R. A. STURGEON.

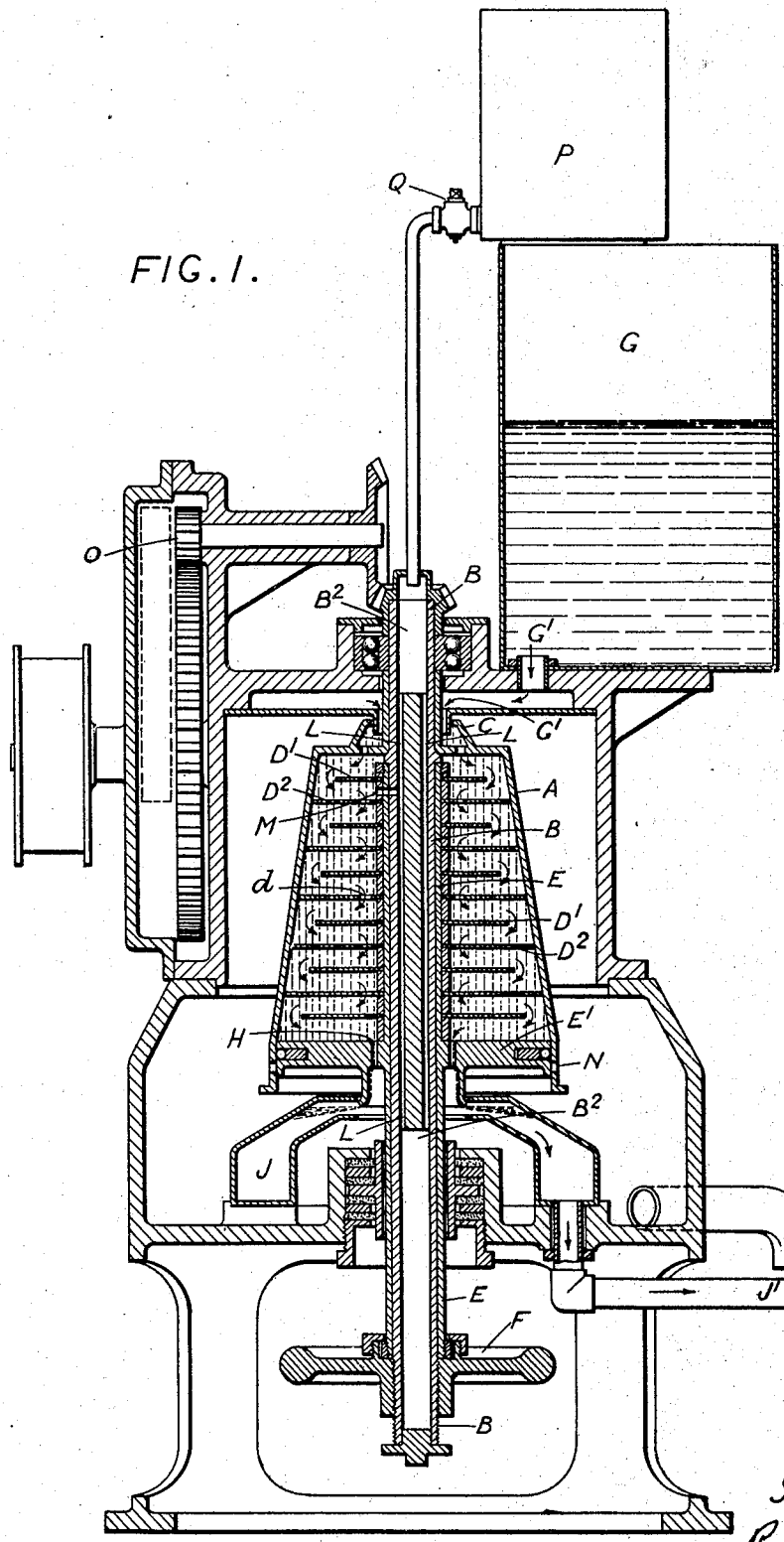
CENTRIFUGAL SEPARATOR AND PROCESS.

APPLICATION FILED APR. 11, 1919.

1,356,665. Patented Oct. 26, 1920.

2 SHEETS—SHEET 1.

FIG. 1.



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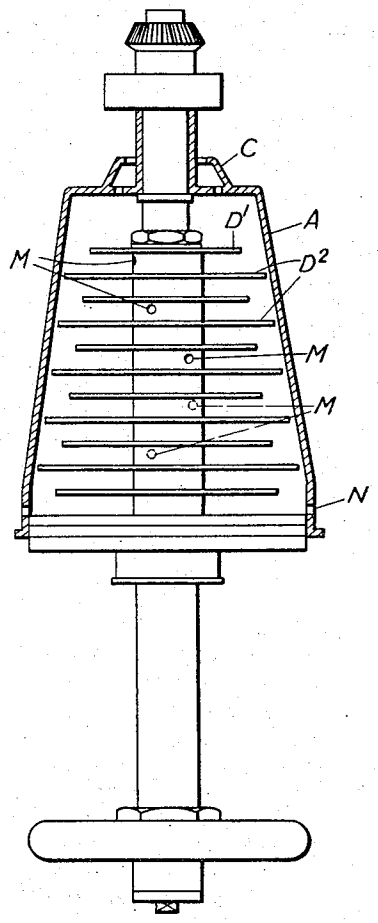
CENTRIFUGAL SEPARATOR AND PROCESS.

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2 SHEETS—SHEET 2.

FIG. 2.



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UNITED STATES PATENT OFFICE.

ROBERT ALEXANDER STURGEON, OF SOUTHSEA, ENGLAND.

CENTRIFUGAL SEPARATOR AND PROCESS.

1,356,665. Specification of Letters Patent. Patented Oct. 26, 1920.

Application filed April 11, 1919. Serial No. 289,384.

To all whom it may concern:

Be it known that I, ROBERT ALEXANDER STURGEON, a subject of the King of England, and resident of Southsea, Portsmouth, England, have invented certain new and useful Improvements in Centrifugal Separators and Processes, of which the following is a specification.

This invention relates to methods of and to machines for the purpose of clarifying liquors generally, and more particularly for the purpose of sterilizing water by centrifugal action combined with precipitation.

According to this invention, means are provided on a single spindle, for passing the liquor through two or more stages of centrifugal treatment, and for adding suitable precipitants, coagulants, or the like, before, during, (and) or after each stage.

One construction of the machine is shown by way of example in the accompanying drawings, in which,

Figure 1 shows a sectional elevation of the machine in its operating position, and

Fig. 2 shows a sectional elevation of the rotating parts when the cylinder is being washed out.

In Fig. 1 the conical casing A is mounted on a tubular spindle B. The upper end of the casing A is provided with a conical trap C, to catch the liquid under treatment, which passes from the tank G, through the passages G'.

Mounted on the spindle B, is a tubular member E, which carries the piston E' and the disks D' and D^2. The alternate disks D' do not reach the inner walls of the conical casing while the intermediate disks, D^2, make a joint therewith, thus forming a series of separate superimposed compartments.

The piston E' is provided with a suitable joint so that no liquid can pass between its edge and the inner wall of the casing A, the lower part of which is formed cylindrical.

The tubular member E is provided with a hand wheel F, at its lower end, which is free to turn on the screwed end of the spindle B, so as to raise and lower the piston E', and the disks D' and D^2.

Inside the hollow spindle B, is a solid bar B^2, provided with channels L, the ribs between the channels forming a joint with the inner wall of the hollow spindle B, so that the channels form longitudinal passages within the spindle.

The spindle B, casing A, and parts connected thereto are driven through suitable gearing O.

The liquid under treatment enters the machine through the trap C, and flows past the edges of the disks D' and back toward the center and through the holes *d* near the centers of the disks D^2, and eventually escapes from the centrifuge through the holes H in the piston E' into the catcher J, whence it flows through the pipes J'.

During the passage of the liquid, suitable coagulant, precipitant or the like is allowed to flow from the chemical tank P, past the regulating valve Q, and into the upper end of the spindle B, where it is distributed in predetermined proportions, down the channels L, and into the casing A, through the holes M, one of which is opposite each channel, forming a passage through the walls of the spindle B and the tube E. Each hole M feeds the chemical to one of the compartments formed by the disks D^2, and the feed is distributed in that compartment, by the fact that there is always slip, either forward or backward, between the rotating parts and the rotating liquid. The result is that the holes rotate relatively to liquid under treatment, and distribute the chemical uniformly over the inner surface thereof.

The impurities are thrown out to the periphery by centrifugal force, assisted by the aforesaid chemical, and are there deposited.

The centrifuging in stages, with separate introduction of chemical between each stage, is an essential feature of this invention.

After running for a period, it will be desirable to wash out the centrifuge. This is done by slowing down or stopping the machine, screwing down the handwheel F, so as to cause the disks D^2 to be clear of the inner wall of the casing A, and the piston E' to uncover the ports N, which are formed through the wall of the casing A, at its lower end. (See Fig. 2.)

Water is then passed through the ma-

chine while the latter rotates thus flushing it completely. The water swirls around the inner walls of the casing A thoroughly cleansing them and escapes through the ports N.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The process of clarifying liquors consisting in passing liquor to be clarified through a suitable centrifuging apparatus and adding a reagent to the liquor at a plurality of points along its course through the apparatus, while being centrifuged.

2. The process of clarifying a liquor consisting in passing the same through a series of compartments in each of which it is centrifuged and treated with a reagent.

3. The process of clarifying a liquor consisting in passing the same through a series of compartments in each of which it is simultaneously centrifuged and treated with a reagent.

4. In apparatus for clarifying liquors, in combination a rotatable casing having a plurality of communicating compartments through which, in succession, the liquor passes, and means for adding a reagent to the liquor contained in one of said compartments for the purpose set forth.

5. In apparatus for clarifying liquors, in combination, a rotatable casing having a plurality of communicating compartments through which, in succession, the liquor passes, and means for adding a reagent to the liquor contained in each of said compartments.

6. In a centrifugal separating machine, the combination of a centrifuge, a plurality of superimposed compartments formed within the centrifuge through which the liquid under treatment passes successively and means for admitting a reagent to each compartment for each centrifuging stage.

7. In a centrifugal separating machine the combination of a centrifuge, a plurality of superimposed compartments formed within the centrifuge through which compartments the liquid under treatment passes for successive centrifuging therein, means for admitting to each compartment a reagent and means for flushing the interior of the centrifuge and its compartments.

8. In a centrifugal separating machine the combination of a rotary shaft, a casing carried thereby, a sleeve surrounding the shaft and rotating therewith, a plurality of disks carried by the sleeve and constituting a series of superimposed centrifuging compartments within the casing, means for admitting liquid to each compartment for successive centrifuging therein and means for admitting a reagent to each compartment through the sleeve.

9. In a centrifugal separating machine the combination of a rotary shaft, a casing carried thereby, a sleeve surrounding the shaft and rotating therewith, a plurality of disks carried by the sleeve and constituting a series of superimposed centrifuging compartments within the casing, means for admitting liquid to each compartment for successive centrifuging therein, means for admitting a reagent to each compartment through the sleeve, means for moving the sleeve and disk axially relatively to the casing and means for flushing the disks and the interior of the casing.

10. In a centrifugal separating machine the combination of a hollow rotary spindle, a conical casing carried thereon, a sleeve surrounding the spindle and rotating therewith a piston carried by the sleeve adapted to close the lower end of the casing, a plurality of disks mounted on the sleeve and constituting a series of superimposed compartments within the conical centrifuging casing through which compartments the liquid under treatment passes successively, means for admitting a reagent to each compartment through the spindle and sleeve, means for moving the disks and piston axially relatively to the casing to form a free passage through the latter and means for flushing the disks and interior of the casing.

In testimony whereof I have signed my name to this specification.

ROBERT ALEXANDER STURGEON.