H. C. WATSON.

PULP BEATER.

APPLICATION FILED JAN. 10, 1914.

1,129,824.

Patented Feb. 23, 1915.

2 SHEETS—SHEET 1.

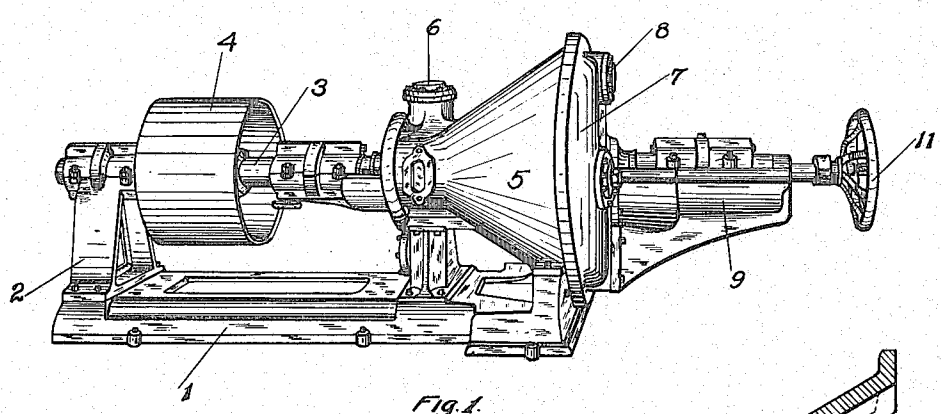


Fig. 1.

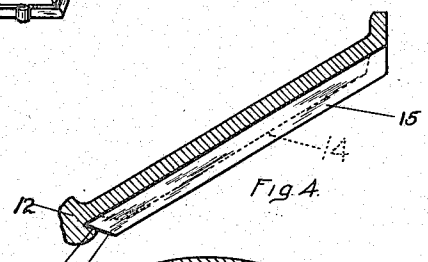


Fig. 4.

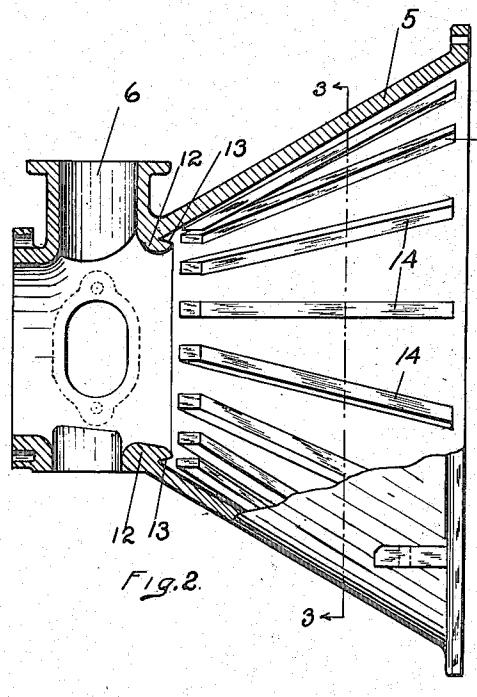


Fig. 2.

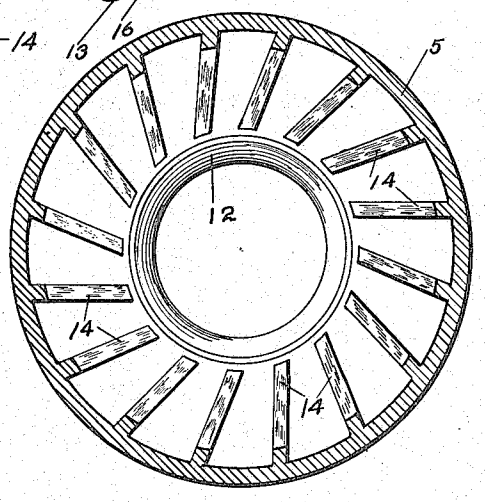


Fig. 3.

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2 SHEETS—SHEET 2.

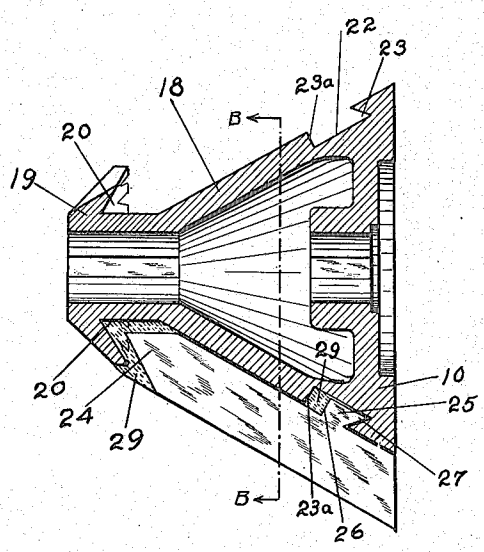


Fig. 5.

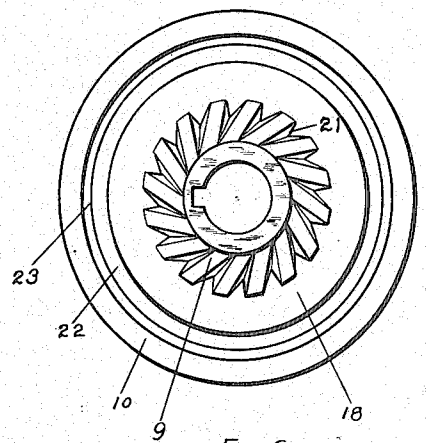


Fig. 6.

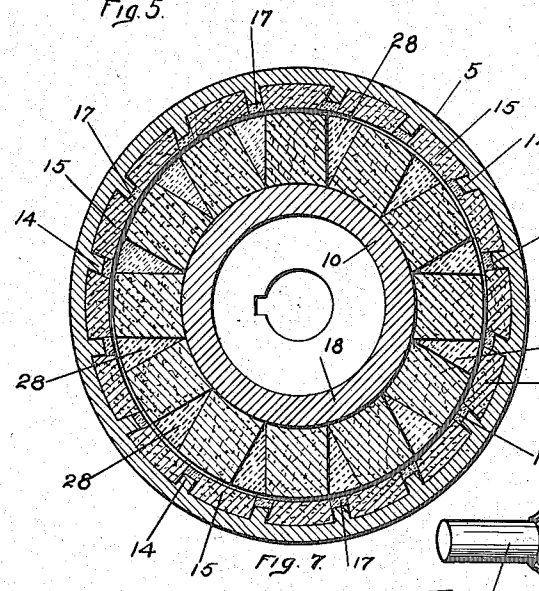


Fig. 7.

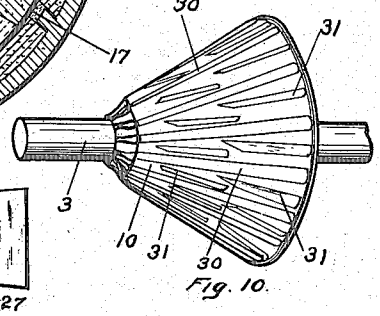


Fig. 10.

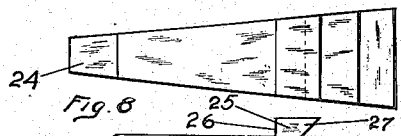


Fig. 8.

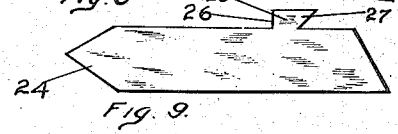


Fig. 9.

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UNITED STATES PATENT OFFICE.

HARRY C. WATSON, OF LANCASTER, OHIO, ASSIGNOR TO THE CLAFLIN ENGINEERING COMPANY, OF LANCASTER, OHIO, A CORPORATION OF OHIO.

PULP-BEATER.

1,129,824. Specification of Letters Patent. Patented Feb. 23, 1915.

Application filed January 10, 1914. Serial No. 811,328.

To all whom it may concern:

Be it known that I, HARRY C. WATSON, citizen of the United States, residing at Lancaster, in the county of Fairfield and State of Ohio, have invented certain new and useful Improvements in Pulp-Beaters, of which the following is a specification.

My invention relates to pulp beaters and aims particularly to provide an improved type of machine wherein the abutting surfaces are of such structure that a highly improved class of work may be turned out. The type of machine to which my invention is particularly applicable, is shown in Patent #864,359, issued August 27, 1907.

I aim to provide two coöperating members relatively movable with respect to each other, these members having their working surfaces formed of stone of suitable coarseness. Beaters of this type are used in the finishing stages of treating the pulp and are designed to separate and draw out the fibers rather than to cut them up into fine particles. I have found that by the use of stone, these fibers may be drawn out in the desired manner, the stones being suitably shaped and grooved to facilitate the ready passage of the pulp therethrough. Further, the stones employed should preferably be filled with pits and as these stones gradually wear away, new pits are presented to give a satisfactory gripping effect.

The manner in which the various stone sections are mounted in position and other objects of my invention will become more apparent from a further detailed description of the accompanying drawings, in which similar characters of reference designate corresponding parts, and in which:

Figure 1 is a view in perspective of a beating machine constructed in accordance with my invention, Fig. 2 is a longitudinal section through the shell portion with the stone filling removed, Fig. 3 is a section taken on line 3—3 of Fig. 2 and looking in the direction of the arrows, Fig. 4 is a fragmentary section of one portion of the shell showing the stone filling in its applied position, Fig. 5 is a longitudinal section of the cone used to coöperate with the shell, one stone being shown in position, Fig. 6 is an end view of the structure shown in Fig. 5, looking from the left, Fig. 7 is a cross section through the shell and cone showing the manner of construction, Fig. 8 is a bottom view of one of the stone fillings used in connection with the cone, Fig. 9 is a side elevation of the structure shown in Fig. 8, and, Fig. 10 is a view in perspective of the assembled cone.

In the drawings, there is shown a base plate 1 which carries an upright standard 2 forming the bearing for one end of a drive shaft 3, which shaft is driven from any source of power by means of the pulley 4. At its opposite end, the base plate 1 is formed to support a conical shell 5, the body portion of which has formed therein an inlet 6 at its inner end and whose outer end is covered by a cap structure 7 formed with an outlet opening 8. This cap structure preferably carries an out-hanging bracket 9 which forms the other bearing for the drive shaft 3 and which shaft, as will be presently shown, carries the cone member 10 shown particularly in Fig. 5, this cone member being longitudinally adjustable within the shell 5 by means of a well known structure under the control of a hand wheel 11. The structure of the shell 5 will be more apparent by referring to Figs. 2, 3 and 4 from which it will be seen that the inlet opening 6 is in communication with the interior of this shell and also that an annular shoulder 12 is formed at its inner reduced end, which shoulder is grooved at an acute angle, as shown at 13. Radiating outwardly and in a line oblique to a plane passing through the longitudinal axis of the shell, are a plurality of ribs 14, which ribs, as will be seen, terminate a short distance from the outside end of the shell. This rib and shell structure forms the basic unit upon which the stone filling is adapted to be mounted, one of the stones being shown at 15 in Fig. 4. From this figure, it will be apparent that the stones are of somewhat increased height over the depth of the lugs 14 and are formed at one of their ends as shown at 16 with a pointed structure to snugly fit the groove 13 of the inner shoulder 12. The entire surface of the shell unit is thus covered with stones of this type and in the remaining space between the stones and ribs 14 and also the spaces below the level of the stones themselves and above the ribs 14, as well as the outer ends are filled in or packed with cement, as is shown more clearly at 17 in Fig. 7. After the basic unit has been thus built up,

it is mounted upon a suitable machine and the interior surface now formed of stone, is turned down to true conical form. It will be understood that I use a stone filling preferably because of the pits in these stones, for as they gradually wear away, new pits are always presented, as has been previously related.

The cone proper which is mounted upon the drive shaft 3, is also surfaced with a filling of stone and is adapted to coöperate with the shell by being rotatably mounted therein. This cone 10 comprises a basic hollow casting 18, which unit is formed with an annular shoulder 19 at its inner end, this shoulder being also grooved to a uniform angle, as is shown at 20. The over-hanging portion of the shoulder, has its exterior surface also grooved as shown at 21 at an angle oblique to a plane passing through the longitudinal axis. Likewise, the outer end of this cone casting, is also formed with the groove 22, whose inner wall is grooved as shown at 23, and whose other wall is square as shown at 23^a, the grooves 20 and 23 being so formed as to incline in opposite directions. These two grooves are adapted to form the medium of attachment for the stone filling, one of which stones is shown in Figs. 8 and 9, from which it will be seen that their inner ends are formed with an angle projection 24 of a contour parallel with the angle 20 and whose bottom walls adjacent their upper ends are formed with a tenon 25, one of whose walls 26 is adapted to lie in parallel relation with the wall 23^a with the groove 22 and whose other wall is inclined to form the pointed projection 27 to follow the contour of the groove 23. These stones are provided in sufficient number and the distance between the point of the formation 27 and the pointed end 24, is such as to permit their placement upon the cone body, whereupon they are moved rearwardly to the position shown in the lower half of Fig. 5. It will be noted that these stones are shown as being cut with square side walls, although this latter feature is not absolutely essential, as the inclination of the side walls depends upon the number of stones used. All of these stones forming the filling for the cone member, are mounted in the relation shown in Fig. 7 and the space between them is filled or packed with cement as shown at 28. Also, the spaces between the inner shoulder 19 and the pointed formations 24, on the lower ends of the stones, are filled with cement, as is shown at 29. In this manner, the stones are rigidly mounted in position to withstand the destructive tendency of the centrifugal action as the cone is rotated. It must be apparent that in a short time, all the cemented portions will become hardened, whereupon it may be considered that the cemented portions 29 practically form an integral part of the inner ends 24 of these stones. Outward movement then will be resisted by the inwardly over-hanging portion of the annular groove 19, while the pointed formations 27 at the opposite ends of the stones will engage the pointed end of the groove 22 to prevent outward movement at this portion.

After the cone has been thus assembled, it may be shaped to true form and the cemented portions leading from the grooves 21 of the shoulder 19 will be grooved as shown at 30, to present channels for the ready flow of the pulp as it is fed to the machine. The two stone surfaces coöperating, will cause a tearing action, thereby separating the fibers in the desired manner. The coarseness of the comminuted pulp depends in a great measure on the distance between the grooves 30 and the closeness between the cone and the shell. I have found that by the provision of the staggered grooves 31 between each pair of grooves 30, the desired result may be gotten. It will be noted that these grooves are oblique to the medial lines of the spaces between each pair of grooves 30 and that these grooves are formed in the stones proper. As the pulp is fed to the machine, it is drawn outwardly by the centrifugal effect of the rotating cone, the grooves forming small pockets from which the pulp engages the stone surfaces of the shell filling and in this manner is continuously drawn between the two stone surfaces until finally it issues from the outlet opening 8. As has been before stated, the degree of fineness may finally be regulated by adjusting the cone itself toward or away from the shell by means of the hand wheel 11.

It will thus be apparent that I have provided a type of machine in which two relatively movable members are provided, the pulp being adapted to be fed between such members. The working surfaces of these relatively movable members are preferably all of stone formation, one of which may be grooved for the purpose specified, if so desired. After the cemented portions have become hard, it may reasonably be considered that the entire surface is of one stone and of one texture. An advantage of the all stone formation, resides in the fact that gradual wearing away will be uniform throughout and thus subsequent truing up will become unnecessary. It will further be apparent that I have provided a particularly novel type of connecting means for the stone filling of both the cone and shell. The means for holding the filling carried by the shell in place, is such that rotative movement of the stones themselves, is absolutely prevented, while the means provided for

mounting the stones upon the cone is such that they will resist dismemberment by centrifugal force and always retain their true form.

What I claim, is:

1. In a pulp beater, a conical shell to which pulp is adapted to be fed and withdrawn, a cone fitting within said shell and adapted to be rotated therein, a plurality of suitably shaped stones rigidly attached to both said shell and said cone and disposed lengthwise thereon from apex to base, and cement packing between each pair of adjacent stones on the same member to fill the space therebetween, one surface of either said shell or cone having its cement packing grooved.

2. In a pulp beater, a conical shell to which pulp is adapted to be fed and withdrawn, a plurality of ribs on the inner surface of said shell, a plurality of stones of greater thickness than the height of said ribs adapted to fit between said ribs, a cement packing between said stones and covering said ribs, and a suitable cone within said shell and adapted to be rotated therein.

3. In a pulp beater, a conical shell to which pulp is adapted to be fed and withdrawn, a cone fitting within said shell and adapted to be rotated therein, an annular shoulder on the inner end of said cone, said cone being also formed with a groove adjacent its outer end, said shoulder and said groove being formed with inclined walls, a plurality of stones adapted to be carried by said cone, the inner ends of said stones being shaped to be parallel with the inclined wall of said shoulder, a dove-tail projection adjacent the outer ends of said stones adapted to fit said groove, and a cement packing between said stones and between said groove and said stones and between said shoulder and said stones.

4. In a pulp beater, a conical shell provided with inlet and outlet openings, a grooved annular shoulder around the inner end of said shell, a plurality of ribs on the inner surface of said shell, a plurality of stones of greater thickness than the height of said ribs and adapted to fit between said ribs, the lower ends of said stones being shaped to fit said shoulder, a cement packing between said stones and covering said ribs, a cone fitting in said shell and adapted to be rotated therein, and a plurality of stones suitably shaped and secured to the outer surface of said cone.

5. In a pulp beater, a conical shell provided with inlet and outlet openings, a grooved annular shoulder around the inner end of said shell, a plurality of ribs on the inner surface of said shell, a plurality of stones of greater thickness than the height of said ribs and adapted to fit between said ribs, the lower ends of said stones being shaped to fit said shoulder, a cement packing between said stones and covering said ribs, a cone fitting in said shell and adapted to be rotated therein, an annular shoulder on the inner end of said cone, said cone being also formed with a groove adjacent its outer end, said shoulder and said groove being formed with inclined walls facing each other, a plurality of stones adapted to be carried by said cone, the inner ends of said stones being shaped to be parallel with the inclined wall of said shoulder, a dove-tail projection adjacent the outer ends of said stones adapted to fit said groove, and a cement packing between said stones and between said groove and said stones and also between said shoulder and said stones.

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

HARRY C. WATSON.

Witnesses:

DAVID F. KINSER,

G. W. RAGEN.