Jan. 21, 1930. J. MARKLEY ET AL 1,744,235

ATTRITION MILL

Filed March 8, 1928

FIG 2

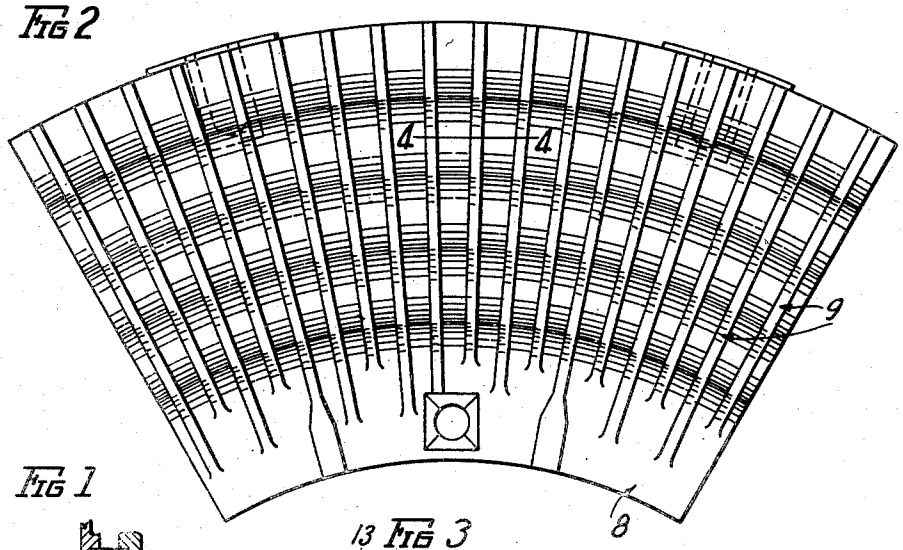
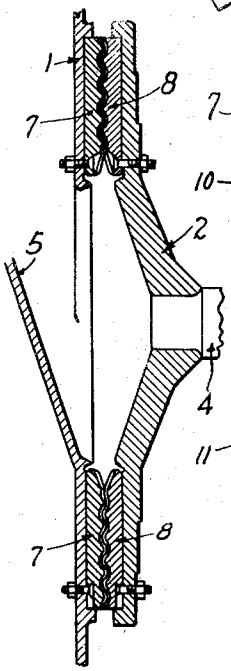


FIG 1



13 FIG 3

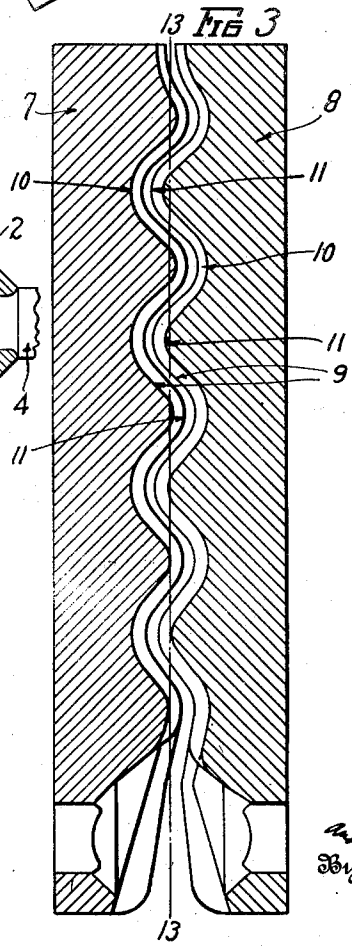
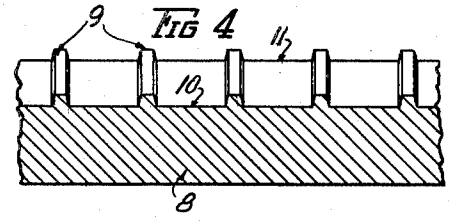


FIG 4



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UNITED STATES PATENT OFFICE

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ATTRITION MILL

Application filed March 8, 1928. Serial No. 260,125.

This invention relates to attrition mills of the type employing opposed relatively movable disintegrating members and it particularly relates to the construction of the working faces of the members.

The object of the invention is to form the working faces of the disks so as to retard the flow of the material between the same; a more specific object being to provide channels of serpentine or tortuous form through which the material passes of a character which are gradually reduced in size and increased in tortuousness in the direction of flow of the material.

The disintegrating members employed are more particularly adapted for use in an attrition mill employed in connection with the production of pulp from wood or other fibrous materials and to reduce or disintegrate wood chips, such as come from the chipper or hog, or other fibrous material, in the presence of a quantity of water and preferably with the aid of heat which may be supplied either in the nature of steam or hot water.

In carrying out the invention the working faces of the disintegrating members are provided with ribs or projections which tend to roll and crush the material between the members with a minimum of cutting effect and the faces of the members are also formed so as to provide a series of radially-extending tortuous channels for the material which is fed from the center of the disks outwardly whereby the material and impregnating water is more or less retained with the result that the proper disintegration and saturation is secured with a minimum consumption of power.

In the accompanying drawings:

Fig. 1 is a vertical section of so much of a mill as is necessary to illustrate the invention.

Fig. 2 is an elevation of the working face of one of the segmental plates which form the disintegrating surfaces of the members.

Fig. 3 is an enlarged vertical section through two opposed plates showing the plates separated to a degree greater than that employed when in working position to better illustrate the construction.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring to the drawings, 1 and 2 represent the members which support the disintegrating plates 7 and 8. The particular type of mill shown in what is known as the single disk type in which one of the grinding members is stationary and the other rotatable, although the invention is equally applicable to an arrangement in which both members rotate in opposite directions. The member 1 is the rear wall of the casing of the mill while the member 2 is a disk which is connected with a shaft 4 driven by an electric motor or other suitable source of power (not shown). The material is fed from the chute 5 through a central opening in the member 1 and flows outwardly between the plates 7 and 8.

The plates 7 and 8 in the present case are of segmental form and constitute the grinding or disintegrating surfaces of the mill. The working face of each plate is provided with a series of radially-extending ribs 9 and the faces of the plates are also formed with a series of concentric depressions or grooves 10 of uniform depth and distance apart and elevations 11, the depressions of one series of plates being opposed to the elevations of the mating plates. The ribs 9 follow the contour of the depressions and elevations on the respective plates.

By referring to Fig. 3 it will be seen that the peaks of successive elevations on each grinding element extend, when the plates are in working position, to a gradually increasing height from the inner portion of each plate outwardly. This is shown by the theoretical center lines 13—13. The height of each rib is correspondingly increased in an outer direction.

As a result of this arrangement of the ribs, depressions and elevations form a series of more or less tortuous radially-extending channels for the material and impregnating water, the tortuous nature of each of which increases and the cross-sectional dimension decreases from the central throat to the outer discharge end, with the result that the flow of the material and water is retarded and causes the material to be thrown from one plate to the other

to insure a proper disintegration and saturation with a minimum consumption of power.

Having thus described my invention, I claim:

1. In a mill of the character described, opposed relatively movable members, each member being formed with a series of alternate depressions and elevations extending about the same, said depressions being of uniform depth and said elevations being of gradually increasing height, and a series of outwardly extending ribs following said elevations and depressions and gradually decreasing in height, said ribs, depressions and elevations forming a series of outwardly extending channels each of which decreases in size and increases in tortuousness toward the periphery of its member.

2. In a mill of the character described, opposed relatively movable members, each member being formed with a series of alternate depressions and elevations extending about the same, said depressions being of uniform depth and said elevations being of gradually increasing height, with the peaks of the elevations projecting beyond the plane between said members, a series of ribs extending toward the periphery of said members and following the elevations and depressions and gradually decreasing in height to form with said depressions and elevations outwardly extending channels each of which decreases in size and increases in tortuousness toward the periphery of its member.

3. In a mill of the character described, opposed relatively movable members, each member being formed with a series of alternate depressions and elevations extending about the same, said depressions being of uniform depth and said elevations being of gradually increasing height and also being uniformly spaced apart, and a series of outwardly extending ribs following said elevations and depressions and gradually decreasing in height to form with said depressions and elevations a series of outwardly extending channels each of which decreases in size and increases in tortuousness toward the periphery of its member.

In testimony whereof we have hereunto set our hands this 6th day of March, 1928.

JONATHAN MARKLEY.
EDWARD M. BRENNAN.