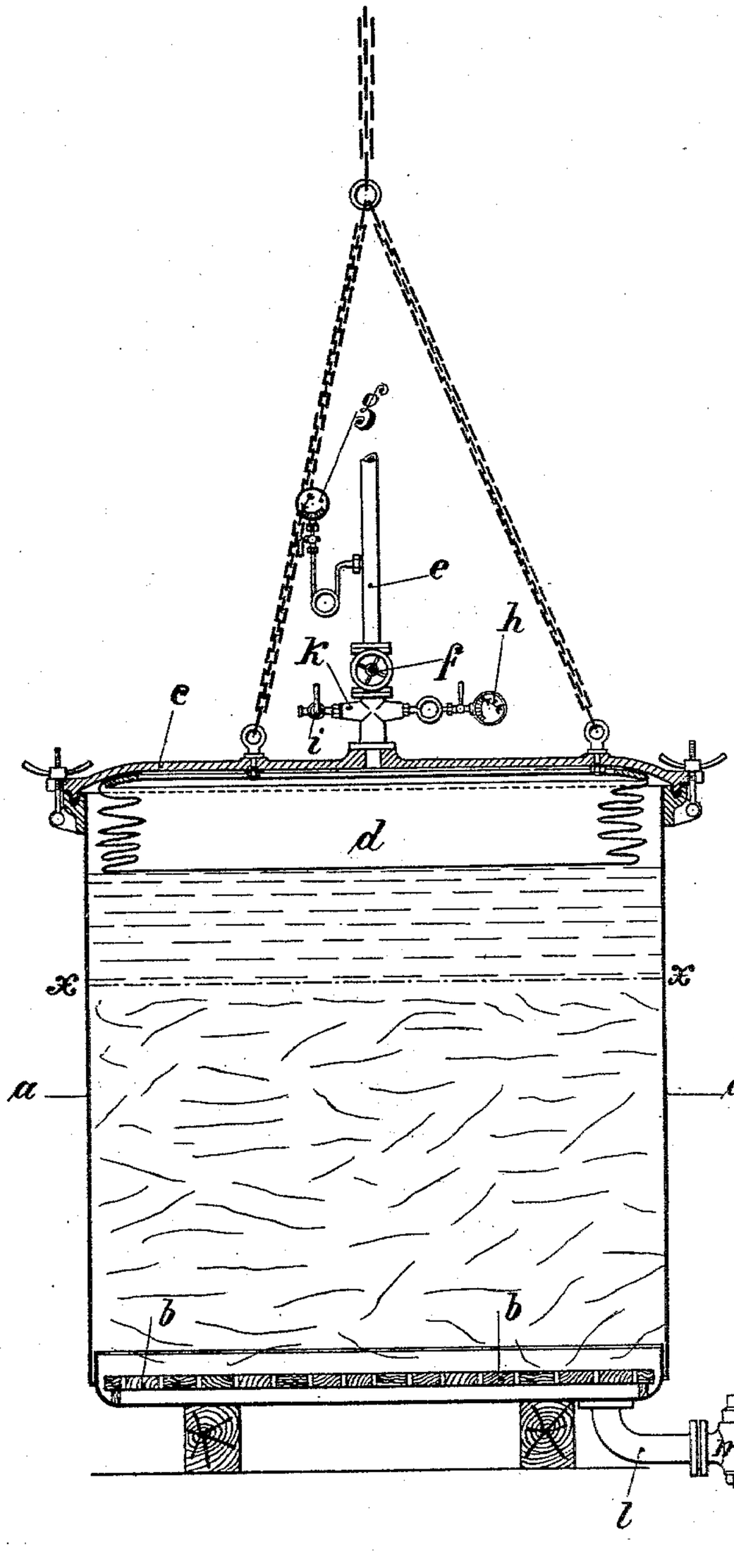
(No Model.)

L. HWASS.

APPARATUS FOR DYEING, &c.

No. 597,716. Patented Jan. 25, 1898.



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UNITED STATES PATENT OFFICE.

LEONARD HWASS, OF CREFELD, GERMANY, ASSIGNOR TO G. BUSCHGENS & SOHN, OF SAME PLACE.

APPARATUS FOR DYEING, &c.

SPECIFICATION forming part of Letters Patent No. 597,716, dated January 25, 1898.

Application filed January 13, 1897. Serial No. 619,039. (No model.) Patented in Germany July 4, 1895, No. 90,221.

To all whom it may concern:

Be it known that I, LEONARD HWASS, a subject of the King of Sweden and Norway, residing at Crefeld, Germany, have invented certain new and useful Improvements in Apparatus for Impregnating, Bleaching, Mordanting, or Dyeing Fibrous Materials or Fabrics, (for which I have obtained German Patent No. 90,221, dated July 4, 1895,) of which the following is a specification.

The present invention consists of an apparatus for treating fibrous materials—*e. g.*, yarn and thread—and fabrics—*e. g.*, textile fabric, tissue, and cloth—with fluids, and serving especially for impregnating, bleaching, mordanting, or dyeing fibrous materials—such as yarn, thread, fabrics, textile fabrics, &c.—said apparatus comprising an expansible chamber arranged within the receptacle for the material and the fluid with which the latter is to be impregnated or treated. After the material and the fluid have been placed in the receptacle and the latter closed air-tight the expansible body or chamber is inflated and compresses the contents of the receptacle, thus causing the fluid to enter all the pores of the material or fabric. The outlet for the fluid is then opened, whereupon the expansible body will continue to expand, driving the fluid out of the receptacle and pressing or squeezing out the material or fabric to any desired extent.

In order to render the present specification more easily intelligible, reference is had to the accompanying drawing, in which similar letters of reference denote similar parts, and which shows the apparatus in vertical section.

The apparatus consists of the casing or receptacle *a*, having a perforated plate *b*, arranged a short distance above the bottom and having a cover *c*, to the under side of which is air and fluid tightly attached an air and liquid tight bag or expansible chamber *d*. The bag may be made of oil-canvas, rubber, gutta-percha, or other suitable material. The cover *c* is provided with a pipe *e*, leading from the interior of the bag and serving to conduct compressed air or hydraulic pressure to the same. The pipe is provided with a stop-cock *f*, pressure-gages *g* and *h*, and with a lateral branch pipe *k*, having stop-cock *i*, forming the outlet for the pressure fluid. A pipe *l* is provided at the bottom of the receptacle *a* and fitted with a stop-cock *m*.

The apparatus is manipulated in the following manner: The material to be treated is placed in the receptacle *a*, which is filled therewith to about the line *x x*, the material lying on the perforated plate *b*. The cock *m* of the pipe *l* is now opened, and the fluid with which the material is to be treated is forced into the receptacle and through the perforations of the plate *b* in sufficient quantity to completely cover the fibrous material or fabric, and the cock *m* is then closed. The perforated plate *b*, being raised above the bottom of receptacle *a*, serves to prevent the material from stopping the opening of the pipe *z* and also to allow the impregnating fluid to reach the entire under surface of the material. The cover *c* is then fastened down air-tight on the receptacle *a* and the cock *f* of the pressure-fluid-feed pipe *e* opened. The pressure fluid now passes into the bag *d* and inflates the same. Thus pressure will be exercised on the fluid in the receptacle and the same will be forced into all the pores of the material therein and thoroughly impregnate the same. When the pressure has reached the desired height, which may be read off from the gage—for instance, four atmospheres—the cock *f* should be closed and the material allowed to remain in the receptacle for a suitable period of time, according to the nature of the same. In some cases ten minutes will be sufficient, while in others several hours may be required. The cock *f* of the pressure-fluid feed is then opened and also the cock *m* of the fluid outlet and inlet pipe *l*, so that the bag will expand still more and forcing the fluid through the material and through the perforations of plate *b* out at *l* will press the material in the receptacle. The flexible walls and bottom of the bag will accommodate themselves to any unevenness of the upper surface of the material and equalize the pressure exerted on the whole mass. It is advantageous to continue forcing the fluid out until the material is sufficiently wrung out by the pressure of the bag, which can be ascertained from the quantity of fluid expressed. The cocks *f* and *m* are then closed and the cock *i* opened to al-

low the outlet of the pressure fluid from the bag. The cover *c* is then removed and the material taken out of the receptacle.

If desired, the fluid-outlet at *l* may be accelerated by connecting the pipe to a suction device.

The fluid inlet and outlet may not be necessarily arranged at the bottom of the receptacle *a*. It can, if desired, be at the top or at any other suitable point. A separate inlet and outlet may also be provided for the fluid should such appear advisable.

I claim as my invention—

1. An apparatus for treating fibrous material and fabrics with impregnating fluid, consisting of a receptacle for liquid, an expansible chamber arranged therein, and provided with air or fluid inlets and outlets respectively, means for letting the fluid in and out of the receptacle, and a perforated bottom plate arranged in said receptacle at a short distance above its bottom, substantially as described.

2. An apparatus for treating fibrous materials and fabrics with impregnating fluid, consisting of a receptacle having a removable cover, means for fastening said cover airtightly and water-tightly to said receptacle, an expansible chamber air-tightly attached to the under side of said cover, adapted to be inclosed in said receptacle, and provided with air or fluid inlets and outlets respectively extending through the cover, means for letting the fluid in and out of the receptacle, and a perforated bottom plate arranged in said receptacle a short distance from its bottom, substantially as described.

3. The combination of the liquid-receptacle *a* having the air-tight cover *c*, an expansible bag *d* air-tightly fixed to said cover and means for conducting into and letting off pressure fluid or air from said bag, a perforated bottom plate arranged within said receptacle a short distance from the receptacle-bottom, a fluid inlet and outlet to said receptacle substantially as described.

4. The combination of the liquid-receptacle *a* having the perforated bottom plate *b* as specified, a cover *c* to said receptacle and means for attaching the same air-tight and liquid-tight to the receptacle, an expansible bag *d* air-tightly secured to the under side of said cover, a liquid or air pressure feed-pipe mounted on said cover and communicating with the interior of said bag, a pressure-fluid or air outlet on said cover and means for closing both inlet and outlet, a liquid inlet and outlet pipe at the bottom of said receptacle and means for closing the same, and pressure-gages in connection with the pressure-inlet and in connection with the interior of the bag substantially as described and shown and for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

LEONARD HWASS.

Witnesses:

G. BÜSCHGENS,

FRANZ MÜLLER, Jr.