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D. W. MOLINS ETAL

3,119,397

MANUFACTURE OF MOUTHPIECE CIGARETTES

Filed July 13, 1960

3 Sheets-Sheet 1

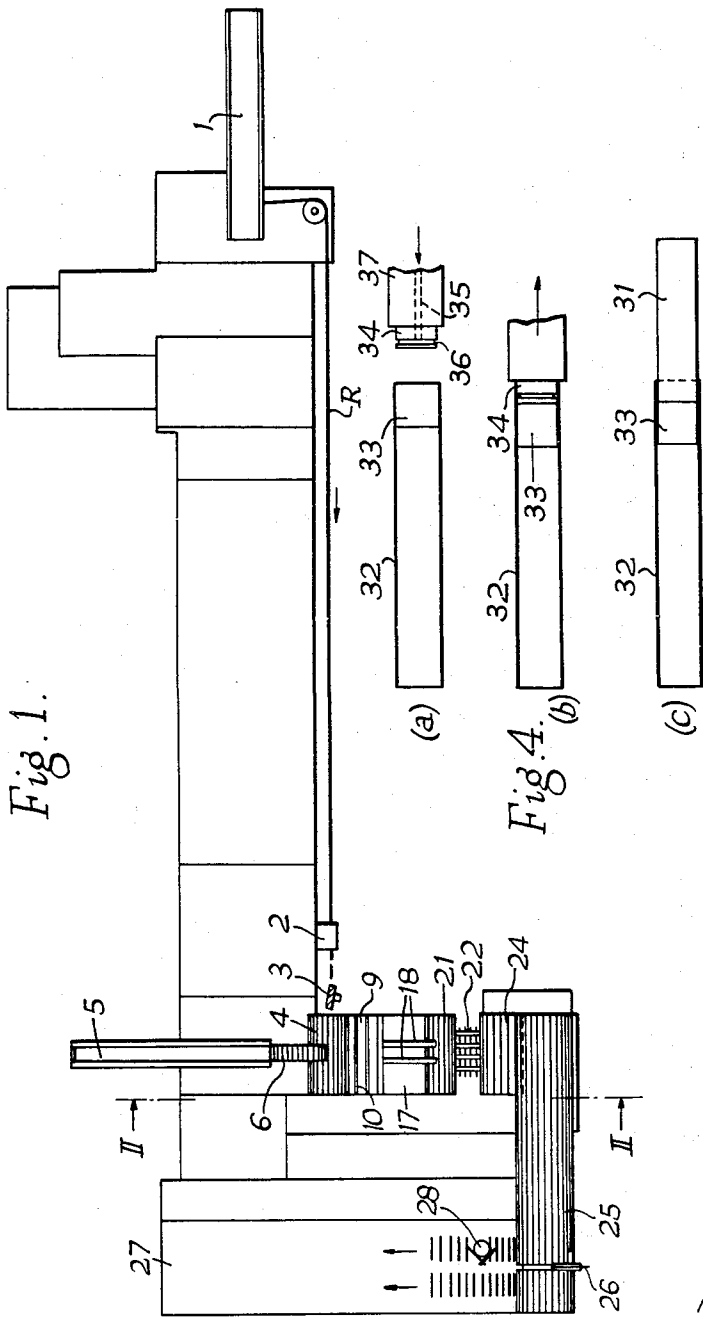


Fig. 1.

Fig. 4.

INVENTOR

Desmond Walter Molins
Tom Rowlands

BY

Watson, Cole, Grindle & Watson
ATTORNEY

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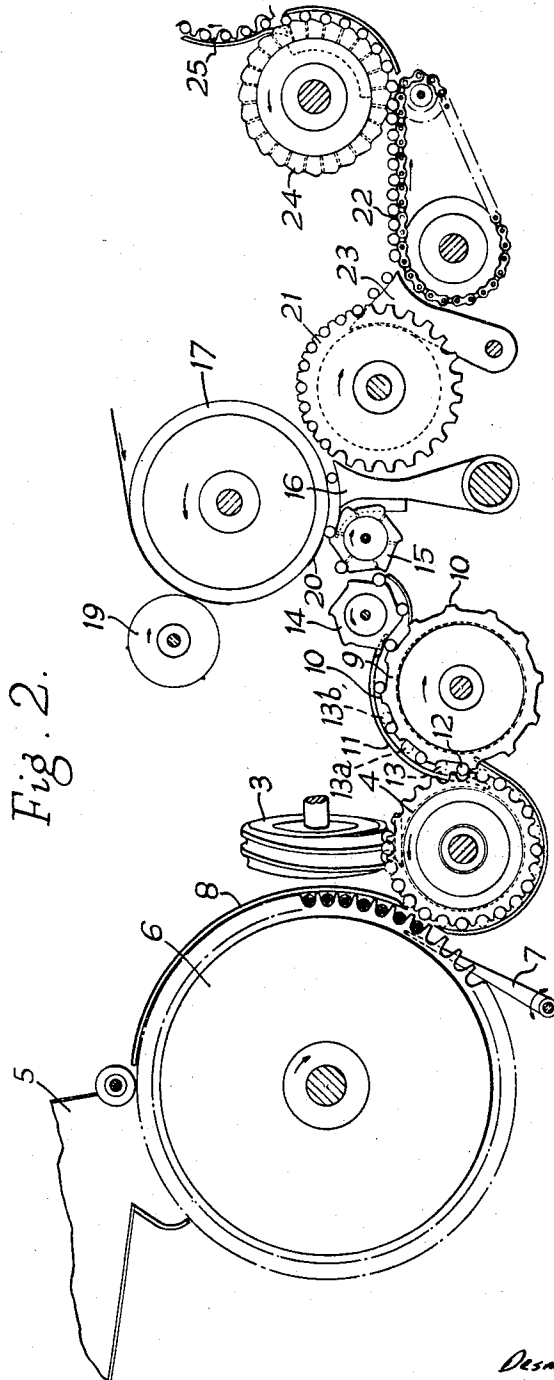
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INVENTOR

Desmond W. Molins
Tom Rowlands
BY

Watson, Cole, Grindle & Watson
ATTORNEY

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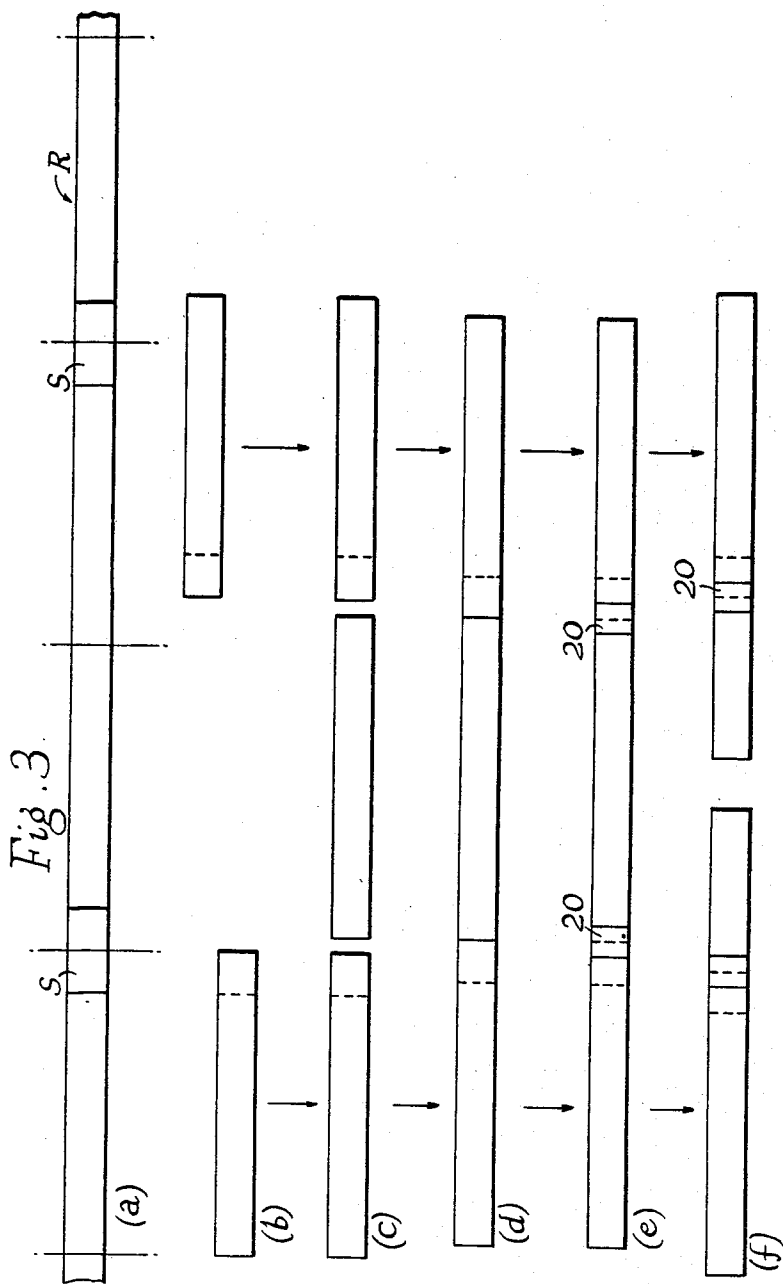
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INVENTOR

Desmond W. Molins
Tom Rowlands
BY

Watson, Cole, Shindle & Watson
ATTORNEY

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MANUFACTURE OF MOUTHPIECE CIGARETTES
Desmond Walter Molins and Tom Rowlands, London,
England, assignors to Molins Machine Company Limited, a British company

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6 Claims. (Cl. 131—94)

This invention concerns improvements in or relative to the manufacture of mouthpiece cigarettes, and in particular, of cigarettes having hollow tubular mouthpieces.

According to the present invention there is provided a method of making mouthpiece cigarettes, comprising the steps of forming a continuous rod of mouthpiece material and feeding it lengthwise, severing the rod into individual mouthpiece lengths, separating pairs of mouthpiece lengths endwise, inserting a double-length cigarette portion between the two separated mouthpiece lengths of each pair, uniting each cigarette portion with the two mouthpiece lengths between which it lies, and severing each cigarette portion to produce two mouthpiece cigarettes.

Although any desired form of mouthpiece material may be used, the invention is particularly suitable for the manufacture of mouthpiece cigarettes having relatively long mouthpieces, for example having long hollow mouthpieces, such as the cigarettes often known as "Russian cigarettes." In the latter case the continuous rod of mouthpiece material may be formed as a tube, which may contain, at spaced intervals along its length, stubs, for example made of filtering material. Each of the stubs may be of double the length required in the mouthpiece of an individual cigarette, and the rod of mouthpiece material is then severed through the stubs and also through the intermediate hollow portions. The pairs of mouthpiece lengths referred to above may then each consist of two mouthpiece lengths containing stubs at adjacent ends, so that when these two lengths are separated endwise and a double-length cigarette portion inserted between them, the stubs adjoin the ends of the cigarette portion. Thus an individual mouthpiece cigarette will have a stub adjoining the tobacco portion while the end of the cigarette to be placed in the mouth consists of a hollow open-ended tube.

Further according to the invention there is provided apparatus for making mouthpiece cigarettes, comprising means to form a continuous rod of mouthpiece material and feed it lengthwise, cutting means to sever the rod into individual mouthpiece lengths, means to separate pairs of mouthpiece lengths endwise, means to insert a double-length cigarette portion between the two separated lengths of each pair, means to unite each cigarette portion with the two mouthpiece lengths between which it lies, and means to sever each cigarette portion to produce two mouthpiece cigarettes.

The said means to form a continuous rod of mouthpiece material may comprise means to form a strip of relatively stiff paper or the like into tubular form, and may further comprise means to feed stubs on to the said strips at spaced intervals before it is folded into tubular form, so that the resulting rod consisting of a tube containing stubs at spaced intervals. In that case the means to sever the rod may be arranged to cut through each stub and also through each hollow part between successive stubs.

The means to separate pairs of mouthpiece lengths endwise may include a rotating fluted drum, and means to cause two successive lengths of a pair to move lengthwise into successive flutes of the drum, one of the two flutes being provided with a stop member to limit the lengthwise movement therethrough of one of the two

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mouthpiece lengths while the other length is free to move beyond the said one length. In that case the two mouthpiece lengths of each pair are offset laterally, one being contained in each of two consecutive flutes, and means are provided subsequently to bring them into axial alignment. For example a pair of mouthpiece lengths may be transferred from the fluted drum on to a further conveyor surface on which one of the two lengths is caused to roll as to bring it into axial alignment with the other. For example the rolling action may be imparted by the said conveyor surface and a counter-surface engaging the said length, and the conveyor-surface may have abutments against which each successive pair of mouthpiece lengths can be lined up and which limit the sideways rolling movement of the lengths.

Preferably the mouthpiece lengths of each pair are separated endwise on moving into the flutes of the drum by at least the length of a double-length cigarette portion. The double-length cigarette portions may be fed into alternate flutes of the drum and transferred, together with the mouthpiece lengths, on to the said further conveyor surface, whereby both mouthpiece lengths of a pair, and a double-length cigarette portion, are brought into axial alignment to form a group.

Each group, consisting of two single mouthpiece lengths with a double-length cigarette between and in axial alignment with them, may be united by a pair of adhesive uniting bands wrapped around the group at the junction of the two mouthpiece lengths and the end parts of the cigarette portion. Where the mouthpiece lengths are of a considerable length, it may be unnecessary and undesirable for the uniting bands to cover the whole extent of the mouthpiece lengths, and the bands may therefore be relatively small so as to extend over only a short part of each mouthpiece.

The uniting bands may be applied by causing the groups to roll between two opposed surfaces moving relatively to one another.

Further according to the invention there is provided a method of making mouthpiece cigarettes, comprising the steps of forming a continuous rod of mouthpiece material and feeding it lengthwise, severing the rod into individual mouthpiece lengths, separating pairs of mouthpiece lengths endwise, inserting a double-length cigarette portion between the two separated mouthpiece lengths of each pair, uniting each cigarette portion with the two mouthpiece lengths between which it lies, and severing each cigarette portion to produce two mouthpiece cigarettes.

Further according to the invention there is provided a method of making mouthpiece cigarettes, comprising the steps of forming tubular mouthpieces, applying adhesive to the inner surface of the tube at one end, and inserting a cigarette portion partly into the said end. Each tubular mouthpiece may be formed so as to contain a stub at the said one end, in which case the method includes the step of pushing the stub further into the tube, before or while applying adhesive to the tube, in order to make room for the cigarette portion. The tubular mouthpieces may be arranged in pairs each consisting of two endwise spaced mouthpieces, and a double-length cigarette portion may then be introduced into the space between two mouthpieces and its ends inserted into the mouthpieces, e.g. by endwise movement of the two mouthpieces towards each other.

The apparatus in accordance with the invention will now be described by way of example with reference to the accompanying drawings, in which:

FIGURE 1 is a diagrammatic plan view,

FIGURE 2 is an end view, to a greatly enlarged scale, taken on the line II—II, FIGURE 1,

FIGURE 3 diagrammatically illustrates the sequence

of operations performed by the apparatus according to FIGURES 1 and 2, and

FIGURE 4 diagrammatically illustrates an alternative method.

Referring to FIGURES 1, 2 and 3, the general outline of the apparatus is best seen in FIGURE 1. The apparatus diagrammatically shown at the right-hand side of FIGURE 1 consists of apparatus for forming a continuous rod of tubular mouthpiece material, represented by the solid line marked R. A hopper 1 contains stubs which are fed down on to a continuous web of stiff paper coated with adhesive, for example heat-sealing adhesive, and the stubs, each of which is double the length required in a finished cigarette, are fed to the web at suitable spaced intervals. The web is then folded into tubular form about the spaced stubs and its overlapping edges are sealed so as to form a continuous tube containing double-length stubs at desired intervals along its length.

The arrangement may be similar to that disclosed in the complete specification and drawings of U.S. patent specification No. 2,902,807, but since in the present construction the stubs are to be spaced a considerable distance apart, only one stub hopper is required instead of the two hoppers disclosed in the specification just mentioned.

The arrangement of stubs in the tube forming the rod R is illustrated in FIGURE 3(a).

A cut-off device 2, FIGURE 1, of any suitable known kind, is arranged to cut the rod R at the intervals indicated in FIGURE 3 by dot and dash lines, the stubs being indicated by the reference S. It will be seen that the rod is cut midway along the lengths of the stubs S and also midway along the length of each hollow tubular portion extending between two stubs.

The cut lengths of mouthpiece rod, each constituting an individual mouthpiece length, are in succession deflected by a helically grooved wheel 3, FIGURES 1 and 2, into successive flutes in a fluted drum 4, arranged to rotate as shown by the arrow, FIGURE 2, the arrangement being in general similar to that disclosed in the co-pending U.S. patent application Serial No. 5,933, now U.S. Patent No. 3,039,589, for deflecting cigarettes on a continuous rod cigarette-making machine. Every second flute of the drum 4 is provided with a stop to limit the lengthwise movement of a mouthpiece length through the flute, so that two consecutive lengths, in consecutive flutes, are separated endwise from each other as well as being offset laterally. The stop members are not shown in the drawings, but in FIGURE 2 the mouthpieces which have moved through the whole or almost the whole length of a flute are represented by full-line circles, while those which have had their lengthwise movement arrested by a stop member are represented by dotted circles. In FIGURE 2, a mouthpiece represented by a dotted circle, and the immediately succeeding full line mouthpiece (considered in the direction of rotation of the drum 4) constitute a pair of lengthwise separated mouthpieces whose inner ends (that is, the ends opposed to each other) contain stubs.

A cigarette hopper 5 extends over a fluted wheel 6 which receives in its flutes double-length cigarette portions and feeds them to the drum 4. The wheel 6 is located approximately centrally of the drum 4, and the mouthpieces are spaced apart endwise in the flutes of the drum (as illustrated in FIGURE 3(b)) by a distance a little greater than the length of a cigarette portion. Cigarette portions are transferred from the wheel 6 into alternate flutes of the drum 4, and accordingly the wheel 6 rotates at half the peripheral speed of the drum 4. Swinging arms 7 extending into peripheral grooves in the wheel 6 engage successive cigarette portions after the latter have passed the end of a guide 8 and positively transfer them into flutes of the drum 4, the flutes which receive the cigarette portions being those which con-

tain the mouthpieces represented by full line circles in FIGURE 2.

Thus every second flute in the drum 4 contains a mouthpiece and a cigarette portion, while the flute immediately preceding it contains only a mouthpiece portion.

A further conveyor 9, provided on its surface with transverse abutments 10, is arranged to receive the mouthpieces and cigarettes from the drum 4. The pitch of the abutments 10 is equal to two flute pitches of the drum 4, and is timed in relation to the drum 4 so that two endwise spaced mouthpieces, both of which contain stubs at their inner ends, and contained in two consecutive flutes, are together with a cigarette portion, transferred on to the conveyor 9 between two abutments 10, as shown in FIGURE 2. A fixed concave plate 11 extending over the conveyor 9 engages the cylindrical surfaces of the mouthpieces and cigarettes, and due to the relative movement between the plate 11 and the surface of the conveyor 9, the mouthpieces and cigarette portions are set in rolling motion. One mouthpiece, and the cigarette portion, are transferred to the conveyor 9 at the position shown by the full-line circle 12, FIGURE 2, and as they immediately precede an abutment 10 they are unable to roll over the surface of the conveyor, whereas the remaining mouthpiece, represented by the dotted circle 13, FIGURE 2, is free to roll backwards into alignment with the first-mentioned mouthpiece and cigarette portion. This rearward rolling movement is illustrated by the different positions of the dotted circles 13a, 13b, in FIGURE 2. Each pair of lengthwise-separated mouthpieces is thus brought into alignment with a double-length cigarette portion, which now lies between their ends, as shown in FIGURE 3(c). It will also be seen from FIGURE 3(c) that the ends of the cigarette portion about stubs contained in the inner ends of the two mouthpieces.

The aligned groups of mouthpieces and cigarette portions are transferred from the conveyor 9 by two transfer conveyors 14 and 15 on to a concave plate 16 located beneath a suction drum 17.

At some suitable position after a group has been aligned and before it is received between the plate 16 and drum 17, end-presser members (not shown) engage the ends of the mouthpieces and urge them towards each other so as to bring them into close endwise abutment with the central cigarette portion, as illustrated in FIGURE 3(d). For example the presser members may be mounted alongside the conveyor 9, at a position just before that at which the groups leave the conveyor, and in that case the plate 11 may be recessed to enable the mouthpieces to move axially into abutment with the cigarette portion.

The suction drum receives two spaced strips 18 of adhesive-coated material (see FIGURE 1) which are severed by rotating cutters 19, FIGURE 2, into desired lengths 20. The strips 18 are fed to the drum at a slower speed than that of the drum surface, which therefore slips beneath the strips, and the cut lengths are therefore separated.

As a group enters between and is gripped by the moving drum surface 17 and the stationary plate 16, it is caused to roll rearwardly over the drum, and over a pair of cut lengths 20 which constitute uniting bands and are located at the junctions between the two mouthpieces and the cigarette portion. Thus the uniting bands 20 are wrapped around the groups to unite them.

A fluted conveyor wheel 21 receives the united groups from the plate 16 and conveys them towards a chain conveyor system 22 on to which the groups roll down ramps 23 which also serve to strip the groups from the wheel 21 by extending into peripheral grooves in the wheel.

The groups are then taken from the conveyor 22 by a suction conveyor 24 which conveys them into flutes of a long fluted drum 25, only a fragment of which is shown

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in FIGURE 2, but which is seen in plan view in FIGURE 1.

A blower device (not shown) located at the right-hand end of the drum 25 as viewed in FIGURE 1, directs a jet of air along successive flutes, by which the groups are blown along the flutes towards the left, FIGURE 1, and are arrested by end stops, not shown. By this means the united groups are brought into position to be cut in half by a rotating disc knife 26, FIGURE 1. That is to say, they are so positioned that the knife cuts through the cigarette portions, thus subdividing each group into two mouthpiece cigarettes as shown in FIGURE 3(f). It will be seen that each such cigarette consists of a cigarette portion of wrapped tobacco, which is joined by a uniting band 20 to a relatively long tubular mouthpiece which contains a stub at the end adjoining the tobacco, but is open at the other end.

The completed mouthpiece cigarettes are carried around and beneath the drum 25 and deposited in two rows on a catcher band 27, or each row may be fed on to a separate catcher band. Before or after they reach the catcher band they are separated slightly endwise in any convenient way, as by inclined guides. If desired, the cigarettes of one row may have their orientation reversed, by a turning device 28 which may be as disclosed in the complete specification and drawings of co-pending U.S. patent application Ser. No. 757,040, now U.S. Patent No. 3,000,488. The purpose of this is to have all the cigarettes arranged with their mouthpiece ends pointing in the same direction.

FIGURE 4 diagrammatically illustrates a different method of making tubular-mouthpiece cigarettes, according to which a cigarette portion 31 is inserted into one end of a tubular mouthpiece 32 instead of being joined to it by an encircling band.

The tubular mouthpieces are made in the same way as described above with reference to FIGURES 1-3, with a stub 33 at one end of the tube, but the cigarette portions should in this alternative method have a diameter slightly smaller than that of the cigarette portions used in the method according to FIGURES 1-3, so that they can fit within the tubular mouthpieces without distortion.

A mouthpiece is suitably held against endwise movement while a plunger 34 moves endwise against the stub, FIGURE 4(b), and pushes it a short distance into the tube. It will be appreciated that for this purpose the stub should be secured to the inside of the tube by relatively slow-drying adhesive so that it is capable of sliding in the tube, or alternatively it may be held in position in the tube only by friction.

The plunger 34, see FIGURE 4(a), has one or more bores 35 communicating with a peripheral groove 36 near its end, and projects from a housing 37 which contains a supply of adhesive, means being provided to force adhesive through the bores 35 so that a small quantity of adhesive enters the groove 36 and is transferred to the inner surface of the tubular mouthpiece during the pushing stroke of the plunger, or during its withdrawal, or during both strokes. This is in order to secure a cigarette portion within the tube; but in a case where the stub was not originally secured to the tube, some of the adhesive applied by the plunger 34 may assist in securing the stub in position after it has been pushed inwardly.

After the withdrawal of the plunger, the mouthpiece is moved laterally away, and a cigarette portion is pushed into the hollow space formed by the plunger, FIGURE 4(c). This may be accomplished by moving the cigarette portion endwise, or alternatively by holding the cigarette portion and moving the mouthpiece towards it. For example the mouthpieces may be arranged in endwise separated aligned pairs, and a pair of plungers 34 may be arranged to enter the ends of both mouthpieces of a pair, e.g. simultaneously. In that case a double length cigarette portion may then be inserted between two mouth-

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pieces, which are then moved endwise towards each other so that their internally gummed, hollow ends slip over the ends of the cigarette portion until the latter is abutted at both ends against the stubs 33. The group or assemblage so formed is then subdivided by cutting midway through the cigarette portion.

Alternatively individual mouthpiece cigarettes may be formed by inserting single-length cigarette portions individually into the tubular mouthpieces, in which case only a single plunger 34 is required.

What we claim as our invention and desire to secure by Letters Patent is:

1. Apparatus for making mouthpiece cigarettes, comprising means to form a continuous, lengthwise moving rod of mouthpiece material, cutting means to sever the rod into individual mouthpiece lengths, a rotating drum having peripheral flutes with open ends, means to cause two successive lengths of a pair of mouthpiece lengths to move lengthwise into two successive flutes of the drum, said two flutes having stop means to limit the endwise movement of the said two lengths therethrough, the stop means being located at different positions along the lengths of the said two flutes such that the said two lengths are spaced from each other endwise in their flutes by a predetermined distance, means to feed a cigarette, whose length is no greater than the said distance, into one of said two flutes in end to end relationship with the mouthpiece length contained in said flute, means to bring the said two mouthpiece lengths and the said cigarette into axial alignment, means to unite the aligned mouthpiece lengths and cigarette, and means to sever the said cigarette to produce two mouthpiece cigarettes.

2. Apparatus as claimed in claim 1, comprising a conveyor having a conveyor surface, means to transfer the said cigarette and one of said mouthpiece lengths from one flute, and the other mouthpiece length from the other flute, on to said conveyor surface, and means to cause the said other mouthpiece length to roll over said surface into axial alignment with the said one mouthpiece length and the said cigarette.

3. Apparatus as claimed in claim 2, comprising a countersurface opposed to said conveyor surface to cause the said rolling, the conveyor surface having abutments to limit the extent of rolling movement and against which the said mouthpiece lengths and cigarette can be lined up.

4. Apparatus as claimed in claim 1, comprising means to feed a pair of adhesive uniting bands into engagement with the aligned mouthpiece lengths and cigarette, at the region where they adjoin each other endwise, and means to secure the said bands around the said lengths and cigarettes to unite them.

5. Apparatus for making mouthpiece cigarettes from cylindrical components consisting of cigarette lengths and mouthpiece lengths respectively, comprising a conveyor having a conveyor surface, feeding means to feed on to said surface groups each consisting of two outer components of one kind and one central component of another kind, each group containing at least one mouthpiece length and at least one cigarette length, said feeding means being arranged to deposit groups on said surface so that the axes of the components are transverse to the direction of movement of said conveyor, and with the components of each group spaced lengthwise from each other and with at least two components of each group positioned one in advance of the other considered in the direction of movement of said surface, a member opposed to said surface to engage components and cause rolling movement of components over said surface to bring the components of each group into axial alignment, means to unite the aligned components of each group, and means to cut through the central component of each united group, thereby producing two mouthpiece cigarettes from each group.

6. Apparatus as claimed in claim 5, comprising a rotating fluted drum having peripheral flutes with open ends, means to feed two successive components of the said one kind endwise into two successive flutes through said open ends, said two flutes having stop means differently positioned along the lengths of the flutes whereby the two said lengths are spaced lengthwise from each other by a predetermined distance so as to constitute the outer components of a group, means to feed into one of said two flutes a component of said other kind which is to constitute the said central component, the said drum being located adjacent said conveyor surface and being arranged to transfer components from said two flutes on to said surface with one of said outer components out of alignment with the remaining two components.

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