Dec. 15, 1936. C. N. McINTYRE ET AL 2,064,024

MACHINE FOR RECLAIMING WASTE FIBER

Filed Aug. 23, 1935 3 Sheets-Sheet 1

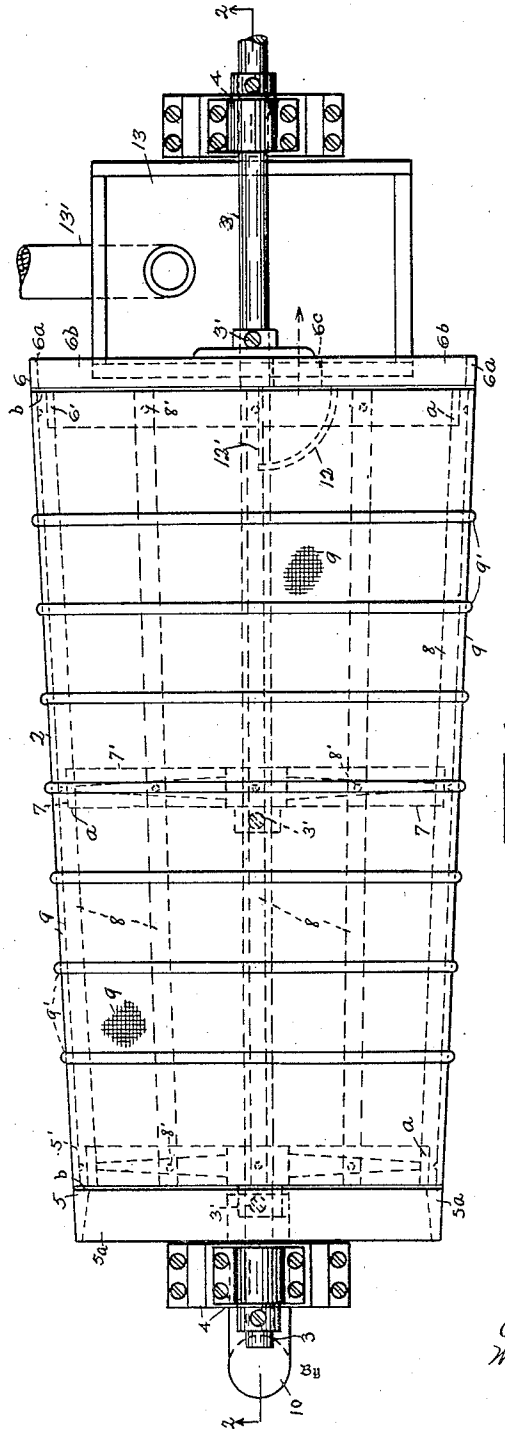


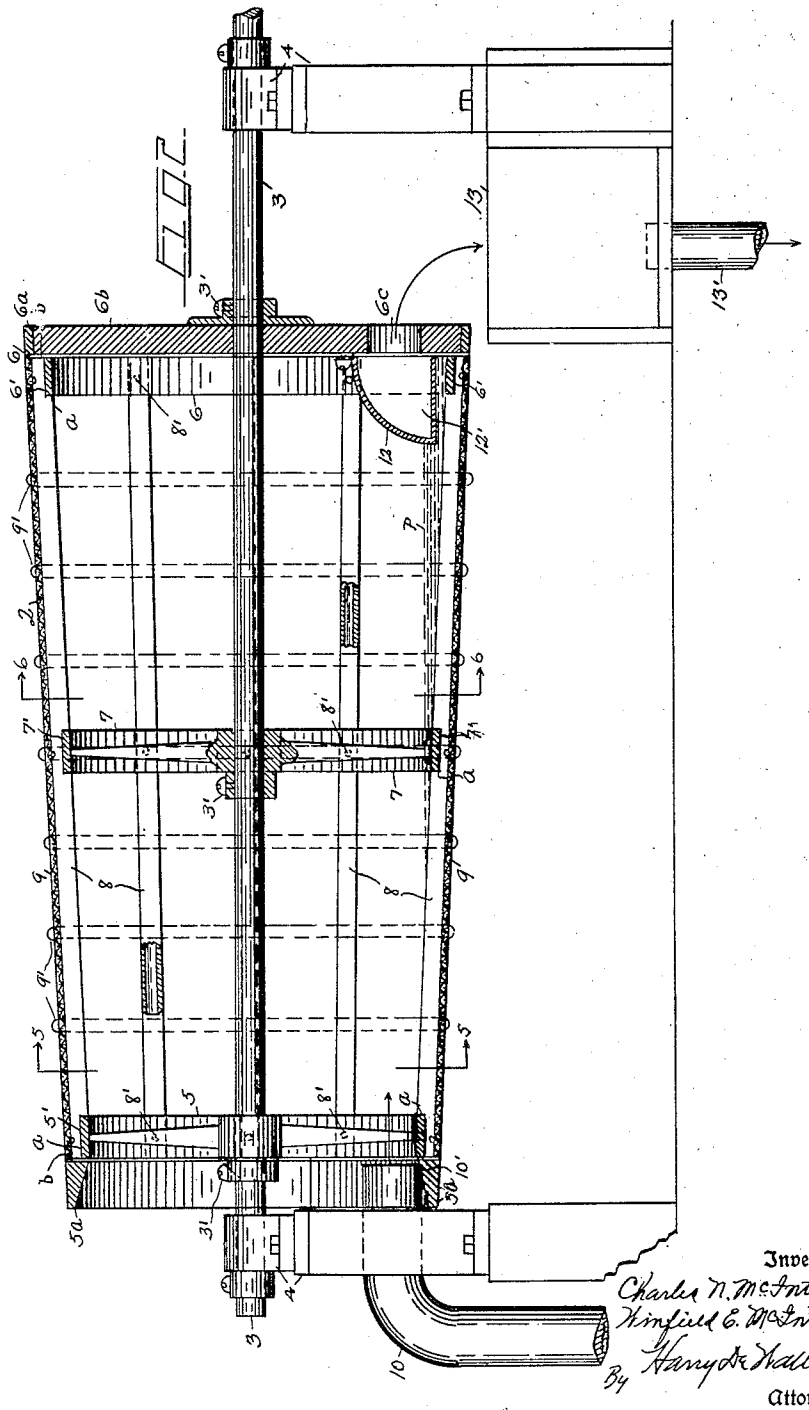
FIG. 1.

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MACHINE FOR RECLAIMING WASTE FIBER

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MACHINE FOR RECLAIMING WASTE FIBER

Filed Aug. 23, 1935 3 Sheets-Sheet 3

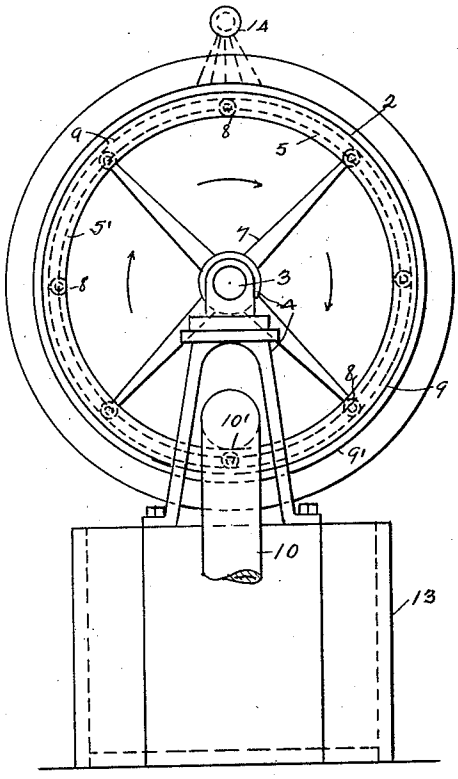


FIG 3

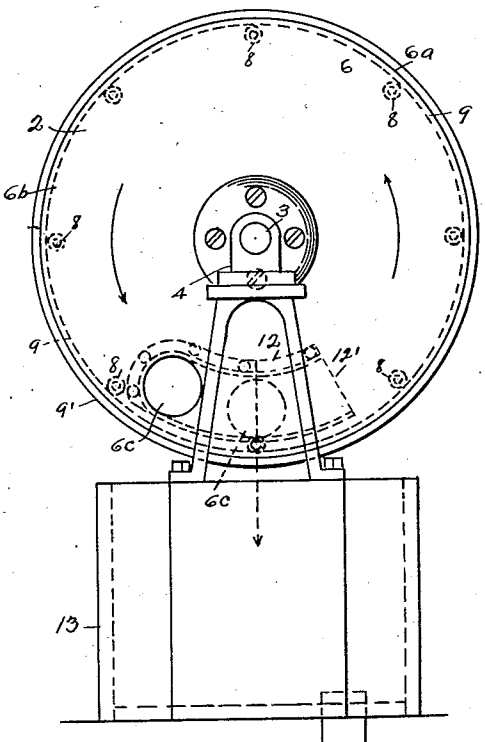


FIG 4

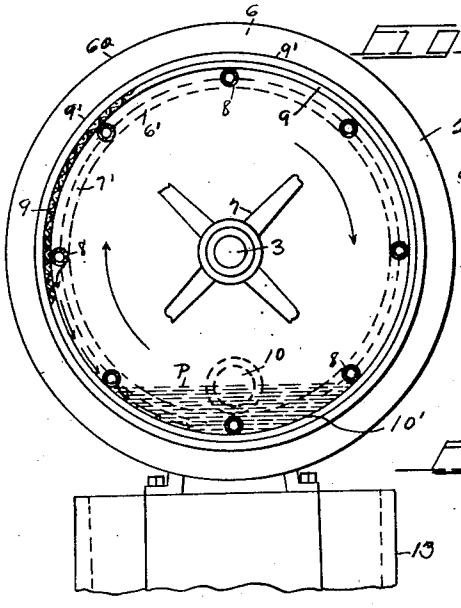


FIG 5

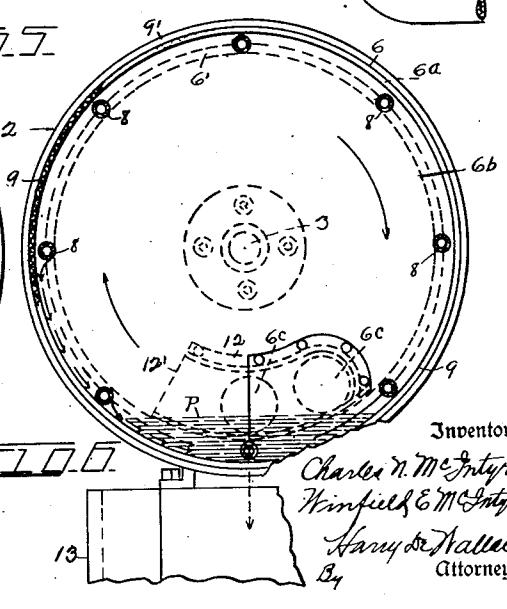


FIG 6

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MACHINE FOR RECLAIMING WASTE FIBER

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Application August 23, 1935, Serial No. 37,536

3 Claims. (Cl. 92—35)

This invention relates to novel and simple mechanism for reclaiming fibers ordinarily wasted with the water extracted by gravity or vacuum during the forming of webs of paper commonly made on Fourdrinier and drum-mold machines, and has for its object to provide a hollow rotatable foraminous cylinder preferably in the form of a frustrum cone, having a normally open head-end that receives the watery waste products of the paper machines and screens out the fiber content thereof in a continuous operation without the aid of vacuum. A further object is to provide a cylindrical cage structure comprising annular flanged head and tail portions that support a circular arrangement of ribs or vanes around which is wrapped a relatively fine-mesh woven screen that collects the fibers upon its inner surface, the said ribs serving to successively elevate portions of the solution so that the same may cascade from the ribs to continuously wash the fibers from said inner surface and enable the fibers to gravitate towards and form a pool adjacent the expanded end of the cylinder, the said end being closed by a circular head having a relatively small eccentric opening through which the reclaimed fibers, together with a certain amount of water, may be discharged into a tank or chest and from which it may be returned to the usual stock-chest that conditions the fiber-stock for the forming machines. And a further object is to provide novel means for intermittently dipping the accumulated fibers from the pool and discharging the same through the eccentric opening. This dipping operation tends to prevent a free and steady outflow of the reclaimable fibrous stock which would ordinarily be difficult to control, besides resulting in the saving of more water than may be desired.

We attain these objects by the means set forth in the detailed description which follows, and as illustrated by the accompanying drawings, in which—

Figure 1 is a top plan view of the complete machine. Fig. 2 is a central vertical longitudinal section taken on line 2—2 of Fig. 1. Fig. 3 is a head or reduced end elevation. Fig. 4 is a tail or expanded end elevation. Fig. 5 is a transverse vertical section taken on line 5—5 of Fig. 2. And Fig. 6 is a similar cross-section taken on line 6—6 of Fig. 2, showing the dipper that effects the intermittent discharge of the reclaimed fibers.

In the drawings, 2 represents generally the rotatable conical cylindrical screen which is supported horizontally by an axial shaft 3, the latter being journaled in pedestal bearings 4—4', and may be driven by any suitable power. The cylinder or drum 2 comprises a cage-like structure consisting of similar flanged head, tail and intermediate annular parts 5, 6, and 7, preferably made of metal, and being held in spaced relation by a number of longitudinal ribs or vanes 8, which are equidistantly spaced around the peripheries of said parts and permanently secured to flanges 5', 6', and 7' by rivets or bolts 8'. The ribs in the present structure are preferably iron pipes having their ends and medial portions cut away, as at *a*, to receive said flanges, as shown in Fig. 2. The annular heads 5 and 6 are each formed with outwardly facing annular flanges 5*a*—6*a*, of slightly larger diameter than the flanges that carry the ribs 8, to provide shoulders *b* between which the ribs together with a finely woven screen 9 that is wound around the ribs, may be disposed substantially flush with the flanges 5*a* and 6*a*, as shown in Figs. 1 and 2. The head 5 is normally open, while the flanges 6' and 6*a* are stepped to provide a circular socket in which may be disposed a disc-like part 6*b* that substantially closes the tail end of the drum 2. The annular supports 5—7 and the closure 6*b* are preferably keyed or otherwise rigidly secured, as by devices 3', to the shaft 3, and the rings 5 and 7 are preferably formed with spokes to stiffen and thereby enable said rings to be of lighter weight. The screens 9, in order to collect relatively fine waste fibers, preferably range from 100 to 120 mesh per inch. The screen 9 is shown in one piece and may be soldered at a few points (not shown) to the ribs 8, and the screen may also be bound to the ribs by a plurality of spaced external hoops, as 9'. The screen 9 is supplied with the waste from the paper machines by a pipe 10, whose discharge end is preferably inserted in the open head 5 so as to discharge the waste fluid substantially at the level of the bottom of the screen, as best seen at 10' in Figs. 2, 3, and 5. By this arrangement, the said fluid is directed longitudinally over the lower central portion of the screen, and continuously washes the fibers that gather upon the inner surfaces of the wire 9 and impells the same towards the tail end, and thereby prepares the screen for the deposit of a new layer, and so on. In practice, the force of the inflowing liquid is not sufficient to carry a heavy stream the full length of the screen; for the reason that most of the water will have drained through the bottom by the time the flood reaches and passes

the medial support 7. This diminishing of the stream's force is due partly to the fact that the ribs 8 are continuously moving transversely through the stream, and this sets up a sufficient agitation to accelerate the screening between the supports 5 and 7. The ribs 8 constantly rotate in a frustoconical path parallel to the axis of the drum 2 as well as the path of the inflowing fluid, the fresh liquid naturally dislodging the fibers that cling to the ribs and the inner surface of the screen, as these portions successively pass through the stream. As soon as the ribs and the corresponding inner surfaces of the screen move out of the direct path of the discharge by pipe 10, these portions again become coated with fresh fibers that ordinarily would be carried around until the same portions reenter the zone of the said stream, were it not for the fact that all the ribs in turn scoop up small portions of the fluid and carry the same upwardly until it is entirely wasted by gravitation from the ribs, as indicated by the short curved arrows at the right in Figs. 5 and 6. In other words, as the ribs 8 successively move upwardly from the path of the inflowing stream, the fluid elevated by the ribs cascades therefrom and washes the fibers from the ribs as well as from the inner surface of the screen that lies between the ribs, as may be understood by consulting Figs. 5 and 6. This washing down action returns the loosened fibers to the zone or path of the main stream, which naturally carries the fluid in constantly diminishing volume down the incline towards the tail end 6b where all the freed fibers gather in a pool, as *p*, shown in Figs. 2, 4, and 6. The pool *p* lies almost wholly at the bottom of the incline resulting from the expansion of the tail end and receives the fibrous fluid mainly by gravity since the force of the flow of the main stream will have been spent by the continuous and rapid extraction of the water in the region between head 5 and the medial support 7, as explained.

The drum 2 has been purposely expanded in a gradual manner from the head 5 towards the tail 6 in order that gravity may help to impound the fibers collected by the screen at a suitable distance from the main body of the incoming stock. This dislodging of the captured fibers by the washdown action produced by the ribs increases the fiber content and reduces the percentage of water in the pool *p*, as compared with the unscreened product that is being delivered by the pipe 10. This enables the user of the present machine to pipe its output directly to the usual stock-chests that condition all fibrous stocks for use by the forming machines, without unduly diluting said stock. There is also a certain amount of screening constantly taking place in the area covered by the pool *p*, since the screening web 9 also forms the bottom of the pool. But this latter screening is retarded by the constant settling of the fibers upon the said bottom, which, owing to the extremely fine mesh of the screen 9, amounts to merely a light trickle, as compared with the more free and rapid screening that is continuously taking place between the head 5 and the support 7. The closure 6b is formed with a relatively small eccentric discharge opening 6c, which communicates with the interior of a hollow dipper or ladle, as 12, which is mounted on the inner face of the closure, as shown in Fig. 6. This dipper has a normally open mouth 12' that faces in the direction of the travel of the closure, and when said mouth approaches the pool *p*, the dipper scoops up a few quarts of the liquid of the pool and discharges said liquid through the opening 6c, from which it gravitates into a chest or tank 13, from which the liquid containing the reclaimed fibers may be drawn off through a pipe 13'. The opening 6c and the dipper 12 are so positioned that once each revolution of the drum 2, a measured quantity of the contents of the pool may be transferred to the chest 13. The opening 6c is preferably disposed just out of registry with the liquid level of the pool *p* so that there may be no normal wash or flow from the pool through said opening, as explained. In Figs. 2, 4, and 6, the full lines show the dipper 12 in the act of dipping the liquid from the pool *p*, and by the time the dipper moves leftward to its dotted position in Fig. 6, the opening 6c will start discharging the contents of the dipper into the chest 13, as indicated by the dotted arrow in said view. The drum 2 may be operated at speeds ranging from 20 to 50 R. P. M. according to the variations in the volume of the waste from the paper-forming machines.

Obviously, one or more shower devices may be disposed above the screen to supplement the washing down of the fibers effected by the cascading of the liquid elevated by the ribs 8, as indicated at 14 in Fig. 3.

Having thus described our invention, what we claim, is—

1. In a machine for reclaiming waste fiber, a conical drum comprising end members, rods connecting the end members, a screen encircling the rods, the larger end member having an outlet adjacent its periphery, and a dipper connected to the larger end member and having its longitudinal axis coextensive with the plane of the said larger end member and having a closed end and an open end and a side and bottom wall, the side wall being spaced from and extending across the outlet.

2. In a machine for reclaiming waste fiber, a conical drum comprising end members, a screen connected to the end members, the larger end member having an outlet adjacent its periphery, and a dipper connected to the said larger end member and having an open and a closed end, and a side and bottom wall, the side wall being spaced from and extending across the outlet.

3. In a machine for reclaiming waste fiber, a conical drum comprising end members having inwardly extending flanges of less diameter than that of the members themselves, a central member, longitudinal rods having their ends reduced and engaged with the flanges, and having their central portions provided with reduced parts to receive the central member, an inlet at the smaller end of the drum, an outlet, at the larger end of the drum, a screen encircling the rods, and a shaft on which the end and central members are mounted.

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