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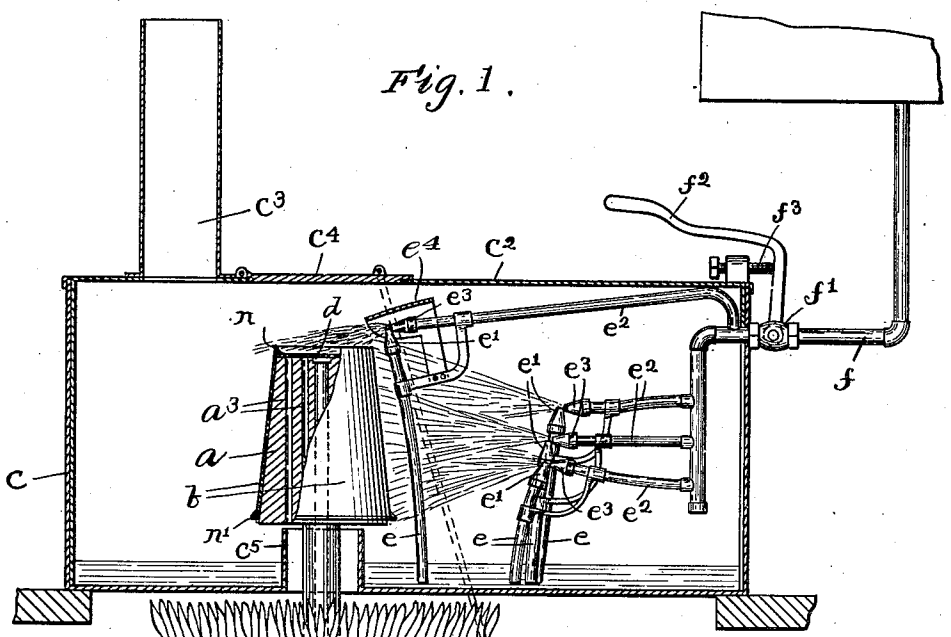
APPARATUS FOR COATING ARTICLES.

APPLICATION FILED JAN. 25, 1909.

999,789. Patented Aug. 8, 1911.

Fig. 1.



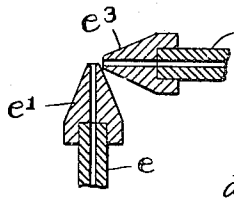


Fig. 3.

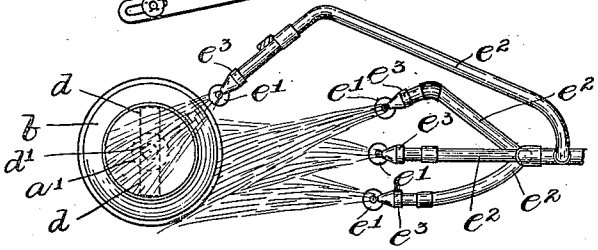


Fig. 2.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR COATING ARTICLES.

999,789. Specification of Letters Patent. Patented Aug. 8, 1911.

Application filed January 25, 1909. Serial No. 474,020.

To all whom it may concern:

Be it known that I, ALFRED R. HUSSEY, a citizen of the United States, of Harvard, county of Worcester, State of Massachusetts, have invented an Improvement in Apparatus for Coating Articles, of which the following is a specification.

This invention relates to apparatus for coating articles and particularly hollow articles, such for instance as cups, with paraffin wax, or equivalent material, whereby they are rendered impervious to water and also made aseptic.

The article herein shown for the purpose of illustrating my invention is a cup composed of paper which may be composed of a hollow body having a bottom piece held in engagement with it, as shown in my application for Letters Patent Serial No. 474,022 filed January 25, 1909, yet so far as this invention is concerned the cups may be of any construction and composed of any kind of paper or other fibrous material, and in fact articles other than cups may be coated.

The apparatus embodying my invention consists of a supporting form for the cup or other article, and atomizing nozzles arranged in juxtaposition thereto, by which melted paraffin wax or equivalent material is deposited on the article in the form of spray, which congeals and thereby forms a thin film thereon, and if the article is porous, as for instance, if made of paper, it will become saturated with the melted paraffin wax and will thereby become filled with it as well as coated. The article will be coated exteriorly and not interiorly.

The apparatus also comprises means for revolving the supporting form so that the sides of the article may be presented to the atomizing nozzles, which latter will be stationarily supported.

The apparatus also comprises a reservoir for the paraffin wax, which is adapted to be heated, and said reservoir is made of suitable size to contain the revolving form and also the atomizing nozzles. A plurality of stationarily supported atomizing nozzles may be employed, which are arranged adjacent the revolving form, so that the entire external surface of the article may be coated. The main air supply pipe leading to the atomizing nozzles is provided with a controlling valve by which the requisite volume of air which is supplied to said nozzles may be controlled. The reservoir also has a discharge pipe for the air. It also has a lid which closes an opening in the top thereof, at a point above the supporting form, whereby access may be had to said form for the introduction and removal of the article. The supporting form is adapted to be heated and means are provided for heating it. The supporting-form also has a discharging-device for the article, which, when operated will lift the article to facilitate its removal. Means may be provided for operating the discharging-device and also for opening the lid, whereby the article may be lifted from the form and projected up through the opening in the top of the reservoir.

Figure 1 is a longitudinal vertical section of a coating apparatus for paper cups and other articles, embodying this invention. Fig. 2 is a plan view of the revolving form and atomizing nozzles. Fig. 3 is a detail of the atomizing nozzles.

a represents a form which is of any suitable shape to correspond to the shape of the article which is to be placed thereon, or which is otherwise constructed to support the article to be coated. The form is mounted on a shaft a' to which a belt pulley a^2 or other means is secured whereby it may be revolved. The form may have longitudinal passages a^3 through it whereby it may be evenly heated or for any other purpose. The form is arranged in upright position so as to receive upon it an inverted cup *b* or other article, which it is desired to coat externally, and as here shown said form is of suitable dimensions to snugly fit the cup so as to prevent the coating-material from entering the cup and being deposited on the interior thereof.

As herein shown, the article is designed to be coated with paraffin wax, and c represents a reservoir which contains the wax, which is adapted to be heated for the purpose of melting the wax. It is arranged above a burner c' of any suitable construction. It has a closed top c^2 provided with a discharge pipe c^3 and with an opening adapted to be normally closed by a lid c^4. The form is arranged within the reservoir at a point directly beneath the lid c^4 and its shaft extends through the bottom of the reservoir. The form is supported a short distance above the bottom of the reservoir, so as to occupy a position above the level of the melted wax. To prevent the melted wax from escaping around the shaft a' a tubular flange c^5 extends upward from the bottom of the reservoir which surrounds said shaft. The cup is placed on the form, the lid c^4 having been raised for its introduction.

After the cup has been coated it is lifted from the form and projected upward by a suitable discharging-device, which, as herein shown, consists of a set of fingers d radiating from a rod d' which latter extends vertically through the form and its shaft and is connected with a foot-lever d^2 or other means, by which it may be raised. The end of the form is recessed to receive the fingers d when the discharging-device is in its normal or lowermost position. The lid c^4 is also connected by a link d^3 with said foot-lever, so that it will be raised at the same time the cup is lifted, so that the cup may be projected upward through the opening in the top of the reservoir to facilitate its removal therefrom.

As herein shown the cup is coated by spraying the melted wax onto its external surface, which, upon congealing thereon, forms a thin film in intimate contact therewith. To carry out this part of my invention a set of atomizing nozzles are employed which are stationarily supported in juxtaposition to the form, so that while the cup is being revolved by the form all of its sides will be exposed to the action of the spraying-devices. The atomizing nozzles which are employed are of any usual construction and as here shown each atomizing nozzle comprises a liquid tube e having a nozzle e' and an air tube e^2 having a nozzle e^3, said nozzles being arranged at right angles to each other or thereabout, see Fig. 3. The liquid tube e is made long enough to extend down into the melted paraffin wax at the bottom of the reservoir, and the air tube e^2 is connected with a suitable main air supply pipe f.

As many atomizing nozzles will be employed as may be desired, and, as it is herein desired to coat the entire external surface of the cup, that is to say, its sides and bottom, four atomizing nozzles will be provided, three being arranged one above the other to direct the spray against the side of the cup and one being arranged above the top of the inverted cup to direct the spray in a downward direction against the bottom of the cup. A hood e^4 is arranged above the uppermost atomizing nozzle to serve as a deflector for the spray, said hood being arranged to assist in directing the spray against the bottom of the cup. A valve f' is provided in the air supply pipe f for controlling the delivery of air to all of the atomizing nozzles. This valve is of any suitable construction, but the hand lever f^2 attached to it, and by which it is operated, is arranged to engage an adjustable stop f^3 when thrown one way, to open the valve, to thereby control the volume of air which is being supplied. Adjustment of the stop regulates the volume of air which is supplied. The length of time the valve is open may be determined by the operator who soon accustoms himself to the requirement. The reservoir is made large enough to contain the form and also the atomizing nozzles, so that they will all be heated to even temperatures and the discharge pipe c^3 is sufficiently large to provide for the escape of the air.

By applying a coating in the form of spray it will be noted that a very thin film may be applied and the entire external surface covered, and in case the article is made of porous, fibrous material, such material will become saturated, and when the article is removed from the form and allowed to cool the coating and filling will congeal, and but little wax is required, and but little time required to apply it and to enable it to congeal, and furthermore, the general appearance of the finished article is far superior to the results accomplished by dipping the article in melted paraffin wax. Furthermore, as the cup herein shown for the purpose of illustrating this invention is formed with a bottom flange n and with a lip n', fillets will be formed on the under sides or inner sides of said flange and lip which reinforce and stiffen them.

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

1. In an apparatus for coating articles, the combination of a plurality of atomizing-nozzles arranged at different elevations, a revolving form adapted to receive upon it the article to be externally coated arranged in front of said nozzles and below the uppermost nozzle, means for supporting the atomizing-nozzles at the side of the form whereby the spray is directed against the side of the article on the form, and means for supporting the atomizing-nozzle above the form whereby the spray is directed at a downward inclination against the top of

the article on the form, means for supplying all of said atomizing-nozzles with liquid, means for supplying all of said atomizing-nozzles with air, and means for controlling the air supply whereby all of said atomizing-nozzles are simultaneously controlled, substantially as described.

2. In an apparatus for coating articles, the combination of a plurality of atomizing-nozzles connected respectively with liquid-tubes and air-tubes, an air supply pipe common to all said air-tubes having a controlling-valve, a revolving-form arranged in front of said nozzles adapted to receive upon it the article to be coated, whereby the entire exterior of the article will be presented to the nozzles as the form revolves, a reservoir adapted to be heated, inclosing said atomizing-nozzles and form and also adapted to contain the liquid to be sprayed by said nozzles, the liquid-tubes connected with said nozzles terminating near the bottom of said reservoir and taking their supplies of liquid therefrom, said reservoir having an opening above the form and a closing-lid therefor, and also having a vent, substantially as described.

3. An apparatus for coating the entire external surface of an article, characterized by a supporting-form for the article, rotatable about a vertical axis in front of a plurality of atomizing-nozzles, one of which is arranged to direct its spray against the top of the article on the form and the others to direct their sprays against the side of the article on the form, whereby all parts of the top of the article on the form and all of its sides are presented to the direct action of the sprays and a uniform coating applied to the entire external surface of the article, substantially as described.

4. In an apparatus for coating articles exteriorly, the combination of a plurality of atomizing-nozzles arranged at different elevations, a supporting-form for the article to be coated, rotatable about a vertical axis and arranged in front of said nozzles, to support the article in the direct path of the spray issuing from the nozzles, means to support one of the nozzles to direct its spray downwardly against the top of the article on the form, means to support the other nozzles to direct their sprays horizontally against the side of the article on the form, means to rotate the form to present all sides of the article and all parts of its top to the direct action of the spray issuing from the nozzles, whereby a substantially uniform coating is applied to the entire external surface of the article, substantially as described.

5. In an apparatus for coating articles, the combination of a reservoir, a supporting-form contained therein on which the article to be coated is placed, and atomizing-nozzles also contained in said reservoir and arranged in juxtaposition to said form, a lid at the top of the reservoir, closing an opening therein at a point above the form, an actuating-device, and means connecting said lid with said actuating-device, substantially as described.

6. In an apparatus for coating articles, the combination of a reservoir having an opening closed by a lid, a supporting-form contained therein, beneath said opening, on which the article to be coated is placed, atomizing-nozzles also contained in said reservoir and arranged in juxtaposition to said form, a lifting-device for the article, extended through the form, an actuating-device for said lifting-device, and means connecting said lifting-device with said actuating-device, substantially as described.

7. In an apparatus for coating articles, the combination of a reservoir having an opening closed by a lid, a rotatable supporting-form contained therein beneath said opening, on which the article to be coated is placed, atomizing-nozzles also contained in said reservoir and arranged in juxtaposition to said form, a lifting-device for the article extended centrally through the form, an actuating-device for said lifting-device, and means connecting said lifting-device with said actuating-device, substantially as described.

8. In an apparatus for coating articles, the combination of a reservoir having an opening closed by a lid, a supporting-form contained therein, beneath said opening, on which the article to be coated is placed, atomizing-nozzles also contained in said reservoir and arranged in juxtaposition to said form, a lifting-device for the article extended through the form, an actuating-device, for said lid and lifting-device, and means connecting said lid and lifting-device with said actuating-device, substantially as described.

9. In an apparatus for coating articles, the combination of a reservoir, a supporting form contained therein on which the article to be coated is placed, and atomizing nozzles also contained in said reservoir and arranged in juxtaposition to said form, the liquid tube thereof extending down toward the bottom of the reservoir, a lid at the top of the reservoir closing an opening therein at a point above the form, a discharging-device connected with the form, and means for operating said discharging-device to lift the article from the form, substantially as described.

10. In an apparatus for coating articles, the combination of a reservoir, a supporting form contained therein on which the article to be coated is placed, and atomizing nozzles also contained in said reservoir and arranged in juxtaposition to said form, the liquid tube thereof extending down toward

the bottom of the reservoir, a lid at the top of the reservoir closing an opening therein at a point above the form, a discharging-device connected with the form, and means connected with said discharging-device and also with said lid for raising them both, substantially as described.

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

ALFRED R. HUSSEY.

Witnesses:

GEO. R. BLINN,

EMMA A. ALLEN.