(No Model.) 4 Sheets—Sheet 1.

C. G. JOHNSEN.

CENTRIFUGAL MACHINE FOR MAKING SUGAR.

No. 262,787. Patented Aug. 15, 1882.

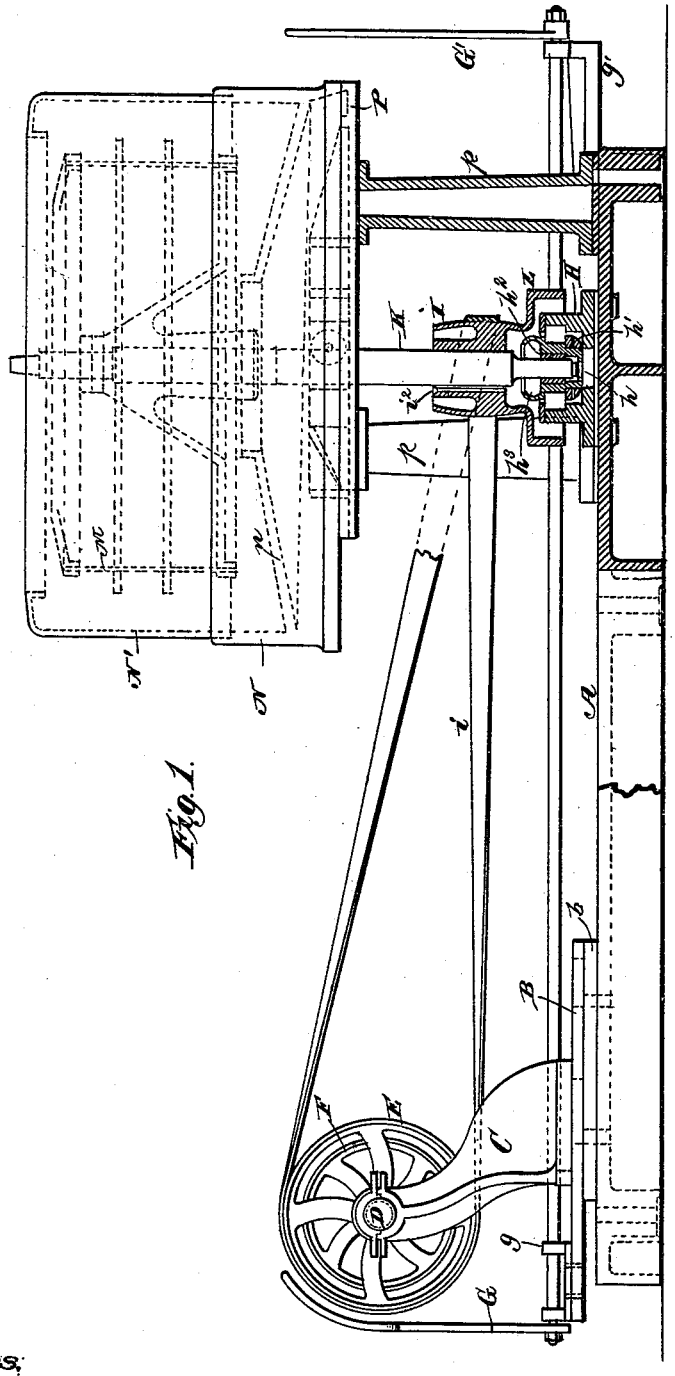

Fig. 1.

Witnesses:
Robt Everett.
J. A. Rutherford

Inventor:
Charles G. Johnsen.
By James L. Norris.
Atty.

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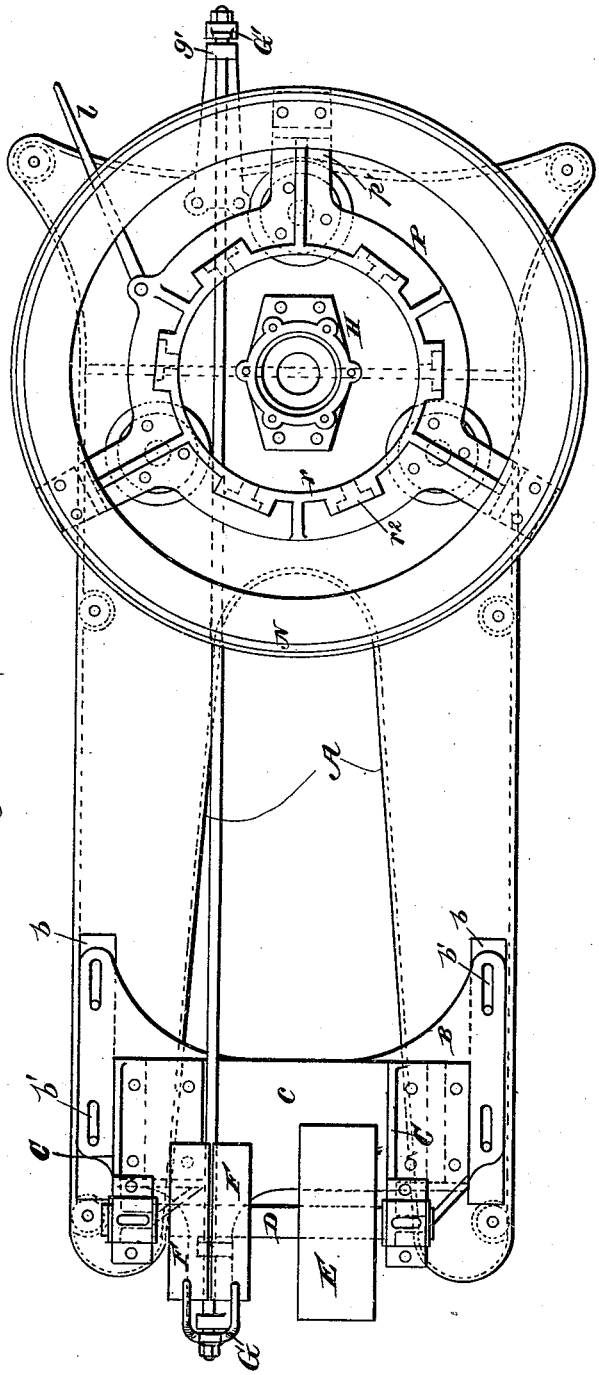

Fig. 2.

Witnesses.
Robt. Everett.
J. A. Rutherford

Inventor.
Charles G. Johnsen.
By James L. Norris.
Atty

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Fig. 3.

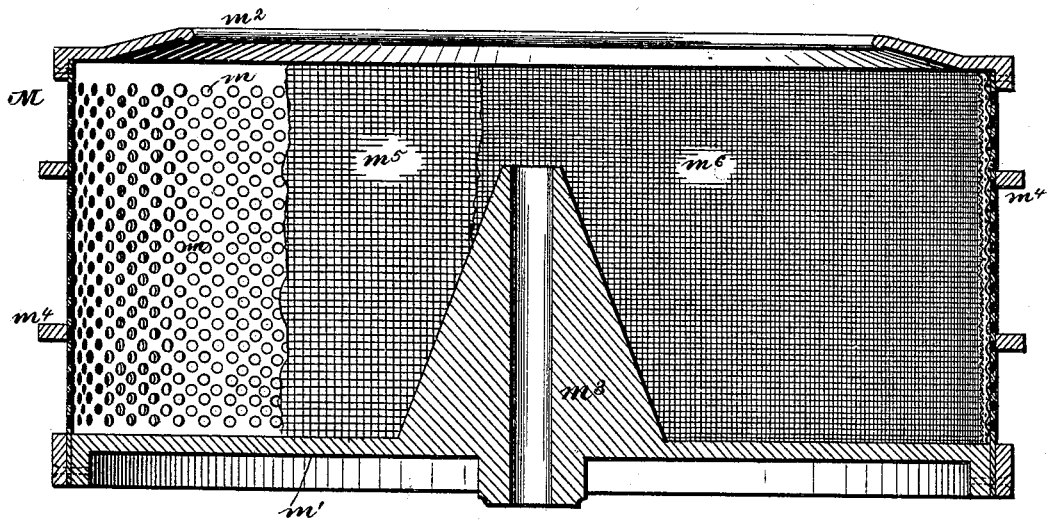
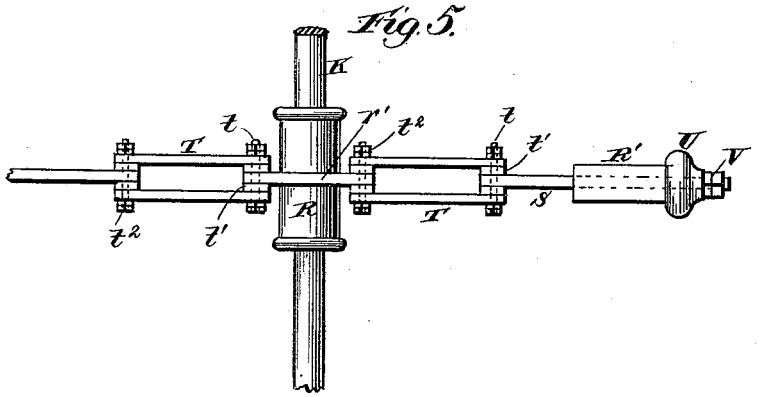


Fig. 5.



Witnesses.
Robt Everett
J. A. Rutherford

Inventor.
Charles G. Johnsen.
By James L. Norris.
Atty.

(No Model.) 4 Sheets—Sheet 4.

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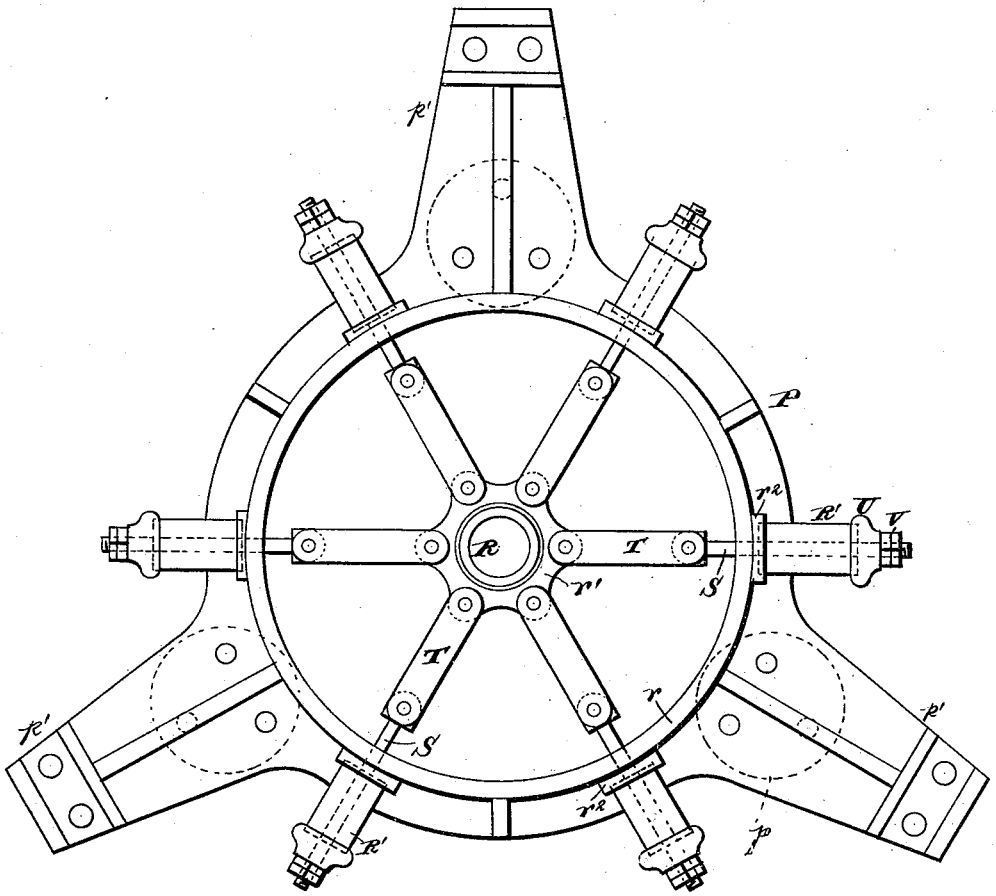
Fig. 4.



Witnesses.
Robert Everett
J. A. Rutherford

Inventor.
Charles G. Johnsen.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

CHARLES G. JOHNSEN, OF NEW ORLEANS, LOUISIANA.

CENTRIFUGAL MACHINE FOR MAKING SUGAR.

SPECIFICATION forming part of Letters Patent No. 262,787, dated August 15, 1882.

Application filed March 6, 1882. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. JOHNSEN, a citizen of the United States, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented new and useful Improvements in Centrifugal Machines for Making Sugar, of which the following is a specification.

This invention relates to that class of centrifugal machines employed for the draining of sugar in which a rotary basket is arranged within a stationary casing and caused to revolve with great rapidity, so that the sugar contained within the basket will be drained or purged of the sirup or molasses by centrifugal action. As these machines revolve with great rapidity, making at least from eight hundred to nine hundred revolutions per minute, the danger attending their use is considerable.

One object of my invention is to so construct the machine as to obviate the danger incident to the use of other machines. A further object is to so simplify the machine that it can be used by labor not expert; also, to lessen the expense of construction, and otherwise improve the construction and combination of parts. These objects I attain by means of the apparatus illustrated in the accompanying drawings, in which—

Figure 1 represents a side elevation of the machine with certain parts shown in section; Fig. 2, a top or plan view with the basket, spindle, and upper portion of the machine removed. Fig. 3 is a section taken on a vertical plane through the basket. Fig. 4 is a top or plan view of the frame and elastic bearings for the basket-spindle. Fig. 5 is a detail view of a portion of the elastic bearing.

The letter A indicates a heavy cast-metal bed-plate, which is adapted to support the entire machine. The bed-plate is provided upon its under side with vertical flanges *a*, which constitute legs for elevating the base-plate.

B indicates a horizontal slidable plate, that rests at its ends upon the rails *b*, which are securely bolted to the main base-plate. The slidable plate B is provided with slots *b'* at its ends, and in the tracks are inserted set-screws, which pass through said slots, whereby the plate will be guided and steadied in its movement, and also secured in position upon the rails which support it by tightening up the set-screws.

C C are two standards, that are bolted to the said slidable plate, and these standards are connected together by means of a base-plate, *c*, whereby great strength and rigidity are imparted to the structure. The upper ends of these two standards provide bearings for a rotary shaft, D, which carries the belt-pulley E for driving the centrifugal machine by belt-connection, the fast and loose belt-pulleys E F, for the belt *f*, by means of which power is obtained, being also mounted upon said shaft. By means of the above construction and arrangement of parts the slidable plate, carrying the standards, can be adjusted horizontally upon its supporting-tracks in order to tighten up the belt *i* when necessary.

G indicates the belt-shifter, which is forked at its upper end, so as to embrace the belt, and at its lower end it is secured upon one end of a long horizontal rock-shaft, which at this end of the machine is supported in bearings *g* upon the plate B. This long rock-shaft extends over the main base-plate to the other end of the machine, where it is supported in a suitable bearing, *g'*, and provided with a hand-lever, G', which is near the draining apparatus. By this arrangement the belt-shifter at the power end of the machine will be under control of an attendant at the opposite end of the machine, where the said draining apparatus is located.

Upon the base-plate is secured a step-bracket, H, consisting of a hollow metal block flanged around its base and formed with an interior seat for the step-bearing *h* of the basket-spindle. This step-bearing consists of a tubular metal casting formed with a step or seat in its partly-closed lower end, in which the spindle is centered. It is also formed with an annular shoulder, against which is fitted a ring, *h'*, convexed, as shown, and seated in the step-bracket H. The spindle passes through a sleeve, h^2, that is fitted within the step-bearing *h*, and the upper end of the latter, above said sleeve, is enlarged, so as to form an oil-chamber, h^3, into which oil for lubricating the spindle and its bearings is received. The opening at the top of this oil-chamber has a greater diameter than the diameter of the

spindle, so as to allow the oil to pass into the oil-chamber.

I refers to the belt-pulley upon the basket-spindle K, the driving-belt *i* being passed around such pulley. The pulley I is formed with a vertical oil-passage, i^2, through which the lubricant can pass and then drip down into the oil-chamber h^3. The said pulley is enlarged at its lower end to form a brake-wheel, L, against which any suitable brake-shoe can be applied by means of the brake-lever *l*, such brake mechanism not being shown. This brake-wheel surrounds and covers the top of the step-bracket and step-bearing, whereby dust or other objectionable matter is prevented from entering the oil-chamber.

The rotary basket M, for containing the sugar to be purged, is composed of a cylindrical body of flange-iron, the ends of the sheet being brought together and a plate riveted on the outside to hold the same together. This body is formed with perforations *m*, each about one-fourth of an inch in diameter and about one inch apart, so as to allow the passage of the molasses or sirup expelled from the sugar. The bottom m' and the cap m^2 of the basket are preferably of cast-iron and of suitable strength, the bottom being provided with a tapering hub, m^3, which receives the upper end of the spindle that supports the basket. To give increased strength to the basket in order to prevent breakage, wrought-iron bands m^4 are shrunk on the same and all of said parts riveted together, so as to make a strong rigid basket. The inside of the basket is lined with two grades of brass or other suitable metal wire mesh-work, as indicated by the letters m^5 and m^6, the coarser being next to the cylindrical shell composing the body of the basket, portions only of such mesh or wire-gauze being shown in Fig. 3. The basket is properly balanced on its spindle, and the pulley, before referred to, keyed on the latter, so that when the spindle is rotated the basket will be revolved and the saccharine matter within the basket purged of all sirup, which passes through the wire mesh or gauze and the perforations in the body of the basket. The basket is surrounded by the two-part cylindrical covering N N′, and below the basket is a conical diaphragm, *n*, (shown in dotted lines, Fig. 1,) upon which any sirup deflected inwardly from the walls of the casing will be conducted back toward the same. Any suitable outlet for the sirup can be provided near the lower edge of the lower portion of the cover or casing N.

The elastic bearing for centering the spindle is as follows:

P indicates an annular frame or ring-plate mounted upon the standards *p*, that rise from the base-plate A. This ring-plate is provided with a set of radial arms, p', which constitute supports for the casing N, that connects with the casing N′, so as to inclose the basket.

A tubular sleeve or bearing, R, for the spindle is located centrally within the ring-plate. Around an inner annular flange, *r*, formed upon the ring-plate, are arranged the springs R′, having their inner ends fitted in seats r^2, located around the outer wall of the annular flange and through holes in the flange, and these springs pass the spring-bolts S, that are connected with a flange, r', on the central bearing, R, by means of the short horizontal plates T, arranged in pairs and bolted at their ends to the said flange r' and to the radial spring-bolts S by means of short vertical tie-bolts *t*. Springs t', arranged upon these bolts *t*, are interposed between the flange of the bearing R and the plates T, the latter being clamped upon the said springs by means of nuts t^2, fitted upon the screw-threaded ends of the bolts. The spring-bolts S also pass through the cap-washers U, which fit the outer ends of springs R′, and upon the outer screw-threaded ends of the bolts are nuts V, that are tighened up against the cap-washers. From this arrangement it will be seen that a spring-resistance is opposed to the movement of the bearing R in any direction, and hence should the charge be unequally distributed in the basket the elastic bearing formed by the devices described will restore the equilibrium of the basket in a few revolutions of the latter without danger of breakage.

In conclusion I will observe that I do not claim separately any of the elements of this machine, and also that many of them are substantially found in other centrifugal machines for draining sugar.

In machines of this character the basket and spindle revolve with great velocity, and it has frequently happened that during operation the mechanism becomes disorganized and certain parts have been thrown off by centrifugal force and occasioned loss of life.

It is essential that the machine should combine great strength with accuracy of adjustment and freedom of motion, and that each element, while performing its appropriate duty in the best possible way, should operate in conjunction with the other elements, so as to enable me to attain by my organization of parts an improved machine devoid, so far as can now be known, of flaw or irregular or imperfect action in any one part.

In United States Patent No. 125,036 the arrangement of the driving-pulley and step-brackets for the basket-spindle is substantially similar in most respects to that employed by me, the block in which the spindle is stepped in said patent being, however, confined in the box by elastic blocks, while in my machine the block or step-bearing for the spindle has an inner sleeve, through which the spindle passes, and a ring rounded upon its under side is fitted to the lower end of the block or step-bearing and arranged within the box; also, in said patent the basket consists of a single perforated drum or shell, while in mine the basket has a double cylindrical perforated sieve, which, as the basket must be revolved with great rapidity, tends to retain the sugar and allow the liquid

to be drawn off more effectively than where but one sieve is employed. Said patent does not show the conical hub for the spindle within the basket, and the governor or elastic star-buffer compresses a hub connected by single rods and plates with springs, and not by the double plates with intervening springs on the bolts which secure the plates together, as shown in my improved machine. In another machine the basket has a conical hub for the spindle, but such feature is not claimed as a novel element.

In Patent No. 224,674 the basket has an outer perforated wall, with a cylindrical wire-gauze lining located within and separate from said wall, with an annular space between the two, and within the basket are other cylindrical walls or shells. In my machine the outer wall is perforated, and within and in juxtaposition to this are the two sieves of different grades. This arrangement I have found to be productive of better effects and to draw off the liquid and retain the sugar better than where two perforated outer walls are located with a space between them, since the sugar will find its way into such space, and thus clog the basket.

In a German patent, No. 7,082 of 1878, the spindle passes through a sleeve in a step-bearing, which latter has also a pair of inner sleeves, and its lower end is rounded and stepped in a concave bearing-surface, the lower end of the spindle being screw-threaded and fitted in one of said sleeves. The difference between such arrangement and mine will be apparent. This patent has not the double sieve, nor has it the arrangement of star-buffer shown by me. Also, a step-bearing in a centrifugal sugar-machine has been formed of a casing having an oil-chamber at its top, and a sleeve fitted within a central bore extending down part way through the center of the casting, the spindle being inserted in said sleeve, and the casting being rounded at its bottom and supported in a cup-shaped seat. Hence I do not claim broadly any of the elements described in said machine; but

What I claim is—

In a centrifugal sugar-machine, the herein-described rotary basket-spindle, the hollow step-bracket H, secured to the base-plate, the step-bearing *h*, seated in the step-bracket, and composed of a tubular metal casting, with a step in its partly-closed end for the spindle, a ring, *h'*, fitted in said casting, a sleeve, h^2, and an oil-chamber, h^3, the belt-pulley I, located on the basket-spindle above said step-bearing, and formed with an oil-passage, i^2, and with an enlarged portion, L, constituting the brake-wheel, the rotary basket M, mounted upon the spindle and formed of a perforated shell or drum, with a bottom, *m'*, and cap m^2, the tapering hub m^3 on the bottom of the basket, the double wire-gauze sieve of different grades located against the perforated basket or drum for draining off the fluid, the ring-plate P, mounted upon standards that rise from the bed-plate, the radial arms of the ring-plate for supporting the casing N, that incloses the basket, the tubular bearing R, for the spindle, located centrally on the ring-plate, the springs R', located around a flange, *r*, on the ring-plate, and having their inner ends fitted in seats r^2, the bolts S, connected with a flange, *r'*, on the central bearing, R, by pairs of horizontal plates T, bolted at their ends on said flange *r'* and to the radial bolts S by means of vertical bolts *t*, the springs *t'*, located upon the vertical bolts between the flange of the central tubular bearing and the horizontal plates, that are bolted together in pairs, the nuts t^2, for clamping said plates upon the springs, and the cap-washers U on the horizontal bolts, and clamping the ends of springs R', said members being all constructed, relatively arranged, and organized as and for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHAS. G. JOHNSEN.

Witnesses:
J. CHABAND,
W. H. CHURCHILL.