

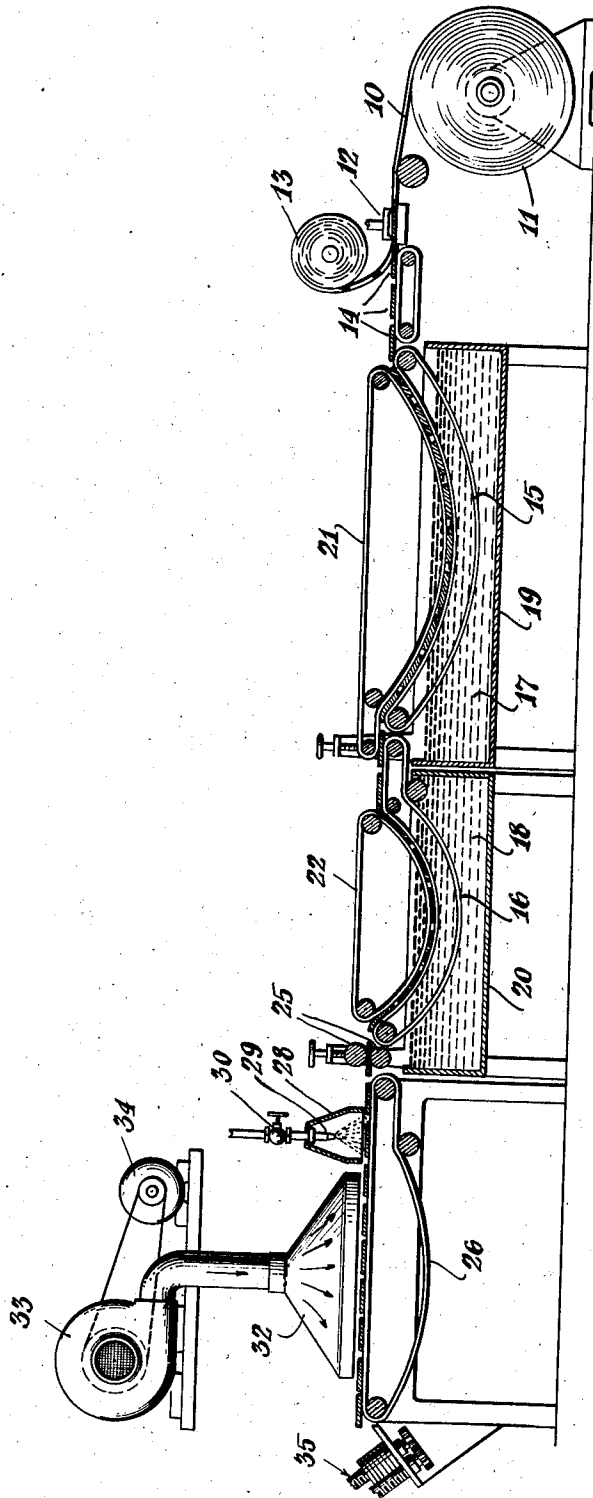
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METHOD AND APPARATUS FOR TREATING MATERIALS

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METHOD AND APPARATUS FOR TREATING MATERIALS

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This invention relates to a method and apparatus for treating materials and more particularly to a method and apparatus for cooling wax-treated paper blanks.

This invention is an improvement on the process for treating paper blanks to condition the same for the formation of cover-all milk bottle caps as described in the Baum Patent 1,668,349.

In that process the blanks are wax-treated or impregnated, stacked, and stored for seasoning or tempering to condition the same for a severe forming operation. It has been found, however, that in order to obtain uniform impregnation and to prevent the blanks from sticking together when stacked, the surface of the wax-treated blanks must be cooled at least to a temperature below the melting point of the wax before stacking. One method of accomplishing this is to hold the blanks on a conveyor for a sufficiently long time to allow the blanks to become cooled to the desired point. This method, however, is unsatisfactory from a quantity production standpoint due to the excessive space which would be required for long conveyors of the type above indicated.

An object of the invention is to provide a novel and improved means for cooling the wax-treated blanks prior to stacking.

Another object is to provide a cooling system which is applicable to the treatment and processing of various materials.

Another object is to provide means for quickly and efficiently cooling blanks of the type above indicated, which requires only a minimum amount of plant space and equipment.

Various other objects and advantages will be apparent as the nature of the invention is more fully disclosed.

In accordance with the present invention, I have found that the blanks may be quickly and uniformly cooled by spraying thereon a small quantity of a readily vaporizable liquid such as water and utilizing the heat of the blanks to vaporize the liquid. The latent heat of vaporization of the liquid thus serves to extract heat from the blanks and thereby rapidly cools the same to the desired point. A minimum amount of liquid is used and the major part of the liquid is immediately evaporated and removed from the blanks so as not to interfere with the subsequent operations. A predetermined amount of moisture may, if desired, be allowed to remain on the blanks for conditioning the same for the subsequent forming operations.

In one embodiment the wax-treated blanks are

passed under a spray of cold water and thence immediately under a hood to which a current of cold air is supplied by a suitable fan or blower. The current of cold air removes the vapor-laden air from contact with the blanks and facilitates the vaporization of the water.

The surfaces of the blanks are thus cooled quickly to a point such that the wax film thereon becomes solidified. The body of the blank, however, remains hot and when the blanks are stacked the stored heat serves to gradually soften the wax and causes the same to be drawn into the fibres for impregnating the blanks. The wax is not softened on the surface, however, to such an extent that the wax tends to flow and cause uneven impregnation or to cause the blanks to stick together. This latter feature is of particular importance when the wax contains adhesive materials such as resins or the like which would tend to cause sticking of the stacked blanks.

Although the novel features which are believed to be characteristic of this invention are pointed out more particularly in the claims appended hereto, the invention itself, as to its objects and advantages and the manner of its operation, may be better understood by referring to the following description, taken in connection with the accompanying drawing in which a specific embodiment thereof has been set forth for purposes of illustration.

In the drawing, the figure is a diagrammatic representation of a wax treating process embodying the present invention.

In the following description and in the claims certain specific terms are used for convenience in referring to various details of the invention. It is to be understood, however, that these terms are to be given as broad an interpretation as the state of the art will permit.

Referring to the drawing more in detail wherein the invention is applied to the treatment of a paper blank to be used for the formation of milk bottle caps in accordance with the process set forth in the Baum Patent 1,668,349 above referred to, the material is shown in the form of a web 10 which is supplied from a roll 11. The web 10 is fed from the roll 11 by suitable means not shown, to a punch or die 12 wherein the desired blanks are punched therefrom, the used web being taken up in a roll 13. The blanks 14 which are punched from the web 10 by the die 12 are passed by conveyors 15 and 16 through wax baths 17 and 18 respectively in tanks 19 and 20. The wax may be maintained in a molten condition by any suitable heating means not shown. Upper webs 21

and 22 may be provided to hold the blanks in position in the bath during the wax treatment.

The blanks 14, after removal from the tank 20, are passed between squeeze rollers 25 which are so adjusted as to remove the excess wax coating from the surface of the blanks and to discharge the blanks onto a conveyor 26 with a predetermined wax film on the surface thereof.

The blanks, after passage between the rollers 25, are passed under a hood 28 containing nozzles 29 which may be controlled by valves 30. The nozzles 29 are adapted to direct a spray of vaporized liquid such as water onto the surface of the blanks and may be regulated so as to supply the quantity required. The quantity of liquid is preferably so controlled that the heat of the blanks causes the greater part of the liquid to immediately vaporize. The latent heat of vaporization is thus utilized for cooling the surface of the blanks as above indicated. After passage under the hood 28, the blanks are passed under a drying hood 32 which is supplied with a current of cold air by a fan or blower 33 actuated by a motor 34.

After these blanks have thus been cooled, they are discharged into a stacking device 35 wherein they are stacked and may be removed to storage or to suitable cap forming mechanism as may be desired.

In the operation of this system it is to be understood that water may be applied to the blanks prior to wax treatment if desired as set forth in the Baum patent above mentioned. It is also to be understood that the quantity of liquid supplied by the nozzles 29 and the time of treatment under the hood 32 are so controlled that all of the water supplied to the blanks is evaporated from the surface thereof or so that a portion remains thereon for conditioning the blanks as may be desired.

It has been found that an extremely small quantity of water is sufficient for the above purpose and that, when operated as above indicated, the evaporation of the water rapidly cools the surface of the blank to a point such that the wax becomes hardened and subsequent flow of the wax which would produce uneven impregnation is avoided. The body of the blank, however, is not immediately cooled and the heat stored therein is sufficient to cause the wax to become absorbed into the fibres of the blank itself, as set forth in detail in the above mentioned Baum patent.

The quantity of cooling liquid is not sufficient to cool the blanks by heat absorption but is so regulated that the latent heat of vaporization of a small quantity of readily vaporizable liquid is utilized for the purpose. While water has been found satisfactory, various other vaporizable liquids may be used if desired.

While the invention has been shown as spe-

cifically applied to the treatment of paper blanks to be used for the formation of cover-all milk bottle caps, it is to be understood that the cooling system is also applicable to various other processes wherein it is desired to quickly cool webs or blanks. The invention is only to be restricted in accordance with the scope of the appended claims.

What is claimed is:

1. An apparatus for treating paper blanks, comprising a reservoir containing a molten wax bath, conveyor means for passing said blanks through said bath, a cooling zone, conveyor means passing the wax-treated blanks from said reservoir through said cooling zone, means spraying a vaporizable liquid onto the blanks in said cooling zone in a quantity such that the heat of the blanks vaporizes at least the major part of said liquid and a drying zone including means to supply a current of cold air over said blanks for removing said vapor, said conveyor means carrying said blanks from said cooling zone through said last zone.

2. The process for preparing blanks for the formation of formed articles such as milk bottle caps, which comprises passing said blanks through a wax bath to impregnate the fibers thereof with said wax and to form a surface film of wax thereon, removing said blanks from said bath, spraying onto the surface of said blanks a vaporizable liquid in a quantity such that the heat of the blanks vaporizes at least a major part of said liquid, passing said blanks through a drying zone and in said drying zone rapidly removing the vapor laden air from contact with said blanks under conditions to utilize the heat of vaporization of said liquid as a cooling agent to cool rapidly the surface of said blanks to a point such that the wax film thereon solidifies.

3. The process for preparing blanks for the formation of formed articles such as milk bottle caps, which comprises passing said blanks through a wax bath to impregnate the fibers thereof with said wax and to form a surface film of wax thereon, removing said blanks from said bath, spraying onto the surface of said blanks a vaporizable liquid in a quantity such that the heat of the blanks vaporizes at least a major part of said liquid, passing said blanks through a drying zone and in said drying zone rapidly removing the vapor laden air from contact with said blanks under conditions to utilize the heat of vaporization of said liquid as a cooling agent to cool rapidly the surface of said blanks to a point such that the wax film thereon solidifies while the body of the blank retains stored heat, and stacking the blanks for a sufficient time to allow the stored heat to soften and draw the surface film of wax into the fibers for impregnating the same.

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