No. 641,423. Patented Jan. 16, 1900.

J. WÜSTENHÖFER.

PENDULUM MILL.

(Application filed Dec. 5, 1898.)

(No Model.)

Fig. 1.

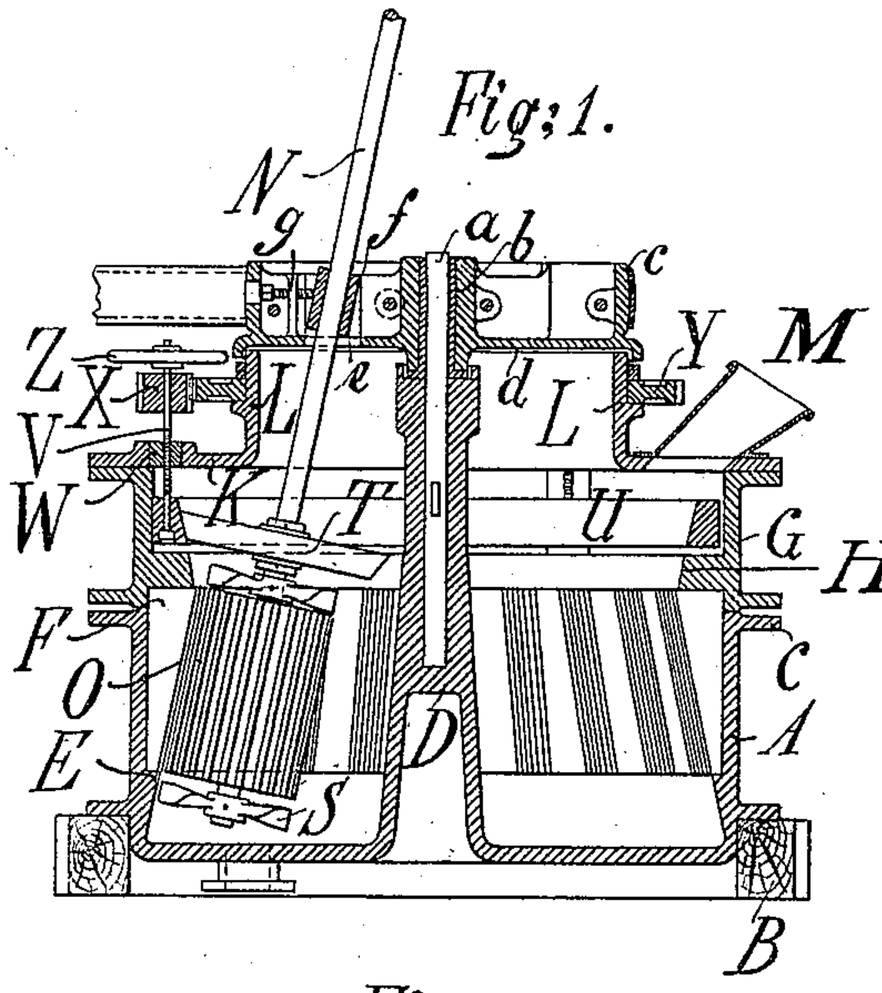


Fig. 3.

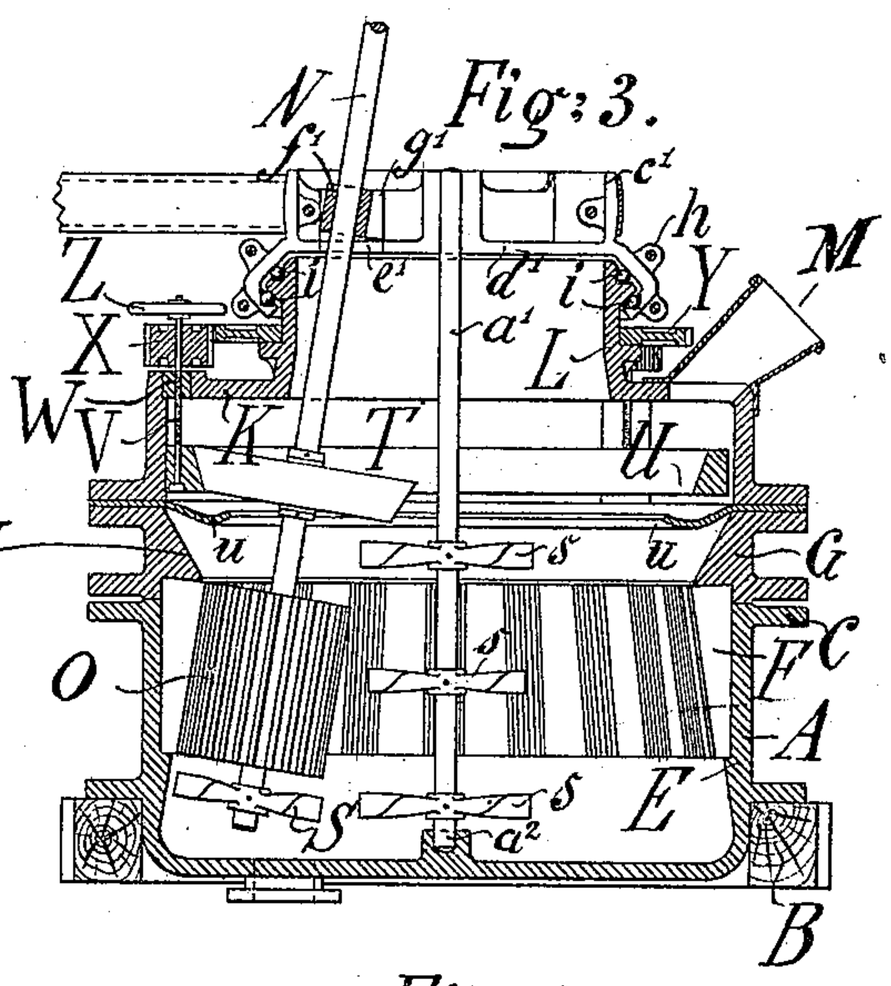


Fig. 2.

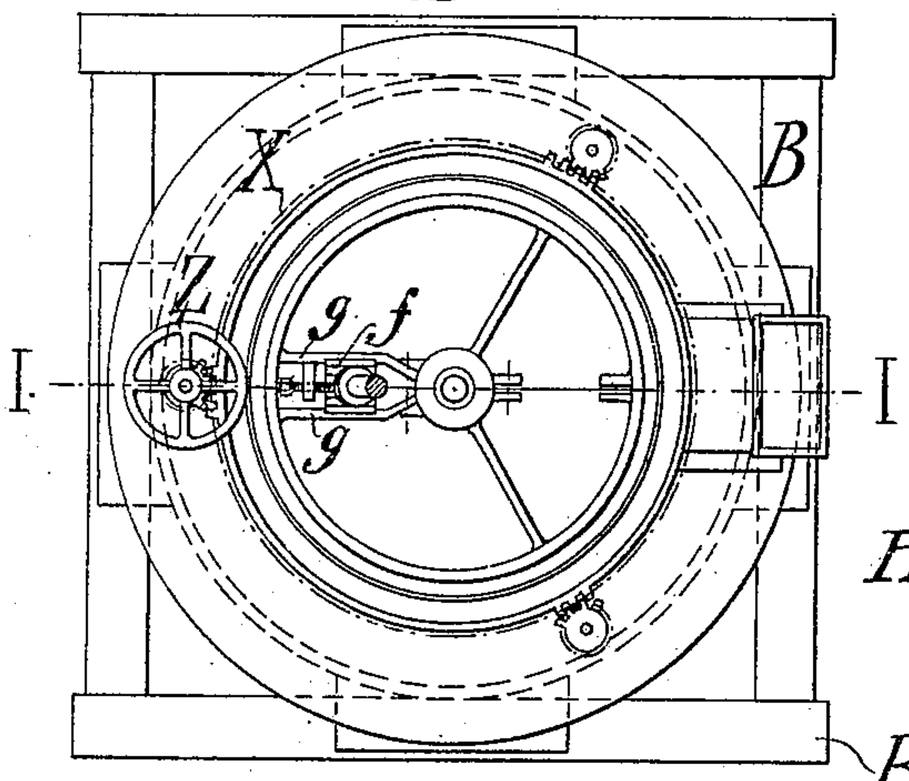


Fig. 4.

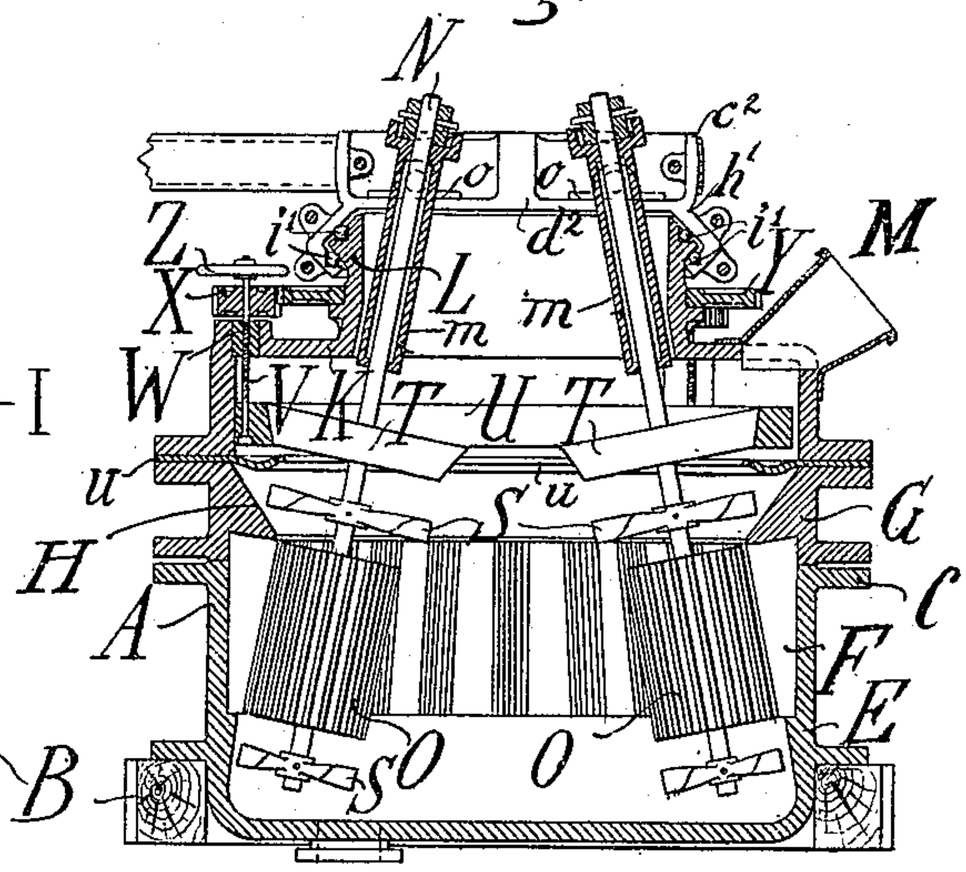
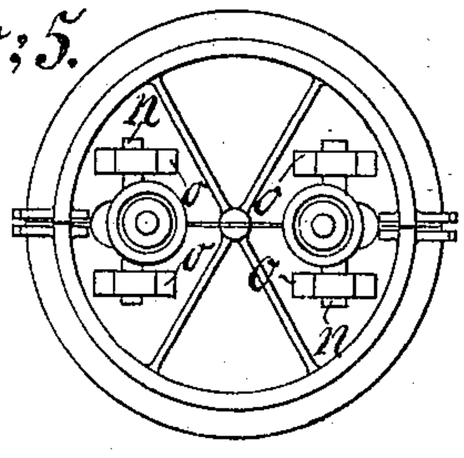


Fig. 5.



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JULIUS WÜSTENHÖFER, OF HAGEN, GERMANY.

PENDULUM-MILL.

SPECIFICATION forming part of Letters Patent No. 641,423, dated January 16, 1900.

Application filed December 5, 1898. Serial No. 698,406. (No model.)

To all whom it may concern:

Be it known that I, JULIUS WÜSTENHÖFER, a subject of the Emperor of Germany, residing at Hagen, in the Province of Westphalia, Germany, have invented certain new and useful Improvements in Pendulum-Mills; and I do hereby 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.

My invention relates to improvements in pendulum-mills, especially in that sort of mills for reducing materials for paper-making, dye-wood, and the like, for which Letters Patent No. 616,517 have been granted December 27, 1898. In those mills the pendulum roller (or rollers) rotates or rolls along the inner circumference of the mill-trough, and it consequently makes one revolution around its own axis in the opposite direction to that given it by the initial driving force always when the length of way on the trough is equal to the length of the circumference of the roller. Now I have found it desirable for certain crushing and reducing processes either to cause the crushing or knife roller to rotate quicker or slower in said opposite direction—that is to say, to cause this secondary or retarding rotation around its own axis independently from its rolling path along the inner circumference of the mill-trough, so that in the first case the roller exerts a drawing-in action by sliding quickly at the same spot of the trough somewhat like a shaft in its journal instead of rolling only along therein or that in the second case it has more of a squeezing action besides that of rolling along the inner circumference of the mill-trough by retarding its race along the circumference due to its rolling action. This mode of working of course can be carried out by one or more rollers working in the same trough. I attain these objects by the mechanisms shown in the accompanying drawings, which give three examples of carrying out my idea, the essential of which consists in this that the roller-shaft, besides receiving an initial turning action around its own axis, which causes it to fly around in the trough, is carried around by a special pulley, which takes the roller and roller-shaft around at its own speed and allows them only a free way in radial direction, so that they can follow their centrifugal force.

Figure 1 is a vertical section along line I I of Fig. 2 of an example in which the pulley guiding the roller-shaft is held on a central gudgeon. Fig. 2 is a top view of Fig. 1. Fig. 3 is a vertical section of a modification in which the pulley guiding the roller-shaft is carried on friction-rollers on the neck of the mill-trough. Fig. 4 is a vertical section of the modification with two cutter-rollers arranged in the mill with the same driving-gear as that of Fig. 3. Fig. 5 shows a top view of the driving-pulley of Fig. 4.

In the following description similar letters denote similar parts in all the figures.

The trough A is carried on a timber-frame B and is provided with a flange C at its upper edge. Rising from the center of the bottom of the trough there is arranged a column D. A few inches above the bottom a shoulder E in the circumference of the trough serves as a support for the knives F, arranged in groups around the circumference. By a ring G, bolted to the flange C of the trough and having an inner flange H projecting slightly obliquely downward, the knives F are held vertically in their place. A cover K, with a large central opening and a ring or tube-shaped neck L, is placed on top of the ring G, and a feeding chute or hopper M is arranged at one side of the cover K. Through the central opening in the cover K reaches the roller-shaft N, which is guided in the pulley *c*, as will be described hereinafter.

The shaft N, carrying at its foot the cutter-roller O, is suspended and driven above in the well-known manner, and these parts are therefore not shown on the drawings.

The cutter-roller O, with its knives, is of the construction shown by my said Patent No. 616,517, of December 27, 1898. Above its top side there is keyed to the shaft N a conical guide-roller T, and the screw-shaped stirrers S are arranged above and below the roller, as shown in my said patent.

The device for adjusting and regulating the approach of the cutter-roller to the knives in the mill-trough and consisting of the suspended conical ring U, the suspension-spin-

dles V, the screwed boss W, pinions X and wheel Y, and the hand-wheel Z are all arranged as in the specification accompanying my application, Serial No. 698,405, filed December 5, 1898, and also for the same purpose.

Now, as mentioned above, there is in Fig. 1 a column D rising from the center of the mill-trough and having a pin or gudgeon *a* fixed therein, and on this pin rotates, by means of a long nave or boss *b*, the pulley *c*, resting with its boss *b* on the top of the column D, while by its rim it is supported and guided upon the top of the neck L of cover K. In the bottom disk *d* of the pulley *c*, which is constructed as a split pulley, there is provided a slot *e* for the roller-shaft N to pass through. The shaft is here provided with brasses or slide-blocks *f*, and these are guided in stays *g*, running radially, so that the shaft and the cutter-roller can swing out radially freely, but its side movement is hindered by the stays *g*, while it is taken around by the pulley *e* at the same ratio as this rotates. It will thus be understood that while the shaft N and roller O turns around its own axis in the direction and at the speed given it by the usual first top driving-pulley (not shown in the drawings) it rolls along the inner circumference at the speed and in the direction given it by the pulley *c*, and this is what is desired—namely, to control and direct this special movement at will and independent of the rotation of the shaft N.

The arrangement shown in Fig. 3 differs from the preceding one only in minor constructive details. The pulley *c'* is keyed fast to a spindle *a'*, guided at the foot in a pot a^2, so that this spindle turns around with the pulley *c'*. The oblique rim *h* of the pulley *c'*, which, like pulley *c*, is constructed as a split pulley, serves to guide it upon the neck L of cover K by means of antifriction-balls *i*, arranged in suitable grooves at the outside of the neck L. As in the preceding case, the shaft N passes through a slot *e'* in the disk *d'* of the pulley and is guided radially in exactly the same manner therein by brasses *f'* and stays *g'*, and so it will be seen that its object and manner of working are exactly the same as before. The spindle *a'* being taken around by the pulley *c'* can be provided with wings or stirrers *s*, which stir about the floating material in the mill-trough.

Between the ring G and the cover K may be arranged a plate forming a ring-channel *u* to prevent fat or grease to drop down into the trough from the ring U.

In the modification shown in Fig. 4, where the trough A, ring G, cover K, rings U and *u*, and the lifting-gear for ring U are arranged as before, the spindle *a'* and the central column are done away with, the driving-pulley c^2 is arranged on the top of neck L in exactly the same manner as in Fig. 3 and guided thereon by the oblique flange *h'* and antifriction-balls *i'*. Instead of only one cutter-roller two are arranged here, as shown, and these are suspended on the bottom disk d^2 of the pulley c^2 by means of sleeves *m* and side pins *n*, which are journaled in brackets *o*, so that the shafts N and rollers O can swing out radially, as in the other cases, while their rolling motion along the circumference of the mill-trough is again, as in the two other cases, controlled and prescribed by the rotation of the pulley c^2. The shafts N of this mill may receive their initial rotation through any suitable means.

I am aware that pendulum-mills have been made prior to my invention, and I therefore do not claim, broadly, such mills; but

What I do claim, and desire to secure by United States Letters Patent, is—

In a machine for reducing materials the combination of a trough A, a ring G, and a cover K, with a neck L on said cover, with a pulley *c*, a pin *a* holding said pulley, of a column D, rising from the bottom of the trough A, the pulley resting with its rim upon the edge of neck L, a slot *e*, in the disk *d*, of said pulley and stays *g* therein, slide-blocks *f* guided in said stays and for the pendulum-shaft N, passing through said slide-blocks *f* and slot *e*, in the pulley, the whole as described and illustrated and for the purpose set forth.

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

JULIUS WÜSTENHÖFER.

Witnesses:
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OTTO KÖNIG.