Dec. 2, 1969 G. A. JACKOBOICE 3,481,440

POWER MEANS FOR A CEMENT DISCHARGE CHUTE

Filed Aug. 8, 1967 2 Sheets-Sheet 1

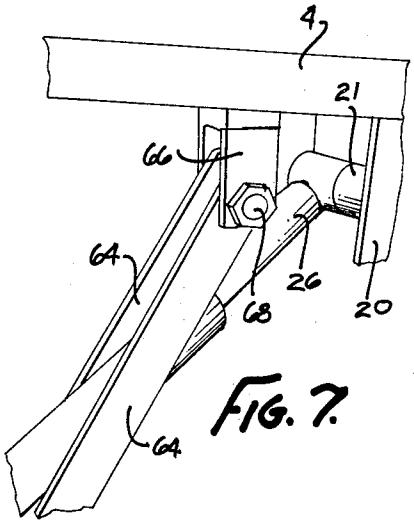


FIG. 7.

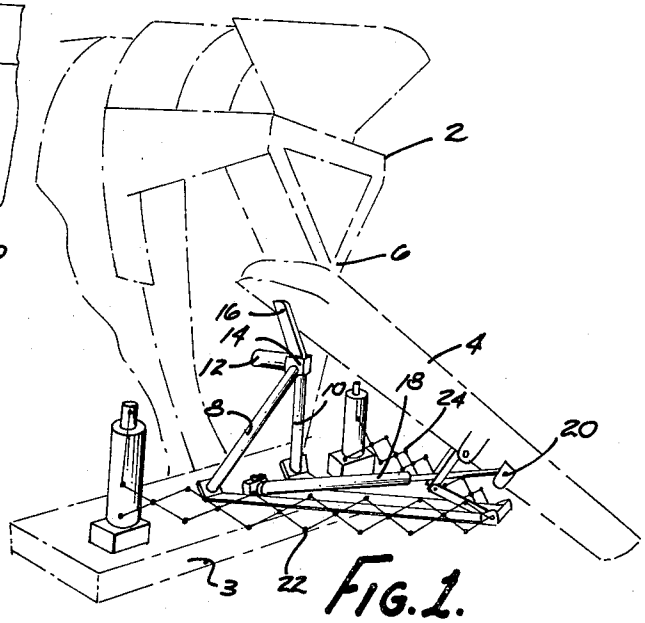


FIG. 1.

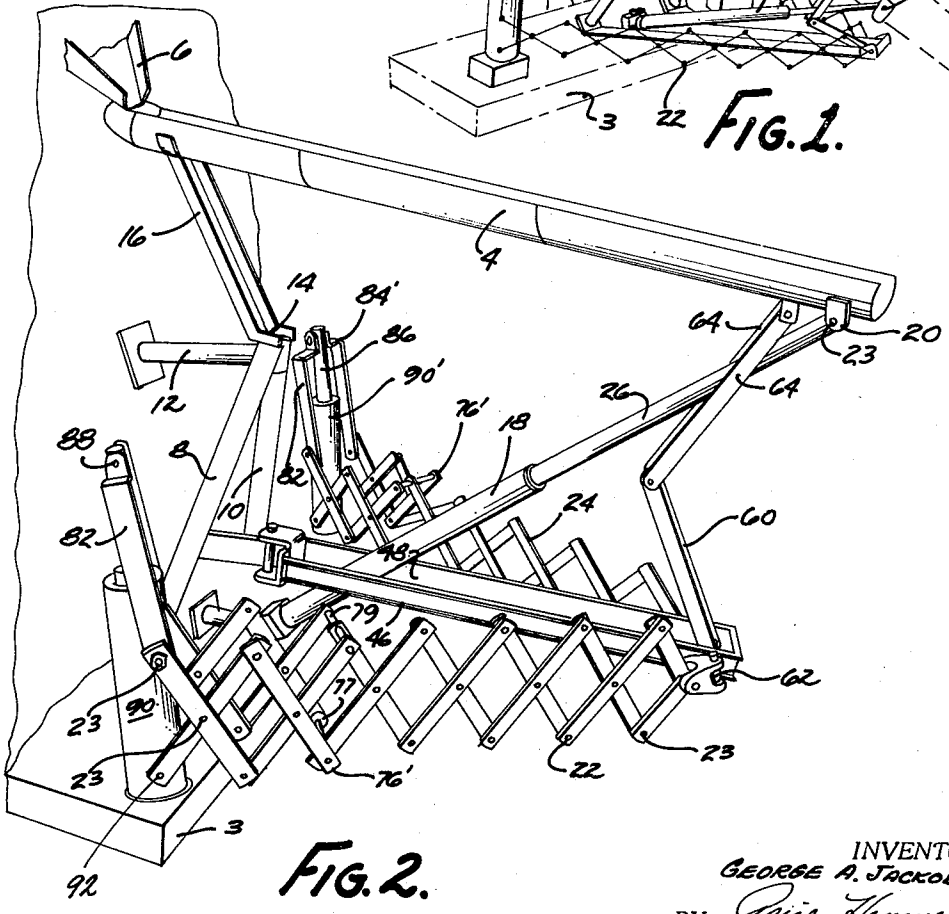


FIG. 2.

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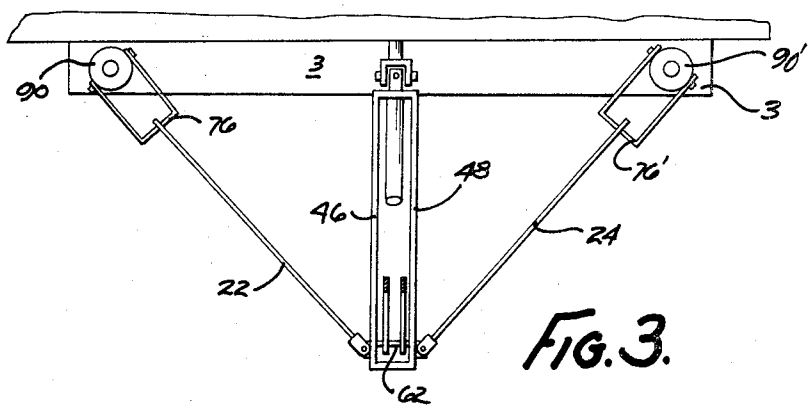


FIG. 3.

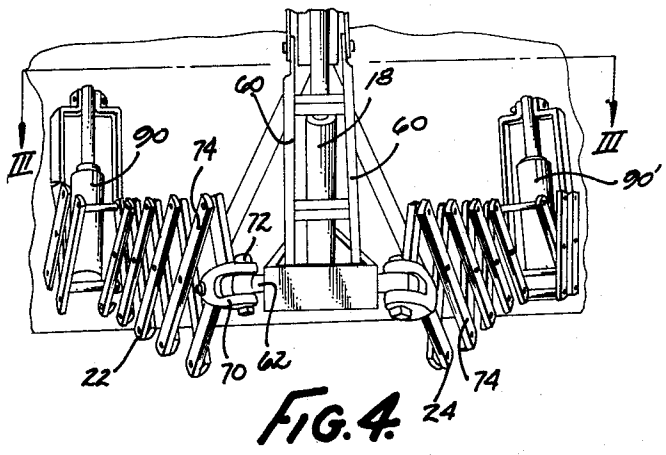


FIG. 4.

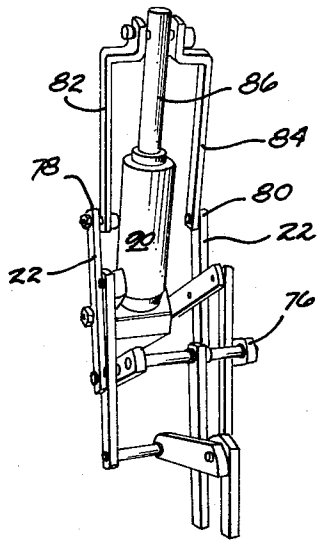


FIG. 5.

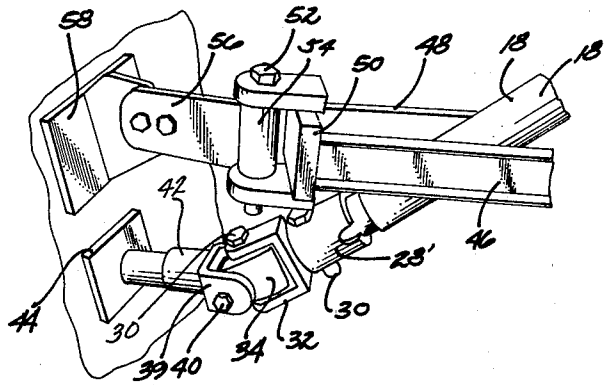


FIG. 6.

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POWER MEANS FOR A CEMENT DISCHARGE CHUTE

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Int. Cl. B65g 11/00
U.S. Cl. 193—10 14 Claims

ABSTRACT OF THE DISCLOSURE

This disclosure relates to a dispensing chute for a cement mixing truck wherein the chute has power means to rotate the chute about a substantially vertical axis and power means to raise or lower the dispensing end of the chute.

The power means for the horizontal movement of the chute comprises a pair of vertically disposed hydraulic cylinders having a reciprocatable rod attached to links of one end of an interlocking parallelogram structure which is also connected at that same end to a fixed portion of the cylinder supporting block such that the reciprocation of the cylinder rod causes extension and contraction of the parallelogram structure. At the outer end, the parallelogram structure is attached to a supporting member and through a connecting link is attached to the chute.

This invention relates to dispensing chutes for cement trucks and power means therefor. In one of its aspects it relates to a power means for rotating a dispensing chute for a cement truck about a substantially vertical axis.

Ready mix cement trucks are conventionally provided with dispensing chutes which are rotatable about a substantially vertical axis. Most of these trucks are provided with a power means for raising and lowering the end of the dispensing chute. Generally, the chute is horizontally swingable by hand. In larger operations, the chute is extended and becomes quite heavy when filled with cement. It then becomes difficult to move by hand. In any case, the horizontal rotation of the chute is rather difficult when the chute is filled with cement, such as during the dispensing operation. This problem becomes particularly severe when the truck is parked on an incline such that the chute tends to rotate on its own toward the bottom of the incline. In this situation the chute must be held in position and, in some cases, moved up the incline to a different position.

I have now devised a horizontal power rotating system for a cement chute, which system employs hydraulic cylinders and a plurality of interlocking links forming a parallelogram structure. By the use of the invention, the dispensing chute can be horizontally movable, generally rotatable about a substantially vertical axis and can be held in a relatively constant horizontal position regardless of the pitch of the truck.

By various aspects of this invention, one or more of the following, or other objects, can be obtained.

It is an object of this invention to provide a power means to rotate a dispensing chute about a generally vertical axis.

It is a further object of this invention to provide a means to work in combination with a second power means for positioning a dispensing and a cement dispensing truck at any given point in a generally vertical plane.

It is a still further object of this invention to maintain a dispensing chute at a suitable position relative to a vertical axis regardless of the position of the truck with relation to the ground.

It is yet another object of this invention to provide a hydraulic system for positioning an end of a dispensing chute along an arcuate path in a plane substantially parallel to the base of the truck and spaced a distance from a substantially vertical axis about which an end of the chute can rotate.

Other aspects, objects, and the several advantages of this invention are apparent to one skilled in the art from a study of this disclosure, the drawings, and the appended claims.

According to the invention, there is provided a discharge chute for a cement mixing truck having a power means attached to the truck and to the chute for rotating the dispensing end of the chute about a substantially vertical axis or an axis which is substantially perpendicular to the base of the truck. Preferably, the power means are hydraulic and comprise a pair of horizontally spaced hydraulic cylinders rotatably attached to the base of the truck and operably connected to horizontal extension means, such as a plurality of interconnected links, forming a plurality of interconnected parallelograms. The hydraulic cylinders are so actuated that one is extended while the other is retracted. The ends of the parallelogram structures are connected to the dispensing chute.

The invention will now be described with reference to the accompanying drawing which show an embodiment of the invention.

FIG. 1 is a perspective view of the invention as applied to a dispensing chute from a cement mixing truck;

FIG. 2 is an enlarged and more detailed perspective view of the embodiment schematically shown in FIG. 1;

FIG. 3 is a top view of the structure shown in FIG. 2 and generally taken along lines III—III of FIG. 4;

FIG. 4 is an end view of the structure shown in FIGS. 2 and 3;

FIG. 5 is a close-up view of a hydraulic cylinder employed in the invention shown in FIGS. 1 through 4, and its connection to the parallelogram structure;

FIG. 6 is an enlarged, detailed view of the means for attaching the supporting structure for the parallelogram structure to the truck and its relationship to the power means for raising and lowering the dispensing chute; and

FIG. 7 is a close-up, enlarged view of the connection of the chute to the means for moving the chute horizontally and vertically.

Referring now to the drawings, a cement truck shown in phantom lines, and generally designated as **2** has a dispensing tray **6** and a dispensing chute **4**. Support member **16** is attached to one end of the dispensing chute and is rotatable about a pin on block **14**, which in turn, is supported by members **8**, **10**, and **12**, all of which members are rigidly attached to the rear portion of the truck. A hydraulic cylinder **18** having an extension rod **26** is attached to the dispensing end of chute **4** through bracket **20** and pin **23**. The other end of the hydraulic cylinder **18** is attached to collar **28** through pin **30**. The collar **28** is attached to a universal joint comprising U-shaped members **32** and **38**, which are attached together through pins **30**, collar **34**, and pins **40**. Support post **42** is rigidly attached to the back of the truck through plate **44**.

According to the invention, means are provided to swing the dispensing end of chute **4** about a generally vertical axis, i.e., through point **14**. These power means comprise a pair of vertically disposed, hydraulic cylinders **90** and **90'** which are rotatable about a vertical axis on platform **3** as indicated by the arrows in FIG. 3. The platform **3** is rigidly attached to the back of the cement truck. Each hydraulic cylinder can be attached to the platform by a pin (not shown) beneath each cylinder or other suitable rotatable coupling. Each hydraulic cylinder has an extendible rod **86** and **86'** (see FIGS. 2 and 5)

which at the end thereof is connected through pin **88** to links **82** and **84**. These links are attached to the end of a parallelogram structure defined by a plurality of interlocking links **22** which are secured together by pins **23**. At each hydraulic cylinder, a double pair of parallelogram structures are attached to either side of the hydraulic cylinder. The bottom portion of the parallelogram structure near the truck is attached to the support **3** for the cylinder through pin **92**. Thus, the parallelogram structure is rotatable about the hydraulic cylinders and rotates as each cylinder rotates.

At **76**, a pair of bars **77** and **79** is provided between each side of the parallelogram structure extending out from the hydraulic cylinder. A single line of interlocking links **22** is then provided out to connecting member **62** on supporting bars **46** and **48**. Each side of the parallelogram structure is supported at the outer portion thereof by a pair of beams **46** and **48**, which are attached through U-shaped bracket **50**, pin **52**, collar **54**, support member **56**, and plate **58** to the back of the truck. As can be seen in FIG. 6, the hydraulic cylinder **18** is positioned between the beams **46** and **48**.

Each of the parallelogram structures is attached to the beams **46** and **48** through a horizontally extending pin **62**, pin **72**, and U-shaped collar **70**.

Pin **62** is also rotatably attached to a pair of parallel support members **60**, inside of beams **46** and **48**. The members **60** are rotatably attached at the other end thereof to a pair of support members **64**, which in turn are rotatably attached to the dispensing end of the chute through a bracket **66** and a pin **68** (see FIG. 7). As can be seen from FIG. 7, the upper portion of rod **26** extends between the parallel members **64** and attaches through pin **21** and support plate **20** to the dispensing end of chute **4**.

In operation, the hydraulic cylinder **18** can be actuated to extend rod **26** to thereby raise or lower the dispensing end of chute **4**. When it is desirable to move the dispensing end of chute **4** in a generally horizontal plane (i.e. one that is substantially parallel to the base of the truck), then hydraulic cylinders **90** and **90'** are actuated to move the parallelogram structure **22** and **24**. The hydraulic cylinders are connected in a control circuit that rod **86** on cylinder **90** will be extended while rod **86'** on cylinder **90'** will be retracted. The retraction of rod **86'** (i.e. the movement downwardly of rod **86'**) will cause members **82'** to move downwardly, and thus force the ends of the parallelogram closer together, thereby expanding in a horizontal direction the parallelogram structure **24**.

On the other hand, rod **86** of cylinder **90** will be extended upwardly, thereby forcing the ends of the parallelogram structure **22** at the hydraulic cylinder **90** away from each other, which in turn, will retract the parallelogram structure **22**. This combination of action between each parallelogram structure will cause the dispensing end of the cylinder to move to the left as seen in FIGS. 3 and 4.

The placement of the hydraulic cylinder **18** and rod **26** between supporting members **46** and **48** and between the connecting links **64** insures a relatively rigid structure for rotating the dispensing end of chute **4** about a generally vertical axis. It is to be emphasized that, whereas the embodiment of the invention shown in the drawing employs a hydraulic cylinder with an extensible rod **26** to raise and lower the dispensing end of chute **4**, such an arrangement for the employment of the raising and lowering means is not essential to the invention. Thus, the invention could be employed without the use of cylinder **18** and rod **26**.

Reasonable variation and modification are possible within the scope of the foregoing disclosure, the drawings, and the appended claims to the invention without departing from the spirit thereof.

I claim:

1. In a discharge chute for a cement mixing truck comprising power means attached to said truck and to said chute for rotating said chute about a substantially vertical axis, the improvement in said power means comprising a pair of horizontally spaced, hydraulic cylinders on either side of said truck, each cylinder operably connected to a horizontal extension means, such that reciprocation of said hydraulic cylinders extends and contracts said horizontal extension means, each of the said extension means being operably connected to such chute at a point spaced from the axis of rotation of said chute, and means are further provided to actuate said hydraulic cylinders such that expansion of one of said horizontal means causes the contraction of the other of said expansion means, thereby rotating said chute about said substantially vertical axis.

2. A discharge chute according to claim **1**, wherein said expansion means comprises a plurality of interconnected links forming an interlocking parallelogram structure, one end link of said structure at one end thereof is attached to one end of a vertically disposed, reciprocable, hydraulic cylinder, and another link at said one end is attached to a vertically fixed point on said truck, whereby extension of said cylinder causes contraction of said parallelogram structure and retraction of said cylinder causes extension of said parallelogram structure.

3. A dispensing chute according to claim **2**, wherein said parallelogram structure at one end thereof comprises two groups of interlocking parallelogram structures, each attached to either side of said vertically disposed hydraulic cylinder.

4. A discharge chute according to claim **1**, wherein there is further provided horizontal support means for said horizontal extension means, said horizontal support means being centrally located at each of said horizontal extension means and attached to said truck, said support means rotatable about a substantially vertical axis, said support means being attached to each of said extension means at an end thereof spaced from said truck.

5. A discharge chute according to claim **4**, wherein said horizontal extension means is rotatably attached to said support means to permit rotation of said support means, with respect to said extension means about a substantially vertical axis.

6. A discharged chute according to claim **4**, wherein there is further provided a means to raise or lower the outer end of said discharge chute, and vertical extension means are provided on the outer end of said support means for connecting said rotatable support means with the discharge end of said discharge chute, whereby vertical and horizontal movement of said outer end of said chute is permitted.

7. A discharge chute according to claim **6**, wherein said power means for raising and lowering said discharge end extends from said truck between support arms of said support means and is operably connected to said outer end of said chute through a pair of parallel arms of said vertical extension means to said discharge end of said chute.

8. A discharge chute according to claim **7**, wherein said vertically extendible means comprises a first pair of parallel arms spaced from each other and rotatably connected at one end to the outer end of said support means, and at the other end to a second pair of spaced parallel arms, said second pair of parallel arms being rotatably attached to the other end thereof to said chute.

9. A dispensing chute according to claim **1**, wherein said hydraulic cylinders are rotatable about a substantially vertical axis on said truck base.

10. A power means for a cement discharge chute comprising:

(A) first and second linear horizontal extension means connected at one end thereof,

(B) means at said one end for connecting said one end to said cement discharge chute,

(C) separate power means attached to said first and second horizontal extension means adapted to actuate extension of one of said extension means and contraction of the other of said extension means,

(D) means for attaching each of said first and second horizontal extension means to a rear portion of a cement mixing truck at points spaced from each other.

11. A power means according to claim **10**, wherein said power means comprises first and second hydraulic cylinders attached to said first and second extension means, respectively.

12. A power means according to claim **11**, wherein said extension means comprises a plurality of interconnected links forming an interlocking parallelogram structure, one end link of said structure at the other end from said one end is attached to an end of one of said hydraulic cylinders, and another link at said other end of said parallelogram structure is attached to another end of said one hydraulic cylinder, whereby the reciprocation of said hydraulic cylinder causes extension and contraction of said parallelogram structure.

13. A power means according to claim **10**, wherein said means of (B) comprises a vertically extendible linkage adapted to permit vertical movement of said cement chute, relative to said first and second horizontal extension means.

14. A power means according to claim **10**, wherein said means of (D) comprises a rotatable coupling which attached to said power means of (C).

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U.S. Cl. X.R.

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