

PATENT SPECIFICATION

DRAWINGS ATTACHED

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International Classification:—A24c.

COMPLETE SPECIFICATION

Improvements in or relating to Apparatus for Forming a Continuous Tobacco Filler

5 We, USINES DECOUFLÉ, a French corporate body of 7, rue Deparcieux, Paris, France, 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 concerns improvements in or relating to apparatus for forming a filler in a continuous rod cigarette-making machine, and constitutes an improvement in or modification of the invention the subject of British Patent Specification No. 764,551. In British Specification No. 764,551 there is disclosed a continuous rod cigarette-making machine in which a tobacco filler (which may consist wholly of tobacco or may consist of tobacco lengths alternating with filter tips) is carried on the underside of a suction conveyor over a paper web and is deposited on to the paper web, in which it is subsequently enclosed to form a continuous wrapped cigarette rod.

15 In the present specification the expression "filler" means a narrow stream of tobacco which (after any lateral compression which may be necessary to form it to the required cross-sectional size and shape) is while moving lengthwise to be enclosed and sealed in a continuous wrapper. The expression "filler stream" is used herein as meaning a stream of tobacco which contains more tobacco per unit length than is required in the continuous wrapped filler, and which while moving lengthwise has surplus tobacco removed from it by a trimming operation. The part of the filler stream which remains after such trimming operation then constitutes a "filler."

20 Neither of the expressions "filler stream" and "filler" when used herein is to be taken to include the tobacco carpet which is formed in a hopper and then fed (e.g. picked and showered) therefrom preparatory to commencing the formation of the "filler stream," nor does either of the expressions "filler

stream" and "filler" include a flow of more or less discrete particles of tobacco such as a shower which is discharged in loose formation from the hopper towards a moving surface against which they build up to form the "filler stream."

25 According to the present invention there is provided a continuous rod cigarette-making machine, comprising means to form a lengthwise moving filler stream of tobacco, a trimming device to remove surplus tobacco from the filler stream to reduce the latter to a desired depth, thereby producing a filler, and a perforated suction conveyor arranged to carry the trimmed filler on the underside of the conveyor by suction over a continuous, lengthwise-moving wrapper and to deposit the filler on said wrapper for enclosure therein.

30 Further according to the invention there is provided a method of forming a filler in a continuous rod cigarette-making machine and transferring it on to a wrapper for enclosure therein, comprising the steps of forming a lengthwise-moving filler stream of tobacco, trimming the filler stream to remove surplus tobacco and reduce the filler stream to a desired depth, thereby producing a filler, conveying the trimmed filler by suction on the underside of a perforated conveyor over a continuous, lengthwise-moving wrapper, and depositing the filler on to the said wrapper from the suction conveyor.

35 Apparatus forming part of a machine in accordance with the invention will now be described by way of example with reference to the accompanying drawing, which corresponds to Figure 2 of the drawings accompanying the complete specification of British Patent Application No. 6407/57 (Serial No. 854,736) (from which the present case is divided) and which is a sectional front elevation of part of a continuous rod cigarette-making machine.

40 The apparatus illustrated includes a passage extending upwardly towards a flat endless

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conveyor belt 10, which moves through a channel 9 and passes over wheels or rollers 11, 12 and 13 of which the roller 11 drives the belt. The conveyor belt 10 is perforated, being provided with small holes each of a diameter of 0.8 to 1.2 mm. and constitutes a suction conveyor. About 40 such holes per square centimetre of the entire surface of the belt are provided.

The belt 10 is held within the channel 9 by the lower surfaces of a pair of opposed elements 14, which overhang the walls of the channel 9 by about 1 mm. on each side, thus forming shoulders which guide the belt through the channel.

The channel 9 and conveyor belt 10 are slightly inclined downwardly in the direction of movement of the band. This inclination may for example be at an angle of 6° to 10° to the horizontal.

A suction chamber 15 communicates with the perforated conveyor belt 10, and further communicates with a pipe 17, which extends to the inlet of a fan (not shown) arranged to draw air through the pipe 17 from the chamber 15 and thus through the perforated conveyor belt 10.

The passage 8 extends downwardly below the conveyor belt 6, and communicates with a pipe, not shown, which extends to the output side of the fan referred to above, so that air is blown through the pipe into and through the passage 8. As illustrated, the air sucked through the conveyor 10 between the points marked 18 and 19 in the Figure reaches the conveyor from the passage 8, while between the points marked 19 and 20 the air is drawn through the channel 9, whose opposed sides are extended downwardly by guide plates 22.

The arrangement of the fan, the pipe 17, and the suction chamber 15, is such that a negative pressure of about 800 to 900 mm. of water is maintained immediately above the belt 10.

A trimming device for trimming the tobacco filler stream is provided beneath the channel 9 at a position beyond the passage 8, that is, between the points marked 19 and 20. The trimming device comprises a pair of peripherally chamfered discs 23 mounted on two rotating spindles. The discs are arranged to be rotated in opposite directions, with a peripheral speed slightly greater than the linear speed of the conveyor belt 10. The two discs 23 have their bottom surfaces disposed in a single plane parallel to the plane of the flat conveyor belt 10. The opposed edges of the discs are, at the point where they are closest to each other, separated by a distance of 0.1 to 0.2 mm.

Beneath the trimming device is a paddle-wheel device for removing tobacco which is separated from the filler by the discs 23. This comprises a hub 27 provided with four radial blades 28, each about 8 mm. wide. The

blades 28 are adjusted so that their extreme edges rub against the bottom surface of both the discs 23 at the region where the edges of the two discs approach closest to each other, and thus engage and remove tobacco which is beneath the discs, thus cooperating with the discs by completing the separation of that tobacco which extends beyond a desired depth of the filler stream, from the tobacco within the said depth, which latter tobacco passes above the discs.

An endless conveyor 30 extends beneath the rotating paddle-wheel 26 to receive tobacco removed and thrown downwardly by the blades 28. The conveyor 30 is arranged to convey such tobacco towards, and deposit upon, a further conveyor (not shown) which in turn deposits the tobacco on a conveyor band which returns it to the hopper of the machine.

The mounting of the trimming device, and means for adjusting its position in order to alter the level or depth of the filler stream at which tobacco beyond that depth is separated from the tobacco within that depth carried by the conveyor 10, are fully described and illustrated in the Complete Specification and drawings of British Patent Application No. 6407/57 (Serial No. 854,736) from which the present application is divided, and to which reference should be made for a full description of these parts.

An endless conveyor belt 41 is arranged to carry a continuous web 42 of cigarette-paper through rod-forming mechanism, including a tongue 43, by which the tobacco filler is enclosed in the cigarette-paper web to form a continuous cigarette rod. The belt 41 and cigarette-paper web 42 extend beneath part of the conveyor 10, and move at the same speed as the conveyor 10 and in the same general direction, although in the construction shown, the belt 41 runs horizontally while the conveyor 10 is slightly inclined downwardly in its direction of movement.

The suction chamber 16 extends to the point marked 20, and beyond that point the conveyor 10 is no longer in communication with the source of suction. The paper web 42 is led in beneath the conveyor 10 just before the latter reaches the point 20, and is thus in a position to receive and support the tobacco filler when this is no longer held by suction against the conveyor 10. The spacing between the paper web 42 and the conveyor 10 is at no point greatly in excess of the depth of the tobacco filler, and is preferably approximately equal to the depth of the filler, so that the latter can be transferred from the conveyor to the paper without any substantial drop and thus with little disturbance.

A shoe 44 is arranged between the tongue 43 and the roller 11 and has an edge just clear of the conveyor 10 to prevent tobacco being carried around the roller 11 by the

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conveyor 10.

The belt 41 is supported in a trough which shapes it and the paper web 42 into arcuate form in the usual way.

5 The operation of the apparatus is as follows.

Tobacco is fed into the passage 8 by tobacco-feeding means which are fully described and illustrated in the Complete Specification and drawings of British Patent Application No. 6407/57 (Serial No. 854,736). As
10 stated above, air is caused to move upwardly through the passage 8, and the arrangements for moving the air (as fully explained in the above-mentioned Complete Specification) are
15 such that air moves through the passage 8 at a speed of 30 feet per second, and tobacco particles fed into the passage are carried at high speed to the conveyor 10, on whose
20 underside they accumulate and build up to form a filler stream, which is held by suction to the conveyor.

Tobacco is fed to the passage 8 in sufficient quantity, in relation to the speed of the conveyor 10, to enable a filler stream to be built
25 up on the conveyor of greater depth than is required in the final filler. The filler stream so formed may vary in depth from point to point along its length, but its minimum depth should, as far as is practicable, be at least
30 equal to the distance between the conveyor 10 and the discs 23 of the trimming device which removes excess tobacco and thereby trims the filler stream to a desired depth.
35 Since the width of the filler stream is controlled by the side walls of the channel 9, it will be seen that the filler produced by trimming the filler stream and reducing the latter to a desired depth will have a substantially
40 uniform cross-sectional size, the conveyor surface of the conveyor 10 and the side walls of the channel 9 cooperating to constitute a confining and volumetric measuring chamber, of generally rectilinear cross-section, for tobacco
45 in the filler stream.

The trimmed filler is carried on the under-surface of the conveyor 10 past the point 20, beyond which it is no longer held to the conveyor 10 by suction. By this time, however, it
50 has been led over the paper web 42 which is moving at the same speed as the filler and is close enough to the conveyor 10 to receive the filler from the conveyor without the filler being subjected to any substantial drop or other disturbance. Thus the structure of the filler which
55 has been trimmed on the conveyor 10 is little disturbed during transfer to the paper web.

The final compression of the filler under the tongue 43, and its enclosure in the paper web
60 42 to form a continuous wrapped cigarette rod which is severed to produce individual cigarettes, follows conventional practice and need not be described.

The apparatus described and illustrated
65 herein and in the accompanying drawings is

also described and illustrated in the complete specification and drawings of British Patent Application No. 6407/57 (Serial No. 854,736) from which the present application is divided. In the complete specification of Application No. 6407/57 (Serial No. 854,736), there is
70 claimed a method of forming a tobacco filler in a tobacco-manipulating machine such as a continuous rod cigarette-making machine, comprising the steps of introducing tobacco
75 particles into a current of air which carries them towards conveyor means on which they form a continuous filler stream, the current of air having a sufficiently high velocity, and tobacco particles being fed into the current of
80 air in such a manner, that the speed of movement of the said particles is increased by the air current, conveying the filler stream lengthwise while controlling its width, and subjecting the filler stream so formed to a trimming
85 operation by which surplus tobacco is removed from the filler stream so as to reduce the latter to a desired depth and thereby to produce a filler of a desired cross-sectional size.

In the complete specification of British Patent Application No. 14133/60 (Serial No. 854,737) (which is also divided out of Application No. 6407/57 (Serial No. 857,736)) there is claimed a method of producing a continuous tobacco filler in a tobacco-manipulating machine such as a continuous rod cigarette-making machine, comprising the steps of
90 building up a continuous filler stream of tobacco, and, while controlling its width, conveying the filler stream lengthwise on air-pervious conveyor means from a position beyond that at which the building up of the stream has been completed, to a trimming
95 position, the two said positions being spaced apart, trimming the filler stream at the said trimming position by removal of surplus tobacco from the filler stream to reduce the latter to a desired depth and thereby produce a filler of a desired cross-sectional size, and
100 subjecting the filler stream, during its passage between the two said positions, to air pressure by drawing air through the filler stream and the conveyor means, so as to urge tobacco in the filler stream towards the conveyor means.
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WHAT WE CLAIM IS:—

1. A continuous rod cigarette-making machine, comprising means to form a lengthwise-moving filler stream of tobacco, a trimming device to remove surplus tobacco from the filler stream to reduce the latter to a desired depth, thereby producing a filler, and a perforated suction conveyor arranged to carry the trimmed filler on the underside of the conveyor by suction over a continuous, lengthwise-moving wrapper and to deposit the filler on said wrapper for enclosure therein.
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2. A method of forming a filler in a continuous rod cigarette-making machine and transferring it on a wrapper for enclosure therein, comprising the steps of forming a
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conveyor 10.

The belt 41 is supported in a trough which shapes it and the paper web 42 into arcuate form in the usual way.

The operation of the apparatus is as follows.

Tobacco is fed into the passage 8 by tobacco-feeding means which are fully described and illustrated in the Complete Specification and drawings of British Patent Application No. 6407/57 (Serial No. 854,736). As stated above, air is caused to move upwardly through the passage 8, and the arrangements for moving the air (as fully explained in the above-mentioned Complete Specification) are such that air moves through the passage 8 at a speed of 30 feet per second, and tobacco particles fed into the passage are carried at high speed to the conveyor 10, on whose underside they accumulate and build up to form a filler stream, which is held by suction to the conveyor.

Tobacco is fed to the passage 8 in sufficient quantity, in relation to the speed of the conveyor 10, to enable a filler stream to be built up on the conveyor of greater depth than is required in the final filler. The filler stream so formed may vary in depth from point to point along its length, but its minimum depth should, as far as is practicable, be at least equal to the distance between the conveyor 10 and the discs 23 of the trimming device which removes excess tobacco and thereby trims the filler stream to a desired depth. Since the width of the filler stream is controlled by the side walls of the channel 9, it will be seen that the filler produced by trimming the filler stream and reducing the latter to a desired depth will have a substantially uniform cross-sectional size, the conveyor surface of the conveyor 10 and the side walls of the channel 9 cooperating to constitute a confining and volumetric measuring chamber, of generally rectilinear cross-section, for tobacco in the filler stream.

The trimmed filler is carried on the under-surface of the conveyor 10 past the point 20, beyond which it is no longer held to the conveyor 10 by suction. By this time, however, it has been led over the paper web 42 which is moving at the same speed as the filler and is close enough to the conveyor 10 to receive the filler from the conveyor without the filler being subjected to any substantial drop or other disturbance. Thus the structure of the filler which has been trimmed on the conveyor 10 is little disturbed during transfer to the paper web.

The final compression of the filler under the tongue 43, and its enclosure in the paper web 42 to form a continuous wrapped cigarette rod which is severed to produce individual cigarettes, follows conventional practice and need not be described.

The apparatus described and illustrated herein and in the accompanying drawings is

also described and illustrated in the complete specification and drawings of British Patent Application No. 6407/57 (Serial No. 854,736) from which the present application is divided. In the complete specification of Application No. 6407/57 (Serial No. 854,736), there is claimed a method of forming a tobacco filler in a tobacco-manipulating machine such as a continuous rod cigarette-making machine, comprising the steps of introducing tobacco particles into a current of air which carries them towards conveyor means on which they form a continuous filler stream, the current of air having a sufficiently high velocity, and tobacco particles being fed into the current of air in such a manner, that the speed of movement of the said particles is increased by the air current, conveying the filler stream lengthwise while controlling its width, and subjecting the filler stream so formed to a trimming operation by which surplus tobacco is removed from the filler stream so as to reduce the latter to a desired depth and thereby to produce a filler of a desired cross-sectional size.

In the complete specification of British Patent Application No. 14133/60 (Serial No. 854,737) (which is also divided out of Application No. 6407/57 (Serial No. 857,736)) there is claimed a method of producing a continuous tobacco filler in a tobacco-manipulating machine such as a continuous rod cigarette-making machine, comprising the steps of building up a continuous filler stream of tobacco, and, while controlling its width, conveying the filler stream lengthwise on air-pervious conveyor means from a position beyond that at which the building up of the stream has been completed, to a trimming position, the two said positions being spaced apart, trimming the filler stream at the said trimming position by removal of surplus tobacco from the filler stream to reduce the latter to a desired depth and thereby produce a filler of a desired cross-sectional size, and subjecting the filler stream, during its passage between the two said positions, to air pressure by drawing air through the filler stream and the conveyor means, so as to urge tobacco in the filler stream towards the conveyor means.

WHAT WE CLAIM IS:—

1. A continuous rod cigarette-making machine, comprising means to form a lengthwise-moving filler stream of tobacco, a trimming device to remove surplus tobacco from the filler stream to reduce the latter to a desired depth, thereby producing a filler, and a perforated suction conveyor arranged to carry the trimmed filler on the underside of the conveyor by suction over a continuous, lengthwise-moving wrapper and to deposit the filler on said wrapper for enclosure therein.

2. A method of forming a filler in a continuous rod cigarette-making machine and transferring it on a wrapper for enclosure therein, comprising the steps of forming a



lengthwise-moving filler stream of tobacco, trimming the filler stream to remove surplus tobacco and reduce the filler stream to a desired depth, thereby producing a filler, conveying the trimmed filler by suction on the underside of a perforated conveyor over a con-

tinuous, lengthwise-moving wrapper, and depositing the filler on to the said wrapper from the suction conveyor.

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