J. C. WOODCOCK.

FEED MILL.

APPLICATION FILED AUG. 16, 1909.

976,535.

Patented Nov. 22, 1910.

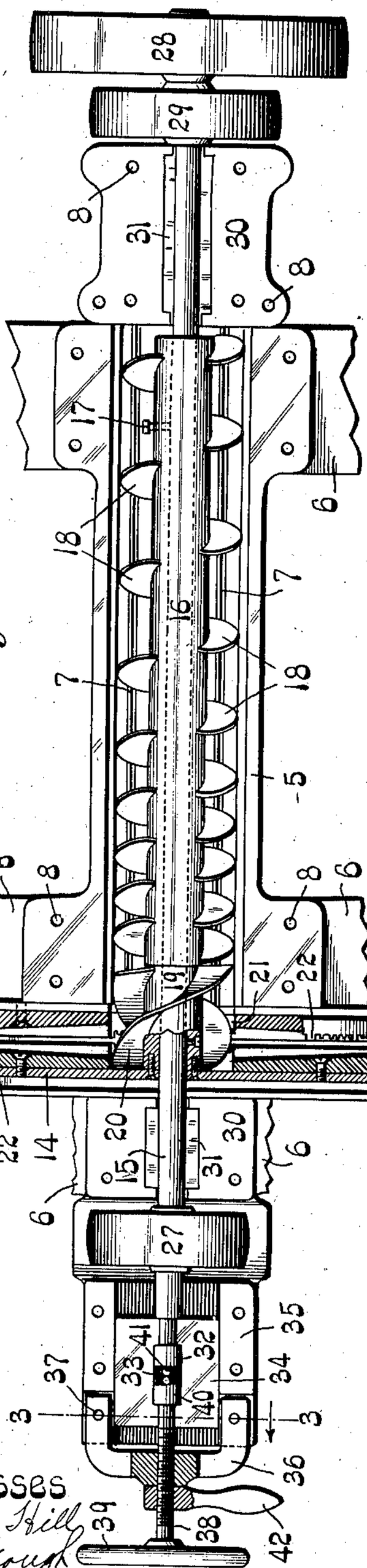


Fig. 1.

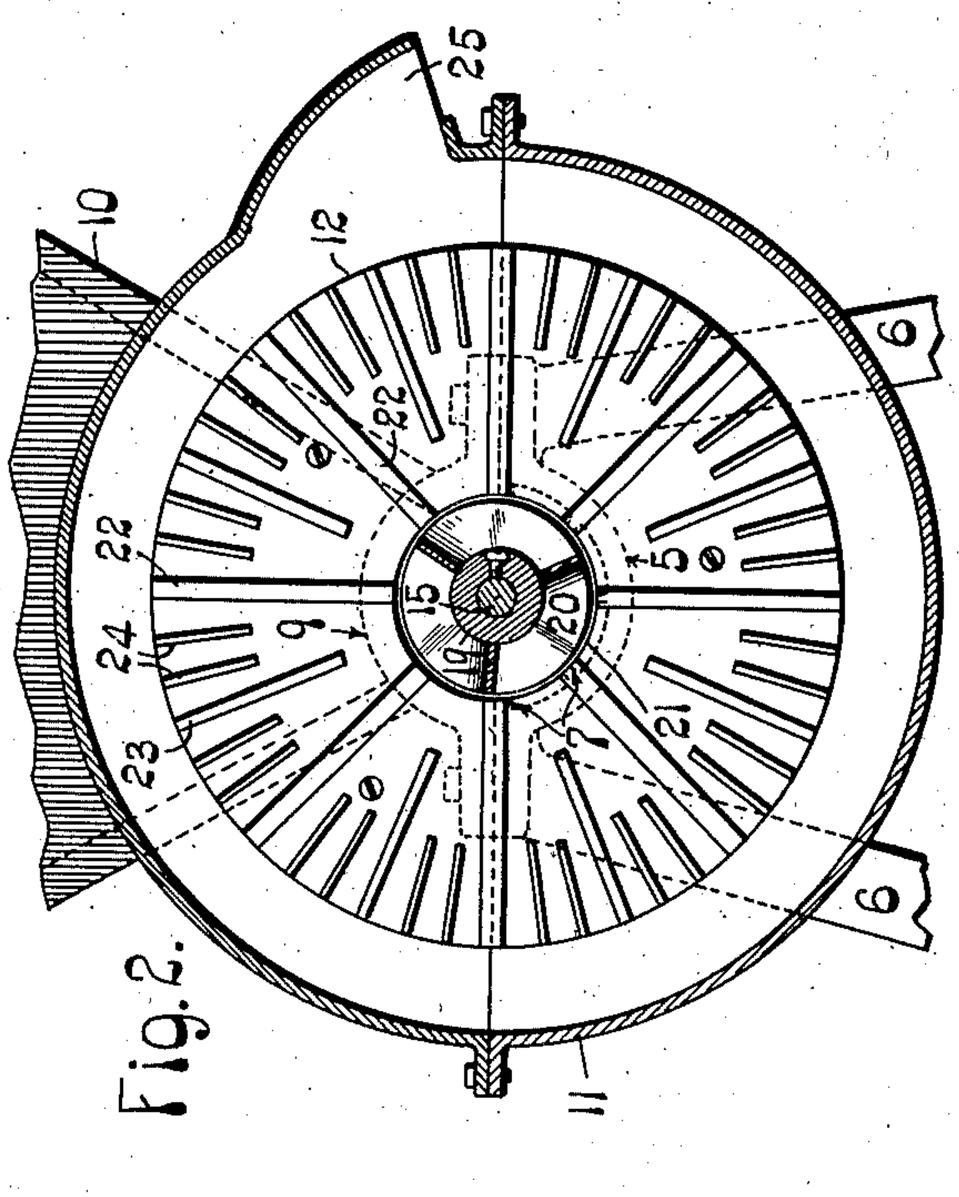


Fig. 2.

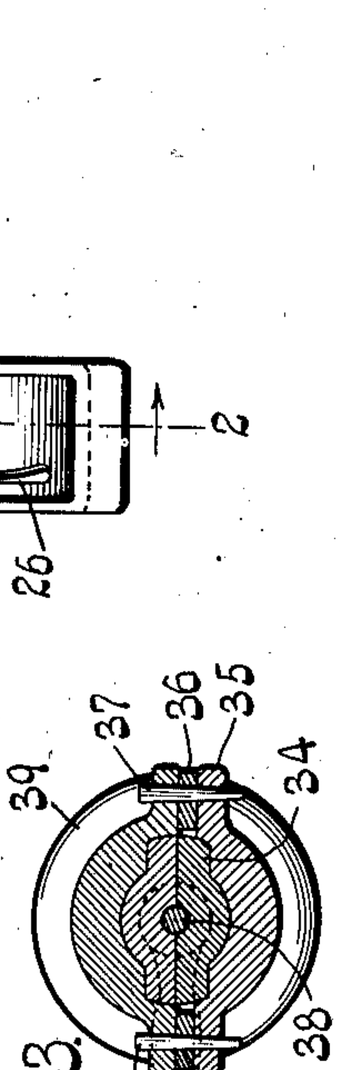


Fig. 3.

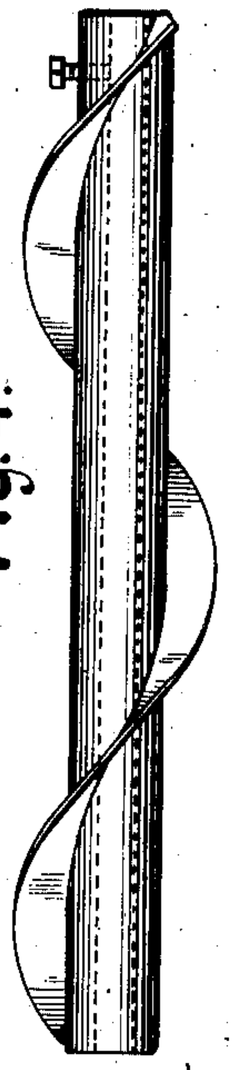

Fig. 4.

Witnesses
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# UNITED STATES PATENT OFFICE.

JOHN C. WOODCOCK, OF LITCHFIELD, ILLINOIS.

## FEED-MILL.

976,535. Specification of Letters Patent. Patented Nov. 22, 1910.

Application filed August 16, 1909. Serial No. 513,020.

*To all whom it may concern:*

Be it known that I, JOHN C. WOODCOCK, a citizen of the United States, residing at Litchfield, in the county of Montgomery and State of Illinois, have invented new and useful Improvements in Feed-Mills, of which the following is a specification.

My invention relates to certain new and useful improvements in grinding mills, and has for its general object to provide a machine of this kind which, by reason of its novel construction and arrangement of parts, is readily adaptable for grinding various kinds of material, such as ear corn, shell corn, and all kinds of small grain, as well as for grinding alfalfa hay into meal, and various kinds of cereals in the head into suitable feed for stock.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is a sectional plan view of a machine constructed according to my invention; Fig. 2 is a sectional view, partly broken away, and taken on the line 2—2 of Fig. 1; Fig. 3 is a section on the line 3—3 of Fig. 1, and, Fig. 4 is a view in elevation of a force feed device for use when the machine is employed for grinding hay, small grain, or grain in the head.

Referring to the drawing, the numeral 5 indicates the lower half of a cylinder in which the feeding and, in the case of corn cobs, or corn on the ear, part of the grinding takes place, and which is supported on suitable legs 6 at each end. This lower portion 5 of the cylinder is provided throughout its length at suitable intervals with ribs 7 which assist in breaking up the corn cobs, or ears of corn, and reducing them to small pieces. The other half of the cylinder, which is placed upon the part 5, and bolted thereto at the bolt holes 8, is indicated by dotted lines in Fig. 2, and designated by the numeral 9.

10 indicates a hopper from which the material to be ground is fed into the cylinder.

11 indicates a circular casing in which are located the grinding disks 12, 13. The disk 12 is stationary, being secured to one side of the casing 11, while the disk 13 is adapted to rotate, being secured to a face plate 14, which in turn is secured to a shaft 15 extending lengthwise through the device substantially from end to end thereof.

In Fig. 1, I have shown a cob breaker 16, mounted on the shaft 15, and secured thereon by means of a set screw 17. This cob breaker is in the form of a tube, having on its outer periphery a series of blades, 18, which are so inclined as to form an interrupted screw, or spiral conveyer, and which are arranged relatively close together at the end adjacent to the grinding disks. The grinding disks 12 and 13 do not extend to the shaft 15, but a circular space is provided to permit the entrance of the material to the space between the grinding disk, and also to provide room for a force-feed device 19, which is in the form of a hub connected to the face plate 14, and provided with three spirally-arranged blades 20. These blades work snugly in the circular space at the center of the grinding disks, and operate to force the material to be ground not only into said space but outward into the space between the grinding disk. Each of these grinding disks has the same character of grinding surface, that of the grinding disk 12 being shown in Fig. 2.

Extending from the periphery of the disk to the circular recess 21 thereof are a series of radially-disposed rub-irons 22. Centrally of the space between two rub-irons is a relatively long tooth 23, which, however, does not extend to the recess 21, and between each of these teeth and a rub-iron are two shorter teeth 24. The rub-irons and the teeth 23 and 24 are spaced an equal distance apart at the periphery of the grinding disks. The rub-irons 22 project from the face of the grinding disk to a slightly greater extent than do the teeth 23 or 24, and are slightly thicker, the purpose of this being to have these stouter reducing surfaces do the initial work of grinding, and also in the event of the grinding disks coming in contact to protect the shorter and smaller teeth from meeting, and thus being broken or ground off. This arrangement, I find, adds materially to the life of the grinding disks, and in addition results in producing a gradual reduction of the material being ground. That is to say, as the material enters between the grinding disks through the recess 21 it is first engaged by the rub-irons 22 and reduced to a certain extent; it will next be acted upon by these rub-irons and the long teeth 23, and finally by both of these and the teeth 24.

25 indicates an outlet from the casing 11, one or more of which may be provided. A

discharge from this outlet is effected by means of fan blades 26 arranged on the periphery of the face plate 14, these blades operating to blow the ground feed out of the casing into any suitable receptacle, or into an elevator. If an elevator is to be employed I provide a pulley 27 for running the same from the shaft 15.

28 indicates the drive pulley for the shaft 15, and preferably I apply an additional pulley 29 which may be conveniently used for driving other pieces of machinery, such as feed cutters, corn shellers, and the like, from the shaft 15. The casting 30 at the ends of the cylinder, to which the legs 6 are secured, form bearings for the shaft 15, and are suitably recessed to receive Babbitt metal 31, as shown. The end of the shaft 15, opposite to that on which the pulley 28 is secured, is grooved to provide a head 32 which works in a shouldered recess 33 provided in a slide box 34. This slide box works in a groove formed in a casting 35. On the outer end of this casting is secured a yoke 36, the securing means being wooden pins 37. This yoke is centrally screw-threaded to receive the screw threads of a spindle 38, having a handle 39, and provided on its inner end with a head 40, similar to the head 32, and which engages in the opposite end of the shouldered recess 33. Between the heads 32 and 40 I interpose balls 41 to provide an anti-friction bearing. 42 indicates a lock lever having screw-threaded engagement with the spindle 38.

The shaft 15 is freely movable longitudinally in its bearings, and when it is desired to vary the distance between the grinding disks the lock lever 42 is turned to move it away from the yoke 36, and the hand wheel 39 is turned in one direction or the other thereby moving the slide box, and also the shaft 15, which will result in moving the grinding disk 13 toward or from the stationary grinding disk 12. When the adjustment has been made the lock lever 42 is turned into engagement with the yoke 36. By unscrewing the set screw 17 the cob breaker 16 may be moved in accordance with the adjustment of the grinding disk 13.

The construction I have described also provides for preventing material injury being done the machine in the event that either a large or small object, such as a nut, bolt, nail, or the like, should get into the machine. In the case of a large object it would be caught between one of the blades 18 and one or the other of the ribs 7, and ordinarily one or more of the blades would be broken off, or other injury done the machine, before the machine could be stopped. With my invention, under the above circumstances, the set screw 17 will be broken loose from its engagement with the shaft 15, probably breaking away a small piece of the cob breaker, and the latter will cease to revolve, and the object be prevented from passing to the grinding disks. Of course the cob breaker can readily be secured to the shaft 15 at any other point after the breakage. In the event that a small metal object should find its way into the space between the grinding disks, the result would be that the wooden pins 37 would be broken off and the grinding disks separated a sufficient distance to allow the object to fall out from between them, resulting in very little, if any, injury to said disks.

In Fig. 4 I have shown what I term a force feed device, which may be placed on the shaft 15 in place of the cob breaker. This force feed device is used when alfalfa or other hay, or grain, is to be ground, and operates on the principle of a spiral conveyer to force the material to the force feed device 19, which latter forces it between the grinding disks.

It should be further stated that the grinding disks 12 and 13 are dished, or concaved, on their inner faces, so that they gradually decrease in thickness from the periphery to the central aperture, while the rub irons 22 are of the same thickness throughout their length, and their opposing faces are parallel. This construction affords relatively wide openings between the rub irons at the center of the disks for the entrance of the material to be ground, which latter, by the combined actions of centrifugal force and the rub irons, is thus forced rapidly outward between the grinding surfaces.

I claim:

In a grinding mill, in combination with a casing having a fixed grinding disk mounted therein, a shaft extending through said casing and having a coöperating grinding disk mounted thereon, means for rotating said shaft, a casting, a yoke, frangible pins securing said yoke to said casting, a slide box working in said casting and having one end of said shaft rotatably mounted and engaged therein, and a spindle also rotatably mounted and engaged in said slide box and having screw-threaded engagement with said yoke.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN C. WOODCOCK.

Witnesses:
J. H. ATTERBURY,
A. W. HAMILTON.