

Aug. 23, 1966

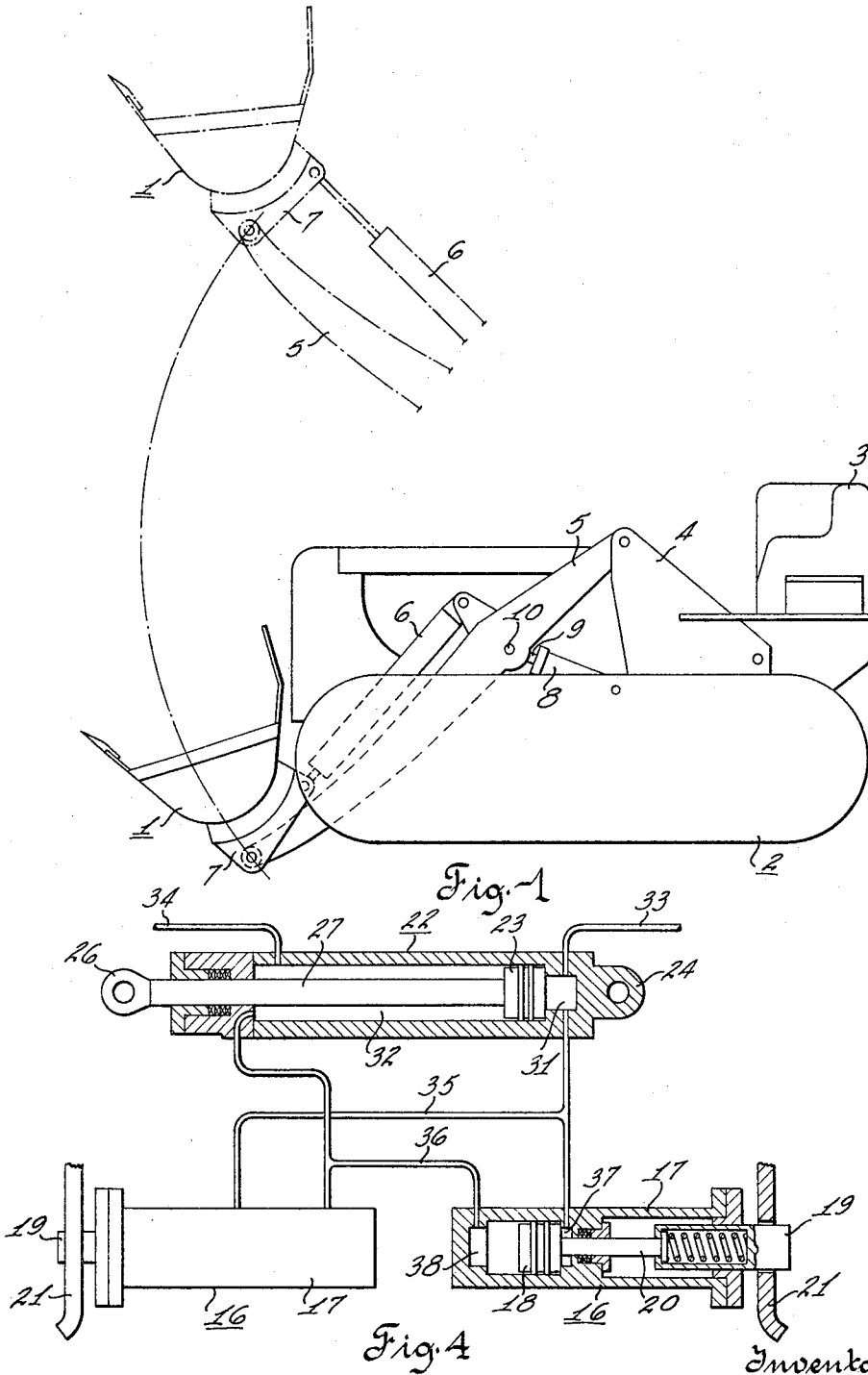
P. PENSA

3,268,101

SIDE DUMP BUCKET

Filed Jan. 17, 1962

3 Sheets-Sheet 1



Inventor
Pietro Pensa
By Charles L. Schuch
Attorney

Aug. 23, 1966

P. PENSA

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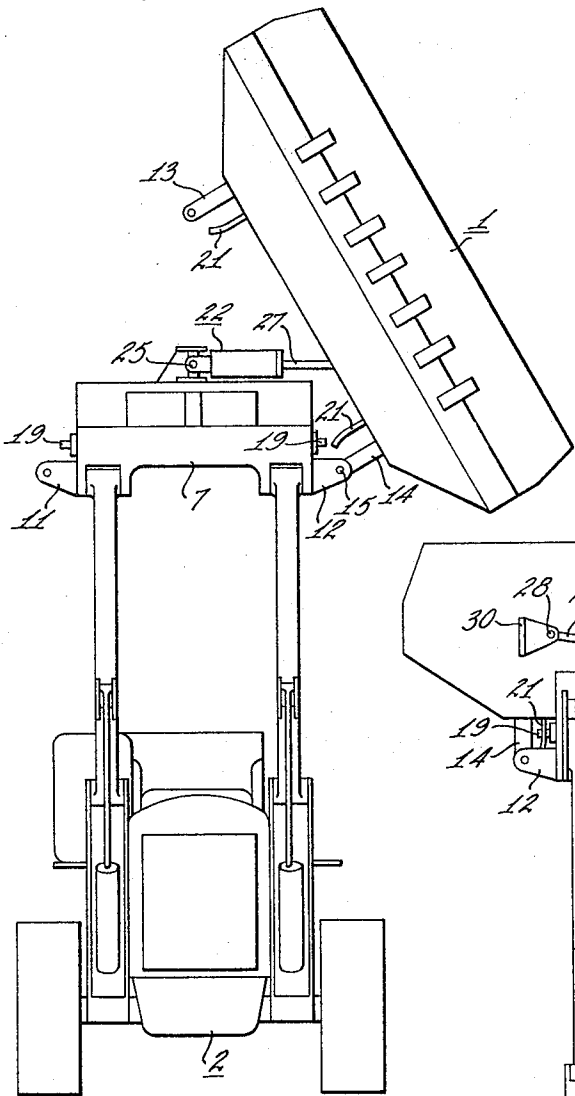


Fig. 1

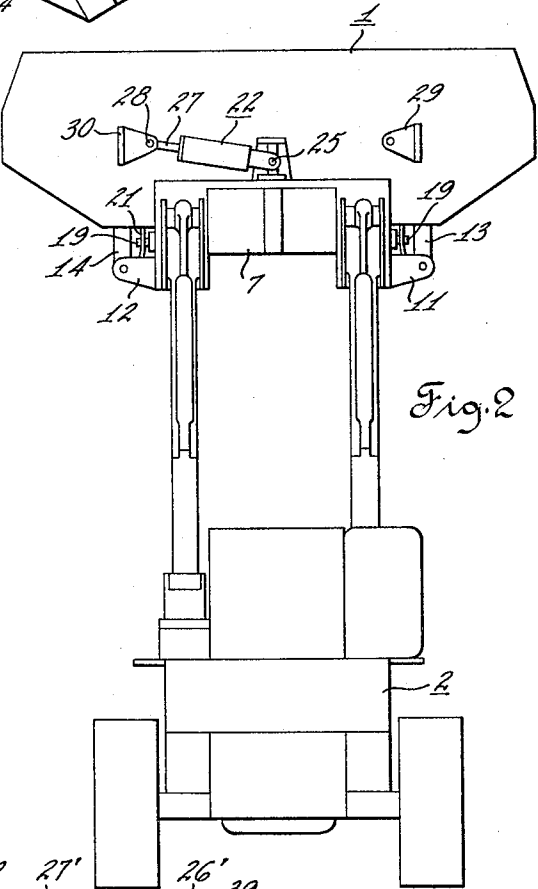


Fig. 2

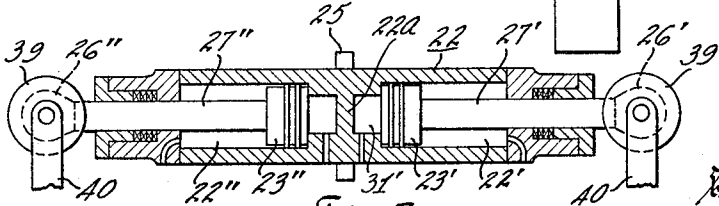


Fig. 7

Inventor
Pietro Pensa
By Charles L. Schwab
Attorney

Aug. 23, 1966

P. PENSA

3,268,101

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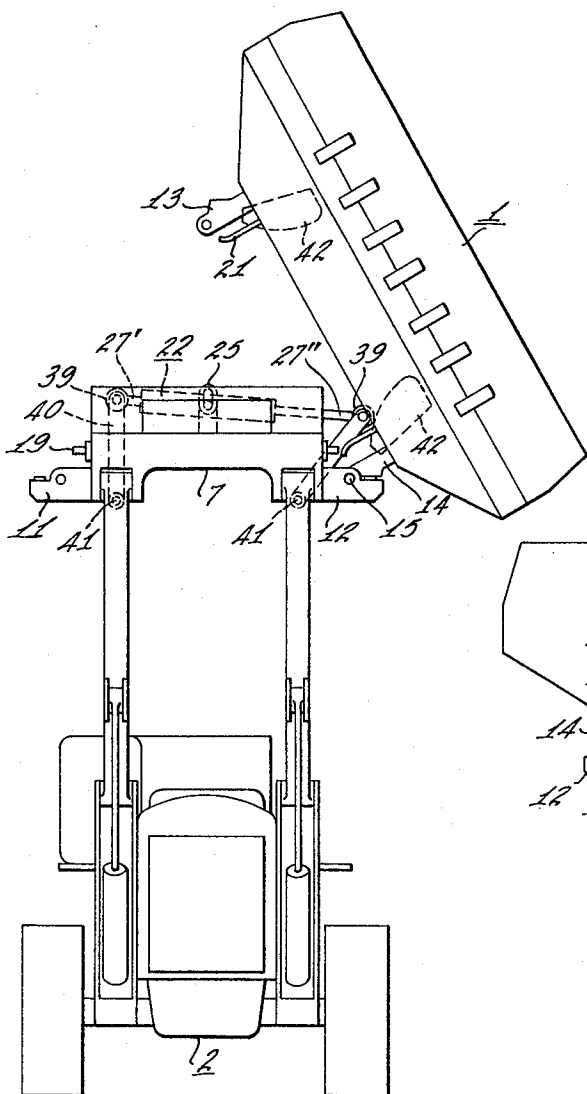


Fig. 6

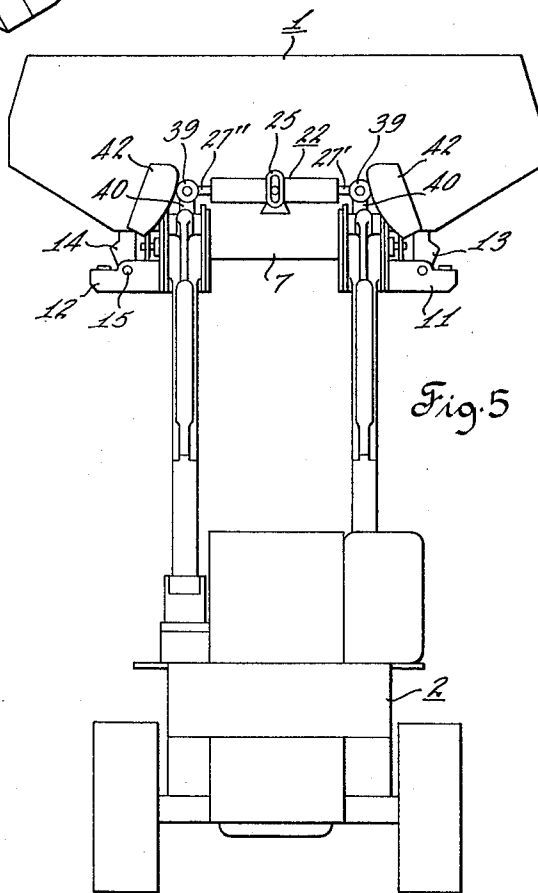


Fig. 5

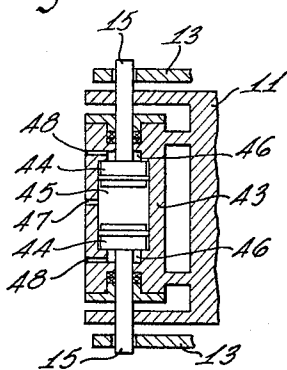


Fig. 8

Inventor
Pietro Pensa
By Charles L. Schmal
Attorney

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3,268,101

SIDE DUMP BUCKET

Pietro Pensa, Milan, Italy, assignor to Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

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646,552

7 Claims. (Cl. 214-140)

This invention relates to a side dumping, front loading excavator bucket and particularly to such a bucket which selectively dumps to either of the lateral sides of the vehicle on which it is mounted.

The utility of being able to laterally unload an excavating bucket to either one side or the other has heretofore been recognized, however, prior art devices have not proven entirely satisfactory. One prior art bucket is centrally pivoted to a support but such arrangement has the serious defect of not allowing a steep unloading inclination of the bucket and thus some types of materials do not discharge easily when side dumping the bucket. Such prior art device fails to discharge material in an effective manner and does not efficiently fill the device into which the material is dumped.

It is an object of this invention to provide a side dumping bucket which has improved dumping characteristics.

It is an object of this invention to provide an improved side dump bucket of the type which dumps to either lateral side of the vehicle on which installed.

It is a further object of this invention to provide a front loading, side dumping bucket which selectively pivots during side dumping on one of two laterally spaced pinions.

It is a further object of this invention to provide a front loading, side dumping bucket which includes hydraulically actuated means for selectively dumping the bucket to one lateral side or the other.

It is a further object of this invention to provide a bucket which can be dumped to either lateral side and includes means for releasably locking the bucket to a supporting structure.

These and other objects and advantages of this invention will be apparent to those familiar with the art to which this invention pertains when the following description is read in conjunction with the drawings of two embodiments of the invention in which:

FIG. 1 is a lateral side view of a vehicle with an excavating bucket mounted thereon;

FIG. 2 is a rear view of an excavating vehicle with a bucket constructed in accordance with one embodiment of this invention;

FIG. 3 is a front view of the vehicle shown in FIG. 2;

FIG. 4 is a schematic view of part of the hydraulic control mechanism for the bucket illustrated in FIGS. 2 and 3;

FIG. 5 is a rear view of an excavating vehicle with a bucket incorporating a second embodiment of this invention;

FIG. 6 is a front view of the embodiment illustrated in FIG. 5;

FIG. 7 is a section view of the double hydraulic ram employed in the embodiment of FIGS. 5 and 6; and

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FIG. 8 is a section view of one of the two laterally located pivot connections between the bucket and support.

FIG. 1 shows a symmetrical side dumping bucket 1 mounted on an excavating vehicle 2 by means of the supporting structure including a fixed portion 4 on the vehicle. Vertically swinging arms 5 and 6 are pivoted at their front ends to a support 7 for the bucket 1. Upon movement of the sliding pistons in cylinder 8, the rods 9 of said pistons, which are coupled by articulated joints 10 to arms 5, will raise the bucket 1 to the position shown by dotted lines in FIG. 1. The operation of the bucket 1 is controlled from the driver's seat 3.

Referring to FIGS. 2 to 4, which illustrate a first embodiment of this invention, the support 7 includes a pair of lateral lugs 11 and 12 which are connected, respectively, by pinions 15 with pivot members in the form of lugs 13 and 14 solidly fixed to the front loading, side dumping bucket 1. In each pair of lugs 11, 13 and 12, 14 there is alternately inserted, the reciprocable pivot elements in the form of pinions 15, so as to allow the bucket to pivot to a lateral dumping position to either side of the vehicle 2. The bucket 1 is provided on each side with locking means 16, shown in detail in FIG. 4. Locking means 16 includes a hydraulic actuator comprising a cylinder 17, a piston 18 and a rod 20 secured to the piston and having a spring biased plunger 19. Each plunger 19 engages a hole in the associated lug 21 rigidly connected to the side of the bucket 1.

Hydraulically actuated means are provided to rotate the bucket and in the first embodiment such means is a ram including, as shown in FIG. 4, a cylinder 22 in which a piston 23 can slide. The end 24 of cylinder 22 is pivoted by a pin 25 to a central portion of the bucket support 7 and the free end 26 of rod 27 of piston 23, is pivotally connected by means of a pinion 28 to one or the other of two pivot components in the form of lugs 29 and 30 located at points on the bucket 1 spaced laterally of the central portion of the support 7. In FIG. 2, the extremity 26 of rod 27 is shown connected to lug 30.

As shown in FIG. 4, the cylinder 22 of the ram is divided into two inversely variable volume chambers 31 and 32 by piston 23. Chambers 31 and 32 communicate by means of pipes 33 and 34 with a source of hydraulic pressure fluid and a reservoir, not shown. The chambers 31, 32 are, respectively, in communication by means of conduits 35, 36 with chambers 37 and 38 into which each cylinder of the hydraulic actuators 16 is divided by the associated piston 18.

The operation of the first embodiment of this invention will now be described. When it is desired to unload or dump the bucket to the right hand side of the vehicle, as viewed in FIG. 3, it is necessary to bring pinion 15 into pivotal connection with lugs 12 and 14, then connect pinion 28 with the piston rod 27 and lug 30, then by means of the control located at the driving seat 3, put conduit 33 into communication with the compressed fluid source, not shown, which is usually oil. When pressure fluid is applied, the parallel connected chambers 31 and 37 of the ram and actuator 17, cause parallel connected chambers 32 and 38 to discharge through conduit 34. Since the resistance to movement of pistons 18 is less than

the force exerted by pinion 28, by virtue of a full bucket, pistons 18 will be the first to move, thus withdrawing the plunger from the mating hole in lug 21 and hence freeing the bucket which can then be rotated by the hydraulically actuated means 22, 23.

To dump on the other lateral side of the vehicle it is only necessary to move pinion 28 and the end 26 of the ram 22, 23 to pivotal connection with lug 29, and pivotally connect lugs 11 and 13 with the retractible pivot pinion 15. The bucket may then be operated for dumping on the left as viewed in FIG. 3.

The second embodiment of the invention will now be described with particular reference to FIGS. 5 through 8 in which the common parts or the parts similar to those described in regard to the first embodiment are indicated with the same reference numbers, with or without primes.

In the second embodiment the hydraulically actuated means includes a double chamber ram having a cylinder 22 divided in two semicylinders 22' and 22'' by a baffle plate 22a. The cylinder 22 is pivoted at its central pin 25 to the central portion of the support 7.

Inside of the cylinders 22', 22'' slide two oppositely located pistons 23' and 23'' which operate alternately. Rollers 39 are mounted on the respective ends 26' and 26'' of rods 27' and 27''. Connecting rods or links 40 are pivotally connected at one end to the pins on which the rollers 39 pivot and the other ends of the links 40 are pivotally connected by pivot joints 41 to support 7. The rollers 39 are in confronting relation to camming surfaces of cams 42 which are integrally formed on laterally opposite sides of the bucket. This second embodiment also includes the pinions 15, oppositely located and mounted on each of the lugs 11 and 12.

Referring to FIG. 8, the hydraulic control or actuating means in part 11, includes an expansible and contractible hydraulic motor having a cylinder 43 in which two pistons 44 slide. The opposite rods of the pistons extend outwardly to form a two part pivot element or pinion 15. The pistons 44 divide cylinder 43 into three chambers, namely, the control chamber 45 between the two pistons, and chamber 46 between the pistons and the respective ends of cylinder 43. It is evident that on delivering compressed oil through conduits 47 or 48, the pins or pinions 15 will extend outwardly and pivotally connect with lugs 13 or will retract to disengage from lugs 13.

The operation of the second embodiment of this invention will now be described. When it is desired to unload the bucket to the right, as viewed in FIG. 6, the controls are adjusted at the driver's seat to deliver compressed oil to conduits 48—48 of the hydraulic motor in part 11; into chambers 37 of the locking means 16, and into chamber 31' of cylinder 22, causing the discharge of chamber 45 and chambers 38 of locking means 16. The locking means 16 is used in both of the illustrated embodiments of this invention. Piston 23'' floats by virtue of its opposite ends being placed in free flow fluid communication by the controls, not shown. The oil pressure moves pistons 44 and 18 before moving pistons 23' by virtue of the difference in opposition to their movement. The right roller 39, as viewed in FIG. 6, will roll on the confronting camming surface of cam 42 and the bucket will rotate around pinion 15 which connects parts 12 and 14.

It is obvious from the foregoing description and from the drawings that I have provided an extremely novel front loading, side dumping bucket. The two embodiments of my invention provide a high dumping inclination for the bucket to insure complete emptying of material from the bucket. When side dumping, the bucket discharges material a sufficient distance to the side of the vehicle to insure efficient loading of the device being filled.

Although only two embodiments of the invention have been illustrated and described, other variations are possible without departing from the inventive concept covered by the appended claims.

What is claimed is:

1. In an excavating vehicle, the combination of a bucket support structure having a pivot element at each of its laterally opposite sides, a bucket structure having a pair of laterally spaced pivot members adapted for pivotal connection with said pivot elements, respectively, hydraulic control means for selectively connecting one of said elements to one of said members for relative pivotal movement, camming surfaces formed on said bucket at laterally opposite sides of the longitudinal center of said vehicle, a double hydraulic ram including a cylinder partitioned into two chambers mounted on said support and a pair of reciprocable pistons in said chambers with rods, respectively, extending laterally from opposite ends of said cylinder, and rollers on said rods in confronting relation to said camming surfaces, one of said rollers engaging one of said camming surfaces upon outward movement of the rod associated therewith.

2. The structure set forth in claim 1 wherein said cylinder is pivotally connected to said support structure and further comprising a pair of links pivotally interconnected, respectively, between the free ends of said rods and said support structure.

3. The structure set forth in claim 2 wherein said control means includes a hydraulic motor on said support structure with a reciprocable component fixedly secured to one of said pivot elements and wherein the latter is reciprocable into and out of pivotal engagement with one of said pivot members.

4. The structure set forth in claim 3 wherein said hydraulic motor includes a pair of pistons in a common cylindrical chamber having oppositely disposed rods forming one of said pivot elements.

5. A side dump bucket construction for an excavating vehicle of the type having vertically swingable support arm means, comprising:

a bucket support structure adapted for pivotal connection to a forward end of said support arm means on a transverse axis,

a front loading side dumping bucket,

pivot means at each lateral side of said bucket permitting selective side dumping to opposite lateral sides, each of said pivot means including

spaced pivot members on said bucket having aligned openings,

a pair of pins reciprocally supported on said support structure in alignment with one another and said openings, and

an expansible and contractible hydraulic motor on said support structure between said pins, said pins moving into said openings, respectively, upon said motor being expanded and said pins moving out of said openings upon said motor being contracted, and

power means in thrust transmitting relation to said bucket for pivoting said bucket laterally about one of said pivot means to a side dumping position.

6. The construction set forth in claim 5 wherein each of said motors includes a cylinder rigid on said support structure and a pair of opposed reciprocable pistons in opposite ends of said cylinder in thrust transmitting relation to said pins, respectively.

7. A side dump bucket construction for an excavating vehicle of the type having vertically swingable support arm means, comprising:

a bucket support structure adapted for pivotal connection to a forward end of said support arm means on a transverse axis,

a front loading side dumping bucket,

pivot means at each lateral side of said bucket permitting selective side dumping to opposite lateral sides, each of said pivot means including

spaced pivot members on said bucket having aligned openings,

a pair of aligned pivot elements, and

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hydraulic actuating means for said pivot elements including cylinder means on said support structure and a pair of pistons in said cylinder means connected, respectively, with said pivot elements, said pivot elements being moved into said aligned openings upon said pistons being moved away from one another and said pivot elements being withdrawn from said aligned openings upon said pistons being moved toward one another, and

power means in thrust transmitting relation to said bucket for pivoting said bucket laterally about one of said pivot means to a side dumping position.

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HUGO O. SCHULZ, *Primary Examiner.*