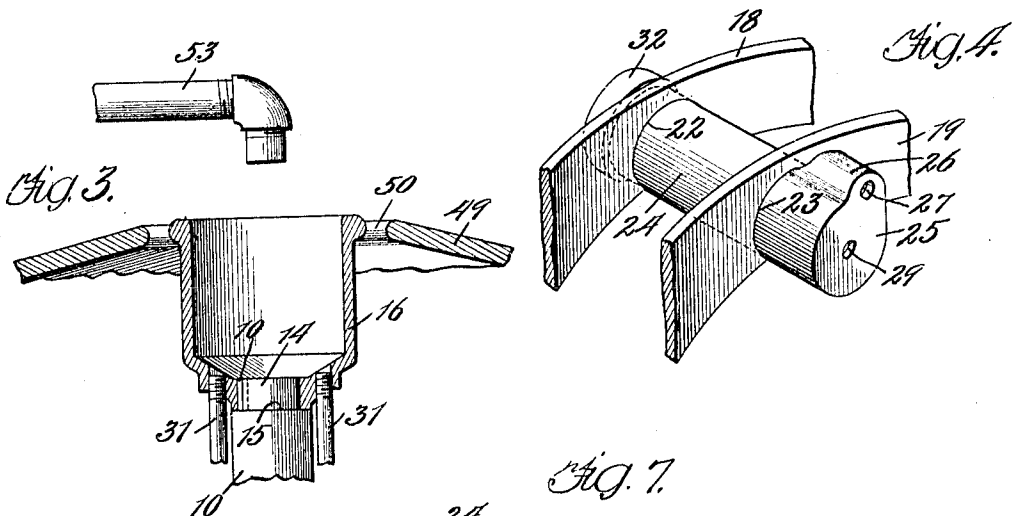
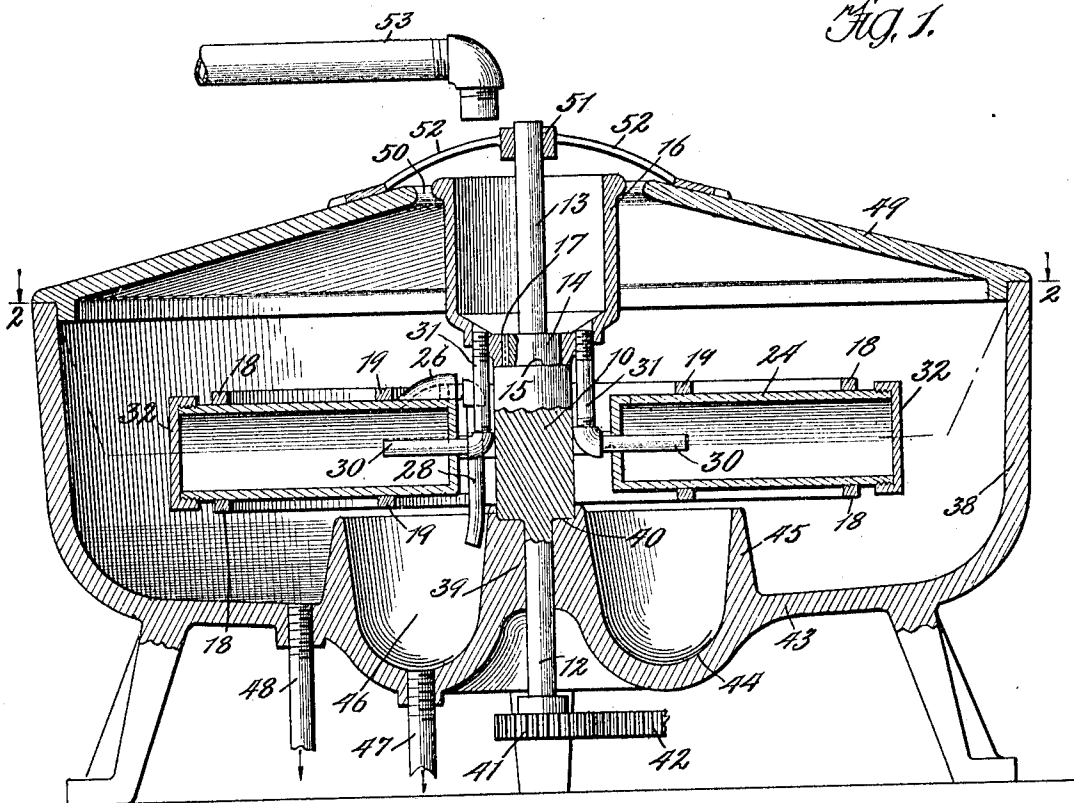


H. M. GOODMAN.
CENTRIFUGAL SEPARATING MACHINE.
APPLICATION FILED APR. 23, 1908.

949,226.

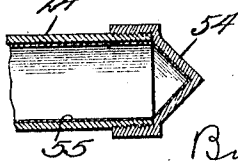
Patented Feb. 15, 1910.

2 SHEETS—SHEET 1.



Witnesses:

W. H. Perry
J. S. Johnson, Jr.



Inventor:
H. M. Goodman
By *Brown & Phipps*
Attys.

H. M. GOODMAN.
CENTRIFUGAL SEPARATING MACHINE.
APPLICATION FILED APR. 23, 1908.

949,226.

Patented Feb. 15, 1910.

2 SHEETS—SHEET 2.

Fig. 2.

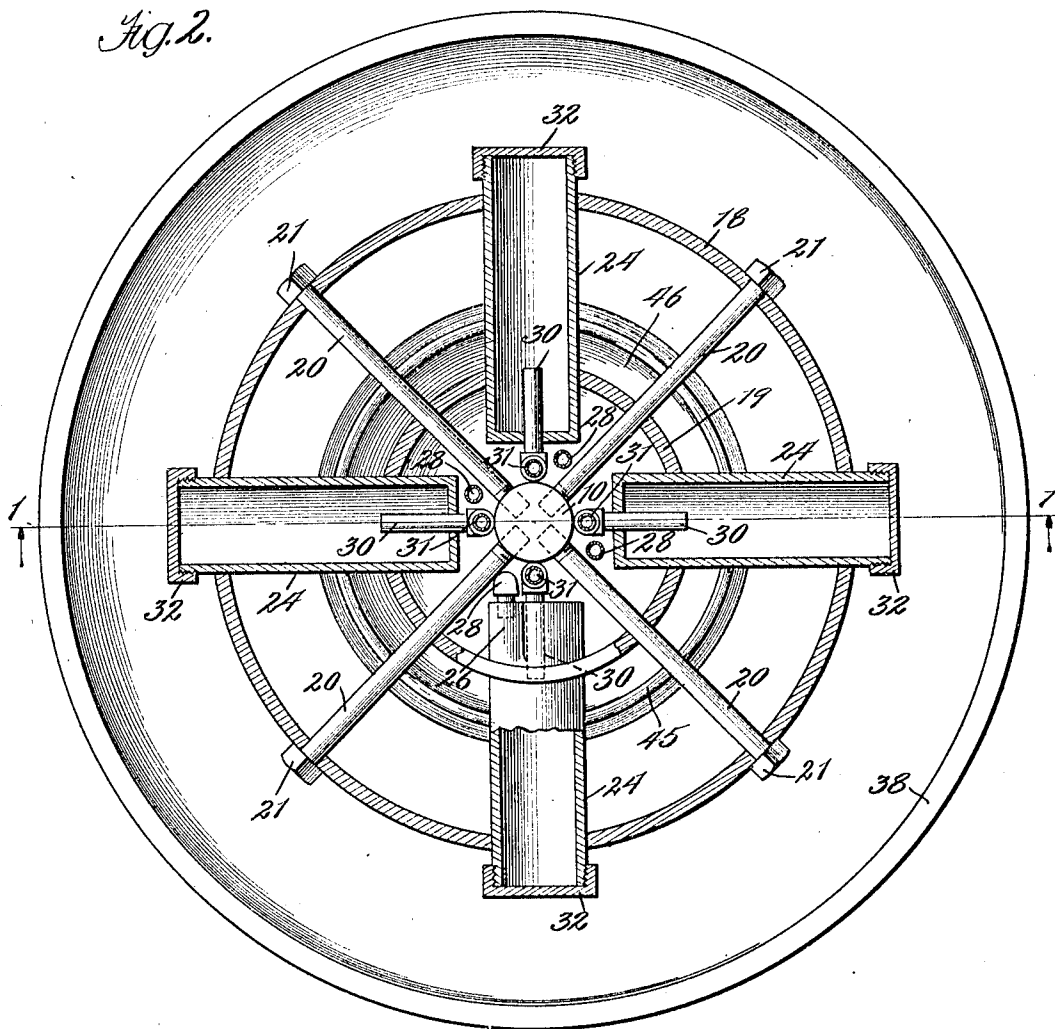


Fig. 5.

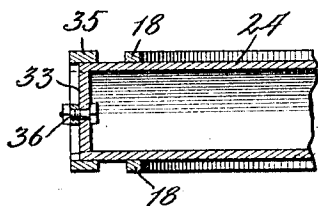
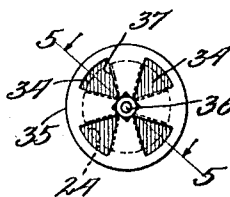


Fig. 6.



Witnesses:

Wm. J. Jochum, Jr.

Wm. J. Jochum, Jr.

Inventor:

H. M. Goodman

By Brown & Stofeno
Attys

UNITED STATES PATENT OFFICE.

HENRY M. GOODMAN, OF LOUISVILLE, KENTUCKY.

CENTRIFUGAL SEPARATING-MACHINE.

949,226.

Specification of Letters Patent. Patented Feb. 15, 1910.

Application filed April 23, 1908. Serial No. 428,771.

To all whom it may concern:

Be it known that I, HENRY M. GOODMAN, a citizen of the United States, residing at Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Centrifugal Separating-Machines, of which the following is a specification.

This invention relates to improvements in centrifugal separating machines and the primary object of the invention is to provide an improved simple, durable and effective machine of this character, particularly adapted for clarifying liquids by separating the solid matters therefrom to produce a clear solution.

A further object is to provide an improved casing for the machine into which the clarified liquid, as well as the sediment may be discharged without becoming mixed with each other.

To the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts hereinafter described and claimed, and shown in the accompanying drawings, illustrating an exemplification of the invention and in which—

Figure 1 is a vertical sectional view on line 1—1 of Fig. 2, showing an improved device of this character constructed in accordance with the principles of this invention. Fig. 2 is a horizontal sectional view on line 2—2 of Fig. 1. Fig. 3 is an enlarged detail sectional view of a modified form of the invention. Fig. 4 is a detail perspective view of one of the cylinders showing the improved manner of supporting the cylinders. Fig. 5 is a detail sectional view on line 5—5 of Fig. 6, of one extremity of one of the cylinders showing another form of closure for the cylinder. Fig. 6 is an end elevation of Fig. 5. Fig. 7 is a detail sectional view similar to Fig. 5 of another form of closure for the cylinder.

Referring more particularly to the drawings and in the present exemplification of the invention the numeral 10 designates a vertical shaft which is preferably provided with reduced extremities 12, 13, and a re-

duced portion 14 adjacent the extremity 13 to form a circumferential shoulder 15.

A receptacle 16 is provided with an aperture in the bottom thereof into which the reduced portion 14 projects so that the receptacle will surround the reduced portion 14 and rest upon and be supported by the shoulder 15. Any suitable means may be provided for causing the receptacle 16 to rotate with the shaft 10, such, for instance, as a locking key 17.

The body portion of the shaft intermediate the reduced extremities may be of any desired diameter and length and surrounding this enlarged portion of the shaft are a plurality of concentric rings 18, 19, which may be of any desired height and these rings are spaced from each other and supported for rotation with the shaft 10 in any desired or suitable manner, preferably by means of tie-bolts or rods 20, which extend through the rings intermediate their upper and lower edges with the heads 21 of the bolts preferably resting against the periphery of the outer ring 18 and the inner extremities of the bolts are detachably secured to the shaft 10, preferably by being threaded thereinto. These rings are each provided with a plurality of apertures 22, 23, the apertures 22 in the outer ring being arranged in alinement with the respective aperture 23 in the inner ring 19. These apertures may be of any desired diameter preferably of a diameter slightly larger than the diameter of the separating cylinders 24, which latter are supported by the rings 18 and 19 by being passed through the registering or alined apertures therein and the rings are so spaced from each other that the extremities of the cylinders will project beyond the respective rings.

Each of the cylinders has a closed end 25 and is preferably provided with an enlargement 26 extending beyond the periphery of the cylinder and having communication therewith adjacent the closed end. These enlargements are each provided with an aperture 27 adjacent the closed end of the cylinder into each of which is inserted one extremity of an outlet or discharge pipe 28. The closed end 25 of each of the cylinders is provided with an aperture 29

which is preferably located adjacent the diametric center thereof and projecting into the cylinder through the opening 29 is an inlet pipe 30 which preferably terminates
5 adjacent the closed end of the cylinder and this pipe 30 is connected to a supply pipe 31, which latter has communication with the receptacle 16 through the bottom thereof. These pipes 30 are preferably provided with
10 detachable connections whereby the pipes may be readily removed when desired.

The outer ends of the cylinders 24 are provided with suitable closures and in the exemplification shown in Figs. 1 and 2, the
15 closures are in the form of caps 32, which are threaded onto the outer extremities of the cylinders. In the exemplification of the invention shown in Fig. 5 the outer extremity of the cylinders is also closed as at
20 33 in a manner similar to the inner extremities of the cylinder and the end 33 is provided with a plurality of apertures 34. A damper or closure 35 is rotatably mounted upon the extremity 33 by means of a suitable
25 fastening device 36, such as a bolt or the like which passes through the extremity 33 and also the closure 35. This closure 35 is also provided with a plurality of apertures or openings 37 similar in number and
30 configuration to the apertures 34 in the end 33 so that the apertures in the closure and the end of the cylinder may be brought into alinement to permit the material to be discharged and when the closure is rotated
35 upon the fastening device 36 as an axis, the solid portions of the closure may be brought to a position to close the openings in the extremity 33.

The shaft 10 is mounted for rotation within a suitable receptacle 38 in such a manner that the extremity 12 thereof will pass through the bottom of the receptacle, as at
40 39, which portion of the receptacle is shaped to form a bearing for the shaft and the enlarged portion of the shaft is stepped as at 40 into the bearing 39.

Secured to the extremity of the reduced portion 12 of the shaft is a suitable gear wheel 41 by means of which the shaft 10
50 may be rotated in any desired or suitable manner, preferably through the medium of an intermeshing gear 42.

The bottom 43 of the receptacle is provided with a depressed portion 44 which surrounds the bearing 39 and the extremity 12
55 of the shaft 10, and an upwardly projecting flange 45 which also surrounds the bearing 39 in the extremity 12 of the shaft 10 to form a receptacle 46 which is provided with
60 an outlet in the bottom thereof to which is connected a discharge pipe 47.

The flange 45 may be of any desired height but preferably of a height to terminate below the cylinders 24 and in close
65 proximity to the lower edges of the rings

18 and 19. The outlet ends of the discharge pipes 28 are located within the receptacle 46 and terminate preferably adjacent the top thereof so that the clarified liquid which
70 passes out of the pipes 28 will be discharged into the receptacle 46 from which it may be conveyed by means of the pipe 47 to any desired point of consumption.

The outer extremities of the cylinders 24 project beyond the flange 45 and terminate
75 at a point intermediate the flange and the surrounding wall of the receptacle. The bottom of the receptacle between the outer wall and the flange 45 is preferably inclined toward the flange 45 and is provided with an
80 outlet aperture to which is secured one extremity of a discharge pipe 48.

In the exemplification of the invention shown in Fig. 1 of the drawings the extremity 13 of the shaft 10 preferably projects
85 beyond the upper edge of the receptacle 16. The receptacle 38 is provided with a suitable closure 49 having an aperture 50 adjacent the receptacle 16 and into which the upper edge of the receptacle 16 projects.
90 The extremity of the shaft 13 is mounted in a suitable bearing 51 which is supported by means of suitable arms 52 which are secured to the closure 49 so as to hold the bearing 51 in proper position. This
95 exemplification of the invention is particularly adapted for use in heavy machines so that the shaft 10 will be provided with a solid bearing.

In the exemplification of the invention shown in Fig. 3 the extremity 13 of the shaft is dispensed with and the receptacle 16 is
100 supported in a similar manner by the shoulder 15 on the shaft 10 and this form of the invention is particularly adapted for use with light machines.
105

In use the shaft 10 is first set in motion and the liquid to be clarified is supplied to the receptacle 16 through a suitable supply
110 pipe 53 which discharges into the receptacle 16. The liquid will pass from the receptacle 16 through the pipes 31 and be discharged into the cylinders 24 through the pipes 30. The centrifugal force set up by the rotation
115 of the shaft 10 will cause the heavy particles or solid matters to be thrown outwardly toward the outer extremities of the cylinders 24 while the clarified liquid will work its way toward the inner ends of the cylinders
120 and will pass out of the enlarged portions 26 through the pipes 28 and be discharged into the receptacle 46, from which it is conveyed as clear liquid through the pipe 47 to any desired point of use. The liquid may be
125 continuously supplied through the pipe 53 to the machine until the water or liquid discharged through the pipes 28 becomes cloudy. At this point of the operation of the machine, the supply of liquid may be shut off and the machine then stopped, the closure
130

49 removed, and the closures 32 at the extremities of the cylinders also removed if the form of closure is used as shown in Fig. 1 or if the form of closure which is used is the form shown in Figs. 5 and 6, the latter may be adjusted to open the ends of the cylinders. When the outer ends of the cylinders have been thus opened the machine may be again started by rotating the shaft 10 until the desired speed is acquired, at which time the centrifugal force generated will throw the heavy particles or accumulated matter out of the open end of the cylinders into the receptacle 38 and this sediment will accumulate between the flange 45 and the wall of the receptacle from where it may be discharged or conveyed through the pipe 48 to any desired point.

In the exemplification of the invention thus far described the machine is of a size to be particularly adapted for use for clarifying large quantities of liquid and preferably includes four cylinders but any number of cylinders may be used, and the invention may be so constructed as to be particularly adapted for medical purposes. In this form of the invention the machine may be constructed on a much smaller scale or a size about the size of the ones now employed in physicians' offices for separating or collecting a small amount of sediment from large quantities of urine for microscopic examination. The number of cylinders in this character of the machine may be limited to two and the closure or cap at the outer extremity of the cylinder may be of any desired construction. For instance, a conical-shaped closure 54 may be employed and the inside of the cylinder and cap is preferably lined, as at 55, with some material not attacked by the urine.

The liquid may be supplied to the machine in the same manner and the same operation is proceeded with. After the heavy particles or sediment have been separated, the sedimentary matters remain adherent to the interior of the cap 54. This cap may then be removed and examined microscopically, thereby rendering possible a perfect microscopic examination of specimens which it is exceedingly difficult and often impossible to examine by the present methods.

The same device may be used for the concentration and microscopic examination of the sedimentary matters of milk or other fluids.

In order that the invention might be fully understood the details of the foregoing embodiment have been thus specifically described, but

What I claim as new is—

1. A centrifugal separating machine including a rotatable chamber having a fixed end and an end adapted to be opened, said fixed end being provided with a liquid dis-

charge outlet, means for feeding the material into the chamber through the fixed end thereof, means for rotating the chamber, and a closure for the open end of the chamber for retaining the separated material within the chamber, said chamber being supported for free access to the closure for the open end thereof, the said outlet in the fixed end of the chamber being adapted to permit the liquid to escape from the chamber.

2. A centrifugal separating machine including a rotatable horizontally disposed chamber having a fixed end and an end adapted to be opened, said chamber being provided with a liquid discharge outlet in the fixed end and adjacent the top of the chamber, means for feeding the material into the chamber through the fixed end, means for rotating the chamber, and a closure for the open end for retaining the separated material within the chamber, said chamber being supported for free access to the said closure, the said outlet in the fixed end being adapted to permit the liquid to escape from the chamber when the materials have been separated from the liquid.

3. A centrifugal separating machine including a vertical, rotatable shaft, a horizontally disposed chamber supported by the shaft, said chamber being provided with a fixed end and an end adapted to be opened, said fixed end being provided with a discharge outlet, a liquid receptacle supported by the shaft for rotation therewith, said receptacle having communication with the chamber through the fixed end thereof whereby the liquid will be supplied to the chamber through the fixed end, and a closure for the open end of the chamber for retaining the separated materials within the chamber, said chamber being supported for free access to the said closure, the said outlet in the fixed end being adapted to permit the liquid to escape from the chamber after the materials have been separated from the liquid.

4. A centrifugal separating machine including a vertical rotatable shaft, spaced members supported by the shaft, a horizontally disposed chamber supported by the members, said chamber being provided with a fixed end and an end adapted to be opened, said fixed end being disposed adjacent the shaft, a receptacle supported for rotation with the shaft, and having communication with the chamber through the fixed end thereof, said fixed end being provided with a discharge outlet for the liquid, and a closure for the open end of the chamber for retaining the separate materials.

5. A centrifugal separating machine including a vertical rotatable shaft, spaced members arranged concentric with the shaft, means for supporting the members by the shaft, a plurality of horizontally disposed

chambers supported by the said members, each of said chambers being provided with a fixed end and an end adapted to be opened, a liquid receptacle supported for rotation
 5 with the shaft, said receptacle having communication with the chambers through the fixed ends thereof, a closure for the free ends of the chambers, and means for rotating the shaft to separate the materials from the
 10 liquid, the said fixed end of each of the chambers being provided with an outlet to permit the liquid to escape after the materials have been separated therefrom.

6. In a centrifugal separating machine, the combination of a receptacle, an upright shaft journaled in the casing, a horizontally disposed chamber supported by the shaft
 15 receptacle having communication with the shaft, said chamber being provided with an end adapted to be opened, a closure for said end, said chamber being supported for free access to the closure, a liquid receptacle supported for rotation with the shaft, said receptacle having communication with the
 20 chamber through the other end, and means whereby the shaft may be rotated, said chamber being provided with an outlet opening through the said other end thereof to permit the liquid to escape into the receptacle.
 30

7. In a centrifugal separating machine, the combination of a receptacle, an upright shaft journaled in the casing, a horizontally disposed chamber supported by the shaft
 35 within the receptacle and rotatable with the shaft, said chamber being provided with an end adapted to be opened, a closure for said end, said chamber being supported for free access to the said closure, a liquid receptacle supported for rotation with the shaft and
 40 within the said receptacle, a closure for the first said receptacle, said closure being provided with an opening through which the liquid may be supplied to the liquid receptacle, said liquid receptacle having communication with the chamber through the other
 45 end thereof, and means for rotating the shaft, said chamber being provided with an outlet opening through its said other end to permit the liquid to escape into the receptacle after the materials have been separated therefrom.

8. In a centrifugal separating machine, the combination of a receptacle provided
 55 with a wall to divide the same into two compartments, a shaft journaled in the receptacle, a chamber within the receptacle supported for rotation with the shaft, said chamber being provided with a fixed end
 60 and an end adapted to be opened, one of the ends of the chamber being disposed on one side and the other on the other side of the said wall, a closure for the open end of the chamber, means for supplying liquid to the chamber through the fixed end thereof and
 65

means for rotating the shaft, said fixed end of the chamber being provided with an outlet opening to discharge the liquid on one side of the said wall and within the receptacle, and the other end of the chamber being
 70 adapted to be opened to permit the materials separated from the liquid to be discharged on the other side of the wall by centrifugal force and within the receptacle.

9. In a centrifugal separating machine, the combination of a receptacle provided
 75 with a wall to divide the same into two compartments, a shaft journaled in the receptacle, a chamber within the receptacle supported for rotation with the shaft, said chamber being provided with a fixed end
 80 and an end adapted to be opened, one of the ends of the chamber being disposed on one side and the other on the other side of the said wall, a closure for the open end of the chamber, a liquid receptacle also within the first said receptacle and supported for rotation with the shaft, said liquid receptacle having communication with the chamber for
 85 supplying liquid to the chamber through the said fixed end thereof, and means for rotating the shaft, said fixed end of the chamber being provided with an outlet opening to discharge the liquid on one side of the said wall and within the receptacle, and the other end
 90 of the chamber being adapted to be opened to permit the materials separated from the liquid to be discharged on the other side of the wall by centrifugal force and within the receptacle.
 95

10. In a centrifugal separating machine, the combination of a receptacle provided
 100 with a wall to divide the same into two compartments, a shaft journaled in the receptacle, a chamber within the receptacle supported for rotation with the shaft, said chamber being provided with a fixed end
 105 and an end adapted to be opened, one of the ends of the chamber being disposed on one side and the other on the other side of the said wall, a closure for the open end of the chamber, means for supplying liquid to the chamber through the fixed end thereof, and means for rotating the shaft, said fixed end
 110 of the chamber being provided with an outlet opening to discharge the liquid on one side of the said wall and within the receptacle, and the other end of the chamber being adapted to be opened to permit the materials separated from the liquid to be discharged on the other side of the wall by centrifugal force and within the receptacle, each of said compartments being provided with a discharge outlet.
 115

11. A centrifugal separating machine including a rotatable shaft, a chamber supported for rotation therewith, said chamber
 120 being provided with an end adapted to be opened, a detachable conical closure for said end, means for supplying liquid to the cham-
 130

ber through the opposite end thereof, means
for rotating the shaft to cause the heavier
particles to accumulate in the said closure,
and means whereby the liquid will be per-
5 mitted to escape from the inlet end of the
chamber.

In testimony whereof I have signed my

name to this specification, in the presence of
two subscribing witnesses, on this 17th day
of April A. D. 1908.

HENRY M. GOODMAN.

Witnesses:

E. G. VAN METER,

M. J. DEMAREE.