No. 775,320. PATENTED NOV. 22, 1904.

A. C. VAN KIRK.

CENTRIFUGAL MACHINE.

APPLICATION FILED JAN. 23, 1904.

NO MODEL. 3 SHEETS—SHEET 1.

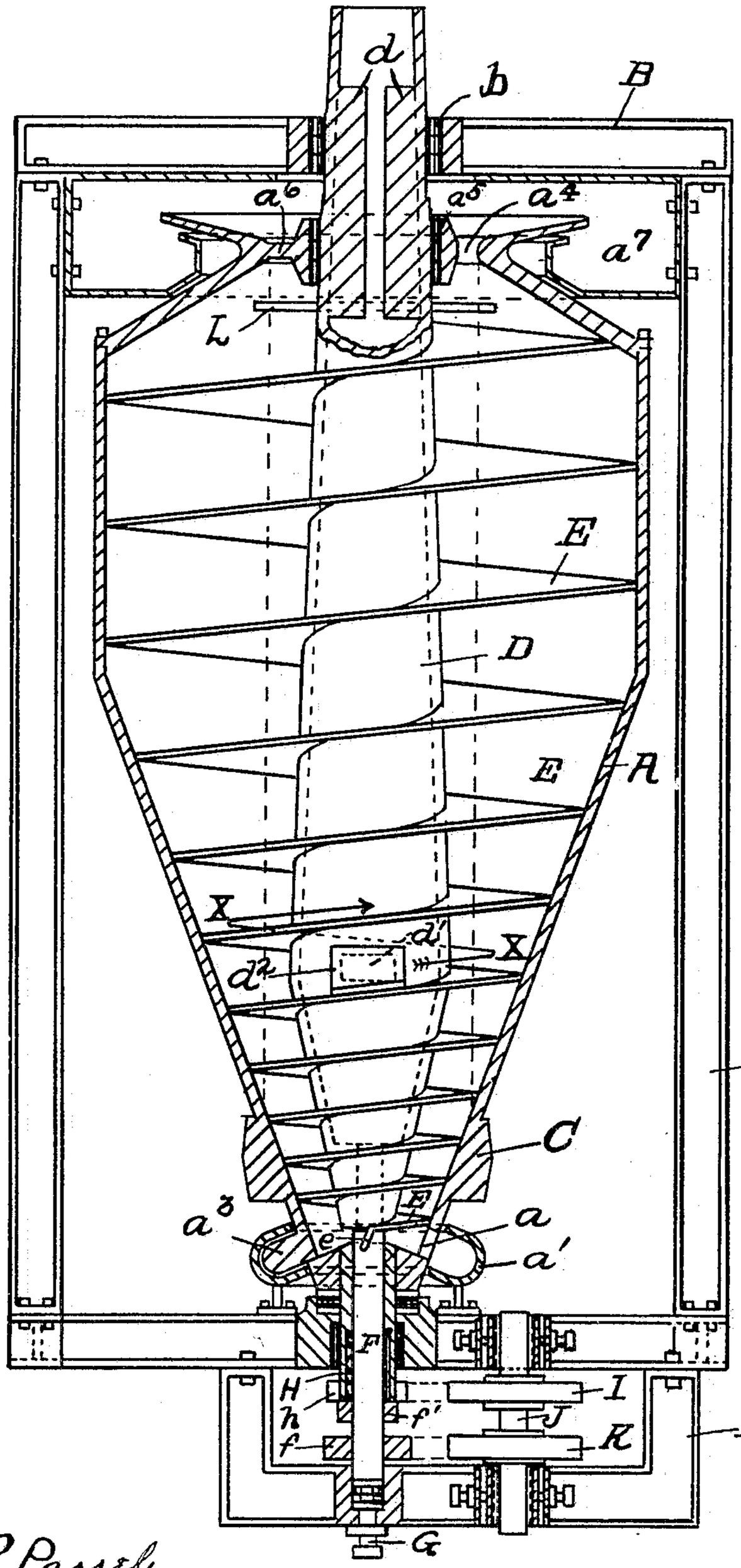

FIG. 1.

Witnesses

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Agnes B. Grant.

Inventor

Arthur C. Van Kirk

By Attorneys

Parkinson & Richards

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NO MODEL. 3 SHEETS—SHEET 2.

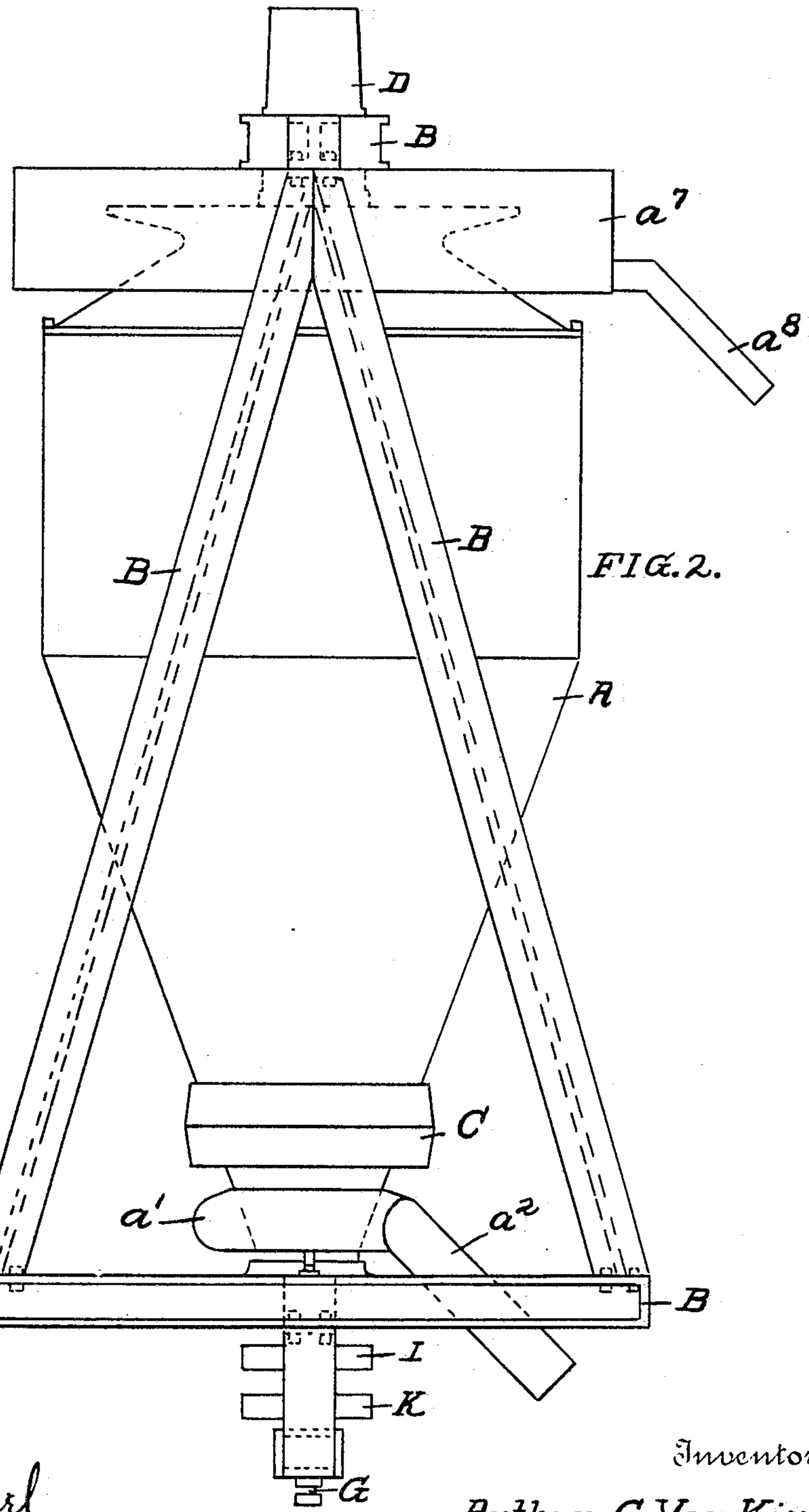

FIG. 2.

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NO MODEL. 3 SHEETS—SHEET 3.

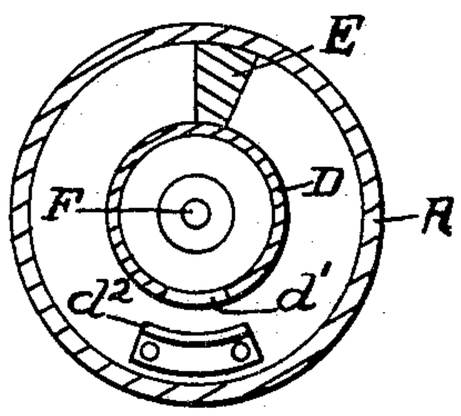

FIG. 3.

Witnesses
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No. 775,320. Patented November 22, 1904.

UNITED STATES PATENT OFFICE.

ARTHUR C. VAN KIRK, OF TIFFIN, OHIO.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 775,320, dated November 22, 1904.

Application filed January 23, 1904. Serial No. 190,318. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR C. VAN KIRK, a citizen of the United States, residing at Tiffin, in the county of Seneca and State of Ohio, have invented certain new and useful Improvements in Centrifugal Machines, of which the following is a specification.

The object of my invention is to provide an improved centrifugal machine for removing solid matter from liquids; and my invention consists in the combination and arrangement of parts hereinafter described and claimed.

In the drawings, Figure 1 is a vertical section of a machine embodying my invention; Fig. 2, a side view of the same, and Fig. 3 a cross-section through the separating-chamber.

The separating-chamber A is rotatably mounted in frame B and is driven at a high rate of speed by means of pulley C. At its lower end chamber A is provided with the discharge-opening a, discharging into the annular trough a', which is provided with a discharge-trough a^2. The lower end of the bottom blade E is preferably turned downward to form a lip or wing e, which forces any solid matter on the bottom of chamber A up to and out of opening a. The chamber A carries a discharge-wing a^3, which rotates in trough a' and serves to force solid matter therein up to and out through spout a^2. At its upper end chamber A is provided with a discharge-opening a^4 and is given a bearing on cone D by means of the bearing-sleeve a^5, which is carried by lugs a^6 in opening a^4. Surrounding the upper portion of chamber A is a discharge-trough a^7, provided with a discharge-spout a^8. In chamber A is mounted the feed-cone D, which carries screw-blades E, adapted to rotate in chamber A. The feed-cone D is rotatably mounted on shaft F, which is adjustably mounted in frame B by means of set-screw G. At its upper end cone D is given a bearing b in frame B. At its top the cone D is preferably provided with wings d, which impart a preliminary rotation to matter fed into the open upper end of the cone, and toward its lower end with an opening d', provided with a shield d^2, secured to one of the blades E a short distance in front of opening d'. At its lower end the chamber A is provided with a hollow shaft H, surrounding shaft F and provided with a sprocket-wheel h. The sprocket-wheel h drives a sprocket-wheel I, which is mounted on a shaft J, which carries a sprocket K. The sprocket K drives sprocket f on shaft F. It will be observed that the sprocket f is slightly larger than the sprocket h and that sprockets I and K are the same size, so that by this arrangement shaft F, and consequently cone D and blades E, will be rotated in the same direction as chamber A, but at a slightly-lower speed. Collar f' prevents vertical movement of shaft F. A circular blade L of a diameter slightly larger than the diameter of opening a^4 is secured to cone D just below opening a^4 and above blades E.

In operation when the mixture to be separated is fed to the upper open end of cone D it is given a preliminary rotation by wings d and passes down and out through opening d' under the influence of the centrifugal force, the shield d^2 serving to prevent undue disturbance in surrounding matter. Under the influence of centrifugal force solid matter, which is heavier than the liquid in the mixture, collects on the walls of chamber A, and lighter matter around cone D. As chamber A rotates in the same direction as cone D, but at a slightly faster speed, it will cause the solid matter collecting on its walls to travel down the blades E and out through discharge-opening a. The lighter matter collecting around cone D will be prevented from passing out through opening a^4 by blade L and accumulating around cone D will be forced to travel down the blades E and out through opening a. The liquid in the mixture follows the course of arrow X X, traveling up the blades E and out through opening a^4 into trough a^7, whence it is discharged through spout a^8.

By running the cone D and blades E faster than chamber A or by reversing the direction of chamber A and cone D screw-blades E, having an opposite pitch or "left-hand thread," may be used. It will be observed by these means matter either heavier or lighter may be removed from a liquid.

Owing to the fact that the discharge-opening d' in cone D is in the lower and narrower

portion of chamber A, the heavier matter will at once settle and be discharged, while any lighter matter passing upwardly with the water will come under the influence of a much greater centrifugal force in the upper and wider portion of chamber A and be thrown out against the chamber-walls, to be carried down and discharged by the action of blades E.

While I have shown and described the preferred means for carrying my invention into effect, it is obvious that this is capable of variation without departing from the spirit of my invention. I therefore do not wish to be limited to the exact construction shown in the drawings; but

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a centrifugal machine of a separating-chamber mounted to rotate on a vertical axis; screw-blades in the chamber mounted to rotate coaxially with, but at a different speed from that of the chamber; a discharge-opening for the solid matter located near the bottom of the chamber; a discharge-opening for the liquid located near the center portion of the top of the chamber and a shield adapted to prevent the direct flow of material from the blades through the liquid-discharge opening, substantially as specified.

2. The combination in a centrifugal machine of a separating-chamber mounted to rotate; screw-blades in the chamber mounted to rotate at a different speed from that of the chamber; a discharge-opening for the solid matter located at the discharge end of the blades; a discharge-opening for the liquid located at the opposite end of the blades; and a shield adapted to prevent direct flow of material from the blades through the liquid-discharge opening, substantially as specified.

3. The combination of chamber A; feed-pipe D having a discharge-opening into chamber A; screw-blades E on pipe D; discharge-openings a and a^4 for discharge of the liquid and solid matter respectively; a discharge-lip e on the bottom blade E; and means for rotating the chamber and feed-pipe at different speeds, substantially as specified.

4. The combination of chamber A; feed-pipe D having a discharge-opening into chamber A; wings d in pipe D; screw-blades E on pipe D; discharge-openings a and a^4 for discharge of the liquid and solid matter respectively; a discharge-lip e on the bottom blade E; and means for rotating the chamber and feed-pipe at different speeds, substantially as specified.

5. The combination of chamber A; feed-pipe D having a discharge-opening into chamber A; screw-blades E on pipe D; discharge-openings a and a^4 for discharge of the liquid and solid matter respectively; a discharge-lip e on the bottom blade E; trough a' and discharge-wing a^3 operating therein; and means for rotating the chamber and feed-pipe at different speeds, substantially as specified.

6. The combination in a centrifugal machine of chamber A having an upper wider portion and a lower narrower portion; discharge-openings a and a^4; cone D having a discharge-opening d' in its lower portion protected by shield d^2; screw-blades E on cone D; and means for rotating chamber A and cone D at different speeds, but in the same direction, substantially as specified.

7. The combination in a centrifugal machine of chamber A having an upper wider portion and a lower narrower portion; discharge-openings a and a^4; discharge-troughs a' and a^7; cone D having a discharge-opening d' in its lower portion protected by shield d^2; screw-blades E on cone D; lip e on blades E and wing a^3 on chamber A; and means for rotating chamber A and cone D at different speeds, but in the same direction, substantially as specified.

8. The combination in a centrifugal machine of chamber A; discharge-openings a and a^4; discharge-troughs a' and a^7; cone D carried by shaft F and having a discharge-opening d' and shield d^2; screw-blades E on cone D; lip e on blades E and wing a^3 on chamber A; pulley C for rotating chamber A; hollow shaft H carrrying sprocket-wheel h; shaft J carrying sprocket-wheels I and K; sprocket-wheel f on shaft F; and set-screw G for adjusting shaft F, substantially as specified.

ARTHUR C. VAN KIRK.

Witnesses:
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JOHN L. FRIEDEL.