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(54) Apparatus for sequentially applying caps onto cans or tins

(57) Apparatus for sequentially applying caps or lids (5) onto cans or tins (3), comprising a gravity feeding path (4) for aligned groups of caps (5) which are mutually connected by connecting strips (10); a can feeding device (2) arranged below the feeding path (4) and designed to cause the cans (3) to move along the feeding path (4); interception means (12) for groups of caps arranged at the lower end of the feeding path (4), so that each group of caps (5) is aligned transversely to the feeding direction of the cans (3); and an application roller (15) located downstream of the feeding path (4) and arranged to apply pressure onto the caps (5), thereby force-fitting them onto the top of the cans (3). The application roller (15) comprises cutting means for cutting the strips (10) mutually connecting adjacent caps (5) in the same group.

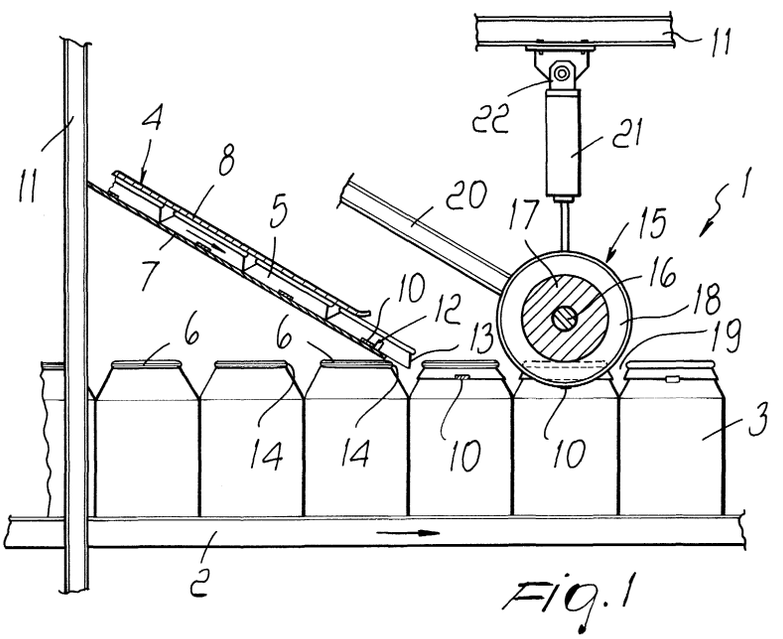

Fig. 1

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Description

[0001] The present invention relates to an apparatus for sequentially applying caps onto cans or tins containing beverages in general.

[0002] The application of caps onto the top of cans is meant to provide hygienic protection for the surfaces on which the user is going to put his lips in order to consume the product.

[0003] Apparatuses suitable for performing this operation automatically have already been proposed. In general, such apparatuses have two feeding devices, for the cans and the caps, respectively.

[0004] The cans are usually fed by means of a horizontal belt conveyor, on the movable surface of which groups of cans or tins are set out in a matrix arrangement having an advancement front extending transversely to the feeding direction.

[0005] The cap feeding device is instead provided above the horizontal conveyor and is constituted by an inclined plane which acts as a chute and along which groups of caps, also in a matrix arrangement, move forward and effect a controlled descent one after the other.

[0006] At the lower end of the chute retention means is provided to temporarily retain each group of caps in a position which is favorable for being intercepted and engaged by an underlying group of cans that advances on the horizontal conveyor.

[0007] In order to ensure correct positioning of the groups of caps onto the top of the cans, the sliding chute is also provided with one or more resilient tabs which are arranged to sequentially press onto the caps in order to guide and prepare them for the subsequent compression step by a pressure roller which has a horizontal axis, is resiliently loaded and is designed to yieldably press a transverse row of caps against the top of the cans in order to cause them to snap-onto a respective can.

[0008] Once the caps have been fitted on the tops of the cans, it is necessary to cut the thin strips that mutually connect the caps of the same row so that each can is disconnected from the others.

[0009] Since this is a rather complicated operation sequence, it would be desirable to simplify it in order to increase the apparatus reliability, since a fault in any one of its components entails downtime for the entire apparatus.

[0010] The main object of the present invention is to provide an apparatus which can simultaneously perform the operations of fitting the caps onto the cans and cutting their respective connecting strips, and does not require guiding means between the chute and the pressure roller.

[0011] Another object of the present invention is to provide an apparatus for simultaneously applying a plurality of caps onto the same number of cans which is simpler in structure and thus more reliable in operation.

[0012] These and other objects which will become better apparent hereinafter are achieved by an apparatus for sequentially applying caps or lids onto cans or tins, which comprises a gravity feeding path for aligned groups of caps which are mutually connected by connecting strips; a can feeding device arranged below said feeding path and designed to cause the cans to move along a feeding path; interception means for said groups of caps arranged at the lower end of said feeding path so that each group of caps is aligned transversely to the feeding direction of the cans; and an application roller located downstream of said feeding path and arranged to apply pressure onto said caps thereby force-fitting them onto the top of the cans, characterized in that said application roller comprises cutting means for cutting said strips mutually connecting adjacent caps in the same group.

[0013] Advantageously, said application roller is a multiple segment roller and said cutting means comprises a plurality of disks of relatively rigid material, each coaxially mounted between two adjacent segments of the application roller thereby radially extending from the outer surface of said application roller.

[0014] The invention is further described hereinafter with reference to the accompanying drawings, in which:

Figure 1 is a diagrammatic and partly cross-sectional front elevation view taken along a vertical plane of an apparatus according to the invention;

Figure 2 shows a group of caps arranged frontally aligned as used in the apparatus of Figure 1;

Figure 3 is a partly cross-sectional view on an enlarged-scale of an application roller of the apparatus of Figure 1;

Figure 4 is a reduced-scale cross-sectional view taken along the line IV- IV of Figure 3, and illustrates the mutual position of a can on which a cap is resting, and of the application roller before the step of snap-fitting the cap onto the top of the can being performed;

Figure 5 shows the mutual position of the can of Figure 4 and the application roller during snap-fitting of the cap onto the top of the can; and

Figure 6 illustrates the mutual position of the can of Figure 4 and the application roller after snap-fitting of the cap onto the top of the can and cutting of the tab connecting that cap to an adjacent cap.

[0015] In the accompanying drawings, identical or similar parts or components have been designated by the same reference numerals.

[0016] With reference to the Figures, an apparatus according to the invention is generally designated by the reference numeral 1 and comprises a horizontal conveyor 2 which acts as a feeding device for ordered groups of already filled and sealed cans 3. The cans 3 rest on the conveyor 2 in an orderly arrangement, by being aligned in the feeding and transverse directions according to a matrix pattern.

[0017] Above the conveyor 2 a chute 4 is provided

which is designed to feed by gravity groups of caps which are frontally aligned.

[0018] Preferably, the chute 4 is constituted by a smooth inclined bottom 7, on which groups of caps 5 can slide, and a metal sheet 8 extending parallel to the bottom 7 and spaced from it by an extent which is slightly greater than the height of the caps 5.

[0019] As is more clearly shown in Figure 2, each group of caps 5 is formed by two or more units and is designated by the reference numeral 9. The caps 5 of each group 9 are each aligned and connected to the adjacent cap or caps 5 by means of thin connecting strips or tabs 10. Preferably, the tab 10 between the caps 5 at the ends of each group 9 is designed to be engaged by a pair of pins 12 extending from the bottom 7 and located at the lower end of the chute 4, as shown in Figure 1. The pins 12 constitute said retention means for the groups 9 of caps 5.

[0020] More particularly, the pins 12 act as abutment elements for a respective tab 10 of a front group 9, since they block the descent of each group 9 at such a height that the edges 13 of the caps 5 of the front group 9 that are directed downwards are at a distinctly lower level than the top edge 14 of the first front transverse row of cans 3 being fed on the conveyor 2.

[0021] The chute 4 has a width which is equal to the length of the group 9, which can comprise, e.g. six aligned caps 5, as shown in Figure 2. In this manner, the groups 9 of caps 5 arrange themselves, in use, so as to be orientated transversely to the feeding direction of the cans owing to their abutment engagement against the pins 12, thereby also ensuring a feeding synchronized with the feeding movement of the cans 3. While advancing, the cans 3 abut against the internal surface of the edge 13 of a respective cap 5 and pull it forward while raising it slightly thereby disengaging its tab 10 from the pins 12 to let it fall onto the top of a respective can 3.

[0022] Directly downstream of the chute 4 there is located an applicator 15 which is arranged above the conveyor 2 and extends transversely to the feeding direction of the cans 3.

[0023] As shown in Figure 3, the applicator 15 is constituted by a horizontal pivot or shaft 16 which is supported in any suitable manner at its ends, and on which roller segments 17 are rotatably mounted; the number of said segments is equal to the number of rows of cans 3 to be capped which are fed by the conveyor 2. The applicator 15 extends at right angles with respect to the feeding direction of the cans 3.

[0024] The roller segments 17 are idly mounted on the pivot 16 and can be slightly wider than the diameter of the cans 3. The outer surface of the segments 17 can be covered with rubber-like material to ensure sliding-free rolling on the caps 5.

[0025] A disk 18 is idly and rotatably mounted on the pivot 16 between two adjacent segments 17 and has a diameter greater than the diameter of the segments 17, whereby it protrudes with respect to them by an extent which is slightly greater than the height of the caps 5. The disks 18 are arranged on the pivot 16 in such a position that they extend through a respective gap 19 delimited by two adjacent cans 3 passing below the applicator 15.

[0026] The pivot 16 is supported, e.g. at the lower ends of a pair of cantilevered arms 20, the other end of which (not shown in the drawings) is linked to the supporting structure 11 of the apparatus. The pivot 16 is also resiliently loaded, e.g., by a shock absorber 21 which is resiliently pressed downwards and has an end 22 linked to the supporting frame 11 and its other end 24 linked to the pivot 16, as shown in Figures 1 and 3.

[0027] Alternatively, the segments 17 and the disks 18 can be keyed or otherwise fixed to the shaft 16, which in this case must be freely mounted on the arms 20.

[0028] The operation of the above described apparatus is quite simple and reliable. After a group 9 of caps 5 has been transferred in the described manner from the chute 4 to the top of a front of cans 3, said cans pass under the applicator 15, where the segments 17 roll on the caps 5 at the top 6 of the cans 3 and the disks 18 press downwards against the connecting strips 10, so as to produce first snap fitting of the caps 5 onto a respective can 3 and immediately after cutting of the connecting strips 10 by pulling them until they tear.

[0029] The above described apparatus is susceptible of numerous modifications and variations within the scope defined by the appended claims.

[0030] The disclosures in Italian Utility Model Application No. VR99U000070 from which this application claims priority are incorporated herein by reference.

[0031] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An apparatus for sequentially applying caps or lids (5) onto cans or tins (3), comprising a gravity feeding path (4) for aligned groups (9) of caps (5) which are mutually connected by connecting strips (10); a can feeding device (2) arranged below said feeding path (4) and designed to cause the cans (3) to move along said feeding path (4); interception means (12) for said groups (9) of caps arranged at the lower end of said feeding path (4), so that each group (9) of caps (5) is aligned transversely to the feeding direction of the cans (3); and an application roller (15) located downstream of said feeding path (4) and arranged to apply pressure onto said caps (5), thereby force-fitting them onto the top of the cans (3);

characterized in that said application roller (15) comprises cutting means (18) for cutting said strips (10) mutually connecting adjacent caps (5) in the same group (9).

2. An apparatus according to claim 1, characterized in that said cutting means (18) comprises at least one circular ridge radially extending from the lateral surface of said application roller (15), thereby delimiting a number of segments (17) of said roller (15) which is at least equal to the number of rows of cans (3) to be capped and arranged, in use, between a respective pair of cans (3) to engage and break its respective connecting strip (10).

3. An apparatus according to claim 2, characterized in that said cutting means (18) comprises a plurality of disks of relatively rigid material, each disk being coaxially mounted between two segments (17) of said application roller (15) thereby radially extending from the outer surface of said application roller (15).

4. An apparatus according to claim 3, characterized in that said disks have a rounded peripheral edge thereby applying a pressure to said connecting strips (10) sufficient to cause snap-engagement of said caps (5) onto said cans (5) before breaking said connecting strips (10).

5. An apparatus according to any one of the preceding claims, characterized in that said application roller comprises a resilient loading device (21) designed to hold it yieldingly pressed downwards.

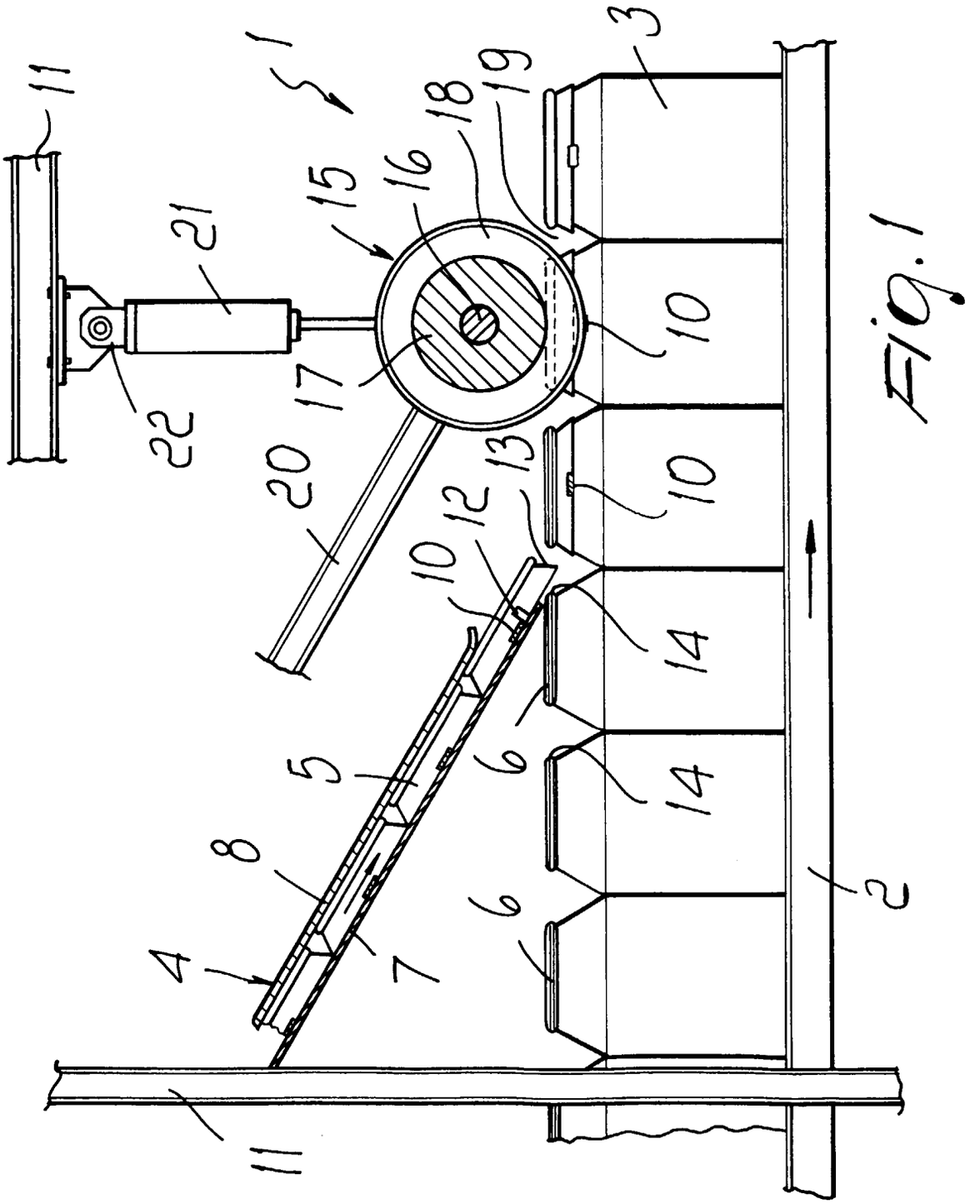


Fig. 1

Fig. 2

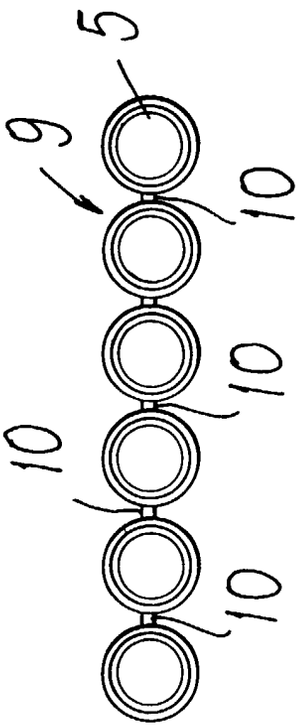
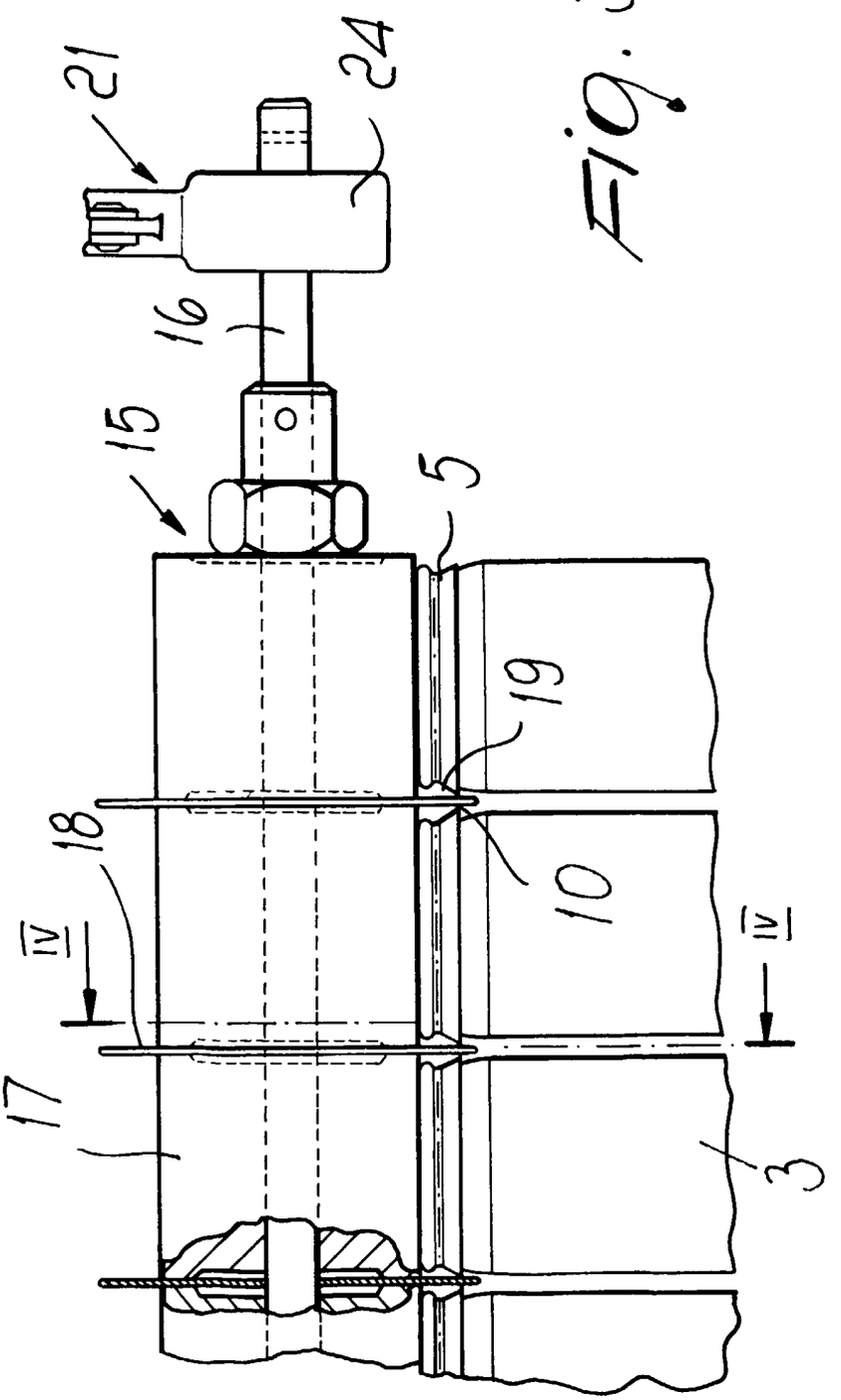


Fig. 3



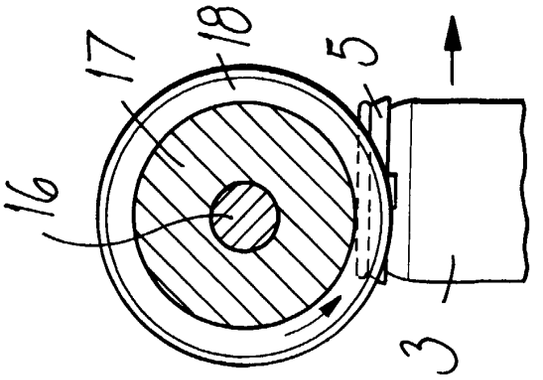


Fig. 6

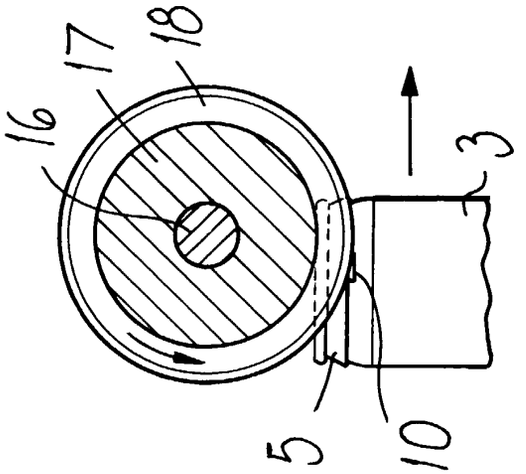


Fig. 5

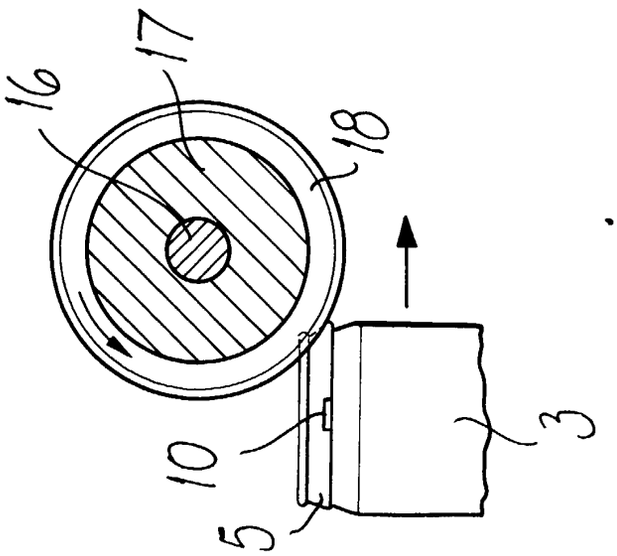


Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 00 12 6528

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 894 717 A (PEDROTTI) 3 February 1999 (1999-02-03) * the whole document * -----	1,5	B65B7/28

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26 March 2001	Grentzius, W

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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26-03-2001

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