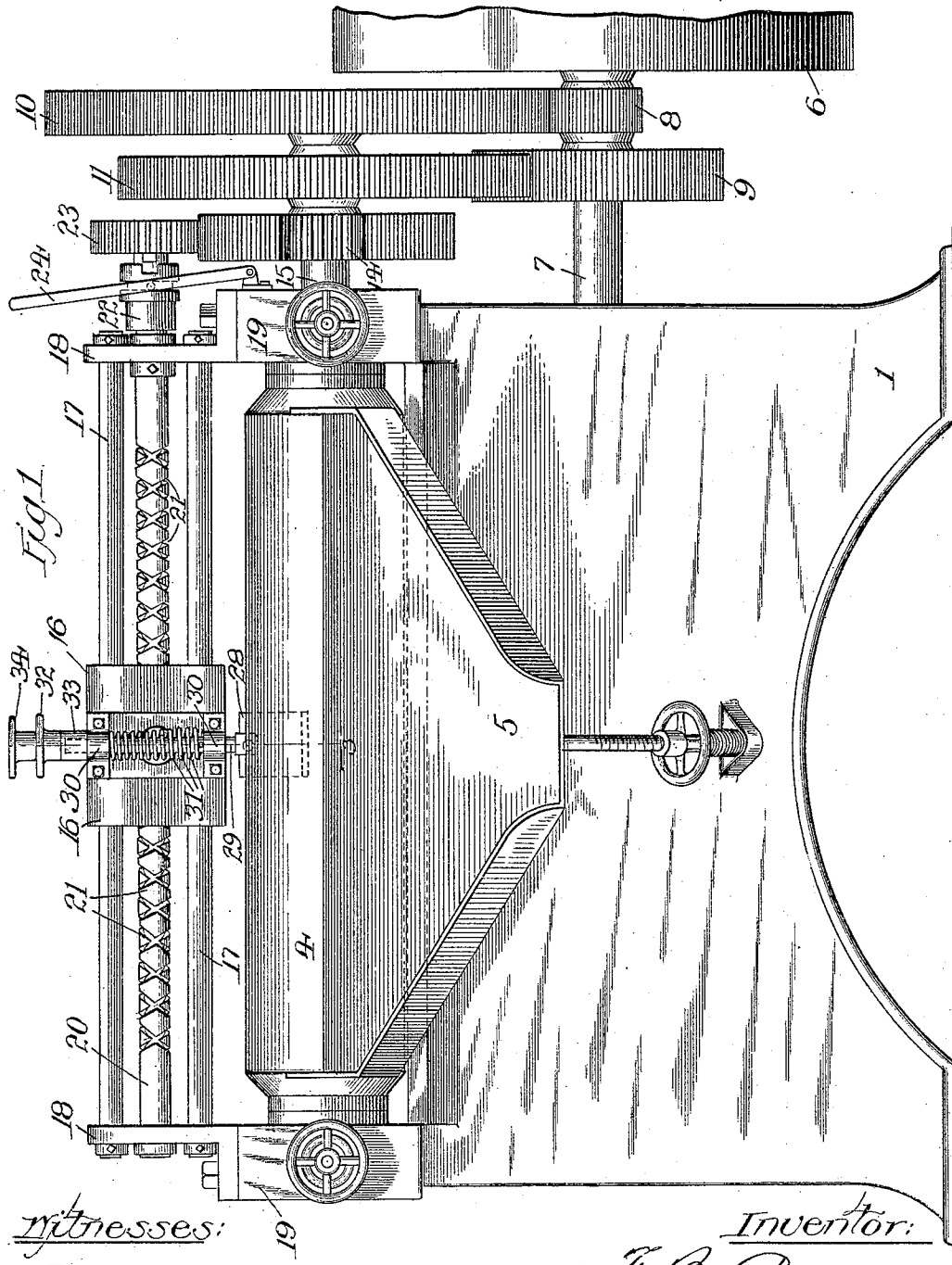


F. B. CANODE.
GRINDING MILL.
APPLICATION FILED JAN. 11, 1904.

946,107.

Patented Jan. 11, 1910.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

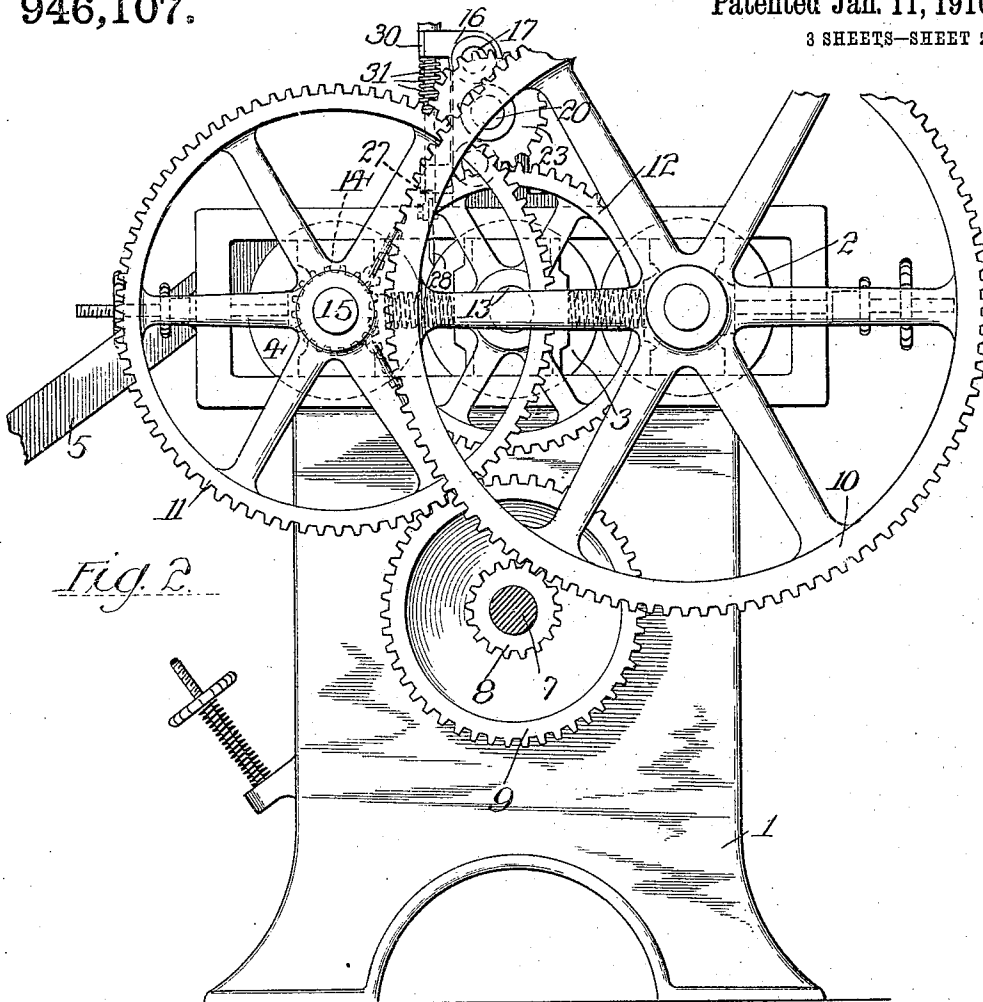


Fig. 2.

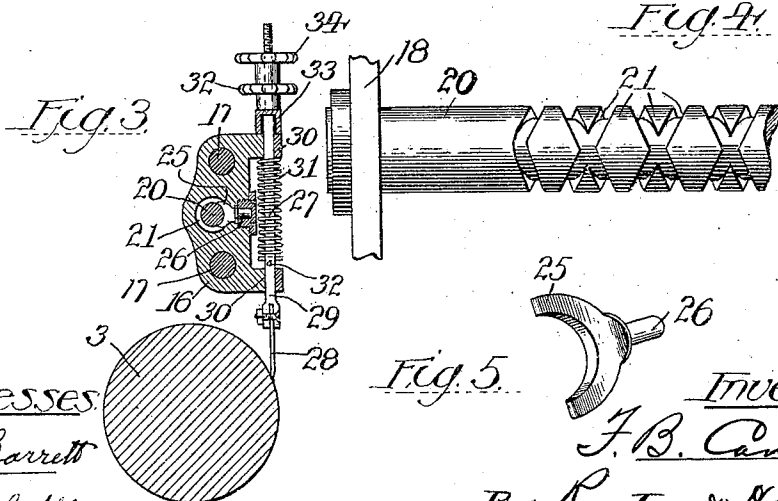


Fig. 3.

Fig. 4.

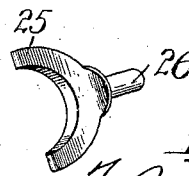


Fig. 5.

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3 SHEETS—SHEET 3.

Fig. 6

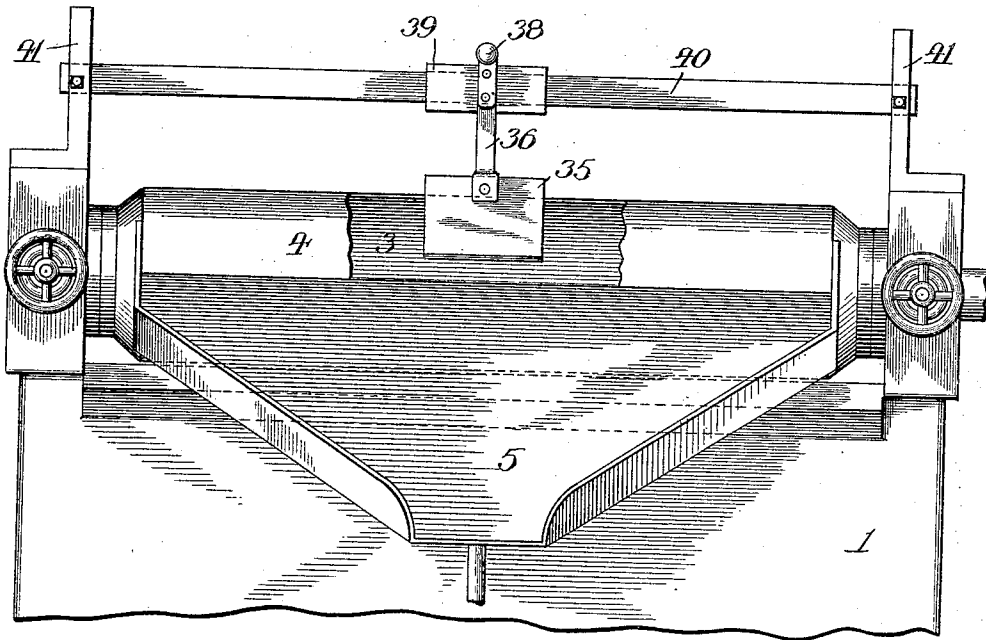
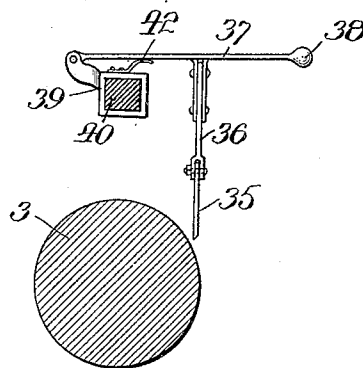


Fig. 7



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UNITED STATES PATENT OFFICE.

FREDERICK B. CANODE, OF CHICAGO, ILLINOIS.

GRINDING-MILL.

946,107.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed January 11, 1904. Serial No. 188,495.

To all whom it may concern:

Be it known that I, FREDERICK B. CANODE, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification.

My invention relates to grinding mills used for different purposes in the arts and employing a series of grinding rollers.

The object of my invention is to overcome the objectionable caking of the ground material on the roller by providing such mill or machine with a knife or scraper by preference operated by the power of the mill for removing such caked material from the roller.

In the present instance I have chosen to illustrate and describe my invention as applied to an ink mill of the three-roller type, although such invention may readily be applied to grinding mills employed for other purposes than the grinding of inks.

The features of advantage and utility of my invention will be apparent from the description hereinafter given.

In the drawings, Figure 1 is a front elevation of a three roller ink mill illustrating my improvement applied; Fig. 2 an end elevation thereof; Fig. 3 a section on the line 3 of Fig. 1 taken through a part only of the machine; Figs. 4 and 5 detail views of parts of the knife or scraper mechanism constituting my improvements; Fig. 6 an elevation of a portion of a grinding mill embodying a modified form of construction of my attachment; and Fig. 7 a section on line 7—7 of Fig. 6.

The ink mill itself is of a well known construction and therefore need not be described in detail. It will suffice to say that the machine comprises a frame 1, three grinding rollers 2, 3 and 4, journaled therein, a color apron 5 whose inner edge acts as a scraper cooperating with one of the rolls, and gearing for driving the rollers at different speeds in the well-known manner. As herein shown, the tight pulley 6 drives the shaft 7 which carries the two pinions 8 and 9 respectively driving the gears 10 and 11. These gears are connected to the shafts of the two outside grinding rollers 2 and 4 and thereby drive the latter. The middle roller 3 on which the color (if an ink mill) cakes or packs is driven by the gear 12 mounted on its shaft 13 and meshing with

the pinion 14, which is secured to the same shaft 15 as the gear 11.

The machine or mill so far described is one of a well known make and is typical of the modern ink mill. My attachment or improvements now about to be explained are shown in connection with such mill but with slight mechanical alterations or change in proportions they may be adapted to mills of other makes and constructions.

Referring to Figs. 1 to 5 of the drawings, illustrating the preferred form of construction, my attachment as shown is arranged above the middle roller and comprises essentially a knife or scraper mounted in a suitable carrier or frame which, in this particular construction, is caused to travel longitudinally of the middle roller in such relation thereto as to scrape off or remove any of the color sticking or adhering to such roller. In the present instance the knife carrier or frame 16 is provided with transverse openings so as to receive two parallel guide rods 17 on which such carrier is arranged to slide. These guide rods are arranged substantially above the middle roller 3 and longitudinally thereof, with their ends connected to angle plates 18 secured to the main journal boxes 19 of the machine. The angle plates 18 also constitute in fact bearings for a double screw 20 having a double set of screw threads or grooves 21 so constructed that an engaging member will, upon rotation of the screw, be caused to travel first in one direction and then in the other after being reversed by such threads. As shown, a clutch 22 of suitable construction is connected to one end of the screw and adapted to be thrown into and out of engagement with the pinion 23 which is loosely mounted on one end of the shaft or screw 20 by means of the hand lever 24. This pinion 23 is in mesh with the gear 12 and is therefore in rotation during the working of the machine, with the result that my attachment may be put into operation at any time at the will of the operator. The screw 20 passes freely through the carrier frame at a point midway of the two guide rods 17, as indicated in Fig. 3, and cooperates with an engaging member fixed in the carrier and comprising, in the present instance, a yoke or U-shaped portion engages or fits in the screw threads or grooves of the screw, while its pin end 26 loosely bears in a socket formed

in a screw plug 27 arranged to screw into an opening in the carrier communicating with the opening through which the screw extends, all as clearly illustrated in Fig. 3.

5 The knife or scraper 28 is secured to the lower end of a spring pressed plunger or rod 29, which has suitable bearings, in the present instance a pair of bearings 30, in the carrier, as shown, so as to move or slide

10 vertically therein. This rod is pressed downwardly with a yielding pressure by means of a coiled spring 31 abutting at one end against the upper bearing 30 and at the other end against a pin 32 on the rod. Suitable means for adjusting and determining

15 the downward limit of movement of the knife are employed, and for such purpose I have provided, in the present instance, an adjusting nut 32, screwing on the upper

20 screw threaded end of the rod 29 and bearing preferably against a cup washer 33 resting on the top bearing 30. By screwing this nut up or down, the limit of the knife downwardly pressed by the spring may be

25 adjusted. A second nut 34 serves to lock the adjusting nut.

When it is desired to scrape the roller 3 and thereby remove any material accumulated or caked thereon, the knife is properly

30 adjusted downwardly until its spring is enabled to press it against the periphery of the roller substantially tangentially thereof, and the clutch thrown into engagement, with the result that the screw 20 will be rotated by the driving gears of the mill and by reason

35 of the engagement of the carrier with the screw through the medium of the member or yoke 25, the yoke will be automatically but comparatively slowly moved longitudinally of the roller, cutting and removing the

40 packed or caked material therefrom. When the carrier is moved in one direction, its yoke engages one set of the grooves of the screw and upon reaching the end thereof

45 such yoke enters the other set thereof, partially rotating in such act, so that the movement of the carrier is automatically reversed. The knife may thus be caused to travel back and forth longitudinally of the roller and in

50 operative relation thereto as long as desired by the operator. When the roller is effectually cleaned or scraped, the operator throws out the clutch and raises the knife by manipulating the nuts 32, 34. In case the knife

55 encounters any material packed on the roller so hard that it cannot be removed by such knife, the latter will yield upwardly against the tension of its spring so that the mechanism will not be broken or injured.

60 By the use of my improvements the efficiency and output of a mill to which they are attached are considerably increased, inasmuch as, first, the roller may be kept clean and therefore in condition for proper and

65 effective grinding, and, secondly, the time of

the operator is not consumed in removing the caked material by hand in the usual laborious and tedious manner.

While I prefer the construction of attachment above described, yet so far as the broad

70 idea of my invention and some of the claims are concerned, the feature of the actuation of the knife by power may be dispensed with and provision made to bring the knife in co-operative relation with the roller and shift it

75 therealong by hand, without departure from the spirit and scope of my invention. Such modified form of construction is illustrated in Figs. 6 and 7 wherein the grinding mill itself is the same as shown in the other figures and the parts thereof therefore have corresponding reference characters.

Referring to Figs. 6 and 7, the knife 35 which as before is made of much less width than the length of the roller is carried on

85 the lower end of a rod or support 36 which is secured at its upper end to a substantially horizontal arm or lever 37, provided with a handle 38 to be grasped by the operator. This lever is pivoted at its rear end to a

90 sleeve 39, which, in the present instance, has a square opening to receive and slide upon a rod 40 which is square in cross-section. This rod 40 forms a support and guide for the knife and its associated parts and is mounted

95 above the roller parallel to the axis thereof, with its ends fastened to the angle plates 41 secured to the machine or mill frame. This knife 35 is of less width than the length of the roller, as stated, but it is evident that the knife may equal the roller in width although the former construction is preferable. The knife 35 is normally upwardly spring-

100 pressed away from the periphery of the roller in any suitable manner, as by means of a spring 42 interposed between the lever 37 and the sleeve 39, as clearly illustrated in Fig. 7. In practice, the operator or attendant, after shifting the knife along its carrier to the desired place, bears down on the

110 handle 38 and thereby brings the knife 35 into coöperative relation with the roller, thereby scraping and cleaning the latter. The knife, after use in one place on the roller, may then be shifted longitudinally thereof and by a series of shifting movements the roller may be scraped and cleaned throughout its entire length.

I claim:

1. In a grinding mill, the combination

120 with the plurality of grinding rollers thereof, of a knife coöperating with one of the rollers and arranged to be presented thereto substantially end on to remove material packed or caked thereon; means for moving

125 the knife longitudinally of the roller, and means for adjusting the limit of movement of the knife toward the roller; substantially as described.

2. In a grinding mill, the combination

130

with the plurality of grinding rollers thereof, of a knife arranged to cooperate with and arranged above one of the rollers and adapted to be brought into cooperative relation therewith by being presented thereto substantially end on to scrape and clean the same and means for moving the knife longitudinally of the roller; substantially as described.

3. In a grinding mill, the combination, with the plurality of grinding rollers thereof, of a knife arranged to cooperate with and arranged above one of the rollers and substantially tangential to the periphery of the roller, said knife being normally out of cooperation but adapted to be brought into cooperative relation with the roller to scrape and clean it and means for moving the knife longitudinally of the roller; substantially as described.

4. In a grinding mill, the combination with the plurality of grinding rollers thereof, of a knife movable longitudinally of one of the rollers and arranged to be presented substantially tangentially thereto to scrape and clean the same, but normally not cooperative therewith, means for moving the knife longitudinally of the roller, and a scraper for removing the material from one of the rollers; substantially as described.

5. In a grinding mill, the combination, with a grinding roller thereof, of a knife movable longitudinally of the roller and arranged to scrape or clean the same, means for holding the knife with a yielding pressure in cooperative relation with the roller and manually controlled mechanism for holding said knife retracted at the will of the operator; substantially as described.

6. In a grinding mill, the combination, with a grinding roller thereof, of a spring-pressed knife projected against the roller and arranged to cut and remove material packed or caked thereon, means for moving the knife longitudinally of the roller, and manually controlled means for holding said knife retracted at the will of the operator; substantially as described.

7. In a grinding mill, the combination, with a grinding roller thereof, of guiding mechanism mounted on the mill, a carrier movable on and guided by such mechanism, means for so moving the carrier, a knife mounted in such carrier and means for holding such knife projected therefrom with a yielding pressure against the periphery of the roller to remove caked material therefrom; substantially as described.

8. In a grinding mill, the combination, with a grinding roller thereof, of a pair of parallel guide rods mounted on the mill and above such roller and longitudinally thereof, a carrier arranged to slide on such guide rods, means for so sliding or moving the carrier on the guide rods, and a knife ar-

ranged in such carrier and adapted to remove caked material from the roller; substantially as described.

9. In a grinding mill, the combination, with a grinding roller thereof, of guide rods mounted on the mill and above such roller and longitudinally thereof, a carrier arranged to slide on such guide rods, a rotatable screw cooperating with such carrier to move the latter longitudinally of the roller, and a knife arranged in such carrier and adapted to be presented end on to the roller to remove caked material therefrom; substantially as described.

10. In a grinding mill, the combination, with a grinding roller thereof, of a carrier, a knife arranged in such carrier and adapted to be presented to the roller substantially end on, a rotatable screw mounted on such mill and having a double set of right and left hand screw threads, and a member arranged in such carrier for engaging said sets of threads alternately; substantially as described.

11. In a grinding mill, the combination, with a grinding roller thereof, of a carrier, a knife arranged in such carrier and in proximity to the roller, a rotatable screw mounted on such mill and having a double set of right and left hand screw threads communicating with each other at their ends, a yoke mounted to have a partial rotation in such carrier and to alternately engage the sets of threads whereby the carrier is continuously moved back and forth longitudinally of the roller, and a pair of parallel guide rods on which the yoke is mounted to slide; substantially as described.

12. In a grinding mill, the combination, with a grinding roller thereof, of guide rods mounted on the mill and above such roller, and longitudinally thereof, a carrier arranged to slide on such rods, a knife mounted in such carrier and arranged in proximity to the roller, a rotatable double screw passing freely through the carrier, a screw plug located in said carrier and having a socket, and an engaging member comprising a yoke portion cooperating with the screw and a pin portion 26 received by such socket; substantially as described.

13. In a grinding mill, the combination, with a grinding roller thereof, of a knife held projected toward the roller with a yielding pressure and arranged to remove material packed or caked thereon, said knife being less in width than the length of the roller, means for moving the knife longitudinally, and means for adjusting the limit of projection of such knife; substantially as described.

14. In a grinding mill, the combination, with a grinding roller thereof, of a carrier or frame mounted above such roller, a knife carried by such carrier and spring pressed

therefrom and held projected toward the roller, said knife being less in width than the length of the roller, means for moving the knife longitudinally, and means for adjusting the limit of projection of such knife; substantially as described.

15. In a grinding mill, the combination, with a grinding roller thereof, of a carrier or frame mounted above the plane of such roller, and longitudinally thereof, a spring pressed rod or plunger bearing in such carrier, and a knife carried by such rod and held projected toward the roller; substantially as described.

16. In a grinding mill, the combination, with a grinding roller thereof, of a carrier or frame mounted above the plane of such roller, a spring pressed rod or plunger bearing in such carrier, a knife carried by such rod and held projected toward the roller,

and an adjusting nut on such rod for adjusting the limit of projection of the knife; substantially as described.

17. An attachment for a grinding mill, comprising guide rods 17, a rotatable screw 25 20 having right and left hand threads, a carrier 16 arranged to slide on the guide rods and through which the screw freely passes, a screw plug 27 in such carrier and having a socket, a yoke 25 engaging the screw and 30 having a pin received by said socket, bearings 30 on such carrier, a rod or plunger 29 in such bearings, a spring 31 adapted to hold such rod projected, a knife 28 carried by the lower end of the rod 29, and an adjusting 35 nut 32 on the upper end of the rod.

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