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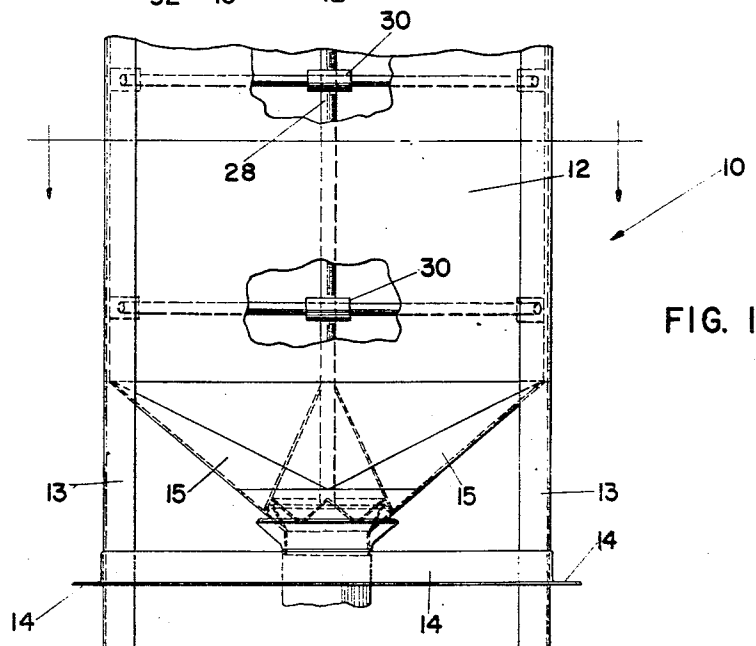
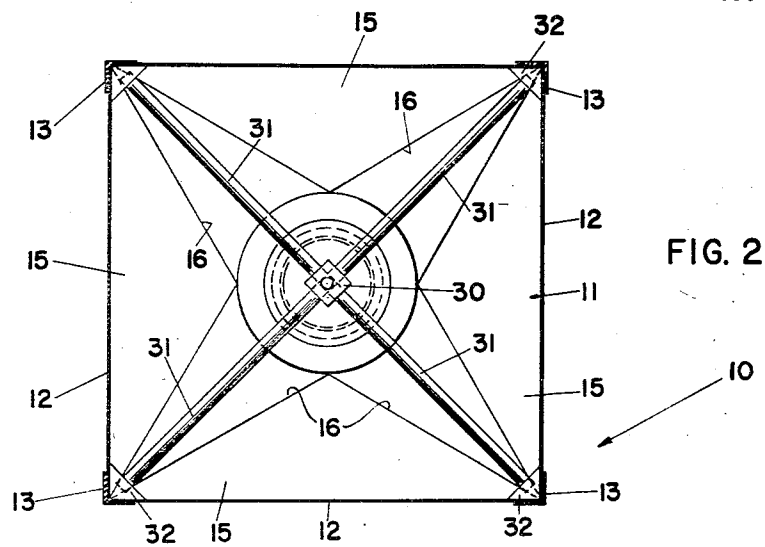
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VALVE MECHANISM FOR DISPENSING HOPPERS

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VALVE MECHANISM FOR DISPENSING HOPPERS

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This invention relates to an improvement in dispensing devices. More particularly this invention relates to an improved valve mechanism for controlling the discharge of material from a dispensing hopper.

It is a prime object of this invention to provide an improved dispensing hopper and valve mechanism therefor whereby accurate quantities of granulated material may be dispensed.

Still another object is to provide an improved dispensing hopper having a novel valve mechanism which may be actuated to dispense measured quantities of granulated material from the hopper and which is effective to positively close the discharge opening of the hopper during non-use position.

A still further object is the provision of a dispensing hopper with a valve mechanism which is actuated by means of a receiving conduit adapted to be placed into position for receiving measured quantities of granulated material from the dispensing hopper.

These and further objects will become more readily apparent from a reading of the specification when examined in connection with the accompanying sheets of drawings.

In the drawings:

Figure 1 is a side elevational view of a dispensing device and hopper valve mechanism;

Figure 2 is a cross sectional view through a dispensing device taken substantially along the line 2—2 of Figure 1; and

Figure 3 is an enlarged cross sectional view through a dispensing device and hopper shown in Figures 1 and 2.

A dispensing device is generally designated by the reference character 10. The dispensing device 10 includes a hopper 11 having upright upper side walls 12 with their edges suitably connected by means of vertically extending angle supports 13. The angle supports 13 are suitably connected together by means of horizontally extending angle bars 14. The upright upper side walls 12 are connected to a plurality of lower or bottom walls 15. The lower or bottom walls 15 are interconnected by means of trough portions 16, the walls 15 and trough portions 16 sloping in the direction of an opening 17 centrally positioned at the bottom of the hopper 11. The opening 17 is in communication with an annular spout or hopper extension 18.

Surrounding the opening 17 is a valve seat generally designated at 19. The valve seat includes a collar 20 which is positioned to slope upwardly and inwardly toward the center of the hopper 11. The collar in turn is connected to an inner annular wall 21 which slopes down-

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wardly and is connected to the hopper 11 immediately adjacent the discharge opening 17.

A bell-shaped valve 22 is positioned within the hopper 11. The bell-shaped valve 22 comprises a conical wall 23 having a downwardly extending annular skirt 24. A bottom wall 25 is connected to the bell-shaped valve 22, the said bottom wall 25 being connected to the inner surface of the conical wall 23 at a point spaced upwardly from the lower peripheral edge of the skirt 24 as indicated at 26. The bottom wall 25 comprises an annular portion sloping downwardly toward the opening 17 and is provided at a central portion with a conical pocket 27 the apex of which is disposed above the lowermost portion of the bottom wall 25.

The bell-shaped valve 22 is provided with a vertically extending guide member 28 connected as indicated at 29 to the apex of the conical pocket 27. The guide member 28 is vertically reciprocable in guide bearings 30 which are suitably supported by spider-like rods 31 to corner braces 32. The corner braces 32 are suitably connected to the angle supports 13.

A conduit or conveyor trough 33 is positioned immediately below the discharge opening 17. The conduit 33 is vertically movable relative to the hopper 11 and includes a funnel-shaped inlet 34 having a suitable annular seal 35 connected thereto. The conduit conveyor 33 also includes an actuating rod which is connected to a centrally disposed block 37 in turn supported on rods 38 which are suitably connected to the conduit 33. The actuating rod 36 projects upwardly above the upper peripheral edge of the funnel-shaped inlet 34.

The dispensing device and hopper are particularly useful for dispensing finely granulated material such as sand which might be used in connection with a molding or foundry operation. In cases of this type it is desired that accurate control be had over the dispensing of the granulated materials from the hopper. In operation the conduit 33 is moved upwardly until the seal 35 engages the bottom walls 15 whereupon the conduit 33 is in position for receiving material from the hopper 11. Just prior to the positioning of the conduit 33 in this position the rod 36 engages the conical pocket 27 thereby lifting the bell-shaped valve 22 upwardly so that the skirt 24 is lifted free from the valve seat 19. Material can be discharged from the hopper 11 since the discharge opening 17 is now open. Immediately upon the retraction of the conduit 33 from the discharge position indicated the bell valve 22 returns to the position shown in Figure 3 wherein the skirt 24 is in such relative position with respect to the bottom walls 15 and the valve seat 19 that an effective closure member is provided to prevent the leakage of the granulated materials through the discharge opening 17. In Figure 3 a portion of the valve member is shown in dotted line position to indicate the opening of the valve member with respect to the discharge opening. By making the valve member 22 of bell-shape design the granulated material effectively is distributed to the outer edge portions of the bottom walls 15 whereupon it slides down these walls and through the discharge opening. Furthermore the shape of the bell-valve tends to keep the valve closed over the discharge opening since the weight of the material on the bell-shaped member will have a tendency to add to the in-

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herent weight of the valve for keeping the bell-shaped valve in closed position.

Thus it can be seen that the objects of the invention have been fully achieved and that a novel valve mechanism and dispensing device have been described. It must be understood that certain changes and modifications may be made without departing from the spirit of the invention as disclosed or the scope thereof as defined in the appended claims.

What is claimed is:

1. A dispensing device comprising a hopper having a discharge opening, said hopper including upper upright walls, lower walls connected to said upright walls and sloping inwardly toward said discharge opening, an annular valve seat connected to said lower walls and concentric with said discharge opening, said valve seat having a collar portion projecting upwardly from the lower walls into said hopper, a valve member in said hopper, said valve member comprising a bell-shaped portion having a lower skirt adapted to cooperate with said collar portion for closing and opening said discharge portion, a bottom wall within said valve member, said bottom wall having a peripheral edge portion connected to the inner surface of said skirt above the lower peripheral edge of said skirt, a centrally disposed conical portion on said bottom wall, said conical portion having its apex disposed above said bottom wall, a guide member connected to said valve member and extending upwardly within said hopper, a plurality of centrally located guide elements in said hopper, said guide elements being engaged by said guide member in relative sliding relation, means for lowering and raising said valve member into and out of engagement with said valve seat comprising a receiving conduit disposed below said discharge opening, a funnel shaped neck portion on the upper end of said receiving conduit, said neck portion being adapted to engage the lower walls of said hopper, and an actuating rod connected to said receiving conduit, said actuating rod being adapted to engage said conical portion during movement of said conduit for moving said valve member out of engagement with said valve seat.

2. A dispensing device comprising a hopper having a discharge opening, said hopper including upper upright walls, lower walls connected to said upright walls and sloping inwardly toward said discharge opening, an annular valve seat connected to said lower walls and concentric with said discharge opening, said valve seat having a collar portion projecting upwardly from the lower walls into said hopper, a valve member in said hopper, said valve member comprising a bell-shaped portion having a lower skirt adapted to cooperate with said collar portion for closing and opening said discharge portion, a bottom wall within said valve member, said bottom wall having a peripheral edge portion connected to the inner surface of said skirt above the lower peripheral edge of said skirt, a centrally disposed recessed portion on said bottom wall, a guide member connected to said valve member and extending upwardly within said hopper, a plurality of centrally located guide elements in said hopper, said guide elements being engaged by said guide member in relative sliding relation, means for lowering and raising said valve member into and out of engagement with said valve seat comprising a receiving conduit disposed below said discharge opening, a funnel shaped neck portion on the upper end of said receiving conduit, said neck portion being adapted to engage the lower walls of said hopper, and an actuating rod connected to said receiving conduit, said actuating rod being adapted to engage said recessed portion during movement of said conduit for moving said valve member out of engagement with said valve seat.

3. A dispensing device comprising a hopper having a discharge opening, said hopper including upright walls, lower walls connected to said upright walls and sloping inwardly toward said discharge opening, an annular valve

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seat connected to said lower walls and concentric with said discharge opening, a valve member in said hopper, said valve member comprising a bell-shaped portion having a lower skirt adapted to cooperate with said valve seat and opening said discharge portion, a bottom wall within said valve member, said bottom wall having a peripheral edge portion connected to the inner surface of said skirt above the lower peripheral edge of said skirt, a centrally disposed conical portion on said bottom wall, a guide member connected to said valve member and extending upwardly within said hopper, means for lowering and raising said valve member relative to said opening comprising a receiving conduit disposed below said discharge opening, a funnel shaped neck portion on the upper end of said receiving conduit, said neck portion being adapted to engage the lower walls of said hopper, and an actuating rod connected to said receiving conduit, said actuating rod being adapted to engage said centrally disposed conical portion during movement of said conduit for moving said valve member out of engagement with said valve seat.

4. A dispensing device comprising a hopper having a discharge opening, said hopper including upper upright walls, lower walls connected to said upright walls and sloping inwardly toward said discharge opening, an annular valve seat connected to said lower walls and concentric with said discharge opening, a valve member in said hopper, said valve member comprising a bell-shaped portion having a lower skirt adapted to cooperate with said valve seat for closing and opening said discharge portion, a bottom wall within said valve member, said bottom wall having a peripheral edge portion connected to the inner surface of said skirt above the lower peripheral edge of said skirt, a centrally disposed recessed portion on said bottom wall, means for lowering and raising said valve member relative to said opening comprising a receiving conduit disposed below said discharge opening, a neck portion on the upper end of said receiving conduit, said neck portion being adapted to engage the lower walls of said hopper, and an actuating rod connected to said receiving conduit, said actuating rod being adapted to engage said recessed portion during movement of said conduit for moving said valve member out of engagement with said valve seat.

5. A dispensing device comprising a hopper having a discharge opening, said hopper including upper upright walls, lower walls connected to said upright walls and sloping inwardly toward said discharge opening, a valve seat encircling said discharge opening, said valve seat having a collar projecting upwardly into said hopper, a valve member in said hopper, said valve member comprising a bell-shaped portion having a lower skirt adapted to close and open said discharge portion, a bottom wall within said valve member, said bottom wall having a peripheral edge portion connected to the inner surface of said skirt above the lower peripheral edge of said skirt, means for lowering and raising said valve member relative to said valve seat comprising a receiving conduit disposed below said discharge opening, and an actuating rod connected to said receiving conduit, said actuating rod being adapted to engage said bottom wall during movement of said conduit for moving said valve member relative to said opening.

6. A dispensing device comprising a hopper having a discharge opening, said hopper including lower walls sloping inwardly toward said discharge opening, a valve seat including a collar having an annular tapering wall portion projecting upwardly into said hopper, a valve member in said hopper, said valve member comprising a bell-shaped portion adapted to close and open said discharge portion, a bottom wall having a conical portion within said valve member, means for lowering and raising said valve member into and out of engagement with said valve seat relative to said opening comprising a receiving

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conduit disposed below said discharge opening, and an actuating rod connected to said receiving conduit, said actuating rod being adapted to engage said conical portion during movement of said conduit for moving said valve member out of engagement with said valve seat.

7. A dispensing device comprising a hopper having a discharge opening, a collar connected to said hopper, said collar encircling said discharge opening and projecting upwardly into said hopper, a valve member in said hopper, said valve member having a skirt portion adapted to encircle said collar and engage a portion of said hopper for closing said discharge opening, means for raising said valve member to open said discharge opening, comprising

a material conveying member movably positioned relative to said hopper, and means projecting outwardly from said conveying member toward said valve member, said means being adapted to engage said valve member for moving the same.

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