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MACHINE FOR WRAPPING UNITING BANDS AROUND ROD-SHAPED ARTICLES

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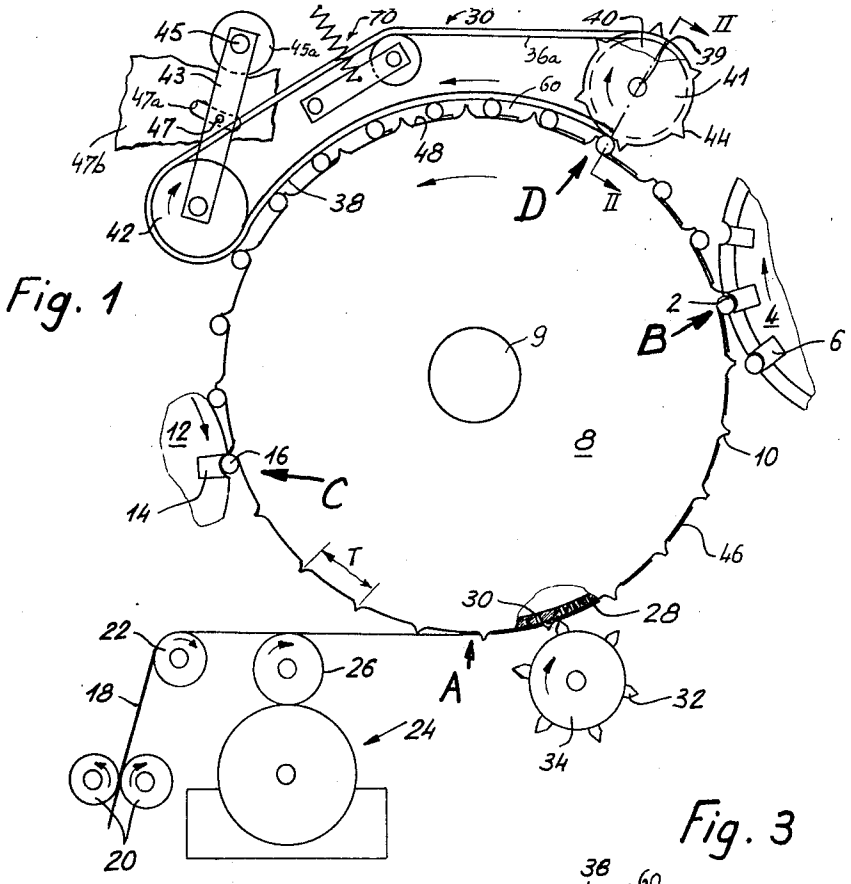

Fig. 1

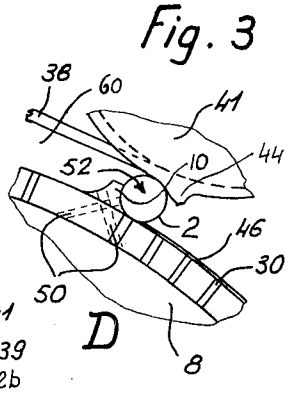

Fig. 3

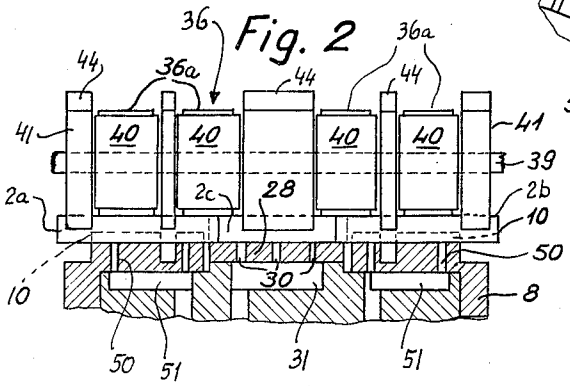

Fig. 2

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MACHINE FOR WRAPPING UNITING BANDS AROUND ROD-SHAPED ARTICLES

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Int. Cl. A24c 5/58
U.S. Cl. 131—94 11 Claims

ABSTRACT OF THE DISCLOSURE

A filter cigarette or filter cigar machine wherein groups of coaxial rod-shaped articles are united by adhesive-coated bands which are carried by an assembly conveyor. The groups are fed to the traveling assembly conveyor in such positions that their articles are adjacent to the leading or front ends of the respective uniting bands, and the groups are thereupon caused to travel through an elongated wrapping passage defined by the assembly conveyor and a travelling rolling conveyor which comprises endless belts bounding one side of the passage. The belts are driven at a speed which is less than the speed of the assembly conveyor so that, during wrapping, the groups are caused to roll backwards with reference to the assembly conveyor.

The rolling conveyor has aligning teeth which cooperate with successive pairs of ribs on the assembly conveyor at the upstream end of the wrapping passage. The aligning ribs and teeth insure that the articles of each group are placed into exact axial alignment prior to their entry into the passage.

BACKGROUND OF THE INVENTION

The present invention relates to a machine for wrapping adhesive-coated uniting bands around groups of rod-shaped articles, particularly for wrapping uniting bands of cork, cigarette paper or like web material around sections of filter rods, cigarette rods, cigar rods, cigarillo rods and/or the like. Still more particularly, the invention relates to improvements in the construction and operation of such parts of a wrapping machine which roll two or more coaxial rod-shaped articles with reference to adhesive-coated uniting bands.

It is already known to provide a filter cigarette machine with an assembly conveyor whereon groups of coaxial cigarettes and filter rod sections are rotated about their own axes in response to engagement with a stationary rolling surface. A serious drawback of such machines is that the rolling operation is completed within a very short interval of time, i.e., that the groups of rod-shaped articles are compelled to rotate about their own axes at a very high angular speed which leads to the formation of pleats, air pockets, leaks and other defects. The speed of the assembly conveyor is rather high because a modern filter cigarette machine must turn out a very large number of articles per unit of time.

It is also known to convolute adhesive-coated bands around groups of rod-shaped articles by passing such groups through a tunnel which is bounded by two travelling rolling surfaces including the surface of an assembly conveyor and a second surface whose speed exceeds the speed of the surface on the assembly conveyor. Such machines require even less time to complete a wrapping operation and exhibit the same drawbacks as the aforementioned machines with stationary rolling surfaces.

Accordingly, it is an important object of the present invention to provide a filter cigarette machine or an

analogous machine which is capable of convoluting adhesive-coated uniting bands around groups of two or more coaxial rod-shaped articles and wherein the likelihood that the uniting bands would be formed with folds or that they would fail to form leakproof joints around the adjoining ends of rod-shaped articles is reduced without any reduction in the ouput of the machine.

Another object of the invention is to provide a machine of the just outlined character which can be obtained by relatively minor and inexpensive alterations of conventional filter cigarette machines.

A further object of the invention is to provide a machine wherein the individual rod-shaped elements or articles of each group are automatically aligned with each other prior to formation of leakproof joints therebetween.

An additional object of the instant invention is to provide a machine which can bbe readily converted for application of adhesive-coated uniting bands to groups of articles having different diameters.

Still another object of my invention is to provide a machine which occupies little floor space, which can be adjusted while in actual use, and whose operation is fully automatic.

An ancillary object of the invention is to provide a novel rolling or wrapping conveyor which may be utilized in the above-outlined machine.

SUMMARY OF THE INVENTION

One feature of my present invention resides in the provision of a machine for convoluting adhesive-coated uniting bands around groups of coaxial rod-shaped articles, particularly for convoluting such bands around groups which comprise pairs of axially spaced cigarette rods of unit length and a filter rod section of double unit length therebetween. The machine comprises travelling assembly and rolling conveyors which define between themselves an elongated wrapping passage whose width at most equals the diameter of a group, means for supplying adhesive-coated uniting bands to the assembly conveyor upstream of the wrapping passage, a feed for supplying to the assembly conveyor groups of rod-shaped articles upstream of the wrapping passage so that each group is adjacent to the leading end of the respective uniting band as viewed in the direction of travel of the assembly conveyor and that the articles of the groups are initially out of direct contact with the associated bands, and drive means for advancing the two conveyors in the same direction but at different speeds whereby the speed of the asesmbly conveyor exceeds the speed of the rolling conveyor. As a result of such difference in speeds, the groups of articles travelling through the passage are caused to roll backwards relative to the assembly conveyor to thereby convolute the uniting bands around their respective articles.

The length of the passage is a multiple of the length of a uniting band, and the rolling conveyor preferably comprises one or more endless flexible bands or belts having stringers which bound one side of the passage opposite the assembly conveyor, and first and second pulleys which are respectively adjacent to the upstream and downstream ends of the passage. At least one of the pulleys is preferably adjustable with reference to the assembly conveyor to thereby vary the length of the stringers and hence the effective length of the wrapping passage.

The novel features which are considered as characteristic of the invention are set forth in particular in the appended claims. The improved machine itself, however, both as to its construction and its mode of operation, together with additional features and advantages thereof, will be best understood upon perusal of the following detailed description of certain specific embodiments with reference to the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a somewhat schematic fragmentary side elevational view of a filter cigarette machine which embodies my invention;

FIG. 2 is an enlarged fragmentary sectional view as seen in the direction of arrows from the line II—II of FIG. 1; and

FIG. 3 is an enlarged view of a detail of the structure shown in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1, there is shown a portion of a filter cigarette machine including a series of conveyors which cooperate to convolute adhesive-coated uniting bands or wrappers **46** around the meeting or adjoining ends of rod-shaped articles **2***a*–**2***c* which form groups **2**. In the illustrated embodiment, each group **2** contains two axially spaced cigarette rods **2***a*, **2***b* of unit length (see FIG. 2) and a filter rod section **2***c* of double unit length disposed between and in axial alignment with the cigarette rods **2***a*, **2***b*. When the filter rod section **2***c* is united with the adjoining end portions of the two cigarette rods **2***a*, **2***b*, the resulting filter cigarette **16** of double unit length is severed midway across the convoluted uniting band to yield two filter cigarettes of unit length each of which includes one-half of a filter rod section **2***c* and one of the two cigarette rods.

The feed of the machine shown in FIG. 1 includes a rotary drum-shaped conveyor **4** having axially parallel equidistant peripheral pockets or holders **6** serving to advance groups **2** of coaxial but unconnected rod-shaped articles **2***a*–**2***c* to a first transfer station B where the groups are taken over and adhere to the periphery of a rotary drum-shaped assembly conveyor **8**. The peripheral surface of the assembly conveyor **8** is subdivided into a plurality of equidistant rolling portions **48** separated from each other by pairs of axially parallel walls or ribs **10** (see also FIG. 2). Thus, each rolling portion **48** is bounded at its leading end (as seen in the direction of rotation of the assembly drum **8**) by a first pair of ribs **10** and at its trailing end by a second pair of ribs **10**. The distance between successive pairs of ribs **10** at least equals but preferably exceeds the length of a uniting band **46** for reasons which will be explained hereinafter. The distance between the ribs **10** of each pair (as seen in the axial direction of the assembly conveyor **8**) at least equal the width of a uniting band **46**.

The uniting bands **46** are convoluted around the filter rod sections of the respective groups **2** during travel from the transfer station, B, through a rolling or wrapping passage **60**, and toward a second transfer station C where the resulting filter cigarettes **16** of double unit length enter successive pockets or holders **14** of a drum-shaped receiving conveyor **12** which cooperates with a suitable cutter (not shown) to sever each cigarette **16** midway between its ends so that such cigarette yields two filter cigarettes of unit length. One of the filter cigarettes of unit length is then inverted in a manner well known from the art of filter cigarette machines so that the filter tips of all cigarettes face in the same direction.

The means for supplying uniting bands **46** into the spaces between successive pairs of ribs **10** is illustrated in the lower portion of FIG. 1 and includes a bobbin or reel (not shown) containing a supply of convoluted uniting web **18**, a pair of advancing rolls **20** which draw the web **18** upwardly from the bobbin, a guide roll **22** which deflects the web **18** in a direction substantially tangentially of the assembly conveyor **8**, a paster **24** of conventional design whose roller-shaped applicator **26** coats the underside of the web **18** with a coat of adhesive paste, and a rotary drum-shaped cutter **34** whose blades **32** sever the web **18** at regular intervals to subdivide it into uniting bands **46** of requisite length. The cutting edges of the blades **32** cooperate with a ring-shaped counterknife **28** which is recessed into the median portion of the periphery of the assembly drum **8** between the pairs of ribs **10** (see FIG. 2) and is provided with suction ducts **30** communicating with a suction chamber **31** so that the uniting bands **46** are compelled to adhere to the external surface of the counterknife **28**. The character A denotes in FIG. 1 the point where the web **18** reaches the counterknife **28**. The latter preferably consists of steel or other suitable hard metallic material which can stand long periods of use and can be machined with requisite precision to insure the formation of clean cuts between successive uniting bands **46**. This counterknife **28** is not provided with ribs.

The upstream end of the wrapping or rolling passage **60** shown in FIG. 1 is located at D and this passage extends toward but short of the second transfer station C. The rolling passage **60** is bounded from above by a wrapping or rolling conveyor **36** which includes four endless flexible belts or bands **36***a* (see FIG. 2) trained around a driven front pulley **42** which is located at the downstream end of the passage **60** and around a multi-section rear pulley **40** which is freely rotatable on a horizontal shaft **39**. The lower or inner stringers **38** of the belts **36***a* form arcs whose centers of curvature are located on the axis of the drive shaft **9** for the assembly conveyor **8**. The belts **36***a* are driven in a sense to move their stringers **38** in the same direction as the direction of travel of rolling portions **48** on the assembly conveyor **8**. The front pulley **42** is driven by a sheave **45***a* through the intermediary of a chain, belt or the like (not shown). The sections or rollers of the rear pulley **40** are separated from each other by aligning disks **41** having axially parallel teeth **44** which can cooperate with the ribs **10** of the assembly conveyor **8** to properly align the articles **2***a*–**2***c* of groups **2** in the event that one or more articles of such groups are moved out of exact axial alignment with the remaining article or articles during transfer from the pockets **6** onto the assembly drum **8**. In the illustrated embodiment, the shaft **39** carries five aligning disks **41**. The shape of teeth **44** will determine the length of time required for aligning the articles **2***a*–**2***c* of the groups **2**. The shaft **39** drives the disks **41** in synchronism with the shaft **9** by conventional means (not shown) to insure that successive teeth **44** of these disks will cooperate with successive pairs of ribs **10** on the assembly conveyor **8** in order to insure that the rod-shaped articles **2***a*–**2***c* of each group **2** are moved or retained in exact axial alignment prior to wrapping of the respective uniting bands **46** therearound.

The effective length of stringers **38** can be regulated by appropriate adjustments in the position of the front pulley **42**. This pulley is mounted on a lever **43** which is rockable on the shaft **45** of the sheave **45***a* and can be locked in selected positions of adjustment by a bolt or screw **47** passing through an arcuate slot **47***a* provided in a fixed support member **47***b*. By changing the position of the front pulley **42**, the operator can determine the length of the interval during which a group **2** travelling from the point D toward the transfer station C is caused to rotate about its own axis to convolute the respective uniting band **46** therearound. If desired, the shaft **39** of the rear pulley **40** can be mounted in the same way as the shaft of the front pulley **42**. A tensioning device **70** biases the upper stringers of the bands **36***a*

The peripheral speeds of the cutter **34**, disks **41** and conveyors **4**, **8**, **12** are identical, and the distances between the centers of successive pockets **6** and **14** are identical with the distances T between successive pairs of ribs **10**, between successive teeth **44** of the disks **41**, and between successive blades **32**. The peripheral speed of the advancing rolls **20** is somewhat less than the peripheral speed of the assembly conveyor **8** so that the successively severed uniting bands **46** are separated from each other by spaces wide enough to accommodate the pairs of ribs **10**. The length of the uniting bands **46** (as seen in the circumferential direction of the conveyor **8**) depends on

the diameters of groups 2 and can be varied by regulating the speed of advancing rolls 20. The drives for the rolls 20 and paster 24 are well known from the art of filter cigarette machines and need not be described here.

In accordance with a feature of my invention, the drive (including the sheave 45*a*) for the belts or bands 36*a* of the wrapping conveyor 36 advances these bands at a speed which is less than the speed of the wrapping portions 48 on the periphery of the assembly conveyor 8. The drive for the conveyor 8 includes the shaft 9, and both drives can derive motion from the main shaft of the filter cigarette machine in a manner which is well known in the art.

FIG. 2 shows that the toothed disks 41 need not be of identical axial length and that the conveyor 8 is formed with suction ducts or channels 50 whose inlets are located in the rolling portions 48 immediately ahead of and behind the ribs 10 (see also FIG. 2). The channels 50 communicate with a suction chamber 51. The axial distance between the left-hand and right-hand pairs of belts 36*a* may approximate the diameter of a group 2. The axial distance between the belts 36*a* may be varied by changing the axial distance between the rollers of the pulley 40.

The numeral 52 denotes in FIG. 3 a space which extends in parallelism with the axis of the conveyor 8 and is bounded at its front side by a pair of ribs 10 and at its rear side by a row of aligned teeth 44. The width of this space 52 (as seen in the circumferential direction of the conveyor 8) equals the diameter of a group 2 whereby the articles 2*a*–2*c* of the group 2 are automatically aligned with each other when such group reaches the point D where the groups enter the upstream end of the wrapping or rolling passage 60.

If the length of the passage 60 is *n* times T, the distance covered by a pair of ribs 10 during rolling of a band 46 around the respective group 2 is $n+1$ times T due to the conveyor 8 moving faster than conveyor 36.

The operation is as follows:

The web 18 is drawn from the bobbin by the advancing rolls 20 (at least one of which is driven to rotate at a peripheral speed which is somewhat less than the peripheral speed of the counterknife 28 on the assembly conveyor 8), and the leading end of the web 18 reaches the counterknife 28 at the point A shown in FIG. 1. The applicator 26 provides the underside of the web 18 with a coat of adhesive material and the uncoated side of the web 18 adheres to the periphery of the counterknife 28 because the latter is formed with suction ducts 30 which communicate with the suction chamber 31. Of course, the periphery of the counterknife 28 slips with reference to the leading end of the web 18 because the peripheral speed of the conveyor 8 exceeds the forward speed of the web. The edges of the blades 32 sever the web 18 at regular intervals to form successive uniting bands 46 which are shorter than the distance between the roots of successive pairs of ribs 10, and the leading end of each freshly formed uniting band 46 adheres to the respective wrapping portion 48 but is spaced from the front ribs 10. This is clearly shown in FIG. 1 in the region between the cutter 34 and feed conveyor 4. The latter supplies onto each rolling portion 48 a group 2 of three coaxial rod-shaped articles 2*a*–2*c* which are transferred onto the assembly conveyor 8 at the station B and immediately adhere to the conveyor 8 because they are deposited directly behind a pair of aligned ribs 10. The suction ducts 30 in each rolling portion 48 include ducts which are fully or partially aligned with the channels 50 so that suction prevailing in such ducts attracts the median rod-shaped article 2*c* of the respective group 2 and holds it in alignment with the two outer rod-shaped articles 2*a*, 2*b*.

As stated before, the distance T between the center planes of successive pairs of ribs 10 exceed the length of uniting bands 46 and the leading ends of the uniting bands are located behind the front pair of ribs 10 so that, during transfer onto the rolling portions 48 at the station B, the groups 2 are deposited on the portions 48 in such a way that they do not immediately contact the adhesive-coated surfaces of the respective uniting bands 46. However, such groups 2 adhere to the rolling portions 48 because they are attracted by suction prevailing in the channels 50 and ducts 30.

When a group 2 reaches the point D, its rod-shaped articles 2*a*–2*c* are engaged by a row of teeth 44 on the aligning disks 41 and are urged toward the adjoining front ribs 10 (see FIG. 3). As stated before, the width of the spaces 52 approximates the diameters of groups 2 so that the articles 2*a*–2*c* of each group are invariably aligned or are held in axial alignment at the time they are caused to enter the rolling or wrapping passage 60. Since the speed of the stringers 38 is less than the speed of rolling portions 48, the stringers 38 cause the groups 2 to roll backwards, i.e., away from the front pair of ribs 10 and toward the rear pair of ribs 10 whereby the median rod-shaped articles 2*c* are united with the corresponding outer rod-shaped articles 2*a*, 2*b* because the respective uniting bands 46 are converted into tubes which surround the median articles (i.e., the filter rod sections 2*c* of double unit length) and the adjoining inner end portions of the two outer articles 2*a*, 2*b* which are constituted by cigarette rods of unit length. At the beginning of travel of groups 2 from the leading toward the trailing pair of ribs 10, the stringers 38 urge the rod-shaped articles 2*a*–2*c* of successive groups against the adjoining rows of teeth 44 to further enhance the aligning action at and immediately past the point D. Such accurate alignment of rod-shaped articles 2*a*–2*c* takes place prior to actual contact between the groups 2 and the respective uniting bands 46 so that the adhesive at the exposed sides of such bands cannot interfere with the aligning action of teeth 44. The rolling step begins when the groups 2 advance beyond the range of teeth 44 on the disks 41 and is terminated when the resulting filter cigarettes 16 of double unit length complete a full revolution about their own axes or a little more to account for the overlap of edges on the respective uniting bands 46. In the course of the convoluting operation, each group 2 rolls in a direction from the leading pair of ribs 10 toward the trailing pair of ribs 10 on the assembly conveyor 8, i.e., the groups 2 roll in a clockwise direction as viewed in FIG. 1. When a cigarette 16 of double unit length reaches the trailing pair of ribs 10, it is held in such position by suction in the adjoining channels 50 and adheres to the trailing ribs until it reaches the transfer station C. At the station C, the suction in channels 50 is terminated or the machine comprises suitable stripping fingers or analogous transfer devices of known design which compel the cigarettes 16 to leave the assembly conveyor 8 and to enter successive pockets 14 of the receiving conveyor 12. The manner in which the cigarettes 16 are thereupon subdivided into filter cigarettes of unit length has been described hereinabove.

A very important advantage of my improved machine is that, during draping of adhesive-coated uniting bands 46, the groups 2 rotate at a relatively low speed (about their own axes) which is desirable because the formation of air pockets between the uniting bands and the articles 2*a*–2*c* of groups 2 is more likely to occur if the groups rotate at a higher speed. Such low-speed rotation is due to the fact that, in the passage 60 between the assembly conveyor 8 and the stringers 38 of the belts 36*a*, the groups 2 are caused to roll backwards, namely, from the leading pair toward the trailing pair of the ribs 10.

Furthermore, and since the feed conveyor 4 delivers groups 2 against the rear surfaces of leading ribs 10, the machine of my present invention can be obtained by relatively simple conversion of conventional filter cigarette machines wherein the assembly conveyor cooperates with a stationary rolling surface. All that is necessary is to replace such stationary rolling surface with the wrapping conveyor 36 of my present invention without, however, necessitating any changes in the drives which ro-

tate the feed conveyor and the assembly conveyor. Transfer of groups **2** directly behind the leading pairs of ribs **10** is desirable because a rod-shaped article which happens to be out of exact axial alignment with the other article or articles of a group is automatically returned into full axial alignment during travel past the disks **41** on the shaft **39**. Inaccuracies in transfer of groups which consist of two or more rod-shaped articles are likely to occur when the conveyors are constituted by drums (such as the conveyors **4** and **8** in FIG. 1) because the length of the transfer station (such as the station B) is then very short.

The provision of pairwise arranged ribs **10** which are separated by gaps wide enough to accommodate the leading end of the web material **18** is of advantage because the subdivision of the web into uniting bands **46** presents fewer problems. The provision of disks **41** and suction ducts and channels **30**, **50** enables the machine to accurately align the articles of each group prior to actual contact between such articles with the adhesive-coated sides of the uniting bands **46**.

Another advantage of my machine is that the passage **60** is relatively short because the groups **2** are caused to roll backwards. This is important because the machine can utilize an assembly conveyor of small diameter.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features which fairly consitute essential characteristics of the generic and specific aspects of my contribution to the art.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

What is claimed is:

1. Machine for convoluting adhesive-coated uniting bands around groups of coaxial rod-shaped articles, comprising travelling assembly and rolling conveyors defining between themselves a wrapping passage the length of which exceeds the length of a uniting band, said assembly conveyor being provided with equidistant rib means extending transversely of the direction of travel of said conveyors; means for supplying adhesive-coated uniting bands to said assembly conveyor upstream of said passage, said supplying means being arranged to deliver successive uniting bands between successive rib means on said assembly conveyor and the distance between successive rib means being at least equal to the length of a uniting band; a feed for supplying to said assembly conveyor groups of rod-shaped articles upstream of said passage so that each group is adjacent to the leading end of one of said uniting bands, as viewed in the direction of travel of said assembly conveyor, each of said groups comprising three coaxial rod-shaped articles including two outer articles and a median article and the width of said uniting bands exceeding the axial length of said median articles, said supplying means being arranged to deliver uniting bands in such positions that each uniting band extends beyond the axial ends of each of the respective median articles, each of said rib means comprising a pair of spaced ribs each adjacent to one of said outer articles and each of said ribs having a front side and a rear side, as viewed in the direction of travel of said assembly conveyor, said feed being arranged to deliver the groups in such positions that the outer articles of each group are adjacent to the rear sides of the respective ribs, said rolling conveyor comprising aligning means cooperating with successive pairs of ribs on said assembly conveyor at the upstream end of said passage to align the articles of successive groups prior to entry of such groups into said passage; and drive means for advancing said conveyors in the same direction but a different speeds so that the speed of said assembly conveyor exceeds the speed of said rolling conveyor, said passage being of such width that, during travel therethrough, the groups of rod-shaped articles are rolled backwards relative to said assembly conveyor to thereby convolute the uniting bands around ther espective rod-shaped articles.

2. Machine for convoluting adhesive-coated uniting bands around groups of coaxial rod-shaped articles, comprising travelling assembly and rolling conveyors defining between themselves a wrapping passage, said rolling conveyor comprising at least one endless flexible band having a stringer bounding one side of said passage opposite said assembly conveyor and first and second pulley means respectively adjacent to the upstream and downstream ends of said passage, said band being trained around said pulley means; adjusting means operative to charge the position of at least one of said pulley means with reference to said assembly conveyor to thereby vary the effective length of said stringer; means for supplying adhesive-coated uniting bands to said assembly conveyor upstream of said passage; a feed for supplying to said assembly conveyor groups of rod-shaped articles upstream of said passage so that each group is adjacent to the leading end of one of said uniting bands, as viewed in the direction of travel of said assembly conveyor; and drive means for advancing said conveyors in the same direction but at different speeds so that the speed of said assembly conveyor exceeds the speed of said rolling conveyor, said passage being of such width that, during travel therethrough, the groups of rod-shaped articles are rolled backwards relative to said assembly conveyor to thereby convolute the uniting bands around the respective rod-shaped articles.

3. Machine for convoluting adhesive-coated uniting bands around groups of coaxial rod-shaped articles, comprising travelling assembly and rolling conveyors defining between themselves a wrapping passage; adjusting means operative to vary the effective length of said passage; means for supplying adhesive-coated uniting bands to said assembly conveyor upstream of said passage; a feed for supplying to said assembly conveyor groups of rod-shaped articles upstream of said passage so that each group is adjacent to one of said uniting bands; and drive means for advancing said conveyors at different speeds, the width of said passage being such that, during travel therethrough, the groups of rod-shaped articles are rolled relative to said conveyors to thereby convolute the uniting bands around the respective rod-shaped articles.

4. Machine for convoluting adhesive-coated uniting bands around groups of coaxial rod-shaped articles, comprising travelling assembly and rolling conveyors defining between themselves a wrapping passage, said rolling conveyor comprising a plurality of endless bands having stringers bounding one side of said passage opposite said assembly conveyor and first and second pulley means respectively adjacent to the upstream and downstream ends of said passage, said bands being trained around said pulley means; means for supplying adhesive-coated uniting bands to said assembly conveyor upstream of said passage; a feed for supplying to said assembly conveyor groups of rod-shaped articles upstream of said passage so that each group is adjacent to the leading end of one of said uniting bands, as viewed in the direction of travel of said assembly conveyor; and drive means for advancing said conveyors in the same direction but at different speeds so that the speed of said assembly conveyor exceeds the speed of said rolling conveyor, said rolling conveyor further comprising aligning means provided at the upstream end of said passage and cooperating with said assembly conveyor to place the articles of successive groups into accurate axial alignment with each other prior to entry of such groups into said passage, said passage being of such width that, during travel therethrough, the groups of rod-shaped articles are rolled backwards relative to said assembly conveyor to thereby convolute the uniting bands around the respective rod-shaped articles.

5. Machine as defined in claim **4**, wherein said aligning means comprises a plurality of disks having equidistant circumferentially spaced aligning teeth and mounted coaxially with said first pulley means, and drive means for rotat-

ing said disks at a peripheral speed which equals the speed of said assembly conveyor, said assembly conveyor comprising a plurality of equidistant spaced rib means whose spaced distance equals the distance between the teeth of said disks, each of said rib means defining with one tooth of each disk a space which is just wide enough to accommodate a group of rod-shaped articles during entry of such groups into said passage.

6. Machine as defined in claim **5**, wherein said assembly conveyor is provided with suction ducts and channels arranged to attract said uniting bands and the articles of said groups, at least during travel of such articles and bands toward said passage.

7. Machine for convoluting adhesive-coated uniting bands around groups of coaxial rod-shaped articles, comprising a travelling assembly conveyor and a travelling rolling conveyor, said conveyors defining between themselves a wrapping passage; means for supplying adhesive-coated uniting bands to said assembly conveyor upstream of said passage; a feed for supplying to said assembly conveyor groups of rod-shaped articles upstream of said passage so that each group is adjacent to one of said uniting bands; and drive means for advancing said conveyors at different speeds, said passage being of such width that, during travel therethrough, the groups of rod-shaped articles are rolled relative to said conveyors to thereby convolute the uniting bands around the respective rod-shaped articles, said rolling conveyor further comprising aligning means provided at the upstream end of said passage and cooperating with said assembly conveyor to place the articles of successive groups into accurate axial alignment with each other prior to entry of such groups into said passage.

8. Machine as defined in claim **7**, wherein said drive means is arranged to advance said assembly conveyor at a speed which exceeds the speed of said rolling conveyor so that the groups of rod-shaped articles in said passage are rolled backwards relative to said assembly conveyor.

9. Machine as defined in claim **7**, further comprising limiting means rigid with and adjacent to the periphery of said assembly conveyor for limiting the extent of rolling movement of said groups relative to the rolling surfaces of said assembly conveyor.

10. Machine as defined in claim **9**, further comprising means for locating said groups in predetermined positions with reference to said assembly conveyor prior to entry of such groups into said passage.

11. Machine as defined in claim **10**, wherein said locating means constitute said limiting means.

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