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1,219,290.

Patented Mar. 13, 1917.

2 SHEETS—SHEET 1.

Fig. 1.

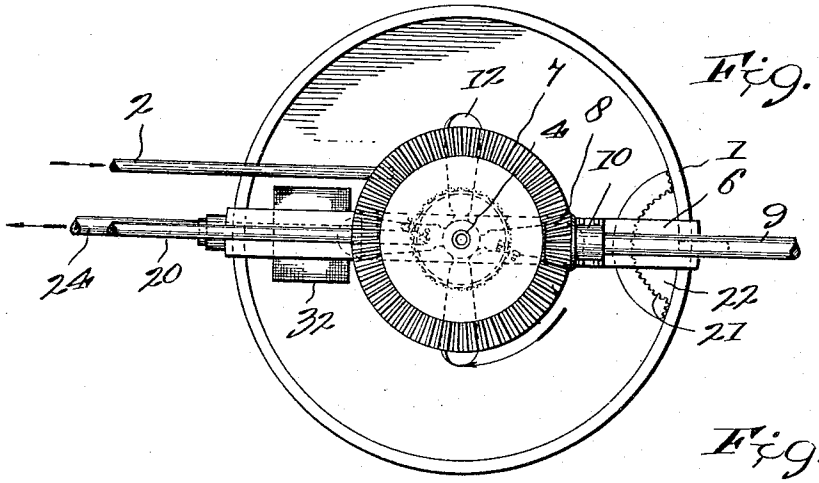



Fig. 4.

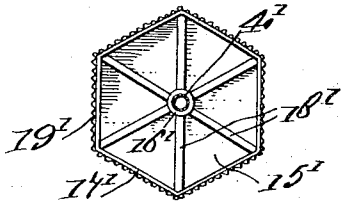



Fig. 2.

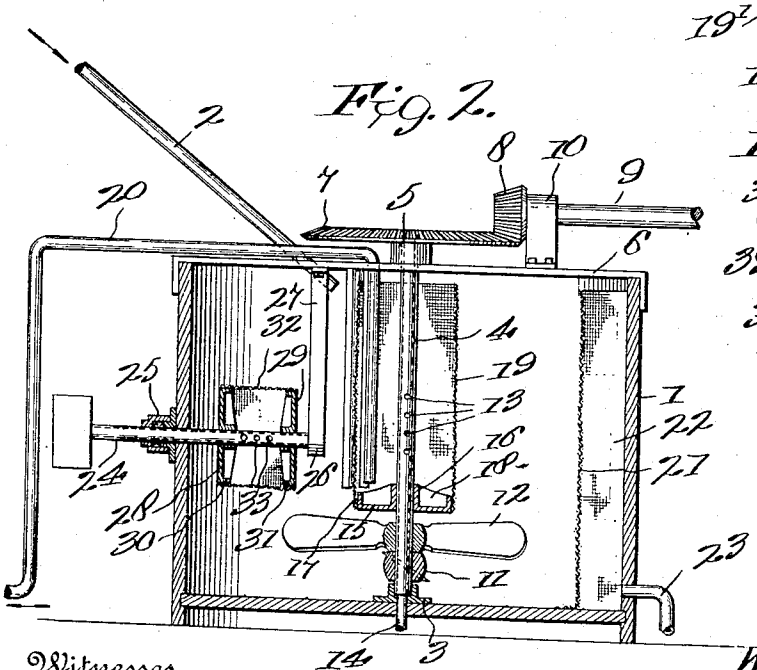
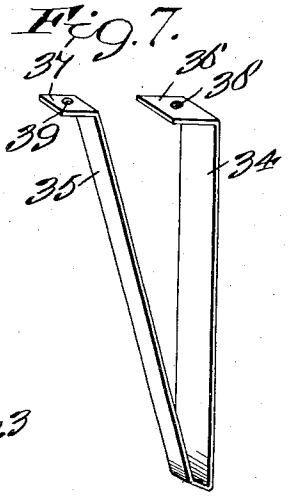



Fig. 7.




Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

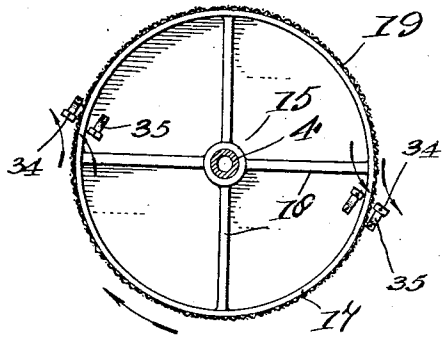



Fig. 6.

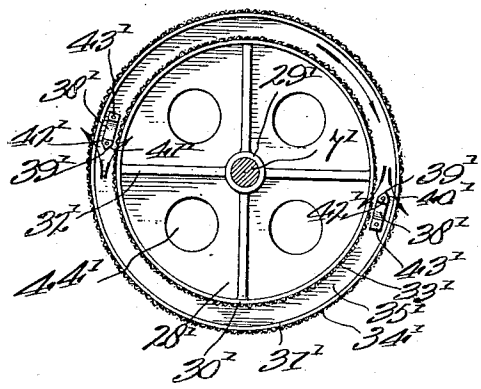



Fig. 5.

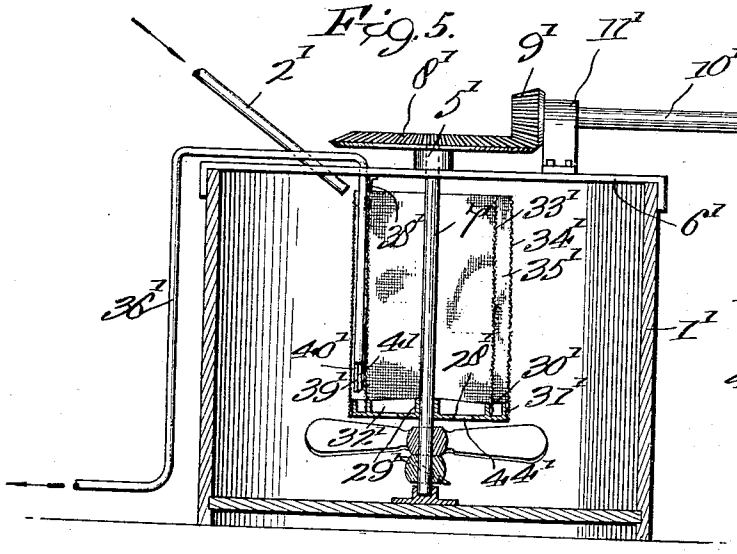
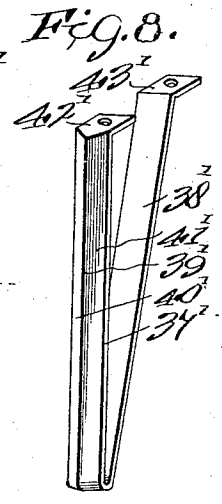



Fig. 8.




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# UNITED STATES PATENT OFFICE.

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## SEPARATOR.

1,219,290. Specification of Letters Patent. Patented Mar. 13, 1917.

Application filed December 23, 1915. Serial No. 68,420.

*To all whom it may concern:*

Be it known that we, WILLIAM J. GOYNE, WILLIAM E. GOYNE, and GEORGE M. PACETTI, citizens of the United States, residing at City Point, in the county of Prince George and State of Virginia, have invented certain new and useful Improvements in Separators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in separators for liquid borne substances, and the principal object and benefit of the invention is its time saving feature during such separations, as for instance in the manufacture of gun cotton, wood pulp, and other products, in the pulping, boiling, cooling, settling, draining, washing, etc., although it is to be understood that the invention is not limited to this use; it may have other applications.

Another object of the present invention resides in providing an apparatus of the above character which will be of a construction to permit of a continuous process as applied to gun cotton, wood pulp, or other finely divided material, in contradistinction to the present intermittent processes.

A further object of the present invention resides in providing an improved separator which will include a screen, with which are associated deflectors for encountering the currents set up in the material to be separated, and directing such material angularly through the meshes of the screen to free the latter from any particles tending to clog the same and constantly maintaining such screen or screens as may be employed clear.

With these and other objects in view the invention consists in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

In the accompanying drawings forming a part of this application, and in which similar reference symbols indicate corresponding parts in the several views:

Figure 1 is a top plan view of one form of separator constructed in accordance with the present invention.

Fig. 2 is a central vertical sectional view of the same.

Fig. 3 is an enlarged top plan view of the screen shown in Figs. 1 and 2.

Fig. 4 is an enlarged top plan view of a slightly modified form illustrating a polygonal screen.

Fig. 5 is a central sectional view of a still further modified form of the invention.

Fig. 6 is an enlarged top plan view of a double screen employed in the form of invention shown in Fig. 5.

Fig. 7 is a perspective view of one form of deflector shown in Figs. 1 and 2.

Fig. 8 is a perspective view of a modified form of deflector.

Referring more particularly to the drawings, 1 designates a receptacle or vat for receiving the material which is to be separated, and which is delivered thereto through a pipe 2, or other suitable means.

The receptacle 1 may be stationary or movable, as desired, and is provided at a suitable point in the bottom thereof with a bearing 3 in which is supported a hollow or other shaft 4. This shaft 4 is mounted at its upper end in a bearing 5 supported on a cross bar 6, which is fitted on the receptacle 1 in any suitable manner.

Above the cross bar 6 the shaft 4 is connected to a bevel gear wheel 7 in mesh with a bevel pinion 8 on a shaft 9, which is driven from any suitable source of power (not shown) and is journaled at one end in a bearing 10 which may be located on the cross bar 6, as shown, or on other parts of the apparatus, as found most convenient in practice.

At its lower end, and preferably immediately above the bearing 3, the shaft 4 is provided with suitable agitating mechanism, which, in the instance shown, is furnished by a pair of paddles or propellers including each a central hub 11 mounted on the shaft 4, and vanes or blades 12 projecting therefrom.

It will be understood that from the shaft 9 and through the bevel gears 7 and 8, the shaft 4 is continuously rotated at any speed required; and the same carries the paddles or propelling means 11, 12, around, subjecting the material which is in the receptacle 1

to an agitating motion, such as to bring all portions of the liquid into contact with the screen or screens employed and thereby give the same opportunity to become thoroughly filtered and separated; and likewise to promote a circulation of the heavier and solid particles, preventing the same from becoming lodged against and clogging the meshes of the separating devices so as to impede the operation of separation.

The shaft 4 may be formed with one or more perforations or slots 13 for the passage of the liquid from the space within the screen to the interior of the shaft, whence the same will flow by gravity down through the hollow shaft and be conveyed away through a pipe 14, which may include a valve for controlling the amount of liquid removed and the speed with which it is withdrawn. Such valve in the pipe 14 will be necessary as controlling this amount of the liquid removed, and the speed of removal in order to regulate the relative elevations of the material within and without the screen, as hereinafter more particularly described.

Above the paddles or agitating mechanism 11, 12, is a casting 15 including a central bearing 16, an outer flange 17, and reinforcing ribs 18 connecting said bearing 16 and flange 17. To the outer flange 17 is secured a screen 19 which may be of the circular form shown in Figs. 1, 2 and 3, or of the polygonal form shown at 19′ in Fig. 4, where the outer flange 17′ is similarly formed polygonal. The other parts in Fig. 4, including the hollow shaft 4′, the casting 15′, bearing 16′, and reinforcing ribs 18′, are similar to the corresponding parts shown in the circular form, as in Figs. 1, 2 and 3. In this connection it will be noted that we do not desire to limit ourselves to any particular configuration of screen, and it is obvious that the same can be made in accordance with any design which may be found necessary or desirable in practice.

Referring now again to Figs. 1 and 2, 20 designates a siphon pipe, the inner end of which extends downwardly within the space embraced by the screen 19, and is preferably arranged so that its end terminates a short distance above the casting 15. This siphon pipe 20 provides for removing the separated liquid which has passed through the meshes of the screen 19 and become filtered and separated thereby; this siphon pipe 20 being used either alone or in conjunction with the hollow shaft 4, through which the liquid in the interior space within the screen 19 may be withdrawn, as above described. It will be understood that although we have illustrated but the siphon and gravity means of withdrawing the liquid, the same might evidently be accomplished by pumping, ejection, or other means, and such devices may be used either separately or in combination.

In addition to the screen 19 which encircles the shaft 4, if it is found desirable, another or other screens may be employed, such, for instance, as a side screen 21, which may be secured to the receptacle 1, as clearly indicated in Figs. 1 and 2, or may be secured therein in any other manner and located at any point in the receptacle as may be found desirable and convenient. This screen 21 incloses an area 22 for receiving the separated liquid, and the latter may be conveyed from the area 22 by gravity through a pipe 23, or through a siphon, ejection, or other means, as will be now well understood.

Besides the screens or separators 19 and 21, the device may embrace a multiple arrangement of screens including a submerged screen mounted on a hollow shaft 24 supported in bearings 25 and 26, the latter bearing 26 being supported from a hanger 27 depending from the cross bar 6, or other stationary parts of the apparatus. The submerged screen includes heads 28 and 29 similar in construction to the castings 15, and formed each with outer flanges 30 and 31 between which are connected the mesh 32 constituting the screen or separator. Within the interior of the submerged screen the hollow pipe is formed with one or more perforations or slots 33 for placing the same in communication with the interior of the pipe 24, through which the separated material may be withdrawn by gravity, siphon, or other means, as above indicated. The horizontal hollow shaft 24 may be rotated, if desired, and in any suitable manner.

Referring more particularly to Figs. 3 and 8, the circular screen 19 is preferably equipped with deflectors for encountering the liquid currents set up by the rotation of the screen and deflecting the same angularly through the meshes thereof in order to maintain the same clear and prevent clogging. Each deflector is preferably constructed of a single length of flat metal bent centrally upon itself to provide front and rear members 34 and 35, said members having their upper terminal ends bent over, as indicated at 36 and 37, and perforated as at 38 and 39, to receive bolts or other suitable means for attaching the same to the cross bar 6 or other framing of the apparatus. These deflectors are located with respect to the mesh wall 19 of the screen, as more particularly seen in Fig. 3, where the front members 34 are arranged angularly to radii of the screen. The interior deflectors are adapted to encounter the liquid current set up and direct the same angularly through the adjacent meshes of

the screen as the same is revolved substantially in that manner indicated by the arrows.

The deflectors situated on the exterior of the screen 19 have for their object to similarly encounter the current set up in the liquid due to the revolution of the screen, and deflect the same outwardly and away from the screen, as also shown by the arrows in Fig. 3, these outer deflectors being so located as to remove the liquid from the exterior of the surface of the screen 19 at points where the interior liquid is being directed therethrough, due to the action of the interior deflectors. This simultaneous deflection of the interior and exterior currents produces a tendency on the part of the interior liquid to readily pass through the meshes, removing all solid matter and to be carried away from the exterior wall of the screen in the path and together with the exterior liquid currents.

Now referring more particularly to Figs. 6 and 7, 7′ designates a shaft which may be solid as shown, or hollow as in Fig. 2, and which is mounted in a receptacle 1′ of any suitable character, and is journaled at its upper end in a bearing 5′ on a cross bar 6′. The shaft 7′ is driven through a bevel gear wheel 8′ in mesh with a similar pinion 9′ on a shaft 10′ and journaled at one end in a bearing 11′. 2′ indicates the intake pipe for the material to be separated.

Similarly, shaft 7′ may be equipped with paddles or agitating means, as here shown. Above the agitating means is secured a casting 28′ including a central bearing 29′ and a pair of spaced flanges 30′ and 31′ to which are connected respectively mesh walls 33′ and 34′, inclosing an annular space 35′. The bearing 29′ and interior flange 30′ are connected by webs 32′, and the base of the casting 28′ is formed with perforations 44′ to permit the material in the receptacle 1′ to enter within the interior space inclosed by the mesh wall 33′, through which latter it may pass to the annular space 35. A siphon 36′ extends down within the annular space 35′ and operates to withdraw the separated liquid. It will be seen that in this form of the invention the material is filtered and separated through a double screen from opposite sides, the interior pressure neutralizing that from the exterior, and the two screens affording an increased area over which the process of separation is conducted.

Referring more particularly to Figs. 7 and 8, the deflectors used in conjunction with this form of invention are also advantageously bent from a single length of metal to provide front and rear members 37′ and 38′, the front member being shaped to provide a central ridge 39′ and side walls 40′ and 41′ diverging therefrom. The terminal ends 42′ and 43′ are bent over and perforated to receive bolts or other means for securing the deflectors to the cross bar 6′. The action of these deflectors is clearly shown in Fig. 7, they being located within the annular space 35′ and encountering the liquid currents as set up by the rotary motion of the separator, directing the liquid to either side angularly, as shown by the arrows, through the meshes of the screen and preserving the same clear from clogging.

It is obvious that those skilled in the art may vary the details of construction and arrangements of parts without departing from the spirit of our invention, and therefore we do not wish to be limited to such features except as may be required by the claims.

We claim:

1. In a separator, the combination of a receptacle, a movable filter in said receptacle, and deflectors for directing the fluid through the filter walls comprising single lengths of metal bent substantially U-shaped and having their ends bent to provide supporting means, substantially as described.

2. In a separator, the combination of a receptacle for holding the material, a movable filter in said receptacle, and deflectors for said filter adapted to encounter the current set up by the latter and direct the material through and away from the filter walls, said deflectors comprising each a single strip of metal bent upon itself and having its terminal ends arranged to provide supporting means, substantially as described.

3. In a separator, the combination of a receptacle for receiving the material to be separated, a filter journaled in said receptacle, means for driving said filter, means associated with said driving means for agitating the material in said receptacle, and double deflectors for said filter adapted to encounter the currents set up by the motion of the latter and direct the material through and away from the filter walls, said deflectors comprising each a single strip of metal bent upon itself and having its terminal ends arranged to provide supporting means, substantially as described.

4. In an improved separator, the combination of a receptacle for holding the material, a movable filter in said receptacle, and exterior and interior deflectors for said filter adapted to encounter the current set up by the movement of the latter and direct the material through and away from the filter wall in coincident paths, substantially as described.

5. In a separator, the combination of a receptacle for holding the material, a movable filter in said receptacle, exterior and interior deflectors for said filter adapted to encounter the current set up by the movement of the latter and direct the material through and away from the filter wall in co-

incident paths, said deflectors comprising each a single strip of metal bent upon itself and having its terminal ends arranged to provide supporting means, substantially as described.

6. In a separator, the combination of a receptacle for receiving the material to be separated, a shaft journaled in said receptacle, means for rotating said shaft, means mounted on said shaft for agitating the material within said receptacle, a screen mounted to revolve with said shaft for separating the liquid, interior deflectors for encountering the liquid current set up by the movement of said screen and directing the same angularly through the meshes thereof, and exterior deflectors for directing the agitated liquid away from the screen at points coincident with the path of the interior deflected currents, substantially as described.

In testimony whereof, we affix our signatures.

WILLIAM J. GOYNE.
WILLIAM E. GOYNE.
GEORGE M. PACETTI.

**Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."**