Dec. 4, 1923. 1,476,260

M. B. McFEELY

MILL

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Fig. 1.

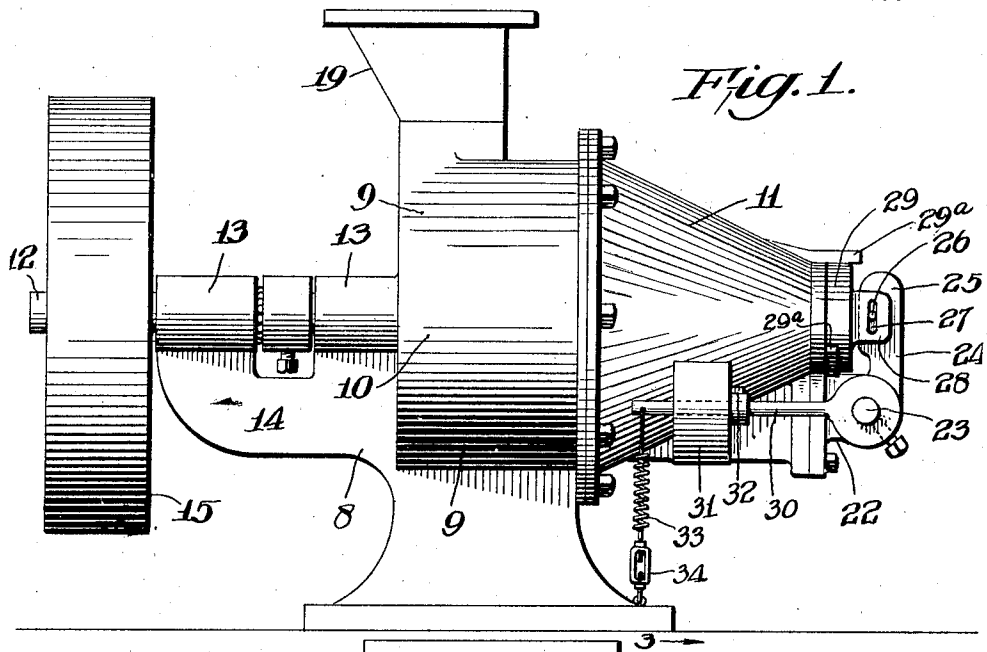
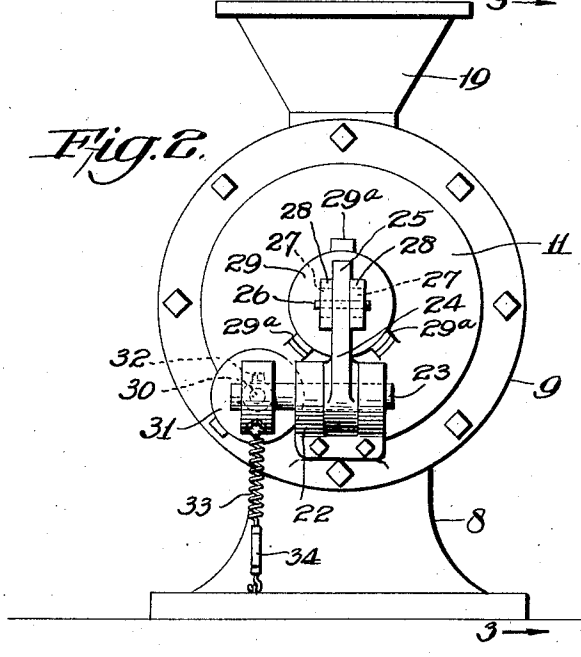


Fig. 2.



Witnesses:

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Augustus B. Copper

Inventor

Maynard B. McFeely

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Fig. 3.

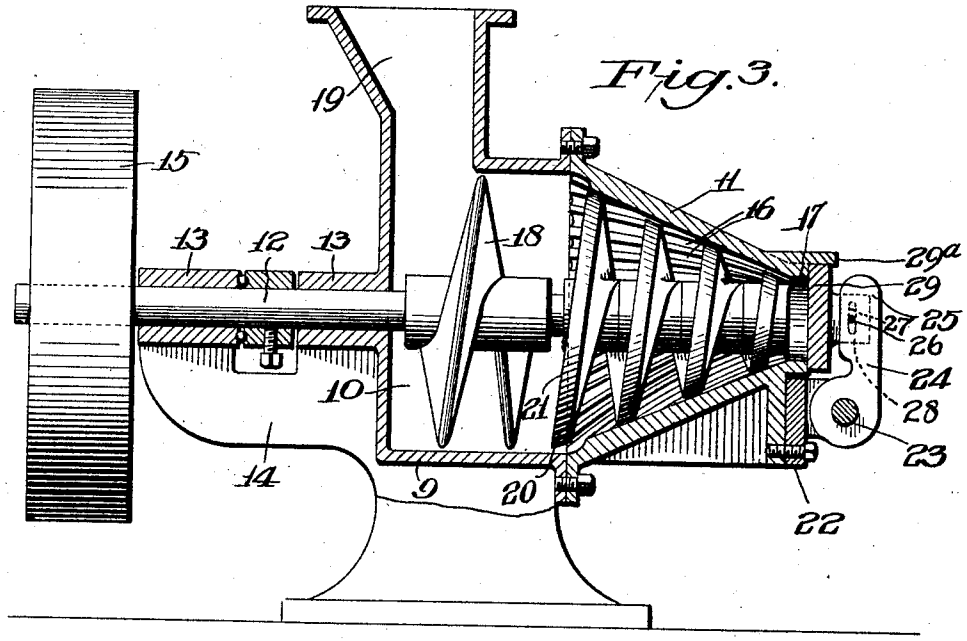


Fig. 4.

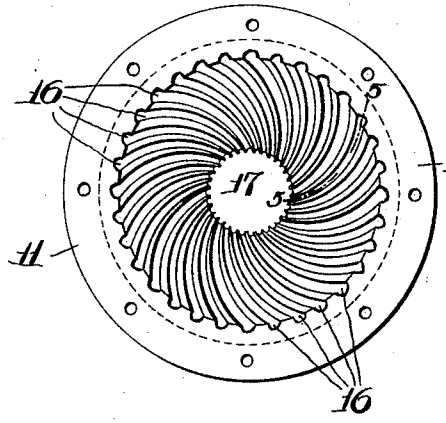


Fig. 5

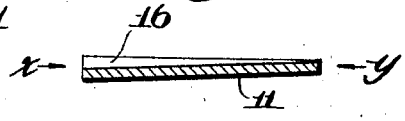


Fig. 6

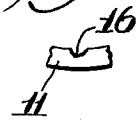


Fig. 7.



Witnesses:

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Patented Dec. 4, 1923. 1,476,260

UNITED STATES PATENT OFFICE.

MAYNARD B. McFEELY, OF PHILADELPHIA, PENNSYLVANIA.

MILL.

Application filed January 6, 1920. Serial No. 349,762.

To all whom it may concern:

Be it known that I, MAYNARD B. McFEELY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Mills, of which the following is a specification.

One object of my invention is to provide an improved mill which is particularly adapted for grinding cereals into granular form and is of the type in which the outlet end of the grinding casing is provided with a gate or other closure which is moved into an open position to permit the ground material to pass out of the grinding casing; said gate or closure being automatically returned. In mills of this type previously made, spring pressure was exerted on the gate or closing means and in view of the fact that the discharge from the casing is not always even, improper grinding resulted in view of the fact that the gate acted differently when various pressures were exerted upon the same due to the discharge of the material. In other words, when masses of various densities were discharged, the character of the spring pressure was incapable of properly forming the outlet required and in view of this fact the discharged material often came through the machine in improper form for commercial purposes.

Another object of my invention is to so construct the automatic moving means for the discharge gate that it will permit an even discharge and will respond properly to various pressures exerted by different densities and quantities of material passing out of the mill thereby preventing the "belching" of lumps of material as frequently occurred in old types of machines.

A further object is to make the device of my invention of a strong and durable construction.

These objects, and other advantageous ends which will be described hereinafter, I attain in the following manner, reference being had to the accompanying drawings in which

Figure 1 is a longitudinal elevation of a mill constructed in accordance with my invention,

Figure 2 is an end elevation of Figure 1,

Figure 3 is a longitudinal sectional elevation taken on the line 3—3 of Figure 2,

Figure 4 is an end view of a conical grinding shell made in accordance with my invention,

Figure 5 is a developed sectional view taken on the line 5—5 of Figure 4,

Figure 6 is a fragmentary end view looking in the direction of the arrow x of Figure 5, and

Figure 7 is a fragmentary end elevation looking in the direction of the arrow y of Figure 5.

Referring to the drawings, 8 represents a base including a casing 9 having a substantially cylindrical portion 10 and a conical grinding shell 11 in axial alignment with the cylindrical portion 10. A shaft 12 extends through the casing 9 and is mounted in bearings 13 formed on an arm 14 of the base 8. A pulley 15 or other suitable means can be secured to the shaft for the purpose of rotating the same. The inner surface of the conical grinding shell 11 is provided with a number of grooves 16 which are arranged in the form of helical grooves extending from the wide to the small outlet end or opening 17. These grooves, as shown in Figures 5 to 7 inclusive are deeper at their forward ends and gradually become shallower until they reach the end providing the opening or discharge port 17. In addition to being of varying depth, these grooves are of varying widths; being wider at the end of largest diameter of the shell 11 and becoming narrower adjacent the opposite end of said shell. The shaft 12 has secured thereon a screw conveyor 18 arranged within the cylindrical portion 10 of the casing 9; said cylindrical portion having a hopper 19 into which the material to be ground is discharged. The portion of the shaft 12 which extends within the grinding shell 11 has a helical grinder 20 having edge portions 21 which taper substantially in the direction of the inner surface of the grinding shell 11; said edges being placed in close proximity to said inner surface of the grinding shell. Thus the material during the rotation of the shaft 12 is moved by the conveyor 18 into engagement with the grooved inner surface of the grinding shell 11 and the helical grinder 12 causes said material to be forced against the grooved inner surface of the shell and at the same time move toward the discharge port or opening 17. This causes the grinding of the material and at the same time the ground

material is conveyed due to the character of the helical grinder 20 toward the opening 17. The fact that the grooves are of varying width and depth throughout their lengths as above described causes the material first to be broken or ground into comparatively large granular particles and then to be ground into smaller size particles as they move toward the opening 17.

A bracket 22 is secured to the outer portion of the grinding shell 11 and this bracket forms a bearing for a pivot pin 23. The outer end of the bracket 22 is bifurcated at the portion through which the pivot pin 23 extends and an arm 24 fits between the furcations and is secured to the pivot pin 23. The upper end 25 of the arm 24 has a pin 26 extending entirely therethrough; the opposite ends of said pin being preferably movable within slots 27 in lugs 28 on a gate 29 so as to swingably mount the gate upon the arm 24 by a movable connection. The lugs 28 are spaced apart and the arm 24 freely fits between said lugs. The forward end of the grinding shell 11 has guiding lugs 29ª so as to form a sliding bearing for the gate 29 in alignment with the discharge port or opening 17, out of which the ground material is adapted to pass.

An arm or rod 30 is secured to the pivot pin 23 outside of the bracket 22; said rod actually forming a bell crank lever with the arm 24. The rod 30 extends toward the cylindrical portion 10 of the casing 9 and normally occupies a substantially horizontal position. A weight 31 is mounted on the rod 30 and can be secured in various positions thereon by means of a set screw 32. Thus the weight 31 will operate through the medium of the rod 30 and arm 24 to normally hold the gate 29 in a position to close the discharge opening 17.

I preferably connect the rod 30, adjacent its free end, by a coiled spring 33; said spring including a turn-buckle 34 which serves as a tension regulating or varying device for said spring 33. As illustrated the end of the turn-buckle opposite the spring 33 is connected to the base 8 so that by turning said turn-buckle the tension of the spring 33 can be varied to exert more or less pull on the rod 30. In some instances, according to the character of the material being ground, I may dispense with the spring 33 and the turn-buckle 34 in which case the weight 31 will serve as automatic closing means for the gate 29.

By the above construction the weight 31 at all times acts upon the gate 29 with a substantially equal pressure and thus the resistance offered to the material within the mill is substantially constant and insures proper and even grinding and discharge.

By providing the lugs 29ª as illustrated, the gate 29 will move outwardly in the direction of its axis only. In other words, by providing the lugs 29ª and having the pin and slot connection between the gate and the arm 24, the gate will not tilt during its opening movement but on the contrary will move bodily in the direction of the axis of the grinding shell. Thus the amount of opening provided by the gate will be equal throughout its circumference and equal portions of the discharged material will therefore be delivered throughout the entire circumference of the discharge opening; thereby compelling the mill to deliver material which is all similarly ground when passing out of the discharge opening.

While I have described my invention as taking a particular form, it will be understood that the various parts of my invention may be changed without departing from the spirit thereof, and hence I do not limit myself to the precise construction set forth, but consider that I am at liberty to make such changes and alterations as fairly come within the scope of the appended claims.

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

1. A mill of the character described comprising a grinding shell having a discharge opening at one end; guiding lugs spaced apart around the portion of said shell providing said opening, said guiding lugs terminating in outer free ends extending beyond said opening; a member pivotally mounted to swing away from said opening; a gate slidably mounted within the space precribed by said lugs, and having a slidable connection with said member; and means engaging said member and arranged to exert a yielding pressure thereon and on said door, substantially as described.

2. A mill of the character described comprising a grinding shell having a discharge opening at one end; guiding lugs spaced apart around the portion of said shell providing said opening, said guiding lugs terminating in outer free ends extending beyond said opening; a bell crank lever arrangement having its axis spaced from said opening and adapted to swing away from said opening; a gate slidably mounted within the space prescribed by said lugs and having a loose connection with one leg of said bell crank lever arrangement; and means connected to the other leg of said bell crank lever arrangement adapted to exert a yielding pressure thereon for normally urging said door to closed position, substantially as described.

3. A mill of the character described including a grinding shell having a discharge opening, guiding lugs spaced apart around the portion of said shell providing said open-

ing, said guiding lugs terminating in outer free ends and extending beyond said opening; a gate slidably mounted within the space prescribed by said lugs, said gate having slotted lugs projecting therefrom; a pivot pin spaced from said opening; a freely adjustable arm secured to said pivot pin and having a pin extending within the slots of the lugs on said gate; a rod secured to said pivot pin; and means for exerting a yielding pressure on said rod, substantially as described.

4. A mill of the character described including a grinding shell having a discharge opening; a gate; means for supporting and guiding said gate whereby it can be moved toward and from said opening, said gate having slotted lugs projecting therefrom; a pivot pin; an arm connected to said pivot pin and including a pin extending within the slots of said gate lugs; a rod secured to said pivot pin; an adjustable weight on said rod; a base support for said shell; a spring connected to said rod; and adjustable means connecting said spring with the base support; substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

MAYNARD B. McFEELY.

Witnesses:
AUGUSTUS B. COPPES,
CHAS. E. POTTS.