(No Model.) 2 Sheets—Sheet 1.

W. BODGE.

CENTRIFUGAL MACHINE.

No. 459,197. Patented Sept. 8, 1891.

Fig. 1

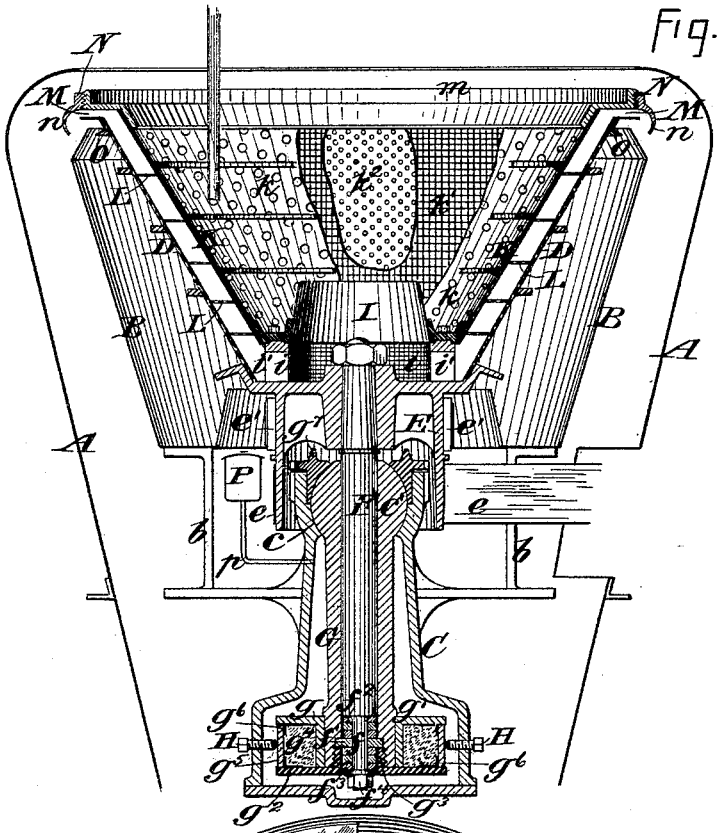
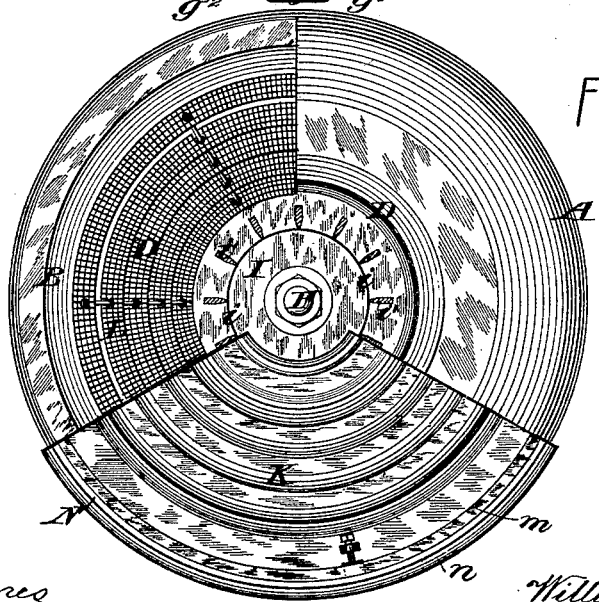


Fig. 2



WITNESSES:
Fred't Haynes
C. L. Sundgren

INVENTOR
William Bodge
BY
Brown & Seward
ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

W. BODGE.

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Fig. 3

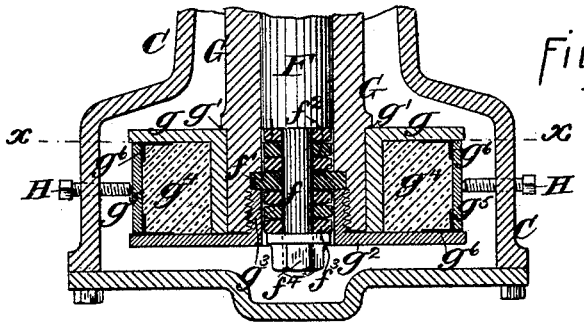


Fig. 4

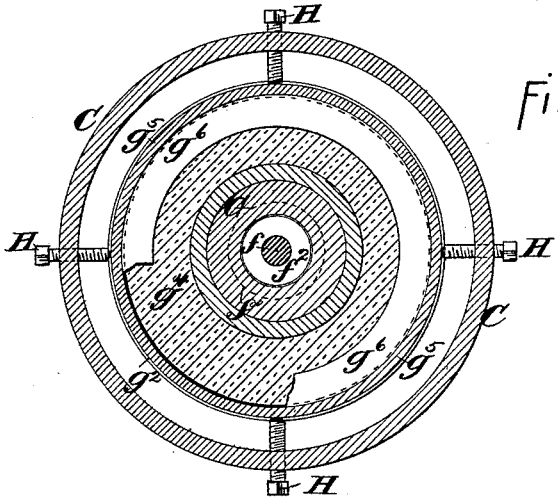


Fig. 6

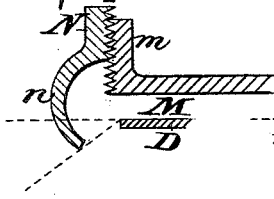
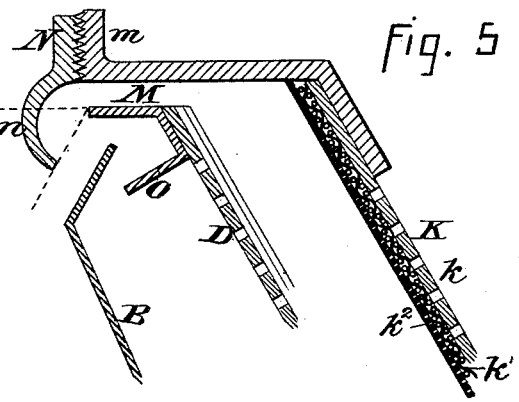


Fig. 5



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Fred'k Haynes

C. L. Sundgren

INVENTOR

William Bodge

BY

Brown & Ewand

ATTORNEY.

UNITED STATES PATENT OFFICE.

WILLIAM BODGE, OF BROOKLYN, NEW YORK.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,197, dated September 8, 1891.

Application filed October 29, 1890. Serial No. 369,719. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BODGE, of Brooklyn, in the county of Kings and State of New York, have invented a new and useful Improvement in Centrifugal Machines, of which the following is a specification.

My invention relates to an improvement in centrifugal machines in which the material to be operated upon is led by centrifugal force upwardly along the wall of an inverted cone and discharged from the top thereof.

The object is to provide means for more thoroughly subdividing the material as it leaves the receiving-hopper and keeping it in a loosened condition as it travels along the wall of the separator.

A further object is to provide simple and efficient means for regulating the discharge.

A further object is to provide a cone adapted to feed the water from its periphery in spray.

A further object is to provide a bearing for the separator-shaft by which the separator may be more effectually controlled and caused to rotate with a steady motion.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in claims.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents the machine in vertical section, a portion of the wall of the cone being broken away to show the structure of the different layers. Fig. 2 is a top plan view of a portion of the cone, a portion of the basket with the series of transverse screens, and a portion of the receiver. Fig. 3 is an enlarged view, in vertical section, of the box and bearing for the separator-shaft. Fig. 4 is a horizontal section through line $x\,x$ of Fig. 3, and Figs. 5 and 6 represent enlarged views in detail of a portion of the wall of the cone and the discharge-outlet at the top of the basket, showing the discharge-regulating device in two different adjustments.

A represents an outer casing of any suitable form. Within the casing A there is located a receiver B, the latter being fixed in its position upon suitable supports—as, for example, the brackets *b*, secured to the pedestal C. Within the receiver B the inverted cone-shaped separator-basket D is located and supported upon and fixed to the upper end of a hub E, by means of which a rotary motion is imparted to the basket, and to the other parts fixed to the hub by means of suitable driving-belt, (indicated by *e*.) A brake-wheel is also indicated at e' in proximity to the upper portion of the hub E for the purpose of stopping the motion of the machine.

The hub E is fixed to the upper end of a vertical shaft F, the latter being journaled in the pedestal C, as follows: The pedestal C is hollow and is provided at its upper end with a spherical seat *c*, adapted to receive the upper spherical end c' of an elongated bearing G. The lower end of the bearing G is located in a lower enlarged portion of the hollow pedestal C and has fixed thereto a cylindrical box *g*. The cylindrical box *g* is conveniently formed by means of an angle-iron forming the inner and upper walls of the box and adapted to abut at its upper end against a shoulder g' on the elongated bearing, while the lower side of the box is formed by means of a plate or disk g^2, provided with a central hollow exterior screw-threaded boss or nipple g^3, adapted to register with an interior screw-threaded opening in the lower end of the bearing G. When the disk or plate g^2 is screwed home into the end of the bearing G, it tends to force the angle-iron forming the remaining two sides of the box *g* into contact with the shoulder g' on the bearing. The box *g* is provided with a yielding cushion g^4, of india-rubber, for example, and around the outer face of the box there is placed a ring g^5, which rests with its inner face in contact with the exterior face of the yielding cushion.

For the purpose of preventing the oil with which the lower portion of the pedestal is intended to be charged from coming in contact with the yielding cushion, I provide corner-guards g^6, of thin metal, which engage the upper and lower exterior corners of the yielding cushion, as clearly shown in Fig. 3. The lower end of the main shaft F is provided with a reduced portion *f*, which extends through

an opening in a thrust-plate f', firmly secured within the lower end of the elongated bearing G, preferably, by having its outer portion held between a seat in the bearing G and the upper end of the nipple g^3, as shown in Fig. 3. Between said thrust-plate f' and the enlarged portion of the shaft F, I locate one or more washers f^2, consisting, preferably, of annular steel packing-rings, which washers or packing-rings will receive the downthrust upon the shaft, and for the purpose of receiving the upthrust on the same I also provide one or more such washers f^3 between the thrust-plate f' and a cap f^4, secured to the lower end of the shaft F. The bearing G, with the shaft F mounted therein, is secured in a normally-vertical position by means of a series of set-screws H—four, for example—(shown in Fig. 4,) which extend through the pedestal and engage the opposite sides of the ring g^5, which surrounds the yielding cushion in the box g. The yielding of the ring with which the screws H engage at the same time allows the elongated bearing G to assume a position slightly out of the vertical when under strain, tending to draw it to one side, and thereby prevents the cramping or cutting out of the bearing by the shaft, or vice versa. The bearing is held in its position against vertical displacement by means of a suitable gland g^7, fixed to the upper end of the pedestal C.

The hopper in which the material to be separated is fed is represented by I, and is provided at its base with an annular screen i, through which the material is discharged under the influence of the centrifugal force, and by which all lumps—as in separating sugar, for example—are thoroughly broken up and the material caused to issue in a loose mass. Radial wings i' extend at intervals from the screen portion i of the hopper and form supports for the cone K. The shape of the cone K is similar to that of the basket D, and it is spaced therefrom, as is usual, so as to leave a passage for the travel of the material upwardly between it and the basket. For the purpose of subdividing the water or other liquid admitted within the cone into a spray as it leaves the cone and comes in contact with the material traveling along up its surface I form the wall of the cone of three layers of material, the inner layer k consisting of a stiff coarsely-perforated material, while outside of this I place a wire-cloth k', and still outside of this a finely-perforated sheet-metal sieve k^2.

To further provide for keeping the mass as it travels along between the cone and the basket in a loose porous mass, I provide at short intervals screens L, which may be set either directly across the passage or may be set obliquely thereto, as found expedient. As the basket and cone are fixed to rotate together, it follows that the screen L carried thereby must necessarily remain fixed relatively thereto.

At the upper end of the basket there is a fixed opening M for the discharge of the separated material, and to regulate the discharge through said fixed opening I provide an annular nut N, which screws up and down upon the screw-threaded rim m of the top of the cone. The lower end of the nut N is developed into an outwardly-curved rim portion n, as clearly shown in Figs. 5 and 6, which curved rim portion is adapted to be raised and lowered in front of the material being discharged from the opening M, and to thereby change the direction of said discharge, so as to cause it to free itself from the opening more or less rapidly. For example, if the discharge-regulating nut be screwed down into the position shown in Fig. 5 the material being discharged will pass from the surface of the material retained in the curved rim, along the dotted line, oblique to the horizontal, and hence under the impulse of the centrifugal force will be discharged more slowly, while if the discharge-regulating nut be elevated, as shown in Fig. 6, the surface of the material held within the hollow rim will have a less angle to the horizontal, and hence the discharge will be more rapid.

In Fig. 5 I have shown a guard O for preventing the separated liquid from coming in contact with the material from which it has been separated.

An oil-cup P communicates through a pipe p with the interior of the hollow pedestal C for the purpose of keeping the working parts thoroughly lubricated.

What I claim as my invention is—

1. In a centrifugal machine, the combination, with a receiving-hopper and a separating-basket, of a sieve located around the receiving-hopper, through which the material to be operated upon is caused to pass before reaching the separating-basket, substantially as set forth.

2. The combination, with a separating-basket and the cone through which the liquid is discharged, of one or more screens located across the path of the material, being operated upon as it travels upwardly and outwardly toward the discharge-opening, the said screens being fixed with respect to the cone and basket, substantially as set forth.

3. The combination, with the separating-basket and the cone, having a fixed discharge-opening between their peripheries, of an adjustable discharge-regulator provided with a rim projecting outwardly and downwardly in front of the discharge-opening, the said rim presenting a concave face toward the discharge-opening, substantially as set forth.

4. The combination, with the main shaft of the centrifugal machine and an elongated rocking bearing in which the shaft is mounted, of a plate fixed in said bearing near the lower

end of the shaft, and one or more washers inserted between said fixed plate and abutments on the shaft to receive the up-and-down thrust of the shaft, substantially as set forth.

5. The combination, with the elongated bearing, its support, and the main shaft mounted therein, of an annular yielding cushion surrounding the lower end of the bearing, a ring surrounding the exterior of the yielding cushion, and adjusting-screws in engagement with the ring to center the bearing, substantially as set forth.

WILLIAM BODGE.

Witnesses:
FREDK. HAYNES,
K. E. PEMBLETON.