

May 15, 1956

K. KÖRBER ET AL

2,745,413

MACHINES FOR PRODUCING CIGARETTES

Filed Aug. 24, 1951

3 Sheets-Sheet 1

Fig. : 1

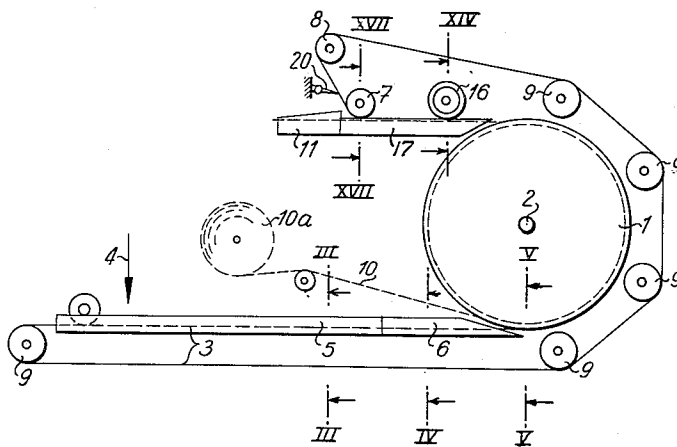
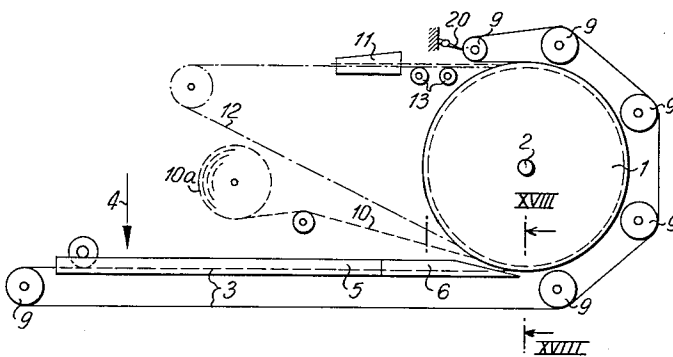


Fig. : 2



INVENTORS.
KURT KÖRBER.
HORST KOCHALSKI.
ALEXANDER FLOCKE.
WALTER HEUER.
BY *H.A. Mayr*
ATTORNEY.

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K. KÖRBER ET AL

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Fig. : 3

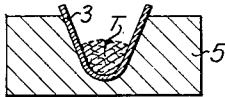


Fig. : 4

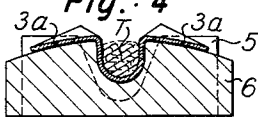


Fig. : 5

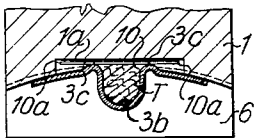


Fig. : 6

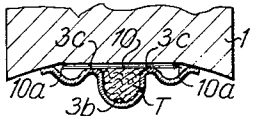


Fig. : 7

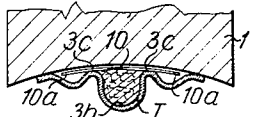


Fig. : 8

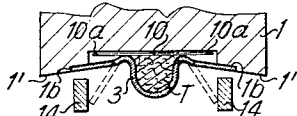


Fig. : 9

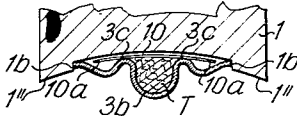


Fig. : 10

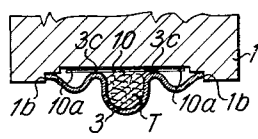


Fig. : 11

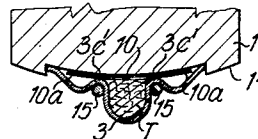


Fig. : 12

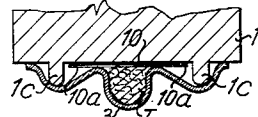
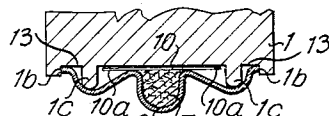


Fig. : 13



INVENTORS.
KURT KÖRBER,
HORST KOCHALSKI,
BY ALEXANDER FLOCKE,
WALTER HEUER,

K. B. Meyer
ATTORNEY.

May 15, 1956

K. KÖRBER ET AL

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Fig. : 14

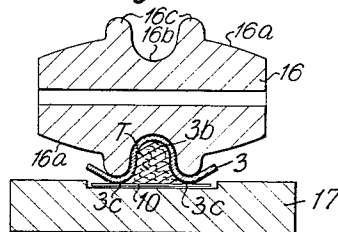


Fig. : 15

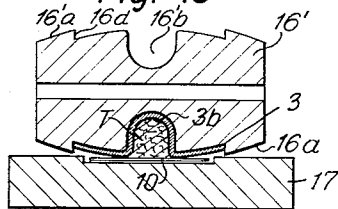


Fig. : 16

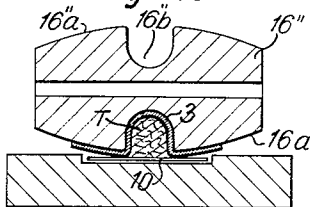


Fig. : 17

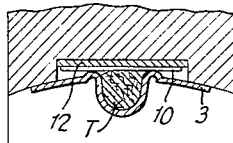
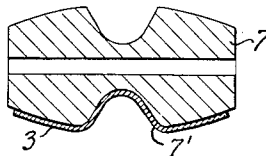


Fig. 18

INVENTORS.
KURT KÖRBER
HORST KOCHALSKI.
BY ALEXANDER FLOCKE.
WALTER HEUER
H. A. GAY
ATTORNEY.

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MACHINES FOR PRODUCING CIGARETTES

Kurt Körber, Hamburg-Bergedorf, Horst Kochalski, Hamburg-Wandsbek, Alexander Flocke, Reinbek, near Hamburg, and Walter Heuer, Hamburg-Bergedorf, Germany, assignors to Kurt Körber & Co. Kommandit-Gesellschaft, Hamburg-Bergedorf, Germany, a German firm

Application August 24, 1951, Serial No. 243,396

Claims priority, application Germany February 12, 1951

9 Claims. (Cl. 131—84)

The invention relates to improvements in machines for producing cigarettes and particularly to a machine for producing a continuous tobacco rod, in which a stream of tobacco from a so-called spreader is transported by means of a conveyor belt to a cigarette rod-former, the direction of travel of the belt being reversed while the tobacco rod is produced. This reversal of the belt is effected in the known manner by means of a disc, one-half of the periphery of which is surrounded by the upper run of the endless belt. Besides machines in which the tobacco is introduced to the feeder disc from above whereby the feeder belt serves as a support therefor, machines are also known in which the tobacco stream is introduced to the disc from below, so that the tobacco stream lies between the disc periphery and the conveyor belt. In these machines the periphery of the disc has a groove-like channel along the base of which the cigarette paper is introduced. In order to keep the side edges of the cigarette paper free from tobacco and to make the feeder disc available for wrapping the tobacco rod in the rod-former, the conventional feeder belt includes an arrangement producing a longitudinal groove-like depression and places the two longitudinal edges of the belt on the paper edges so that they remain free of tobacco.

In the conventional arrangements the feeder belt is subjected to undue stresses at the reversing rollers because of its profiled section and is subjected to excessive wear. Another conventional apparatus provides a non-grooved drum and a profiled tobacco feed belt, causing the same difficulties.

A further conventional construction in which the passage for forming the tobacco rod and producing tobacco-free edge zones on the cigarette paper are obtained by rails stationary relative to the rotating drum, involves increased wear of the feed belt since the traveling feed belt is subjected to heavy wear on the stationary rails.

These disadvantages are avoided by the apparatus according to the invention which fundamentally differs from the known tobacco rod machines due to the provision of guide devices which cause the conveyor belt to rest on the periphery of a disc, the belt, seen in section, having a wave-like configuration forming a groove in the middle of the belt which receives the tobacco, the crests of the belt on each side of the groove pressing against the edges of the cigarette paper and holding them free from tobacco.

This wave-like folding of the conveyor belt can be obtained in various ways. A number of possibilities are shown in the accompanying drawing, wherein:

Fig. 1 is a diagrammatic representation of a tobacco-rod forming machine in which the conveyor belt is introduced from below and having its outlet at the top;

Fig. 2 is a diagrammatic illustration of a similar machine in which, besides the outer conveyor belt, a second endless conveyor belt is provided which is placed under the cigarette paper;

Fig. 3 is a section on line III—III in Fig. 1;

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Fig. 4 is a section on line IV—IV of Fig. 1;

Fig. 5 is a partial section on line V—V of Fig. 1;

Figs. 6 to 13 show modified arrangements for folding the conveyor band, also in section on line V—V of Fig. 1; Figs. 14 to 16 are sections on line XIV—XIV of Fig. 1; Fig. 17 is a section on line XVII—XVII of Fig. 1; and Fig. 18 is a section on line XVIII—XVIII of Fig. 2.

Before describing the invention itself, the type of machine will be described which is to be improved by the invention. Numeral 1 indicates a feeder disc which is journaled on the horizontal shaft 2. The conveyor belt for the tobacco is indicated at 3. The lower run of the conveyor belt extends from the point 4 where the tobacco (not shown) is supplied through a passage 5, which is described later, and through a belt guide channel 6, to the disc 1 which reverses the direction of the belt, the latter extending about halfway around the disc and traveling back to the point 4 over the return rollers 7, 8 and 9.

The cigarette paper 10 is introduced between the tobacco rod and the periphery of the disc 1, the paper running off a reel 10a. While the conveyor belt 3 is returned from the reversal roller 7 the paper strip 10 together with the tobacco rod lying thereon moves on a support or guide means 17 to the former 11 in which it is folded around the tobacco in known manner to form the cigarette rod.

The machine according to Fig. 2 differs from the machine shown in Fig. 1 by the provision of a second endless conveyor belt 12 which extends around the disc 1 below the paper web 10 and serves for better transport of the paper strip and which, on leaving the top of the feeder disc, is conducted beyond the reversal point of the conveyor belt 3 through the former 11. Below this belt 12 rollers 13 or other supports are provided at the outlet of the disc 1.

The type and method of operation of the machine having been explained, the formation of the tobacco rod will now be described. The passage 5 has a V- or U-shaped section which is clearly shown in Fig. 3. The endless conveyor belt 3 runs through this passage 5, is folded inwardly to conform to the passage groove and at point 4 (Fig. 1) the tobacco T is supplied. The tobacco T and the conveyor 3 proceed on further transport means to a belt guide 6, the section of which is shown in Fig. 4. Since the upper surfaces of this guide 6 are convexly curved and its guide groove is less deep than the groove in body 5, the marginal portions 3a of the conveyor belt are laid laterally onto the upper surfaces of the guide by the action of the belt tension.

Upon further movement of the tobacco T and of the conveyor belt 3, the paper strip 10 coming from a reel 10a and, in the case of Fig. 2 also the second conveyor belt 12, run onto the circumferential surface of the conveyor disc 1, the essentially concave sectional form of which corresponds to the curvature of the upper surface of the guide 6, as seen in Fig. 5. In the concave periphery of the disc 1 a rectangular groove 1a is provided for receiving the paper strip 10. When the conveyor belt 3 moves away from the convex upper surface of the guide 6, the conveyor belt being under tension, folds itself on running onto the concave periphery of the disc in wave-like form in such manner that laterally of the central groove 3b a wave crest 3c is formed on each side of the groove (Fig. 5). The lateral crests 3c are on the two sides of the tobacco stream T and press against the marginal portions of the paper strip 10, producing tobacco-free zones 10a on the cigarette paper 10.

This essential feature of the invention, namely the fold formation of the conveyor belt 3, can also be obtained in other ways. Figs. 6 and 7 show, for example, that the groove 1a in the disc 1 can be omitted whereby the support for the paper band 10 can be made either

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flat (Fig. 6) or slightly curved (Fig. 7). Also in these cases, the conveyor belt folds itself automatically in the wave-like manner shown, whereby the tobacco rod T is held and, at both sides thereof tobacco-free zones 10a of the paper strip 10 are formed.

The belt 3 retains its folded shape, since two lateral marginal portions of the conveyor belt are pressed against the disc 1, because of the tension in the belt. In the modification shown in Figs. 8 and 9, the lateral edges of the conveyor belt 3 press against recesses 1b of the disc 1 and so facilitate the desired wave-like folding of the conveyor belt 3, Fig. 8 showing a straight and Fig. 9 a slightly curved support for the paper strip 10. In order to guide the conveyor belt 3 securely into the recess 1b on running onto the disc 1 and from the recess on running off the disc, guide strips 14 or the like may be provided at the transfer points.

In Figs. 8 and 9 there is also shown an essentially concave sectional form of the spool-like surface of the disc 1 in which the peripheral surface 1' may be straight, as shown in Fig. 8, or curved, as shown in Fig. 9 at 1''. The recess edges 1b make it possible to make the spool-like surface cylindrical, as shown in Fig. 10, instead of concave. Fig. 11 shows that the spool-like surface of the disc 1 may also have a convex sectional form whose side surfaces 1''' may be flat or curved. Holding means 15 may be provided for supporting the lateral belt portions 3c'. As shown in Figs. 12 and 13, rib-like projections 1c and recesses 13 may be provided on the periphery of the disc 1 for guiding the side edges of the conveyor belt 3.

All the examples described serve for the novel wave-like folding of the conveyor belt 3 for producing the tobacco roll T during travel of the belt on the periphery of the disc and for retaining the folded condition of the belt. In order to retain the wave-like folding of the conveyor belt also after running off the disc 1, correspondingly profiled rollers 16 and 7 (Fig. 1) are provided by which the fold formation of the conveyor belt is retained to a sufficient extent until the tobacco stream has left the conveyor belt 3 prior to entering the former 11. At this point the conveyor belt 3 can be returned by the reverser roller 7 directly or over a second roller 8 to the reverser rollers 9. Three constructional forms of the profile rollers 16 are shown in Figs. 14, 15 and 16. The roller 16 has an essentially spherical form and according to Fig. 14 is provided with inclined parts 16a which can be made conical or cylindrical. In the center of the periphery a groove 16b is provided for receiving the bottom of the central wave 3b and the tobacco roll T. An annular rib 16c on each side of groove 16b engages the belt waves 3c on the two sides of the belt wave 3b. In the roller 16' shown in Fig. 15, these ribs are omitted and the inclined parts 16'a, seen in profile, are made straight. For lateral confinement of the side edges of the conveyor belt 3 a recess 16d is provided preventing shifting of the belt 3 from the groove 16'b. In the roller 16'' according to Fig. 16 this recess is omitted. The paper strip 10 runs lengthwise below the conveyor belt 3 and beneath the tobacco roll T in each case, for example, in a rectangular groove 10 of a guide support.

Fig. 17 shows the reverser roller 7 (Fig. 1) which lies immediately in front of the former 11 and initiates the return of the conveyor belt 3. This roller is curved on its outer surface and may also incorporate a groove 7' which, however, is more shallow than that of the roller 16 and deeper than that of the succeeding roller 8. It is recommended that, at the point at which the conveyor belt 3 moves out of the horizontal direction, a scraper 20 or a roller is provided which strips off any tobacco adhering to the belt 3. The belt 3 running from the roller 8 finally reaches the first of the return rollers 9 which are essentially cylindrical.

By suitable arrangement of the profiled rollers 16, 7 and 8, the conveyor belt is gradually straightened to fit

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the flat return path, retaining the wave-like configuration sufficiently long to form the cigarette rod without the use of a so-called bridge piece between the conveyor belt 3 and the former 11. Even if the paper strip 10 carrying the tobacco to the former 11 is missing, a regular travel of the tobacco rod remains possible. There may be provided, for supporting the paper strip 10, the second endless belt 12, mentioned above (see Fig. 2), which is conducted through the former 11 and which may be supported by means of rollers 13 or the like after leaving the disc 1.

What we claim is:

1. A cigarette tobacco rod forming machine comprising an endless conveyor belt, means for bending the moving belt to form a longitudinal groove in its middle portion for receiving tobacco and to form longitudinal lateral marginal belt portions extending laterally outwardly from the groove, a conveyor disc having a horizontal axis and a circumferential surface portion receiving the bent belt at the bottom of said disc with the groove opening toward the disc, said belt being adjacent to and following substantially one half of the circumferential portion of said disc, means for continuously introducing cigarette paper web between said belt and the bottom of said disc, the paper web being pressed toward said circumferential surface portion by said belt, and means receiving said belt and the paper web covering the tobacco filled longitudinal groove from the top of said disc.

2. A cigarette tobacco rod forming machine according to claim 1, comprising an additional endless belt extending around said disc between the cigarette paper web and the circumferential surface portion of said disc.

3. A cigarette tobacco rod forming machine according to claim 1, said circumferential surface portion of said disc having a central circumferential recess adapted to receive the cigarette paper web and having circumferential guide surface portions on either side of said recess for guiding the lateral marginal belt portions.

4. A cigarette tobacco rod forming machine according to claim 3, comprising stationary guide means positioned adjacent to said circumferential surface portion for guiding the lateral marginal belt portions to said guide surface portion.

5. A cigarette tobacco rod forming machine comprising an endless conveyor belt, means for longitudinally bending the moving conveyor belt to form a longitudinal groove in its middle portion for receiving tobacco and longitudinal lateral marginal belt portions extending outwardly from the groove, a conveyor disc having a circumferential surface portion receiving the bent belt with the belt portion having a groove opening toward the disc, means for continuously introducing cigarette paper web between said belt and said disc to be pressed toward said circumferential surface portion by said belt, and guide means receiving said belt and the paper web covering the tobacco filled portion of said belt having a longitudinal groove from said disc, said guide means comprising means for pressing the longitudinal lateral marginal belt portions to the lateral marginal portions of the cigarette paper web.

6. A cigarette tobacco rod forming machine according to claim 5, said means for longitudinally bending the conveyor belt comprising a stationary guide member having a longitudinal convex surface portion with a longitudinal groove in its longitudinal center for slidably supporting the bent moving conveyor belt, said guide member having an end surface portion tangent to said disc, the circumferential surface portion of the latter having a concave configuration substantially conforming with the convex surface portion of said guide member, said guide means comprising a stationary guide member having a longitudinal surface portion facing the paper web coming from said disc, and said means for pressing the longitudinal lateral marginal belt portions to the cigarette paper web consisting of at least one barrel shaped roller

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having a circumferential recess adapted to receive the groove forming longitudinal middle portion of said belt.

7. A cigarette tobacco rod forming machine according to claim 5, said means for longitudinally bending the conveyor belt comprising a stationary guide member having a longitudinal convex surface portion with a longitudinal groove in its longitudinal center for slidably supporting the bent moving conveyor belt, said guide member having an end surface portion tangent to said disc, the circumferential surface portion of the latter having an axially concave configuration substantially conforming with the convex surface portion of said guide member, said guide means comprising a stationary guide member having a longitudinal surface portion facing the paper web coming from said disc, and said means for pressing the longitudinal lateral marginal belt portions to the cigarette paper web comprising a barrel shaped guide roller having a circumferential recess adapted to receive the groove forming the longitudinal middle portion of said

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belt and having circumferential projections on either side of said recess, said guide means comprising at least one barrel shaped roller receiving said belt as it comes from said guide roller, and said machine comprising a plurality of additional rollers guiding said belt back to said means for longitudinally bending the belt.

8. A cigarette tobacco rod forming machine according to claim 7, the first of said additional guide rollers to receive said belt being barrel shaped.

9. A cigarette tobacco rod forming machine according to claim 7, at least some of said barrel shaped rollers comprising circumferential guide means for laterally guiding said belt.

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