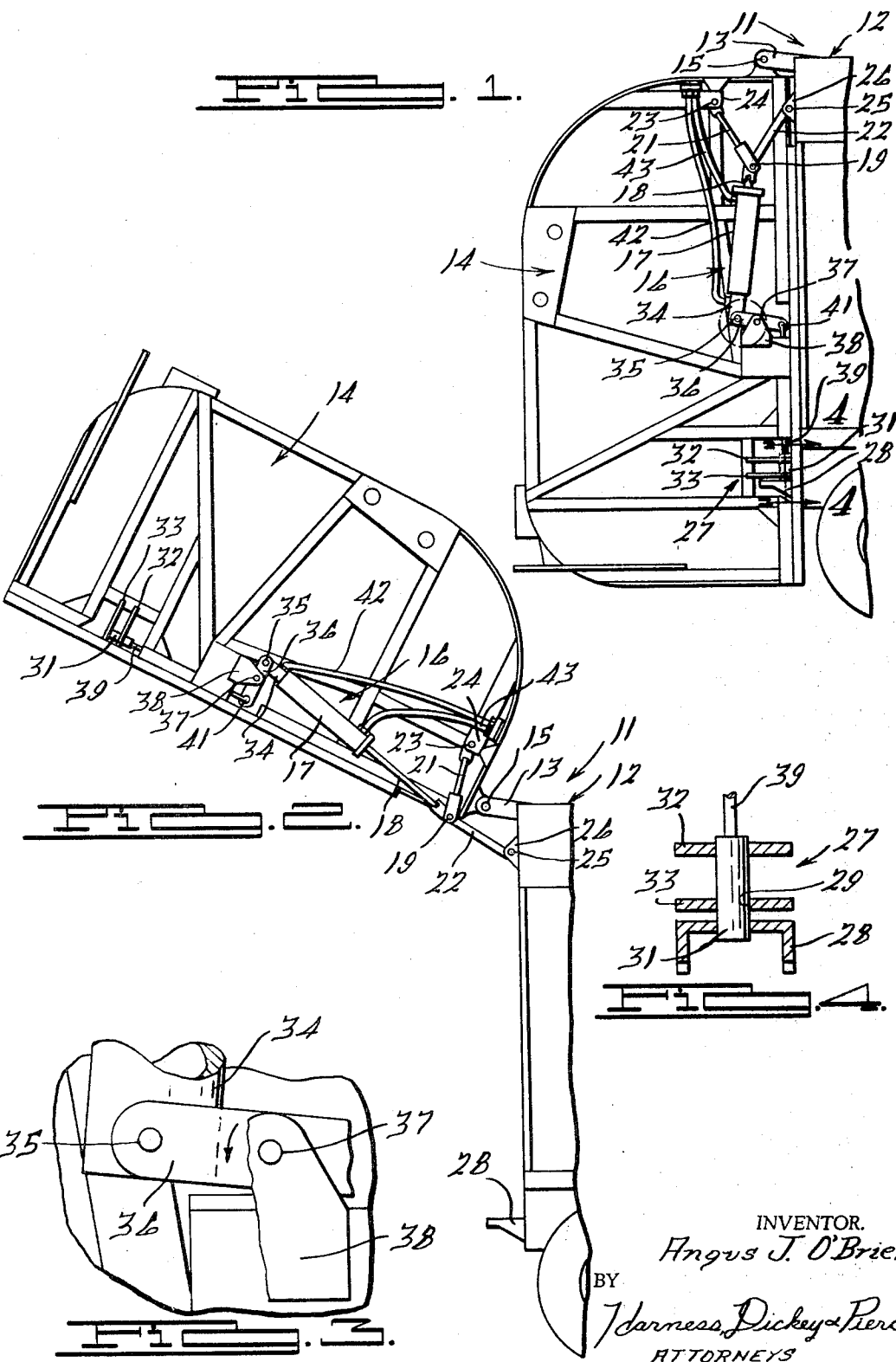


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CLOSURE OPERATOR
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3,440,763

CLOSURE OPERATOR

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1 Claim

ABSTRACT OF THE DISCLOSURE

A refuse vehicle having a closure member at its rear end that is supported for pivotal movement between an opened and closed position. A locking structure is provided for retaining the closure member in its closed position and which is automatically released through a connection to a hydraulic cylinder that effects pivotal movement of the closure member.

This invention relates to a refuse vehicle and more particularly to an improved actuating and latch operating device for operating the closure member of a refuse vehicle.

In one form of refuse vehicle the main body of the vehicle forms a refuse storage area that is open at one end. A combined loading and compacting device is supported adjacent the open end of the vehicle to load refuse into the storage area and to form a closure for the open end. The loading and compacting member compresses refuse into the storage area when in its closed position so that a greater quantity of refuse may be carried. It is essential that a relatively rigid latch structure be provided to retain the compacting and loading member in its closed position during the compression to prevent opening under the extreme forces that are experienced.

When the refuse vehicle is being unloaded, the loading and compacting member is swung to an open position with the latch released and the refuse is removed from the storage area. The latch means previously proposed have necessitated manual release by the vehicle operator and have required him to move to the rear of the vehicle and manually release the latch. Normally the latch is released when the vehicle is backed into its unloading position at a dump area, and quite frequently it is inconvenient for the operator of the vehicle to reach the rear of the vehicle in such a position. This has necessitated the release of the latch prior to the positioning of the vehicle in its unloading position and frequently the refuse will be spilled from the vehicle during the final backing of it into the unloading position.

The previously proposed latches have been manually operated and must be quite strong to resist the compacting forces exerted upon them during the loading of the vehicle. These heavy latches have of necessity been difficult to release manually. The latches also become corroded due to their proximity to the refuse and this further complicates their operation.

It is, therefore, a principal object of this invention to provide an improved latch device for retaining the closure member of the refuse vehicle in its closed position.

It is a still further object of the invention to provide an automatically operated latch for the closure member of a refuse vehicle.

Normally, some form of power actuating device is employed to swing the loading and compacting member from its closed position to its open position. In many of the prior art constructions this actuating device is contained within the storage area of the refuse vehicle and is subject to damage from contact with the refuse.

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It is, therefore, a further object of this invention to provide a power operating means for the closure of a refuse vehicle that is positioned externally of the storage area.

5 It is a still further object of the invention to provide a power operating device for opening the closure member of a refuse vehicle that additionally performs the function of releasing the latch.

A refuse vehicle embodying this invention comprises 10 a combined actuating and latch operating device for operating the closure member of the refuse vehicle. This novel device includes interengaging latch means carried by the closure member and the refuse storage member of the vehicle for retaining the members in a closed 15 position. Actuating means comprised of two relatively movable elements are provided for accomplishing opening movement of the closure member. Means couple one of the elements of the actuating means to at least one of the refuse vehicle members for transmitting relative 20 movement between the elements into relative movement between the vehicle members. Means are further provided for coupling the other of the elements to the latch means for operating the latch means upon the exertion of a reactive force upon the other element.

25 Other objects and advantages of this invention will become more apparent as this description proceeds, particularly when considered in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a partial side elevational view of a 30 refuse vehicle embodying this invention and showing the loading and compacting member in its closed position;

FIGURE 2 is a partial side elevational view, in part similar to FIGURE 1, showing the loading and compacting member in its open position;

35 FIGURE 3 is an enlarged view of the encircled portion of FIGURE 1; and

FIGURE 4 is a cross-sectional view taken along the line 4—4 of FIGURE 1.

Referring now in detail to the drawings, a refuse 40 vehicle embodying this invention is identified generally by the reference numeral 11. The refuse vehicle 11 has a body including a refuse storage member 12 that defines a refuse storage compartment which is open at the rear end of the vehicle 11. The refuse storage compartment 45 12 and its internal construction may be of any known type and includes a compacting and ejection plate (not shown) for serving as a reaction member against which the refuse is compacted and for ejecting the refuse from the refuse compartment. Such devices are well known in 50 the art and this structure forms no part of the instant invention.

A pair of support brackets 13 extend rearwardly from the upper end of the refuse storage member 12 to support 55 a loading and compacting member, indicated generally by the reference numeral 14, for pivotal movement by means of pivot pins 15. It is to be understood that the loading and compacting member 14 may be of any known type and operates to load and compact refuse into the refuse storage member 12. The specific loading and compacting 60 structure also forms no part of this invention.

A combined actuating and latch operating device, indicated generally by the reference numeral 16, is positioned at each side of the loading and compacting member 14, 65 although only one side is shown in the drawing. It is to be understood that an identical construction is provided at each side of the vehicle 11 for operating the loading and compacting member 14. The device 16 is comprised of a reciprocating hydraulic power device including a hydraulic cylinder element 17. The cylinder element sup- 70 ports a hydraulically operated piston element (not shown) having a piston rod 18 integrally connected thereto. The

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piston rod 18 extends upwardly from the cylinder 17 toward the top of the vehicle 11 when the loading and compacting member 14 is in a closed position (FIGURE 1).

The upper end of the piston rod 18 is connected to the knee joint of a toggle linkage by means of a pivot pin 19. The pivot pin 19 pivotally connects the lower end of a first link 21 of the toggle joint with its second link 22. The upper end of the first link 21 is pivotally connected to the loading and compacting member 14 by means of a pivot pin 23 that is carried by a bracket 24 affixed to the side of the loading and compacting member 14. The upper end of the link 22 is pivotally connected to the rear side of the refuse member 12 by means of a pivot pin 25 that is supported in a bracket 26.

A latch assembly, indicated generally by the reference numeral 27 and shown in more detail in FIGURE 4, is provided at the lower end of each side of the loading and compacting member 14 for retaining it in its closed position. The latch assembly 27 comprises an inverted U-shaped bracket 28 that is affixed to the side of the refuse storage member 12. The horizontally extending leg of the bracket 28 is provided with an aperture 29 that is adapted to receive a complementary shaped locking pin 31. The locking pin 31 is supported for reciprocation by a pair of brackets 32 and 33 that are fixed, as by welding, to the adjacent side of the loading and compacting member 14. When the lower end of the locking pin 31 is received in the aperture 29, the loading and compacting member 14 will be retained in its closed position forming a closure for the open end of the refuse storage area.

The lower end of the hydraulic cylinder 17 is formed with an integral boss portion 34 that is connected by means of a pivot pin 35 to one arm of a bell-crank 36. Bell-crank 36 is pivotally supported intermediate its ends by a pivot pin 37 that is affixed to a bracket 38 which is, in turn, affixed to the loading and compacting member 14. The opposite end of the bell-crank 37 is connected to the upper end of a latch operating rod 39 by means of a pivot pin 41. The lower end of the latch operating rod 39 is rigidly affixed to the latch pin 31.

When the loading and compacting member 14 is in its closed position (FIGURE 1) the locking pin 31 is received in the aperture 29 of the bracket 28 and relative movement between the loading and compacting member 14 and the refuse storage member 12 is precluded. The latch assembly 27 has sufficient strength to resist the compacting forces exerted by the member 14. When it is desired to unload the vehicle 11, it is merely backed into the unloading position relative to the dump area. The hydraulic cylinder assembly 16, which has a pair of hydraulic supply conduits 42 and 43 connected to the cylinder 17 at opposite ends of the fluid operated piston, is operated by means of a control valve (not shown) located in the cab of the vehicle 11. The piston and piston rod 18 then tends to be driven axially out of the hydraulic cylinder 17. The latch device 27, however, precludes this relative movement causing a reactive force to be exerted downwardly on the cylinder 17. This reactive force is transmitted through the pivot pin 35 to the bell-crank 36 causing it to pivot in a counterclockwise direction about the pivot pin 37. This movement draws the latch operating rod 39 upwardly until the locking pin 31 is removed from registry with the aperture 29. A suitable stop (not shown) may be provided to limit the downward movement of the hydraulic cylinder 17 once the locking pin 31 is clear of the aperture 29. The hydraulic force then urges the piston rod 18 upwardly causing the toggle links 21 and 22 to spread and pivot the loading and compacting member 14 relative to the refuse member 12 about the supporting pivot pins 15 (FIGURE 2). The refuse member 12 may be then unloaded in the known manner. Closure of the loading and compacting member 14 is accomplished by

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operating the hydraulic cylinder assembly 16 in the opposite direction which will again cause the latch device 27 to be engaged.

While it will be apparent that the preferred embodiment of the invention disclosed is well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claim.

What is claimed is:

1. A refuse vehicle having a refuse storage member open at one end thereof, a closure member for said open end, means supporting said closure member upon said storage member for pivotal movement about a pivot axis disposed at the upper edge of said open end for movement of said closure member from an opened to a closed position, the weight of said closure member being disposed relative to said pivot axis for tending to retain said closure member in its closed position, interengaging latch means on said members for retaining said closure member in its closed position, said interengaging latch means comprising a movable latching element supported upon said closure member contiguous to the lower end thereof for movement from a released position to an engaged position wherein said movable latching element is engageable with a cooperating fixed latch member on said storage member adjacent the lower end thereof, actuating means comprising a pair of relatively extensible elements supported on said closure member intermediate its upper and lower edges, said relatively extensible elements being movable from a contracted position to an extended position relative to each other, bellcrank means pivotally supported upon said closure member between the upper and lower edges thereof, means for pivotally connecting the lower end of one of said relatively extensible elements to said bellcrank, said actuating means extending upwardly from said bellcrank toward said pivot axis of said closure member, toggle linkage means comprising a first link pivotally connected at its upper end to said storage member, a second link pivotally connected at its upper end to said closure member, the other ends of each of said links converging downwardly toward each other and means pivotally connecting the other ends of said links to each other and to one element of said actuating means and means including a link pivotally connected at its upper end to said bellcrank and extending downwardly and away from said extensible elements for connecting said bellcrank to said movable latching element for moving said movable latching element from its engaged to its disengaged position upon movement of said bellcrank effected by initial movement of said extensible elements relative to each other from their contracted to their extended position and while said closure member remains in its closed position, continued movement of said extensible elements relative to each other toward their extended position being effective to pivot said closure member from its closed position to its opened position after said latch means is released.

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ALBERT J. MAKAY, *Primary Examiner.*

U.S. CI. X.R.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,440,763 Dated April 29, 1969

Inventor(s) Angus J. O'Brien

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 4, line 67, "3,249,990" should be -- 3,247,990 --.

SIGNED AND
SEALED

NOV 25 1969

(SEAL)

Attest:

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Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents