March 22, 1938 D. W. MOLINS 2,111,672

MANUFACTURE OF CIGARETTES

Filed June 29, 1936 2 Sheets-Sheet 1

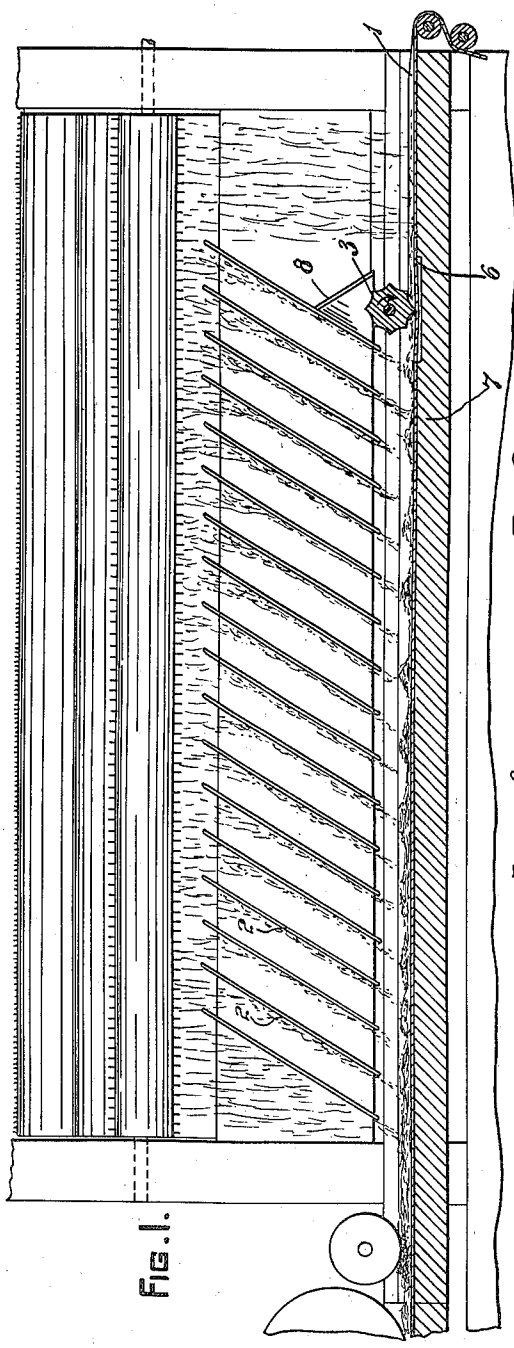


FIG. 1.

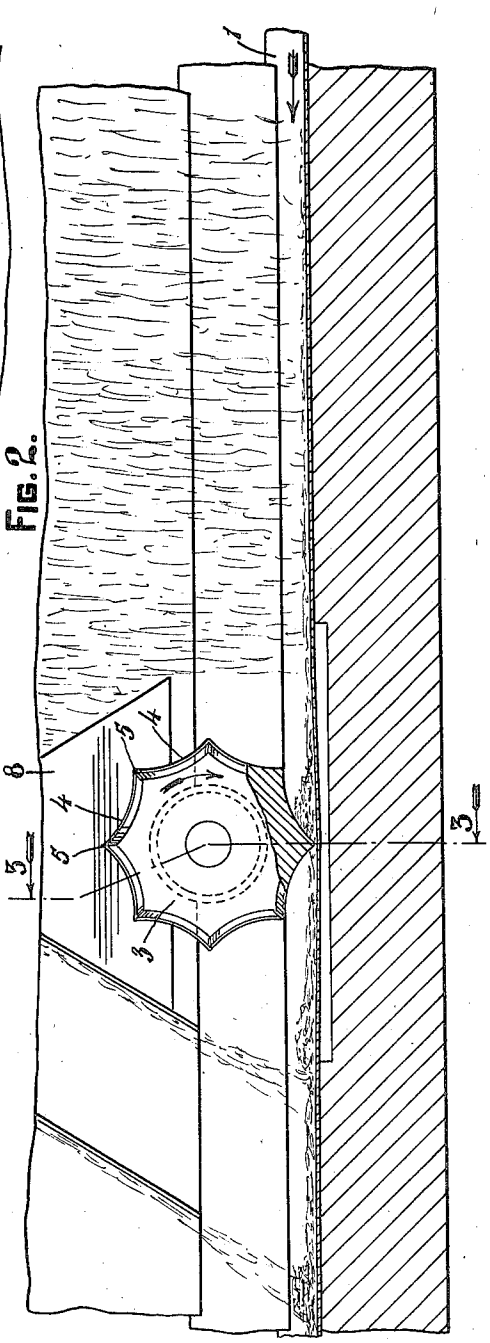


FIG. 2.

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MANUFACTURE OF CIGARETTES

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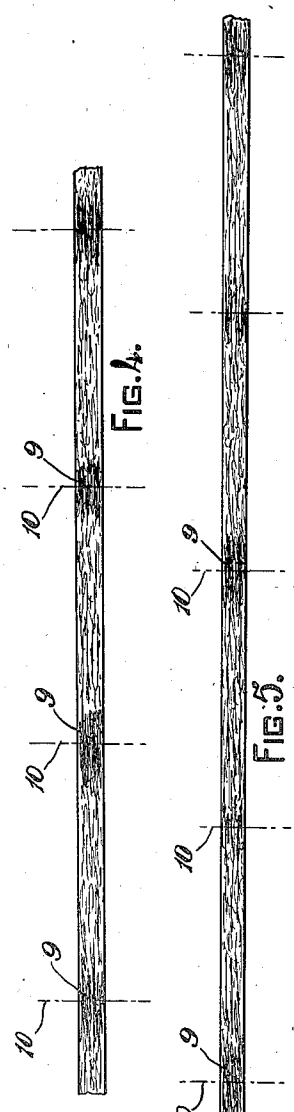


FIG. 4.

FIG. 5.

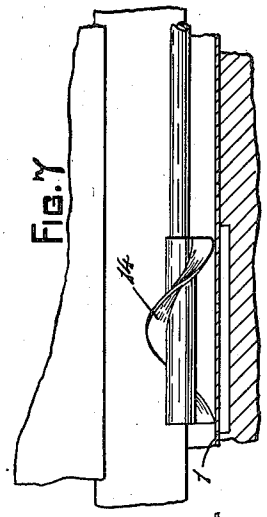


FIG. 7

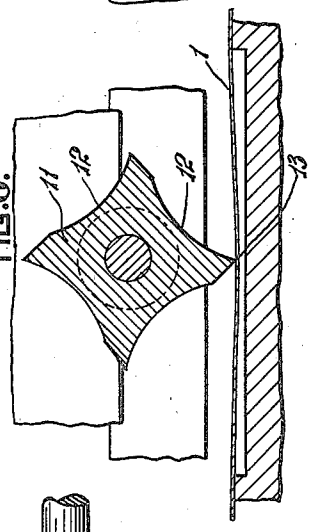


FIG. 6.

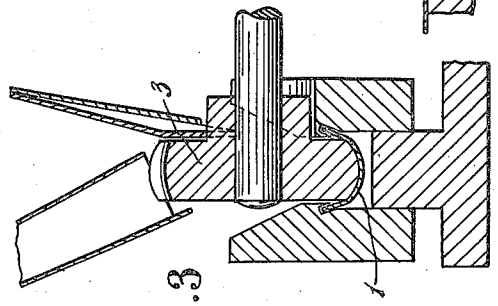


FIG. 3

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UNITED STATES PATENT OFFICE

2,111,672

MANUFACTURE OF CIGARETTES

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Application June 29, 1936, Serial No. 88,001
In Great Britain July 25, 1935

10 Claims. (Cl. 131—39)

This invention is for improvements in or relating to the manufacture of cigarettes, and is concerned particularly with a method of forming a stream of tobacco having alternate sections of greater and less density, which stream is to be formed into a continuous tobacco rod.

According to the present invention there is provided a method of forming a stream of tobacco having alternate sections of greater and less density by feeding tobacco to a moving surface from a source of supply extending lengthwise of the direction of movement of said surface so that each portion of the surface as it moves receives tobacco from successive points along the length of the source of supply, re-distributing the tobacco received on the moving surface into spaced heaps, and thereafter conveying the re-distributed tobacco past the remainder of the length of the source of supply and towards the other end thereof to receive tobacco therefrom.

Further, according to the present invention there is provided apparatus for carrying out the above method, wherein the re-distributing of the tobacco is effected by a movable element which alternately holds up and releases the tobacco carried forwardly by the moving surface.

The movable element may comprise a rotatable fluted wheel whose periphery moves with the moving surface, but at a slower speed, the flutes of the wheel being arranged transverse to the direction of movement of the tobacco on the moving surface. The flutes may be so spaced that there is a ridge or a relatively sharp edge between the adjacent flutes. The periphery of the wheel and the flutes may be convex considered in the direction of the axis of the wheel.

The invention will be more particularly described by way of example with reference to the accompanying drawings, in which:—

Figure 1 shows in sectional elevation part of tobacco feeding mechanism and a moving surface to receive tobacco therefrom and a wheel for redistributing tobacco on the moving surface.

Figure 2 shows a part of Figure 1 drawn to an enlarged scale.

Figure 3 is a section on the line 3—3, Figure 2.

Figure 4 is a view showing a section of a continuous tobacco rod having alternate sections of greater and less density.

Figure 5 shows a modified form of continuous tobacco rod.

Figure 6 shows a modified construction of wheel for redistributing tobacco.

Figure 7 shows a still further modified form of device for redistributing tobacco.

Like references refer to like parts throughout the specification and drawings.

Referring to Figures 1 to 5.—Tobacco is fed by any suitable tobacco feeding mechanism so as to form a source of supply of tobacco which, in the drawings, is shown as a shower of tobacco, the length of which extends in the direction of a moving surface 1, which surface in the drawings is shown as an endless band. It will be appreciated that if desired the endless band may be replaced by a continuous paper web.

The supply of tobacco in the form of a shower is deposited upon the moving surface 1, and if desired, the shower of tobacco may be sub-divided by vanes 2 so as to form a plurality of streams which are delivered on to the moving surface 1. The vanes 2 may, if desired, be arranged as shown in the drawings so that they impart to the tobacco a component of movement in the direction of the moving surface 1.

To one side or one end of the shower of tobacco, see Figure 1, and above the moving surface, there is positioned a fluted wheel 3, the periphery of which, together with the flutes, is convex as can be more clearly seen from Figure 3.

The flutes 4 of the wheel 3 are so spaced that between each adjacent pair of flutes there is a ridge or relatively sharp edge 5.

As will be seen from the drawings, the flutes are arranged transverse to the direction of movement of the moving surface 1 and the wheel 3 is rotated so that it has a peripheral speed which is less than the speed of the moving surface 1. The wheel 3 is disposed above the moving surface 1 so that the ridges 5 engage with or are closely adjacent to the moving surface 1. As shown in Figures 1 and 2, a slot 6 is cut in the supporting plate 7 over which the moving surface 1 is passed, and the rotatable wheel 3 is arranged so that the ridges 5 can rub against the moving surface to separate the tobacco satisfactorily without jamming against the plate 7 and without nipping the moving band or moving paper web, as the case may be, between the wheel 3 and plate 7.

As will be seen from Figures 1 and 2, the rotatable wheel 3 is located a short distance inwardly from that side or end of the shower from which tobacco is first deposited upon any given point from the moving surface, and when vanes 2 are provided a shrouded vane 8 is arranged as shown in Figures 1 and 2 to ensure

that tobacco is not deposited upon the upper surface of the rotatable wheel.

It will be seen, therefore, that by the arrangement above described by the time that any particular point of the moving surface reaches the wheel 3 there will be a slight amount of tobacco on the moving surface. As the moving surface continues to advance, the fluted wheel holds back the tobacco and causes the latter to be redistributed so that it varies in density from point to point by arranging it in spaced heaps. The heaps may be spaced apart by an amount such that the distance apart of the centres of the heaps is equal to the length of the cigarettes to be made. In this case the cigarettes will have dense portions at each end.

The forming of the continuous tobacco rod when the cigarettes made therefrom have dense portions at each end, is shown clearly in Figure 4, the more dense portions being indicated at 9, and the points at which the rod is severed are indicated by chain lines 10.

Alternatively, the distance apart of the centres of the heaps may be double that stated above, in which case each cigarette will have only one dense end and such a construction is shown in Figure 5.

The tobacco which has been redistributed into heaps is then moved past the remainder of the shower and receives tobacco from successive points along the length of the latter. Thus the stream of tobacco is built up to a filler for a cigarette rod having sections of greater and less density.

From the foregoing description it will be seen that if the quantity of tobacco for the whole rod is received equally from each of 19 places along the shower in the example given, one-nineteenth part of the tobacco in the rod will be used to add increased density to the ends of the cigarettes when cut, and since the tobacco on this part would, but for the rotating wheel, have been equally distributed along the rod, it will be seen that the redistribution of the tobacco in each cigarette has been effected by removing to the ends of each cigarette equal amounts of tobacco from the remainder of the length of the cigarette, so that the density of the cigarette over its length between the dense portions will be one-nineteenth less than if the tobacco had not been redistributed.

When the filler for the cigarette rod has been formed in the manner above described, it is enclosed in an endless wrapper by passing it through folding elements arranged to fold the wrapper about the filler and past means for securing the longitudinal edges to form the seam of the cigarette rod.

The cigarette rod so formed is then severed as indicated in Figure 4 or alternatively, as indicated in Figure 5.

The mechanism for folding the wrapper about the continuous tobacco filler and for severing the cigarettes may be of any known form and is not described or illustrated herein.

Instead of the fluted wheel 3 there may be provided a rotatable member 11 of generally rectilinear form as shown in Figure 6, and that part of the side of the member which engages the tobacco on the moving surface is fluted as shown at 12, the flutes being arranged transversely to the direction of movement of the moving surface 1, so that ridges 13, which are similar to the ridges 5 previously referred to, are provided.

The member 11 is rotated so that the ridges 13 move at a speed which is less than the speed of the moving surface 1, and the operation of the member 11 is in other respects similar to the operation of the wheel 3 above described. It is found, however, that the fluted wheel 3 is, in practice, better than the member 11, in that owing to the acute angle between the moving surface and the surface of the flute, the tobacco is better collated than is the case when the member 11 is used.

Referring to Figure 7.—In this modified construction instead of the fluted wheel 3 there is provided a screw-thread 14 which is rotatable about an axis which lies in the direction of movement of the moving surface, and the thread is so arranged relatively to the speed of rotation of the screw that successive points of the helix have a slower linear speed than the speed of the moving surface.

In this way, the tobacco which is first deposited upon the moving surface 1 is caused to heap up in a manner similar to that previously described.

If desired, the screw-thread may be provided with a compound pitch, for instance, the pitch of the thread where the tobacco first meets the latter may be less than the pitch of the thread at the other end so that the tobacco reaches first the part of the screw thread with the small pitch, and is collated thereby and subsequently is released at a slightly greater velocity considered in the direction of movement of the moving surface.

What I claim as my invention and desire to secure by Letters Patent is:—

1. A method of forming a stream of tobacco having alternate sections of greater and less density by feeding tobacco to a moving surface from a source of supply extending lengthwise of the direction of movement of said surface so that a stream of tobacco is built up on the moving surface while the latter is passing from one end to the other of said supply, obstructing that part of the tobacco which is first delivered to the moving surface whereby said surface moves relatively to the obstructed tobacco thereon and heaps are formed on said surface, and releasing the heaps at predetermined intervals whereupon the moving surface conveys the heaps past the remainder of the length of the source of supply.

2. Apparatus for forming a stream of tobacco having alternate sections of greater and less density comprising in combination a moving tobacco receiving surface, mechanism to feed tobacco to said surface from a source of supply which extends lengthwise of the direction of movement of said surface, and an element movable in timed relationship with the moving surface to cause relative movement between the moving surface and the tobacco thereon so as to form spaced heaps of tobacco on said surface at predetermined intervals, said element being arranged between the ends of the supply of tobacco considered in the direction of movement of the moving surface and towards that end of the supply from which tobacco is first received by the moving surface.

3. Apparatus for forming a stream of tobacco having alternate sections of greater and less density, comprising in combination a moving tobacco receiving surface, mechanism to feed tobacco to said surface as a shower which extends lengthwise of the direction of movement of said surface, and an element adjacent to and movable in timed relationship with the moving surface to obstruct the tobacco carried thereby and to release the obstructed tobacco at predetermined intervals so as to form spaced heaps of tobacco there-

on, said element being arranged between the ends of the shower of tobacco considered in the direction of movement of the moving surface and towards that end of the shower from which tobacco is first received by the moving surface.

4. Apparatus for forming a stream of tobacco having alternate sections of greater and less density comprising in combination, a moving tobacco receiving surface, mechanism to feed tobacco to said surface from a source of supply which extends lengthwise of the direction of movement of said surface, and a fluted wheel rotatable about an axis transverse to the direction of movement of the moving surface, a flute of said wheel being moved into a position adjacent the moving surface to collect the tobacco carried by the moving surface so as to form a heap of tobacco thereon, said wheel being rotated in timed relationship with the moving surface so that heaps of tobacco are provided at predetermined intervals thereon and arranged between the ends of the supply of tobacco considered in the direction of movement of the moving surface and towards that end of the supply from which tobacco is first received by the moving surface, the rotation of the wheel being in a direction such that when the flutes release the heaps of tobacco the flutes are moved in the same direction as the moving surface, the peripheral speed of the wheel being slower than the surface speed of the moving surface.

5. Apparatus for forming a stream of tobacco having alternate sections of greater and less density comprising in combination, a moving tobacco receiving surface, mechanism to feed tobacco to said surface from a source of supply which extends lengthwise of the direction of movement of said surface, and a fluted wheel rotatable about an axis transverse to the direction of movement of the moving surface, a relatively sharp edge being provided between adjacent flutes, a flute being moved into a position adjacent the moving surface to collect the tobacco carried by the moving surface so as to form a heap of tobacco thereon, said wheel being rotated in timed relationship with the moving surface so that heaps of tobacco are provided at predetermined intervals thereon and arranged between the ends of the supply of tobacco considered in the direction of movement of the moving surface and towards that end of the supply from which tobacco is first received by the moving surface, the rotation of the wheel being in a direction such that when the flutes release the heaps of tobacco the flutes are moved in the same direction as the moving surface, the peripheral speed of the wheel being slower than the surface speed of the moving surface.

6. Apparatus for forming a stream of tobacco having alternate sections of greater and less density comprising in combination, a moving tobacco receiving surface, mechanism to feed tobacco to said surface from a source of supply which extends lengthwise of the direction of movement of said surface, and a fluted wheel rotatable about an axis transverse to the direction of movement of the moving surface, the flutes of said wheel being convex considered in the direction of the axis of the wheel and arranged transverse to the direction of movement of the moving surface, a flute being moved into a position adjacent the moving surface to collect the tobacco carried by the moving surface so as to form a heap of tobacco thereon, said wheel being rotated in timed relationship with the moving surface so that heaps of tobacco are provided at predetermined intervals thereon and arranged between the ends of the supply of tobacco considered in the direction of movement of the moving surface and towards that end of the supply from which tobacco is first received by the moving surface, the rotation of the wheel being in a direction such that when the flutes release the heaps of tobacco the flutes are moved in the same direction as the moving surface, the peripheral speed of the wheel being slower than the surface speed of the moving surface.

7. Apparatus for forming a stream of tobacco having alternate sections of greater and less density comprising in combination, a moving tobacco receiving surface, mechanism to feed tobacco to said surface from a source of shower which extends lengthwise of the direction of movement of said surface, and a member of generally rectilinear form rotatable about an axis transverse to the direction of movement of the moving surface, said rotatable member being provided on each of its sides with a flute extending transversely of the direction of movement of the moving surface, a flute being moved into a position adjacent the moving surface to collect the tobacco carried by the moving surface so as to form a heap of tobacco thereon, said rotatable member being rotated in timed relationship with the moving surface so that heaps of tobacco are provided at predetermined intervals thereon and arranged between the ends of the shower of tobacco considered in the direction of movement of the moving surface and towards that end of the shower from which tobacco is first received by the moving surface, the rotation of the wheel being in a direction such that when the flutes release the heaps of tobacco the flutes are moved in the same direction as the moving surface.

8. Apparatus for forming a stream of tobacco having alternate sections of greater and less density comprising in combination, a moving tobacco receiving surface, mechanism to feed tobacco to said surface from a source of supply which extends lengthwise of the direction of movement of said surface, and a screw thread rotatable about an axis which lies substantially in the direction of movement of the moving surface, the screw thread being rotated so that successive points of the helix are moved adjacent the moving surface and have a slower linear speed than that of the moving surface to collect the tobacco carried by the moving surface so as to form spaced heaps of tobacco thereon at predetermined intervals, said rotatable screw thread being arranged between the ends of the supply of tobacco considered in the direction of movement of the moving surface and towards that end of the supply from which tobacco is first received by the moving surface.

9. A method of forming a stream of tobacco having alternate sections of greater and less density by feeding tobacco to a moving surface as a shower extending lengthwise of the direction of movement of said surface so that a stream of tobacco is built up on the moving surface while the latter is passing from one end to the other of said shower, collecting that tobacco which is first delivered to the moving surface so that such tobacco is assembled in heaps at predetermined intervals on said moving surface and conveying the heaps of tobacco past the remainder of the length of the shower.

10. Apparatus for forming a stream of tobacco having alternate sections of greater and less

density comprising in combination a moving tobacco receiving surface, mechanism to shower tobacco towards said surface as a shower which extends lengthwise of the direction of movement of said surface, and an element movable in timed relationship with the moving surface to collect the tobacco carried thereby so as to form heaps of tobacco thereon at predetermined intervals, said element being arranged between the ends of the shower considered in the direction of movement of the moving surface and towards that end of the shower from which tobacco is first received by the moving surface.

DESMOND WALTER MOLINS.