Dec. 12, 1944. H. A. COLVIN 2,364,601

ADJUSTABLE TURN-TABLE FOR DISCHARGING WOOD WASTE OR LIKE MATERIAL FROM STORAGE VAULTS

Filed June 25, 1942

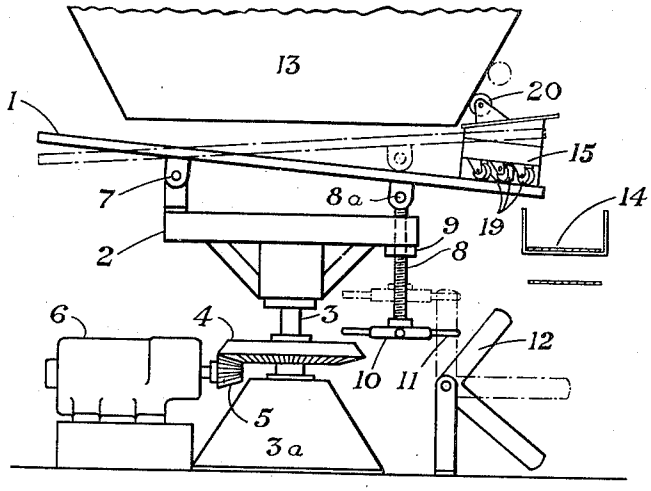


Fig. 1

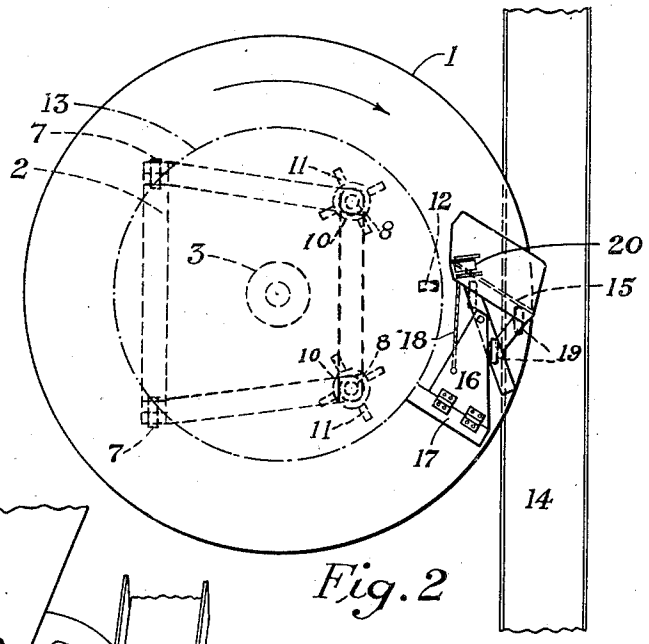


Fig. 2

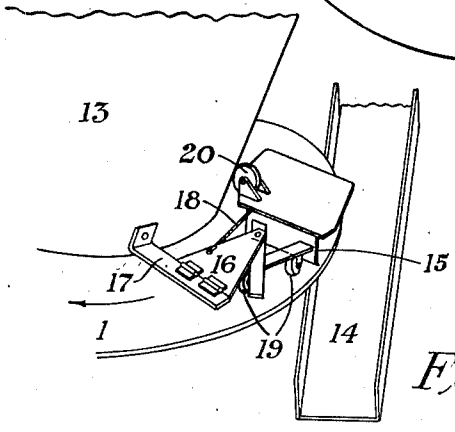


Fig. 3

INVENTOR
HERVEY A. COLVIN
BY George B. Willcox

Patented Dec. 12, 1944

2,364,601

UNITED STATES PATENT OFFICE

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ADJUSTABLE TURNTABLE FOR DISCHARGING WOOD WASTE OR LIKE MATERIAL FROM STORAGE VAULTS

Hervey A. Colvin, Saginaw, Mich.

Application June 25, 1942, Serial No. 448,444

6 Claims. (Cl. 222—404)

This invention relates to rotary unloaders for storage vaults for wood waste, wood chips, or like materials, of the general kind shown in Patent No. 1,890,925, issued December 13, 1932, to William E. Allington, and in my Patent No. 1,971,032, issued August 21, 1934. Its object is to afford a novel adjustable power-driven mounting for the inclined turn-table of an unloader of this kind, whereby its inclination from the horizontal may be varied at will, as well as the discharge space between the bottom of the vault funnel and the turn-table. My novel mode of adjustment of the turn-table permits the range of vertical agitation of the material in the funnel and vault and the rate of discharge of the vault contents to be adjusted without changing the speed of rotation of the turn-table.

Heretofore the inclination of this kind of turntable has been fixed and the spacing between it and the vault bottom has been non-adjustable or could be changed only by raising or lowering the turn-table bodily. Such adjustment could be made only when the vault was empty or nearly so because storage vaults of this kind normally hold a good many tons of material and extremely powerful elevating equipment would have to be provided. My novel turn-table mounting permits its inclination to be readily adjusted, and it can be raised under load by relatively light and simple adjusting mechanism to decrease the total discharge opening.

The invention comprises an off-center pivoted mounting for the turn-table upon a supporting frame carried on a power driven vertical shaft, in combination with vertically adjustable supporting means on the frame for the opposite side of the turn-table. By the adjustable supporting means the adjacent edge of the turn-table can be raised or lowered to incline the table to its maximum extent, or adjusted between these extremes to produce different degrees of agitation of the material in the discharge funnel. This adjustment also changes the clearance between the bottom of the funnel and the turn-table, altering the rate of discharge without any change in the turn-table speed.

An important advantage of the invention is that it permits a substantial reduction in starting torque as compared with rotary unloaders heretofore used. The turn-table is adjusted horizontal before starting, then, when it is in motion it is brought to the inclination giving the desired rate of discharge. The machine may be started under minimum load, so that a motor of reduced size and cost will satisfactorily drive an unloader of given capacity.

A subordinate feature of the invention permits the rate of discharge to be adjusted while the turn-table is in motion, its rotation being utilized for mechanically changing its inclination and clearance. The adjustably supported edge of the turn-table may also be lowered manually when it is stationary, as the load on the table helps the operation.

A further feature of the invention is the provision of an improved means to deflect or scrape material from the turn-table at a predetermined point, as onto a conveyor leading to a furnace or to a waste reclaiming department. This means is so constructed and mounted that it rides true upon the turn-table at all times and in all of its adjusted positions.

These and other features of the invention are further explained and described in the following specification.

Referring to the drawing:

Fig. 1 is a side elevation of an adjustable rotary unloader embodying features of the invention;

Fig. 2 is a top plan view of the mechanism of Fig. 1; and

Fig. 3 is a fragmentary perspective view of the machine of Figs. 1 and 2.

Figs. 1 and 2 show the turn-table 1 tiltably mounted upon a sub-frame 2 carried by a stub-shaft 3, journaled in a suitable sub-base 3a. Shaft 3 is suitably power-driven, as by a bevel gear 4, bevel pinion 5, and a reduction gear motor 6, in known manner. Rotation of the inclined turn-table 1 (from eight to twelve feet in diameter) at the customary speed of 8 to 10 R. P. M. causes the contents of the storage vault and outlet cone 13 to be agitated vertically and flow freely down and out toward its edge. The material may be unloaded from the edge of the table by the improved scraping means shown herein, or by suction or other known means.

The adjustability of the turn-table 1 by which it may be variably inclined and raised or lowered is provided as follows:

At one side of its axis the table 1 is pivotally mounted upon the sub-frame 2, as by alined pintles 7, so that the opposite edge can be lowered below the horizontal as shown in solid lines in Fig. 1, or raised above it as indicated in broken lines. On the opposite side of its center from pintles 7 the turn-table is adjustably supported upon the sub-frame so that its inclination can be set at either of the extremes illustrated or be-

tween them. In the instant apparatus jack screws 8 threaded through nuts 9 in the sub-frame support the table here. The upper end of each jack screw is coupled by a head (not shown) to a pintle 8a beneath the turn-table. To compensate for the slightly arcuate movement of the point of attachment as the inclination of the table is changed, play may be provided at the head or nut 9, or both. Hand wheels 10 are secured to the screws 8 for turning them to change the slope of the table.

Under normal conditions it is easy to lower the turntable by hand, but a heavy load in the vault renders more difficult the opposite manual adjustment. Accordingly spokes or bars 11 are provided on the wheels 10, whereby the rotation of the turn-table may be used to actuate the jack screws to raise the table and its load. A movable abutment member, shown diagrammatically at 12, is mounted so that it may be selectively positioned in the path of travel of the bars 11 as shown in broken lines in Figs. 1 and 2. When member 12 is so positioned it will be engaged by an arm 11 on each wheel at each rotation of the sub-frame 2. It will thus raise the adjacent edge of the turn-table step by step until the desired adjustment and inclination is reached. Similar abutment means may also be provided if desired to engage the spokes 11 inwardly of wheels 10 to lower the table automatically.

Because of the off-center pivoting of the turntable at 7, any adjustment of the height of the opposite side varies the total discharge area between the top of the table 1 and the bottom of the hopper discharge funnel. It also changes the inclination of the table so that the range of vertical agitation of the hopper contents may be increased or decreased. Because of this dual effect of the adjusting mechanism the device is readily adaptable to a number of conditions. For example, if each jack screw be raised to its highest position there will be a combination of minimum outlet area and maximum agitation, as may be desirable to maintain a moderate flow of material having strong tendency to pack and bridge in the hopper funnel. If, on the other hand, each jack screw be fully lowered, maximum agitation is also secured, with a maximum discharge opening. Intermediate adjustments permit moderate agitation of the hopper contents with moderate or considerable discharge rates. Thus it is possible to secure a wide range of discharge rates with materials differing in particle size, characteristics, density, and angle of repose, without requiring any means for varying the turn-table speed.

By leveling the table the starting load can be reduced to a minimum, since the turn-table will not have to raise any part of the load upon it. A much smaller motor can be used for a given installation than has heretofore been necessary with fixedly inclined turn-tables, or the speed-changing gears heretofore used with moderate sized motors are not required. In the installation shown the table is preferably leveled before the unloader is stopped, or if the unloader is in raised position (as shown in broken lines in Fig. 1) the wheels 10 may be turned manually to level the table when it is stationary. After it is up to speed the jacks screws 8 are adjusted up or down as desired to produce the proper inclination for a given material and rate of discharge desired.

As the turn-table rotates, to the right in Fig. 2, the material from the funnel 13 flows outwardly to its particular angle of repose, outside of the circle of the bottom of the funnel, indicated by the broken circle in Fig. 2. It may be removed from here by suitably located suction means, or by the mechanical means shown. A plow or scraper assembly of novel form, to compensate for the adjustability of the turn-table inclination scrapes the material outwardly and causes it to fall from the edge of the table at a predetermined point, as for discharge onto a conveyor 14, which carries it to a furnace or to a processing station. The scraping mechanism comprises a blade 15 welded to a triangular frame which is mounted for pivotal movement in all directions. It is loosely pivoted to a horizontally hinged strut 16, the resulting play permitting the scraper to tilt relative to the plane of the strut. Strut 16 is hinged to a bracket 17 fixedly secured or hinged to the hopper cone 13 and extending outward from it. The blade 15 is pivoted to member 16 at a point inset from its midline, so that material engaging it tends to turn it clockwise in Fig. 2, and a chain or cable 18 connects its inner portion to the frame 16 to limit this turning motion and maintain a proper inclination of the blade 15 to the material on the edge of the table. Casters 19 carry the frame of the blade and ride on the turn-table 1 to maintain its lower edge in the desired scraping relationship to the variably inclined turn-table. The reaction of the material on the rotating table 1 urges the blade inwardly, which tendency is opposed by an idler roller 20 mounted adjacent its upper edge to bear against the inclined face of the discharge cone 13 or a vertical guide thereon.

By the foregoing arrangement of pivot points and guiding elements the scraper blade floats freely within predetermined limits to accommodate itself to various inclinations of the turn-table and position of material upon it within practicable limits.

The mechanism shown and described is illustrative of one embodiment of the invention, and may be altered in detail without departing from the scope of the claims. One or more vertically adjustable turn-table supports of any desired form may be used instead of the jack screws shown, and the number of points of support for the turn-table on the rotating sub-frame may be increased or decreased in practical applications of the invention to various installations. Also, other means than the wheel and abutment combination shown may be used to actuate the vertically adjustable turn-table supporting means while the turn-table is in motion, appropriate to the particular supporting means employed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A rotary discharge assembly comprising a storage vault for wood waste or like material having a bottom discharge opening, a power-driven horizontally rotatable frame below said opening, a turn-table tiltably mounted thereon at one side of its axis of rotation and spaced from said opening, vertically adjustable means on said frame supporting the other side of the turn-table, rotatable means for actuating said adjustable means, circumferentially spaced abutments positioned on said rotatable means, a movable abutment selectively movable into the path of revolution of said spaced abutments for engagement therewith, whereby rotation of the turn-table moves said adjusting means step by step to alter the inclination of the turn-table and its

effective spacing from said discharge opening, for the purposes set forth.

2. A rotary discharge assembly as claimed in claim 1, wherein the adjustable supporting means and the rotatable means comprises a jack screw and an adjusting wheel presenting radial spokes adapted to engage and be displaced by said movable abutment during rotation of the turn-table to adjust its inclination step by step.

3. A rotary discharge assembly comprising a storage vault for wood waste or like material having a bottom discharge opening, a power-driven horizontally rotatable frame below said opening, a turn-table tiltably mounted thereon at one side of its axis of rotation for tilting to various inclinations, and vertically adjustable means upon said frame supporting the opposite side of said turn-table at variable heights whereby the inclination of the turn-table and its spacing from said discharge opening of the storage vault may be adjusted, for the purposes set forth.

4. A rotary discharge assembly as claimed in claim 3 wherein said adjustable supporting means is operable to move its side of the turn-table from a position above the horizontal to a position below the horizontal.

5. A rotary discharge assembly as claimed in claim 3 wherein a movable abutment member is adapted to be selectively positioned for actuating said adjustable supporting means during rotation of the turn-table to alter its inclination and its effective spacing from said discharge opening.

6. A rotary discharge assembly comprising a storage vault for wood waste or like material having a bottom discharge opening, a power-driven horizontally rotatable frame below said opening, a turn-table tiltably mounted thereon, being spaced from said opening and adapted to be tilted to various inclinations; vertically adjustable means on said frame supporting said table at various inclinations whereby its spacing from said discharge opening of the storage vault may be adjusted, for the purposes set forth.

HERVEY A. COLVIN.