

(No Model.)

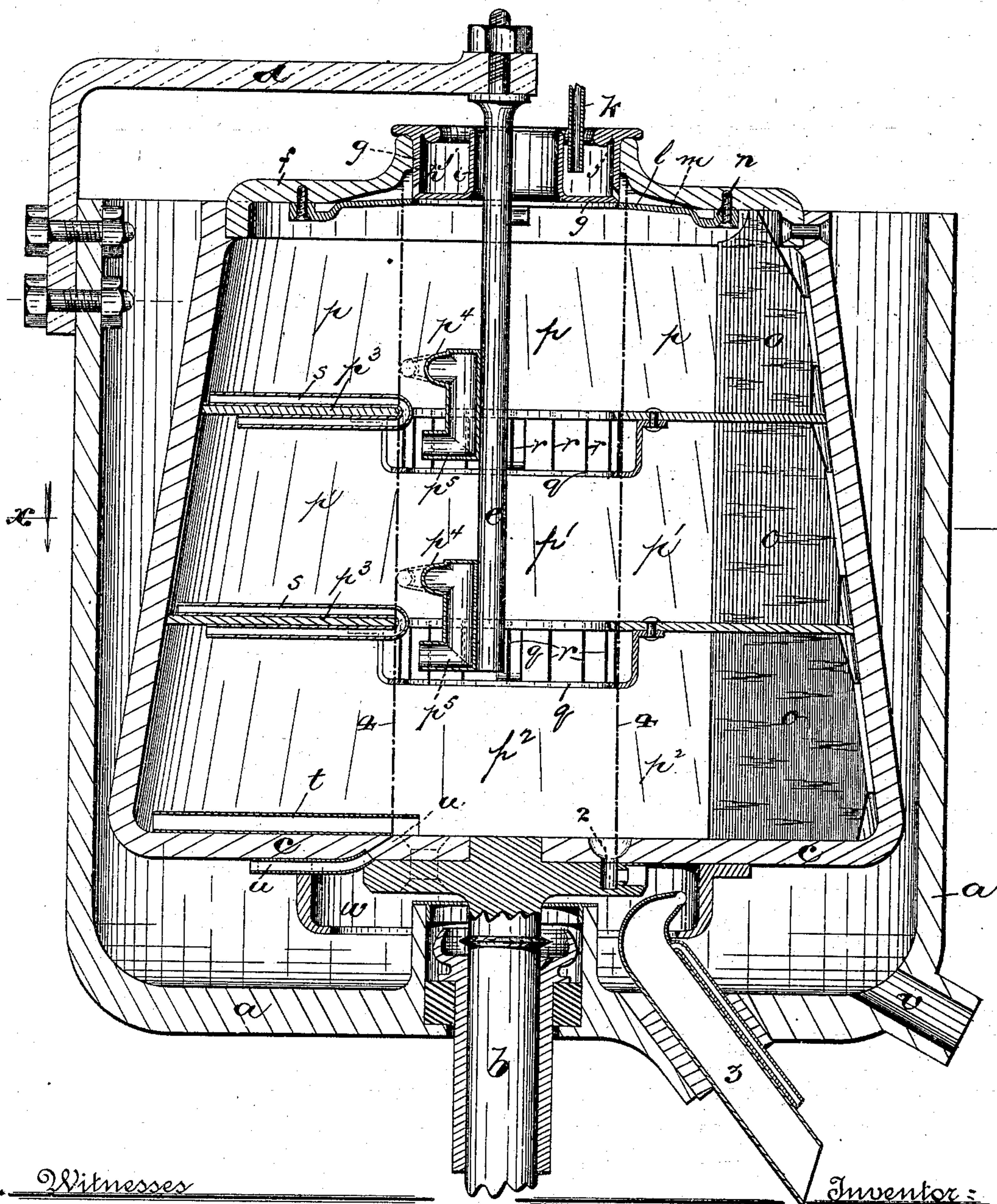
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O. ANDERSON.
CENTRIFUGAL BUTTER EXTRACTOR.

No. 503,731.

Patented Aug. 22, 1893.

Fig I



Witnesses
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Inventor:
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By Drake & Co. Attys.

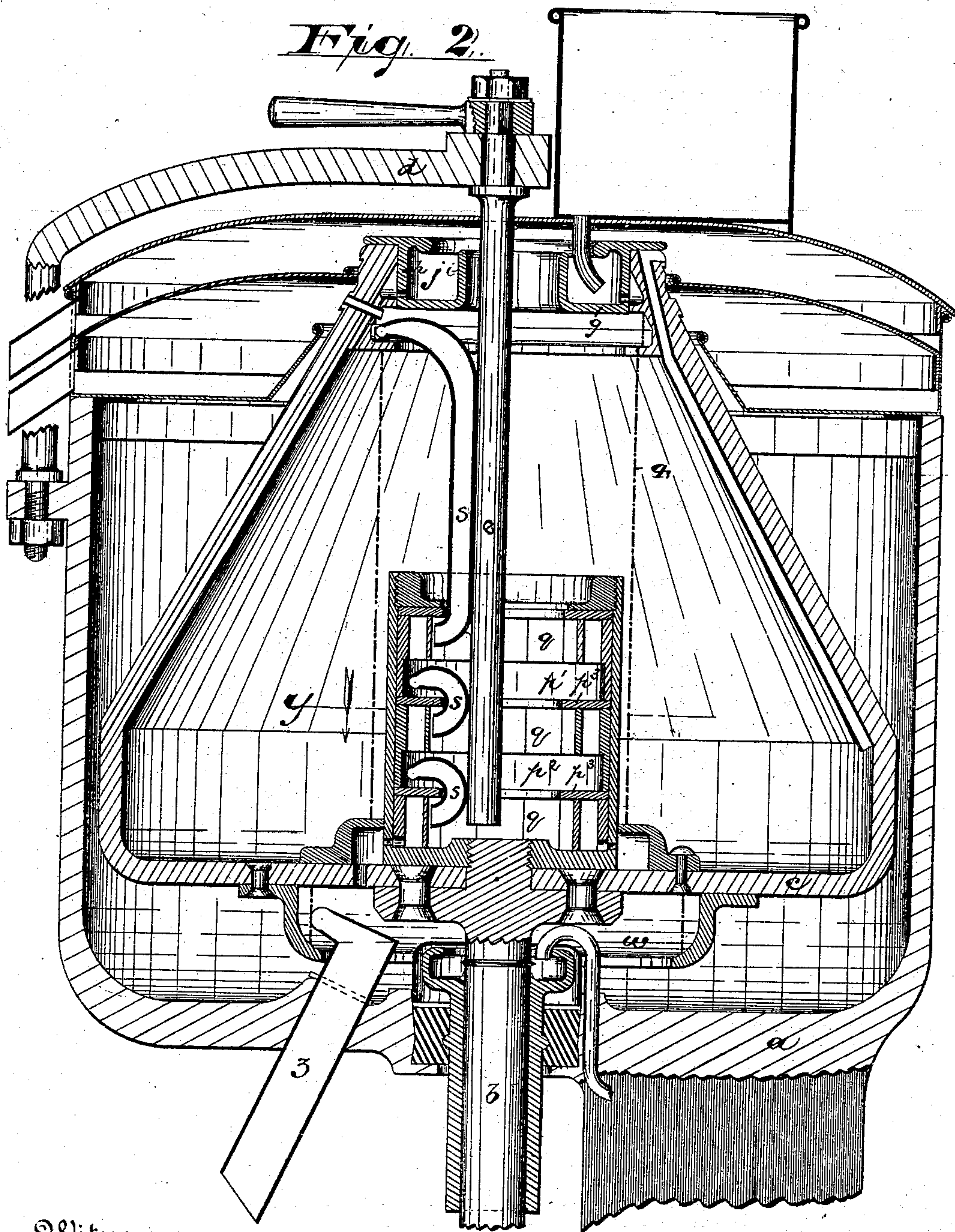
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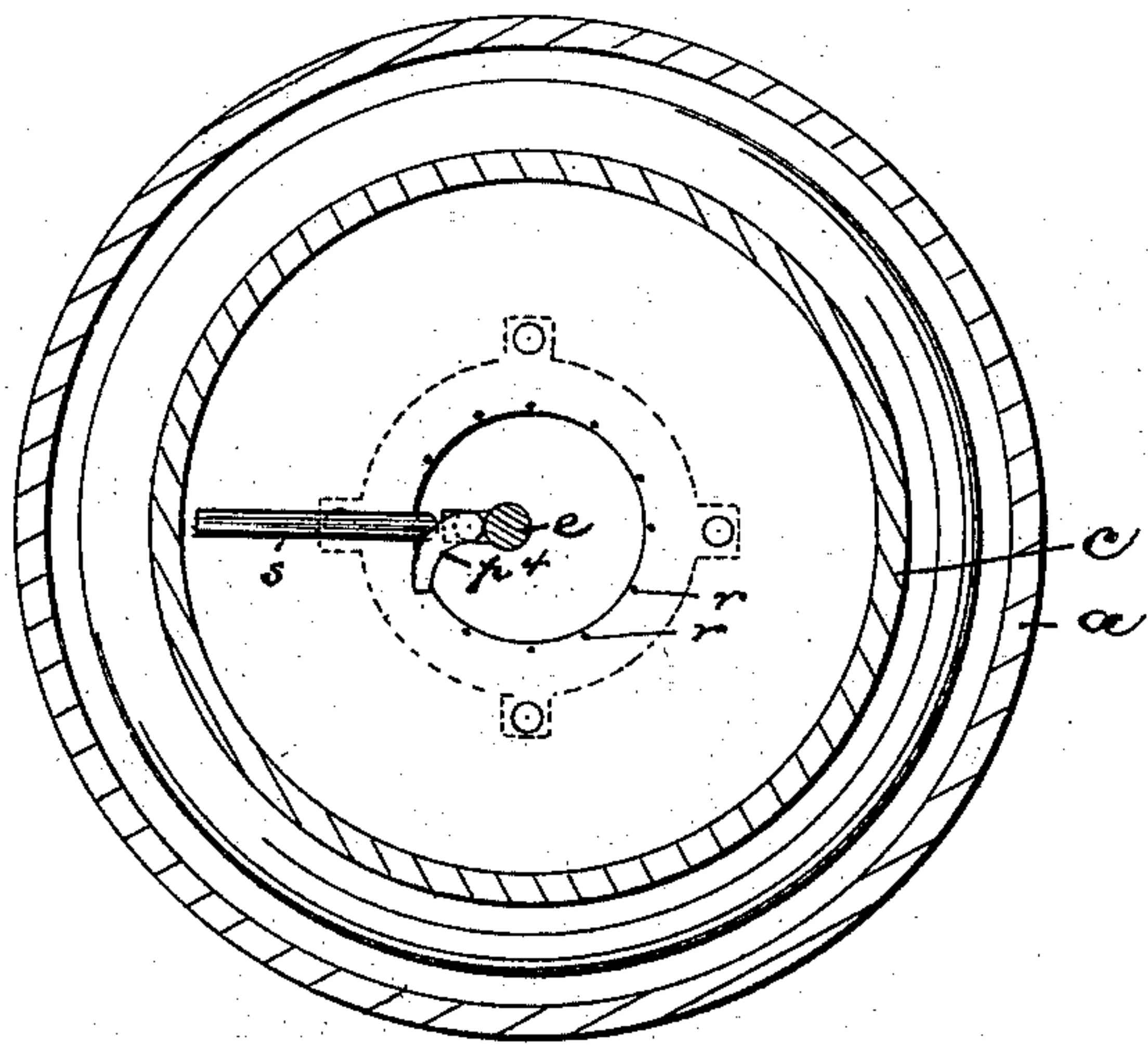


Fig. 3.

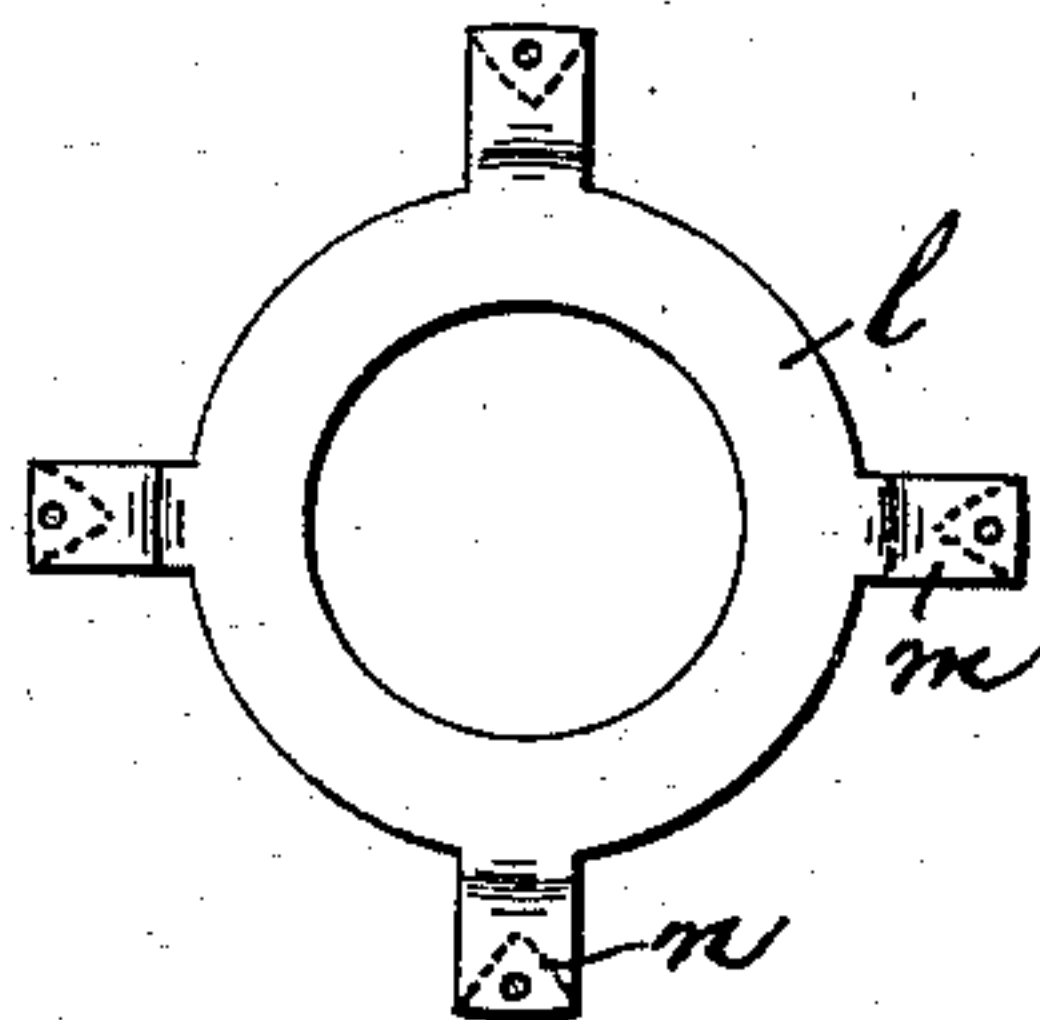


Fig. 4.

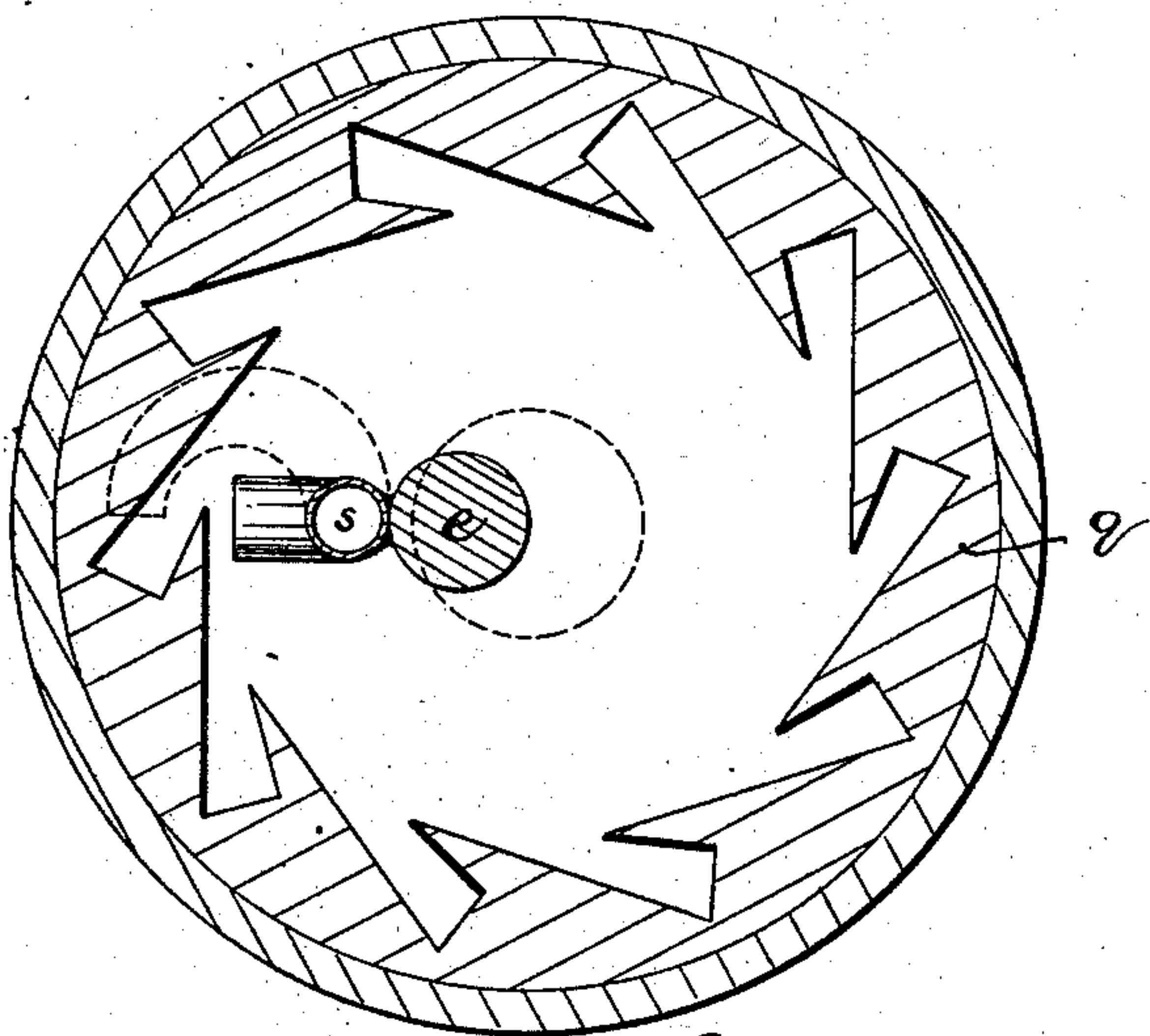


Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

OSCAR ANDERSON, OF NEWARK, NEW JERSEY.

CENTRIFUGAL BUTTER-EXTRACTOR.

SPECIFICATION forming part of Letters Patent No. 503,731, dated August 22, 1893.

Application filed February 19, 1892. Serial No. 422,067. (No model.)

To all whom it may concern:

Be it known that I, OSCAR ANDERSON, a subject of the King of Sweden, residing at Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Butter-Extractors; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The object of this invention is to reduce the cost of construction, to simplify the operation of butter making and reduce the power necessary in driving the machine, to increase the capacity and durability of the machine and at the same produce the highest quality of butter.

The invention consists in the improved centrifugal butter separating machine and in the arrangements and combinations of parts substantially as will be hereinafter set forth and finally embodied in the clauses of the claims.

Referring to the process of churning cream and forming butter therefrom, in the accompanying drawings in which like letters and numerals indicate corresponding parts in each of the views, Figure 1 is a central vertical section of the improved machine illustrating the preferred construction. Fig. 2 is another section showing a modification; Fig. 3, a section, reduced in scale, taken on line *x*, Fig. 1. Fig. 4 is a detail plan of a device serving as a spreader, and Fig. 5 is a section on line *y*, Fig. 2.

In said drawings, *a* indicates a stationary tank or bowl the bottom of which provides bearings for a vertical shaft, *b*, which extends through said bottom and provides a support for a rotary separating receptacle *c*.

At the upper end of the stationary tank or bowl is arranged an inwardly projecting arm *d*, which provides, at a point near the axial center line of the rotary receptacle, bearings for a downwardly extending arm or shaft, *e*, which lies a little eccentric to the center of motion of the rotary receptacle *c*. The said receptacle, *c*, is closed at the top by a cover,

f, having a central orifice to receive a milk receptacle, *g*, of peculiar construction. This said receptacle, *g*, consists preferably of a sheet metal piece or structure having inner and outer flanges *h*, *i*, or side walls which form an annular chamber, *j*, into which the milk is conducted by means of a suitable duct *k*. The upper edge of the outer flange is provided with an inwardly and outwardly projecting rim, the outward projections serving as a bearing to engage the cover, *f*, and the inward projection serving as guard for the milk. The inner flange, *i*, prevents the milk from falling directly into the separator chamber.

The chamber, *j*, is provided with outlet ducts which lead the milk out upon a spreader, *l*, having arms *m*, *m*, shown in plan in Fig. 4 which are secured to the under side of the cover by screws, *n*, or other fastening means. The spreader directs the milk evenly into the separating chamber and conduces to a rapid separation of the cream from the skim milk.

The interior of the receptacle, *c*, is provided with wings, *o*, which serve to impart motion to the body of liquid within the same. Said wings may and preferably do provide bearings or supports for partitions, *p*³, arranged horizontally in the receptacle, which said partitions separate the said receptacle into a series or plurality of chambers marked *p*, *p'*, *p*², which have open communication one with the other at the center of the receptacle to allow the passage of the central shaft, *c*. Around the central openings are arranged churns *q*, *q*, which may be of any suitable construction, but, preferably, are of the cage-like construction shown in Fig. 1. The said cage-like churns are fastened to the under sides of the partitions and revolve therewith and the pins, *r*, which serve to break up the fat globules of the cream are arranged vertically and in an annular series, the diameter of which is less than the annular space within the cream-walls, *4*, hereinafter referred to, so that the cream, as it is operated upon by centrifugal force and held thereby so that the vertical space at the center is formed, will be separate and apart from said churn and will not clog or interfere with its operations. The vertical series or plurality of chambers *p*, *p'*, *p*², are connected by bent or U-shaped

pipes or ducts s, s , which are turned over the inner edges of the said partitions, p^3 , the ends extending outwardly to near the peripheries or sides of the chamber as will be evident. The skim milk, by means of this passage or duct is enabled to flow from the upper to the next lower chamber. At the bottom of the lowest chamber, a pipe or duct is arranged to conduct the refuse milk or fluid from which the butter or fat has been extracted, from the peripheral parts of the rotating bowl or receptacle to an exit aperture u leading through the bottom of the bowl into the tank, a , from which latter it is adapted to pass out through a suitable opening v .

It will be observed that, in the construction shown, the ends of the U-shaped tubes are of uneven length, the upper end being longer and extending close to the side of the receptacle where the fluid is most free of fatty particles and the lower end extending through the body of cream but not to a point so near the side wall. Thus the fluid of the uppermost chamber, after having been largely voided of its cream and fatty particles is conducted to the next chamber, without intermixing with the cream or butter therein and delivered at a point where it will be further acted on to separate any fatty particles remaining therein.

Upon the shaft, e , just above the frames of the partitions are arranged what we may call scrapers or collectors, p^4 . These are stationary with the shaft and extend toward the cream wall and serve to gather the most thoroughly separated cream and the butter lying on the surface of said cream wall and greatly retard the movement of the cream, or entirely stop its rotary movement with the receptacle c . The said scraper is in connection with a churn feed, p^5 , adapted to deliver the cream or the cream mixed with butter to the rotary churn. The said scraper and feed are preferably of a metallic tube, soldered or otherwise fastened to the suspended shaft e , of the U-shape indicated in Fig. 1. Said pipe or tube may be lined with wood to prevent adhesion of the butter. One of the arms of the said U-shaped pipe or tube extends toward the cream wall above the partition, p^3 , while the other arm thereof extends to the churn, and conducts the cream against the rapidly rotating pins and thus the fat globules are thoroughly broken up or churned. From the churn the heavier particles, commonly called butter milk, work back or outwardly toward the cream wall while the butter remains at said cream wall and slowly gravitates toward the second collector or scraper where it is taken up by collecting arm, together with any cream that may be within the scope or limit of action of said scraper, and conducted to the second rapidly rotating churn, where it is again thoroughly churned and brought to a condition in which, when centrifugal force is again allowed to act thereon, the butter will be thoroughly separated from the heavier constituents

of the milk. The butter, remaining at the "cream wall," gradually gravitates to the bottom of the rotary receptacle from which it passes out through the openings, 2, into the butter chamber, w , beneath the receptacle, c , but revolving therewith, while the butter milk and skim milk are taken up by the pipe t and lead to the tank or other receptacle therefor.

In the receptacle, w , the butter is caught by a pipe, 3, and conducted outside of the machine. By arranging the scraper, p^4 , upon the eccentric shaft, e , I may increase or diminish the scraping capacity of the same and thus control the output of butter from the machine and the extent and thoroughness with which the butter is extracted from the milk, the inflow of milk to the machine being also governed by any suitable valve on the pipe k . The means for feeding the cream to the churns are thus easily and conveniently adjustable.

In operating the machine, when it is constructed in the manner indicated in Fig. 1, the milk by a constant and regular flow, governed in any suitable manner, is fed through the pipe, k , to the chamber, j , from which it passes out onto the spreader arranged beneath and projecting laterally from the outer walls or perforated flange h . The spreader conducts the milk in a thin and even film back of the cream wall so as not to intermix with the body of cream thereat. The milk upon entering the chamber, j , comes immediately under the influence of centrifugal force and is forced outwardly thereby, the heavier ingredients of the milk tending to occupy the peripheral parts of the chamber and to hold the lighter parts toward the center where they form what I have called the cream wall and marked 4 in the drawings. While the chambers between the partitions are filling, I prefer to throw the scrapers or cream collectors out of position. When the chamber, p , at the upper end of the rotating tank or receptacle, c , is filled to near the inner edge of the partition, p^3 , and to a point of outflow through the upper pipe s , the skim milk is conducted through said pipe from the upper to the next lower chamber, where it continues to be acted on by centrifugal force and finally fills the chamber, with the addition of butter and butter milk received by the way of the churn and the butter remaining on the surface in connection with the cream which has accumulated from the skim milk or has escaped the churning operation. From the chamber, p' , the skim and butter milk are conducted in like manner to the lowest chamber and the butter and cream receive a final churning which is sufficient to practically separate the said butter from the said cream. Thus, when the butter finally gravitates to the butter outlet, it is free from the other milk constituents and, on the other hand, the said constituents are without butter.

I am aware that various changes and modi-

fications may be made in the construction of the machine and arrangements of parts and I, consequently, do not wish to be understood as limiting myself to the exact arrangements and operations positively described,—and for illustration I have shown in Figs. 2 and 5, one of the many varieties I have contemplated. In this case I employ an ordinary rotating bowl such as I find in the market and insert toward the center thereof a churn—into which extends a fixed cream collector. In this case, instead of employing pins for breaking up the butter globules, I may employ a toothed ring such as is found in plan in Fig. 5.

Having thus described the invention, what I claim as new is—

1. The improved butter extractor herein described combining therein a churn having churning surfaces a centrifugal separator, and a stationary cream collector extending into close adjacency to the churning surfaces and delivering the collected cream directly against the said churning surfaces before rotary motion is imparted to the said cream substantially as set forth.

2. The process of churning cream herein described which consists in feeding cream from a stationary cream collector directly against a rotary churning surface and breaking the buttery globules and simultaneously imparting rotary movement to the cream to separate the buttery particles from the butter milk, substantially as set forth.

3. In combination, a tank *a*, rotary bowl or receptacle *c*, having partitions, *p*³, and wings to impart rotary motion to the liquid, churns secured to said partitions and stationary cream collectors arranged in said receptacle adjacent to said churns, substantially as set forth.

4. In combination, a tank *a*, a rotary receptacle for the milk and means for imparting motion thereto, partitions *p*³, churns *q*, *q*, ducts for conveying the butter milk or skim milk from one chamber to the other and from the said receptacle, and a stationary cream collector and a feeder, communicating one with

the other and adapted to gather the cream from one chamber and feed it to the churn in the next adjacent chamber, substantially as and for the purposes set forth.

5. In combination, the tank, *a*, having arm *d*, a rotary bowl *c*, having a cover, *f*, with a central aperture therein, a shaft, *e*, arranged on said arm and extending through said cover into said bowl, a churn stationed in said bowl and operating therewith and a cream-gatherer and feeder arranged on said shaft, substantially as set forth.

6. In combination, a tank *a*, having an arm, *d*, a rotary bowl, *c*, having a cover, *f*, with a central aperture therein, a shaft, *e*, arranged on said arm eccentric to the axis of said bowl and extending into said bowl, a churn rotating with said bowl and a cream gatherer or collector, arranged on said shaft and adjustable in relation to the cream wall, substantially as set forth.

7. In combination with a rotary separator having centrally open partitions, with U-shaped ducts taking skim milk from above and delivering it below the partitions, churns formed around said openings and U-shaped pipes stationed in said openings and adapted to collect the cream and deliver it to the churns, substantially as and for the purposes set forth.

8. The process of making butter herein described which consists in imparting rotary movement to the milk to separate the cream therefrom, collecting said cream and stopping the rotary movement thereof, then feeding the cream against rapidly rotating churning surfaces and breaking the globules and at the same time imparting rotary movement to said cream, and separating the butter therefrom, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of January, 1892.

OSCAR ANDERSON.

Witnesses:

CHARLES H. PELL,
OSCAR A. MICHEL.