Sept. 14, 1954 T. J. MARTIN 2,689,054

LOAD HANDLING AND DUMPING MECHANISM

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Fig. 1.

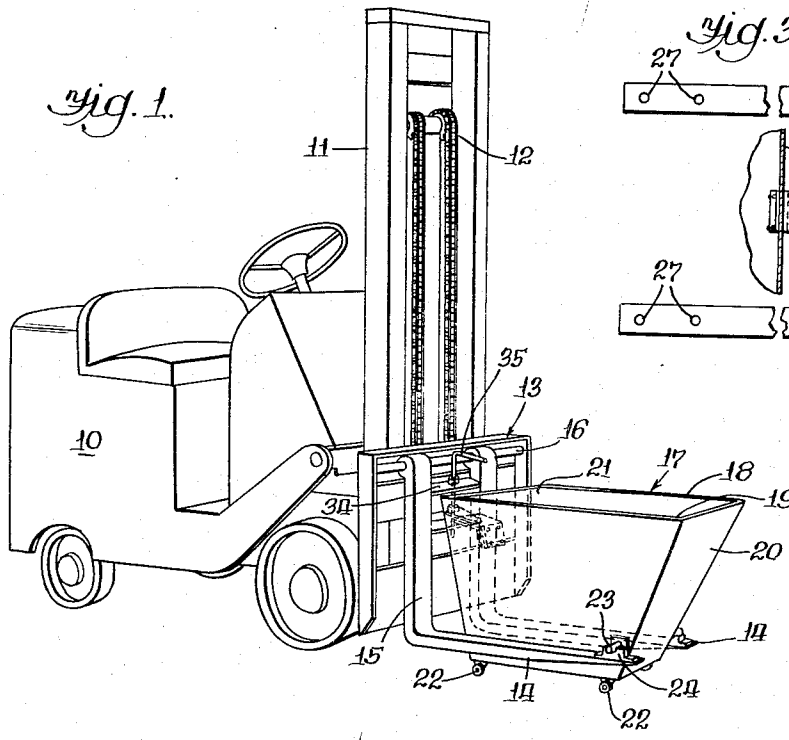


Fig. 3.

Fig. 2.

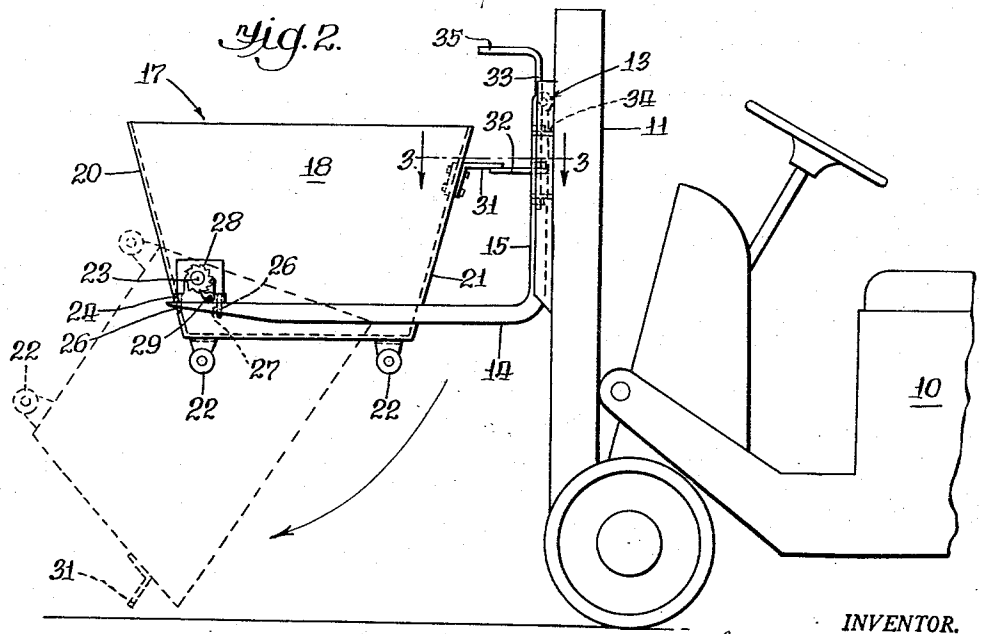
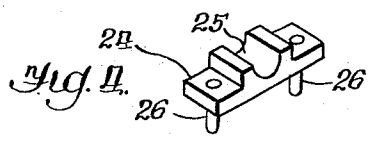


Fig. 4.



INVENTOR.
Thomas J. Martin
BY
Clarence J. Loftus
Atty.

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UNITED STATES PATENT OFFICE

2,689,054

LOAD HANDLING AND DUMPING MECHANISM

Thomas J. Martin, Chicago, Ill.

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1 Claim. (Cl. 214—315)

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This invention relates to material handling equipment, and specifically to a mechanism for lifting, carrying and dumping bulk material.

A more specific object of the invention is the provision of a mechanism adapted for use in connection with a conventional fork lift truck for lifting and carrying a so-called "tote box" adapted to contain any bulk material, together with means for quickly, easily and conveniently dumping said materials in a manner effective to completely discharge the contents of the box.

A further object of the invention is the provision of a unique, swingable "tote box" specifically designed for use with a more or less conventional fork lift truck so that any conventional type of fork lift truck may be converted to a convenient industrial dump truck within a matter of seconds, and can be re-converted for conventional fork lift operations with equal facility.

A still further object is the provision of an improved pivotal mounting and suspension mechanism whereby a box or similar receptacle may be carried by and dumped by means of a conventional fork lift truck.

The foregoing objects are accomplished according to the present teachings by the provision of a box-like receptacle or "tote box," carried on the tines of a fork lift truck but provided with a unique pivotal connection whereby the forward edge of the box is swingably pivoted between the tines of the fork, with the rearward edge of the box supported by a releasable latch in such a manner as to hold the box level in normal operation, but to permit it to be instantaneously released, when desired, to swing between the tines of the fork and dump its contents.

The preferred embodiment of the invention is illustrated in the drawings of this specification, wherein:

Figure 1 is a perspective view of a conventional fork lift truck having a dumping receptacle or "tote box" constructed in accordance with the principles of this disclosure;

Figure 2 is a side elevational view of the mechanism of Figure 1, showing the manner in which the "tote box" may be dumped by swinging from the full line to the dotted line positions illustrated in the drawings;

Figure 3 is a fragmental detail sectional view of the dumping latch release mechanism, the view being taken substantially on the plane of the line 3—3 of Figure 2; and

Figure 4 is a detail perspective view of one of the open bearing blocks utilized by the swinging mounting of the "tote box."

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The present invention contemplates a fork lift truck 10 which may be of any conventional design, and which is accordingly shown with the convenitonal vertical mast 11 and hoisting mechanism 12 by which the supporting carriage 13 is lifted. The carriage includes a lifting fork comprising a pair of horizontal tines 14, each of which has a vertical portion 15 by which they are mounted on a supporting shaft 16 of the carriage 13. The arrangement is such that the entire carriage and fork may be raised or lowered in the manner well understood in the art.

The tines 14 of the fork are rather widely spaced from each other, so that a dumping receptacle or "tote box" 17 of relatively large capacity may be positioned between them. The box 17 may be of any convenient shape but, as illustrated, it is of tapered rectangular configuration having parallel side walls 18 and 19, with a front wall 20 and back wall 21. As shown, it is provided with casters 22, so that it may be manually shifted about upon any floor surface when not being carried by the truck.

The box 17 is provided with a pair of stub shafts or trunnions 23, each mounted on and projecting from one of the sides 18 and 19 of the box. These stub shafts extend outwardly a sufficient distance to overlie the forward ends of the fork tines 14, and are pivotally interconnected with said tines by means of a pair of bearing blocks 24 having bearing surfaces 25 therein. The blocks 24 are each mounted on one of the tines 14 by downwardly extending pins 26 fixed in the blocks and arranged to engage drilled openings 27 in the tines 14. If desired, one or both of the stub shafts 23 may carry a ratchet 28, against which a spring-urged dog 29 rides to facilitate the dumping action of the device, as will appear hereinafter.

The back wall 21 of the box carries an outwardly projecting bracket 31, which overlies a latch arm 32 mounted on the vertical shaft 33 on the cross members 34 of the supporting carriage 13. The latch arm 32 will normally engage the bracket 31 and hold the box 17 in upright position as shown in full lines in Figures 1 and 2. The shaft 33 includes an outwardly extending handle portion 35, however, by which the shaft may be rotated to release the arm 32 from the bracket 31 and thus manually unlatch the side of the box nearest the carriage, leaving the box free for swinging movement between the tines of the fork. When so released, the box will swing in the direction of the arrow of Figure 2, at which time the ratchet wheel 28 will override the dog 29. The

contents of the box will thus be dumped as it moves through the dotted line position of Figure 2.

As the box reaches the end of its swing and begins to swing back, one of the teeth of the ratchet wheel will be engaged by the dog, which will stop the motion of the box abruptly. This abrupt stop will jolt the box sufficiently to free any material remaining therein, even when the equipment is utilized for carrying and dumping materials which may tend to stick to the walls and bottom of the box, or which for any other reason do not flow easily.

From the above it will be apparent that the teachings of this invention provide a material handling mechanism which is of advantage in that it provides means whereby a conventional fork lift truck or other lifting fork may be employed for carrying, lifting and dumping of bulk materials without material alterations to its mechanism. This is accomplished without incapacitating the lift truck for performing the more conventional duties of a fork lift, since the equipment may be re-converted for conventional fork lift functions by merely removing the bearing blocks from the tines.

The boxes disclosed herein are of general utility and may be employed in any of the usual ways practiced in manufacturing plants; yet they may be quickly, easily and conveniently picked up and moved from place to place and, if desired, they may be dumped as disclosed herein. In dumping, the swinging movement of the boxes is such that the contents are smoothly spread out, and the reverse stop ratchet mechanism is effective to insure complete dislodgement of the material within the box. The ratchet is also of value in

that it holds the box in the substantially overturned position illustrated in Figure 2, so that the box may be released from the tines of the fork by merely lowering the fork lift. On the other hand, the box may be conveniently returned to normal horizontal position by merely tripping the latch dog **29** and manually swinging the box back for engagement of the latch arm **32** with the bracket **31**.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

With a lifting fork comprising a pair of parallel fork tines projecting horizontally outwardly from a support and spaced apart from each other, the combination of a generally rectangular open top box; said box having side walls interconnecting a pair of end walls spaced apart a distance less than the distance between the tines of said fork, and being adapted to be positioned between said tines; said box being interconnected to said tines by swinging connections at the forward lower corners of said box, and a latch between the support of the fork and the inner side wall of the box, to hold the box in horizontal position; with a release mechanism for said latch and a reverse stop ratchet to limit the swinging movement of the box with respect to the tines of the fork.

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