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ERNST-ROLF DETERT ET AL
SALIVA RESISTANT TOBACCO SHEET, PROCESS OF MAKING
SAME, AND CIGAR INCLUDING SUCH SHEET
Filed Jan. 21, 1965

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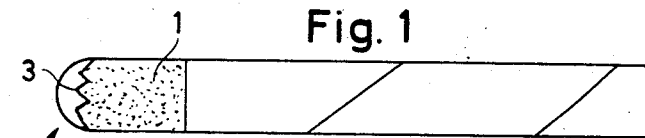


Fig. 1

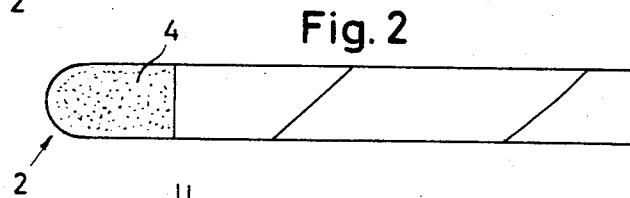


Fig. 2

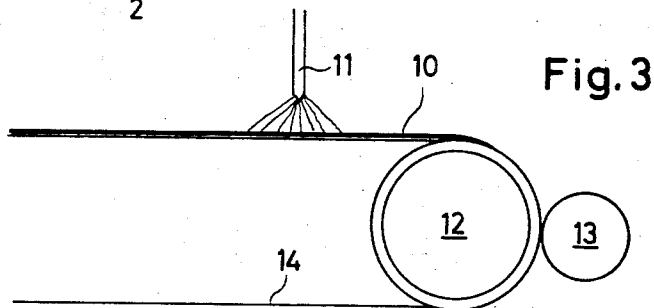


Fig. 3

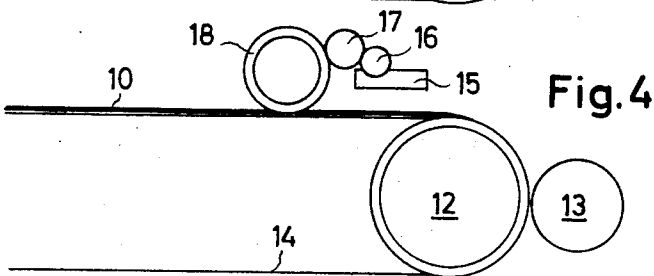


Fig. 4

Fig. 5

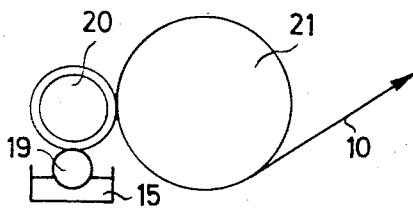
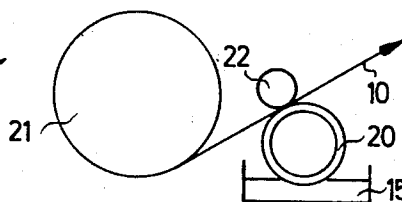


Fig. 6



INVENTORS

ERNST-ROLF DETERT

BY WILHELM BUCHHOLZ

Smice and Smice
ATTORNEYS

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SALIVA RESISTANT TOBACCO SHEET, PROCESS OF MAKING SAME, AND CIGAR INCLUDING SUCH SHEET

Ernst-Rolf Detert, Schutzenstrasse 2, Lubbecke, Germany, and Wilhelm Buchholz, Obermehnen, near Lubbecke, Germany

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This invention relates to a process for the manufacture of a completely saliva resistant tobacco foil or sheet which is also very resistant toward mechanical stress when in moist condition. More particularly, the invention concerns tobacco goods, for example, cigars which are manufactured using the tobacco sheet of the invention as a wrapper or as a leaf or as a reinforcement.

The object of the present invention is to provide a tobacco sheet which is particularly suitable as a wrapper for cigars which the majority of smokers hold between their teeth rather than between their lips. Thus, the wrapper is subjected to hard wear.

A further object of the invention is to provide a tobacco sheet which exhibits a high degree of mechanical stability, which is obtainable in a flexible and ductile condition, which contains no ingredients which detract from the smoking enjoyment or the health of the smoker, and which is capable of being dyed and utilized for the wrapper, the leaf, and also as a reinforcement for cigars.

Especially where it is used as a wrapper and reinforcement, the tobacco sheet of the invention represents a remarkable advance in the art, since it is wrapped up to the end of the cigar, sealed on all sides by means of a heat sealing operation and can be adapted to the shape of the cigar.

A further advantage is found in that a reinforcement made from the tobacco sheet of the invention can be cut in the wrapping or overrolling machine, an advantage which was not possible with the previously known reinforcement prepared from parchmentized paper.

Moreover, the water-resistant and stable tobacco sheets can advantageously be employed in cut or shredded form as a tobacco filler. They behave in the same way as natural tobacco with regard to filling power and resistance toward the aqueous constituents of the smoke condensates. Other than a slight mottling of the filler, which contains the sheet of the invention, no dissolution is observed.

It is known in the prior art to prepare tobacco sheets with the aid of methylcellulose, hydroxyethylcellulose, and alginates. Tobacco sheets thus based upon water-soluble cellulose derivatives have, however, the great disadvantage of being very soluble in saliva. For this reason, they are employed only as leaf for, in such cases, their water sensitivity is not so important.

In order to employ tobacco sheets as wrappers, it has been an objective of the art to increase the saliva resistance of the tobacco sheets by suitable means. Thus, there is known a process whereby a higher degree of resistance to saliva is imparted by cross-linking of the water-soluble cellulose derivatives used as a binding agent. Glyoxal is principally used as a cross-linking agent, but other aldehydes and dialdehydes may also be used. Doubtless, tobacco sheets "hardened" in this manner do exhibit a noticeable increase of water resistance. However, their ability to resist mechanical action remains extremely low. Moreover, the cross-linking with glyoxal results in a certain loss of flexibility which introduces difficulties in the processing of the wrapper. Furthermore, such sheets acquire, through the action of the saliva, a gelat-

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inous and slimy quality which interferes with smoking. Another way in which water-sensitive tobacco sheets can be utilized as wrappers consists in providing the tip of the cigar with a mouthpiece of synthetic resin so that there is no contact whatever between the teeth and the saliva and the tip of the cigar. It is apparent that the measures described above are no more than makeshift expedients and require excessive additional processing and increased amounts of materials.

In our U.S. Patent 3,062,688, we have disclosed the manufacture of tobacco sheets of lesser water resistance and firmness with the aid of a mixture of acetylcellulose or ethylcellulose and methylcellulose as a binder. These tobacco sheets are nevertheless capable of absorbing water that they can be rendered pliable thereby, i.e., elastic, flexible and workable in the same manner as natural tobacco. The acetylcellulose ingredient of the binder should not, however, exceed 60% for this desirable effect to occur. However, the stability toward water can be raised by further increase of the percentage content of water-insoluble celluloses, for example, acetylcellulose, in the binder mixture but, at the same time, the tobacco sheet loses its flexibility, elasticity and pliability. These properties are, however, absolutely necessary for the manufacture of cigar casings, especially as wrappers. For this reason, sheets which employ acetylcellulose alone as a binder are completely unsuitable for use as wrapper sheets.

It is also known in the protective coatings art that the flexibility of a cover film can be improved by the incorporation of a plasticizer, such as, for example, triacetin, diethyl phthalate, citric acid esters, triethyl phosphate, and the like. However, these plasticizers, which are also widely employed in the general manufacture of foils and films, are entirely unsuited for use in tobacco sheets. They have a very unfavorable effect upon smoking enjoyment in that they produce smoldering and decomposition products which are hazardous to health or actually poisonous. Furthermore, they impart to tobacco sheets made from acetylcellulose a permanent elasticity which is most undesirable. Moreover, they cause an adhesion of cigars wrapped with such tobacco sheets in the cigar box.

In accordance with the present invention, there is provided a tobacco foil or sheet which is resistant to saliva, which exhibits good mechanical stability, and which possesses excellent pliability, i.e., is elastic and flexible, thus being well suited for the manufacture of a wrapper, leaf, and/or reinforcement for cigars, and which again relinquishes this pliability to a considerable degree in the course of processing.

The novel tobacco sheets of the invention are prepared from organic solvent-soluble cellulose derivatives, such as cellulose esters, for example acetylcellulose and powdered tobacco, with which there is incorporated tobacco extract in an amount between about 30% and about 300%, calculated upon the basis of the binder portion.

These tobacco extracts are prepared in accordance with the invention by treating finely comminuted tobacco with non-aqueous organic solvents or mixtures thereof. Such organic solvents are suitably ketones, halogenated hydrocarbons and the like, examples of which include acetone and methylene chloride. The extracts impart excellent pliability and elasticity. In any case, the contents of the extract are not sufficient to replace the tobacco material used for filling the sheet, but they do bring about a strong improvement of the sheet when the aforementioned tobacco extracts are added thereto.

Accordingly, the product of the invention is a saliva resistant smoking tobacco sheet, which is pliable and thermoplastic, comprising a homogeneous mixture of a predominant proportion of tobacco meal, a minor pro-

portion of an organic solvent soluble extract of tobacco and a cellulose ester binder.

The proportion of the organic solvent soluble extract of tobacco lies between about 10% and about 50% by weight of the tobacco meal, the proportion of cellulose ester binder lies between 20% and about 50% by weight of the tobacco meal, the proportion of tobacco extract after removal of the solvent lies between about 10% and about 50% by weight of the tobacco meal.

There may advantageously be incorporated in the tobacco sheet mix a readily volatilizable plasticizer, as explained below, the proportion of such plasticizer lying between about 5% and about 20% by weight of the tobacco meal.

For the preparation of the tobacco extract, the proportion of organic solvent employed lies between about 1% and about 50% by weight of the finely comminuted tobacco.

The following examples, which are to be regarded as illustrative and not as limiting, reveal the practice of the invention in the preparation of tobacco sheets.

Example 1

30 parts by weight of finely comminuted tobacco, having an average cross-sectional particle size of about 3 mm., are completely extracted with 95 parts by weight of methylene chloride in a Soxhlet extraction apparatus. To the extract thus obtained, there are added with stirring 7.5 parts by weight of acetylcellulose and 26.5 parts by weight of tobacco meal and with continuation of the stirring there are added 5 parts by weight of methanol until the acetylcellulose is completely dissolved. Thereafter three parts by weight of diethylene glycol are added with stirring to facilitate the separation of the tobacco sheet from the casting base, and to impart to the tobacco sheet a definite hygroscopicity, which corresponds to that of natural tobacco. The mass is thoroughly homogenized in a suitable type of colloid mill, processed in a sheet casting machine in conventional manner, dried, cut and rolled onto bobbins. In order to improve the properties of tobacco sheets for use as wrappers, a further addition of tobacco extract can be made to the casting mixture described above until the desired flexibility is attained. The tobacco extract is preferably introduced in solvent-free form, being obtained in such form by evaporation of the above described separately prepared tobacco extract. Types of tobacco suitable for extraction include tobacco waste, stalks and veins which are utilized for this purpose in finely divided form. The characteristics of the tobacco sheet of the invention can be varied within wide limits in accordance with the use to which it is to be put, such as wrapper, leaf, or reinforcement, by variation of the ingredients of the sheet mixture, i.e., by raising or lowering the cellulose content or the extract content.

The following are specific examples employing various formulations for the preparation of the tobacco sheet and including an example of a preferred formulation for a reinforcement:

Example 2 (Wrapper)

Proceeding as in Example 1, there was prepared a tobacco sheet suitable for use as a wrapper, employing the following ingredients:

	Parts by weight
Acetylcellulose -----	7.5
Tobacco extract as in Example 1 -----	95.0
Diethylene glycol -----	3.0
Tobacco extract, solvent free -----	4.0
Tobacco meal -----	26.5
Methanol -----	5.0

Example 3 (Wrapper)

Proceeding as in Examples 1 and 2, there was prepared

a tobacco sheet suitable as a wrapper employing the following ingredients:

	Parts by weight
Methylene chloride -----	95.0
Acetylcellulose -----	7.5
Tobacco meal -----	26.5
Diethylene glycol -----	3.0
Tobacco extract -----	5.0
Diethyleneglycol monoacetate -----	4.0
Magnesium oxide -----	0.5
Methanol -----	5.0

Example 4 (Reinforcement)

Proceeding as in Example 1, a tobacco sheet suitable for reinforcement purposes was prepared employing the following ingredients:

	Parts by weight
Methylene chloride -----	2625.0
Methanol -----	150.0
Acetylcellulose -----	225.0
Tobacco meal -----	195.0
Tobacco extract -----	60.0

In order to increase the flexibility of tobacco sheet prepared in accordance with the invention, and as illustrated in Example 3, in which diethylene glycol monoacetate is employed, there can be further added "temporary" plasticizers in small amounts. These temporary or readily volatilizable plasticizers serve to further increase the elasticity and flexibility of the sheet during processing, and have the property of volatilizing soon after such processing. As will be described below, these plasticizers can be added to or incorporated in the sheet at suitable times and places in the course of manufacture.

Plasticizers of the character described are those which possess excellent volatility, and which have an evaporation characteristic corresponding to that of water. They include such classes of compounds as esters, ketones, ethers, alcohol, and acetals. The specific examples of the foregoing classes include: glycol monoacetate, glycol diacetate, ethylene glycol, dioxane, n-propyl alcohol, methoxybutanol and diacetone alcohol.

Diethyleneglycol monoacetate is especially suitable as a temporary plasticizer for the purpose of the invention. In addition to excellent volatility, this compound possesses the property of being readily hydrolyzable. The small amounts of water which are always present in the preparation of cigars are sufficient for such hydrolysis. The acetic acid liberated thereby is neutralized with the aid of an equivalent amount of magnesium oxide or other basically reacting compound, which is added to the tobacco sheet in an amount sufficient for neutralization, namely, about 0.5% to 5% by weight of the tobacco meal. Moreover, diethylene glycol diacetate can be used as a temporary plasticizer in the same way.

Since the tobacco sheets of the invention possess thermoplastic properties, it is also possible to process the sheet at elevated temperature instead of employing these temporary plasticizers, for example, at a temperature in the range of about 50°-100° C. This can be accomplished by heating the metallic support upon which the cigar core is wound with the wrapper, leaf, and/or reinforcement to the desired temperature or by exposing the tobacco sheet to heating by the use of infrared rays.

Where it is desired to impart to the tobacco sheet a lighter or darker appearance, there can be admixed in small amounts with the sheet casting mass, suitable colored pigments, such as vegetable dyes in the form of their calcium or aluminum lakes, or in the form of suitable organic synthetic food colorings which do not detract from smoking enjoyment.

The tobacco sheets prepared in accordance with the invention are readily workable without having any water content. Moreover, they are capable of being processed without any water moistening, a property which is abso-

lutely novel in the cigar industry. By the absence of any significant amounts of water, there are obtained the following extraordinary advantages:

(1) Any subsequent fermentation of the processed tobacco is prevented. In this way, the otherwise unavoidable alterations of color upon storage are eliminated. This is a special advantage as far as their use as a wrapper is concerned, since for such purposes great value is placed upon the tobacco sheet which is the lightest, most uniform and of good color.

(2) The stability of the water-free sheet is unlimited when packed properly. The mildew formation which occurs in water containing sheets is completely avoided. The use of preserving agents, which always detract from smoking enjoyment, is not necessary.

(3) The tobacco extract which is incorporated in the sheet also has a favorable effect on the arrangement of the sheet because this extract naturally contains all the ethereal oils and waxes of the tobacco which are essential to the taste of the smoke. Moreover, the fragrance of the tobacco sheet undergoes a significant improvement, eliminating the need for extraneous flavoring materials. It is also possible to employ aqueous, thickened tobacco extracts to be added to the extracts prepared with solvents in accordance with the invention by replacing a portion of the humectant, e.g., diethylene glycol, thereby. They produce a further increase of the quality of the taste since in this way all the ingredients of importance for smoking pleasure are included in the tobacco sheet of the invention in addition to the always strong tasting cellulose portions.

(4) The sheet of the invention is thermoplastic and has a low softening point. The tip of the cigar can, by brief warming, be completely fused or sealed in any desired shape so that any opening and unrolling of the wrapper at the mouthpiece upon smoking is no longer possible.

The good water resistance and stability of the tobacco sheet of the invention further makes it suitable for use as a so-called "reinforcement." The parchmentized paper heretofore employed for this purpose has disadvantages which cannot be overlooked. Since the paper at the top of the cigar cannot be cut, it cannot be wrapped completely to the tip. For this reason there always remains a place which, upon smoking, is opened up by the pressure of the teeth, and part thereof is introduced into the mouth of the smoker. This phenomenon is undesirable and very inconvenient. Moreover, a high paper content would render the reuse of cuttings in the manufacture of tobacco sheet impractical.

A reinforcement prepared on the basis of the tobacco sheet of the invention from acetylcellulose or other suitable solvent-soluble cellulose derivatives does not exhibit these disadvantages. The sheet is excellently suitable for the tip of the cigar. No gluing need be performed since by sealing the wrapped tip in a suitable shape, the sheet can be fused without losing its shape. The tip end also remains undamaged even under severe stress, so that in any event it can continue to perform its function until the cigar is completely smoked.

For a better understanding of the invention and of the manner of manufacturing and utilizing the tobacco sheet thereof for cigars, reference is made to the accompanying drawing in which:

FIG. 1 is a schematic view of a cigar having a reinforcement made of conventional parchmentized paper;

FIG. 2 is a schematic view of a cigar having a reinforcement utilizing the tobacco sheet of the present invention;

FIG. 3 is a diagrammatic view of an apparatus applying the temporary plasticizer to the tobacco sheet;

FIG. 4 is a diagrammatic view of a modified apparatus for applying the temporary plasticizer to the tobacco sheet, and

FIGS. 5 and 6 are diagrammatic views of alternative

arrangements for applying the temporary plasticizer to the sheet.

As will be seen from FIG. 1, the paper reinforcement 1 does not extend to the tip 2 of the cigar, but stops short in a zig-zag form designated 3. This arrangement of the paper reinforcement is necessary because the relatively stiff and inelastic parchmentized paper is not capable of being inserted into the conically rounded cigar tip in such a way that it contacts the wrapper completely smoothly.

These known arrangements of reinforcements have the disadvantage that upon holding the cigar in the mouth between the teeth, as is customary with many smokers, tobacco particles are separated from the unprotected portion of the tip, particularly after the free end of the cigar has opened up due to the action of the saliva.

FIG. 2 shows, in contrast, the arrangement of a cigar tip having a reinforcement 4 made of the tobacco sheet of the invention. It will be recognized that the reinforcement sheet fills the cigar tip uniformly and smoothly so that no portion of the cigar wrapper remains unsupported. Because of the thermoplastic character of the sheet, the form of the cigar tip can be adapted by the use of suitable means, such as, for example, heating to form a smooth and snug fit of the reinforcement sheets into the cigar shell, and particularly into the tip of the cigar.

FIGS. 3-6, inclusive, illustrate the various ways of applying the temporary plasticizer to the tobacco sheet. When a temporary plasticizer is used, it can be introduced into the sheet casting mass prior to drawing out the sheet. The plasticizer can, however, also be applied to the sheet after it has been drawn out in the casting machine and dried. FIGS. 3 and 4 illustrate such possibilities in which the sheet is designated as 10. Spraying is accomplished by means of nozzle 11. Reference numerals 12 and 13 denote a pair of rolls between which the sheet passes, supported on an endless belt 14, and thence the sheet is wound around a bobbin.

In FIG. 4 the plasticizer is applied by means of a system of rolls so that the plasticizer is maintained in container 15, from which it is picked up by roll 16 and carried over to intermediate roll 17, whence it is directly brought onto application roll 18, from which it is finally applied directly to dried sheet 10. This roll application arrangement can be set up in such manner that a driving means is applied to any of rolls 16-18 in accordance with known practice.

A further possible way of applying the temporary plasticizer to the sheet is just before further processing of the sheet already wound on the bobbins as shown in FIGS. 5 and 6. In FIG. 5 the plasticizer in container 15 is picked up by roll 19 and brought onto application roll 20, whence the plasticizer is applied to the outer surface of sheet 10 on the bobbin 21. In FIG. 6 the plasticizer is applied to sheet 10 immediately after it has been drawn off from bobbin 21 by means of two rolls 20 and 22 between which the sheet passes. The plasticizer is in container 15 into which roll 20 dips.

Although certain specific embodiments of the invention have been shown and described, it is obvious that many modifications thereof are possible. The invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

What is claimed is:

1. A saliva resistant smoking tobacco sheet which is pliable and thermoplastic, comprising a homogeneous mixture of a predominant proportion of tobacco meal, from about 10% to about 50% by weight of the tobacco meal of an organic solvent soluble extract of tobacco, and acetylcellulose as a binder.

2. A saliva resistant smoking tobacco sheet which is pliable and thermoplastic, comprising a homogeneous mixture of a predominant proportion of tobacco meal from about 10% to about 50% by weight of the tobacco meal of an organic solvent soluble extract of tobacco, and

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between about 20% and about 50% by weight of the tobacco meal of acetylcellulose as a binder.

3. The tobacco sheet of claim 2 which further includes a readily volatilizable plasticizer.

4. The tobacco sheet of claim 3 in which the plasticizer is diethylene glycol monoacetate.

5. A cigar including as a wrapper the tobacco sheet of claim 1.

6. A cigar including as a leaf the tobacco sheet of claim 1.

7. A cigar including as a reinforcement the tobacco sheet of claim 1.

8. Process for the manufacture of a saliva resistant smoking tobacco sheet which is pliable and thermoplastic, comprising forming an extract of finely comminuted tobacco in an organic solvent, adding to said solvent extract tobacco meal and acetylcellulose as a binder to form a homogeneous mixture, and forming a sheet therefrom with removal of the solvent, said sheet containing from about 10% to about 50% by weight of the tobacco meal of said tobacco extract.

9. The process of claim 8 in which the organic solvent is a chlorinated aliphatic hydrocarbon.

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10. The process of claim 9 in which the solvent is methylene chloride.

11. The process of claim 8 in which an auxiliary organic solvent is added to the extract in an amount sufficient to dissolve the acetylcellulose.

12. The process of claim 11 in which the auxiliary solvent is methanol.

13. The process of claim 8 in which a small amount of a polyglycol is added as a humectant.

14. The process of claim 8 in which a readily volatilizable plasticizer is added to the tobacco-binder mixture.

15. The process of claim 8 in which a readily volatilizable plasticizer is applied to the surface of the tobacco sheet.

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SAMUEL KOREN, *Primary Examiner*.

MELVIN D. REIN, *Examiner*.