

May 31, 1955

A. J. MERCIER ET AL
LOAD EJECTOR FOR LIFT TRUCKS

2,709,531

Filed June 24, 1950

5 Sheets-Sheet 1

Fig. 1.

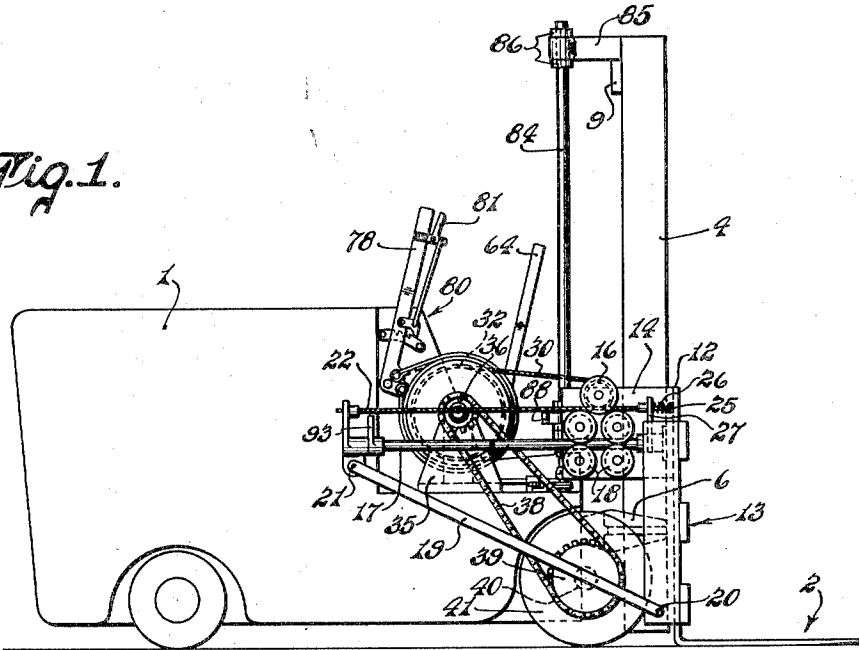
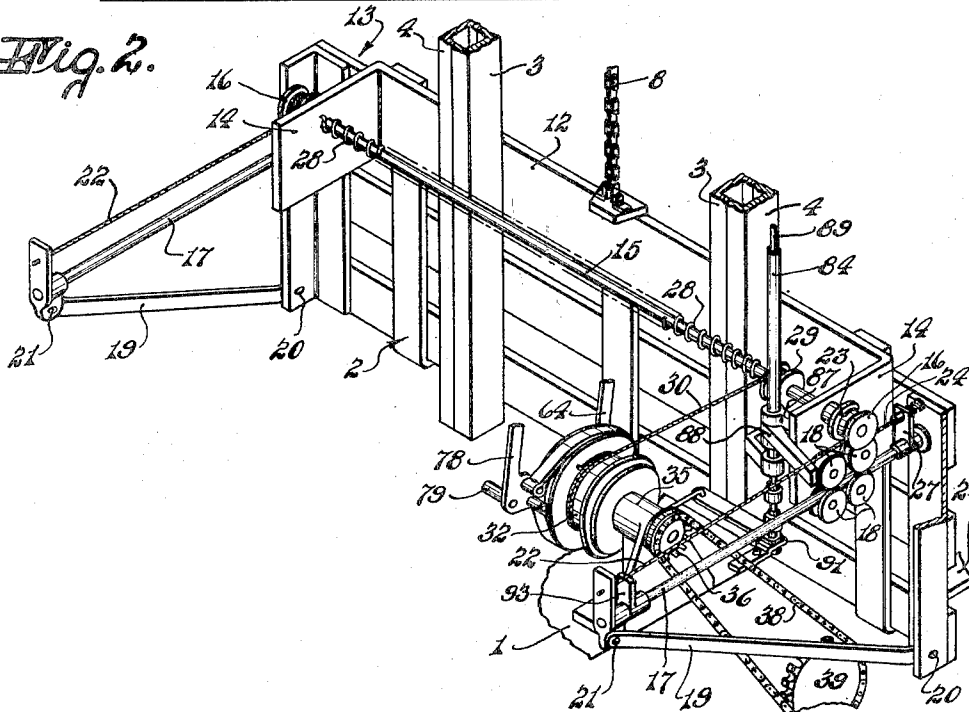


Fig. 2.



INVENTORS
AMOS J. MERCIER AND
GEORGE G. MORIN
BY Chapin & Neal
ATTORNEYS

May 31, 1955

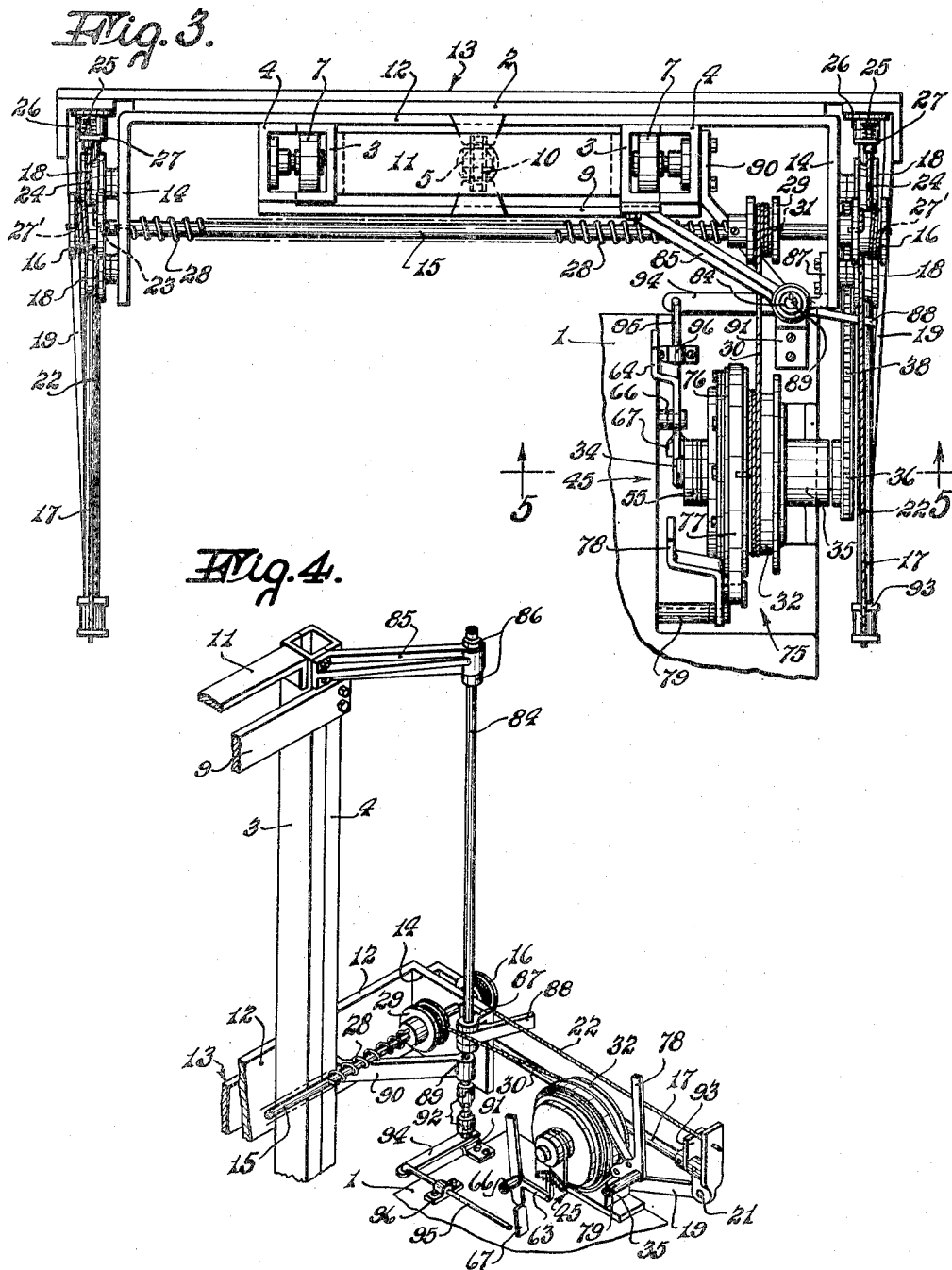
A. J. MERCIER ET AL

2,709,531

LOAD EJECTOR FOR LIFT TRUCKS

Filed June 24, 1950

5 Sheets-Sheet 2



INVENTORS
 AMOS J. MERCIER AND
 GEORGE G. MORIN
 BY *Chapin & Neal*
 ATTORNEYS

May 31, 1955

A. J. MERCIER ET AL

2,709,531

LOAD EJECTOR FOR LIFT TRUCKS

Filed June 24, 1950

5 Sheets-Sheet 3

Fig. 5.

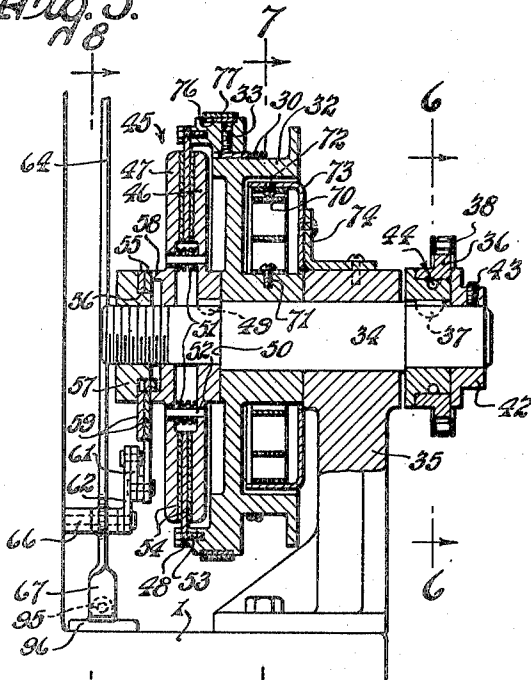


Fig. 7.

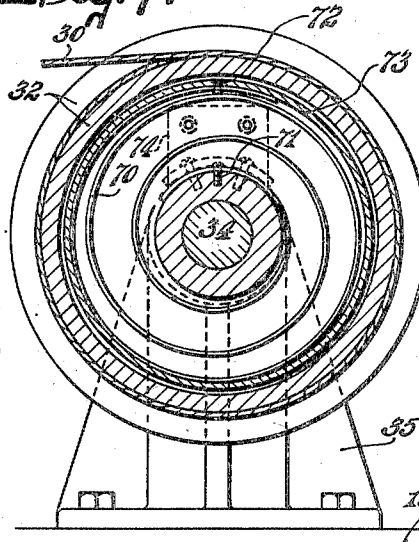


Fig. 8.

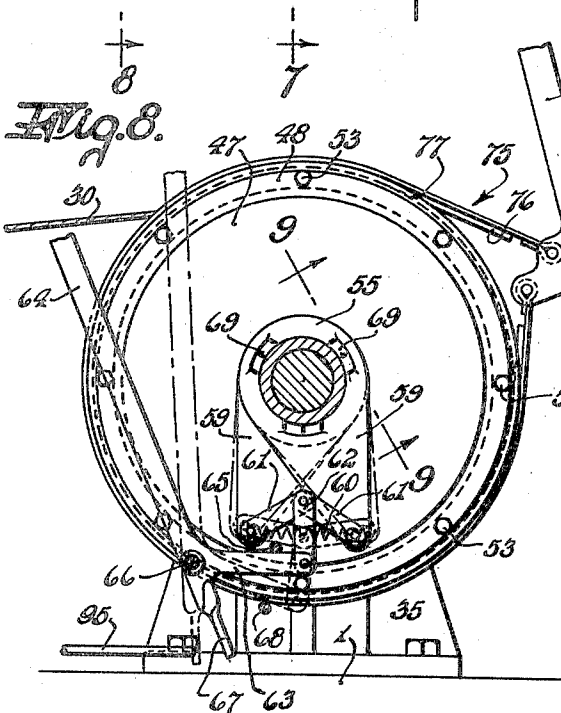


Fig. 6.

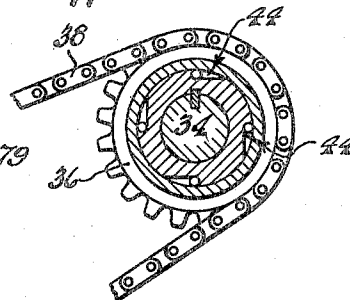


Fig. 9.



Fig. 10.



INVENTORS
AMOS J. MERCIER AND
GEORGE G. MORIN
BY *Chapin & Neal*
ATTORNEYS

May 31, 1955

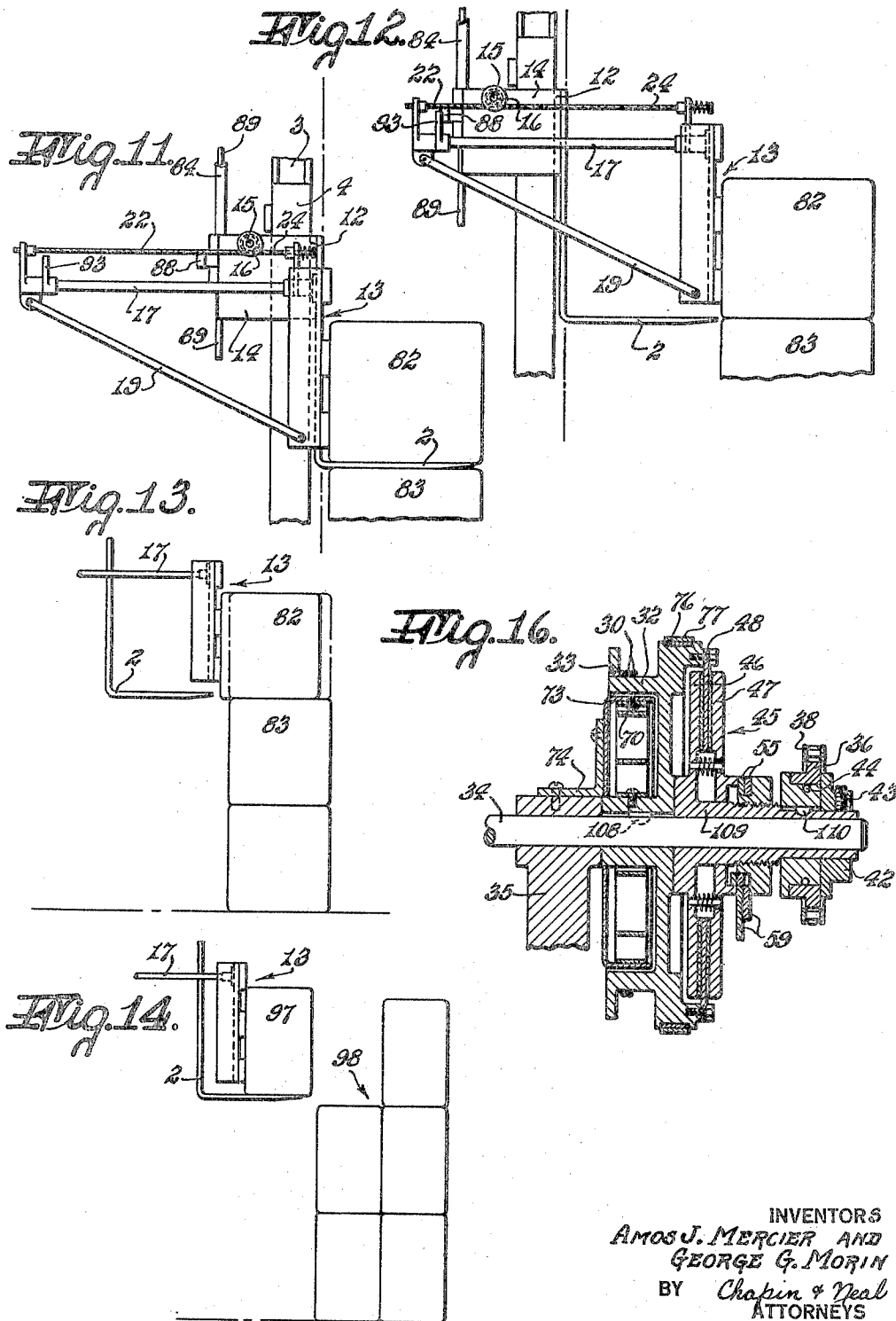
A. J. MERCIER ET AL

2,709,531

LOAD EJECTOR FOR LIFT TRUCKS

Filed June 24, 1950

5 Sheets-Sheet 4



1

2,709,531

LOAD EJECTOR FOR LIFT TRUCKS

Amos J. Mercier, Holyoke, and George G. Morin,
South Hadley Falls, Mass.

Application June 24, 1950, Serial No. 170,124

16 Claims. (Cl. 214—357)

This invention relates to a lift truck and more particularly to a lift truck provided with automatic unloading apparatus.

Material handling devices such as power driven lift trucks, fork trucks and the like, having forward and reverse drives, are widely used in factories and warehouses to carry loads of articles from place to place and to pick up and deposit articles at varying heights. Articles are loaded on the trucks by hand or by driving the truck forwardly toward the articles and scooping the same onto a pair of forks or other load supporting and carrying member on the front of the truck. For unloading, the truck is commonly provided with a pusher, disposed above the carrying member, which may be moved across the member to push the articles off onto the floor or onto the top of a stack of previously deposited articles. The forward movement of the pusher is controlled manually, by the truck operator; and when it is desired to deposit the articles squarely on a selected area the truck is maneuvered to position the carrying member above said area and then backed away therefrom, the operator simultaneously causing the pusher to move forwardly relative to the truck in an effort to hold the pusher and the articles stationary above the selected deposit area. When the truck and the carrying member have been moved out from under the articles, the latter will fall into place on the deposit area. The accuracy of this operation depends upon the skill of the operator in synchronizing the reverse and forward movements of truck and pusher respectively. The general object of the present invention is to provide a lift truck in which the conventional pusher is eliminated and replaced by a stripper, the movement of which is automatically synchronized with that of the truck, thereby increasing the accuracy of the unloading operation while at the same time eliminating reliance on the skill of the truck operator as a factor in the speed and efficiency of operation of the truck.

More particular objects of the present invention are to provide a lift truck with an article-engaging member in the nature of a stripper which will automatically hold a load of articles stationary above a point of deposit when the truck is backed away therefrom; to provide a simple, sturdy, and effective mechanism for automatically operating such a member; and to provide means for automatically returning said member from a predetermined forward position to a position adjacent the body of the truck.

These and other objects and advantages of the present invention are more clearly developed in the following description and accompanying drawings, in which:

Fig. 1 is a side elevational view of a lift truck embodying the invention;

Fig. 2 is a rear perspective view of the drive mechanism for the article-engaging stripper;

Fig. 3 is a plan view of the same to show the relation of parts of the drive mechanism with the truck elevating means;

2

Fig. 4 is a rear perspective view of the drive mechanism taken from a different position than that of Fig. 2, to show the parts of the automatic return means more clearly;

Fig. 5 is a detail sectional view, on a larger scale, taken substantially on line 5—5 of Fig. 3;

Fig. 6 is a detail sectional view on a larger scale taken substantially on line 6—6 of Fig. 5;

Fig. 7 is a sectional view taken substantially on line 7—7 of Fig. 5;

Fig. 8 is a similar view taken on line 8—8 of Fig. 5;

Figs. 9 and 10 are detail sectional views of the rings of the transmission clutch taken on line 9—9 of Fig. 8 and respectively showing the parts in clutch disengaging and clutch engaging positions;

Figs. 11 and 12 are diagrammatic views of the truck in two stages of a typical article depositing operation;

Figs. 13 and 14 are similar views showing the truck operating in other depositing operations;

Fig. 15 is a plan view of a portion of a modified form of truck;

Fig. 16 is a sectional view of a portion of the transmission assembly shown in Fig. 15 and taken substantially on line 16—16 of Fig. 15; and

Fig. 17 is a diagrammatic plan view of a modified form of drive mechanism.

Fig. 1 shows a power driven lift truck which has a forward and a reverse drive (not shown) and carries at the fore end of the body 1 an elevating means of any suitable form on which is mounted, for vertical reciprocation, a forwardly projecting article carrying support member 2. In the form shown in Figs. 2 and 3, the elevating means includes two sets of vertically disposed channels 3 and 4. The inner channels 3 are movable vertically under the influence of a hydraulic ram 5, and the outer channels 4 are pivoted to the truck body 1 by brackets 6. A roller 7 mounted in each fixed channel 4 serves to guide the channels 3 as they shift vertically. A chain 8, secured at one end to a cross-piece 9 mounted on the fixed channels 4, is trained upwardly and over a sheave 10 carried on a beam 11 on the movable channels 3, and is finally trained downwardly and secured as shown in Fig. 2 to a generally U-shaped elevating bracket 12. As the channels 3 are moved up and down by the ram 5, the bracket 12 is likewise shifted up and down by the action of sheave 10 and chain 8. The carrying member 2 is mounted upon the elevating bracket 12 to be moved therewith.

According to the present invention, an article-engaging stripper 13 is mounted upon the elevating bracket 12 in overlying relation to the carrying member 2; and when the truck is backed away from a point of deposit, the stripper 13 is held stationary above said point of deposit as the member 2 is pulled out from under the stripper. It will be manifest that, in order for the stripper 13 to remain stationary relative to a point of deposit as the truck is backing away from said point, the stripper must be driven forwardly, relative to the truck, at the same speed as the speed at which the truck is backing.

Fig. 1 shows one example of a drive mechanism, for the stripper 13, embodying the present invention, and the general relation of said mechanism to the rest of the truck; Figs. 2—4 show details of construction of said mechanism.

As best shown by Figs. 2—4 the elevating bracket 12 has a pair of rearwardly extending leg plates 14; and a horizontal cross-shaft 15 is journaled in said plates 14, across the back of the bracket 12. Fixed on the shaft 15 adjacent the extremities thereof and outside the plates 14 are a pair of twin driver drums 16. A pair of rods 17 extend rearwardly from the stripper 13 adjacent the plates 14 and are carried and supported in

sets of roller sheaves 18 mounted on plates 14. Brace legs 19 are fixed at 20 to the lower portion of stripper 13 and are secured at 21 to the rearmost extremities of rods 17 to lend rigidity to said rods. Secured to the rearmost extremity of each of the rods 17 is a cable 22 which extends forwardly and is coiled about and secured at 23 to the adjacent drum 16. Cables 24 are each secured resiliently to the stripper 13, the extremity of each of said cables having a collar 25 fixed thereon with the cable extending through a compression spring 26 and through a bracket 27 which is fixed to the stripper 13. The other end portion of each cable 24 is coiled about an adjacent drum 16 reversely to the direction in which cables 22 are coiled and is fixed on said drum at 27'. The resilient connections between cables 24 and stripper 13 maintain cables 22 and 24 taut without imparting objectionable lost motion to said stripper in operation of the drive mechanism.

When the shaft 15 is rotated in a counterclockwise direction (as viewed in Figs. 1 or 2), it serves as a windlass to pull the rods 17 and stripper 13 forwardly of the truck by means of cables 22. A relatively heavy torsion spring 28 is coiled about the shaft 15 and is anchored at one end to a drum 29 fixed on the shaft 15 and at the other end to the opposite plate 14. Energy is put into spring 28 as the shaft 15 and drum 29 rotate in a counterclockwise direction as viewed in Fig. 2; and when said spring is allowed to act freely on the shaft 15 (as will be explained later) it acts as a motor to drive said shaft in a clockwise direction. In this event the shaft is again acting as a windlass, to pull the stripper 13 rearwardly of the truck by means of cables 24.

A drive cable 30 has one end portion coiled about drum 29 and is secured to said drum at 31. The other end portion of cable 30 is coiled in the opposite direction about a windlass drum 32 and is secured to said drum by a set screw at 33 (Fig. 5). The drum 32 is rotatably mounted upon a shaft 34 supported on the truck, and may be coupled to said shaft 34 as will be explained to act as a windlass in rotating drum 29 and shaft 15, through cable 30, in a counterclockwise direction as viewed in Fig. 2.

A bearing post 35 supports the shaft 34 on the truck body 1 (Figs. 1, 2 and 5), with the outermost end of the shaft extending slightly beyond the vertical side panel of said body. A sprocket wheel 36 is keyed at 37 to this outer extension of shaft 34 and is connected by a chain 38 to a sprocket wheel 39 fixed on the axle 40 of a front truck wheel 41. A collar 42 is fixed by set screw 43 on shaft 34 to prevent lateral movement of sprocket 36 on said shaft. As best shown in Fig. 6, a one-way overrunning clutch indicated by 44 is provided between shaft 34 and sprocket 36. This clutch acts to couple said shaft and sprocket only when the chain 38 drives the sprocket 36 in a clockwise direction as viewed in Fig. 6; i. e., when the truck is driven in reverse.

A clutch assembly, generally indicated at 45, is provided to releasably couple drum 32 to shaft 34, said clutch comprising a pair of clutch discs 46 and 47 on the shaft and an annular plate member 48 on the drum and extending between discs 46 and 47. Disc 46 is keyed at 49 to the shaft 34 immediately adjacent an abutment 50. The discs are held resiliently spaced apart by springs 51 which are supported by pins 52. The pins 52 also serve to transmit rotation from disc 46 to disc 47. When the discs 46 and 47 are moved together, they clutch between them the member 48 which is fixed at 53 to the drum 32. The member 48 is provided with frictional clutch surfaces 54.

The clutch 45 is engaged as described above by the action of a set of rotatable clutch rings 55. The rings 55 are mounted in a recess 56 in a hub 57 threaded and secured on the shaft 34, and the rings are held in position in said recess 56 by an annular flange 58 on clutch

disc 47. The rings 55 are provided with radial extensions 59 (Fig. 8), the extremities of which are connected by a spring 60. Said extremities are also connected by a toggle linkage at 61 normally held broken as shown in full line in Fig. 8 by the spring 60. A link 62 connects the toggle 61 to a bell crank 63 having an elongated handle extension 64, said bell crank 63 normally being held against a stop 65. The handle 64 is pivoted on a stub 66 mounted on the truck body. A downwardly extending member 67 is provided on crank 63 for a purpose to be later described. To engage the clutch, the bell crank is pulled to the dot-dash position of Fig. 8, against a stop 68. This action makes the toggle 61 as shown, with the result that the respective extensions 59 and rings 55 are rotated relative to each other.

The rings 55 are normally interengaged by a plurality of complementary angular cam portions 69 shown best in Figs. 9 and 10. When the rings are relatively rotated, the portions 69 interact as shown in Fig. 10 to spread the rings 55 apart, whereby hub 57 and flange 58 are moved apart to force the discs 46 and 47 together.

To keep the drive cable 30 resiliently taut between drums 29 and 32 as the elevating bracket 12 with drum 29 is raised and lowered in operation of the truck, a motor spring 70 is provided to resist rotation of the drum 32 in a counterclockwise direction as viewed in Fig. 7. Of course, the spring 70 is not strong enough to overcome the spring 28. The spring 70 is fixed at one end to the drum 32 at 71 and the other end is fixed at 72 to an annular flanged member 73 which is mounted rigidly by a brace 74 on the bearing post 35 fixed on the truck body 1.

For a purpose to be described later, the drum 32 is provided with a brake generally indicated at 75 and comprising a band 76 and a brake strap 77 encircling said band and engageable therewith upon movement of a bell crank handle lever 78 to the left in Fig. 1 or to the right as the apparatus is viewed in Fig. 8. Lever 78 is pivoted on a post 79 fixed to the truck body 1. A spring held pawl and ratchet means, indicated at 80 in Fig. 1 and manipulated by hand piece 81, provides a manually controlled holder for the brake lever 78 by which the brake may be set to hold drum 32 in a selected position.

The ratios among the dimensions of the sprockets and drums in the mechanism above described will be made such that the linear speed of stripper 13 when it is driven forwardly is substantially the same as the rearward speed of the truck. The following diameters are given as an example of a construction which will satisfy the requirement of substantially equal speeds: truck wheel 41, 1.00 ft.; sprocket 39, 0.50 ft.; sprocket 36, 0.20 ft.; drum 32, 1.00 ft.; drum 29, 0.50 ft.; and each drum 16, 0.20 ft.

Figs. 11 and 12 are diagrammatic illustrations showing initial and final stages of a typical article depositing operation of the truck of this invention. In Fig. 11, an article 82 has been positioned on the carrying member 2. The article completely fills the member 2 and is in engagement with the stripper 13. To deposit the article 82 at a particular position, such as on a previously positioned article 83, an operator maneuvers the truck to position the carrying member 2 squarely above said article 83 as in Fig. 11. Then he engages clutch 45 to couple drum 32 to shaft 34 and actuates the reverse drive of the truck. By means of the drive mechanism described above, the stripper 13 is moved forwardly of the truck in synchronization with the rearward movement of the truck, to hold the article 82 positioned above the article 83 as the backing truck pulls the member 2 out from under the article 82. Fig. 12 illustrates the final unloading stage in which the truck is back to a point where the forward edge of the support member 2 is

5

positioned slightly rearwardly of the stripper. The article 82 is deposited precisely on the article 83.

When the article 82 is deposited on article 83 the truck operator manipulates clutch handle 64 to release the clutch 45, thereby abandoning drum 32 and cross-shaft 15 to the force of torsion spring 28. The spring 28 drives cross-shaft 15 in a direction to wind cables 24 up on drums 16 and to pay out cables 22 therefrom, causing the stripper 13 to return from its forward position to a position of rest against the elevating bracket 12.

Preferably, however, to eliminate the necessity for attention of the operator and to remove the chance that the clutch may be forgotten in maneuvering the truck, an automatic clutch release mechanism is provided on the truck to operate independently of the operator when the stripper 13 attains a position slightly beyond the forward edge of the carrying member 2. As best shown in Figs. 3 and 4, a hollow shaft 84 is journaled in a brace arm 85 fixed on a movable elevating channel 3, a pair of collars 86 being provided to carry the shaft 84 up and down with said channel 3. A forked holder 87 fixed on the elevating bracket 12 is slidable on the shaft 84 to carry with said bracket a crank arm 88 which is splined on the shaft 84 between the forks of holder 87. A rod 89 is splined in the hollow shaft 84 and is supported by a brace 90 fixed on the fixed channel 4. The lowermost end of rod 89 is rotatably supported on a bearing 91 fixed on the truck body 1. Two universal joints 92 are interposed in the rod 89 between the lowermost end thereof and the lowermost end of shaft 84 to permit said rod and shaft to follow channels 3 and 4 as the latter are pivoted on brackets 6 in certain operations of the truck not significant in an understanding of the present invention. A trip member 93 is carried adjacent the rearmost extremity of rod 17, and when the stripper 13 is positioned forwardly as described above, the member 93 engages arm 88 to rotate shaft 84 and rod 89 in a direction to drive the free end of a crank 94 fixed on the lowermost end of rod 89 toward the rear of the truck. This drives a striker bar 95 rearwardly of the truck and into engagement with the previously mentioned member 67 depending from the clutch-actuating bell crank 63 to disengage the clutch 45. The bar 95 is held in proper alignment by a brace strap 96 fixed on the truck body 1.

Fig. 13 illustrates a type of situation in which the stripper member 13 may be used as an article pusher. In a depositing operation the article 82 may not be left precisely over the article 83. To remedy this, the clutch 45 is engaged and the truck moved rearwardly to advance the member 13 to the position shown in Fig. 13. Just before trip member 93 acts to disengage clutch 45, brake 75 is set and clutch 45 is disengaged. Member 13 is then locked in position and can be used as a fixed pusher to position the article 82 accurately on the stack of articles 83 as indicated in dotted lines.

It is a condition to a successful unloading operation as described above that the foremost edge of the article on the carrying member 2 be at least substantially flush with the foremost edge of said member 2, and that the rear face of the article be in engagement with the stripper 13, before the truck is positioned with the member 2 overlying the place at which it is desired to deposit an article 97, for example, on a stack 98 of articles (Fig. 14). Otherwise, the backing truck will carry the article 97 away from the stack 98 before the stripper 13 engages the article 97 to hold it fixed. To properly position stripper 13 in engagement with an article 97 as shown in Fig. 14, clutch 45 and brake 75 are manipulated as follows:

An article 97 having been picked up on carrying member 2, the clutch 45 is engaged and the truck is driven rearwardly until the stripper 13 is positioned against the article 97 with the latter at least flush with the fore edge of member 2. Alternatively, the stripper 13 may

6

be adjusted in position before the article 97 is picked up by member 2. In any event, once the condition of Fig. 14 is effected, the truck is brought to a stop. The clutch 45 serves to hold the drive mechanism for stripper 13 in place against the force of spring 28. The brake 75 is then set to positively hold the drive mechanism and stripper 13 in place, while the clutch 45 is disengaged to permit free maneuvering of the truck to position member 2 and article 97 squarely above stack 98. The clutch 45 is then engaged, the brake 75 is disengaged, and the truck is backed away from stack 98 to deposit article 97 thereon according to the process described above with respect to Figs. 11 and 12.

Figs. 15 and 16 illustrate a drive mechanism essentially similar to that of Figs. 1-9 but adapted for use with a lift truck having an elevator construction which does not admit of a cross-shaft in the position of shaft 15 of the last-mentioned figures.

In this adaptation of the invention, a pair of stub shafts 15 are journaled in hubs 99 fixed on the leg plates 14 of elevating bracket 12. Drums 16 carrying cables 22 and 24 are mounted on the lateral extensions of shafts 15, substantially as these elements were shown to be mounted on cross-shaft 15 in the previous example. Each of the inward extensions of shafts 15 carries a drum 29 fixed thereon. Motor springs 100 are secured at 101 to the shafts 15 and at 102 to annular flanged members 103 which are mounted rigidly by braces 104 on the hubs 99. Motor springs 100 serve the same purpose as did spring 28 in the previously described form of the invention, acting to resist unwinding of cables 22 from drums 16 as the stripper 13 is moved forwardly, and to store energy to return the stripper 13 rearwardly.

Drive cables 30 have their upper end portions coiled about drums 29 and secured thereto at 31. The opposite end portions of cables 30 are coiled oppositely about driver drums 32 and 105 respectively and secured thereto at 33 and 106.

The drum 105 is fixed at 107 on a shaft 34 which is journaled in two bearing posts 35 mounted on the truck body. The drum 34 is keyed at 108 to the shaft 34 and is driven through a clutch assembly indicated by 45 of which one clutch disc 46 is integrally connected to a sleeve 109 (Fig. 16). It will be noted this construction is substantially similar to the assembly shown in Figs. 5-10, the significant differences being that in the present example the drum 32 is keyed to the shaft 34 and the clutch 45 is mounted on the sleeve 109 rotatable on said shaft. The sleeve 109 is rotated by a sprocket 36 keyed at 110 to the sleeve, a one-way over-running clutch being provided at 44 to render the sleeve responsive to sprocket 36 only when the latter is driven in reverse by chain 38 from truck wheel 41. A collar 42 is fixed on sleeve 109 by a set screw 43 to hold the sprocket 36 on the sleeve.

Fig. 17 shows, diagrammatically, a different form of drive mechanism for the stripper 13, characterized by the fact that it is primarily hydraulically operated. In this form of the invention, a driven stub shaft 34 is driven through sprocket 36 and clutch 45 in the same manner as shaft 34 in Figs. 15 and 16. The shaft 34 is provided with a pinion 111 which engages a rack 112 on a piston rod 113 having a head 114 reciprocable in a master hydraulic cylinder 115. The cylinder 115 is connected through flexible hydraulic connectors 116 to a pair of spaced driving cylinders 117 mounted on leg plates 14 of elevating bracket 12. The rods 17 are telescoped into the cylinders 117 and are provided with piston heads 118.

Thus, when the shaft 34 is rotated by reverse movement of the truck and when clutch 45 is engaged, piston head 114 in master cylinder 115 acts through a suitable fluid to drive the stripper 13 forwardly in synchronization with the rearward movement of the truck. When the stripper has attained a desired forward position (e. g. above the forward edge of an article carrying member), a trip member 93 on the rod 113 engages a lug 119 which is operable

through means (such as a striker bar 95 and clutch lever 67, seen in Fig. 4) to automatically disengage the clutch 45.

The cylinders 115 and 117 are provided respectively with spring 120 and springs 121 which store energy as the member is moved forwardly and which, upon disengagement of clutch 45 expand to drive the stripper 13 rearwardly to a position against the bracket 12 in the manner of spring 28.

While it is highly preferable to synchronize the rearward and forward movement of the truck and the stripper 13 respectively, the said stripper may be driven at a speed greater than the rearward movement of the truck. In this case, the operator may manually cause the clutch 45 to slip to bring the movement of stripper 13 into synchronization with the movement of the truck. Whether synchronized or not the windlass drive for the stripper 13 has substantial advantages, in case of operation, cost of manufacture and economy of maintenance, over constructions presently available for the purpose.

What is claimed is:

1. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support, means to drive said member forwardly, and means, including a clutch, for optionally coupling said stripper member driving means to the reverse drive of the truck to simultaneously and automatically drive said member forwardly and the truck rearwardly at equal speeds upon activation of the reverse drive.

2. A power driven lift truck as in claim 1 having independent power means operable upon disengagement of the clutch to drive the stripper member rearwardly.

3. A power driven lift truck as in claim 2, said independent power means comprising a spring motor energized by forward movement of the stripper member.

4. A power driven lift truck as in claim 2 having means operable at the option of the operator to hold the stripper member against the action of said independent power means.

5. A power driven lift truck as in claim 2 having means to automatically disengage the clutch upon attainment by the stripper member of a predetermined forward position.

6. In a power driven lift truck having a vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support, means to drive said member forwardly, means, including a clutch, for coupling said driving means to the power drive of the truck, means operable upon disengagement of said clutch to drive said member rearwardly, means to automatically disengage said clutch upon attainment by said member of a predetermined forward position, and brake means to releasably hold said member against the action of said rear drive means at any selected position of its movement.

7. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and reciprocally mounted on the elevating means for movement over the article support, rearward extensions fixed to said member, a shaft rotatably mounted on said elevating means, a windlass fixed to said shaft, a cable connecting the free end of said extension to the windlass, a second cable reversely wound on said windlass and connected to said member, and power means to rotate said shaft first in one direction and then the other to respectively move said member forwardly and rearwardly over said article support.

8. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a

forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and reciprocally mounted on the elevating means for movement over the article support, rearward extensions fixed to said member, a shaft rotatably mounted on said elevating means, a windlass fixed to said shaft, a cable connecting the free end of said extension to the windlass, a second cable reversely wound on said windlass and connected to said member, and means including a clutch to couple said shaft to the reverse drive of the truck to drive said member forwardly, when the truck is driven rearwardly, at the same speed as that of the truck.

9. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and reciprocally mounted on the elevating means for movement over the article support, rearward extensions fixed to said member, a shaft rotatably mounted on said elevating means, a windlass fixed to said shaft, a cable connecting the free end of said extension to the windlass, a second cable reversely wound on said windlass and connected to said member, means including a clutch to couple said shaft to the reverse drive of the truck to drive said member forwardly, when the truck is driven rearwardly, at the same speed as that of the truck, and a spring motor operative upon release of said clutch to drive said member rearwardly.

10. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and reciprocally mounted on the elevating means for movement over the article support, rearward extensions fixed to said member, a shaft rotatably mounted on said elevating means, a windlass fixed to said shaft, a cable connecting the free end of said extension to the windlass, a second cable reversely wound on said windlass and connected to said member, means including a clutch to couple said shaft to the reverse drive of the truck to drive said member forwardly, when the truck is driven rearwardly, at the same speed as that of the truck, a spring motor operative upon release of said clutch to drive said member rearwardly, means automatically operative upon attainment by said member of a position at least vertically above the forward edge of said support to release said clutch, and brake means operable at the option of the operator to releasably hold said member against the action of said spring motor.

11. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and provided with a rearward extension, means to reciprocate said member over the article support, said means including a horizontally disposed cross-shaft carried by said elevating means, a cable, one end of which is fastened to said rearward extension and the other end of which is coiled about and fastened to said cross-shaft, a second cable, one end of which is fastened to said member and the other end of which is coiled in the opposite direction about and fastened to said cross-shaft, and a spring between said cross-shaft and said truck adapted to resist rotation of said cross-shaft in a direction to unwind the second cable, and means to connect said cross-shaft to the reverse drive of the truck to rotate said cross-shaft in said direction, all of said means being so constructed and arranged that when the truck is driven rearwardly the member is driven forwardly over said support at a speed equal to the speed of the truck, and means to automatically disengage said coupling means when said member reaches a position at least

aligned vertically above the forward edge of said support to abandon said member to the force of said spring.

12. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and reciprocally mounted on the elevating means for movement over the article support, rearward extensions fixed to said member, a shaft rotatably mounted on said elevating means, a windlass fixed to said shaft, a cable connecting the free end of said extension to the windlass, a second cable reversely wound on said windlass and connected to said member, a second shaft spaced from and mounted on said truck in parallel relation to said first-mentioned shaft, a second windlass on said second shaft, a clutch to couple said second windlass to said second shaft, a cable between said second windlass and said first-mentioned shaft, a motor spring between said second windlass and said truck to hold said last-mentioned cable resiliently taut as said elevating means is shifted up and down, a one-way drive between said second shaft and the reverse drive of said truck, whereby, when said truck is driven rearwardly and when said clutch is engaged, said windlasses are driven to pull said article engaging member forwardly at a speed substantially equal to that of the truck, a torsional spring motor on said first-mentioned shaft and wound up by the forward movement of the stripper member and operative upon said first-mentioned windlass to return said member to initial position upon release of the clutch, means to automatically release said clutch at a predetermined position of said member, and brake means on the second windlass operable at the option of the operator to releasably hold said member against the action of said spring motor.

13. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and provided with two rearward extensions, means to reciprocate said member over the article support, said means including a pair of horizontally disposed transverse stub shafts carried by said elevating means and positioned one adjacent each of said rearward extensions, a cable connecting each of said extensions to the adjacent stub shaft, one end of each of said cables being wound around said adjacent stub shaft and secured thereto, a second pair of cables connecting said member to respective stub shafts, each of said second pair of cables having one end wound therearound in a direction opposite to the cables connected to the extension, and a spring between each of said stub shafts and said elevating means adapted to resist rotation of said stub shafts in a direction to unwind the cables which are connected to said member, and means to connect said stub shafts to the reverse drive of the truck to rotate said stub shafts in said direction, said means being so constructed and arranged that when the truck is driven rearwardly the member is driven forwardly, at a speed equal to the speed of the truck, and means to automatically disengage said coupling means when said member reaches a position substantially above the forward edge of said support to abandon said member to the force of said spring.

14. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said

elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support, means to advance said member relative to the article support, said means including a pair of hydraulic driving cylinders mounted on the elevator rearwardly of said member, piston heads slidable in said cylinders, piston rods connecting said piston heads to said member, a master cylinder hydraulically connected to said driving cylinders, a piston head reciprocable in said master cylinder, and a spring between each of said piston heads and said member tending to drive the member rearwardly of the support, and means to couple the piston head in said master cylinder to the reverse drive of the truck to drive the member forwardly, when the truck is driven rearwardly, at the same speed as that of the truck.

15. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support, means to advance said member relative to the article support, said means including a pair of hydraulic driving cylinders mounted on the elevator rearwardly of said member, a piston rod with a head received in each of said cylinders, a master cylinder hydraulically connected to said driving cylinders, a piston rod with a head received in said master cylinder, spring means in each of said cylinders tending to drive the member rearwardly of the support, a shaft adjacent said master cylinder, a rack and pinion connection between the piston head and rod in said master cylinder and said shaft, and means, including a clutch, to couple said shaft to the reverse drive of the truck to simultaneously drive said member forwardly and the truck rearwardly.

16. In a power driven lift truck having a forward and a reverse drive, vertically disposed elevating means and a forwardly projecting article support carried by said elevating means; a stripper member positioned to engage the rear face of an article when the latter is in carrying position on the support and reciprocally mounted on the elevating means for movement over the article support, rearward extensions fixed to said member, a shaft rotatably mounted on said elevating means, a windlass fixed to said shaft, a cable connecting the free end of said extension to the windlass, a second cable reversely wound on said windlass and connected to said member, said last-named connection including a spring to maintain the second cable taut, and power means to rotate said shaft first in one direction and then the other to respectively move said member forwardly and rearwardly over said article support.

References Cited in the file of this patent

UNITED STATES PATENTS

1,471,302	Wright et al. -----	Oct. 16, 1923
1,526,993	Luce -----	Feb. 17, 1925
1,805,028	Anthony et al. -----	May 12, 1931
2,169,440	Weiss -----	Aug. 15, 1939
2,256,454	Bomar -----	Sept. 16, 1941
2,371,661	Wilms -----	Mar. 20, 1945
2,397,045	Richey -----	Mar. 19, 1946
2,412,155	Jessen -----	Dec. 3, 1946
2,412,412	Meili -----	Dec. 10, 1946
2,460,544	Smith -----	Feb. 1, 1949
2,468,055	Gibler -----	Apr. 26, 1949
2,515,334	Buye et al. -----	July 18, 1950
2,531,560	De Wall -----	Nov. 28, 1950
2,601,931	Dunham et al. -----	July 1, 1952