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E. G. PRESTON ET AL

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CIGARETTE CONVEYING AND ALIGNING APPARATUS.

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2 Sheets-Sheet 1

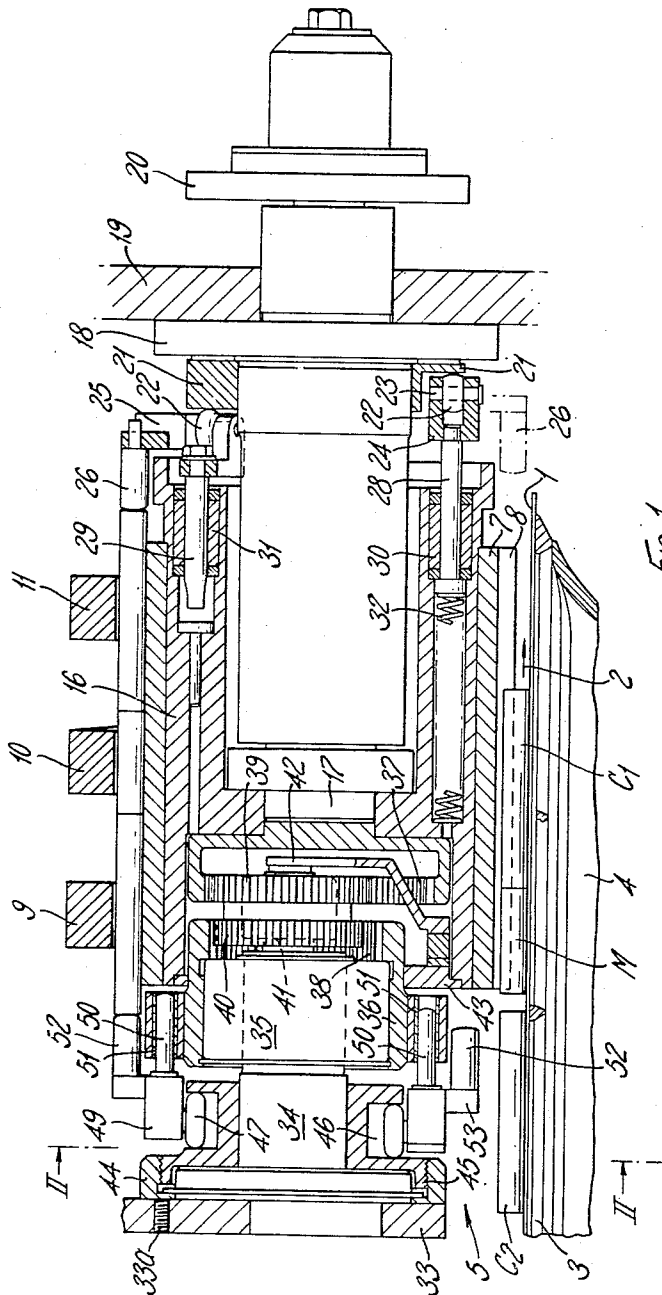


FIG. 1.

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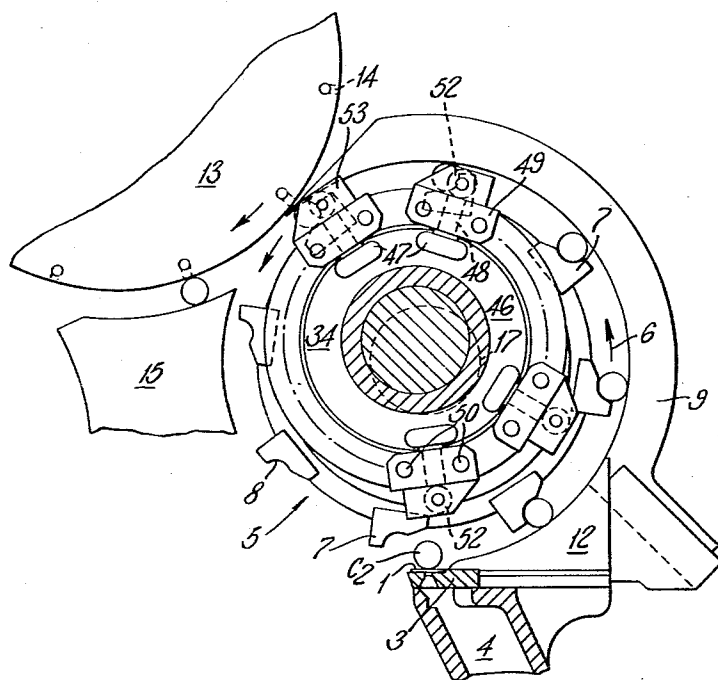


FIG. 2.

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CIGARETTE CONVEYING AND ALIGNING
APPARATUS

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30,639/65

9 Claims. (Cl. 198—25)

This invention concerns improvements relating to tobacco manipulating machinery in which rod-like articles (e.g. cigarettes or cigars) having a mouthpiece are produced.

During the manufacture of such rod-like articles it is usual to form groups of components. Each group may consist of at least one mouthpiece and, say, one cigarette arranged end to end whilst at a later stage these components are joined by an encircling adhesive band. A more usual arrangement is for a group to consist of two cigarettes with an intervening mouthpiece. The encircling band is then wrapped around the whole of the mouthpiece and around adjacent end portions of the two cigarettes. In an alternative arrangement two relatively narrow bands may be wrapped around the two regions in which the mouthpiece is abutted by the cigarettes' ends. In both cases the resulting assembly is cut midway through the mouthpiece to produce two mouthpiece cigarettes. A further alternative is to join a single mouthpiece to one cigarette, preferably by means of a narrow encircling band. The same arrangement is equally applicable to cigars having mouthpieces.

In all the above arrangements it is necessary to cause the components to be abutted in endwise relationship and to have them correctly positioned lengthwise in relation to the band applying mechanism before the bands are actually applied. It is an object of this invention to provide simplified apparatus by which the components may be correctly positioned in abutting relationship.

According to the present invention there is provided a machine for the production of rod-like articles such as mouthpiece cigarettes, cigars or the like, comprising first conveying means by which groups of components (e.g. mouthpieces and cigarettes, cigars or the like) axially aligned are conveyed in succession in an axial direction, second conveying means to which each group is transferred in succession and by which the groups are moved in a direction transversely of said axial direction, a first presser member for engaging the leading end of the leading component of a group and a second presser member adapted to clear the trailing components of a group during transfer and to engage the free end opposite the leading end thereafter.

Apparatus embodying the invention and forming part of more extensive apparatus for making mouthpiece cigarettes will now be described by way of example with reference to the accompanying drawings in which:

FIGURE 1 is a section through the apparatus; and

FIGURE 2 is a section on the line II—II of FIGURE 1.

An air-pervious conveyor 1 runs in the direction of arrow 2 in FIGURE 1 along a bed 3 of a mouthpiece cigarette-making machine, beneath which is a suction chamber 4, air being drawn through the conveyor 1 and through openings in the bed 3.

The conveyor 1 extends from the cut-off mechanism of the cigarette-making machine which is not shown. Suitable mechanism places cigarettes and mouthpieces on this conveyor in such a way that groups each consisting of two cigarettes, C_1 and C_2 , with an intervening mouthpiece, M, are delivered to the apparatus shown. As can

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be seen in FIGURE 1 the components of the group are not all abutted. C_1 is the leading cigarette and C_2 the trailing cigarette.

Directly above the conveyor 1 is a conveying means or deflector drum shown generally by reference numeral 5 and arranged to rotate in the direction of arrow 6, FIGURE 2. Eight projections 7, having concave leading faces 8, are equally spaced around the drum 5 (see FIGURE 2) and extend along the greater part of its length (see FIGURE 1). The projections 7 act as deflectors. Each in succession engages a group similar to the C_1 -M- C_2 group shown in FIGURE 1 and pushes it sideways off the conveyor 1. The deflected groups are held to the drum 5 by means of three arcuate guides 9, 10 and 11, which are adjustably fixed to a block 12 (see FIGURE 2).

To prevent any possibility of the group being accelerated in a sideways direction by impact of the projection 7, the distance between the concave face 8 and the block 12 is restricted so that the group is gripped therebetween. This restriction retards the movement of the group in a path transverse to the axes of the components of the group. The guide 10 which holds the mouthpiece M is part of a helix, this shape being necessitated by the comparatively short length of the mouthpiece and by the fact that during abutment the mouthpiece is caused to move in an axial direction.

The guides 9, 10 and 11 end adjacent to the surface of a suction drum 13 to which the groups are transferred. The drum 13 is arranged to carry suctionally on its cylindrical surface spaced adhesive uniting bands of a suitable size to be wrapped around the central portions of the groups so as to unite the cigarettes to the mouthpieces. Suction is effected through radial holes 14 in the drum 13. A stationary concave plate 15 is positioned below the suction drum 13 and serves as a countersurface over which groups are rolled so as to have the uniting bands wrapped around them. The united group is then cut centrally by means which are not shown to produce two separate mouthpiece cigarettes.

The deflector drum 5 consists of a drum body 16 (see FIGURE 1) bolted to a driving shaft 17. A fixed assembly 18 is bolted to a member 19 which is part of the main frame of the cigarette-making machine. The shaft 17 is housed within the assembly 18 and rotates in bearings, being driven by a gear 20.

A cam track 21 is fixed to the assembly 18 and has running over its surface eight cam rollers 22, each of which is free to rotate about a pin 23 secured to a carriage 24. Carried on the end of an arm 25 a presser member 26 is rigidly mounted on each carriage 24. Each carriage 24 and, therefore, its presser member 26 is free to move in an axial direction relative to the deflector drum 5 and is provided with two projecting rods 28 and 29 which are slidable within needle bearings 30 and 31 respectively, fixed to the drum body 16. The rods 28 are biased by springs 32 so that the rollers 22 remain always in contact with the cam track 21. Thus as the deflector drum 5 rotates the presser members 26 oscillate backwards and forwards in an axial direction.

At the other end of the deflector drum 5, a bracket 33, fixed to the frame of the cigarette-making machine, is provided with a stationary shaft 34 about which rotates a ring 36 on a bearing 35. The axis of the stationary shaft 34 is eccentric to that of the driving shaft 17 so that the ring 36 rotates eccentrically to the drum body 16. An internal cup-shaped gear 37 is fixed to the drum body 16 and thus rotates with it. A further internal gear 38 is formed at the end of the ring 36. Meshing with the internal gears 37 and 38 respectively are gears 39 and 40 which are joined together and which are free to rotate about a bearing 41 carried on the stationary shaft 34. Thus as the drum body 16 rotates so the ring 36

also rotates both being driven by the shaft 17; the body 16 and ring 36 are required to have the same circumferential speed for a reason which will become clear. A dust cover 43 fixed to support 42 attached to shaft 34 helps to prevent dust or foreign matter from entering the gearing 37, 38, 39, 40.

Fixed to the bracket 33 in an adjustable position by a clamping screw 33a is a ring 44 having an internal thread into which is screwed a flange 45 of a box cam 46. Seven cam rollers 47 run in the track of the box cam 46, each roller 47 being attached by means of a pin 48 to an associated one of seven carriages 49. Also attached to each carriage 49 are two rods 50 similar to the rods 28 and 29 which are slidable in an axial direction in bearings 51 fixed to the ring 36. A presser member 52 is fixed by means of an arm 53 to each carriage 49. Over a limited range during the rotation of the deflector drum 5 each presser member 52 is substantially aligned in an axial direction with one of the presser members 26.

Operation of the apparatus will now be described.

The deflector drum 5 mounted on the driving shaft 17 is rotated at a suitable speed in relation to that of the conveyor 1 to cause each projection 7 in succession to engage a group, such as C₁-M-C₂, carried by the conveyor.

Reference to FIGURE 2 shows that as a projection 7, approaches the conveyor 1 the presser member 52 (of which there are seven compared with eight projections 7) nearest to it is travelling along a path located radially further inwards than the projection 7, due to the eccentricity of the shafts 17 and 34, this radial spacing preventing the presser 52 in question and its associated arm 53 from fouling the trailing end of the cigarette C₂. The projection 7 then engages the group, deflects it sideways and pushes it over the block 12. Due to the restricted distance between the concave face 8 and the block 12 the group C₁-M-C₂ is gripped therebetween and its movement in its axial direction is stopped. Usually the leading end of the cigarette C₁ comes to rest about 5 mm. (measured axially) away from the presser member 26. Thereafter the cams 21 and 46 start lifting and carry with them respectively the presser members 26 and 52 associated with the particular projection 7. Thus the presser members 26 and 52 start moving axially inwards, i.e. towards each other, although of course they are not aligned. The cam 21 is designed with 170° rise and 10° dwell so that the presser member 26 is moved to the end of its leftward (as seen when looking at FIGURE 1) movement by the time the group has moved in a counterclockwise (as seen when looking at FIGURE 2) direction to approximately 11 o'clock. The lift of the cam 46, which is designed with a 23° rise and a 10° dwell, and the eccentricity of the shafts 17 and 34 ensure that the presser members 26 and 52 are more or less aligned before the latter member is at the end of its maximum rightward movement, i.e. the group being at approximately 12 o'clock. By 11 o'clock the two presser members 26 and 52 have reached their innermost positions, thus causing the components of the group to be fully abutted. The presser members 52 being carried on the ring 36 which is of smaller diameter than the drum body 16 from which the projections 7 extend, the ring 36 must rotate at a correspondingly higher angular velocity than the drum body 16 so that the members 52 travel at the same linear velocity as projections 7 when they are in conjunction, i.e. the ring 36 and drum body 16 have the same circumferential speed as mentioned earlier. It will be noted that the presser members 26 and 52 are arranged in circles, but the circumferential spacing or pitch of the spacer members on their circle 52 is the same as that of members 26 on their circle, members 52 being fewer in number and lying on the smaller of the two circles.

With continued rotation of the drum 5 the cams 21 and 47 permit the presser members 26, 52 to retract from

the ends of the group by the time the group moves clear from the guides 9, 10 and 11 and enters into the area of influence of the suction acting through one of the holes 14. The group has then reached the suction drum 13 to which it is transferred. The mouthpiece M is pressed against the adhesive surface of a uniting band carried on the drum 13, while the two cigarettes are attracted to and suctionally held to the drum, the outside guides 9 and 11 controlling the cigarettes until contact with the suction drum is established.

The group is then carried by the drum 13 to the plate 15 and is rolled between the drum and the plate so that the uniting band is wrapped around. This band, as is customary, extends beyond the mouthpiece M to overlap the adjacent ends of the two cigarettes C₁ and C₂. The assemblage so formed is then divided by cutting through the mouthpiece in any suitable way.

Each of the presser members 26 and 52 remains in its outward position until they are again required to co-operate with one of the projections 7 engaging a further group, when the sequence described recommences. This sequence, of course, occurs with each of the eight projections 7.

By altering the relative position of the ring 44 and the flange 45 in an axial direction the position of the pressers 52 is adjustable axially. This alteration is achieved by means of the screw thread separating the two parts.

What we claim as our invention and desire to secure by Letters Patent is:

1. Apparatus for feeding rod-like articles, comprising a rotary conveyor to carry articles transversely of their lengths, means to feed articles lengthwise to said conveyor in a direction parallel to its axis of rotation, and presser members at opposite sides of the conveyor to engage ends of articles thereon and movable with said conveyor, the presser members at one side at least of the conveyor being mounted for movement in a circular path eccentric to said axis of rotation so as to register with articles on the conveyor over part of said path and to be clear of articles moving lengthwise to the conveyor for reception thereon.

2. Apparatus for feeding rod-like articles, comprising conveying means by which articles are conveyed lengthwise in succession, a rotatable conveyor to which articles are transferred and by which they are moved in a circular path transversely of their length, at least one first presser member for engaging the leading end of an article on the conveyor, and arranged for movement in a circular path with the conveyor, and at least one second presser member for engaging the trailing end of an article and arranged for movement in a second circular path which is eccentric to the first said circular path such that the second presser member clears an article moving lengthwise on said conveyor means and thereafter engages its trailing end.

3. A rotary conveyor to convey rod-like articles transversely of their length, presser members mounted for movement with said conveyor at opposite sides thereof for engaging the ends of said articles, the members at one side of the conveyor being mounted for movement in a circular path eccentric to the axis of rotation of the conveyor, whereby said latter members engage the ends of said articles only during a portion of said movement.

4. A machine as claimed in claim 3 wherein each projection is associated with a pair of opposed presser members.

5. A rotary conveyor drum to convey rod-like articles transversely of their length, at least one first presser member carried by said drum at one side thereof, at least one second presser member at the opposite side thereof, and a carrier rotatable eccentrically of said drum and carrying said second presser member in a circular path in part of which the two members are substantially opposed to each other to engage the ends respectively of said articles and in another part of which the second

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presser member is closer than the first presser member to the axis of rotation of the drum and therefore out of engagement with one end of said articles.

6. A cigarette machine having means to convey cigarettes endwise in succession, a rotary drum alongside the path of endwise movement of cigarettes and rotatable about an axis substantially parallel to said path, projections on said drum to engage cigarettes and move them in a circular path transversely of their lengths, presser members mounted for movement with said drum at opposite sides thereof, means for moving said presser members towards each other to engage ends of articles on the drum, the presser members at the downstream side of the drum considered in the direction of endwise movement of the cigarettes being mounted for movement in a circular path concentric with the drum, the presser members at the other side of the drum being mounted for movement in a smaller circular path eccentric to said first circular path and such that the last said presser members are clear of cigarettes advancing endwise to a position alongside the drum.

7. A machine as claimed in claim 6 in which each projection has a concave leading surface by which the components of a group are aligned.

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8. A cigarette machine as claimed in claim 6 wherein said means to move said presser members towards each other comprises cam means.

9. Article-feeding apparatus for rod-like articles including means to feed articles in the direction of their longitudinal axes, a rotatable conveyor which sweeps across the axial path of the articles to engage articles and move them transversely of their axes, pairs of opposed presser members arranged to engage ends of articles carried by said conveyor each pair including a first member arranged to move in a circular path with said conveyor and to engage a leading end of an article and a second member to engage a trailing end of an article, considered in the direction of the axial movement of the articles, means to move at least one member of each pair towards the other, and means mounting said second member for movement in a circular path eccentric to said first circular path such that said second member is moved out of line with respect to said first member to clear axially moving articles.

No references cited.

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