

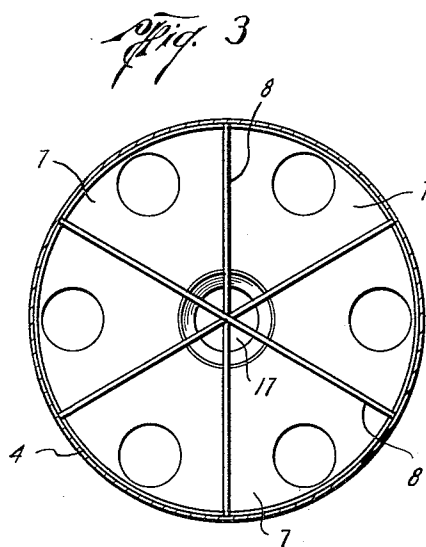
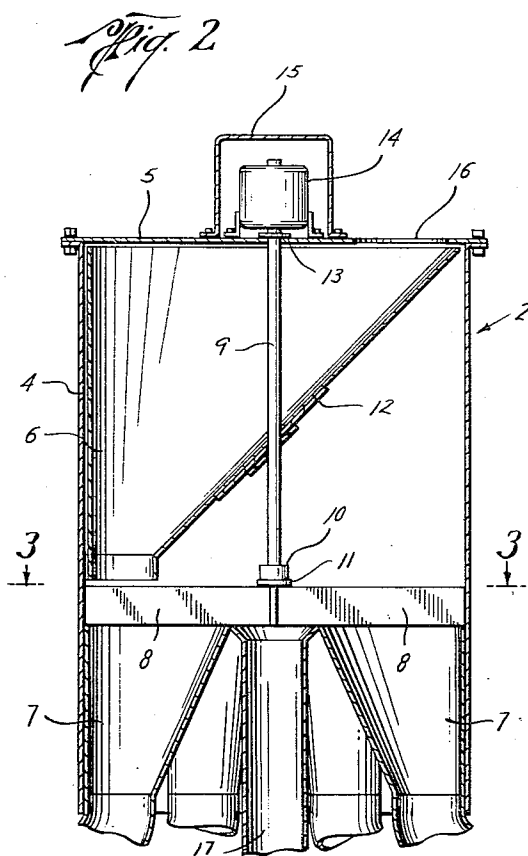
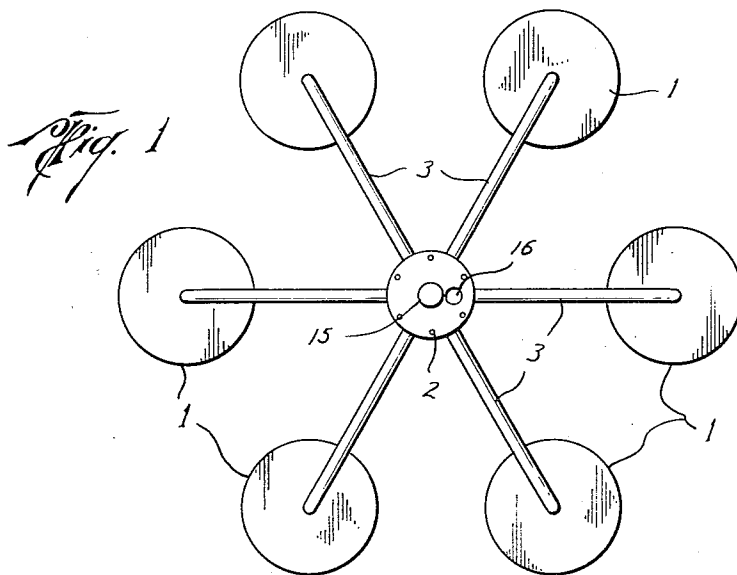
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S. M. PATTILLO

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ROTARY VALVE

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Sidney M. Pattillo
INVENTOR.

BY

James P. [Signature]

ATTORNEY.

2,772,032

ROTARY VALVE

Sidney M. Pattillo, Rosebud, Tex.

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6 Claims. (Cl. 222—330)

The invention relates to a rotary valve, and it concerns more particularly novel valve means for use in selectively directing a stream of granular material, such as grain, thru any one of a plurality of conduits each arranged to deliver the material by gravity flow to one of a plurality of bins which may be provided to receive it.

In the storing and processing of grain it is customary to arrange the storage bins in groups which are served by elevator and conveyor means common to the several bins of the group, and in which the grain is raised to an elevation higher than the tops of the bins and thereafter delivered, by gravity flow, to the bins. An arrangement of valves and conduits is provided for use in selectively directing the flow of material to any one of the bins. Such arrangements ordinarily include a plurality of two-way gates, usually referred to as Y valves, which may be selectively connected in series whereby the flow of material may be directed, stepwise, to any one of the bins.

It is an object of the invention to provide, in combination with a plurality of conduits each arranged to deliver material by gravity flow to one of the several bins of a group, a single rotary valve which is capable of selectively directing the flow of material thru any one of the conduits and which may be substituted for the more or less complicated arrangements of valves and conduits which have been used for this purpose heretofore.

Another object of the invention is to provide valve means of the type described which may be operated by remote control.

The invention will be readily understood by referring to the following description and the accompanying drawing, in which:

Fig. 1 is a diagrammatic top plan view illustrating the method of using the valve means of the invention.

Fig. 2 is a sectional elevational view of valve means embodying the invention.

Fig. 3 is a sectional plan view taken on the line 3—3 of Fig. 2.

Referring to Fig. 1 of the drawing, a plurality of bins 1 are shown arranged in a group about valve means embodying the invention, which is designated generally by the numeral 2. A plurality of conduits 3 are each connected as hereinafter described to the valve means 2 and arranged to deliver material by gravity flow to one of the bins 1.

Referring to Figs. 2 and 3 of the drawing, the valve means of the invention includes a vertically disposed cylindrical housing 4 having a cover plate 5 removably connected to the upper end thereof. A hopper 6, the upper end of which has a diameter approaching the inside diameter of the housing 4 and the lower end of which is of smaller diameter than its upper end and is positioned eccentrically with respect to the housing 4, is disposed within the upper portion of the housing 4 and is rotatably mounted therein as hereinafter described.

A plurality of hoppers 7, the upper ends of which each comprise a sector of a circle having a diameter corresponding to the inside diameter of the housing 4, are

arranged circumferentially below the hopper 6. The lower end of each of the hoppers 7, which is smaller than its upper end, is positioned eccentrically with respect to the housing 4. The hoppers 7 are each adapted to receive material as discharged from the hopper 6 when the lower end of the hopper 6 is aligned circumferentially therewith, and each of the hoppers 7 is in fluid communication with one of the conduits 3 whereby material as discharged from each of the hoppers 7 may be delivered by gravity flow to one of the bins 1.

The hoppers 7 are formed in part by a plurality of circumferentially spaced radial partitions 8, which are rigidly connected to each other at their inner ends and to the housing 4 at their outer ends. Each of the hoppers 7 is positioned between two of the radial partitions 8 and is rigidly connected thereto at its upper edges, so that the adjacent partitions 8 form upward extensions of the hoppers 7.

A vertically disposed shaft 9 is positioned partly within the housing 4 and is aligned axially therewith. The lower end of the shaft 9 engages a thrust bearing 10 carried by a plate 11, which is supported by the connected ends of the radial partitions 8. An intermediate portion of the shaft 9 extends thru the wall of the hopper 6 and is rigidly connected thereto. The wall of the hopper 6 may be reinforced by one or more arcuate plates 12 at the point where it is connected to the shaft 9. The upper end of the shaft 9 extends thru the cover plate 5 and is journaled in a bearing 13 carried by the cover plate 5.

The upper end of the shaft 9 is connected to a motor 14, which is mounted on the cover plate 5, whereby the shaft 9 may be driven as hereinafter described. The motor 14 is of a type, well known in the art, in which the shaft of the motor may be selectively turned to any one of several predetermined positions with respect to the circumference of the motor, and this may be accomplished by push button control. Thus the lower end of the rotatable hopper 6 may be selectively aligned circumferentially with any one of the stationary hoppers 7 by remote control.

The motor 14 is enclosed within a dome shaped cover 15, which is removably connected to the cover plate 5.

An inlet opening 16 is provided in the cover plate 5 adjacent the peripheral edge thereof whereby material may be delivered to the rotatable hopper 6.

An overflow pipe 17, which is disposed vertically and is aligned axially with the housing 4, is arranged centrally with respect to the stationary hoppers 7 and is rigidly connected at its upper end to the radial partitions 8 and the upper edges of the hoppers 7.

The invention may be modified in various ways without departing from the spirit and scope thereof.

I claim:

1. Valve means comprising a vertically disposed cylindrical housing, a hopper disposed within the upper portion of the housing and rotatably mounted therein, the upper end of the hopper having a diameter approaching the inside diameter of the housing and the lower end thereof being of smaller diameter than its upper end and being positioned eccentrically with respect to the housing, a plurality of hoppers arranged circumferentially below the first mentioned hopper, the upper ends of the last mentioned hoppers each comprising a sector of a circle having a diameter corresponding to the inside diameter of the housing, the lower end of each of the last mentioned hoppers being smaller than its upper end and being positioned eccentrically with respect to the housing, the last mentioned hoppers each being adapted to receive material as discharged from the first mentioned hopper when the lower end of the first mentioned hopper is aligned circumferentially therewith.

2. In combination with valve means as described in

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claim 1, a plurality of bins arranged in a group about the valve means, a plurality of conduits each arranged to deliver material by gravity flow to one of the bins, each of the last mentioned hoppers of the valve means being in fluid communication with one of the conduits whereby material as discharged from each of the last mentioned hoppers may be delivered by gravity flow to one of the bins.

3. Valve means as described in claim 1 in which the last mentioned hoppers are formed in part by a plurality of circumferentially spaced radial partitions, the partitions being rigidly connected to each other at their inner ends and to the housing at their outer ends, each of the last mentioned hoppers being positioned between two of the radial partitions and being rigidly connected thereto at its upper edges so that the adjacent partitions form upward extensions of the hoppers.

4. In valve means as described in claim 1, a vertically disposed shaft positioned partly within the housing and aligned axially therewith, the lower end of the shaft being rotatably supported by a thrust bearing mounted above the upper ends of the last mentioned hoppers, an intermediate portion of the shaft extending thru the wall of the first mentioned hopper and being rigidly connected thereto, the upper end of the shaft extending thru the top of the housing and being journaled in a bearing carried thereby, and motor means positioned above the housing and connected to the upper end of the shaft, the motor means being capable of acting upon the shaft to turn it to any one of several predetermined positions whereby the first mentioned hopper may be selectively aligned circumferentially with any one of the last mentioned hoppers.

5. In valve means as described in claim 1, an overflow pipe disposed vertically and aligned axially with the housing, the overflow pipe being arranged centrally with respect to the last mentioned hoppers and being rigidly connected at its upper end to the upper edges of the last mentioned hoppers.

6. The combination of valve means comprising a vertically disposed cylindrical housing, a hopper disposed within the upper portion of the housing and rotatably mounted therein, the upper end of the hopper having a diameter approaching the inside diameter of the housing and the lower end thereof being of smaller diameter than its upper end and being positioned eccentrically with respect to the housing, a plurality of hoppers arranged circumferentially below the first mentioned hopper, the upper ends of the last mentioned hoppers each comprising a sector of a circle having a diameter corresponding to the inside diameter of the housing, the lower end of each of

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the last mentioned hoppers being smaller than its upper end and being positioned eccentrically with respect to the housing, the last mentioned hoppers each being adapted to receive material as discharged from the first mentioned hopper when the lower end of the first mentioned hopper is aligned circumferentially therewith, the last mentioned hoppers being formed in part by a plurality of circumferentially spaced radial partitions, the partitions being rigidly connected to each other at their inner ends and to the housing at their outer ends, each of the last mentioned hoppers being positioned between two of the radial partitions and being rigidly connected thereto at its upper edges so that the adjacent partitions form upward extensions of the hoppers, an overflow pipe disposed vertically and aligned axially with the housing, the overflow pipe being arranged centrally with respect to the last mentioned hoppers and being rigidly connected at its upper end to the upper edges of the last mentioned hoppers, a vertically disposed shaft positioned partly within the housing and aligned axially therewith, the lower end of the shaft being rotatably supported by a thrust bearing mounted above the upper ends of the last mentioned hoppers, an intermediate portion of the shaft extending thru the wall of the first mentioned hopper and being rigidly connected thereto, the upper end of the shaft extending thru the top of the housing and being journaled in a bearing carried thereby, and motor means positioned above the housing and connected to the upper end of the shaft, the motor means being capable of acting upon the shaft to turn it to any one of several predetermined positions whereby the first mentioned hopper may be selectively aligned circumferentially with any one of the last mentioned hoppers, a plurality of bins arranged in a group about the valve means, and a plurality of conduits each arranged to deliver material by gravity flow to one of the bins, each of the last mentioned hoppers of the valve means being in fluid communication with one of the conduits whereby material as discharged from each of the last mentioned hoppers may be delivered by gravity flow to one of the bins.

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