

1,008,231.

Patented Nov. 7, 1911.

2 SHEETS—SHEET 1.

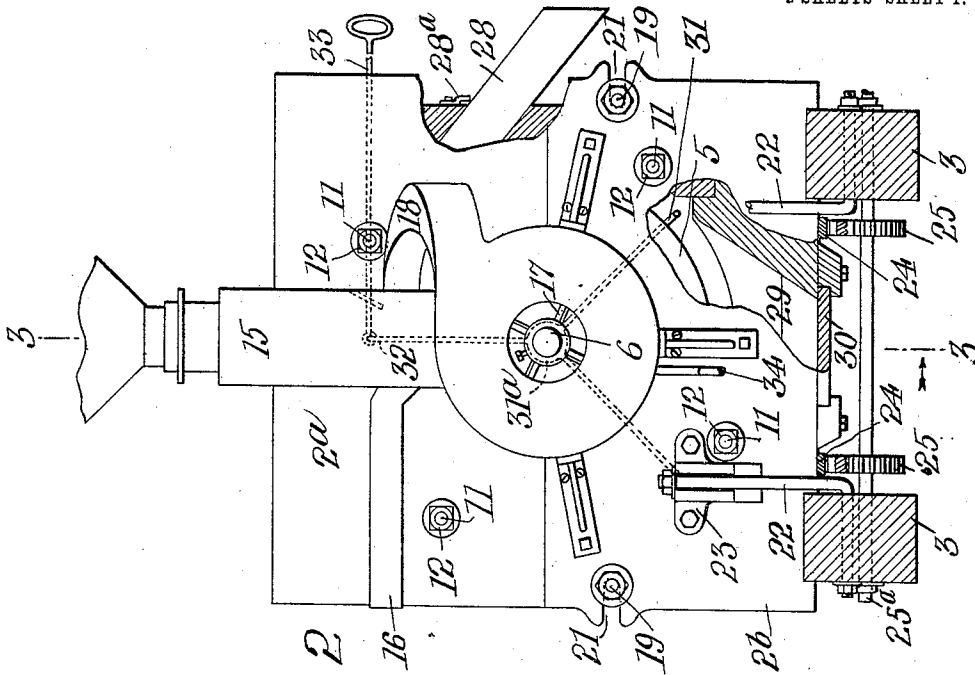


Fig. 2

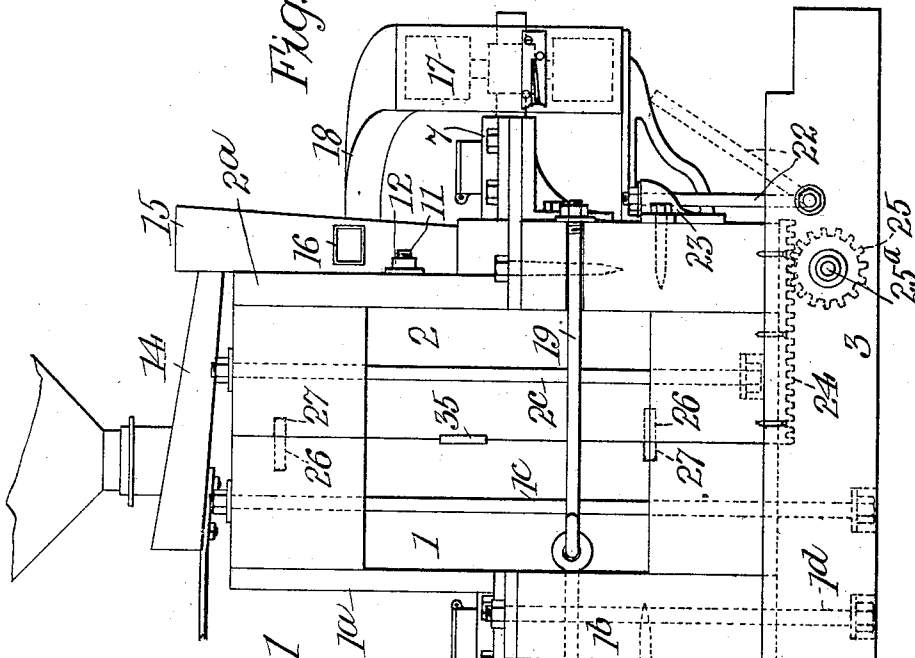


Fig. 1

Witnesses
Joseph C. Stack.
Donald H. Stewart.

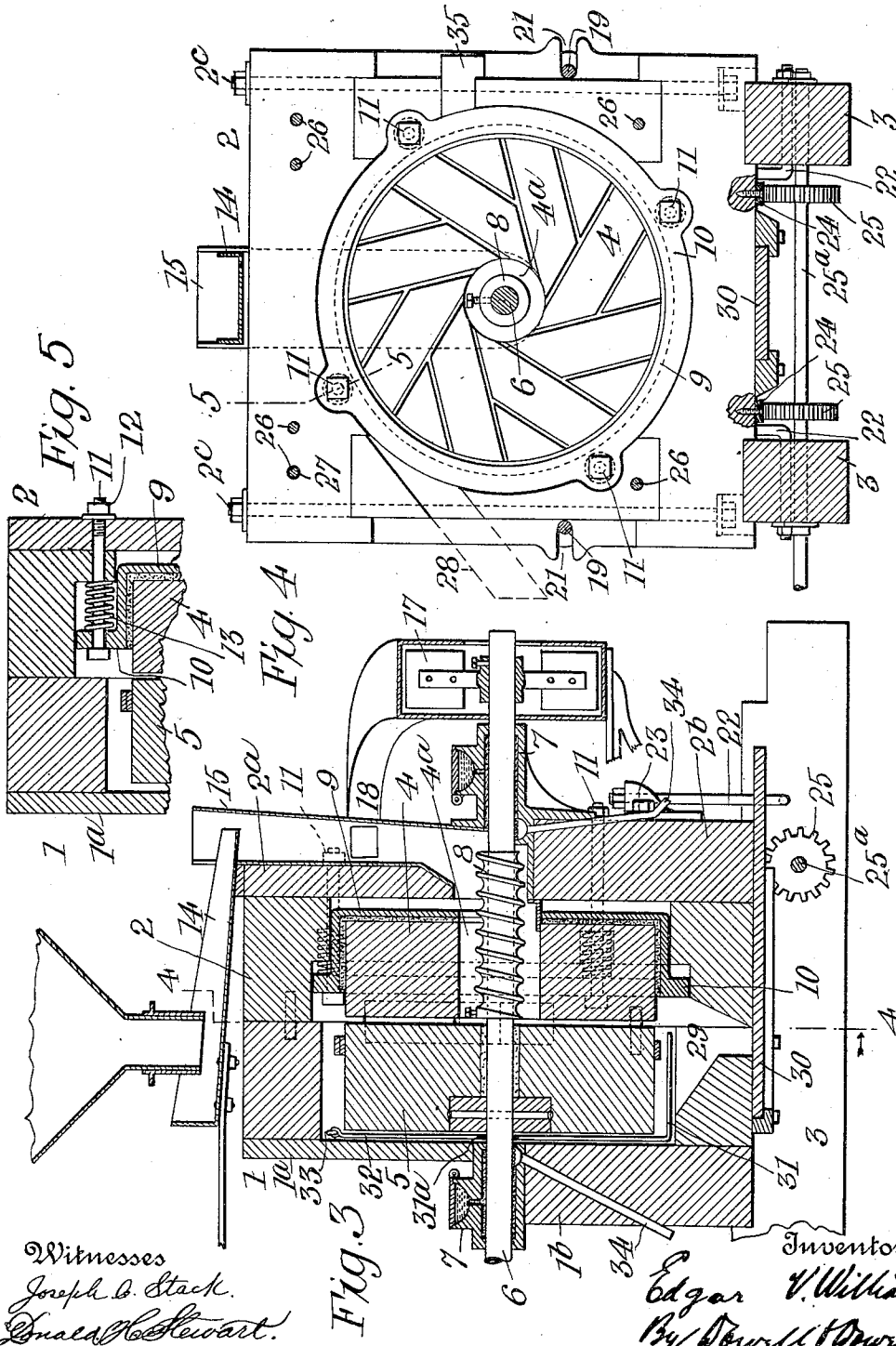
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APPLICATION FILED APR. 16, 1910.

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2 SHEETS-SHEET 2.



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Fig. 3

Fig. 4

Fig. 5

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UNITED STATES PATENT OFFICE.

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1,008,231.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed April 16, 1910. Serial No. 555,839.

To all whom it may concern:

Be it known that I, EDGAR V. WILLIAMS, a citizen of the United States, residing at Laurelsprings, in the county of Alleghany and State of North Carolina, have invented certain new and useful Improvements in Mills, of which the following is a specification.

This invention relates to grinding mills, and more particularly to mills used for grinding corn and other grain.

The primary object of the invention is to provide an improved mill which shall be simple and inexpensive in construction, and efficient and durable in practical use.

The invention will first be hereinafter more particularly described, with reference to the accompanying drawings, which are to be taken as a part of this specification, and then pointed out in the claims at the end of this description.

In said drawings—Figure 1 represents a side elevation of a grinding mill embodying my invention, some parts thereof being broken away. Fig. 2 is an end elevation of the same, partly in section. Fig. 3 is a vertical longitudinal section on the line 3—3 of Fig. 2. Fig. 4 is a transverse vertical section on the line 4—4 of Fig. 3. Fig. 5 is a detail section of an adjustable stop and means for forcing one of the burs yieldingly toward the other, such movement being limited so as to prevent contact of the grinding surfaces and to provide for a uniform separation of the burs.

In the illustrated embodiment of the invention, the type of mill shown is that having vertically disposed millstones and a wooden casing. It is to be understood, however, that the invention is applicable to various types.

The casing shown, which may be of wood, provides a fixed or stationary section 1 and a slidable or removable section 2. Each section is shown as approximating in form a hollow rectangle closed at one end and formed of connected upright and cross timbers, forming the rectangle, the end closures for the sections 1, 2 being the upper and lower plates 1^a, 1^b, 2^a, 2^b, respectively which are suitably secured to the adjacent upright and cross timbers. The upright and cross timbers of either section 1 or 2 may be secured together to form their respective sec-

tion into a rigid unitary structure by cutting the upright timbers into the horizontal timbers and tying these timbers together by bolts 1^c, 2^c which pass through the opposite ends of the cross timbers and bind them down upon the upright timbers. In the illustrated embodiment, the bolts 2^c tie the timbers of the movable section 2 together; and the bolts 1^c tie the timbers of the stationary section 1 together and also pass through stringers 3 upon which the mill is mounted, anchoring the stationary section 1 to the stringers. Bolts 1^d which pass through the plate 1^b, assist in anchoring the section 1 to the stringers 3.

The hollow sections 1 and 2 form a chamber, which contains the grinding disks. Within the removable section 2 of the casing, the non-rotatable millstone or grinding disk 4 may be disposed. The bur 4 is provided with a central aperture 4^a for the passage of grain. With this disposition of the non-rotatable bur, the rotatable millstone or grinding disk 5 is disposed within the stationary section 1 of the casing to leave suitable space around the bur 5. This bur is fast upon a rotatable shaft 6 which is journaled at its opposite ends in suitable journal boxes 7 which may be mounted upon and secured to the lower plates 1^b, 2^b. The journal boxes 7 are shown provided with oil cups. The shaft 6, where it passes through the aperture 4^a of the non-rotatable bur and for a suitable distance beyond the latter may be provided with a screw conveyor 8 for feeding the grain into the space between the millstones.

The invention provides that one millstone shall be yieldingly forced toward the other, such approach being limited by an adjustable and positive stop means.

In the illustrated embodiment of the invention, the non-rotatable bur 4 is the one that is adapted to yieldingly approach the other bur and be limited in such approach. Considering now the means illustrated for accomplishing this result, 9 designates an annular housing or casting having a bottom provided with an aperture registering with the aperture 4^a, the bottom having an outstanding peripheral rim terminated by a laterally and outwardly projecting flange 10. The non-rotatable bur 4 is cemented or otherwise suitably secured in the casting

9, and the upright and cross timbers are cut out as shown in Figs. 3, 4 and 5 to receive the annular casting 9 and allow space for its movement to or from the rotatable bur 5.

3 The flange 10 of the casting 9 is provided with a plurality of bolt holes, four being shown, which loosely receive headed bolts 11 that extend through suitable holes in the timbers of the section 2. The heads of the

10 bolts 11 engage the face of the flange 10 nearer the rotatable bur; and outside of the casing, the bolts 11 are provided with nuts 12 which bear upon the plates 2^a, 2^b or upon washers interposed between the nuts and

15 plates. The heads of the bolts 11 form a stop means which limits the approach or movement of the non-rotatable bur toward the rotatable bur; and the non-rotatable bur, in the illustrated embodiment, is yieldingly

20 held against such stop means by expansion springs 13 which are coiled about the bolts 11 and abut with one end the face of the flange 10 farther from the rotatable bur, and abut with their other ends shoulders

25 formed in the section 2.

Grain may be supplied to the millstones through a hopper discharging onto a shaker 14 in the usual manner. This shaker is adapted to deliver the grain to a spout 15

30 which may be secured to the section 2. The spout 15 delivers the grain to the screw conveyor 8; and in its passage down through the spout 15, the grain is subjected to the cleansing action of a column of air which

35 moves transversely of the grain descending in the chute and separates chaff and other impurities from the grain and carries such impurities out of the spout and discharges them through a branch 16 that extends laterally from the spout 15. The cleansing air

40 draft, may be supplied by a fan 17 which is shown as secured to the shaft 6, and provided with a casing having a curved discharge pipe or return bend 18 which is connected to the spout 15 and is adapted to deliver the blast from the fan across the grain falling downwardly in the spout. The fan casing may be supported in the manner shown, or in any other suitable way.

45 The slidable or removable section 2, is retained in place against horizontal movement by means of horizontally disposed swing-out bolts 19, each provided at one end with an eye which is engaged with an eye bolt 20

50 secured to the plate 1^b. The free end of each swing-out bolt is screw threaded and is provided with a nut, and if desired a washer. To provide for a ready engagement and disengagement of the swing out bolts 19 with

55 the slidable section 2, the plate 2^b thereof is formed with laterally extending slots 21 which open outwardly through the opposite edges of the plate 2^b; the walls of the slots forming shoulders for the abutment of the

60 nuts carried by the bolts 19. The free ends

of the bolts 19 can therefore be swung laterally into and out of the slots 21 when it is desired to secure the section 2 of the casing in place or permit its removal. When the bolts 19 are in the slots 21 and the nuts of

70 said bolts screwed along the bolts to bind against the section 2, the latter will be held securely against the section 1. Vertically disposed swing-out bolts 22 are also provided as a means for anchoring the removable section 2 against vertical displacement.

75 The bolts 22 shown are L-shaped in form, one leg of each L being secured to the adjacent stringer 3 to be susceptible of a swinging movement up and down, the other or

80 upright leg being provided at its extremity with screw threads and a flanged nut, or nut and washer. The upright legs of the bolts 22 are each adapted to be swung between

85 ears outstanding from a bracket 23 secured to the plate 2^b, one at each side of the center, the ears forming an abutment for the nuts carried by the bolts 22. When the upright legs of the bolts 22 are swung upwardly between the ears of the brackets 23, and the

90 nuts carried by the bolts are screwed down to bind tightly upon the ears, the bolts 22 will hold the movable section 2 against vertical displacement.

In order that the removable section 2 of

95 the casing may be handled with ease and rapidity, this section is shown provided with toothed racks 24 with which mesh spur gears 25 fast to a rotatable shaft 25^a journaled in the stringers 3 and adapted to be actuated

100 in any suitable manner. By means of this rack and gearing, the section 2 can be slid back and forth upon the stringers 3 with ease and with rapidity.

The sections 1 and 2 of the casing are

105 shown provided with a dowel pin engagement one with the other. This construction is advantageous in maintaining the sections against accidental lateral shifting or displacement with reference to each other. In

110 the drawings the opposing faces of the sections 1 and 2 are each shown provided with projecting dowel pins 26 and with sockets 27 for the reception of the dowel pins projecting from the opposite section of the

115 casing.

In the ordinary operation of the mill, the meal produced therein is discharged by the bur 5 through a spout 28 which is removably seated in opposing openings formed in

120 the sections 1 and 2 of the casing. The discharge spout 28 may be retained in place by means of a button 28^a pivoted to the casing of the mill and adapted to be turned into and out of engagement with a lug on the

125 spout 28. (Fig. 2).

Another feature of the invention is the provision of means for rapidly discharging from the mill any meal that may remain therein after the bur 5 has ceased to rotate.

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This feature is particularly advantageous in clearing the mill of one grade of meal preparatory to producing another grade, as for example when it is desired to produce flour
 5 after grinding chop. Heretofore with a mill having a side discharge like the spout 28, it would be necessary to keep the bur 5 rotating until it had picked up all of the chop and discharged it out of the spout, and even
 10 then some meal may remain in the bottom of the mill and become sour or musty. My improvement in regard to this feature contemplates the provision of an auxiliary discharge or clean-out opening located at the
 15 bottom of the mill and controlled by a door, and an agitating device for stirring such residue of meal and assisting its discharge through such auxiliary discharge opening. In the illustrated means for accomplishing
 20 this result, the lower cross timber of the section 1 is formed with a hopper like discharge 29, and if desired the opposing timber of the section 2 may also be sloped toward the discharge. The discharge opening 29 is controlled by a door or slide 30 that
 25 may be guided in ways secured to the section 1 of the casing. The agitating device shown consists of arms 31 which radiate from a ring 31^a that is loosely supported on the
 30 shaft 6. The arms 31 are shown formed with angularly disposed ends which extend under the convex surface of the bur 5. The ring 31^a is provided with an arm 32 engaged by a reciprocatory rod 33 which projects
 35 through a suitable opening in the side of the casing and is or may be provided with a hand grasp as shown. When it is desired to clear the mill of any residue of meal, the slide 30 is removed and the agitator swung
 40 back and forth stirring up the meal and aiding in its discharge through the auxiliary discharge opening.

Provision is also made for protecting the meal against contamination by the lubricant
 45 used in the journal boxes 7. In the illustrated embodiment this is accomplished by forming depressions in that end of each journal box nearer the burs, these depressions being covered with a screen to prevent grain falling into the depressions.
 50 These depressions are connected by a drip-pipe 34 with the exterior of the mill whereby the oil will be conducted to the exterior when it has performed its function and will
 55 be prevented from running into the chamber where the meal is ground.

In order that the position of the grinding faces of the millstones relative to each other may be readily seen at any time, alining
 60 sight openings have been provided so that a view may be had across and between the grinding faces of the burs 4 and 5. These sight openings are provided by the opening in the casing which receives the spout 28,
 65 and by an opening formed through the op-

posite side of the casing and normally closed by a plug 35 as shown in Fig. 4. When it is desired to sight across the millstones the spout 28 and plug 35 are removed whereupon a view of the position of the bur
 70 4 relative to the bur 5 may be had. In this way if the burs tend to run together at any place along their faces, it can be seen; and by screwing up the nuts of the adjacent bolts 11 such part of the bur 4 may be withdrawn
 75 a desired distance from the bur 5, and thus a perfect parallel alinement of the burs 4 and 5 may be obtained.

From the foregoing, the operation of the mill will be readily understood. However
 80 the operation, in grinding, may be briefly stated as follows: The mill being in operation, grain is fed down through the spout 15; and in its passage to the millstones is subjected to the blast from the fan 17 which
 85 will carry the impurities out of the grain and discharge such impurities through the branch 16. The spout 15 delivers the grain to the screw conveyer 8 which feeds the grain in between the millstones 4 and 5. As
 90 the bur 4 is held yieldingly against the stop provided by the heads of the bolts 11, by the springs 13 which have sufficient strength to prevent the bur 4 from yielding unless some
 95 hard foreign substance gets in between the millstones, the latter are held positively apart to prevent their running together; and at the same time the bur 4 is held up to the
 100 bur 5 to provide a space between the two burs that is unvarying and uniform for an adjustment as long as grain alone passes between the millstones, thus insuring a flour
 105 uniform throughout its run. But if a hard foreign substance enter between the burs, the millstone 4 will be pressed back, by such hard substance, against the force of the
 110 springs 13 thereby allowing the hard substance to pass from between the burs, whereupon the springs 13 will return the bur 4 to its position against the stop provided by the
 115 heads of the bolts 11. This yielding movement of the bur 4 will save the millstones from injury by a hard foreign substance which may be entered into the mill.

By means of the bolts 11 the millstone 4
 115 can be tilted with reference to the millstone 5 so that the opposed grinding faces will be everywhere equidistant thus insuring a uniform flour and preventing the millstones from running together at any part of their
 120 opposite surfaces thus preserving the burs from injury.

When it is desired to obtain access to the interior of the mill, or to the millstones for inspection, repair or other purpose, the
 125 screw locking the fan to the shaft 6 is loosened as is also the nuts of the swing-out bolts 19 and 22, whereupon these bolts can be swung out of engagement with the removable section 2 of the casing, which to-
 130

gether with the fan can be then quickly moved laterally away from the section 1 by means of the rack and pinion gearing.

I am aware that modifications can be made in some of the details of my invention without departing from its spirit and scope, and I therefore reserve the right to such modifications.

The term "open slots," used in connection with the swing out bolts, is intended to include any structure which would provide a surface behind which the nut-like projection of a swing out bolt could be engaged as the bolt is swung into engaging position.

Having described my invention, what I claim is—

1. In a grinding mill, the combination with a revoluble grinding disk and a casing inclosing the same, said casing having an opening therein through which any meal remaining after said disk has ceased to rotate may be discharged, of an oscillatory agitating device arranged to sweep across said opening and along the periphery of said disk, and means for oscillating said device.

2. In a grinding mill, a pair of millstones, one of which is revoluble, in combination with a casing containing the millstones and provided with a side opening through which the meal is discharged by the rotatable stone, said casing being also provided with a bottom opening, removable means normally closing said bottom opening, and an oscillatory agitating device mounted within the casing adjacent a millstone and adapted to play over the bottom

opening and below the millstone and stir up the meal resting in the bottom to aid in its discharge through said bottom opening.

3. In a grinding mill, a casing and grinding disks mounted therein, in combination with a pivoted agitating device mounted within said casing and having arms provided with portions which extend across the convex face of one of the grinding disks, and means for rocking said arms back and forth.

4. A grinding-mill comprising a chambered casing having a clean-cut opening and grinding disks within said casing, a removable closure for said clean-out opening, and an agitator pivotally mounted in the chamber of the casing to work across the clean-out opening and loosen meal adjacent thereto and between the same and the grinding disks.

5. A grinding mill comprising a chambered casing having a clean-out opening and grinding disks in the chamber of the casing, a removable closure for the clean-out opening, oscillatory agitator arms pivoted within the chamber of the casing adjacent a grinding disk and extending across the clean-out opening, and a reciprocatory rod connected to said arms and extending laterally therefrom through the side of the casing.

In testimony whereof I affix my signature, in presence of two witnesses.

EDGAR V. WILLIAMS.

Witnesses:

B. E. REEVES,

CHAS. R. JOHNSON.