

# UNITED STATES PATENT OFFICE

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TOBACCO

Thomas H. Garber, Washington, D. C., assignor  
to Larus and Brother Company, Inc., Henrico  
County, Va.

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This invention relates to tobacco and more particularly to tobacco products including cigarettes, smoking tobacco and chewing tobacco, and the processing or treating of the tobacco to obtain the finished product. The present invention is a continuation in part of each of my copending applications, Ser. Nos. 415,960 and 451,961, both filed July 22, 1942.

The invention is concerned primarily with the finished product, whether it be cigarettes, smoking tobacco or chewing tobacco, and is concerned more particularly with the method of obtaining a tobacco product of best quality and character that will afford the greatest pleasure and satisfaction to the user without irritation to the mucous membranes of the smoker or other disagreeable effects.

In the processing of tobacco products it is important that the tobacco be treated with certain materials to maintain the proper moisture conditions and to render the same workable as well as in the proper condition for use. It is well recognized that in processing it is necessary to blend various types and grades of tobacco produced by different soils and methods of curing. Various conditioning agents have been employed including hygroscopic agents or humectants, for example glycerine, diethylene glycol, invert sugar, sorbitol and the like, to obtain and control the desired moisture retention qualities. In addition to controlling the moisture in the tobacco it is highly desirable to treat the tobacco so that its use will afford greater enjoyment due to the elimination of irritants. In other words in the manufacture of tobacco two major factors must be considered, viz., the use of a suitable hygroscopic agent or humectant for maintaining the proper moisture content and the addition of something that will properly neutralize irritants including those in the smoke of combustion.

Bright or flue-cured tobaccos containing various amounts of carbohydrates, up to one-fourth of the weight of the tobacco, may be described as acidic, since in the products of combustion acids predominate over alkalines. This is due to the relative amounts of carbohydrates over nitrogenous substances in the leaf. Air-cured types, particularly burley and Maryland tobaccos, are alkaline in their products of combustion due to the predominance of nitrogenous substances in the tobacco. Turkish tobaccos are comparatively neutral in character.

The difference between acidic and alkaline types of tobaccos may be attributed primarily to the method of curing. Bright tobaccos naturally

low in nitrogen are heat or flue-cured more or less quickly and artificially with the result that the carbohydrates are maintained at the maximum and stabilized. When burned these carbohydrates form acidic products. Air-cured tobaccos, such as burley and Maryland types, are relatively high in nitrogen, but low in, if not devoid of, carbohydrates. The foregoing types of tobaccos usually are blended in various proportions to produce the desired various tobacco products including cigarettes and smoking tobacco.

It has been found necessary in the blending of tobaccos that those low in, or of no carbohydrate content, must have their carbohydrate content increased, in order to have the proper chemical balance particularly in the combustion products of the tobacco. Without this alkaline and acidic balance tobacco products are often found to have certain objectionable characteristics which may produce irritation to the mucous membranes of the nose and throat of the smoker. Much has been done in an effort to overcome this difficulty including improvement of the smoking qualities, flavor, and aroma of tobaccos and particularly to remove irritants from the smoke produced during burning of the tobacco product.

It is an object of the invention to control the moisture retention qualities and carbohydrate content of the tobacco by incorporating in the tobacco an improved hygroscopic agent which is likewise a source of carbohydrates, and by adding when necessary additional carbohydrates for balancing the acid and alkaline constituents in the smoke.

In carrying out the invention full consideration is given to the relationship of the added carbohydrates, the characters of the tobaccos, the carbohydrate contents which are supplemented, and the combustion products of the combination.

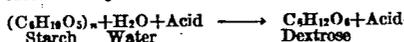
I have found that in order to satisfactorily use air-cured tobaccos having little or no natural sugars in a blend with bright or flue-cured tobaccos having various amounts of natural sugars present in the cured tobaccos, that it is necessary to regulate and control the final carbohydrate content of the finished tobacco product. It will be readily apparent that after the tobaccos are blended, it is necessary to determine definitely the percentage of carbohydrates in the blend from which information the amount of carbohydrates to be added is determined in order that the carbohydrate deficiency may be overcome in order to provide the proper balance of the acidic and alkaline constituents produced in the smok-

ing of the tobacco product, to thereby reduce the irritating properties of the tobacco when smoked. I have found that carbohydrates may be added by the incorporation with the tobaccos of certain carbohydrates, particularly of the character contained in some fruit or grain sugars and the like; fruit sugars being largely dextrose and grain sugars being combinations of carbohydrates. Of these sugars we have found that dextrose is much the best although cane and maple sugars may be used with much less degree of satisfaction.

Dextrose is the best source of added carbohydrates and when it is added it is unnecessary to have other types of sugars and at the same time it will increase the carbohydrate content of the tobacco to a predetermined amount depending upon the amount of dextrose added and it will improve the smoking qualities of the tobacco. If a greater amount of moisture is desired dextrose-maltose-dextrine may be employed as a humectant to supply the dextrose when only a small quantity is required. Actual tests and experience have proven that tobacco treated in accordance with my method produces less irritation during smoking than tobacco treated with other types of carbohydrates such as disaccharides and trisaccharides, that is, cane sugar and dextrine sugar.

While the carbohydrate content can be increased and improved by the use of the primary sugar dextrose, the carbohydrate content and the amount of moisture retention qualities of the tobacco product can be definitely controlled by incorporating dextrose-maltose-dextrine syrup in the tobacco.

Dextrose is prepared commercially from corn starch by a process technically known as acidic saccharification or hydrolysis of starch under the established process used by the manufacturer. Fundamentally, the dextrose formation is brought about by acid causing starch to combine with water chemically as follows:



The acid is not affected by the reaction as the equation indicates. It acts merely as an accelerator or catalyst. It is the hydrogen ion concentration which determines the rate of hydrolysis. Dextrose hydrate is formed with one molecule of dextrose containing one molecule of water of crystallization



Anhydrous dextrose, that is—dextrose without water of crystallization ( $C_6H_{12}O_6$ ), is produced by re-crystallizing dextrose hydrate in vacuum. Both dextrose hydrate and anhydrous dextrose may be used in the herein disclosed process.

In carrying out my improved method in the manufacture of tobacco, a predetermined amount of dextrose is added to the tobacco after blending, preferably with the "casing." The dextrose, preferably in substantially pure form, is dissolved in water and is applied by spraying uniformly on the surface of the tobacco with or without other flavoring ingredients. The dextrose likewise may be applied to tobacco by dipping or submerging the tobacco in an aqueous solution of dextrose with or without other flavoring ingredients and allowing the tobacco to absorb a given percentage of dextrose, after which the tobacco is dried and cut in accordance with the requirements of the tobacco product.

In actual practice dextrose has been success-

fully incorporated in the tobacco product by spraying an aqueous solution uniformly on the tobacco or tobacco blend in an amount up to  $\frac{1}{6}$  dry weight of the dry weight of the tobacco treated or in other words the amount used varying approximately from 1% to 15% by weight of the tobacco being treated. This amount is dependent upon the types of tobacco used and the amount of dextrose required to balance the nitrogenous substances in the natural tobacco. Dextrose has also been successfully applied to tobacco by dipping or by submerging the tobacco in an aqueous solution with or without other flavoring ingredients and allowing the tobacco to absorb a definite amount of dextrose from the solution before drying and cutting into the desired specifications of the tobacco product. The added carbohydrate should be essentially dextrose, that is, substantially far the greater part or substantially all dextrose in order not to add something which will interfere with the operation of the dextrose or which will add other irritants to the product. In actual tests the use of invert sugar has been unsatisfactory due to the presence of levulose with the dextrose.

*Specific example.*—To 1000 lbs. of tobacco, or blend of tobaccos, add 100 lbs. of the primary sugar dextrose dissolved in an aqueous solution by spraying the solution uniformly on the tobacco or submerging the tobacco in the solution for absorption of the dextrose, after which the tobacco is dried to the desired specifications and cut into shreds or granular particles.

In addition to increasing the carbohydrate content of the tobacco by the use of substantially pure dextrose, other flavoring ingredients and materials may be added by this method as desired by the manufacturer for flavoring and moisture retention but the added materials should not interfere with the action of the dextrose or add irritants.

By this improved process the carbohydrate content of tobacco or tobacco blends can be uniformly controlled as to the amount of total carbohydrates and a balance made with the nitrogenous and nicotine contents of the tobacco with the use of only an aldose-hexose type of sugar (dextrose). By this means it is possible to regulate the variations in the carbohydrate content of tobacco by the use of added dextrose. Improvements in the smoking qualities by eliminating harsh irritants and undesirable combustion products are obtained by balancing the acidic and alkaline substances in the tobacco smoke.

The amount of moisture found in tobacco products varies with climatic conditions and is related to the method of manufacture, curing and cultivation of the types of tobacco used in the finished product. It is highly important that a tobacco product maintain a constant moisture range after processing, namely 10 to 13% moisture, in order to insure satisfactory smoking qualities without the production of irritating substances in the smoke developed particularly when dry tobacco is burned. In like manner, tobacco products should not become soggy or too moist from excess absorption of moisture due to effects of some types of hygroscopic substances used with tobacco products. Tobaccos often mold and are damaged if the moisture retention factors are not controlled in the manufacture and formulation of the tobacco product.

A moisture stabilizer which will prevent tobacco products from drying below the desired level as well as to prevent absorption above the de-

sired limit for maximum smoking quality is an object of this invention in the use of dextrose-maltose-dextrine syrup herein described.

Dextrose-maltose-dextrine when added to tobacco in the process of manufacture, adds the desirable carbohydrates to the tobacco product as well as affords a moisture retention substance which stabilizes the moisture at the desired level under most climatic conditions.

None of the customary hygroscopic agents such as glycerine, diethylene glycol, sorbitol, invert syrup and the like, are necessary or desirable when dextrose-maltose-dextrine is used in the processing of the tobacco product as described. In some climates, some tobaccos when treated with dextrose may require little or no hygroscopic substance to be added the dextrose being sufficiently hygroscopic as well as supplying the necessary carbohydrate supplement.

The particular composition of the dextrose-maltose-dextrine syrup most desirable with the present invention is one which contains approximately 20% water with carbohydrate analysis totaling 100% in which the dextrose and maltose and dextrine are respectively approximately 40, 40 and 20% on a dry weight basis. It will readily be understood that the dextrose and maltose each may be from 35% to 40% and the dextrine from 20% to 25%.

While the above composition of syrup has been found satisfactory in practice, other types of dextrose-maltose-dextrine syrups having varying relative percentages of dextrose, maltose and dextrine may be used.

In practice, the dextrose-maltose-dextrine syrup may be added to the tobacco in an aqueous solution with or without the addition of other flavoring ingredients in proportions of from 1% to 15% or up to approximately 1/2 dry weight of the dry weight of the tobacco being treated. This syrup may be applied to the tobacco by spraying before the tobacco is cut and dried, or it may be applied by dipping or submerging the tobacco in an aqueous solution containing the syrup and allowing the tobacco to absorb this syrup, then drying before cutting into shreds or granular particles.

*Specific example.*—To 1000 lbs. of uncut tobacco, apply by spraying or dipping or otherwise to permit absorption, 100 lbs. of the syrup (dry weight) in an aqueous solution with or without other flavoring ingredients. The tobacco should then be dried to a desired moisture content before cutting and incorporating into the final tobacco product—cigarettes and/or smoking tobacco and/or chewing tobacco.

Actual experience has demonstrated that the use of this syrup in the amounts stated imparts to the tobacco the desired moisture-retaining properties while at the same time it acts as a source of carbohydrates necessary to obtain a uniform balance of the carbohydrates with the nitrogenous and nicotine contents or alkaline substances of the tobacco. In other words, the carbohydrate content of the tobacco is increased to a pre-determined amount which improves the smoking quality of the tobacco, and in addition to this factor the syrup acts as a softening or conditioning agent as well as a moisture retaining agent so that the tobacco remains longer in a moist condition.

The carbohydrate contents of air-cured tobaccos, particularly when increased to the desired amount by this method, affords a necessary balance in the smoke of the nitrogenous and

nicotine contents. Thus, the present method accomplishes a two-fold purpose—that is, (1) it increases the carbohydrates during processing thereby improving the smoking quality of tobacco products, and (2) it serves as a hygroscopic or conditioning agent for the retention of moisture to prevent tobacco from drying out.

It will be understood from the foregoing that the present invention contemplates using dextrose-maltose-dextrine to control both the carbohydrate content and the moisture retention properties of the tobacco. Also the invention contemplates using dextrose alone to control the carbohydrate content as well as to supplement the dextrose when the dextrose of dextrose-maltose-dextrine is insufficient. Also where little or no moisture retention control is necessary the dextrose will serve satisfactorily this purpose.

In the processing of some tobaccos it has been found desirable to maintain the carbohydrate content higher than when dextrose-maltose-dextrine syrup was used; in other words it has been found desirable to maintain the dextrose content higher than the amount of dextrose available from the dextrose-maltose-dextrine syrup without the addition of the maltose and the dextrine; that is to say by adding additional primary sugar dextrose to the "casino" or tobacco sweetening or conditioning solution the desired result is accomplished. The addition of the primary sugar dextrose does not appreciably modify the hygroscopic characteristics of the tobacco while each substance dextrose and dextrose-maltose-dextrine are each individually useful but by combining the two a greater flexibility and exactness of control is obtained, and is possible of variations to compensate for the irregular properties and chemical composition of unprocessed tobaccos. Accordingly a tobacco low in carbohydrate content requires a greater amount of primary sugar dextrose to be added while a tobacco having a greater carbohydrate content requires a much smaller amount of the primary sugar dextrose to be added; likewise when the tobaccos are low in moisture retention properties a greater amount of dextrose-maltose-dextrine is required than when such tobaccos have greater moisture retention qualities.

It will be readily appreciated that dextrose-maltose-dextrine is added to tobacco not only for controlling the moisture retention qualities but to increase the carbohydrate content. When such increase in carbohydrate content is not sufficient dextrose is added to supply this deficiency and that occurring from the great variation which exists in the natural unprocessed tobaccos. The requirements are that the manufactured product must be uniform in total carbohydrate and hygroscopic properties. It is therefore possible to obtain the highly desirable carbohydrate balance with the nitrogenous content of the tobacco and maintain the desired moisture retention properties. The above applies not only to a particular tobacco product but to all tobacco products including cigarettes, smoking tobacco and chewing tobaccos.

It will be understood further that each of the dextrorotatory substances dextrose and dextrose-maltose-dextrine may be used individually or they may be used conjointly. That is, dextrose is preferable where the hygroscopic properties need very little, and the carbohydrates substantial, supplement; and dextrose-maltose-dextrine is preferable where a great amount of carbohydrate

supplement is not necessary but substantial hygroscopic supplement is necessary.

It will be understood that although specific examples have been illustrated they are not to be construed as limiting but only as illustrative of the invention and that certain changes in the process and manner of performing the same may be made without departing from the spirit or scope of the invention as defined by the appended claims.

What is claimed is:

1. In the manufacture of a tobacco product, that improvement which comprises incorporating in the tobacco carbohydrate substance comprising dextrose-maltose-dextrine and dextrose, the dextrose-maltose-dextrine being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
2. A tobacco product having incorporated therein carbohydrate substances comprising dextrose-maltose-dextrine and dextrose, the dextrose-maltose-dextrine being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
3. In the manufacture of a tobacco product, that improvement which comprises incorporating in the tobacco carbohydrate substance comprising dextrose-maltose-dextrine and dextrose, said carbohydrate substance being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco treated, the dextrose-maltose-dextrine being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
4. A tobacco product having incorporated therein carbohydrate substances comprising dextrose-maltose-dextrine and dextrose, said carbohydrate substance being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco, the dextrose-maltose-dextrine being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
5. In the manufacture of a tobacco product that improvement which comprises incorporating in the tobacco a carbohydrate comprising dextrose-maltose-dextrine syrup and a carbohydrate consisting essentially of dextrose, the dextrose-maltose-dextrine syrup being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
6. A tobacco product having incorporated therein a carbohydrate comprising dextrose-maltose-dextrine syrup and a carbohydrate consisting essentially of dextrose, the dextrose-maltose-dextrine syrup being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
7. In the manufacture of a tobacco product that improvement which comprises incorporating in the tobacco a carbohydrate comprising dextrose-maltose-dextrine syrup and a carbohydrate consisting essentially of dextrose, said carbohydrates being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco treated, the dextrose-maltose-dextrine syrup being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
8. A tobacco product having incorporated therein a carbohydrate comprising dextrose-maltose-dextrine syrup and a carbohydrate consisting essentially of dextrose, said carbohydrates being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco treated, the dextrose-maltose-dextrine syrup being substantially in the proportions of 40%, 40% and 20% dry weight respectively.
9. In the manufacture of a tobacco product for smoking, incorporating in the tobacco casing including a carbohydrate consisting essentially of dextrose, maltose, and dextrine, in proportions substantially 40%, 40% and 20% dry weight respectively.
10. A tobacco product for smoking having therein a casing including a carbohydrate consisting essentially of dextrose, maltose, and dextrine, in proportions substantially 40%, 40% and 20% dry weight respectively.
11. In the manufacture of a tobacco product for smoking, incorporating in the tobacco a casing including a carbohydrate consisting essentially of dextrose, maltose and dextrine, in proportions substantially 40%, 40% and 20% dry weight respectively, said carbohydrate substance being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco treated.
12. A tobacco product for smoking having therein a casing including a carbohydrate consisting essentially of dextrose, maltose, and dextrine in proportions substantially 40%, 40% and 20% dry weight respectively, said carbohydrate substance being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco.
13. In the manufacture of a tobacco product for smoking, incorporating in the tobacco a casing having therein a carbohydrate syrup including approximately 40% dextrose, 40% maltose, and 20% dextrine and having the requisite moisture retention properties for providing the necessary moisture in the tobacco, said carbohydrate substance being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco treated.
14. A tobacco product for smoking having therein a casing including a carbohydrate providing the necessary moisture retention properties which at the time of incorporation was dextrose-maltose-dextrine syrup in which the dextrose-maltose-dextrine were substantially in proportions of 40%, 40% and 20% dry weight respectively, said carbohydrate substance being an amount up to approximately  $\frac{1}{6}$  dry weight of the dry weight of the tobacco.
15. In the manufacture of tobacco to be smoked, the steps of blending tobaccos to obtain the desired smoking qualities, checking the blend to determine the percentage of carbohydrates present, conditioning the blended tobacco for the proper moisture content, and treating the tobacco with a casing containing substantially pure dextrose in an amount sufficient to balance the carbohydrate deficiency, thereby reducing the irritating properties of the smoke.
16. A tobacco product for smoking comprising a blend of tobaccos having predetermined smoking qualities and initially a carbohydrate deficiency, the blend having a suitable moisture content and including a casing having a carbohydrate consisting of substantially pure dextrose in an amount substantially balancing the carbohydrate deficiency whereby the acidic and alkaline constituents in the smoke are substantially balanced and the irritating properties of the smoke are reduced.

THOMAS H. GARBER.