

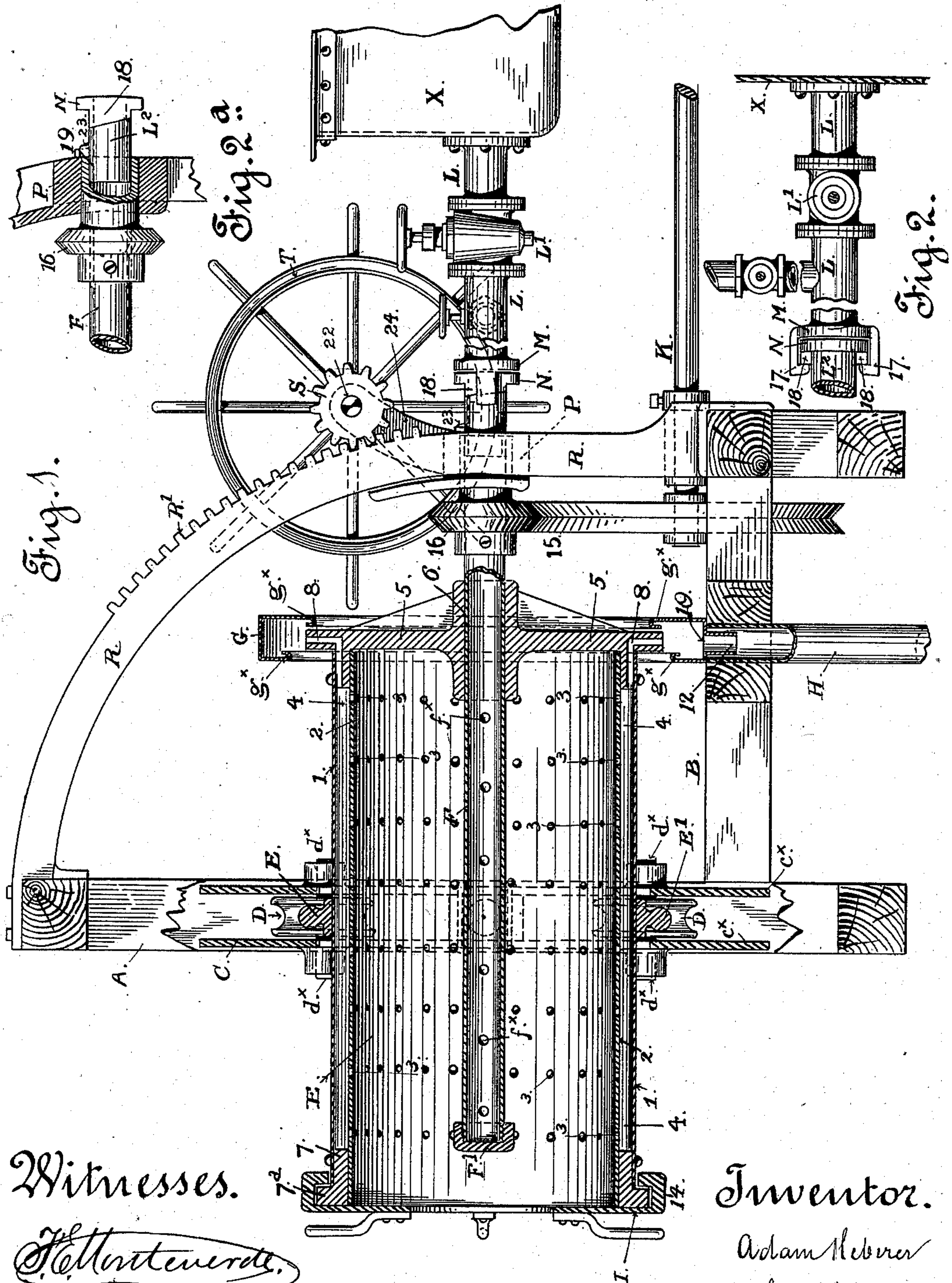
(No Model.)

2 Sheets—Sheet 1..

A. HEBERER.
CENTRIFUGAL MACHINE.

No. 559,059.

Patented Apr. 28, 1896.



Witnesses.

H. H. Braden

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Inventor.

Adam Heberer
By *Frank O. Osborn*
his atty.

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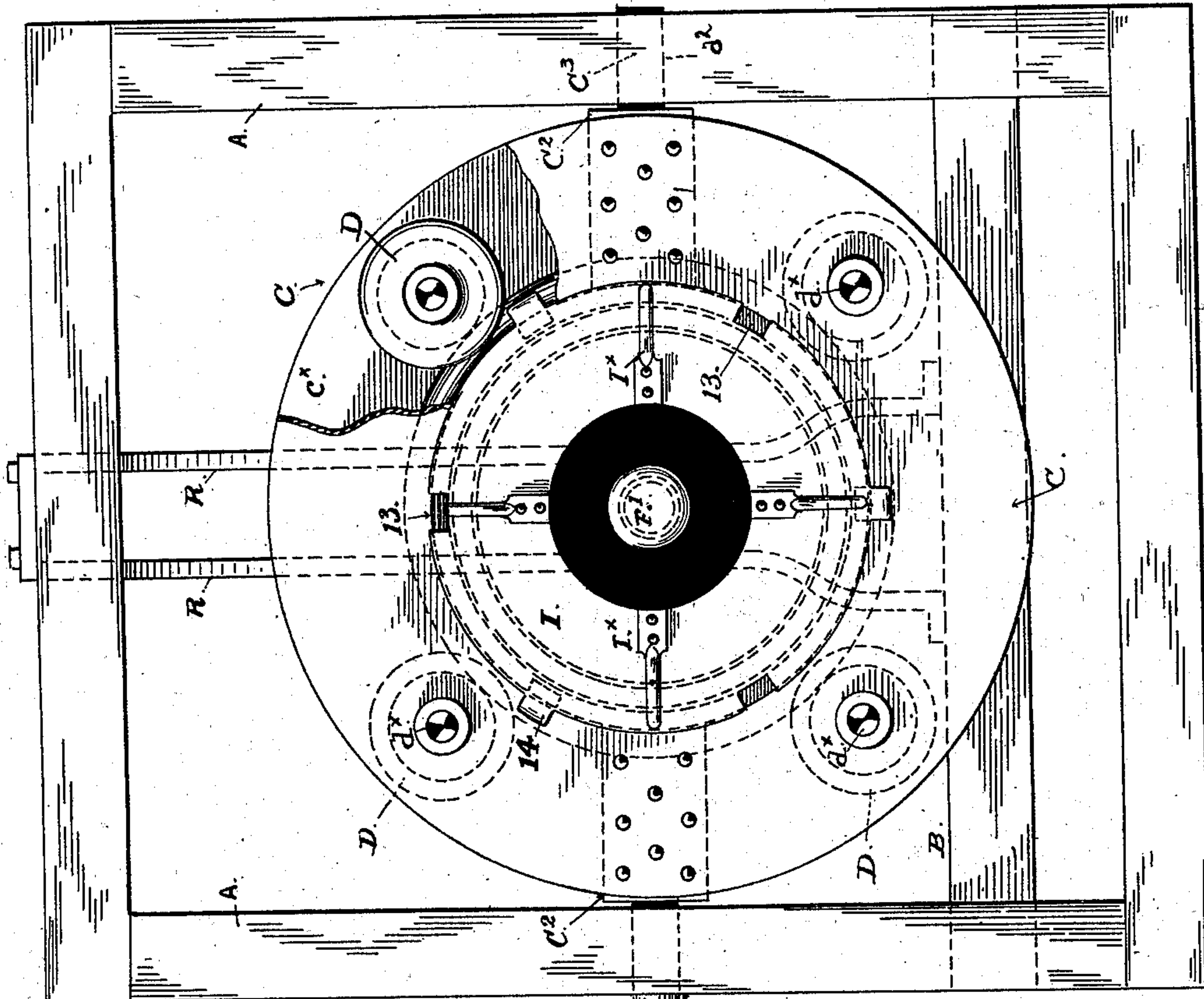


Fig. 3.

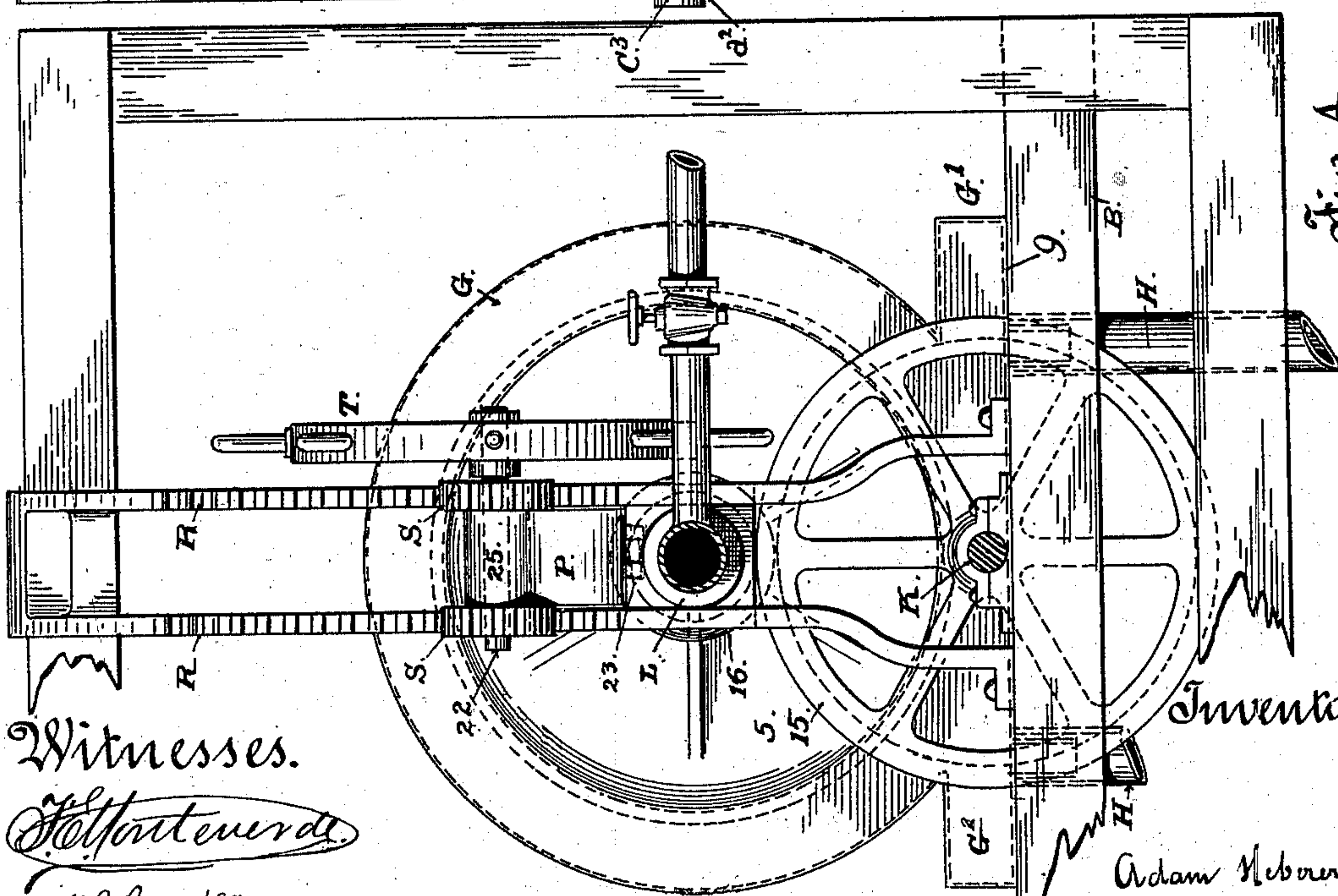


Fig. 4.

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By *Smith & Babson*
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UNITED STATES PATENT OFFICE.

ADAM HEBERER, OF ALAMEDA, CALIFORNIA.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 559,059, dated April 28, 1896.

Application filed September 16, 1895. Serial No. 562,709. (No model.)

To all whom it may concern:

Be it known that I, ADAM HEBERER, a citizen of the United States, residing in the city of Alameda, county of Alameda, and State of California, have invented certain new and useful Improvements in Centrifugal Sugar-Machines, of which the following is a specification.

My invention relates to improvements made in centrifugal machines for use in refineries and for the separation of liquids and solid matter and substances from each other in the various arts and manufactures.

The present improvements comprise a cylindrical separator mounted for rotation upon a horizontal axis and means combined therewith for tilting it at an angle to facilitate the removal of the solid matter or substances remaining at the end of its operation, and means for carrying away the liquid extracted during the operation, together with other parts and details of construction producing a simple, effective and rapidly-operating machine, as hereinafter more fully described, and pointed out in the claims.

The nature of the said improvements and the manner in which I proceed to construct a centrifugal machine for sugar-works in accordance therewith are fully explained and set forth in the following description, reference being had therein to the accompanying drawings, forming part of this specification.

Figure 1 is a side elevation of the machine, with the cylinder and parts of the framework shown in longitudinal section. Fig. 2 is a side view of the portion of the conducting-pipe through which the solution to be operated on is conveyed from the supply-tank into the cylinder, the interlocking ends of the two sections of pipe forming this conductor being here shown in top view. Fig. 2^a is a side view in detail showing the construction of that section of the conducting-pipe which is attached to the cylinder. Fig. 3 is a front elevation of the machine, taken from the left hand of Fig. 1. Fig. 4 is a rear elevation taken from the right hand of Fig. 1.

A A are the upright timbers, and B B horizontal timbers, of a suitable stiff frame to carry and support the working parts.

C indicates a circular frame or carriage, formed of two flat rings c^x , fastened together

at proper distance apart, and $C^2 C^2$ are blocks inserted between the plates on the same horizontal line at the middle of the carriage and fastened by bolts. On the ends of these blocks are trunnions $C^3 C^3$, for which bearings are provided in the sides of the stationary frame at $a^2 a^2$.

D D are flanged wheels with axles d^x set to run smoothly in boxes on the sides of the plates c^x at regular distances apart around the circle, and E is the centrifugal cylinder of which this frame or carriage is the principal support.

Two of the flanged wheels D are placed below and two above the line of the trunnions, and on these four wheels the cylinder is rotated by means of power applied at one end of the cylinder. The position at such time of operation is horizontal, but when at rest and during the cleaning out the cylinder is tilted by elevating one end. At such time the trunnions c^3 of the swinging frame or carriage form the center, the parts being so balanced and arranged that the cylinder swings readily on the center.

E' is a circular rail extending around the body of the cylinder and fastened to the outer surface to form a track for the wheels. The head or bearing portion of the rail is cylindrical in cross-section, and the rims of the wheels between the flanges are of corresponding shape to set over the rail, by which means the cylinder is confined in place in the frame or carriage and is kept from slipping through the opening when tilted at an angle.

The body of the cylinder is constructed of an outer closed non-perforated shell 1 and an inner shell 2, with perforations or apertures 3 3 all around the circumference. The two shells set one inside the other and are of different diameters, leaving an annular space 4 between the two shells. The ends of the cylinder are formed of flanged rims or heads, of which one is a closed head 5, having a central aperture 6 for a hollow shaft F, and the other is a ring 7, with a flange 7^a. Thus the cylinder is open to the outside at one end, but is closed at the other end, and the annular space is closed at both ends by the flanges or parts of the rims that set between the two shells. The rim at the closed end stands outward beyond the body of the cylinder and has pas-

sages 8 8, that run toward the center and thence longitudinally through the flange and open into the annular space. These passages form outlets for the liquid from the space 4 through the head to the outside, and the same are arranged at proper intervals apart all around the circumference.

G is a circular trough that surrounds and covers this rim of the cylinder-head to catch and carry away the liquid as it is discharged from the annular space through the passages before mentioned, and H H are conductors leading from below the trough to any distant point and connected with the trough by suitable couplings or means that allow the trough to be lifted with the cylinder as that end is raised and to be lowered into position when the cylinder is brought back to place in the frame. The construction and arrangement of this trough is well shown in Figs. 1 and 3 of the drawings. The general form of the trough is circular, but at the bottom it has a rectangular shape with a flat bottom 9, and the top and ends of this rectangular portion G' are closed in. There are outlets 10 in the bottom with surrounding rims or tubes 12, that extend downward and fit closely into the upper ends of the conductors H on the frame, thus connecting the trough with the stationary conductors. The sides of its circular portion inclose the rim of the cylinder-head and the edges are turned inward and bent over to form gutters or channels $g^x g^x$, that confine the liquid and prevent it from running down the sides of the trough and dripping upon the outside of the cylinder. One of the perpendicular sides being made shorter than the other side, as shown in Fig. 1, its edge g^x will clear the rim of the cylinder-head and allow the trough to be taken off the cylinder when it is necessary to reach the outlet-passages. The opposite end of the cylinder is closed in around the margin by a removable plate or cover I, having an open center and a flanged rim with locking-lugs 14, shaped to fit over and engage the rim of the cylinder-head, the rim being slotted, as shown at 13, Fig. 3, to let in the lugs behind the rim. When this cover is in place, the lugs are caused to engage the back of the rim, as shown in Fig. 1, by rotating the cover. For this purpose and for readily placing and taking off the cover it is provided with handles $I^x I^x$.

The hollow shaft E is fixed in the cylinder-head, and extending inwardly nearly the entire length of the cylinder it is connected at the outer end with a feed-pipe or supply-pipe, by means of which the solution to be operated on is fed into the cylinder. The shaft is perforated with holes f^x , and its inner end is closed by a cap F'. Power is applied to the part of the shaft outside in any suitable manner to rotate the cylinder. Usually this is done by means of gearing, and in the present construction the cylinder-shaft is connected by friction-gears 15 16 with a driven shaft K mounted on the stationary framework.

The manner of connecting the hollow shaft to and disconnecting it from the supply-pipe L will be understood by referring to Figs. 1, 2, and 2^a.

The stationary pipe L is connected with the outlet of a supply-tank X, and is provided with a gate L' for regulating the flow of the solution into the cylinder.

M is a flanged head on the outer end of the pipe L, and N is a head of corresponding form on the adjacent end of the hollow shaft, the faces of these two parts being fitted to form a close joint when brought together, being also finished with interlocking couplings that draw them together and produce a tight joint.

The form of coupling which I prefer to use is composed of the hooks 17 17 on the end of one part and the inclines or wedge-shaped faces 18 18 on the sides of the other part. This coupling is separated when the cylinder is tilted from that end, and is brought together and a tight joint formed when the cylinder is brought down again to the horizontal position.

In order to permit rotation of the hollow shaft, that portion between the driving-gears and the coupling before mentioned has a telescopic joint 19, one part of which carries the coupling on the outer end and is fitted to the end of the main portion of the shaft in suitable manner to secure a tight joint and at the same time allow the moving part to turn freely on the stationary part.

P is a bearing-block supporting the shaft L, and R R are fixed guide-rails between which the bearing-block is confined, and is fitted to slide up and down. The guide-rails are bent to a quadrant shape, with the outer edges struck from a center at the trunnions C³, and a rack R' is formed on each rail to engage pinions S S, mounted on the bearing-block P. The shaft 22 carrying the pinion is furnished with a long bearing 25 in a bracket 24 on the top of the block P, and a hand-wheel T is made fast on one end of the pinion-shaft for working the pinions. These parts form a simple and efficient means of moving the bearing-block in the fixed-quadrant to raise and lower the back end of the cylinder in the frame.

The joint on the hollow shaft is situated in the bearing-block, and the part L² is prevented from turning accidentally, whenever the bearing-block is raised and the parts of the coupling are separated, by providing lugs 23 23 or projections on the sides of the section of pipe and on the face of the bearing-block. A limited extent of longitudinal movement of this section at the joint 19 allows the faces of the couplings to be drawn up by the inclines and hooks, and thus secures a tight joint.

The machine thus constructed is especially adapted for sugar-works, but it can be used as well for separating liquid from solid matter and substances in other arts and manufactures where pressure is not required.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a centrifugal machine, a revoluble cylinder comprising an inner perforated shell surrounded by an outer solid shell and a clear annular space between the two shells, a permanently-fixed head at one end having in its rim channels that lead from the annular space outward to discharge-apertures in such rim, a removable annular head at the opposite end of the cylinder, the perforated pipe fixed in the permanent head of the cylinder extending axially through the cylinder-space closed at the inner end and adapted at the outer end for connection with a feed-pipe, means for applying power to said perforated pipe to rotate the cylinder, and supporting-rollers under the body of the cylinder to carry the same during its rotation.

2. In a centrifugal machine, a revoluble cylinder having an inner perforated shell and an annular space within its body; in combination with a fixed head on one end in which are channels or passages leading from the said annular space and discharging at the rim of such head, a circular trough surrounding said rim having a straight bottom portion, outlets in such bottom and stationary conducting-pipes connecting with such outlets, said trough being separable from said conductors to allow the cylinder to be tilted from the horizontal without separating the trough and the cylinder-head.

3. A cylinder for a centrifugal machine having a body formed of two concentric shells, inclosing a clear annular space for the full length of the body, the inner shell being perforated and the outer shell solid, a permanent head without openings on one end in which are conduits or passages that lead outward from the annular space and discharge at the rim, and a head partly covering the opposite end of the cylinder and consisting of the permanently-fixed ring having an outwardly-turned flange, the removable cover with a turned rim to engage the flange on the body and a central circular opening and means for locking said cover on the flange.

4. In a centrifugal machine, the combination with the horizontally-revoluble cylinder, of the stationary frame, the circular carriage mounted in said frame on trunnions and surrounding the cylinder-body, flanged wheels in said carriage, a circular rail on the cylinder-body to which said wheels are fitted, and means applied to one end of said cylinder to revolve the cylinder in its carriage and means applied to that end for tilting and for lowering the cylinder to horizontal position again.

5. The combination on a stationary frame of the revoluble cylinder the circular carriage mounted on horizontal trunnions surround-

ing the cylinder-body, flanged wheels on said carriage and the circular rail on the center of the cylinder-body, the stationary segmental racks, the sliding bearing-block, the spur-gears mounted in such block and the hand-wheel on the shaft of said gears, and a shaft fixed in the head of the cylinder and having a bearing in said block and means for applying power to said shaft to revolve the cylinder.

6. A centrifugal separator comprising a horizontal cylinder, a circular carriage mounted on trunnions in a stationary frame and surrounding the body of the cylinder, the trunnion of said carriage being located on the horizontal diameter of the cylinder, the flanged rollers on said carriage and a circular rail on the cylinder-body fitted to said rollers, the perforated pipe fixed in the head of the cylinder forming both a feed-pipe for the syrup and a shaft to revolve the cylinder, the stationary racks having toothed portions concentric with the carriage-trunnions, the sliding bearing-block for the outer end of the hollow shaft between said segments, a stationary supply-pipe from a tank or source of supply provided with a coupling on the end adjacent to and in line with the end of the hollow shaft and the non-rotating pipe-section having one end joined to the hollow shaft in the bearing-block and provided with a coupling on the opposite end to connect it with the end of the stationary supply-pipe.

7. A centrifugal machine, comprising a horizontally-revoluble cylinder formed of an inner perforated shell and an outer solid shell separated by a clear annular space between them, a permanent head closing one end, a removable head on the opposite end having a circular opening in the center, a perforated pipe fixed in the center of the cylinder-space and extending through the permanent head to the outside, a circular carriage having trunnions coinciding with the horizontal diameter of the cylinder midway between the ends of the cylinder and flanged wheel in said carriage adapted to take a fixed circular rail on the cylinder-body, means connecting the hollow shaft outside the cylinder with power to revolve the cylinder, and means for connecting said hollow shaft with, and disconnecting it from a stationary supply-pipe whereby the cylinder is capable of being tilted at an angle to discharge the solid material at the end of the operation by disconnecting it from the stationary supply-pipe and is charged through its hollow shaft after it is restored to horizontal position.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

ADAM HEBERER. [L. S.]

Witnesses:

EDWARD E. OSBORN,
CHAS. E. KELLY.