

March 26, 1968

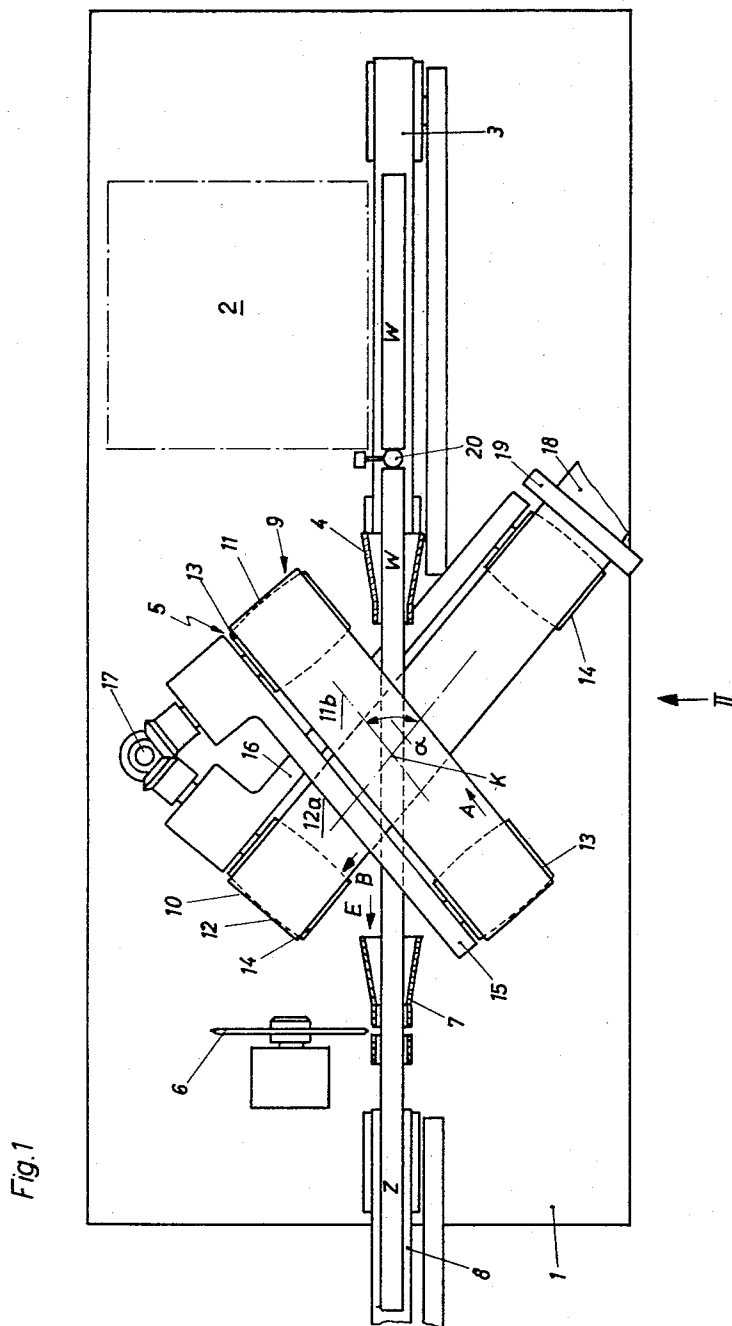
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3,374,796

APPARATUS FOR CONTINUOUSLY ROLLING CIGAR CORES

Filed Dec. 9, 1964

2 Sheets-Sheet 1



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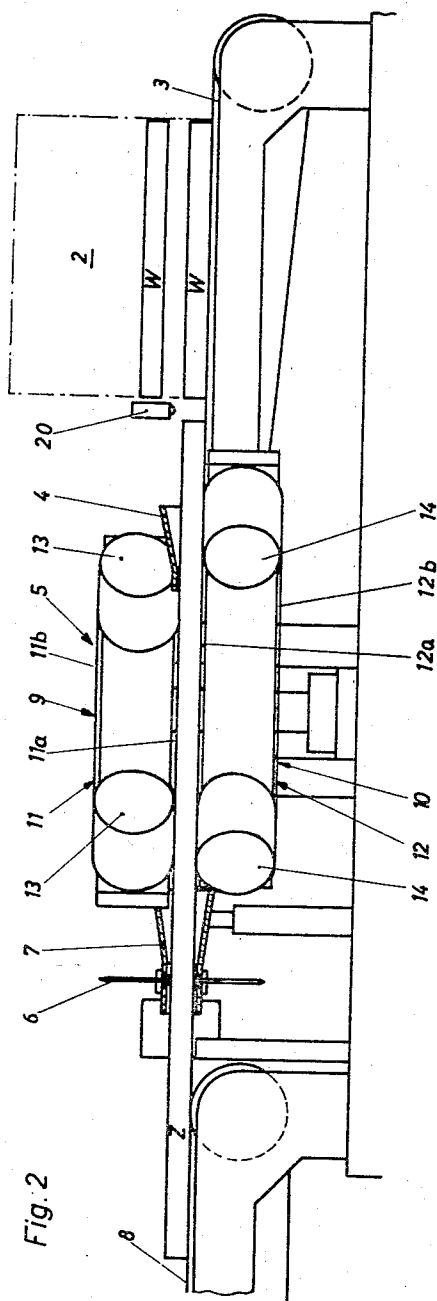


Fig. 2

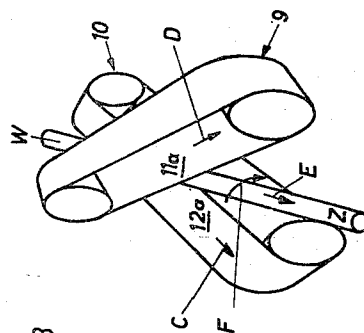


Fig. 3

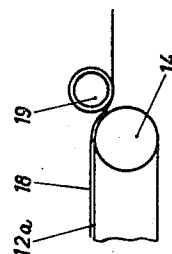


Fig. 4

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1

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APPARATUS FOR CONTINUOUSLY ROLLING CIGAR CORES

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Filed Dec. 9, 1964, Ser. No. 417,134

Claims priority, application Germany, Dec. 11, 1963,
V 25,020

4 Claims. (Cl. 131—59)

ABSTRACT OF THE DISCLOSURE

An apparatus for continuously wrapping axially aligned, successively fed cigar cores, wherein said apparatus comprises a pair of conveyor belts each having longitudinally moving working courses, said working courses being disposed in different planes and crossing to define a rolling zone therebetween. One of said conveyor belts is arranged for receiving a wrapper on the working course thereof and for conducting the wrapper to the rolling zone. The cigar cores are axially introduced into the rolling zone with each of the conveyor belt working courses being positioned at an angle to the lengthwise axis of said cores introduced therebetween. The working courses are spaced apart a preselected distance to enable said working courses to engage each of said cores at two diametrically spaced locations within the rolling zone for simultaneously rotating said cores to spirally wind a wrapper thereon and axially drive the cores through and out of said rolling zone in a wrapped condition.

This invention relates to an apparatus for continuously wrapping cigar cores which are arranged one after the other with a wrapper to form a continuous strand, in which belt-type driving devices are provided for rotating and simultaneously advancing the cores in an axial direction, said belt devices engaging the cores at at least two diametrically opposite positions with respect to the lengthwise axis of the cores and guiding the wrapper to the rolling zone.

Prior apparatus of this general kind is known in which the same belt-driving apparatus serves for advancing the cores and for advancing of the wrapper. In such prior apparatus, driving portions of the belt act on the cores in different planes and at different angles to the forward direction of movement of the cores. These belt driving portions are part of a single conveyor belt which in a horizontal region lying transverse to its direction of primary movement is S-shaped wherein one loop of the S passes around a guide roll which is arranged angularly to the principal direction of movement of the belt while the other S-loop constitutes a shaped guide channel for the cores. The part of the belt which carries the wrapper runs below the guide roll through the guide channel, turns there angularly upwardly to alter its direction of movement and runs obliquely to the entering direction back under the guide roll. The belt acts on the core in the lower part of the guide channel at a different angle with respect to the lengthwise movement of the core than in the upper part of the guide channel. The thereby provided angled engagement between the belt parts and the core provides an axial component of motion which moves the core. Thus, while the core is forwarded and the wrapper is guided and conveyed by the same simple apparatus, nevertheless, uniform application of the wrapper to the cores is not brought about in this manner. The guide channel is supported from inside exclusively by means of the core which can accept no radial force when it is not confined within the guide channel. The S-loop constituting

2

the guide channel of the conveyer can therefore engage the core only quite lightly so that an interbinding of the wrapper advanced on the conveyer with the surface of the core does not occur. It therefore appears that on this basis this prior art rolling apparatus is not useful as a practical matter.

In another prior apparatus, the functioning of the driving devices for the strand and the wrapper are divided from each other. More specifically, there are provided two pairs of parallel belt conveyers which pairs cross at right angles and between which pairs the individual cores axially and sequentially pass at an angle to the belts. The cores pass the crossing of two of the belts as it enters the wrapping zone and the crossing of the other two as they leave the wrapping zone. A single drive belt lying between one parallel belt pair conducts the wrapper to and under the cores within the wrapping zone. In this prior apparatus, the use of two pairs of belt devices for advancing the cores and a further belt device for advancing the wrapper brings about an excessive cost of construction. Moreover, an intimate union between the wrapper and the cores is not obtained. This is so because the cores are essentially supported only on one side, namely by the wrapper advancing belt. This wrapper advancing belt can exert no satisfactory radial force on the cores because it often sags between its points of support, which lie outside the wrapping zone and, hence, said wrapper belt becomes subjected to oscillations. Thus this prior apparatus cannot assure that the wrapper is pressed radially onto the core although this is necessary to the accomplishment of intimate and close union between the wrapper and the cores. This difficulty cannot even be avoided in this known apparatus by addition of suitably contoured support rolls arranged laterally of the strand to support same in the wrapping zone. In addition to the fact that rolls laterally gripping the strand can scarcely provide a supporting force in opposition to the force provided by the wrapper advancing belt, such rollers arranged directly at the wrapping zone cause the danger of damage to the glued, still wet and, therefore, exceedingly delicate wrappers. In addition, the support of the cores before and after the wrapping zone has the actual disadvantage that each of the individual cores is supported at certain times only at its forward or its rearward ends. The cores, under such circumstances, have practically no resistance to radial forces. Thus, the minimum radial forces developed by the wrapper advancing belt can therefore lead to the sagging of the strand of wrapped cores as it is being formed. Such saggings can bring about oscillation which tears the glued wrapper. The then required restoration of the wrapper is then a complicated and time consuming operation. For these named reasons there can exist in this particular prior apparatus a satisfactory union between the wrapper and the strand only with a relatively slow rotation of the strand and, hence, with a correspondingly limited output.

Lastly, a prior wrapping apparatus is known in which the wrapper is fed on a belt device step wise to a wrapping zone. In such apparatus, wrappers, which have been previously cut into several pieces and are lying on the belt crosswise to the lengthwise axis thereof, are rolled by means of suitable roller driving apparatus which take the wrapper from the belt. This constitutes only a mechanization of the old handrolling wrapping method wherein several wrapper pieces were rolled by hand with several cores in a direction crosswise to the length. This prior apparatus has the well-known disadvantage that it cannot work continuously. A belt apparatus guiding the wrappers in several cut pieces must stand still at the moment of rolling the several cores. The output of this prior rolling apparatus is therefore extremely limited.

The purpose of the present invention is to provide an apparatus in which the same belt-type driving devices

advance the strand and guide the wrapper to the wrapping zone so that there is attained a more intimate union between the wrapper and the core. This is accomplished according to the present invention in that said belt-type driving devices comprise two intersecting belt drives having working courses which lie in different planes and cross to define a wrapping zone therebetween through which the cores pass, the working course of one of said belt drives carrying the wrapper. In the apparatus according to the present invention, opposite sides of the core are supported in the wrapping zone by the there directly crossing belt working courses. A radial force can, therefore, be applied on the core which makes possible a simultaneous pressing of the wrapper fed by one of the belt devices against the core. As research has shown, the wrapper enters thereby into an even and certain union with the core. Simultaneously it is established that the strand cannot sag radially in the wrapping zone. The danger that the oscillation will occur at the wrapping zone, which would lead to tearing of the wrapper, is eliminated. Thereby, the rotative velocity and, accordingly, the axial velocity of the strand is permitted to become greater than has been possible previously so that there is obtained a previously unattainable capacity for the rolling apparatus according to the invention. The performance of the apparatus will be still further increased in that the restoring of an eventually torn wrapper can take place very quickly and simply. Lastly, there exists a still further advantage of the apparatus according to the invention in that with it natural wrappers can be continuously rolled.

A preferred angle of intersection of the belt devices for transporting the strand is found at angle of about 80 degrees.

According to a preferred embodiment of the invention, the belt devices lie in a horizontal plane one under the other and the wrapper is supported on and guided by the lower belt. The wrapper lies in this case on the upper surface of the belt so that no extra means for maintaining the wrapper on the belt is required.

The wrapper must be glued before wrapping takes place so that the apparatus must include gluing means for the wrapper. Since the wrapper in a glued condition tears especially easily, it is preferred according to a further feature of the invention to have the gluing apparatus immediately ahead of the belt propelling the wrapper. The glued wrapper segment is then as short as possible and will be supported directly after the gluing by means of the belt.

Finally, it is worthwhile to locate the gluing apparatus opposite the upper surface of the belt slightly downwardly in order that the wrapper will be pressed onto the upper surface by which it is transported. The pressing of the wrapper onto the belt has the purpose to increase the friction between the wrapper and the driving belt whereby the wrapper is uniformly and snugly held on the carrying surface of the driving belt.

The belts of the belt apparatus run advantageously over ball bearing rolls. Thereby there is secured a great flexibility in the pressing of the wrappers. Further, rolls having convexly curved peripheral surfaces can be used to support the belts.

A preferred embodiment of the invention is set forth in the drawings in which:

FIGURE 1 is a plan view of apparatus according to the invention for rolling of cigars.

FIGURE 2 is a side view of apparatus according to FIGURE 1 taken in the direction of the arrow II in FIGURE 1.

FIGURE 3 is a perspective view of the intersecting belts utilized in the apparatus.

FIGURE 4 is a schematic representation of the gluing apparatus.

Referring to FIGURES 1 and 2, a machine base 1 carries a schematically shown supply holder 2 of any convenient type indicated in chain lines for cigar cores

W which lies adjacent and feeds a conveyer 3. This latter can be constructed as a belt or cable conveyer. A conical guide tube 4 is fixed with respect to the leftward (i.e., output) end of the conveyer 3. Rolling or wrapping apparatus, generally indicated at 5, is provided in which the successive cigar cores W are covered with a wrapper. From the rolling apparatus 5, the wrapped cigar cores W travel past a schematically shown cutting apparatus 6 which, for example, can be constructed as a stepped disk. In the region of the cutting apparatus 6, there is provided a guide tube 7 from which the cigars are conveyed leftwardly by a conveyer 8 which again can be either a belt or a two-strand cable conveyer.

The rolling apparatus 5 consists according to the invention of two belt drives or conveyers 9 and 10 whose flexible belts 11 and 12 are guided over rolls 13 and 14, respectively. The belts include working courses 11a and 12a and idling courses 11b and 12b. The belt conveyers 9 and 10 lies in horizontal planes in such a spacing one over the other that the distance between the working courses 11a and 12a is somewhat smaller than the thickness of the cigar core W to be rolled. As shown particularly in FIGURE 1, the belt drives 9 and 10 cross and define an angle α which is preferably of about 80 degrees. The direction of running of the working courses 11a and 12a of the belts 11 and 12 is shown in FIGURE 3 by the arrows C and D, the running direction of the working courses 11b and 12a being shown in FIGURE 1 by the arrows A and B. The running is carried out in such a manner that the working courses 11a and 12a of the belts have a common velocity component in the direction of the arrow E in FIGURES 1 and 3. The working courses each have a further velocity component in the direction perpendicular to the arrow E whereby the latter velocity components of said working courses are in opposite directions. These latter velocity components are therefore responsible for effecting rotation of the core. The rotational movement is indicated in FIGURE 3 by an arrow F.

The rolls 13 and 14 are rotatably mounted on brackets 15 and 16, respectively. One each of the rolls 13 and 14 is rotatably driven from a common drive shaft 17 rotated by any convenient motor means, not shown.

The rolls 13 and 14 can be cylindrical. For wrapping of cigar cores W with conical ends it is nevertheless preferable if the rolls have a rounded peripheral contour as shown in FIGURE 1.

A wrapper 18 which is either of synthetic tobacco or can be a natural tobacco strip is transported, in the illustrated embodiment, on the working course 12a of the lower belt 10 to the wrapping or rolling zone in which the belts cross. If desired, the wrapper 18 may comprise a synthetic tobacco strip which is led from a supply roll, not shown, by a pulling force due to frictional engagement thereof by the belt 12. On the other hand, the wrapper 18 may comprise natural tobacco wrappers in which case the lower belt may be lengthened or may be aligned directly with a further conveyer device, not shown, which is connected with the lower belt 10 through a suitable transfer device, not shown. To the elongated section of the lower belt or to the aligned conveyer device, the natural tobacco strips are layed on in a continuous manner to provide collectively a continuous strip.

For gluing of the wrappers 18 on the side thereof facing the cores, there is provided a gluing apparatus which in the illustrated embodiment is provided with a small tube 19, into whose inner chamber the glue is introduced, which glue escapes through an opening, not shown in the bottom face thereof. The small tube 19 is aligned directly with the lower belt 10. As appears in the schematic presentation of FIGURE 4, the lower opening of the small tube 19 is somewhat lower than the working course 12a so that the wrapper 18 is pressed in the region of the roll 14 firmly against the belt 12. The spacing of the tube 19 from the beginning point of the belt drive 10

is maintained as small as possible so that the glued segment of the wrapper 18 which is not yet supported by the belt is as short as possible.

The working of the described apparatus is as follows:

The cigar cores W, each provided with a surrounding leaf, are deposited by the supply holder 2 at spaced intervals and in axial alignment upon the conveyor 3 in a manner to maintain a measured interval between successive cores. There is provided at the supply holder 2 a controllable stop device which is conventionally built and therefore need not be and is not shown. This stop device can, for example, be controlled through a photocell 20 which inactivates the stop device and, hence, allows a core W to be deposited each time that no core W is present on the conveyor 3 under the photocell 20.

The conveyor 3 conducts the successively following cores W through the guide 4 into the zone between the work courses 11a and 12a of the belt devices 9 and 10. The direction of movement of the cores W extends through the intersection point K of the center lines of the two conveyor devices 9 and 10. The cores W become engaged by the belts 11 and 12 and are both rotated in the direction of the arrow F and carried further in the direction of the arrow E.

The wrapper 18 which is conducted by the working course 12a of the lower belt 12 in the direction of the intersection point K, is rolled through the oppositely directed components of movement of the working courses 11a and 12a with and upon the cores W. The axially advancing cores W with the wrapper 18 spirally wrapped therearound and glued thereto successively leave the rolling apparatus 5 through the guide 7 in the form of a continuous strand. This strand becomes cut into separate cigars Z by the stepped disc 6.

The speed of advancement of the core strand preferably lies between a minimum of about 0.18 meter per second and a maximum of about 0.46 meter per second. The speed of rotation of the strand in the case of a strand having a diameter of 10 millimeters is preferably about 280-750 revolutions per minute and with a strand having a diameter of 16 millimeters is preferably about 177-470 revolutions per minute. The running speed of the belt devices is at about 0.23-0.61 revolution per second.

Although a particular preferred embodiment of the invention has been disclosed above in detail for illustrative purposes, it will be recognized that variations or modifications of such disclosure, which come within the scope of the appended claims, are fully contemplated.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Apparatus for continuously wrapping, axially aligned, successively fed cigar cores, said apparatus comprising:

conveying means consisting of first and second conveyor belts with said first belt being positioned above said second belt, said first belt having a longitudinally moving working course disposed in a first plane with said working course being movable in a first direction within said plane;

said second belt having a longitudinally moving working course disposed in a second plane with said working course being movable in a second direction within

said plane, said second plane being substantially parallel to said first plane and being laterally spaced a preselected distance therebelow, said second direction being inclined with respect to said first direction;

said first belt further having a working surface thereon defined by the lower external surface of the moving working course, and said second belt also having a working surface thereon defined by the upper external surface of its respective working course;

the moving working courses of said first and second belts crossing to define a rolling zone therebetween, said rolling zone being completely bounded and closed at the upper and lower sides thereof by the working surface of said first belt and the working surface of said second belt, respectively;

means for positioning a wrapper on one of said working surfaces for conducting the wrapper to said rolling zone;

means for axially introducing cores to said rolling zone, each of said working courses being at an angle with respect to the lengthwise axis of said cores;

the preselected distance between the working surfaces within said rolling zone enabling the working surfaces to engage each of said cores for simultaneously rotating said cores to spirally wind said wrapper thereon and axially driving said cores through and out of said rolling zone, said one working surface having the wrapper thereon engaging the core at one location and the other working surface engaging the core at another location diametrically spaced from said one location, said locations being positioned within a plane substantially transverse to the longitudinal axis of said core whereby the application of longitudinal bending moments to said core during the wrapping process is substantially eliminated.

2. An apparatus according to claim 1, wherein the working courses of the first and second belts each lie in substantially horizontal planes with the wrapper being carried by the working course on said second belt.

3. An apparatus according to claim 2, further including a pair of support rollers receiving thereon said second belt, gluing means for said wrapper being positioned in alignment with said belt adjacent one of said support rollers, said gluing means pressing said wrapper firmly against said second belt in the region where said second belt engages said one support roller.

4. An apparatus according to claim 1, wherein the engagement locations between the working courses of the conveyor belts and the core are substantially diametrically opposite one another with each said engagement location defining a contact zone which extends axially of the core substantially across the rolling zone.

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