

CENTRIFUGAL SEPARATING APPARATUS.

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952,653.

Patented Mar. 22, 1910.

Fig. 1.

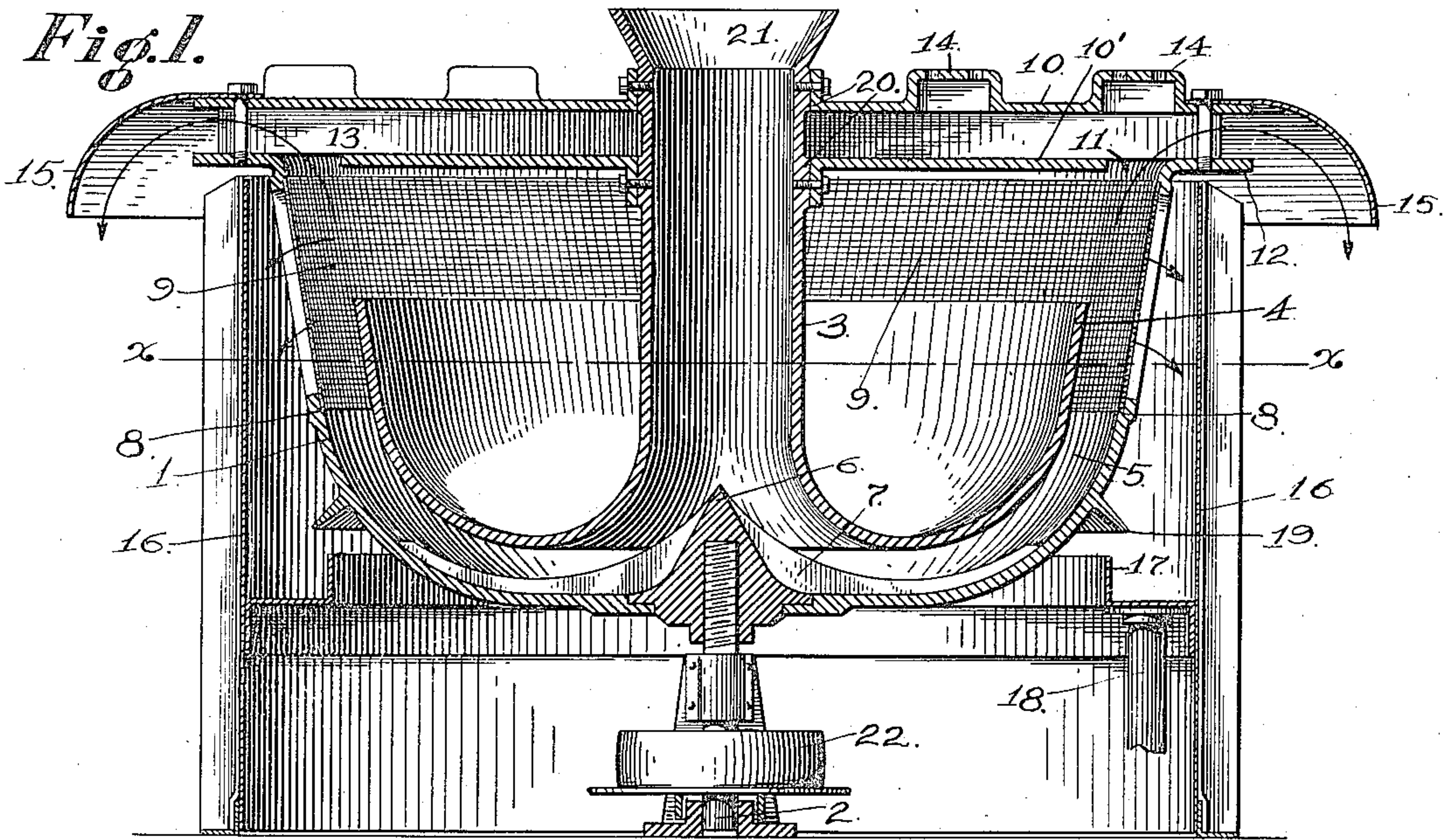


Fig. 2.

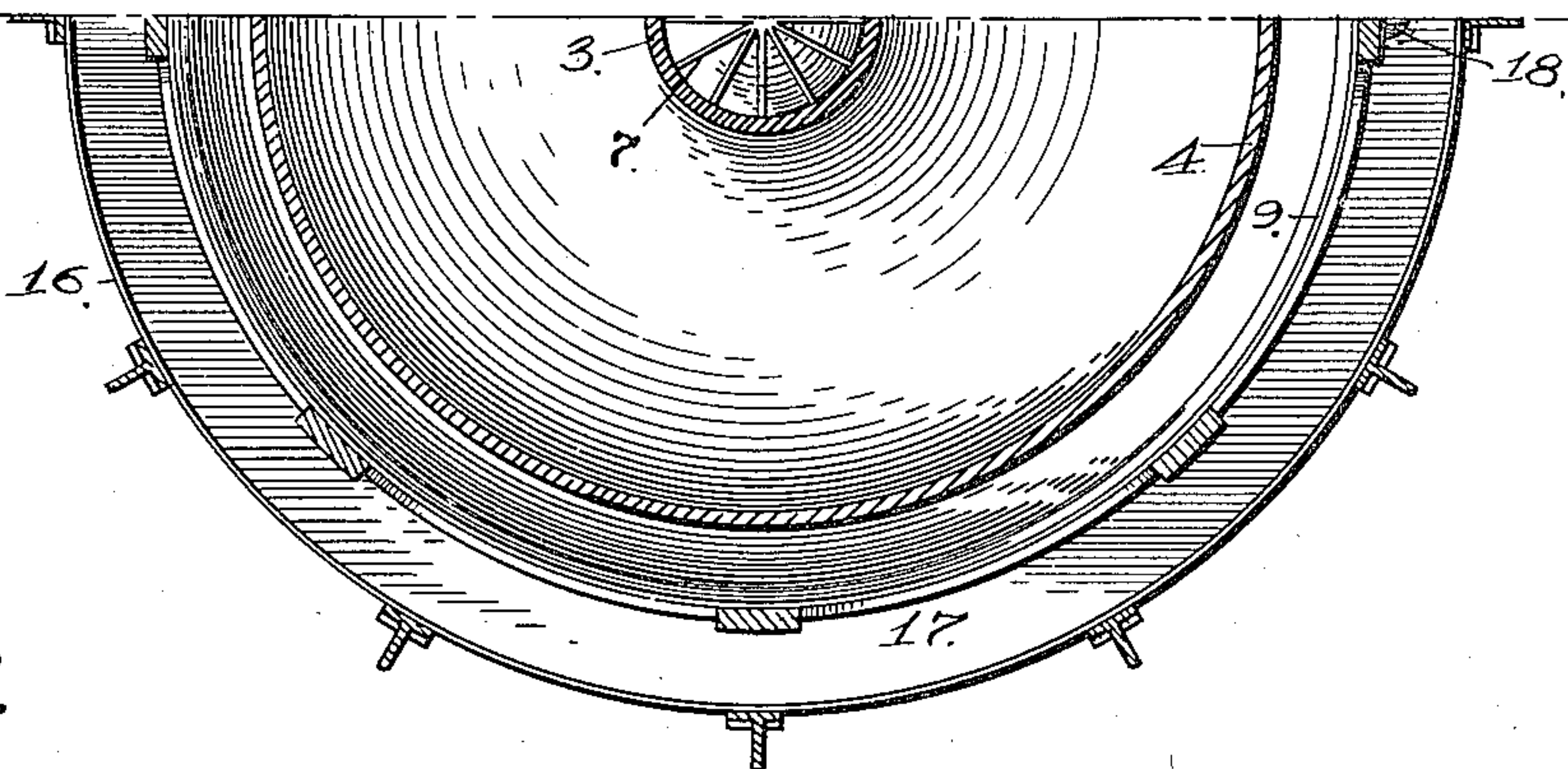
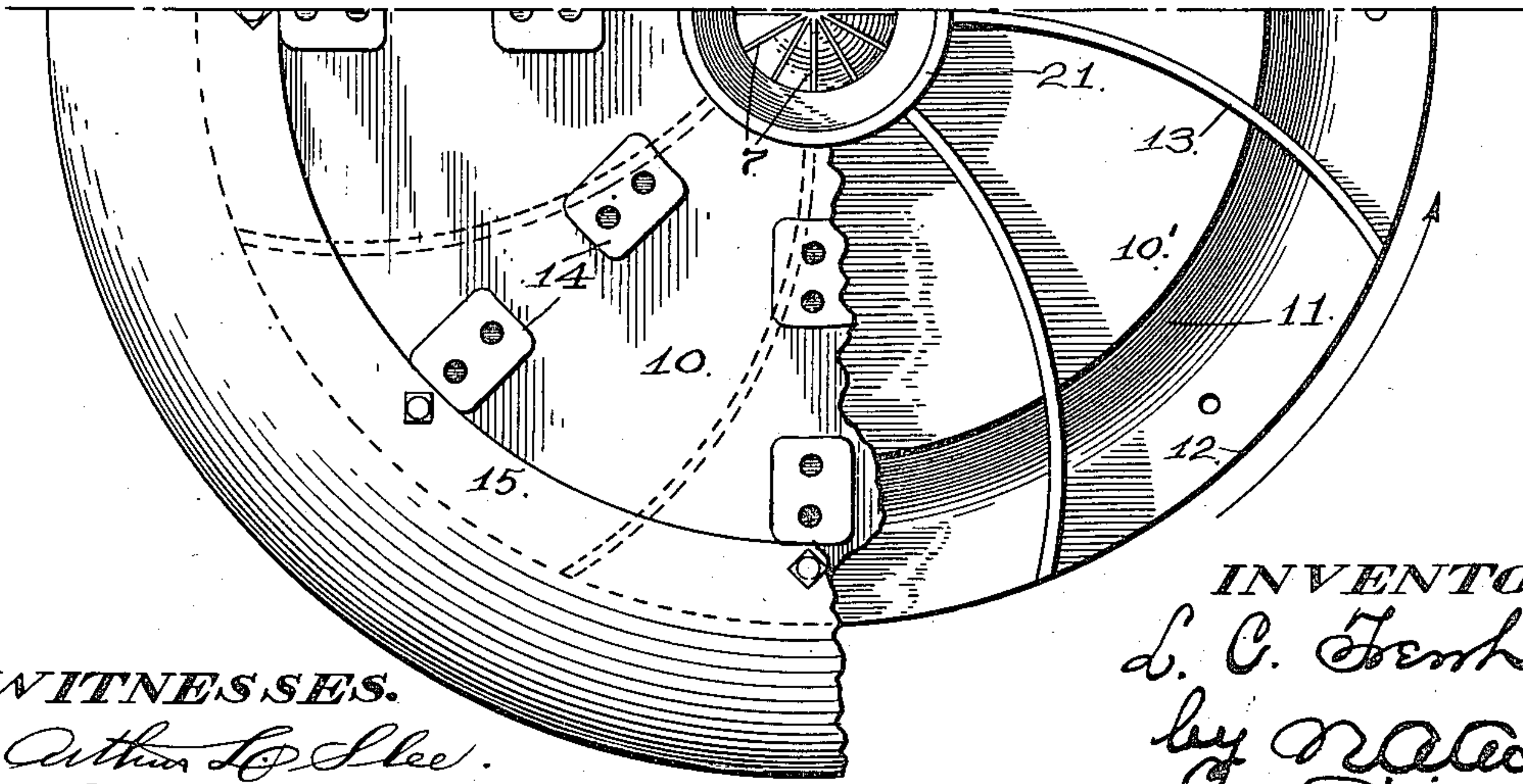


Fig. 3.



WITNESSES.

Arthur L. Slee.

James

INVENTOR.

L. C. Ferk
by W. A. Tucker
his atty.

UNITED STATES PATENT OFFICE.

LAMARTINE C. TRENT, OF AUBURN, CALIFORNIA.

CENTRIFUGAL SEPARATING APPARATUS.

952,653.

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To all whom it may concern:

Be it known that I, LAMARTINE C. TRENT, citizen of the United States, residing at Auburn, in the county of Placer and State of California, have invented certain new and useful Improvements in Centrifugal Separating Apparatus, of which the following is a specification.

The present invention relates to an improved apparatus of that class known as "centrifugals", the object thereof being to permit of the continuous operation of removing the water or fluid portions from material generally delivered thereto in a pulp or semi-fluid condition, although more particularly designed for the removal of the liquid from peat as it comes from the bog, from wood pulp, distilled grain, sugar, salt, pulverized ores, in fact, to treat successfully any and all class of material requiring to be deprived of surplus moisture.

To comprehend the invention reference should be had to the accompanying sheet of drawings, wherein—

Figure 1 is a vertical sectional view of the improved apparatus. Fig. 2 is a cross sectional plan view taken on line $x-x$ of Fig. 1 of the drawings. Fig. 3 is a top plan view of the apparatus, partly broken away.

In the drawings, the numeral 1 is used to indicate a cylindrical bowl shaped receiving vessel, which, in the present case, is mounted on and carried by an under driven shaft 2. Within the receiving vessel 1 is fitted a central feed tube 3, which terminates in an outwardly and upwardly curved circular wall 4, which, acting in conjunction with the inner surface of the lower portion of the receiving vessel 1, forms a contracted annular passage-way 5 for the flow of the material to be treated, delivered thereto from the central feed tube 3. The pulp or semi-liquid material passing through the central tube 3 is evenly distributed into the annular passage-way 5 by means of the cone 6, which projects centrally from the bottom of the receiving vessel 1, and is covered by the feed tube 3. The surface of the said cone 6 is provided with a series of radial ribs 7, which tend to direct and guide the flow of the material into the passage-way 5.

That portion of the circular wall of the receiving vessel 1 above the point 8, may be provided with a straining surface 9, composed of suitable meshed material, against

which the pulp being treated, as hereinafter explained, is pressed, so that the liquid contained therein is squeezed out during the course of the upward travel of the material passing through the passage-way 5 toward the escape outlet for the solid portion of the material.

At times it is desirable that the extracted or separated solid portions of the treated material be partially or wholly dried as forced from within the apparatus through the peripheral outlet toward its point of deposit. For this purpose, the receiving vessel is closed by a horizontally disposed air fan or blower, which, in the present case, is composed of two spaced plates or disks 10—10', suitably bolted, the bottom disk being slightly less in diameter than that of the upper portion of the receiving vessel 1, so as to leave an annular outlet or discharge opening 11 between the periphery of the said disk 10' and the outwardly extended circular flange 12 of the said receiving vessel, the disk 10', in the present case, constituting a cover for the said vessel 1. The upper disk 10 is bolted to the circular flange 12, so that the united disks 10—10' revolve or travel with the receiving vessel 1. Between the disks 10—10' are arranged a series of radial blades or vanes 13, which deflect the air entering through the air inlets 14 of the upper disk 10, toward the periphery of the air fan or blower and against the separated or extracted solids discharging through the annular outlet 11, in order to partially or wholly dry the solids ejected from the apparatus, which ejected material impinges against the circular deflector plate 15 and is directed downwardly to a suitable place of deposit. The liquid strained from the material as forced under pressure over the surface of the straining wall 9, is forced to the outside of the apparatus, and is guided by the circular wall 16, within which the vessel 1 rotates, into the circular trough 17, from which it escapes through the outlet runway 18. Such of the separated or strained liquid as may run down the outer wall of the receiving vessel 1, is deflected by the outwardly inclined circular projection 19 into the said trough 17.

It will be understood by reference to Fig. 1 of the drawings, that the hub 20 of the air fan or blower is attached to the upper end portion of the central feed tube 3, and

that the material to be treated is delivered into the said tube through the medium of the hopper 21.

The apparatus is driven at a high rate of speed by means of a belt working over the pulley 22 on the drive shaft 2, or by any other suitable form of drive mechanism.

In operation the material to be treated is fed into the apparatus after the receiving vessel 1 has attained a high speed of rotation, the material in the form of pulp or in a semi-liquid condition being delivered into the annular passage-way 5 through the feed tube 3, which is slightly inclined or outwardly flared toward its bottom in order to prevent undue friction of the material as moved downwardly. The downwardly traveling material is guided into the passage-way 5 evenly by means of the cone 6, and the flowing mass of material is driven through the said passage-way toward the periphery of the receiving vessel 1 by reason of the centrifugal force generated within the apparatus, which force creating a vacuum behind the moving body of material accelerates the downward passage thereof through the feed tube, while at the same time such centrifugal force or strains drive the material toward the periphery of the receiving vessel 1 and up past the screen or straining surface 9, the material as carried past such straining surface being pressed there against by the centrifugal force generated and the liquid expelled therefrom. The centrifugal force or strains thus generated during the working of the apparatus serve as the propelling medium for the flowing body of material entering through the feed tube, as the pressing medium for forcing the material against the straining surface to remove the liquid therefrom as the material moves across such surface, and as the means for positively driving or advancing the solids of the material toward the annular discharge outlet 11. As the material passes through the annular outlet 11, it is acted on by the air blast from the air fan or blower, which air dries the material and forces the same outwardly through the mentioned outlet. Inasmuch as the straining surface 9 of the apparatus is made slightly conical, the upward travel of the material across the face of said surface is materially assisted, the material constantly expanding as forced upwardly over said surface, due to the increasing circumference, and loosening the solids thereof to permit of the liquid being more easily released to the action of the centrifugal force acting there against.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent is—

1. An apparatus for the described purpose, the same comprising a revoluble re-

ceiving vessel provided with an annular passage-way for the material being treated, a feed tube for the material communicating with the lower end of said passage-way, and both walls of said passage-way being curved upwardly from its point of communication with the feed tube, a circular straining wall surface, secured to one wall of the annular passage against which the material is forcibly pressed by the opposite wall which is imperforate, as moved across the face thereof.

2. An apparatus for the described purpose, the same comprising a revoluble receiving vessel provided with an annular upwardly and outwardly curved passage-way for the material to be treated, said passage-way being formed by oppositely disposed annular walls separated from one another throughout, a feed tube for the material communicating with the lower end of said passage-way, a cone projecting upwardly into the feed tube and separated from the inner annular wall for distributing the material flowing through the feed tube into the annular passage-way, means for imparting rotation to the receiving vessel, and a circular straining wall surface within the wall of the said vessel and adjacent to the upper end of the passage way and against which the material is forcibly pressed as propelled across the face thereof toward the periphery of the receiving vessel to expel the moisture therefrom.

3. An apparatus for the described purpose, the same comprising a revoluble receiving vessel provided with two oppositely disposed annular upwardly and outwardly curved walls forming a curved passage-way for the material to be treated, a feed tube for the material communicating with the lower end of said passage-way, the feed tube being integral with and forming a continuation of the inner wall, a circular straining wall surface within the upper portion of the wall of the receiving vessel and against which the material is forcibly pressed as propelled across the face thereof toward the periphery of the receiving vessel to expel the moisture therefrom, the curved passage-way being continuous and unbroken to its point of connection with said straining wall, and an air blower carried by the receiving vessel for directing an air current onto the material forced over the periphery of the said vessel.

4. In an apparatus for the described purpose, the combination with the receiving vessel thereof provided with an annular upwardly curved passage-way for the material to be treated, a circular straining wall surface within the upper portion of the wall of the receiving vessel, of means for imparting rotation to the said vessel, an air blower carried by the receiving vessel, the same comprising two spaced horizontally disposed

plates having radial blades or vanes therebetween, the lower plates of the air blower being slightly less in diameter than that of the upper portion of the receiving vessel so as to leave an annular outlet for the escape of the solid material between the periphery of the receiving vessel and the said lower plate of the blower, and means for supplying material to be treated to the annular passage-way within the receiving vessel.

5. In an apparatus of the described character, the combination with the receiving vessel thereof, of an air blower carried thereby, the same comprising two spaced plates provided with radial blades or vanes therebetween, of a plurality of air inlets in the upper plate of the blower, the lower plate of the blower being of less diameter than that of the upper portion of the receiving vessel so as to leave an annular outlet between said plate and the periphery of the receiving vessel.

6. An apparatus for the described purpose comprising a rotatable receiving receptacle having an outwardly and upwardly curved annular outer wall terminating in an upwardly extending conical portion centrally of the bottom thereof, the surface of the conical portion having ribs, an annular wall for the receptacle spaced from the outer wall and outwardly and upwardly curved to conform therewith, the inner wall having an integral upward hollow tubular extension centrally of the bottom thereof, and said central conical portion connecting with the outer wall of the receptacle.

7. An apparatus for the described purpose, the same comprising a revoluble receiving vessel provided with an annular outlet for the solid portions extracted from the material being treated, a central feed

for supplying material to be treated into the receiving vessel, said feed terminating in an outwardly and upwardly curved passage-way for the travel of the material toward the annular outlet of the receiving vessel, and means for imparting rotation to the said receiving vessel.

8. An apparatus of the character described, the same comprising a substantially circular cup shaped receptacle, the wall of which is curved throughout, a centrally arranged feed tube terminating at its lower end in an integral outwardly and upwardly curved substantially circular wall, which latter with the curved wall of the receptacle constitutes a continuous curved passage way for the material and an annular screen connecting with the upper end of the receptacle and projecting thereabove.

9. An apparatus of the character described, the same comprising a substantially circular cup shaped receptacle, the wall of which is curved throughout, a feed tube terminating at its lower end in a connected outwardly and upwardly curved substantially circular wall, which latter with the curved wall of the receptacle constitutes a continuous curved passage way for the material, an annular screen projecting upwardly above the upper edge of the receptacle and overlapping a portion of the wall of the upwardly curved end of the feed tube, and an air fan connecting with the upper end of the screen.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LAMARTINE C. TRENT.

Witnesses:

N. A. ACKER,

D. B. RICHARDS.