Aug. 15, 1933. J. J. NEUMAN 1,922,629

MECHANICAL DISCHARGER FOR CENTRIFUGAL EXTRACTORS

Filed July 30, 1932

Fig. 1.

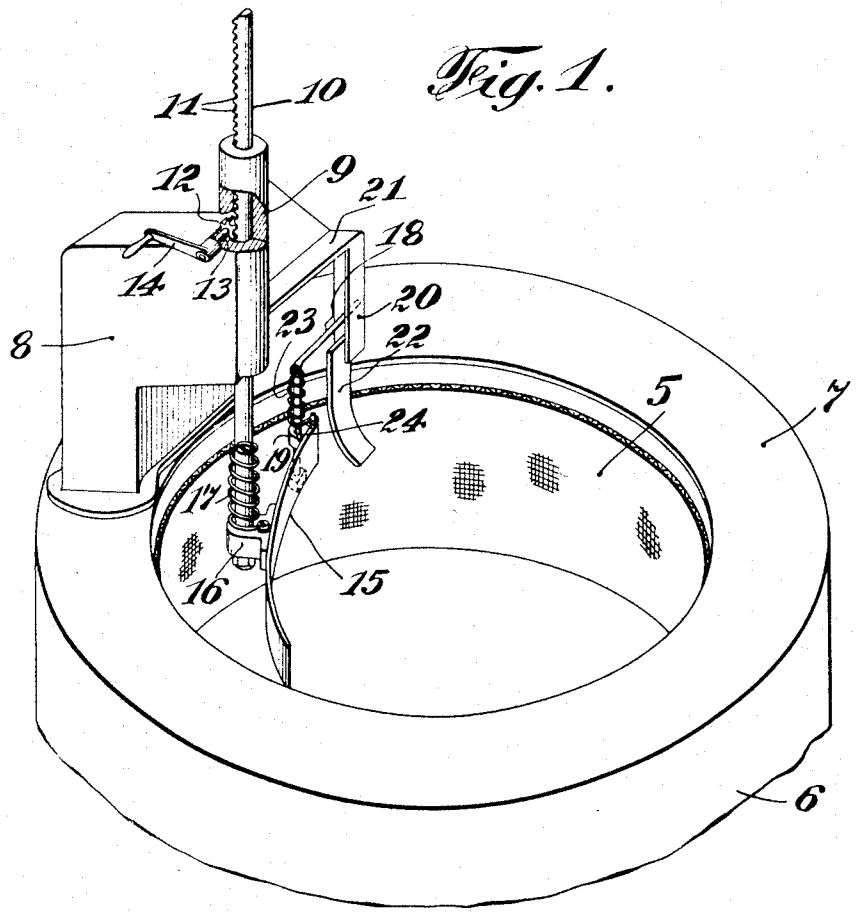
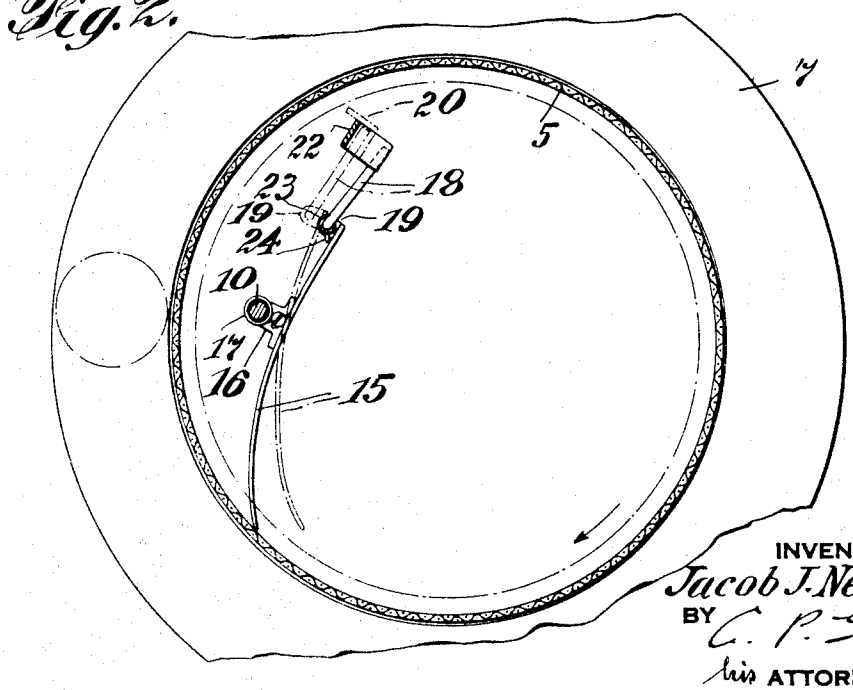


Fig. 2.



INVENTOR
Jacob J. Neuman
BY C. P. Goepel
his ATTORNEY

Patented Aug. 15, 1933 1,922,629

UNITED STATES PATENT OFFICE

1,922,629

MECHANICAL DISCHARGER FOR CENTRIFUGAL EXTRACTORS

Jacob J. Neuman, Jamaica, N. Y.

Application July 30, 1932. Serial No. 626,788

9 Claims. (Cl. 210—70)

This invention relates to mechanical dischargers for centrifugal extractors, and has for its primary object to provide simple and reliably functioning means for automatically controlling the discharging blade or plow such as is used in connection with centrifugal extractors employed in refining sugars, whereby the sugar will be cleanly removed from the wall of the centrifugal basket and discharged from the machine.

Among other important objects and purposes of my present invention which is applicable to mechanical dischargers of either the manually or automatically control type, are to provide means for governing the movement of the plow relative to the wall of the centrifugal basket, whereby considerable saving in time in the discharging operation will be realized, together with a high degree of safety and improvement in sugar production and quality.

With the above and other objects in view, the invention consists in the improved mechanical discharger for centrifugal extractors, and in the form, construction and relative arrangement of its several parts, as will be hereinafter more fully described, illustrated in the accompanying drawing and subsequently incorporated in the subjoined claims.

In the drawing wherein I have disclosed one simple and practical embodiment of the invention, and in which similar reference characters designate corresponding parts throughout the several views,—

Figure 1 is a perspective view of my improved mechanical discharger, showing the same applied to a centrifugal extractor and with the discharging blade or plow disposed in its elevated or inactive position relative to the centrifugal basket, certain parts being shown in section;

Fig. 2 is a plan view showing the plow in full lines in relation to the wall of the basket, at the end of the discharging operation, and in broken lines in its position relative to the basket wall prior to the discharging operation.

In the drawing, for purposes of illustration, I have shown a part of a conventional form of centrifugal extractor embodying the usual basket 5 having a cylindrical wall of a suitable foraminous material and enclosed within a housing or casing 6, having the inwardly extending flange or curb 7 at its upper end. Any suitable connections may be provided between the centrifugal basket and a motor or other convenient source of power under proper control for rotating said basket.

As is well known in the processing of sugars and the like, a mixture of sugar crystals and sugar liquor is charged into the centrifugal basket, which is then rotated at high speed to cause the sugar liquor under the action of centrifugal force to pass through the vertical wall of the basket, leaving the sugar crystals in a compact mass and upon the inner surface of the basket wall. The sugar may or may not be washed with water or other liquid to facilitate the removal of the syrup, depending upon the particular process and the character of the sugar. The extractor basket is then brought to a slow rotating speed by means of a suitable brake or other device, and the discharger or plow is inserted therein to effect the removal of the collected sugar from the basket wall and discharge the same from the machine. During this operation, it is necessary to accurately gauge and control the insertion of the plow at the top of the basket and then manipulate the same so as to maintain proper pressure of the end of the plow blade against the sugar wall in order that the sugar shall be thoroughly and completely removed and a clean basket obtained to receive the following charge. It is then necessary for the operator to manipulate the plow and remove the same from the basket. I propose by means of my present invention to accomplish these manipulations of the plow blade automatically, so that there will be maintained at all times during the discharging operation a slight pressure of the plow blade end towards the basket wall, so as to thereby insure a perfectly clean basket.

To the above end, in the accompanying drawing, the mechanical discharger generally indicated at 8 includes a suitable support mounted on the housing curb 7 of the centrifugal machine, and having a guide 9 for the vertically movable rod or spindle 10. This rod is provided at one side thereof with the rack teeth 11 with which the teeth of the pinion 12 on one end of the shaft 13 are in constant mesh. To the other end of the shaft, a handle 14 is secured whereby the rod 10 may be manually raised or lowered. It is to be understood, however, that insofar as my present invention is concerned, any suitable means automatically operating at a predetermined time in the rotation of the centrifugal basket may be provided for actuating the pinion 12.

The plow blade 15 which, as herein shown, is of elongated longitudinally curved form, has suitably fixed to the convex side thereof and intermediate of its ends, a bearing member 16 loosely connected with the lower end of the rod 10 for oscillatory movement relative thereto. Above this

bearing, a torsional coil spring 17 surrounds the rod 10 and has its upper end suitably fixed to said rod while the lower end thereof is secured in any suitable manner to the bearing 16. This spring applies its force to the plow blade 15, so as to tend to yieldingly press or urge one end of the plow blade towards the cylindrical wall of the basket 5, as will be evident from Fig. 1 of the drawing. This action of the spring 17 is, however, restrained until the blade reaches a predetermined point in its downward vertical movement by the rod 18 which has a vertically extending portion mounted to rotate in suitable bearing projections shown at 19 on the other end of the blade 15. This rod also includes the part extending horizontally from the upper end of said vertical portion and adapted for bearing engagement against a vertically disposed guide flange 20, which is provided upon the part 21 having a fixed connection with the supporting body of the discharger 8. The upper end of the cam plate 22 is suitably fixed to the part 21 in spaced relation to one side of the flange 20, and extends downwardly below the same into the centrifugal basket, said lower end portion of said plate being curved inwardly with respect to the vertical wall of the basket, as clearly shown in Fig. 2 of the drawing.

A spring 23 surrounds the vertical part of the rod 18 and has its upper end attached thereto, while the lower end of said spring is suitably attached to the adjacent end of the plow blade 15. The pin 24 radially projecting from the rod 18 by contact with the face of the blade 15 limits rotation of said rod to its normal position under the action of the spring 23.

It will be apparent from the above description, that since the end of the horizontal part of the rod 18 is held in baring contact with the flange 20 under the action of the spring 17 and said rod is prevented from turning by stop pin 24, the plow blade 15 will be maintained in the position shown in broken lines in Fig. 2 relative to the vertical wall of the basket during downward movement of said plow until the latter reaches a definite position relative to the upper edge of the basket wall, as determined by the position of the lower end of the flange 20 relative to said wall. When the rod 18 reaches the lower end of said flange as it moves downwardly between the same and the upper end of the cam plate 22, the spring 17 then acts to oscillate the blade 15 and yieldingly force or urge one end of said blade into contact with the sugar on the wall of the basket. Due to the angular relation between said blade and the basket wall, as the basket is rotated, the sugar is thus progressively plowed or cut away from the wall of the basket as the downward vertical movement of the plow continues. As the plow approaches the end of this downward movement, the horizontal end portion of rod 18 rides upon the concave face of the cam plate 22 and the rod is therefore rotated, placing spring 23 under tension so that when the rod passes over the lower end of plate 22, the said spring acts to return the horizontal part of said rod to normal position relative to the plow blade, so that it is disposed as seen in full lines in Fig. 2 of the drawing in opposed relation with the convex face of the plate 22. Therefore, a... e direction of movement of the rod 10 is reversed and the plow lifted or elevated, in view of the fact that the engagement of pin 24 with the blade prevents rotation of rod 18 as the horizontal end of said rod rides over the convex surface of plate 22, the plow blade will be rocked or oscillated on the lower end of rod 10 against the action of spring 17 and the other end of said blade will be moved inwardly away from the wall of the basket, as indicated in broken lines in Fig. 2. Thus it will be evident that the plow blade will be automatically manipulated in a proper manner with entire safety to the centrifugal machine and the attendant, with the assurance of a high quality and maximum production of sugar and a thoroughly clean basket for the succeeding new charge of sugar crystals and syrup.

From the foregoing description considered in connection with the accompanying drawing, the construction, manner of operation and several advantages of my present invention will be clearly understood. It will be seen that the device consists of relatively few parts of very simple construction, and will therefore not add materially to the construction and maintenance cost of mechanical dischargers of this kind, as heretofore in use in connection with centrifugal extractors. The device herein disclosed effects a considerable saving of time in the discharging operation, and will function in a reliable and accurate manner so as to obviate any possibility of damage to the centrifugal basket. It will also be evident that such a device will be very durable and without radical modification or change may be readily applied to mechanical dischargers of either the manually or automatically operated type as heretofore used in the art.

While I have herein shown and described one simple and practical embodiment of my present improvements, it is nevertheless to be understood that the device is susceptible of embodiment in various other alternative structural forms, and I therefore reserve the privilege of resorting to all such legitimate changes in the form, construction and arrangement of the various parts as may be fairly incorporated within the spirit and scope of the invention as claimed.

I claim:

1. In a mechanical discharger for centrifugal extractors, a plow mounted to oscillate about a vertical axis, a spring urging said plow at one of its ends towards the wall of the centrifugal basket, means for vertically adjusting the plow into and out of the basket, and means restraining the action of said spring to move the plow to an operative position until said plow is moved downwardly to a definitely predetermined position relative to the upper end of the basket wall.

2. In a mechanical discharger for centrifugal extractors, a plow, means supporting said plow for vertical movement into and out of the centrifugal basket and for horizontal oscillatory movement, means yieldingly resisting oscillation of the plow and tending to urge one end thereof towards the vertical wall of the basket, a fixed cam plate extending downwardly into the basket, and means carried by the other end of the plow and cooperating with said cam plate to oscillate the plow in the upward vertical movement thereof and move the first named end thereof inwardly away from the basket wall.

3. In a mechanical discharger for centrifugal extractors, a plow, means supporting said plow for vertical movement into and out of the centrifugal basket and for horizontal oscillatory movement, means yieldingly resisting oscillation of the plow and tending to urge one end thereof towards the vertical wall of the basket, a fixed vertically disposed guide, a rod mounted on the other end of the plow and cooperating with said

guide to hold the plow out of contact with the basket wall during a predetermined part of the downward vertical movement of the plow, and a cam plate mounted in fixed relation to the guide and extending below the same, said rod cooperating with said cam plate in the upward movement of the plow to oscillate the latter and move the first named end thereof inwardly out of contact with the basket wall.

4. In a mechanical discharger for centrifugal extractors, a plow, means supporting said plow for vertical movement into and out of the centrifugal basket and for horizontal oscillatory movement, means yieldingly resisting oscillation of the plow and tending to urge one end thereof towards the vertical wall of the basket, a vertically disposed fixed guide having the lower end thereof disposed in predetermined relation to the upper end of the centrifugal basket, a rod rotatably mounted on the other end of the plow, a spring acting to rotate the rod in one direction, stop means limiting rotation of the rod under the action of said spring, said rod having an upper end portion engaged with said guide to hold the plow against oscillation into contact with the basket wall, and cam means mounted in fixed relation to the guide and extending below the same to cooperate with said rod in the upward movement of the plow to oscillate the latter to a position out of contact with the basket wall.

5. In mechanical dischargers for centrifugal extractors, a vertical movable rod mounted on one side of the centrifugal basket, a plow blade mounted for horizontal oscillating movement on the lower end of said rod, a spring connected with the plow blade to oscillate the same in one direction and yieldingly urge one end of the blade towards the vertical wall of the basket, a fixed vertical guide spaced from said rod, means mounted on the other end of the plow blade cooperating with said guide to hold the plow blade out of contact with the basket wall until the blade reaches a predetermined point in its downward movement, and cam means mounted in fixed relation to the guide and extending below the same adapted to cooperate with said means on the end of the plow blade to oscillate said blade against the action of said spring and move the blade out of contact with the basket wall during upward movement of said plow blade relative to the basket.

6. In a mechanical discharger for centrifugal extractors, a plow mounted to oscillate about a vertical axis, a spring urging said plow at one of its ends towards the wall of the centrifugal basket, a member adapted to cooperate with means on the other end of the plow to restrain the action of said spring and retain the plow out of operative relation to the basket wall, and means for relatively positioning said member and the cooperating means to effect a sudden release of the restraint upon the action of said spring and the immediate oscillation of the plow to its operative position.

7. In a mechanical discharger for centrifugal extractors, a plow mounted to oscillate about a vertical axis, means for controlling the oscillating movements of said plow towards and from the wall of the centrifugal basket, including a member laterally spaced from said axis and adapted to cooperate with means carried by one end of the plow, and means for vertically moving one of said parts relative to the other.

8. In a mechanical discharger for centrifugal extractors, a plow, means supporting said plow for vertical movement into and out of the centrifugal basket and for horizontal oscillatory movement, means yieldingly resisting oscillation of the plow intending to urge one end thereof towards the vertical wall of the basket, a fixed vertically disposed guide, and a part on the other end of said plow cooperating with said guide to hold the plow against oscillation during a predetermined part of its downward vertical movement, and then suddenly release the same for movement under the action of said means to its operative position relative to the basket wall.

9. In a mechanical discharger for centrifugal extractors, a plow, means supporting said plow for vertical movement into and out of the centrifugal basket and for horizontal oscillatory movement, means yieldingly resisting oscillation of the plow intending to urge one end thereof towards the vertical wall of the basket, a fixed vertically disposed guide, a part on the other end of said plow cooperating with said guide to hold the plow against oscillation during a predetermined part of its downward vertical movement, and then suddenly release the same for movement under the action of said means to its operative position relative to the basket wall, and additional means cooperating with said part on the plow in the upward vertical movement of the latter to oscillate the plow and move the first named end thereof inwardly out of contact with the basket wall.

JACOB J. NEUMAN.