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STRAINER OR SEPARATOR.  
APPLICATION FILED SEPT. 14, 1908.

963,462.

Patented July 5, 1910.

2 SHEETS—SHEET 1.

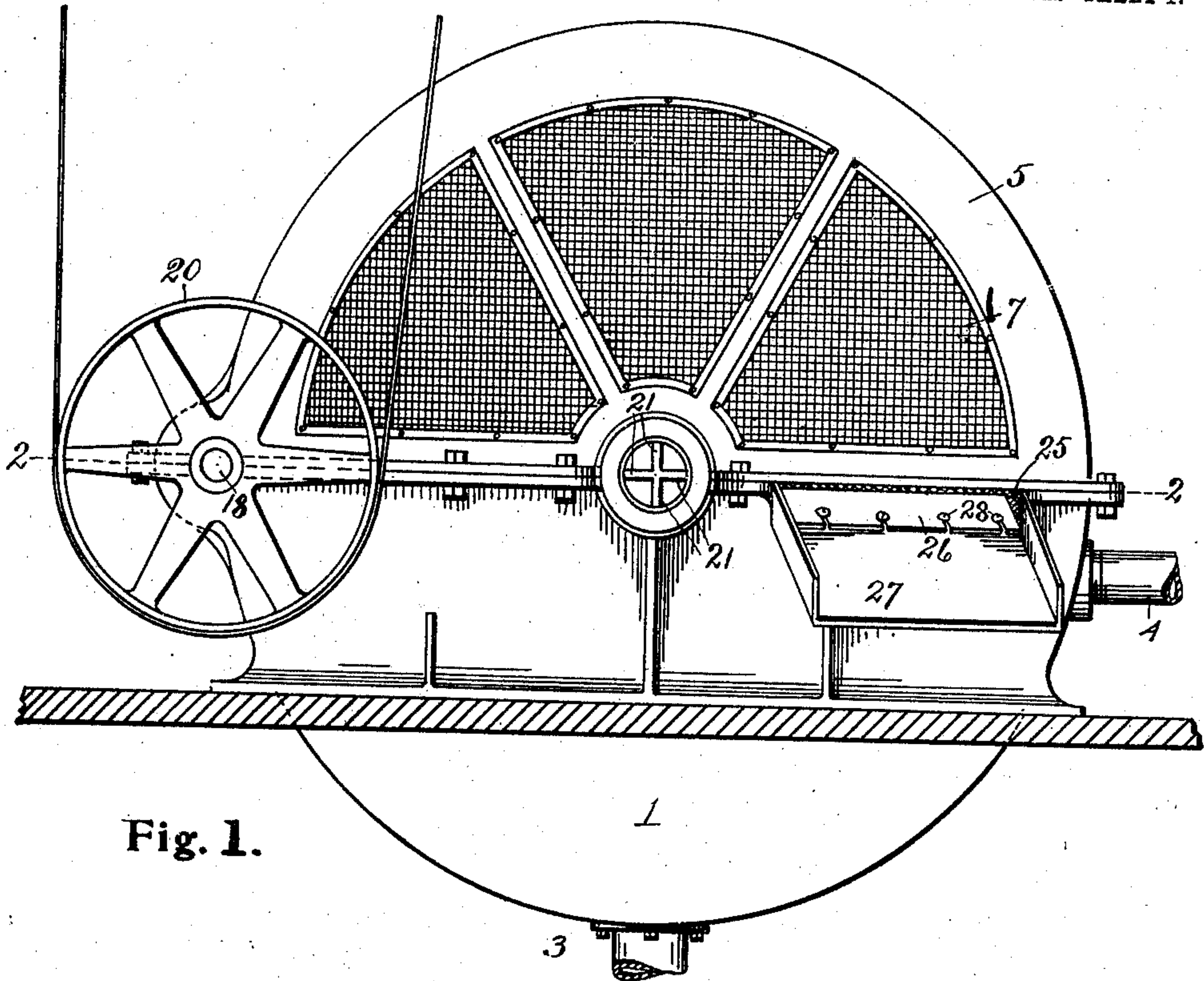


Fig. 1.

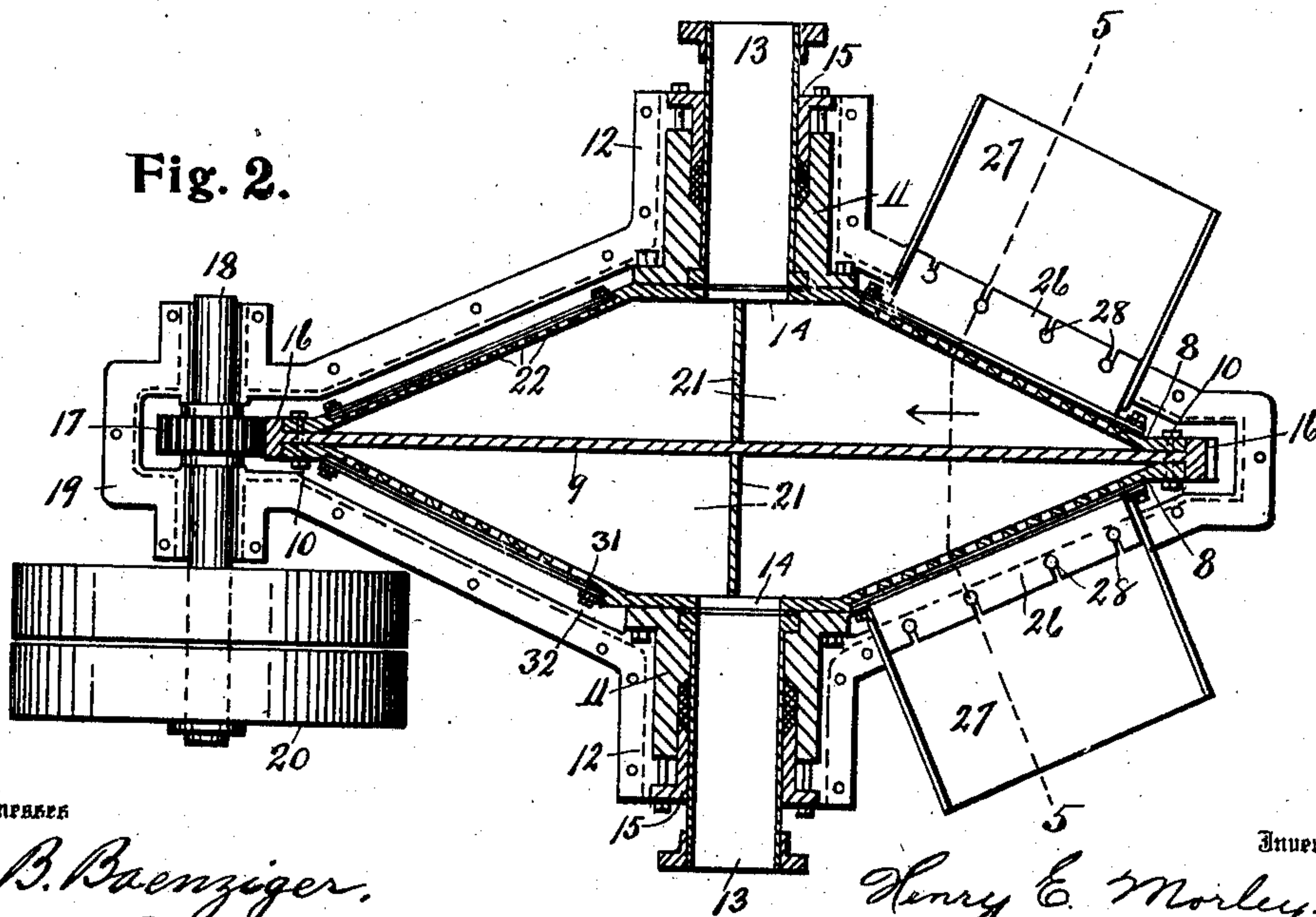


Fig. 2.

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2 SHEETS—SHEET 2.

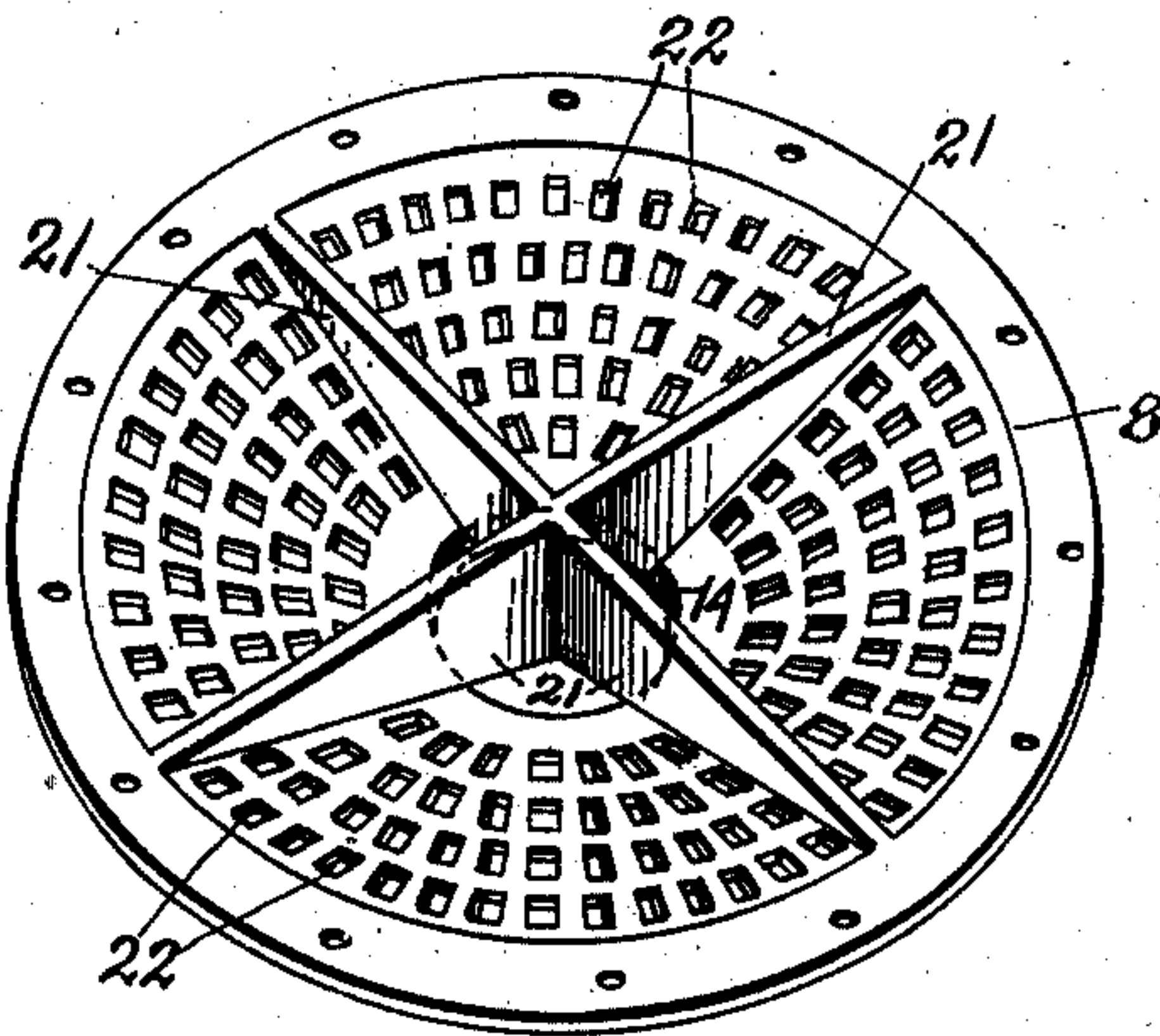


Fig. 3.

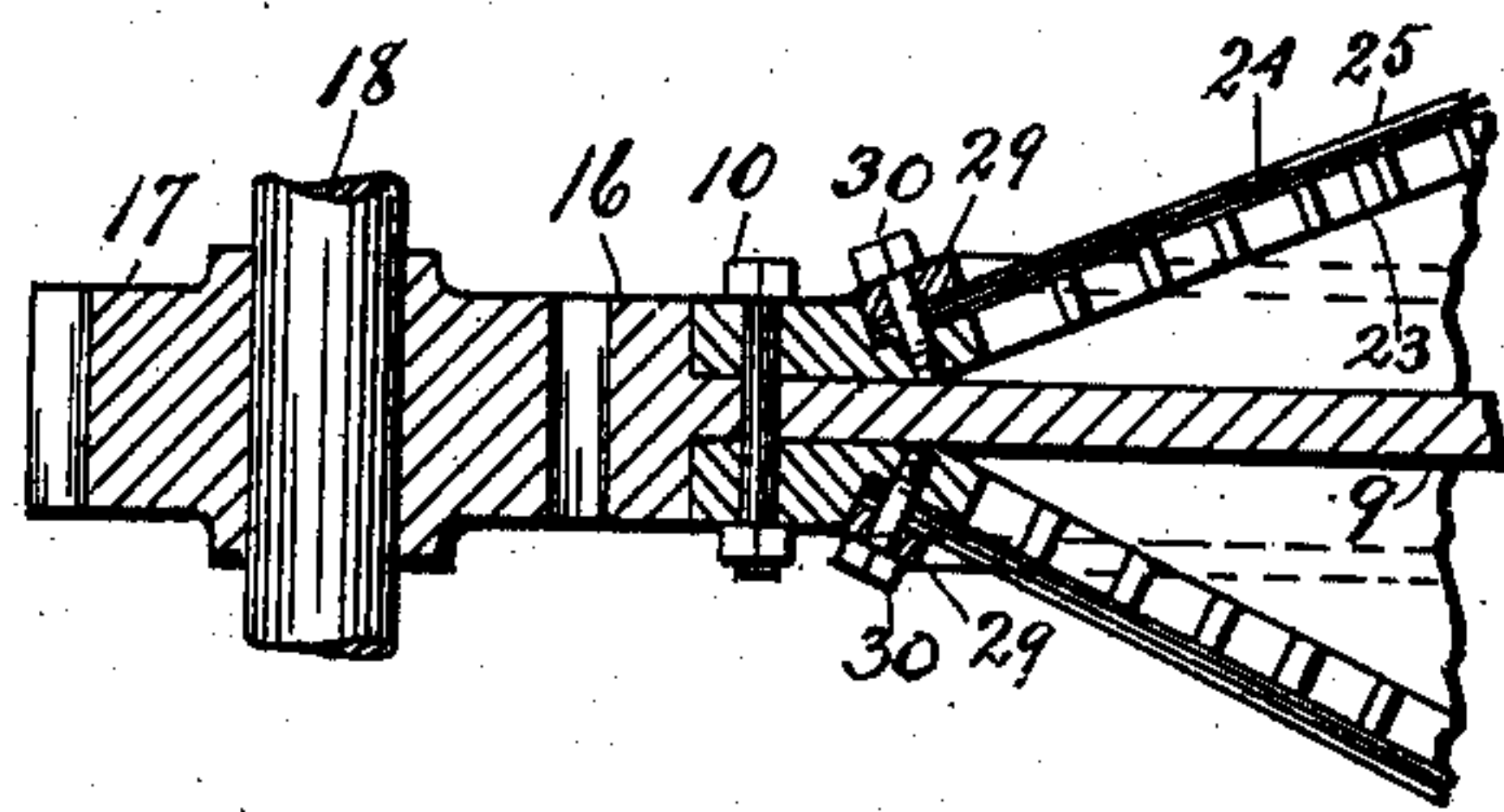


Fig. 4.

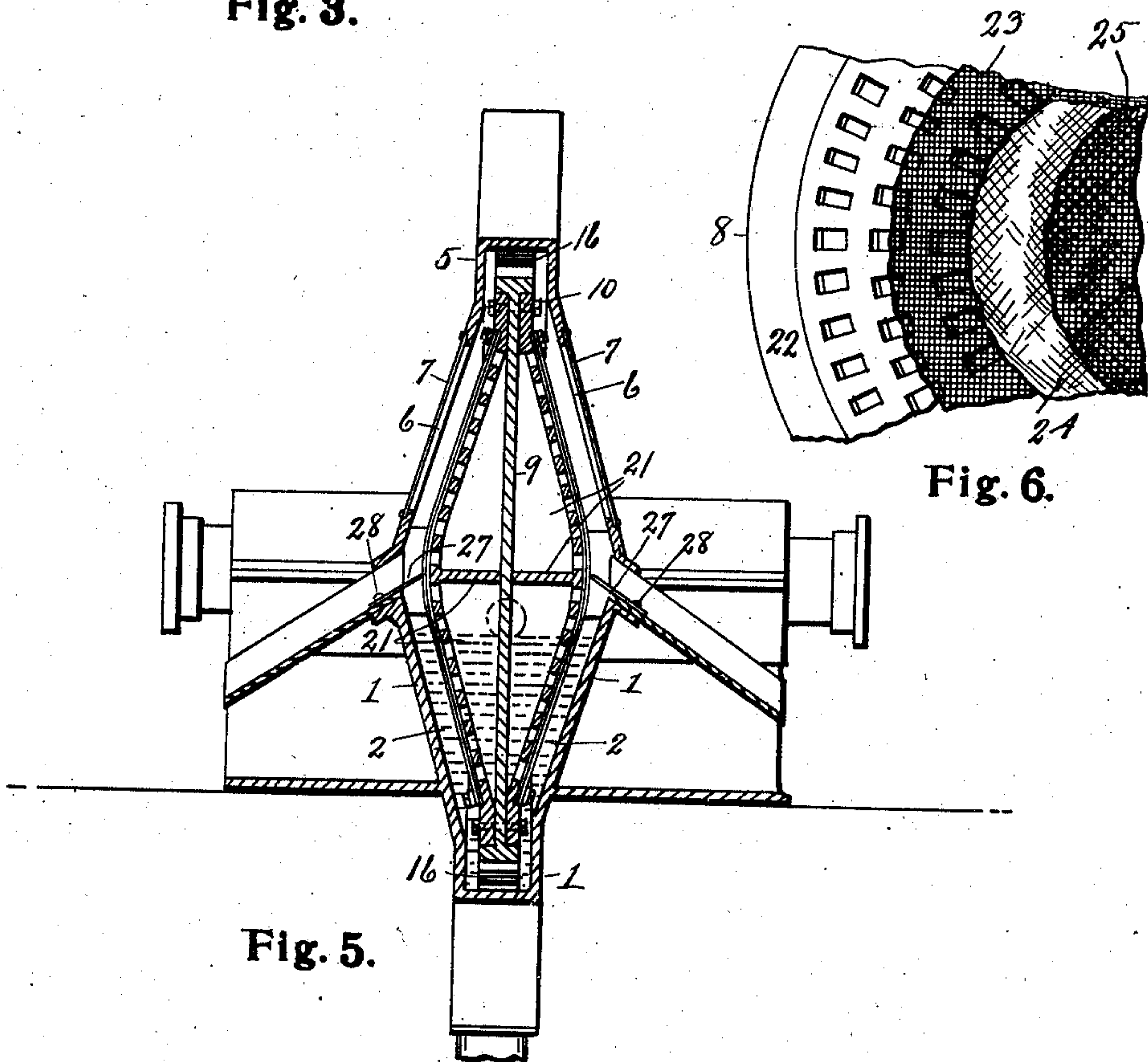


Fig. 5.

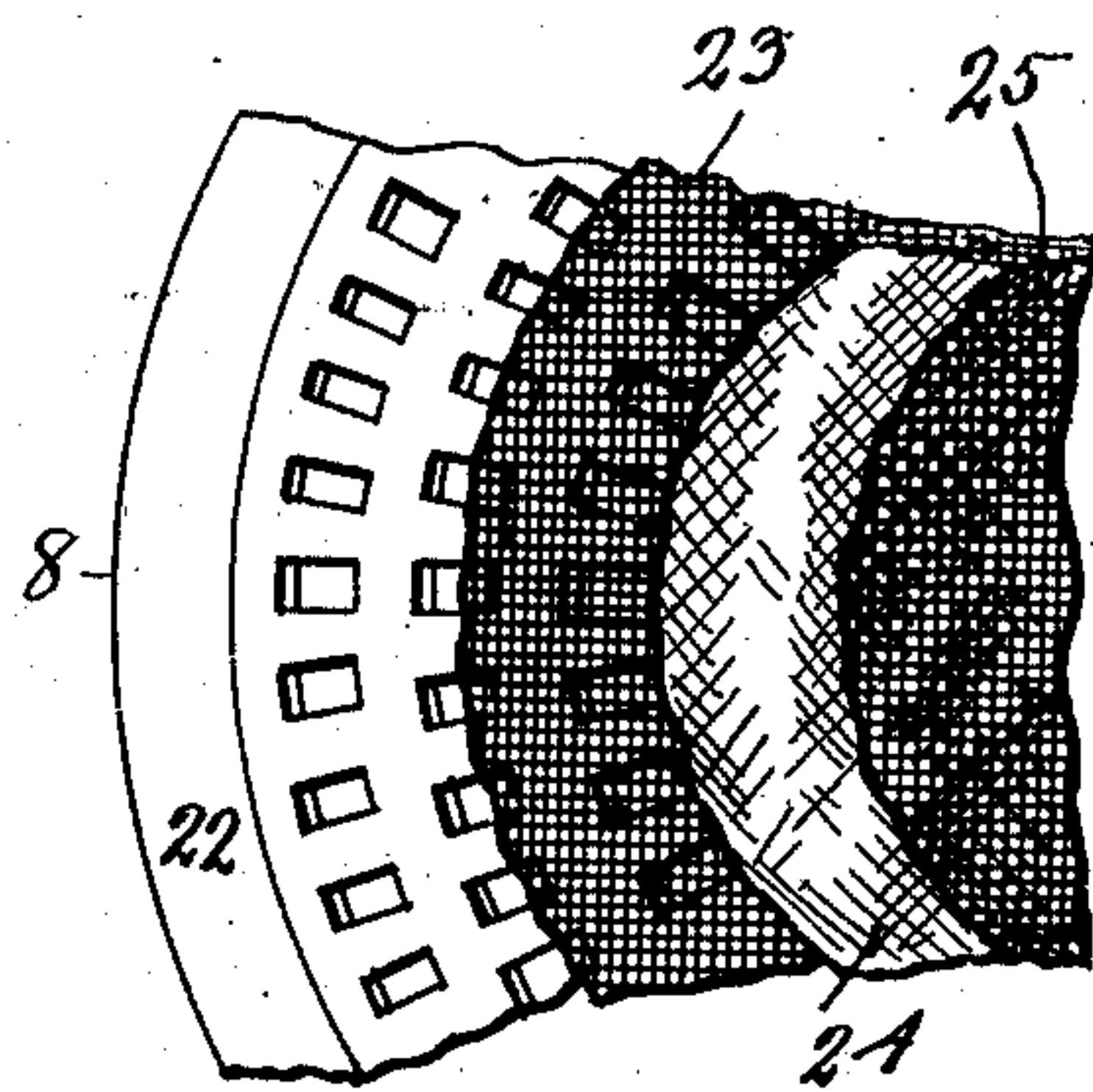


Fig. 6.

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# UNITED STATES PATENT OFFICE.

HENRY E. MORLEY, OF DETROIT, MICHIGAN.

STRAINER OR SEPARATOR.

963,462.

Specification of Letters Patent.

Patented July 5, 1910.

Application filed September 14, 1908. Serial No. 452,954.

*To all whom it may concern:*

Be it known that I, HENRY E. MORLEY, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Strainers or Separators; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in strainers or separators for removing or separating solids or extrinsic matter from liquids, the apparatus being especially designed for use in the manufacture of soda-ash, paint, cement, etc., and consists in the construction and arrangement of parts hereinafter more fully set forth and pointed out particularly in the claims.

The object of the invention is to provide a machine of the character described, of comparatively simple and inexpensive construction, wherein the arrangement is such as to enable a rapid and thorough separation of extrinsic matter from liquids, provision being made for removing the matter separated out of the liquid to prevent an accumulation thereof and a consequent impairment of the strainer or separator.

The above object is attained by the structure illustrated in the accompanying drawings, in which:—

Figure 1 is an elevation of an apparatus embodying my invention. Fig. 2 is a horizontal section as on line 2—2 of Fig. 1. Fig. 3 is a perspective view of one half of the inner straining or separating disk, looking at the inner face thereof. Fig. 4 is an enlarged fragmentary view in section of the gearing for driving the separating disk, showing also the manner of securing the straining materials to the opposite faces of said disk. Fig. 5 is a transverse section through the outer case and the separating disk, as on line 5—5 of Fig. 2. Fig. 6 is a fragmentary view of a portion of one half of the separating disk, showing the screen, filter felt and wire cloth thereon.

Referring to the characters of reference, 1 designates the lower half of the outer circular case which is composed of two semicircular concavo-convex plates joined at their

peripheries and forming a closed receptacle or chamber 2 for the liquid substance into the bottom of which leads an induct pipe 3. To maintain the liquid substance at a proper level in said chamber, an educt pipe 4 leads therefrom at a point below the horizontal center of the outer case.

The upper half of the outer case is also composed of semicircular concavo-convex plates 5 which are secured together at their peripheries and are mounted upon and secured to the lower plates 1 to form a complementary portion of the circular case which is convexo-convex in cross section. Through the upper opposite walls of said case or through the semicircular plates 5 forming said walls are segmental apertures 6 covered by a screening 7 for the purpose of admitting air to the upper portion of the interior of said case.

Within the fixed outer case is a rotative separating disk composed of two circular plates 8 concavo-convex in form which are secured in opposed relation on opposite sides of a circular dividing plate 9, said opposed circular plates 8 forming a substantially convexo-convex separating disk which conforms to the shape of the outer case. The marginal portions of the circular plates 8 are bolted together through the perimeter of the plate 9 by means of the bolts 10, said plate 9 serving to divide the interior of the separating disk into two independent chambers located on opposite sides thereof. Secured to the central portion of each of the plates 8 of the separating disk is a hollow journal 11, said journals being supported in bearing boxes 12 projecting from the opposite sides of the outer case.

Passing through the hollow journals 12 are the educt tubes 13 which are non-rotative and about which the journals 11 revolve. The inner ends of the tubes 13 communicate with the opposite divisions of the separating disk through the apertures 14, as clearly shown in Fig. 2. To prevent leakage around the tubes 13, suitable stuffing boxes 15 are provided. The outer ends of the tubes 13 are adapted for connection with suitable pumps, not shown, for the purpose of creating a partial vacuum in the upper portion of the separating disk and for drawing outwardly through said tubes the filtered or strained liquid.

For the purpose of imparting a rotary motion to the separating disk, the plate 9



is provided upon the periphery thereof, which extends beyond the margins of the plates 8, with gear teeth 16 which mesh with a pinion 17 journaled on a shaft 18 within a housing 19 formed in the outer case, said shaft being driven through the medium of a suitable pulley 20 mounted thereon; the speed of the shaft 18 being regulated to impart a slow rotary movement to the separating disk.

It will be seen on referring to Fig. 3 that each of the plates 8 which comprise the hollow separating disk, is provided on its inner face with the radially extending webs 21 whose inner edges bear against the face of the dividing plate or partition 9, and in conjunction therewith separate the chamber on each side of said partition into four divisions, said webs as the separating disk revolves, serving as buckets which carry upwardly and discharge the liquid, which has passed through the separating disk, into the educt tubes 13 through the openings 14 from whence it is conveyed away. It will also be noted on referring to Fig. 3, that each of the plates 8 is provided with a plurality of apertures 22 through the wall thereof to afford openings for the passage of the liquid through the walls of said plates. To provide for straining said liquid or separating the extrinsic matter therefrom, the outer face of each of the circular plates 8 is covered first with screen 23, then with a layer of filter felt 24 upon said screen, over which is a third layer of wire cloth 25. These layers or coverings permit the passage of the liquid through the walls of the separating disk but prevent the passage of the solid matter carried by said liquid which remains upon the outer surface of the wire cloth. The several layers of wire cloth and felt are secured at their outer margins by a ring 29 which is bolted to the perimeter of the plates 8 by means of the bolts 30, while the inner margins are in like manner secured by a ring 31 fastened by the bolts 32.

To remove the accumulation of the extrinsic matter from the surface of the wire cloth, the knives 26 are employed supported at the upper edges of the troughs 27 by means of fastening bolts 28 which pass through slots in said knives to permit of their adjustment. Said knives project through openings in the walls of the lower half of the outer case and their edges extend into contiguity with the wire cloth upon the outer faces of the separating disk, so that as said disk revolves, the matter separated from the liquid which collects upon the outer surface thereof is removed by said knives and discharged into the troughs 27.

When the apparatus is in operation, the lower portion of the separating disk is submerged in the liquid within the lower part of the outer case. It will be noted that

the dividing webs 21 cross the educt openings 14 leading from the opposite sides of said disk, so that each of the four compartments into which the opposite sides of said disk are divided, is in independent communication with one of the educt tubes 13. When the pumps, not shown, but which are connected with said tubes, are started, the air is partially exhausted from the upper portion of the separating disk on each side, creating a partial vacuum, which relieves the atmospheric pressure within said disk sufficiently to cause the liquid surrounding its lower arc to pass through the submerged portions of the walls thereof, said liquid which passes into the interior divisions of said disk being drawn or discharged into the tubes 13 as the separating disk revolves, and is disposed of in any suitable manner.

It will be noted that the creation of a partial vacuum within the separating disk by means of the suction pumps, will have a tendency to cause an inflow of air through the screens 7 in the upper portion of the outer case and through the upper portion of the walls of the separating disk. This passage of the air through the walls of said disk, serves to partially dry the matter separated from the fluid which adheres thereto, thereby facilitating the removal of said matter by the knives 26 as the separating disk revolves.

By means of this apparatus a large volume of liquid may be handled within a comparatively short time, out of which the extrinsic matter may be readily separated.

Having thus fully set forth my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a separator, the combination of an inclosing case having a liquid receptacle within the lower portion thereof, and perforations in the upper portion above the liquid level, a hollow separating disk having strainers in its opposite sides mounted to rotate within said case, the lower arc of said disk dipping into the liquid therein and the upper arc of said disk lying between the perforated sides of said case, means for educting air and liquid from the interior of the separating disk through a passage common to both, and means for rotating said disk.

2. In a separator, the combination of an inclosing case adapted to contain liquid in the lower portion thereof and having screened openings in its upper portion, a hollow separating disk mounted to rotate within said case having opposed apertured walls covered with straining material, the lower arc of said disk being immersed in the liquid within said case, and means for educting the strained liquid from the interior of said separating disk and for drawing air through the upper part of said disk.



3. In a separator, the combination of a case having a liquid receptacle within the lower portion thereof, a hollow separating disk mounted to rotate within said case, the lower arc of said disk dipping into the liquid therein, means for educting air and liquid from the interior of the separating disk, means for inducing air through the upper arc of the separating disk, and means for removing the extrinsic matter from the face of said disk.

4. In a separator, the combination of a case adapted to contain liquid in the lower portion thereof, a hollow separating disk having opposed circular walls of straining material mounted to rotate in said case, the lower arc of said disk extending into the liquid therein, means for educting the strained liquid from the interior of said disk between said circular walls, means for affording a passage of air through the extrinsic matter upon the circular walls of said disk separated from said liquid, and means for removing said matter from the face of said disk.

5. In a separator, the combination of a case adapted to contain liquid in the lower portion thereof, a hollow straining disk convexo-convex in cross section mounted to rotate in said case and dipping into the liquid therein, and having circular straining walls, an educt tube communicating with the interior of the straining disk between said walls, means for rotating said disk, and means within said disk for discharging the strained liquid into said educt tube as said disk revolves.

6. In a separator, the combination of a case having a liquid receptacle in the lower portion thereof, a hollow straining disk mounted to rotate in said case, said disk being convexo-convex in cross section and having its lower arc immersed in the liquid

therein, transverse partitions within said disk separating it interiorly into independent divisions, an educt tube common to all of said divisions communicating therewith, and means for educting both air and liquid from the divisions of said disk through said tube.

7. In a separator, the combination of a circular case having a liquid chamber therein, a hollow separating disk convexo-convex in form having opposed circular walls adapted to permit of the passage of liquid but arrest the passage of solid matter there-through, means for educting the strained liquid from the interior of said disk, and for drawing air through both sides of the upper arc thereof, stationary knives for removing from the face of said disk the matter separated from the liquid, and means for rotating said disk.

8. In a separator, the combination of a closed outer case having a liquid chamber in the lower portion thereof, and apertures in the walls of the upper portion, a separating disk having opposed perforated walls mounted to rotate in said case and extending into said liquid chamber, a scraping knife set adjacent the surface of said separating disk to remove the extrinsic matter therefrom, means for educting air from between the upper walls of said disk and liquid from between the lower walls thereof, means for imparting a rotary motion to said disk, and means for maintaining a constant level of the liquid in the chamber of the case.

In testimony whereof, I sign this specification in the presence of two witnesses.

HENRY E. MORLEY.

Witnesses:

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E. S. WHEELER.