H. G. THIESING.

GRINDING MILL.

APPLICATION FILED JAN. 29, 1912.

1,046,678.

Patented Dec. 10, 1912.

2 SHEETS—SHEET 1.

FIG. 1.

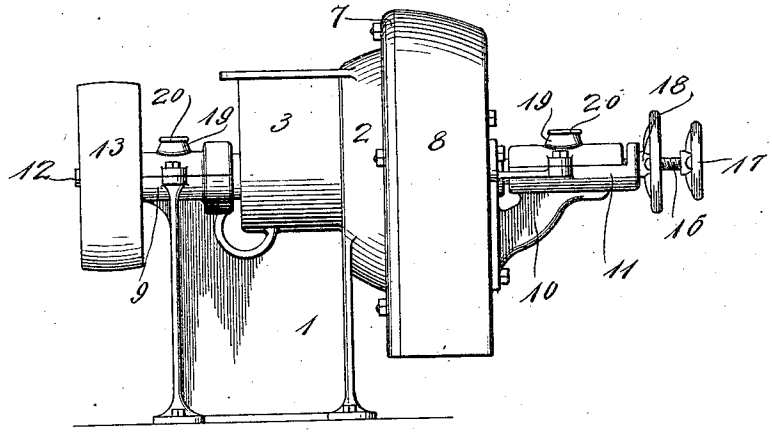


FIG. 2.

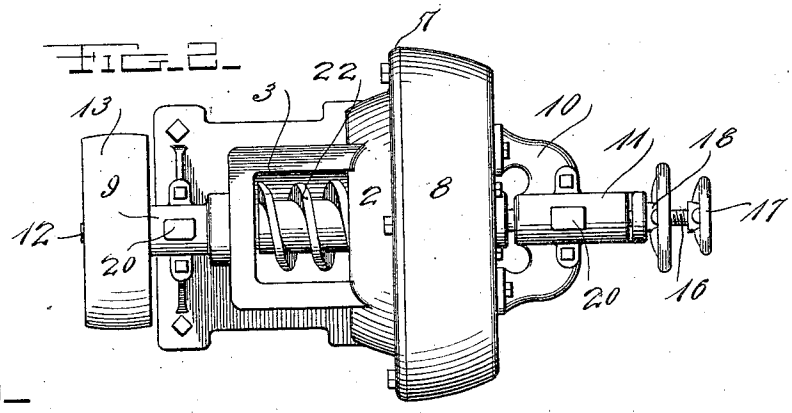


FIG. 3.

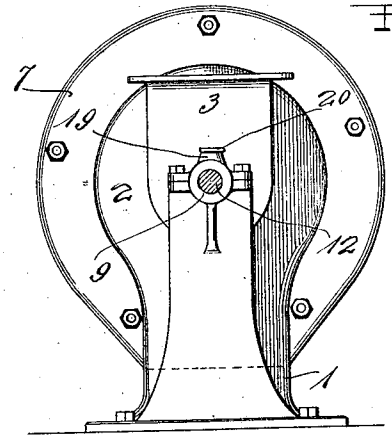
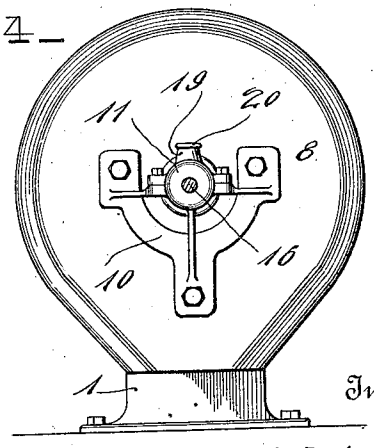


FIG. 4.



Witnesses

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2 SHEETS—SHEET 2.

FIG. 5.

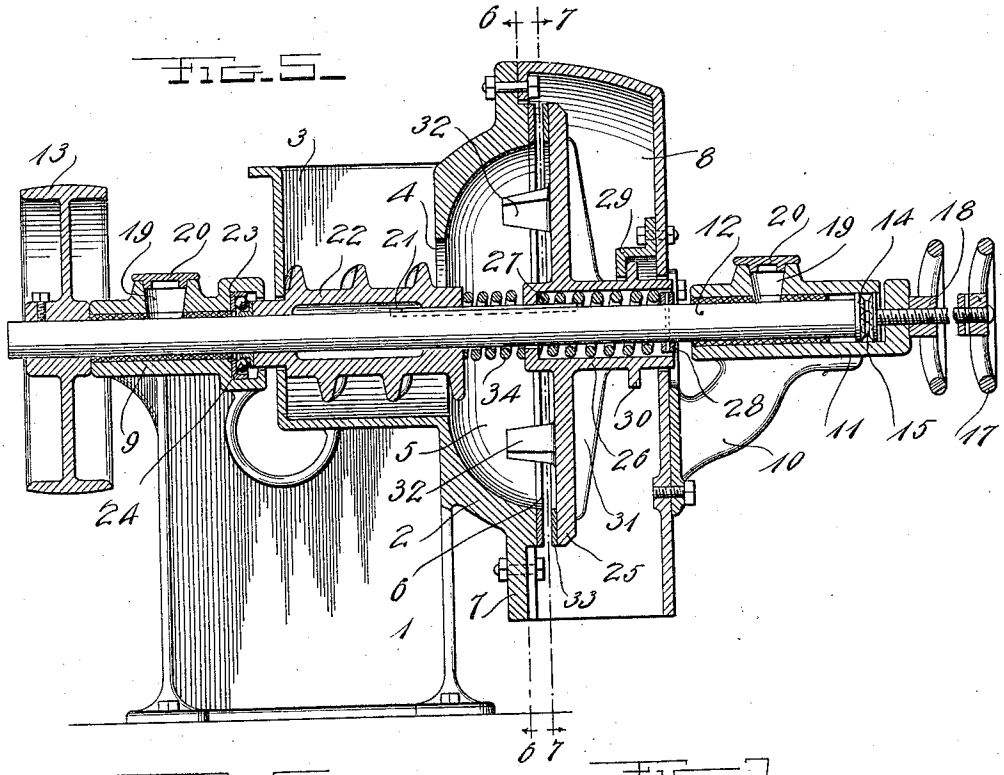


FIG. 6.

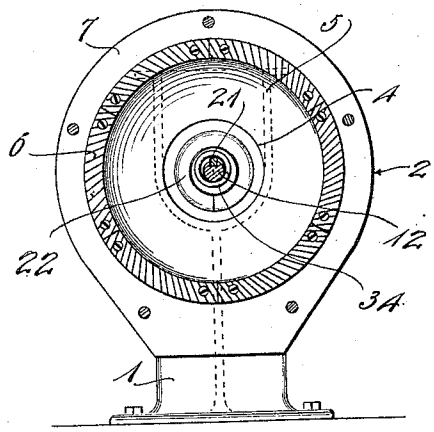
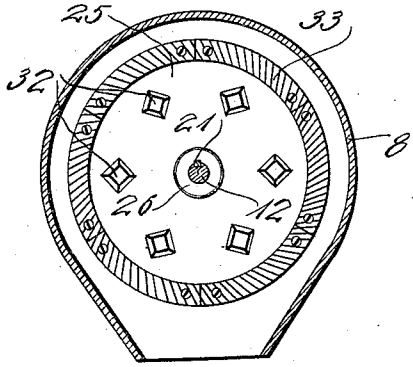


FIG. 7.



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UNITED STATES PATENT OFFICE.

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GRINDING-MILL.

1,046,678. Specification of Letters Patent. **Patented Dec. 10, 1912.**

Application filed January 29, 1912. Serial No. 674,127.

To all whom it may concern:

Be it known that I, HENRY G. THIESING, a citizen of the United States, residing at Lynn, in the county of Randolph and State of Indiana, have invented certain new and useful Improvements in Grinding-Mills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in grinding mills.

One object of the invention is to provide a grinding mill having an improved construction and arrangement of grinding mechanism and an improved means for feeding the material thereto.

Another object is to provide a grinding mill which is especially designed for granulating fine middlings that show the flattening effect of smooth rolls, tailings, or low grade stock whereby a better yield and more flour is obtained out of a given amount of wheat.

With these and other objects in view the invention consists of certain novel features of construction, and the combination and arrangement of parts as will be more fully described and claimed.

In the accompanying drawings; Figure 1 is a side view of my improved grinding mill; Fig. 2 is a top plan view thereof; Fig. 3 is a front end view with the driving pulley removed and the drive shaft in section; Fig. 4 is a rear end view showing the shaft adjusting screw in section; Fig. 5 is an enlarged central vertical longitudinal section; Fig. 6 is a vertical cross section on the line 6—6 of Fig. 5; Fig. 7 is a similar view on the line 7—7 of Fig. 5.

My improved grinding mill comprises a main supporting frame 1, on the inner end of which is arranged one member 2 of a shell or casing with the inner end of which is connected a feed hopper 3, said hopper being formed integral with the shell or casing and communicating therewith through a feed passage 4 as shown. In the opposite side of the shell or casing is formed a circular concentric grinding chamber 5 around the outer edge of which is secured the stationary grinding ring or bur 6 of the mill, said ring or bur being preferably constructed of a series of segmental plates corrugated on their outer surfaces as clearly shown in Fig. 6 of the drawing. On the outer edge of the shell or casing member 2 is formed a radially projecting flange 7 to which is bolted or otherwise rigidly secured the outer member 8 of the shell or casing, said member 8 being open at its lower side to form a discharge opening through which the material is discharged after being ground.

On the upper end of the frame 1 adjacent to the outer side of the hopper 3 is formed a shaft bearing 9, while to the outer side of the member 8 of the shell or casing is secured a bearing bracket 10 on which is arranged a shaft bearing 11. Revolubly mounted in the bearings 9 and 11 is an operating shaft 12 on one end of which is fixed a drive pulley 13. In the bearing 11 at the opposite end of the shaft is arranged a thrust bearing 14 comprising a pair of disks having in their inner surfaces annular ball races in which are arranged bearing balls 15. The adjacent end of the shaft 12 engages the inner disks while with the outer disk is engaged the inner end of an adjusting screw 16 having a threaded engagement with the outer end of the bearing 11, said screw being provided on its outer end with a hand wheel 17 and having thereon a locking nut 18 which is also provided with a hand wheel. By means of the screw 16 the bearing 14 may be adjusted with respect to the end of the shaft to hold the latter in proper position and to receive the end thrust thereof. In the bearings 9 and 11 are formed oil cups 19 having suitable caps or covers 20.

In the central portion of the shaft 12 is arranged a key or feather 21 and slidably keyed to the shaft by said feather is a force feed screw 22 disposed in the lower portion of the feed hopper 3 whereby the material is fed from the hopper through the passage 4 into the grinding chamber 5. The outer end of the feed screw 22 works through an aperture in the outer side of the hopper 3 and on the projecting end of the feed screw is arranged one member of a ball race, the other member of which is arranged in a socket 23 formed on the inner end of the bearing 9. With the ball race is engaged an annular series of bearing balls 24 which form a thrust bearing for the outer end of the feed screw.

Slidably keyed to the shaft 12 by the key or feather 21 is a grinding disk 25 having an elongated hollow hub 26 in which is arranged a coiled spring 27 one end of which bears against the inner end wall of the hub, while the opposite end bears against a stop collar 28 secured to the shaft 12 as shown. The pressure of the spring 27 is exerted to force the grinding disk 25 toward the grinding ring or bur 6 on the shell or casing member 2. The movement of the disk 25 by the spring 27 is limited by a segmental guard bracket 29 with which is engaged an annular stop flange 30 formed on the hollow hub 26 near its outer end as shown. The guard 29 when thus arranged prevents the spring 27 from forcing the disk 25 too closely on the grinding ring 6 and also prevents the flour from blowing out over the ends of the hub. The spring 27 yieldingly holds the grinding disk in proper position with respect to the grinding ring 6 and at the same time permits the disk to respond instantly to any increase or decrease in the material being fed between the disk and ring. The disk 25 is suitably braced on its outer side by bracing ribs 31 and on its inner side has arranged at equal distances apart, a plurality of beaters 32. On the inner side of the disk around the outer edge thereof is arranged a grinding ring 33, said ring being formed of a series of segmental plates corrugated on their outer surfaces and secured to the disk in any suitable manner, said plates and the inner side of the disk being clearly shown in Fig. 7 of the drawings. By thus arranging the driving ring or bur 33, the same will co-act with the ring or bur 6 when the disk is revolved thus forming an efficient grinding mechanism which will uniformly grind the grain to the desired fineness.

On the shaft 12 between the inner end of the hub 26 of the grinding disk and the adjacent end of the force feed screw 22 is arranged a coiled spring 34 the pressure of which is exerted to hold the outer end of the feed screw in engagement with the thrust bearing in the socket on the inner end of the shaft bearing 9. By slidably keying the grinding disk and the force feed screw to the drive shaft and providing the adjusting screw 16 the shaft may be adjusted to apply the desired tension to the grinding disk while the mill is running and without interfering with the operation or arrangement of the force feed screw or other parts of the mill.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention as claimed.

Having thus described my invention, what I claim is;

1. In a grinding mill the combination with a shell or casing, a stationary grinding bur and a revolubly and slidably mounted shaft of a grinding disk having an elongated hollow hub slidably keyed to said shaft, a grinding bur fixed on said disk and adapted to co-act with the bur in said casing, a spring arranged in said hollow hub of the disk whereby the latter is yieldingly held to support the bur thereon in position to co-operate with the stationary bur in the casing, and coöperating means carried by said hub and casing to limit the movement of the disk by said spring.

2. In a grinding mill the combination with a shell or casing, a stationary bur and a revolubly and slidably mounted shaft of a grinding disk having a hollow hub slidably keyed to said shaft, a stop collar secured to the shaft, a spring arranged in said hub between said axle and the inner end of the hub whereby the pressure of the spring is applied to yieldingly hold the disk in operative position, a segmental guard bracket secured in the casing, a stop flange on said hub adapted to engage said bracket whereby the movement of said disk by the spring is limited, and means whereby the shaft is adjusted longitudinally to regulate the tension of said spring thereby regulating the pressure of the grinding disk.

3. In a grinding mill the combination with a casing, a stationary grinding ring or bur and a slidably and revolubly mounted shaft of a grinding disk slidably keyed to said shaft, a grinding ring on said disk adapted to co-act with the grinding ring in said casing, means to yieldingly hold said disk in operative position, a feed hopper arranged on said casing, a force feed screw slidably keyed to said shaft and arranged in said hopper, and a spring arranged between said feed screw and said grinding disk whereby said feed screw is held in position in the feed hopper.

4. In a grinding mill, a supporting frame, a casing arranged thereon, a feed hopper formed on said casing, a revolubly mounted operating shaft, a force feed screw slidably keyed to said shaft and adapted to force the material from said hopper into said casing, a grinding bur arranged in said casing, a grinding disk slidably keyed to the shaft, a grinding ring secured to said disk and adapted to co-act with the grinding ring in said casing, an elongated hollow hub formed on said disk, a spring arranged in said hub, a stop collar secured to the shaft and engaging the outer end of the spring whereby when said shaft is adjusted longi-

tudinally the tension of the spring will be regulated and the grinding mechanism thereby controlled, a guard bracket secured to the casing, a stop flange arranged on the hub of the disk and adapted to engage said bracket whereby the movement of the disk by said spring is regulated.

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

HENRY G. THIESING.

Witnesses:
SAMUEL C. WESTLAKE,
ROY SNYDER.