

Nov. 2, 1965

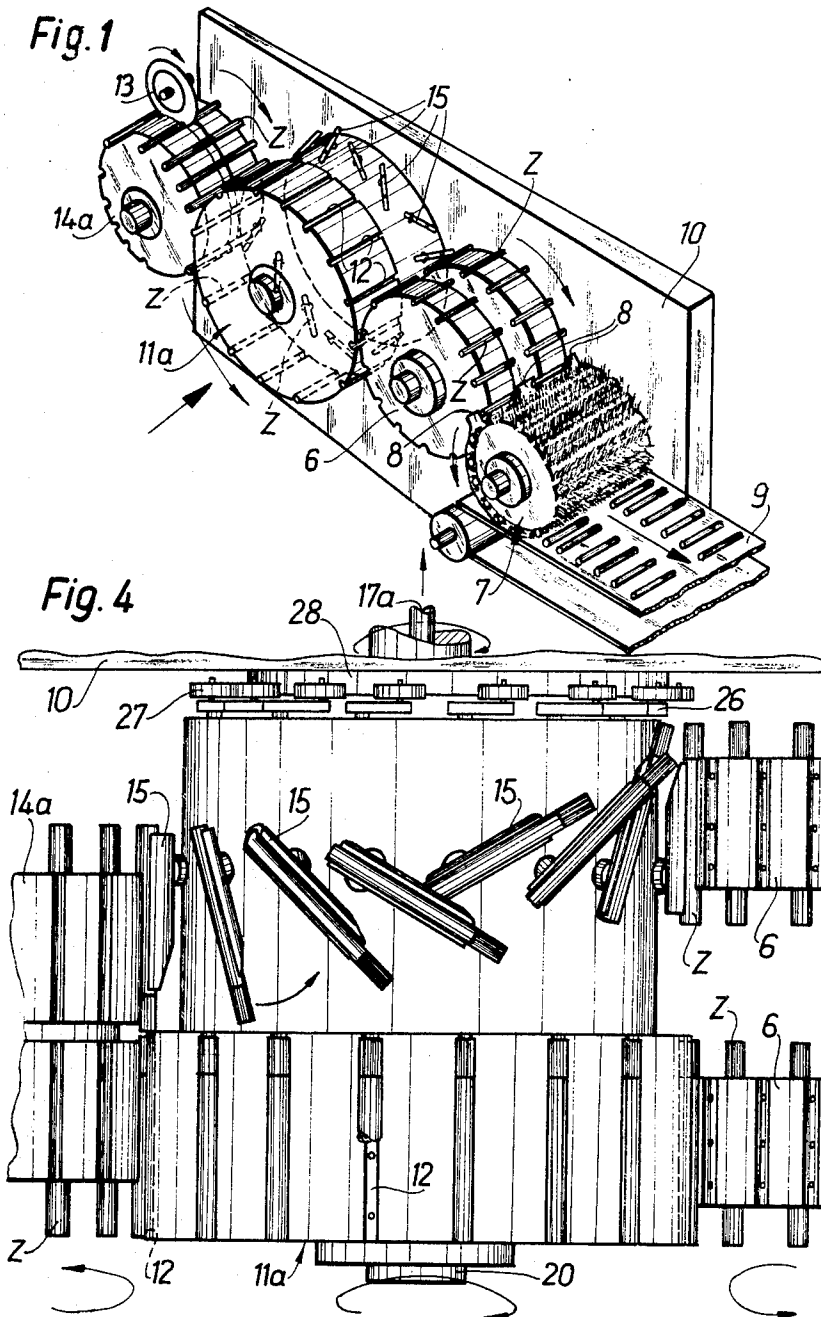
B. A. SCHUBERT

3,215,250

ARTICLE ROTATING APPARATUS

Filed July 30, 1962

3 Sheets-Sheet 1



Inventor:

BERNHARD SCHUBERT

BY

Dicker & Craig
ATTORNEYS

Nov. 2, 1965

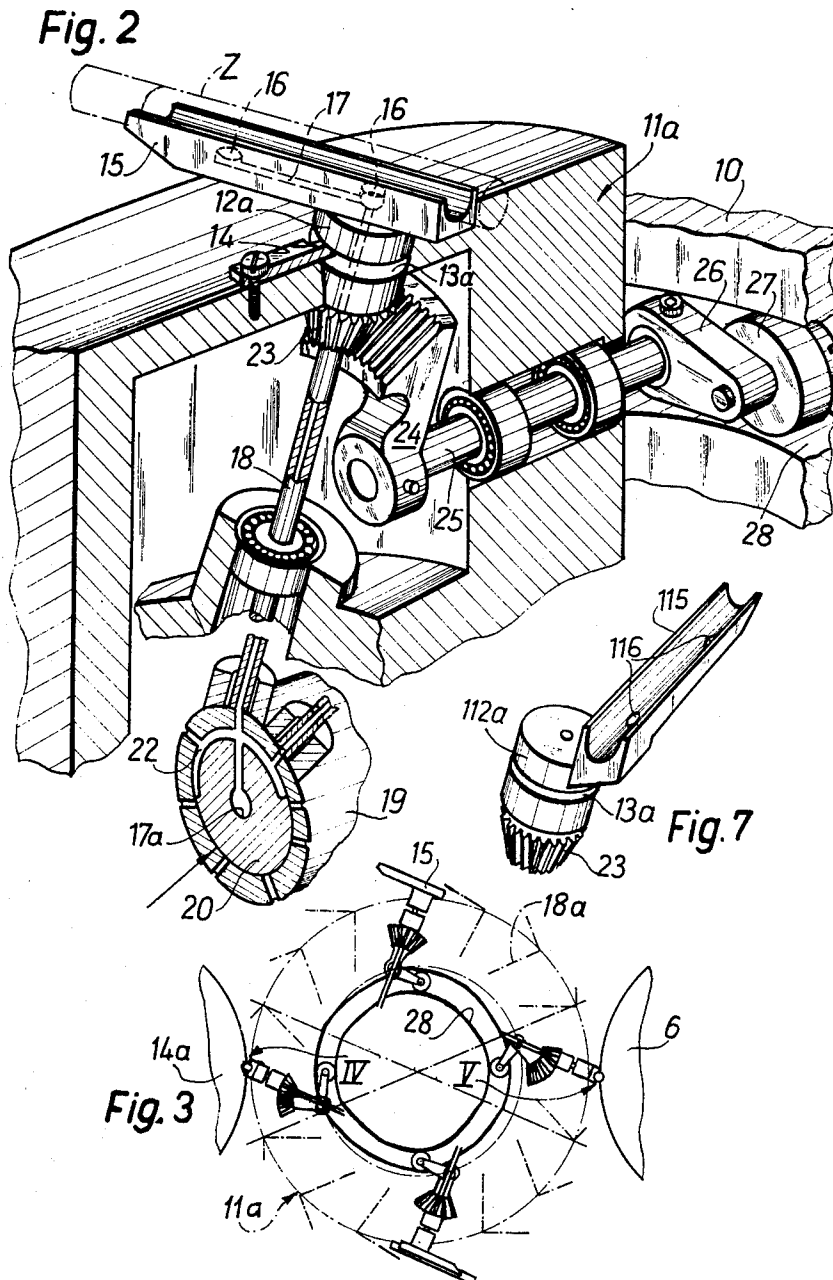
B. A. SCHUBERT

3,215,250

ARTICLE ROTATING APPARATUS

Filed July 30, 1962

3 Sheets-Sheet 2



Inventor:

BERNHARD SCHUBERT

BY *Licke & Craig*
ATTORNEYS

Nov. 2, 1965

B. A. SCHUBERT

3,215,250

ARTICLE ROTATING APPARATUS

Filed July 30, 1962

3 Sheets-Sheet 3

Fig. 5

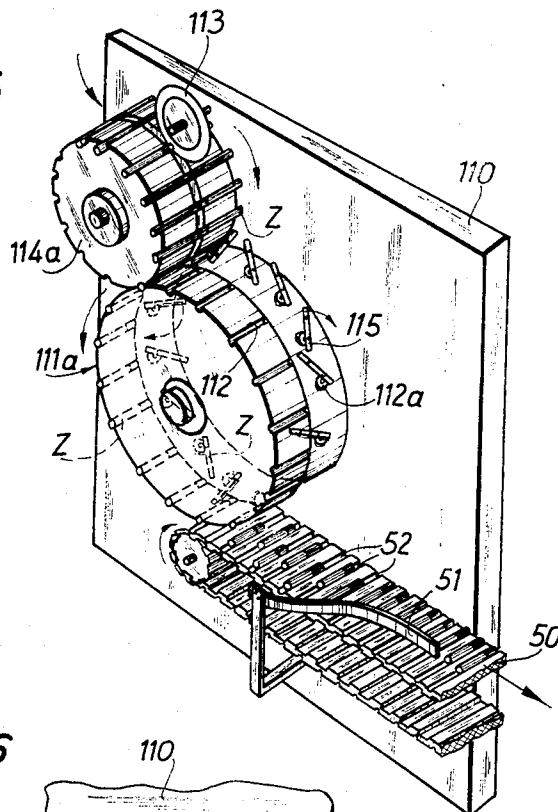
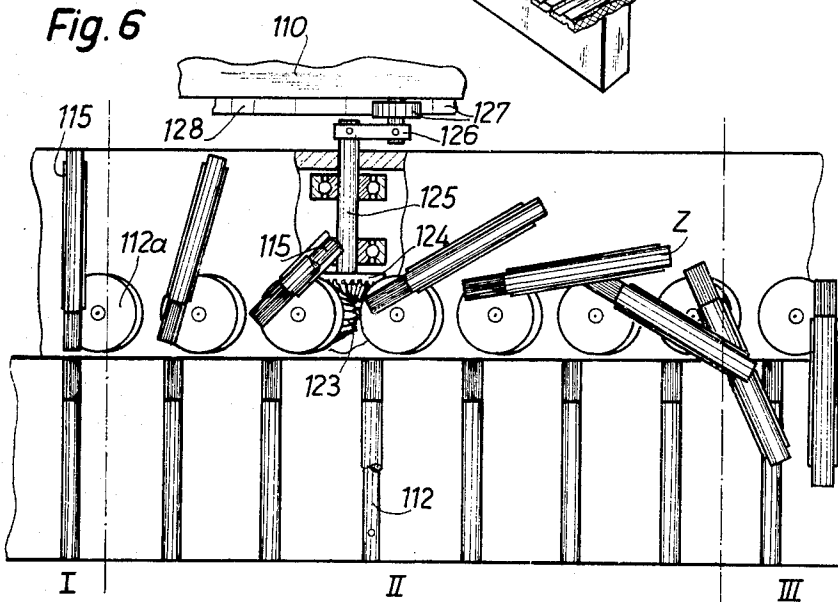


Fig. 6



Inventor:

BERNHARD SCHUBERT

BY *Dicke + Craig*
ATTORNEYS

1

3,215,250

ARTICLE ROTATING APPARATUS

Bernhard Albert Schubert, Hamburg-Lohnbrügge, Germany, assignor to Hauni-Werke Korber & Co., K.G., Hamburg-Bergedorf, Germany

Filed July 30, 1962, Ser. No. 213,393

Claims priority, application Germany, Aug. 8, 1961,

H 43,352

8 Claims. (Cl. 198—33)

The present invention relates to a mechanism for changing the position, and more particularly for turning or reversing cigarettes and other rod-shaped articles, which includes a transverse conveying or feeding means, provided with article-receiving stations and operable to advance the cigarettes in rows, for example, a drum-shaped conveying member provided with trough-shaped cigarette-receiving depressions, a receiving means also provided with article receiving stations and rotating synchronously with the transverse conveying means, for example, also a drum-shaped member provided with trough-shaped cigarette-receiving depressions, and an additional conveying means, for example, a conveyor belt, for the further conveyance of the turned cigarettes. More particularly, the present invention relates to a device for rotating, by 180°, one of the two rows of cigarettes leaving a cigarette-making machine in two rows and for delivering the rotated cigarettes either adjacent to or into the path of movement of the non-rotated cigarettes between the latter.

Such rotating or turning mechanisms are necessary also, inter alia, for distributing installations of filter-cigarette-making machines in order to align the cigarettes, which are supplied from the machines in a position with the filters thereof facing each other, in such a manner that the filters of the cigarettes will point in the same direction. The rotating or turning operation is also applicable to cigarette-making machines in which, for example, the two rows of cigarettes are to be further transported in a single row of cigarettes with the mouth pieces thereof pointing in one and the same direction, for example, for the purpose of passing the cigarettes through an inspection or a testing device which determines the characteristics of each individual cigarette.

A number of mechanically or pneumatically-operated turning mechanisms is known in the prior art. These prior art systems have, however, the disadvantage that the cigarettes are subjected therein to mechanical external forces and pressures surpassing the permissive limits.

It has now been discovered that cigarettes may be rotated or turned without involving any change in the conveying speed thereof and without mechanical loads or stresses, by taking care that the article-receiving stations of the turning-drum are rotatable about 180° in a controlled manner during the travel from the receiving point to the delivery point. This may be achieved, for example, by securing the article-receiving stations of the turning-drum to turning pins adapted to be rotated by means of a transmission the drive shaft of which is provided with a guide member whose end opposite the pin is guided in a stationary cam track in such a manner that a rotary movement by 180° is imparted to the article-receiving stations along the path from the receiving point for the cigarettes to the delivery point thereof and back to the receiving point, which rotary movement is interrupted for a short period of time at these two points for purposes of assuring a faultless and satisfactory reception and delivery of the cigarettes.

In order to prevent mutual interference between the article-receiving stations during such rotation, the turning-drum would have to be made with an undesirably large diameter. In order to avoid such large dimensions,

2

an important feature of the present invention essentially consists in securing the article-receiving stations with one end thereof to the rotating pins and by arranging the pins to extend in a converging manner with respect to those radii of the rotating or turning drum which connect the points of rotation of the article-receiving stations with the axis of rotation of the turning-drum.

As a result of such an arrangement, the article-receiving stations carry out, during rotation thereof, tumbling movements to be described more fully hereinafter so that each article-receiving station is able to rotate over the respectively adjacent article-receiving station. During the rotary movements thereof, the cigarettes are retained in the article-receiving stations thereof by means of a vacuum, whereby the suction channels are formed, according to a preferred embodiment of the present invention, by the rotating pins of the article-receiving stations.

In installations of the type described hereinabove, the present invention proposes for purposes of turning by 180° one row of cigarettes leaving a cigarette-making machine in two rows, to provide the turning-drum with two or possibly also with several rows of article-receiving stations, of which one row of stations is rigidly secured to the surface of the turning drum while each station of another row is rotatably secured to the peripheral surface thereof in such a manner that turning or rotation takes place about the end of the cigarettes to be turned opposite the cigarettes not to be turned.

If it is intended to insert the turned cigarettes into the row of the unturned cigarettes between the latter, the present invention proposes that the turning of the cigarettes intended to be turned take place about the ends thereof facing the cigarettes not to be rotated or turned, and that the rotatable article-receiving stations be secured eccentrically to rotating turning-heads of the rotating pins thereof.

Accordingly, it is an object of the present invention to provide a mechanism for changing the position of articles, particularly for reversing the position of cigarettes by 180° which avoids, by simple means, the shortcomings and inadequacies mentioned hereinabove that are normally encountered with the prior art constructions.

It is another object of the present invention to provide an article turning mechanism, particularly for cigarettes which is capable of rotating and thereby turning the articles so as to change the position thereof by 180° without danger of damage to the articles by the application of forces which might damage the articles.

Still a further object of the present invention resides in the provision of a mechanism for handling articles to reverse the position of the article by 180° which achieves the foregoing aims and objects by relatively simple and inexpensive means without impairment to the speed of operation of the installation and to the speed of handling of the articles.

A further object of the present invention resides in the provision of an article-turning installation, particularly for cigarettes, which is so constructed and arranged as to enable turning of the articles by 180° without mutual interference of the articles whose position is to be reversed and without the need of excessive dimensions, especially in the diametric dimension of the drum-shaped conveyor element performing the turning operation.

Still another object of the present invention resides in the provision of simple, effective and reliable means utilizing underpressure to maintain the articles, particularly cigarettes, in correct position during the turning operation without danger of damage thereto and additionally in the provision of simple control means for the vacuum operated retaining and release means thereof.

These and other objects, features and advantages of

3

the present invention will become more apparent from the following description, when taken in connection with the accompanying drawing which shows, for purposes of illustration only, in FIGURES 1-4 and FIGURES 5-7, respectively, two embodiments in accordance with the present invention, and wherein

FIGURE 1 is a perspective view of an installation including a cutting drum and a conveyor belt in a mouthpiece cigarette-making machine provided with a rotary turning-drum arranged therebetween as well as with an intermediate drum according to a first embodiment of the present invention;

FIGURE 2 is a partial perspective view of an article-receiving station arranged on the turning drum with parts thereof broken away for sake of clarity;

FIGURE 3 is a schematic view illustrating the control of the article receiving stations;

FIGURE 4 is a top plan view, on an enlarged scale, of the turning drum of FIGURE 1, taken in the direction of the arrow of FIGURE 1, which deposits the cigarettes onto a two-part intermediate drum;

FIGURE 5 is a perspective view of a turning arrangement for the direct deposition of a row of cigarettes to be coordinated by insertion on a receiving conveyor belt directly into the cigarettes of another row according to a second embodiment of the present invention;

FIGURE 6 is a partial top plan view of the turning drum of FIGURE 5 illustrating the turning operation and alignment of a first row of cigarettes with respect to a second row of cigarettes, and

FIGURE 7 is a partial perspective view of the eccentric mounting of an article-receiving station on the turning head of the rotating pin of the turning arrangement of FIGURES 5 and 6.

Referring now to the drawing, wherein like reference numerals are used throughout the various views to designate like parts, and more particularly to FIGURE 1, reference numeral 11a designates therein a conveyor here shown as a rotary turning-drum provided with two rows of receiving stations to be referred to hereinafter as trough-shaped elements. One row of trough-shaped elements 12 forming the cigarette-receiving stations is rigidly secured to the periphery of the rotary turning drum 11a, whereas each station of the other row is rotatably secured to the periphery of the turning drum 11a and comprises a trough-shaped turning element 15. The turning drum 11a is arranged behind a cutting drum 14a provided with a knife 13, as viewed in the direction of conveyance of the cigarettes, on which groups of cigarettes consisting of two cigarettes with a common mouthpiece therebetween are cut into two filter cigarettes, in a manner known per se. One row of cigarettes remains unaffected in the positions thereof during its travel on the drum 11a by reason of the stationary trough-shaped elements 12, i.e., the cigarettes thereof received in cigarette receiving stations 12 are not turned but remain in their original position, whereas the cigarettes of the other row are delivered, after being turned by 180° by the trough-shaped elements 15 thereof, forming the cigarette-receiving stations of this row, to a two-part intermediate drum 6, whereby a rotating brush 7 removes the cigarettes from drum 6 by appropriate lifting means 8 and thereupon releases the cigarettes onto a conveyer belt 9. The drums 11a and 6 and the brush 7 are mounted on a supporting wall 10 of the filter cigarette making machine and all rotate synchronously.

According to FIGURE 2, the trough-shaped turning elements 15 are secured in any suitable manner, within the region of one of the two ends thereof, to a swivel head 12a which is provided with an annular groove 13a into which engages a retaining tongue 14 which, in turn, is secured to the periphery of the rotating drum 11a. Suction ports 16 for the admission of suction air are arranged at the bottom of the trough-shaped turning elements 15, these ports 16 being interconnected by a suction chan-

4

nel 17 which continues on the inside of drum 11a through a suction pipe 18 to a suction ring 19. The suction ring 19 rotates about a stationary shaft 20 provided with a suction air bore 17a, which is in communication with an underpressure or vacuum producing means. The range of influence of the vacuum or suction air is limited by the concentrically arranged suction air groove 22 arranged on the surface of the shaft 20.

On the bottom side of the swivel head 12a, a bevel gear 23 is provided which engages with a toothed segment 24 attached to a shaft 25. This shaft 25 carries on the opposite end thereof a control lever or guide member 26, to the opposite end of which is secured a guide roller 27 which, in turn, is guided within a cam track or control groove 28 machined into the wall 10 of the machine. The configuration of the control groove 28 is shown in FIGURE 3 in a plan view on a reduced scale. Some of the trough-shaped turning elements 15 are illustrated in FIGURE 3 together with the drive means thereof, while the other trough-shaped turning elements together with the axes 18a of the vacuum pipes 18 are schematically indicated in dash-and-dot lines. Reference numeral IV generally designates the receiving area for receiving the cigarettes from the cutting drum 14a, while reference numeral V designates the delivery area for delivery of the cigarettes to the intermediate drum 6. The turning-drum 11a, which is also indicated in dash-and-dot lines, rotates in the counterclockwise direction and the cigarettes are rotated or turned by 180° along the path thereof from point IV to point V. During return from point V to point IV, the empty trough-shaped turning elements 15 are then pivoted back into the starting positions thereof. No rotating or turning movements take place within the regions of points IV and V because the cam 28 extends in these regions concentrically with respect to the turning-drum 11a so that no control influence is exerted on the trough-shaped elements 15 by means of the drive arrangement described hereinabove.

After receiving the cigarettes at point IV, the cigarettes are retained within the trough-shaped turning elements 15 by the suction air and the rollers 27 guided along the cam track are moved out of the concentric range thereof, which results in a pivoting or swinging movement of the guide member 26. This swinging movement is transmitted by the shaft 25 to the toothed segment 24 which now sets the meshing bevel gear 23 (FIGURE 2) into rotation and thereby rotates or turns the trough-shaped turning element 15. This swinging operation continues for about 180° until shortly ahead of the delivery point V of the cigarettes from the turning drum 11a to the divided intermediate drum 6. The curvature of the cam track extends, within the delivery area (station V), again concentrically to the turning-drum 11a so that the trough-shaped turning elements 15 also fail to be rotated during release of the cigarettes to the intermediate drum 6. The development of the rotating operation is shown in FIGURE 4, as viewed in the direction of the arrow in FIGURE 1. The cigarettes delivered by the cutting drum 14a and intended to be rotated are taken over by the trough-shaped turning elements 15 of the rotating drum 11a, are turned in position and thereupon are conveyed to the delivery point at which the trough-shaped turning elements 15, while in alignment with the stationary trough-shaped elements 12 are not pivoted for a short period of time.

When the trough-shaped turning elements 15 (FIGURE 1) are positioned opposite the trough-shaped elements of the divided intermediate drum 6, which is equally subjected to the effect of the suction air, then the vacuum existing within the suction channel 17 of trough-shaped turning element 15 is interrupted, according to FIGURE 2, and the cigarette is then transferred to the corresponding trough-shaped element of the divided intermediate drum 6 and is retained therein. The range of influence of the vacuum in the turning drum 11a or 11a (see FIGURE 5) is dependent upon and limited by the coincidence of

5

the vacuum pipe 18 terminating in the suction air ring 19 with suction air groove 22 which is provided peripherally within the stationary shaft 20.

After release of the cigarettes to the divided intermediate drum 6, the trough-shaped turning elements 15 are swung back to the original position thereof, whereby the convergent arrangement of the pivot axes 18 (FIGURE 2) or 18a (FIGURE 3) with respect to the corresponding radius of the receiving drum 11a renders it possible for a respectively following trough-shaped turning element 15 to swing over the respectively preceding trough-shaped turning element. The cigarettes Z released to the divided intermediate drum 6 are lifted off the intermediate drum 6 by lifting means 8 (FIGURE 1) and are raised into the brush-free grooves of the rotating brush 7 which deposits the rotated cigarettes in alignment with the non-rotated cigarettes on the conveyor belt 9.

In the embodiment of FIGURES 5 and 6, the cigarettes Z, after having been separated by the knife 113 of a cutting drum 114a, are transported from this cutting drum to a turning drum 111a, from which they are deposited directly on a conveyor belt 50 provided with trough-shaped article receiving portions 52. The cutting drum 114a, the turning drum 111a and the conveyor belt 50 also rotate synchronously with respect to each other in this embodiment. The delivery or release of the cigarettes from the turning drum 111a onto the belt 50 effectively provided with trough-shaped depressions takes place by interrupting the vacuum in the trough-shaped elements of the turning drum 111a, whereupon the cigarettes Z fall, by gravity, into a corresponding trough-shaped portion of belt 50 disposed therebelow. Since the spatial coordination of the turning drum 111a to the belt 50 is given by the use of the force of gravity in the release operation, the spatial coordination of the cutting drum 114a has to be matched thereto in such a manner that the trough-shaped turning elements 115 will be in alignment with the trough-shaped portions of the cutting drum 114a during transfer of the cigarettes from the cutting drum 114a to the turning drum 111a, as described hereinabove in connection with the previous embodiment.

Whereas in the previous embodiment the two rows of cigarettes according to FIGURES 1 and 4 are deposited into two rows adjacent one another, the rotated cigarettes are deposited in the embodiment of FIGURES 5 and 6 into the path of the non-rotated cigarettes. FIGURE 7 shows the arrangement of a trough-shaped turning element 115 positioned on the swivel head 112a, by means of which this operation is effected. The trough-shaped turning element 115 is displaced therein with its center line from the center of the pivot head 112a to such an extent that the cigarettes Z positioned in the trough-shaped turning element 115, after being rotated by 180° about the center of the pivot head 112a will come to be positioned between the non-rotated cigarettes. The turning operation is shown in FIGURE 6. The pair of cigarettes Z taken over by the turning drum 111a from the cutting drum 114a (station I) is disposed, respectively, within a stationary trough-shaped element 112 and within a trough-shaped turning element, respectively. During passage through station II, the trough-shaped turning element 115 together with the cigarette received therein is pivoted by 180° ahead of the stationary trough-shaped element 112 and, thus oriented with corresponding aligned ends thereof, is brought into the path of non-rotated cigarettes (station III). From this position, the cigarettes are then deposited into trough-shaped recesses 52 of the belt 50. During the advancing movement on the belt 50, the non-rotated cigarettes are pushed into the path of movement of the rotated cigarettes by a deflector member 51.

While I have shown and described two embodiments in accordance with the present invention, it is understood that the same is not limited thereto, but is susceptible of

6

many changes and modifications within the spirit and scope thereof as known to a person skilled in the art, and I therefore do not wish to be limited to the details shown and described herein, but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

I claim:

1. An installation for reversing the position of rod-shaped articles such as cigarettes, provided with first means for supplying the articles in a row-like manner and with second means for transporting the turned articles, comprising a plurality of article-receiving means rotatable with respect to each other and each arranged to receive a single article from said first means, said article-receiving means being operable to deliver the respective articles to said second means in a position rotated by about 180° with respect to the position of the articles in said first means, said first, second and article-receiving means operating synchronously, and control means for controllably rotating each of said article-receiving means substantially by 180° along the path thereof substantially from a receiving point at which the articles are received from said first means to a delivery point where the articles are delivered to said second means.

2. An installation for reversing the position of rod-shaped articles such as cigarettes, provided with first means for supplying the articles in a row-like manner and with second means for transporting the turned articles, comprising a plurality of article receiving means rotatable with respect to each other and each arranged to receive a single article from said first means, said article-receiving means being operable to deliver the respective articles to said second means in a position rotated by about 180° with respect to the position of the articles in said first means, said first, second and article receiving means operating synchronously, and control means for controllably rotating each of said article receiving means substantially by 180° along the path thereof substantially from a receiving point at which the articles are received from said first means to a delivery point where the articles are delivered to said second means and for controllably rotating each of said article receiving means substantially by 180° back to the initial positions thereof along the path from said delivery point to said receiving point.

3. An installation as set forth in claim 2, wherein each of said article receiving means comprises a substantially trough-shaped element and wherein said control means comprises rotary pins to which said trough-shaped elements are secured and drive means for rotating said pins including drive shaft means provided with guide means and relatively stationary cam means for guiding said guide means.

4. An installation as set forth in claim 3, wherein said control means is arranged to rotate each of said article receiving means through substantially 180° back to the initial positions thereof along the path from said delivery point to said receiving point and further comprising vacuum-controlled means operable in said article receiving means for selectively and controllably retaining the articles in the respective article receiving means from said receiving point to said delivery point, said vacuum-controlled means including suction-air lines portions of which extend through said rotary pin means.

5. An installation for reversing the position of rod-shaped articles such as cigarettes, provided with first means for supplying the articles in a row-like manner, with a turning conveyor, and with second means for transporting the turned articles, comprising a plurality of article receiving means each rotatably mounted on said turning conveyor and each arranged to receive a single article from said first means, said article-receiving means being operable to deliver the respective articles to said second means in a position rotated by about 180° with respect to the position of the articles in said first means, control means for controllably rotating each of said article receive-

7

ing means substantially by 180° along the path thereof substantially from a receiving point at which the articles are received from said first means to a delivery point where the articles are delivered to said second means, each of said article receiving means including a substantially trough-shaped element and said control means including rotary pin means to which said trough-shaped elements are secured, and drive means for rotating said rotary pin means including drive shaft means provided with guide means and relatively stationary cam means for guiding thereby said guide means, said trough-shaped elements being secured near one end thereof to said rotary pin means and said rotary pin means extending with the axis thereof in a converging manner with respect to those radii of said conveyor which connect the points of rotation of said trough-shaped elements with the axis of said conveyor.

6. An installation for reversing the position of rod-shaped articles such as cigarettes, provided with first means for supplying the articles in a row-like manner and with second means for transporting the turned articles, comprising a plurality of article receiving means rotatable with respect to each other and each arranged to receive a single article from said first means, said article-receiving means being operable to deliver the respective articles to said second means in a position rotated by about 180° with respect to the position of the articles in said first means, control means for controllably rotating each of said article receiving means substantially by 180° along the path thereof substantially from a receiving point at which the articles are received from said first means to a delivery point where the articles are delivered to said second means, each of said article receiving means including a substantially trough-shaped element and said control means including rotary pin means to which said trough elements are secured, and drive means for rotating said rotary pin means including drive shaft means provided with guide means and relatively stationary cam means for guiding thereby said guide means, and vacuum-controlled means operable in said receiving means for selectively and controllably retaining the articles in said article receiving means from said receiving point to said delivery point.

8

7. An installation for changing the position of elongated articles comprising a rotary turning conveyor, a plurality of article-receiving means, each arranged to accommodate one elongated article at a time; means for rotatably supporting said article-receiving means along the periphery of said turning conveyor and in such close proximity to each other that upon rotation of the article-receiving means portions of the articles supported therein may be rotated over portions of the articles supported in the adjacent article-receiving means, control means for controllably rotating said article-receiving means with respect to each other during rotation of said turning conveyor, and suction generating means for retaining the articles in the respective article-receiving means during turning.

8. An installation for turning, by 180°, one row of cigarettes supplied from a cigarette-making machine in two rows and for supplying the turned cigarettes adjacent the path of movement of the unturned cigarettes, comprising a rotary conveyor provided with a plurality of rows of article-receiving means, the article-receiving means of one row being stationary on said conveyor each article-receiving means of another row being rotatably secured along the periphery of said conveyor, means including the rotatable article-receiving means for turning the cigarettes to be turned by 180° about the ends thereof opposite the stationary cigarettes, and suction generating means for retaining the articles in the respective article-receiving means of said other row during turning.

References Cited by the Examiner

UNITED STATES PATENTS

2,923,397	2/60	Parrish	198—33
2,944,654	7/60	Schubert	198—32
2,988,198	6/61	Pinkham	198—32

FOREIGN PATENTS

618,592 4/61 Canada.

SAMUEL F. COLEMAN, *Primary Examiner.*

EDWARD A. SROKA, ERNEST A. FALLER,
Examiners.