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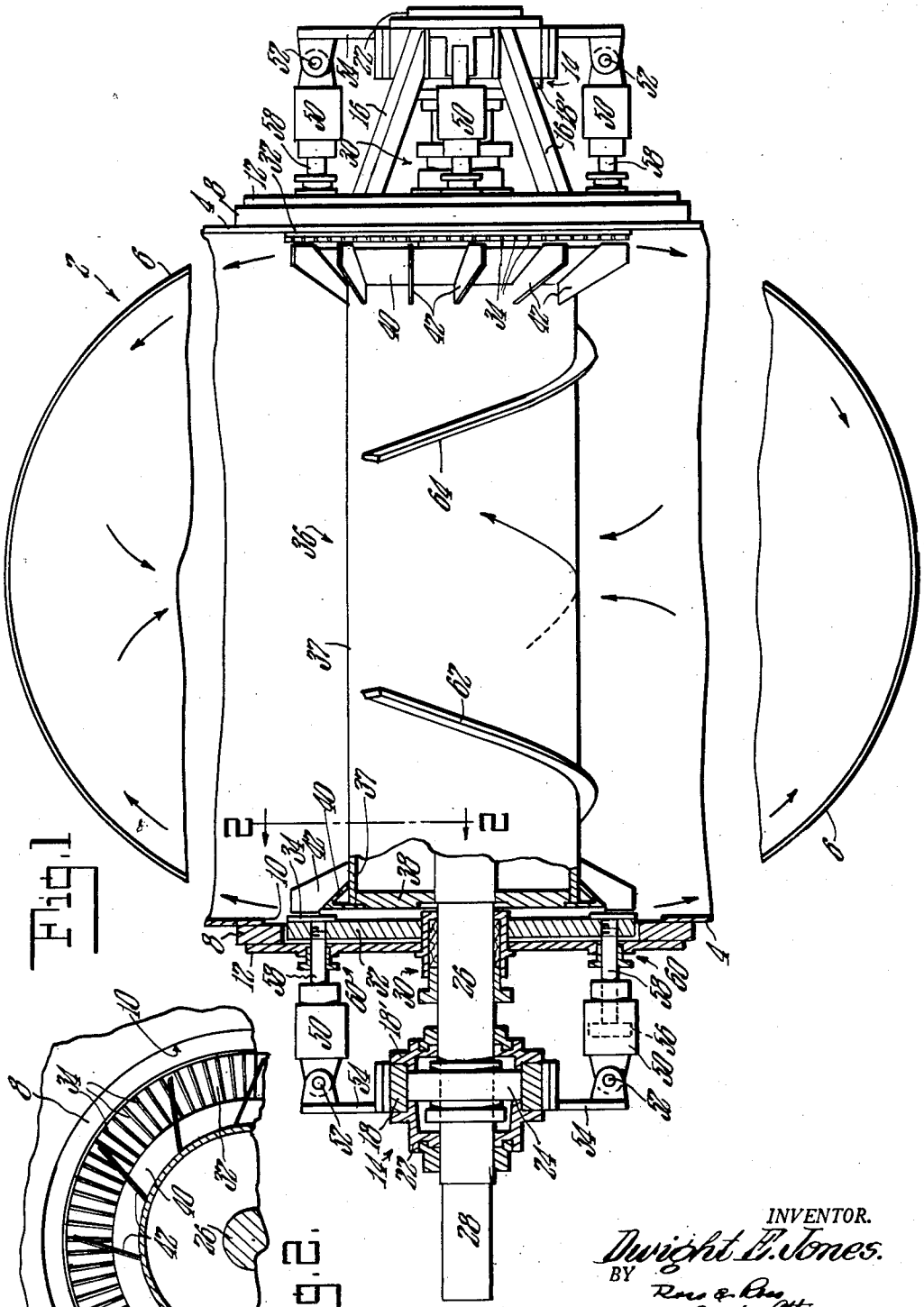


Fig. 1

Fig. 2

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1 Claim. (Cl. 92—26)

My invention relates to new and useful improvements in a pulping machine for use in disintegrating and mixing material and is directed more particularly to the provision of a disintegrator for use in making paper pulp from fibrous materials such as waste paper, rags, wood fibers and the like.

While various types of pulping machines have been known heretofore, one of the most efficient types has been based upon a system including an inner roll revolvably mounted within an outer casing so as to form an annular passage therewith, the revolving roll disintegrating the stock which is passed through the annular passage.

The pulping machine made according to my invention is a modified form of the above described type which yields improved results in terms of quality of pulp and rate of production thereof.

It is one of the primary objects of the invention to provide structural and operational improvements in machines of this general classification, which improvements simplify the structure so as to make its construction more economical but also provide other advantages thereover insofar as strength, durability and the like are concerned.

Generally speaking, in my construction pressure is applied so as to actuate the bed plate thereby creating pressure against the ends of the rotor. Impellers on the rotor throw the stock radially outward with a considerable velocity against the sides of the tank wall.

I accomplish the above cited objects by means of such structure and relative arrangement of parts, as will fully appear by a perusal of the description below and by various specific features hereinafter set forth.

All of the above objects I accomplish by means of such structure and relative arrangements of parts thereof, as will fully appear by a perusal of the description below and by various specific features which will be hereinafter set forth.

To the above cited and other ends and with the foregoing and various other novel features and advantages and other objects of my invention as will become more readily apparent as the description proceeds, my invention consists in certain novel features of construction and in the combination and arrangement of parts as will be hereinafter more particularly pointed out in the claim hereunto annexed and more fully described and referred to in connection with the accompanying drawings wherein:

Fig. 1 is a broken plan view of the device of my invention;

Fig. 2 is a sectional elevational view along the line 2—2 of Fig. 1.

In the following description and claim, various details will be identified by specific names for convenience. These names, however, are intended to be as generic in their application as the art will permit.

Referring now to the drawing more in detail and referring more particularly to the preferred form of my invention selected for illustrative purposes, I have shown a tank or vat 2 which may be similar to the tank shown in U. S. Letters Patent #2,433,490 dated December 30, 1947, having opposite side walls 4 and 4 and opposite end walls 6 and 6, which end walls are preferably curving so as to provide a tank of substantially oval shape.

Annular ring-like inner plates 8 are secured to opposite side walls 4 as by welding or the like and are disposed around openings 10 in the walls. Annular outer plates 12 are secured to outer sides of the plates 8.

Housings, generally indicated by 14, are disposed outwardly of plates 12 and are supported relative thereto by struts 16 which are suitably connected at opposite ends to the housings 14 and to the plates 12.

These housings 14 include hollow central portions such as 18 and inner and outer caps 18′ and 22 respectively.

Anti-friction bearings 24 within the central portions 18 of the housings rotatably support a shaft 26 which extends outwardly at 28 through the outer cap 22 such as the one shown at the left hand side of the machine as shown in Fig. 1.

The shaft may be connected to a suitable source of power as by belts, silent chain or the like or it may be connected directly to a motor or the like, all as may be desired.

A stuffing box construction indicated generally by 30 is carried by each of the plates 12 to seal the rotatable shaft 26 in its rotation.

Discs such as 32 adjacent and inwardly of plates 12 are slidable relative to the stuffing boxes 30 and are disposed in the rings 12. These discs 32 on inner adjacent sides carry circumferentially spaced radially disposed blades or knives 34. The blades may be of any desired form and cooperate with blades on a rotor about to be described.

A rotor generally indicated by 36 is fixed on the shaft 26 and is preferably in the form of an elongated hollow drum 37 closed at opposite ends by end heads such as 38. By the employment of a full cone or roll, considerably large economies are effected.

Circumferential flanges 40 are secured to opposite ends of the rotor and have inner adjacent faces which diverge relative to one another as shown.

Blades or impellers 42 at opposite ends of the drum extend outwardly therefrom and have outer edges or faces which cooperate with the blades 34 of the discs 32. These blades are preferably tangentially disposed relative to the shaft 26 or inclined rearwardly from planes extending transversely through the axis of rotation of the shaft. That is to say, the blades 42 tilt rearwardly from the rotor relative to the direction of rotation thereof.

A plurality of cylinders 50 are pivoted at 52 to brackets 54 fixed to the housings 14 and have pistons 56 reciprocable therein. Rods 58 extend from the pistons 56 through stuffing boxes 60 carried by the plates 12 and have inner ends secured in the discs 32.

There may be as many cylinders and associated sets of connections to the discs as desired. In one non-limitative embodiment of the invention, four of the cylinders are shown as provided at each end of the machine.

These cylinders may be connected to a common source of pressure and pressure releasing means so that the pistons may be actuated and thereby, through the rods, move the discs 32 axially back and forth. In this way, the cooperating non-rotating blades 34 and the rotating blades may be related in any desired manner.

Ribs 62 and 64 are carried by the rotor and are arranged helically thereon so that in the rotation thereof, the material being operated upon is directed axially of the drum in opposite directions toward the cooperating blades at opposite ends of the rotor.

In operation, upon the application of pressure from a common source, the cylinders are caused to actuate the bed plates whereby pressure is created against the ends of the rotor where the real disintegrating forces are at work with the result that the material being worked upon is thrown outwardly therefrom in the direction of the arrows to the end walls of the tank and thence back toward the rotor at the midsection thereof, also as indicated by arrows in Fig. 1.

I have determined through processes of experimentation that the bulk of the work is done by the impellers and that the only purpose for the remainder of the rotor is to provide a very coarse, preliminary breaking action. It may even be said that in some instances, the circulation created by the rest of the rotor is not desirable.

In prior art structures, the impellers throw the stock radially outward with considerable velocity against the ends of the tank. This stock is returned to the central area of the pulper and if there is a high turbulence in

this area the stock may be picked up and again thrown out away from the rotor before it can reach the impellers. I have determined, however, that if there is little agitation on the rotor itself, the stock is permitted to reach the impellers and this, I accomplish, by moving the stock more or less tangentially and spirally to the rotor. The spirally curved vanes aid in the accomplishment of this desideratum. The vanes 42 are angularly disposed so as to more or less draw the stock into them. These vanes may also be set in such a manner as to deflect the stock toward the bedplate.

The invention may be embodied in other specific forms without departing from the essential characteristics thereof. Hence, the present embodiments are therefore to be considered in all respects merely as being illustrative and not as being restrictive, the scope of the invention being indicated by the appended claim rather than by the foregoing description, and all modifications and variations as fall within the meaning and purview and range of equivalency of the appended claim are therefore intended to be embraced therein.

What it is desired to claim and secure by Letters Patent of the United States is:

A pulping machine comprising in combination, a tank having vertically disposed opposite side walls and opposite end walls curving in opposite directions to said side walls, an elongated cylindrical hollow rotor closed at opposite ends having parallel imperforate side walls, end

shafts extending from opposite ends of the rotor through stuffing boxes provided in said side walls and bearing means for said end shafts outside said side walls rotatably supporting said shafts and rotor, ribs fixed to the outer side of the walls of the rotor extending helically outwardly in opposite directions from intermediate opposite ends of the rotor for directing stock in the tank outwardly during rotation of the rotor towards said side walls and around said end walls, disc members at opposite ends of said rotator around said shaft ends having inner faces and being slidably mounted in said side walls for movements towards and away from the ends of the rotor, blades fixed to the periphery of said rotor at opposite ends thereof extending outwardly radially of said periphery and having working edges disposed transversely to the axis of rotation of said rotor, and blades fixed to inner faces of said disc members arranged for coaction with working edges of the blade of the rotor.

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