

J. BERCHA.
GRINDING MILL.
APPLICATION FILED MAR. 11, 1910.

980,048.

Patented Dec. 27, 1910.

2 SHEETS-SHEET 1.

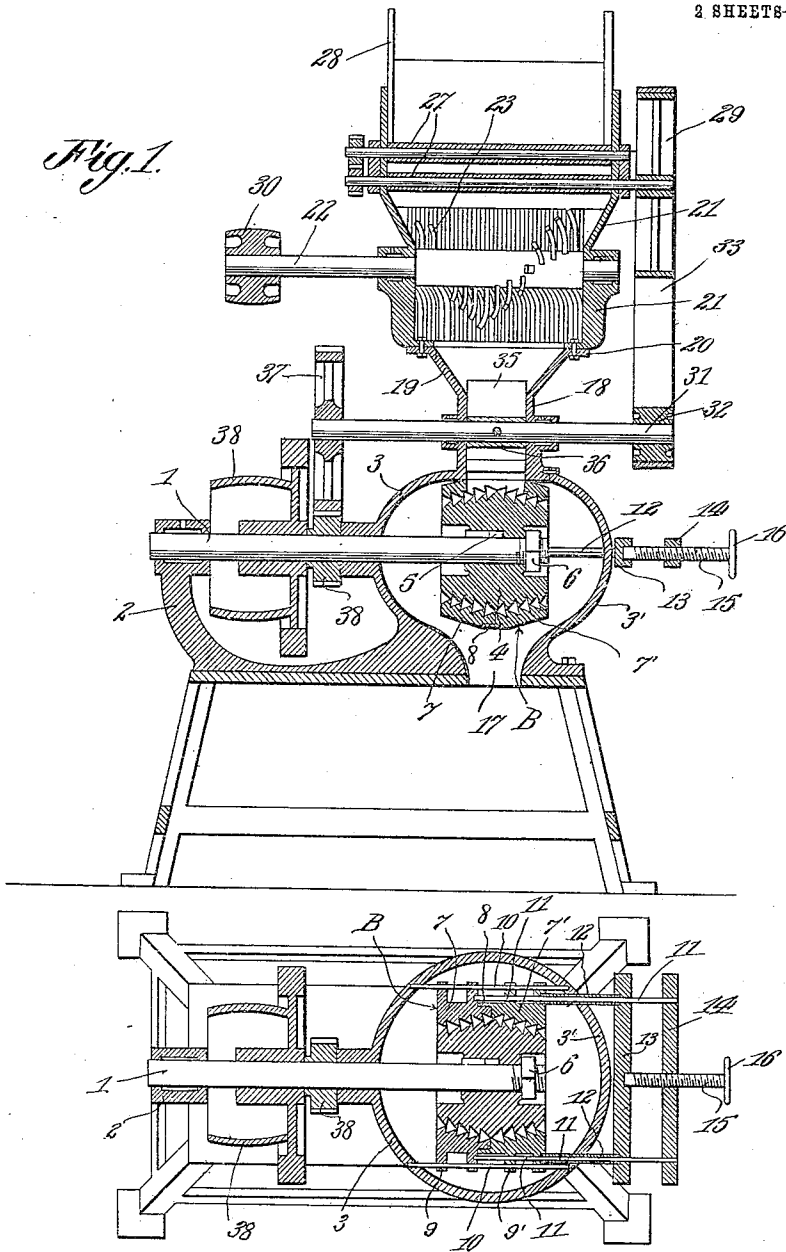


Fig. 2.

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Witnesses
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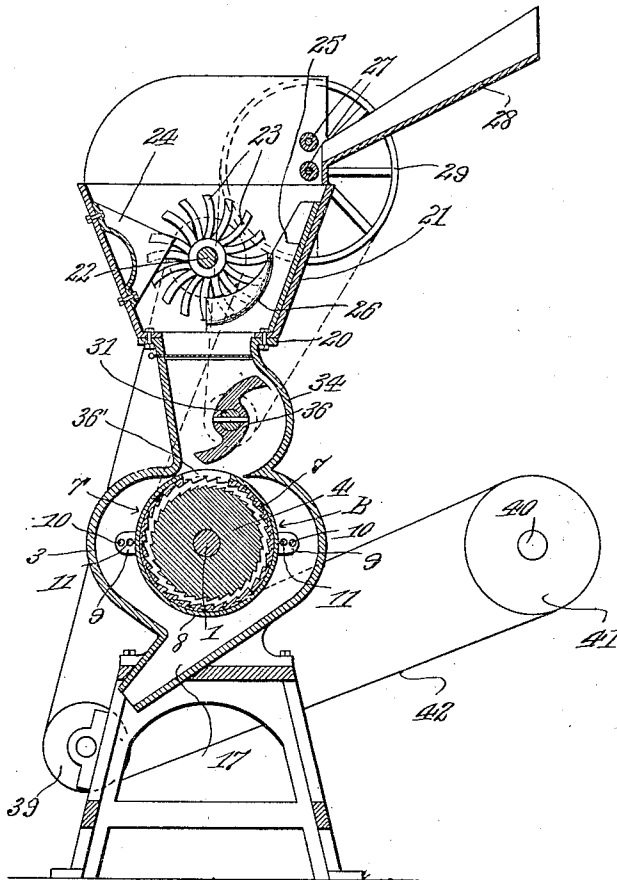


Fig. 3.

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UNITED STATES PATENT OFFICE.

JOSEPH BERCHA, OF BEATRICE, NEBRASKA.

GRINDING-MILL.

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Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed March 11, 1910. Serial No. 548,560.

To all whom it may concern:

Be it known that I, JOSEPH BERCHA, a citizen of the United States of America, residing at Beatrice, in the county of Gage and State of Nebraska, have invented new and useful Improvements in Grinding-Mills, of which the following is a specification.

This invention relates to grinding mills, and the particular object of the invention is to produce a mill, whereby not only grains, but fibrous material, such as hay and the like, may be comminuted to the desired degree of fineness.

With this and other ends in view, which will readily appear as the nature of the invention is better understood, the same consists in the improved construction and novel arrangement and combination of parts which will be hereinafter fully described and particularly pointed out in the claims.

In the drawings, Figure 1 is a sectional front elevation of a grinding mill constructed in accordance with the invention. Fig. 2 is a horizontal sectional view taken through the grinding mechanism. Fig. 3 is a sectional side elevation.

Corresponding parts in the several figures are denoted by like characters of reference.

The main shaft 1 of the improved mill is supported for rotation in bearings 2 upon a frame which includes a casing 3 into which the main shaft extends, said casing including a detachable end piece 3'. The shaft 1 carries within the casing 3 a male grinding bur 4, tapering toward the ends so as to present a double conical shape, said bur being securely and adjustably mounted upon the shaft by means of a key 5 and a nut 6, the latter being threaded upon the end of a shaft and tightened against the bur. The exterior surface of the bur 4 is suitably dressed to cooperate with the dress upon the inner surface of the female bur B, the latter being composed of two tapering or cone-shaped members 7 and 7' provided at their meeting edges with interengaging flanges 8 permitting the sections or members 7 and 7' to be adjusted relatively toward or away from each other to entirely separate the same. The sections 7 and 7' are provided with laterally extending lugs designated, respectively, 9 and 9', said lugs being apertured for the passage of supporting rods 10

disposed horizontally within the casing 3 and mounted securely in the walls of said casing, thereby adjustably supporting the sections or members of the female grinding bur.

Securely mounted in the lugs 9 of the member 7 adjacent to the meeting edges of the sections are rods or bolts 11 which are guided slidably through the lugs 9' of the member 7' and through tubes or sleeves 12 connected with the outermost lugs of the member 7' and extending through the detachable wall member 3' of the casing, the outer ends of the sleeves 12 being secured upon a cross bar 13 through which the bolts or rods 11 extend, said bolts being secured in a cross bar 14 wherein is threaded an adjusting screw 15 having a hand wheel 16, whereby it may be manipulated to tighten it against the cross bar 13.

It will be observed that by tightening the screw 15, the cross bar 13 with the tubes 12 and the member 7' of the female grinding bur will be forced inward in the direction of the member 7, while the latter, being connected by the bolts 11 with the cross bar 13, will be forced outward in the direction of the member 7', thus decreasing the distance between the dressed faces of the female bur sections and the correspondingly dressed face portions of the male bur, and thereby regulating the fineness of the material ground between the burs. On the other hand, by loosening the screw, the members of the female bur will quickly be forced apart by the pressure of the material ground in the mill, thereby increasing the distance between the dressed faces of the male and the female bur sections and causing the material to be ground more coarsely. It will be understood that in adjusting the distance between the male and female bur faces, the relative even distance between said faces will be maintained by the material passing between said faces in the act of being ground or operated upon, said material passing so evenly between the respective faces that an even distance will be maintained therebetween in practice, causing the material to be evenly ground or comminuted to the desired fineness. If the even distance between the respective faces should be disturbed while the mill is not in operation, it will be quickly

resumed as soon as the mill is again started in operation. The material ground in the mill escapes at the ends of the bur sections into the casing 3 which opens downwardly, as shown at 17, to deliver the ground material into a chute or receptacle which may be arranged underneath. The casing 3 has an upwardly extending neck 18 expanding upwardly, as shown at 19, to form a mouth piece having a flange 20 upon which a hopper casing 21 is suitably supported, said hopper casing being provided with bearings for a shaft 22 carrying a series of teeth or cutters 23 which are arranged in spiral order around the shaft from which they radiate, said teeth being longitudinally curved, as best seen in Fig. 1 of the drawings.

Within the hopper casing is supported a shield 24 composed of a plurality of spaced plates between which the teeth or cutters may operate. Interiorly of the hopper is also supported a concave 25 likewise composed of a plurality of spaced bars or members 26 which are suitably curved to permit the passage therebetween of the teeth or cutters. A pair of feed rollers 27 are supported adjacent to the lower end of a feed chute 28 directed into the hopper casing 21, the shaft of one of said rollers being equipped with a band wheel 29 for the purpose of receiving motion, as will be presently described. The cutter-carrying shaft 22 is likewise provided with a band wheel 30. Supported for rotation in the neck 18 of the casing is a shaft 31 having at one end a band wheel 32 from which motion is transmitted by a belt 33 to the band wheel 29 of the feeding mechanism. The neck 18 has a back wall 34 which is curved concentrically with the axis of the shaft 31, and the latter carries a feed member or beater consisting of diametrically opposed arms 35 extending from and connected with the hub 36 which is firmly secured upon the shaft, said arms having arcuate convex front faces upon which material coming from the hopper above is discharged, and whereby said material is positively packed or forced through the feed aperture 36 in the female bur. The shaft 31 also carries a spur wheel 37 meshing with a pinion 38 upon the main shaft 1 from which the force feed shaft will thus be driven at a moderate speed, the speed being further decreased, as it is transmitted from the shaft 31 to the initial feeding mechanism.

The main shaft 1 carries a band wheel or pulley 38, and a guide pulley or idler 39 is supported for rotation upon the frame of the machine at a distance from which a motor driven shaft 40 having a band wheel 41 is likewise supported. A single belt, indicated at 42 in Fig. 3 of the drawings, may be used to transmit motion from the shaft 40 to the shafts 1 and 22, the return lead of

the belt being guided under the idler 39, and the speed being governed by the relative sizes of the pulleys or band wheel.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of this invention will be readily understood by those skilled in the art to which it appertains.

Material to be comminuted, such as grain, corn, either shelled or on the cob, straw, hay, alfalfa hay, or the like, may be positively fed into the hopper casing 21 between the feed rollers 27, being there acted upon by the teeth or cutters which will serve to chop the material into fragments of proper dimensions which will be discharged between the shield 24 and the concave 25 into the neck of the casing through which such material will be positively forced or fed through the aperture 36 of the female grinding bur and between the cooperating dressed faces of the burs, where it will be ground to the desired fineness before being eventually discharged between the ends of the burs.

It is obvious that the burs may be dressed in any convenient, well known and effective manner to operate successfully upon the material to be ground or crushed.

The improved mill is simple in construction and has been found thoroughly efficient for the purpose for which it is provided.

Having thus described the invention, what is claimed as new, is:—

1. In a grinding mill, a double conical male bur, a female bur comprising two slidably supported conical members having overlapped interengaging flanges at their meeting edges, and means for positively forcing each member of the female bur in the direction of the mating member to vary the distance between the grinding faces of the male and female burs.

2. In a grinding mill, a frame including a casing, a shaft supported for rotation, said shaft extending within the casing, a double conical male bur mounted upon the shaft, guide rods supported within the casing, a female bur comprising conical members slidably supported upon the guide rods, sleeves connected with one female bur member and guided through the casing, a cross bar connecting said sleeves, bolts connected with the other female bur member and guided through the sleeves of the first bur member, a cross bar connecting said bolts, and an adjusting screw threaded in the second cross bar and bearing against the first mentioned cross bar.

3. In a grinding mill, a casing, a conical male bur supported for rotation within the casing, guide rods supported within the casing, a female bur comprising two conical sections having apertured lugs slidably en-

gaging the guide rods, sleeves connected
with one bur member and extending through
the casing, bolts connected with the other
bur member and guided through the sleeves
5 of the first bur member, a cross bar connect-
ing the sleeves, said cross bar being aper-
tured for the passage of the bolts, a cross
bar connecting the bolts, and an adjusting

screw threaded in the latter cross bar and
bearing against the first cross bar.

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

JOSEPH BERCHA.

Witnesses:

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