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DEVICE FOR FEEDING OF GRANULAR MATERIALS

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FIG. 1.

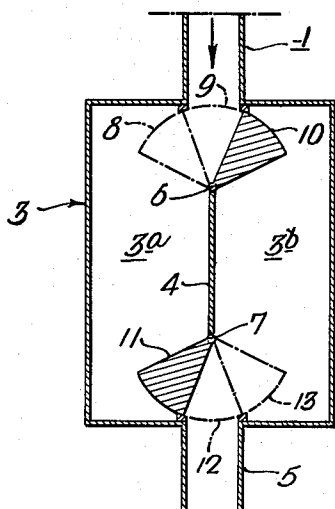


FIG. 2

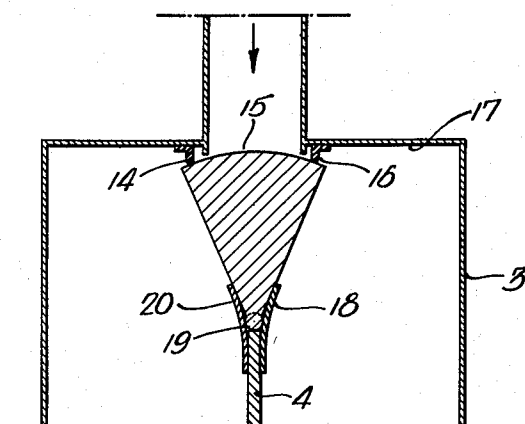


FIG. 3.

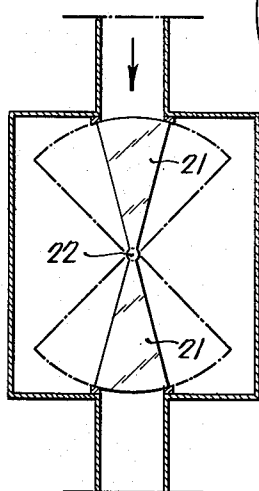
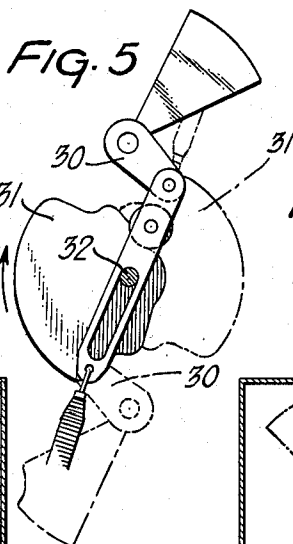
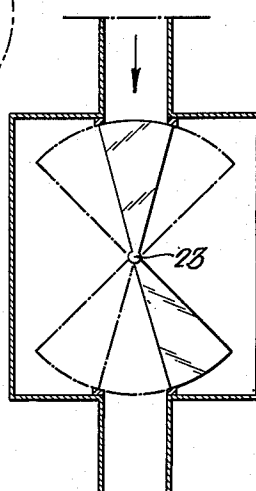


FIG. 4.



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DEVICE FOR FEEDING OF GRANULAR MATERIALS

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4 Claims. (Cl. 222—427)

The present invention relates to apparatus for effecting a regulated flow of granular material from a duct into a container.

In conventional apparatus of this type, grain is fed into a rotating pocketed wheel which is confined in a container or the like. The wheel, however, has a tendency to crush the granular material adjacent the edges of the feeding channel. This tendency is more pronounced when the wheel is filled with the material. The crushed material is subject to rapid deterioration and causes a loss in quality of the rest of the material. This disadvantage is especially pronounced in grain handling apparatus since crushing of the grain particles renders them unsuitable for many uses. To overcome this difficulty, the practice is to only partially fill the pockets of the wheel, but of course, this prevents accurate regulation and requires the use of an additional control device. In addition, the capacity of the apparatus is substantially reduced.

With the foregoing in mind, a primary object of the present invention is to provide a feed device for grain and like granular material in which grain is fed alternately into opposite side chambers of a duct extension.

More specifically, the invention contemplates feeding apparatus of the type described wherein a damper member in the shape of a sector is provided at each of the opposite ends of the extension to move angularly to introduce material alternately into the respective side chambers of the extension.

Another object is to provide a device which is operable between three positions corresponding respectively to opening the feed duct to one side chamber, closing the feed duct, and opening the feed duct to the opposite side chamber.

The invention also contemplates apparatus which is susceptible to automatic control by cam elements mounted on a common shaft whereby, by controlling the speed of the cams, it is possible to control the rate of feed for the material.

These and other objects of the invention and the various features and details of the construction and operation thereof are more fully set forth hereinafter with reference to the accompanying drawing in which:

Fig. 1 is a section of the device.

Fig. 2 shows a convenient embodiment of a damper blade with its fulcrum and its packings in a greater scale.

Fig. 3 shows a section of a device with the two damper blades joined to a common tilting body.

Fig. 4 shows a section of the device with two separate damper blades having one and the same fulcrum.

Fig. 5 shows a device for displacing the damper blades.

In the drawing the same parts are designated with the same numerals. A duct is designated 1. Said duct opens to an extension 3 having two separate spaces 3a and 3b being separated by a partition 4. 5 designates a connection from the extension to a container for instance a silo or similar container to which feeding of material is possible in accordance with the invention even if a pressure above or below the atmospherical pressure is pre-

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dominant. In Fig. 1 the partition between the two separate spaces of the extension consists partly of a wall 4 and partly of two sector-shaped damper blades with their fulcrums designated 6 and 7. Each damper blade can have the three positions, diagrammatically shown in Fig. 1, which are numbered 8, 9 and 10 for the upper damper blade and 11, 12 and 13 for the lower damper blade. As evident from Fig. 1 it is intended to give the two damper blades opposite angular positions with respect to the middle position. In Fig. 1 the position 10 of the upper damper blade thus corresponds to the position 11 of the lower damper blade. In the same way the position 8 of the upper damper blade corresponds to the position 13 of the lower damper blade. In the first mentioned position the left part 3a of the extension is thus open at its top and closed at its bottom. The current of the material can thus fill this left space. The two damper blades are forced to take the middle positions 9 and 12, respectively and both the inlet and the outlet will be closed and the current of the material is momentarily cut off. After this a turning of the two damper blades takes place and the damper blades are forced to take angular positions mutually opposite, designated 13 for the lower damper blade and 8 for the upper damper blade. This involves that the left part of the extension will be emptied and the filling of the right part 3b of this extension will immediately begin. In this manner feeding of the material can take place practically continuously. It is also possible to feed a current of the material even at different existing pressures in different parts of the duct just before and just behind the device (the extension). A certain advantage is also that the surface of the packings, which take the form of inward projections equally spaced from the longitudinal center line of the extension at the edges of the openings to the duct 1 and the connection 5, will be small, especially if compared with the volume of the feeding material. Also in this respect it would be a disadvantage to use a wheel for portioning the material.

In Fig. 2 packings of rubber are designated 14 and 16 which will secure a good tightening between the circular-shaped convex side 15 of the damper blade and the upper plane surface 17 of the extension 3.

Owing to that the rubber packings are bent they will make a scraping possible of the convex surface of the damper blade during the tiltings of the damper blade from its left angular position of the damper blade (for instance 8 in Fig. 1) to its right angular position (for instance 10 in Fig. 1). The numbers 18, 20 designate plate-like packings at each side of the axle 19 of the damper blade in Fig. 2.

Fig. 3 shows an embodiment of the device where the two damper blades are joined to a common tilting body 21. This body is executing a common movement around the fulcrum which in this case is designated 22.

In Fig. 4 a corresponding arrangement is shown with a common fulcrum 23 for the two damper blades. Each of these damper blades are in this case executing tilting movements around their common fulcrum which is designated 23.

Fig. 5 shows a suitable mechanism for displacing the damper blades. To this end, a link coupling 30 is provided on each damper blade. Each coupling 30 is driven by a cam 31, and it has been found convenient to have the cams mounted on a common axle 32. The cams are provided with three different heights, each corresponding to a position of the damper blade. When positioning the damper blades, for a certain time in the center position, it is possible to vary, i. e., to reduce, the velocity of feeding.

While particular embodiments of the present invention have been herein illustrated and described, it is not in-

tended to limit the invention to such disclosures, but changes and modifications may be made therein and thereto within the scope of the following claims.

I claim:

1. In a device for regulating the flow of granular material between a duct and a container, a duct extension having opposed end walls, a pair of inward projections in each end wall, the projections of each pair being equally spaced from the longitudinal centerline of said extension and defining therebetween a central end opening into said extension, the opening in one of said opposed end walls communicating with the duct and the opening in the other of said opposed end walls communicating with the container, partition means disposed along the longitudinal centerline of said extension and defining opposed side chambers therein, said partition means including a sector-shaped damper element at each end pivoted on the longitudinal centerline and having an arcuate surface adapted to confront the opening at said end, the width of said surface being coextensive with the spacing of said inward projections, means to pivotally displace each damper element selectively between three positions, in the first of said positions the arcuate surface of said damper element engaging only one of the projections of its associated end opening to afford between the other of the projections and said damper element open communication between said opening and one of said side chambers, in the second of said positions the arcuate surface of said damper element engaging both of the projections of its associated end opening to close communication between said opening and both of said side chambers, and in the third of said positions the arcuate surface of said damper element engaging only the other of the pro-

jections of its associated end opening to afford between the one projection and said damper element open communication between said opening and the other of said side chambers.

2. A device according to claim 1 wherein the damper elements at the opposite ends of said partition means are moved simultaneously in the first position to open communication between said one side chamber and one of said end openings and between said other side chamber and the other of said end openings, in the second position to close communication between both of said side chambers and both of said end openings, and in the third position to open communication between said one side chamber and said other end opening and between said other side chamber and said one end opening.

3. A device according to claim 1 wherein the damper elements at each opening of the extension are mounted on a common pivot for said rotation and constitute the whole of the partition means.

4. A device according to claim 1 wherein said projections comprise flexible packings adjacent said opening to engage said arcuate surface of the associated damper and afford movement of said damper without crushing said granular material.

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