

No. 637,729.

Patented Nov. 21, 1899.

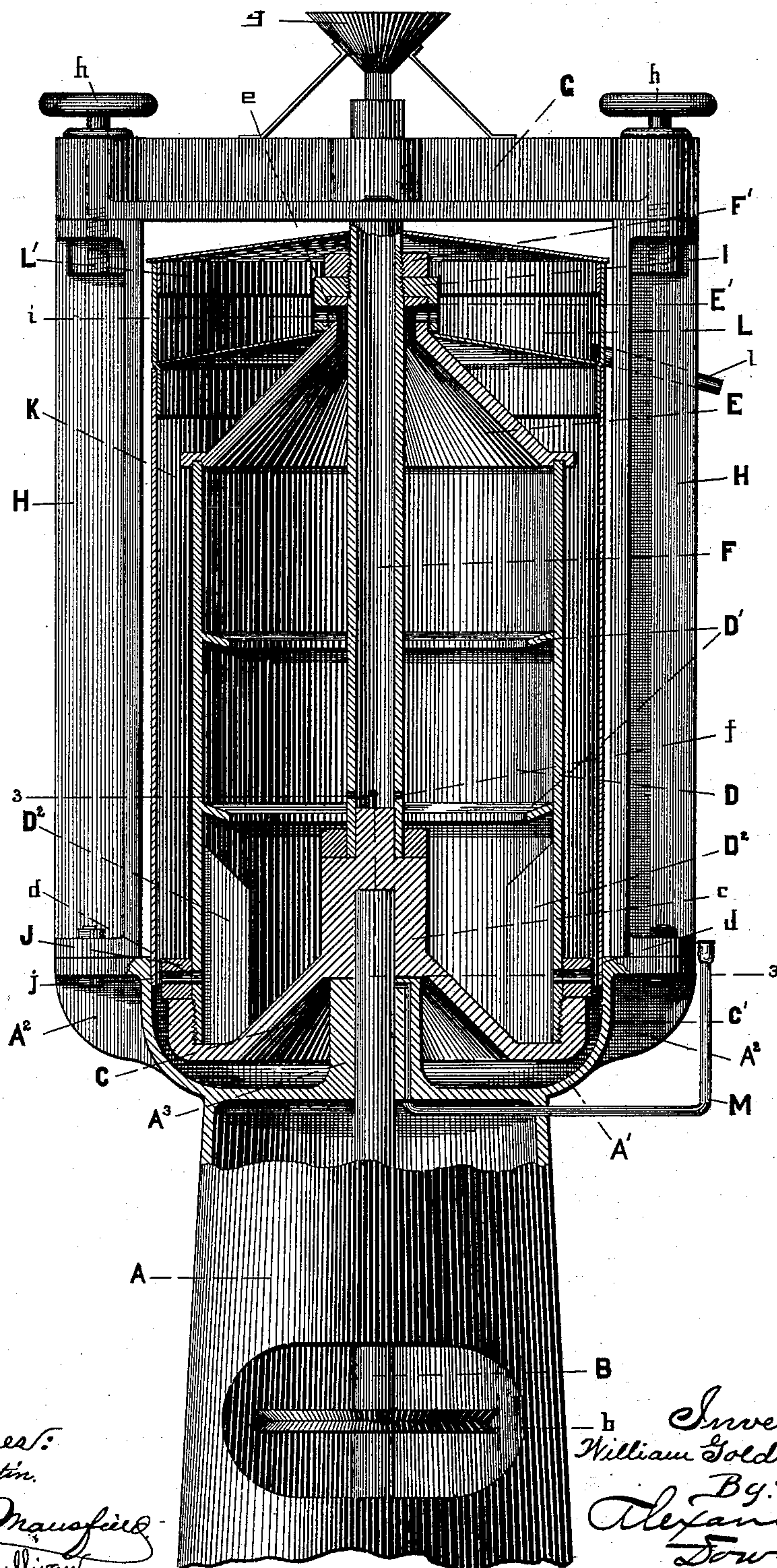
W. GOLDSWORTHY.
CENTRIFUGAL LIQUID PURIFIER.

(Application filed Jan. 18, 1899. Renewed Oct. 26, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.



Witnesses:
H. S. Austin.

James P. Mansfield
William Sullivan

Inventor:
William Goldsworthy
By:
Alexander and
Sowalk

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2 Sheets—Sheet 2.

Fig. 2.

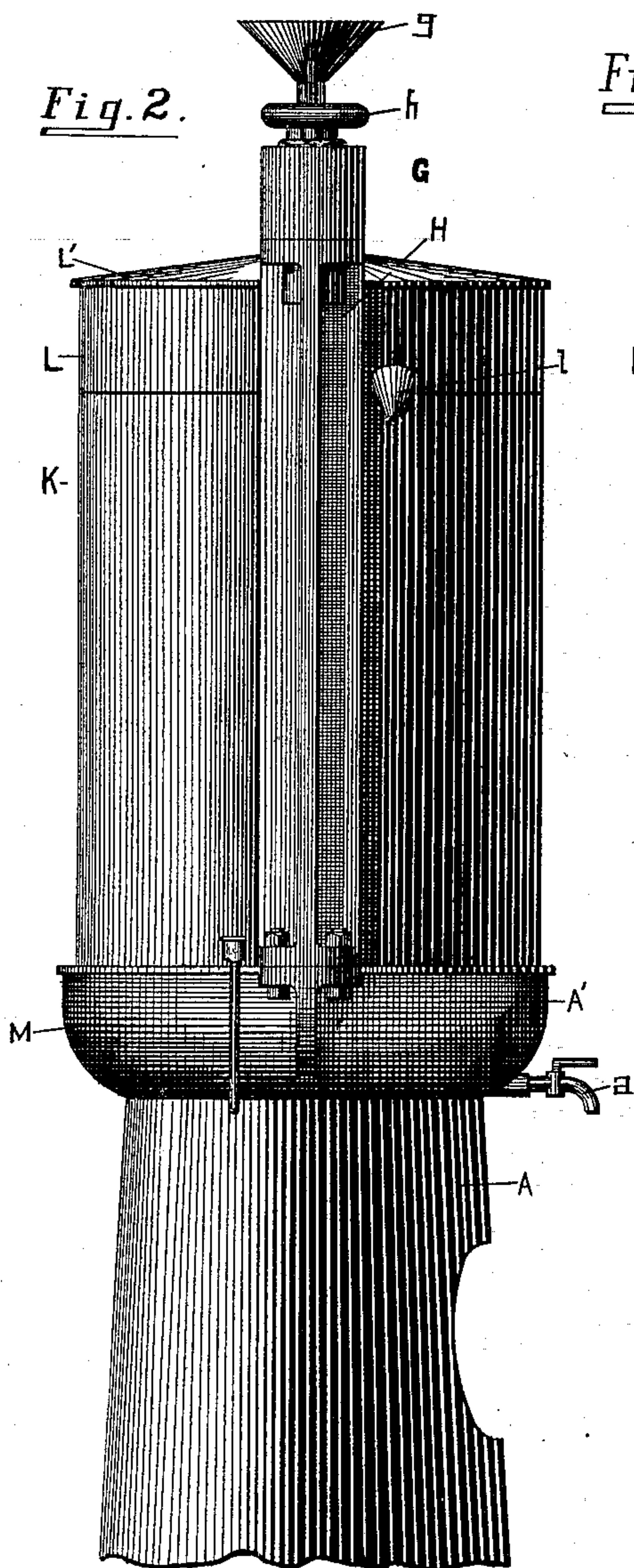


Fig. 4.

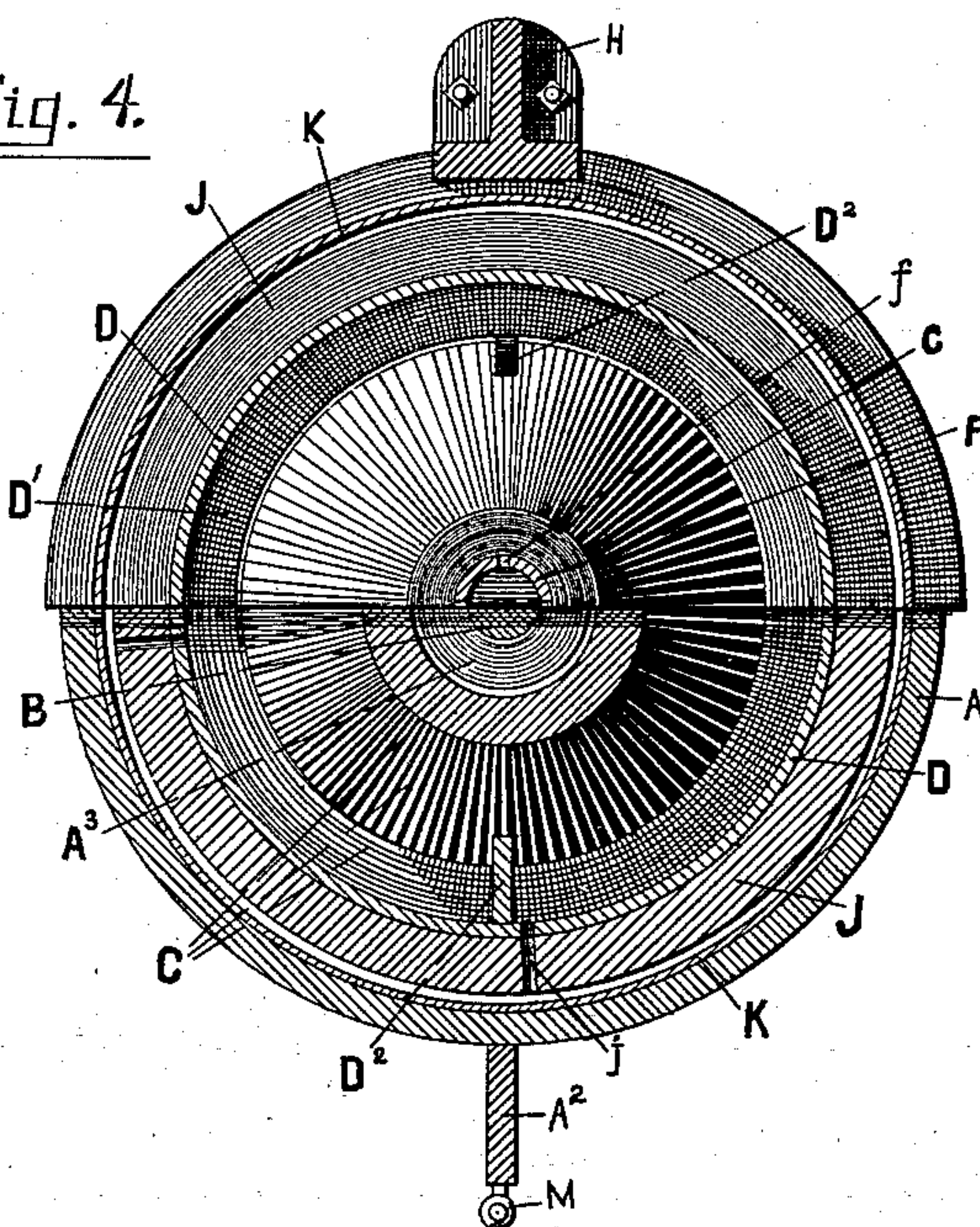
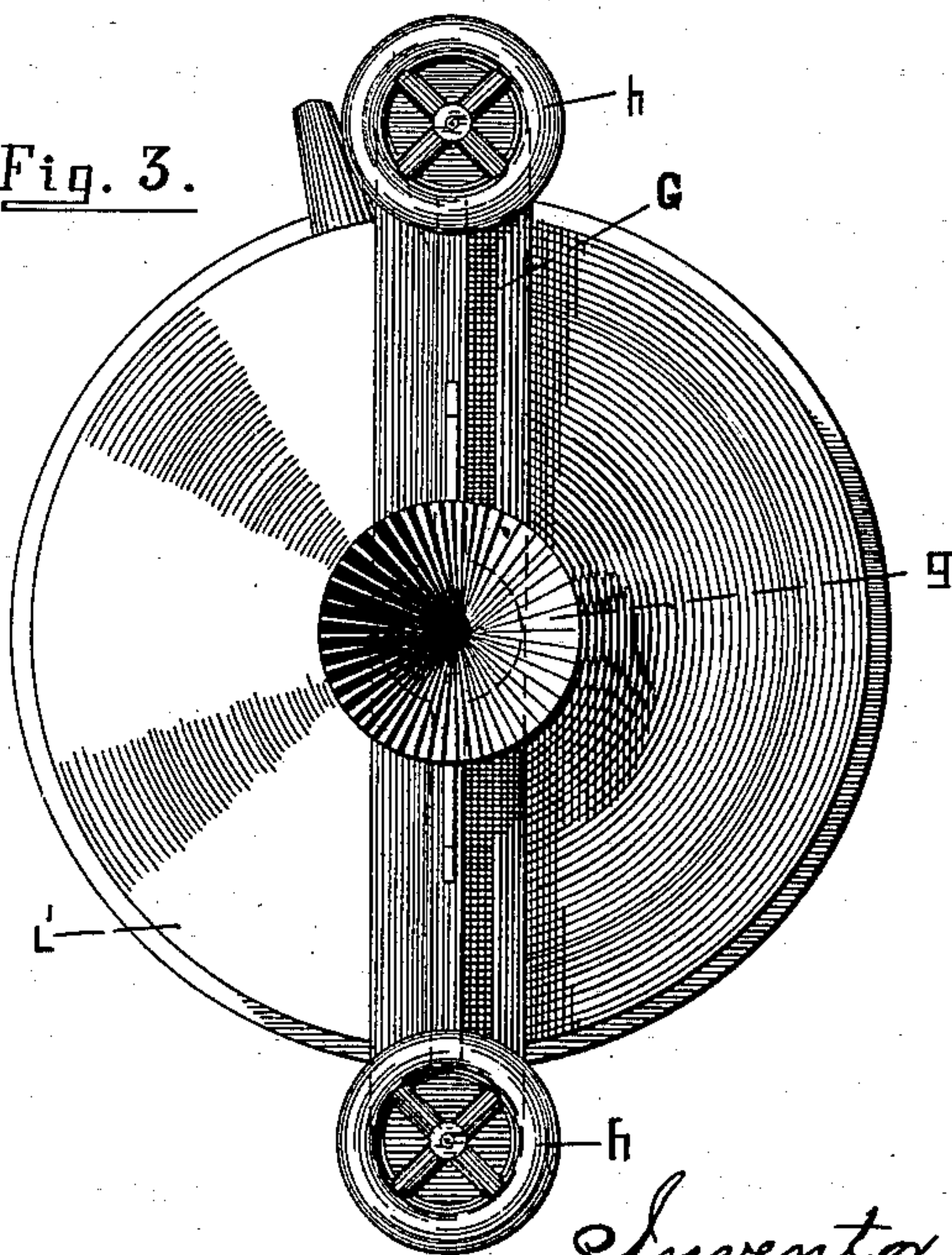


Fig. 3.



Witnesses:
H. S. Austin,
James R. Mansfield
William C. Sullivan.

Inventor:
William Goldsworthy
By his attorneys
Alexander & Towell

UNITED STATES PATENT OFFICE.

WILLIAM GOLDSWORTHY, OF MOLINE, ILLINOIS, ASSIGNOR OF ONE-THIRD
TO EDWARD H. SLEIGHT, OF SAME PLACE.

CENTRIFUGAL LIQUID-PURIFIER.

SPECIFICATION forming part of Letters Patent No. 637,729, dated November 21, 1899.

Application filed January 18, 1899. Renewed October 26, 1899. Serial No. 734,882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM GOLDSWORTHY, of Moline, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Centrifugal Liquid-Purifiers; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in centrifugal liquid-purifiers for purifying milk, water, and other liquids by centrifugal action.

It consists in the novel constructions and combinations of parts hereinafter claimed, and the accompanying drawings illustrate a purifier constructed in accordance with my invention and adapted to be operated by power, being of large size.

In the drawings, Figure 1 is a vertical central section of the purifier. Fig. 2 is a reduced side elevation thereof. Fig. 3 is a top plan view, and Fig. 4 a detail transverse section on line 3 3, Fig. 2.

Referring to the accompanying drawings, A designates the base-casting, having a basin A' at its upper end and provided with bearings for a vertical shaft B, which can be rotated at high speed by any suitable means, as by a belt applied to the pulley B. The upper end of shaft B projects through the journal-bearing A³ in the center of the basin A' on top of the base and carries the purifier-cylinder.

The separator consists of a conical base-plate C, provided with a hub c, fast to the upper end of shaft B, and with a peripheral flange C', which is preferably interiorly threaded and is engaged by the lower end of a cylinder D, forming the main body. The upper end of cylinder D is closed by a conical top E, through the apex E' of which passes a tubular shaft F, the lower end of which is securely connected to the hub c of the base-plate C. In large-sized machines shaft F has a bearing in a yoke-bar G, fastened to side uprights H H of the main frame, which are secured at the lower ends to brackets A² on the sides of basin A'. Bar G is secured to the uprights H by detachable hand-screws h

to facilitate the removal of the cylinder for repairs, &c.

A feed-funnel g is supported on the yoke G and depends into the upper end of the tubular shaft F, so as to supply the liquid thereto. In the lower end of shaft F are apertures f, through which the inflowing liquid enters the cylinder. The apex E' of top E is cylindrical and preferably exteriorly threaded, and on it is secured a cap-nut I, fitted closely around the shaft F, and above this cap-nut, screwed onto the threaded end of shaft F, is a lock-nut F'. The cylinder D may be connected to the base C and top E in any suitable liquid-tight manner. As shown, it is screwed into the flange c' of base-plate C and is rabbeted into the top E, a suitable gasket being placed in the rabbet to make the joint liquid-tight. In the sides of nut I are perforations i, adapted to register with perforations e in part E'. By adjusting the nut I the apertures i e can be moved partially or wholly out of register so that they can be partially or wholly closed. In this manner the liquid being treated can be subjected to a more or less violent or continued centrifugal action in its passage through the cylinder as may be necessary to properly purify the liquid. Liquids vary in the proportion of impurities contained therein. If the impurities are coarse, they can be more rapidly extracted, or if the impurities are very fine—such as are found in muddy water, for instance—a more violent or longer-continued centrifugal action is required to accomplish its purification. By reducing the size of the escape-apertures a longer centrifugal action is obtained, as the liquid is retained in the cylinder for a longer period.

Screwed onto the lower end of cylinder D, just above the flange C', is a locking-band or valve-ring J, provided with apertures j, adapted to register with apertures d in the cylinder when the band is properly adjusted. During the separating or purifying process the band J is shifted so that the apertures d j do not register and no liquid can escape there-through.

Within the cylinder D and attached to the walls thereof are annular inwardly-projecting flanges D', the number of which vary ac-

according to the size and capacity of the separator. These flanges may be concaved on their under sides or beveled downwardly and inwardly, so as to form pockets thereunder, in which impurities will be trapped and retained during the separating process. The lighter impurities are flung outward against the walls of the cylinder by the centrifugal action and tend to rise therein by the natural flow of the liquid upwardly to the outlets *e i*. The cylinder D may also be provided with one or more interior vertical blades D² in its lower end to impart a quick and rapid centrifugal motion to the fluid. The cylinder is inclosed in a casing the sides of which are formed by a casing K and the bottom by the basin A' on the upper end of the base A.

On top of casing K is a removable pan L, into which the purified liquid is discharged through the apertures *e i* and from which it is conveyed through spout *l*. The pan L is closed by a cover L'.

The bearing of the shaft B can be lubricated by the oiling device M, as shown.

In small-sized machines the yoke G and up-rights H may be omitted, as also may the annulus J and the apertures *d*, as a small cylinder can be readily lifted off and cleansed by hand. When a large machine is to be cleaned, it is brought to a standstill, the cap-nut I is shifted so as to close the apertures *e*, and band J is shifted so as to open apertures *d*. Then the water can be supplied to the cylinder and the impurities all driven out into the casing and withdrawn from the basin A' through the cock *a*. The cylinder being in rapid motion forces the water through rapidly, carrying all impurities out that has accumulated. The separated impurities are caught under the flanges D', so that the liquid being purified does not have to pass through the impurities previously separated. I preferably do not use any filtering material, but depend upon centrifugal action.

When the machine is used for purifying milk, it acts as a perfect aerator, the rapid motion creating a suction that removes all the animal heat and odor from the milk. This apparatus will extract from milk all impurities, and the centrifugal action partly breaks up the fatty globules, so that the cream will rise very rapidly to the surface of milk which has been passed through the machine and can thereafter be readily skimmed therefrom before the milk sours.

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

1. The combination of the rotatable purifier having a conical bottom, outlets near its bottom and means for closing such outlets, the cylinder fitted on said bottom, and the conical top fitted on the upper end of said cylinder having outlets at its apex, and means for closing or varying the area of said outlets; with the annular downwardly-inclined flanges

on the internal walls of the cylinder, and the vertical stirrer-blades at the lower end of the cylinder below the flanges, and the casing inclosing said purifier, substantially as and for the purpose described.

2. The combination of the vertical rotatable purifier having a conical bottom provided with a central hub, the cylinder fitted onto said bottom, and the conical top fitted on the upper end of said cylinder having outlets at its apex, and the adjustable flanged nut fitted on the apex of the top and provided with apertures adapted to register with outlet-apertures in the apex of the top; substantially as described.

3. The combination of the vertical rotatable purifier having a conical bottom provided with a central hub, the cylinder fitted onto said bottom at its lower end, and the conical top fitted on the upper end of said cylinder having outlets at its apex; with the adjustable flanged nut fitted on the apex of the top and provided with apertures adapted to register with outlet-apertures in the apex of the top; and the cleansing-apertures in the lower end of the cylinder and the annular band for closing said apertures, substantially as described.

4. The combination of the vertical rotatable purifier having a conical bottom provided with a central hub and a peripheral flange, the cylinder fitted into said flange at its lower end, and the conical top fitted on the upper end of said cylinder having outlets at its apex, the hollow shaft passing through said top and fastened to the hub of the bottom, provided with fluid-outlets near its lower end, and the adjustable flanged nut fitted on the apex of the top and provided with apertures adapted to register with outlet-apertures in the apex of the top; with the cleansing-apertures near the lower end of the cylinder and the annular band for closing said apertures, substantially as described.

5. The combination of the vertical rotatable purifier having a conical bottom provided with a central hub and a peripheral flange, the cylinder fitted into said flange at its lower end, and the conical top fitted on the upper end of said cylinder having outlets at its apex, the hollow shaft passing through said top and fastened to the hub of the base, provided with fluid-outlets near its lower end, and the adjustable flanged nut fitted on the apex of the top and provided with apertures adapted to register with outlet-apertures in the apex of the top; with the cleansing-apertures near the lower end of the cylinder and the annular band for closing said apertures; the annular downwardly-inclined or concaved flanges on the internal walls of the cylinder, the casing inclosing said centrifugal separator, and the pan for receiving the liquid discharged from the upper end of the cylinder, for the purpose and substantially as described.

6. In a centrifugal liquid-purifier, the com-

5 bination of the base, a vertical shaft jour-
naled in said base, the centrifugal separator
on said shaft consisting of a conical bottom
C attached to said shaft and having a periph-
10 eral flange C', a cylinder D fitted to said flange
and a conical top E fitted on the upper end
of the cylinder D and having a contracted
apex E' provided with outlet-apertures, a hol-
low shaft extending through the top E and
15 connected at its lower end to the hub of the
bottom C, and provided with outlet-apertures
in its lower end, the adjustable cap-nut I
screwed onto the apex of the top E, and the
annular impurity-retaining flanges D', and
20 the agitator-blades D², within the cylinder,
all substantially as and for the purpose de-
scribed.

7. In a centrifugal liquid-purifier, the com-
20 bination of the base having a basin on its up-
per end, a vertical shaft journaled in said
base and projecting above the basin, the up-
rights mounted on said base and the yoke
supported on and detachably connected to the
upper end of said uprights, the centrifugal
25 separator supported on said shaft consisting
of a conical bottom C attached to said shaft
and having a peripheral flange C', a cylinder
D fitted to said flange and a conical top E fit-
ted on the upper end of the cylinder D; with
30 an inlet-pipe journaled in said yoke G and ex-
tending through the top E and connected at
its lower end to the hub of the bottom C, and
provided with outlet-apertures in its lower
end, the adjustable cap-nut I screwed onto

the apex of the top E, the annular impurity- 35
retaining flanges D' and the agitator-blades
D² within the cylinder, the casing K mounted
upon the basin A', and catch-pan L mounted
upon the casing K, all constructed and ar-
40 ranged substantially as and for the purpose
described.

8. In a centrifugal liquid-purifier, the com-
bination of the base, having a basin on its up-
per end, a vertical shaft journaled in said 45
base and projecting above the basin, the up-
rights mounted on said base and the yoke
supported on and detachably connected to the
upper end of said uprights, the centrifugal
separator supported on said shaft consisting
of a conical bottom C attached to said shaft 50
and having a peripheral flange C', a cylinder
D fitted to said flange and a conical top E fit-
ted on the upper end of the cylinder D; with
a hollow shaft journaled in said yoke G and
extending through the top E and connected 55
at its lower end to the hub of the bottom C,
and provided with outlet-apertures in its
lower end, the casing K mounted upon the
basin A', and the catch-pan L mounted upon
the casing K, all constructed and arranged 60
substantially as and for the purpose described.

In testimony that I claim the foregoing as
my own I affix my signature in presence of
two witnesses.

WILLIAM GOLDSWORTHY.

Witnesses:

E. H. SLEIGHT,

GUY R. FRAZELLE.