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OSCILLATING FEEDER
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2,620,946

Fig. 1.

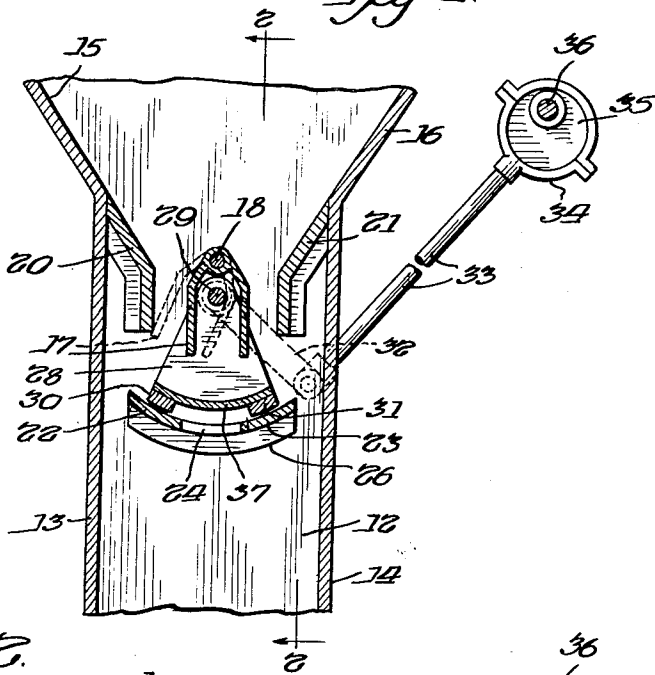
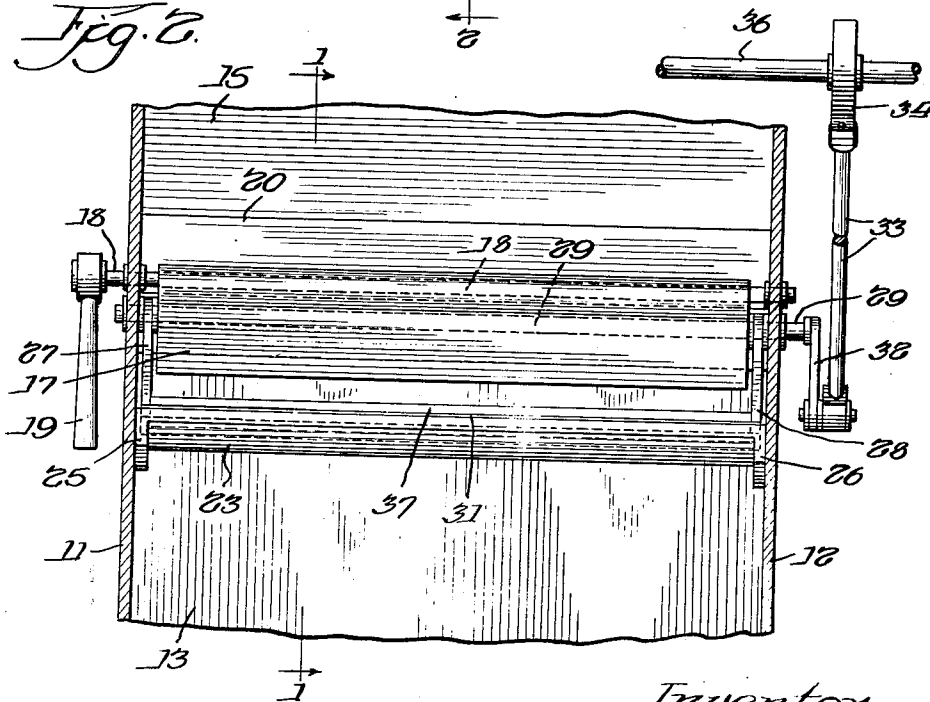


Fig. 2.



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OSCILLATING FEEDER

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Original application August 6, 1945, Serial No. 609,070, now Patent No. 2,513,836, dated July 4, 1950. Divided and this application March 29, 1950, Serial No. 152,678

6 Claims. (Cl. 222-328)

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This application is a division of co-pending application, Ser. No. 609,070, filed August 6, 1945, now Patent No. 2,513,836, dated July 4, 1950. The invention disclosed herein relates to material feeders, and is particularly concerned with an oscillating gate or valve mechanism for intercepting the gravitational flow of granular or comminuted material and for adjustably releasing increments of such material for gravitational downward flow, either intermittently in measured batches or in a steady, continuous stream composed of consecutively released measured material increments.

The gate or valve mechanism made in accordance with the invention may be considered an improvement on the oscillating gate structure shown in the U. S. patent to Lawry, No. 2,334,337. It may be incorporated in a pneumatic coal cleaner to operate in the nature of a discharge device for removing separated material from a discharge conduit depending from the deck of such a cleaner for deposit in a discharge chute, as specified in the Lawry patent; or it may be used as a feeder for supplying raw material to a separator for separation therein, as explained in the above mentioned Patent No. 2,513,836; or it may be used, in fact, in any applicable circumstance requiring the controlled transfer of granular or comminuted material from one point to another for either gravitational feed or discharge or for another transfer purpose.

The various specific objects and features of the invention will appear from the detailed description which is rendered below with reference to the accompanying drawings. In these drawings,

Fig. 1 shows an embodiment of the new device in diagrammatic transverse sectional view taken approximately along lines 1-1 in Fig. 2; and

Fig. 2 represents a diagrammatic sectional view of the device taken approximately along lines 2-2 in Fig. 1.

Known details and elements will be described only to the extent required for conveying an understanding of what is considered new. Like parts are designated in the figures by like reference numerals.

Referring now to the drawings: The new device comprises a cross-sectionally generally rectangular casing formed by the end walls 11, 12 and side walls 13, 14. The side walls may flare outwardly at the upper end, as indicated at 15 and 16, to form a hopperlike structure into which the raw material is fed in more or less haphazard

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manner by any suitable means. A separate hopper for receiving the raw material for downward flow into the casing may of course be provided.

The operating mechanism comprises a cross-sectionally generally U- or V-shaped shield 17 which extends substantially across the space between the end walls 11 and 12, leaving some clearance at either end, as shown in Fig. 2. The shield is keyed to a shaft 18 which is rotatably mounted in the end walls of the casing, one end of the shaft projecting from the end wall 11 and carrying a suitable adjusting member, e. g., a handle 19, as shown in Fig. 2. Suitable means (not shown) may be provided for securing the handle 19 and therewith the shaft 18 and shield 17 in any position of angular adjustment. The shield may thus be placed into the dotted line position, as shown in Fig. 1, or into the cross-hatched central position, or into a position opposite that shown in dotted lines.

Deflecting baffles 20 and 21 are disposed within the casing, as shown, for directing the material flow downwardly and laterally inwardly against the shield 17. When the shield 17 is disposed in the central cross-hatched position, material flows downwardly on either side thereof. When the shield is tilted to the left into the dotted line position, material flows downwardly only on the right side thereof, through the opening between the shield and the baffle; and when the shield is placed in a position opposite that in which it is shown in dotted lines, material will flow downwardly only on the left side through the space between the shield and the baffle 20. The shield 17 functions in this manner in the nature of a valve or gate-adjusting or deflecting member for dividing the flow of material fed to the casing to form two streams which are directed downwardly along either or both of its side walls.

Below the shield 17 is disposed a tray structure having two fixed tray members 22, 23 which extend across the entire space between the end walls 11, 12 of the casing. These fixed tray members are separated by a central opening 24, as shown in Fig. 1. The opposite ends of this tray, with its fixed tray members 22, 23, are mounted on the opposite end walls 11, 12 by flanges such as 25, 26.

An arcuate scraper member is provided comprising two segment-shaped mounting plates 27 and 28 which are secured to a shaft 29 disposed below the shaft 18 of the shield 17. Stub shafts may be used, one with each of the segment-shaped plates 27, 28. The segment-shaped mounting plates carry a traylike element 37 and

two scraper members 30, 31 depending downwardly therefrom in close proximity to the upper surface of the fixed tray members 22, 23.

The shaft 29 of the scraper extends outside of the casing, as indicated in Fig. 2, and attached to the shaft is a rocker arm 32. This rocker arm coacts with a connecting rod 33 which extends from the bearing bushing 34 of the eccentric 35 which is operable by the shaft 36. The shaft may be rotated by any suitable and desired actuating means which may include means for adjusting its speed of rotation. It will thus be clear that rotation of the shaft 36 causes rotation of the eccentric 35 and reciprocation of the connecting rod 33 with consequent rocking motion of the lever or rocking arm 32 and rocking or oscillating motion of the movable tray member 37 with its scrapers 30, 31 with respect to the fixed tray members 22, 23.

The fixed tray members 22, 23 and also the movable traylike member 37 carrying the scrapers 30, 31 are so shaped and dimensioned that raw material supplied to the mechanism and dropped downwardly into the casing, assuming the shield 17 to be in central or neutral position as shown in full lines in Fig. 1, is intercepted, deposited on both sides of the stationary tray (members 22 and 23) and normally assumes an angle of repose which inhibits the free downward flow thereof. The material will flow downwardly on either side of the shield 17 and will pile up on the tray member 37 and along the opposite edges of the fixed tray members 22, 23. Reciprocation of the scraper responsive to actuation of the rocker arm 32 results in this case in release of consecutive increments of material, with each stroke of the scraper, alternately from the left and right of the fixed tray members 22, 23, forming a steady stream.

If it is assumed that the shield is placed in the dotted line position (Fig. 1), the material delivered to the casing will drop downwardly for deposit substantially only along the edge of the fixed tray member 23 and on the right half of the movable tray element 37. Reciprocation of the scraper will then cause intermittent release of batches of material from the tray member 23 only during one stroke of the scraper.

If we assume that the shield is placed in alternate position, to the right from its central position, it will block the corresponding passage and material will therefore be delivered for deposit substantially only on the fixed tray member 22 and on part of the movable tray element 37. Reciprocation of the scraper will then again cause intermittent release of batches of material from the tray member 22 and only during one stroke of the scraper.

The stroke with which the rocker arm 32 is oscillated may be regulated by placing the lower end of the connecting rod 33 adjustably at various points along the rocker arm 32. For this purpose the rocker arm 32 may be provided with a series of holes (not shown) for variably securing the connecting rod 33.

The function of the central opening 24 in the stationary tray, between the fixed tray members 22, 23 is to prevent jamming of the device by fines that may creep inwardly between the scraper members 30, 31.

It will be seen from the above description of the feeder device that raw material may be fed for gravitational flow, for feed or discharge, or for another desired purpose, in adjustable measured amounts, either intermittently or in a steady

stream composed of consecutively released measured increments of material. The amounts or increments released in either case are adjustable by suitable adjustment of the stroke of the rocker arm 32 and the frequency of release of material increments is adjustable by the speed of operation of the eccentric 35.

The new device, when used as a feeder for a hydraulic material separator, e. g., a separator of the type disclosed in the Patent No. 2,513,836, prevents erratic and haphazard supply of raw material, thereby preventing overloading or underfeeding of the liquid separating medium. The optimum feed can be easily determined and adjusted for any given raw material which is to be subjected to separation. When used as a discharge device for removing separated material, e. g., in a pneumatic separator of the type shown in the previously mentioned Lawry patent, the device will provide for fine adjustment to regulate the discharge function within a wide range in accordance with the amounts of material to be removed from the separator.

Reference to the use of the device in connection with material separators has been made for convenience of description. It will be understood that the device may be used for different purposes as well, and for the handling of materials different than coal.

The designation "feeder device" is intended to include the meaning attached to the term "discharge" or, generally, the meaning designating the "transfer" of material. The designation "granular material" is intended to include comminuted materials and, generally, materials composed of individual particles without special regard to the size range of such particles.

Changes may be made within the scope and spirit of the accompanying claims which define what is considered new and desired to have protected by Letters Patent of the United States.

I claim:

1. A feeder device of the class described comprising a downwardly extending casing for receiving a stream of material supplied thereto at the top thereof, means forming in said casing a downwardly depending shield, the opposite sides of said shield forming with adjacent inner casing walls downwardly extending feed passages, means for pivotally mounting said shield, means for angularly adjusting said pivotally mounted shield to selectively block either one of said feed passages, means forming in said casing below the lower edge of said shield a stationary tray for receiving material from either or from both of said feed passages, the opposite edges of said tray forming with adjacent inner casing walls downwardly permanently open discharge passages, scraper means disposed above said tray, means for pivotally mounting said scraper means at a point centrally above said tray below the pivot of said shield, and means for oscillating said scraper means for discharging adjusted amounts of material from either side of said tray for gravitational downflow through said permanently open discharge passages.

2. A feeder device of the class described comprising a downwardly extending casing for receiving a stream of material supplied thereto at the top thereof, a cross-sectionally generally U-shaped shield disposed in said casing with its opposite walls in downwardly depending position, the opposite walls of said shield forming with adjacent inner casing walls downwardly extending feed passages, means for pivotally mounting

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said shield, means for angularly adjusting said pivotally mounted shield to selectively block either one of said feed passages, means forming in said casing below the lower edges of the walls of said shield a stationary tray for receiving material from either or from both of said feed passages, the opposite edges of said tray forming with adjacent inner casing walls downwardly permanently open discharge passages, scraper means disposed above said tray, a shaft for pivotally mounting said scraper means, said shaft extending between the downwardly depending walls of said shield, and means for rocking said shaft to oscillate said scraper means for discharging adjusted amounts of material from either side of said tray for gravitational downflow through said permanently open discharge passages.

3. A feeder device of the class described comprising a generally vertically extending casing for receiving a stream of material supplied thereto at the top thereof, means forming in said casing a downwardly depending shield, the opposite sides of said shield forming with adjacent inner casing walls downwardly extending feed passages, means for pivotally mounting said shield, means for angularly adjusting said pivotally mounted shield to selectively block either one of said feed passages, means forming in said casing below the lower edge of said shield a pair of laterally spaced trays respectively positioned underneath said feed passages for receiving material therefrom, the outer edges of said trays forming with adjacent inner casing walls downwardly permanently open discharge passages, a traylike plate above said pair of laterally spaced trays for bridging the space therebetween, a pair of scrapers carried by said traylike plate, one for each of said trays, a shaft for pivotally mounting said traylike plate below the pivot of said shield, and means for rocking said shaft to rock said traylike plate for oscillating said scrapers relative to the associated trays to effect discharge of adjusted amounts of material from either tray for gravitational downflow through said permanently open discharge passages.

4. A feeder device for granular materials comprising a casing having walls forming a downwardly extending feed duct and walls forming a discharge duct which is wider than said feed duct and extends downwardly therefrom, means in said feed duct forming therein a downwardly depending shield, the opposite sides of said shield forming with adjacent inner walls of said feed duct downwardly extending feed passages, means for pivotally mounting said shield, means for angularly adjusting said pivotally mounted shield to selectively block either one of said feed passages, means forming in said discharge duct below

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the lower edge of said shield a stationary tray for receiving material from either or from both of said feed passages, the opposite edges of said stationary tray forming with adjacent inner walls of said discharge duct downwardly permanently open discharge passages, scraper means disposed above said stationary tray, means for pivotally mounting said scraper means at a point centrally above said stationary tray below the pivot of said shield, and means for oscillating said scraper means for discharging adjusted amounts of material from either side of said stationary tray for gravitational downflow through said permanently open discharge passages.

5. The feeder device as set forth in claim 4, wherein a cross-sectionally generally U-shaped member constitutes said shield, the opposite legs of said U-shaped member extending downwardly and forming with the adjacent inner walls of said feed duct said downwardly extending feed passages.

6. The feeder device as set forth in claim 4, wherein said stationary tray has a central cutout formed therein to form two tray portions, one tray portion underneath each of said feed passages, said scraper means comprising a pivotally mounted traylike member disposed above said central cutout in said stationary tray and covering such cutout, and a scraper bar extending along each edge of said pivotally mounted traylike member in scraping engagement with the corresponding tray portions of said stationary tray.

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