

June 2, 1959

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2,888,935

CIGARETTE AND APPARATUS FOR MAKING THE SAME

Filed March 30, 1955

6 Sheets-Sheet 2

FIG. 4

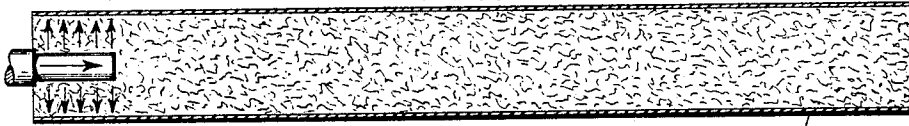


FIG. 5

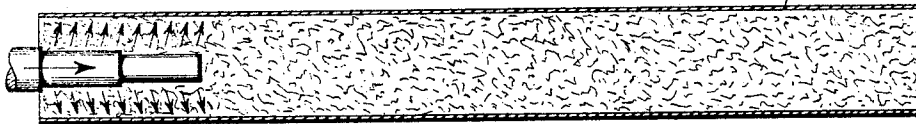


FIG. 6

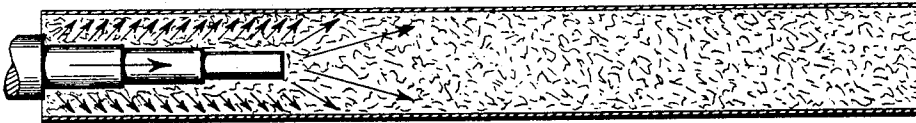


FIG. 7

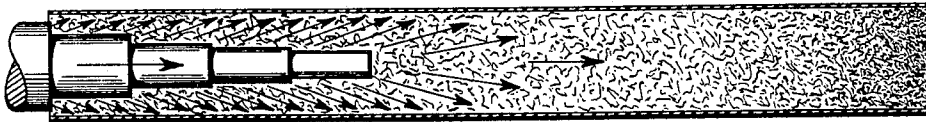


FIG. 8

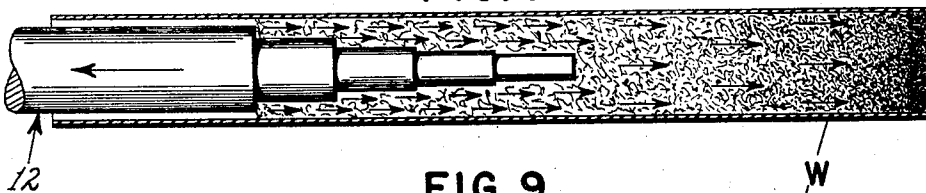


FIG. 9

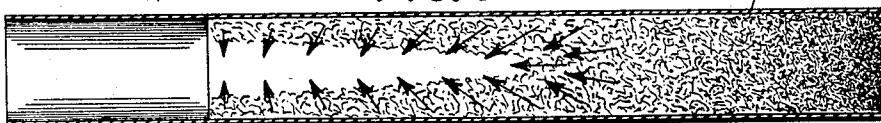
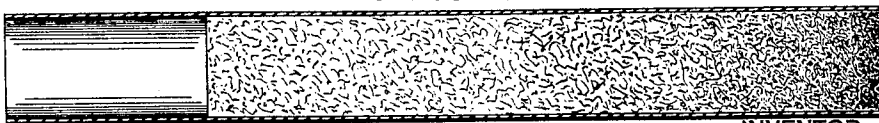


FIG. 10



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6 Sheets-Sheet 3

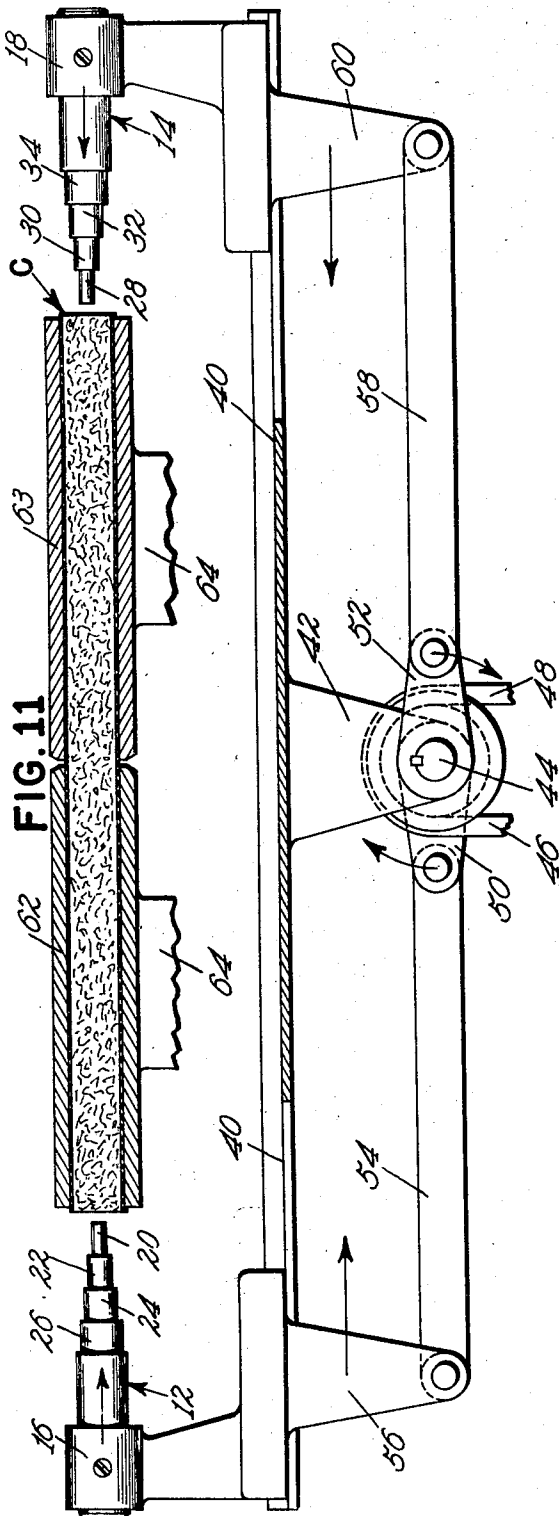


FIG. 11

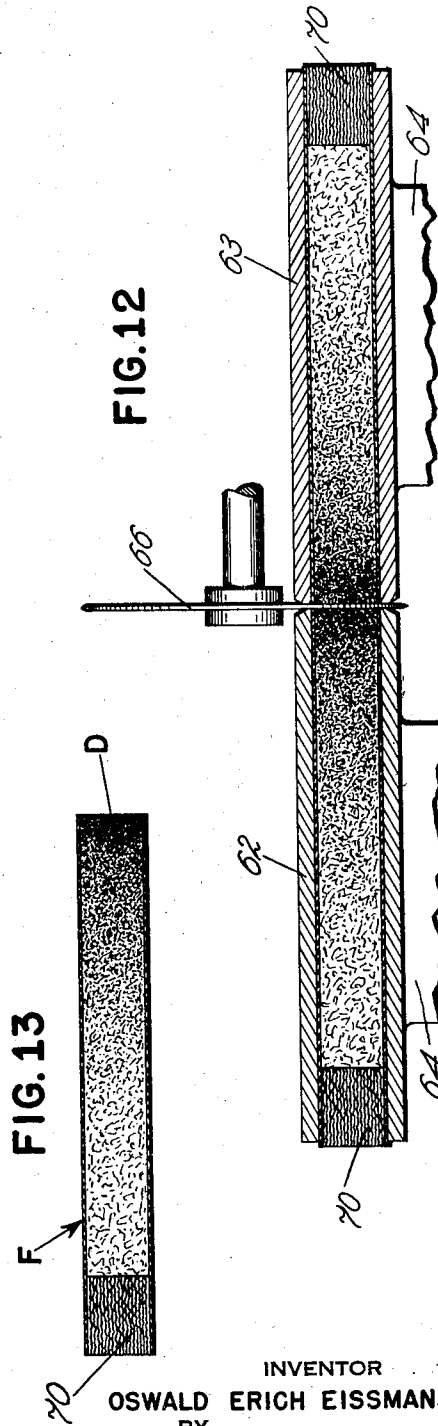


FIG. 12

FIG. 13

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CIGARETTE AND APPARATUS FOR MAKING THE SAME

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6 Sheets-Sheet 4

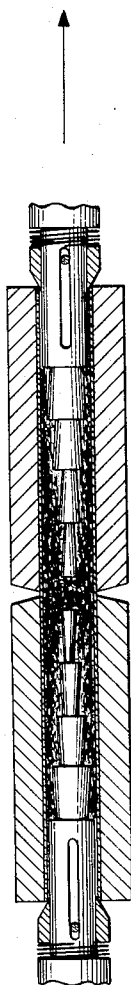
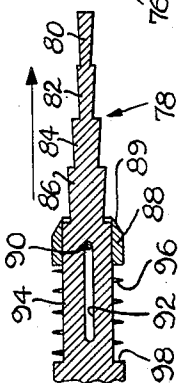
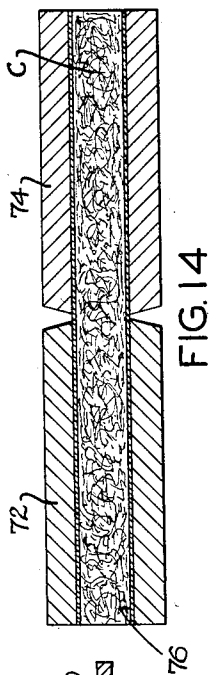
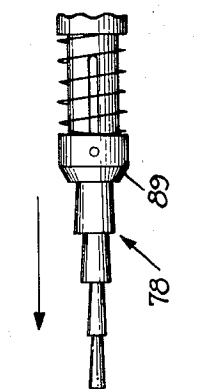


FIG. 14

FIG. 15

FIG. 16

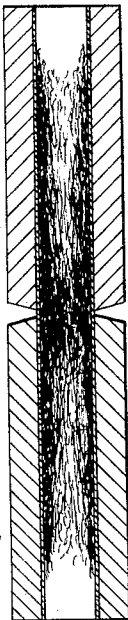


FIG. 17

FIG. 18

FIG. 19



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CIGARETTE AND APPARATUS FOR MAKING THE SAME

Filed March 30, 1955

6 Sheets-Sheet 5

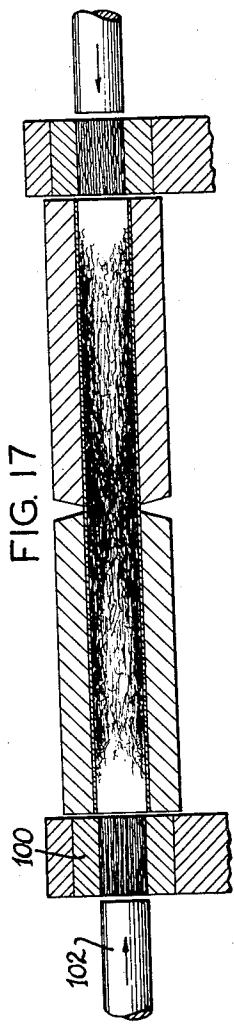


FIG. 17

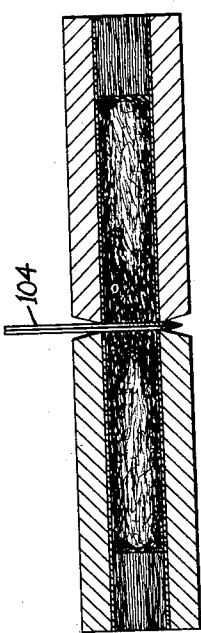


FIG. 18

FIG. 20

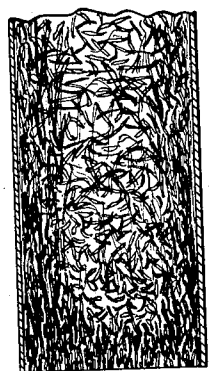


FIG. 19

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1

2,888,935

CIGARETTE AND APPARATUS FOR MAKING THE SAME

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Application March 30, 1955, Serial No. 498,012

10 Claims. (Cl. 131-94)

This invention relates to a method and apparatus for making an improved cigarette.

The present invention is a continuation-in-part of applicant's prior application Serial No. 325,764, filed December 13, 1952. Since the filing of applicant's original application, various improvements and additional discoveries have been made which have now been consolidated into the present application.

It is the purpose of the present invention to provide an apparatus and method for making a cigarette of an improved design. Heretofore, to give a cigarette a firm body so that it would feel well-formed and filled, it was necessary to place more tobacco into the cigarette than was desirable. This practice of over-filling to obtain a good feel was not desirable because it made the draw of the cigarette more difficult. When filter tips are placed on the end of such an over-filled cigarette, the draw of the cigarette becomes still more difficult.

The present invention overcomes these various objections and difficulties by a unique arrangement which enables not only the end of the cigarette to be and appear fully compacted but also the cylindrical side walls of the cigarette so that they will have a full, firm feel. This accomplished without any overfilling of the cigarette so that a cigarette with a very easy draw is obtained.

An object of this invention is to provide an improved means and method for densifying the end of a cigarette.

Another object of the invention is to provide a method and apparatus for varying the density of a cigarette along its length in accordance with the manufacturer's requirements.

Other objects and features of the invention will appear as the description of the particular physical 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.

Figs. 1-3 are sectional side elevations of a double length cigarette disclosing the method of making dense end cigarettes and simultaneously providing a pocket for receiving a filter plug.

Figs. 4-8 are sectional side elevations of a cigarette illustrating the directional compacting forces exerted when the stepped plunger is progressively inserted into the end of the cigarette.

Fig. 9 is a sectional side elevation of a dense end cigarette immediately after the plunger is retracted.

Fig. 10 is a sectional side elevation of the same cigarette shortly after retraction of the plunger.

Fig. 11 is a sectional side elevation illustrating a suitable plunger activating mechanism for making my improved cigarette.

Fig. 12 is a sectional side elevation illustrating a knife passing through the compacted center portion of a double length cigarette to obtain two single cigarettes each having a compacted end on one end and an inserted filter plug at the other end.

2

Fig. 13 is a sectional side elevation of a single cigarette obtained by this method, having a dense end on one end and an inserted filter plug on the other end.

Figs. 14-16 are sectional side elevations of a double length cigarette disclosing other devices for making my improved cigarette wherein the tobacco in the core area of the cigarette has less density than the tobacco adjoining the side walls of the cigarette.

Figs. 17-20 show how the improved cigarettes may have filter plugs or hollow tubes inserted into the ends of the cigarettes after the stepped plungers have been withdrawn, and also the manner in which the double length cigarettes are severed into two individual cigarettes.

Fig. 21 is a sectional side elevation illustrating a double length stepped plunger suitable for king-size cigarettes inserted in a double length cigarette.

Fig. 22 is a side elevation of a single length stepped plunger showing the exact construction and dimensions of one type of plunger which may be used for king-size cigarettes.

I have shown in the drawings various embodiments of my invention. In Figs. 1-10 I have shown how a stepped plunger with non-tapering steps can be employed for compressing the filler tobacco in a cigarette both axially and radially.

In some types of tobacco, due to the amount of moisture and types of flavoring employed, it is desirable to employ stepped plungers wherein the base end of each step is cut down more than the far end of the step. Such an arrangement is shown in Figs. 14-16, 21 and 22, and has the advantage that the plungers can be readily withdrawn without pulling out tobacco shreds with the plunger.

The apparatus shown in Figs. 1-10 consists of a pair of clamps 10 and 1 for clamping a length of cigarette rod R having a wrapper W. When the length of cigarette rod R is held in clamped position, a pair of elongated cylindrical stepped plungers 12 and 14 are moved in opposite directions as indicated by the arrow into opposite ends of the double length cigarette as shown in Fig. 1.

The plungers 12 and 14 are slideably mounted in suitable guiding brackets 16 and 18. Due to the steps 20, 22, 24, 26, 28 30, 32, and 34, there is effected two distinct actions. When the steps 20 and 28 first enter the end of the cigarette, the compression effected is primarily lateral, as shown in Fig. 4. As the second step 24 and 30 of the plunger enters into the end of the cigarette, the compression is still primarily outwardly as shown in Fig. 5, with a slight tendency to compress the tobacco longitudinally of the cigarette. As the third step 22 and 32 of the plungers 12 and 14 enters the cigarette, there is now a much more marked tendency to compress the tobacco longitudinally as shown in Fig. 5. As the fourth step 26 enters the cigarette, this tendency is still more marked as shown in Fig. 7.

As the shaft of the plungers 12 and 14 enters the end of the cigarette, there is a longitudinal compression of the tobacco and densification has been found to occur at the opposite end of the cigarette rather than immediately in front of the plunger, due to the stepped arrangement described above. The amount of densification so achieved at the opposite end can be varied and changed by changing the number of steps in the plunger as well as the diameter and length of each step. The degree that the density of the filler tobacco tapers is also controlled and varied in like manner.

The density of the tobacco in the double length cigarette is below normal before the stepped plungers are inserted into the end of the cigarette. In cigarettes having an 8 mm. diameter, a 70 mm. length, and a 16 mm. filter at one end of the cigarette, the amount of tobacco in the finished cigarette will have to have its full normal

density for only 54 mm. in length, due to the space occupied by the filter plug. It will thus be seen that the 54 mm. normal tobacco density of the finished cigarette is uniformly distributed over the 70 mm. length of the cigarette prior to the insertion of the stepped plunger. In the case where double length cigarettes are made the figures just mentioned, of course, would be double the amount set forth.

While I have used a plunger having four steps to illustrate the invention, it will be realized that the number of steps actually employed, the length and diameter of the steps and plunger and the angle of the set-backs will depend upon the type of tobacco being handled, the densification desired thereof, the dimensions of the cigarette, and the filter to be inserted therein. As an example, in this connection, I have shown in Figs. 21 and 22 the actual dimensions of a plunger which is especially well-suited for making a cigarette 85 mm. long with a diameter of 8 mm. and which will have a filter 13 mm. long inserted into the end of the cigarette.

When the plungers 12 and 14 have reached their maximum amount of penetration into the ends of the double length cigarette as shown in Fig. 8, they are then withdrawn. When the plungers are withdrawn, the space occupied by each plunger as shown in Fig. 9 becomes filled again by the expanding action of the tobacco as illustrated in Figs. 9 and 10. The density along the axial length of the cigarette, however, will be less than the density of the filler along the sides of the cigarette.

The end of the cigarette continues to remain densified as shown in Fig. 10 after the plunger is withdrawn, so that there is no tendency for the small shreds or shorts to fall out of the end of the cigarette. Regular filler tobacco or filter plugs are then inserted into the hollow ends of the cigarette. The double length cigarette is then severed across the densified portion of the cigarette to make two cigarettes, each having a densified portion of filler tobacco at one end and tobacco filler or a filter plug at the other end.

From the foregoing description it will be seen that I have provided a device which produces a filler with a densified end at one end and a cavity at the other end of the cigarette. A filter plug, a hollow tube, or a short length of cigarette tobacco is inserted into this cavity to complete the cigarette. This single-step compression operation has several advantages. For example, it enables the mechanism for making my improved cigarette to be made which consists of a cigarette having a dense portion of filler tobacco at one end of the cigarette and a filter plug, hollow tube or length of cigarette rod at the other end of the cigarette.

It has often been said that it is desirable to have a finished cigarette of a density as low as possible without getting hot when smoked. My invention has enabled a cigarette to be made having the tobacco along the longitudinal axis of the cigarette of a low density while the tobacco along the side walls is of high density. As a consequence, I have produced cigarettes having the advantages of an easy draw as is achieved in low density cigarettes and also of a firm full feel as is attained in cigarettes of high density. I have also provided in the same cigarette a densified end which is capable of being severed so as to provide a clean, straight cut without the fine or small shreds of filler tobacco falling out from the end of the cigarette. These improvements in cigarette construction have been disclosed and claimed in my divisional application S.N. 626,568, filed November 19, 1956.

While I have shown how two cigarettes can be densified simultaneously and then severed into two individual cigarettes, it is also possible to use only one cigarette length and a single plunger to obtain the same results with one cigarette at a time.

As illustrated in Fig. 11, the guide brackets 16 and 18 which carry the stepped plungers 12 and 14, respectively, are slideably supported in a suitable horizontal track 40.

From the central portion of the bottom side of said track projects a forked bearing bracket 42 which supports a shaft 44 to the center portion of which is secured a pulley 46 which is rotated or driven by means of a belt 48. An arm 50 and 52 is keyed to each free end of shaft 44 respectively. Arms 50 and 52 are so arranged that they form a straight double lever so that the center of their free ends are in line with the center of their neutral supporting shaft 44.

The free end of arm 50 is connected by means of a link 54 with the free end of a lug 56 projecting from the bottom side of the plunger supporting bracket 16. The free end of arm 52 is connected by means of link 58 to the free end of a lug 60 projecting from the bottom side of the plunger supporting bracket 18.

Rotation of the pulley 46 and shaft 44 causes the plunger supporting brackets 16 and 18 to move towards and away from each other. The effect of the movement of said brackets towards each other results in the entry of the respective stepped plungers into the respective ends of the double length cigarette C and causes the compaction of the tobacco within said cigarette as described hereinbefore.

As the brackets move away from each other the plungers are withdrawn from the ends of said cigarette leaving a densified center and a hollow at each end of the double length cigarette and a less densified section extending along the longitudinal axis of the cigarette, as illustrated in Fig. 3 of the drawings.

The clamp holding said double length cigarette may consist of two individual pockets 62 and 63 of a suitable turret 64 spaced in such a manner as to follow a suitable knife blade 66 to enter between the adjacent ends of said clamp pockets and effect a cutting of the double length cigarette into two individual cigarettes as illustrated in Fig. 12.

The cutting, of course, is done through the densified central portion of the double length cigarette.

A suitable filter plug or a hollow tube or a plug of tobacco or other desired material 70, is inserted manually or by suitable mechanism into the hollow ends of the cigarette. Each individual cigarette F thus formed has a very desirable dense end D on one end and a filter plug 70 or other suitable filling as indicated above on the other as disclosed in Fig. 13 of the drawings.

In the embodiment of my invention shown in Figs. 14-16 I have provided a cigarette clamping structure 72 and 74 for holding a double length cigarette C. Sets of these clamps may be mounted along the periphery of a suitable rotating turret at spaced intervals, as shown, for example, in my co-pending application Serial No. 505,605, filed May 3, 1955. The cigarette filler in the cigarette wrapper 76 is compressed axially and radially by the insertion of a cylindrical stepped plunger 78 into the end of a cigarette in the manner described above. In this embodiment I have shown the stepped plunger made with steps which taper towards the fastened end of the plunger. Each step has the appearance of an inverted, elongated, truncated cone.

The stepped plunger 78 used to illustrate this embodiment consists of a cylindrical member having a plurality of steps 80, 82, 84, 86, each of which is wider at its forward end than at its rear end. A slidable sleeve 88 is mounted on each plunger and has a pin 90 extending through the sleeve 88 through the slot 92. The slot 92 limits the distance the sleeve 88 can slide back and forth on the non-tapering shaft 94. The leading end 89 of the sleeve 88 is tapered or cone-shaped to fit a slight distance into the mouth end of the cigarette holding clamps 72 and 74, respectively, when it is in cigarette holding position. A compression spring 96 is mounted on each shaft 94, and continuously urges the sleeve 88 outwardly from the spring supporting shoulder 98. When the plunger has been completely withdrawn from clamps 72 the pin 90 will be pushed to a position of rest against

5

the far end of slot 92 by spring 96. This structure is also shown and claimed in my application Serial No. 505,605, filed May 3, 1955.

When the plungers 78 are inserted into opposite ends of the double length cigarette the steps 80, 82, 84, and 86 will act on the tobacco in the manner heretofore described, and the nose or tapered end 89 of sleeve 88 upon engagement with the paper 76 and mouth end of clamp 72 will begin sliding back on the shaft 94 as the stepped plunger continues its advance inside of the cigarette. When this occurs, the spring 96 is compressed in the manner shown in Fig. 15.

When the stepped plunger 78 is withdrawn from the cigarette, it does not pull any shreds of tobacco with it from the compressed cigarette filler because of the tapered arrangement of the individual steps 80, 82, 84, and 86 of the plunger. The importance of tapering the steps varies with the type and condition of the tobacco that is being handled. It has been found that there is less tendency for the compressed shreds of tobacco to adhere to the plunger when shaped in this manner, when being withdrawn, as shown in Fig. 16, especially if the filler has a larger than usual amount of moisture and casing.

After insertion and withdrawal of the stepped plunger 12 or 78 the tobacco at the forward end of the cigarette will be in a densified condition while the longitudinal axis of the filler will be less dense because of the insertion of the stepped plunger. The tobacco around the periphery of the cigarette will also be in a compacted and densified condition. After the stepped plunger is withdrawn there is a creeping back of tobacco from the side walls of the cigarette, but this creeping back does not restore the density of the tobacco along the center longitudinal axis of the cigarette to its precompact density. It will thus be apparent that I have provided a cigarette which is of a design which gives the consumer and manufacturer many advantages they did not before have available.

Suitable means are then employed for inserting either a cigarette filter plug, a hollow tube, cigarette tobacco or other suitable material into the hollow cavity of the cigarette. In the apparatus I am showing in Fig. 17, which apparatus may be similar to that shown in my co-pending application, Serial No. 505,605, filed May 3, 1955. These filter plugs, hollow tubes, or lengths of conventional cigarette filler or other means are axially positioned in front of the center of the cigarette holding clamps by means of suitable locating devices 100 which may be similar to the structure shown in my co-pending application. Suitable ejecting plungers 102 are employed for pushing the cigarette filter, hollow tube, or other plug member into the cavity formed by the stepped plunger 78. After the filter plug or other member has been inserted into the end of the cigarette as shown in Fig. 18, the double length cigarette is severed at its center by means of a knife 104 in the manner shown in Fig. 18, to form two completed cigarettes.

With respect to the cigarettes thus formed it will be noted as shown in Figs. 18, 19, and 20 that the center core or longitudinal axis of the cigarette is of lighter density than the end and the side walls of the cylindrical cigarette.

While I have stated that plugs are readily inserted into the hollow ends of the compacted cigarette tobacco as it is held in the cigarette holding clamps, it should be understood that filter material or other suitable material does not have to be in plug form, but could be in a continuous rope of tobacco which is severed after the required amount of such filter material or other material as has been injected into the cigarette directly from the cigarette rod or rope making machine.

The invention hereinabove described may be varied in construction within the scope of the claims, for the particular device selected to illustrate the invention is

6

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. Apparatus for manufacturing filter plug cigarettes comprising a clamp for holding a double length cigarette while maintaining it free from deformation, a plunger having fixed graduated cylindrical steps positioned at each end of said clamp, means for moving said plungers together into and out of engagement with opposite ends of said double length cigarette to compress the cigarette filler lengthwise and a knife for severing said double length cigarette into two cigarettes.

2. Apparatus for forming filter plug cigarettes comprising a cigarette holding clamp having a cigarette clamping surface conforming to the configuration of a double length cigarette, plungers having fixed graduated steps mounted at opposite ends of said clamp for compressing the tobacco filler in said cigarette lengthwise to provide a space for a filter plug, means for moving said stepped plungers simultaneously into and out of engagement with the opposite ends of said double length cigarette to compress the cigarette filler, means for inserting a filter plug into the end of the cigarette into which said stepped plunger was inserted, and a cutter for severing said double length cigarette across the middle to form two individual cigarettes.

3. Apparatus having the features provided for in claim 2 in which said stepped plungers coast with said clamp and move along a path extending through the center of said clamp, the individual steps of said plungers being tapered towards the base of each step, so as to effect when inserted in the end of a cigarette length a densification of the tobacco adjacent the outer surface of the cigarette and form an interior core in the cigarette which is of less densification than the tobacco adjacent the outer surface of the cigarette.

4. Apparatus having the features provided for in claim 2 in which said plungers move in and out of the end of a cigarette held by said clamp to axially and radially compact the cigarette filler in the cigarette held by said clamp to form a cigarette filler which is denser at the outer surfaces of the cigarette than in the interior of the cigarette, said plungers having a series of truncated, elongated cones arranged end-to-end wherein the truncated portion of the cone faces in a direction away from the clamp and the stepped cones decrease in size towards the clamp.

5. Apparatus having the features provided for in claim 2 wherein the steps of said plungers are made up of a series of inverted, truncated elongated cones mounted end-to-end to form a stepped plunger.

6. Apparatus having the features provided for in claim 2 wherein said plungers are made up of a series of tapered steps arranged end to end and which are successively smaller in size and wherein the leading steps are inverted, truncated, cones.

7. Apparatus having the features provided for in claim 2 wherein the said plungers are made up of a series of inverted, elongated, truncated cones mounted end to end which are staggered in decreasing size towards the leading end of the plunger.

8. Apparatus having the features provided for in claim 2 wherein said plungers have shanks and steps which taper inwardly toward the shanks of said plunger to permit withdrawal of said plunger without removal of tobacco from said cigarette.

9. Apparatus for manufacturing filter cigarettes comprising a clamp for holding a double length cigarette, plungers having cylindrical steps of fixed length to be inserted into opposite ends of the double length cigarette held by said clamp to compress the tobacco therein at the center of said double length and a cutter to sever said double length cigarette transversely across the center

of said compressed portion of tobacco to form two individual cigarettes.

10. Apparatus for manufacturing cigarettes comprising means to form double length cigarettes having a filler of desired density, a clamp having a configuration conforming to the diameter of a finished cigarette clamping each double length cigarette, oppositely spaced plungers having fixed cylindrical graduated steps insertable into opposite ends of said cigarettes so as to compress the tobacco filler therein lengthwise to the desired density and to make room for a filter plug and a cutter to sever said double length cigarette at the middle to form two individual cigarettes.

References Cited in the file of this patent

UNITED STATES PATENTS

235,886 Lindsley ----- Dec. 28, 1880

15

485,861
567,947
651,108
1,796,522
1,920,708
1,967,154
1,968,018
2,002,886
2,045,601
2,639,715

5

10

Cohen ----- Nov. 8, 1892
Matz ----- Sept. 15, 1896
DuBrul ----- June 5, 1900
Hopkins ----- Mar. 17, 1931
Molins ----- Aug. 1, 1933
Molins ----- July 17, 1934
Arelt ----- July 31, 1934
Edwards et al. ----- May 28, 1935
Howarth ----- June 30, 1936
Molins ----- May 26, 1953

FOREIGN PATENTS

Great Britain ----- June 10, 1929
Germany ----- Oct. 8, 1931