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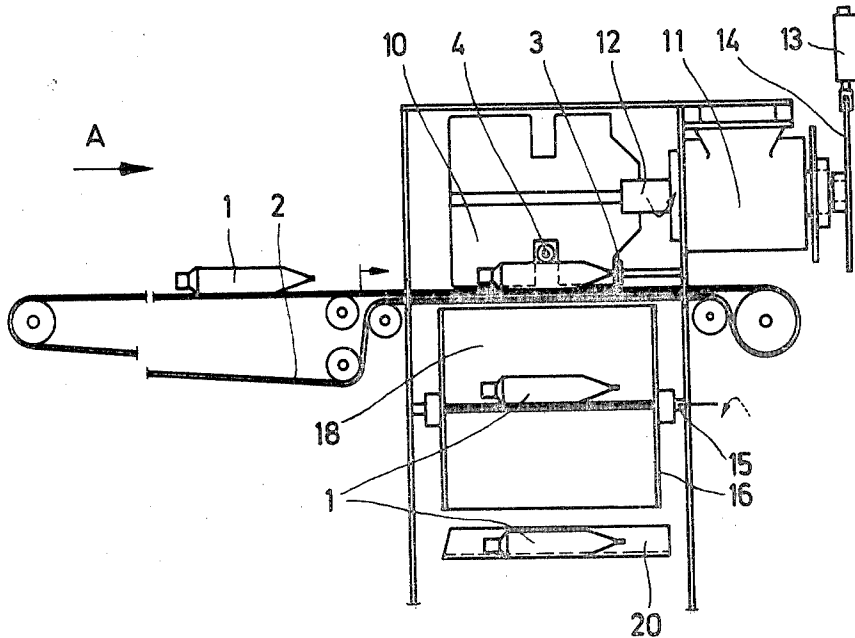
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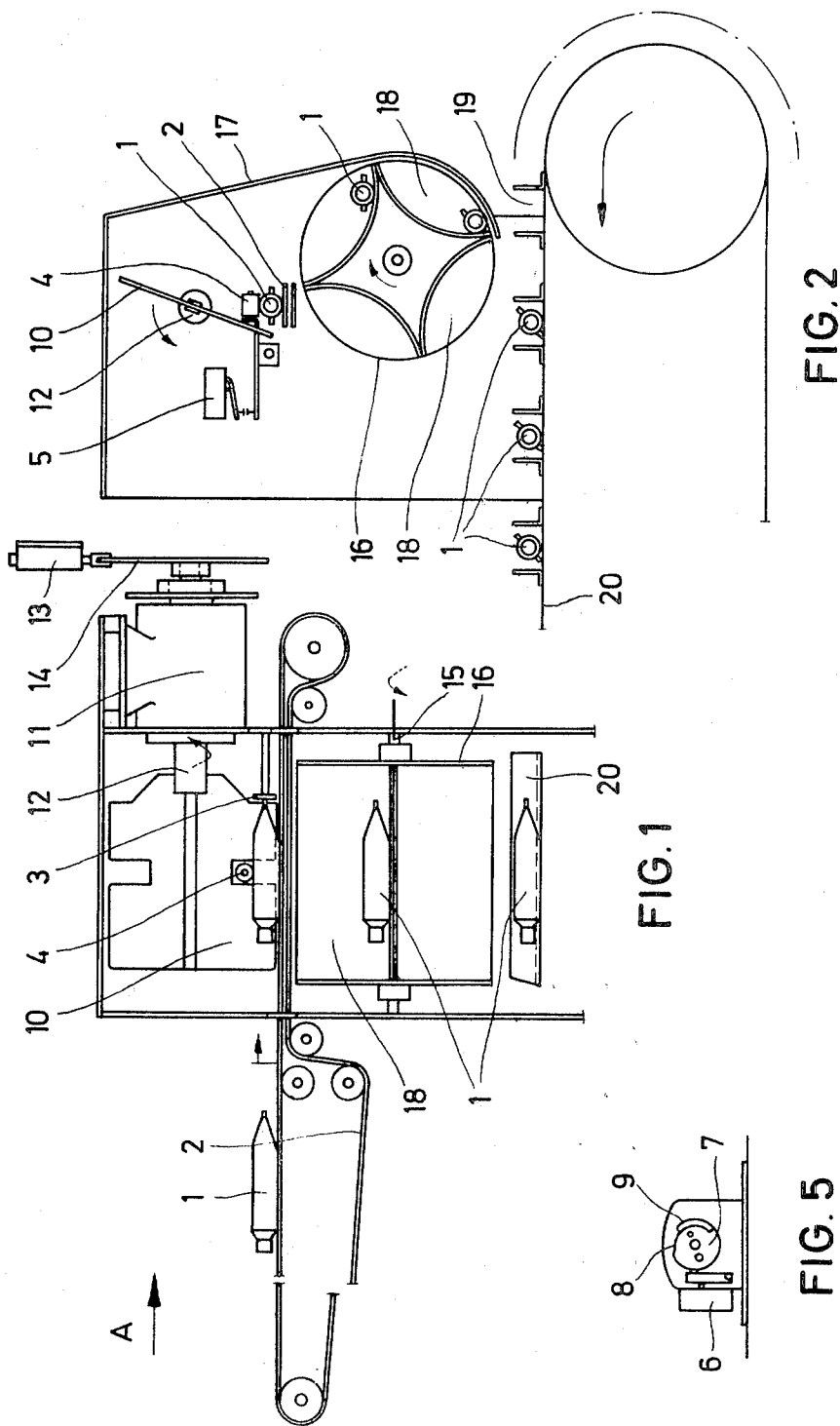
[54] **DEVICE FOR TRANSFERRING INDIVIDUAL
 ARTICLES TO A PACKAGING MACHINE**
 8 Claims, 5 Drawing Figs.

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 198/26

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ABSTRACT: The invention comprises a device for transferring individual articles, such as tubes, bottles, glasses and the like, from the discharge end of a filler and closing machine to the start of a packaging machine. The device comprises at least one horizontally disposed endless transfer band driven in synchronism with an article-receiving conveyor chain of the packaging machine and provided with uniformly spaced pockets, each of which is adapted to receive only a single article to be transferred. From these pockets the individual articles are expelled by a slidable member into a pocket of a pocket wheel from which the articles are discharged one by one onto the conveyor chain of the packaging machine.





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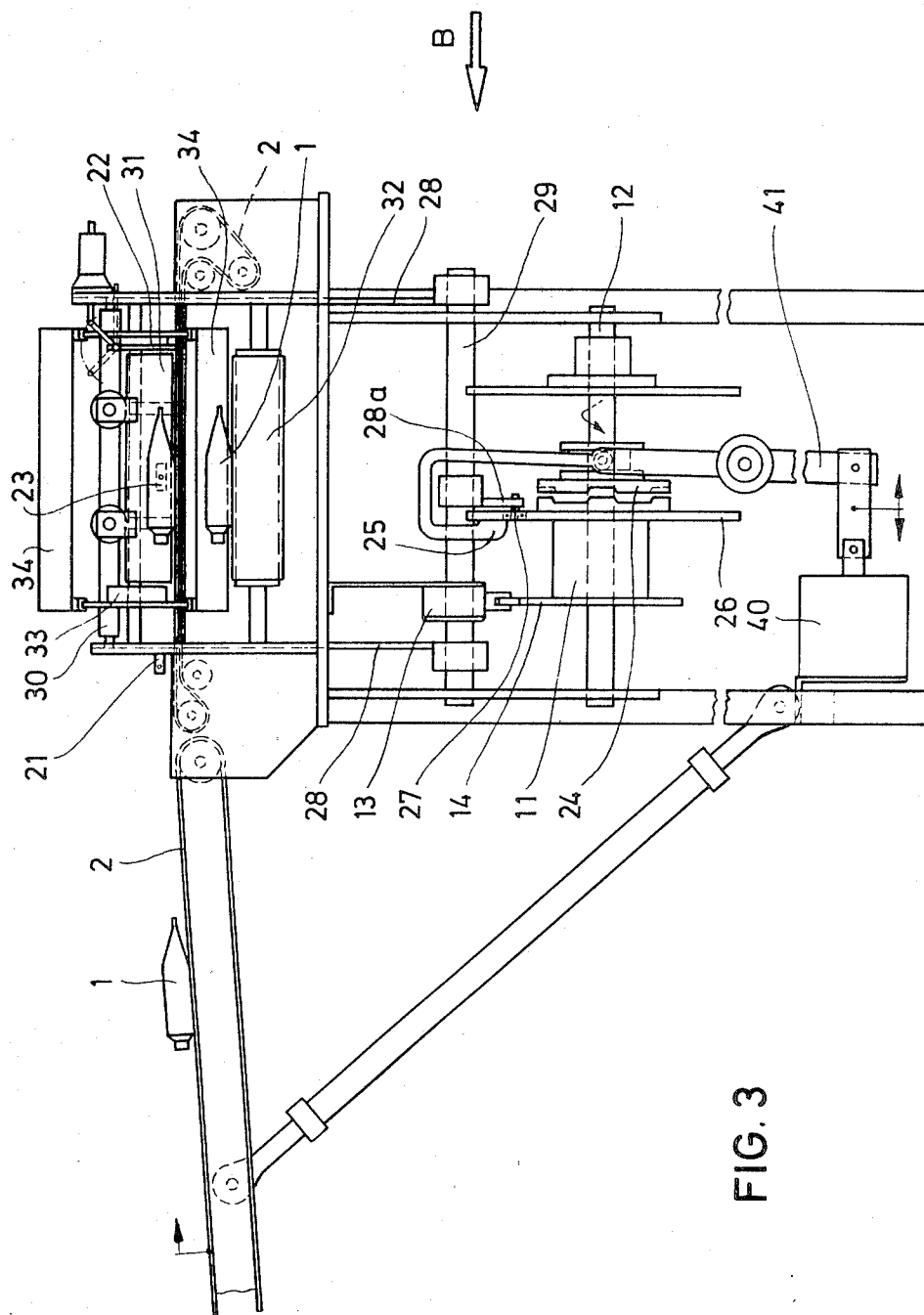


FIG. 3

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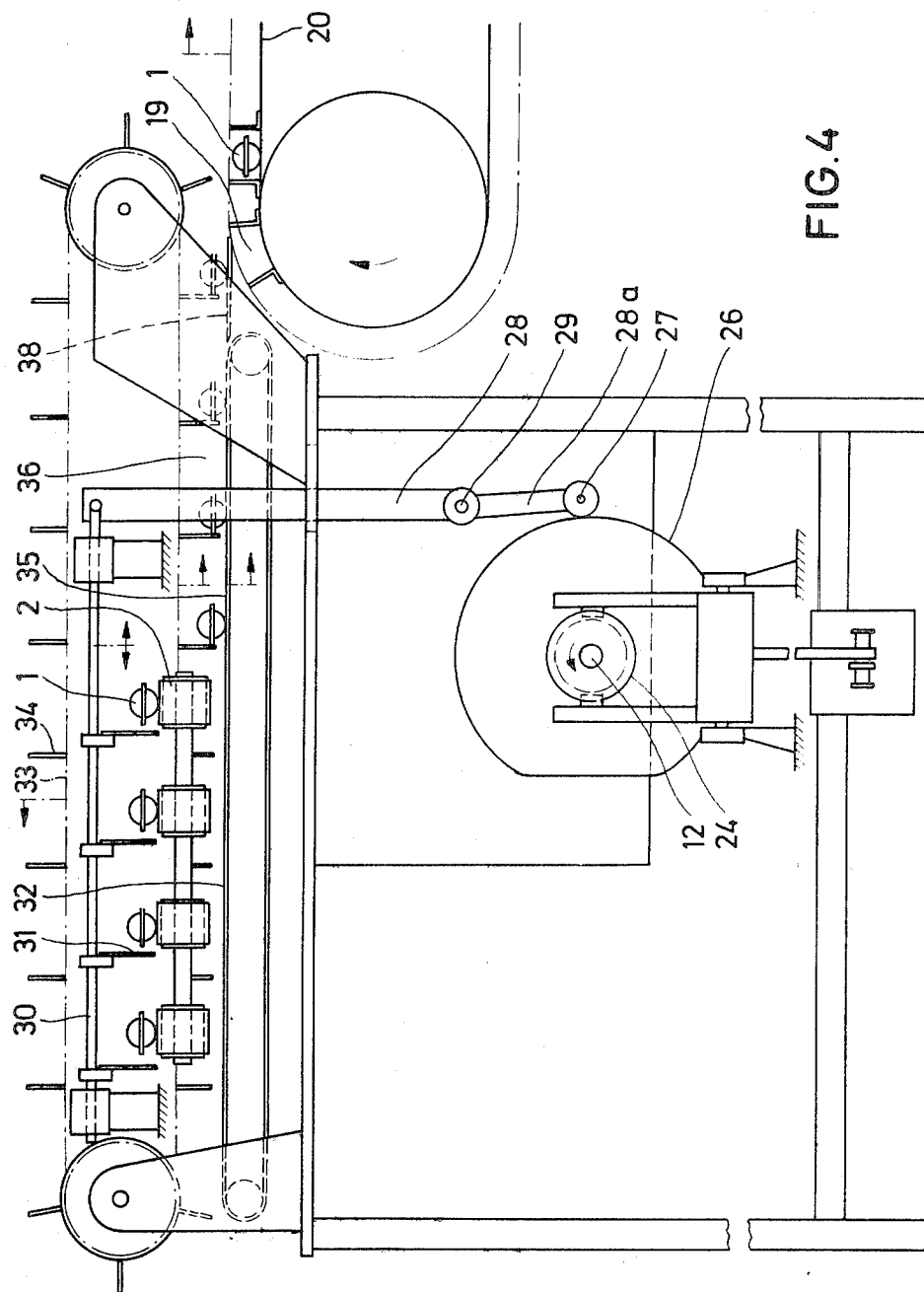


FIG. 4

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DEVICE FOR TRANSFERRING INDIVIDUAL ARTICLES TO A PACKAGING MACHINE

The invention relates to a device for feeding and depositing individual articles, such as tubes, bottles, glasses or the like, into the receiving pockets of a continuously moving conveyor chain of a packaging machine provided with a feed device for continuously feeding the individual articles from a filler- and closure-machine to a delivery point of the packaging machine.

In the known constructions of this type, a synchronous movement takes place between the filler-machine and closure-machine, on the one hand, and the packaging machine, on the other hand, because both machines are driven by a single powerful motor. Although these two machines move synchronously with one another, on account of their structure, they are very expensive in their cost. A further disadvantage is that these two machines require both from a structural point of view as well as regards to their operation, a great amount of space.

It is an object of the invention to overcome these disadvantages by employing a device which makes it possible with simple technical means to control these two machines simultaneously, even though they are provided each with their own drive motor, so that in spite of the lack of synchronous driving connection, a trouble-free transfer of the articles from the filler- and closure-machine to the packaging machine is insured.

The object of the invention is attained by an effective transfer device acting as a connection member between the filler- and closure-machine and the packaging machine, said transfer device having a transfer-imparting means moving synchronously with the conveyor chain of the packaging machine and feeding the individual articles to the same, and having a slide-member feeding the individual articles from the end of the feed device in the direction of transfer, the actuation of the slide member being controlled by means of a switch device in relation to the individual articles at the end of the feed device and by means of a locking device releasing the article when the transfer device is located in a receiving position. Owing to this construction, it is insured that each machine of its own type remains operative as filler- and closure-machine, on the one hand, and as packaging machine, on the other hand, whereby also as regards to the drive, the two machines are independent of one another, as no rigid driving connection is employed. A further advantage resides in this, that each machine may carry out its function by itself alone. Both individual machines by means of the new transfer device, may be united to form a double machine, without it being necessary to furnish an additional machine.

According to another feature of the invention, the switch device may be arranged at the end of the feed device, whereby its actuation takes place by an individual articles supplied by the feed device. The switch device may in this connection be constructed as a feeler lever which is pivotally moved by means of the individual articles from its position of rest into a position operating on a locking device. It is, however, also possible to construct the switch device as light barrier, which is actuated by the individual articles and in this way influences the locking device.

Another object of the invention is to employ a locking device provided with a control cam which cooperates with a terminal switch. This control cam rotates continuously and has at least two sections scannable by the terminal switches and is adjustable for the locking and actuation of the slide member, said slide member being in connection with an actuating device. One section of the locking device is provided for locking the slide member and accordingly prevents its movement. The locking device is formed by a control cam having a recess in the outer periphery. This recess may be adjusted as to its height, whereby the locking period for the slide member may be changed. The remaining section of the locking device is not recessed and effects the release or actuation, respectively, of the slide member. The terminal switch scans the periphery of the rotating control cam, so that a con-

tact opens or closes and thereby causes the locking or release of the slide member.

According to still another feature of the invention, the actuating device with which the slide member is associated may be constructed as a magnetic coupling provided with a brake, whereby its control takes place by the switch device and the locking device. As soon as the transfer device is in its receiving position, the slide member is caused by means of the actuating device controlled by the switch device and the locking device to effect a discharge of the individual articles conveyed by the feed device into the transfer device. The magnetic coupling may be in connection with a continuously rotating contact cam cooperating with a terminal switch, which is provided with at least two recesses disposed opposite one another and scannable by means of the terminal switch for the release and locking of the brake cooperating with the magnetic coupling. The slide member may be constructed as a pivotal member made in one piece and arranged on the shaft of the actuating device and rotatable 180° at a time. In place of a single slide member, a plurality of slide members may be provided, which are arranged on a horizontal rod reciprocable in horizontal direction, said rod being connected with a larger lever pivotal about a pin to which is attached one end of a smaller lever, whose other end carries a roller which engages a rotating cam and is controllable by means of the same for the transfer of the sliding movement to the horizontal rod.

Still another object of the invention is to construct the transfer device which receives the individual articles as rotating multipart pocket wheel which cooperates with a cover and in whose pockets a single individual article is received at a time. The transfer device for the retransmission pockets of the individual articles to the receiving pockets of the feed or conveyor chain of the packaging machine may, however, also consist of a continuously movable conveyor chain cooperating with a continuously movable conveyor belt, whereby the individual actuator is constructed as a transverse bar which forms with the strand of the conveyor band the pockets for the reception of individual articles.

The invention is furthermore characterized in this, that viewed in the direction of feed, a plurality of light barriers are arranged in front of a switch device for the control of the presence of all of the individual articles conveyed stepwise from the feed device in the particular passage, which individual articles cooperate with bars at the end of the feed device, said bars serving for the limitation of the feed movement of the individual articles, whereby the bars upon omission of a single individual article by an impulse issuing from the light barrier are pivoted upwardly for the expulsion of the remaining individual articles from the transfer device. The feed device serving for advancing the individual articles from the filler- and closure-machine to the transfer device may be constructed as a single track or also as multitrack transfer band.

The drawings by way of example illustrate diagrammatically two embodiments of the invention and will be described in greater detail in the following description.

In the drawings:

FIG. 1 shows a front elevation view of the transfer device for a single track feed device.

FIG. 2 shows a side elevation view in direction of the arrow A in FIG. 1;

FIG. 3 shows a front elevation view of the transfer device for a four track feed device.

FIG. 4 shows a side elevation view in direction of the arrow B in FIG. 3, and

FIG. 5 is an end elevation view of a locking device cooperating with a terminal switch.

The individual articles 1, such as tubes, bottles, glasses or the like, which have been filled and closed by a filler- and closure-machine, not shown, are seized by a continuously operating feed device, which in accordance with FIGS. 1 and 2, is constructed as a one track transfer band 2. The articles 1 are conveyed during the operating cycle of the filler- and closure-

machine horizontally against a stop member 3, which is horizontally adjustable in accordance with the size of the individual articles. The required distance from individual article to individual article is produced by a corresponding speed of the conveyor band or feed belt. The individual articles when advanced forward one at a time actuate and raise a scanning lever 4 which actuates a switch 5 over a relay and a locking device 6, 7, 8 and 9. This locking device comprises a continuously rotating cam 7 cooperating with a terminal switch 6. This cam 7 comprises at least two adjustable sections 8 and 9, of which the one section 8 has a recess located in the outer periphery of the cam and serves for the locking of a slide member 10, while the other section 9 causes the operation or release of this slide member. For this purpose, the locking device 6, 7, 8 and 9 is in active connection with the slide member 10 and with an actuating device 11, which is constructed as magnet coupling provided with a brake. The slide member 10 is constructed as one part pivot member, which with its center is rotatably mounted on the horizontal shaft 12 of the actuating device 11 and is rotatable on the same upon release of the locking device in steps of each 180° at a time. On the end of the shaft 12 opposite the one which supports the slide member 10 is provided in continuously rotating contact cam 14 cooperating with a terminal switch 13. The contact cam 14 is provided with at least two oppositely disposed recesses (not shown) scannable by the terminal switch, for the release and locking of the brake cooperating with the magnetic coupling. Below the slide member 10 which is rotatable about the horizontal shaft 12, is disposed a transfer device receiving the individual articles 1. This transfer device is constructed as a multipart pocket wheel 16 rotating about a horizontal axis 15, said pocket wheel cooperating with a fixedly mounted vertically disposed cover 17 which surrounds with its lower end a portion of the pocket wheel 16 and serves the purpose of preventing a premature dropping of the individual articles 1 from the pockets 18 of the pocket wheel 16. Each pocket 18 receives an individual article, which at the lower end of the cover 17 when leaving the pocket enters a receiving pocket 19 of an endless continuously moving conveyor band 20 arranged in a horizontal plane below the pocket wheel 16.

The operation of this transfer device which is arranged between the outlet of the filler- and closure-machine and the start of the packaging machine and acts as connecting member between the two machines which are each provided with their own drive, is as follows:

When the individual article 1 is advanced by the conveyor band 2 from the filler- and closure-machine raises the scanning lever 4, the mentioned several operations are initiated at the same moment, in order to insure that the individual article will be laterally pushed by the slide member 10 during its pivotal into a pocket 18 of the pocket wheel 16, but only when the latter is in a receiving position. The receiving position of the rotating pocket wheel 16 is the one when during the rotation of the wheel 16, an empty pocket 18 of the same is located opposite the individual article 1 disposed still on the conveyor band 2. When this is the case, the individual article 1 is engaged by the slide member 10, is pushed laterally and caused to drop into the still empty pocket 18. It must accordingly not occur that two individual articles are successively tossed into one and the same pocket. Furthermore, the dropping of the individual article should not take place if, as illustrated in FIG. 2, the pointedly meeting ends of two walls of two adjacent pockets 18 point in direction to the individual article, because if this would be the case, undesired disturbances would occur. In order to insure a frictionless drop of each individual article 1 into a single pocket 18 of the pocket wheel 16, the locking device 6 to 9, the actuating device 11 with the slide member 10 as well as the contact cam 14 cooperating with terminal switch 13 are operative and are correspondingly adjusted to one another. By means of the constantly rotating control cam 7, which is provided with a section 8 for locking of the slide member 10 and with a section 9 for actuation of

the slide member 10, upon scanning of the periphery of the control cam by means of the terminal switch 6, a contact is constantly opened or closed. When the contact is open, a locking of the slide member takes place, while with a closed contact, the release of the slide member is signaled to the contact cam 14 of the actuating device 11 which operates the terminal switch 13. The terminal switch 13 engaged by the rotating contact cam 14 causes the contacts for the magnetic coupling of the actuating device 11 to close and those of the brake to be opened. By means of the magnetic coupling now engaged, the slide member 10 is engaged and performs a rotation of 180° and thereby pushes the individual article 1 disposed on the conveyor band 2 into the empty pocket 18 of the pocket wheel. The dropping of the individual article causes the scanning lever 4, which was raised previously by the individual article, to return again to its starting position, so that the switch 5 also drops or is opened. In spite of the opened switch 5, there is still, however, no current interruption, because the terminal switch 13 is still engaged and is closed by the contact cam 14. Only after the terminal switch, after a rotation of the cam of 180° engages one of the two oppositely disposed low points on the contact cam, an interruption of the electric circuit takes place. This causes the contacts for the magnetic coupling to open, so that the latter becomes currentless, while the contacts for the brake are closed, so that the latter may again engage and become operative. Now the preparations for dropping the next following individual article into the pocket of the pocket wheel may be initiated. These described steps obviously take place in fractions of seconds.

The operation of the transfer device shown in the FIGS. 3 and 4 is similar to that according to FIGS. 1 and 2. A difference consists solely therein, that the angle band is replaced by four endless bands which convey the individual articles 1 coming from the filler- and closure-machine into the area and that four light barriers 21 are provided. These light barriers 21 perform a control function to determine whether all of the four individual endless bands are provided each with an article. If all four articles are present, then the individual articles are conveyed further. If, however, in place of the required four individual articles, only three or still less are present, then the light barrier which indicates the omission of an individual article actuates four stop strips 22 which are provided for limiting the conveyor movement of the individual articles. The impulse issuing from the one light barrier causes the stop strips 22 to pivot upwardly, so that the remaining individual articles are moved by the transfer belts 2 from the transfer device and are dropped into a container standing in readiness. If all four individual articles are present, the latter are conveyed by the transfer bands 2 into the range of a light barrier 23 which initiates the same control steps as the scanning lever 4 of the one track transfer device described previously.

In order to prevent unnecessary repetitions of the description of the control operation, the following description of the four track transfer device refers only to those parts which are constructed differently from the one track embodiment of the invention. It is assumed that the transfer device is arranged in its position for receiving the individual articles 1. Previously the contacts for the magnetic coupling 24 of the actuating device 11 are closed and the contacts of the brake 25 are opened, so that now the engaged magnetic coupling on the shaft 12 may become active. In the FIGS. 3 and 4 the coupling 24 drives a cam 26 on which travels a roller 27 which is mounted at the end of a small lever 28a. This small lever 28a is connected by a pin 29 with a larger lever 28 which is engaged by a horizontal rod 30, to which are secured at uniform distances a plurality of slide members 31 which serve as discharge members. Since the rotating cam 26 has a nonround shape, as is apparent from FIG. 4, the roller 27 travelling on the periphery of the cam during each rotation of the cam obviously scans also this nonround section, which has the result that this movement of the roller is transmitted by the small lever 28a to the pin 29, so that the larger lever 28 performs a small pivotal movement and the rod 30 is moved to and fro

jerkily in a horizontal direction. During this jerky movement of the rod 30, the slide members 31 push the individual articles 1 disposed on the four transfer bands 2, sideways so that they drop onto a continuously rotating horizontal conveyor band 32, which cooperates with a likewise continuously moving endless coupling chain 33 arranged thereabove and forms together with the same transfer device. On this coupling chain 33 are arranged at uniform distances apart, upright transverse bars 34 which together with the horizontal upper stretch 35 of the endless conveyor band 32 form the pockets 36 for the reception of the individual articles 1. The individual articles 1 arranged in the conveyor band 32 are pushed with the assistance of the bars 34 of the coupling chain 33 in a direction toward the conveyor chain 20 of the packaging machine. By means of a connection member 38, each individual article 1 is transferred to a receiving pocket 19 of the conveyor chain 20 indicated in FIG. 4. This conveyor chain 20 moves with the same speed as the coupling chain 33.

The transfer device operates in correspondence with the movement of the filler- and closure-machine as well as that of the packaging machine in a predetermined operating cycle and adjusted in advance. If now at the adjusted switching time, there is not individual article 1 at the light barrier 23, then a magnet 40 is actuated by means of a relay, not shown. This magnet by means of a lever 41 engages the magnetic coupling 24 constructed as a four part claw coupling, and also engages the brake 25. The result is that the magnetic coupling becomes disengaged and accordingly delays for one operative step the cycle of operation, so that the only one receiving pocket 19 remains empty on the conveyor chain 20 of the packaging machine. The individual articles 1 meanwhile having reached the light barrier 23 make the magnet 40 currentless, so that the normal operating cycle is again operative.

What we claim is:

1. A device for the feeding and depositing of individual articles, such as tubes, bottles, glasses or the like from a filler- and closure-machine into the receiving pockets of a continuously moving conveyor belt of a packaging machine, said device comprising transfer means serving as a connection between the discharge end of the filler- and closure-machine to the start of the packaging machine, said transfer means comprising a transfer mechanism operating synchronously with said conveyor belt of said packaging machine and conveying to the same, individual articles, a pivotally mounted slide member for discharging the individual articles from the end of a feed device (2) into the transfer device, a switch device for controlling the actuation of the slide member in dependence on the presence of an individual article at the end of the feed device, and a locking device releasing the slide member for actuation solely when the transfer device is in an article receiving position, said locking device comprising a continuously rotating control cam cooperating with a terminal switch, said control cam having a least two adjustable sections which are scanned by said terminal switch for locking and actuating the slide member, said slide member being in connection with an actuating device.

2. Device according to claim 1, in which said actuating device comprises a magnetic coupling provided with a brake means for controlling said actuating device by said switch device and said locking device, which causes during the receiving position of the transfer device, the slide member to discharge the individual article passed on by the feed device to the transfer device.

3. Device according to claim 1, in which said actuating device comprises a magnetic coupling provided with a brake means for controlling said actuating device by said switch

device and said locking device, which causes during the receiving position of the transfer device, the slide member to discharge the individual articles passed on by the feed device to the transfer device, said magnetic coupling being in connection with a continuously rotating contact cam (14) cooperating with a terminal switch, (13), said contact cam being provided with at least two low points disposed opposite one another and scanned by means of said terminal switch for release and locking of the brake associated with said magnetic coupling.

4. Device according to claim 1, multipart which said slide member is constructed as one part pivotal member (10) arranged in the shaft of said actuating device (11) and being rotated 180° at a time.

5. A device for feeding and depositing of individual articles, such as tubes, bottles, glasses or the like from the discharge end of a filler- and closure-machine into the receiving end of a separately driven continuously moving conveyor belt of a packaging machine, said device comprising transfer means driving as a connection between said discharge end of the filler- and closure-machine and the start of the packaging machine and comprising a separately driven continuously moving transfer band (2) operating synchronously with said separately driven conveyor belt of said packaging machine and conveying toward the latter said individual articles, a pivotally mounted slide member and a transfer device, said slide member discharging the individual articles from the end of said transfer band into said transfer device, a switch device for controlling the actuation of said slide member in dependence on the presence of an individual article at the end of the transfer band, and a locking device releasing the slide member for actuation solely when the transfer device is in an article-receiving position, said transfer device which receives the individual articles is constructed as a rotating pocket wheel (16) cooperating with a fixed cover, (17), the pockets (18) of said pocket wheel receiving one single individual article at a time.

6. In a device for feeding and depositing of individual articles, such as tubes, bottles, glasses or the like, the combination of a filler- and closure-machine having a discharge end, of a continuously moving independently driven conveyor belt of a packaging machine having a receiving end, to receive a succession of articles from said discharge end, transfer means serving as a connection between said discharge end of said filler- and closure-machine and said receiving end of said driven conveyor belt of said packaging machine, said transfer means comprising an independently driven continuously moving transfer band (2) operating synchronously with said independently driven conveyor belt of said packaging machine and conveying said individual articles toward the latter, a pivotally mounted slide member (10) and a rotatable transfer device disposed below said slide member, said slide member discharging the individual articles from the end of said transfer band into said rotatable transfer device, a switch device for controlling the actuation of said slide member in dependence on the presence of an individual article at the end of the transfer band, and a locking device releasing the slide member for actuation solely when the rotatable transfer device is in an article-receiving position.

7. Device according to claim 6, in which the switch device is arranged at the end of said transfer band (2) and is adapted to be actuated by the individual articles conveyed forwardly by said transfer band.

8. Device according to claim 6, in which said switch device is constructed as scanning lever, (4), which is adapted to be pivoted by the individual articles from its position of rest into a position engaging said locking device.

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