

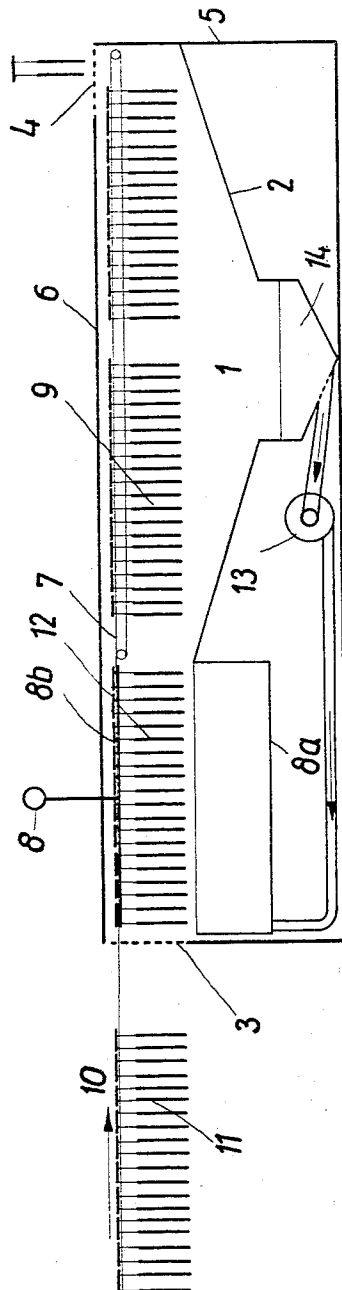
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PROCESS AND APPARATUS FOR APPLYING A COVER ON CIGARS

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## PROCESS AND APPARATUS FOR APPLYING A COVER ON CIGARS

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### ABSTRACT OF THE DISCLOSURE

A process and apparatus for applying a coating on cigar rolls in a closed chamber by holding the rolls in an atmosphere substantially saturated with solvent vapors and then drying the coated rolls outside the atmosphere.

This invention relates to a process and an apparatus for the application of a cover on a cigar filler through application of a mass consisting of particles of tobacco and a solvent solution onto the filler and a subsequent evaporation of the solvent.

From the German Patent No. 469,304, cigars have already been known which have in place of the customary cover leaf or wrapper, a mass applied to the filler, wherein the applied mass consists of a mixture of a cellulose ester solution, especially an acetyl cellulose solution, with finely powdered tobacco. The applied mass, after evaporation of the solvent, will form a coating on the filler, which coating is to take the place of the rolled-on cover leaf or wrapper. The application of the mass on the cigar filler may, according to this German patent, be accomplished by hand or through any kind of device, thus, for example, through submerging of the cigar filler into the applied mass or else by spraying on or painting on of the mass onto the cigar filler.

The production of such cigars is supposed to be cheaper than that of cigars which are wrapped transversely in the conventional manner into a strip of cover leaf, and they are supposed to have the advantage, as compared to cigars covered with a rectangular sheet of tobacco foil used as a cover leaf, that the folding in of the casing of the cover leaf at its ends may be omitted and a better shape can be achieved. In practice, however, the production of such cigars is accomplished with considerable difficulty.

If one applies the application mass in the customary manner onto the filler then, as a result of the evaporation of the solvent in the air which starts very soon, a skin will form on the layer which in itself is still fluid, and by the unavoidable flow of this mass underneath the skin, the latter will tear, so that the coating becomes uneven. Since, moreover, the applied mass running down on the object leads to the development of thick spots or drips, the cigars produced in such a manner have an ugly appearance which cannot even be covered up by application of a powder.

The disadvantages of this known process will be particularly noticeable in those cases when the fillers are submerged into a mass whose solvent is relatively highly volatile at the working temperature. During the submersion process, more material will be carried out from the submersion vessel by the filler, because of the viscosity of the applied mass, than is actually necessary for the formation of the cover leaf. The surplus quantity of this mass will drip away, which will take several minutes. If the evaporation of the solvent will start during the dripping away process, then the above mentioned skin will form, which will tear under the flow of the dripping mass. Finally, an elongated drop will form at the lowest point of the cigar filler, which will not tear off any more but

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which will solidify in that shape and which will have to be cut off mechanically, without there being any possibility to achieve a point for the cigar which would have a pleasing shape.

The process according to the present invention has for an object to provide the filler to be coated with a layer of the applied mass, in the desired thickness, in an atmosphere of vapors of the solvent which is contained in said applied mass, and that one then expels the solvent.

Preferably, the application is accomplished by submersion of the fillers into the mass and that one then allows the fillers to drip in the atmosphere of the solvent.

Preferably one should submerge the fillers perpendicularly in the mass without their touching each other. At the same time, it will be particularly favorable to hold them at that end which is to be the end to be lighted and to reverse them before the last drop will fall off, so that the top now will point upwards. The small remaining surplus of the applied mass will now run back and will be deposited on the top of the cigar while solidifying said top.

The time of submersion should be within the time limit of one minute, and the dripping time should be within the time limit of three minutes. However, one can either use less time or more time and this will depend entirely on the quality and consistency of the applied mass.

The drying of the coated filler is accomplished in the air, preferably with some heated air.

The application of the cover by submersion of the fillers into the applied mass is particularly attractive because as far as the process is concerned and the apparatus, it is not at all complicated. The applied mass is hard to spray because of its viscosity and because of the contents of solid tobacco particles, and the painting of the mass on the cigar filler, if not accomplished by hand, presupposes complicated painting devices which are prone to breakdowns. However, the method of operation according to this invention is also applicable to this type of application of the mass onto the cigar filler, since here too one must still count with the flowing off of the excess quantities of the mass applied and one must still prevent the formation of a skin or the solidification of the drops as they are running off.

Since the quantities of solvent which are still present, either on or in the cigar filler after the dripping off period, can only be recaptured with a considerable expenditure in apparatus, it will be appropriate to use a solution for the applied mass which is as concentrated as possible, in order to save solvents. But it is exactly in the case of thick applied masses where the above mentioned difficulty exists, and it is a particular advantage of this invention that it makes possible the processing of highly concentrated solutions.

The applied mass will have more or less a tendency for sedimentation. Therefore, it is advisable to keep it in motion constantly, or from time to time, in order to prevent a deposit.

The kind of solvents used for the applied mass will depend on the binder. Since tobacco leaves will swell under the influence of water and thereby experience changes of shape, one will give preference to organic anhydrous liquids, where a swelling of tobacco would not occur. Solvents whose vapors are heavier than air are particularly well suited, in order that one could more easily produce and maintain with them the desired gaseous atmosphere. For cellulose ether, such as methyl cellulose or ethyl cellulose, methylene chloride will be particularly suitable as a solvent, perhaps in a mixture with methanol. For acetyl cellulose, therefore for a cellulose ester, chloroform would be suitable as a solvent, for the acetone soluble cellulose hydroacetates, acetone or mixtures of acetone and methyl or ethyl alcohol.

If the dipped in cigar fillers have cover leaves made of

the well known tobacco foil, then one must pay attention to the fact that the binders of this tobacco foil must not be soluble in the solvent used for the applied mass; cover leaves made of tobacco foil with water soluble solvents such as gum arabic, tragacanth, agar-agar and so forth, are preferred, whenever organic solvents with methylene chloride are used. Inversely, tobacco foils from cellulose ester or ether are suitable for use as a cover leaf, whenever aqueous applied masses are being used.

Particularly, in the case of tobacco fillers with a natural cover leaf, the danger exists that the cover leaf will become unwound through the influence of penetrating water.

All film forming substances are pertinent as binders for tobacco particles, which substances are soluble in certain solvents. They must be unobjectionable physiologically and naturally they must not impair the tobacco taste while burning.

The tobacco particles in the applied mass should not be too fine. The addition of fiber-shaped tobacco particles has proven particularly favorable, as could be obtained in a grinding mill with a  $\frac{3}{100}$  mm.-slot. Crudely powdered or fiber-shaped tobacco particles will lead to a cover layer of greater strength and toughness than would finely ground material.

By the process according to the present invention, and particularly by the use of a submersion device according to the invention, one will achieve that the cover leaf produced from the liquid applied mass will not form entirely evenly, whereby the uneven places of the cover leaves are leveled and its overlappings are closed. Thus one will obtain a cigar which in its exterior is superior even to those with a normal dry cover leaf.

The device according to the invention for the application of a cover leaf by submersion of the cigar filler in accordance with a process according to the invention has been characterized by a closed chamber with lateral and upper walls, an entrance opening, an exit opening and a floor tub, which is filled at least in one section with the applying mass at a height corresponding to at least the submersion depth, as well as by a device for the submersion of cigar fillers at the above mentioned section and an arrangement for the transportation of the submerging fillers from the entrance opening to the submersion device, as well as for the transportation of the submerging fillers from the submersion device through the chamber to the exit opening.

As a holder for the cigar fillers during the accomplishment of the process according to the invention, needles have proven themselves as particularly suitable. It is best to unite these needles in the form of needled boards, and these again can be combined into fields or groups and can be handled in larger units. Preferably, the cigars will be placed on the needles with the end to be lighted, which can be accomplished either by machine or by hand. At the same time, the cigar fillers are not to touch each other, in order to make possible the formation of the cover sheet on each filler without disturbance.

Preferably, the submersion section of the floor tub has been developed as a special vessel. The submersion device consists either of one element which lowers the cigar fillers in their support into the submersion vessel, or else in a lifting device which will lift the submersion vessel to a point toward the cigar fillers held constantly as to height, whereby the latter will dip into the applying mass.

The shape of the floor tub may be constructed in such a manner that the material dripping off from the submerged fillers will flow back automatically into the submersion vessel. However there also may be a pumping arrangement provided which will move back the material that has dripped down from the lowest spot of the bottom tub into the submersion vessel. This pumping device will thus simultaneously keep the applying mass in motion, as a result of which sedimentation is prevented. For this purpose one could also provide instead of the

above arrangement in the submersion vessel or in addition to it, a stirring apparatus.

The floor tub may be uniform across its whole length, and in that case it must be filled everywhere to the required height with the applying mass. Then a special application vessel will become unnecessary and the transportation arrangement may be constituted by one single conveying chain or similar object, which will run from the entrance opening to the submersion device or from the submersion device to the exit opening of the chamber. This conveying chain will then run in such a manner that it will transport, on the one hand, the cigar fillers on their support from the entrance to the exit opening of the chamber and that, on the other hand, it will move them vertically in such a manner that the cigar fillers are dipped into the application mass at the entrance side of the chamber, so that they are kept in said application mass for the desired time and they are then pulled out again, and then transported above the application mass, so that the surplus may drip off. In order to keep the volume of the application mass located in the chamber fairly small, it will be advantageous, however, to equip the chamber with an inclined floor and merely to maintain a supply of the liquid at the required depth in the actual submersion section.

The conveying of the submerged fillers from the submersion device to the exit opening may be accomplished horizontally or obliquely. During the upward conveyance one must make sure that the material dripping off from preceding fillers will not drop onto the succeeding fillers.

The invention will be further explained by reference to the accompanying drawing by way of example.

The drawing shows a longitudinal section through an apparatus or plant for the application of the cover leaf, according to the invention, by dipping the cigar fillers into the application mass.

A usual cigar comprises a filler which is composed of scraps of tobacco leaves and possibly small stems in a mass. The filler is rolled in an inner or first tobacco leaf or sheet of tobacco foil and this inner leaf with the filler is known as a roll.

With conventional cigars, the roll is rolled in an outer or second tobacco leaf, the so-called wrapper. According to the dip coating technique, to which the invention relates, the roll is coated with a film of tobacco particles and a suitable binder, instead of being wrapped in a separate wrapper. Since the roll which in the drawing is referred to by the reference character 11, in any case carry the inner tobacco leaf there is no substantial danger of falling from the conveyor 10. The inner wrapping of course must not be deteriorated by the solvent which is contained in the coating mixture.

The cigars equipped with a cover leaf are placed on pin studded boards with the end that is to be lighted. Twenty-six cigar fillers, as shown, each are united in double rows on one pin studded board. Ten pin studded boards each are combined into one group and are pushed through the opening 3 by means of the conveying arrangement 10, onto the submersion device 8, 8a. The entrance opening 3 is closed by means of a flap that can be operated rapidly, but it can also be developed in the form of a sluice, in order to prevent the escape of vapors of the solvent. Inside of the chamber, a slight under-pressure can be maintained for the same reason by means of a blower, but only insofar as one has made sure that no substantial quantities of air will be sucked in from the outside. At the entrance side of the chamber 1, there is a submersion vessel 8a, and this vessel is filled with a liquid which is composed as follows:

5 parts by weight of methyl cellulose of medium viscosity  
250 parts by weight of methylene chloride  
135 parts by weight of methanol  
50 parts by weight of tobacco powder.

Another mixture would be for example:

10 parts by weight of sec. acetyl cellulose  
300 parts by weight of acetone  
100 parts by weight of tobacco powder.

The tobacco powder may be obtained through tearing up of tobacco leaves in a grinding mill whose slot had been adjusted to 5/100 mm. The structure of the tobacco particles is fibrous. According to its saturation steam pressure, the solvent will fill the inside space of the chamber 1 with its vapors.

The hoisting or lifting cylinder 8 will lower the pin studded boards resting on the rails 8b as one united group into the vessel 8a, so that the cigar fillers will be submerged entirely into the mass. Instead of the lifting cylinder, there may also be used a cable line. Furthermore, one could also raise the vessel 8a, for example, by hydraulic means instead of lowering the fillers. The submerging process will last approximately one minute and will be controlled by the corresponding operations of the lifting element.

During the submersion process the next rail group 10 will be prepared. The new rail group 12, which had been pushed by mechanical operation, will replace the rail group 9 which had in the meantime been immersed, so that the next rail group will be suspended above the container of liquid. Through some visual signal one will have a guarantee that the next rail group 12 will not be pushed in prior to the completion of the submersion process.

Through the displacement of the rail group with the cigars that had already been submerged, this rail group 9 pushed onto a conveyor chain 7, which is operated electrically, and which will transport this rail group 9 within a period of about three minutes up to the opening 4. The dripping time will be adjusted by synchronization of the transportation speed with the length of the chamber, which here amounts to about 500 cm. height and width of the chamber will amount to about 100 cm.

During the transportation by means of the conveyor chain 7, the excess of liquid, which is not required for the formation of the liquid cover sheet, will drip off from the cigars. Since this dripping off takes place in an atmosphere saturated by vapors of the solvent, the solvent itself cannot evaporate. As a result of that, it will be avoided that the liquid will solidify during the dripping off process and form a skin which will be drawn downwards over the top of the cigars and beyond, and will form a casing there which will tear because of its weight and which will destroy the cigars. The liquid needed for the formation of the cover sheet will combine with the covering leaf into the liquid cover sheet.

Simultaneously, the submersion into the liquid and the subsequent dripping off process will cause the smoothing out of the uneven parts of the cover leaf, so that the liquid covering sheet which develops afterwards will envelop the cigars completely and evenly like a normal dry cover leaf. Furthermore, as a result of that, the end to be lighted and the top will be fixed. At the same time, the liquid will also close the overlapping of the cover sheet.

As soon as the individual rail groups have reached the opening at 4, they will be removed by hand. Devices for the removal in a mechanical way are also suitable and possible. The pin studded boards are subsequently stood up in a wind channel (not shown), in such a manner that the cigars will stand in this wind channel facing upwards. The pin studded boards move on a conveying chain for a period of about 30 minutes through this wind channel through which heated air will move (about +3° C. above the wind channel, the cigars will dry. Subsequently the cigars are powdered, packaged and made ready for shipment according to the customary method.

The residue of liquid, which had dripped off in chamber 1, is collected on discharge on metal sheets 2 which carry the liquid into a sump 14. This sump is

emptied through the operation of suction pump 13. The suction pump 13 will pump the liquid into the submersion vessel 8a mentioned in the beginning. The required quantity of liquid will be refilled from time to time.

The turn around of the cigars prior to introduction into the wind channel will add very much to the purpose, because as a result of that the formation of droplets will be prevented. And, above all, the quantity of the application mass, which in the case of a cigar suspended in the wind channel would form such a drop at the lowest spot of the cigar, would in case of a standing cigar additionally strengthen the top, that is, the tip of the cigar and make it mechanically insensitive.

Because the top is taken into the smoker's mouth during smoking, it is also exposed to considerable wear. Perhaps within the first three minutes a droplet would always form in the wind channel in the case of a suspended cigar, and said droplet would only be an impediment during the further processing and would have to first be removed.

I claim:

1. A process for providing a cover on cigar rolls comprising dipping the rolls into a mass of tobacco particles and a solvent solution including a cellulose derivative binder, removing the rolls from said mass, permitting the excessive amount of particles and solution to drip off and then holding the rolls in an atmosphere which is substantially saturated with solvent vapours permitting the evaporation of the solvent from said coating whereby dripping-off is substantially completed so that a solvent-wet and substantially non-flowable coating of tobacco particles and binder is formed on the rolls, and drying the coated rolls outside of said atmosphere.

2. A process according to claim 1, in which the rolls are submerged into the mass in a vertical direction, and the rolls being suspended from their ends where they are lightest, and reversing the rolls before the last drop falls off from the rolls after removal from said atmosphere containing solvent vapours.

3. A process according to claim 1, in which a viscous mass is used which contains the tobacco in the form of coarse particles and which is provided with high binder concentration.

4. An apparatus for applying a cover on cigar rolls comprising a substantially closed chamber casing, having an entry opening in one end of the chamber casing, and an exit opening adjacent an opposite end of the chamber casing, a first tank near the entry opening of the casing and mounted in the casing, a trough-like container mounted in the chamber casing adjacent the tank, means to dip suspended cigar rolls into the tank, and conveying means to convey the dipped cigar rolls through a space in the chamber casing above the trough-like container and finally to the exit opening, said trough-like container sloping toward a second tank for receiving excess solvent deposited on the trough-like container, means for returning solvent from said second tank to said first tank and means for substantially preventing the entry of air through said openings into said chamber.

5. An apparatus according to claim 4, in which means are provided to suspend the cigar rolls vertically on the means to dip the rolls into the tank in groups, and in which the suspension means include needles of which one is for each roll.

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