Oct. 21, 1969 E. OESTERLING ET AL 3,473,536

MACHINE FOR UNITING TOBACCO RODS WITH MOUTHPIECES

Filed March 13, 1968 2 Sheets-Sheet 1

Fig. 2

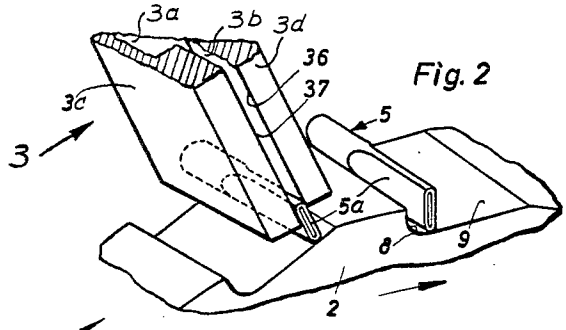
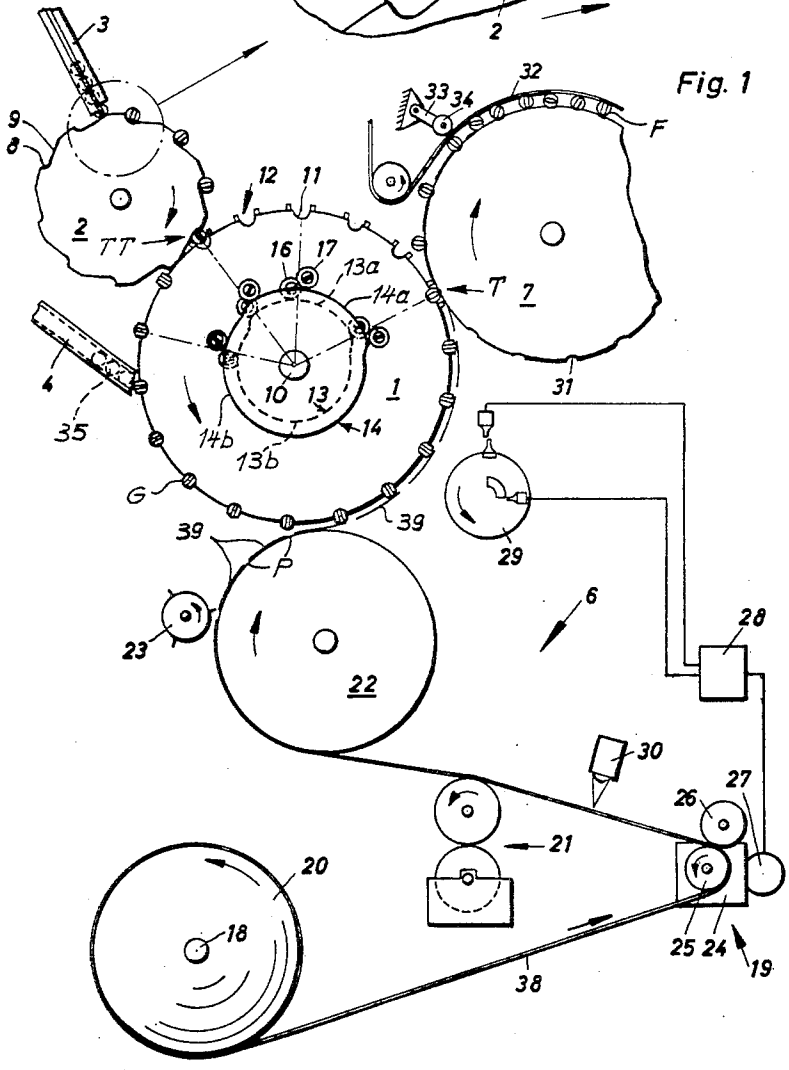


Fig. 1



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Filed March 13, 1968 2 Sheets-Sheet 2

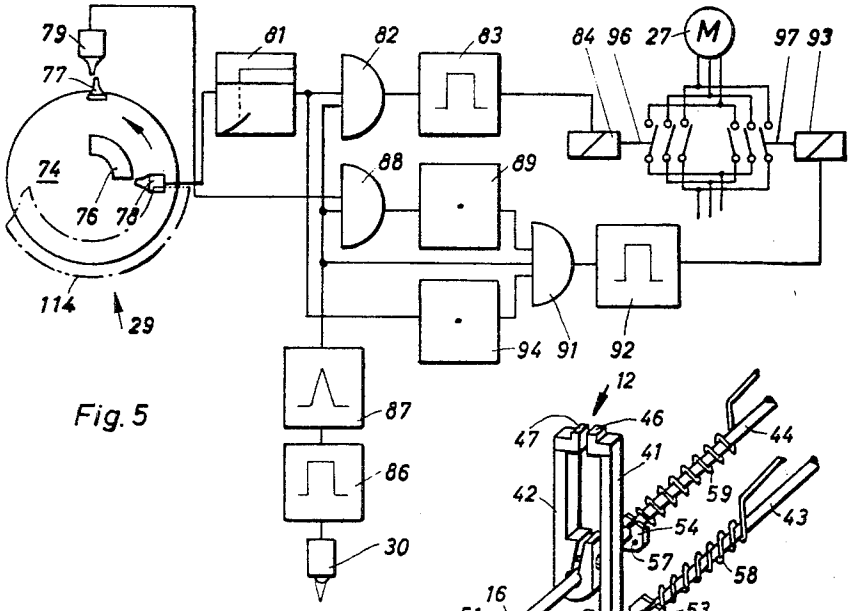
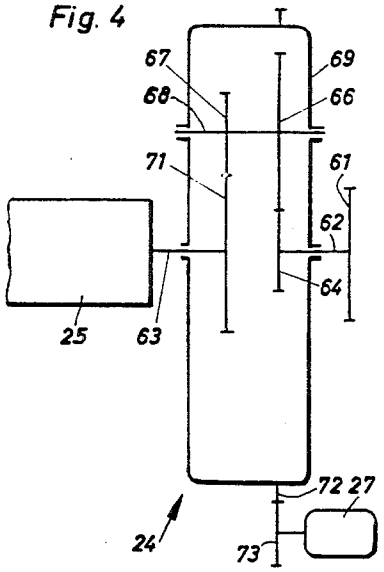


Fig. 5

Fig. 3

Fig. 4



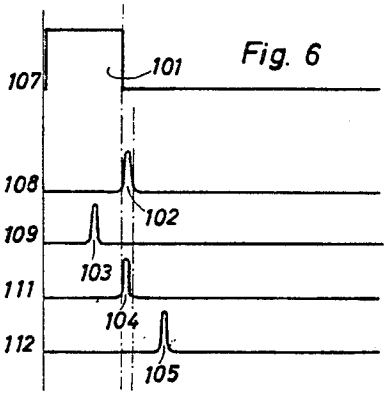
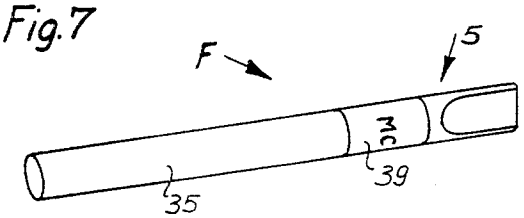


Fig. 6

Fig. 7



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MACHINE FOR UNITING TOBACCO RODS WITH MOUTHPIECES

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Int. Cl. A24c 5/48, 5/58
U.S. Cl. 131—21 14 Claims

ABSTRACT OF THE DISCLOSURE

Mouthpieces having flat tips are joined with cigarillos by adhesive-coated uniting bands which are provided with imprints. The mouthpieces are held in predetermined angular positions with reference to an assembly drum when a feed attaches predetermined portions of uniting bands thereto. An optical signal generator scans a tape which is severed to yield uniting bands. Signals produced by the generator in response to detection of imprints on the tape are compared with signals produced by a timer when a mouthpiece reaches the band applying station, and a transmission changes the speed of tape if the signals are not produced simultaneously. This insures that the imprint is visible when the finished product is held by a smoker's teeth.

Background of the invention

The present invention relates to the production of smoking products of the type wherein a wrapped tobacco rod is united with a mouthpiece having a flattened tip which is to be held by the teeth or lips of a smoker. More particularly, the invention relates to improvements in machines for the production of smoking products wherein the mouthpiece is joined with the tobacco rod by means of an adhesive-coated uniting band and wherein the uniting band is provided with one or more imprints or other indicia.

In heretofore known machines which are utilized for the assembly of cigarettes, cigarillos or like smoking products wherein the mouthpiece has a flattened tip and is joined with a wrapped tobacco rod by means of an imprinted uniting band, the angular position of the imprint with reference to the tip of the mouthpiece cannot be determined in adavnce with a requisite degree of accuracy. Since the imprint normally represents the trademark of the manufacturer or the brand name of the product, it should be visible and clearly readable when the product is gripped by the teeth, lips or fingers of the smoker as well as when it is temporarily placed into an ash tray in a position which is best suited for returning the tip into the mouth.

It is already known to stack oval cigarettes in packs or boxes in such a way that the imprints of a full row of cigarettes are visible when the box is opened. The cigarettes are scanned by photoelectric detectors and turned until their imprints face in a predetermined direction. However, such method cannot be employed in connection with cigarillos or like smokers' products whose mouthpieces are provided with flattened tips because it is customary to stack cigarillos in such a way that the tips of mouthpieces in a row of cigarillos are located in a common plane or in parallel planes. Thus, and if an imprint is improperly positioned with reference to the tip of the mouthpiece, cigarillos in a pack or box can only be stacked according to the positions of their imprints or according to the positions of their tips.

Summary of the invention

It is an object of the present invention to provide a machine for the production of cigarillos or like smokers' products wherein wrapped tobacco rods are joined with tipped mouthpieces by means of imprinted uniting bands and to construct and assemble the machine in such a way that the imprints on all uniting bands are properly oriented with reference to the tips.

A further object of the invention is to provide a machine wherein the orientation of uniting bands with reference to the parts which are joined thereby is changed automatically if the imprints are out of position so that the number of products with improperly oriented imprints is reduced to a minimum.

The improved machine comprises an assembly conveyor having a series of flutes, a first feed for supplying mouthpieces to successive flutes, a second feed for supplying tobacco rods to successive flutes, and a third feed having variable speed advancing means for a tape which is provided with equidistant imprints, or analogous indicia, means for severing the tape to form a series of uniting bands each having an imprint at a predetermined distance from the point of separation from the tape when the position of the imprint is satisfactory, and means for applying predetermined portions of bands to rods and mouthpieces in successive flutes. The machine further comprises orienting means associated with the conveyor to maintain each mouthpiece in a predetermined angular position during application of a uniting band thereto, wrapping means for convoluting the bands around the respective rods and mouthpieces, and control means including a detector for scanning imprints on the tape and for producing signals on detection of such imprints, and adjusting means for changing the speed of tape when a signal produced by the detector indicates that the position of an imprint on the respective band will be unsatisfactory, i.e., that the imprint will not be plainly visible when the band is convoluted around a mouthpiece and the respective rod and when the tip of the resulting product is gripped by a smoker's teeth.

Proper positioning of imprints on the finished products is achieved because the improved machine meets three important requirements, namely:

(a) The speed of tape is controlled in such a way that the imprint on each uniting band is located at a predetermined distance from the point where the band is severed from the tape;

(b) The third feed applies predetermined portions of successive bands to successive groups of tobacco rods and mouthpieces; and

(c) The mouthpieces are held in predetermined angular positions during attachment of uniting bands.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved machine itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawing.

Brief description of the drawing

FIG. 1 is a fragmentary schematic side elevational view of a cigarillo making machine which embodies the invention;

FIG. 2 is a larger-scale fragmentary perspective view of the feed which supplies mouthpieces to the assembly conveyor of the machine shown in FIG. 1;

FIG. 3 is a perspective view of one of a series of orienting devices which are built into the assembly conveyor to

bring about proper orientation of mouthpiece tips prior to application of uniting bands;

FIG. 4 is a schematic view of an adjustable transmission serving to regulate the speed of tape which is being subdivided to yield uniting bands;

FIG. 5 is a diagram of the electric control circuit in the machine of FIG. 1;

FIG. 6 is a graph wherein the curves represent various signals which are being produced by the control circuit of FIG. 5;

FIG. 7 is a perspective view of a completely assembled cigarillo with a mouthpiece.

Description of the preferred embodiment

FIG. 1 illustrates a portion of a cigarillo machine which comprises a drum-shaped assembly conveyor **1** (hereinafter called assembly drum) provided with equidistant axially parallel peripheral receiving means or flutes **11** adapted to accommodate wrapped tobacco rods (cigarillos **35**) and axially aligned mouthpieces **5** whose tips are flattened, as at *5a* (see FIG. 2).

A first feed which supplies plastic mouthpieces **5** is adjacent to the top part of the assembly drum **1** and comprises a downwardly inclined chute or duct **3** and a transfer conveyor **2** here shown as a drum which is driven to rotate in a clockwise direction and is provided with axially parallel peripheral flutes or pockets **8** located at the radially innermost ends of inclined rolling surfaces **9**. A second feed which supplies tobacco rods **35** to successive flutes **11** of the assembly drum **1** comprises a downwardly inclined chute **4** which accommodates a stack of tobacco rods and is located downstream of or past the transfer drum **2**, as considered in the direction of travel of flutes **11**. It will be noted that the assembly drum **1** rotates in a counterclockwise direction. A third feed **6** which is located downstream of or past the chute **4** serves to supply adhesive-coated uniting bands **39** to successive groups G in the flutes **11**, each such group G comprising a mouthpiece **5** and a tobacco rod **35** which latter is axially aligned with and abuts against the round end of the respective mouthpiece, i.e., against that end which is remote from the flat tip *5a*. The feed **6** includes an applicator **22** which is a suction drum and serves to apply predetermined portions of successive uniting bands **39** to successive groups G in the flutes **11** upstream of a first transfer station T where the groups G (each having a uniting band attached thereto) are transferred into shallow flutes **31** of a rotary wrapping drum **7** cooperating with a travelling rolling belt **32** to convolute the uniting bands **39** around the abutting ends of tobacco rods **35** and mouthpieces **5** to form filter cigarillos F.

The assembly drum **1** rotates about the axis of a horizontal shaft **10**. The distances between the centers of adjoining flutes **11** equal the distances between the centers of adjoining pockets **8** or flutes **31**. The assembly drum **1** is associated with a set of orienting devices or tongs **12**, one for each flute **11**. The function of tongs **12** is to properly orient the mouthpieces **5** with reference to the assembly drum **1** prior to application of uniting bands **39**, i.e., upstream of the suction drum **22** of the feed **6**. Each set of tongs **12** receives motion from a linkage **15** (FIG. 3) and such linkages receive motion from stationary cams **13, 14** which are mounted on the shaft **10**. The linkages **15** comprise roller followers **16, 17** which respectively track the faces of cams **13, 14**.

The faces of cams **13, 14** respectively comprise concentric arcuate portions **13***a*, **14***a* having greater radii of curvature and concentric arcuate portions **13***b*, **14***b* having smaller radii of curvature. The two zones of transition between the arcuate portions **13***a*, **13***b* and **14***a*, **14***b* are respectively located at the aforementioned transfer station T where the groups G are transferred into the pockets **31** of the wrapping drum **7** and at a second transfer station TT where the flutes **11** receive mouthpieces **5** from the transfer drum **2**. The roller followers **16, 17** of each linkage **15** are radially offset with reference to each other

to an extent which equals the difference between the radii of cam face portions **13***a*, **14***a* or **13***b*, **14***b*.

The feed **6** further comprises a support including a shaft **18** which carries a bobbin **20** or an analogous supply of convoluted wrapper tape **38**, a variable-speed advancing unit **19** which draws tape **38** off the bobbin **20**, a conventional paster **21** which coats one side of the tape **38** with a film of adhesive, the aforementioned suction drum **22**, and a rotary cutter wheel **23** with one or more radially extending blades which cooperate with the suction drum **22** to sever the tape at predetermined intervals and to thus form a succession of uniting bands **39**.

The control system of the apparatus comprises an optical scanning device or detector **30** (e.g. a photodiode) which is installed between the advancing unit **19** and paster **21** and serves to generate signals in response to detection of indicia imprinted on or otherwise applied to the upper side of the tape **38**. Such indicia may represent the trademark of the manufacturer, the brand name of the product, the name of the manufacturer, or any other matter which can be detected by the detector **30** while the tape travels toward the suction drum **22**. The detector **30** may be of the type sold under the name NT *9a* by the Firm Sick of Waldkirch in Breisgau, Germany.

The advancing unit **19** comprises a driven advancing roll **25** which rotates in a counterclockwise direction and cooperates with a companion roll **26** which is freely rotatable and rotates in response to frictional engagement with the tape **38**. The roll **26** is preferably biased against the tape **38**. The drive for the roll **25** comprises a differential gear transmission **24** which can be adjusted by a reversible electric motor **27**. The arrangement is such that the advancing roll **25** transports the tape **38** at a speed which is slightly less than the peripheral speed of the suction drum **22** so that the uniting bands **39** are separated from each other by narrow gaps P.

A timer **29** is connected with a control circuit **28** which controls the adjusting motor **27** for the purpose of changing the rate at which the transmisson **24** drives the advancing roll **25**.

An idler roller **34** is mounted on a lever **33** and bears against the rolling belt **32** at the point where the belt engages successive uniting bands **39** to convolute such bands around the respective groups G which travel with the wrapping drum **7**. The purpose of the roller **34** is to set the groups G in rolling motion. The belt **32** can be stationary but it preferably travels at a speed which is either higher or less than the peripheral speed of the wrapping drum **7**. The drums **1, 2, 7** are suction drums and are provided with customary suction ports which can hold the uniting bands, tobacco rods and mouthpieces in the respective flutes or pockets. The system which controls suction in such ports is known from the art of filter cigarette machines and is not shown in the drawing. The drive which rotates the drums **1, 2** and **7** causes the flutes **11**, pockets **8** and flutes **31** to travel at the same speed in directions which are indicated by arrows. This drive also rotates a disk **74** of the timer **29** so that the disk completes one revolution while the assembly drum **1** turns through an angle of $360/n$ degrees wherein n is the number of flutes **11** in the assembly drum.

As shown in FIG. 2, the chute or duct **3** of the feed which supplies mouthpieces **5** comprises a channel having a wider portion *3a* and a narrower portion *3b* flanked by parallel guide surfaces **36, 37**. The width of the channel portion *3b* is just sufficient to permit passage of tips *5a* so that the tips reach the transfer drum **2** in predetermined angular positions. The rear panel or wall *3c* of the duct **3** extends closer to the drum **2** than the front panel or wall *3d* and the distance between the front panel *3d* and the periphery of the drum **2** is slightly less than the diameter of a mouthpiece **5**. The length of each rolling surface **9** as considered in the circumferential direction of the transfer drum **2**, exceeds half the circumference of a mouthpiece.

Referring now to FIG. 3, the orienting device or tongs

12 therein shown comprises two arms 41, 42 which are respectively clamped to shafts 43, 44 and carry jaws 46, 47 which can engage the flat faces of a tip 5*a* upon entry of the respective mouthpiece 5 into one of the flutes 11. The arms 41, 42 are accommodated in a cutout of the assembly drum 1 and when caused to move apart, their jaws 46, 47 flank the respective flute 11 in a manner as shown in FIG. 1 in the region between the transfer zones TT and T. The shafts 43, 44 are respectively connected with levers 48, 49 by means of adjustable clamping devices and the levers 48, 49 respectively carry the roller followers 16, 17. Each of these roller followers preferably comprises an antifriction bearing whose outer race tracks the face of the cam 13 or 14 and whose inner race is secured to the corresponding lever by a screw 51 or 52. The arrangement is such that the jaws 46, 47 are spaced from each other when the roller followers 16, 17 respectively track the portions 13*a*, 14*a* of the cam faces and that the jaws move toward each other and clamp the tips 5*a* when the roller followers track the cam face portions 13*b*, 14*b*. The shafts 43, 44 respectively carry angularly adjustable retainers 53, 54 for the front ends 56, 57 of torsion springs 58, 59. The rear ends of torsion springs 58, 59 are anchored in the assembly drum 1 and the bias of these springs can be increased or reduced by changing the angular positions of retainers 53, 54. The springs 58, 59 serve to bias the roller followers 16, 17 against the faces of cams 13, 14.

FIG. 4 illustrates the construction of the transmission 24 whose output shaft 63 carries the advancing roll 25 for the tape 38. The input shaft 62 of the transmission 24 carries a driver gear 61 which forms part of the drive for drums 1, 2, 7, 22 and cutter wheel 23. The input shaft 62 is coaxial with the output shaft 63 and carries a gear 64 meshing with a gear 66 on an intermediate shaft 68. The gear 66 forms part of a gear cluster which further includes a gear 67 meshing with a gear 71 on the output shaft 63. The diameters of gears 64, 67 and 66, 71 are respectively identical and the diameter of the gear 66 is twice the diameter of the gear 64. The intermediate shaft 68 is journalled in a case or housing 69 which is provided with a ring gear 72 meshing with a gear 73 on the output shaft of the adjusting motor 27.

Referring now to FIG. 5, there is shown the control circuit of the apparatus which is illustrated in FIG. 1. The disk 74 of the timer 29 carries an arcuate first magnet 76 which extends along an arc of 90 degrees and a second magnet 77 having a pointed pole extending radially of the disk. The magnets 76, 77 respectively cooperate with signal generators 78, 79 which also form part of the timer and are provided with pointed portions. The operation of signal generators 78, 79 is based on the well known Hall effect. The positioning of magnets 76, 77 is such that the magnet 77 moves into registry with the signal generator 79 when the magnet 76 moves beyond the signal generator 78. The signal generator 78 is connected with the input of a Schmitt trigger 81 and the latter is connected with a relay 84 by way of an AND-gate 82 and a signal amplifier 83. The signal generator 79 is connected with the input of a second AND-gate 88 which is connected with a second relay 93 by way of a NOT-gate 89, and AND-gate 91 and an amplifier 92. The AND-gate 91 is further connected with the output of the Schmitt trigger 81 by way of a second NOT-gate 94. The detector 30 is connected with the AND-gates 82, 88, 91 by way of a threshold circuit 86 and an impulse shaper 87. The relay 84 controls a switch 96 which is connected in the circuit of the adjusting motor 27 and this circuit further includes a second switch 97 which is controlled by the relay 93. The switches 96, 97 are in parallel but the connection between the adjusting motor 27 and switch 96 differs from the connection between the motor 27 and switch 97 by two interchanged phases.

The operation of the machine will be described with repeated reference to the graphs of FIG. 6. As shown in FIG. 2, the duct 3 of the feed for mouthpieces 5 causes the mouthpieces to move sideways whereby the tips 5*a* travel in the channel portion 3*b* between the guide surfaces 36, 37 so that each mouthpiece reaches the adjoining rolling surface 9 of the transfer drum 2 in a predetermined angular position in which the tip 5*a* extends substantially radially of the transfer drum. The drum 2 rotates and causes the mouthpiece to slide along the surface 9 toward the axis of the drum and to begin to turn shortly before it clears the panel 3*d* (guide surface 36) to complete about one-half of a revolution before it reaches the suction ports in the adjoining pocket 8. The length of the rolling surface 9 is such that the plane of the tip 5*a* of a mouthpiece in the pocket 8 extends substantially radially of the transfer drum 2. The latter transfers successive mouthpieces 5 into the flutes 11 of the assembly drum 1 at the transfer station TT and the tips 5*a* of the thus transferred mouthpieces are thereupon engaged by the jaws 46, 47 of the corresponding tongs 12 to hold the mouthpieces in a predetermined angular position with reference to the assembly drum, namely, so that the planes of the tips 5*a* extend substantially radially of the drum 1. The jaws 46, 47 remain in engagement with the tips 5*a* during travel from the station TT to the station T so that the orientation of mouthpieces 5 remains unchanged during application of adhesive-coated uniting bands 39. When a flute 11 moves beyond the station TT, the corresponding roller followers 16, 17 move from the portions 13*a*, 14*a* onto the portions 13*b*, 14*b* of the faces on cams 13, 14 and permit the springs 58, 59 to turn the shafts 43, 44 in a sense to move the respective jaws 46, 47 toward each other so that the jaws grip the adjoining flat faces of the respective tip 5*a*. The maximum distance between the leading guide surface 36 and the adjoining rolling surface 9 at least equals the diameter of a mouthpiece 5.

The chute 4 supplies tobacco rods 35 into successive flutes 11 while the jaws 46, 47 continue to hold the mouthpieces 5 against angular movement with reference to the assembly drum 1. Each tobacco rod 35 is placed into axial alignment with the adjoining mouthpiece 5 and is moved axially so that one of its ends abuts against the rounded end of the mouthpiece. The mechanism which can effect such axial displacement of tobacco rods 35 in the flutes 11 may comprise a wobble plate or the like. Reference may be had to German Patent No. 1,008,-173 which discloses a suitable mechanism of such character.

The driven roll 25 of the advancing unit 19 cooperates with the companion roll 26 to draw tape 38 off the bobbin 20 and to feed such tape toward the suction drum 22 whereby the underside of the tape receives a film of adhesive during travel along the paster 21. The speed at which the roll 25 draws tape 38 off the bobbin 20 is slightly less than the peripheral speed of the suction drum 22. The leading end of the tape 38 is drawn against the periphery of the suction drum 22 and is moved along the wheel 23 which severs the tape at regular intervals to form a succession of uniting bands 39. The drum 22 cooperates with the wheel 23 in such a way that the trailing edge of each uniting band 39 is adjacent to a predetermined portion of the periphery of the drum 22. The purpose of the control circuit of FIG. 5 is to insure that a properly positioned imprint is always located at the same distance from the trailing edge of each uniting band 39 so that, when the uniting band is convoluted around a group G during travel in the gap between the drum 7 and belt 32, the imprint can be seen when the smoker's teeth or lips grip the tip 5*a* of the respective mouthpiece. This is achieved by regulating the speed of the advancing roll 25 by way of the adjusting motor 27 which controls the angular position of the case 69 in the transmission 24. Such adjustments determine the position of the leading end of the tape 38 with reference

to the suction drum 22 and hence the position of trailing edges of successively formed uniting bands 39.

The detector 30 produces a signal whenever it locates an imprint on the tape 38 in the region downstream of the advancing roll 25. As a rule, the imprints are darker than the remainder of the tape 38 and the detector 30 reacts to such changes in the color of tape 38 and produces signals at intervals determined by the speed of the roll 25. Signals produced by the detector 30 are shown in FIG. 6 at 103, 104, 105 as forming part of curves 109, 111, 112, respectively. The signal 104 is a satisfactory signal and the signals 103, 105 indicate that the speed of the advancing roll 25 must be changed. The disk 74 of the timer 29 completes one full revolution while the drum 1 changes its position by an angle corresponding to the distance between the centers of two adjoining flutes 11. During each of its revolutions, the disk 74 causes the generation of two signals, namely, the generator 78 produces a directional signal 101 (see the curve 107 in FIG. 6) and the generator 79 produces a comparison signal 102 as indicated by the curve 108 in FIG. 6. The generators 78, 79 respectively produce signals 101, 102 when their tips respectively register with the travelling magnets 76, 77.

It will be seen that the control system produces three signals during each stage of angular displacement of the assembly drum 1, namely, two signals which are produced by generators 78, 79 and a signal produced by the detector 30. The directional signal 101 is terminated when the comparison signal 102 begins (see FIG. 6). The detector 30 can produce signals prior, during or after generation of a comparison signal 102 (see the signals 103, 104, 105 shown in FIG. 6). If the detector 30 produces a premature signal 103, this signal coincides with the signal 101. The threshold circuit 86 amplifies the signal and transmits it to the impulse shaper 87 which transmits the signal to the AND-gates 82, 88 and 91. The AND-gate 82 receives a simultaneous directional signal 101 from the Schmitt trigger 81 (signal generator 78); consequently, the AND-gate 82 transmits a signal to the amplifier 83 which energizes the relay 84 so that the latter closes the switch 96 for an interval whose length depends on the magnitude of the signal transmitted by the amplifier 83. The adjusting motor 27 turns the case 69 of the transmission 24 oppositely to the direction of rotation of the output shaft 63 so that the roll 25 rotates at a reduced speed and temporarily moves the tape 38 at a correspondingly reduced speed.

The AND-gate 88 receives no signal from the generator 79 while the detector 30 transmits the signal 103 (see FIG. 6) so that the relay 93 remains deenergized and the switch 97 remains open. The AND-gate 91 receives the directional signal 101 from the Schmitt trigger 81; however, such signal is inverted by the NOT-gate 94 so that the gate 91 does not cause energization of the relay 93.

If a proper signal (104) from the detector 30 coincides with the comparison signal 102 from the generator 79, the AND-gate 82 does not receive a simultaneous signal from the Schmitt trigger 81 (generator 78) so that the relay 84 remains deenergized. The AND-gate 88 receives the signals 102 and 104 so that it sends a signal to the NOT-gate 89 which inverts the signal and sends a negative signal to the AND-gate 91 which therefore cannot send a signal to the amplifier 92. The relays 83, 93 remain deenergized and the adjusting motor 27 does not change the angular position of the case 69 because the tape 38 is being transported at a requisite speed toward the suction drum 22.

If the signal (105) produced by detector 30 follows the comparison signal 102 from the generator 79, the signal 105 is transmitted to the AND-gates 82, 88 and 91. The generator 78 does not transmit the directional signal 101 so that the gate 82 does not effect energization of the relay 84, i.e., the switch 96 remains open. The NOT-gate 94 receives no signal (negative signal) and therefore sends to the AND-gate 91 a positive signal. The gate 89 also transmits a positive signal (i.e., it receives no signal from the generator 79). Thus, the gate 91 receives only positive signals and causes the amplifier 92 to energize the relay 93 which closes the switch 97 whereby the adjusting motor 27 turns the case 69 in a sense to accelerate the advancing roll 25 and to thus temporarily increase the speed of the tape 38 for a period determined by the amplifier 92.

It will be seen that, aside from assembling mouthpieces 5 with tobacco rods 35 and of uniting such parts by way of adhesive-coated bands 39, the machine of the present invention performs three important functions, namely, it insures proper orientation of tips 5*a* with reference to the assembly drum 1 during application of uniting bands 39, it insures that each imprint is located at a predetermined distance from the leading and trailing edges of the respective uniting band 39, and it insures that each uniting band is applied to the adjoining tobacco rod 35 and mouthpiece 5 in exactly the same way as each preceding or each following uniting band. The combination of these features insures that the imprints are visible when the smoker's teeth or lips grip the tip 5*a* of the mouthpiece in a cigarillo F.

The accuracy of the machine is so high that the differences in the position of imprints on successive cigarillos F are in the range of 0.05 millimeter or even less. The imprint on each uniting band 39 may comprise two parts which are spaced apart in such a way that one thereof is seen from one side and the other from the other side of the tip 5*a*, i.e., that one of the imprints can be seen regardless of whether the smoker grips the mouthpiece tip 5*a* in a first position or in a second position at 180 degrees from the first position. If the imprint comprises two parts, the timer 29 can be modified in a manner as shown in FIG. 5 by phantom lines. The disk 74 then carries a further magnet 114 which extends along an arc of predetermined length and cooperates with the generator 79. When the magnet 114 travels along the generator 79, the control circuit assumes a condition which is indicative of a uniting band with a properly located imprint. The AND-gate 91 receives no signal from the detector 30 or it receives a negative signal from the gate 89 when the detector 30 transmits a signal. Thus, the relays 84, 93 are not energized.

An important advantage of the improved machine is that its control system can be readily installed in existing cigarillo makers. All that is needed is to employ the transmission 24 as a means for driving the advancing roll 25 for the tape 38, to install the control circuit of FIG. 5, to provide the assembly drum 1 with tongs 12 or analogous orienting devices, and to replace a conventional feed for mouthpieces with a feed of the type shown in FIG. 2. Another important advantage of the machine is that the control system is independent of other control systems which are usually employed in such machines.

The feed including the duct 3 and drum 2 can be mounted downstream of the chute 4.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly constitute essential characteristics of the generic and specific aspects of our contribution to the art.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

We claim:

1. A machine for joining mouthpieces having flattened tips with wrapped tobacco rods by uniting bands provided with indicia and obtained on subdivision of a tape whereon the indicia are applied at regular intervals, comprising an assembly conveyor having a series of receiving means; a pair of feeds for respectively successively supplying a flattened-tip mouthpiece and a tobacco rod to each of said receiving means; a third feed including vari-

able-speed tape advancing means, means for severing the tape to form a series of uniting bands each having an indicium at a predetermined distance from the point where the band is severed from the tape when the position of the indicium is satisfactory, and applicator means for applying predetermined portions of said bands to the rods and mouthpieces in said successive receiving means; orienting means for maintaining each mouthpiece in a predetermined angular position during application of a uniting band thereto; wrapping means for convoluting the bands around the respective mouthpieces and rods; and control means including a detector for scanning indicia on the tape and for producing signals in response to detection of indicia, and adjusting means operative to change the speed of said advancing means when a signal produced by said detector indicates that the position of an indicium will be unsatisfactory.

2. A machine as defined in claim 1, wherein said orienting means comprises a plurality of tongs associated with said conveyor and having jaws movable into and from engagement with the tips of mouthpieces in said receiving means, and means for moving said jaws with reference to each other.

3. A machine as defined in claim 2, wherein the means for moving said jaws comprises cam means and follower means tracking said cam means and operatively connected with said jaws.

4. A machine as defined in claim 1, wherein said conveyor comprises a rotary drum and wherein said receiving means are axially parallel flutes provided in the periphery of said drum.

5. A machine as defined in claim 1, wherein the feed for mouthpieces comprises a rotary transfer drum and a duct for supplying mouthpieces to said drum, said duct having a channel which accommodates the mouthpieces and guide surfaces flanking that portion of said channel which accommodates the tips, said guide surfaces holding the tips in predetermined angular positions during advance toward and during transfer onto said drum.

6. A machine as defined in claim 5, wherein said transfer drum has a plurality of peripheral pockets which receive mouthpieces from said channel and inclined rolling surfaces along which the mouthpieces roll during transfer into said pockets.

7. A machine as defined in claim 6, wherein the inclination of said rolling surfaces is such that the distance between the rolling surfaces and said guide surfaces increases while said rolling surfaces travel past said duct.

8. A machine as defined in claim 7, wherein one guide surface of said duct is located ahead of the other guide surface, as considered in the direction of rotation of said transfer drum, and wherein the maximum distance between said one guide surface and said rolling surfaces at least equals the diameter of a mouthpiece.

9. A machine as defined in claim 1, wherein said advancing means comprises a variable speed transmission and said adjusting means comprises motor means for changing the speed of said transmission.

10. A machine as defined in claim 1, wherein said control means further comprises timer means arranged to produce comparison signals at a rate corresponding to the speed of said conveyor and means for operating said adjusting means when the interval between a signal from said timer means and a signal from said detector is outside of a predetermined range.

11. A machine as defined in claim 1, wherein said detector comprises a photodiode.

12. A machine as defined in claim 1, wherein said tobacco rods are selected from the group consisting of cigarettes and cigarillos.

13. A machine as defined in claim 1, wherein said third feed further comprises means for coating one side of the tape with a film of adhesive.

14. A machine as defined in claim 1, wherein said advancing means comprises a differential transmission.

References Cited

UNITED STATES PATENTS

2,130,729	9/1938	Burns.	
2,366,187	1/1945	Friedwald	131—24
2,924,223	2/1960	Miller	131—24
3,067,754	12/1962	Pinkham et al.	131—21
3,398,753	8/1968	Stelzer	131—11 X
3,404,689	10/1968	Schubert	131—88 X

FOREIGN PATENTS

265,698	7/1964	Australia.

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131—88, 94