

## UNITED STATES PATENT OFFICE

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## TOBACCO TREATMENT

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This invention relates to the treatment of tobacco in order that its properties may be improved thereby rendering it more valuable. More particularly, the invention relates to the treatment of leaf tobacco such as that used in the preparation of cigar wrappers in order that the characteristics of the tobacco leaf may be rendered more suitable for use in the manufacture of cigars.

10 It may be said that the invention more especially concerns itself with the treatment of leaf tobacco in order to extract undesirable substances therefrom. These undesirable substances may be either dark colored materials or light colored materials but, in all circumstances, my improved treatment process results in lightening of the color of the tobacco leaf so that the resulting product is more valuable and attractive as a cigar wrapper.

20 In the manufacture of cigars it has been usual to employ Havana tobacco leaves as wrappers for the more expensive grades. Tobaccos similar to Havana tobacco, such as those grown in Connecticut and Florida, are also frequently 25 used for wrapping cigars, especially those of more expensive grade. Unfortunately, from about one-third to perhaps one-half of the tobacco leaves grown in Connecticut and Florida or, more properly, those known in the trade as Connecticut 30 cut and Florida tobaccos, are too dark in color to permit of their use in the manufacture of cigars.

The leaves of Sumatran tobacco have also been utilized to some extent as cigar wrappers but thus far it has not been possible to utilize the relatively cheaper tobaccos such as those grown in the States of Kentucky, North Carolina and Virginia for cigar wrapping purposes. These grades and, in fact, all tobaccos except those 40 known as Havana and Sumatran tobaccos and to some extent the Connecticut and Florida tobaccos, have generally contained undesirable constituents and are too dark in color to permit extensive use of the leaves as wrappers in the manufacture of cigars. The trade has been 45 obliged to utilize the more expensive tobacco leaves to enclose the filling tobacco of cigars. This has necessarily resulted in increased cost.

It is one of the objects of this invention to develop a process for treating tobacco leaves intended for cigar wrappers so as to render them more satisfactory for use in the cigar manufacturing industry. While my process is especially valuable for treating tobacco leaves of the relatively cheaper tobaccos so as to permit of their

utilization as cigar wrappers, the method may also be utilized with advantage for treating even tobaccos of more expensive grade such as the Connecticut and Florida tobaccos.

The primary objective of this invention may accordingly be realized by the development of a process for treating tobacco, particularly leaf tobacco, which will not only lighten the color of the resulting product, thereby rendering it more suitable for use in wrapping cigars, but which will also remove from that tobacco, by extraction, a number of ingredients and principles whose presence in cigar wrappers is generally regarded as objectionable.

Although most useful in connection with the treatment of less expensive tobaccos, the complete aim and object of this invention involves the improvement of all leaf tobaccos intended for use as cigar wrappers by the development of a process, more particularly an extraction process, by which the color and shade of those tobacco leaves may be substantially improved. It is another object of this invention to carry out this extraction process in such a manner that "tendering" of the tobacco leaf will be avoided. 25 Very frequently, especially in the tobacco treatment processes now known to the art, the tobacco leaf at the conclusion of the process is so weakened that it readily crumbles upon being touched. Obviously, a leaf having these characteristics has absolutely no value as a cigar wrapper. In the trade, this condition of the leaf is termed "tender", and any process by which this condition is obtained is characterized as one which "tenders" the leaf.

The foregoing objects of this invention, involving the improvement of the characteristics of tobacco leaves intended for use as cigar wrappers by a process involving extraction, are to be accomplished with the additional objective in view of securing this improvement in quality without injuring or destroying those properties which permit of the utilization of those leaves in the making of cigars. While it may be frequently necessary at the conclusion of my process to restore the burning qualities of the tobacco by the addition of suitable materials, it is a further object of my process to accomplish the extraction of undesirable agents from the tobacco leaf with the accompanying improvement in color and other characteristics of the leaf, without rendering that leaf too tender, brittle or otherwise increasing its tendency to crack, flake, or crumble.

These and still other objects of my invention

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will be clarified and explained by the ensuing disclosure which is the preferred method known to me for improving the qualities of leaf tobacco as stated in the foregoing aims.

5 I have found that it is essential to subject the tobacco leaves to be improved to a two-stage process, the first stage involving the use of a warm aqueous solution containing an agent which permits ready penetration of the surface 10 of the tobacco leaves by the aqueous solution. At the conclusion of this first stage treatment, which is essentially a surface treatment of the tobacco leaf, the washed leaf is no longer rough and uneven to the touch but presents a velvety 15 feel. The second stage in my improved two-stage process involves the use of an extraction bath wherein dark-colored and other objectionable principles in the tobacco are extracted. Between the two operations, the first of which may 20 be termed a steeping or scrubbing operation while the second is an extraction operation, the tobacco leaves may be washed and/or dried. Drying may be carried out either by centrifugation, or by permitting the tobacco to stand until its 25 aqueous content has been reduced. Usually, at the conclusion of the extraction process, the burning properties of the tobacco have been reduced to such an extent by the extraction that the tobacco cannot be utilized as a cigar wrapping 30 material without restoration of these burning properties. Accordingly my process also involves the restoration, when necessary, of the burning properties to the tobacco, either by including an agent serving to restore the burning 35 properties in the extraction bath or by giving the tobacco a separate treatment with this agent serving to improve burning qualities.

In order that the extraction process carried 40 out in the second stage of my improvement process may be successful, I have found it essential that the first step, that of treating the tobacco leaves with warm aqueous liquor, be included in my complete tobacco treating process. In order that satisfactory extraction of both light 45 and dark colored objectionable ingredients may be secured it is essential that the extraction bath of the second step be utilized. Thus, neither step is effective when utilized alone, but when both steps are employed conjointly the leaf improvement characteristic of my novel tobacco 50 treatment process is secured.

In the steeping or scrubbing step I have found it desirable to employ warm water, the temperature ranging from about 100° F. to the boiling 55 point. Preferably a temperature within the range 160 to 212° F. is employed. During this step it is essential to include in the aqueous bath an agent which will permit the warm water readily to penetrate the surface of the tobacco leaves, 60 thereby removing those waxy and other surface impurities which render the tobacco leaf harsh and rough to the touch. As the agent to permit ready penetration of the surface of the tobacco leaves by the warm aqueous solution I prefer to 65 use a product such as that sold under the trademark name "Duponol". This product, which is manufactured and sold by the E. I. du Pont de Nemours & Company, Inc., is a sulfated higher alcohol sold generally for use in bleaching and dyeing baths wherever an effective wetting agent 70 may be utilized. Various grades of this product are now sold, containing different proportions of alcohols. Thus, the following identifying marks are used in connection with these grades: "ME"; "WA Flakes"; "WA Paste"; "PW"; "LS Paste";

and "LS Flakes". The first four products are made by the sulfation of lanol, or alcohols obtained by reduction of coconut oil. The last two products are made by the sulfation of oenol, or alcohols obtained by reduction of sperm oil. 5 Although other sulfated products, such as those prepared as described in Schweitzer Patent 1,974,436 may also be used as agents permitting ready penetration of the surface of the tobacco by the warm water, I prefer to utilize "Duponol" 10 as above described.

It may be stated at the outset that tobacco leaves are extremely sensitive to variations in alkalinity or acidity. If subjected to too high a degree of alkalinity they will become tender, 15 readily crumbling or flaking when subjected to subsequent handling. Obviously tobacco leaves which crumble or flake are worthless as cigar wrappers. On the other hand, in order that the extraction of undesirable and deleterious constituents may be carried out, it is essential to employ treatment baths which are alkaline in reaction. The problem in both stages of my process therefore involves the careful regulation of the pH of the treatment solution so that satisfactory extraction may be secured without undue 20 tendering or other objectionable impairment in the quality of the tobacco. When utilizing "Duponol" in amounts hereinafter specified in the steeping or scrubbing stage, no particular problem 25 is encountered insofar as the pH of the steeping bath is concerned. This is because this agent affects to but a slight extent the pH of the aqueous solution in which it is dissolved. However, during the second stage of my process, that 30 wherein an alkaline extraction bath is utilized, it is necessary that the pH be carefully regulated within the range of pH values 8 to 11, preferably within the pH range 9 to 10. It may be stated as a general conclusion that I have 35 found it to be necessary when treating the tobacco with alkaline baths to maintain the pH at all times within this range in order that the resulting tobacco leaf may not be so impaired in quality as to render it worthless in the cigar 40 wrapping industry.

It may also be stated that it has previously been suggested to treat tobaccos with warm water and then to immerse the tobacco in an alkaline bleaching bath of hydrogen peroxide, which bath 50 contains ammonia. However, the results secured by this process, which was a bleaching process as distinguished from an extraction process, have not been satisfactory. The primary reason for lack of commercial success was the fact that the 55 preliminary hot water treatment did not cooperate with the subsequent bleaching treatment in such a way as to insure a satisfactory product. Another important reason for the failure of this process to make any impression in the cigar 60 wrapping industry was the fact that no attempt was made in the known process to control the alkali content or the pH of the hydrogen peroxide solution utilized for bleaching during the bleaching phase. Merely utilizing a bath of hydrogen 65 peroxide containing ammonia resulted in objectionable tendering of the tobacco, thereby securing a product which was practically valueless from the commercial standpoint. This tendering must necessarily result from the use of any bath 70 of this character unless the quantity of ammonia or other alkali present is definitely restricted so that the pH falls within the range previously specified. When the pH is maintained within the range 8 to 11, preferably 9 to 10, I have found 75

that, surprisingly enough, the tobacco is not bleached, the bath of hydrogen peroxide containing ammonia acting as an extraction agent, extracting both light and dark colored impurities from the tobacco. At the conclusion of my extraction step the extraction solution is extremely dark in color, a condition which would never obtain if the bath were solely a bleaching bath as in the methods previously suggested in this art.

10 The novel characteristics of my process may be summarized by stating that the first stage operation so cooperates with the second as to permit ready extraction of undesirable principles from the tobacco in the second stage, without undue tendering or injury to the tobacco leaf. Another and important distinction between my process and those previously suggested in the art is that I employ an extraction bath during the second stage and not a bleaching operation.

15 20 The first or steeping stage of my process employing the use of a warm aqueous solution, one usually having a temperature within the range 160 to 212° F. and containing "Duponol" dissolved therein, has been previously referred to. This particular wetting agent has but little effect on the pH of the solution. As control of the pH is at all times important, the advantages of "Duponol" are apparent. During the actual extraction step the pH must be within the range 25 30 35 8 to 11 and preferably within the range 9 to 10, but during the preliminary treatment a pH not differing substantially from that of neutrality is desirable. Since "Duponol" gives such a solution this agent is to be regarded as a preferred 40 45 50 55 60 65 70 ingredient in the steeping or scrubbing bath.

The amount of "Duponol" present in this bath may vary from 0.01 to 1%, this amount being by weight, based upon the amount of liquid in the bath. I have found that most satisfactory steeping baths are obtained when "Duponol" in amounts ranging from 0.04 to 0.06% is added to warm water, the temperature of the water in all cases being above 100° F. and preferably within the range 160 to 212° F. The tobacco is steeped in this bath for a period usually ranging from 5 to 20 minutes although, in some cases, especially in large scale commercial operations, it is necessary to steep the tobacco for periods up to one hour or even longer. In addition to merely steeping the tobacco, some positive scrubbing action may advantageously be maintained. This may be accomplished by agitating the bath, either by hand, or by some positive mechanical means. In some cases sufficient agitation may be secured merely by moving the tobacco by hand around in the warm aqueous bath. While I do not desire to be limited to any exact ratio, or amount of tobacco treated to amount of steeping solution, it may be said that I have ordinarily utilized 60 gallons of solution to treat 60 "hands" of tobacco. Since the weight of tobacco in a "hand" may vary somewhat, some tobaccos such as Connecticut tobacco weighing less per hand, a greater number of "hands" may sometimes be treated in the specified 60 gallons of solution. This ratio of steeping solution to tobacco treated is to be regarded purely as illustrative as, obviously, as long as thorough wetting is secured, it is possible to employ almost any ratio of warm water to tobacco.

70 After the requisite immersion period, a period usually not exceeding 20 minutes but in some cases, especially where relatively large amounts of tobacco are handled, extending up to one hour, the tobacco is removed from the warm bath and

either washed with warm water or subjected to treatment in a centrifugal drying machine. It has been found that after washing with hot water and being permitted to dry by standing for a short period of time, the tobacco will retain about 2 pounds of water per pound of tobacco. After centrifugation, on the other hand, the water content of the tobacco will have been reduced to approximately 1 pound of water per pound of tobacco. Either method of treatment of the 10 tobacco after it has been removed from the treating and scrubbing bath may be carried out. When removed from the steeping bath it will be noticed that this bath is exceedingly dark in color, being dark brown or almost black. This 15 indicates that even during the steeping and scrubbing step a substantial amount of extraction of dark colored materials from the tobacco is secured although, as previously stated, the treatment in the second bath is to be regarded 20 more properly as the extraction step of my improved process.

25 After washing or centrifugation, the tobacco leaves are immersed for periods ranging from 10 minutes to one-half hour, or in some cases even 25 longer, in a bath containing hydrogen peroxide and water. The quantity of ammonia present in this extraction bath must be carefully regulated so that the pH shall fall within the range 8 to 11, preferably within the pH range 9 to 10. This 30 means that the amount of ammonia added must be sufficient so that the ammonia (NH<sub>3</sub>) content of the extraction bath ranges from about 0.002% to about 1%, preferably from about 0.006% to about 0.25%. These percentages are approximate NH<sub>3</sub> percentages which will yield pH values within the range previously specified. When the NH<sub>3</sub> addition is made by adding a solution of ammonium hydroxide, the ammonia content of that solution must be taken into account, unless, 40 as is probably the preferable procedure, the correct amount of commercial ammonium hydroxide solution to be added to any given bath is determined by pH observation.

45 The quantity of hydrogen peroxide present in my extraction bath may vary from 0.03% to 1.00%, (approximately 0.1 volume to 3.3 volumes). As in the case of the ammonia concentration these percentages are actual computed percentages based on the weight of active agents 50 added to the bath. When utilizing a solution of hydrogen peroxide, such as the commercial 100 volume "Albone" containing a hydrogen peroxide content of approximately 28% by weight, the hydrogen peroxide percentage of the source of 55 hydrogen peroxide must be taken into consideration in determining the amount of this commercial solution to add to any extraction bath. I have found that a hydrogen peroxide concentration ranging from 0.85 to 0.90% yields most satisfactory results when the extraction bath is maintained at a temperature within the range 100 to 175° F. My preferred extraction bath is maintained at a temperature within the range 120 to 130° F. but, in some cases, the temperature 60 may be as low as 100° F. and in other cases the temperature may go up to 200° F. or even slightly higher, for example to the boiling point. However, it is usually unwise to employ a temperature in excess of about 175° F. for the extraction bath. 70

The tobacco is preferably immersed in the warm alkaline hydrogen peroxide solution, forming the extraction bath, for a period of ten to thirty minutes. In some cases immersion periods of an hour or even longer may be adyan- 75

tageously utilized. When treating tobacco which is relatively light in color and from which but few objectionable principles are to be extracted, immersion periods of less than ten minutes may suffice.

The action taking place in the second stage of my process is essentially an extraction process. As in the first stage of my process, (which also acts to extract undesirable principles from the tobacco), the treatment solution becomes very dark in color and this dark color continues for a very considerable period of time after the tobacco has been removed from the bath. Finally, some hours after removal of the tobacco from the bath, sufficient bleaching action takes place in the bath as a result of the hydrogen peroxide present therein so that the solution becomes appreciably lightened in color. After standing for periods of three hours or more the solution, which is extremely dark in color after the removal of the tobacco therefrom, changes in color to a very light green and is characterized by remarkable clarity. This latter effect is more properly a bleaching effect, the peroxide acting to bleach the dark-colored extracted impurities present in the bath, but during the actual treatment of the tobacco in the solution containing hydrogen peroxide and ammonia no substantial bleaching action occurs and the tobacco is improved almost solely as the result of the extraction of objectionable principles therefrom.

It has been observed that if the extraction bath is maintained at a temperature much over 175° F. tendering of the leaves, as well as vigorous decomposition of the hydrogen peroxide present in the extraction bath, will occur. Surprisingly enough, the extraction of both light and dark colored impurities appears to be less at this temperature than at lower temperatures. Accordingly a temperature within the range 120 to 130° F. is to be regarded as preferred. The decomposition of hydrogen peroxide observed to some extent with the extraction bath at this temperature appears to be primarily the result of the elevated temperature, as well as due to the presence of an alkali in the bath, and it is attributable in but very small measure to any actual oxidation of impurities present in or on the tobacco. The greater portion of the decomposition of hydrogen peroxide does not occur to any appreciable extent during the period in which the tobacco is immersed in the extraction solution in any case, but takes place after the removal of the tobacco from the solution. The dark-colored principles extracted from the tobacco and present in the extraction bath are bleached by the action of the hydrogen peroxide after removal of the tobacco from the bath, but during the period wherein the tobacco is immersed in the bath the bleaching activity of the hydrogen peroxide seems to be distinctly subordinated to its hydrolytic or other action which renders the bath extremely effective as an extraction medium.

After removal of the tobacco from the extraction bath it may be subjected to centrifugal drying and then hung up to dry in any well known type of drier. The centrifugation is not essential, as the tobacco leaves may be merely permitted to drain excess solution back into the bleaching bath and then hung up to dry. The resulting product will be found to be of velvety texture, without any appreciable tendency to flake or crumble, and of a very satisfactory light color.

The objectionable principles have been removed

and the tobacco seems to be actually milder in taste and flavor. Curiously enough, no appreciable amount of tendering of the tobacco leaves occurs and in this respect my process is a striking improvement over older processes wherein the major portion of the tobacco leaves treated usually become so tender during the treatment as to prevent their use as tobacco wrappers.

Since the burning qualities of the tobacco are usually completely destroyed or at least seriously impaired during the extraction treatment, it is usually necessary to restore the burning properties by treating the tobacco with any treatment agent now well known in the art to accomplish this purpose. After removal from the extraction bath, and before centrifugation or drying, the tobacco may be immersed in a solution of potassium acetate which may contain, for example, approximately 12.5 pounds of the salt per 100 gallons of solution. This approximates about 15 grams of potassium acetate per liter of solution. Or, if desired, the potassium acetate may be placed directly in the extraction bath so that after removal from the extraction bath the tobacco is ready for immediate drying. While potassium acetate in the amount specified has been found to give very satisfactory results in restoring burning properties to the tobacco, any other agents well known in the art, or now used for this purpose in the tobacco industry may be utilized.

It will be obvious to those skilled in the art that various changes may be made in my process without departing from the spirit of the invention. Therefore, I do not desire to be restricted to the precise details of my process hereinbefore described as illustrative. The scope of my invention is to be construed in accordance with the appended claims and the prior art. Wherever in these claims "Duponol" is referred to, it is my intention to signify the product sold under that trade-mark name previously identified.

I claim:

1. A process of improving tobacco which comprises steeping said tobacco in a bath of warm water having a temperature in excess of 160° F. and containing "Duponol" in amounts up to 1% and, thereafter, immersing said tobacco in an extraction bath having a pH within the range 8 to 11 and comprising hydrogen peroxide in amounts ranging from 0.03% to 1% and ammonia in amounts ranging from 0.002% to about 1%, all said percentages being by weight based on the amount of liquid in the bath.

2. A process for improving tobacco which comprises steeping said tobacco in a warm aqueous liquid having a temperature between 160° F. and its boiling point and containing an agent permitting ready penetration of the surfaces of said tobacco by said aqueous liquid in amounts ranging from 0.04 to 0.06%, and, thereafter, immersing said tobacco in an extraction bath containing hydrogen peroxide in amounts ranging from 0.03% to 1.00% and ammonia in amount sufficient to render that bath alkaline in reaction so that it possesses a pH value within the range 8 to 11, all percentages specified being by weight, based on the weight of liquid in the respective baths.

3. A process for improving tobacco which comprises the steps of steeping said tobacco in a warm aqueous liquid having a temperature between 160° F. and its boiling point which contains "Duponol" in amounts ranging from 0.04 to 0.06% by weight, based on the weight of said

5 aqueous liquid, and, thereafter; immersing said tobacco in an extraction bath having a pH within the range 8 to 11 and containing hydrogen peroxide in amounts ranging from 0.03 to 1.00%, by weight, based on the weight of said extraction bath.

10 4. A process for improving tobacco which comprises steeping said tobacco in a bath of warm water having a temperature within the range 160-212° F. in the presence of an agent 10 permitting ready penetration of said tobacco surfaces by said water, said agent being present in at least 0.01% by weight based on the weight of

said bath and, thereafter, immersing said tobacco in an extraction bath containing hydrogen peroxide and having a pH within the range 8 to 11.

5 5. A process for improving tobacco which comprises steeping said tobacco in a bath of warm water having a temperature within the range 160-212° F. and containing "Duponol" present in the amount of at least 0.01% based on the weight of water and, thereafter, immersing said tobacco in an extraction bath containing hydrogen peroxide and having a pH within the range 8 to 11.

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