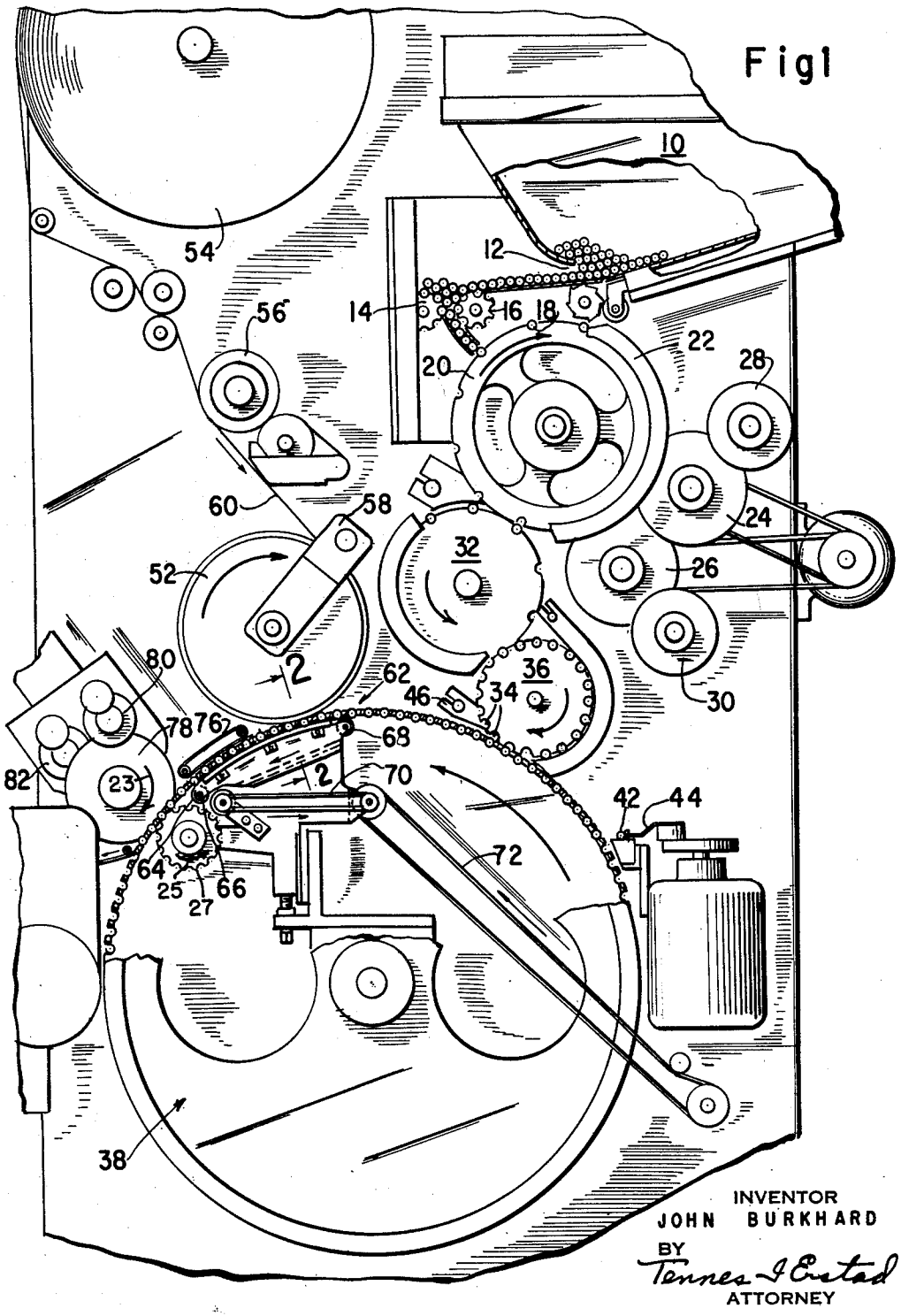
Nov. 10, 1964 J. BURKHARD 3,156,246

CIGARETTE MACHINE FOR MAKING MOUTHPIECE CIGARETTES

Filed Sept. 29, 1961 5 Sheets-Sheet 1

Fig1



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CIGARETTE MACHINE FOR MAKING MOUTHPIECE CIGARETTES

Filed Sept. 29, 1961 5 Sheets-Sheet 2

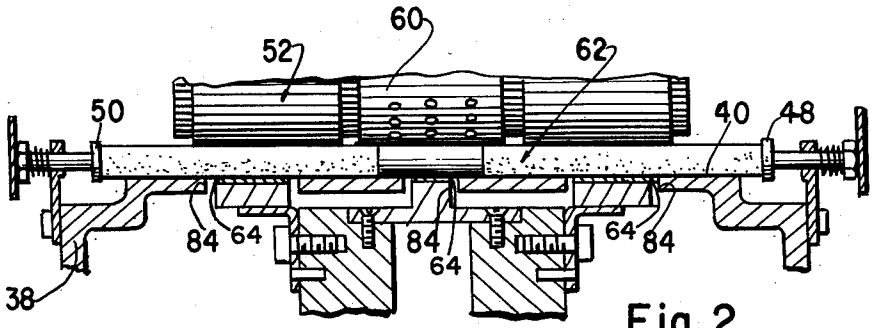


Fig. 2

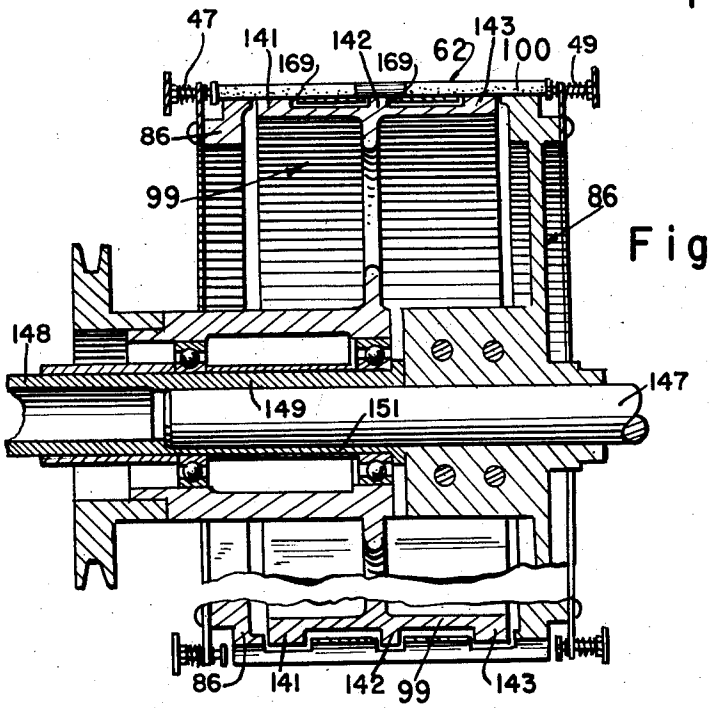


Fig. 4

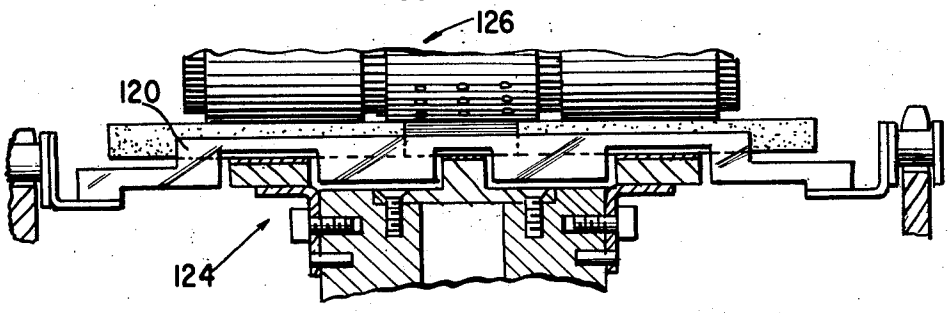


Fig. 6

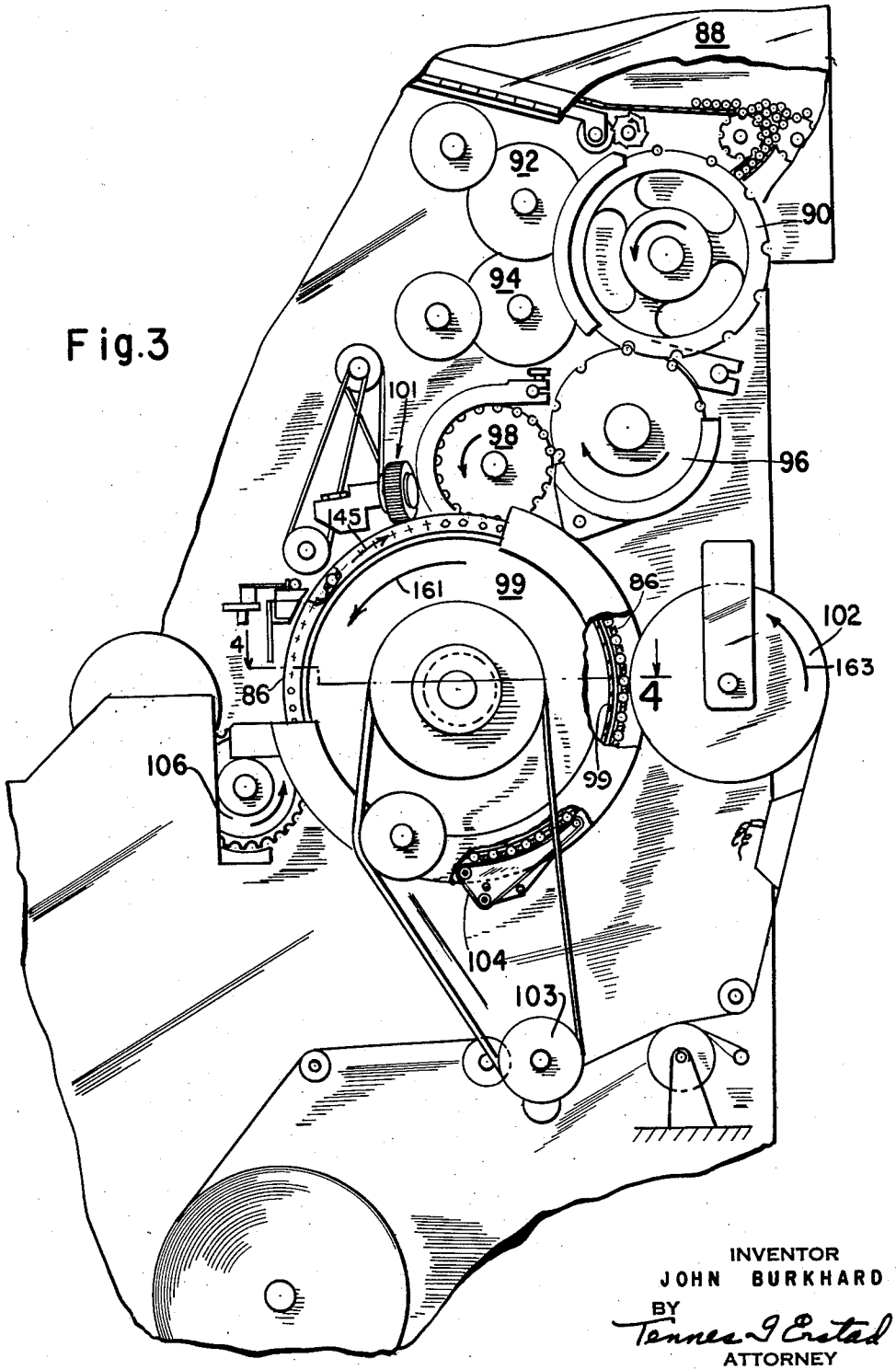
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CIGARETTE MACHINE FOR MAKING MOUTHPIECE CIGARETTES

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Fig.3



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CIGARETTE MACHINE FOR MAKING MOUTHPIECE CIGARETTES

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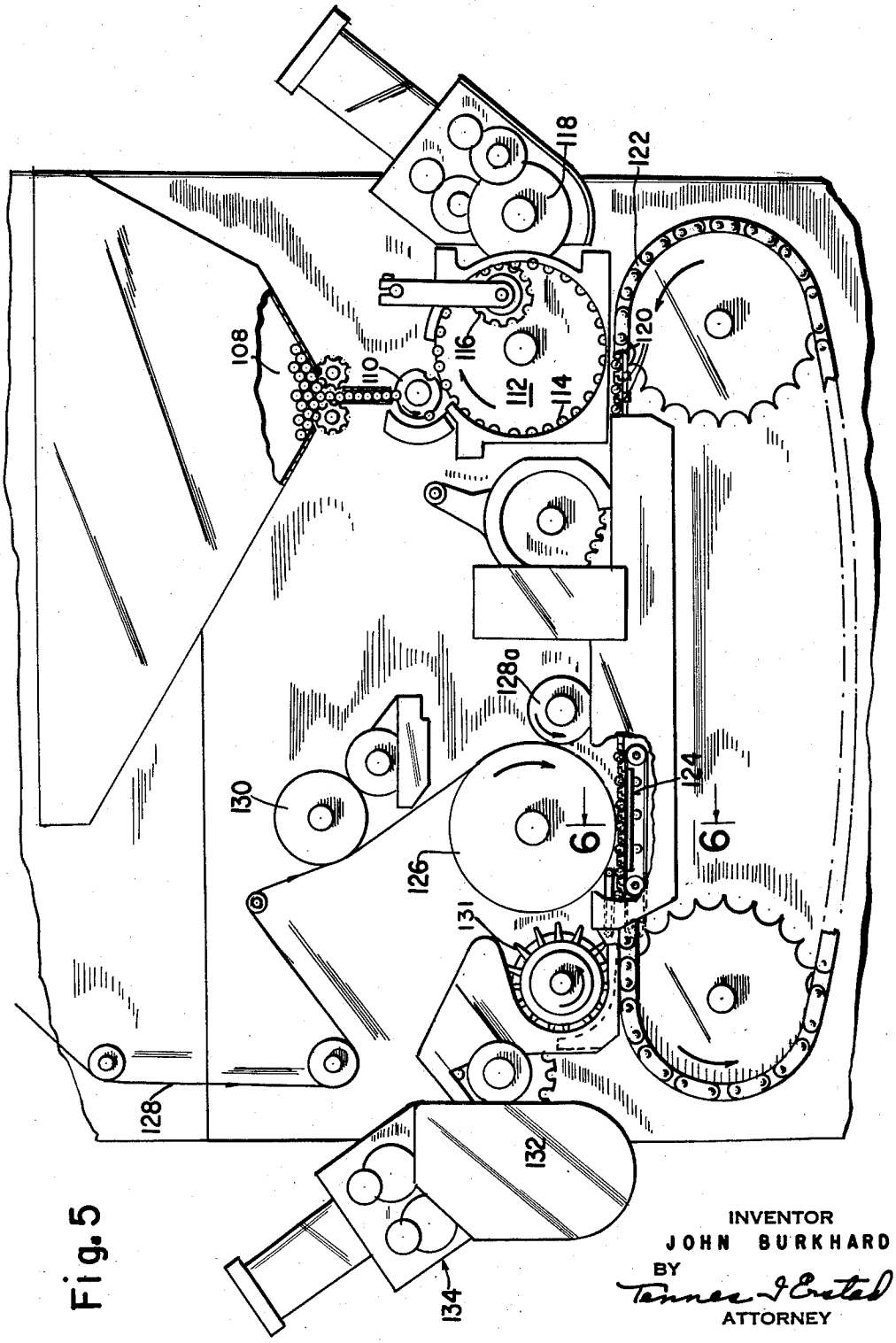


Fig. 5

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CIGARETTE MACHINE FOR MAKING MOUTHPIECE CIGARETTES

Filed Sept. 29, 1961 5 Sheets-Sheet 5

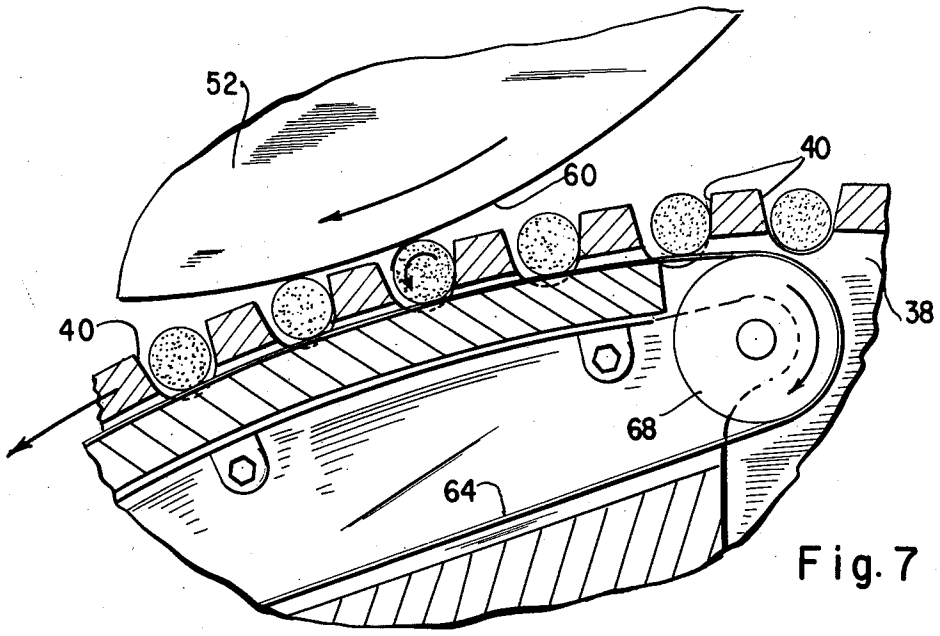


Fig. 7

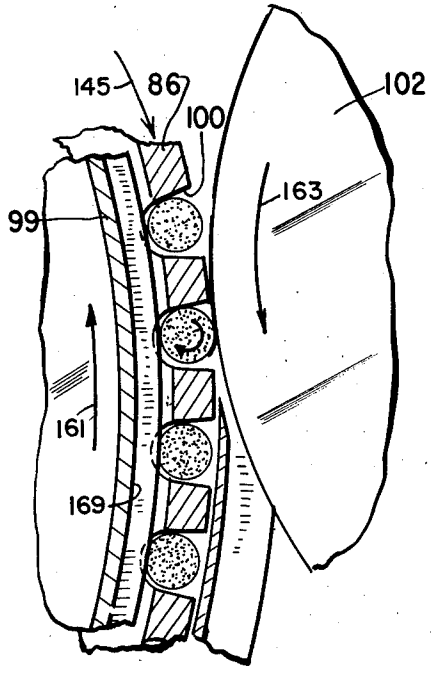


Fig. 8

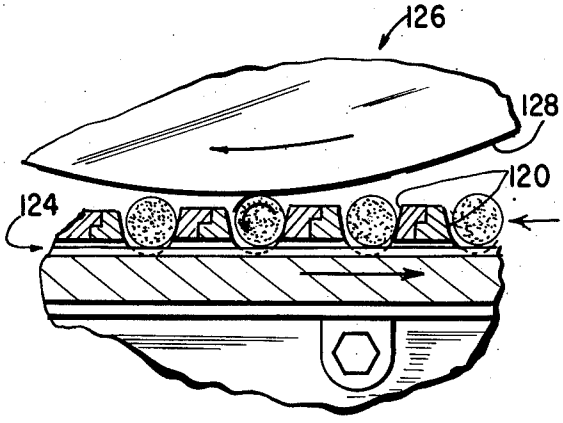


Fig. 9

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3,156,246

CIGARETTE MACHINE FOR MAKING MOUTHPIECE CIGARETTES

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Filed Sept. 29, 1961, Ser. No. 141,764
3 Claims. (Cl. 131—94)

This invention relates to cigarette making machines for making mouthpiece cigarettes.

Mouthpiece cigarettes are generally made by joining two lengths of cigarette material and a double mouthpiece together by means of a uniting band and then cutting the double mouthpiece assembly in the middle to make two mouthpiece cigarettes.

In the process of joining mouthpieces to cigarettes in this manner, an assembly carrying drum or an endless assembly belt conveyor is employed on which the components are first assembled, then brought into contiguous relationship and then a uniting band is applied about the central portion of the assembly to form two joined mouthpiece assemblies which are cut in the middle to form two mouthpiece cigarettes.

Various forms of assembly drums and arrangements have been designed and employed for this purpose. Some of the assembly drums and concave belts have had the disadvantage that they become easily jammed. In others the mouthpiece assemblies become skewed during rolling so that either jams occur or the uniting band spirals. In other instances there is a tendency for the assembly either before or after reaching the uniting band applying station to jump out from between the rollers supporting the assembly. When a flute is used to support the assembly, difficulty was encountered in getting the uniting band to wrap itself about the assembly.

It is therefore an object of this invention, to provide an assembly conveyor which will facilitate the application of a uniting band about the assembly and which will be of simple construction, self clearing and reliable operation.

A further object of this invention is to provide a fluted conveyor wherein slotted openings are formed in the bottom of the trough of the flutes so as to permit a roller or belts to enter through the bottom of said trough to rotate a cigarette assembly positioned in the trough at the time the uniting band is to be applied thereabout.

A further object of this invention is to provide a fluted conveyor for carrying composite assemblies wherein there is provided a series of transverse slotted openings formed at spaced intervals along the length of each trough so as to permit traveling members to enter said slots to rotate the cigarette assemblies carried in said troughs at a certain portion of the path of travel of said flutes.

A further object of this invention is to provide a fluted conveyor wherein means are provided adjacent and in the vicinity of the uniting band applying station so as to cause the assembly to be rotated against either one side or the other of said flute to permit the uniting band to be introduced to said assembly along the opposite side of said flute at a controlled rate of pressure so as to cause the cigarette assembly when rotating to push the uniting band securely into contact with the assembly, or to control the size of the opening and the pressure on cigarette assembly.

A further object of this invention is to provide a fluted assembly conveyor having a slot through which a cutting knife may extend to subdivide assemblies and wherein there is provided and coacting with the assemblies carried in said flutes a rotating ledger which coacts with the cutting knives to support each assembly against rotation while being cut and provide the necessary shearing edge.

Another object of this invention is to provide a fluted assembly conveyor having slotted openings formed at intervals along the bottom of said troughs of said flute to permit eccentrically arranged traveling members or belts eccentric or concentrically located to pass transversely across said flutes during a portion of the travel of said flutes.

A further object is to provide a fluted assembly conveyor having a fluted opening formed in the bottom of each of the troughs whereby a rotating member may enter said openings to rotate a cigarette assembly carried in said flute while still allowing the ends of said uniting band to be supported by the uncut portion of the fluted troughs.

Other objects and features of the invention will appear as the description of the particular embodiment selected to illustrate the invention progresses. In the accompanying drawings, which form a part of this specification, like characters of reference have been applied to corresponding parts throughout the several views which make up the drawings.

FIG. 1 shows an end view of a uniting band applying mechanism employing my invention.

FIG. 2 is a partial cross section taken on the line 2—2 of FIG. 1.

FIG. 3 is an end elevation showing a modified form of my invention.

FIG. 4 is a partial plan sectional view taken on the line 4—4 of FIG. 3

FIG. 5 is an end elevation of a modified form of my invention using a belt conveyor.

FIG. 6 is a cross section taken on the line 6—6 of FIG. 5.

FIG. 7 is a partial detailed end elevation of FIG. 1 showing a uniting band being introduced to the assembly.

FIG. 8 is a partial enlarged detailed elevation of the embodiment in FIG. 3 showing a uniting band being introduced to the assembly.

FIG. 9 is an enlarged partial sector of FIG. 5 showing the introduction of a uniting band.

Referring to FIG. 1, sextuple lengths of plug material are fed from a hopper 10 through an opening 12.

These sextuple lengths are then metered between two fluted metering rollers 14 and 16 one at a time into the flutes 18 of a feed drum 20. The sextuple lengths of mouthpiece material are properly aligned in a manner well known as for example by guides 22 after which they pass by the cutting knives 24 and 26. The cutting knives 24 and 26 are sharpened by conventional grinders 28 and 30.

When the sextuple lengths of plug material has been divided, it is fed to plug separating drum 32 consisting of three discs moving at different rates of speed. The timing is such, however, that when the flutes are in plug receiving position, they are all in alignment, but by the time they have reached the plug delivery station, they have separated the plugs laterally so that only one double length plug is delivered to each of the flutes 34 of plug aligning drum 36. When the double length plugs are carried by the flutes 34 of drum 36 they are cammed into a single column as the plug aligning drum 36 rotates in the direction indicated by the arrow. If desired, reference may be made to co-pending application of George Dearsley, S.N. 509,293, filed May 18, 1955, now Patent No. 3,036,581, for a more detailed disclosure of this type of apparatus.

An assembly conveying drum 38 having assembly conveying flutes 40, FIG. 7, traveling in the direction indicated by the arrow, FIGS. 1 and 7, passes by a cigarette receiving station where a pair of cut lengths of cigarette rod 42 is pushed sidewise by a pusher 44 into each flute. The deflector travels in timed relationship with the flutes

of the assembly conveyor 38. The two cut lengths of cigarette rod, carried in the flutes 40, are separated axially so that when they pass under the plug aligning feed drum 36, there is adequate room to receive a double length of mouthpiece material therebetween as it is discharged from said plug feed 36.

A suitable stripper 46 is provided to positively deflect a double length of mouthpiece material into the flute 40 from the flutes 34 in case there is any tendency for the double length of mouthpiece material to adhere to the plug feed drum 36. Suitable pushers 48 and 50, FIG. 2, are then employed to axially push against the opposite ends of the assembly to bring them into abutting contiguous relationship.

The abutting assemblies are then brought into engagement with the uniting band applying drum 52 as shown in FIG. 2 where the uniting band is applied about the assembly. Uniting band material is fed from a reel 54, FIG. 1, past a paste applying drum 56, where adhesive is applied to the upper surface of the uniting band material. A suitable cutter, not shown, supported in the bracket 58, cuts off a predetermined length of uniting band material from the leading end of the uniting band 60. The uniting band applying drum 52 traveling in the direction indicated by the arrow, brings the uniting band material into contact with the assemblies 62.

The bottom of the flutes 40 have openings 84 cut out at three positions along the length of the flutes as shown in FIG. 2. Alternatively, additional openings can be provided and several rollers or belts used to engage portions of the double mouthpiece in the vicinity of the juncture of mouthpiece and cigarettes. This permits the belts 64, as shown in FIG. 1, with its lower run traveling in the direction indicated by the arrow to engage with a portion of the assembly immediately in advance of its contacting the uniting band applying drum 52 and thereby raise the assembly slightly out of contact with the bottom of the trough and to start the assembly rotating prior to its contact with the uniting band on drum 52. The relative speeds of the driving belts 64, which travel over the pulleys 66 and 68 and of the drum 38, is such that the flutes 40 push the assembly leaving a space between the forward side of the trough and the assembly. The belts 64 are driven through a train of belts 70 and 72, the speed of which is adjustable. This permits the speed of belts 64 to be set so that the assembly is permitted to be pushed against the rearward side of the trough 40 with regulated pressure.

It has been found that by controlling the assembly in this manner, a cut length of uniting band material can be inserted between the assembly and the forward side of the trough without wrinkling. The assembly being rotated between the uniting band applying drum and the belts 64 causes the uniting band to be pushed securely against the mouthpiece and the cigarettes as shown in FIGS. 2 and 7. When the leading edge of the uniting band enters the back side of trough 40, the greater surface speed of applying drum 52 (in relation to speed of belts 64) urge the cigarette against the front side of the trough thereby pressing the uniting band firmly to the entire assembly.

When the leading end of the uniting band again reaches the forward side of the trough 40, in which it is supported, the band will have been pressed firmly against the entire circumference of the assembly. Since the entire assembly is supported along its length in the trough, it does not have any tendency to become skewed and therefore the uniting band has no tendency to spiral but is applied in the exact cylindrical arrangement desired. By changing the speed of belts 64, the pressure exerted in the cigarette assembly can be regulated as required.

When the uniting band has been applied in this manner, it passes under a heat sealing shoe 76 where the uniting band material is dried. The assembly then passes into the range of operation of the subdividing disc knife 78 which may be rotated in either direction. At the point of cutting, a rotating ledger 27 is provided. Ledger 27 rotates counterclockwise, as indicated by arrow 25, to support the cigarette assembly, and to permit its translation, during the cutting operation. The ledger 27 is driven in timed relation to the assembly drum 38. This mechanism and mode of operation assures that a square cut is achieved and any tendency of the cigarette to roll during cutting is avoided. Without this type of support there was a previous problem in that the cigarette tended to roll during cutting operation and the resulting cut was not square.

Conventional sharpening grinders 80 and 82 are provided for maintaining the disc knife 78 sharp. When the cut length of rod leaves the cutting knife 78, it is removed from the assembly drum by any suitable means such as a stripper or a suction receiving drum. Each second cigarette may be turned end for end, if desired, by means well known in the art, so that all of them are similarly oriented with their mouth pieces in alignment.

In the structure just described, the cut out portion formed in the assembly drum permits the assembly to be rotated prior to the application of the uniting band and to be positively driven during the application of the uniting band. The speed of the belts 64 may be adjusted so as to move the assembly to the rear of its supporting trough 40. Thus the uniting band may readily be brought into contact with the assembly and directed against the sides and bottom of the trough so as to make it firmly adhere to the assembly during the interval while it is in engagement with the uniting band applying drum. This arrangement in combination with the trough supports the cigarette and prevents it from being bent and twisted relative to the uniting band applying drum so that the uniting band is always directly applied about the assembly.

It will also be apparent from an examination of this structure, that in the event a plug is missing or something goes wrong, the machine will be self-clearing in that the objectionable material in the normal cause of operation will be ejected from the machine so that no jam-up occurs.

In the embodiment shown in FIGS. 1 and 2, the assembly supporting drum is made in two halves to facilitate the assembly of the apparatus as is clearly shown in FIG. 2. It will be noted, that the cut out portion 84 in the center of the trough 40 is less than the width of the uniting band and that the ends of the uniting band are supported by the portions of the trough which adjoin the cut out portion 84 so that there is no tendency for the uniting band to engage with the cut out portion so as to interfere with it when being applied about the assembly.

In FIG. 3 I have shown a modified form of my invention wherein instead of employing a belt moving in the cut out areas of the fluted drum, I have instead employed a drum with 3 raised peripheral bands 141, 142 and 143, as shown in FIG. 4, which are eccentrically mounted relative to the axis of rotation of the fluted drum 86.

In the arrangement shown in FIG. 3, sextuple lengths of mouthpiece material are fed from a hopper 88 to a subdividing drum 90 where they are cut into three double lengths by the cutting knives 92 and 94. These three double lengths are then delivered to separating drums 96 which in turn deliver them one at a time to the plug aligning drum 98. The individual plugs are delivered one at a time inbetween two cut lengths of cigarette rod in a manner similar to that described in connection with FIG. 1.

Spaced pairs of cut lengths of cigarette rod are deposited in the flutes 100, FIG. 4, of the drum 86 in a manner similar to that disclosed in co-pending application of George Dearsley, S.N. 509,293, filed May 18, 1955, now Patent No. 3,036,581, issued May 29, 1962,

and FIG. 1 of the present application. This drum 86 traveling in the direction indicated by the arrow 145, brings the cut length of rod past the separating rollers 101, FIG. 3, which spaces them apart so that when the flutes travel underneath the plug transfer drum 98, the single length of double mouthpiece material will be deposited in the flute inbetween the two axially aligned cut lengths of cigarette rod material.

The components of each assembly located in each flute are then axially pushed into contiguous contact with each other by suitable pushers such as 47 and 49 shown in FIG. 4. When these assemblies are brought together in this manner as they approach the uniting band applying drum 102, FIG. 3 the eccentrically mounted peripheral bands 141, 142 and 143, which are employed in this embodiment, instead of the driving belts 64 shown in FIG. 1 and FIG. 2, commence extending upwardly through the slotted openings 169 formed in the drum 86. These eccentrically arranged rollers lift the assembly slightly from the bottom of the trough 100 and because the drum 86 travels faster than roller 99 the rearward side of the trough pushes the assembly thereby facilitating the entry of the uniting band into the forward side of the flute (without wrinkling) as it passes by the uniting band applying drum. The speed of roller 99 is regulated by adjusting the size of pulley 103. The eccentricity is obtained by displacing the center of rotation of roller 99 with respect to drum 86 toward the position of the band applying drum 102, by machining fixed sleeve bearing 148 so that it is mounted eccentrically on shaft 147, as may be seen from a comparison of the relative thicknesses of portions 149 and 151 of sleeve 148.

As soon as the uniting band touches the assembly, it will be forwarded with the rotating assembly and will be pressed between the rearward side of the trough and the assembly and thereby be wrapped firmly about the assembly. It will be noted that elements 141, 142 and 143 on the eccentric drum at this time are pressing the assembly against the uniting band applying drum 102.

When the assembly has had a uniting band applied thereabout in this manner, the eccentrically mounted rollers disengage themselves from the assembly due to the rotation of the assembly drum, but the assembly is nevertheless supported along its lengths in its respective troughs 100. From there the assemblies come into contact with the stationary heater 104 where the uniting band material is dried.

The assembly is then delivered into the flutes of a cutting drum 106. The assemblies are then cut through their middle in a manner well known in the art and then they are delivered into a catcher belt in two rows. If desired, suitable mechanism may be employed for turning one row of cigarettes end for end so that all of the mouthpiece cigarettes in the collector will be facing in the same direction.

It will be apparent from the foregoing description that my invention can be used with either rotating belts or with rotating eccentrically mounted elements either of which operate through slotted openings formed in the bottom of the troughs which carry the assemblies. In both cases the assemblies are so rotated and the timing of the eccentric drums, or of the assembly rotating belts, is such that the assembly is brought into contact with the rearward side of the trough. By adjusting the relative speed of the inner roller, the fluted drum and the band applying drum, the assembly can be placed in contact with either the front or rear of the trough with pressure regulated as required.

In FIG. 5 I have shown another modified form of my invention. In this case, sextuple length plugs may be fed from a hopper 108 to a plug transfer 110 where the sextuple length plugs are delivered to a plug conveying and cutting drum 112. This plug cutting and conveying drum may be similar to that shown in copending application of George Dearsley, S.N. 730,223, filed April 22, 1958, now Patent No. 3,067,644.

The operation of this plug conveying and subdividing drum may be briefly described as follows: The sextuple length plugs move past a pusher station where plug material carried in the flutes 114 of drum 112 is forwarded axially up against a rotating stop 116. The distance between the stop 116 and the plug cutting knives 118 is equal to the length of a double plug. Therefore each time a flute 114 passes the knife 118, a double length of plug material is severed. In this way through recirculation, the multiple lengths of plug material is gradually subdivided into three lengths on its third pass by the cutting knife 118.

Each time a flute 114 reaches its lowermost position of travel, a single double length of mouthpiece material is discharged into the pocket of a flute 120 carried on a conveyor belt 122. As the chain travels in the direction indicated by the arrow, the flutes 120 pass under a cigarette discharge drum wherein two lengths of cigarette rod material are deposited in the flute on opposite sides of the double lengths material. As the belt 122 continues its travel, the troughs move past suitable pushing devices which bring the components of each assembly into contiguous contact with each other.

Each of the flutes 120 has three slotted openings formed in the bottom of the troughs in the manner previously described herein. As the assemblies are moved along by the belt 122, they pass over three assembly rotating belts 124 which may be of a design and construction similar to the belts 64 shown in FIGS. 1 and 2. These belts by extending through the slotted openings formed in the troughs 120 cause the assemblies to begin rotating before they come in contact with the uniting band applier.

The speed of the three belts 124 is adjustable and belts are set so that the assembly is lifted from the bottom of the trough through the slotted openings by the belts 124 up against the rearward side of the trough to thereby permit the uniting band material to enter between the forward side of the trough 120 and the assembly. Due to the movement of the belts 124, the uniting band material first engages the assembly near the forward side of the trough and is firmly secured about the assembly between the belts 124, the uniting band applying drum 126 and the trough 120. By regulating the speed of belts 124, the band applying drum 126, and the assembly carrying belt 122, the assembly can be pressed against either the forward side or the rearward side of the trough and the pressure exerted between cigarette assembly and trough sides can be thereby controlled. While I have shown three slots, it will be appreciated any other number could be used to suit the requirements in a given case.

Uniting band material 128 is fed by suitable conventional means past a paste applying drum 130 onto the uniting band applying drum 126 where predetermined lengths are cut from the leading end thereof by the cutter 128*a*.

The assemblies united in this manner are then delivered to an elevating drum 131 which in turn delivers the same to a cutter drum 132 where a cutting knife 134 subdivides the assembly into two mouthpiece cigarettes. The cut lengths of mouthpiece cigarettes are then delivered to a suitable catcher which may or may not have a turnaround incorporated therewith.

The speed of belts 124 is adjusted to control the pressure against sides of trough to a desired amount. Belt speed of belts 124 can alternatively be arranged to vary concurrent with variation of trough assembly travel speed so that the differential rate of rolling will vary to suit rolling speed and pressure requirements.

From the foregoing description it will be evident that I have provided an improved machine for making filter tip cigarettes wherein the machine accurately applies a uniting band about a cigarette assembly, and wherein there is no tendency for the assembly to become skewed or jammed. Also in the event that a foreign or malfunctioning did occur during the operation of the ma-

chine, the mechanism would be self-clearing so that no time would be lost in clearing the machine.

The invention hereinabove described may therefore be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible embodiments of the same. The invention, therefore, is not to be restricted to the precise details of the structure shown and described.

What is claimed is:

1. In a mouthpiece attaching machine, a conveyor drum for carrying composite assemblies to be united by a uniting band being applied thereabout, said conveyor drum having transverse flutes on its surface moving therewith for carrying said assemblies, means defining cutout portions at spaced intervals along the length of and in the bottom of said flutes to provide intervening flute portions for supporting said assemblies, a uniting band conveyor drum positioned adjacent said fluted drum for applying uniting bands about said assemblies as they are conveyed by said conveyor drum, and traveling surfaces extending upwardly through the cutout portions in the bottom of said flutes for first pressing the assembly against one side of said flute and then against said uniting band applying drum to facilitate applying a uniting band about the assembly.

2. A machine in accordance with claim 1 in which one of said traveling surfaces is a continuous belt.

3. A machine in accordance with claim 1 in which said traveling surfaces are elements on a rotatable drum mounted eccentrically within said fluted drum.

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