United States Patent

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[73] Assignee **American Brands, Inc.**
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[54] **PRODUCTION OF A FILTER CIGARETTE**
4 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** **131/79,**
131/10, 131/16, 131/81R, 131/94
[51] **Int. Cl.** **A24c 05/06,**
A24c 05/50, A24d 01/04
[50] **Field of Search** ..... 131/77, 78, 79, 81, 89, 94, 10, 16, 20, 61 (A)

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ABSTRACT: A filter cigarette having a substantially uniform cross-sectional form defined by two mirror image arcs joined at their extremities is shaped from a conventional cylindrical filter cigarette by so compressing the latter as to crease two opposite sides of the cigarette, and apparatus for doing this includes elongated trough-shaped dies spaced from one another and serving as shaping supports for travelling belts between which the conventional cylindrical cigarettes are fed for progressive compression as they move along the length of the dies.

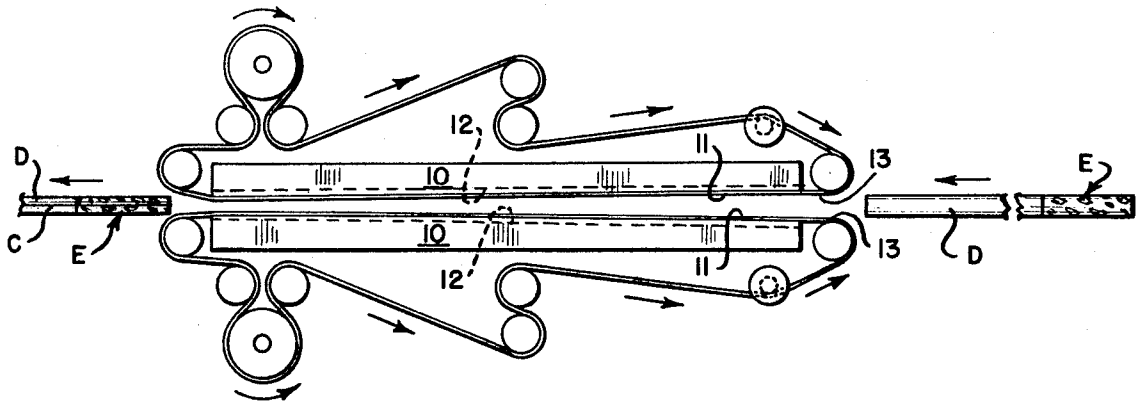


FIG. 1

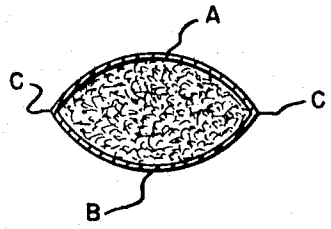


FIG. 2

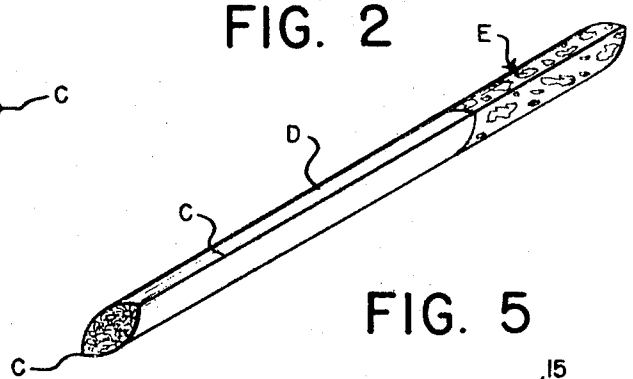


FIG. 3

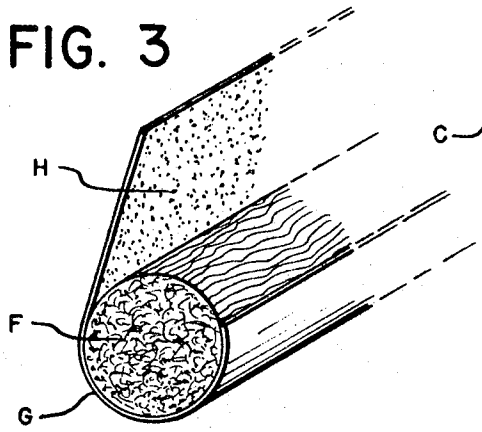


FIG. 5

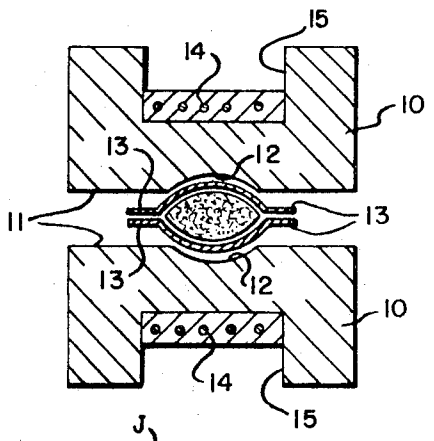


FIG. 4

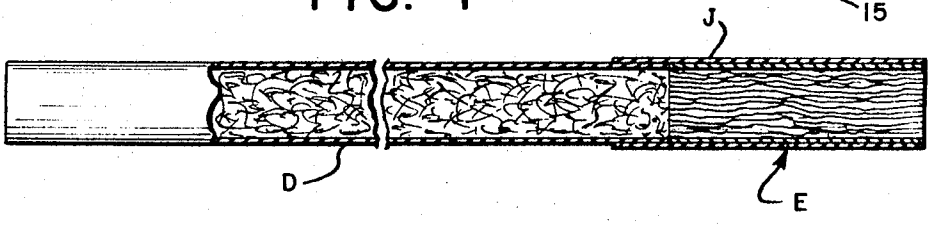
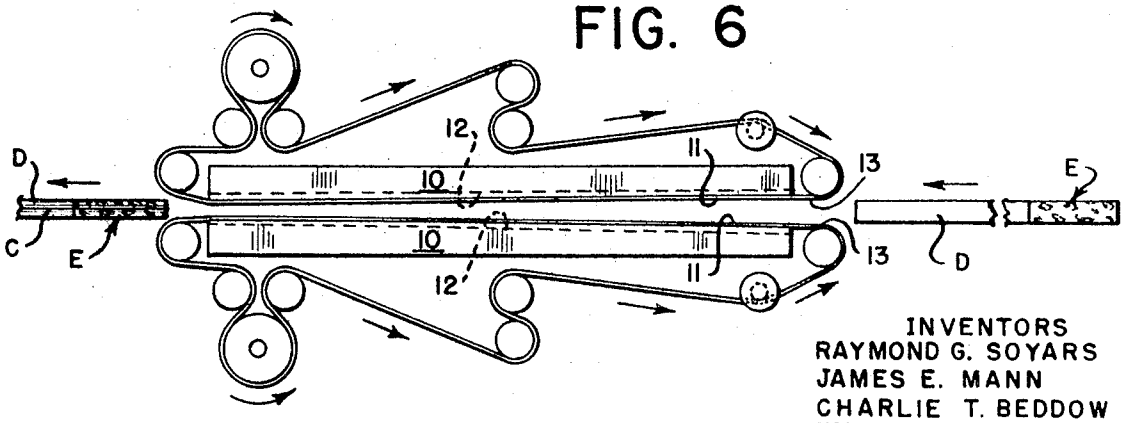


FIG. 6



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PRODUCTION OF A FILTER CIGARETTE

This invention relates to filter cigarettes and, more particularly, to a method for forming a filter cigarette of novel cross-sectional shape.

A filter cigarette has been devised that has a novel shape and advantageous characteristics. This cigarette is characterized by a cross-sectional form defined by two mirror image arcs joined at their extremities so as to have two diametrically positioned creases extending the full length of the cigarette. The filter portion of such a cigarette is formed a tow of filamentary material such as cellulose acetate and it is essential that the tow completely conform to the shape of the cigarette without there being any significant longitudinal voids, particularly adjacent the creases, which might otherwise permit the smoke to bypass the filter.

We have now developed a method and apparatus for forming the aforementioned filter cigarettes. The method of our invention comprises

a. forming a cylindrical tobacco portion by enclosing tobacco in a wrapper,

b. forming a filter portion by enclosing a cylindrical mass of cellulosic filament tow in a wrapper while an adhesive is interposed therebetween to effect adhesion of the peripheral portion of the tow to the inner surface of its wrapper,

c. joining the cylindrical tobacco and filter portions with another wrapper, and

d. compressing the resulting cylindrical filter cigarette sufficiently at diametrically opposite sides of the cigarette as to form diametrically opposite creases extending the full length of the cigarette.

The apparatus for performing our invention comprises a pair of spaced longitudinal dies, the opposing face of each die being provided with a longitudinal trough of substantially arcuate cross section, the dies being spaced further apart adjacent one end than at the other end, a flexible endless belt encompassing the longitudinal dimension of each die and adapted to conform to the shape of the trough in said die, and means for moving the belts at the same speed in a direction from the wider spaced ends of the dies toward the closer spaced ends thereof. In the presently preferred form of the apparatus we have found it advantageous to provide heating means for each die so as to heat the belt moving past its troughed face.

These and other novel features of the invention will be more readily understood from the following description taken in conjunction with the accompanying drawings in which

FIG. 1 is a cross section through the filter end of the cigarette formed pursuant to the invention;

FIG. 2 is a perspective view of the filter cigarette;

FIG. 3 is a partial perspective view of the filter portion of the round preliminary form cigarette showing its wrapper in the partially applied position;

FIG. 4 is a sectional side view of the round preliminary form cigarette which is converted to the shape of that shown in FIG. 1 by the method and apparatus of the invention;

FIG. 5 is a cross-sectional elevation through a pair of dies and cooperating carrier belts for forming the aforementioned cigarette; and

FIG. 6 is a schematic side view of the dies and belts shown in FIG. 5.

The method of the present invention has been developed to produce the novel-shaped cigarette shown in cross section in FIG. 1. The outstanding characteristic of this cigarette is that its cross section is defined by two mirror image arcs A and B joined at their extremities to form a pair of diametrically positioned creases C extending the full length of the tobacco-filled portion D and filter portion E of the filter cigarette as shown in FIG. 2.

In practicing the method of our invention to produce this filter cigarette, a cylindrical tobacco portion is formed by any conventional procedure for producing a cylindrical tobacco rod composed essentially of tobacco enclosed in a paper wrapper. In forming the filter portion of the cigarette pursuant

to the invention, it is presently preferred not to incorporate any significant amount of plasticizer in the filamentary tow which would tend to make it intractable. However, in the conventional operation of making a filter rod of tow wherein a rodlike shape of the tow F (FIG. 3) is enclosed in a paper wrapper G, we interpose an adhesive, pursuant to our invention, between the periphery of the tow and the inner surface of the paper wrapper so that the peripheral portions of the tow will adhere to the inner surface of its wrapper during subsequent deformation. Although the adhesive can be sprayed onto the surface of the cylindrically formed tow, it is presently preferred to apply a layer H of the adhesive to the entire inner surface of the wrapper so that the wrapper not only adheres to the peripheral portion of the tow but adheres to itself where it overlaps to complete the tow enclosure.

The adhesive used for the aforementioned purpose is not critical. It can comprise a hot melt adhesive, such as wax or conventional thermoplastic natural or synthetic resin, or it can comprise, as presently preferred, a quick-drying or tacky adhesive such, for example, as glyceryl triacetate (triacetin) containing dissolved cellulose acetate.

The filter rod made in this manner is then cut to approximate length, as is the tobacco rod, for feeding to a conventional filter cigarette maker wherein a filter portion E is positioned adjacent one end of a tobacco rod portion D and the two portions are joined by a tipping paper J or mouthpiece wrapper, or the equivalent, which covers the filter portion and overlaps a significant length of the end of the tobacco rod portion, all as shown in FIG. 4. The resulting product then appears to be that of a conventional cylindrical filter cigarette but differs therefrom in that the filter tow is substantially free internally of plasticizer or other stiffening agent and in that the peripheral portion of the tow is adhered to the inner surface of its surrounding wrapper.

The cylindrically shaped filter cigarette is then sufficiently compressed, pursuant to the invention, to form diametrically opposite creases extending the full length of the filter cigarette. During this compression the pliable tobacco in its portion of the cigarette follows the distortion of the cigarette during its compression and completely fills the thus compressed and creased tobacco portion wrapper. The tow, by virtue of its peripheral adherence to the compression-distorted shape of the filter portion and completely fills this portion right out to the sharp creases. The absence of stiffening material within the tow permits the tow to be shaped by the compression distortion and to assume the resulting cross-sectional shape without the development within the body of the filter tow of any significant longitudinal voids which would otherwise permit smoke to bypass the filtering effect of the tow.

Apparatus for compressing the round-shaped cigarette of FIG. 4 to that of FIG. 2 comprises a pair of backup dies **10** spaced apart and with their opposing faces **11** each provided with an arcuate trough **12**, as shown in FIG. 5. A pair of endless driven belts **13** are positioned between the opposing faces of the dies **10** and move at identical speeds longitudinally thereof so that when the aforementioned round cigarette is fed axially between the belts it causes the belts to be expanded outwardly to conform to the shape of the troughs **12**. The belts **13** are significantly wider than the trough and are wide enough to extend beyond the creases C in the cigarette when it is compressed by passage between the diebacked belts. In order to compress the cigarette progressively as it passes between the belts **13**, it has been found advantageous to space the dies **10** somewhat further apart at the entrance end of the cigarette path than at its discharge end.

There is, as would be expected, a tendency for the compressed cigarette to expand somewhat after its compression, and this is particularly true of the filter portion of the cigarette. However, this characteristic can be overcome by any of a number of expedients. For example, at the discharge end of the diebacked belts **13**, their spacing can be significantly less than the desired ultimate thickness of the minor

cross-sectional axis of the finished cigarette. Alternatively, the round cigarette can be compressed, prior to its passage between the creasing belts 13, by any appropriate means such as a pair of conventional rolls or belts which will compress the round cigarette at least as much as, and preferably more than, the extent of the compression produced by the belts 13 but without necessarily producing the creases C along the cigarette. It is presently preferred, however, to create a permanent desired shape to the cigarette in a single pass through the belts 13, and without the other aforementioned precompression treatments, by applying heat to the cigarette as it is being compressed. To do this, a conventional heating element 14 is mounted adjacent the back of each die, and advantageously in a recess 15 in the back of the die, so that the heat from each element 14 will be transferred through the die 10 and the belt 13 to the cigarette. The extent of the heating will, of course, depend upon the retention time of the cigarette between the forming belts 13. For example, using forming dies 10 about 48 inches long and a belt speed of about 325 feet per minute, a die temperature between about 300° and 450° F. has been found to be effective in producing a permanent shape of the desired configuration in both the tobacco and filter portions of the cigarette.

We claim:

1. The method of making a filter cigarette composed of a tobacco portion and a tow filter portion, the cross-sectional form of the tobacco and filter portions being defined by two mirror image arcs joined at their extremities, said method comprising

a. forming a cylindrical tobacco portion by enclosing tobacco in a wrapper,

b. forming a filter portion by enclosing a cylindrical mass of cellulosic filament tow in a wrapper while an adhesive is interposed therebetween to effect adhesion of the peripheral portion of the tow to the inner surface of its wrapper,

c. joining the cylindrical tobacco and filter portions with another wrapper, and

d. compressing the resulting cylindrical filter cigarette sufficiently at diametrically opposite sides of the cigarette as to form diametrically opposite creases extending the full length of the cigarette.

2. The method according to claim 1 in which the entire cigarette, prior to being compressed to crease its opposite sides, is laterally compressed to an extent greater than that to which it is compressed in the edge-creasing compression.

3. The method according to claim 1 in which the compression is effected by moving the cigarette longitudinally between opposing concave surfaces which are progressively closer together in the direction of movement of the cigarette.

4. The method according to claim 1 in which the compression is effected by moving the cigarette longitudinally between opposing concave surfaces which are progressively closer together in the direction of movement of the cigarette while applying heat to the moving cigarette.