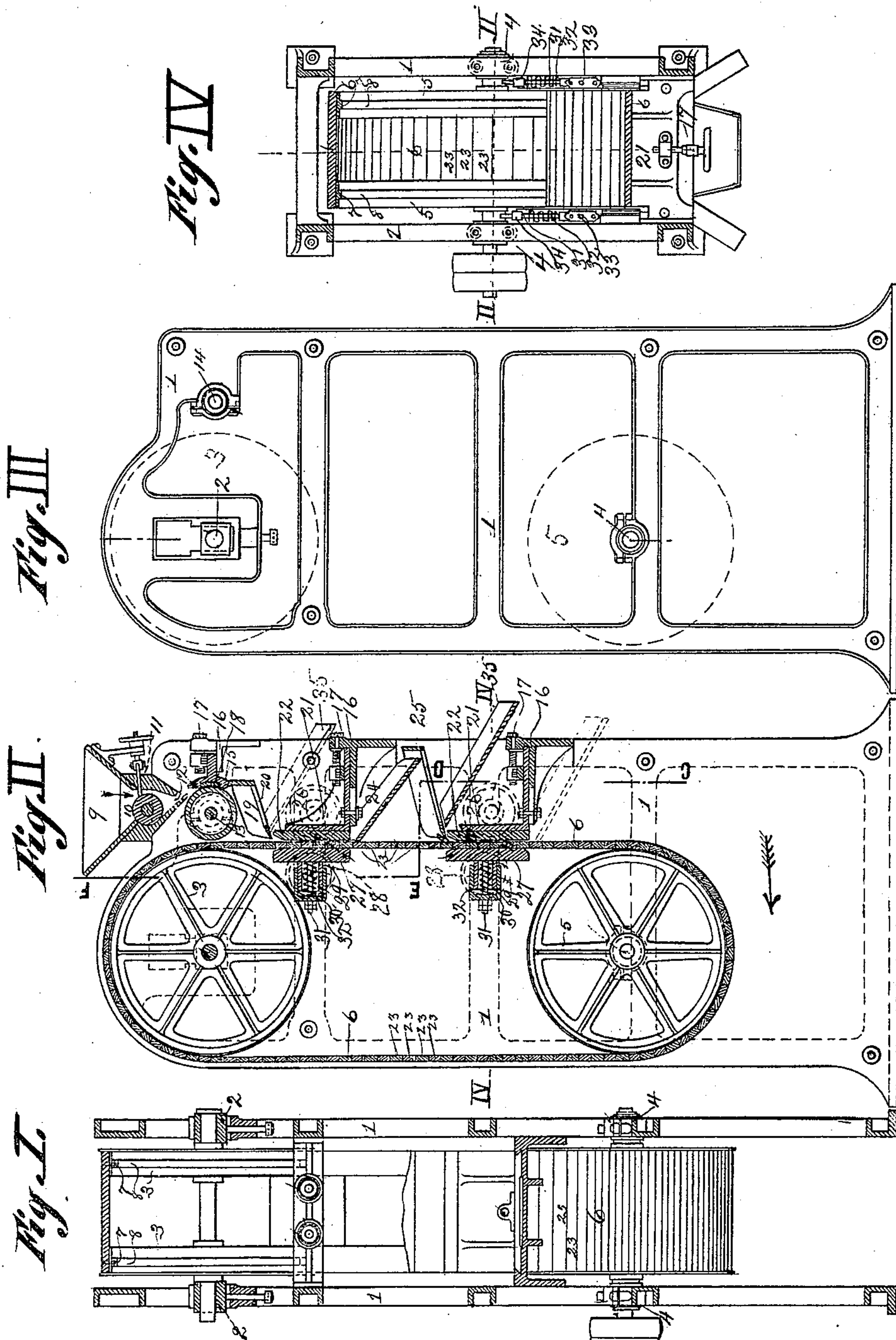


(No Model.)

F. QUÉNĒHEN & A. VANSTEENKISTE.  
GRINDING MILL.

No. 405,177.

Patented June 11, 1889.



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# UNITED STATES PATENT OFFICE.

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## GRINDING-MILL.

SPECIFICATION forming part of Letters Patent No. 405,177, dated June 11, 1889.

Application filed May 23, 1887. Serial No. 239,153. (No model.) Patented in Belgium March 18, 1887, No. 76,744; in England June 13, 1887, No. 8,492; in Germany June 18, 1887, No. 42,784; in France June 30, 1887, No. 184,535; in Italy December 31, 1887, XIV, 209, XXI, 22,427, and in Austria-Hungary May 1, 1888, No. 11,104, and No. 50,307.

*To all whom it may concern:*

Be it known that we, FRANÇOIS QUÉNÉHEN, mining engineer, and ACHILLE VANSTEENKISTE, manufacturer, both of Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Grinding-Mills, of which the following is a specification.

The said invention has been patented in Belgium March 18, 1887, No. 76,744; Germany June 18, 1887, No. 42,784; Great Britain June 13, 1887, No. 8,492; France June 30, 1887, No. 184,535; Austria-Hungary May 1, 1888, Nos. 11,104 and 50,307; Italy December 31, 1887, Nos. 209 and 22,427, Vols. XIV XXI.

Our invention has for its object to provide a machine adapted to thoroughly and quickly grind vegetable, animal, or mineral substances, and it may be used for preparing substances for alimentary, industrial, or other purposes, though it is particularly adapted for the decortication and grinding of grain, beans, &c., for the production of flour.

By extensive experience we have found our apparatus simple and effective for the purposes above named.

In practice the machine is preferably constructed of fire-proof materials and of such design that all the members may be neatly inclosed in an outer casing, whereby the danger usually incident to apparatus of similar nature is obviated. The journals and regulating mechanism, however, protrude beyond the casing to allow ready access thereto for lubricating and adjustment, in the manner as will hereinafter appear. The apparatus will also be found to be economical in regard to power required for running it. It will also be found that the material will not be heated to any considerable extent by our machine, and the machine will last a long time, owing to the great extent of grinding-surface.

Our invention consists, essentially, of an endless grinding-band constructed of transverse plates or blades of any suitable material and attached together in any suitable manner, a pulley, over which the band runs, a feed-hopper, a preliminary breaking mechanism

consisting of a roll and grinding-plate and two or more succeeding grinding members consisting of plates supported in any suitable manner adjacent or contiguous to the grinding-band, suitable means being provided for keeping the grinding-band up to the plates, all of which will be more particularly described and claimed hereinafter.

In the accompanying drawings, Figure I is a section of our machine on the line C D E F, Fig. II. Fig. II is a vertical section on the line II II, Fig. IV. Fig. III is a side elevation; and Fig. IV is a horizontal section on line IV IV, Fig. II, a modification (the roll) being shown.

1 1 are the frames, having bearings 2 4 for the pulleys 3 5, and preferably conforming in outline to the outer extremities of the parts they carry.

6 is the endless band running over the pulleys 3 5 and having tongues 7 engaging in grooves 8 in the pulleys, whereby the band is retained in place.

9 is a feed-hopper, which may be provided with a roller 10, valve 11, and throat 12, the last named discharging the grain into the first or preparatory break mechanism. The first break mechanism consists of a grooved hard-iron cylinder 13, mounted in suitable bearings 14, and a segment 15, supported by bracket 16, on which it is adjustable by means of a screw 17. This segment has a grooved hard-metal plate 18 inserted therein contiguous or adjacent to the roll, and it also supports a shoe 19, for emptying the broken kernels into the next grinding member, the bottom of this shoe being provided with a sieve 20, through which the finely-divided material may pass. The second grinding mechanism consists of a support 21, carrying a grinding-plate 22, which support is adjustably mounted on a bracket 16, with screw 17, as hereinbefore explained with respect to the first grinding member. In the second member the broken kernels are ground between the plate 22 and the numerous roughened plates or blades 23 of the endless band 6, and the material thus treated passes over a guide-



board 24 onto a second shoe having a screen 25, and is there delivered into the third grinding members, the material divided to a certain fineness passing through the sieve 25, and being there collected, as is that delivered by the previous screen, in any well-known or desirable manner. The third grinding members are constructed in precisely the same manner as heretofore set forth with respect to the second pair, the parts being numbered similarly. Behind the continuous band, substantially opposite the plates 22, are arranged supports 27, consisting of flat plates mounted preferably by means of telescoping cylindrical parts 29 30, the former secured to the plate and the latter fixed on the frame, the two parts having passed axially through them rods 31, on which is mounted a coil-spring 32, which tends to separate the parts 29 and 30. By this means the support-plates keep the band at this point constantly in position with a yielding pressure.

If desired, rollers 28 can be substituted for the plates 27, in which case the yielding pressure is attained by applying the rods 31 and springs 32 between the journals 33 and a fixed support 34, as shown in Fig. IV. It will also be seen from the drawings that rolls 26 may be substituted for plates 22, their bearings being mounted on supports 21.

35 may represent shoes or guide-boards for conducting the material to any receptacle, and of these shoes there may be any necessary number located in necessary places.

The operation of our device is as follows: The substance to be ground, being deposited into the hopper 9, passes through the valve 10 at a rate permitted by the adjustment of the valve, is spread out by the throat or spreader 12, and drops into the first break mechanism. Here the grain is preferably split in halves, and in passing out drops into the shoe 19, where the finely-divided material passes through the sieve 20, the large portions passing onto the second break mechanism, where it is ground to a finely-divided state, when the material is again sifted, and the part not passing through the sieve is finally treated in the last grinding mechanism.

Of course we desire it understood that the grinding-band may be of any length, and any

number of grinding-plates 22 mounted in front of it. It is also obvious that several bands may be used without altering the character of our invention. In other words, our apparatus may be increased in size and capacity by simply multiplying the parts.

An apparatus constructed as hereinbefore explained is capable of grinding any substance whatsoever, from the finest to the coarsest, and either dry, damp, greasy, or any other kernels. The endless bands may be constructed of steel blades or plates or linked chains, or they may consist of leather or wire bands or ropes or any other flexible substances, such as hemp, horse-hair, &c.

We are aware that grinding devices have been heretofore devised in which an endless grinding-band has been caused to pass in front of one or more roughened plates or rollers, and therefore do not claim such devices, broadly considered.

Having thus fully described our invention and the manner of carrying the same into effect, what we claim as new is—

1. A grinding device which consists of the combination of the perpendicularly-arranged series of elements, to wit: the feeding and cracking mechanism containing the hoppers 9, roller 10, and adjustable gate or valve 11, the vertically-descending grinding-band 6, and a series of coacting grinding-plates 22, adjustable toward and from said band and each having a separating-sieve 20, said band having opposite each grinding-plate an elastic and adjustable support or abutment 27, substantially as set forth.

2. The combination, with the vertically-descending grinding-band and coacting grinding-plates in front of same, of the provision in rear of said band of the elastic and adjustable support or abutment 27, having the telescoping cylindrical parts 29 30, the former secured to the plate and the latter fixed on the frame and the two being normally forced asunder by spiral spring 32, as set forth.

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Witnesses:

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