

UNITED STATES PATENT OFFICE

2,137,706

IMPREGNATED CIGARETTE

Richard T. Ubben, Wilmington, Del., assignor to
E. I. du Pont de Nemours & Company, Wil-
mington, Del., a corporation of Delaware

No Drawing. Application May 18, 1935,
Serial No. 22,169

4 Claims. (Cl. 131—36)

This invention relates to the manufacture of cigarettes and more particularly to a method of treating the paper of the cigarette to render the same waterproof and at the same time not to impair the smoking qualities of the finished cigarette.

It is well known that paper which is commonly used in the manufacture of cigarettes has the disadvantage that it readily disintegrates when it becomes wet or damp for any reason. The paper also has a definite tendency to stick to the lips, sometimes quite tenaciously. It is a common experience of smokers to have a cigarette become soggy due to the absorption of moisture by the paper and tobacco and to have the individual pieces of tobacco become loosened and remain in the mouth. Heretofore, these disadvantages have been partly overcome by coating one tip of the cigarette with straw, cork, bark, ivory, and materials of a similar nature. The main disadvantages of this practice are that the cost of cigarettes so prepared is high because of the special tipping operation required; the cigarette can be lighted at only one end; and only the tip is protected and rain or wet fingers readily cause the remaining part of the cigarette to disintegrate rapidly. Other expedients such as coating the cigarette or cigarette paper with cellulose derivatives, oils, waxes, etc., have been proposed, but in each case the appearance, burning rate, odor, or taste has been adversely influenced by the agent used.

The use of various resins for coating cigarette paper has also been proposed. It has been my experience, however, that the resins suggested in the prior art exert a more or less definite and undesirable transparentizing action on the paper, thereby altering its appearance. Apparently it is possible to obviate this transparentizing effect by applying the resin in such a way as to produce an "efflorescent coating" on the paper, but this method is commercially undesirable because it involves the costly process of drying the paper, after it has been treated with a solution of the resin in organic solvent, in special and abnormally warm, humid atmospheres, in order to produce this "blooming" or "blushing" effect which masks the transparentizing action of the resin.

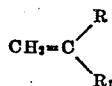
It is also known that some of the agents used in this invention can be used to impart water-resistance to papers other than cigarette paper. However, it was not evident from such art that the agents which have been so used would not change the appearance of a cigarette or the spe-

cial types of paper employed in its manufacture. Likewise, it could not be predicted that the agents used herein would not adversely affect the odor, taste, and combustibility of the cigarette.

This invention has as an object the preparation of a cigarette which is resistant to moisture at least over that part which is placed in the mouth and preferably over its entire length. A further object is the preparation of cigarette paper or the impregnation of the paper of a finished cigarette, without the necessity of resorting to special methods of treatment, in such a way that the paper will not readily disintegrate and at the same time will not have adversely affected its appearance, odor, taste, or combustibility.

These objects are accomplished by treating the cigarette paper before or after the cigarette is made with dilute solutions or emulsions of certain resins not heretofore to my knowledge proposed for the purpose. The resins used in my invention are of the type which do not transparentize the paper; that is, they do not give the paper impregnated therewith the appearance of parchment but leave it in exactly the same condition, as far as may be observed, as the original paper. Furthermore, these effects are produced without resorting to special solvents or special methods of drying.

It has been found that only limited and restricted classes of synthetic resins have the properties described above. Those with which the present invention is concerned are the vinyl resins, which, for the purposes of this invention, are defined comprehensively as resinous polymers of compounds of the general formula



where R is hydrogen or a monovalent hydrocarbon radical and R₁ is halogen, aryl, acyl, or acyloxy. Typical resins of this class are polymers of styrene, vinyl naphthalene, vinyl chloride, vinyl bromide, vinyl acetate, vinyl chloroacetate, vinyl formate, vinyl propionate, alpha-methyl styrene, methyl vinyl ketone, butyl vinyl ketone, alpha-methylvinyl methyl ketone, or interpolymers thereof. The above compounds are not to be confused with the polymeric esters of acrylic and alpha-substituted acrylic acids whose preparation and properties are quite different from those of the vinyl resins. I may, however, use in my invention interpolymers of these two types of compounds. I may also use vinyl resins which have been treated with aldehydes, such as form-

aldehyde, provided the treated resin remains soluble.

The following examples, in which parts given are by weight, represent specific illustrations of the present products and processes. However, the practice of the invention is not limited to these examples since modifications thereof will be readily apparent to those skilled in the art.

Example I

	Parts
Polystyrene -----	2.0
Acetone -----	31.0
Toluene -----	67.0
	100.0

Example II

	Parts
Vinyl acetate polymer -----	2.0
Acetone -----	72.0
Toluene -----	26.0
	100.0

Example III

	Parts
Methyl vinyl ketone polymer -----	3.0
Acetone -----	97.0
	100.0

The above resin solutions may be brushed on either the tip of the cigarette or over the entire surface of the paper. The solutions penetrate the paper and within 1-2 minutes at 25° C. the portion treated is perfectly dry and unaltered in appearance from the remainder of the cigarette. When only the tip is treated it is waterproofed to the extent that it can be rubbed between moist lips without any effect on the paper and a definite line of demarcation will appear between the treated and untreated portions of the cigarette when moistened by the tongue or lips.

Cigarettes treated with solutions prepared according to each of the above examples, in addition to being definitely waterproof, are not rendered different from untreated cigarettes with respect to odor, taste, appearance, and rate of burning. In connection with this latter test, two cigarettes, one which had been treated and the other which had not been treated, were lighted and smoked for about 1/4 inch and then laid side by side at the edge of a table. The cigarettes burned at the same rate and there was no evidence to indicate that the coatings had any effect whatever on the combustibility or burning qualities of the cigarettes.

If desired, a small amount of plasticizer such as dibutyl phthalate, tricresyl phosphate, or similar agent may be used to increase the pliability of the paper, especially in instances where the resin is brittle. No limitation is placed on the particular plasticizer selected except that it obviously should not be poisonous or have an offensive odor when it burns.

While I have given examples where the resin is dissolved, I may resort to aqueous emulsions particularly where the coating is applied to the paper before it is made into a cigarette. The expense and hazards of handling organic sol-

vents are thus avoided and emulsions furthermore lend themselves more readily than solutions to application in one operation of the same amount of different resins or different amounts of the same resin.

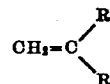
In the practice of this invention it is preferable to use dilute solutions or emulsions, for example in the range from 0.5 to 2.5% resin by weight. This concentration may, however, be varied beyond these limits. For example, if a resin of very low viscosity is used or if the solvent selected is particularly active, the percentage of resin may be increased. On the other hand, the solution may be made as thin as desired but if carried too far in this direction, a plurality of impregnations or coatings will probably be necessary. Pigmented compositions may in some instances be used to advantage. It has also been found that in addition to solvent, resin, and plasticizer, small amounts of cellulose derivatives such as cellulose nitrate, cellulose acetate, ethyl cellulose and other esters and ethers may be incorporated into the impregnating compositions. These compounds should be added, however, in amounts small enough so that they will not seriously influence the rate of burning or taste of the cigarette.

While I have indicated that the resin solution may be brushed on the paper of the cigarette, it is obvious that other conventional methods may be used such as spraying or dipping. It is also within the scope of this invention to treat the cigarette paper with the resin before the cigarette is rolled by dipping the paper in the resin solution or emulsion, or by applying the resin to one side or both sides of the paper. The untreated cigarette may also be passed over rolls one side of which is immersed in the resin solution or emulsion.

It is apparent that many widely different embodiments of this invention may be made without departing from the spirit and scope thereof; and, therefore, it is not intended to be limited except as indicated in the appended claims.

I claim:

1. In the process of manufacturing cigarette paper, the improvement which consists in the step of treating the cigarette paper with a composition comprising from 0.5 to 2.5% of a water-insoluble resinous polymer of a compound of the general formula



where R is a member of the group consisting of hydrogen and a mono-valent hydrocarbon radical, and R₁ is a member of the group consisting of aryl, halogen, acyl, and acyloxy.

2. Process of claim 1 in which the resin is a vinyl resin.

3. Process of claim 1 in which the compound is in the form of an aqueous emulsion.

4. In the process of manufacturing cigarette paper the improvement which consists in the step of treating the paper with a composition containing from 0.5 to 2.5% of a vinyl resin.

RICHARD T. UBBEN.