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PATENTED JULY 9, 1907.

H. H. TRACY.
CENTRIFUGAL MACHINE.
APPLICATION FILED MAR. 18, 1906.

2 SHEETS—SHEET 1.

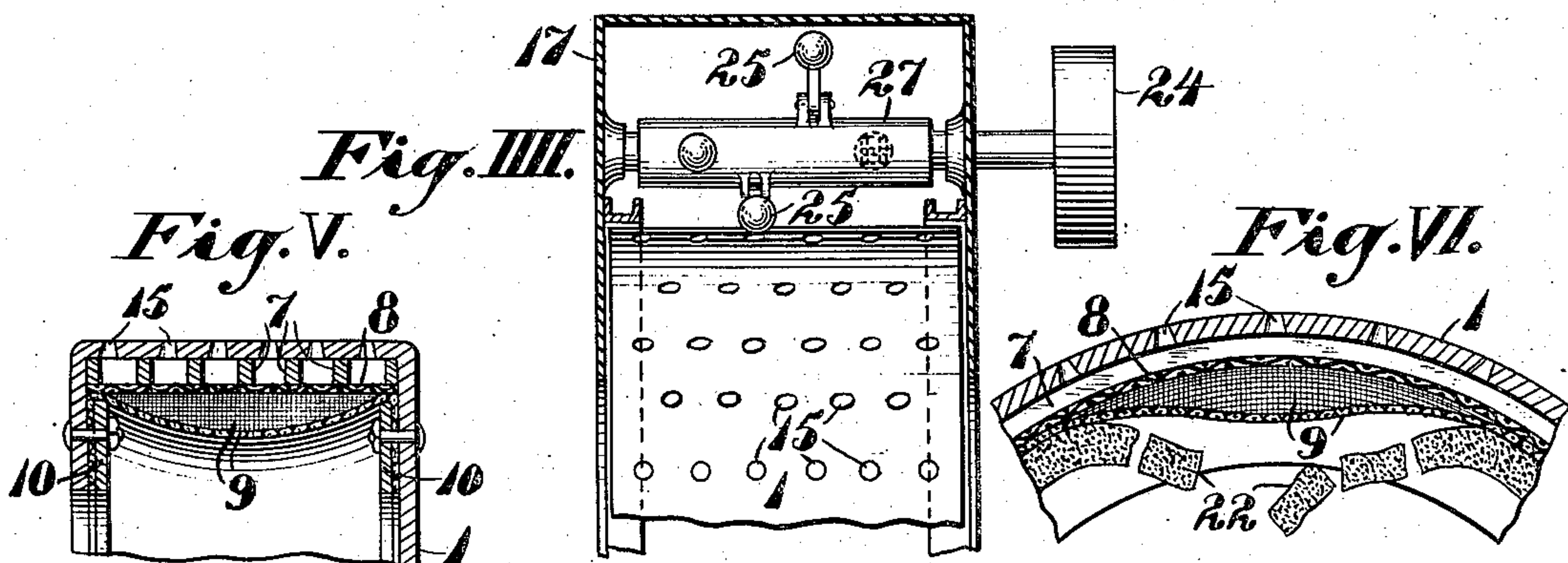
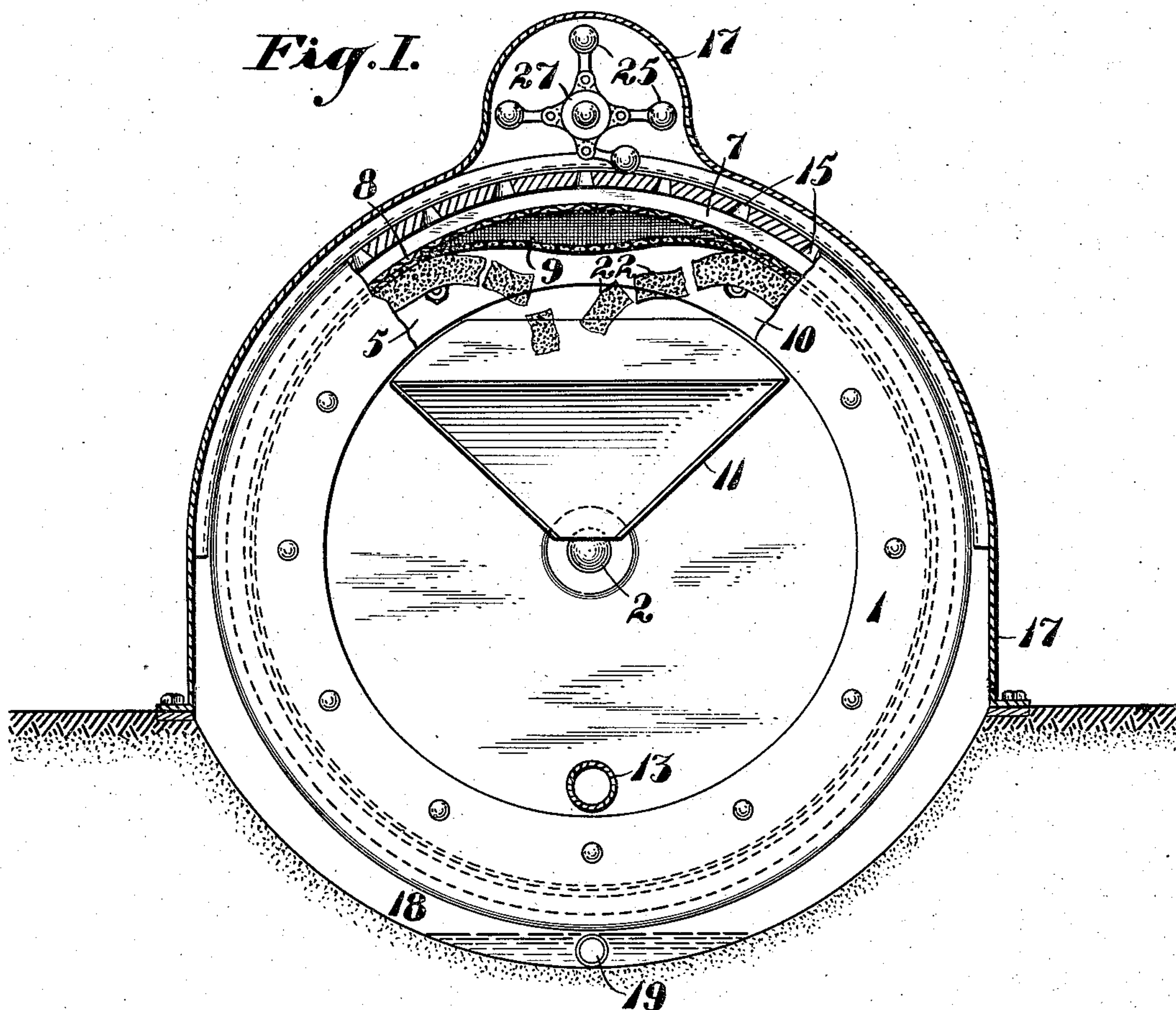
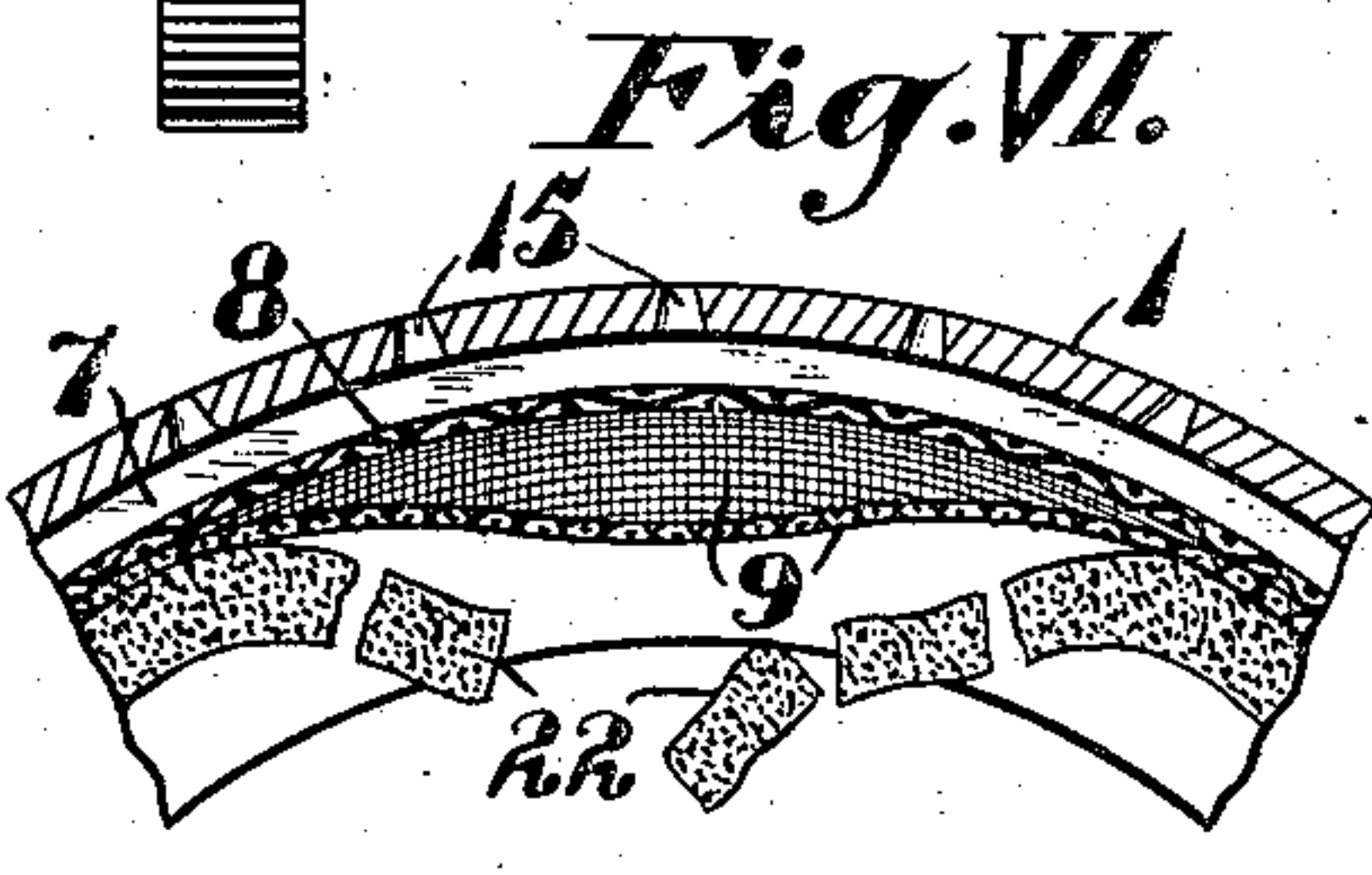


Fig. V.



Witnesses:
J. C. Fiedner
Elmer Wickes.

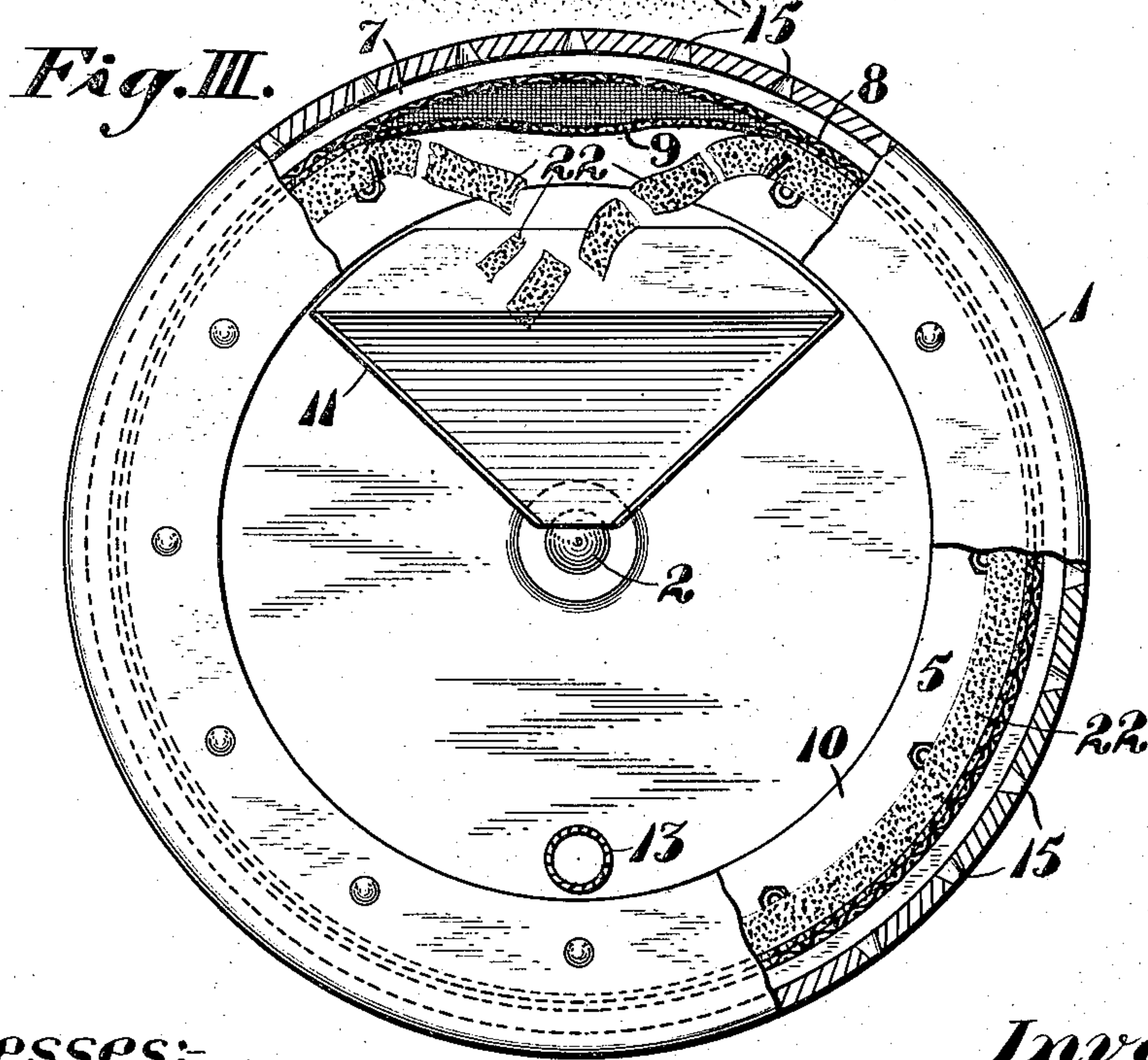
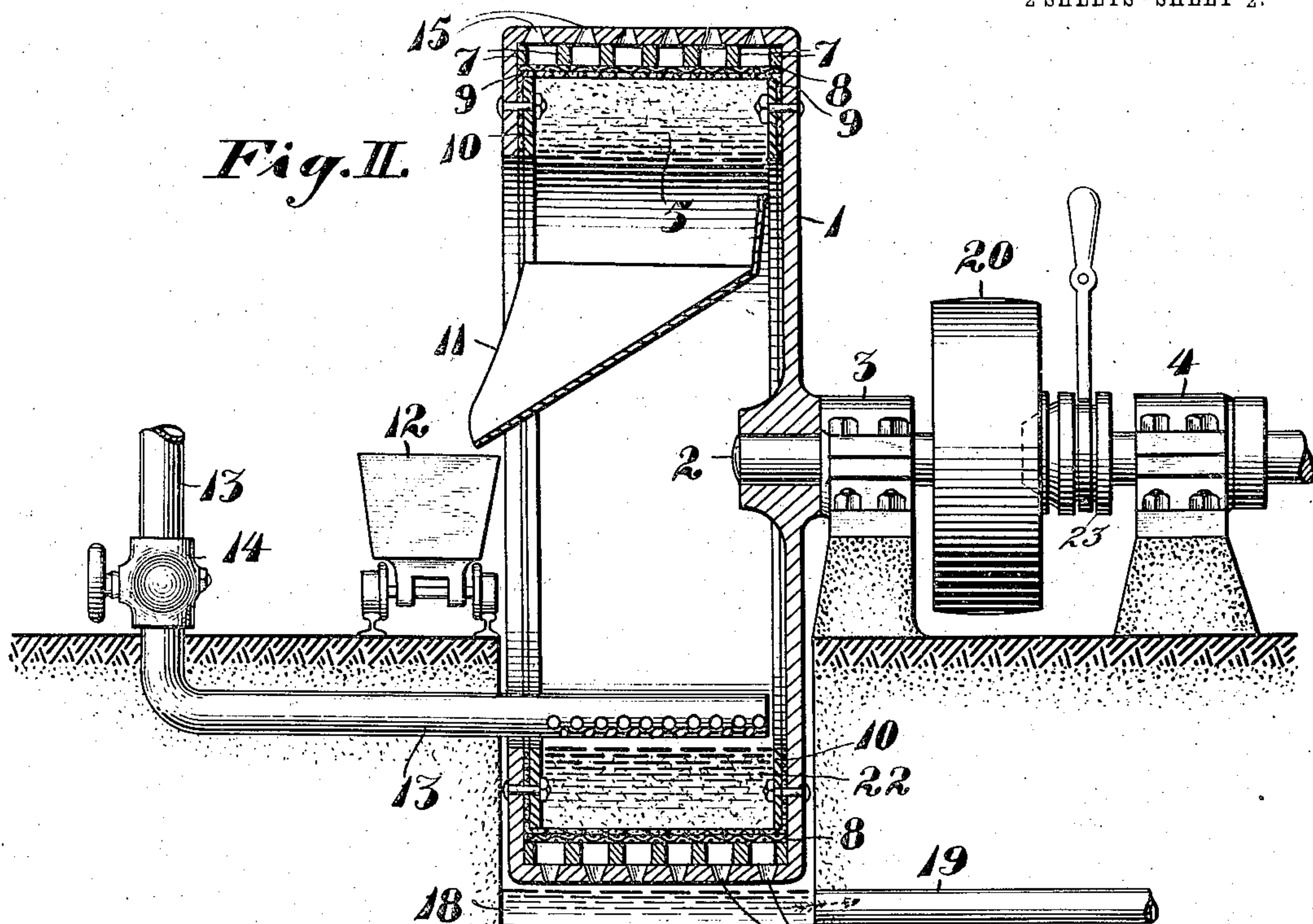
Inventor,
Hayden H. Tracy,
by J. Richards & Co.
- 7 - (Attys)

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

HAYDEN H. TRACY, OF SAN FRANCISCO, CALIFORNIA.

CENTRIFUGAL MACHINE.

No. 859,857.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed March 16, 1906. Serial No. 306,445.

To all whom it may concern:

Be it known that I, HAYDEN H. TRACY, a citizen of the United States of America, residing at San Francisco, county of San Francisco, and State of California, have invented certain new and useful Improvements in Centrifugal Extracting and Filtering Machines; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to certain improvements in filtering or extracting apparatus for saturated mineral or other substances, operating by centrifugal force; and relates especially to a manner of discharging and handling the material treated, as will be hereinafter fully explained and illustrated by drawings that form a part of this specification.

My improvements consist in a cylindrical containing vessel mounted and revoluble on a horizontal axis; this containing vessel provided around its periphery with perforations for the escape of liquid that passes from the inside outwardly by centrifugal force, through filtering devices of a nature that will arrest and retain pulverized solids; these devices consisting of a reticulated supporting web of wire and a flexible and loose inner web of fibrous nature that will fall inward at the top and produce a reverse curve to discharge the filtered material therefrom; also consist in means for controlling the speed or rate of revolution for this containing vessel, so that the degree of centrifugal force applied can be regulated at will and reduced at intervals so that charges of the material treated will fall by gravity from the top of and out of the containing vessel; my improvements further include, when required, supplementary means for loosening or disengaging the filtered material and the filtering web on which it rests in the revoluble vessel in case of adhesion, so that this web can assume a pendent curve and the material may fall from it into a conducting spout and be discharged.

The objects of my invention are to provide a simple and automatic means for discharging the solids or filtered contents of centrifugal extracting apparatus and to provide a large and effective area of filtering surface for fine material such as pulverized ore from which solutions are to be removed.

To these ends I provide apparatus as illustrated in the accompanying drawings; Figure I being a front of a machine operating according to my invention adapted especially for treating pulverized ores or slimes of gold in cyanid solution, the external housing being shown in section, Fig. II a side view, mainly in section, of the same machine, with the outer housing omitted, Fig. III a front view of the centrifugal extracting vessel or chamber, Fig. IIII a partial section showing in side view a device for loosening by concus-

sion the compacted material from the inner or filtering surface of the centrifugal vessel, Fig. V a partial section through the main vessel transversely, showing the shape of the inner web or screen in discharging, Fig. VI a similar broken section through a portion of the main vessel, transverse to Fig. V or in the plane of rotation.

In centrifugal extracting apparatus, especially for material of an adherent or viscous nature there is the impediment of removing the filtered mass from the barrel or vessel after the liquid portion has been expelled, especially in the case of finely pulverized ore or slimes and like substances. The present machine is devised to avoid this impediment by securing an automatic discharge of the drained or filtered material by gravity with suitable devices and conditions hereinafter explained.

Referring to the drawings, 1 is the main revoluble vessel mounted on a horizontal shaft 2, supported in journal bearings 3 and 4. The revoluble vessel 1 is open centrally at the front, side, or ends when double, forming an annular channel 5 around the periphery, in which chamber the filtering operation is performed.

Around the interior of the vessel 1, at its periphery, are a series of segmental ribs 7 to sustain the filtering webs, consisting of an outer one 8 of reticulated form, preferably of wire, to sustain a flexible inner filtering web 9 of canvas or other fibrous material that will prevent the escape of the fine solid to be drained or filtered. The web 8 is held outward in position at the sides by segments 10, as shown in Fig. II, and may be fastened to the ribs 7 or mounted in any suitable manner to sustain the weight and centrifugal force of the material being treated.

The inner or fibrous filter web 9 is mounted loosely, as indicated in Figs. V and VI, so that when centrifugal force ceases or partially ceases by the periodical arrest of the motion of vessel 1 this web 9 will fall inward at the top, producing a reverse curve, thus breaking and disengaging the filtered material 22 from the web 9 and discharging the said filtered material, as indicated in Figs. I, III and VI. The centrifugal force, being radial, will maintain the web against the sides at moderate speeds under which the web and adherent material will yield at the top; where gravity acts in direct opposition to said force, and being vertical is at its maximum of effect.

11 is a discharge spout, into which the spent or filtered material falls and is conducted to a car 12 or other means of removal, as indicated in Fig. II.

Fine ore called slimes, or other like substance to be filtered, combined with liquids to render the material fluid, is supplied through a pipe 13 to the interior of the vessel 1, as shown in Fig. II, a regulating valve 14 determining the rate or amount admitted. The liquid extracted or expelled from the material 14 passes through

the web 9, screen 8 and perforations 15 in the periphery of the vessel 1, is caught in the housing 17 and drains down into the chamber 18, from where it flows or is pumped through a pipe 19.

5 In operating, the vessel 1 is set in revolution by means on a band or pulley 20 and shaft 2; the same being provided with the usual and common means for starting, stopping and varying the speed to control the required centrifugal force in the chamber 5. 23 is a
10 friction clutch or brake to represent well known speed controlling means. A charge of the material to be filtered is supplied through valve 14 and the pipe 13 and takes the form of an annular stratum 22, around the interior on the web 9. This stratum 22, resting on the
15 filter web 9, may be more or less in depth according to its density or fineness, and the liquid therein is forced out through the filter web 9, the screen 8 and perforations 15 in the main vessel and runs down to the chamber 18, as before explained. When the material 22
20 is sufficiently drained, the speed of the vessel 1 is reduced by the usual means until the centrifugal force is reduced to a degree which permits the web 9 and the material thereon to fall by gravity from the top of the vessel 1 into the spout 11, as indicated in the drawing.
25 Should the web 9 or the material 22 thereon adhere by reason of the arch form and not be dislodged by gravity when the vessel 1 is revolving at a slow speed, I employ supplementary means to break up this stratum, which means may consist of various devices obvious in
30 their nature either internal or external. One of the latter of a concussive nature is shown in Figs. I and III, consisting of hinged balls 25 mounted on a shaft 27 connected to the motive power by a pulley 24. This device gives successive blows on the periphery of the
35 vessel, as indicated in Fig. I, but as such devices are not essential in most cases and when the filter web 9 is loosely mounted as shown in Figs. V and VI, I make no claim of novelty therefor. This method of loosening the compacted material is in some respects preferable
40 to a scraper, roller or other fixed device inside the chamber 5. When the filtered material 22 is thus discharged, a new charge is introduced and the operation repeated.

Material of a granular nature, such as sand, sugar and the like, will fall quickly by gravity alone, but finely pulverized or cohering substances require more effort 45 to loosen them; but in any case the discharge of the filtered material requires but little time, so that the operation goes on nearly continuously. In the chamber 5, a careful adjustment by means of the speed of revolution and the relation between the centrifugal force and 50 gravity of the material, as will be understood, causes the latter to fall from the top and within the spout 11.

I claim:

1. In a centrifugal extracting and filtering apparatus, a circular vessel revolubly mounted on a horizontal shaft, said vessel centrally open at the side, forming an annular channel, perforated on its periphery, supplied with a loose web of filtering material around the inner periphery, means for introducing material to be filtered within said annular channel, and a delivery chute within the vessel, projecting through the open side, for receiving and discharging the residuum, substantially as specified. 55
2. In a centrifugal extracting and filtering apparatus, a circular vessel revolubly mounted on a horizontal shaft, said vessel centrally open at the side, perforated on its periphery, supplied with layers of reticulated filtering material around the inner periphery, the inner layer being a loose web of fabric, means for introducing material to be filtered within said vessel, a chute within the vessel projecting through the open side, and means for slackening the speed of rotation of said vessel, whereby by the diminution of centrifugal action the loose web with its accumulations may fall away from the periphery at the top by the action of gravity, permitting the residuum to be discharged through the open side, substantially as specified. 60 70 75
3. In a centrifugal extracting and filtering apparatus, a casing, a circular vessel revolubly mounted in said casing on a horizontal shaft, centrally open at the side, perforated on its periphery, supplied with layers of reticulated filtering material around the inner periphery, the inner layer being a loose web of fabric, means for introducing material to be filtered within said vessel, means for controlling the speed of rotation of said vessel, and a supplementary percussion device mounted outside of said vessel, substantially as specified. 80 85

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

Witnesses:

JAMES MASON,
ELMER WICKES.