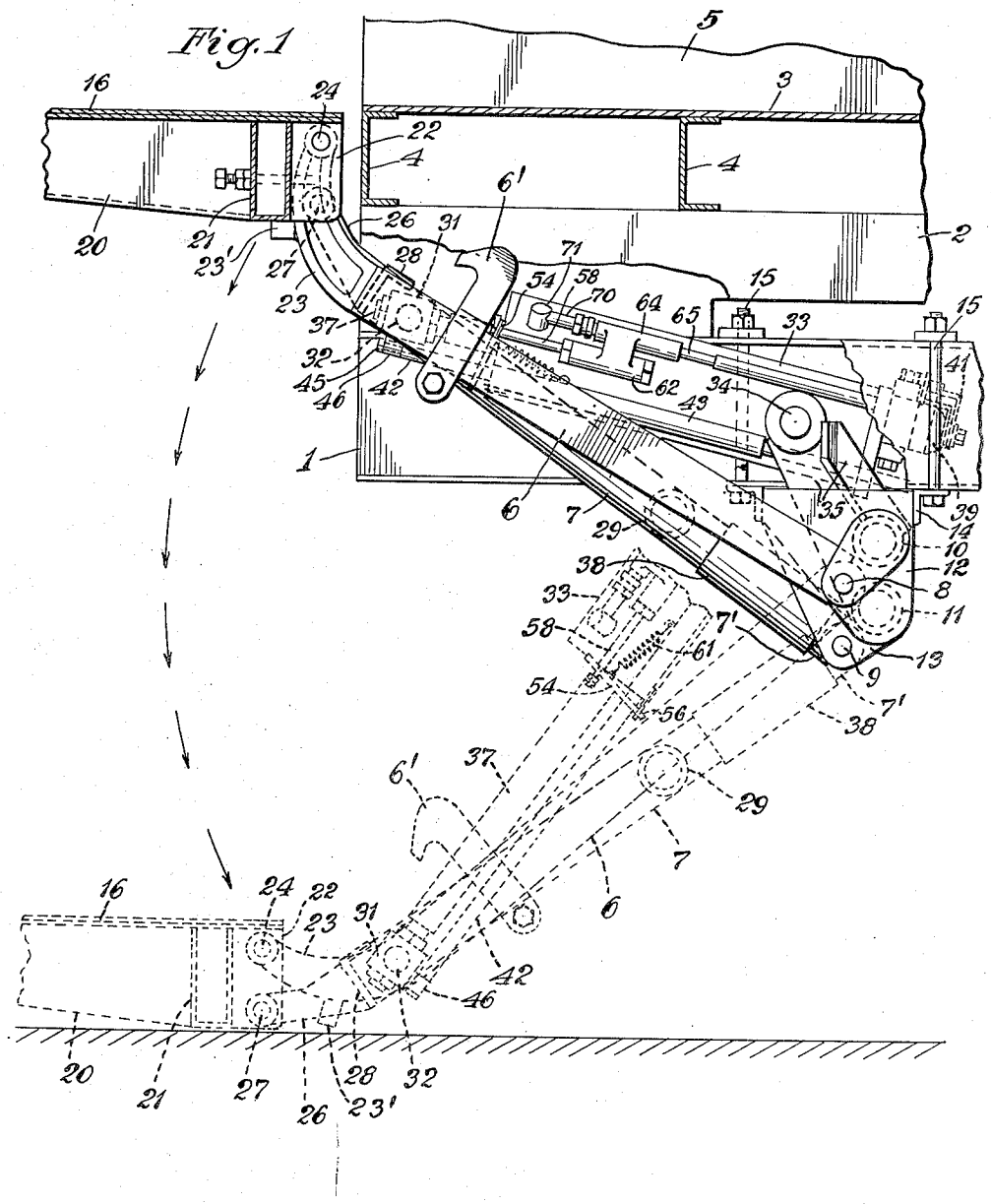
July 27, 1954 G. S. PARK 2,684,770

LATCH FOR LIFT GATES

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Fig. 1



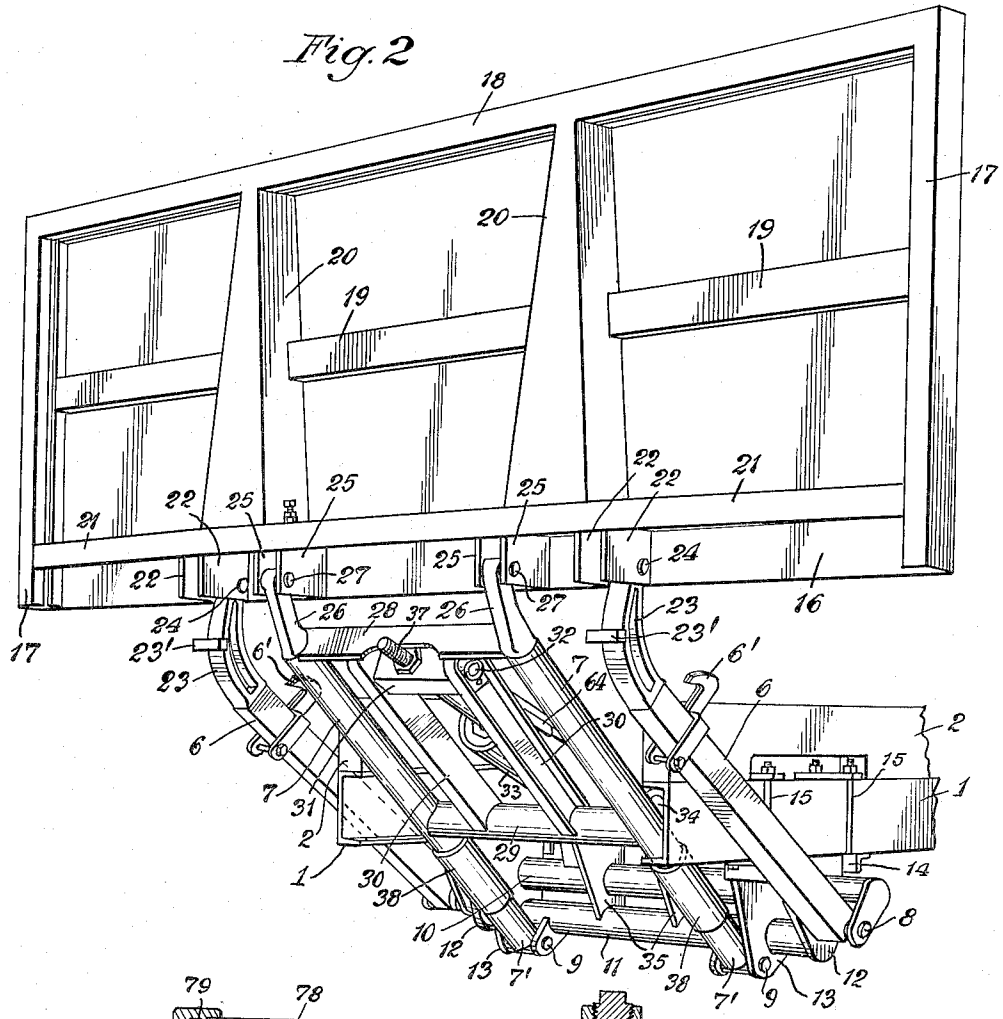
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LATCH FOR LIFT GATES

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Fig. 2



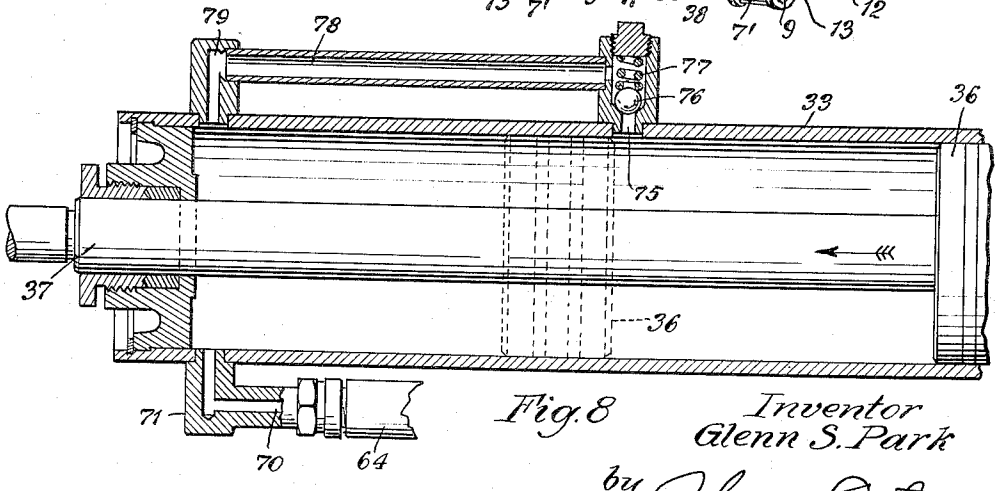


Fig. 8

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Glenn S. Park

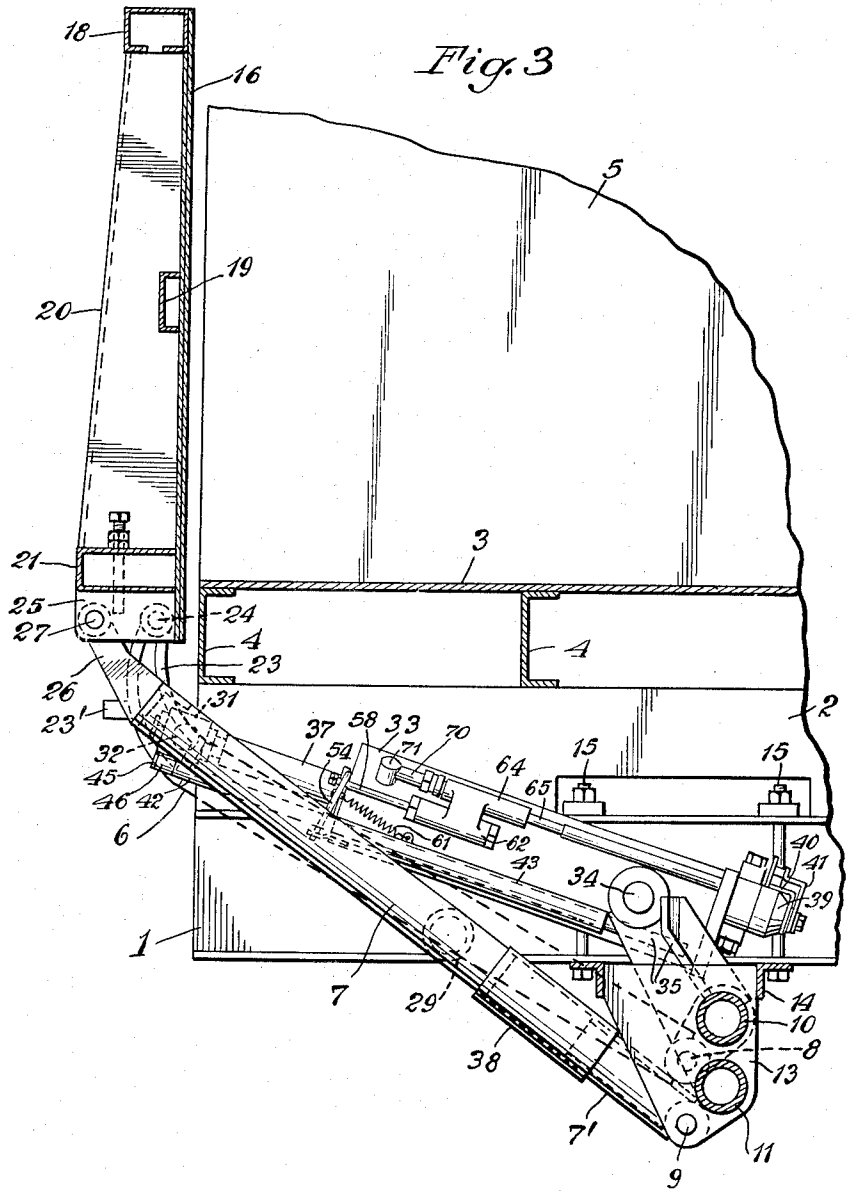
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LATCH FOR LIFT GATES

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Fig. 3



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LATCH FOR LIFT GATES

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Fig. 4

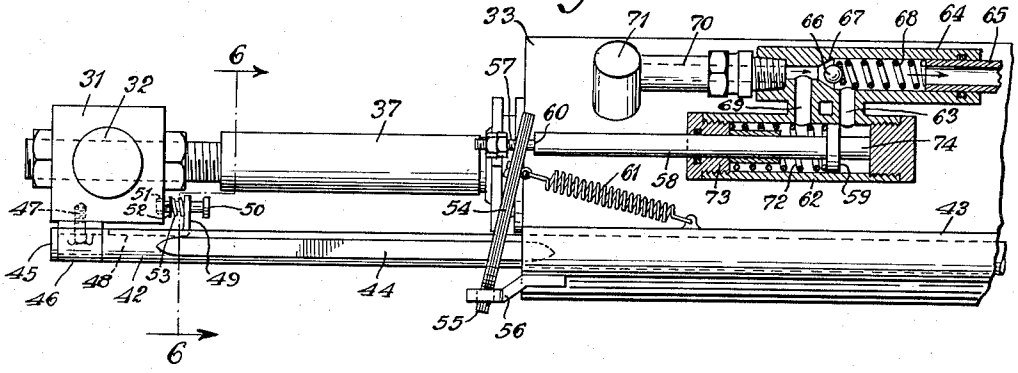


Fig. 5

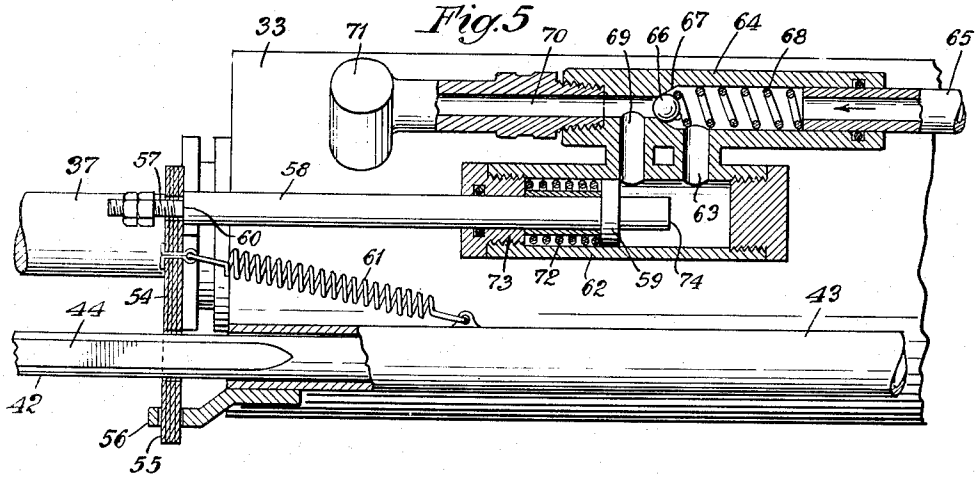


Fig. 6

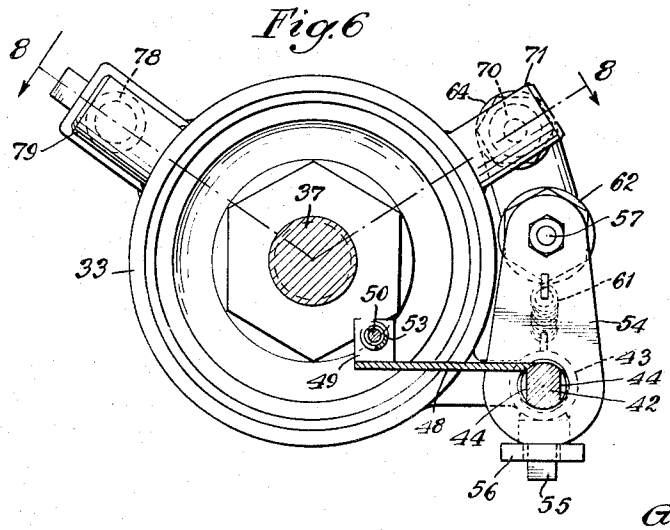
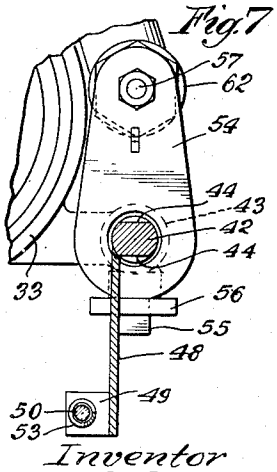


Fig. 7



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Patented July 27, 1954

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UNITED STATES PATENT OFFICE

2,684,770

LATCH FOR LIFT GATES

Glenn S. Park, Streator, Ill., assignor to Anthony Company, Streator, Ill., a corporation of Illinois

Application March 26, 1952, Serial No. 278,699

15 Claims. (Cl. 214—77)

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This invention relates to a latching or holding means and it has for one object to provide a means whereby a mechanical element is automatically locked in one position, preferably at or near the limit of its movement in one direction.

In the particular form here shown, the invention is embodied in or applied to a lifting and closing mechanism arranged to lift and close a gate or a gate-like element, and the structure includes means for latching and holding the gate element in its closed position.

One object of the invention is, therefore, to provide means for holding or latching a closure member in closed position.

Another object is to provide such latching means automatically effective to latch the closure member in closed position, even when the power closing device is inactive.

A still further object of the invention is to provide such a latching means associated with a hydraulically actuated lift gate and to provide for locking the gate or latching its closing means in the closed position automatically as a gate reaches its closed position, and to latch the gate in closed position when the hydraulic closing and lifting means are inactive.

Other objects will appear from time to time throughout the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings, wherein:

Figure 1 is a vertical longitudinal section of a portion of a vehicle and gate showing the gate lifting and closing means in elevation;

Figure 2 is a perspective view of the device of Figure 1 shown on a different scale and illustrating the gate in the closed position;

Figure 3 is a vertical longitudinal section showing the device on the scale of Figure 1 with the gate and the raising and closing means all in the raised and closed position;

Figure 4 is a side elevation of a portion of the hydraulic cylinder, piston rod, latch means in the latched position, and cross head illustrating the latch all in elevation and with parts of the hydraulic control system in section;

Figure 5 is a fragmentary view showing the latch means in unlatched position and showing the hydraulic control means with parts in section and parts in elevation;

Figure 6 is a transverse section taken at the line 6—6 of Figure 4 on an enlarged scale and illustrating the adjustment of parts when the latch is in latching position;

Figure 7 is a fragmentary view of the latch rod control means in the unlatched position;

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Figure 8 is a longitudinal sectional view taken at line 8—8 of Figure 6 and illustrating a portion of the hydraulic control system.

Like parts are designated by like characters throughout the specification and drawings.

In the particular form here shown, the device is applied to a truck or other automotive vehicle. It might equally well be applied to a stationary support. The present invention is not directed to or limited to the combination of a raising and closing means with any particular base or support. It is necessary only that there be a firm support capable of carrying the load imposed upon it.

As shown, the raising assembly is mounted on a truck which includes frame member 1 and intermediate body frame support 2, a body which includes a floor plate 3, transverse frame members 4 and side portions 5. Only so much of the body is shown and described as to indicate that the assembly contemplates the association of the lifting and closing means with a load supporting and carrying member. This may be the ordinary flat platform body, it may be a closed body having complete closure means, or it may merely include side closing means.

The purpose of the element which is raised and lowered is two-fold. It acts as an elevator for raising or lowering material to or from the level of the load-carrying surface 3. It also acts, when in the position of Figures 2 and 3, as a tail gate or other form of gate for closing the vehicle or the load-carrying assembly.

The precise details of the mounting and supporting means for carrying the lifting assembly form no essential part of the invention. The particular device might be mounted in a variety of ways. The vehicle frame is a convenient supporting means and, as shown, the hoisting or raising assembly is fastened to the vehicle frame. Whatever the means for mounting the device on the truck frame or other support, means are provided for furnishing a pivotal support for two pairs of arms. There is thus an outer pair of arms 6, 6 and an inner pair of arms 7, 7. The arms 6 are pivotally supported concentrically with respect to each other on bearings 8 and the arms 7 are similarly supported concentrically with respect to each other on bearings 9. The bearings are carried in suitable supporting webs or frame members, the details of which form no essential part of the invention. In the present form, however, a more or less frame-like assembly is formed to carry the bearings 8 and 9 and to carry other parts which will be mentioned be-

low. This more or less frame-like structure is formed of tubular members 10 and 11 which extend transversely of the supporting frame or other support, and are secured to pairs of plates or plate-like members 12 and 13. A pair of such members is positioned at each side of the assembly and the tubular members 10 and 11 are secured to them. Each pair of plate-like members 12 and 13 is secured to a base part 14 which, as shown in Figures 1, 2 and 3, is fastened by bolts 15 or otherwise to one of the side frame members 1. The tubes 10 and 11, and the plates 12 and 13, thus, with the base parts 14, comprise a frame-like member which may be treated as a unit and from which all of the parts of the assembly are carried. Thus the assembly, as a unit, may be mounted on and secured to a truck frame or other frame.

The gate or platform which is raised by the mechanism which is itself hydraulically actuated, is shown in section in Figures 1 and 3 and in perspective in Figure 2. It comprises a platform or gate-like member which, in horizontal position as shown in Figure 1, acts as a raising or lowering elevator and as shown in Figures 2 and 3 acts as a gate for closing the body. This gate may be of almost any desired detailed construction so long as it is of sufficient size and strength to act as a lowering means and also to act as a gate closing means. As shown, it comprises a generally flat member 16 which is surrounded in part at least by a stiffening frame construction comprising side members 17 and a transverse member 18. These members are of angular or tubular cross section and additional transverse stiffening member 19 may be used, if desired, and a pair of intermediate stiffening frame members 20, 20 may also be used. These members 20, 20 are preferably tapered, as shown in Figure 2, and may be secured to the third transverse frame member 21. In general, the gate will, according to current manufacturing practice, be welded together so that in effect it forms a unit, although it may be otherwise produced.

Along the transverse member 21, preferably secured to it and to the gate plate 16, there are mounted pairs of bearing or hinged supporting parts to receive the outer or swinging ends of the arms 6 and 7. There are thus two pairs of bearing supporting members 22, 22 between which the curved ends 23 of the arms 6 are received in bearing pins 24. Similarly, there are two pairs of bearing supports 25, 25 which are secured to the member 21 and to the plate 16 and between each pair of the members 25 the curved or bent ends 26 of the arms 7 are received on bearing members 27. The portions 23 and 26 may be respectively integral with the arms 6 and 7 or they may be made as support members of the desired shape and secured in place. In the particular form here shown, they are separately made and are fastened in place.

The inner arms 7, 7 are joined together by a transverse member 28 adjacent the curved portions 26 and they are also joined together by a second transverse member 29 which, as shown, is of tubular cross section but might be of any shape. The members 28 and 29 are joined by longitudinal parts 30, 30 which furnish pivotal or other movable bearing parts for a cross head 31, the cross head itself being mounted for movement upon trunnions 32 which engage the cross head and are supported for rotation in the members 30.

The gate, its supporting arms and the means for supporting them having now been described, the description of the raising and lowering means will follow. This raising means comprises a hydraulic cylinder 33 which is pivoted, as at 34 between members 35 which are secured to the tubular frame members 10 and 11 and extend upwardly from them, as shown in Figures 1 and 3 particularly. A piston 36, shown in Figure 8, is mounted for reciprocation within the cylinder 33 and the piston rod 37 extends outwardly from the cylinder and is fastened to the cross head 31.

The arms 6, 6 are of fixed length while the arms 7, 7 are of variable length being of telescopic construction. As shown particularly in Figure 3, the arms 7 may be extended. In Figure 1, they are at their shortest length and in Figure 3 at their longest length. The main arm portion 7 is provided with a sleeve extension 38 which engages a short arm section 7'. It is this section which is pivoted at 9 and when the gate is in the closed position, the parts 7 and 7' are moved apart and the distance between them is spanned by the sleeve 38. When they are in the lowered position, as shown in dotted lines in Figure 1, they move together and the sleeve portion 38 overlaps an increased proportion of the section 7'.

The device of this invention will be associated with some form of power means whereby a pump can be driven to furnish pressure fluid to the cylinder and piston assembly. No pump is shown because the invention is not limited to any particular pump. If the device is mounted on an automotive vehicle, it will ordinarily be driven by a pump which is itself driven from the engine of the vehicle. Pressure fluid is conducted to the cylinder 33 from the pump or other source and the movement to and from the cylinder is controlled by a valve or valves positioned within a housing 39 preferably mounted upon the base of the cylinder to move with it. Valve operating levers 40 and 41 are shown. The particular arrangement of the valves will not be described because such devices are known and the invention is not limited to any particular valve. The cylinder arrangement shown is a double acting cylinder, that is to say, it is one in which pressure fluid may at will be introduced at either end of the cylinder so that the piston is carried by force of the pressure fluid in either direction.

The construction thus far described comprises generally the platform or gate and the means for lowering and raising it. The means for moving it from the horizontal position of Figure 1 to the vertical position of Figures 2 and 3 comprise latching means not shown in detail since such latching means are disclosed in co-pending application Serial No. 249,666 filed in the United States Patent Office October 4, 1951, now Patent No. 2,654,491. Latch hooks 6' are shown.

In general, the latching means used in connection with actuating the piston and cylinder assembly to close the gate to the vertical position comprises latching means for latching the raising assembly in the raised position. When the parts are in this position and are held there by the latch mechanism, if pressure fluid is introduced into the cylinder above the piston in the direction to force it outwardly away from the pivot end of the cylinder, the gate will be moved from the full line position of Figure 1 to the vertical position of Figure 2.

If the assembly were not latched in the raised

position, pressure on the inner face of the piston would force the piston rod outwardly and would merely lower the gate to the dotted line position of Figure 1. Since, however, the assembly is at this time latched in the raised position and cannot be lowered, the outward movement of the piston 36 is effective through the cross head 31 and the associated parts to extend the length of the arms 7 and thus to move them from the short position of the dotted line showing of Figure 1 to the extreme long position shown in Figures 2 and 3. Thus an outward thrust on the piston 36 at a time when the lifting means are latched upwardly so that they cannot be lowered is effective to extend the telescopic arms 7, 7 and this extension or lengthening of these arms exerts sufficient pressure through the parts 26 and the bearing members 27 upon the gate to tilt it upwardly to the vertical position.

Since the hydraulic force is effective to close the gate by moving it to the vertical position, it will be effective to hold it in that position. Frequently, however, it is desirable to discontinue the hydraulic closing force. If, for example, the gate has been used to raise a load onto a truck and the load has been moved from the gate into the body of the truck and the gate has thereafter been moved from the full line position of Figure 1 to the vertical position of Figures 2 and 3 in which it acts as a closure, it is frequently desirable thereafter to discontinue the hydraulic action. If the truck is to be driven a considerable distance, it will be both convenient and economical to put the hydraulic driving means out of operation, or at least to discontinue the upward thrust. Since the elevating mechanism comprising the arms 6 and 7 has already been latched in the upward position to make possible the power closing of the gate, all that is required is a latching of the gate in the closed position. With both latch devices in effect, the power means may be discontinued or put out of operation and the gate will remain in the raised or closed position.

The means for latching the gate in the closed position will now be described. The latch includes a rod 42 which is shown in detail in Figures 4 to 7. This rod is received loosely in a tubular housing 43 which is mounted to move with the cylinder 33 being secured to it, preferably. The rod 42 is, as shown generally in figures last mentioned, provided with oppositely placed flattened surfaces 44. At its outward or free end, rod 42 is provided with a head 45 and it is received in a ring-like part 46 secured to the cross head 31 by screws 47, or otherwise.

Means are provided for rotating the latch rod 42 through approximately a quarter of a revolution. These means may be of different forms, but as shown, they include a generally flat bar 48 secured to the rod 42 by welding or otherwise. The bar 48 is provided with an angularly disposed extension 49 within which a spring-held pin 50 is positioned. The pin 50 may extend into a depression or a notch 51 in the cross head and provided with a collar 52. A spring 53 is positioned on the pin 50 between the collar 52 and the portion 49 and the spring is biased to urge the pin into the depression 51. When the parts are shown, as in Figures 4, 5 and 6, the flattened sides 44 of the rod 42 are positioned in engagement with the latch, as will be explained below, and when the rod is moved to the position of Figure 7, the flattened portions 44 then occupy the upper and lower surfaces of the rod 42 and they are out of position to engage the latch member.

The latch assembly includes also one or more plates 54. These members, as shown in Figures 6 and 7, are of generally elongated shape and include downward extensions 55 of reduced size which are received in a keeper 56 secured to the tube 43, as shown in Figures 4 and 5. At their upper ends, the plates 54 are received loosely upon the reduced portion 57 of a piston rod 58 which carries a piston 59. The reduced portion 57 of the rod 58 forms a shoulder 60 against which the plates 54 are held by a spring 61 which is secured to the plates and also at its opposite end to the tube 43. The spring is biased to tilt the latch plates 54 in clockwise direction from the position of Figure 5 to that of Figure 4.

The piston 59 is mounted in a housing 62 which may be secured to the cylinder 33. It is connected through a duct or passage 63 to a ball check housing 64. Pressure fluid is conducted to the housing 64 by means of a conduit 65. A ball check valve 66 is urged against a seat 67 by a spring 68. A second passage or duct 69 leads from the housing 62 back to the housing 64 and completes communication with a conduit section 70 whereby means of an elbow or other connection 71 communicates with the interior of the cylinder. A spring 72 positioned within the housing 62 bears against the piston 59 and against the closure 73 of the housing 62 and is biased to move the piston from the position of Figure 5 to that of Figure 4.

The piston 59 is positioned away from the end of the rod 58 and thus it leaves an extending or free portion 74 which acts as a stop to limit the movement of the piston as shown in Figure 4.

With the parts in the position of Figure 4, there is no pressure upon the piston 59 to move it to the left and the spring 72 is free to move it to the right until the stop 74 contacts the inner member of the housing or cylinder 62. In that position, the spring 61 is free to pull the latch plate or plates 54 into the position of Figure 4. In that position, they are canted to a sufficient degree to grip the rod 42 and to hold it in the full outward position of Figure 4. Any tendency of the gate to move from the vertical to the horizontal position must tend to reduce the length of the arms 7, that is to say, to telescope them.

This effect tends to move the cross head 31 inwardly. Movement of the cross head inwardly tends to carry the rod 42 equally and in the same direction, and movement of the rod is prevented by the engagement of the latch plate or plates 54 with the rounded surfaces of the rod 42. The parts are shown in this position in Figure 4. In this position, the gate is latched in the vertical position and it will remain in this position irrespective of the presence or absence of pressure fluid until the latch plates 54 have been moved out of engagement with the rod 42. The device thus furnishes a mechanical latch means for holding the gate in the closed position without reliance upon any hydraulic pressure. Hydraulic pressure is effective to raise the gate and thereafter the mechanical means will hold it in place vertically indefinitely until the parts are unlatched.

To unlatch the parts, the valve system within the valve housing 40 is manipulated so the pressure fluid is directed to the outer end of the piston, that is to say, pressure fluid moves in the direction of the arrow in Figure 5. Thus, sufficient pressure is brought to bear upon the piston 59 to move it to the left, to position of Figure 5. Thus, the ducts or passages 63 and 69 are opened and

the pressure fluid moving through them can reach the outer end of the piston to cause movement of the piston inwardly into the cylinder. This movement of the piston 59 moves the piston rod 58 to the position of Figure 5 and tilts or cants the latch plates 54 out of engagement with the rod 42. The rod is thus unlocked and all of the parts related to the gate closing cycle are free for reverse movement and the gate may be opened by being moved to the horizontal position of Figure 1.

The unlatching action just described depends upon the actuation of the hydraulic system. At times it may be desirable to unlatch the gate and to permit its lowering from the vertical to the horizontal position independently of the actuation of the hydraulic system. This is accomplished as follows: When the gate is latched in the vertical position the rod 42 is occupied in the position generally shown in Figures 4 and 5 and shown in detail in Figure 6. In that position, the latch plate or plates 54 may engage the upper and lower curved surfaces of the rod 42. They will engage it with sufficient force when they are tilted to the position of Figure 4 to latch it firmly against movement in the opening direction. If now the pin 50 be disengaged from the depression or notch 51 of the cross head the member 48 will be free to be moved from the position of Figure 6 to that of Figure 7. This movement of the member or handle 48 rotates the rod 42 through approximately a quarter of a revolution and in this rotation the flat surfaces 44 are moved so that they are positioned along the top and bottom of the rod 42. This movement results in unlatching the latch plate or plates 54. They will not be in contact with the upper and lower flattened surfaces because of the size and shape of the perforations in the plates 54; and with the rod 42 in the position of Figure 7, latching contact between the rod and the plates 54 is impossible. Therefore, the parts are moved out of latching engagement and the gate may be lowered. Thus means are provided for unlatching the gate to permit its opening either manually when the hydraulic system is inactive or automatically in response to actuation of the hydraulic system with a reasonable valve control movement to cause the pressure fluid to flow, as shown in Figure 5, and thus to unlatch the gate and to free it for movement to the horizontal position.

The construction in Figure 8 illustrates a safety device which may be considered as an overrun preventing device or as a means for preventing excess downward movement. The piston will be moved in the direction of the arrow in Figure 8 by pressure introduced to the right of the piston 36 through a valve and a duct not shown. It is convenient to use relatively high pressure during at least a part of the downward movement. As the gate approaches the position shown in the dotted lines in Figure 1 in which it will contact the ground or other surface upon which the vehicle may stand, less pressure is required or even wanted in the cylinder. It is possible after the gate has reached the ground to supply to it excess force to the degree that the gate may be tilted or moved out of the horizontal position as a result of continuing downward pressure when the gate has really reached what should be the limit of its lower movement. If sufficient force is, however, not available at this portion of the cycle, no harm will result even though the gate is pressed upon the ground and the lowering force is not interrupted as soon as the gate contacts the ground. The valve arrangement of Figure 8 is to make possible this solution. It may be assumed that pressure of 80 pounds per square inch is desirable during an initial portion of the lowering effect. When, however, the piston has reached the dotted line position of Figure 8, the gate will have approached the ground and less pressure is required. As the piston moves to this position, the passage 75 is uncovered and the pressure within the cylinder is sufficient to raise the ball check valve 76 from its seat against the resistance of the spring 77. Fluid is thus vented through the passage 78 and running to the connection 79, thus depending upon the pressure at which the valve 76 is set to yield the effective fluid, pressure upon the piston will be reduced to a safe limit after the piston has uncovered the passage 75. This arrangement prevents excessive forcing of the gate and associated parts upon the ground surface. The parts are protected from damage and the gate itself is prevented from being tipped, even though the pressure fluid is directed into the cylinder for a substantial period of time after the gate has contacted the ground.

The use and operation of the invention is as follows:

The device of the present invention, whether it is mounted on a fixed or a movable support, comprises a gate which acts both as a raising and lowering platform and as a gate or closure. It includes means for raising and lowering it. These means include a power source such as a hydraulic piston and cylinder assembly. By means of proper controls for the piston and cylinder assembly and for the other parts of the device, the same power source is rendered effective both to raise the gate and to lower it while maintaining it in a horizontal position and also after it has been raised, to move it to the vertical position. All of this movement is accomplished by a single power means as a result of selective controls effective upon the action of that power means.

When the gate has been raised from the dotted line position of Figure 1, to the full line position of that figure, it is generally latched in place by latches which preferably, although not necessarily, engage one or more of the arms 6 or 7 and hold them and the gate as well as the cylinder assembly in the raised position, irrespective of further hydraulic effect.

After the gate has been raised to the full line position of Figure 1, if it is desirable to close it, the piston is actuated to move it in the outward direction which would normally be the lowering direction for the gate. Since, however, the gate is latched in the upper horizontal position it cannot be lowered even though the piston starts to move in the lowering direction. This lowering direction of the piston being as it is in the outward direction with respect to the pivot point of the cylinder is effective to elongate the telescopic arms 7, 7 and this elongation of these arms tilts the gate from the horizontal to the vertical position, the gate in this movement pivoting about the pivots 24. As the gate reaches the vertical position, it reaches the position shown in Figures 4 and 5. The latch means for the gate, which is independent of the latch means for the raising arms 6 and 7, assumes the position shown in Figure 4 and the gate is thus latched in the vertically raised position by the engagement of the latch plates 54 with the round upper and lower surfaces of the rod 42. Should

the pressure fluid now be discontinued, the gate will remain latched in the position of Figures 2 and 3 because the latch means has assumed the position of Figure 4.

When it is desired to move the gate from the vertical position and finally to lower it, the valve means are moved to bring the latch controlling parts of Figure 5 into the position shown in that figure. The latch plates 54 are thus moved out of engagement with the rod 42. With the latch parts thus disengaged, the device may now be lowered by further manipulation of the valve so that further pressure fluid is introduced on the inner end of the piston and the latter is moved outwardly to carry the gate to the dotted line horizontal position of Figure 1.

I claim:

1. In combination, means for raising a gate in horizontal position and for moving it while raised to a vertical position, means for latching said gate in raised horizontal position, a second latching means for latching said gate in vertical position, said raising and moving means comprising a cylinder and a double-acting piston mounted for movement in said cylinder, means controlling the supply of pressure fluid to said cylinder to move said piston selectively in either direction, movement of said piston in one direction when said gate is latched in raised horizontal position being effective to move said gate to vertical raised position, the second latch means being effective to prevent movement of said piston in the opposite direction after said gate had been moved to vertical position, said second latch means including a latch part mounted to move with said piston and a latch member engaging said latch part and means biased to hold said latch part in latching engagement with said latch means, a valve cylinder in communication with said fluid supply means, and a valve member positioned in part within said valve cylinder and adapted in response to movement of said fluid in one direction to free said latch part and said latch member from latching engagement.

2. In combination, means for raising a gate in horizontal position and for moving it while raised to a vertical position, means for latching said gate in raised horizontal position, a second latching means for latching said gate in vertical position, said raising and moving means comprising a cylinder and a double-acting piston mounted for movement in said cylinder, means controlling the supply of pressure fluid to said cylinder to move said piston selectively in either direction, movement of said piston in one direction when said gate is latched in raised horizontal position being effective to move said gate to vertical raised position, the second latch means comprising a latch part mounted to move with said piston and a latch member engaging said latch part and means biased to hold said latch part in latching engagement with said latch means, a valve cylinder in communication with said fluid supply means, and a valve member positioned in part within said valve cylinder and adapted upon movement in one direction to free said latch part and said latch member from latching engagement, and additional manual means for moving said latch part into position to disengage it from said latch member independently of the position of said latch member.

3. In combination, means for raising a gate in horizontal position and means for moving it while raised to a vertical position, means for latching said gate in raised horizontal position, a second latching means for latching said gate in vertical position, said raising means comprising a cylinder and a double-acting piston mounted for movement in said cylinder, means controlling the supply of pressure fluid to said cylinder to move said piston selectively in either direction, movement of said piston in one direction when said gate is latched in raised horizontal position being effective to move said gate to vertical raised position, the second latch means comprising a latch part mounted to move with said piston and a latch member engaging said latch part and means biased to hold said latch part in latching engagement with said latch means, a valve cylinder, and a valve member positioned in part within said valve cylinder and adapted upon movement in one direction to free said latch part and said latch member from latching engagement, said valve being in communication with the fluid supply system for said cylinder and being moved to accomplish unlatching only in response to fluid flow in one pre-determined direction.

4. In combination, means for raising a gate in horizontal position and for moving it while raised to a vertical position, means for latching said gate in raised horizontal position, a second latching means for latching said gate in vertical position, said raising and moving means comprising a cylinder and a double-acting piston mounted for movement in said cylinder, means controlling the supply of pressure fluid to said cylinder to move said piston selectively in either direction, movement of said piston in one direction when said gate is latched in raised horizontal position being effective to move said gate to vertical raised position, the second latch means comprising a latch part mounted to move with said piston and a latch member supported from said cylinder and loosely surrounding said latch part and means biased to hold said latch part in latching engagement with said latch means, a valve cylinder connected in series with said fluid pressure supply control means and a valve member positioned in part within said valve cylinder and adapted upon movement in one direction to free said latch part and said latch member from latching engagement.

5. In combination, means for raising a gate in horizontal position and means for moving it while raised to a vertical position, means for latching said gate in raised horizontal position, a second latching means for latching said gate in vertical position, said raising means comprising a cylinder and a double-acting piston mounted for movement in said cylinder, means controlling the supply of pressure fluid to said cylinder to move said piston selectively in either direction, movement of said piston in one direction when said gate is latched in raised horizontal position being effective to move said gate to vertical raised position, the second latch means comprising a latch part mounted to move with said piston and a latch member supported from said cylinder and loosely engaging said latch part and means biased to hold said latch part in latching engagement with said latch means, a valve cylinder and a valve member positioned in part within said valve cylinder and adapted upon movement in one direction to free said latch part and said latch member from latching engagement, and additional manual means for moving said latch part into position to disengage it from said latch member, said valve being in communication with the fluid supply system for said cyl-

inder and being moved to accomplish unlatching only in response to fluid flow in one pre-determined direction.

6. In combination, means for raising a gate in horizontal position and means for moving it while raised to a vertical position, means for latching said gate in raised horizontal position, a second latching means for latching said gate in vertical position, said raising means comprising a cylinder pivotally mounted and a double-acting piston mounted for movement in said cylinder; valve means controlling the supply of pressure fluid to said cylinder to move said piston selectively in either direction, movement of said piston in one direction when said gate is latched in raised horizontal position being effective to move said gate to vertical raised position, the second latch means comprising a latch part mounted to move with said piston and a latch member supported from said cylinder and loosely engaging said latch part and means biased to hold said latch part in latching engagement with said latch means, a valve cylinder and a valve member positioned in part within said valve cylinder and adapted upon movement in one direction to free said latch part and said latch member from latching engagement, and additional manual means for moving said latch part into position to disengage it from said latch member, said valve being in communication with the fluid supply system for said cylinder and being moved to accomplish unlatching only in response to fluid flow in one predetermined direction.

7. In combination, a piston and cylinder, a piston rod connected to said piston and extending from said cylinder, a member outside of said cylinder connected to said piston rod for movement thereby and means for latching said member and said piston rod against movement in one direction, said means including a generally rounded bar, said bar having a pair of flat oppositely placed faces and being of less diameter in the direction of said flat faces than in the direction of its rounded portions and means for rotating said bar, a fluid conduit defining means extending toward that end of the cylinder through which the piston rod protrudes; an auxiliary control cylinder, a first fluid passage and a second fluid passage, said first and second passages connecting portions of said auxiliary cylinder serially in said conduit means, a control piston in said auxiliary control cylinder, said last named piston being normally biased between said first and second passages to prevent the flow of pressure fluid through said auxiliary cylinder; a control rod connected to said control piston and extending from its cylinder, a latch plate member loosely mounted on the exposed end of said control rod and loosely embracing said latch bar, a spring biased to move said latch plate into latching engagement with said latch bar, the control rod being effective when the control piston is in one position to move said latch plate out of engagement with said latch bar, the arrangement of the parts being such that when pressure fluid is directed toward the outer end of said cylinder to cause retraction of said piston within said cylinder, said control piston is moved to the unlatching position.

8. In combination, a main piston and a main cylinder movable therein, a piston rod connected to said piston and adapted to travel outwardly from one end of said cylinder, means for locking said rod in extended position, including a locking bar connected to said rod for travel therewith and a lock plate member adapted to grip and lock said bar against travel toward said cylinder, said lock plate member being loosely supported at one end from said cylinder and having a portion loosely surrounding said bar when said plate is in unlocked position and adapted to grip said bar when said plate is in locking position, means biased to hold said plate member in locking position, said bar being free, independently of the position of said plate, to travel outwardly through said plate in response to the outward movement of said piston rod, and power means for unlocking said piston rod to permit its return including a stem loosely connected to said locking plate member at a point spaced thereon from said first-named cylinder and plate connection, an auxiliary piston on said stem, an auxiliary cylinder surrounding said piston, a fluid conduit adapted to direct fluid toward said main cylinder to force said main piston and rod inwardly into said cylinder, a first passage between said conduit and said auxiliary cylinder, a second passage between said conduit and said auxiliary cylinder, means biasing said auxiliary piston into position between said passages, valve means in said conduit and adapted to direct fluid flowing in one direction therethrough into said first passage to force said stem outwardly from said auxiliary cylinder, the movement of said stem being effective, through said loose connection with said locking plate member, to disengage said plate from said bar and to uncover said second passage to permit the pressure fluid to flow through said auxiliary cylinder and return to said conduit and thereafter to move said main piston and piston rod.

9. The structure of claim 8 characterized by and including a housing on said main cylinder adapted to receive and closely surround said locking bar when said piston and piston rod enter said main cylinder.

10. The structure of claim 8 wherein said valve in said fluid conduit is adapted to permit the flow of said pressure fluid in a direction away from said main cylinder directly through said conduit.

11. The structure of claim 8 characterized by and including a member on said auxiliary piston adapted to contact a wall of said auxiliary cylinder and thereby to prevent movement of said auxiliary position in one direction away from said biased position, while permitting movement thereof in the opposite direction.

12. The structure of claim 8 characterized by and including means for releasing the binding effect of said plate when said power means is inoperative, including a connection between said locking bar and said rod adapted to permit rotation of said bar and means for manually rotating said bar.

13. The structure of claim 8 wherein said locking plate member is comprised of a plurality of individual loosely connected plates, said plates being normally biased at an angle to said bar whereby each said individual plate is in binding contact with said bar.

14. In combination, a main cylinder and a main piston, a main piston rod on said main piston and adapted to travel outwardly from said main cylinder, a control body associated with said main cylinder, a main fluid conduit through said body and adapted to convey fluid into and from one end of said main cylinder, a valve in said main conduit adapted to prevent the flow of fluid directly therethrough in one direction and to permit the flow of fluid directly there-

through in the opposite direction, a hollow chamber in said body, a first passage in said body between said chamber and said conduit above said valve, a second passage in said body between said chamber and said conduit below said valve, an auxiliary piston movable in said chamber, means biased to hold said piston intermediate said passages to prevent the flow of fluid therethrough in said opposite direction, said chamber being of sufficient linear extension to permit the movement of said piston, in response to the flow of fluid through said first passage in said first direction, to cause said auxiliary piston to uncover said second passage, a stem on said auxiliary piston extending outwardly from said chamber, locking means adapted normally to prevent the movement of said main piston and piston rod inwardly into said cylinder and a loose connection between said locking means and said stem formed and adapted to cause said locking means to move into unlocked position in response to the said outward movement of said stem.

15. In combination, a main cylinder, a piston movable therein, a piston rod connected to said piston and adapted for movement into and out of said cylinder, a fluid conduit adapted to convey fluid to and from one end of said main cylinder, means for normally binding said rod against movement into said cylinder said means being adapted freely to permit movement of said rod outwardly from said cylinder, said means including a bar mounted for travel with said rod, a locking plate member comprising a plurality of plates loosely supported at one end on said cylinder, said plates each having an aperture adjacent one end thereof and of greater diameter than said bar, said bar being adapted for travel through said apertures in response to the movement of said rod into and out of said cylinder, means for normally biasing said plates in angular position with relation to said bar to bind said bar against inward movement, power means for returning said plates to vertical position to release said bar, said power means including an auxiliary piston and auxiliary cylinder therefor connected in series with said conduit and an actuating connection between said piston and said plates.

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