

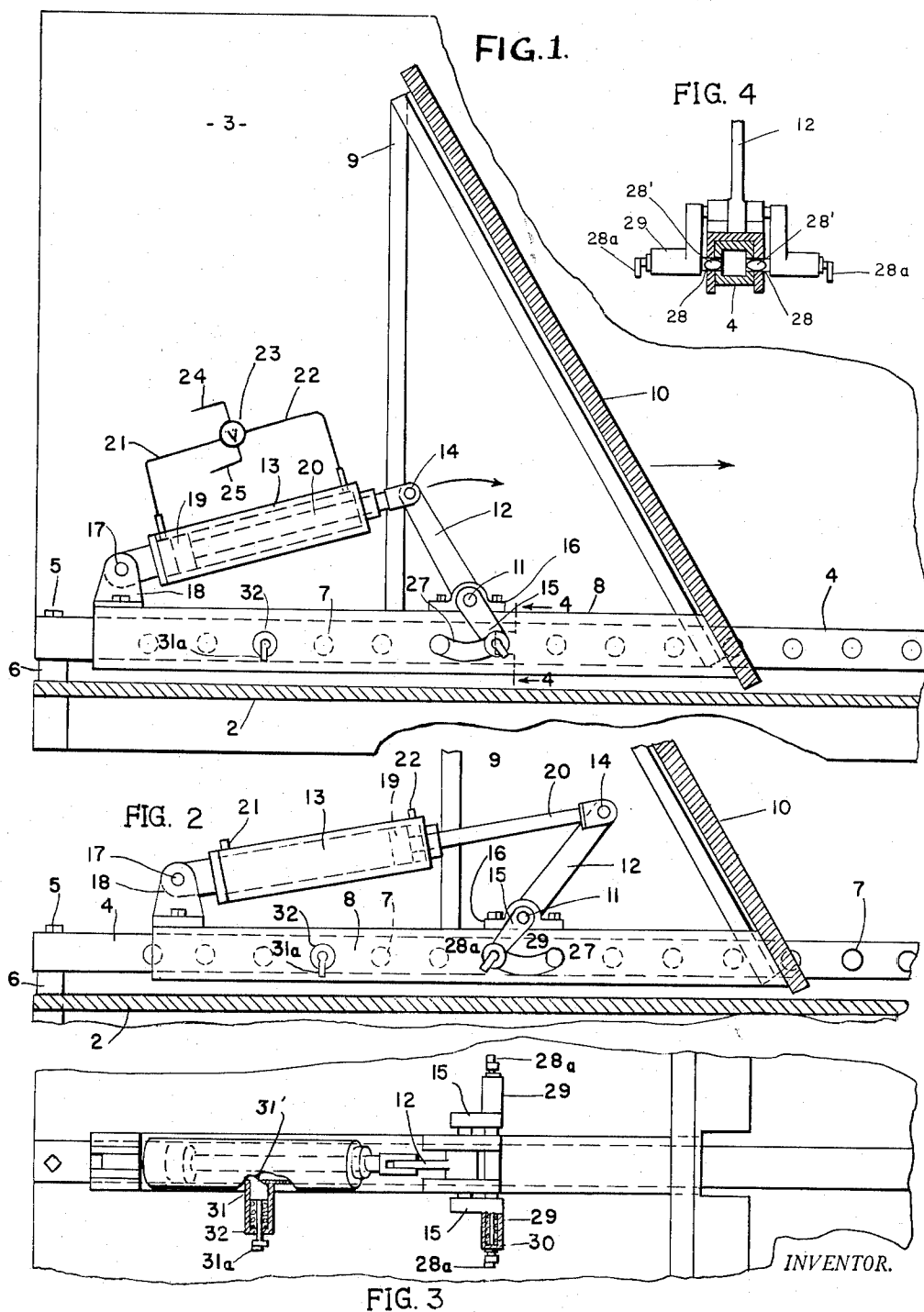
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R. E. BABCOCK, JR

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WAGON UNLOADER EJECTOR MECHANISM

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WAGON UNLOADER EJECTOR MECHANISM

Richard E. Babcock, Jr., Lancaster, Pa., assignor to The New Holland Machine Division of the Sperry Corporation, New Holland, Pa., a corporation of Delaware

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This invention relates to a wagon unloader of the class in which a false end gate is carried by a slide or carriage for movement along a guide or track lengthwise of the load carrying body of a truck, wagon or the like, and in which the power for moving the carriage is derived from a reciprocating power element.

In earlier arrangements of wagon unloaders of this general type, it has been common to employ as the source of power a usual double acting hydraulic cylinder the piston of which was connected to the aforementioned end gate carrying slide to cause movement thereof, and the cylinder of which was connected to a separate slide, both slides being equipped with means cooperating with the guide means or track to permit movement therealong in one direction only, while preventing retrogressive movement, to the end that both slides have walked along the beam in alternate steps responsive to projection and retraction respectively of the piston and piston rod relative to the cooperating cylinder.

With the foregoing in mind it is the primary object of the instant invention to provide a wagon unloader of the type aforementioned embodying but a single slide or carriage, and further, to provide in such a simplified arrangement a power multiplying means through which the thrust of the hydraulically actuated cylinder mechanism is transmitted to the slide to urge same in an unloading direction.

In accordance with the invention such objects are attained by connecting one end of a double acting hydraulic jack to the end gate supporting slide and the other end thereof to the end of a lever fulcrumed on said slide, the free end of the lever being provided with a detent or other suitable means cooperating with the track on which the slide moves to establish a fixed pivotal connection with the track during swinging movement of the lever in one direction and to be freely movable along the track during swinging of the lever in the opposite direction. Such movement in the one direction serves to propel the slide toward the discharge end of the wagon box or body, and the slide itself being equipped with a detent or other means engageable with the track to prevent retrogressive movement of the slide while permitting discharge movement thereof.

The foregoing and other incidental objects and advantages are all attained by the preferred embodiment of the invention illustrated in the accompanying drawings in which:

Figure 1 illustrates a longitudinal section through the forward end portion of a usual wagon box having the invention incorporated therein, the wagon unloading mechanism of the invention being shown in its fully retracted position at the forward end of the wagon prior to commencement of its initial discharging step or movement.

Figure 2, a view generally similar to Figure 1, but with the upper portion of the wagon box side and the movable end gate broken away, showing the various parts in the positions which they assume at the end of the initial discharge step or movement of the slide;

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Figure 3, a plan view, partly in section, showing the several operating parts in the position illustrated in Figure 1; and

Figure 4, a cross-section on the line 4—4 of Figure 1, looking in the direction of the arrows.

Referring now in detail to the accompanying drawings, the numeral 2 designates the horizontal bottom of a usual wagon box having relatively spaced longitudinal sides 3, of which only one is shown. Supported on the floor of the wagon box and extending longitudinally thereof medially between the sides 3 is a guide or track 4, which may comprise a rigid metal beam of tubular construction and preferably having a rectangular cross-section, as indicated in Figure 4. Preferably the opposite ends of the guide or track 4 will be bolted to the floor 2, as at 5, and supported in slightly spaced relation thereabove on spacers 6, to provide ample clearance between the floor and the slide hereinafter referred to. A series of uniformly spaced round holes or bores 7 extending laterally through both sides of the track 4, exemplifies one manner in which the track may be formed or adapted as a rack bar for cooperation with the engaging means or detents of the slide and the actuating lever hereinafter mentioned.

Mounted on the track 4 for movement therealong is a slide or carriage 8 of inverted or downwardly opening channel shape loosely conforming in size and shape to the track 4. Fixedly rigidly supported on this slide or carriage 8 is a suitable rigid frame work generally designated 9 on which is carried the movable end gate or load ejector 10 which, as it is moved toward the rear end of the wagon in the direction indicated by the arrow in Figure 1, serves to discharge the wagon contents through the rear end of the wagon body.

Medially fulcrumed on the slide 8, as at 11, is an actuating lever, the upper end of which designated 12, is pivotally connected to the double acting hydraulic jack 13, as at 14, to be swung or oscillated forwardly and rearwardly responsive to extension and retraction respectively of the jack 13.

The lower or free end of the actuating lever is bifurcated and includes the depending arms 15 respectively fixed on the fulcrum or shaft 11 and depending on opposite sides of the slide 8 for swinging movement parallel to said sides. It will be noted that the fulcrum pin or shaft 11 extends completely across the top of the slide 8 and is supported in bearings 16 on said slide and that the upper end 12 of the lever is in the form of a crank arm medially fixed to said shaft 11 between the bearings 16.

The hydraulic jack 13 is of the usual conventional type embodying a cylinder which is pivotally connected at 17 to a bracket 18 fixed on the slide 8. The piston 19 disposed for reciprocation in said cylinder has a piston rod 20 movable through the end of the cylinder and pivotally connected at 14 to the upper arm 12 of the lever in the manner and for the purpose aforementioned. Actuating fluid under pressure is simultaneously admitted to one end of the cylinder and exhausted from the other end thereof through conduits 21 and 22 respectively, both of which are supplied with fluid through a reversing valve 23 through a conduit 24, through which fluid is circulated from any suitable source. Fluid is returned to the source through return line 25. The valve 23 is of a conventional type which may be actuated either manually or automatically to reverse the flow of fluid through the conduits 21 and 22 each time the piston 19 reaches the end of a stroke to thus institute a stroke in the return direction and thereby produce an oscillating or swinging movement of the lever arm 12.

Suitable means are carried by the depending lever arms 15 respectively to project through arcuate slots 27

in the sides of slide 8 and establish a fixed pivotal connection between the lever arms 15 and the track 4 during operative swinging movement of the lever arm 12 in a rearward direction as indicated by the arrow in Figure 1 to cause a rearward or discharge movement of the movable end gate or load ejector 10. As best seen in Figures 3 and 4, each such means for establishing the aforesaid pivotal connection, in the present embodiment comprises a cylindrical detent or pin 28 which is resiliently projected from its housing 29 at the end of its respective arm 15 to be automatically inserted into any of the holes or openings in the track with which it may come into registry. A compression spring 30 in each housing 29 abuts against the detent therein and thus serves to resiliently project same in the desired manner.

A similarly arranged detent 31 contained in a housing 32 on the side of slide 8 is similarly spring projected through the side of said slide for reception in such holes 7 as may register therewith.

The free ends or end faces 28' and 31' respectively of said detents are axially slanted or inclined in a direction and to such an extent as will cause them to function as cam surfaces to engage the edges of their respective holes 7 and automatically retract the respective detents 28, 31 from said holes as either the slide 8 or the free end portions or arms 15 of the actuating lever are moved in a discharging direction toward the rear end of the wagon box. In other words the action of each said detent with respect to the track 4 is similar to the action between a usual pawl and ratchet.

The operation of the invention is as follows:

Commencing with the parts in the positions shown in Figure 1 and assuming that the wagon box will have been filled with material rearwardly of the movable end gate or load ejector 10, the valve 23 will be actuated to admit fluid into the cylinder 13 through the conduit 21. This will cause the piston 19 to commence its rearward stroke and thus cause rearward swinging movement of the lever arm 12. During such movement of the lever, the cylindrical faces of the respective detents 28 will abut positively against the respective holes 7 in which they are at this time received to establish a fixed pivotal connection between the track or guide 4 and the said lever so long as the upper arm 12 of the lever is swung in this same rearward or discharge direction. Thus the lever will pivot about the common axis of the cylindrical detents 28 under the thrust exerted by the jack 13, and the pivotal connection 11 between the lever and the slide 8 will cause the slide and its follower 10 to be moved toward the rear end of the wagon box until the end of the piston stroke. At this time the various parts are in the positions indicated in Figure 2.

During the discharge movement of the slide 8 aforementioned, the pivotal connection 11 will necessarily swing through an arc about the detents 28. It will be seen however that the inverted channel construction of the slide 8 will permit the slide to move vertically on the track 4 to such extent as is necessary to accommodate this arcuate movement of the pivot 11.

At the completion of the discharge stroke, the valve 23 is reversed to institute return movement of the piston 19 and to return the lever arm 12 to the position shown in Figure 1 in preparation for another discharge stroke. On the ensuing forward swing of the lever arm 12 (and consequent rearward swing of the lever arms 15) the cam faces 28' of the respective detents 28 will coact with the track 7 to automatically withdraw the detents from their respective holes 7 while they are swung rearwardly for insertion into the adjacent set of holes 7. During this

period of disengagement of the detents 28, it will be seen that the detents 31 of the slide 8 will engage in one of the holes 7 to maintain the slide 8 against retrogressive movement under the pressure of the wagon contents.

Obviously when the jack 13 and the lever assume the positions shown in Figure 1, the foregoing operations may be again repeated to move the slide 8 rearwardly another step and this may be continued until the wagon body is fully unloaded.

In order to return the load ejector 10 to its starting point, preparatory to a further unloading cycle, the control handles 28a and 31a of the respective detents 28 and 31 may be manually swung through 180° to reverse the directions of operation of their respective detents, whereupon actuation of the hydraulic jack may be utilized to cause the return movement.

In this application, I have shown and described the best mode now contemplated for carrying out the invention. However, I recognize that the invention is capable of other embodiments and that its details may be modified in various ways all without departing from the invention. Accordingly the drawings and description herein are to be construed as merely illustrative in nature and not as exclusive.

Having thus described my invention, I claim:

1. In a wagon unloader of the class in which a carriage guided for movement along a rack bar propels an ejector toward the discharge end of a load carrying body, the combination with said carriage of a lever medially fulcrumed thereon, a double acting jack connected between one end of said lever and a fixed point on said carriage, a detent carried at the other end of said lever for operative engagement with said rack bar to prevent movement of said other end away from the other end of the body and to provide a pivot point about which swinging of the lever toward said discharge end will function to propel the carriage toward said end, and a detent carried by the carriage in operative engagement with the rack bar to prevent movement of said carriage away from said discharge end.

2. The combination of claim 1 in which both of said detents are reversible, whereby the said jack may function at the conclusion of an unloading operation to return said carriage toward its starting point.

3. In a wagon unloader of the class including a carriage guided for movement along a rack bar, the combination with said carriage of a lever fulcrumed thereon, a double acting jack connected between said lever and a fixed point on said carriage for swinging said lever to and fro about its fulcrum, a detent carried by said lever for operative engagement with said rack bar during swinging of the lever in one direction to cause unloading movement of the carriage, and a detent carried by the carriage in operative relation with said rack bar to prevent retrogressive movement of the carriage during return swinging of said lever.

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