

No. 619,487.

Patented Feb. 14, 1899.

W. JOHNSON.  
CENTRIFUGAL CREAM SEPARATOR.

(Application filed May 2, 1898.)

(No Model.)

3 Sheets—Sheet 1.

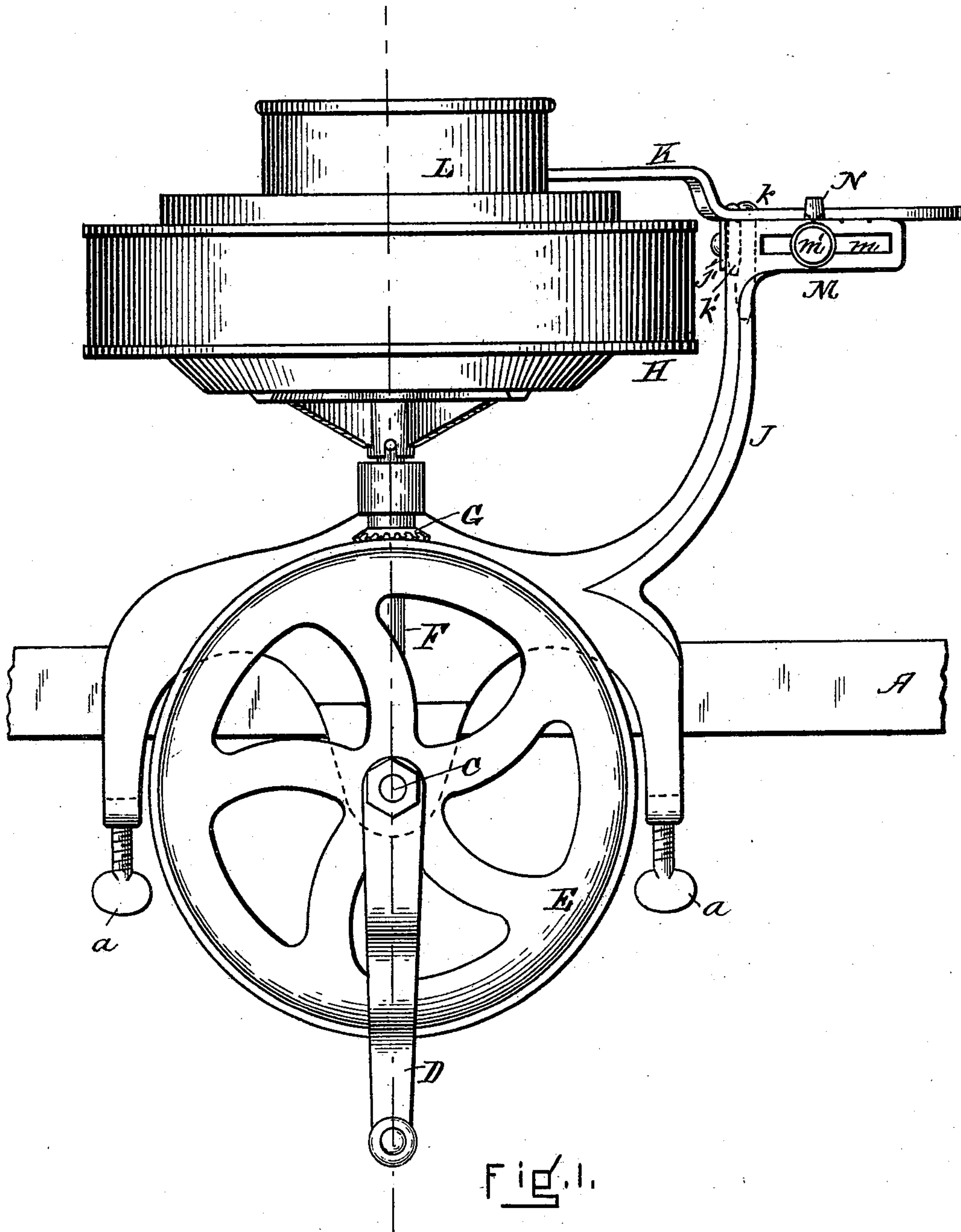


Fig. 1.

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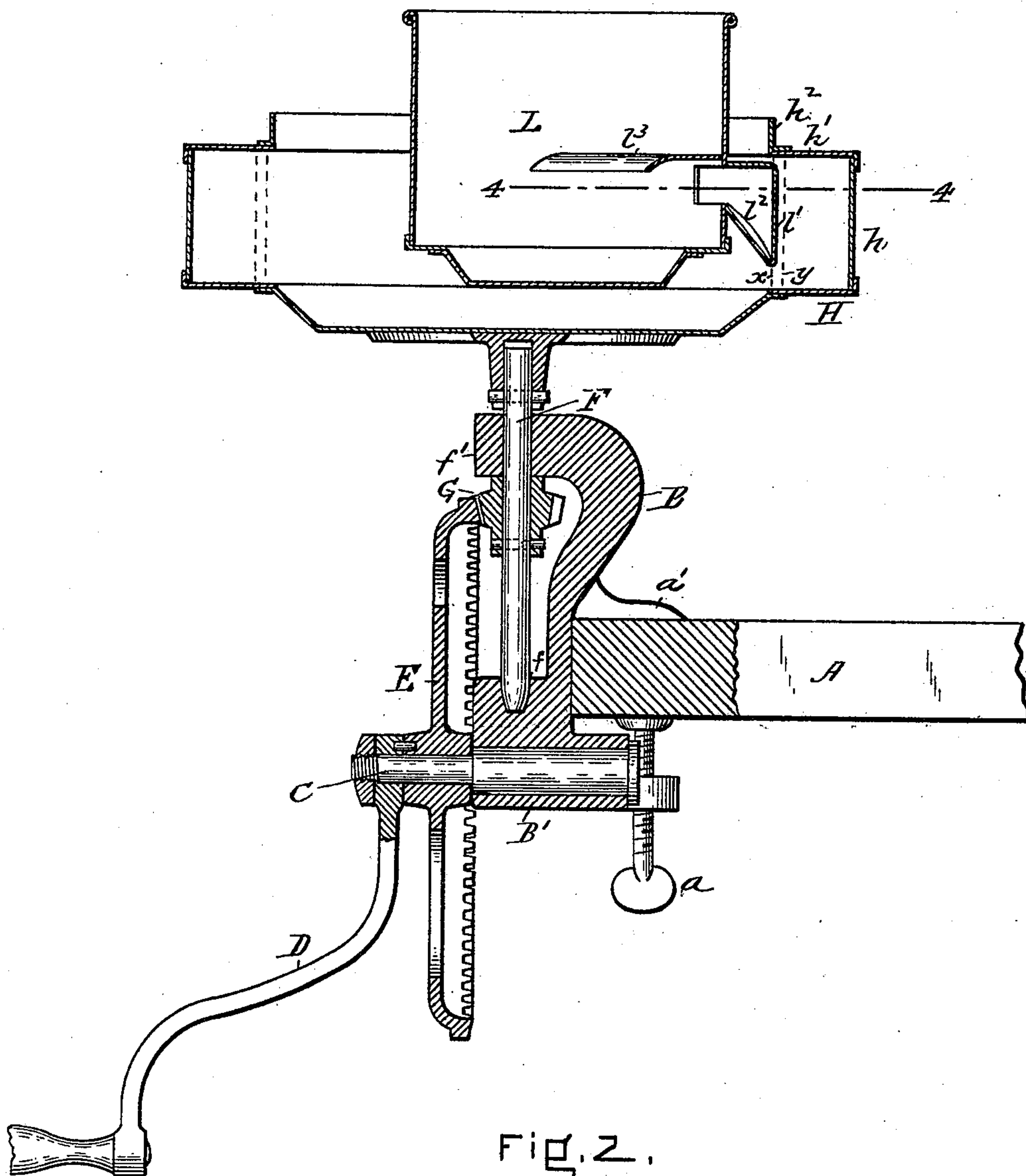
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**3 Sheets—Sheet 2.**



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3 Sheets—Sheet 3.

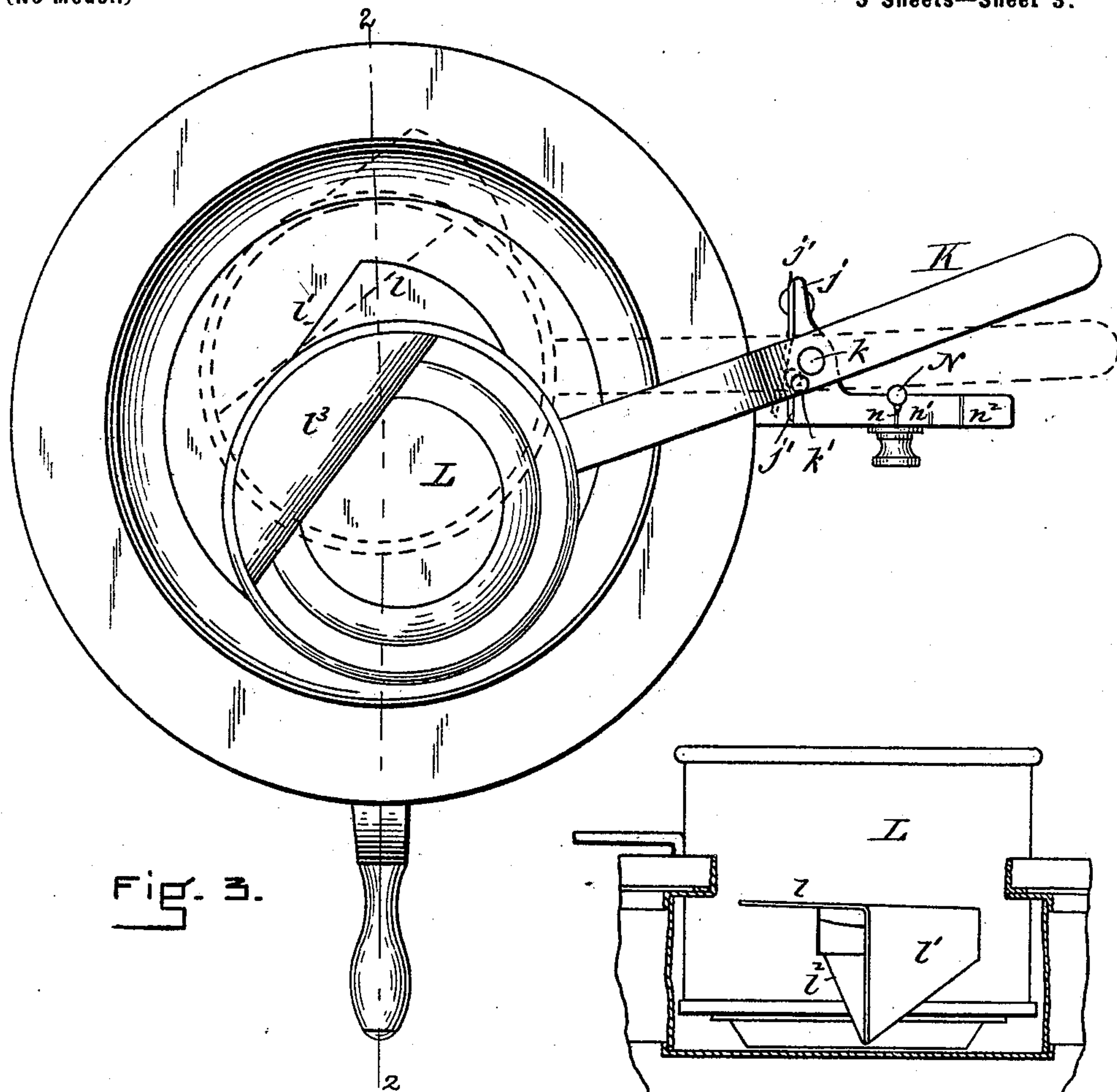


Fig. 3.

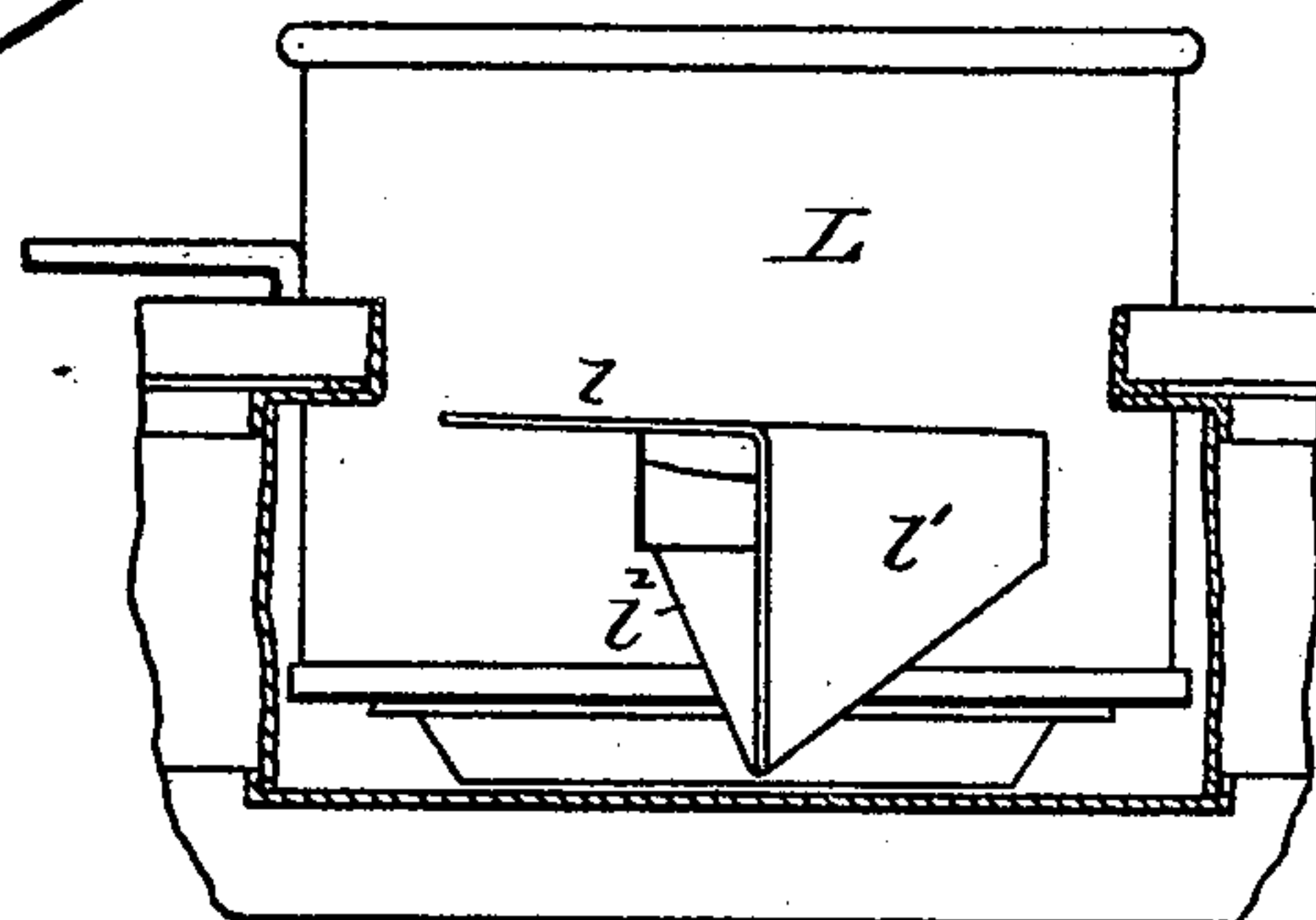


Fig. 5.

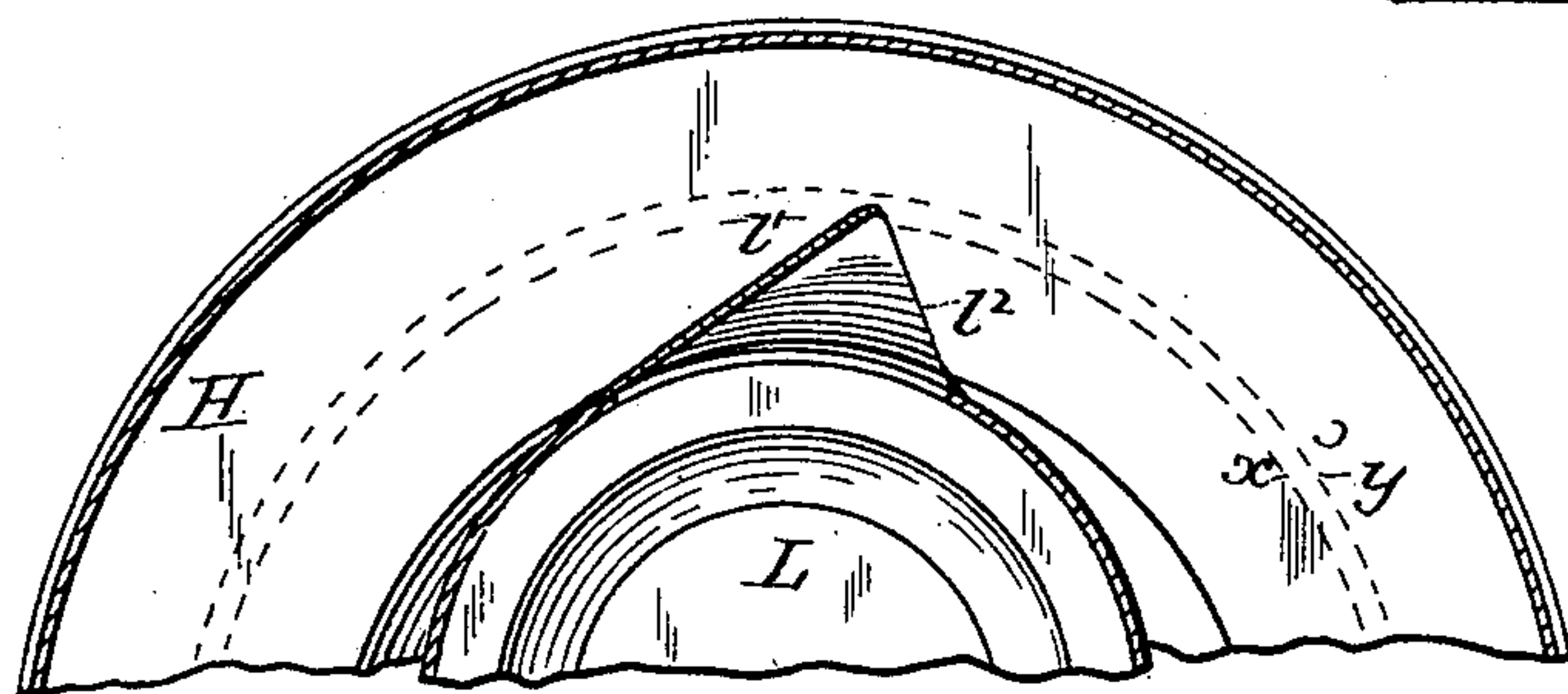


Fig. 4.

WITNESSES  
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# UNITED STATES PATENT OFFICE.

WILLIAM JOHNSON, OF BOSTON, MASSACHUSETTS.

## CENTRIFUGAL CREAM-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 619,487, dated February 14, 1899.

Application filed May 2, 1898. Serial No. 679,466. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM JOHNSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Centrifugal Separators, of which the following is a specification.

My invention relates more especially to the use, with a centrifugal separator, of a skimmer which is normally held out of engagement with the liquid to be skimmed, but which may be brought into engagement therewith when desired and the movement of which may also be adjusted according to the quantity of liquid contained in the separator.

My invention will be understood by reference to the drawings, in which—

Figure 1 is an elevation of the best form of device now known to me embodying my invention, Fig. 2 being a vertical section on line 2 2 of Fig. 1, the skimmer being in the skimming position shown in dotted lines in that figure; Fig. 3, a plan view; and Fig. 4, a sectional detail on line 4 4 of Fig. 2, showing the skimmer in operation. Fig. 5 is a detail of the skimmer-nozzle.

My device is especially adapted for household use, and for that reason I have shown it attached to a table A by means of a screw-clamp mechanism  $a a'$ . B is the frame which carries the members of this screw-clamp and also carries the other parts of the device. For this purpose it is provided with a journal B', in which is mounted the shaft C, carrying the handle D for rotating the shaft and the gear E for giving motion to the vertical spindle F. This spindle is stepped in the lower part of the frame at  $f$  and journaled in its upper part at  $f'$ . It carries a bevel-gear G, which engages with the gear E, above referred to. Upon the top of the spindle F is suitably mounted a chamber H, which is preferably shaped as shown. It is dished at the bottom and has a side wall  $h$  and a partial cover  $h'$  and rim  $h^2$ . Upon the frame is also mounted a support J, upon the upper end of which is pivoted the handle K, carrying the skimmer L. For this purpose the support J has an arm  $j$ , in which there is a socket in which sets a pin  $k$ , projecting from the under side of the handle K. The arm  $j$  also has a spring  $j'$ , (preferably a leaf-spring, as shown,) 50

which bears against a second pin  $k'$ , which also projects from the under side of the handle K, this construction being such that the spring  $j'$  will hold the pin  $k'$  against the arm  $j$  and keep the skimmer L normally in the position shown in full lines in that figure. If, however, the handle K is turned about the pin  $k$  into the position shown in dotted lines, it will be noted that the pin  $k'$  will be moved against the force of the spring  $j'$ . The purpose of this mechanism is to keep the skimmer normally out of engagement with the liquid and in the position shown in full lines in Fig. 3, but allow it to be moved into the position shown in dotted lines in that figure for purposes now to be explained.

The skimmer L is preferably constructed as shown in section in Fig. 2—that is to say, it is of considerable depth and sets down into the separator. It is provided with a skimming-nozzle, which is preferably constructed of a top  $l$ , a side wall  $l'$ , which is substantially tangent to the periphery of the skimmer, and an inclined bottom (indicated at  $l^2$ ) leading down to a point near the level of the bottom of the chamber H. This nozzle leads back into the skimmer, and above its connection with the skimmer there is provided a shield  $l^3$ , which will prevent the liquid, as it flows in through the nozzle, from splashing out over the top of the skimmer.

The support J is also provided with an adjustable stop mechanism consisting of an extension M, having a slot  $m$ , in which there is a set-screw  $m'$ , carrying a stop N, and upon the top of this extension M may be provided, as shown, a series of graduation-lines  $n n' n^2$ , which are planned with relation to the lateral movement which it is desired to give the skimmer L about its pivot  $k$ —that is to say, if it is intended that the skimmer L shall be moved toward the periphery of the chamber a distance indicated by the dotted lines in Fig. 3 the stop N is made fast in the position shown in that figure; but if it is desired that the skimmer shall be thrown still farther toward the periphery, as is the case when a small amount of liquid is contained in the chamber H, the stop N is moved to one of the other lines of graduation  $n' n^2$ , when it will be seen that the skimmer L may be moved 100



still farther toward the periphery of the rotating chamber.

My device is operated in the following manner: Into the chamber H is poured, for example, a quart of milk, if milk is the liquid to be separated thereby. The parts being in the position shown in Fig. 3, the chamber is rotated by turning the handle D for a short time—say two minutes. Upon rotating the chamber the liquid contained therein will form a vertical wall against the inside periphery of the chamber, extending, say, to the line  $x$ , the cover  $h'$  of this chamber preventing the liquid from slopping over. After the chamber has been rotated for a sufficient length of time to cause the heavier particles of the liquid to separate from the lighter particles, there will be, in effect, two walls, an outer wall of milk extending to the line  $y$  and an inner wall of cream extending from  $y$  to  $x$ . The rotation continuing, the operator, first having set the stop N against the graduation-line  $n^2$ , (which is the graduation corresponding to one quart, the original contents of the chamber,) moves the free end of the handle K against the stop, thereby throwing the skimmer toward the periphery of the chamber sufficiently far to cause the front edge of its wall  $l'$  to engage with the liquid and skim from it what I have termed the "inner wall" or "wall of cream," the rotation continuing during all of this time. When no more liquid enters the skimmer L and the skimming operation is finished, the device may be stopped and the skimmer removed, and it will be found to contain the lighter particles of the original liquid poured into the chamber H.

If instead of one quart two quarts are to be skimmed, the liquid is poured into the chamber as before, the stop N is moved to the graduation-line  $n$ , and the operation is carried on as before, the spring  $j'$  keeping the skimmer out of contact with the liquid until such time as the operator moves the handle K against the force of the spring to throw the skimmer into operative position.

As the purpose of the cover  $h'$  is to prevent the liquid in the chamber from slopping out during the rotation of the chamber, the amount of liquid to be used in a chamber of given size should never be more than will be contained under the cover  $h'$  when the chamber is in rapid rotation.

It will be seen that the skimming operation consists in first, as it were, building the liquid into the shape of a hollow cylinder, the periphery of which is made up of the heavier particles and the inner portion of which is made up of the lighter particles, and then removing the lighter particles. This operation I believe to be new with me.

The device above described has been found in practice to operate very simply and easily and to have the merit not only of simplicity, but of cleanliness, for there is no part of the device which cannot be easily and rapidly

cleansed. For this reason, as well as because of its simplicity of construction, it is well fitted for household use, although it is evident that if made larger it may be easily adapted for other purposes, being capable, of course, of running by power, if desired, for my invention consists, mainly, in the use, with a rotary chamber of suitable shape, of a skimmer which is normally held out of engagement with the liquid to be skimmed and yet may, whenever it is thought desirable, be thrown into engagement therewith, so as to skim the inner layer or wall of liquid, which has been caused by the rotary action of the separator-chamber. Moreover, the skimmer may be removed entirely during the separating operation and set into place when the skimming operation is to begin. In this case the spring  $j'$  may be omitted, the only necessity being for means to support the skimmer and prevent it from being thrown too far into the liquid. It is evident that the details of construction of my device may be varied considerably without departing from the spirit of my invention.

I am aware that separators have been made in which the skimming portion is a tube projecting either upward from below or downward into the rotary vessel; but in these cases, so far as I have knowledge, the skimmer has been moved by a screw into and out of action and the device so constructed has been utterly unfit for use as a household utensil, for which purpose my separator is primarily designed. In my separator the skimmer is mounted on the end of an arm which is pivotally supported upon the frame of the device and is preferably held out of engagement with the liquid by a spring, and it is a very simple matter, by acting upon the outer end of the lever on which the skimmer is supported, to throw the skimmer into action.

What I claim as my invention is—

1. In a centrifugal separator, having a rotary vessel and provided with a suitable support, a skimmer mounted on said support and located within said vessel, in combination with a spring located to engage with said skimmer and retain it normally out of engagement with the liquid to be skimmed, as and for the purposes set forth.

2. In a centrifugal separator having a rotary vessel, a support, a skimmer pivotally carried thereby and located within said vessel and a spring adapted to engage with said skimmer and normally retain said skimmer out of engagement with the liquid to be skimmed, all as set forth.

3. In a centrifugal separator, a rotary vessel closed at the bottom, in combination with a suitable support carrying a skimmer pivotally supported thereby within the vessel and a graduated stop adapted to limit the movement of said skimmer into engagement with the liquid to be skimmed whereby the movement of the skimmer into the liquid may



be adjusted according to the quantity of liquid which the vessel contains, as and for the purposes described.

5 4. A skimmer of substantially the kind described having a skimming-nozzle projecting outward from its periphery and a shield projecting inward from the interior of said skimmer above the entrance of said nozzle into the skimmer, as set forth.

10 5. In combination with a rotary centrifugal separator of the kind described, a skimmer having a handle projecting therefrom

pivotally mounted on a suitable support, a spring holding said handle in one position and a stop located to limit the movement of 15 the skimmer in the opposite direction, as set forth.

In testimony whereof I have hereunto set my hand this 23d day of March, 1898.

WILLIAM JOHNSON.

Witnesses:

GEORGE O. G. COALE,  
E. A. GUILD.