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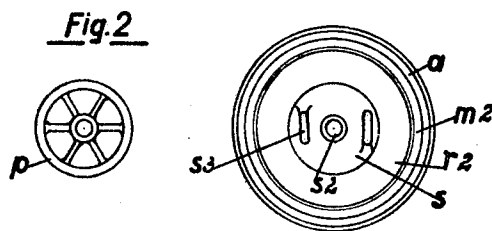
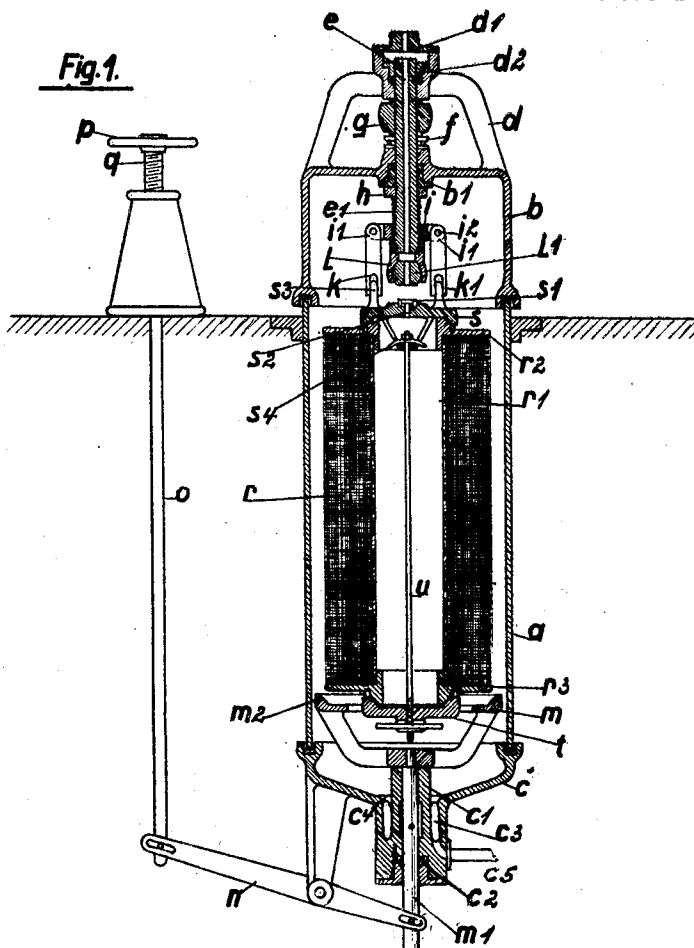
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H. WOLFER

CENTRIFUGAL MACHINE FOR TREATING TEXTILES WITH LIQUID AND GASES

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2 Sheets-Sheet 1



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By Hans & Danielson,
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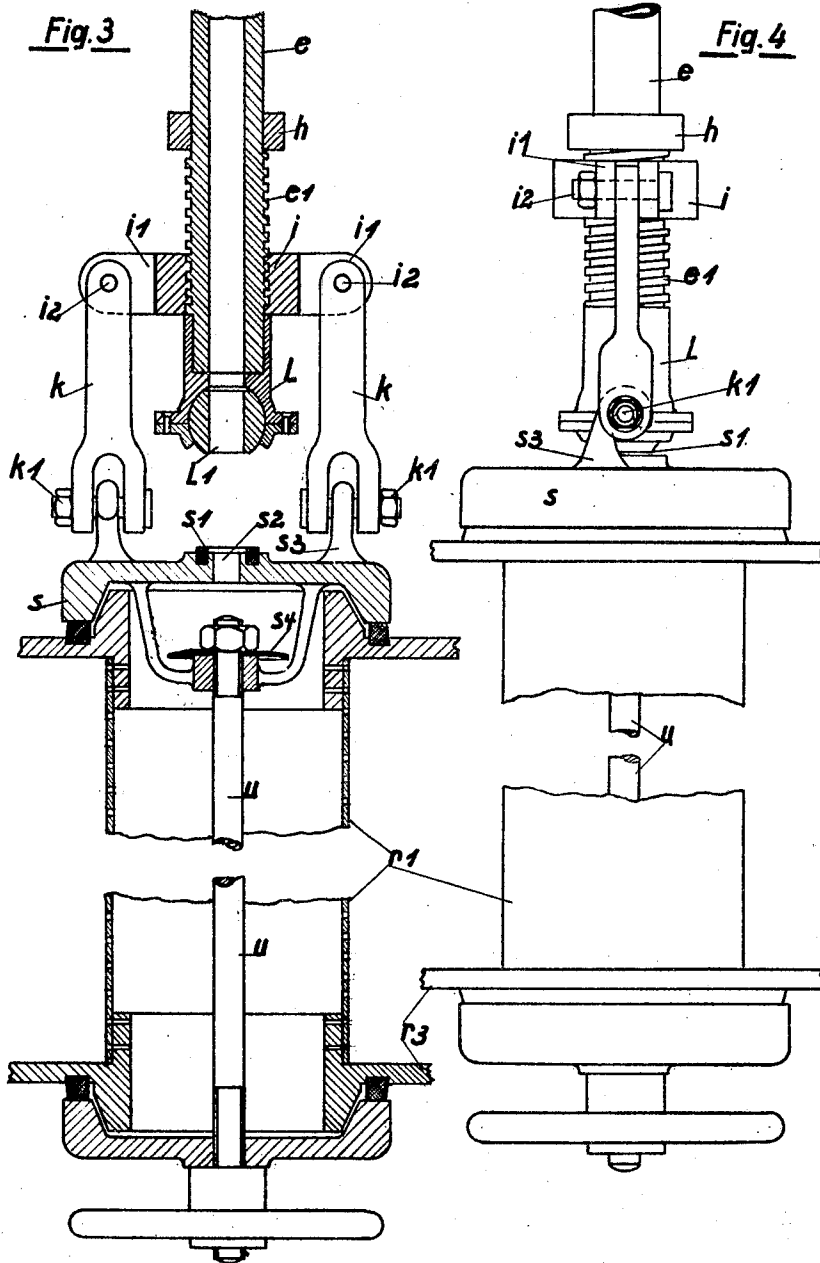
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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL MACHINE FOR TREATING TEXTILES WITH LIQUID AND GASES.

Application filed December 8, 1924. Serial No. 754,571.

To all whom it may concern:

Be it known that I, HEINRICH WOLFER, a citizen of the German Republic, and resident of Ludwigshafen-on-the-Rhine, Germany, have invented certain new and useful Improvements in Centrifugal Machines for Treating Textiles with Liquid and Gases, of which the following is a specification.

This invention relates to a centrifugal machine for treating textiles with liquid and gases and of the type comprising a vertical receptacle within which a perforated drum wound with the materials to be treated, is rotated by means of a hollow driving shaft through which the liquid and gases are supplied.

The invention consists essentially in the provision of means whereby the drum can be suspended from the driving shaft so that it can adjust itself about the suspension point and effect its own centration. Thus the usually employed centering devices and the labour involved in the adjustment of the same, will be obviated. Means are provided whereby the drum is automatically applied to the fluid delivery nozzle at the commencement of the operation and withdrawn therefrom as the machine is stopped. The invention also includes improved devices for supporting and adjusting the drum during the suspension, as well as for supplying and discharging the fluid whereby the materials are treated.

Fig. 1 of the accompanying drawings represents a vertical section of the complete apparatus, and

Fig. 2, a top view of the same with the cover of the vessel removed.

Fig. 3 is a sectional view on an enlarged scale of the drum and its suspending elements, and

Fig. 4 is an elevation at right angles to Fig. 3 and with the drum shown in a different position relative to the driving shaft.

The device comprises a vertically supported, preferably cylindrical vessel *a* which is closed at the top by a cover *b* and at the bottom by a cover *c*, both covers being connected to the vessel so as to effect a tight closure. The top cover *b* is detachable and carries a hollow shaft *e* which is coaxial with the vessel *a*. One bearing for the shaft *e* is held by the cover *b* direct, and the other bearing is held on the cover by a shackle *d*. Both bearings are constructed as stuffing

boxes and fitted with glands *d*² and *b*¹ respectively. The upper bearing is closed by a pipe connection *d*¹ to which the different supply pipes can be readily connected for feeding liquid or gas through the shaft *e*. The shaft carries a driving pulley *g* and is prevented from axial displacement, in downward direction by a thrust bearing *f* and in the upward direction by a collar *h*. The lower portion *e*¹ of the shaft is screw-threaded for the reception of a nut *i* which is fitted with two diametrically opposed, forked wings *i*¹. Links *k* are suspended on pins *i*² in the wings *i*¹ for carrying the warp beam *r*¹ or other drum on which the materials *r* are wound for treatment. The drum *r*¹ is perforated so that the liquid or gas can be forced radially through the drum and through the materials *r* into the vessel *a*. Rings provided with flanges *r*² and *r*³ respectively are fitted in the ends of the drum *r*¹, and caps *s* and *t* are applied to the rings so as to close the end of the drum. The caps are held in position by means of a clamping device composed of a rod *u* which passes centrally through the drum and which is screw-threaded for the reception of a clamping nut. The latter is constructed as a hand wheel and bears against the cap *t* while the opposite end of the rod is firmly connected by means of a shackle to the cap *s*. The cap *s* is fitted with two diametrically opposed hooks *s*³ which face tangentially in opposite directions and which are spaced in conformity with the links *k* so that they can be attached to the latter for the suspension of the drum *r*¹. The lower ends of the links *k* are forked and fitted with bolts *k*¹ for engagement with the hooks *s*³. The bolts *k*¹ are arranged at right angles to the pins *i*². For admitting the fluid from the shaft *e* into the drum *r*¹, the cap *s* is provided with a central aperture *s*² which is surrounded by a packing ring *s*¹. For engagement with this ring the shaft *e* carries at its lower end a spherical body *L*¹ having a diametral bore through which the duct of the shaft *e* and the aperture *s*² of the cap *s* can communicate. The body *L*¹ is ground to a supporting shell *L* so that it can turn in the latter and follow the oscillations of the drum *r*¹ when in contact therewith. A dished plate *s*⁴ is arranged in the drum *r*¹ under the cap *s* so as to receive the liquid from the shaft *e* and divert it towards the drum wall.

The lower cover *c* of the vessel *a* has a boss *c*¹ in which a plunger *m*¹ is guided. Connected to the upper end of this plunger by means of radial upturned arms, is a ring *m* fitted with a raised edge *m*². This ring serves as a temporary support for the drum *r*¹ which it is adapted to hold in a central position relative to the shaft *e*. The plunger *m*¹ is engaged by a double-armed lever *n* which can be operated by means of a rod *o*, a screw spindle *q*, and a hand wheel *p* for raising and lowering the ring *m*. The plunger *m*¹ passes through a stuffing box which is fitted with a gland *c*². The liquid from the vessel *a* passes through a funnel-shaped space *c*⁴ in the cover *c* into an annular space *c*³ made in the boss which surrounds the plunger *m*¹, and a pipe *c*⁵ leads from the space *c*³ for conveying the liquid wherever required.

In preparing the device for use, the cover *b* is first removed together with the machine elements connected to it. The drum *r*¹ is, together with the materials *r*, connected by means of the hooks *s*³ to a hoisting tackle and lowered vertically into the vessel *a*. When it is at rest on the supporting ring *m*, which should be in its lowest position, the hoisting tackle is removed, and the cover *b* is replaced on the vessel and secured in position. Thereupon the drum *r*¹ is raised by means of the gear *p*, *q* until the hooks *s*³ are in a position to enter the forks of the links *k*. Suitable stops may be provided for determining its position. The shaft *e* is then turned by means of the pulley *g* until the bolts *k*¹ strike against the stems of the hooks with the latter in an overhanging position. If now the support *m* is lowered, the bolts *k*¹ will be engaged by the hooks *s*³, and the drum *r*¹ will remain suspended on the links *k* ready for action. After the connection of a supply pipe to the nipple *d*¹, the shaft *e* is set in motion. Owing to the inertia of the drum and to the small friction between the screw *e*¹ and the nut *z*, there will at first be a rotary displacement of the shaft relative to the nut which causes the drum to be raised and the orifice of the aperture *s*² to be applied to that of the ball *I*¹. Further rotary displacement of the shaft relative to the drum is then prevented, and the drum, which is free to swing about the center of the ball joint, will acquire proper centration while participating in the rotary motion of the shaft. As the shaft now communicates with the aperture *s*² and therefore with the interior of the drum, the supply taps can be opened so as to admit the fluid, which passes through the drum and through the material *r* under the influence of the centrifugal effect. The material may be subjected in this manner to alternate steeping and drying proc-

esses without stopping the machine. When liquid is supplied, the plate *s*⁴ ensures a uniform distribution of the same all along the interior of the drum. For the drying process, air under pressure is supplied, and the process can be speeded up by connecting the pipe *c*⁵ to an exhaust. Heating of the air also accelerates the drying process. When a circulation of liquid or gases is required, for instance for dyeing or bleaching, the pipe *c*⁵ may be connected to the supply nipple *d*¹ through a pump and, if required, through a boiler. Suitable windows may be provided in the vessel *a* and in the cover *b* for inspection purposes.

When the treatment is completed, the supply of fluid is cut off, and the machine is stopped. The drum *r*¹ continues to move after the power has been cut off and in so doing turns the nut on the screw thread *e*¹ and descends to its initial position, thereby interrupting the communication between the shaft and the interior of the drum. When the drum is at rest, the supporting ring *m* is raised so as to lift the drum and disengage the hooks *s*³ from the bolts *k*¹. Then the shaft *e* is turned so as to move the links away from the hooks, whereupon the cover *b* can be removed, and the drum *r*² lifted out of the vessel *a*.

Instead of driving the machine by means of a pulley *g*, an electric or other motor may be mounted on the cover *b* and connected to the shaft for direct drive.

Other devices than those described may be employed for setting the drum automatically in communication with the hollow driving shaft. The adjustment may, for instance, be effected centrifugally by means of weighted levers.

I claim:

1. A centrifugal machine for treating textiles with liquid and gases, comprising a closed vessel, a hollow vertical shaft supported rotatably in the upper part of said vessel, a perforated drum adapted to be wound with the materials to be treated, means for suspending said drum on said shaft vertically inside the vessel so that rotation will be communicated by the shaft to the drum and so that the latter can adjust itself about the suspension point and effect its own centration, and means for maintaining the duct of the shaft in communication with the interior of the drum.

2. A centrifugal machine for treating textiles with liquid and gases, comprising a closed vessel, a hollow vertical shaft supported rotatably in the upper part of said vessel, a perforated drum adapted to be wound with the materials to be treated, means for suspending said drum on said shaft vertically inside the vessel so that rotation will be communicated by the shaft

to the drum and so that the latter can adjust itself about the suspension point and effect its own centration, caps covering the ends of said drum, the top cap having a central inlet aperture, and automatically operating means for lifting the drum at the commencement of the rotation so as to apply the cap aperture to the end of the hollow shaft and for re-lowering the drum when the rotation stops.

3. A centrifugal machine for treating textiles with liquid and gases, comprising a closed vessel, a hollow vertical shaft supported rotatably in the upper part of said vessel and provided with a screw-threaded lower vent, a perforated drum adapted to be wound with the materials to be treated, suspending hooks connected to one end of the drum, a winged nut arranged on the screw-threaded end of the shaft, forked links pivotally suspended on the wings of said nut, and bolts fitted in the forks of said links so that the drum can be suspended thereon by means of its hooks inside the vessel for receiving motion from the shaft, the nut being free to rotate on the shaft under the influence of the inertia of the drum so that the latter will be raised against the end of the shaft at the commencement of the motion and withdrawn therefrom when the shaft is stopped, the drum being provided with an inlet aperture arranged so as to be applied to the end of the hollow shaft when the drum is thus raised.

4. A centrifugal machine for treating textiles with liquid and gases, comprising a closed vessel, a hollow vertical shaft supported rotatably in the upper part of said vessel and provided with a screw-threaded lower end, a bored spherical body held swivelly at the lower end of the shaft as a continuation of its duct, a perforated drum adapted to be wound with the materials to be treated, suspending hooks connected to one end of the drum, a winged nut arranged on the screw-threaded end of the shaft, forked links pivotally suspended on the wings of said nut, and bolts fitted in the forks of said links so that the drum can be suspended thereon by means of its hooks inside the vessel for receiving motion from the shaft, the nut being free to rotate on the shaft under the influence of the inertia of the drum so that the latter will be raised against the shaft at the commencement of the motion and withdrawn therefrom when the shaft is stopped, the drum being provided with an inlet aperture arranged so as to be applied to the orifice of said spherical body when the drum is thus raised.

5. A centrifugal machine for treating textiles with liquid and gases, comprising a

closed vessel, a hollow vertical shaft supported rotatably in the upper part of said vessel, a perforated drum adapted to be wound with the materials to be treated, means for suspending said drum on said shaft vertically inside the vessel so that rotation will be communicated by the shaft to the drum and so that the latter can adjust itself about the suspension point and effect its own centration, a stuffing box surrounding the upper end of the shaft, a pipe connection applied to said stuffing box for feeding fluid into the shaft, and means for maintaining the duct of the shaft in communication with the interior of the drum during the operation.

6. A centrifugal machine for treating textiles with liquid and gases, comprising a closed vessel, a hollow vertical shaft supported rotatably in the upper part of said vessel, a perforated drum adapted to be wound with the materials to be treated, means for suspending said drum on said shaft vertically inside the vessel so that it will be rotated by the shaft and so that it can adjust itself about the suspension point and effect its own centration, a vertically adjustable support arranged in the lower part of the vessel and adapted to receive and centre the drum previous to the suspension of the same, means for withdrawing the support after the suspension, and means for maintaining the duct of the shaft in communication with the interior of the drum during the operation.

7. A centrifugal machine for treating textiles with liquid and gases, comprising a vertical cylindrical vessel, covers forming top and bottom of said vessel, a hollow driving shaft supported vertically and rotatably in the top cover of the vessel, a perforated drum adapted to be wound with the materials to be treated, means for suspending said drum vertically on said shaft inside the vessel so that it will be rotated by the shaft and so that it can adjust itself about the suspension point and effect its own centration, means for feeding fluid through the hollow shaft into the drum during the operation, a vertical plunger guided in the bottom cover of the vessel, a flanged ring carried by said plunger inside the vessel, said ring being adapted to serve as a temporary support for the drum during the suspension, means for withdrawing the support from the drum after the suspension, the bottom cover being provided with an annular space arranged so as to receive the fluid from the vessel, and a pipe communicating with said space for discharging the fluid.

HEINRICH WOLFER.