

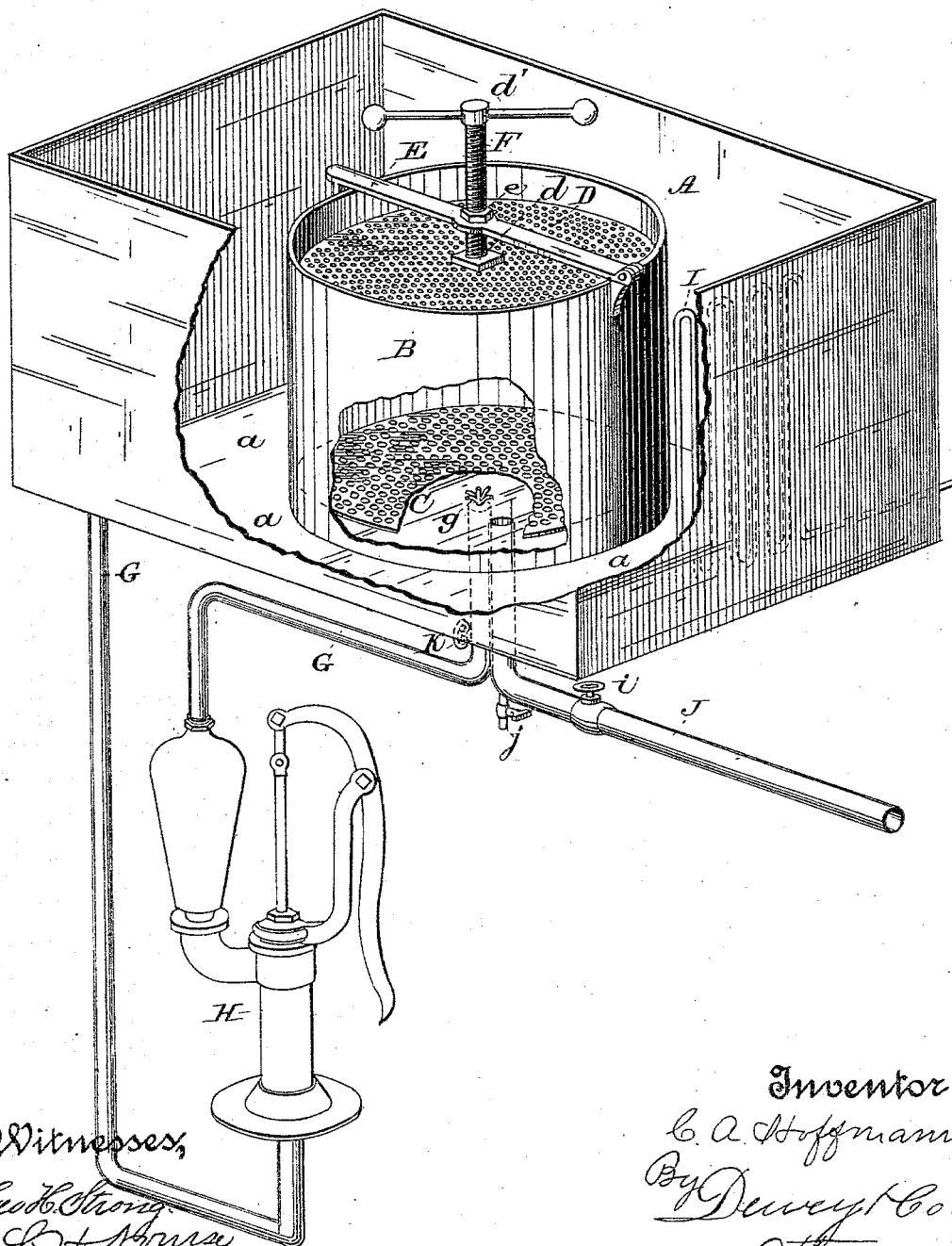
(No Model.)

C. A. HOFFMANN.

DYE VAT.

No. 305,818.

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# UNITED STATES PATENT OFFICE.

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## DYE-VAT.

SPECIFICATION forming part of Letters Patent No. 305,818, dated September 30, 1884.

Application filed April 21, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, CARL A. HOFFMANN, of the city and county of San Francisco, and State of California, have invented an Improvement in Dyeing and Drying and Apparatus therefor; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a new and useful improvement in and apparatus for dyeing and drying wool, cotton, slubbing, and other loose fiber material; and it consists in confining and packing the material within a vessel and forcing the dye-stuff through the mass, and subsequently drying it while still confined.

The apparatus consists of an exterior vat or tank for containing the dye-stuff, an interior vessel having a lower and upper foraminous diaphragm, between which the material to be dyed and dried is confined; in a means for pressing the material in the vessel; in a pipe and force-pump for pumping the dye-stuff from the vat up through the foraminous diaphragms and intervening material, and in a hot-air pipe for drying the material, all of which I shall hereinafter fully explain.

The object of my invention will be set forth in the following description.

Referring to the accompanying drawing, the figure is a perspective view of my apparatus for dyeing and drying.

A is a vat or tank, the dimensions of which in practice I prefer to be about nine feet long, five feet high, and six feet wide.

B is an open-ended vessel or annular rim or band, having preferably a diameter of five feet and a height of four feet six inches. These dimensions, both of vat and interior vessel, may of course be varied. The vessel B is placed within the vat, and a circumscribing space, *a*, is left by reason of the smaller dimensions of said vessel. The vessel B is provided with a foraminous diaphragm, C, forming a bottom, and another foraminous diaphragm, D, forming a top. The perforations of the upper diaphragm are smaller than those of the lower one.

E is a bar hinged at one end to the side or rim of the vessel B, and provided with a catch at its other end, by which it engages the rim of said vessel. At the center of this bar is a nut, *e*, receiving the pressure-screw F, the

lower end of which is seated or stepped in a bearing, *d*, on the center of the upper diaphragm, whereby said diaphragm may be forced down. Handles *d'* are secured to said diaphragm for the purpose of affording facility in lifting it out when the cross-bar and screw have been turned back.

G is a pipe opening out from the space *a* at its bottom, and entering again the vat and the vessel B under its bottom diaphragm, and the discharge end of this pipe is provided with diverging nozzles *g*, to distribute the liquor they discharge.

H is a force-pump in pipe G, whereby liquor from the space *a* may be pumped up into and through vessel B.

I is an ordinary steam-pipe for heating the liquor in the vat.

J is a hot-air pipe supposed to extend from any source of heat. It opens under and into vessel B. It is provided with a check-valve, *i*, and has also a draining-cock, *j*, whereby the liquid contents of vessel B may be drawn off when the operation of dyeing is concluded. The pipe G has also a check cock or valve, K.

Heretofore it has been customary to put the stuff to be dyed directly into the dyeing-liquor in the vat. When wool, cotton, or half-spun yarn, technically known as "slubbing," or other similar loose fiber materials, are thus treated, there is a tendency to deterioration or injury to the fiber by reason of the looseness of the mass and its movement in the vat. The fiber becomes too much separated and is liable to be broken; and this is especially the case with slubbing, which is likely to lose the benefit of the operation it has already undergone, and wool is liable to become felted. Then, again, the material requires too much handling when put loosely in the vat; but these disadvantages are overcome by my process when carried out by the use of the apparatus I have described. I first put the material to be dyed in the vessel B and pack it down closely by forcing down the upper diaphragm upon it. Then I put the dye-liquor in the space *a*, open the cock K, and pump it through pipe G, forcing it up through the lower diaphragm, through the contained mass of material, and through the upper diaphragm, letting it flow over the top of vessel B into the space *a* again. The larger perforations of the

lower diaphragm permit an easy entrance to the liquor, and the smaller perforations of the upper diaphragm offer enough resistance to the escape or discharge of the liquor to cause it to thoroughly permeate and saturate the contents of vessel B. The material, being packed closely, is not liable to be injured, and does not require handling. After the material has taken up all the dye-stuff necessary, the cock K is closed and the draining-cock *j* is opened to draw off from vessel B whatever surplus liquor may be in it. Then the cock is closed and the check-valve *i* is opened to admit hot air to dry the contents of vessel B.

This apparatus is also useful in the process of burr-killing wool. After the wool has been treated with acid it is put into vessel B and dried to kill the burrs. Then without taking it out it may be treated with soda to remove the acid, then dyed and dried again, thus performing a series of operations with the least amount of labor.

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

1. The combination of the vat or tank A, for containing the dye-stuff, the interior vessel, B, having the lower and upper foraminous diaphragms, C D, between which the material to be dyed is confined, the pipe G, and force-pump H, substantially as herein described.

2. The combination of the vat or tank A, for containing the dye-stuff, the interior vessel, B, having the lower and upper foraminous dia-

phragms, C D, the perforations in the upper diaphragm being smaller than those of the lower one, the pipe G, and force-pump H, substantially as described.

3. The combination of the vat or tank A, the interior vessel, B, having the lower and upper foraminous diaphragms, C D, the pressure-screw F, for forcing down the upper diaphragm, the pipe G, and force-pump H, substantially as herein described.

4. The combination of the vat or tank A, the interior vessel, B, having the lower and upper foraminous diaphragms, C D, the hinged cross-bar E, having nut *e*, the pressure-screw F, the pipe G, and force-pump H, all arranged substantially as herein described.

5. The combination of the vat or tank A, the interior vessel, B, having lower and upper foraminous diaphragms, C D, the pipe G, force-pump H, and the hot-air pipe J, with check-valve *i*, substantially as herein described.

6. The combination of the vat or tank A, the interior vessel, B, having lower and upper foraminous diaphragms, C D, the pipe G, force-pump H, and the hot-air pipe J, having the draining-cock *j*, substantially as herein described.

In witness whereof I have hereunto set my hand.

CARL A. HOFFMANN.

Witnesses:

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