May 6, 1924.

1,493,382

P. PRIEM

WOOD GRINDER

Filed June 12, 1922

Fig.1

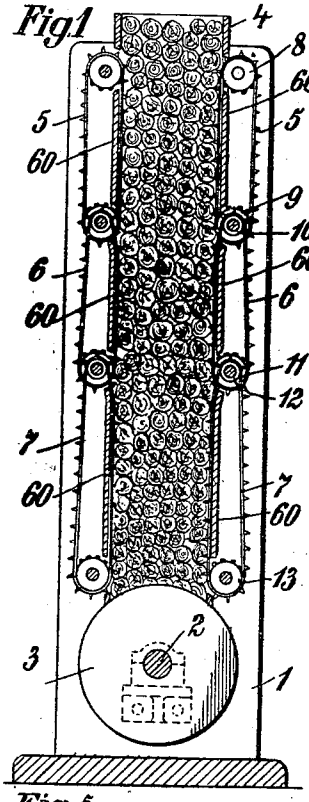


Fig.2

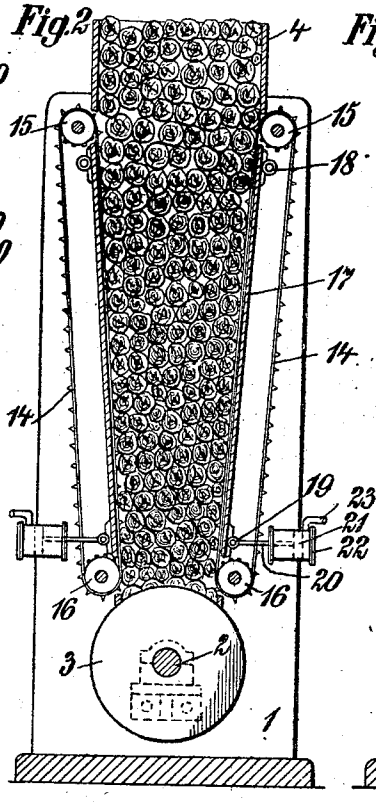


Fig.4

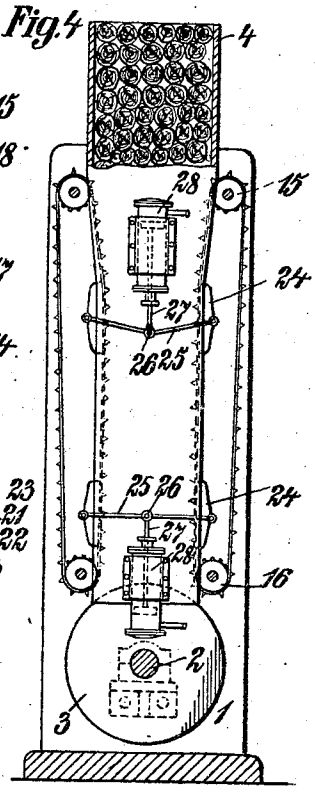


Fig.5

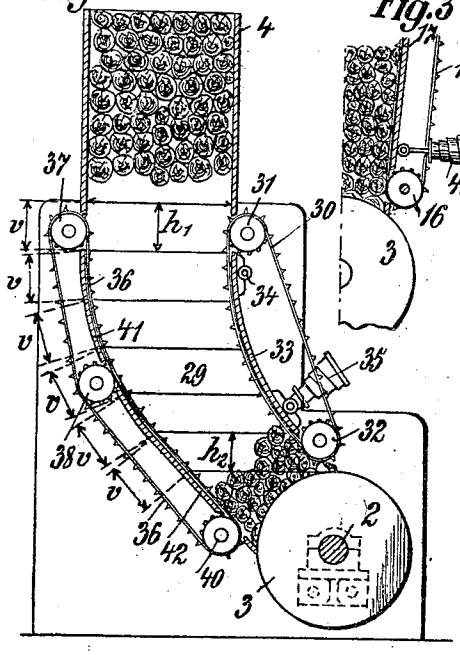
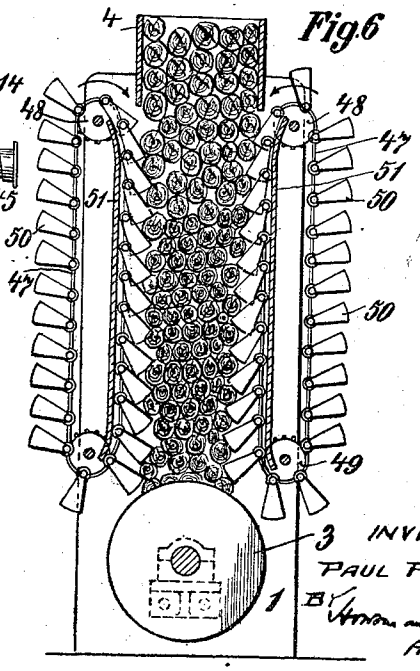


Fig.3

Fig.6



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UNITED STATES PATENT OFFICE.

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WOOD GRINDER.

Application filed June 12, 1922. Serial No. 567,778.

To all whom it may concern:

Be it known that I, PAUL PRIEM, a citizen of the Republic of Germany, and residing at Heidenheim-on-der-Brenz, Germany, have invented certain new and useful Improvements in Wood Grinders, of which the following is a specification.

In continuously operating wood grinders, in which feed devices press against the sides of the charge of blocks and advance it against the grind stone, I have observed that only the blocks which are in direct engagement with the feed devices—that is to say, only those at the sides of the charge mass,—are forced against the grind stone with the desired pressure. The blocks in the middle of the charge mass, which are not directly engaged by the feed devices, do not receive sufficient pressure from the latter for the most efficient operation of the grinder. This difficulty cannot be remedied by merely increasing the height of the hopper and of the charge mass within it—even for example, to the height of sixty feet. Even under such conditions the action of the grind stone on the blocks in the middle of the charge is incomplete, because of the lack of necessary pressure at this point. The efficiency of the grinder is seriously influenced by this condition, since the pressure of the blocks against the stone is really the controlling factor in determining the output of the machine.

I have met this difficulty according to the present invention, by increasing the feed pressure on the interior of the charge by increasing the lateral pressure of the feed devices against the sides of the block mass. As a consequence of the increased lateral pressure of the feeders, the frictional engagement between the blocks of the charge is so increased, that the grip of the feeders on the sides of the charge is transmitted to the interior of the mass, and the latter, as well as the marginal areas thereof, is forced against the grinder with the desired pressure.

Several ways of accomplishing this are shown in the accompanying drawings, in which—

Figs. 1 and 2 are vertical sections through feed hoppers in which my invention is embodied in different manners;

Fig. 3 is a partial section showing a modification of the construction shown in Fig. 2;

Fig. 4 is a broken side elevation of another modification; and

Figs. 5 and 6 are sections through other modified embodiments of my invention.

Referring to Fig. 1, I have indicated a pair of spaced standards 1 in which is journalled the shaft 2 carrying the grind stone 3. Above the latter is the hopper 4 through which the wood blocks are fed to the stone. Associated with the hopper are three pairs of feed chains 4, 5 and 6, which may be arranged adjacent the front and back walls of the hopper, and are provided with feed pallets or teeth in well understood manner. The feed chains pass through slots in the walls of the hopper so that their inner and downward-travelling reaches engage the adjacent sides of the charge. The feed chains 5 pass over sprockets 8 and 9, which may be driven in any suitable manner. Fast on the spindles of the sprockets 9 are smaller sprockets 10, which drive the chains 6, the lower ends of which pass over sprockets 11. Inasmuch as the chains 6 are driven by the smaller sprockets 10, their speed is less than that of the uppermost chains 5. Similarly, the sprockets 11 have fast therewith smaller sprockets 12 which drive the lowermost chains 7 which, at their lower ends, engage the sprockets 13. The chains 7 are thus driven still slower than the chains 6. The speeds of the three feed chains 5, 6 and 7 are consequently progressively slower, and the feed of the block mass is similarly progressively less as it approaches the stone 3. During their drive, the feed chains bear against the inner faces of the hopper wall sections 60, which may be either rigid or yieldingly held in position, and support the feed chains. As a result of the greater speed at which the upper chains 5 and 6 are driven, the more rapid feed of the charge at this point compacts the charge below, and thus increases the frictional engagement between the blocks, and the effectiveness with which the interior of the charge is pressed against the grind stone. Of course the number of feed chains, and their extent, may be varied as desired.

In Fig. 2 the increased pressure on the interior of the charge in the neighborhood

of the grind stone is accomplished by reducing the diameter of the hopper adjacent the stone in the area in which the feed devices work. As a result, the compactness of the charge adjacent the stone is increased, with accompanying increase of effective feed pressure, especially upon the blocks in the interior of the mass which are forced by the feeders against the stone. The effective operation of the stone is greatly increased by this simple expedient.

For this purpose the feed chains 14 are engaged by sprockets 15 and 16, driven in any suitable fashion. The pressure of the feed chains against the blocks is accomplished by press plates 17, which are pivoted on trunnions 18 at their upper ends. At their lower ends, the plates are engaged at 19 by rods 20 of pistons 21 working in cylinders 22, to which air or liquid under pressure is introduced through pipes 23, so that the lower ends of the plates 17 are forced by the pistons against the charge.

Instead of pressure cylinders, heavy springs 45 may be substituted, as indicated in Fig. 3.

Whichever arrangement is employed, the press plates 17 are forced against the charge in the hopper, in thoroughly practical manner, and the pressure may be regulated as desired, either by varying the pressure of the liquid or air admitted to the cylinders 21, or by varying the stress of the spring 45.

It is not necessary that the reduction of the hopper cross section be gradual and continuous, as in Figs. 2 and 3. It suffices, as shown in Fig. 4, to provide a constricted area at the point spaced somewhat above the stone. In this construction the increased compactness of the charge in the neighborhood of the stone is effected by shoes 24, against which slide the inner reaches of the feed chains, the shoes being drawn together by links 25 connected at 26 to the pistons 27 of pressure cylinders 28 mounted on the sides of the hopper.

In Fig. 5 the compactness of the charge is increased at the stone by curving the lower portion 29 of the hopper 4. On the concave wall of the curved portion 29 of the hopper, is arranged the feeder 30 which runs on sprockets 31 and 32. The inner reach of the feeder lies against the inner face of a curved press plate 33, which is pivoted at 34 at its upper end, while its lower end is forced inward by the heavy spring 35 against the blocks. A cooperating feeder 36 bears against the inner face of the convex sides of the curved lower end of the hopper, and runs over sprockets 37, 38 and 40, of which the intermediate sprocket 38 serves as the driving element. The plate 42, against the inner face of which the feeder travels, is stationary. Obviously if v represents the travel of the feeder 36 in a given time interval, the compression of the charge corresponds to the difference between the masses h' and h^2 with respect to the lateral projection of the distances v.

Again, the compacting of the charge may be accomplished as indicated in Fig. 6, in which the feeders 47, running over the sprockets 48 and 49, carry wedges 50 which, during their working travel, gradually vary their inclination from a downwardly angled position to a position more nearly horizontal. Thus, if the wedges 50 at the outset of their working travel assume an angle of 60° from the horizontal, their speed of advance may be so much greater with respect to the speed of consumption of the blocks by the stone that as they approach the latter they assume an angle of only 30° to 45°. The compacting of the charge thus increases as the wedges approach the stone and gradually assume a more nearly horizontal position.

Various other arrangements for accomplishing the same end will readily occur to those dealing with the problem, without departing from what I claim as my invention.

I claim—

1. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, and feed means engaging the charge and operative to advance the latter at decreasing speed as it approaches the grind stone and while engaged by said feed means.

2. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, and feed means engaging the charge and operative to progressively compact the charge and to advance the same at decreasing speed as the charge approaches the grind stone.

3. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, and feed means engaging the charge and automatically operative to progressively compact the latter and to advance the same at decreasing speed as it approaches the grind stone.

4. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, endless feed means operating in the hopper and engaging the charge for simultaneously advancing the latter at progressively reduced speed and laterally compacting the charge progressively as the latter is advanced at reduced speed toward the grind stone.

5. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, means engaging the sides of the charge for continuously and forcibly feeding the latter against the grind stone, said feed means adjacent the grind stone serving to advance a portion of the charge in engagement therewith at a speed commensurate with the consumption of the charge by the grindstone, and simultaneously to advance the charge at an accelerated speed at a point remote from

the grind stone to effect a compacting action upon the charge in the neighborhood of the stone.

6. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, a series of feed chains for continuously and forcibly feeding the charge against the grind stone, and means for driving the feed chains remote from the charge at higher speed than those engaging the charge in the neighborhood of the stone, the drive of the latter being at a speed substantially commensurate with the rate of consumption of the charge by the stone.

7. In a wood grinder, a grind stone, an associated hopper for a charge of wood blocks, a series of feed chains engaging the charge and driven at different relative speeds, the feed chains remote from the stone being driven at higher relative speed than the feed chains adjacent the stone.

8. The method of continuously feeding a charge of wood blocks to a grind stone which comprises advancing the portion of the charge in engagement therewith toward the stone at progressively diminishing speed, the speed of the feed in the neighborhood of the grind stone being substantially commensurate with the consumption of the charge by the stone.

9. The method of continuously feeding a charge of wood blocks toward a grind stone, which comprises advancing and simultaneously laterally compacting the charge, and effecting the lateral compacting action upon the charge as it approaches the stone by diminishing the speed of the advance of the charge.

10. The method of continuously feeding a charge of wood blocks in a wood grinder or the like, which consists in subjecting the charge at points differently spaced from the stone to feed thrusts exerted at different speeds, the thrusts at the areas remote from the stone exceeding in speed the feed thrusts in the neighborhood of the stone.

11. In a wood grinder, a grind stone, an associated magazine for a charge of wood blocks, together with a series of feed chains arranged along each of two opposite sides of the magazine, each successive chain of each series acting substantially as a continuation of the preceding chain of the series to advance the charge continuously toward the grind stone, and means for so driving the chains at each side of the magazine that they cooperate to increase the pressure in the interior of the charge as it approaches the grind stone.

12. In a wood grinder, a grind stone, an associated magazine for a charge of wood blocks, together with a series of feed chains arranged along each of two opposite sides of the magazine, the successive chains of each series overlapping at their adjacent ends and serving to advance the charge continuously toward the grind stone, and means for so driving the chains at each side of the magazine that they cooperate to increase the pressure in the interior of the charge as it approaches the grind stone.

In testimony that I claim the foregoing as my invention I have signed my name.

PAUL PRIEM. [L. S.]

Witnesses:
BERTOLD A. BRAUN,
M. W. ALTAFFER.