Nov. 1, 1927. 1,647,555

S. D. WELLS

DISINTEGRATING MILL

Filed Aug. 26, 1926 2 Sheets-Sheet 1

Fig. 1

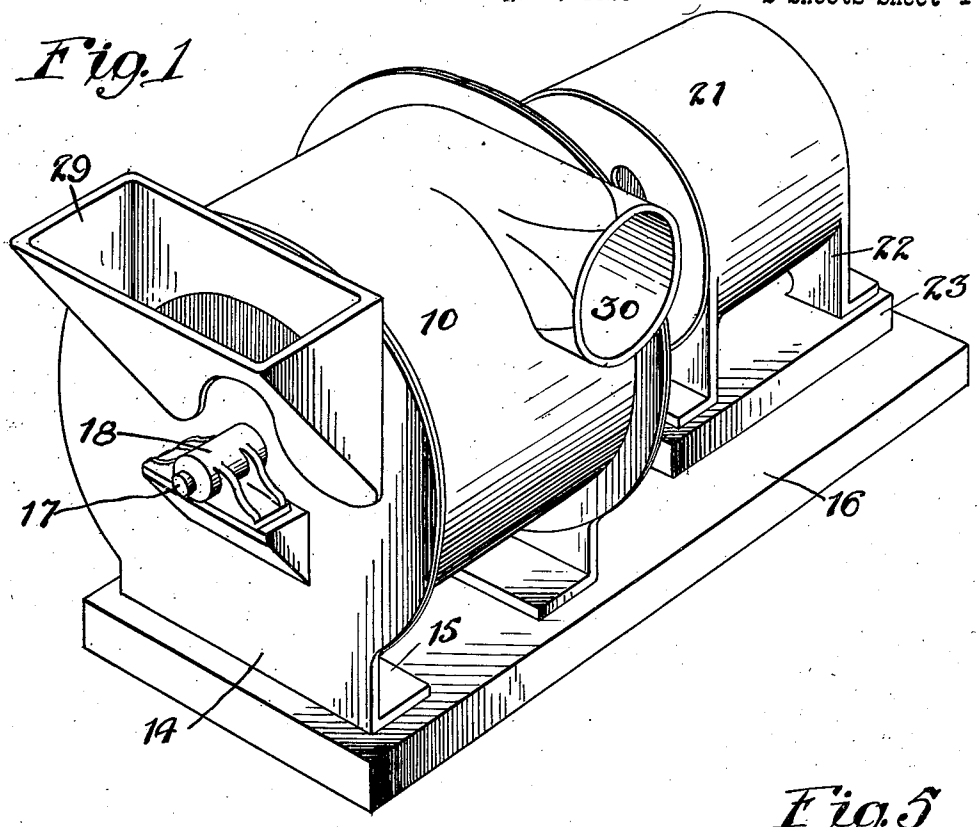


Fig. 4

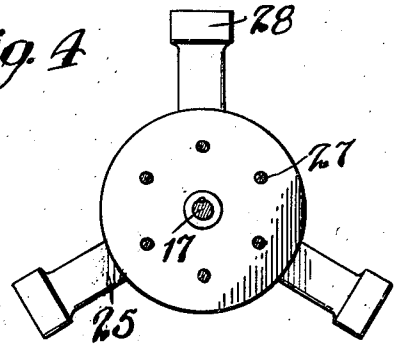
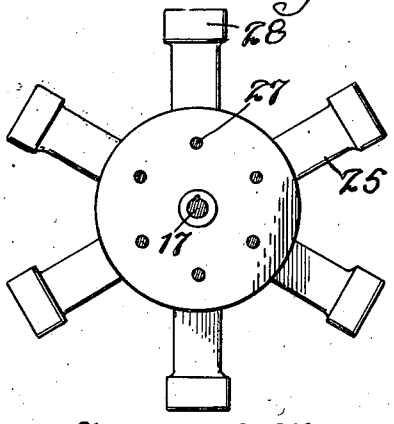


Fig. 5



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DISINTEGRATING MILL

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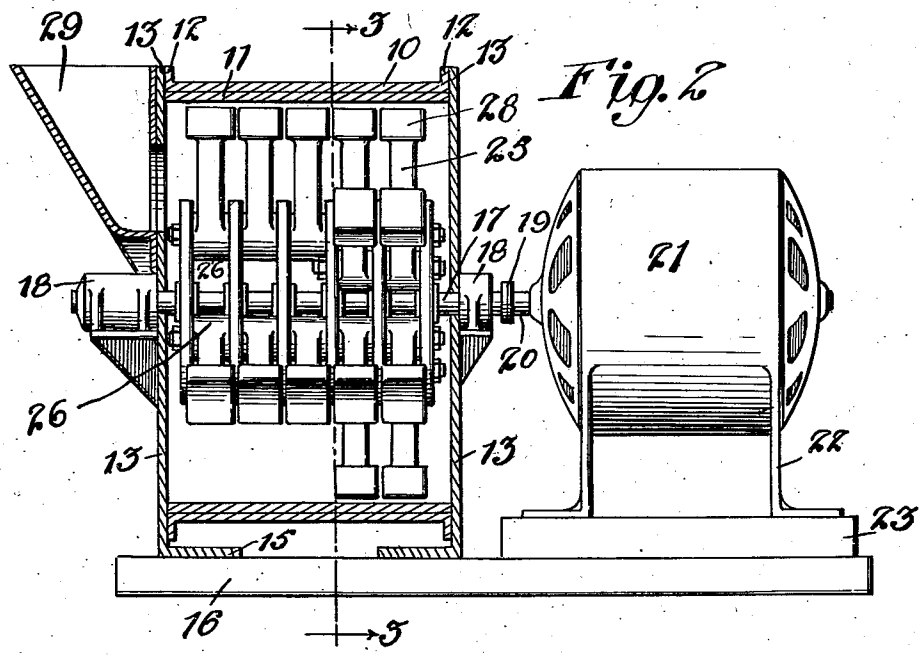


Fig. 2

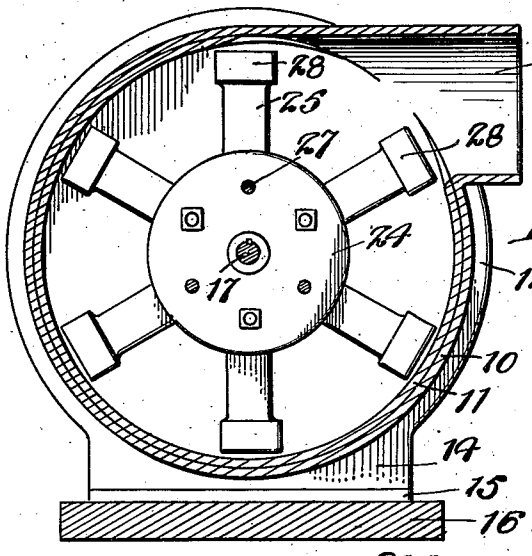


Fig. 3

Sidney D. Wells
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Patented Nov. 1, 1927. 1,647,555

UNITED STATES PATENT OFFICE.

SIDNEY D. WELLS, OF QUINCY, ILLINOIS, ASSIGNOR TO PAPER MILL LABORATORIES, INC., OF QUINCY, ILLINOIS, A CORPORATION OF ILLINOIS.

DISINTEGRATING MILL.

Application filed August 26, 1926. Serial No. 131,629.

My invention relates to improvements in apparatus for shredding and disintegrating fibrous material and is especially adapted for beating pulp for paper manufacture or the like, although not necessarily restricted to this use.

An important object of my invention is to provide a device of this character which will shred by means of impacts imparted to the material to be treated in place of the usual grinding, rubbing or rolling operation.

Another object of my invention is the provision of a device of this character in which the impacts are increased as the material is reduced.

A further object of my invention is to provide means for insuring the proper discharge of the reduced material.

A still further object of my invention is the provision of a device of this character which will be compact, simple and efficient.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the accompanying drawings, which form a part of this specification and wherein like characters of reference denote like or corresponding parts throughout the same,

Figure 1 is a perspective view of my improved mill,

Figure 2 is a central longitudinal sectional view thereof.

Figure 3 is a transverse section on the line 3—3 of Figure 2,

Figure 4 is a detail side elevation of one of the hammer supporting disks and the associated hammers, and

Figure 5 is a similar view of another of the disks and associated hammers.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of my invention, the numeral 10 designates a cylindrical casing having a suitable lining 11 arranged therein, and having circumferential flanges 12 at each end to which are secured end plates 13 having depending leg portions 14 which are bent over at their lower ends to form horizontal foot portions 15 which rest upon the base 16 and are secured thereto in any suitable manner.

A centrally arranged shaft 17 extends entirely through the casing 10 and is journaled in suitable bearings 18 which are arranged exteriorly of the casing 10 and are supported by the end walls 13 thereof. One end of the shaft 17 is coupled at 19 to the end of an armature shaft 20 of an electric motor 21, although any other means of rotating the shaft 17 may be used. The motor 21 is supported by legs 22 which rest on a block 23 which is also secured to the base 16.

Spaced disks 24 are keyed to the shaft 17 and hammer elements 25 are pivotally secured between adjacent pairs of disks. The hammer elements 25 extend radially toward the lining 11 and have their inner ends provided with substantially cylindrical enlargements 26 of a length corresponding to the space between the adjacent disks. The enlargements 26 of the hammers are arranged in alignment, and shafts 27 extend through the disks and enlargements 26 and serve to pivotally secure the hammers between the disks. The outer ends of the hammer elements are provided with enlarged heads 28 which are arranged immediately adjacent the lining, the adjacent heads being arranged with a very slight space therebetween.

The hammer elements are equally spaced about the disks as shown in Figures 4 and 5. The disks at the intake end of the casing are shown as provided with three hammers, while those near the discharge end are shown as provided with twice that number. The number is immaterial, but it is desirable to have more hammers at the discharge end than at the intake end. If desired, the weight of the hammers may be decreased, as their number increases.

The intake end of the casing is provided with a feed hopper 29 which is secured to the end wall 13 of the casing and opens into the casing above the central shaft 17. The opposite or discharge end of the casing is provided with a tangential discharge outlet 30.

In operation, the material is fed through the hopper into the casing where the revolving hammers reduce and disintegrate it by pounding it against the lining 11. The material is fibrous in nature and is fed into the casing in a wet condition and is shredded and disintegrated by the impact of the hammers. As the material is revolved in the casing it moves longitudinally thereof and is discharged through the opening 30 by centrifugal force. As it nears the discharge opening it is in a more reduced state than when it enters the casing, and more impacts are given to it because of the increased num-

ber of hammers. It will be seen that the action of the hammers disintegrates the material by tearing and pulling it apart rather than by rubbing, rolling or grinding operation such as is usually employed.

While I have shown the preferred embodiment of my invention, it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of my invention or the scope of the subjoined claims.

Having described my invention, what I claim and desire to protect by Letters Patent is:

1. A disintegrating mill for treating fibrous materials comprising a casing, a feed hopper at one end of the casing, a tangential discharge at the other end of the casing, a shaft journaled in said casing and extending longitudinally thereof and means to rotate said shaft, and swinging hammer elements secured to said shaft to revolve therewith and disintegrate the material by a hammering action as it is fed toward the discharge end of the casing, there being more hammers at the discharge end of the casing than at its intake end, whereby the number of impacts is increased as the material is reduced.

2. A disintegrating mill for treating fibrous materials comprising a casing, a feed hopper at one end of said casing, a tangential discharge at the other end of the casing, a centrally arranged shaft journaled in said casing, means to revolve the shaft, spaced disks secured to said shaft and hammer elements pivotally arranged between said disks to revolve therewith and having their ends arranged adjacent the walls of the casing, there being a greater number of hammer elements between the disks adjacent the discharge end of the casing than between the disks adjacent the other end of the casing whereby the number of impacts imparted to the material is increased as the material is reduced.

3. A disintegrating mill for treating fibrous material comprising a casing, a feed hopper at one end of the casing, a discharge at the other end of the casing, a shaft journaled in said casing and extending longitudinally thereof, means to rotate said shaft, and hammer elements secured to said shaft to revolve therewith and disintegrate the material by a hammering action as it is fed toward the discharge end of the casing, there being more hammers at the discharge end of the casing than at its intake end, whereby the number of impacts is increased as the material is reduced, the relative weight of the hammers being inversely proportional to their number.

4. A disintegrating mill for treating fibrous material comprising a casing, a feed hopper at one end of the casing, a discharge at the other end thereof, means within said casing to impart a series of impacts to the material passing through the casing to disintegrate the same and means whereby the number of impacts is increased as the material is reduced, the impacts being lighter as their number is increased.

In testimony whereof I affix my signature.

SIDNEY D. WELLS.