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D. P. DIETER ET AL

3,271,801

DOCKBOARD

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2 Sheets-Sheet 2

FIG. 4.

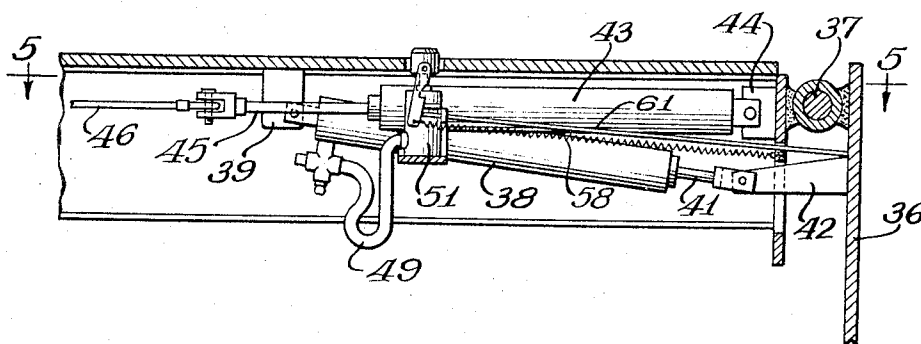


FIG. 5.

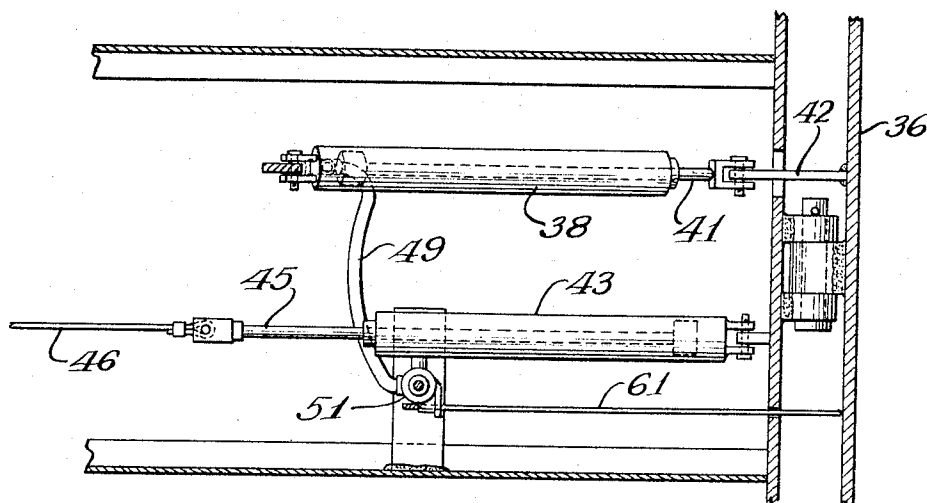


FIG. 6.

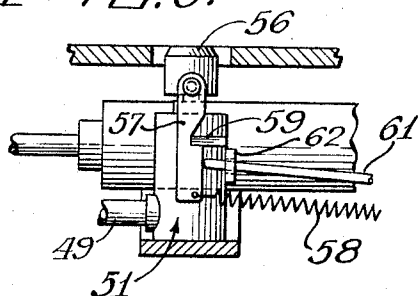
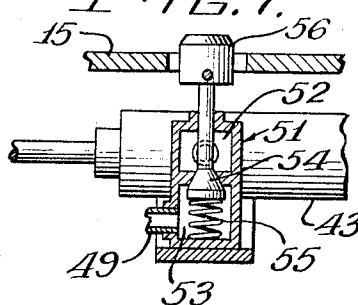


FIG. 7.



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3,271,801

DOCKBOARD

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5 Claims. (Cl. 14-71)

This invention relates to dockboards and more particularly to control means for holding a dockboard in its inoperative position and for controlling movements of the dockboard lip.

Dockboards, as commonly constructed, are urged upwardly by springs and are held in inoperative position flush with the dock surface by latching means. It is also common to provide pivoted lips at the outer ends of the boards which are raised to engage a truck bed and which depend from the end of the board to be out of the way when the board is not in use.

The present invention relates to improvements in means for latching the board in its inoperative position and for automatically raising the lip when the board is raised and holding the lip in its raised position until it engages a truck bed.

It is one of the objects of the invention to provide a dockboard in which the board is held in its inoperative position by a hydraulic unit controlled by a valve which holds the board securely in the desired position without being affected by wear or maladjustments and which will also function to dampen movements of the board.

Another object is to provide a dockboard in which the lip is raised by a hydraulic unit powered by raising of the board itself and controlled by a check valve to hold the lip in raised position. The check valve may be manually opened to permit lowering of the lip.

According to a feature of the invention the check valve is held in opened position by a latch which is released automatically by the lip when it moves to its dependent position.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying drawings in which:

FIG. 1 is a vertical section through a dockboard embodying the invention with parts being shown in elevation;

FIG. 2 is a partial section on the line 2-2 of FIG. 1;

FIG. 3 is a section on the line 3-3 of FIG. 2;

FIG. 4 is a partial section similar to FIG. 1 on an enlarged scale;

FIG. 5 is a sectional view on the line 5-5 of FIG. 4;

FIG. 6 is an enlarged view of the valve latching mechanism; and

FIG. 7 is a sectional view through the valve of FIG. 6.

The dockboard as shown is adapted to be mounted in a dock structure indicated generally at 10, which is formed at the outer end of the dock with a recess or opening in which the dockboard is mounted.

The dockboard itself comprises a supporting frame having horizontal supporting members 11 and a vertical supporting member 12 at one end thereof. The frame is adapted to be mounted in the recess and secured in place therein by anchoring devices 13 which hold the frame in a position such that the dockboard will be flush with the upper surface of the dock when the dockboard is in its lowered or inoperative position. At the forward end of the frame a short stop member 14 is provided for a purpose which will appear more fully hereinafter.

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A board 15 formed of an upper metal, or plate reinforced by longitudinally extending beams 16 is pivoted to the upper end of the upright 12 on a horizontal axis indicated at 17. The board may thus swing from the horizontal inoperative position as shown, to an upper dotted line position illustrated in FIG. 1, or to positions below the horizontal as required. The board is urged upwardly by spring devices which include one or more triangularly shaped levers 18 pivoted at their lower ends at 19 on the horizontal frame members 11. At their outer ends the levers 18 carry rollers 21 which bear against the lower surface of the board. Springs 22 are connected to the levers 18 and to anchor members 23 at the inner lower portion of the frame to urge the levers constantly in a counter-clockwise direction in which they tend to elevate the board to the dotted line position shown.

In order to hold the board in its lowered inoperative position hydraulic latching means are provided according to the present invention. As shown, this latching means comprises a cylinder and piston unit including a cylinder 24 pivoted at one end to the frame. A piston in the cylinder has a piston rod 25 projecting through the other end of the cylinder and pivotally connected to a bracket 26 on the board. An accumulator cylinder 20 having a spring pressed piston 20' therein is connected to the cylinder 24 to maintain the cylinder full and to accommodate piston rod displacement.

The ends of the cylinder 24 are interconnected by a conduit 27 in which a control valve 28 is interposed. The control valve 28 as best seen in FIG. 3, comprises an enlarged valve casing 29 connected to the inner or rear end of the cylinder 24, and also connected to the pipe 27 as shown. The valve seat 31 is formed in the casing between its connections to the cylinder and the pipe 27 and a valve member 32 is normally urged against the seat by a spring 33. With this construction the valve 32 functions as a check valve to permit flow from the rear end of the cylinder to the forward end thereof so that the board can be lowered but normally to block flow in the reverse direction to prevent raising of the board. The valve 32 is formed with a passage therethrough normally closed by a downwardly opening relief valve 30. The valve 30 will remain closed under the pressure generated by the springs 22 but will open under the higher pressures developed when the board is raised by a rising truck body during unloading to permit the board to rise.

To open the valve 32 a cable 34 is connected thereto and extends upwardly through an opening in the board adjacent to its hinged end to terminate in a ring or similar handle 35. When it is desired to raise the board the operator pulls upwardly on the ring 35 thereby unseating the valve 32 so that fluid can flow freely from one end to the other of the cylinder. At this time the springs 22 and levers 18 will function to raise the board to its dotted line position as shown in FIG. 1.

It will be noted that the hydraulic cylinder will hold the board in whatever lowered position it is moved to so that no accurate adjustments are required and there are no parts which can wear to affect the latched position of the board. Also, even when the valve 32 is open the hydraulic cylinder will act in the manner of a dashpot to damp rapid movements of the board so that damage to the parts upon reaching limits of movement will be avoided.

The board also includes a lip 36 pivoted at 37 to its forward end to swing from a dependent position as shown

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in full lines in FIG. 1 to a raised or extended position as shown in dotted lines in which it forms an extension of the board. It will be noted that the hinge 37 is positioned at a point spaced from the extreme edge of the lip so that on upward swinging movement the edge of the lip will engage the edge of the board to limit swinging of the lip to a position in which it is substantially aligned with the board. When the lip is in its dependent position it will engage the stop member 14 to limit downward movement of the board and will be out of the way so that it cannot be damaged by a truck backing into the dock.

The lip is raised according to the present invention, by hydraulic mechanism best shown in FIGS. 4 to 7. This mechanism comprises a hydraulic cylinder 38 pivoted at one end on a bracket 39 on the board. A piston in the cylinder has its piston rod 41 projecting through the forward end thereof and pivotally connected to a bracket 42 on the lip 36. A second hydraulic cylinder 43 is secured at its forward end to a bracket 44 on the board and has a piston therein whose piston rod 45 projects rearwardly toward the board hinge. A cable 46 as best seen in FIG. 1, is connected to the piston rod 45 and is trained over a sheave 47 mounted on the board with its other end anchored to the horizontal frame members 11 as indicated at 48.

The two cylinders 38 and 43 have their inner ends connected by a conduit 49 and a valve 51 as best seen in FIG. 5. Thus when the piston rod 45 of the cylinder 43 is pulled outwardly by the cable 46 when the board is raised fluid will be pumped from the cylinder 43 into the rear end of the cylinder 38 to extend the piston rod 41 and swing the lip 36 upward.

The valve 51, as best seen in FIG. 7, comprises a housing having an upper chamber 52 connected to the rear end of the cylinder 43 and a lower chamber 53 connected to the conduit 49. The two chambers are separated by a valve seat which is normally closed by an upwardly moving valve member 54 urged upwardly by a spring 55.

It will again be noted that this valve functions as a check valve to permit flow from the cylinder 43 into the cylinder 38 to raise the lip but which will close to prevent back flow from the cylinder 38 to the cylinder 43. Thus once the lip has been raised by extension of the cylinder 38 the check valve will hold it in raised position until the valve itself is open.

To open the valve a button 56 is connected thereto and extends through an opening in the board 15 adjacent to its outer end. After the board has been raised to the dotted line position shown in FIG. 1 an operator may walk out on the board to move it downward so that the lip 36 will engage the bed of a truck adjacent to the dock and may step on the button 56 to open the valve 54 so that the lip is then free to pivot.

When the button is moved downwardly to open the valve 54 it is held in opened position by latching means best seen in FIG. 6. As shown in this figure, the latching means comprises a latching lever 57 pivoted to the button and formed with a latching notch in its forward edge. The lever is urged forwardly to its latching position by a spring 58 so that when the button is pressed downward the lever will swing forward and the latching notch therein will engage a latch bar 59 carried by a valve 51. Thus the valve 54 will be held open until the latch is released.

To release the latch a rod 61 is slidably mounted on the board with the rear end thereof passing through a guide 62 on the valve body so that it will engage the latch bar 57. The forward end of the rod, as best seen in FIG. 4, extends through the front edge of the board in a position to be engaged by the lip 36 when it swings downwardly to its dependent position. Thus at the completion of use of the board and when the truck being loaded or unloaded pulls away, the lip 36 will swing freely to its dependent position due to the fact that the valve 54 is open. As it reaches its depending position it will move the rod 61 rearwardly and the rod will, in turn, swing the

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latch lever 57 clockwise as seen in FIG. 6 to disengage it from the latch bar 59. At this time the spring 55 will close the valve leaving the board in the full line position shown in FIG. 1 ready for a subsequent operation.

While one embodiment of the invention has been shown and described in detail, it will be understood that this is illustrative only and is not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims.

What is claimed is:

1. A dockboard comprising a frame, a board pivoted at one end on a horizontal axis to the frame, resilient means urging the other end of the board upwardly, a lip pivoted to the other end of the board to move from a dependent position to a raised position forming an extension of the board, a first extensible hydraulic unit connecting the lip and the board to raise the lip when the unit is extended, a second hydraulic unit including relatively movable parts, a fluid connection from the first hydraulic unit to the second hydraulic unit, means connecting the parts of the second hydraulic unit respectively to the board and the frame so that the second hydraulic unit will be operated by raising of the board to force fluid from the second unit through the fluid connection into the first unit to extend it, a check valve in the fluid connection opening toward the first unit, and manual means to open the check valve to permit flow of fluid from the first unit to the second unit.

2. A dockboard comprising a frame, a board pivoted at one end on a horizontal axis to the frame, resilient means urging the other end of the board upwardly, a lip pivoted to the other end of the board to move from a dependent position to a raised position forming an extension of the board, a first extensible hydraulic unit connecting the lip and the board to raise the lip when the unit is extended, a second hydraulic unit including relatively movable parts, a fluid connection from the first hydraulic unit to the second hydraulic unit, means connecting the parts of the second hydraulic unit respectively to the board and the frame so that the second hydraulic unit will be operated by raising of the board to force fluid from the second unit through the fluid connection into the first unit to extend it, a check valve in the fluid connection opening toward the first unit, manual means to open the check valve, latch means to hold the check valve open, and means operated by the lip when it moves to its dependent position to release the latch means.

3. A dockboard comprising a frame, a board pivoted at one end on a horizontal axis to the frame, resilient means urging the other end of the board upwardly, a lip pivoted to the other end of the board to move from a dependent position to a raised position forming an extension of the board, a first extensible hydraulic unit connecting the lip and the board to raise the lip when the unit is extended, a second hydraulic unit including relatively movable parts, a fluid connection from the first hydraulic unit to the second hydraulic unit, means connecting the parts of the second hydraulic unit respectively to the board and the frame so that the second hydraulic unit will be operated by raising of the board to force fluid from the second unit through the fluid connection into the first unit to extend it, a check valve in the fluid connection opening toward the first unit, a manually operable button projecting through the board and connected to the valve to open it when the button is depressed, a latch including an arm pivoted on the button and a latch bar engaged by the arm when the button is depressed, and a slidable rod engaged by the lip when it moves to its dependent position and moved thereby into engagement with the latch arm to disengage it from the latch bar.

4. A dockboard comprising a frame, a board pivoted at one end on a horizontal axis to the frame, resilient means urging the other end of the board upwardly, a lip pivoted to the other end of the board to move from a dependent position to a raised position, a first hydraulic

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cylinder and piston unit having the rear end of the cylinder pivoted to the board and a piston rod extending through the front end of the cylinder and pivoted to the lip, a second cylinder and piston unit having the cylinder secured to the board and a piston rod extending through one end of the cylinder, means connecting the second piston rod to the frame to pull it from the second cylinder when the board is raised, a fluid connection from said one end of the second cylinder to the rear end of the first cylinder, a check valve in the connection opening toward the first cylinder, and manual means to open the check valve.

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5. The dockboard of claim 4 including a latch to hold the check valve open and means operated by movement of the lip to its dependent position to release the latch.

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