

No. 787,950.

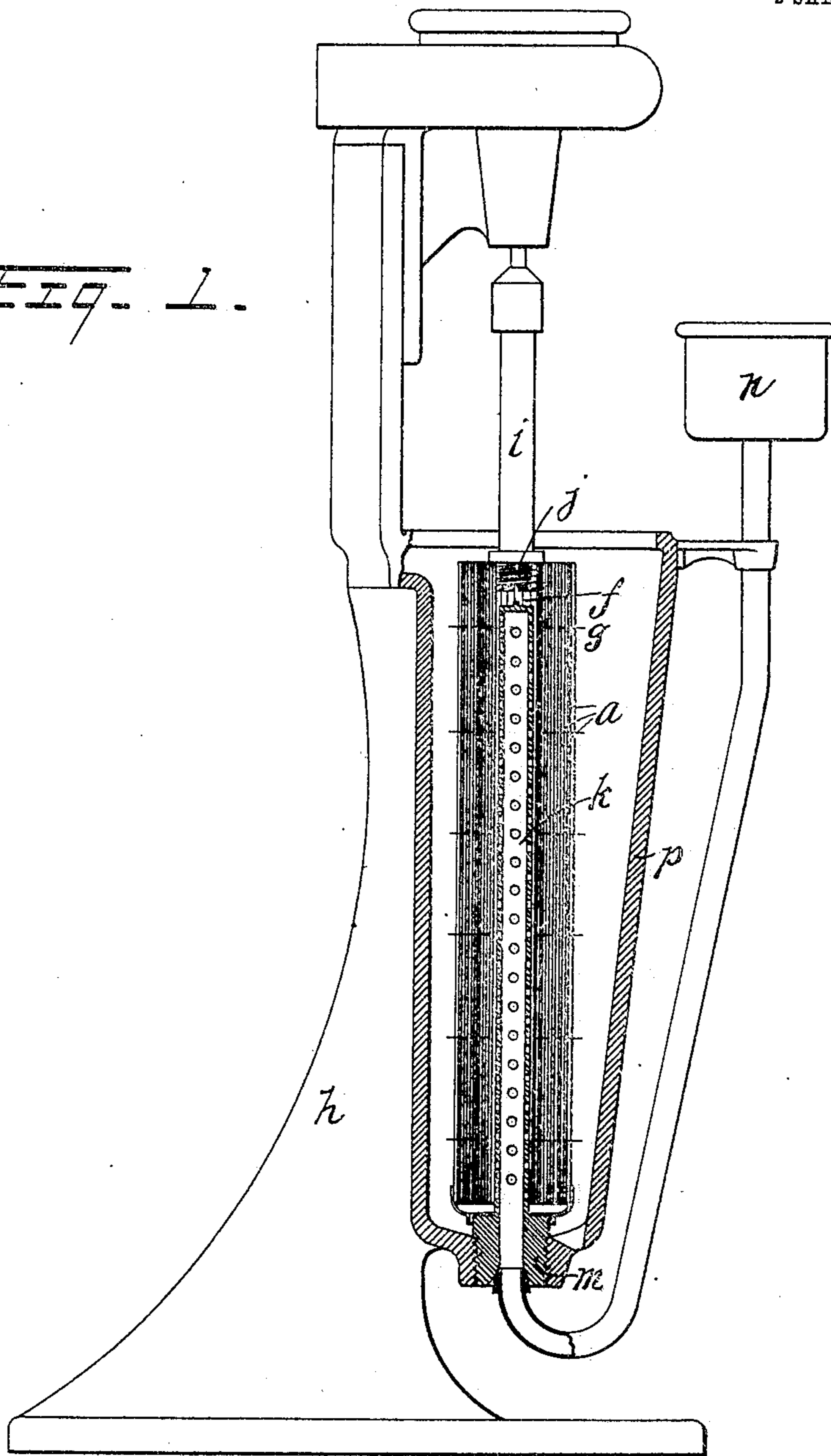
PATENTED APR. 25, 1905.

D. T. SHARPLES.
DIVISION DEVICE FOR CENTRIFUGAL SEPARATORS AND MEANS FOR
CLEANING SAME.

APPLICATION FILED DEC. 26, 1902.

2 SHEETS—SHEET 1.

FIG. 1.



Witnesses
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David T. Sharples Inventor

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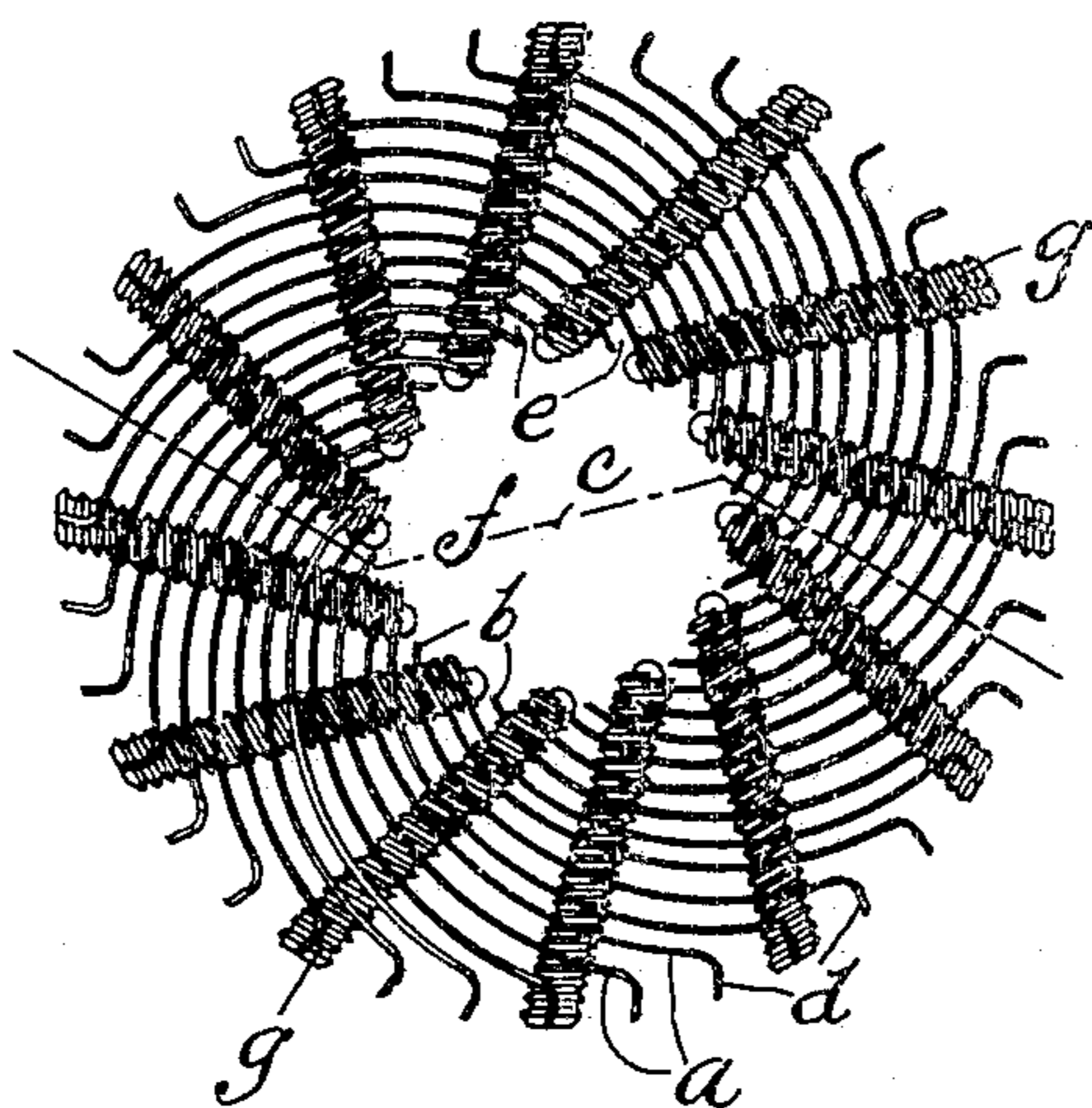
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2 SHEETS—SHEET 2.

FIG. 2.



Witnesses
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UNITED STATES PATENT OFFICE.

DAVID TOWNSEND SHARPLES, OF WESTCHESTER, PENNSYLVANIA.

DIVISION DEVICE FOR CENTRIFUGAL SEPARATORS AND MEANS FOR CLEANING SAME.

SPECIFICATION forming part of Letters Patent No. 787,950, dated April 25, 1905.

Application filed December 26, 1902. Serial No. 136,598.

To all whom it may concern:

Be it known that I, DAVID TOWNSEND SHARPLES, a citizen of the United States of America, and a resident of Westchester, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements in Division Devices for Centrifugal Separators and Means for Cleaning Same, of which the following is a specification.

My invention relates to centrifugal liquid-separators; and my main objects are, first, to provide improved means for facilitating the separation of the different constituents, and, second, to provide for conveniently and effectively cleansing the same when required.

It is well known that the division of the mass of liquid which is being subjected to centrifugal action into layers or strata extending across the radial lines of the vessel greatly facilitates the separation and gathering of the constituent parts of the liquid, the movements of which latter are respectively toward and away from the center of rotation, due to their different atomic weights, and such division of the mass of liquid is commonly effected by means of variously formed and arranged division plates or partitions placed within the vessel. However, while such division devices have been effective in facilitating the separation of the compound liquid, as stated, their use commonly involves disadvantages and difficulties which at least largely offset the benefit desired. The importance of absolute cleanliness of all parts of the mechanism brought in contact with the liquid to be operated upon (as milk) is well understood, and the increased labor naturally incident to the cleaning of the greatly-increased contacting surface necessarily presented by such devices is evident. To permit of ready access to all points for thorough cleansing, the plates have heretofore been commonly made separable and grouped in various ways within the vessel during the operation of the latter. This separable construction, however, not only necessitates the considerable labor of separately handling each plate and generally the taking apart and proper re-

constructing of the group, but also involves the likelihood of accidentally damaging or somewhat changing the form of one or more of the plates, thus greatly increasing the difficulty, which exists even without such mistreatment, of so grouping the reconstructed series within the vessel as to not only insure their firm retention in position therein, but also to maintain the nice distribution of weight which is essential to the exact balancing of the rotary mechanism and without which its operation is both unsatisfactory and dangerous.

The purpose of my invention is to provide for securing the undoubted benefit of dividing the mass of rotating liquid as described without incurring the disadvantages and difficulties mentioned as heretofore incident to such construction.

To this end it consists, essentially, first, in providing an independently-rigid plate structure forming a single part of the mechanism instead of a separable group of plates with liquid-spaces between the plates opening at the periphery and communicating with a common axial space, and, second, in the combination of said rigid plate structure rotatively mounted with a liquid-supply mechanism whereby its thorough cleansing is effected.

The invention is fully described in connection with the accompanying drawings, and the novel features are particularly pointed out in the claims.

Figure 1 is a sectional elevation showing my improved division device for centrifugal vessels rotatively mounted in connection with a liquid-supply mechanism for automatically cleansing said device. Fig. 2 is an enlarged cross-sectional view of the division device.

My improved division device in the preferred form shown is made up of a series of similarly-shaped partition-plates *aa*, arranged with their inner longitudinal edges *b* equidistant from the axis *c* of the structure and with the width of the plates extending outward from said axis across the radial lines of the structure and terminating in outwardly-bent longitudinal edges *d* at a distance from the

axis c corresponding to the radius of the centrifugal vessel to which the structure is adapted. These plates are spaced apart equally around the axis c to form between them narrow passage-ways e , communicating at their inner ends with the axial opening f of the structure, extending across the radial lines thereof and open at the periphery. This arrangement of the plates is maintained independently of the centrifugal mechanism in connection with which it is adapted to operate by rigidly uniting them to form a single device or structure of fixed form and dimensions throughout accurately and permanently adapted to its place in the centrifugal machine as a single element thereof. This rigid connection of the plates is effected, as shown, by securing each plate at different points in its width and length to adjacent variously-overlapping plates, so that each plate shall be directly or indirectly secured to every other plate of the group forming the complete structure. In practice I have found this to be effectively accomplished by means of intersecting screws g , arranged approximately radially in circular series, as indicated in Fig. 2, throughout the length of the structure, each screw being engaged in aligned screw-threaded openings extending through a series of overlapping plates and serving as a spacing and connecting pin or bar for said plates. This preferred connection may be effected satisfactorily, as I have ascertained in practice, by first building up the structure upon a mandrel, with the plates properly spaced by strips of fusible metal (as lead) and clamped by suitable bands and then tapping the aligned openings and inserting the screws, the spacing-strips being subsequently readily removed by subjecting the completed structure to sufficient heat to melt the same.

The improved structure described provides a one-piece division device of permanent form adapted to divide the mass of liquid as desired into strata of uniform thickness in practically unobstructed passage-ways. In order, however, that the device may be of practical value, it is necessary that it be thoroughly and frequently cleansed, and the provision for accomplishing this forms an essential part of my invention.

During the operation of the centrifugal machine oppositely-moving currents of slow velocity are maintained in each passage-way e , the cream moving inward to the axial space and the skim-milk outward to the wall of the inclosing vessel. In order to cleanse these passage-ways, I provide for producing a forced and rapid circulation of cleansing liquid therethrough by rotatively mounting the division devices in connection with an axial cleansing-liquid-supply tube located in the

axial space f . In Fig. 1 this arrangement of mechanism is indicated. The division devices and the machine-frame h shown are adapted for the "tubular" form of separator vessel. The division device is removed from the latter and separately attached to the rotary spindle i , the end j of the latter screwing into the end of the division device, thus suspending the latter therefrom. Entering the axial space f from below is the cleansing-liquid-supply tube k , fixed to the frame at its base m and communicating with an elevated reservoir n or pressure system, whereby the liquid is discharged in said axial space so as to contact with the inner edges b of the rotating division device and be rapidly forced through the passage-ways e , escaping freely at the periphery into the open-bottom casing p . After being subjected for a short time to this automatic cleansing action the device may be removed, reinserted in the centrifugal vessel, and the separating operation be renewed without involving any tedious labor in cleansing or reconstruction or any uncertainty as to the correctness of the latter and the safety and satisfactoriness of the succeeding operation.

What I claim is—

1. A division device for centrifugal liquid-separators comprising a series of division-plates extending across the radial lines of the device and connecting-bars engaging and holding each separate intersecting plate independently of other intersecting plates.
2. A division device for centrifugal liquid-separators comprising a series of division-plates extending across the radial lines of the device and connecting-bars engaging each separate intersecting plate to support the same in positively-spaced position thereon independently of other intersecting plates.
3. A division device for centrifugal liquid-separators comprising a series of division-plates extending across the radial lines of the device and screw-threaded connecting-bars engaging each separate intersecting plate to support the same in positively-spaced position thereon independently of other intersecting plates.
4. The combination with a division device for centrifugal liquid-separators composed of a circular series of longitudinal division-plates united to form an independently-rigid structure, said plates being arranged across the radial lines and forming an axial opening with spaces between the plates communicating with said axial space, of a spindle for said division device, and a fluid-supply conduit extending into said axial space.
5. A division device for centrifugal liquid-separators comprising cylindrically-grouped approximately parallel division-plates extend-

ing across the radial lines of the device and intersecting spacing-bars each engaging aligned openings in a series of overlying plates to form a rigid structure, and having their outer
5 ends extending as far as the outer edges of the plates to contact with the wall of the separator-bowl.

Signed at Westchester, Pennsylvania, this
3d day of December, 1902.

DAVID TOWNSEND SHARPLES.

Witnesses:

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I. NEWTON GROFF.