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E. A. SCHWARZ

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GATE POSITIONING MECHANISM FOR HULLING MACHINES

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Fig. 1.

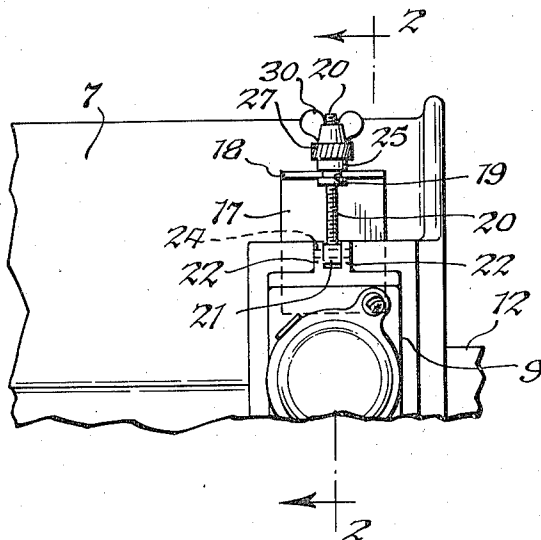


Fig. 2.

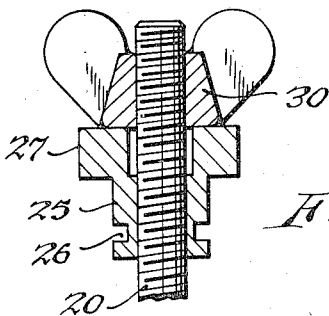
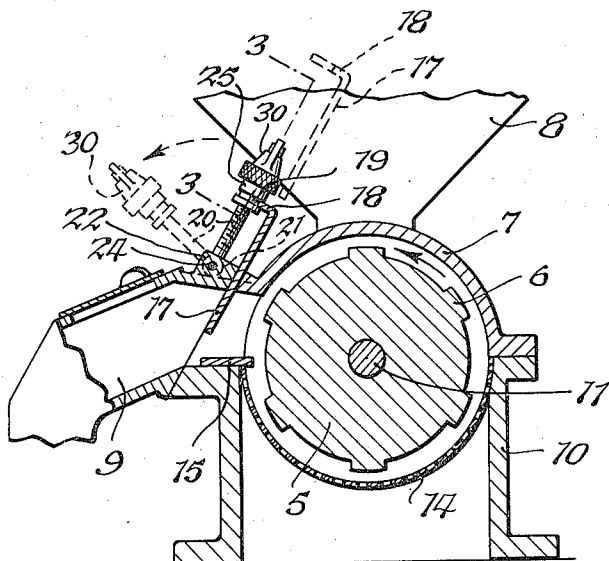


Fig. 3.

INVENTOR.
Eugene A. Schwarz
 BY
Parker Prochnow & Farmer,
 Attorneys.

UNITED STATES PATENT OFFICE

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GATE POSITIONING MECHANISM FOR
HULLING MACHINESEugene A. Schwarz, Snyder, N. Y., assignor to
The Geo. L. Squier Mfg. Co., Buffalo, N. Y.

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This invention relates to means for accurately positioning the gates of hulling machines, such for example as machines used for hulling rice or other grains.

In hulling machines, the discharge gate which controls the discharge of hulled rice or other grain from a machine must be accurately positioned to retard the discharge of rice to such extent so that proper hulling of the grain within the hulling cylinder will take place. This retarding of the rice or other grain in the machine also must not be too great, since otherwise damage to the kernels will result. In machines as heretofore constructed, the gate was adjustable by means of a screw. However, it frequently happens that foreign particles, such as stones or pieces of metal, enter the hulling machine, and when this happens it is necessary to open the gate quickly to discharge the foreign objects before the same seriously damages the machine. Consequently, after opening the gate another careful adjustment of the same to produce the desired hulling effect was necessary, and these adjustments required considerable time, since the operator must observe the grain discharged from the machine and continue the adjustments until the desired results are produced. These adjustments vary according to the size, type and quality of the grain which is being hulled.

One of the objects of this invention is to provide an adjusting mechanism for a discharge gate of a hulling machine which is so constructed that it may quickly be detached from the gate to permit the gate to be opened and again closed, without changing the setting of the adjusting mechanism. A further object of this invention is to provide a gate controlled mechanism of this type including an adjusting nut arranged on a threaded rod so as to be locked thereon in adjusted position and which nut may be readily released from the gate without changing its adjustment relatively to the bolt. Other objects and advantages of this invention will appear from the following description and claims.

In the accompanying drawing:

Fig. 1 is a fragmentary elevation of the discharge end of a hulling machine showing the gate embodying this invention arranged thereon;

Fig. 2 is a transverse, sectional elevation thereof, approximately on line 2—2, Fig. 1; and

Fig. 3 is a fragmentary sectional view, on an enlarged scale, on line 3—3, Fig. 2.

My improvements may be applied to a hulling machine of any suitable or desired type, and in the construction illustrated by way of example,

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the hulling machine includes a rotatable drum or cylinder 5 having hulling knives 6 formed thereon or secured thereto. This rotatable cylinder is arranged in a cylindrical housing comprising an upper imperforate substantially semi-cylindrical upper part 7 having a hopper 8 for the material to be hulled at the receiving end thereof, and having a discharge spout 9 at the discharge end thereof. This semi-cylindrical housing member rests on a hollow substantially rectangular base 10 and is suitably secured thereto, the base also being provided with bearings for the shaft 11 of the rotatable cylinder, one of these bearings being indicated at 12 in Fig. 1. The lower part of the cylindrical housing is formed by a semi-cylindrical screen or perforate plate 14 having perforations therein of the required size for the material which is being hulled, the perforations being smaller in size than the grain, but large enough to permit the hulls to pass through the same. The knives 6 of the rotary cylinder 5 cooperate with a stationary knife 15 which, in the construction illustrated, extends lengthwise of the housing of the machine, preferably at the junction of the screen with the housing part 7. The discharge of the hulled material from the machine through the discharge spout 9 is controlled by means of a gate which may extend crosswise of the discharge passage to partly intercept the passage of material in such a manner as to retard the passage of the material through the machine sufficiently to effect complete hulling of the same. All of the parts of the machine thus far described have heretofore been used in connection with rice hulling machines and of themselves constitute no part of this invention.

I have provided means of improved construction for controlling the discharge of material through the discharge spout in such manner that the gate can be instantaneously moved into open position and again restored accurately to its formed position without requiring adjustment of the gate. For this purpose, I provide a gate 17 which is slidable through a slot in the wall of the discharge spout 9, and this gate has the upper end thereof provided with a flange or projection 18 which extends substantially perpendicular to the gate 17, and which is provided with a notch or recess 19 therein which terminates at the outer end of the flange or projection 18.

In order to position the gate in the desired relation to the discharge spout, I provide a threaded bolt 20, the lower end of which is pivotally mounted on the machine. In the particular con-

struction provided for this purpose, I provide the lower end of the bolt with an enlargement or head 21 which has flat sides formed to fit between a pair of lugs or projections 22 formed on a part of the machine, for example, on the discharge spout 9, as clearly shown in Figs. 1 and 2. The flat sides of the head of the bolt cooperate with the lugs 22 to prevent turning of the bolt about its axis. The bolt 20 may be pivoted to the lugs in any suitable manner, and in the construction illustrated, the head of the bolt and the lugs 22 are provided with registering apertures through which a pivot pin 24 may pass. As a result of this construction, the bolt 20 may swing about the pivot pin toward and from the gate 17.

In order to effect adjustment of the gate, I provide a nut 25 on the bolt, which nut has a threaded engagement with the bolt and may be turned to adjust the nut lengthwise of the bolt. The nut 25 is preferably a collar nut having an annular slot 26 formed therein thus forming a neck portion on the nut which is of such diameter that it may pass freely into the notch 19 formed in the flange 18 of the gate. Consequently, when the nut is turned in one direction, the shoulder portion thereof on one side of the neck formed by the slot 26 will engage the flange 18 of the gate to move the gate in one direction, and when the nut is turned in the opposite direction, the shoulder at the other end of the neck engages the flange to move the gate in the opposite direction. The nut may, if desired, be provided with a knurled flange or enlargement 27 by means of which the nut may be easily turned.

Means of any suitable type are provided for holding the nut in adjusted position. For example in the construction illustrated, I have provided a wing nut 30 which also has a threaded engagement with the bolt 20, and which has a face formed to engage one end face of the nut 25, the wing nut acting as a lock nut to prevent turning of the adjusting nut 25.

In the use of the gate adjusting mechanism described, the gate is first carefully adjusted by turning the nut 25 while the lock nut 30 is turned to be out of engagement with the adjusting nut 25. This adjustment of the gate is usually done while observing the material discharged from the spout 9, the gate being lowered until the desired hulling effect is obtained. The adjusting nut 25 is then locked in position by means of the lock nut 30. If a foreign body or obstruction enters the machine, thus making it necessary to open the gate to permit such obstruction to pass rapidly out of the machine, the bolt 20 with the nuts 25 and 30 arranged thereon is swung out of engagement with the gate 17, for example, into the broken line position shown in Fig. 2, whereupon the operator can grasp the gate and move the same out of the discharge passage or spout 9, as indicated in broken lines in Fig. 2. When the foreign article or obstruction has passed out through the spout 9, the gate is again placed into its slot and the bolt 20 swung about its pivot, so that the groove 26 of the adjusting nut enters into the slot or recess 19 of the flange of the gate, whereupon the gate will again be located in the same position into which it was adjusted, and the operation of the machine may then be immediately resumed without again requiring adjustment of the gate.

It will be noted that the gate 17 and the bolt 20 are arranged at an angle to the vertical, so that the bolt will tend to swing by gravity toward the gate. Consequently, vibrations of the machine

will not tend to cause disengagement of the adjusting nut 25 from the flange or projection of the gate.

It will be understood that various changes in the details, materials and arrangements of parts, which have been herein described and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention, as expressed in the appended claims.

I claim:

1. In a hulling machine having a housing containing hulling instrumentalities and having a discharge spout for the hulled material, and a gate movable crosswise of said discharge spout for controlling the discharge of material therefrom, that improvement which comprises a threaded bolt pivotally mounted on said machine to swing toward and from said gate about an axis extending substantially perpendicular to the axis of said bolt, an adjusting nut on said bolt adjustable lengthwise thereof, and having an annular groove extending about said nut, outwardly extending parts on said gate formed to enter said groove when said bolt is swung on its axis toward said gate and to be disengaged from said nut when said bolt is swung away from said gate, and means for locking said nut against movement relatively to said bolt.

2. In a hulling machine having a housing containing hulling instrumentalities and having a discharge spout for the hulled material, and a gate movable crosswise of said discharge spout for controlling the discharge of material therefrom, that improvement which comprises a threaded bolt pivotally mounted on said machine to swing toward and from said gate about an axis extending substantially perpendicular to the axis of said bolt, an adjusting nut on said bolt adjustable lengthwise thereof, and having an annular groove extending about said nut, said gate having a flange extending toward said bolt and provided with a slot into which the groove of said nut extends when said bolt is swung toward said gate, the portions of said nut forming the side walls of said groove engaging the opposite faces of said flange adjacent to the slot therein for transmitting adjustments of said nut to said gate, means for locking said nut against movement relatively to said bolt, said bolt being movable about its axis to move said groove out of said slot to permit said gate to be moved independently of said nut and to permit said nut to be replaced in engagement with said gate without changing the adjustment of said nut on said bolt.

3. In a hulling machine having a housing containing hulling instrumentalities and having a discharge spout for the hulling material, that improvement which includes a gate in the form of a substantially flat plate slidable crosswise of said spout in a slot in the upper portion of said spout and arranged at an inclination to the horizontal, the upper portion of said gate having a flange extending substantially perpendicular to and outwardly from that surface of said gate which faces laterally and upwardly, said flange having a slot extending inwardly from the outer edge thereof, a threaded bolt pivotally mounted on said machine to swing toward and from said slot in said gate about an axis substantially perpendicular to the axis of said bolt, an adjusting nut having a threaded engagement with said bolt and adjustable lengthwise thereof and having an annular groove formed therein substantially concentric with the axis of said bolt and

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formed to enter said slot when said bolt is swung about its axis, the portions of said nut forming the side walls of said groove engaging opposite faces of said flange adjacent to said slot, to transmit adjustment of said nut lengthwise of said bolt to said gate for adjusting the same relatively to said spout, a lock nut arranged on said bolt for cooperating with said adjusting nut, said gate and said bolt being arranged relatively to each other so that said bolt will be in an inclined position when said nut is in engagement with said slot in said gate flange to cause said bolt to be urged by gravity into a position to hold said nut in engagement with said flange.

4. In a hulling machine having a housing containing hulling instrumentalities and having a discharge spout for the hulled material, and a gate movable crosswise of said discharge spout for controlling the discharge of material therefrom, that improvement which comprises a threaded bolt mounted on said machine, a collar nut part on said bolt adjustable lengthwise thereof, a slotted part on said gate engaging said collar nut part for transmitting adjustment of said nut to said gate, one of said parts being mounted to move into and out of engagement with the other part to engage and disengage said collar nut and said gate to release said gate without changing the position of said collar nut relatively to said bolt.

5. In a hulling machine having a housing containing hulling instrumentalities and having a discharge spout for the hulled material, and a

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gate movable crosswise of said discharge spout for controlling the discharge of material therefrom, that improvement which comprises a threaded bolt pivotally mounted on said machine to swing toward and from said gate about an axis extending substantially perpendicular to the axis of said bolt, an adjusting nut on said bolt adjustable lengthwise thereof and having an annular groove coaxial with the axis of said bolt, and a part on said gate having a notch therein formed to extend into said groove of said nut and with which said nut cooperates to move said gate in accordance with adjustments of said nut, said notch extending in the direction in which said bolt may swing about its pivotal mounting to enable said nut to be moved into and out of engagement with said notch on said gate by swinging said bolt on its pivotal mounting.

EUGENE A. SCHWARZ.

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