

Singapore

PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improved Method of Treating Tobacco

5 We, THE IMPERIAL TOBACCO COMPANY (OF GREAT BRITAIN & IRELAND) LIMITED, a British Company, of East Street, Bedminster, in the City and County of Bristol, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to the treatment of normal and/or puffed tobacco, either before or after having been cut into shreds; such tobacco is hereinafter referred to as process tobacco.

15 In the normal preparation of tobacco to render it suitable for smoking, either as pipe tobacco or as a filler in cigarettes or cigars, or for use as snuff, a certain amount of scrap tobacco, comprising for example, leaf lamina or stem, is produced.

20 For example, one operation that is frequently employed is that known as "threshing." In this the leaves, either as whole leaves or leaf pieces, are mechanically threshed to remove the lamina from the stems, and the thick portions of stem near the butt ends of the leaves are separated and removed as they are unsuitable for smoking because of their high cellulose content. These
25 unsuitable thick portions of stem are usually not absolutely clean, that is to say all pieces of lamina are not necessarily removed, and such pieces constitute valuable leaf, not only from a monetary value point of view, but
30 also because they may be of good quality tobacco.

35 A subsequent operation can be performed on the thick portions of stem to remove the pieces of lamina, but even then the pieces are considered as "scrap" tobacco because of their small size, since, when they subsequently pass with the larger pieces of lamina to a machine for cutting, these small pieces are further reduced in size and thus become very

45 small bits that may, for instance, fall out of the ends of cigarettes when carried loosely in a packet.

Medium thickness portions of stem, i.e. stems further from the butts, would be not so unsuitable for smoking as the thick portions, were it not for the fact that they form hard lumps, known as spills, in the tobacco and may pierce the paper of a cigarette, thus rendering it unsuitable for smoking. Thus medium stems also provide a source of scrap tobacco. 55

In manufacturing operations shredded tobacco is sometimes rendered unsuitable for use. For example, if a defect occurs in a cigarette-making machine a considerable amount of cigarette rod may be formed before the machine is brought to rest and such rod must be discarded as the shredded tobacco is then unsuitable for re-use in that manufacturing operation. Tobacco which has been discarded during a manufacturing operation, either in shredded or other form, is herein included in the term "scrap tobacco." 60

Thus in the preparation of tobacco to render it suitable for smoking and in manufacturing operations to provide tobacco articles, there are many sources of scrap tobacco, that is to say tobacco which is normally unsuitable for use, although it is usually of good quality. It will be appreciated from the above that this material may be leaf lamina, stems, or may be cut or shredded tobacco. 65

Due to the high cost of tobacco it is most undesirable to discard this scrap or waste and there is a further point that if high quality scrap or waste tobacco could be rendered suitable for smoking it could then be mixed with inferior quality tobacco to improve the smoking properties of the latter. 70

Scrap tobacco as above defined may, in accordance with this invention, constitute treatment material for treating process tobacco. 75

[Price 3s. 6d.]

Another source of material for use in treating process tobacco according to this invention is what may be termed "blending" tobacco, that is, good quality tobacco chosen for its blending or flavouring properties and adapted to improve the smoking properties of process tobacco of inferior quality.

Puffed tobacco is normal tobacco that has been subjected to an operation that expands the cell walls substantially beyond their elastic limit, and one suitable method of puffing tobacco leaf and/or stem comprises supplying steam thereto in a container in the substantial absence of air, increasing the steam pressure upon and correspondingly the temperature of the tobacco and then suddenly reducing the pressure by connecting the container with a chamber maintained at a pressure considerably below atmospheric.

Such puffed tobacco, as hereinbefore explained, may be used as process tobacco, and as it is prepared and used in the same manner as normal tobacco, scrap is produced in a similar way. Thus puffed tobacco provides also yet another source for providing material for treating process tobacco.

It has previously been proposed to use scrap or waste tobacco by forming it into sheets, e.g. by a paper making process, but difficulty was experienced in that the sheet was too brittle unless a plasticiser was added. The treatment to which the said tobacco was subjected also had deleterious effects on the material and the resultant sheets were unpleasant to smoke.

A method of making a tobacco article is also known which comprises shaping to the form of the article a quantity of tobacco to constitute the filler of the article, applying to the shaped filler tobacco a solution, slurry or sol containing finely divided or colloidal sized particles of tobacco, such as blending or flavouring tobacco, drying the tobacco and applied solution, slurry or sol to form a continuous film-like coating or enclosure about said filler, and applying an enclosing wrapper. It will be noted that this method involved the drying of the process tobacco wetted by the use of a solution or sol.

The expression "treatment material" as employed herein, means tobacco which may be scrap or blending tobacco, as hereinbefore described, and whole or part leaves, such being either from normal tobacco or puffed tobacco.

The object of the present invention is to provide improved methods and apparatus for treating process tobacco, involving the use of treatment material as above defined. A further object is to improve the smoking properties of inferior quality tobacco.

According to the present invention, finely divided treatment material of the order of 1 to 76 microns is applied as airborne particles on to the process tobacco to be treated, to which

it adheres due to the inherent gumminess and/or surface tension of tobacco, and so provides a discontinuous coating of the finely divided tobacco particles on said process tobacco.

Preferably the process tobacco is treated when in a moistened condition.

As already intimated "process tobacco" consists of normal and/or puffed tobacco.

The term "gumminess" is employed herein in the sense generally used in the trade, that is, it refers to the natural stickiness which is due to the presence of water soluble gummy materials such as monosaccharides, oligosaccharides, polysaccharides and pectins, and of leaf cuticle waxes such as saturated and unsaturated aliphatic hydrocarbons, with smaller amounts of aliphatic alcohols, esters and ketones, these waxes being soluble in organic solvents.

A method and apparatus for treating process tobacco in accordance with the present invention is diagrammatically indicated in the accompanying drawings in which:—

Fig. 1 is a flow sheet illustrating the preparation and application of the treatment material.

Fig. 2 is a diagrammatic representation of a plant for preparing the treatment material and applying it to process tobacco.

Figs. 3 and 3A are parts of the plant, drawn to an enlarged scale and illustrating constructional features, and

Fig. 4 is a plan of that part of the pneumatic system shown in Fig. 3.

The flow sheet which constitutes Fig. 1 indicates broadly how the treatment material, for example medium stems and leaf lamina, is mixed and dried, and then milled and/or ground to reduce it to a powdered condition. The powdered material is then separated into finely divided particles hereinafter referred to as "fines" and "tailings," the fines being blown as airborne particles on to the process tobacco to be treated so that they adhere thereto due to the inherent gumminess and/or surface tension of tobacco. The tailings may be reground and/or remilled for further use or they may be rejected.

The treatment material may be of a higher quality than that of the process tobacco to be treated so that the smoking properties of the latter are improved.

Referring to Figs. 2, 3, 3A and 4, the scrap tobacco which is to provide the treatment material is delivered by a feed conveyor 1 provided with a scale 2 so that the weight of treatment material fed may be controlled. The treatment material is delivered to an inclined rotating drying cylinder 3, heated by gas jets 4, and this acts through tines 5 to mix the scrap together, feed the material through the cylinder 3 and, at the same time, dry it to a water content of about 5% to 6% by weight.

A conveyor 6 then carries the mixed and dried treatment material to a milling device 7 that is secured to one side of a conical hood 8 surmounting a mulling mechanism 9. Between the milling device 7 and the hood 8 is interposed a rotary valve 10.

The milling device 7 is of the type comprising a cylindrical chamber having a plurality of inwardly directed peripheral blades coacting with knives on a rotating vaned drum whereby, as the treatment material passes through, it is cut or chopped into small pieces. The valve 10 slowly rotates to permit the said pieces to fall through an orifice 11 into the interior of the muller 9. The valve 10 is interposed to prevent escape of air during the passage of chopped pieces of treatment material from the milling device 7 into the muller 9.

Preferably the pieces of treatment material pass through a screen into the rotary valve 10 so as to prevent pieces above a predetermined size passing into the muller 9.

The muller 9 is of the type comprising a rotating crosshead 9A carrying eccentrically mounted thereon a pair of freely pivoted grinding rollers 9B adapted, through centrifugal action, to rotate in contact with the wall of the muller casing so as to grind material fed therebetween. The crosshead 9A also carries a pair of flow type deflectors 9C adapted to gather the material and feed it continuously into the grinding position. The grinding rollers 9B are of appreciable weight and the crosshead 9A revolves at high speed with the result that chopped pieces of treatment material fed to the muller 9 are ground to particles varying in size from about 1 to 500 microns.

A centrifugal fan 12 is adapted to create a current of air flowing steadily around the circuit provided by the trunking 13, 13A.

The centre of the conical hood 8 is provided with an elbow piece 14 which projects into the trunking with its opening directed downstream of the air flow. The presence of the elbow piece 14 reduces the cross sectional area of the trunking 13, thus forming a venturi from the muller.

By this arrangement, the current of air flowing around the trunking 13, 13A and passing over the venturi 14, acts to draw powdered treatment material from the muller 9 when the particles in said material have been ground sufficiently small to become airborne. An air inlet 15 controls the air flow into and within the muller and prevents any tendency for a vacuum to be created there, but the inlet 15 is so small as not to interfere with the current of air in the trunking 13, 13A.

The finely powdered tobacco particles then pass along the trunk 13 into a cyclone chamber 16. This, as can be seen from Fig. 4, comprises a number of separating tubes 17

having peripheral slots, the arrangement being such that the air current flowing past the slots acts to swirl the powdered material into the tubes, down which it falls through a rotary valve 18 on to a conveyor 19. It will be seen that the conveyor 19 is enclosed by a shield 20, and this shield continues as far as an entry hopper 21 to a centrifugal separator 22.

The air separator 22 is conveniently of the type which comprises a number of discs 22A rotating on a hollow central spindle 22B, one below the other, within a drum 22C, said discs being smaller in diameter than an interior wall 22D of the drum within which they rotate. Peripheral vanes 22E extend inwardly and downwardly from said interior wall 22D, such as to collect powder thrown from one disc and direct it on to the disc immediately below. A fan 22F arranged at the top of the apparatus creates a current of air which flows upwardly past the edges of the discs 22A and vanes 22E, and then downwardly outside the interior wall 22D, through a gap into the interior again. A hopper 22G is located below the lowermost disc and vane to receive rejected powder, sometimes referred to as "tailings."

The hollow central spindle 22B constitutes an entry tube centrally above the disc 22A and this leads powdered tobacco from the hopper 21 onto the topmost disc. The discs 22A rotate at high speed and throw the powder centrifugally into the current of air. Light particles are raised in the air current and pass down outside the interior wall to a delivery orifice 23.

Particles too heavy to be raised by the air current pass via a vane to the disc below where the same operation takes place. This operation is repeated according to the number of discs (e.g. six) and finally the tailings fall to the orifice 24. These tailings, via a conveyor 25 are either returned to the muller 9 in some convenient manner, or are rejected. Rotary valves 26, 27 control the openings 23, 24 in order to avoid any interference with the air current.

A separator as above described divides the powder into two grades. The ascending fines, which constitute finely divided scrap tobacco, vary in size from about 1 to 76 microns, and the tailings are above 76 microns. It has been found that fines of this size are suitable for applying to the tobacco to be treated.

Thus particles from about 1 to 76 micron size pass through the delivery orifice 23 and the valve 26 to an enclosed conveyor 28 that delivers them to a hopper 29 above a powder dispenser 32, while tailings above 76 microns pass to the conveyor 25.

The hopper 29 then delivers the treatment material through another rotary valve 31 to the powder dispenser 32. This is of known type and includes a compressed air supply pipe 33 and powder delivery pipe 34 ter-

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minating in a nozzle 35.

The nozzle 35 delivers material to a substantially closed rotating cylinder 36 having internal tines 37 and being set on a slant, the arrangement being such that said cylinder contains a mist of finely powdered treatment material. Tobacco to be treated (process tobacco), which preferably has a moisture content of 17—25% by weight, is continuously delivered by a conveyor 38 to the cylinder 36 and, while it is being fed therethrough by the tines 37, the powder blower nozzle 35 creates in the drum 36 an atmosphere laden with the fines, the dry particles of which adhere to the process tobacco on account of the inherent gumminess and surface tension of tobacco, that is, the finely ground tobacco is not mixed with water and wet ground to form a slurry.

Preferably a weighing mechanism is included in the conveyor 38, but this is not indicated in the drawing. By weighing the process tobacco delivered by the conveyor 38 in conjunction with the weight of the treatment material shown on the scale 2, the rate of supply of material to the process tobacco may be controlled.

The fines adhere to the process tobacco as a discontinuous coating, that is to say, a leaf of process tobacco examined under a microscope after treatment will be found to be almost entirely covered with the particles, but such particles adhere as a discontinuous coating in that the bare leaf can be seen between particles. Such a coating is to be distinguished from a coating of finely divided colloidal sized tobacco particles applied as a solution, sol or slurry to provide a continuous film on the tobacco to be treated. It should be noted that process tobacco under treatment may be in a tangled condition and so certain portions of it may not be exposed to the tobacco particle laden air in the treating drum, and the word "discontinuous" does not refer to these untreated portions but, as hereinbefore explained, to the fact that the various particles do not form a continuous film on portions exposed to the said air.

A conveyor 39 receives process tobacco treated with treatment material, and this tobacco is then passed for further processing in the usual way. An extractor 40 removes surplus powder laden air.

In applying the present invention to pipe smoking tobacco the finely divided scrap tobacco particles are produced in the same way as above described but are applied to the process tobacco to be treated when the latter has a moisture content of about 35% by weight. This is so because, during manufacture, pipe tobacco is usually brought to a higher moisture content than cigarette tobacco and it has been found convenient to treat it at a stage where the moisture content is highest. It may, however, be treated at any other

suitable stage of manufacture.

In the case of cigars the filler tobacco, the binder leaves and the wrapper leaves, which all constitute process tobacco, may all be treated, the filler and binder preferably when at a moisture content of about 25% by weight and the wrapper preferably after formation i.e. at a moisture content of about 20% by weight.

Whilst approximate moisture contents have been referred to both as regards the treatment material and the process tobacco to be treated, it is to be understood that these are not critical, and have only been stated because in experiments so far carried out the process tobacco has been treated at a stage in manufacture that was found convenient, and the moisture content at these different stages have been quoted. In this connection it should be noted that tobacco in its natural state is gummy and that this gumminess is rendered more apparent as the moisture content increases.

In the hereinbefore described invention where the expression "moistened" or "dampened" is used, it is to be understood that it means that the tobacco referred to has been artificially moistened. In this connection it should be noted that tobacco has a great affinity for moisture and thus it can be said that it is probably never completely dry, in fact after a short time its moisture content reaches equilibrium with, or substantial equilibrium with, that of the surrounding atmosphere. Similarly when the word "drying" is used it is not intended to infer that the tobacco is completely dry but that some moisture has been removed.

There are other characteristics of process tobacco which may assist adherence of the finely divided particles thereto, for instance some of said particles may be held on a piece of leaf tobacco by being entangled in the natural hairs of the surface.

The cylinder 36 may be replaced by an apparatus operating on similar lines to the centrifugal separator 22. For example the process tobacco may be fed through a central tube similar to the spindle 22B so that it continually passes downwards from one disc 22A to another and at the same time a current of air carries a mist of finely divided treatment material up through, so that as the process tobacco passes down through the apparatus it is continuously subjected to an atmosphere laden with finely divided treatment material.

WHAT WE CLAIM IS:—

1. A method of treating process tobacco in which finely divided treatment material of the order of 1 to 76 microns is applied as airborne particles, on to the process tobacco to be treated, to which it adheres due to the inherent gumminess and/or surface tension of tobacco, and so provides a discontinuous



minating in a nozzle 35.

5 The nozzle 35 delivers material to a substantially closed rotating cylinder 36 having internal tines 37 and being set on a slant, the arrangement being such that said cylinder contains a mist of finely powdered treatment material. Tobacco to be treated (process tobacco), which preferably has a moisture content of 17—25% by weight, is continuously delivered by a conveyor 38 to the cylinder 36 and, while it is being fed therethrough by the tines 37, the powder blower nozzle 35 creates in the drum 36 an atmosphere laden with the fines, the dry particles of which 10 adhere to the process tobacco on account of the inherent gumminess and surface tension of tobacco, that is, the finely ground tobacco is not mixed with water and wet ground to form a slurry.

15 Preferably a weighing mechanism is included in the conveyor 38, but this is not indicated in the drawing. By weighing the process tobacco delivered by the conveyor 38 in conjunction with the weight of the treatment material shown on the scale 2, the rate of supply of material to the process tobacco may be controlled.

25 The fines adhere to the process tobacco as a discontinuous coating, that is to say, a leaf of process tobacco examined under a microscope after treatment will be found to be almost entirely covered with the particles, but such particles adhere as a discontinuous coating in that the bare leaf can be seen 30 between particles. Such a coating is to be distinguished from a coating of finely divided colloidal sized tobacco particles applied as a solution, sol or slurry to provide a continuous film on the tobacco to be treated. It should be noted that process tobacco under treatment may be in a tangled condition and so certain portions of it may not be exposed to the tobacco particle laden air in the treating drum, and the word "discontinuous" does 35 not refer to these untreated portions but, as hereinbefore explained, to the fact that the various particles do not form a continuous film on portions exposed to the said air.

40 A conveyor 39 receives process tobacco treated with treatment material, and this tobacco is then passed for further processing in the usual way. An extractor 40 removes surplus powder laden air.

55 In applying the present invention to pipe smoking tobacco the finely divided scrap tobacco particles are produced in the same way as above described but are applied to the process tobacco to be treated when the latter has a moisture content of about 35% 60 by weight. This is so because, during manufacture, pipe tobacco is usually brought to a higher moisture content than cigarette tobacco and it has been found convenient to treat it at a stage where the moisture content is highest. It may, however, be treated at any other

suitable stage of manufacture.

In the case of cigars the filler tobacco, the binder leaves and the wrapper leaves, which all constitute process tobacco, may all be treated, the filler and binder preferably when 70 at a moisture content of about 25% by weight and the wrapper preferably after formation i.e. at a moisture content of about 20% by weight.

75 Whilst approximate moisture contents have been referred to both as regards the treatment material and the process tobacco to be treated, it is to be understood that these are not critical, and have only been stated because in experiments so far carried out the process tobacco has been treated at a stage in manufacture that was found convenient, and the moisture content at these different stages have been quoted. In this connection it should be noted that tobacco in its natural state is 80 gummy and that this gumminess is rendered more apparent as the moisture content increases.

85 In the hereinbefore described invention where the expression "moistened" or "dampened" is used, it is to be understood that it means that the tobacco referred to has been artificially moistened. In this connection it should be noted that tobacco has a great affinity for moisture and thus it can be said 90 that it is probably never completely dry, in fact after a short time its moisture content reaches equilibrium with, or substantial equilibrium with, that of the surrounding atmosphere. Similarly when the word "drying" is used it is not intended to infer that the tobacco is completely dry but that some 95 moisture has been removed.

100 There are other characteristics of process tobacco which may assist adherence of the finely divided particles thereto, for instance some of said particles may be held on a piece of leaf tobacco by being entangled in the natural hairs of the surface.

105 The cylinder 36 may be replaced by an apparatus operating on similar lines to the centrifugal separator 22. For example the process tobacco may be fed through a central tube similar to the spindle 22B so that it continually passes downwards from one disc 22A to another and at the same time a current of air carries a mist of finely divided treatment material up through, so that as the process tobacco passes down through the apparatus it is continuously subjected to an atmosphere laden with finely divided treatment material.

WHAT WE CLAIM IS:—

1. A method of treating process tobacco in which finely divided treatment material of the order of 1 to 76 microns is applied as airborne particles, on to the process tobacco to be treated, to which it adheres due to the inherent gumminess and/or surface tension 125 of tobacco, and so provides a discontinuous

coating of the finely divided material on said process tobacco.

2. A method as claimed in claim 1, in which the process tobacco is treated when in a moistened condition.

3. A method as claimed in claim 1 or claim 2 in which mixed treatment material is subjected to a grinding operation to reduce it to small pieces and is then subjected to a mulling operation to reduce it to a finely divided condition whereupon the said finely divided material is separated into fines and tailings and the former are blown as airborne particles on to the process tobacco to be treated and the tailings are discarded.

4. A method as claimed in claim 3, in which the mixed treatment material is dried before or during its preparation.

5. A method as claimed in claim 3 or 4 in which the mulling operation reduces the treatment material to particles (fines and tailings) varying in size from 1 to 500 microns.

6. A method as claimed in claim 3, 4 or 5, in which the fines vary in size from 1 to 76 microns and the tailings are from 77 microns upwards.

7. A method as claimed in any of the preceding claims in which the process tobacco has a moisture content of from 17 to 35% by weight.

8. Apparatus for treating process tobacco with finely divided treatment material, comprising a mixing chamber for the treatment material, means for drying the treatment material in said chamber, means for reducing the treatment material to small pieces, and for reducing said small pieces to powder, means for separating said powder into fines and tailings, means for removing the tailings and fines separately from said separator, a receptacle for receiving and delivering pro-

cess tobacco to be treated and a powder blower adapted to blow the fines on to the tobacco in said receptacle so as to apply a discontinuous coating of said fines to said tobacco.

9. Apparatus as claimed in claim 8, adapted for continuous treatment of process tobacco, in which the mixing chamber is connected by an endless conveyor to a grinding mechanism constituting means for reducing treatment material to small pieces, said grinding mechanism delivering said pieces direct to a mulling apparatus for producing powder which is pneumatically conveyed to a cyclone which delivers it to a "tailings" and "fines" separator, the "fines" being conveyed to a rotary drum wherein it is blown onto process tobacco passing therethrough.

10. Apparatus as claimed in claim 8 or 9 in which a conveyor that carries treatment material to the mixing chamber includes a weighing device and the process tobacco delivered to the receptacle or drum is weighed, whereby the rate of supply of material to the process tobacco may be controlled.

11. Process tobacco treated with treatment material according to the method claimed in any of claims 1 to 7.

12. Process tobacco treated with treatment material in apparatus as claimed in any of claims 8 to 10.

13. The improved method and apparatus for treating process tobacco with treatment material substantially as hereinbefore described and as illustrated in the accompanying drawings.

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PROVISIONAL SPECIFICATION

No. 23760 A.D. 1955

Improved Method of Treating Tobacco

80 We, THE IMPERIAL TOBACCO COMPANY (OF GREAT BRITAIN & IRELAND) LIMITED, a British Company, of East Street, Bedminster, in the City and County of Bristol, do hereby declare this invention to be described in the following statement:—

85 This invention relates to the treatment of tobacco, either in leaf form or after having been cut into shreds. Such tobacco is herein-after referred to as processed tobacco.

90 In the normal processing of tobacco to render it suitable for smoking, either as pipe tobacco or as a filler in cigarettes or cigars, a certain amount of scrap tobacco comprising for example, leaf lamina and stems, is produced.

95 For example, one process that is frequently employed is that known as threshing. In this

the leaves either as whole leaves or leaf pieces, when the process is repeated, are mechanically threshed to remove the lamina from the stems, and the thick pieces of stem are separated and removed as they are unsuitable for smoking. The unsuitable thick pieces of stem near the butt ends of the leaves are not usually absolutely clean, that is to say all pieces of lamina are not necessarily removed, and such pieces constitute valuable leaf, not only from a monetary value point of view, but also because they may be of good quality tobacco.

A subsequent operation can be performed on the stems to remove the pieces of lamina, but then the pieces are considered as scrap tobacco because of their small size, since they subsequently pass to a machine with the



larger pieces of lamina for cutting, these small pieces are further reduced in size and thus become very small bits that may, for instance, fall out of the ends of cigarettes when carried loosely in a packet.

Medium thickness stems, i.e. stems further from the butts, would be not so unsuitable for smoking were it not for the fact that they form hard lumps, known as spills, in the tobacco and may pierce the paper of a cigarette, thus rendering it unsuitable for smoking. Thus quantities of medium stems also comprise scrap tobacco.

In manufacturing processes shredded tobacco is frequently rendered unsuitable for use. For example, if a defect occurs in a cigarette machine a considerable amount of cigarette rod will be formed before the machine is brought to rest and such rod must be discarded as the shredded tobacco is unsuitable for re-use in that manufacturing process. Tobacco in shredded or other form has been discarded during a manufacturing process is herein referred to as "waste tobacco."

Thus in the processing of tobacco to render it suitable for smoking and in the course of manufacturing tobacco articles, there are many sources of scrap and waste tobacco, that is to say tobacco which is normally unsuitable for use, although it is usually of good quality. It will be appreciated that this material may be leaf lamina, stems, or may be cut or shredded tobacco.

Due to the high cost of tobacco it is most undesirable to discard this scrap or waste and there is a further point that if high quality scrap tobacco could be rendered suitable for smoking it could then be mixed with inferior quality tobacco to improve the smoking properties of the latter.

A third source of tobacco for use in treating processed tobacco according to this invention is what may be termed "blending" tobacco, that is, good quality tobacco chosen for its blending or flavouring properties and adapted to improve the smoking properties of processed tobacco of inferior quality.

The materials above defined for treating processed tobacco, viz. scrap tobacco, or waste tobacco, or blending tobacco, are hereinafter referred to as "treatment material."

It has previously been proposed to use scrap tobacco by forming it into sheets, e.g. by a paper making process, but difficulty was experienced in that the sheet was too brittle unless a plasticiser was added. The treatment to which the scrap tobacco was subjected also had deleterious effects on the material and the resultant sheets were unpleasant to smoke.

A method of making a tobacco article is also known which comprises shaping to the form of the article a quantity of tobacco to constitute the filler of the article, applying to the shaped filler tobacco a solution, slurry or sol containing finely divided or colloidal

sized particles of tobacco, such as blending or flavouring tobacco, drying the tobacco and applied solution, slurry or sol to form a continuous film-like coating or enclosure about said filler, and applying an enclosing wrapper. It will be noted that this method involved the drying of the processed tobacco wetted by the use of a solution or sol.

The object of the present invention is to provide improved processes of an improved apparatus for treating processed tobacco, involving the use of treatment material as hereinafter defined. A further object is to improve the smoking properties of inferior quality tobacco.

According to the present invention, finely divided treatment material is pneumatically applied, that is, blown as airborne particles on to the processed tobacco to be treated, to which it adheres due to the inherent gumminess and/or surface tension of tobacco, and so provides a discontinuous coating of the finely divided tobacco particles on said processed tobacco.

Preferably the processed tobacco is treated when in a moistened condition.

If desired the treatment material providing the finely divided particles may be so divided when in a moistened condition.

One method of treating processed tobacco according to the present invention comprises mixing and drying treatment materials either separately, or a mixture thereof, milling and/or grinding same to reduce it to a powdered condition, separating said powder into finely divided particles and tailings, and blowing the finely divided tobacco as airborne particles on to the processed tobacco to be treated so that it adheres thereto due to the inherent gumminess and/or surface tension of tobacco.

The treatment material may be of a higher quality than that of the processed tobacco to be treated so that the smoking properties of the latter are improved.

One method of treating processed tobacco in the manufacture of cigarettes will now be described by way of example.

Scrap tobacco, that may include small pieces of leaf, medium sized stems and cut tobacco, all of suitable quality, is first mixed together and dried to a moisture content of about 5 to 6%. The mixed scrap is then milled, a suitable mill for the purpose comprising a cylindrical chamber having a plurality of inwardly directed peripheral blades adapted to coact with knives on a rotating vaned drum, the arrangement being such that the chamber is charged with the scrap, the drum is rotated at a high speed so that the coating knives act to chop the scrap into small particles and when these have been reduced to a predetermined size they pass through a screen for further treatment.

The small particles then pass to a centrifugal grinding machine that acts to dry grind

the particles to a fine powder varying in size from about 1 to 500 microns (30 B.S. Mesh). The fine powder is then fed to an air separator of any suitable kind. Thus in one form, the powder is fed in at the top of the separator to the upper of a number of rotating discs which throw the powder radially through an ascending air stream that carries away the fines.

Powder not carried up as fines in the first stage falls to lower rotating discs and the first stage conditions are repeated. Five discs are provided in all and the fines and tailings are collected separately. The separator used divides the powder into two grades. The ascending fines, which constitutes finely divided scrap tobacco, vary in size from about 1 to 75 microns and the tailings are above 75 microns, and it has been found that fines of this size are suitable for applying to the tobacco to be treated.

The processed tobacco to be treated (which may be leaf or shredded tobacco) is preferably fed continuously through a drum within which the nozzle or nozzles of a powder blowing apparatus is or are located and preferably the processed tobacco is treated when it has a moisture content of about 17—25%. Thus as the dampened processed tobacco passes through the drum the powder blower creates in the drum an atmosphere laden with the finely divided dry ground tobacco and the dry particles adhere to the processed tobacco entirely on account of the inherent gumminess and surface tension of tobacco, that is, the finely ground tobacco is not mixed with water and wet ground to form a slurry.

The finely divided scrap tobacco adheres to the processed tobacco as a discontinuous coating, that is to say a leaf of processed tobacco examined under a microscope after treatment, was found to be covered with the particles, but such particles adhered as a discontinuous coating in that the bare leaf could be seen between particles. Such a coating is to be distinguished from a coating of finely divided colloidal sized tobacco particles applied as a solution, sol or slurry to provide a continuous film on the tobacco to be treated. It should be noted that processed tobacco under treatment may be in a tangled condition and so certain portions of it may not be exposed to the tobacco particle laden air in the treating drum, and the word discontinuous does not refer to these untreated portions but, as hereinbefore explained, to the fact that the various particles do not form a continuous film on portions exposed to the said air.

In applying the present invention to pipe

smoking tobacco the finely divided scrap tobacco particles are produced in the same way as above described but are applied to the processed tobacco to be treated when the latter has a moisture content of about 35%. This is only so, because, during manufacture, pipe tobacco is usually brought to a higher moisture content than cigarette tobacco and it has been found convenient to treat it at a stage where the moisture content is highest. It may however be treated at any other suitable stage of manufacture.

In the case of cigars the filler tobacco, the binder leaves and the wrapper leaves, which all constitute processed tobacco, may all be treated, the filler and binder preferably when at a moisture content of about 35% and the wrapper preferably after formation, i.e. at a moisture content of about 20%.

Whilst approximate moisture contents have been referred to both as regards the treatment material and the processed tobacco to be treated, it is to be understood that these are not critical, and have only been stated because in experiments so far carried out the processed tobacco has been treated at a stage in manufacture that was found convenient, and the moisture content at these different stages have been quoted. In this connection it should be noted that tobacco in its natural stage is gummy and that this gumminess is rendered more apparent as the moisture content increases.

In the hereinbefore described invention where the expression "moistened" or "dampened" is used, it is to be understood that it means the tobacco referred to has been artificially moistened. In this connection it should be noted that tobacco has a great affinity for moisture and thus it can be said that it is probably never completely dry, in fact after a short time its moisture content will approach a value corresponding to that of the surrounding atmosphere. Similarly when the word "drying" is used it is not intended to infer that the tobacco is completely dry but that some moisture has been removed.

If desired, instead of using scrap tobacco as a treatment material to provide the finely divided particles, whole leaves may be used. This enables inferior quality processed tobacco to be coated with particles of a higher grade leaf, thus blending or flavouring the former and so improving its smoking properties.

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& ROLLINSON,
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PROVISIONAL SPECIFICATION

No. 36567 A.D. 1955

Improved Method of Treating Tobacco

We, THE IMPERIAL TOBACCO COMPANY (OF GREAT BRITAIN & IRELAND) LIMITED, a British Company, of East Street, Bedminster, in the City and County of Bristol, do hereby declare this invention to be described in the following statement:—

This invention relates to the treatment of tobacco.

In the specification of my co-pending Patent Application No. 23760/55 there is described a method of applying finely divided treatment material, e.g. finely divided scrap, waste or blending tobacco to whole tobacco leaf or shredded tobacco leaf.

The object of the present invention is to extend the application of finely divided treatment material to material other than whole or shredded tobacco leaf.

Due to the high cost of tobacco many suggestions have been made for utilising tobacco which is normally unsuitable for use.

For example it has previously been proposed to use scrap tobacco by forming it into sheets, e.g. by a paper making process, but difficulty was experienced in that the sheet was too brittle unless a plasticiser was added. The treatment to which the scrap tobacco was subjected also had deleterious effects on the material and the resultant sheets were unpleasant to smoke.

A method of making a tobacco article is also known which comprises shaping to the form of the article a quantity of tobacco to constitute the filler of the article, applying to the shaped filler tobacco a solution, slurry or sol containing finely divided or colloidal sized particles of tobacco, such as blending or flavouring tobacco, drying the tobacco and applied solution, slurry or sol to form a continuous film-like coating or enclosure about said filler, and applying an enclosing wrapper. It will be noted that this method involved the drying of the processed tobacco

wetted by the use of a solution or sol.

It has also been proposed to puff tobacco leaf and/or stem by supplying steam to the product in the substantial absence of air, increasing the steam pressure upon and correspondingly the temperature of the product and then suddenly reducing the pressure by connecting the product with a chamber maintained at a pressure considerably below atmospheric.

In the above described processes for utilising tobacco which is normally unsuitable for use, and the puffing process, and in other processes not referred to, the resultant material may retain its inherent gumminess and/or surface tension. Such resultant materials together with the processed tobacco as defined in my said co-pending application No. 23760/55 are hereinafter referred to as tobacco materials.

According to the present invention, tobacco treated by the processes hereinbefore referred to and the products of the so-called puffing process are treated with finely divided treatment material in substantially the same manner as described in my said co-pending application No. 23760/55.

The invention according to this application and to my prior application may together be viewed as comprising pneumatically applying finely divided treatment material to tobacco materials as above defined, to which it adheres, due to the inherent gumminess and/or surface tension, and so provides a discontinuous coating of the finely divided tobacco particles on said tobacco material.

Preferably the tobacco material is treated in a moistened condition.

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