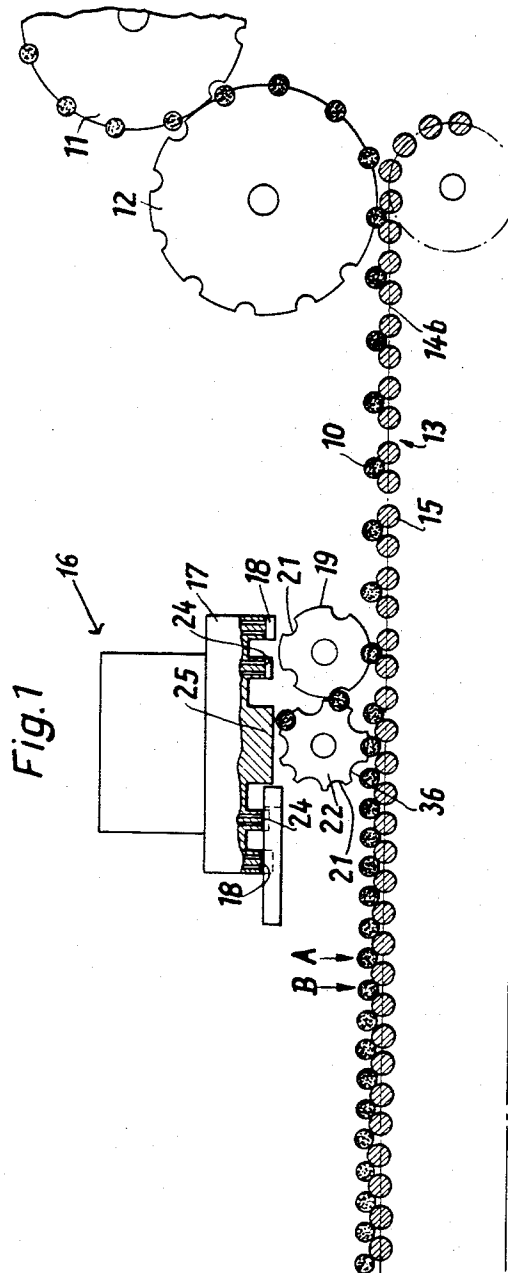


Dec. 24, 1968 K. LIEDTKE 3,417,855
 DEVICE FOR TURNING OBLONG ARTICLES, PARTICULARLY
 FILTER TIP CIGARETTES
 Original Filed Aug. 12, 1966 3 Sheets-Sheet 1

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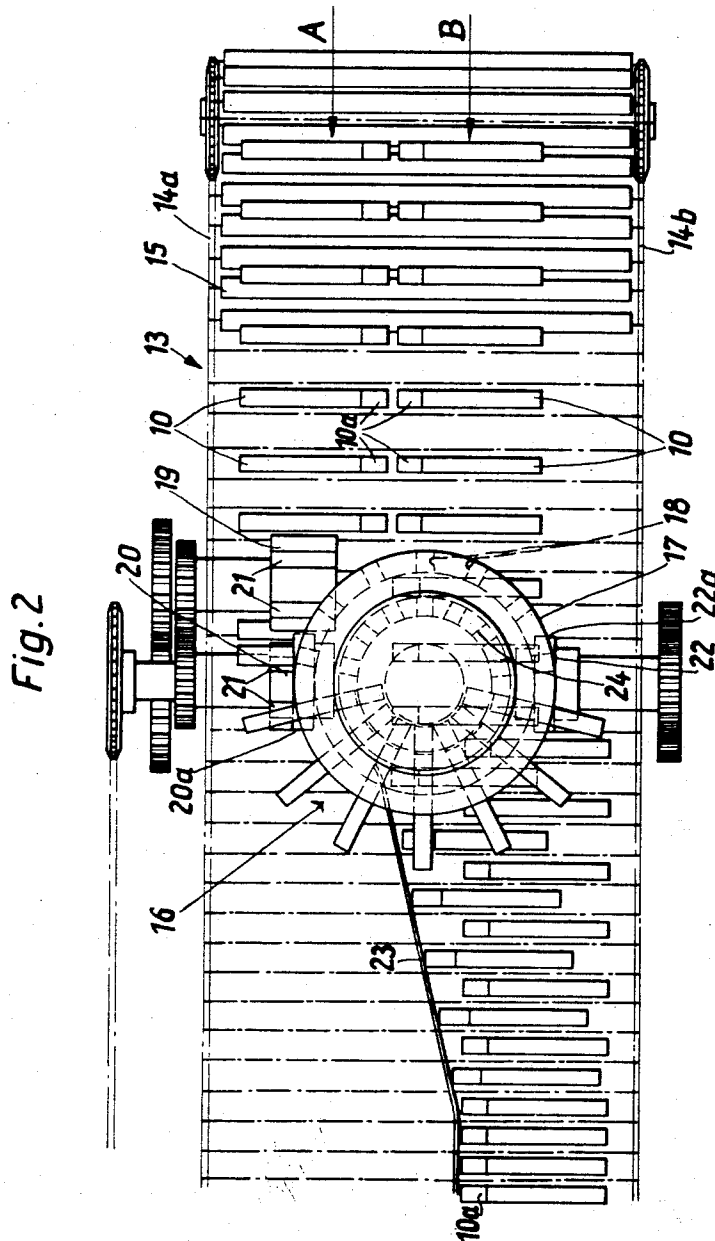
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Fig. 3

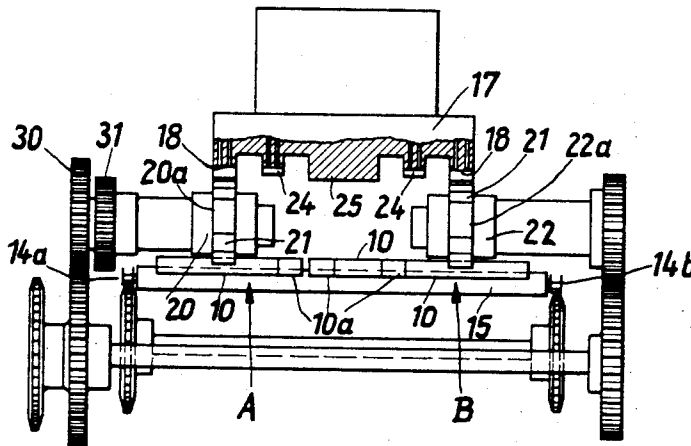
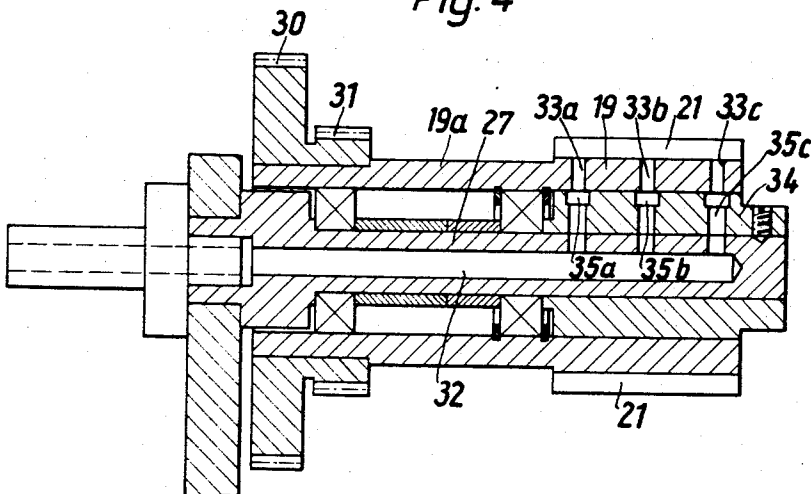


Fig. 4



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DEVICE FOR TURNING OBLONG ARTICLES, PARTICULARLY FILTER TIP CIGARETTES

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Continuation of application Ser. No. 572,083, Aug. 12, 1966. This application Jan. 4, 1968, Ser. No. 695,809
5 Claims. (Cl. 198—32)

ABSTRACT OF THE DISCLOSURE

Conveyor apparatus is described for consolidating two continuously moving rows of filter tipped cigarettes with the filter tips of each row adjacent each other into a single continuously moving row with all of the filter tips arranged in the same direction. A turning trough wheel spaced above the path of the cigarettes transfers the cigarettes from one row to a position above the other row and simultaneously orients the cigarettes with the filter tips in the same direction as those of the other row. A delivery trough wheel transfers the turned cigarettes to the other row, feeding them to the other row in the same direction as the other row is moving.

This application is a continuation of copending application Ser. No. 572,083, filed Aug. 12, 1966, now abandoned.

This invention relates to a device for turning oblong articles, particularly filter tip cigarettes, comprising a conveyor for receiving cigarettes leaving a filter tip machine in two rows in juxtaposed arrangement with their filter tips turned toward each other, the arrangement being such that only the cigarettes of one of the two rows of cigarettes are turned and then placed onto the conveyor between the unturned cigarettes of the other one of the two rows of cigarettes.

Usually, filter tip cigarettes come in pairs from the filter tip machine, with their tips being connected, and are subsequently separated in the middle so that there result in each case pairs of longitudinally juxtaposed cigarettes having their filter tips turned toward each other. For the further processing and handling of the cigarettes, particularly for the packing of the cigarettes, it is required that at least the cigarettes of one of the two rows of cigarettes are turned, in such a manner that these cigarettes are lying with similarly directed filter tips between the unturned cigarettes of the other row of cigarettes.

For the turning of the filter tip cigarettes devices are already known in the art which operate with endless intertwined conveyor belts. The cigarettes to be turned are successively fed between the intertwined conveyor belts and thereby gradually turned through 180°. The fact that the cigarettes are mechanically retained between the moving conveyor belts is disadvantageous since cigarettes are very sensitive to mechanical stresses and can easily be damaged or flattened.

In another known device for the turning of filter tip cigarettes the cigarettes of one row of the pairs of cigarettes coming from the filter tip machine are turned by individual troughs each adapted to receive one cigarette. Consequently, while the cigarettes of one of the rows of cigarettes are fed on without changing their positions, the cigarettes of the other row are successively transferred to separately rotatable troughs and, during the further movement of these troughs, gradually turned through 180° and finally placed between the unturned cigarettes. For gradually rotating the individual troughs this known device uses a relatively complicated bevel gear drive,

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whereby the whole device is rendered intricate in design and susceptible to trouble.

Further, a suggestion has become known according to which the filter tip cigarettes of one of the rows of cigarettes are turned on a turning drum. Extending centrally all around this drum is a recess into which the filter tips of the cigarettes are pushed through a guide bail. The cigarettes are turned by tilting them top over. Also in this known device the cigarettes are by no means handled with sufficient care, particularly the tilting in the turning trough is disadvantageous.

The object of the present invention is to provide a device for turning particularly filter tip cigarettes which is of simple design and reliable and—what is especially important—careful in operation.

To attain this object, the device according to the present invention comprises a turning trough wheel spaced above the plane of the feed path of the cigarettes and rotatable about an axis extending perpendicularly to this plane, downwardly open cigarette receiving troughs radially arranged in the turning trough wheel, at least one feed trough wheel for feeding the cigarettes to be turned from the conveyor to the turning trough wheel, and at least one delivery trough wheel for delivering the turned cigarettes from the turning trough wheel to the conveyor therebelow.

A considerable advantage of this invention consists in that when the cigarettes are transferred from one half of the conveyor to the other half while being turned through 180° the cigarettes continue moving without any step-like change of direction. The cigarettes are thus handled with particular care. This advantageous effect is further assisted by the fact that the cigarettes are positively lying in the troughs of the individual wheels and retained therein by suction air, whereby undesirable shifting or wrong disadvantageous positions of the cigarettes are avoided.

According to a further feature of the invention, the turning trough wheel is provided with relatively narrow receiving troughs, as seen in the axial direction of the cigarettes. Similarly, according to a further feature of the invention also the feed trough wheel passing the cigarettes to be turned to the turning trough wheel and the delivery trough wheel taking the cigarettes over from the turning trough wheel are provided with relatively narrow receiving troughs. This measure ensures that the cigarettes can be taken over by the turning trough wheel or passed by this latter to the delivery trough wheel, respectively, without trouble and without being pressed. When the turning trough wheel takes over the cigarettes from the feed trough wheel and when the turning trough wheel passes the cigarettes to the delivery trough wheel it has to be considered that the feed trough wheel and the delivery trough wheel rotate about horizontal axes, whereas the turning trough wheel rotates about a vertical axis.

The invention further consists in that a shallow supporting trough is associated with each receiving trough of the turning trough wheel. These supporting troughs are spaced from the receiving troughs in the radial direction of the turning trough wheel so that each cigarette, while being fed and turned through 180° by the turning trough wheel, is supported and retained at two points.

Another feature of the invention consists in that the delivery trough wheel delivering the turned cigarettes to the conveyor is provided with large recesses between its receiving troughs so that the unturned cigarettes lying on the conveyor can pass without hindrance. In this manner it is achieved that the delivery trough wheel which places the turned cigarettes between the unturned

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cigarettes does not contact these cigarettes but lets them pass without hindrance.

The invention is seen to reside not only in the described individual features but also in the different possible combinations thereof.

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:

FIG. 1 is a schematic side elevational view of a device according to the invention;

FIG. 2 is a schematic top plan view of the device of FIG. 1;

FIG. 3 is a front elevational view, partly in section, of a detail in the region of the turning station of the device, and

FIG. 4 is an axial section through a trough wheel of the device of FIGS. 1 and 2.

FIG. 1 shows a device which is intended to be used, in the first place, for the turning over of filter tip cigarettes 10. Usually, filter tip cigarettes come from the filter machine axially juxtaposed in pairs, with the filter tips turned toward each other. The pairs of cigarettes 10 are successively transferred onto a conveyor 13 by means of transfer drums 11 and 12, with the filter tips 10a being slightly spaced apart from each other, as shown in FIG. 2.

As shown in FIGS. 1 and 2, the conveyor 13 is formed of individual spaced bars 15 supported by endless chains 14a and 14b, the spacing between the bars 15 being smaller than the diameter of the cigarettes 10 so that these will be held between the bars 15 without falling therethrough. The cigarettes 10 are delivered in pairs onto the conveyor 13 in such a manner that only each second interspace between the bars 15 receives a pair of cigarettes 10. Consequently, between the cigarettes 10 on the conveyor 13 there remains still one space for receiving a further cigarette (see left-hand side of FIG. 1).

By charging the conveyor 13 two rows of cigarettes A and B are formed which are conveyed to a turning station 16 in which the cigarettes of the row of cigarettes A are turned through 180° and placed between the cigarettes of the row of cigarettes B. After having been turned the row A cigarettes are located in the interspaces of the conveyor 13 that have been previously kept free (see left-hand side of FIG. 2).

The turning station 16 comprises a turning trough wheel 17 arranged above the conveyor 13 and provided on its underside with a plurality of radially directed and downwardly open troughs 18 each adapted to receive one cigarette 10 of the row of cigarettes A. The turning trough wheel 17 is arranged to be continuously rotated about a vertical axis, thereby to receive one after the other the cigarettes 10 of the row of cigarettes A, turning them through 180° and then placing them on the other half of the conveyor 13, that is, substantially in the region of the row of cigarettes B. During the turning and the transfer of the cigarettes 10 by the turning trough wheel 17 the cigarettes 10 are held in the individual troughs 18 by suction air.

In the illustrated embodiment, two feed trough wheels 19 and 20 are provided for taking the individual cigarettes 10 of the row of cigarettes A of the conveyor 13 and delivering them to the turning trough wheel 17. Distributed around the periphery of the feed trough wheels 19 and 20 are several axially extending troughs 21 each adapted to receive one cigarette 10 (see particularly FIG. 2). At least one of the two feed trough wheels 19 and 20 (in the illustrated embodiment feed trough wheel 19) is arranged so close above the conveyor 13 that one cigarette 10 after the other of the row of cigarettes A will be caught by the troughs 21 and held by means of suction air. The driving speed and the spacing of the feed trough wheel 19 from the conveyor 13 are chosen so as to ensure that the individual cigarettes 10 of the row

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of cigarettes A are continuously taken off the conveyor 13.

From the feed trough wheel 19, which is driven corresponding to the direction of movement of the conveyor 13, the individual cigarettes 10 are transferred to the feed trough wheel 20 which is concealed in FIG. 1 and driven in the direction opposite to that of the feed trough wheel 19 but in the same direction as the turning trough wheel 17. To the cigarettes to be transferred to the turning trough wheel 17, consequently, the same direction of movement and speed is imparted by the feed trough wheel 20 as to the turning trough wheel 17 so that the latter is capable of taking over the cigarettes one after the other without trouble.

Delivering the cigarettes to the conveyor 13, i.e. placing them into the gaps between the cigarettes of the row of cigarettes B, is effected in a manner similar to taking them off, namely by means of a delivery trough wheel 22. This latter is of practically the same design as the feed trough wheel 20 on the opposite side of the turning trough wheel 17. In operation, the turning trough wheel 17 places the cigarettes into the individual troughs of the delivery trough wheel 22 where they are retained by suction air. Interposing a second trough wheel on this side is not necessary since the desired direction of movement of the cigarettes results automatically.

A considerable advantage of this construction resides in the fact that the cigarettes are turned and placed into the gaps between the cigarettes of the row of cigarettes B without any abrupt change of their direction of movement. To achieve this end either two feed trough wheels 19 and 20 as well as a delivery trough wheel 22, as in the illustrated embodiment, or conversely, one feed trough wheel and two delivery trough wheels are required depending on the chosen direction of rotation of the turning trough wheel 17. After the delivery of the turned cigarettes of the row of cigarettes A these are lying in exact alignment along one edge of the conveyor 13. The cigarettes of the row of cigarettes B are still positioned somewhat more toward the middle of the conveyor 13 (see FIG. 2) and, while being fed on, are then gradually aligned by a straight-edge 23.

The design of the turning trough wheel 17 provides, in the illustrated embodiment, a particularity consisting of supporting troughs 24 spaced radially from the receiving troughs 18. The supporting troughs 24 are shallower than the receiving troughs 18 and have for their task to hold each cigarette at two points on the turning trough wheel 17 since the turning troughs 18 are relatively narrow in radial direction, in order to render possible a trouble-free take-over from the feed trough wheel 20 and a trouble-free delivery to the delivery trough wheel 22, without any risk of damaging the cigarettes. The feed trough wheel 20 and the delivery trough wheel 22 likewise are each provided with a relatively narrow rim 20a, and 22a, respectively, in which the receiving troughs 21 are arranged. In the center of the turning trough wheel 17 there is a neck 25 (FIGS. 1 and 3) serving as an abutment for the inwardly directed ends, i.e. the filter tips 10a, of the cigarettes. The drive of the turning trough wheel 17 and its mounting on a machine frame are not shown in the drawings for reasons of a simplified illustration.

The drives of the feed trough wheels 19 and 20 and of the delivery trough wheel 22 are shown in detail in FIGS. 3 and 4. In each case gear transmissions are used. FIG. 4 is an axial section through an embodiment of a trough wheel, for example the feed trough wheel 19 which comprises a sleeve 19a rotatably mounted on an axle 27. The sleeve 19a mounts gears 30 and 31 for driving the feed trough wheel 19. The axle 27 is provided with a longitudinal central bore 32 opening in each receiving trough 21 a plurality of radial bores 33a, 33b and 33c.

The radial bores 33a, 33b and 33c communicate in-

directly with the longitudinal bore 32 through associated suction air channels 35a, 35b and 35c on the periphery of a bearing member 34. The suction air channels 35a, 35b and 35c extend only over a predetermined arc length of this periphery so that suction is applied to the respective receiving trough only through a predetermined angle of rotation of the feed trough wheel, thereby to ensure that the cigarettes 10 are retained at the right moment in the receiving trough 21 and released when they are taken over by the turning trough wheel 17.

In a similar manner suction air is supplied to the delivery trough wheel 22 and to the turning trough wheel 17. In FIG. 3 it is indicated that two bores open respectively in one receiving trough 18 and it one supporting trough 24 for the passage of the suction air. In this case, too, the control of the suction air is effected by means of sector-shaped and limited air channels.

In the design of the delivery trough wheel 22 a constructional particularity has to be taken into consideration insofar as this wheel 22 is positioned in the region of the unturned cigarettes 10 of the row of cigarettes B. These cigarettes 10 of the row of cigarettes B have to be passed below the rotating delivery trough wheel 22 without hindrance and without any risk of getting damaged. To achieve this end, radial recesses 36 (FIG. 1) are provided on the periphery of the delivery trough wheel 22 between the troughs 21 receiving the cigarettes 10 from the turning trough wheel 17. The recesses 36 are somewhat larger dimensioned than one cigarette 10 so that at identical driving speeds of the delivery trough wheel 22 and of the conveyor 13 the cigarettes 10 of the row of cigarettes B can each get into one of the recesses 36 and thus pass without hindrance.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

I claim:

1. A device for turning oblong articles, particularly

filter tip cigarettes, comprising a conveyor for receiving cigarettes leaving a filter tip machine in two rows in juxtaposed arrangement with their filter tips turned toward each other, a turning trough wheel spaced above the plane of the feed path of said cigarettes and rotatable about an axis extending perpendicularly to said plane, downwardly open cigarette receiving troughs radially arranged in said turning trough wheel, at least one feed trough wheel for feeding the cigarettes to be turned from said conveyor to said turning trough wheel, and at least one delivery trough wheel for delivering the turned cigarettes from said turning trough wheel to said conveyor therebelow, the arrangement being such that only the cigarettes of one of said two rows of cigarettes are turned and then placed onto said conveyor between the unturned cigarettes of the other one of said two rows of cigarettes.

2. A device as claimed in claim 1, wherein relatively narrow receiving troughs, as seen in the axial direction of said cigarettes, are provided in said turning trough wheel.

3. A device as claimed in claim 2, wherein a shallow supporting trough is associated with each of said receiving troughs of said turning trough wheel.

4. A device as claimed in claim 1, wherein said feed trough wheel arranged to pass said cigarettes to be turned to said turning trough wheel and said delivery trough wheel arranged to take over said cigarettes from said turning trough wheel are each provided with relatively narrow receiving troughs.

5. A device as claimed in claim 1, wherein said delivery trough wheel arranged to deliver the turned cigarettes to the conveyor is provided with relatively large recesses enabling the unturned cigarettes lying on said conveyor to pass without hindrance, said recesses being arranged between said receiving troughs of said delivery trough wheel.

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EDWARD A. SROKA, *Primary Examiner.*

U.S. Cl. X.R.

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