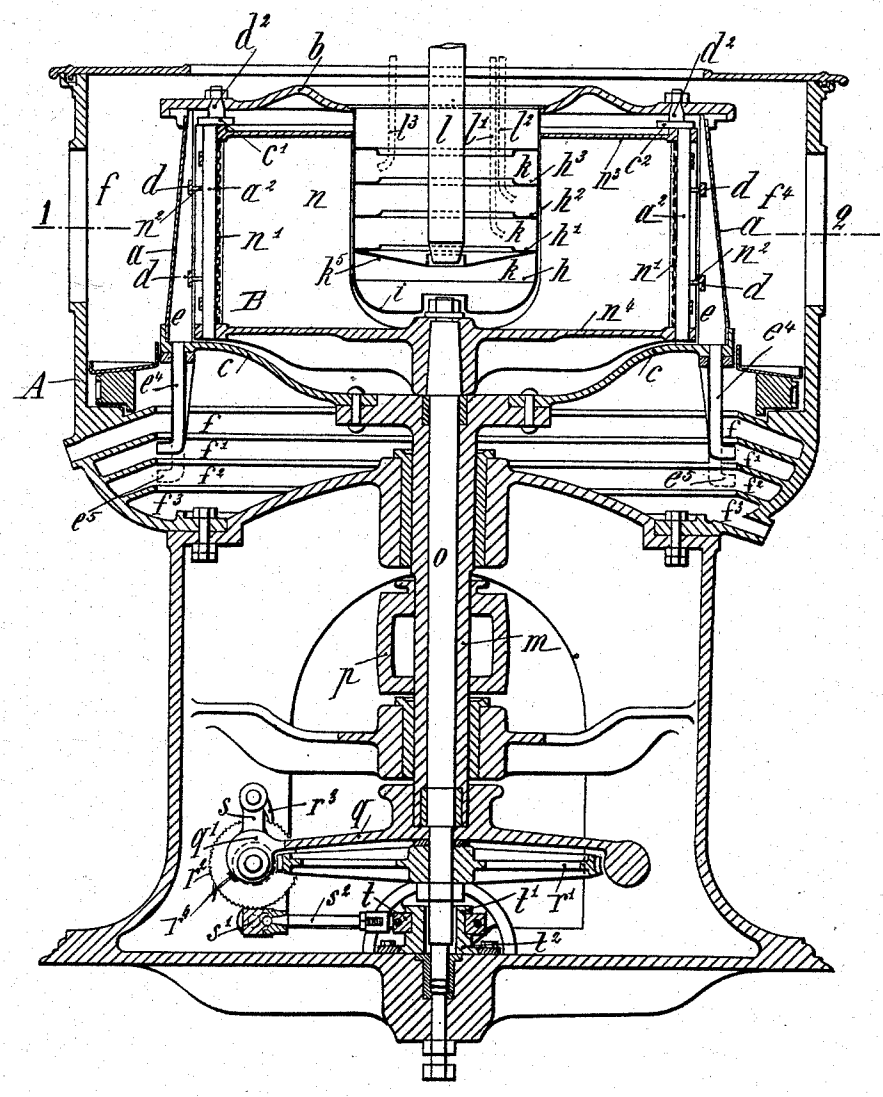
(No Model.) 2 Sheets—Sheet 1.

E. LÉVY-SAMSON.

CENTRIFUGAL MACHINE.

No. 527,499. Patented Oct. 16, 1894.

FIG. 1.



Witnesses:
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Inventor
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his Attorneys.

(No Model.) 2 Sheets—Sheet 2.

E. LÉVY-SAMSON.

CENTRIFUGAL MACHINE.

No. 527,499. Patented Oct. 16, 1894.

FIG. 2.

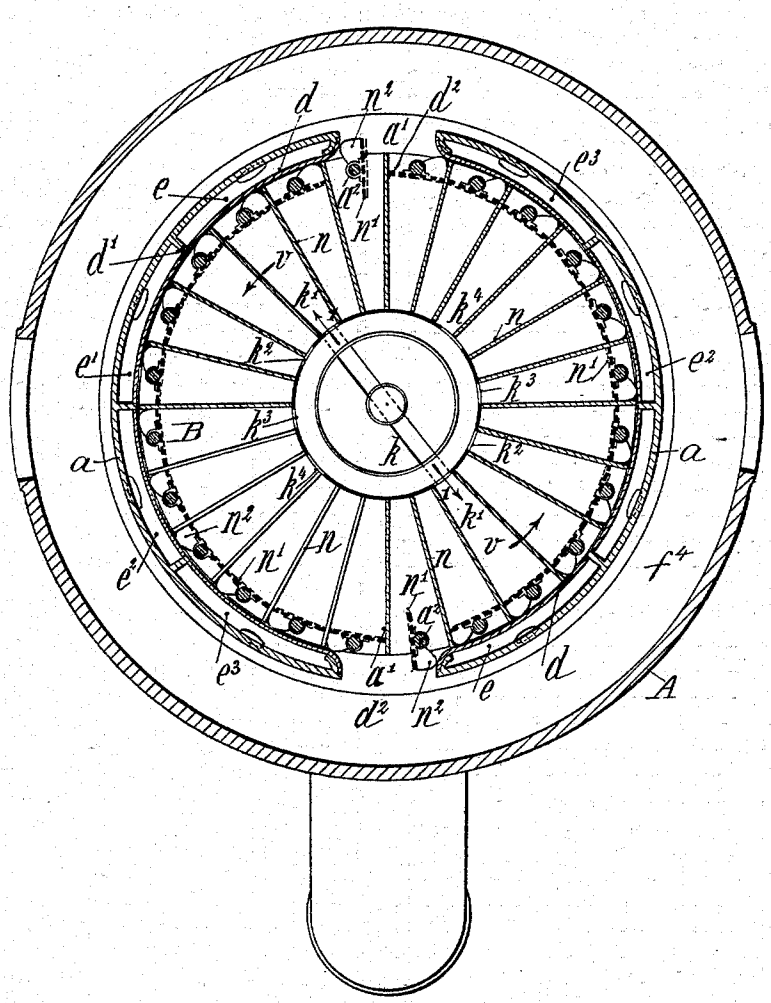


FIG. 4.

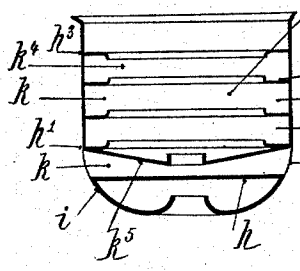
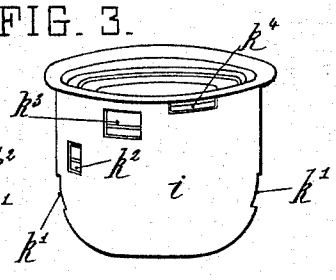


FIG. 3.



Witnesses:
L. M. Wachschlager,
Fred. C. Mouse

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UNITED STATES PATENT OFFICE.

EDMOND LÉVY-SAMSON, OF PARIS, FRANCE.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 527,499, dated October 16, 1894.

Application filed July 21, 1893. Serial No. 481,159. (No model.) Patented in France February 12, 1892, No. 219,358; in Germany April 6, 1892, No. 69,464; in Belgium August 1, 1892, No. 100,772, and in Austria-Hungary March 28, 1893, No. 39,858 and No. 86,589.

To all whom it may concern:

Be it known that I, EDMOND LÉVY-SAMSON, of the city of Paris, France, have invented a Continuously Acting Centrifugal Machine, (for which I have obtained Letters Patent in France for fifteen years, dated February 12, 1892, No. 219,358; in Germany for fifteen years, dated April 6, 1892, No. 69,464; in Belgium for fifteen years, dated August 1, 1892, No. 100,772, and in Austria-Hungary, dated March 28, 1893, No. 39,858 and No. 86,589,) of which the following is a full, clear, and exact description.

This invention relates to a continuously-acting centrifugal machine or hydro-extractor, more especially intended for use in sugar manufacture but applicable to other purposes by modifications in detail which in no way affect the principle of the invention.

Reference is to be had to the accompanying drawings, forming part of this specification, which illustrate the machine as arranged for the special purpose indicated, wherein—

Figure 1 represents a central vertical section of the centrifugal machine, and Fig. 2 a horizontal section of the same on the line 1—2 Fig. 1. Fig. 3 is a perspective view, and Fig. 4 a vertical section of the distributer.

The same letters of reference denote like parts in all the figures.

The machine comprises a slightly-coned outer revolving drum *a* closed by a top cover *b* and a bottom *c* and is provided with internal vertical ribs *d'* forming a series of chambers *e e' e² e³* (Fig. 2) for the assortment of the liquids drained off. Each of these chambers has an outlet pipe *e⁴ e⁵*, (Fig. 1) leading to one of the series of collecting channels *f f' f² f³* in the lower part of the outer stationary casing A, the two diametrically opposite chambers communicating with the same channel. The cover *b* is annular and carries a central distributer which revolves with the drum *a* and which distributes the matter to be treated and the washing or other medium with which it is treated. The distributer is a cylinder *i* closed by a bottom *h* and provided with internal horizontal dividing ledges *h' h² h³* forming a series of circumferential channels *k* into the three uppermost of which project stationary nozzles *l'* to *l³* by which steam or other washing medium is supplied. Pairs of diametrically-opposite ports *k²* to *k⁴* open from the respective channels *k* through the side of the distributer *i* each pair of ports being situated in a different vertical plane to those of the ports above or below whereby the washing or other media are distributed at predetermined points.

The matter to be treated, say a mass of sugar crystals, is introduced by the central pipe *l* through the aperture of an inclined diaphragm *k⁵* (Fig. 1) to the lowest channel *k* of the distributer from which a pair of diametrically opposite ports *k'* open through the side of the distributer.

The outer drum *a* and distributer *i* are carried by a vertical tubular shaft *m*, and within said drum *a* is an inner chambered drum B formed of top, and bottom plates and radial partitions *n* (Fig. 2) extending inward to the distributer *i* and forming chambers which are closed at their outer ends by doors *n'* of perforated metal or wire gauze. This inner chambered drum is mounted upon a shaft *o* passing through the hollow shaft *m* and revolving independently thereof at a slightly different speed. Each perforated door *n'* of the chambered drum is pivoted on a central vertical axis *a²* so as to be balanced and is provided with curved arms *n²* which bear against circumferential rails *d* fixed to the partitions *d'* of the outer revolving chambered drum *a* whereby the doors are held in the closed position. The drum *a* has two diametrically-opposite outlet apertures *a'* (Fig. 2) in its side, through which the sugar crystals, or other solid matters, may be discharged into the space *f⁴* within the upper part of the outer casing which may be lined with fabric to prevent the crystals being injured by striking against the walls of the casing.

The means whereby each pair of doors *n'* is opened on coming opposite the apertures in the outer drum are illustrated in Fig. 2.

A fork c' c^2 at the upper end of the door axis engages a stud d^2 on the cover plate b which, by the relative motion in the direction of the arrow, gradually opens the door at the proper moment, the stud d^2 becoming disengaged from the fork c' c^2 by the continued motion, whereupon the door is closed by coming against the rails d. The door can only be opened in one direction, the fork preventing the opening in the opposite direction under the action of centrifugal force, and the action of this mechanism is dependent upon the differential motion of the inner and outer drums B and a.

The operation of the machine is essentially as follows, whatever the material operated upon: The inner chambered drum B revolves at a speed differing from that of the outer drum a to the extent of one or more revolutions per minute according to requirements, so that the charge to be treated, fed to the distributer by pipe l and delivered through the pair of ports k' is projected, as indicated by the arrow 1 in Fig. 2, into the two opposite chambers marked v which for the time being coincide with the said ports k'. Owing to the difference of velocity of the inner and outer drums, these two chambers pass ahead or lag behind the point indicated by the arrow and are replaced by the adjacent pair of chambers formed between the partitions n which come opposite the ports k' in turn, for the purpose of receiving a charge. The charge thus projected into chambers v is thrown by centrifugal action against the peripheral doors, the solid particles are retained by the wire cloth, and the liquid is received in the corresponding compartments e of the outer drum a and flows through the delivery pipe e^4 into the corresponding collecting channel f in the casing. The chambers v retaining the solid matters then come opposite the pair of ports k^2 through which is projected the fluid employed for the preliminary treatment supplied by the pipe l, the liquid drained off passing into its corresponding compartments e' and flowing out into the corresponding channel f'. Similarly, the said chambers coincide successively with the pairs of ports k^3 and k^4 and receive other fluids by which the treatment of the solid matters is completed the resulting liquids being received in the corresponding compartments e^2 e^3 and collected in the respectively corresponding channels f^2 f^3. The chambers then come opposite the outlets a' of the drum a, the fork c' c^2 on the door pivot engages with the stud d^2 which is situated opposite the center of the opening a', and the door is gradually opened to allow the solid matters to be discharged into the chamber f^4. The fork c' is then released by the continued rotation and the door is closed by coming against the rails d. The action is similar for each succeeding group of two diametrically opposite chambers, from their passage in front of the ports k' to their arrival opposite the openings a' Fig. 2.

This system of centrifugal machine may be applied for the purposes of filtration and clarification, by furnishing the doors n' with a filtering surface suited to the operation to be performed, or it may be used for drying, by introducing hot air, superheated steam, or a liquid, for otherwise preparing or heating the solid matters. Any suitable mechanism may be adopted for driving the machine and imparting the differential rotary motion to the inner and outer drums. One example is illustrated in the drawings, which, however, forms no part of my present invention. In this example the shaft m is driven by a belt on pulley p and has keyed on it a disk q provided with lugs q' q' in which is journaled a worm r in gear with a worm wheel r' keyed on the shaft o by which the chambered drum is revolved. Upon each end of the shaft of the worm r is keyed a ratchet wheel r^2 with which engages a pawl r^3 carried by a lever s oscillating about the shaft of the worm r. Each ratchet wheel r^2 may be provided with a check pawl r^4. The two rock levers s are connected by a rod s' coupled at its middle by a ball and socket joint with the end of a rod s^2 connected to the strap t of a stationary eccentric t' which is adjustable in guides t^2 upon the base plate of the casing by turning the hand wheel of screw u. By this combination the worm r is rotated on its own axis by the revolution of the disk q and consequently produces a differential-movement of the wheel r' and shaft o, proportional to the eccentricity of the eccentric t'.

I claim—

1. In a continuously-acting centrifugal machine the combination with a stationary casing provided with circumferential channels therein, an outer drum provided with chambers therein and having pipes rotating therewith which communicate with the channels in the casing and with a central receiving and distributing chamber connected to and revolving with said outer casing and provided on the inner side thereof with tiers of circumferential channels, pipes extending to said circumferential channels within the distributer and corresponding ports opening through the sides of the distributer, of an inner radially chambered drum surrounding the distributer and provided with peripheral pivoted strainers, said inner drum revolving differentially from the outer drum so that its chambers will successively coincide with the ports of the distributer, for receiving in succession the materials to be treated and the agents with which it is to be treated, as specified.

2. In a continuously-acting centrifugal machine, the combination with an outer rotating drum and with a central receiving and distributing chamber connected to and re-

volving therewith and provided with tiers of circumferential channels therein, means for conveying fluid thereto and corresponding ports opening through the sides of the receiver and distributer, of an inner radially chambered drum surrounding the distributer and provided with peripheral pivoted strainers, said inner drum revolving differentially from the outer drum so that its chambers will successively coincide with the ports of the distributer, for receiving in succession the materials to be treated and the agents with which it is to be treated, as specified.

The foregoing specification of my continuously-acting centrifugal machine signed by me this 21st day of June, 1893.

EDMOND LÉVY-SAMSON.

Witnesses:

ROBT. M. HOOPER,

ALBERT MOREAU.