

No. 813,282.

PATENTED FEB. 20, 1906.

E. H. DUTCHER.  
CENTRIFUGAL MACHINE.  
APPLICATION FILED JULY 3, 1905.

3 SHEETS—SHEET 1.

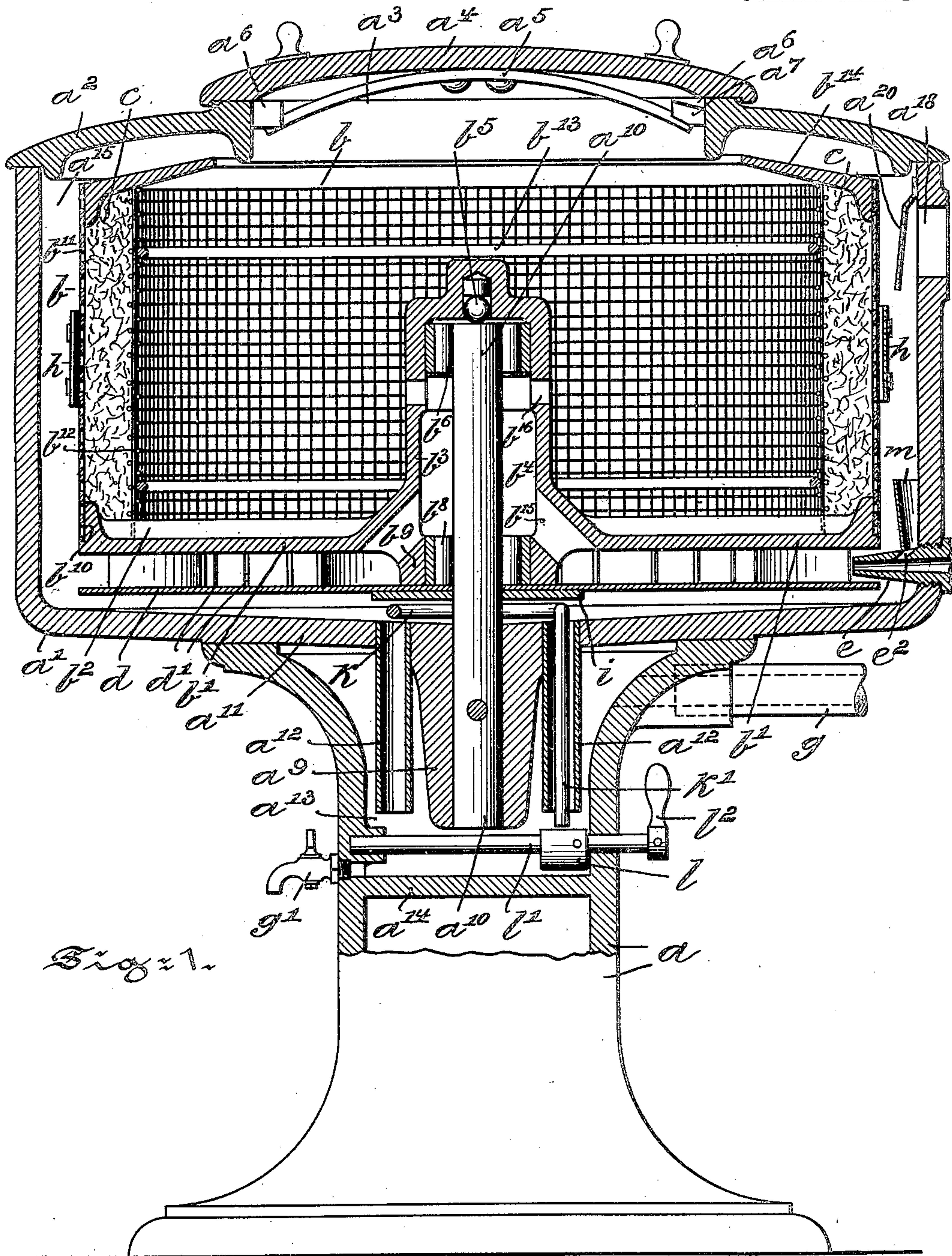


Fig. 1.

Witnesses:  
Wilhelm Vogt  
Thomas M. Smith.

Inventor:  
Edward H. Dutcher,  
By *Walter Douglas*  
Attorney.

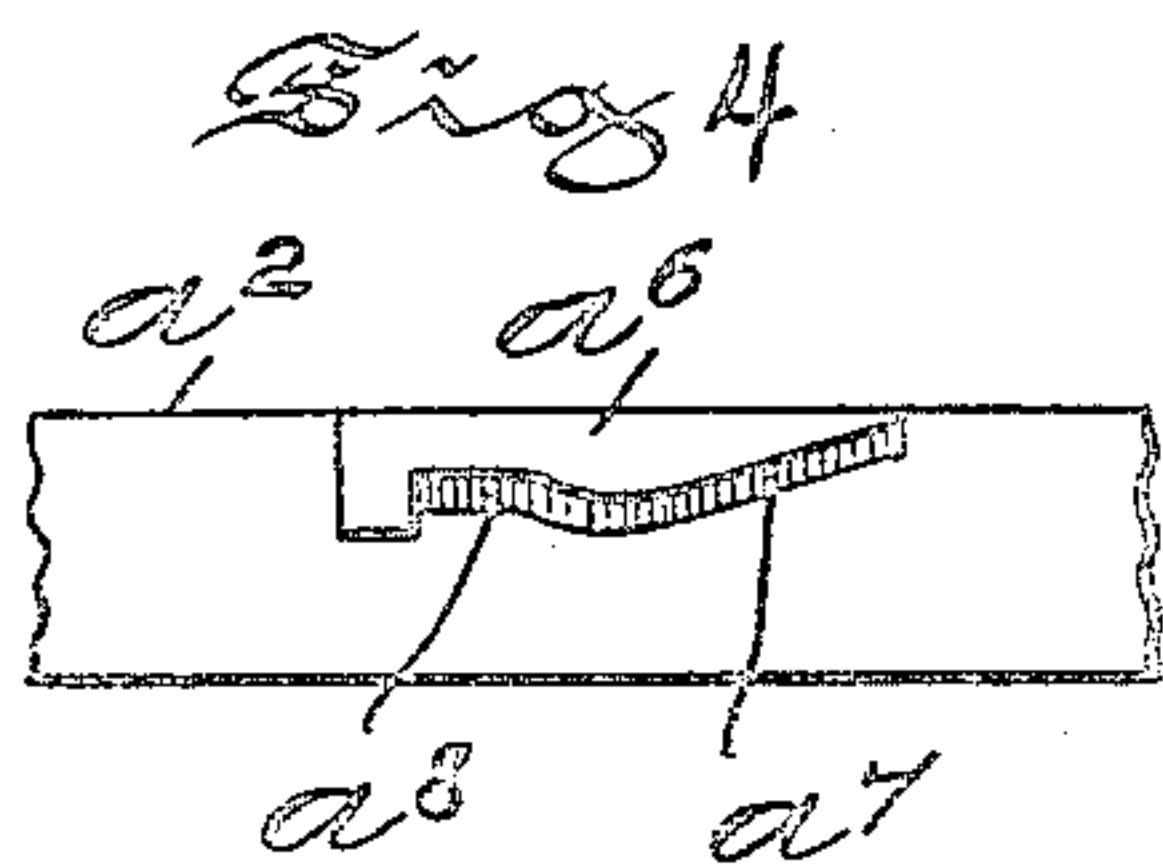
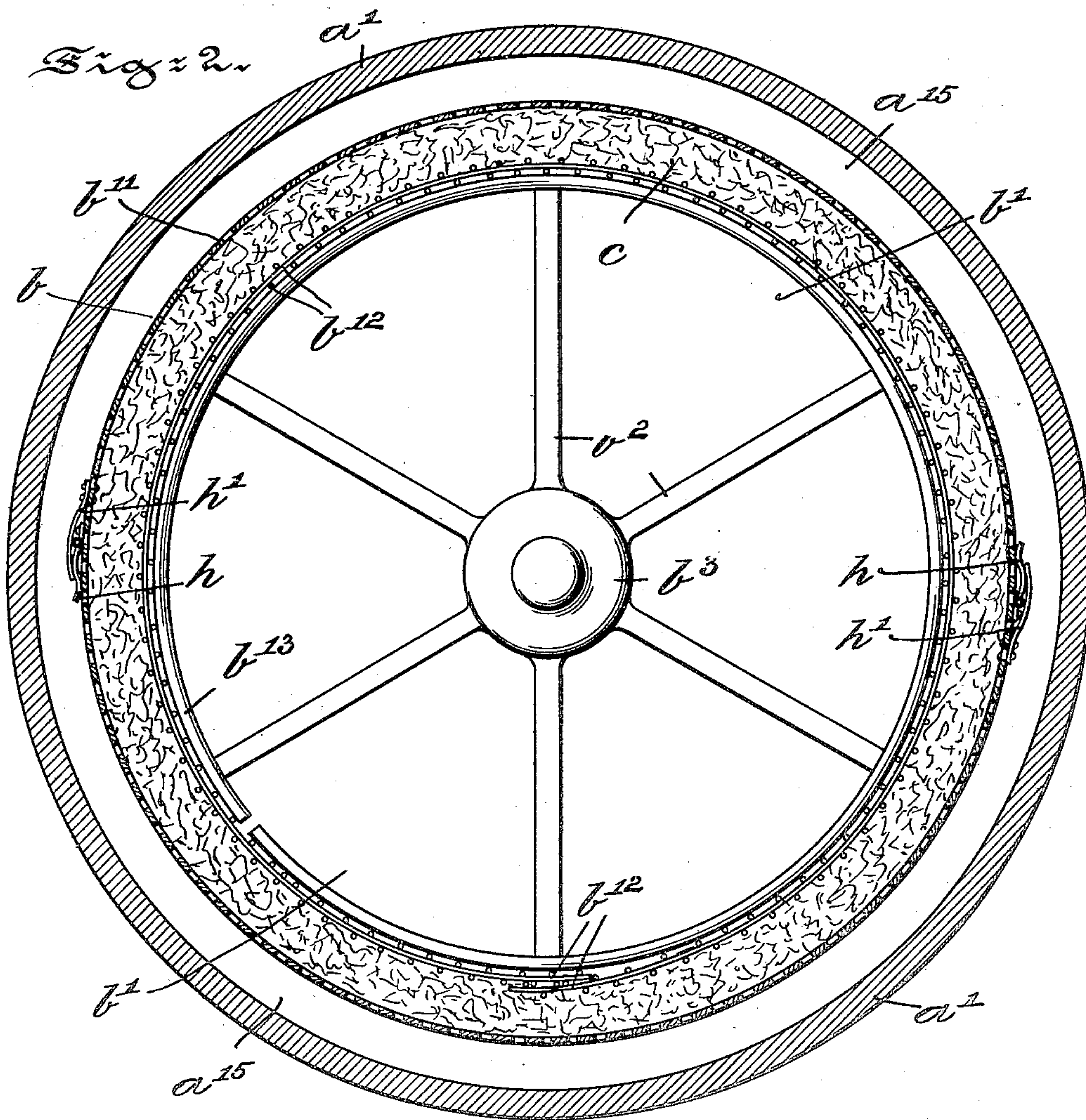


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3 SHEETS—SHEET 2.



Witnesses:  
Wilhelm Vogt  
Thomas M. Smith.

Inventor:  
Edward H. Dutcher,  
by J. Walter Douglas  
Attorney.

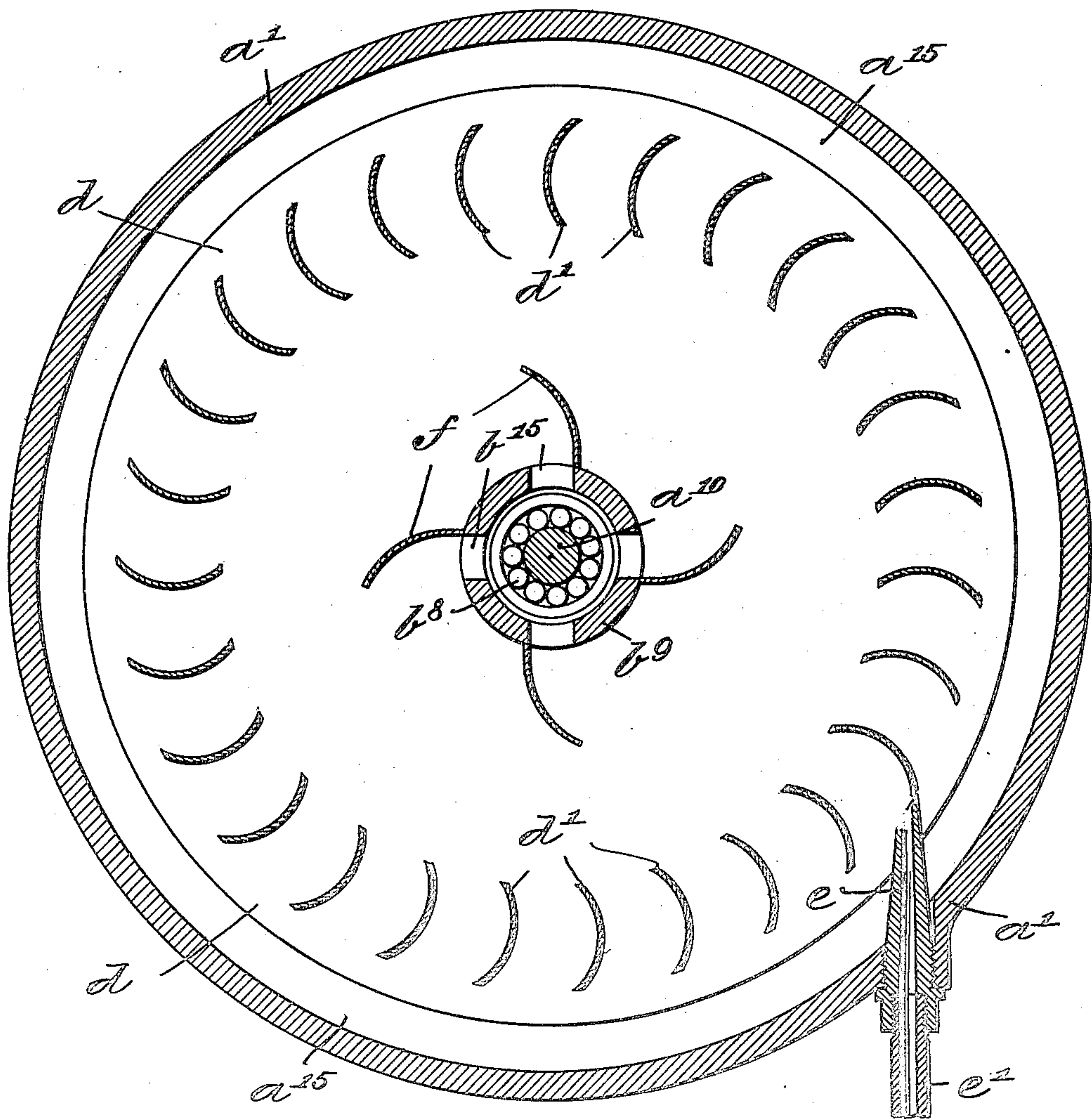
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3 SHEETS—SHEET 3.

சுருதி.



289<sup>th</sup> Successor:  
 Wilhelm Vogt  
 Thomas M. Smith

Worcester  
 Edward H. Butler,  
 Esq. J. Walter Hughes  
 & Co.



# UNITED STATES PATENT OFFICE.

EDWARD H. DUTCHER, OF SIEGFRIED, PENNSYLVANIA, ASSIGNOR, BY  
DIRECT AND MESNE ASSIGNMENTS, TO LEHIGH OIL AND WASTE  
SAVING COMPANY, OF CAMDEN, NEW JERSEY, A CORPORATION OF  
NEW JERSEY.

## CENTRIFUGAL MACHINE.

No. 813,282.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed July 3, 1905. Serial No. 268,105.

*To all whom it may concern:*

Be it known that I, EDWARD H. DUTCHER, a citizen of the United States, residing at Siegfried, in the county of Lehigh and State of Pennsylvania, have invented certain new and useful Improvements in Centrifugal Oil Extracting and Filtering Machines, of which the following is a specification.

My invention has relation to a centrifugal oil extracting and filtering machine, and in such connection it relates more particularly to the construction and arrangement of such a machine.

The nature and scope of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming part hereof, in which—

Figure 1 is a view, partly in front elevation and partly in vertical central section, of the centrifugal oil extracting and filtering machine and illustrating the receptacle for the oily material, the manner of holding the filtering material in position therein, and the means for supporting and rotating the same within a stationary housing. Fig. 2 is a horizontal sectional view of the upper portion of the housing of the machine of Fig. 1 and a receptacle for oily material arranged therein and also illustrating the construction of the side walls of the receptacle formed of filtering material and of perforated and loose wire-netting walls. Fig. 3 is a horizontal sectional view of the lower portion of the housing of the machine of Fig. 1, illustrating a turbine connected with the receptacle and the steam-inlet nozzle connected with the housing and blades arranged opposite openings in the lower end of the receptacle, forming an exhaust-fan adapted to force the steam ejected from the turbine-blades into and through the receptacle and the oily material therein; and Fig. 4 is a detail view illustrating in side elevation a projection of the housing serving as a catch for a spring for locking the lid to the housing.

Referring to the drawings,  $a$  is the standard of the machine, to the upper end of which is suitably secured a housing  $a'$ , annular in cross-section, having a cover  $a^2$  provided with an opening  $a^3$ . This opening is normally closed by a lid  $a^4$ , which by means of a leaf-spring  $a^5$ , secured to the under side of the lid  $a^4$ , is removably connected with the housing

$a'$  by engaging projections  $a^6$  thereof, as shown in Fig. 1. However, the cover  $a^2$  may be dispensed with, and the lid  $a^4$  may be directly connected with the housing  $a'$ . As shown in Fig. 4, each of the projections  $a^6$  is provided with an inclined surface  $a^7$ , which guides the spring  $a^5$  into a depression  $a^8$ , serving as a lock for the spring  $a^5$ , which prevents a ready unlocking of the same from the projections  $a^6$ . The housing  $a'$  is provided with a centrally-arranged projection  $a^9$ , extending into the standard  $a$ , which serves as a support for a shaft  $a^{10}$ . The shaft  $a^{10}$ , within the housing  $a'$ , serves as a support for a basket or receptacle  $b$ , adapted to receive material more or less saturated with oil, which is to be extracted therefrom. The material, consisting of cotton-waste or other fibrous material, rags, wood shavings, sawdust, and the like, is introduced into the receptacle  $b$  by removing the lid  $a^4$ , closing the opening  $a^3$ , and then replacing the same on the cover  $a^2$ .

The basket or receptacle  $b$  preferably consists of an annular disk or bottom plate  $b'$ , strengthened by ribs  $b^2$ , having a central upwardly-projecting portion  $b^3$ , forming a chamber  $b^4$ , and a support for a ball-bearing  $b^5$ , centrally engaging the upper surface of the shaft  $a^{10}$  and of a roller-bearing  $b^6$ , surrounding the shaft adjacent to the ball-bearing  $b^5$ . These bearings in conjunction with a roller-bearing  $b^8$ , arranged in an extension  $b^9$  of the projection  $b^3$ , serve to support the plate  $b'$  on the shaft  $a^{10}$  and to permit of an easy turning of the same thereon. The plate  $b'$  adjacent to its perimeter is provided with a flange  $b^{10}$ , which holds a perforated cylinder  $b^{11}$ , carried by the plate  $b'$  in its proper position. In addition to the perforated cylinder  $b^{11}$  the plate  $b'$  is provided with a second cylinder  $b^{12}$ , preferably formed of coarse-meshed wire-netting, which in conjunction with the cylinder  $b^{11}$  forms an annular chamber for the reception of a suitable filtering material  $c$ , as shown in Figs. 1 and 2. The wire-netting forming an inner side wall  $b^{12}$  is preferably held in position by annular springs  $b^{13}$ , which tend to force the same against the filter material  $c$ , and which springs when disengaged therefrom permit of a ready removal of the inner wall  $b^{12}$  and of the replacing of the filter material  $c$ , as the wall is in no way connected with the plate  $b'$ . At its upper end the per-



forated outer wall  $b^{11}$  is provided with an annular flange  $b^{14}$ , extending over the filtering material  $c$  and projecting a certain distance over the basket or receptacle  $b$ , formed by the bottom plate  $b'$ , side walls  $b^{11}$  and  $b^{12}$ , and filtering material  $c$ . In this receptacle is placed the material from which oil is to be extracted, and the projecting flange  $b^{14}$  serves to hold this material in the receptacle when the same is forced against the inner wall  $b^{12}$  by the rapid rotation of the receptacle  $b$ . The inner wall  $b^{12}$  under the influence of centrifugal force and the pressure exerted thereon by the material from which oil is to be extracted is forced against the outer perforated wall  $b^{11}$ . The filter material  $c$ , placed between the outer and inner yielding walls, is thus compressed and securely held in position between the walls  $b^{11}$  and  $b^{12}$ . As shown in Figs. 1 and 3, below the bottom plate  $b'$  and secured to the extension  $b^9$  of the projection  $b^3$  is arranged an annular disk  $d$ , which is provided adjacent to its outer periphery with curved blades  $d'$ , radially arranged with respect to the shaft  $a^{10}$ . This disk  $d$ , in conjunction with a nozzle  $e$ , arranged tangentially with respect to the blades  $d'$  in the wall of the housing  $a'$ , forms a turbine, and the motive power is furnished by steam introduced into the nozzle  $e$  by means of a pipe  $e'$  from any suitable generator. (Not shown.) The jet of steam issuing from the nozzle  $e'$  and impinging against the blades  $d'$  sets the disks  $d$  and the receptacle  $c$  in rapid rotation, and by the same and the centrifugal force all the oil in the material placed in the receptacle  $b$ , as well as the impurities and other extraneous matter in the same, is liberated therefrom and forced into the filtering material  $c$  by readily passing through the inner wall  $b^{12}$ . The filtering material  $c$ , however, arrests all these impurities, not alone of the oil extracted from the waste material, but also those formerly held by the oily material, and only permits the extracted oil to pass therethrough. The oil when finally leaving the filtering material  $c$  and passing through the openings in the outer wall  $b^{11}$  is in a thoroughly-purified state, ready again for use. Owing to the centrifugal force, this oil is forced through the chamber  $a^{15}$ , formed between the receptacle  $b$  and the housing  $a'$  and against the inner wall of the same and by flowing downward thereon is finally conducted by the inclined bottom  $a^{11}$  of the housing  $a'$  and tubes  $a^{12}$ , arranged therein, into a settling-chamber  $a^{13}$ , formed in the standard  $a$  by a partition-wall  $a^{14}$ , as shown in Figs. 1 and 4.

In addition to rotating the receptacle  $b$  the steam is also utilized to heat the oily material and to thin the oil therein, and thus facilitate the removal and extraction of the oil from the oily material. The steam also tends to loosen the filter material  $c$  by passing

through the same. This causes a sagging of the filter material and as a result an improper filtering of the oil passing there-through. This objectionable feature is, however, eliminated in one instance by the springs  $b^{13}$  forcing the wire-netting against the filter material during the standstill of the machine and in the other instance by the centrifugal force assisting the springs  $b^{13}$  in their action when the machine is actuated.

In order to conduct the steam into the receptacle  $b$  and to force the same through the oily material therein, the extension  $b^9$  is provided with curved blades  $f$ , forming an exhaust-fan, which during the rotation of the receptacle  $b$  conducts the steam leaving the turbine-blades  $d'$  through openings  $b^{15}$ , arranged in the plate  $b'$ , into the chamber  $b^4$  of the projection  $b^3$  and from the same, by means of openings  $b^{16}$ , into the interior of the receptacle  $b$ . The steam by passing beneath the plate  $b'$  and through its projection  $b^3$  heats the bottom and central portion of the receptacle  $b$ , and thereby the oily material therein, and by forcing its way therethrough further heats the same and thins the oil. By the thinning of the oil a more speedy and complete extraction is made possible. Furthermore, dirt and extraneous matter clinging to the waste material is loosened, and its removal by centrifugal force is facilitated. The steam finally leaves the receptacle  $a'$  through the opening formed by the flange  $b^{14}$  and passes into the chamber  $a^{15}$ , from which the same escapes through an opening  $a^{18}$ , arranged in the housing  $a'$ . As shown in Fig. 1, this opening  $a^{18}$  is covered by a guard-plate  $a^{20}$ , which prevents oil from passing through the same. A certain portion of the steam by being brought in direct contact with the oily material is condensed therein, and the water so formed, in conjunction with the oil, is forced through the filtering material into the housing  $a'$  and flows from thence into the settling-chamber  $a^{13}$  by means of the pipes  $a^{12}$ . The oil, being of less specific gravity than the water, will readily separate therefrom in the chamber  $a^{13}$  and by means of the pipe  $g$  will be conducted from the same. A drain-cock  $g'$ , arranged in alinement with the partition-wall  $a^{14}$ , permits of the draining of the accumulated water from the chamber  $a^{13}$ , as shown in Fig. 1. The oily material in the receptacle  $b$  after having been thus treated is left therein thoroughly clean and ready for further use, as oil, dirt, and other extraneous matter have been completely removed therefrom. The receptacle  $b$  is provided with automatic brakes, each consisting of a wing  $h$ , pivotally secured to the perforated side wall  $b^{11}$  and held in engagement therewith by leaf-springs  $h'$ , as shown in Figs. 1 and 2.

Beneath the turbine-disk  $d$  and secured thereto is arranged a plate  $i$ , surrounding the shaft  $a^{10}$ . Opposite the disk  $i$  is arranged a



ring  $k$ , having a projection  $k'$ , preferably passing through one of the pipes  $a^{12}$  and terminating above a cam  $l$ , carried by a shaft  $l'$ , supported by the standard  $a$ . When the shaft  $l'$  is turned by means of a handle  $l^2$ , the cam  $l$  is brought into engagement with the projection  $k'$ , which by raising the ring  $k$  forces the same against the plate  $i$ , and thus retards and finally stops the rotation of the receptacle  $b$ .

As shown in Fig. 1, the nozzle  $e$  is provided with an opening  $e^2$ , into which by means of a receptacle  $m$ , preferably formed integral with the housing  $a'$ , a certain portion of the extracted and filtered oil is collected by flowing into the receptacle  $m$  and is conducted into the steam passing through the nozzle  $e$ , which vaporizes and carries the same in this state into the chamber  $b^4$  of the receptacle  $b$  and into the ball-and-roller bearings  $b^5$ ,  $b^6$ , and  $b^8$ , arranged therein. Thus the bearings are continuously lubricated during the rotation of the receptacle  $b$ , and all the moving parts are coated with oil, which renders the same rust-proof.

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

1. In a centrifugal oil extracting and filter-

ing machine, a housing and a receptacle for an oil-containing material having a bottom plate with a fixed outer wall and an expandible and contractible inner wall, said inner and outer walls forming a chamber, wherein filter material is adapted to be placed, spring-acting means adapted to hold said inner wall in required varying positions with respect to said filter material and the latter with said outer wall, and means for rotating said receptacle.

2. In a centrifugal oil extracting and filtering machine, a stationary housing and a receptacle for an oil-containing material having a bottom plate with a fixed perforated outer wall and a movable perforated inner wall, said inner and outer walls forming a chamber, wherein filter material is adapted to be placed, springs adapted to engage said inner wall so as to force the wall against said filter material and the latter against the outer wall and means for rotating said receptacle.

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

EDWARD H. DUTCHER.

Witnesses:

ROBT. L. COPE,

ROBERT M. CORTRIGHT.