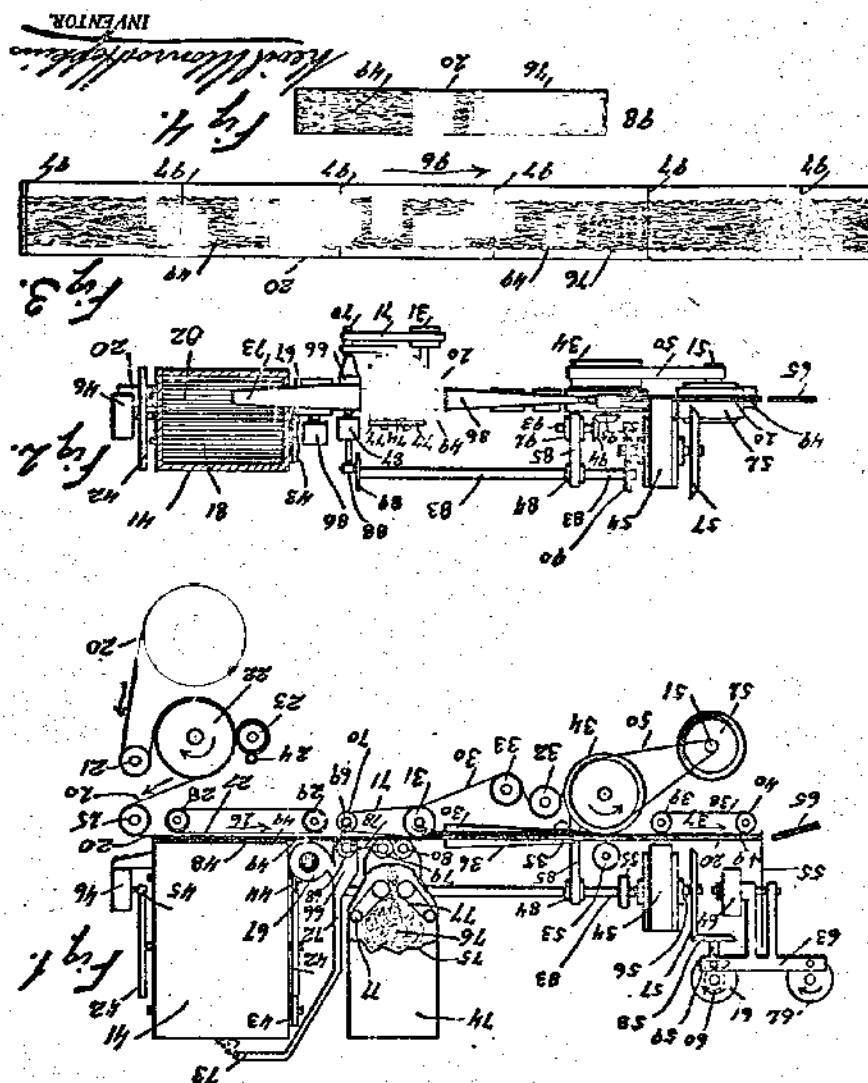


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2 Sheets-Sheet 1

Filed March 24, 1925

CIGARETTE MANUFACTURING MACHINERY

1,721,117

N. M. HOPKINS

July 16, 1929.

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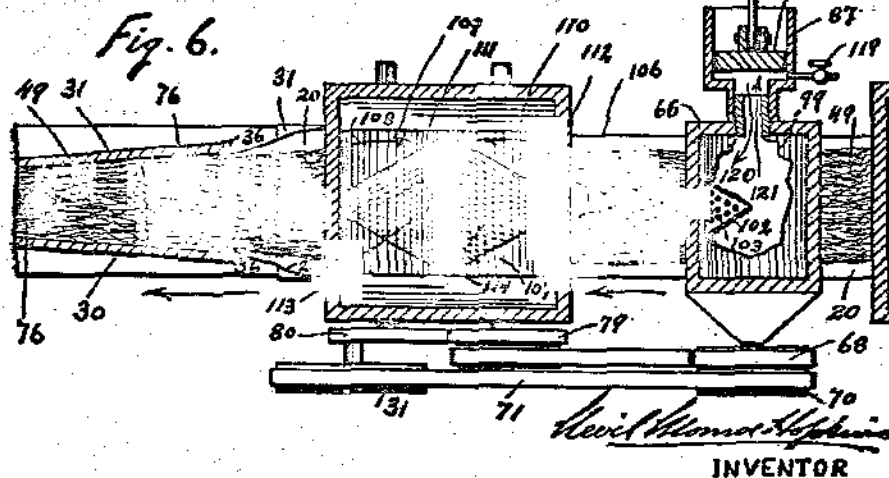
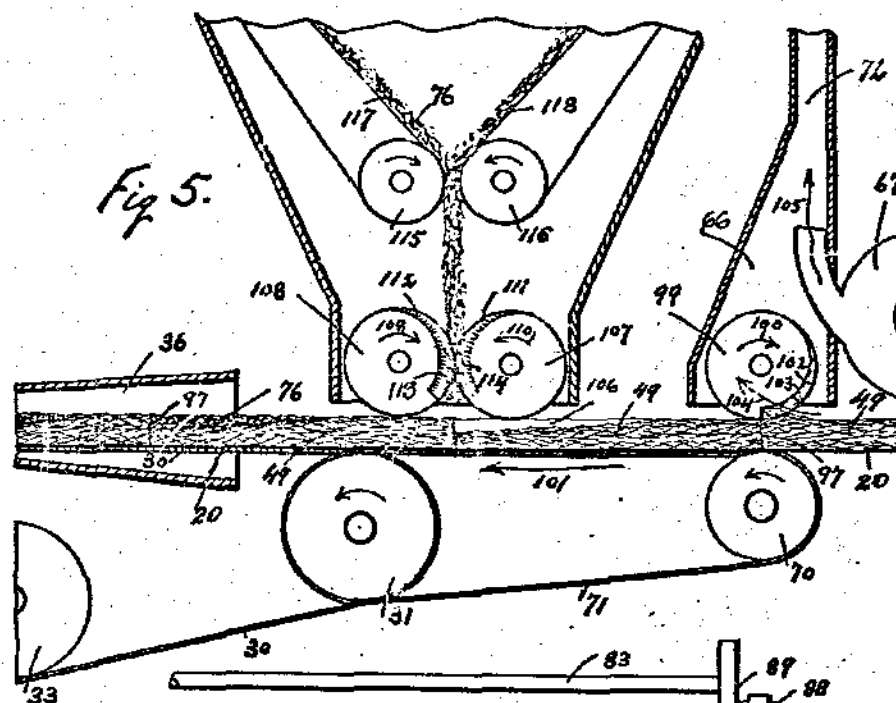
N. M. HOPKINS

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CIGARETTE MANUFACTURING MACHINERY

Filed March 24, 1925

2 Sheets-Sheet 2



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Patented July 16, 1929.

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# UNITED STATES PATENT OFFICE.

NEVIL MONROE HOPKINS, OF NEW YORK, N. Y.

CIGARETTE-MANUFACTURING MACHINERY.

Application filed March 24, 1925. Serial No. 17,987.

This invention relates to novel mechanisms or machinery for making cigarettes, particularly to novel mechanisms and machinery for manufacturing a compound cigarette of uniform smoking qualities, due to the proper distribution of the tobacco with respect to nicotine and other volatiles.

It is a scientific fact that an ordinary cigarette made up of one kind of tobacco, or of tobacco of uniform strength or flavor, or of tobacco with other uniform characteristics, from end to end, grows stronger to the taste as it is smoked, because the tobacco lying between the burning end, and the lips of the smoker in the cigarette, is successively augmented in strength by the condensable volatiles, nicotine, flavors, etc., or in flavor to the taste, as the cigarette is intermittently "puffed" or "drawn upon" from the portion of the cigarette in the fire zone, and it is an object of my invention to provide novel mechanisms and machinery to so construct a compound cigarette, as to eliminate, or to reduce as much as possible, this increase in strength toward the end of the smoke, due to the aforesaid condensed volatiles, as the cigarette is consumed.

In my co-pending applications as follows: Ser. No. 756,732, filed December 18, 1924, method of improving cigarettes, cigars and pipe cartridges; Ser. No. 756,733, filed December 18, 1924, cigarettes, cigars or pipe cartridges; Ser. No. 1,192, filed January 8, 1925, machines for treating cigarettes, cigars and pipe cartridges; Ser. No. 15,589, filed March 14, 1925, cigars; and Ser. No. 15,588, filed March 14, 1925, method of manufacturing cigarettes, there is a detailed discussion of the theory upon which the type of cigarette to be made in the present machine is based, together with some discussion of the principles of chemistry involved. No considerable discussion of this theory is necessary in the present application, but the object of this invention is to provide a machine by which cigarettes may be made in which quantities of mild and strong tobacco are incorporated in the paper wrapper in such manner that when the cigarette is smoked, the quality of the smoke is of uniform strength throughout the burning of the cigarette.

Referring to the accompanying drawings, forming a part of this specification, in which like numerals designate like parts in all the views, Figure 1 is a side view of one of my

machines in diagram and partially in section. Figure 2 is a top plan view of this machine in diagram and partially in section. Figure 3 is a top view considerably enlarged of the cigarette paper passing through this machine and containing the compound spread of different tobaccos thereon as "planted" by my novel mechanism. Figure 4 is a longitudinal section, full-sized through one of my compound cigarettes. Figure 5 is a greatly enlarged sectional view through part of the mechanism shown in Figure 1. Figure 6 is a top plan view in partial section greatly enlarged of a portion of my special mechanism.

The drawings are largely in diagrammatic form, with various simple features of the machine eliminated.

With further reference to Figure 1—20 is the cigarette paper wound in a "hobbin" passing over the tightening wheel 21 and around the larger wheel 22 where it is printed with cross bands and letters as herein-after described, by the print wheel mechanism 23, running in contact with the ink wheel 24. The band of paper 20 continues in its route, and passes over the cylindrical roller 25 giving it a horizontal position, and moving in the direction of the arrow 26, supported by the belt 27, running over the pulleys 28 and 29. This belt is driven at a uniform motion from right to left by a system of belts not shown here in the interest of clearness, furthermore, this belt is naturally and normally in contact with the paper band 20 which it supports and drives, but for the sake of clarity it is shown with a space above and between itself and the paper band. The band continues its travel until it meets with the additional supporting and driving belt 30—30, running over the cylindrical pulley wheel 31 and the tightening wheels 32 and 33 of a width to support and drive the paper band, passing under and around the large cylindrical drum wheel 34 and back to the pulley 31 by way of the cone 35, passing through a slot 35 and in the said cone-forming device 36.

The paper 20 then continues to move in the direction of the arrow 37, supported by the belt 38 running over the pulleys 39 and 40, also belt and motor driven by simple mechanism not shown here for the sake of clearness.

The large tobacco bin at the right 41, is equipped with gears 42, 43 and 44 which are

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driven by the pinion 45 of the electric motor 46, and said gears drive interior rollers, belts and feeding mechanism, according to standard practice for sprinkling tobacco at a uniform, or substantially uniform rate, at the lower edge of the bin 48, on the upper side of the paper band 20, the tobacco being indicated at 49.

With further reference to the large cylindrical or drum wheel 34, the belt mechanisms described, and in turn, the paper band 20 are driven by the driving belt 50 from the pulley 51 of the electric motor 52 in a uniform, or substantially uniform motion. It will be apparent that in the machine there is a continuously operated, or continuously friction driven paper band 20, moving from right to left of the drawing, and a continuous sprinkling, or shower of tobacco upon the upper side of the said moving paper band, which in ordinary standard practice, passes directly through the forming cone 36, by the friction of a soft and pliable belt, which enters the forming cone with the paper band and tobacco, but which leaves the cone through a bottom opening just before the paper "rope" leaves the smaller end of the said cone, having the seam pasted by the pasting wheel 53 and having the paste dried by a blast of air from the centrifugal blower 54, and then being cut off by the reciprocating and rotating knife, an edge view of which is shown at 55'. The knife is given a reciprocating motion back and forth, and up and down, according to standard practice, and the beveled gears shown in dotted lines 59 and 60, and the rotating disks 61 and 62, supporting and drawing the yoke member 63. The disk knife 55' is driven at high speed by the independent electric motor 64. This up and down, and back and forth motion of the revolving knife, is common practice in standard cigarette making machines, adapting the knife to cut off cigarettes at automatic regularly measured intervals from the cigarette "rope", as formed from the paper band and tobacco contents, forming cone, paste and dryer without injuring or buckling said "rope". In the present drawing, a cigarette 65 is shown immediately after having been cut off from the end of the cigarette rope, made from the cigarette paper 20 and the contained tobacco 49.

With further reference to the tobacco bin 41 and the steady sprinkling or feeding of tobacco from the lower edge 48, and the spread of tobacco 49, according to standard practice, a portion of my novel tobacco removing mechanism is shown at 66 which is associated with a centrifugal blower 67 and driven by an independent electric motor immediately behind, and not shown in the present diagram. 68 is a belt wheel operating my tobacco removing mechanism, and being driven by a belt 69 from the

wheel 70 which in turn is operated by the belt 71. The housing of the tobacco removing device is connected to the uptake 72 which discharges some of the tobacco at the point 73 back into the top of the open bin 41. The details of the mechanism of this tobacco removing device will be more fully disclosed in a subsequent detailed view, but it may be stated here that the said tobacco removing device periodically picks up from the moving paper band, small masses of tobacco and returns it to the main feeding bin 41. Immediately to the left of this main feeding bin 41 is the auxiliary tobacco feeding bin 74 cut away at 75, to show a different kind of tobacco or other substance 76, being fed by the roller and feeding belt mechanism 77-77'. The roller feeding devices 77 are operated by an electric motor in the usual manner. Preferably these roller feeding devices will have an intermittent action for purposes presently to be described. Operated by the belt 78 are the gear wheels 79 and 80 which operate feed rollers within, which feed or "plant" the tobacco 76, upon the voids on paper band 20, made by the tobacco removing device 66. These feed rollers 107 and 108 rotate continuously toward each other, and their surfaces 111 and 112 are provided with triangular registering recesses 114 and 113, respectively. These recesses 114 and 113 are each fitted with sharp points and are arranged so that as the recesses register, they form a closed chamber having greatest width at the point of registration, this chamber gradually decreasing in width as the rollers rotate. Accordingly, the tobacco 76 supplied by feeder 77, which includes belts 117 and 118 moving toward each other over rollers 115 and 116, respectively, falls in the chamber formed by recesses 113 and 114, and is enclosed thereby in a gradually decreasing amount, which is likewise deposited in voids 106 in a gradually decreasing amount, as shown in the drawings. As these recesses 113 and 114 cover only a portion of the entire periphery of the respective planting rollers in order to produce the desired intermittent tobacco-planting action, it is not necessary that tobacco from hopper 74 be supplied continuously, but only when recesses 113 and 114 are registering to form the chamber described. Accordingly, an intermittent motion may be applied to rollers 115 and 116 over which pass the feeding belts 117 and 118 of the tobacco hopper 74, this intermittent motion being produced and synchronized with the rotation of planting rollers 109 and 110 in any well-known manner.

The centrifugal blower 54 is operated from the gear 55 from a gear directly behind and not shown in present drawing

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on shaft 83. On the said shaft 83 is a pulley wheel 84 with a driving belt 85 which goes to a pulley and bevel gear, not shown in present drawing, but which connects with the large drum driving wheel 34.

With further reference to Figure 2, which is a top plan view of partial section, with the reciprocating standard knife mechanism removed for the sake of clearness, 41 is a sectional view through the large tobacco bin. 42 and 43 are driving gears therefore operated by the electric motor 46. 73 is the top of the housing of the tobacco uptake from the tobacco removing mechanism in the housing 66. 67 is the centrifugal fan driven by its independent electric motor 86, communicating with the interior of my tobacco removing mechanism at 66 is an air pump 87 operated by the wrist pin 88 and crank 89 on the shaft 83. 77-77 is a top view of the tobacco feed mechanism in the auxiliary bin 74 and the pulley 31 and belt 71 and pulley 70 and connecting belt is shown in top view looking down.

The large driving drum or cylindrical pulley 34 is driven by the belt 50 running over the small motor pinion 51 of the electric motor 52. The centrifugal blower or drying apparatus 54 is mounted on shaft 83 which is driven from pulley 34 through intermeshing beveled gears 94 and 95, pulleys 84 and 92 and belt 85 connecting these pulleys. The large beveled gear 57 is again shown but with the reciprocating knife mechanism removed therefrom in the interests of clarity. The cigarette is again shown at 65, severed from the tobacco "rope" made from the said paper band 20 and the tobacco 49.

With further reference to Figure 3, 20 is the paper band which has been run through my apparatus in the direction of the arrow 96, and containing the two tobaccos 49 and 76 respectively. Due to my tobacco removing mechanism, and my associated synchronized tobacco planting mechanism, there appear in regularly spaced intervals between the imprints or band marks 97-97-97-97-97, the two tobaccos upon the band.

With further reference to Figure 4, I have a longitudinal section through one of my compound cigarettes showing the tobaccos at 49 and 76. The end 98 of this cigarette is the end adapted to be lighted, and the condensation products from the tobacco 76 condense in the tobacco 49 the cross section of the stronger tobacco 76 growing smaller as smoked, and the cross section of the tobacco 49 growing larger.

In Fig. 5 there is shown the paper cigarette band at 20, carrying the tobacco 49 spread uniformly or evenly upon it by the standard mechanism of the main tobacco bin not shown again here. 67 is the centrifugal blower, and 66 is the housing of

the tobacco removing device, and 72 the uptake therefrom. 99 is the end of the tobacco removing device which consists of a hollow drum which rotates in the direction of the arrow 100, being driven by a belt so as to have a peripheral speed the same as the speed of movement of the paper band to make one revolution when the paper band 20 with the transversely printed bands 97-97-97 come underneath as said paper band 20 travels in the direction of the arrow 101. 70 is one of the driving drum wheels operated by the belt 71 from the drum pulley wheel 31 operated by the belt 30 which consists of a very pliable friction belt, and which comes in close contact with the cigarette paper 20, especially within the forming cone 36. 33 is one of the belt tightening drum pulleys. As the hollow tobacco removing drum wheel 99 revolves, its offset or recess in its periphery 102 having a perforated face sweeps over the tobacco 49, and air is drawn through a series of small holes 103, which communicate with the interior of the revolving cylindrical device 99. The dotted arrow 104 shows how tobacco may be drawn to and pulled against the small openings 103, as the member 99, which has the air pumped from its interior by a synchronized pump, revolves. And it may also be readily appreciated that during the period of revolution of the hollow drum member 99 that in place of a vacuum within the cylinder member 99, an air pressure may be automatically and synchronously substituted therefor by a synchronously operated pump, exhausting air in the direction of the dotted arrow 104 and later releasing the tobacco 49, which had been held against the small openings 103, by an alternate air pressure from the pump and a blast of air from the blower 67 to carry the tobacco particles in the direction of the long arrow 105 up the uptake 72. As the band of paper 20 is advancing from right to left or in the direction of the arrow 101, and as the cylindrical, vacuum-pressure device revolves, some of the tobacco 49 is removed by suction in a more or less wedge-shaped mass, leaving a void 106 shown approaching under the tobacco "planting" cylinders 107 and 108. These cylinders are rotated at a rate such that as each void 106 comes beneath the line of contact of the cylinders, tobacco which is discharged from the recesses 111 and 112 in the surfaces of the cylinders, is dropped into the void. In the recesses are sharp projections 113 and 114 for holding the tobacco until it is released, this tobacco being introduced into recesses 111 and 112 by rotating rolls 115 and 116 discharging tobacco 76 from container 74".

With further reference to Figure 6 we have a top plan view partially in section of this apparatus where the paper cigarette

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band is again shown at 20, the tobacco 49 from the first bin or reservoir 41, a section through the housing of the tobacco removing device at 66 and a view of the revolving tobacco removing cylinder partially cut away at 99, but leaving projecting upward in elevation a tip of the triangular recess member 102, having a perforated face showing some of the small holes 103 therein. The driving mechanism of this revolving tobacco removing device is shown again by a pulley 70, a belt 71, a pulley 31 and a belt 63 which also drive the pulleys 79 and 80 of the tobacco "planting" device.

The revolving tobacco removing device 99 where it is cut away, shows its interior in communication with the pump 87 equipped with a pet-cock 119 by means of which variations of vacuum on the one hand and the amount of air compression on the other hand may be regulated, depending upon how much by-pass is allowed by the adjusting of said pet-cock 119. The arrows 120 and 121 respectively show the alternating vacuum and air pressure, set up within the cylinder 99, in synchronism with its revolutions, drawing the tobacco 49 alternately against the numerous small openings or holes 103, and expelling it alternately into the housing 66, to be swept upward by a blast of the centrifugal fan 67 shown in the previous illustrations. The pump 87 has a piston 122 operated from the wrist pin 88 of the crank disk 89 upon the shaft 83. It will thus be seen that as the paper band 20, carrying the tobacco in a uniform depth of layer or substantially uniform depth of layer passes under the tobacco removing cylinder 99, the tobacco is removed from the band, carried around with the cylinder, and expelled, leaves voids 106 in the band of tobacco at equally spaced intervals.

The tobacco planting device, receiving tobacco from the feeding mechanism 77, deposits this tobacco in the voids in the band so that the band is substantially of uniform shape and size after leaving the planting drums, but contains tobaccos of two different kinds, arranged as shown in Fig. 3.

The strip of paper with the tobacco on it, passing from the planting drums, is led through the usual cone, in which the paper is rolled to form the usual tubular cylinder which encloses the tobacco. The overlapping edges of the paper are then pasted by suitable mechanism, and delivered by an air blast, after which the rope is cut into suitable lengths, the line of severance passing across the band at the forward end of each void in which the stronger tobacco has been deposited.

Instead of depositing stronger tobacco in the form of a triangular mass on the paper band, the machine may be operated merely to distribute additional tobacco on the band

at the appropriate points, or some suitable flavoring material may be distributed by the action of the planting drums. Also, instead of the stronger tobacco being deposited in the form of a wedge-shaped mass, masses of other shapes may be incorporated in the rope.

#### Claims:

1. In a cigarette making machine, the combination of means for continuously advancing a band of paper, feeding mechanism operating to deposit a continuous layer of tobacco on the band, mechanism for removing tobacco from the band at spaced intervals, and means for feeding tobacco to replace that removed.

2. In a cigarette making machine, the combination of means for continuously advancing a band of paper, feeding mechanism operating to deposit a continuous layer of tobacco on the band, mechanism for removing portions of the tobacco on the band lying at intervals along the band and mechanism for depositing tobacco of a different kind at said intervals on the band.

3. In a cigarette making machine, the combination of means for continuously advancing a band of paper, feeding mechanism operating to deposit a continuous layer of tobacco on the band, suction mechanism for removing tobacco from the band to leave spaced voids, and means for filling these voids with tobacco.

4. In a cigarette making machine, the combination of means for continuously advancing a band of paper, feeding mechanism operating to deposit a continuous layer of tobacco on the band, a rotary suction member contacting with the tobacco on the band and intermittently operative to remove masses of tobacco therefrom, and means for depositing tobacco on the band to replace that removed.

5. In a cigarette making machine, the combination of means for continuously advancing a band of paper, feeding mechanism operating to deposit a continuous layer of tobacco on the band, mechanism for removing portions of the tobacco lying at spaced intervals along the band, mechanism for replacing the tobacco thus removed with tobacco of a different kind, means for folding the paper to form a wrapper of indefinite length for the tobacco, and means operating to sever the wrapper into lengths with the line of severance lying at one end of the mass of tobacco placed on the band to replace that removed by the first-mentioned mechanism.

6. In a cigarette making machine, the combination of means for continuously advancing a band of paper, feeding mechanism for depositing a continuous layer of tobacco on the band, means operating to remove spaced portions of the layer of tobacco and means operating to substitute tobacco of a different

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kind for the portions of tobacco removed from the band.

7. In a cigarette making machine, the combination of means for continuously advancing a band of paper, means for depositing a continuous layer of tobacco on the paper, a hollow rotary element having a perforated face contacting with the layer of tobacco, and means for alternately creating pressure and partial vacuum within the element, whereby the latter removes a portion of the tobacco from the layer and discharges it.

8. In a cigarette making machine, the combination of means for continuously advancing a band of paper carrying a layer of tobacco, means for removing portions of said tobacco to form spaced voids, and feeding mechanism for intermittently depositing different tobacco in these voids to form a continuous layer of tobacco on the band.

9. In a cigarette making machine, the combination of means for continuously advancing a band of paper carrying a layer of tobacco having spaced voids substantially of predetermined shape, feeding mechanism for

intermittently depositing tobacco in these voids to form a continuous layer of substantially uniform thickness, means for wrapping the paper about the tobacco and securing the edges of the paper to form a cigarette rope of indefinite length, and means for severing the rope at one end of each filled void.

10. In a cigarette making machine, the combination of means for continuously advancing a band of paper, means for continuously applying a uniform layer of tobacco thereto, a suction device adjacent the surface of said layer for removing spaced portions to form voids therein, a feed device adjacent said layer for intermittently depositing a different tobacco in the voids therein to again form a continuous layer, means for folding and securing the paper around the tobacco and means for severing equal lengths from the rope thus formed.

Signed at New York city, in the county of New York and State of New York, this 20th day of March A. D. 1925.

NEVIL MONROE HOPKINS.

### CERTIFICATE OF CORRECTION.

Patent No. 1,721,117.

Granted July 16, 1929, to

NEVIL MONROE HOPKINS.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 4, line 41, before the word "leaves" insert the words "and this action"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 13th day of August, A. D. 1929.

(Seal)

M. J. Moore,  
Acting Commissioner of Patents.

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