefor, a rock shaft within said pit extended transversely of said cover members, a pair of rock arms adjacent opposite ends of said shaft, a third rock arm on said shaft intermediate the ends thereof, pivoted lever systems connected between said pair of rock arms and cover members to provide for the pivotal movement of said cover members in response to a rocking movement of said shaft, air-operated means in said pit connected with said third rock arm to move said shaft in one direction to open said cover members, yieldable means arranged to act on said third rock arm to move said shaft in an opposite direction to close said cover members, means for raising and lowering said lift member including an oil reservoir, means for supplying air under pressure to said oil reservoir and air-operated means, and an air control system for relatively controlling the supply of air under pressure to said oil reservoir and air-operated means such that air is admitted to said air-operated means concurrently with the admission of air to or the release of air from said oil reservoir.

5. In a hydraulic vehicle hoist having a lift member mounted in a floor pit and movable to a lowered position within the pit, means for closing said pit including a pair of oppositely arranged cover members pivoted on side walls of said pit for pivotal movement toward each other to closing positions therefor, movable means in said pit connecting said cover members together for concurrent pivotal movement, fluid operated means for moving said movable means in one direction to pivotally move said cover members to open positions therefor, means for raising and lowering said lift member including a source of fluid under pressure, a first means fluid connecting said pressure source with said lift member, a second means fluid connecting said pressure source with said fluid operated means, and valve means connected in said two fluid connecting means adapted to relatively control the supply of fluid under pressure to said lift member and said fluid operated means such that said pivoted cover members are in their open positions prior to the movement of said lift member away from a raised position or a lowered position therefor.

6. In a full-hydraulic vehicle hoist having a lift member mounted in a floor pit and movable to a lowered position within the pit, means for closing said pit including a pair of oppositely arranged cover members pivoted on side walls of

11

said pit for pivotal movement toward each other to closing positions therefor, movable means in said pit connecting said cover members together for concurrent pivotal movement, air-operated means for moving said movable means in one direction to pivotally move said cover members to open positions therefor, means for raising and lowering said lift member including an oil reservoir, a source of air under pressure, air connections from said air source to said oil reservoir and

5

10

12

air-operated means, and air control means arranged in said air connections adapted to relatively control the supply of air from said source to said air-operated means and oil reservoir such that air is admitted to said air-operated means concurrently with the admission of air to or the release of air from said oil reservoir.

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No references cited.