Dec. 22, 1964
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3,162,199
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Filed April 21, 1961
2 Sheets-Sheet 1
SMOKING ARTICLES HAVING ENCAPSULATED TOBACCO ADDITIVES AND THEIR MANUFACTURE

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Filed Apr. 21, 1961, Ser. No. 104,693
5 Claims. (Cl. 131—9)

This invention relates generally to the incorporation of flavors and other desirable additives in cigarettes or other smoking articles. And more particularly, to the introduction of such additives in an encapsulated form to be released during pyrolysis of the tobacco.

In the past, it has been common practice to spray flavoring material on tobacco after it has been cut and dried. The tobacco was then allowed to bulk for approximately 24 hours, as a general rule, to facilitate the diffusion of the flavoring material throughout the tobacco. This procedure, however, has inherently presented a number of difficulties and disadvantages. In this connection, it has been extremely difficult to obtain a truly uniform application as well as distribution of the flavoring material throughout the tobacco. In addition, time and space requirements incident to the stated bulk period are factors contributing to the cost of manufacture and consequently, that of the ultimately finished smoking article. Cigarettes having flavoring material added in this fashion experience deterioration with age and necessarily limited shelf life, due to the evaporation and volatilization of the flavoring materials most commonly employed. Needless to say, a cigarette manufactured in this manner, will not necessarily have a uniform distribution of the flavoring material throughout and consequently, uniform release of these materials on pyrolysis of the tobacco cannot be expected, especially when variable concentrations will be present while different sections of the cigarette are smoked.

It is therefore an object of this invention to overcome these aforementioned difficulties and disadvantages by encapsulating these flavoring materials and additives, such that they are readily uniformly released during pyrolysis of the tobacco.

Another object is to provide for such uniformity of control in flavoring materials and additives in addition to the elimination of the above bulking operations and limited shelf life of the exposed cigarette as a result of their evaporation and volatilization.

A further important object resides in the effective control of flavoring incorporated into each cigarette, as well as that received by the smoker upon each inhalation, not withstanding the time during which the cigarette package is opened and exposed to the ambient temperatures and humidity conditions.

Briefly stated, this invention contemplates the provisions of an elongated ribbon-like capsule for receiving and retaining the selected flavoring materials and additives only, released upon pyrolysis of the tobacco. This capsule is preferably initially extruded in tabular form with the flavoring subsequently introduced therein or fabricated from a flat ribbon eventually folded around the additive material.

The encapsulated additive is conveniently incorporated into the cigarette during the cigarette manufacturing process, to be released upon pyrolysis of the tobacco. On the other hand, it is evident that the flavor-containing capsule may be introduced at other locations, which out of necessity, would be before the standard garniture station, for example, by having it accompany the cut tobacco as it is fed and deposited on the web of cigarette paper.

Other objects and advantages will become apparent from the following description, which is to be taken in conjunction with the accompanying drawings illustrating specific embodiments of the invention, and in which:

FIG. 1 is a diagrammatic view of a continuous rod cigarette making machine having incorporated therein a roll of flavoring ribbon, the web of which is introduced into the continuous rod as it is formed, as contemplated by the proposed teachings of the present invention;

FIG. 2 is a diagrammatic view, partially in section, showing extrusion apparatus that may be employed in fabricating the continuous web of flavoring ribbon introduced during the cigarette making process;

FIG. 3 is a longitudinal sectional view of a cigarette embodying one form of flavoring ribbon capable of manufacture by the use of this extrusion apparatus and disposed within the cigarette as shown, by practicing the invention in accordance with the teachings defined by FIG. 1;

FIG. 4 is a cross-sectional view of the cigarette of FIG. 3 taken along the line 4—4 of FIG. 3;

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 3 for purposes of illustrating the pinched sector of the flavor-containing ribbon;

FIG. 6 is a perspective view of a film having deposited thereon, metered amounts of flavoring material, in powdered form, to be ultimately encased by the film by sealing the film's longitudinally extending marginal side edges;

FIG. 7 is a longitudinal sectional view of a filter cigarette including a predetermined length of the flavor ribbon manufactured in accordance with the embodiment illustrated in FIG. 6; and

FIG. 8 is a cross-sectional view taken along the line 8—8 of FIG. 7.

For purposes of illustrating the present invention, a conventional continuous rod cigarette making machine is partially shown in FIG. 1. This machine essentially includes the tobacco feed designated generally by the numeral 10 and cigarette maker designated generally by the numeral 12. The principal components of the cigarette maker 12 are comprised of a rod folder tongue 14, a rod former 16, a cigarette rod pasteur 18, a rod roller 20, a cut-off device 22, and a cigarette catcher and collector 24 (illustrated schematically with phantom lines). In this connection, it should be understood any one of the standard continuous rod cigarette forming machines can be employed in practicing this invention, as for example, the Molins Mark VI or Mark VIII manufactured by Molins Machine Co. Limited of England, the Haarhoff-Gerant, I manufactured in Hamburg, West Germany, and comparable machinery manufactured by the American Machine & Foundry Co. of New Jersey, any of which may have annexed thereto a filter tip attachment common to the industry as is the case with the American Machine & Foundry Filter Tip Attachment.

The tobacco feed 10 showers cut tobacco continuously onto a traveling tape 26, which delivers the showered tobacco to the traveling paper web 28. The paper web 28 is fed from a reel or roll 30 and is suitably guided through the rod folder tongue 14, the rod pasteur 18 which applies a strip of paste to the lap edge of the cigarette rod paper, the rod former 16 and the rod roller 20, by a continuously moving folding belt 32 driven by the drum 34. In passing, it is this area of the cigarette maker 12 that is referred to in the industry as the garniture. Drum 34 is continuously driven and takes its drive off the motor (not shown) for the entire cigarette making machine.

When the cigarette rod 36 emerges from the rod former 16 it passes through the cigarette cut-off 22, wherein a knife 38 is driven in proper relation with the movement of the cigarette rod. Thus, individual cigarettes of predetermined length are severed from the cigarette.
rod 36, to be eventually picked up by catcher belts (not shown) and delivered to a suitable collecting receptacle included within the cigarette catcher or collector 24.

As previously stated, this invention contemplates the provision of a cigarette or other smoking article having an elongated ribbon-like element which excretes a flavoring material incorporated therein. This flavor containing ribbon may be introduced into the cigarette during its manufacture preferably in continuous web form. Thus, a roll or bobbin 42 containing a substantial length of capsule material may be mounted on the cigarette machine as illustrated in FIG. 2. The length of capsule paper per roll 42 is determinable and obviously selectable. In this connection, its length can correspond with that of the paper roll 30. If conditions dictate, a series of rolls 42 can be utilized with the tail end of one connected to the leading end of the following roll of the series. With this in mind, constant replenishment of the flavoring ribbon rolls 42 need not be experienced.

The web 44 of prefabricated ribbon containing the flavoring substance or additive can be fed into practically all of the cigarette making machines used by the industry. Accordingly, the web 44 can be suitably directed along with the web 28 of cigarette paper or else introduced at a later stage after the tobacco has been deposited on the moving paper web, but prior to the formation of the cigarette seam. As illustrated, the web 44 is properly guided through the cigarette rod forming apparatus along with the web 28 of cigarette paper. In this connection, it has been found that reinforcement is thus provided, thereby preventing untimely rupture of the ribbon by having it accompany the travel of the cigarette paper. In an effort to initiate this relationship, it may be necessary to affix the leading end of the ribbon web 44 to the paper web 28. To this end, this invention contemplates employing a suitable adhesive or paste to facilitate simultaneous feeding of these webs and support of the flavor containing ribbon. Once the feeding of the web 44 is commenced, the density and compactness of the surrounding tobacco deposited on the paper web 28 will ordinarily be sufficient to pull the web 44 through the garniture. Under such circumstances, the flavor-containing ribbon will be located adjacent the interior face of the cigarette paper of the formed continuous cigarette rod. It should be understood at this point, that the flavoring ribbon and cigarette paper need not be supplied on separate rolls, but may form component parts of a composite roll with the flavor-containing ribbon affixed to the cigarette paper intervals or throughout the length of their intimate engagement.

In FIG. 2, extrusion apparatus 46 is schematically illustrated and is representative of one of several proposed means and methods for forming the ribbon containing the selected flavoring substances and additives. In accordance with the illustrated embodiment, a thermoplastic in granulated or pellet form is contained in a hopper or reservoir 48 having a suitable controlled discharge orifice 50 communicating with an extruder nozzle 52. This configuration may be in the form of a valve means 53. In addition, the flavoring substance or additive, either in liquid or powder form, can be supplied from the reservoir 54 through a control outlet 56 for metering purposes, and similarly be directed through the extruder nozzle 52 as shown. The control may be in the form of a valve means 58. Under the circumstances, the extruder will form a ribbon or tube which will embody a thermoplastic film encapsulating the selected flavoring substance or additive. The ribbon is pinched off at predetermined intervals so that the flavoring substance will not escape when cut through the blade 38 of the cut-off device 22. This is generally preferable, especially in the case where flavoring liquids are used. In an effort to prevent such materials from escaping at one time, the ribbon can be mechanically pinched approximately every 10 millimeters, or at other intervals, depending upon the particular conditions or requirements. Thus, a suitable pinching apparatus 58 can periodically pinch the ribbon as it is formed by the extruder 52 to eventually divide the ribbon into compartments constituting the roll 42 of encapsulated flavoring material. With certain techniques, the flavor-containing ribbon may be formed by polyethylene having an inside diameter of 0.010 and an outside diameter of 0.014.

Referring now to FIGS. 3, 4 and 5, it will be seen that the cigarette 40 consists of a length of paper 60 wrapped around the tobacco rod filler 62 and length of flavor-containing ribbon 64. The length of ribbon 64 will be adjacent the inner wall of the paper 60 and is pinned at the prescribed locations 66 along its length. Therefore, separate chambers are provided, thereby insuring separate and progressive release of a controlled amount of flavoring material during the smoking of the cigarette.

The present invention provides for another form of encapsulating, generally preferred for powdered substances. As FIG. 6 will indicate, the flavor-containing ribbon may also be made from a continuous length of flat sheet material or strip 68, folded around metered amounts of such flavoring materials 70. The marginal side edge of the strip 68 may be heat sealed or secured in any other manner, as indicated. When the additive is supplied as a powdered material, the small interstices of the ribbon wall will naturally prevent powder from escaping. In actual practice, the blade 38 at the cut-off station 22 will have a pinching effect, thereby prohibiting undesirable discharge of the contained powder 70 in the ribbon. As previously the case, this form of ribbon is introduced into the cigarette rod making machine as a web leading from a roll 72 of a suitable form tip cigarette 40 is shown having the usual paper 60' wrapped around a tobacco filler 62'. The flavor-containing ribbon 64' is disposed adjacent the inner wall of the paper and extends for the entire length of the tobacco filler 62'. However, it is conveniently terminated at its inner end at the juncture with the filter plug 72 for obvious reasons.

The capsule or ribbon 64 and 64' are in elongated tubular form and the casings thereof may be made of either inorganic or organic material, which upon pyrolysis of the tobacco, will release the contents thereof into the smoke stream. In addition, it should be harmless to human beings and suitable for human consumption, both in its initial or original form and after pyrolysis. Suitable materials for this purpose are urea, formaldehyde, cellulose, polyvinyl pyrolidone, and other similar materials. Materials whose products of combustion have poor compatibility with tobacco smoke should be avoided, such as methyl cellulose, polyvinyl alcohol and polyvinyl acetate. Polyethylene tubing has been found to perform satisfactorily.

Any desired flavoring or aroma-producing material or additive suitable for use in cigarettes and other smoking articles may be encased inside the capsules. Examples of such flavoring materials and additives are natural and synthetic flavoring and aromatic oils such as oil of peppermint, oil of eucalyptus, methyl and derivatives of menthol and other esters and other derivatives of organic flavoring acids. Powdered cocoa as commonly used in smoking articles can be introduced effectively in encapsulated form. In addition, this invention may be used for incorporating various distinctive blending tobaccos such as Turkish tobacco with the remaining cigarette tobacco, particularly when it is desirable to control their distribution. The quantity of flavoring materials incorporated in the capsule may obviously be varied in accordance with the concentration of the additive and the flavoring results desired.

Thus, the several aforesaid objects and advantages, among others; are most effectively attained. It should be understood, however, that this invention is in no sense
limited by the embodiments thereof disclosed herein and its scope is to be defined by the appended claims.

I claim:

1. As an article of manufacture, an improved smoking tobacco rod comprising a filler of tobacco, a wrapper embracing the longitudinally extending periphery of said filler, said rod being cut to predetermined length, a hollow tubular ribbon extending longitudinally within the filler for substantially its entire length, said ribbon being cut to predetermined length with its cut ends being adjacent the cut ends of said rod, a tobacco additive contained within the hollow of said ribbon and adapted to be released upon pyrolysis of the tobacco and drawn through the rod by the smoker, said ribbon, when subjected to the heat of burning, permitting the release of said additive, and said ribbon being pinched at predetermined intervals to provide separate compartments of said additive to prevent escape of said additive and to permit its uniform release upon pyrolysis of the tobacco throughout the length of the burning rod.

2. The invention in accordance with claim 1 wherein a filler for the smoke is at one end of said filler.

3. In the manufacture of continuous length cigarette rod wherein a continuous paper tape is provided, tobacco is fed onto said tape as it is moved along a predetermined path of travel, and said paper tape and said tobacco are formed into a continuous cigarette rod and then cut into individual cigarette lengths, the improvement comprising: providing a roll of encapsulated additive in ribbon form wherein the ribbon includes an outer hollow tube with the additive disposed interiorly thereof, the ribbon tube being pinched at predetermined intervals to provide separate compartments of said additive to prevent escape of said additive and to permit its uniform release, the ribbon when subjected to the heat of burning permitting the

release of said additive upon pyrolysis of the tobacco, guiding the web of the ribbon over a predetermined path of travel leading to the cigarette rod, leading the leading end of the web of the ribbon into the cigarette rod, and then cutting the continuous length cigarette rod with enclosed ribbon of encapsulated additive into individual cigarette lengths each of which includes a corresponding length of the ribbon.

4. The invention in accordance with claim 3 wherein the leading end of the ribbon is carried by the web of the paper tape to be introduced into said continuous cigarette rod at such time as the tobacco is fed onto said tape.

5. The invention in accordance with claim 1 wherein the ribbon is disposed proximate said wrapper.

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