Feb. 6, 1962 P. JEAN-MARIE T. ALLARD 3,019,949

HOPPER CAPABLE OF BEING EMPTIED IN A REGULATABLE MANNER

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Fig. 2

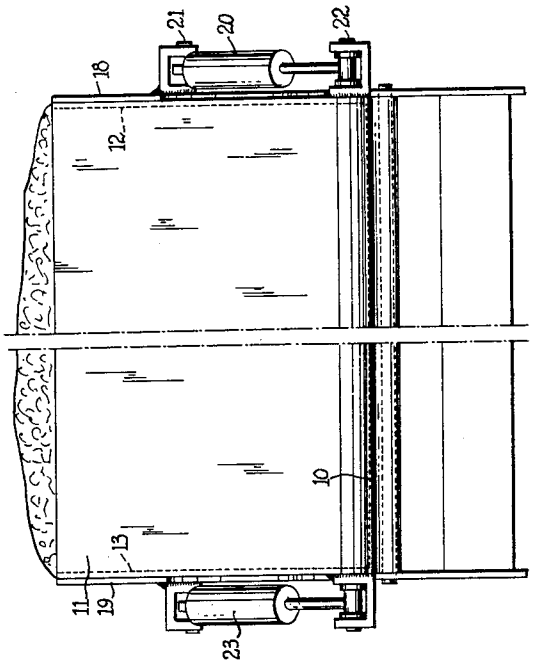
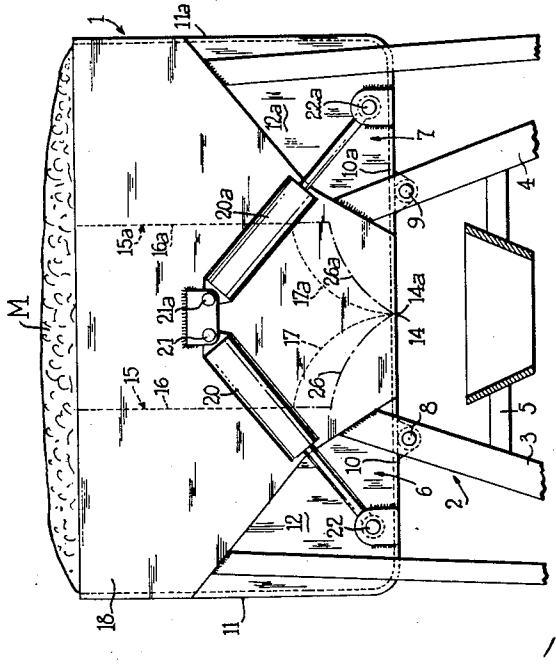


Fig. 1



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Fig. 3

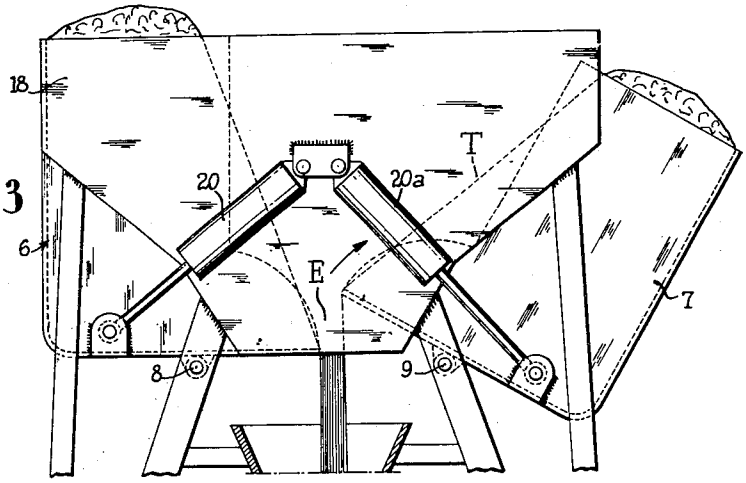
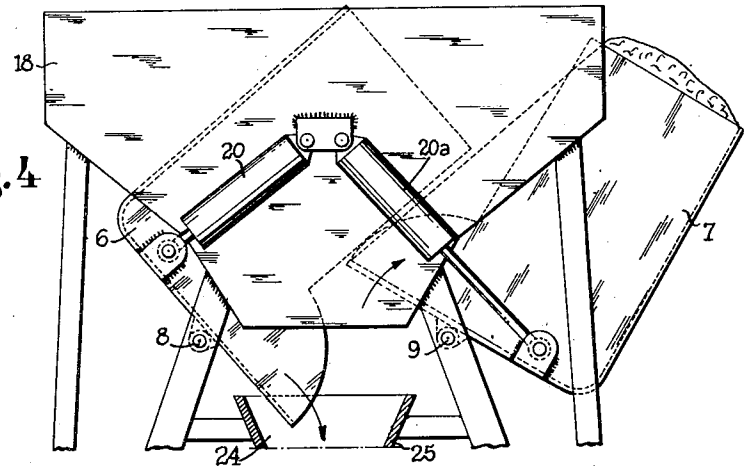


Fig. 4



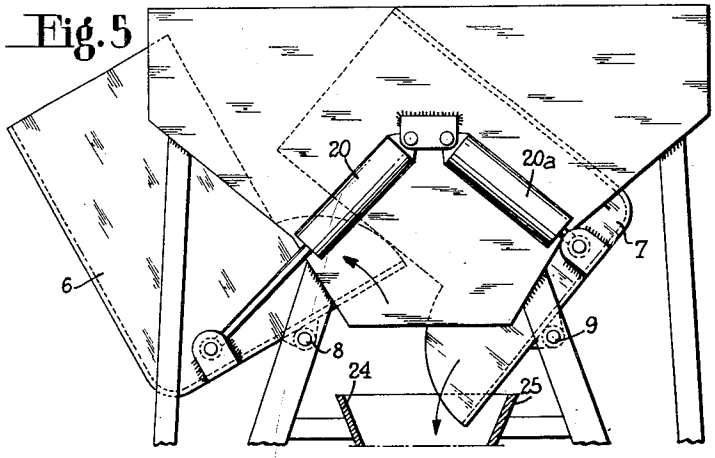
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Fig. 5



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HOPPER CAPABLE OF BEING EMPTIED IN A REGULATABLE MANNER

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4 Claims. (Cl. 222—502)

The invention relates to a hopper receiving and discharging bulk materials which are difficult to pour, such as adhesive or caking materials or materials in the form of blocks.

Conventional hoppers generally have a downwardly convergent lower portion which directs the material in the hopper toward the outlet aperture, which is selectively opened or closed by suitable means, thereby discharging these materials as desired.

A drawback of these prior hoppers is that when the material is of the aforementioned type, they are not easily emptied and often require that the sides have a relatively steep slope to avoid or reduce the clogging or obstruction of the outlet aperture. Owing to the provision of these slopes, the material sliding along the downwardly convergent walls has a tendency to clog or to become wedged, thus forming an arch which hinders the flow of this material. Further, owing to the shape of the lower walls, these hoppers are excessively high for a particular volumetric capacity.

Briefly, the invention comprises a supporting structure upon which two confronting bucket members are mounted for individual pivotal movement about spaced parallel axes. Each bucket is open at the side which faces the other bucket member so that the two bucket members communicate freely with each other. The two bucket members have flat bottom portions which are normally substantially coplanar. The flat bottom portions have rectilinear edges which are equidistant from the parallel horizontally extending pivotal axes. Lateral portions of each bucket member are cut away so that both bucket members are individually movable in either direction, each independently of the other, away from the normal position wherein their bottom portions are horizontal and the edges of the bottom portions are effectively in contact with each other so that the discharge of material is shut off. By tilting the bucket members away from each other in opposite directions, the bulk material is broken up from any caked condition. After breaking up the caked condition, the bucket members may be separately tilted to discharge first the contents of one bucket and then the other.

Various additional features and advantages of the invention will become apparent upon reading the following specification with reference to the accompanying drawing forming a part hereof.

In the drawing:

FIG. 1 is a diagrammatic elevational view of a hopper according to the invention, in its normal or closed state;

FIG. 2 is a side elevational view of the hopper shown in FIG. 1, and

FIGS. 3–5 are views similar to FIG. 1 of the hopper in various positions in the course of emptying the material contained therein.

In the illustrated embodiment, the hopper of the invention comprises the hopper proper designated generally as 1, a chassis or supporting structure designated generally as 2 which has a shape and size suitable for the vehicle or other evacuating means on which the material must be placed. This chassis comprises legs 3 and 4 interconnected by cross-members 5 and additional legs 3*a* and 4*a*.

The hopper 1 comprises two confronting bucket members designated generally as 6 and 7. The bucket members 6 and 7 are mounted for individual pivotal movement on spaced parallel horizontal shafts 8 and 9 which are journaled in the legs 3 and 4.

The bucket members 6 and 7 are identical so that they constitute a pair and are disposed symmetrically in confronting relationship. The bucket member 6 comprises a flat normally horizontal bottom portion 10, an outer wall 11 and two lateral walls 12 and 13 (FIG. 2). Similar portions of the other bucket member 7 are designated by corresponding reference numerals each with the suffix *a*. The flat bottom portions 10 and 10*a* are disposed in the same horizontal plane when the hopper 1 is in its normal or closed condition as shown in FIG. 1. In the normal position, the rectilinear inner edges 14, 14*a* are in contact with one another to prevent the discharge of material from the hopper 1.

The lateral walls 12, 12*a* and 13, 13*a* (the wall 13*a* is not visible in the drawing) are cut away as indicated in dotted lines, so that the bucket members 6 and 7 are capable of individual pivotal movement in either direction independently of the other as shown in FIGS. 3, 4 and 5. The cut away portions are defined by the inner edges 15, 15*a* which consist of upper vertical portions 16, 16*a* and lower arcuate portions 17, 17*a* which are shaped as sectors of circles concentric with the pivotal axes provided by the shafts 8 and 9, respectively. The lower ends of the circular edges 17, 17*a* terminate at the rectilinear edges 14, 14*a*, respectively.

A pair of spaced parallel vertical side plate members 18, 19 is secured to the chassis 2. Each of the side plate members 18 and 19 extends perpendicularly with respect to the horizontal pivotal axes provided by the shafts 8 and 9. The side plate members 18, 19 laterally enclose the cut away portions 15, 15*a* of the bucket members 6 and 7 throughout the range of pivotal movements shown in FIGS. 3, 4 and 5 so that material can be discharged from the hopper 1 only over the rectilinear edges 14, 14*a*.

For displacement of the bucket members, two hydraulic cylinders 20, 20*a* have their body portions individually pivoted to the side plate 18 at 21, 21*a*, respectively. The free end of the piston rod of cylinder 20 is pivoted to the bucket member 6 at 22. The piston rod of cylinder 20*a* is similarly pivoted to the bucket member 7 at 22*a*. At the opposite side of bucket member 6 a further hydraulic cylinder 23 (FIG. 2) is provided which cooperates with the cylinder 20 to tilt the bucket member 6. A similar additional cylinder (not visible in the drawing) is provided for the bucket member 7. With the hopper 1 closed, as shown in FIG. 1, all of the piston rods are in a semi-extended condition. Suitable means (not shown) for supplying pressure fluid to the hydraulic cylinders 20, 23 is provided together with appropriate control means for causing the cylinders 20, 23 to displace either or both of the bucket members 6 and 7, at will, in either direction from the normal or closed position as shown in FIG. 1.

Discharge of material M from the hopper 1 is effected in the following manner:

The pair of hydraulic cylinders comprising cylinder 20*a* connected to the bucket member 7 is actuated to tilt the bucket member 7 outwardly to the position shown in FIG. 3, the bucket member 6 remaining stationary.

Tilting of the bucket member 7 decompresses or loosens the material in line with the previously closed junction line of the bottoms 10 and 10*a* of the bucket members 6, 7. The loosened material is discharged beneath the hopper as indicated in FIG. 3 through the space E between the normally contacting edges of the bucket members 6 and 7. This discharge will continue until the loosened material assumes its slope of repose as indicated at T.

Thereafter, the bucket member 6 is tilted inwardly to

the position shown in FIG. 4, so that it is completely emptied, the material being discharged through a guide funnel comprising flaps **24** and **25** which are shown connected to the cross-members **5**.

The discharge is completed by tilting the bucket members **6** and **7** outwardly and inwardly, respectively, to the positions shown in FIG. 5. This movement will result in the final emptying of bucket member **7** which, as shown in FIGS. 3 and 4, was previously only partially emptied.

The discharge may be interrupted at will be restoring the bucket members **6** and **7** to their normal positions as shown in FIG. 1.

As shown in FIG. 1, the curved edges **17**, **17***a* may be modified to have the arcuate shape indicated in dot-dash lines at **26**, **26***a*. If the modified shape **26**, **26***a* is used, material may flow outwardly beyond the edges **14**, **14***a* as well as downwardly between the edges **14**, **14***a* when the two bucket members **6** and **7** are tilted inwardly toward each other.

While I have shown and described what I believe to be the best embodiments of my invention, it will be apparent to those skilled in the art that various changes and modifications may be made therein without departing from the spirit and scope of the invention as defined in the appended claims.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A hopper of the class described, comprising: a pair of confronting bucket members having normally substantially horizontal and coplanar flat bottom portions, each of said bucket members being open at the side which faces the other and each communicating with the other through said open side, means supporting said bucket members for individual pivotal movement about horizontally spaced parallel axes in either direction away from their respective normal positions, lateral portions of said bucket members being cut away to permit individual pivotal movement of either bucket member in either direction independently of the other, said bottom portions having rectilinear edges which are normally effectively in contact with each other and equidistant from said axes, a pair of spaced parallel side plate members extending perpendicularly to said axes and laterally enclosing said cut away portions, and separate displacement means connected to each bucket member for effecting said individual pivotal movement thereof.

2. A hopper according to claim 1, wherein said lateral portions are cut away to define edges the lower portions of which are shaped as sectors of circles concentric with said axes, the lower ends of said sectors passing through said rectilinear edges.

3. A hopper according to claim 1, wherein said lateral portions are cut away to an extent sufficient to permit simultaneous displacement of both of said bucket members in the same direction with their respective bottom portions maintained parallel.

4. A hopper according to claim 1, wherein said displacement means comprises hydraulic cylinder means.

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