

[54] MICROWAVE TREATMENT OF
CIGARETTES ON A MAKING MACHINE
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[22] Filed: Apr. 17, 1972
[21] Appl. No.: 244,785

[52] U.S. Cl. 131/140 P, 131/20, 131/79
[51] Int. Cl. A24b 03/18, A24b 05/28
[58] Field of Search..... 131/20, 79, 140,
131/140 P, 4, 8

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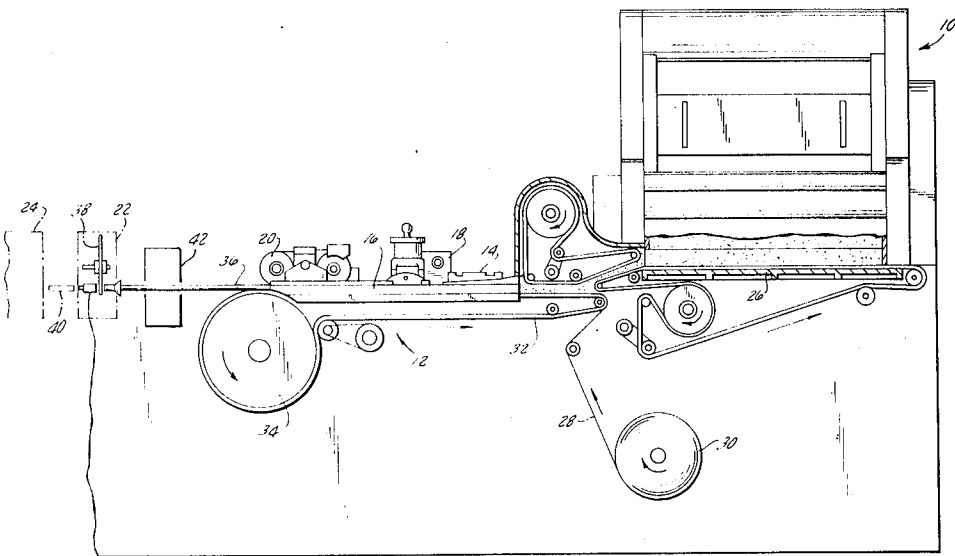
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[57] ABSTRACT

A cigarette rod or finished cigarette is filled with less tobacco than necessary to completely fill the wrapper and, in addition, the moisture content of the tobacco is adjusted to an appropriate level above normal making moistures. The cigarette rod is then irradiated with microwave energy which causes the tobacco to expand and dry, producing a cigarette of proper firmness and tobacco moisture level.

6 Claims, 1 Drawing Figure



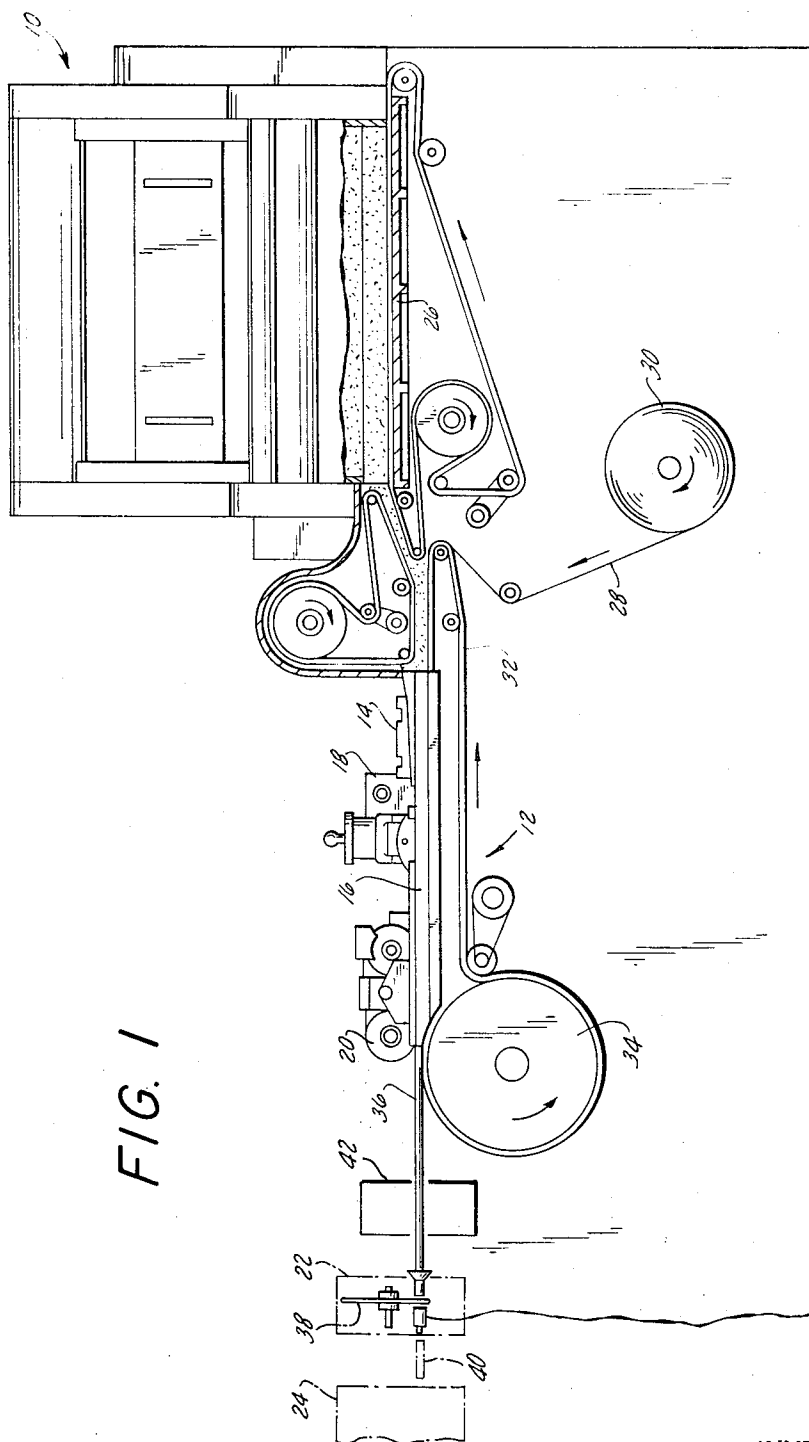


FIG. 1

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MICROWAVE TREATMENT OF CIGARETTES ON A MAKING MACHINE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to the expansion of tobacco and, more particularly, to the expansion of tobacco within the cigarette rod.

DISCUSSION OF THE PRIOR ART

Various means have been employed to increase or expand tobacco leaves, strips, stems, or reconstituted tobacco. For example, in U.S. Pat. No. 3,524,451, the patentee teaches that tobacco may be impregnated with a volatile organic liquid and then heated with a hot gas which volatilizes the liquid and expands the tobacco. Still another means becoming increasingly popular is described in U.S. Pat. No. 3,409,023 where tobacco stems are irradiated with microwave energy, thereby generating heat and causing the stems to puff. As an example, in copending application, Ser. No. 177,268, assigned to the same assignee as the present invention, the puffing to tobacco fines to a usable size by exposure to microwave radiation is described and claimed.

Whether the tobacco is puffed or not, one of the persistent problems in the manufacture of cigarettes is the occurrence of loose ends in the tobacco rod. Aside from having unpleasing appearance, a cigarette with loose ends if not firmly packed produces a quality generally regarded as being undesirable by a smoker.

It is, therefore, a principal object of the present invention to provide a means and method by which loose ends may be significantly reduced while concurrently maintaining the proper moisture level in a cigarette rod.

SUMMARY

The foregoing and other objects are obtained by filling a cigarette wrapper, either in rod form or as a finished cigarette, with less tobacco than necessary to completely fill the wrapper. The finished cigarette or rod is then irradiated with microwave energy which expands the tobacco and provides a firm cigarette. In this manner, a cigarette is produced with weight, moisture content and firmness controlled to an optimum degree directly at the cigarette making machine.

Other objects and advantages will become apparent from the following detailed description which is to be taken in conjunction with the accompanying drawing in which the single FIGURE is a diagrammatic view of a continuous rod cigarrette making machine having incorporated therein a source of microwave energy according to the teachings of the present invention.

DESCRIPTION

For the purposes of illustrating the present invention, a conventional continuous rod cigarette making machine is partially shown in the Figure. 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, rod former 16, a cigarette rod paster 18, a rod sealer 20, a cut-off device 22, and a cigarette catcher or 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 Haunie Garant-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 32. The paper web 28 is fed from a reel or roll 30 and is suitably guided through the rod folder tongue 14, the rod paster 18 which applies a strip of paste to the lap edge of the cigarette rod paper, the rod former 16 and the rod sealer 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 timed relation with the movement of the cigarette rod. Thus, individual cigarettes 40 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 includes within the cigarette catcher or collector 24.

As previously stated, this invention contemplates feeding less than the required amount of tobacco to completely fill the cigarette rod 36. Towards this end, from 1 percent to 9 percent reductions are made from normal production values of tobacco density of the continuous rod. Similarly, the moisture content of the tobacco should be adjusted to an appropriate level 14 percent to 22 percent, as compared to normal making moistures, which is about 13 percent. The continuous rod 36 or, as in a contemplated alternative embodiment, the individual cigarettes 40, are then introduced into a region occupied by an intense microwave field such as within a wave guide 44 connected to a remote microwave source 42, which produces an expansion of the tobacco materials. In this manner, the apparatus and process of this invention gives rise to an increase in the filling factor and allows moisture control at the maker. These conditions also tend to increase the firmness of the cigarette and thereby eliminate to a large extent the production of loose ends.

The microwave source 42 may be any one of several available commercial units capable of generating a high frequency fluid in the ISM bands of the microwave region, i.e., 915 and 2,450 megahertz. Of course, it is understood that the regions are limited only by restrictions imposed by the FCC. In actual practice, the microwaves penetrate the tobacco within wrapper 28. There is an intensive development of heat causing selective drying of the tobacco and control of the moisture content at the maker. The tobacco is expanded or puffed when exposed to the microwave energy generated by unit 42. The rate and degree of puffing depends on the amount of energy to which the tobacco is exposed. This, in turn, is a function of the power input to the microwave source 42, the length of time the tobacco is ex-

posed to this source which, in turn, is dependent upon the rate of travel of the rod 36, the frequency or wave length of the microwaves generated and the moisture content of the tobacco. Thus, when a more powerful microwave source is employed, the time of exposure of a unit length of rod 36 to the microwave energy may be shorter. On the other hand, longer periods of exposure would be necessary when using a less powerful microwave source.

As will be appreciated by those skilled in the art, the microwave source 42 may assume the form of a magnetron capable of generating very high frequencies and radiation efficiency in continuous operation while having relatively long working life. There are many commercial sources for magnetrons of this type.

Thus, the several aforementioned objects and advantages are most effectively attained. Although a single somewhat preferred embodiment of the invention has been disclosed and described in detail herein, it should be understood that this invention is in no sense limited thereby and its scope is to be determined by that of the appended claims.

What is claimed is:

1. The method of treating tobacco within a wrapper to obtain an increase in fill factor while controlling moisture of cigarettes directly on a making machine during production comprising:

forming a cigarette rod with tobacco in a wrapper at a level below that which a firm cigarette is obtained,

exposing the tobacco in the cigarette rod to microwave energy to cause the tobacco to expand and puff giving rise to an increase in the filling factor and the firmness of the cigarette.

2. The invention in accordance with claim 1 wherein

the moisture content of the tobacco in the rod prior to exposure to the microwave energy is above the prescribed level for cigarettes produced at the making machine and reducing, and at the same time controlling the moisture content of the rod to the prescribed level as a result of the exposure of the rod to the microwave energy.

3. The invention in accordance with claim 2 wherein said moisture content of the tobacco prior to irradiation is from 14 percent to 22 percent.

4. The invention in accordance with claim 1 wherein the continuous cigarette rod is cut into individual cigarette length prior to exposure to the microwave energy.

5. In a cigarette making machine including a tobacco feeder, a cigarette paper feeder, means for discharging a predetermined amount of the tobacco on the web of the cigarette paper, means for wrapping the paper about the tobacco thereon to form a continuous length of cigarette rods and means for cutting the rod into individual length cigarettes, the improvement comprising:

means for feeding less than the prescribed level of tobacco for producing a firm cigarette, a source of microwave energy on the maker at a location following the formation of the continuous cigarette rod and proximal to said rod for exposing the contained tobacco to microwave energy to expand the tobacco within the paper to produce a firm rod and consequently firm cigarettes.

6. The invention in accordance with claim 5 wherein the microwave energy source is located on the maker at a location prior to cutting of the rod into the individual cigarettes.

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