(No Model.) 2 Sheets—Sheet 1.

G. C. ROBERTS.

CENTRIFUGAL MACHINE.

No. 386,788. Patented July 24, 1888.

Fig 1.

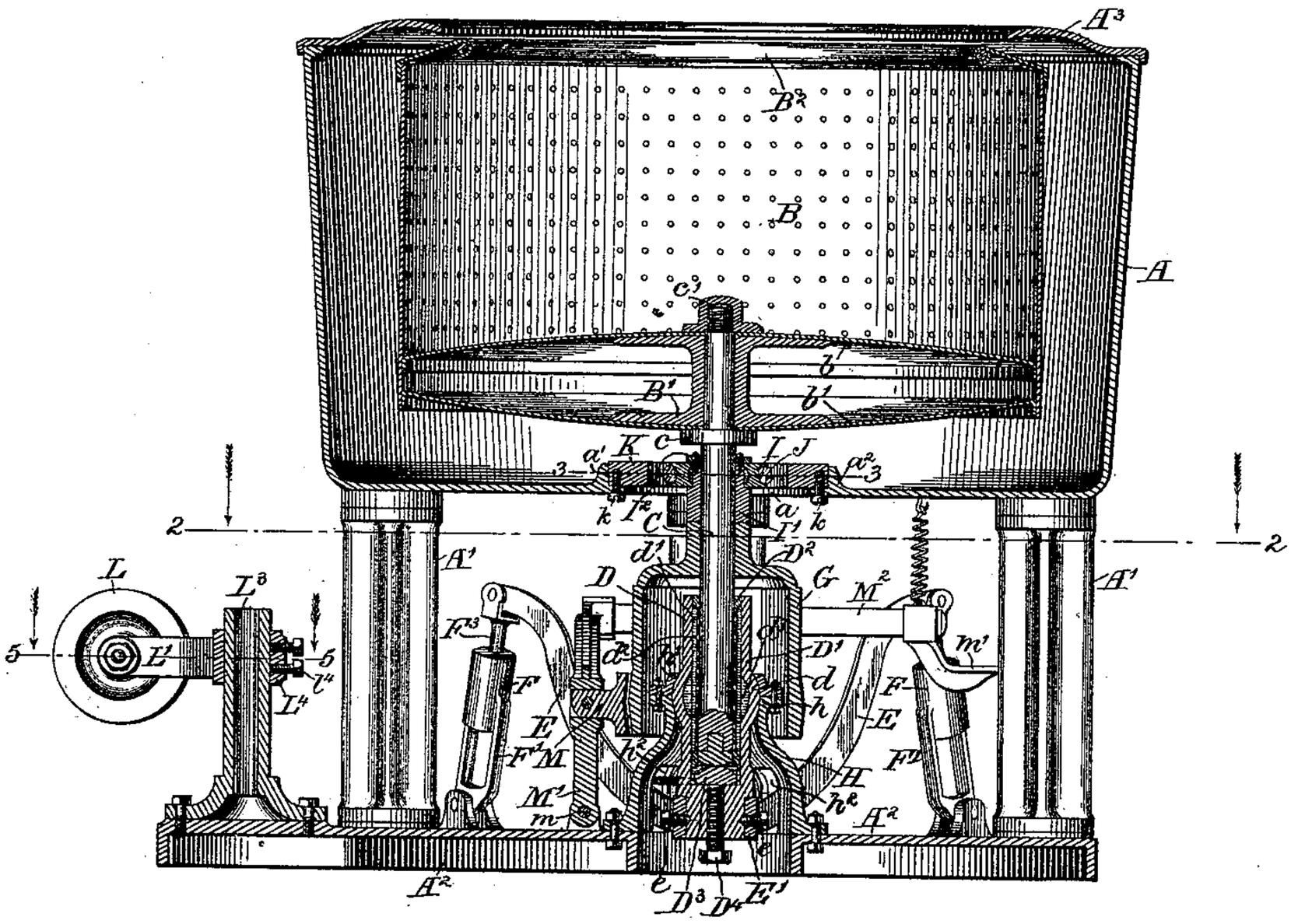
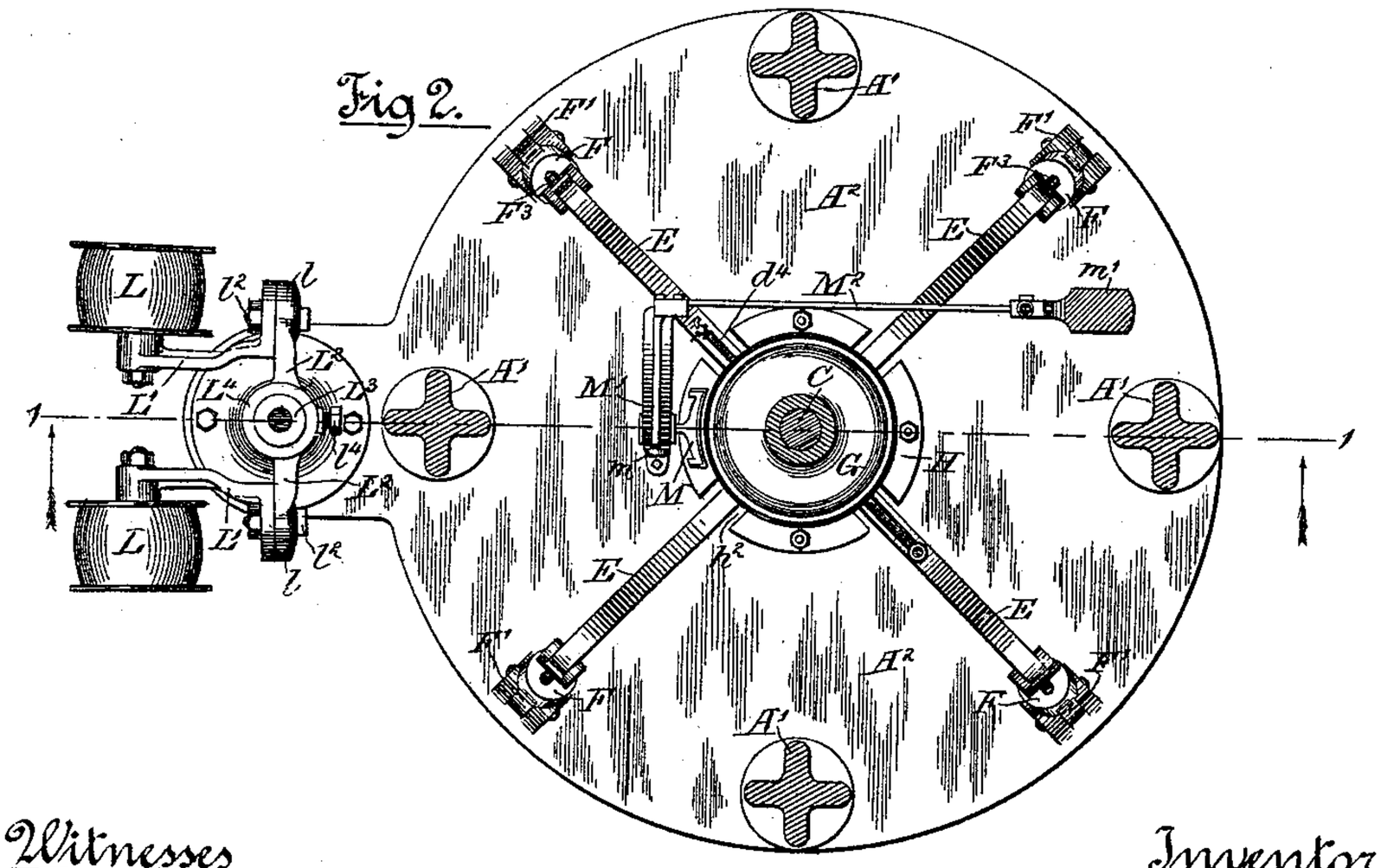


Fig 2.



Witnesses
Wm. F. Fleming.
Louis M. F. Whitehead

Inventor
George C. Roberts.
by Dayton, Poole & Brown
Attorneys.

(No Model.) 2 Sheets—Sheet 2.

G. C. ROBERTS.

CENTRIFUGAL MACHINE.

No. 386,788. Patented July 24, 1888.

Fig 3.

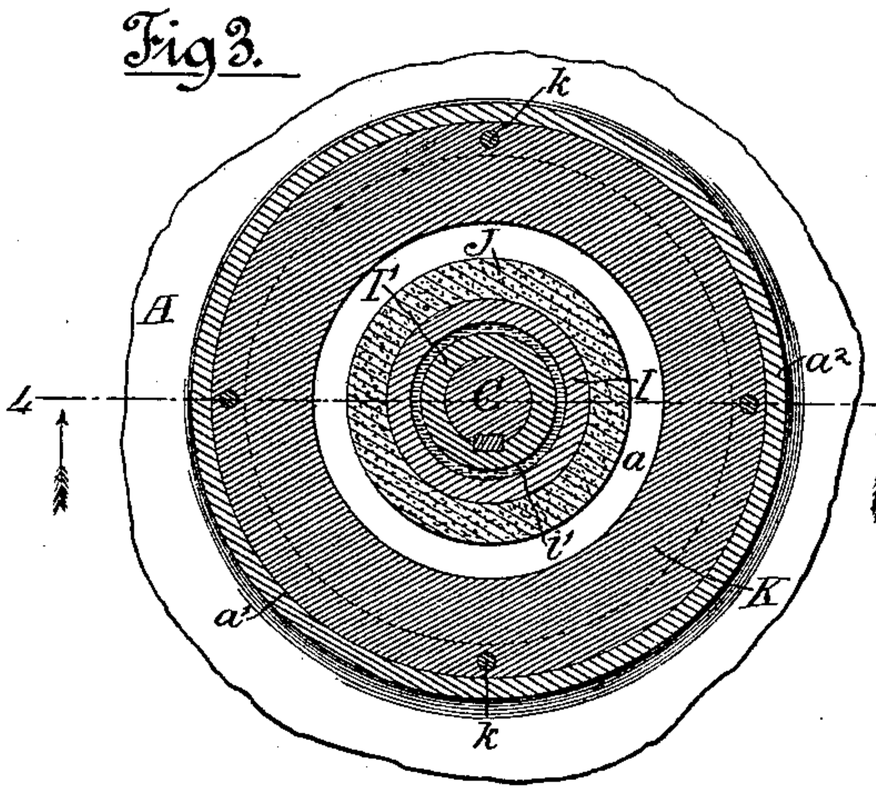


Fig 4.

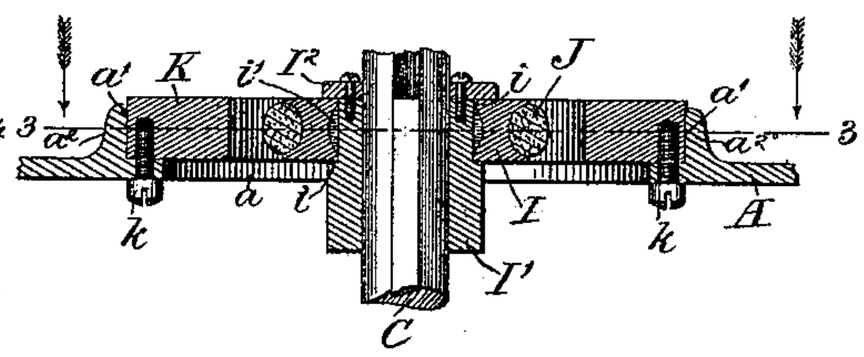
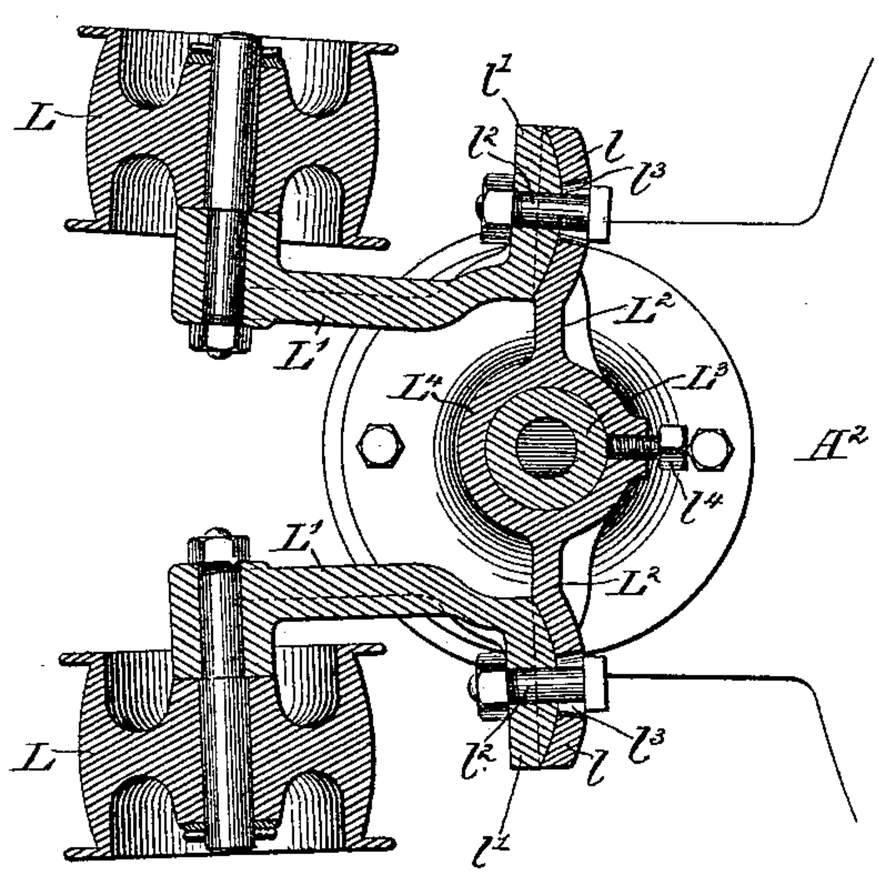


Fig 5.



Witnesses
Wm. F. Fleming
Louis M. Whitehead.

Inventor
George C. Roberts.
by Dayton, Poole & Brown
Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE C. ROBERTS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE TROY LAUNDRY MACHINERY COMPANY, OF TROY, NEW YORK.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 386,788, dated July 24, 1888.

Application filed March 29, 1888. Serial No. 268,854. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. ROBERTS, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Centrifugal Machines; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in centrifugal separators or apparatus employed for extracting by centrifugal action fluid from solid substances.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

My invention is herein shown as embodied in a machine intended more especially for use in laundries for the purpose of extracting water from clothing or other articles preparatory to drying the same.

In the accompanying drawings, illustrating my invention, Figure 1 is a central vertical section taken upon line 1 1 of Fig. 2 of an extractor embodying my invention. Fig. 2 is a sectional plan view of the extractor shown in Fig. 1, taken upon line 2 2 of said Fig. 1. Fig. 3 is an enlarged detail section taken upon line 3 3 of Figs. 1 and 4. Fig. 4 is an enlarged detail section of the parts shown in Fig. 3. Fig. 5 is an enlarged detail section taken upon line 5 5 of Fig. 1.

As illustrated in the said drawings, A is the stationary casing or shell of the machine, which is supported by means of standards A′ A′ from a bed-plate, A^2.

B is a revolving perforated cylinder located within the casing A, within which cylinder the articles from which the water is to be extracted are placed. Said perforated cylinder B is mounted upon the upper end of a vertical shaft, C, which passes through a central aperture, *a*, in the bottom of the receptacle A, and has bearing at its lower end in a long vertical bearing-box, D. This bearing-box is pivotally supported from or upon the bed-plate A^2, and is held in vertical position by means of a plurality of outwardly-extending rigid arms E E E, which are rigidly attached to the box and connected at their free ends with the bed-plate A^2 by means of spring-connections F F F. Said spring-connections are so adjusted as to hold the shaft C normally vertical, but are adapted to yield so as to allow the shaft and the cylinder carried thereon to seek and maintain an axis of rotation passing through the center of gravity of the cylinder and its load.

G is a driving-pulley affixed to the shaft C near its lower end, said pulley being made hollow and arranged to extend over or around the pivotal support of the shaft C, so that the bearing-surface of the pulley is brought centrally opposite the pivotal axis of the bearing D.

The pivotal connection between the bearing D and the machine-frame is formed by means of a ball-and-socket joint located between the ends of the bearing, which latter is constructed to extend both above and below the ball-and-socket joint. Said bearing D consists of a metal sleeve or box, D′, provided at its middle part with a spherical enlargement, *d*, the exterior surface of which is fitted within a correspondingly-shaped socket, *h*, formed in a tubular standard, H, which is bolted to the bed-plate A^2. The socket *h* is shown as provided with a removable cap, *h*′, to allow the insertion and removal of the bearing in and from the socket. The arms E E are rigidly attached to the lower end of the sleeve D′, said arms extending outwardly through lateral openings h^2 h^2 in the tubular standard H. Said arms are attached to the sleeve D′ by being made integral with a ring, E′, which ring is fitted over the cylindric lower end of the said sleeve and secured thereto by set-screws *e*, as herein shown, or by other securing device. This construction obviously affords a simple and convenient means of attaching the arms to the bearing-sleeve, enabling the parts to be readily connected in putting the machine together.

The bearing-box D′ is constructed in detail as follows: Said box D′ is made somewhat larger in its interior diameter than the exterior diameter of the lower end of the shaft, and within said box is placed a tubular lining, D^2, which will commonly be made of brass or other soft metal, such as is used for bearings. The lining D^2 is provided in its exterior surface with longitudinal grooves *d*′ *d*′ and con-

tains holes or perforations d^2 d^2, leading from said grooves inwardly to the bearing-surface of the sleeve. Within the spherical enlargement d the box D′ is provided with an oil recess or chamber, d^3, which communicates with the vertical passages formed by the grooves d' d', and the bearing-surfaces are supplied with oil from said recess through the perforations d^2 d^2 and said passages. The grooves d' d' terminate short of the ends of the sleeve D^2, so that the end portions of said sleeve fit tightly or make a close joint with the inner surface of the box.

D^3 is a step or bearing-block, which is fitted within the lower part of the bearing-box in the manner clearly shown in the drawings.

D^4 is a set-screw inserted through an axial hole in the lower part of the sleeve D′ and bearing against the under surface of said step or bearing-block D^3. By turning the set-screw the vertical position of the shaft may obviously be adjusted as desired.

d^4 is an oil-escape pipe, desirably inserted in the sleeve D′ in such manner as to communicate with the bottom of the recess within the sleeve below the lining d', as clearly shown in the drawings, Figs. 1 and 2.

The spring-connecting devices F, which unite the outer ends of the several arms E E E with the bed-plate A^2 of the machine, embrace metal yokes F′, which are pivoted at their lower ends to the bed-plate, and rods F^3, pivoted to the ends of the arms E, inserted through the top plates of the yokes and provided at their lower ends with disks, between which disks and the top of the yoke are located coiled springs. These parts are constructed in the same manner as shown and described in a prior application for patent, Serial No. 243,951, made by George N. Downs, July 11, 1887.

In the use of a machine of the character described, wherein the shaft passes through an opening in the bottom of the shell or casing A, it sometimes occurs that, by the breakage of parts or for some other reason, the cylinder and upper end of the shaft, when in rapid rotation, are thrown laterally, so as to bring the cylinder or shaft against the shell or the edge of the opening in the shell. An occurrence of this kind is liable to cause great injury to, if not the complete destruction of, the machine. To avoid liability of injury in case of an occurrence of this kind, I mount upon the shaft a freely-rotating ring, and I provide a stationary bearing-ring surrounding the rotating ring and located in such position that it will be engaged by the rotating ring in case the shaft is thrown laterally from its vertical position. Said rotating ring will usually turn with the shaft, but upon contact with the stationary ring the rotation of the ring upon the shaft will be arrested, while the shaft will turn in the said ring in the same manner as in an ordinary bearing. The said ring, which is mounted upon the shaft, is desirably provided with an external ring or collar, of rubber or some other soft or yielding material, forming a cushion to prevent jar when the parts come together.

As shown in the said drawings, and as more clearly seen in Figs. 3 and 4, I is a ring which is supported upon the shaft C by means of a hub, I′, secured to the shaft by means of a key, as shown, or otherwise, and having a groove or rabbet, i, at its upper end, affording a bearing for said ring. A separate cap, I^2, secured to the upper end of the collar, serves to hold the ring in place, and enables the same to be removed from its bearing when desired. The said ring I is desirably provided with a groove or annular depression, i', upon its inner cylindric bearing-face to lessen the area of the surfaces in frictional contact and to serve as a reservoir for a lubricant.

J is a ring, of rubber or other elastic material, placed around and projecting from the periphery of the ring I, said ring I being herein shown as grooved to receive the said elastic or flexible ring.

K is a stationary bearing-ring, which is herein shown as supported upon the bottom of the casing A and as placed around the margins of the opening a in the said casing. Said ring K is provided with an inner cylindric bearing-surface arranged opposite the ring I in position for contact with the latter when the shaft is moved sidewise. Said ring K is held in place upon the casing by being fitted in a rabbet, a', formed partially or entirely by a raised rib, a^2, upon the upper surface of the bottom of the casing adjacent to the opening a. The said ring K is further secured in place by means of screws k k, inserted through the bottom wall of the casing into the said ring, in the manner clearly shown in the drawings.

The cylinder B of the extractor is shown in the drawings as constructed in a manner heretofore well known, the bottom of said cylinder being formed by two convex plates, b b', secured to a flanged sleeve between a suitable collar or shoulder, c, and a nut, c', placed upon the upper threaded end of the shaft, serving to hold said sleeve B′ rigidly upon the shaft. Said cylinder B is provided at its upper edge with an inwardly-extending flange, B^2, while the outer casing, A, is provided with a similar flange, A^3, arranged in a manner heretofore well known in devices of this character.

L L, Figs. 1, 2, and 5, indicate two guide-pulleys for the driving-belt. Said guide-pulleys are mounted upon arms L′ L′, attached to a cross-bar, L^2, which is supported at its center by means of a vertical standard, L^3, bolted to the bed-plate A^2 of the machine. The pulleys are arranged horizontally opposite the main driving-pulley G, and the supporting-arms L′ L′ thereof are arranged horizontally and extend rearwardly from the cross-bar L^2, by which said arms are immediately supported. The said arms L′ are connected with the cross-bar L^2 by a connection embracing concave and

convex engaging-surfaces so arranged as to afford adjustment of the said arms L′, both horizontally and vertically, or, in other words, giving universal adjustment to the drive-pulleys. In the particular construction illustrated the bar L^2 is provided at its outer end with recessed or cup-shaped vertical plates $l\,l$, within which are fitted the convex surfaces of vertically-arranged plates $l'\ l'$ upon the arms L′ L′. The arms L′ L′ are adjustably held upon the cross-bar L^2 by means of bolts $l^2\ l^2$, inserted through said plates l', and through horizontally-elongated apertures l^3 in the concave plates $l\,l$. This construction obviously affords a greater latitude of adjustment horizontally than vertically, this being the direction in which change in the position of the pulleys is most likely to be required. Said slots $l^3\ l^3$ may, however, be made of sufficient width to give any desired amount of vertical adjustment in the pulleys. The said cross-bar L^2 is provided with a central ring, L^4, surrounding the cylindric standard L^3, a set-screw, l^4, being inserted through the said ring and bearing upon the standard for holding the supporting-arms rigidly in position. The said cylindric standard L^3 affords the desired vertical bodily adjustment of the pulleys and supporting-arms.

M is a brake-shoe arranged to act upon the belt-pulley G at the side of the latter nearest the guide-pulleys L L, so that said brake-shoe will not interfere with the belt and will act to thrust the pulley in the direction opposite to that in which it tends to move by the pull of the belt. Said brake-shoe is mounted upon a vertical lever, M′, pivoted at m to the base of the machine, and having a horizontal lever-arm, M^2, to the free end of which is attached a foot-piece, m', for operating the brake.

With relation to the features above described for limiting the lateral movement of the shaft, it will be entirely obvious that the same practical result will be obtained in a construction in which the bearing-ring K or its equivalent is sustained in position to engage the ring I otherwise than being attached directly to the shell or casing A. This part of the invention, as herein claimed, therefore, is not limited to a construction of said ring in which said ring is attached to or forms a part of said casing. The ring K, when supported upon the casing, may obviously be made integral with the same without departure from my invention.

I am aware that it has heretofore been proposed to employ in centrifugal extractors a rotating ring surrounding and free from the shaft of the extractor and adapted to be turned by the shaft when the latter comes in contact with the ring, as illustrated, for instance, in a prior patent, No. 389,555, granted to G. N. Downs, April 3, 1888. A revolving ring or collar mounted directly upon the shaft and adapted to engage a stationary ring when the shaft is inclined has the important advantage of being much more easily turned than a ring sustained at its outer edge, the prompt and free turning of the ring being esssential to the successful operation of the device, owing to the high speed at which the shaft is rotated. The construction in the ring herein described and claimed is much more simple than that shown in said prior patent, a ring which is sustained by bearings at its outer edge requiring anti-friction bearing-rollers in order to enable it to turn with sufficient freedom to be of any utility whatever.

I claim as my invention—

1. The combination, with the perforated revolving cylinder of a centrifugal extractor, a shaft supporting the same, a bearing for the shaft constructed to allow the inclination of the shaft, and an exterior shell or receptacle provided with an aperture in its bottom larger than the shaft for the passage of the latter, of a ring mounted upon the shaft and adapted to rotate freely thereon and a stationary ring in position for engagement with the ring upon the shaft when said shaft is inclined, substantially as described.

2. The combination, with the perforated revolving cylinder of a centrifugal extractor, a shaft supporting the same, a bearing for the shaft constructed to allow the inclination of the shaft, and an exterior shell or receptacle provided in its bottom with an aperture larger than the shaft, of a ring mounted to rotate freely upon the shaft, said ring being provided with a peripheral cushion, and a stationary ring sustained in position to engage the ring upon the shaft when said shaft is inclined, substantially as described.

3. In a centrifugal extractor, the combination, with the revolving cylinder and shaft, of a drive-pulley upon the shaft, a frame provided with a cylindric standard, L^3, and a horizontal bar, L^2, fitted to slide upon the standard, arms L′ L′, attached to the said horizontal bar, and guide-pulleys L^2, mounted upon the outer ends of said arms, the joints between said arms and the horizontal bar being formed with concave and convex surfaces having the form of spherical segments and affording universal angular adjustment of the said arms with relation to the bar, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

GEORGE C. ROBERTS.

Witnesses:

C. CLARENCE POOLE,

O. N. WILLIS.