Feb. 29, 1944. G. DAVIDSON 2,342,924

CIGARETTE MOUTHPIECE MATERIAL

Filed May 14, 1940 3 Sheets-Sheet 1

Fig. 1

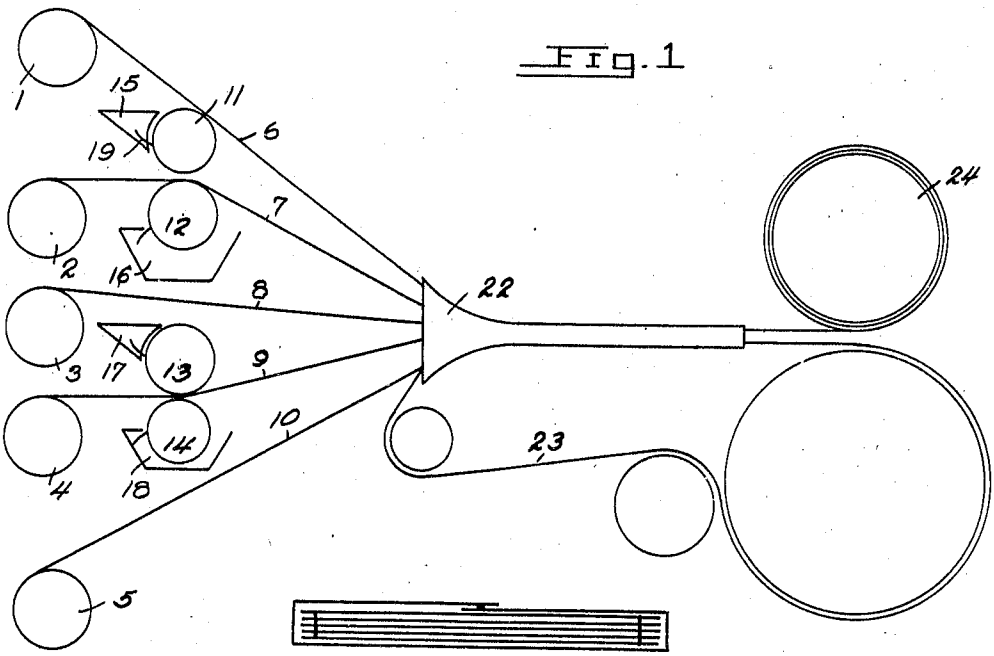
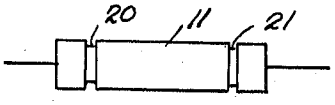


Fig. 6

Fig. 7



Fig. 2



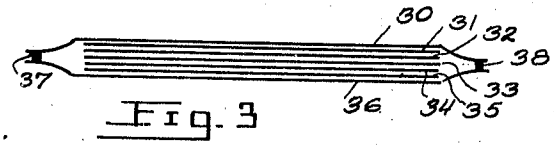
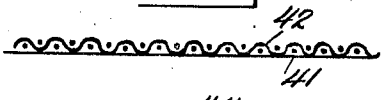


Fig. 3

Fig. 8



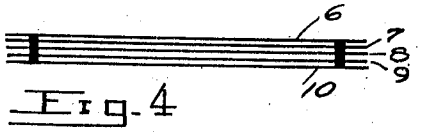


Fig. 4

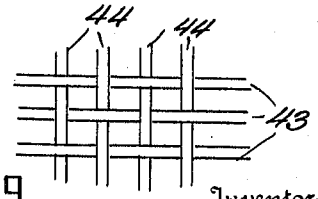


Fig. 9

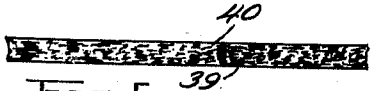


Fig. 5

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Feb. 29, 1944. G. DAVIDSON 2,342,924

CIGARETTE MOUTHPIECE MATERIAL

Filed May 14, 1940 3 Sheets-Sheet 2

Fig. 10

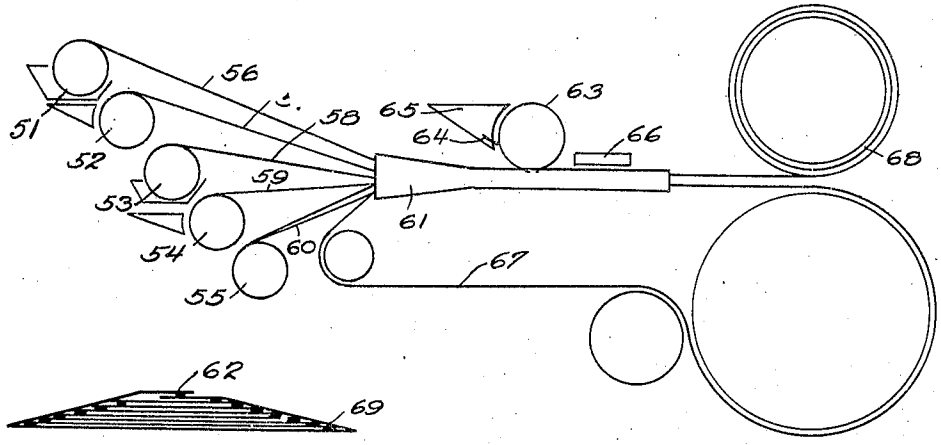
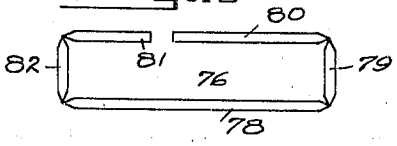


Fig. 11

Fig. 16



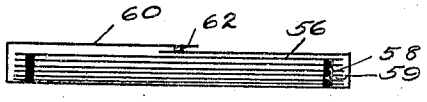


Fig. 12

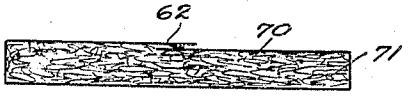


Fig. 13

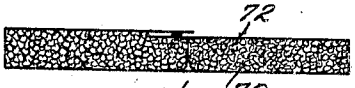


Fig. 14



Fig. 15

Fig. 17

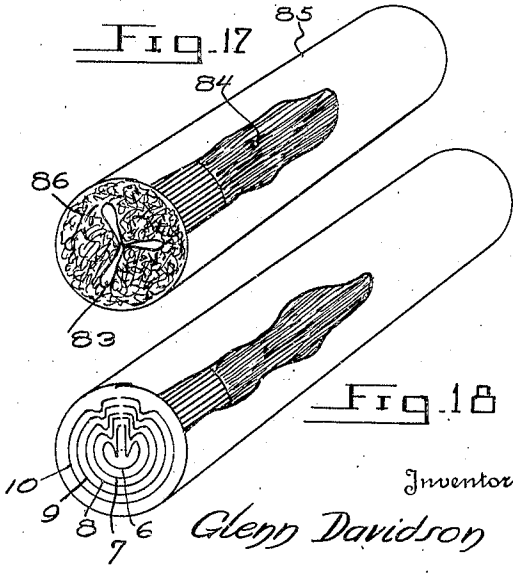


Fig. 18

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Feb. 29, 1944. G. DAVIDSON 2,342,924

CIGARETTE MOUTHPIECE MATERIAL

Filed May 14, 1940 3 Sheets-Sheet 3

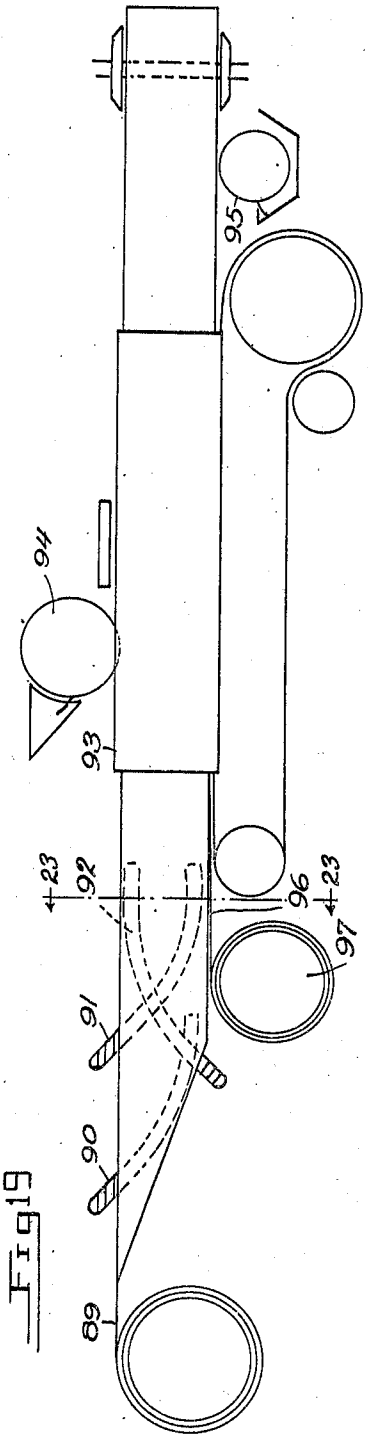


Fig. 19

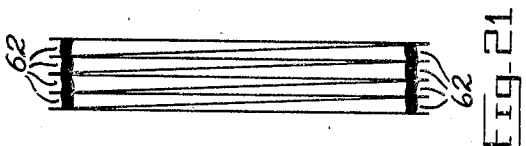


Fig. 21

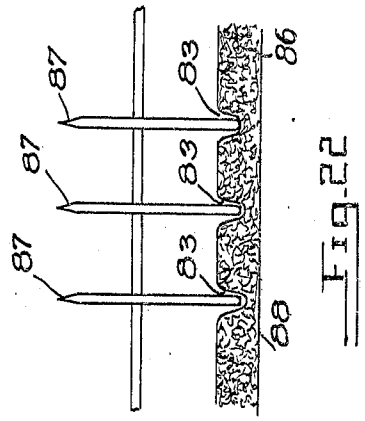


Fig. 22

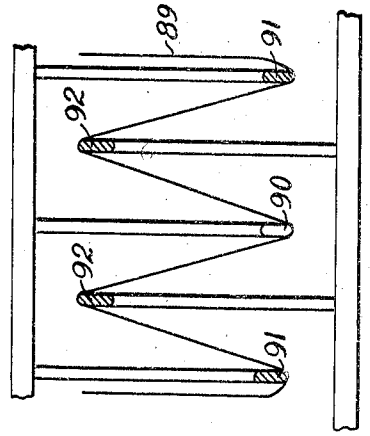


Fig. 23

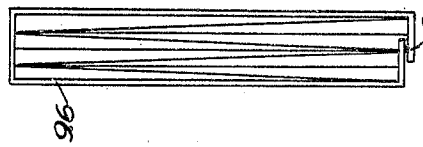


Fig. 20

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Patented Feb. 29, 1944

2,342,924

UNITED STATES PATENT OFFICE

2,342,924

CIGARETTE MOUTHPIECE MATERIAL

Glenn Davidson, Aurora, Ill.

Application May 14, 1940, Serial No. 335,193

6 Claims. (Cl. 131—10)

This invention relating as indicated to cigarette mouthpiece material is more particularly directed to mouthpiece material of ribbon like character which is adapted to be folded or bent longitudinally in the manufacture of cigarettes having individual mouthpiece plugs.

Such mouthpieces or inserts have been used to some extent for preventing the tobacco from coming into direct contact with the mouth, for avoiding the waste of tobacco otherwise contained in the end of the cigarette which is thrown away, and more particularly, when composed of fire resistant material, for the purpose of preventing the smoldering of the discarded end and consequent danger of fire. While the desirability of such devices is recognized, particularly for the purpose last referred to, they have not come into general use, partly because as heretofore devised their manufacture has involved considerable trouble and expense, adding materially to the cost of the cigarette, and partly because they have resulted in changes in the characteristics of the cigarette to which the public has become accustomed.

The present invention has for one object the provision of a ribbon of mouthpiece material, this ribbon being substantially flat and preferably having a width slightly less than the width of a conventional web of cigarette wrapper material. Furthermore, this ribbon has a thickness which permits it to be folded from its flattened condition to its final circular condition without any portions overlapping. Stated in other words, the ribbon has a width and thickness so that its longitudinal edges may be folded into abutting relationship and the resultant circular plug will substantially fill the circle formed by the exterior surface of such plug. The ribbon thus formed can be employed in the commercial manufacture of cigarettes since no special coiling equipment is necessary.

Another object of the invention is to provide a preformed ribbon which can be conveniently coiled into reels or rolls and which can be made close to the source of supply of raw materials and subsequently shipped to a cigarette factory. The reel is then separated into individual sections of ribbon which can be incorporated in cigarettes, or, if desired, the reel may be formed into a continuous rod of circular configuration and this rod can be separated into smaller divisions whereupon such divisions may be incorporated in conventional cigarettes.

A more detailed object of the invention is to provide a ribbon of mouthpiece material which may or may not have an envelope but in any event which has cellulosic material in some form which acts as a filtering medium. In some instances laminations of paper have been shown in which the laminations may or may not be adhesively united one to the other. In other instances the filtering medium may consist of woven material or a mass of adhesively united cellulose fibers. It is also possible to use round strands or separate relatively narrow strips.

It is still another object of the invention to provide a ribbon of folded cellulose material, such as paper or the like, it being understood that spaces will occur for the passage of smoke between the folds when the ribbon is formed into a plug of circular cross section.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described, and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawings:

Fig. 1 is a side elevation of a diagrammatic showing of apparatus which may be used to form ribbons of mouthpiece material.

Fig. 2 is a transverse section of one form of ribbon.

Fig. 3 is a transverse section of a modified form of ribbon.

Fig. 4 is a transverse section of another modification of ribbon.

Fig. 5 is a transverse section of still another modification of ribbon.

Fig. 6 is a transverse section similar to Fig. 4 showing an envelope.

Fig. 7 is an elevation of one of the glue rollers shown in Fig. 1.

Fig. 8 is a transverse section of a ribbon composed of woven material.

Fig. 9 is a plan view taken from above and greatly enlarged of Fig. 8.

Fig. 10 is a side elevation diagrammatically shown of apparatus which may be used to form a ribbon having an enclosing envelope.

Fig. 11 is a transverse section of a ribbon which may be formed by means of the apparatus shown in Fig. 10.

Fig. 12 is a modification of Fig. 11.

Fig. 13 is a modification of Fig. 11.

Fig. 14 is another modification of Fig. 11.

Fig. 15 is still another modification.

Fig. 16 is a transverse section of the pull belt shown in Fig. 10.

Fig. 17 is a perspective view with parts broken away of a cigarette having a mouthpiece formed from the ribbon shown in Fig. 5.

Fig. 18 is a view similar to Fig. 17 in which the mouthpiece is formed from a ribbon of the character shown in Fig. 4.

Fig. 19 is a side elevation of apparatus diagrammatically illustrated in which the ribbon shown in Figs. 20 and 21 may be produced.

Fig. 20 is a transverse sectional view of a ribbon which may be produced by the apparatus shown in Fig. 19.

Fig. 21 is a modification of Fig. 20.

Fig. 22 is a diagrammatic showing of one means of forming channels in the upper surface of the ribbon shown in Fig. 5.

Fig. 23 is a vertical section on line 23—23 of Fig. 19.

Referring now to the drawings, and especially Fig. 1, a series of drums 1, 2, 3, 4, and 5 is shown from which webs 6, 7, 8, 9 and 10 are respectively drawn to form a ribbon of the character shown in Fig. 4. In this ribbon the laminations 7, 8 and 9 are united to each other and to the other plies 6 and 10 by means of adhesive that is applied from the rollers 11, 12, 13 and 14. The adhesive is contained in reservoirs 15, 16, 17 and 18 and each of these reservoirs is preferably provided with an adjustable scraper blade 19 so as to wipe all of such adhesive from the outer surface of the rollers leaving a small amount in each of the grooves 20 and 21. The result of this construction is that glue or other adhesive is applied to the webs of cellulosic material, such as paper, in thin lines.

The webs just described are drawn through the forming tube 22, thus uniting each of the laminations one to the other. This drawing through is accomplished by means of the pull belt 23 and the ribbon in final form is drawn up to form a roll 24.

In Fig. 2 the laminations 25, 26, 27, 28 and 29 are adhesively united in much the same manner as the webs shown in Fig. 1 and this form of ribbon differs only from that shown in Fig. 4 by width of the various webs. It may be desirable in some instances to provide a ribbon in which the laminations decrease in width from the bottom to the top as this may render the folding operation less difficult.

In Fig. 3 I have shown a transverse section of a ribbon somewhat similar to that shown in Fig. 4 but in which the laminations 31, 32, 33, 34 and 35 are enclosed in two webs somewhat wider than the laminations so as to form an envelope. The two webs are adhesively united by means of suitable lines of adhesive material 37 and 38.

Fig. 5 shows a section of a ribbon which consists of a backing 39 and a mass of cellulosic fibers 40. This mass may be formed much in the manner of a product now on the market sold under the trade name of "Balsam Wool." This material is deposited on the backing 39 and the adhesive contained therewith serves to unite the fibers into a matted mass and at the same time to unite the mass to the backing.

The rollers shown in Fig. 1 are more fully illustrated by Fig. 7 in which the roller 11 is provided with two circumferential grooves the purpose of which is to apply an adhesive material in two lines upon web 6. The other rollers are similar to roller 11 and function in the same manner.

The ribbon shown in Fig. 6 is similar to that shown in Fig. 4 except that it is provided with an envelope. The ribbon shown in Fig. 6 comprises a number of layers of cellulosic material adhesively united, the adhesive being applied by means of a roller such as roller 11, in the manner described in connection with the ribbon shown in Figs. 2, 3 and 4. The envelope which completely surrounds the layers of cellulosic material is applied as shown in Fig. 10. In this case, the envelope is drawn from a roll 55 and is caused to pass around the layers of cellulosic material as it is drawn through the forming tube 61.

In Fig. 8 I have shown sectionally a ribbon composed of a backing 41 which has a filtering medium associated therewith which in this instance takes the form of woven material. Preferably, this woven material is made from warp strands 43 having a round configuration, and weft strands 44 having the same shape, all of said strands preferably being composed of a cellulosic material such as paper.

The apparatus diagrammatically illustrated in Fig. 10 consists of a series of rolls of cellulosic material 51, 52, 53, 54 and 55 from which the webs 56, 57, 58, 59 and 60 are drawn into the forming tube 61. In this tube a line 62 of adhesive material is applied by means of the glue roller 63 which in this instance is provided with a single groove and differs in this respect from the roller shown in Fig. 7. The glue obtained from reservoir 65 is scraped from the major portion of the roller 63, after being applied to the same, by means of the adjustable blade 64. If desired, some such heating means as shown diagrammatically at 66 may be associated with the forming tube 61, and the assembly is drawn through the forming tube by means of the pull belt 67. The ribbon thus formed may be coiled about a drum to form a roll 68.

It is not believed necessary to show details of the mechanism for forming the envelope 60 as this is divisible subject matter that can be treated in a separate application. The envelope 60 is formed by appropriate guides in the forming tube so as to completely enclose the laminations 56, 57, 58 and 59. A sectional view of a ribbon thus formed is shown in Fig. 12.

In Fig. 11 the envelope 69 is different in geometrical cross section from that shown in Fig. 12 due to the fact that the laminations in Fig. 11 increase progressively in width from the top to the bottom of the ribbon. In some instances this may be advantageous as rendering the folding operation less difficult. The envelope 69 may have its edges sealed by means of a line of adhesive material 62 similar to the envelope 60 and this may be true of the other envelopes shown in the various modifications. The laminations in this instance may be sealed similar to those in Fig. 2.

In Fig. 13 the envelope 70 is formed similar to the envelope 60 but in this instance the envelope contains a filler of absorbent material 71 which may be composed of "Balsam Wool" or the equivalent.

In Fig. 14 an envelope 72 similar to those shown in Figs. 12 and 13 has a filler of round strands 73 which are preferably made of cellulosic material such as paper.

The envelope 74 shown in Fig. 15 has a filler of separate narrow strips 75 of cellulosic mate-

rial such as paper and these are arranged at random within the envelope.

The fabrication of ribbons of geometrical cross section to be later compressed to circular cross section in the cigarette machine differs from the fabrication of round mouthpiece rods in some respects. First, since only very slight compression is required in the ribbon, a relatively fragile absorbent wrapper may be used if a wrapper is desired. Second, if the paper pull belt is to be allowed to encircle the ribbon it cannot be of the same type as that used in forming round rods as well as cigarettes themselves, for such a belt would tend to compress and distort the ribbon from geometrical cross section. This is undesirable for many reasons. First, it places the wrapper or the freshly applied glue, holding the layer together, under strain. Secondly, a rod held in a compressed condition tends to be rigid longitudinally and cannot readily be wound on to spools without damage as can an uncompressed ribbon. Accordingly, the material must be carried through the forming tube either on a flat belt or a series of individual belts, i. e., one for each side of desired geometrical cross section must be used. With suitable guides these can all be carried on the same drums or a specially designed single belt as I have shown in cross section in Fig. 16 may be used. Such a belt must fold at sharp angles to form a tube of the desired cross section. In order to accomplish this, my belt, generally indicated at 76 in Fig. 16, is composed of sections 78, 79, 80, 81 and 82 which are hingedly connected one to the other so as to form an envelope rectangular in cross section. It will be understood that the envelope 69 shown in Fig. 11 would require a belt slightly different in cross section. The various sections of the belt 76 may be secured to each other in any desired manner as this figure is intended to be merely a diagrammatic representation.

In Fig. 17 I have illustrated a complete mouthpiece cigarette in which a plug 86 formed as shown in Fig. 22 and section of tobacco 84 are enclosed by a wrapper 85. The openings 83 having a tear drop cross section are formed by means shown in Fig. 22.

Fig. 18 depicts a cigarette similar to that shown in Fig. 17 but in which the mouthpiece plug is formed from the ribbon shown in Fig. 4.

In Figs. 19 and 23 a web of cellulosic material 89 is drawn beneath a central forward guide 90 which folds the web longitudinally and centrally thereof. The web encounters a second set of guides, one of which 91, is shown, and then encounters a third pair of guides one, of which 92, is shown. In this way the web assumes the general shape shown in Fig. 21 in the forming tube 93 where adhesive may be applied by means of the adhesive roller 94. Adhesive 62 is also applied by roller 95 to produce the ribbon shown in Fig. 21. In the event that it is desired to produce a ribbon having an envelope the drum 97 from which the web 96 is drawn may be used in association with the apparatus shown in Fig. 19. The envelope 96 is withdrawn from the roll 97 and folded around the folded web 89 and, if desired, adhesive 98 may be applied by either of the drums 94 and 95, depending upon the location of roll 97, the adhesive 62 being omitted from between the folds. Of course adhesive may be used between the folds by the employment of additional glue applicators.

The use of a material such as "Balsam Wool" or the like may in some instances result in a mouthpiece which does not have a proper draft, and I have therefore provided means of insuring a draft resistance which may be controlled. One manner of accomplishing this is disclosed in Fig. 22 in which a mass of cellulose fibers 86 are provided with channels 83 in the upper surface of such mass by means of the fly cutters 87. The backing 88 is sufficient to hold the matted mass 86 in place during such cutting operation and the channels 83 will be given a U formation. This U formation will be changed to what may be called a tear drop section, as shown in Fig. 17, where the ribbon is folded to assume a circular cross section.

The cigarettes shown in Figs. 17 and 18 may be assembled in some such manner as that shown in my Patent No. 1,963,076 issued June 19, 1934, which was reissued February 21, 1937, as Reissue Patent No. 21,007.

From the foregoing it will be seen that I have provided a ribbon of mouthpiece material which can be very inexpensively manufactured and which can be rolled about a drum without any damage whatever to such ribbon. Furthermore, it will be noted that I have provided a ribbon which may be continuously made thus rendering the cost of production comparatively low so that the individual mouthpieces severed from such ribbon are low in cost and the resulting mouthpiece cigarette can be manufactured for less cost than a conventional cigarette because of the substitution of low cost mouthpiece material for relatively expensive cigarette tobacco.

It will be noted that I have used the term "ribbon" throughout the preceding description and it should be understood that this term has been arbitrarily selected to define a composite flat member as distinguished from a rod having a circular cross section.

Heretofore circular rods have been used but a ribbon has certain advantages over a rod, the most important of which is the flexibility in usage of the ribbon. In the first place a ribbon can be manufactured in a paper mill close to the source of supply and then shipped to a cigarette factory on reels, where it can be incorporated with tobacco to form a mouthpiece cigarette. However, this is not the case with a mouthpiece rod of indefinite length. Such rods must be made on the cigarette machine, or if made at the paper mill or other remote point, they must be severed at such place and shipped in short lengths which necessitates a hopper machanism for feeding the same. On the other hand the reel of mouthpiece ribbon can be conveniently shipped and severed at the cigarette machine.

Another advantage of the ribbon type of mouthpiece material is that highly absorbent fragile material may be used particularly as the envelope or wrapper member, whereas in a round rod the envelope or wrapper must be relatively heavy and seldom is absorbent.

The term "Balsam Wool" has been used for lack of a better term to define a matted mass of cellulose fibers and it is to be understood that the invention is not to be restricted to this specific material. In fact "Balsam Wool" itself is too crude for a mouthpiece as the fibers are relatively large and the backing is too coarse. This term is meant to include all equivalent materials such, for example, as blotting paper which is readily susceptible to grooving and bending.

It is to be understood that the tear drop channel shown in the drawings is only one example

of the draft passage that may be formed and the invention is not restricted to that particular form. The exact form of channel will depend in part upon the channel initially formed in the ribbon and in part upon the compression to which the ribbon is subjected.

The method of grooving shown will, of course, be understood to be merely an example of one method of forming channels in the filler ribbon material and it will be further understood that such channels may be formed by cutting, compressing, embossing, other equivalent means or such channels may be formed in the sheet at the time of manufacture.

The glue rolls from which the webs are drawn in Figs. 1 and 10 may be separately powered and synchronously driven with the paper pull belt in order to prevent rupture or breakage where fragile material is used in the webs.

The forming tubes shown in Figs. 1, 10 and 19 will have a cross section that conforms with the desired configuration.

The internal bore of the forming tube is tapered from a width at the entrance equal to the width of the envelope web to the width of the desired ribbon at the exit end. This taper is so formed that the belt shown in Fig. 16 is first folded, from its flattened or extended form, that is with the parts **78, 79, 80, 81** and **82** in a single plane, at the two innermost hinges to form a three sided trough in which the sides **80** and **82** are parallel to each other and at right angles to the bottom, consisting of **82, 78** and **79**. Subsequently the belt is folded at right angles at the two outermost hinges to form the rectilinear enclosure as shown in Fig. 16.

The present application is a continuation in part of my co-pending application entitled Cigarette mouthpieces, filed May 4, 1936, Serial No. 77,889, now Patent No. 2,202,839 of June 4, 1940.

I have used the term "cellulosic fibre" in the claims to denote paper, cardboard, blotting paper and other cellulosic base materials as the invention is not restricted to paper alone.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the device herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A ribbon of cigarette mouthpiece material comprising an envelope, and laminations of cellulosic material, within said envelope, said laminations being adhesively united at spaced locations, said ribbon being flat and relatively indefinite in length and adapted to form multitudinous smoke passageways when folded along lines parallel with its length.

2. A ribbon of cigarette mouthpiece material comprising an envelope, and laminations of cellulosic material, said laminations being adhesively united at spaced locations, said laminations varying in width, said ribbon being flat and relatively indefinite in length and adapted to form multitudinous smoke passageways when folded along lines parallel with its length.

3. A ribbon of cigarette mouthpiece material comprising an envelope and a filler for said envelope, said filler being formed of relatively narrow strips of cellulosic material, said ribbon being flat and relatively indefinite in length and adapted to form multitudinous smoke passageways when folded along lines parallel with its length.

4. A ribbon of cigarette mouthpiece material comprising an envelope and a filler within said envelope composed of folded cellulosic material, said ribbon being flat and relatively indefinite in length and adapted to form multitudinous smoke passageways when folded along lines parallel with its length.

5. A ribbon of mouthpiece filter plug material having a width corresponding approximately to the circumference of a cigarette, said ribbon comprising an envelope and a filling therein of cellulosic fibre material and being flat and relatively indefinite in length and adapted to form multitudinous smoke passageways when folded along lines parallel with its length, said envelope being substantially rectangular in cross section.

6. A ribbon of mouthpiece filter plug material having a width corresponding approximately to the circumference of a cigarette, said ribbon comprising an envelope and a filling therein of superimposed layers of cellulosic fibre material and being adapted to form multitudinous smoke passageways when folded along lines parallel with its length, said envelope being substantially rectangular in cross section.

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