March 27, 1962 R. E. BROWN 3,027,028

DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

Filed April 19, 1957 7 Sheets-Sheet 1

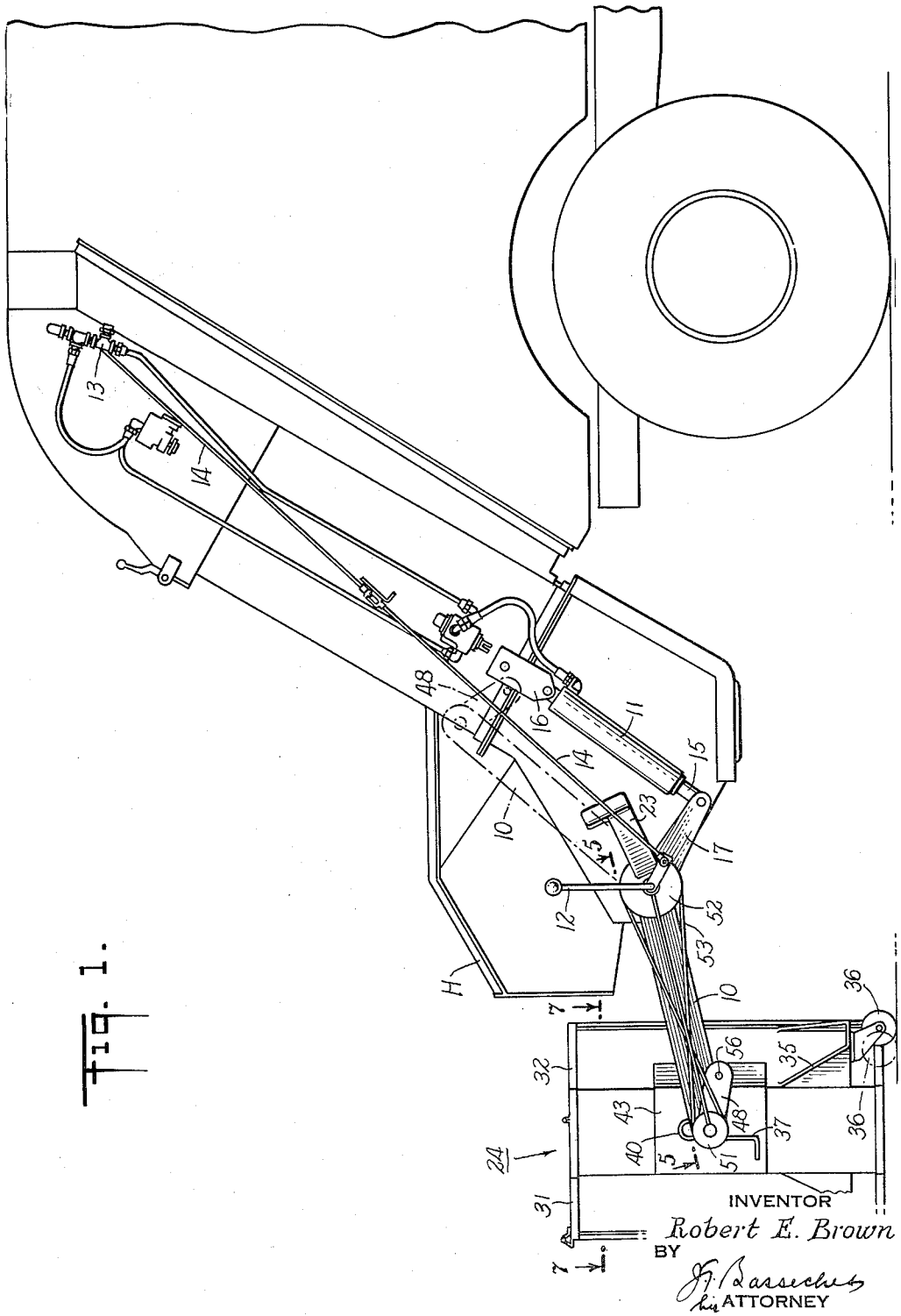


Fig. 1.

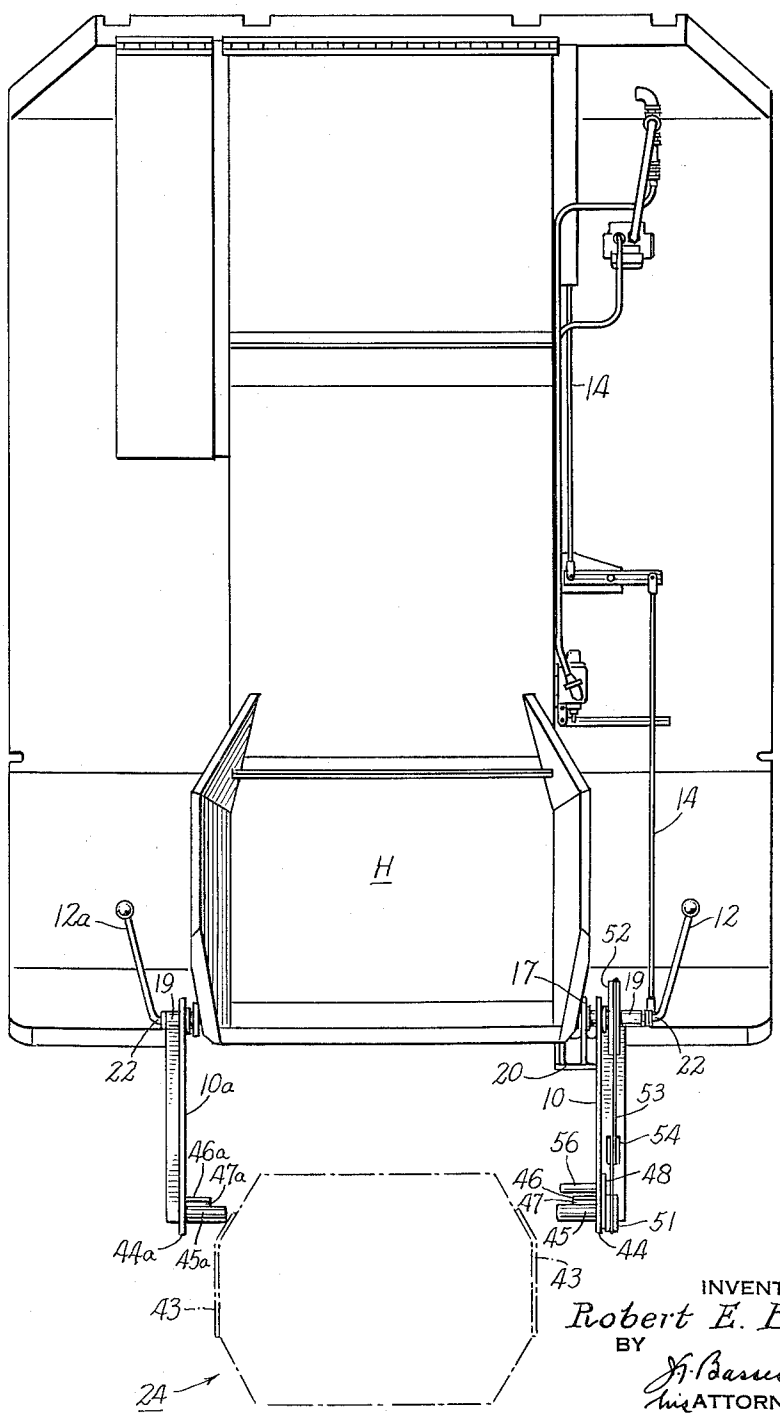
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DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

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Fig. 2.



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DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

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Fig. 3.

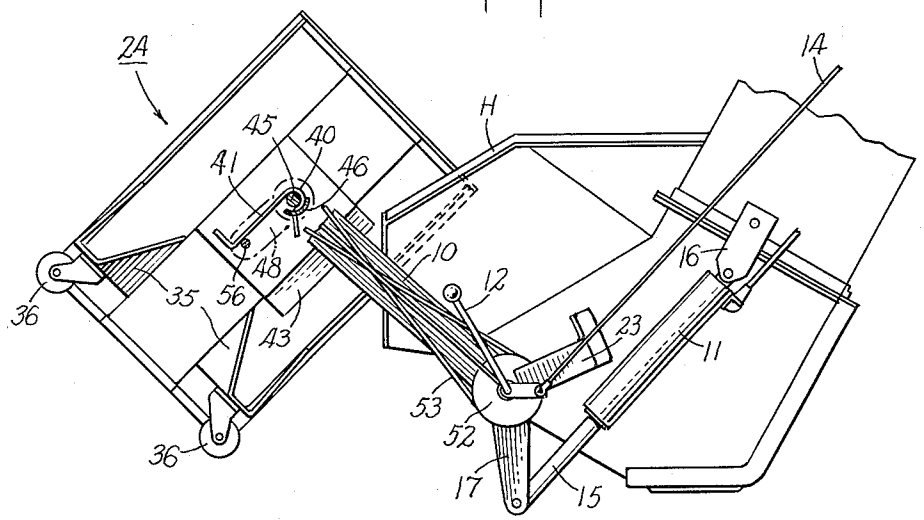
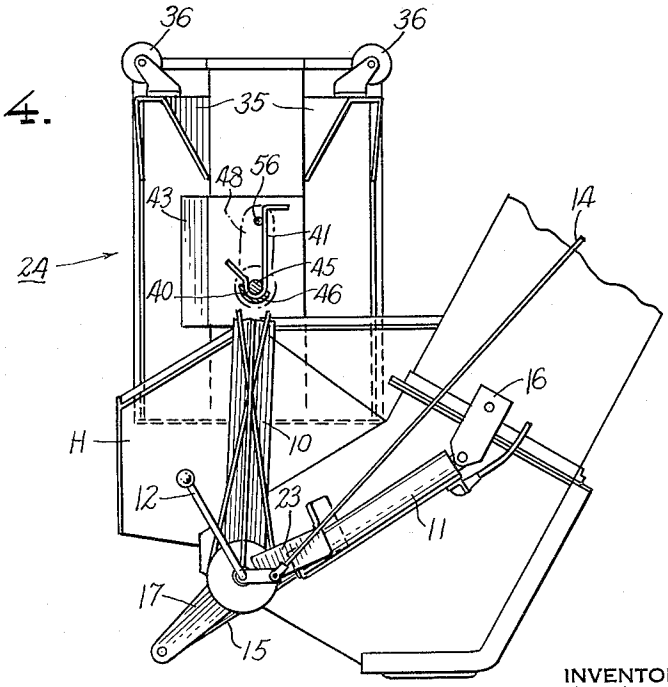


Fig. 4.



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DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

Filed April 19, 1957 7 Sheets-Sheet 4

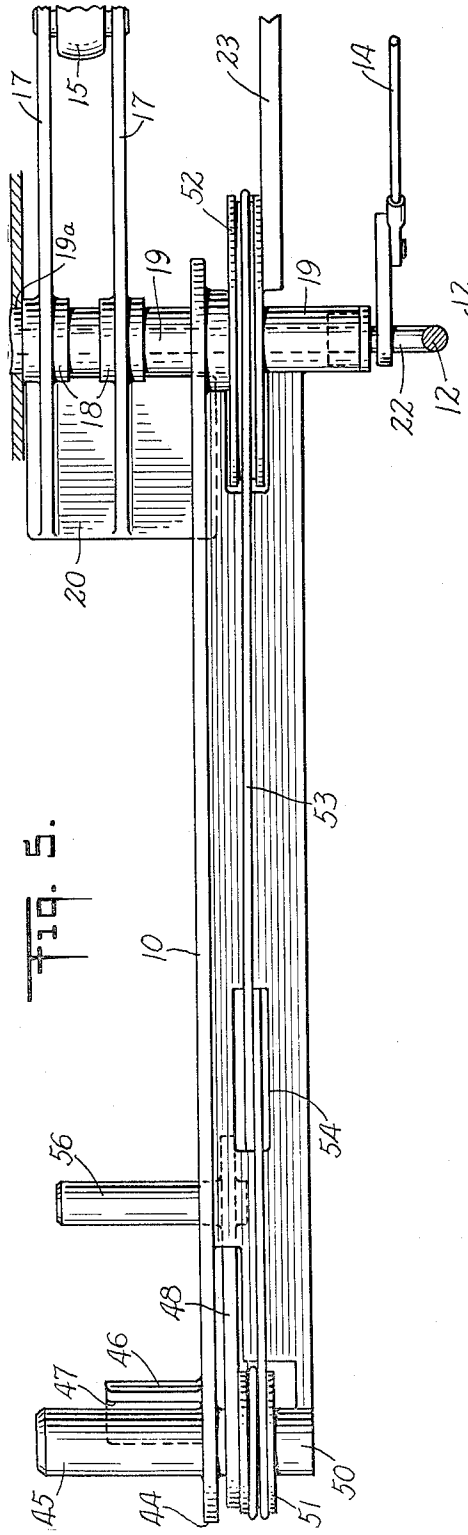


FIG. 5.

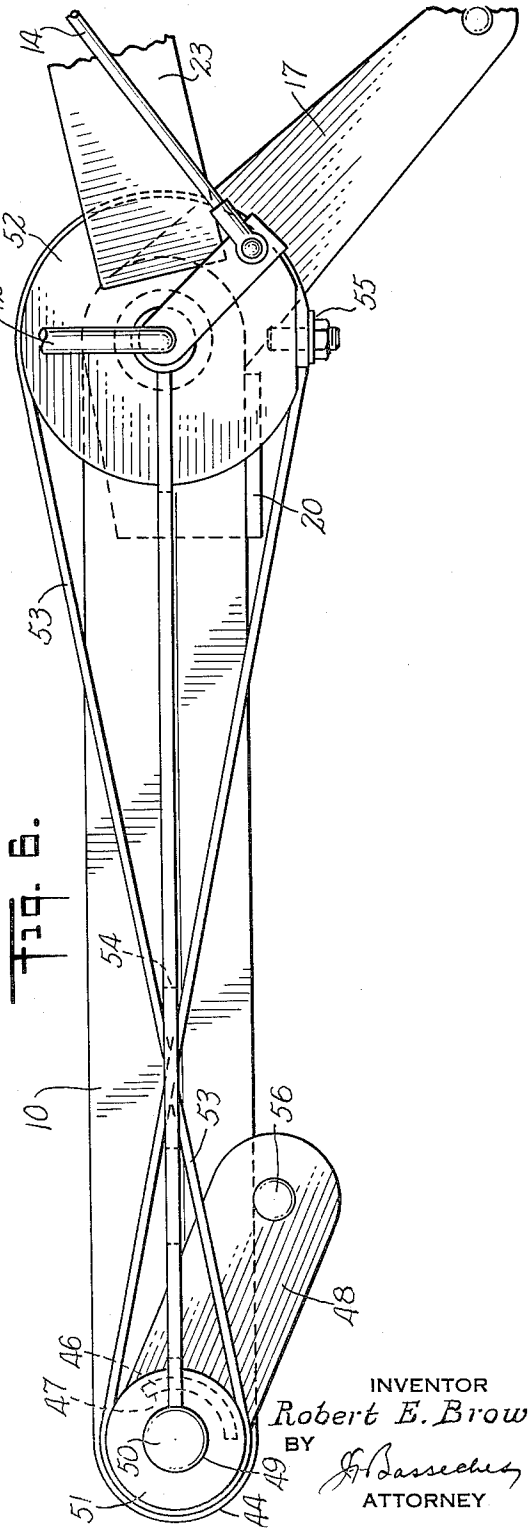


FIG. 6.

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DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

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Fig. 7.

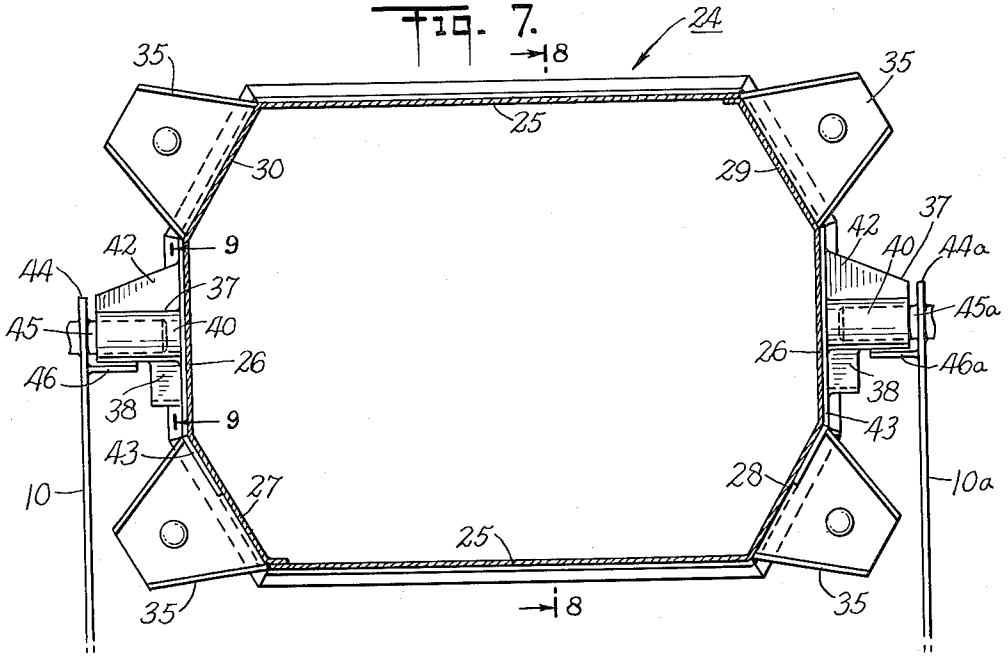


Fig. 8.

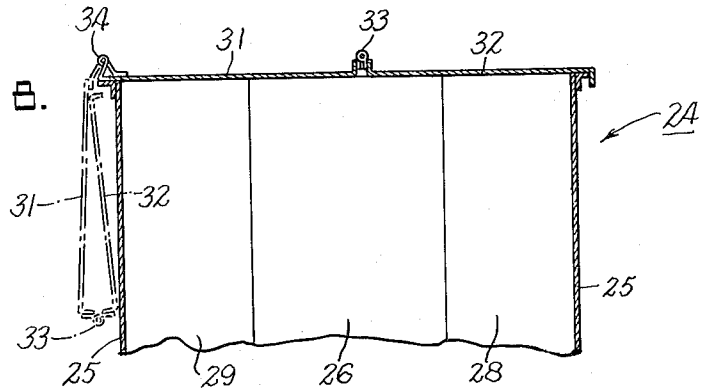
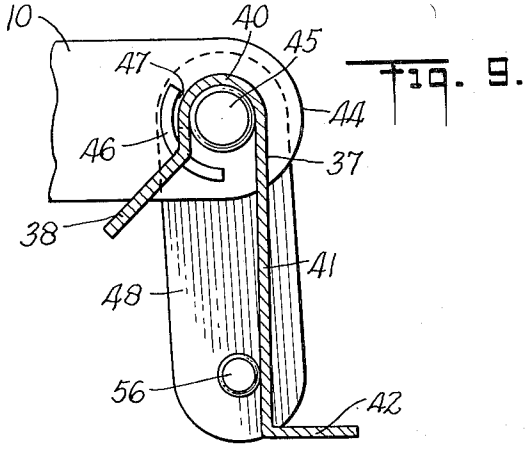


Fig. 9.



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DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

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Fig. 10.

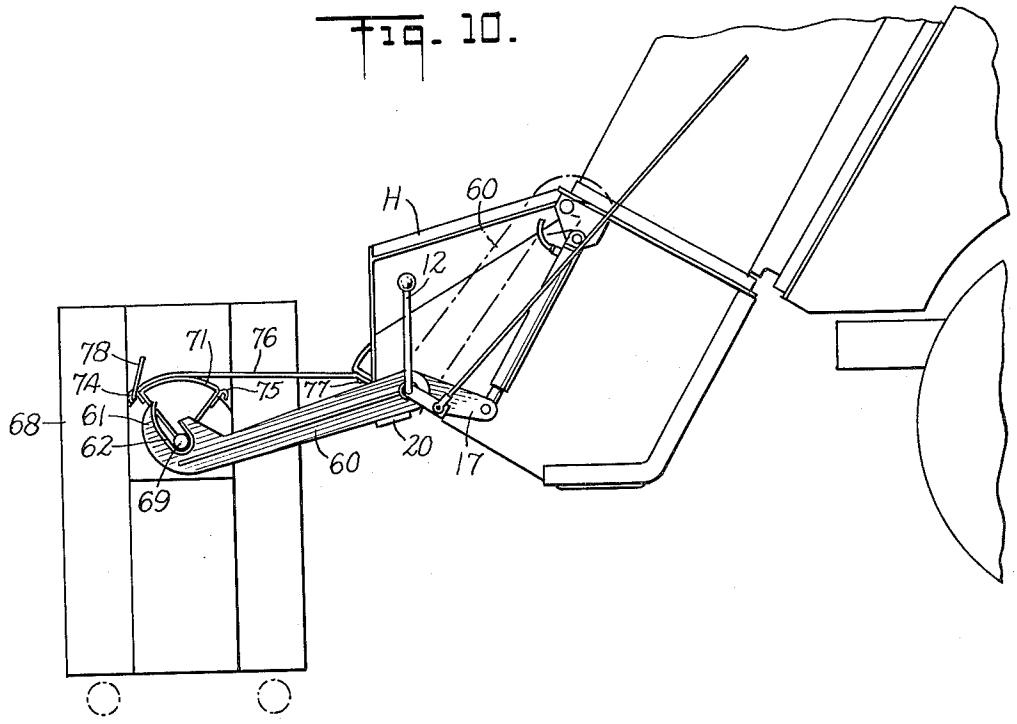
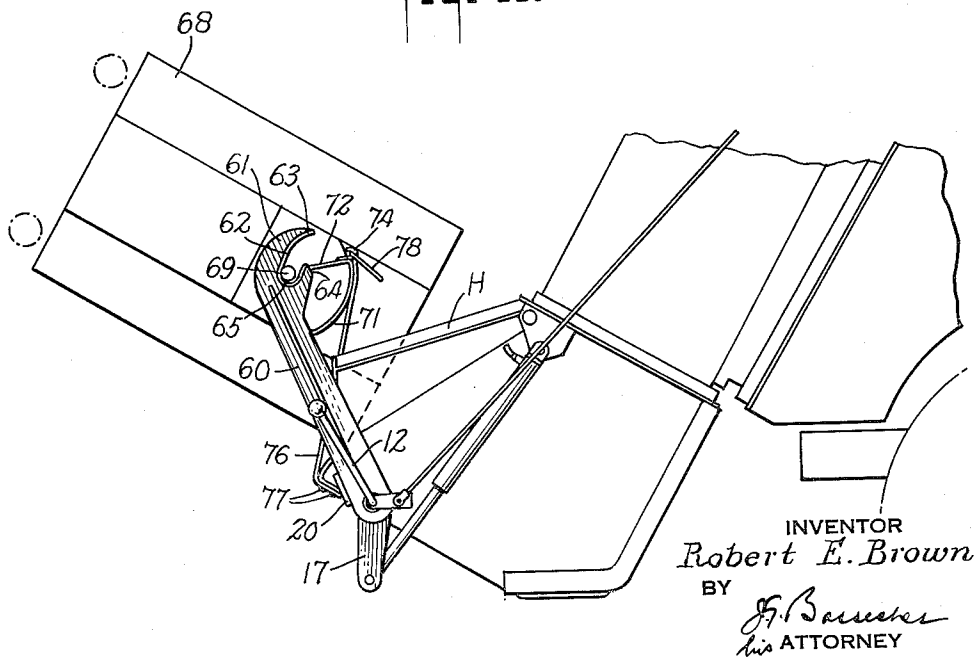


Fig. 11.



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DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

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Fig. 12.

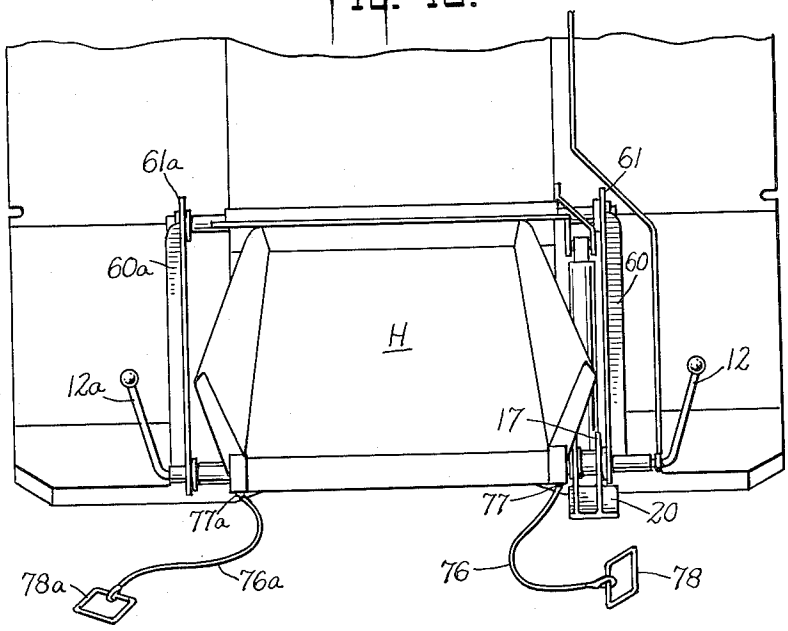


Fig. 13.

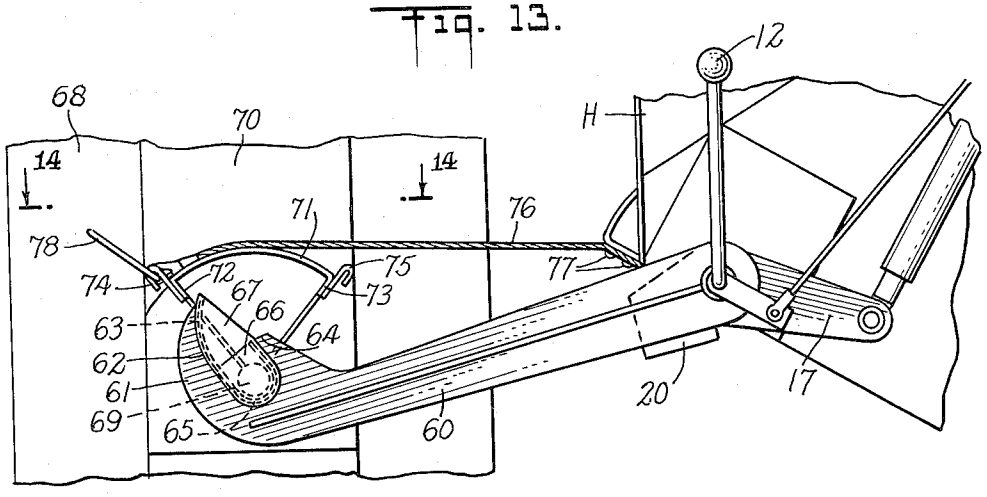
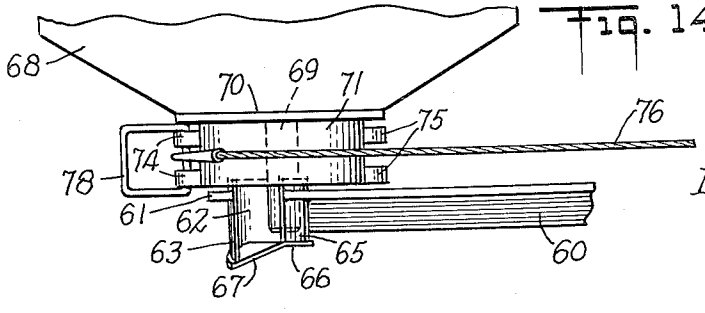


Fig. 14.



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United States Patent Office 3,027,028 Patented Mar. 27, 1962

3,027,028

DISPOSAL MECHANISM AND CANISTER CONSTRUCTION THEREFOR

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Filed Apr. 19, 1957, Ser. No. 653,924
4 Claims. (Cl. 214—302)

This invention relates to refuse transfer means whereby refuse may be transferred from a refuse container to the body of a truck and more particularly to novel canisters therefor.

This invention deals with the solution of loading problems in the handling of refuse or like bulk material to be transferred to collecting trucks. While low level loading refuse trucks in accordance with Patent No. 2,660,326, inter alia, have eased the labor and shortened pick-up time in refuse collection where heavily laden batches involving large storage canisters are employed, manual labor is taxed to capacity, to make the use of such canisters unprofitable.

Accordingly, this invention has for its object the provision of a novel refuse loader whereby refuse contained in a portable canister is speedily and facilely transferred to the hopper of a low level loader type refuse truck. Still more particularly, this invention relates to a novel canister and lift assembly for use in conjunction with a refuse truck of the low level loader type whereby a refuse containing canister at ground level may be quickly and facilely coupled to powerized lift means on a refuse truck, elevated by said lift means to a position over the hopper of said truck, and dumped when in said elevated position.

Still more particularly, this invention relates also to a novel canister for use in the above mentioned assembly and for the aforesaid purposes.

Still another object of this invention is to provide a refuse transfer means whereby refuse stored in a canister may be rapidly and safely transferred to the hopper of a refuse truck, thus permitting use of large capacity canisters more profitably.

A further object of this invention is to provide a refuse truck loading means whereby refuse stored in portable, easily movable, large capacity canisters may be quickly and automatically transferred to the hopper of a low level feeder of a refuse truck.

A further object of this invention is to provide a novel, portable canister which may be quickly connected to powerized, coordinated lift means extending from a dump truck and raised and dumped by said means into a hopper feeding a low level loader on said truck.

Still a further object of my invention is to provide a canister which may be coupled to the lift arms of a dump truck, with minimal pre-positioning of the canister in relation to the lift arms, said canister being, in a measure, positioned by the initial action of said lift arms.

A further object of my invention is to provide a refuse truck loading assembly whereby a portable receptacle may be speedily and automatically transferred to the body of the truck, with a minimum of manual adjustments and efforts.

In order more fully to describe my assembly and illustrate its use, I make reference to the accompanying drawings forming a part hereof, in which:

FIGURE 1 is a side elevation of a refuse truck incorporating my invention;

FIGURE 2 is a magnified rear elevation of a truck incorporating lift arms in accordance with one embodiment of my invention;

FIGURE 3 is a side elevation of my invention, showing the canister at an interim position in the dumping cycle;

FIGURE 4 is a side elevation of my invention showing the canister in the dumping position;

FIGURE 5 is a magnified plan view of a lift arm taken on the line 5—5 of FIGURE 1;

FIGURE 6 is a side elevation taken on the line 6—6 of FIGURE 5;

FIGURE 7 is a magnified plan view taken on the line 7—7 of FIGURE 1;

FIGURE 8 is a section taken on the line 8—8 of FIGURE 7;

FIGURE 9 is a further magnified section taken on the line 9—9 of FIGURE 7;

FIGURE 10 is a fragmentary side elevational view of another embodiment of my invention;

FIGURE 11 is a side elevational view of the embodiment shown in FIGURE 10, with the canister in the dumping position;

FIGURE 12 is a fragmentary plan view of the embodiment of FIGURE 10 in the stowed position of the lift arm;

FIGURE 13 is a fragmentary magnified side elevational view of the embodiment of FIGURE 10 with parts cut away to show details;

FIGURE 14 is a section taken on the line 14—14 of FIGURE 13.

My invention may be summarized as comprising a refuse truck having a low level loader fill hopper and provided with powerized lift means in the form of vertically swingable lift arms, with which canisters are coordinated. A portable canister is automatically pivotally engaged to the arms by the upward lifting actuation and swinging motion of the arms, the arms and canister each having cooperating coupling means, such as cammed projections, which serve to align the arms with the canister, thereby to facilitate engagement where the canister has been placed in imperfectly aligned position relative to the arms. Further movement of the lift arms is coordinated with the canister to raise the canister to a position over the hopper and automatically to invert the canister to dumping position when the canister is so located. Upon lowering the lift arms after dumping, the canister is replaced free from connection with the arms.

In the embodiment illustrated in FIGURE 1, a refuse truck is provided in accordance with the patent aforesaid. Adjacent the lower portion of the tailgate and fill hopper H, there is provided an opposed pair of vertically swingable lift arms 10 and 10*a*, which arms are powerized to swing in a vertical plane by a hydraulic driver assembly 11. A control lever 12, in close proximity for controlling the tailgate loader, is linked to a hydraulic regulator assembly 13 by a push rod 14. The regulator assembly 13 controls, in a known manner, the flow of hydraulic fluid from a pressurizing source to or from the driver assembly 11, according to the position of the control lever 12 selected by the operator.

A piston 15 is axially slidably mounted within the driver assembly 11, and is responsive to manipulation of the control lever 12, to become actuated to propulsion or withdrawal or oscillation. Upon advancing the control lever to the lift position, the piston 15 is extended axially outwardly from the driver 11. The upper end of the driver 11 is pivotally affixed to a bracket 16 on the truck body, and the piston 15 is likewise pivotally mounted upon a bell crank arm 17. The crank arm 17 has a bearing 18 pivotable about a tubular trunnion 19 outwardly extending from the truck (see FIGURES 5 and 6). A reinforced butt plate 20 is inwardly extended from the bell crank arm 17 to engage the underside of the lift arm 10.

The arms 10 and 10*a* are welded or otherwise keyed to the tubular trunnion 19, which trunnion is pivotally

mounted relative to the truck body in the bearing apertures 19*a*.

Concentrically rotatably mounted within the tubular trunnion 19 is a connecting rod 22, operatively linking the control lever 12 to the auxiliary control lever 12*a*, thereby enabling lift arm actuation to be controlled from either side of the truck body.

The lift arms 10 and 10*a* may be manually swung to the stowed or transit position shown in dotted lines in FIGURE 1, in which position they are arranged to be maintained by the bracket 23 for transportation between refuse or like batch pick-ups. Powerized activation of the arms 10, 10*a* is controlled by the control levers 12 or 12*a* Upon actuation of one of the said levers 12 or 12*a* to the lift position, hydraulic pressure in the driver 11 extends the piston 15, thus pivoting the bell crank 17 about a fulcrum formed by the trunnion 19, and thereby forcing the butt plate 20 upwardly against the undersurface of the lift arm 10. A vertical swinging is thus imparted to the arm 10, and through the arm 10 to the trunnion 19 and arm 10*a*, thus operatively connected to the arm 10.

The novel canister assembly and the linking assembly which enables the lift arms to engage and control the dumping of the said canister will now be described.

The canister to carry out one of the features of my invention is outlined by opposed parallel forward and rearward walls 25, and perpendicular opposite side walls 26, each side wall being joined to each forward and rearward wall by the angularly disposed walls 27, 28, 29, 30. I have found elimination of the right angular corners to be advantageous in that the tendency of refuse to stick in the canister upon dumping is thereby reduced. Likewise, the canted outer surface presented by the angular walls is useful in quickly centering the canister between the lift arms, as will be later described.

The canister 24 is provided with a closure comprising capping members 31 and 32, which members are foldably connected by a hinge 33, the member 31 being additionally hinged at 34 to the rear wall 25 of the canister 24 (see FIGURE 8).

In operation, the shorter segment 32 is folded to lie against the rear segment 31, after which the segments 31, 32 are pivoted about the hinge 34 so as to assume the position shown in dotted lines (see FIGURE 8). When thus positioned, the canister may be inverted without dislodging the closure from the folded open position.

For portability, the angular walls 27, 28, 29 and 30 of the canister 24 have brackets 35 welded or otherwise rigidly extended therefrom. A set of wheels or casters 36 is mounted under the brackets 35, the said mounting preferably permitting the casters to spin in a plane parallel to that defined by the base of the canister, in addition to the usual wheel rotation. Skids or pallets, where such traction is possible, may be employed for transporting the canister to and from the lift engaging position.

The sides 26 of the canister 24 are provided with oppositely positioned, axially aligned hook-like extensions 37. The forward edges 38 of the extensions 37 are downwardly inclined toward the forward wall 25 of the canister 24.

The forward edges 38 terminate in shoulders 39, at which point are formed socket portions 40. The sockets 40 of the extensions 37 are of a greater width than the forward edges 38. Rearwardly of the sockets 40, the extensions 37 descend vertically, as at 41, the terminal portions of said extension 37 being rearwardly directed as at 42, at an angle of 90° relative to the portions 41.

Since the extensions will be subjected to considerable abuse in operation, it is important that they be fabricated of a durable material, such as heavy gauge steel. Likewise, a pair of hardened, wear-resistant plates 43 are welded or otherwise affixed to the canister side walls 26—26, and extend forwardly to cover a portion of the forward angular walls 27 and 28. The function of the plates 43 will be outlined when the coupling and dumping operation of my device is described in greater detail.

The lift arms 10, 10*a* are provided at their free swinging ends 44, 44*a* with inwardly projecting, axially aligned trunnions 45 and 45*a*, respectively. Arcuate segments 46, 46*a* are fixedly mounted in spaced relation to the trunnions 45 and 45*a*, respectively, the inner surfaces 47, 47*a* of the segments 46 and 46*a* describing arcs whose center is the axis of the trunnions 43 and 43*a*.

The lift arm 10 is additionally provided with a link 48, with a bearing aperture 49, the said link 48 being swingably mounted relative to the arm 10 by positioning the outer trunnion 50, which is an extension of the trunnion 45, within the said bearing aperture 49. A pulley 51 is fixedly mounted on the link 48, in coaxial alignment with the trunnion 50. A complemental pulley 52 to the dependent pulley 51 is welded or otherwise non-rotatively fixed to the truck body.

The pulleys 51 and 52 are operatively connected by a crossed frictional cable 53, a space 54 being formed through the arm 10 to provide for the cable intersection. It will be understood, however, that the drive means, items 51 and 52, and cable 53, may be inter-engaging sprockets and chains, respectively.

A clamp 55 on the pulley 52 is provided, to secure the cable 53 against sliding on the pulley 52. An actuating pin 56 is rigidly mounted on said link 48.

It will be readily recognized that upon swinging elevation of the lift arms 10 and 10*a*, the link 48 will be caused to rotate relative to the arm 10 by the pulley arrangement provided. The ratio relationship of the pulleys is arranged to rotate the link 48 through an arc of 180° relative to the arm 10 when the arms 10 and 10*a* are rotated about the trunnion 19 an arcuate distance calculated to position the canister 24 above the opening in the hopper H.

The dumping operation is carried out as follows: With the lift arms 10 and 10*a* in the lowered position shown in FIGURE 1, the refuse-filled canister 24 is wheeled into approximate aligned position between the said arms 10, 10*a*. The operator places the control lever 12 (or 12*a*) in the lift position and the arms swing arcuately upwardly about the trunnion 19. Precise alignment of the canister and arms is not required since a relatively wide degree of misalignment is compensated for by the cooperative camming action of the trunnions 45, 45*a* with the side plates 43, to correct for sidewise misalignment, and with the portions 38 and 41 of the extension 37, to correct for forward or rearward misalignment.

Adjustability is made easier by the provision of wheels 36 for the canister 24. An illustration of a situation where forward adjustment is effected may be seen in FIGURE 1 where the misaligned position of the canister, as represented by the wheels and shown in dotted lines, has been corrected and the canister precisely positioned as shown in solid lines, by the conjoint action of the trunnions 45, 45*a* with the leading edges 38 of the extensions 37, upon partial arcuate upward rotation of the arms 10, 10*a*. Further lifting of the arms serves to seat the trunnions 45, 45*a* within the sockets 40 of the extensions 37, and thus to lift the canister 24 from its position on the ground.

As the arms 10, 10*a* continue to swing upwardly, the link 48, under the influence of the pulleys 51 and 52 and the cable 53, is rotated about the trunnion 50. Continued swinging of the arm 10 brings the pin 56 into contact with the vertical portion 41 of the extension 37, thereby causing a pivoting of the entire canister 26 about the trunnions 45, 45*a* (see FIGURE 3). The gradual pivoting of the canister continues until the piston 15 is fully extended from the driver 11, at which fully extended position the canister will have been elevated by the arms 10, 10*a* and pivoted by the pulley actuated link 48 to the inverted dumping position over the hopper opening 57 (see FIGURE 4).

During the dumping cycle, detachment of the canister

from the arms is prevented by the sliding engagement of the upper portion of the socket 40 with the inner surface 47 of the arcuate sector 46, the said portion forming the support bearing for the canister in the inverted or semi-inverted position thereof.

It will be understood that jogging of the arms 10 and 10*a* may serve to dislodge the canister contents and aid in the unloading of heavily compacted debris or like material.

Accumulation of the debris in the hopper H is prevented through the use of any one of several known truck packing mechanisms which may lead into the bottom of the hopper H to empty the contents into the truck body, as exemplified in the patent aforesaid.

Upon completion of the dumping operation, the control lever 12 (or 12*a*) is placed in the lowering position, thus causing the arms 10 and 10*a* to swing vertically downwardly, and at the same time causing the link 48 to be pivoted in a reverse direction to the lift direction, thereby allowing the canister slowly to pivot back to the upright position as in FIGURE 1 under gravitational influence. With the canister 26 resting on the ground, the arms 10, 10*a* are lowered out of engagement with the canister and the truck may then be driven away from the thus emptied canister.

In FIGURES 10, 11, 12, 13 and 14 I have illustrated another embodiment of connecting and dumping assembly.

The tailgate mounted, powerized assembly for actuating the bell crank 17 for the lift arm means as previously described are retained. However, in this latter assembly, the lift arms 60, actuated by the powerized bell crank 17, are provided at their left and right free swinging ends 61, with claw-like trunnion seats 62. The trunnion seats 62 are provided with angularly directed guide portions 63 and 64 at the uppermost rearward and the uppermost forward portions, respectively, of the trunnion seats 62. The guide portions 63, 64 lead to the adjacent, axially aligned bearing sockets 65, outwardly extending relative to the arms 60. The sockets 65 are capped at the outer ends by butt plates 66. Camming shields 67 are inwardly disposed to form end abutments for the portions of the trunnion seats 62 not capped by butt plates 66.

The canister intended to cooperate with the lift arms of my assembly is substantially identical with the canister previously described, the only variations being in the assembly for coupling the canister to the lift arms.

In the embodiment shown in FIGURES 10 to 14, a canister 68 is provided with axially aligned trunnions 69, outwardly extending from the side walls 70 of the said canister. Arcuate segments 71 are supported on the side walls 70, and are braced by the radially extending struts 72, 73. Hook members 74, 75 are positioned at the ends of the segments 71, the openings of said hooks being faced forwardly and rearwardly of said canister 68, for purposes which will become apparent.

In the embodiment of FIGURES 10 to 14, the dumping impetus is supplied by a cable having one end fixed to the chassis of the truck and other end eccentrically affixable to the canister, upward swinging of the lift arms serving to pivot the canister to dumping position due to the stress eccentrically applied by the cable to the canister under the influence of the upwardly swinging arms.

For the purpose of carrying out the dumping operation, cables 76 and 76*a* are affixed to the truck chassis at 77 and 77*a*. The free ends of the cables 76, 76*a* are provided with buckles 78, 78*a*, respectively, the said buckles 78, 78*a* being adapted to engage the hooks 74 or 75 of the canister 68.

The dumping operation of my alternative structure is carried out as follows:

A refuse-filled canister 68 is wheeled into approximately centered position between the lift arms 60. The canister may be coupled and dumped without regard to which of the elongated canister faces is nearmost to the truck.

When the canister is so located that the trunnions 69 approximately overlay the trunnion seats 62, one of the buckles 78, 78*a* is passed over the corresponding segment 71 and engaged with one of the hooks 74, 75 (see FIGURES 13 and 14). It is to be noted that only one of the cables need be connected to dump the canister, two cables being provided merely to eliminate the necessity for the operator's walking from one side of the truck to the other.

After affixing a cable, the operator advances the control lever 12 (or 12*a*) to the lift position (see FIGURE 11), causing an upward swinging of the arms 60.

I have provided the arms and canister with cooperative, self-aligning means, thereby obviating the difficult operation of maneuvering a relatively heavy, refuse-filled canister into precise alignment with the canister-engaging portions of the lift arms. If the canister 68 is non-centrally located between lift arms 60, the upward swinging of the arms causes one or the other of camming shields 67 to contact a trunnion 69, further lifting the arms 60, thus serving to cam the canister laterally to a centered position between the arms 60.

Forward or rearward aligning adjustment of the canister is effected upon upward swinging of the arms by the coaction of the trunnions 69 with guide portions 63, 64 of the trunnion seats 62. Thus aligned, the trunnions 69 are seated in the bearing sockets 65 by the upward movement of the arms 60, further swinging of the arms serving to raise the canister.

As the canister is raised and swung over the hopper H of the truck, the cable 76 (or 76*a*) is gradually tautened, causing the canister 68 to pivot relatively to the arms 60. The cable is of a length adapted to pivot the canister to the dumping position (see FIGURE 11) when the arms 60 are raised to the limit of their swing.

The emptied canister may be released by placing the control lever 12 (or 12*a*) in the arm lowering position, thereby causing the canister to be returned to the ground level. As the arms are swung to the lowered position (see FIGURE 10), the relaxing cable permits the canister to pivot back to its original, vertical orientation under gravitational influence. When the canister is at ground level, the buckle 78 (or 78*a*) is disengaged from the canister, allowing the truck to be driven away to the next loading point.

Through the use of my refuse collecting assembly, considerable savings in time may be effected, due in part to the extremely simple and rapid connecting and dumping thereby made possible. Also, since my device largely eliminates the heavy manual labor usually associated with refuse dumping, it is now possible to effect personnel economies, or to handle bulk of a magnitude not previously feasible.

By providing a device in which the canister is largely self-adjusted relative to the lift arms, it is possible in many cases to maneuver the refuse truck into canister-engaging or coupling position without necessitating manual shifting of the canister.

Furthermore, the relatively simple structure of the lift arm and canister assembly assures long life, with minimal breakdowns.

It should be understood that while I have illustrated my device used on a truck with a low level loader, it is possible, without departing from the spirit of my invention, to use my device with a top loading truck.

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

1. A refuse loading device comprising a truck having a low level fill hopper, a single, unitary, rigid pair of powerized lift arms arranged to swing vertically in unison about a pivot on said truck to a position substantially above the mouth of, but below said fill hopper, each of

said arms including a horizontal trunnion connector member axially aligned with a trunnion connector member carried by the other arm, a bell crank lever having an inwardly directed lug portion rotatably mounted adjacent one of said trunnion connector members, crank actuator means arranged to control the rotative orientation of said crank lever with respect to said arms, and a portable canister including side wall portions each having axially aligned, complemental trunnion connector members arranged to cooperate with said trunnion connector members of said arms to pivotally support said canister between said arms from horizontal loading position to a vertical position for dumping in relation to said arms and bodily to lift said canister above the mouth level of said fill hopper, said canister including an abutment extension portion arranged to be engaged by said lug portion of said crank lever, thereby to pivot said canister relative to said arms in accordance with the pivoted position of said crank lever.

2. A device in accordance with claim 1 wherein said canister includes substantially vertical leading edge camming walls angularly disposed adjacent said side walls, and downwardly inclined portions on said side walls adjacent said complemental trunnion connector members, whereby upon relative movement of said arms to said canister, said arms will coact with said camming portions to shift said canister laterally to centered position between said arms, and said trunnion connector members of said arms will coact with said inclined portions to shift said canister longitudinally to align said trunnion connector members with said complemental trunnion connector members.

3. A refuse loading device comprising a truck having a fill hopper, a pair of powerized lift arms arranged to swing vertically in unison about a pivot on said truck to a position substantially above said fill hopper, each of said arms including a horizontal trunnion connector member axially aligned with a trunnion connector member carried by the other arm, a bell crank lever having an inwardly directed lug portion rotatably mounted adjacent one of said trunnion connector members, crank actuator means arranged to control the rotative orientation of said crank lever with respect to said arms, and a portable canister including side wall portions each having axially aligned, complemental trunnion connector members arranged to cooperate with said trunnion connector members of said arms to pivotally support said canister between said arms, said canister including an abutment extension portion arranged to be engaged by said lug portion of said crank lever, thereby to pivot said canister relative to said arms in accordance with the pivoted position of said crank lever, said crank actuator means comprises a pulley affixed to said crank lever, a complemental pulley non-rotatably affixed to said truck, and a belt operatively associating said pulleys.

4. A device in accordance with claim 3 wherein said belt is crossed, thereby to cause said crank lever to pivot relative to said arms in the same direction as said arms pivot relative to said truck.

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2,828,032	Beasley et al.	Mar. 25, 1958
2,847,135	Galloway	Aug. 12, 1958
2,860,797	Wilcox	Nov. 18, 1958