

July 25, 1961

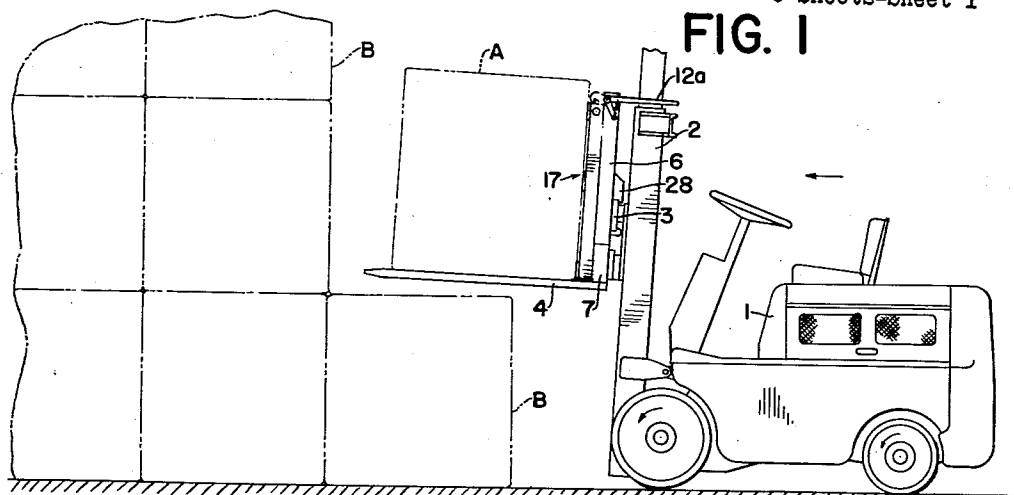
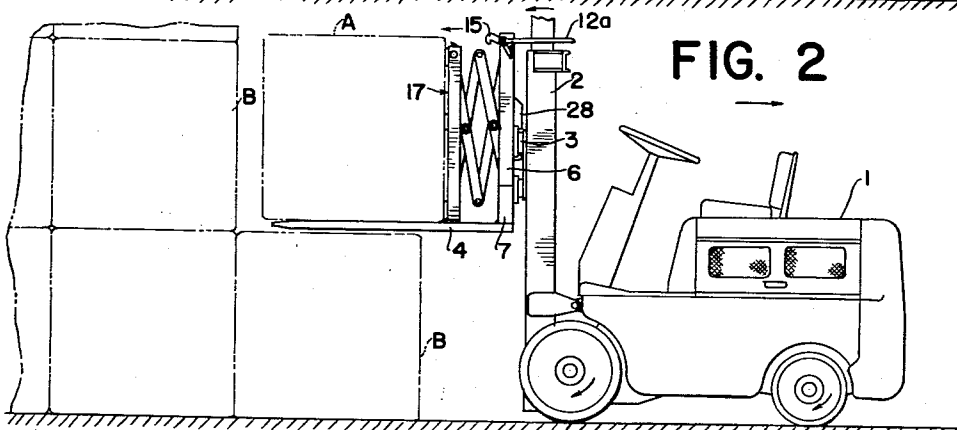
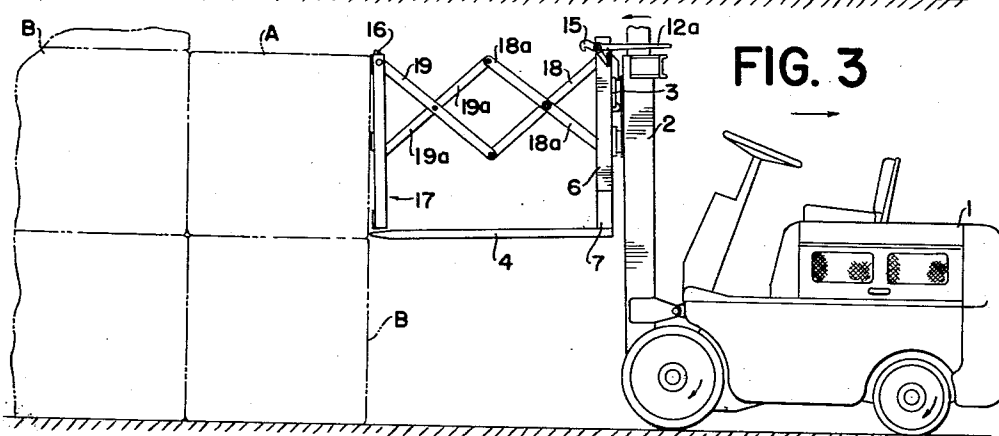
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2,993,610

PUSH-OFF ATTACHMENTS FOR LIFT TRUCKS

Filed April 16, 1957

3 Sheets-Sheet 1



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FIG. 4

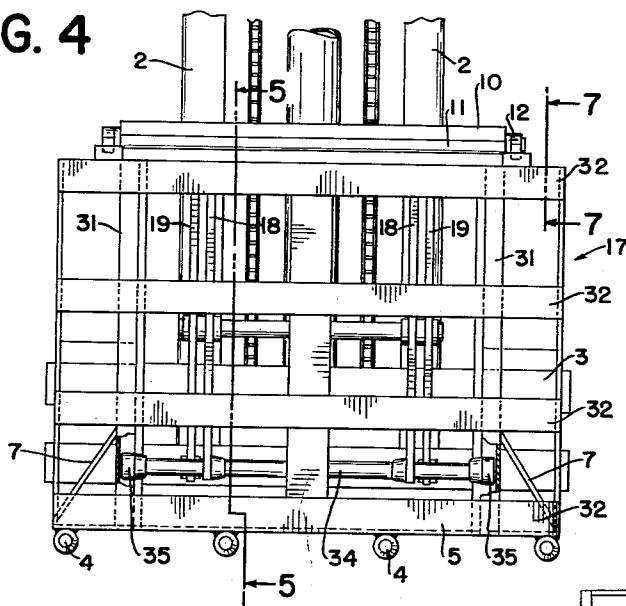
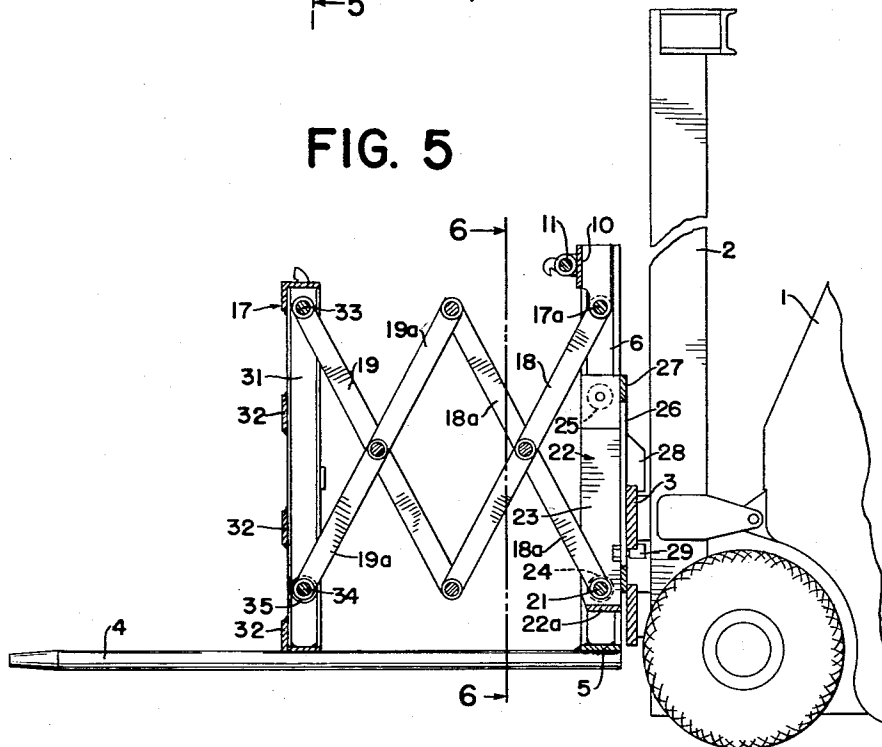


FIG. 5



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FIG. 6

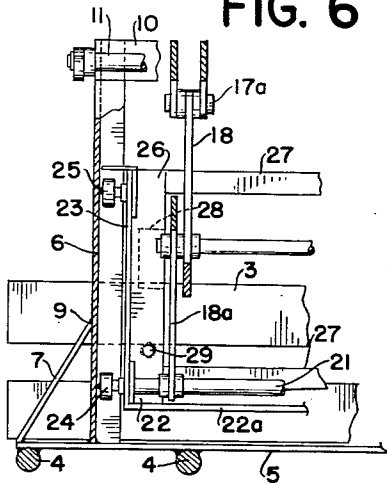


FIG. 7

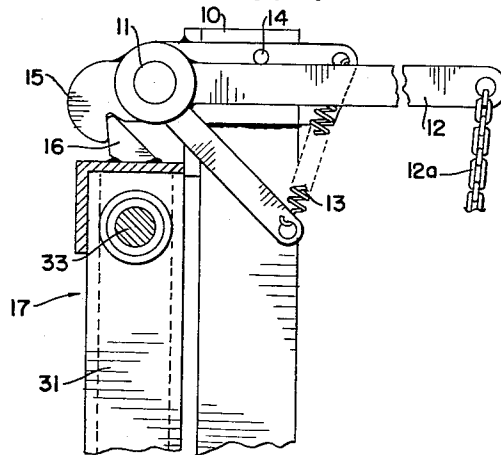
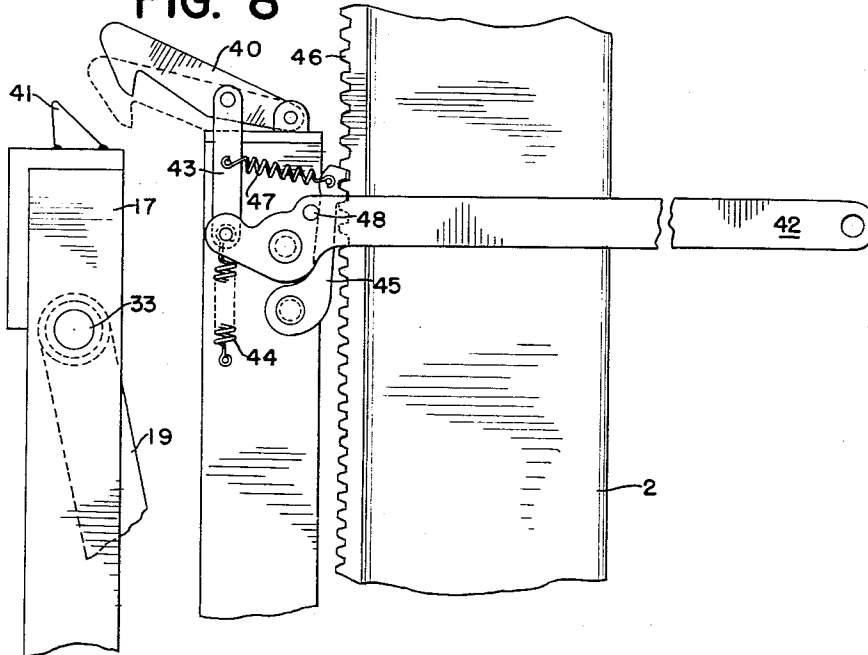


FIG. 8



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**PUSH-OFF ATTACHMENTS FOR LIFT TRUCKS**  
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**Filed Apr. 16, 1957, Ser. No. 653,236**  
**3 Claims. (Cl. 214-514)**

This invention relates to push-off attachments for lift trucks and has for its object to provide a push-off attachment which effects the discharge of the load from the fork of the truck by manipulation of the truck and its lifting mechanism and without employing separate power attachments to the hydraulic system of the truck, as is required for push-offs now in use. Such power operated push-off attachments add considerably to the cost and weight of the truck and are generally unsatisfactory in operation.

A further object of my invention is to provide a push-off attachment which is simple and cheap to make, is of very rugged construction, and adds very little to the weight of the truck.

A further object of the invention is to provide a push-off attachment for lift trucks which takes up very little room on the frame of the trucks and which does not interfere with the normal operation of the lift truck when not in use.

Further objects of the invention will appear from the following specification taken in connection with the accompanying drawings, wherein

FIGS. 1, 2 and 3 are side elevational views showing the lift truck with the push-off attachment in operation in stacking packing cases;

FIG. 4 is a front elevation on an enlarged scale of the truck shown in FIGS. 1-3;

FIG. 5 is a side elevation on an enlarged scale of the mechanism shown in FIG. 4;

FIG. 6 is a sectional view on line 6-6 of FIG. 5;

FIG. 7 is a detail sectional view on line 7-7 of FIG. 4; and

FIG. 8 is a detail view of a modified form of my improved push-off attachment.

Referring to the drawings, particularly to FIGS. 4 and 5, 1 indicates the lift truck body having the usual vertical frame 2 mounted to tilt about the axis of the front wheels of the truck. 3 represents the customary vertically movable cross head which is raised and lowered in the operation of the truck.

The load engaging portion of the lift truck comprises four forwardly extending fork members 4 fastened together at their rear ends by a cross bar 5 to the under surface of which the rear ends of the members 4 are welded. Also attached to the cross bar 5 and extending upwardly therefrom near the ends of the member 5 are channels 6, the lower ends of these channels being welded to the upper face of the cross bar. The channels 6 are further anchored to the cross bar 5 by diagonal braces 7 welded at their lower ends to the ends of the cross bar 5 and welded at their upper ends to the outer face of the channels 6 as shown at 9 in FIG. 6. There are two upright channels 6, one adjacent each end of the cross bar 5 as shown in FIG. 4, the upper ends of the channels being connected by a cross bar 10 welded at each end to the upper end of the channel 6. Extending across the front of the part 10 is a rock shaft 11 having at one end a handle 12 (see FIG. 7). The handle 12 is attached to the rod 11 so as to turn the rod in its bearings and the rod is biased by a spring 13 so as to hold the handle normally in its elevated position against a stop pin 14 on an adjacent portion of the channel 6. Attached to the shaft 11 adjacent each end are latch members 15 positioned to engage upstanding projections 16 attached to the upper face of the horizontally movable pusher frame 17 which will be later described. Also extending between the upstanding channels 6 adjacent

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their upper ends is a shaft 17a from which depend a series of links 18 connected to each of which are a series of additional links 18a, 19 and 19a arranged to provide a pair of forwardly extending lazy tongs for shifting the push-off frame 17 toward and away from the fixed channels 6 when the shaft 21 to which the rearmost bars 18a are pivotally attached is raised and lowered with respect to the shaft 17a on which the bars 18 are mounted.

In order to effect the relative movement of the shafts 21 and 17a the shaft 21 is carried by a sub-frame 22 (see FIG. 6) enclosed within the rectangular main frame consisting of the cross bar 5, the vertical channels 6, the braces 7 and the upper cross bar 10. The sub-frame comprises a bottom cross bar 22a and vertical end bars 23 which are parallel with the channels 6 and spaced from the channels a sufficient distance to provide the necessary space for rollers 24 and 25 which lie within the side members of the channels. The rollers 24 are mounted on the ends of the shafts 21, and the rollers 25 are carried by pins extending outwardly from the end bars 23.

Also forming part of the sub-frame at each end are vertical members 26 and upper and lower transverse members 27, the whole forming a light but strong and rigid rectangular frame supported for vertical movement with respect to the main frame, the sub-frame being retained in place by the rollers 24 and 25 which extend into the channels, all as shown in FIG. 6.

The sub-frame 22 is connected to the vertically movable cross head 3 of the lift truck by means of cleats 28 welded to the rear face of the vertical members 26 and bolts 29 having L-shaped heads. As will be apparent from the above description the vertical movement of the cross head 3 will first elevate the sub-frame until it reaches the upper end of its movement before the main frame and the attached load supporting members 4 are elevated. During this relative vertical movement of the main frame and sub-frame the lazy tongs will be extended, thereby moving the push-off head 17 to the extreme end of the members 4 so that a load carried by the members 4 will be pushed off the carriage as shown in FIG. 3.

As explained above, the push-off head 17 is normally held against movement by means of the latch members 15 which are normally held in engagement with the lug 16 on the push-off head by the springs 13. The operating lever 12 for the latches 15 may have attached to it a downwardly extending chain 12a so that the latches may be readily operated by the driver of the truck in any vertical position of the carriage.

The push-off head 17 may be of any suitable construction and as shown in FIG. 5 consists of a rectangular frame formed of vertical channels 31 at each end and horizontal bars 32 welded to the channels. The outer ends of the bars 19, 19a carry at their free ends upper and lower shafts 33, 34, respectively. The shaft 33 is mounted at its ends in the channels 31 while the shaft 34 carries at its free ends rollers 35 which are retained within the channels 31 forming the ends of the frame.

The operation of the device is illustrated in FIGS. 1, 2 and 3. As shown in FIG. 1, the lift truck has picked up a crate A in the usual manner and carried it to a position to be added to the previously stacked crates B. During the lifting and transporting operation of the truck the push-off head 17 has been held against movement by the latches 15. In order to discharge the crate A from the fork members 4 the operator of the truck tilts the frame 2 forwardly to vertical position as shown in FIG. 2 and then releases the latch members by means of the chain 12a. He then moves the cross head 3 upwardly, thereby, through the lugs 28, elevating the sub-frame 22 while the forks 4 are held down by the weight of the crate. The push-off head 17 is connected by the lazy tongs to the frame and sub-frame so that their rela-

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tive movement moves the push-off head and with it the crate A toward the previously stacked crates B. As the crate A is moved off the fork members the operator of the truck backs and truck away from the packed crates and at the same time tilts the frame 2 forwardly so as to deposit the crate A in proper position with respect to the previously stacked crates B.

After the crate A is discharged from the forks cross head 3 is lowered until the forks strike the floor. Continued downward movement of the cross head 3 causes the sub-frame to move downwardly with respect to the main frame, thereby collapsing the lazy tongs and drawing the push-off head 17 back against the frame until it is latched in position by the latch members 15 engaging the lugs 16.

In FIG. 8 I have shown a modification of the above described structure. The latch for holding the push-off frame against movement comprises latch members 40 supported at each end of a shaft extending across the top of the main frame, which latches are operated by a lever 42 mounted on the channel 6 at one end of the main frame and connected to one of the latches 40 by means of a link 43, the latches being normally held in latched position by the spring 44. Also mounted on the channel 6 adjacent the lever 42 is a pivoted lock member 45 having teeth in its upper end positioned to engage a rack bar 46 fixed to the front face of one of the frame members 2 which supports the lifting head of the truck. The member 45 is biased away from the rack by a spring 47 and is forced against the rack by a pin 48 mounted on the lever 42 when the lever is pulled down by the operator to release the latch.

In operation the sub-frame and main frame 6 are normally held against relative movement by the latches. When it is desired to operate the push-off frame to eject the crate the latches are released by the handle, which operation locks the main frame 22 against movement.

When handling loaded crates such as shown in FIGS. 1, 2 and 3, the forks 4 will be held by the weight of the load and the added latch of FIG. 8 is not required. With light loads, however, it may happen that the resistance to movement of the sub-frame through friction or other causes is such that the main frame will rise with the sub-frame even when the latches 15 are released.

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With the mechanism of FIG. 8, the main frame will be held against movement whenever the latches are held in released position and relative movement of the two frames will be assured.

5 The mechanism of FIG. 8 is particularly useful for effecting a positive return movement of the push-off head without lowering the forks to the floor.

10 In the foregoing specification I have described in detail the preferred forms of my improved push-off attachment, but it will be understood that my invention is not limited to the specific structures disclosed except insofar as recited in the appended claims.

I claim:

15 1. A push-off attachment for lift trucks and the like comprising a vertically movable lifting mechanism, a support for the material to be handled carried by said lifting mechanism, a push-off member movable transversely of said support, a motion transmitting connection between said lifting mechanism and said support comprising a member movable with said lifting mechanism and independently of said support, means for optionally latching the member movable with the lifting mechanism to said support to cause movement of the lifting mechanism to be transmitted to said support, and means operated by relative movement of said lifting mechanism and said support for operating said push-off member.

20 2. The push-off attachment of claim 1 wherein said last named means comprises interconnected links and levers for translating the relative vertical movement of the support and lifting mechanism into relative horizontal movement of the support and the push-off member.

30 3. The push-off attachment of claim 1 wherein the last-named means comprises a lazy tongs having the levers at one end connected respectively to the lifting mechanism and the support and the levers at the other end in engagement with the push-off member.

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