

AN ARRANGEMENT FOR ADVANCING LABELS OR LIKE ELEMENTS

DESCRIPTION

Technical Field.

The present invention relates to an arrangement for feeding labels or like articles from a label
5 magazine to a moulding or shaping cavity in which a container or some other object made of thermoplastic material is formed and at least one label is affixed thereto.

Background Prior Art.

10 It is previously known to advance labels and like articles to a moulding cavity in which a container or some other object made of thermoplastic material is shaped or formed while simultaneously affixing a label thereto. Examples of this known technique are
15 found in Swedish Patent Specifications Nos 7216547 (publ. no. 370 203), and 81 03608-9, and in Australian Patent Specification No 535 895.

Although various feed arrangements for advancing labels to the moulding cavity have been pre-
20 viously proposed in the art and used in practice, no optimal arrangement has yet been proposed which a) will positively ensure that solely one label at a time is introduced into the cavity in a precise, predetermined position therein without the aid of means located immediately adjacent the cavity and liable to dis-
25 turb the manufacturing process, b) is reliable in operation despite high manufacturing speeds, c) will enable the magazine to be loaded or replenished while the arrangement is in operation, and d) is of simple
30 construction.

Summary of the Invention.

It is an object of this invention to improve previously known label feed arrangements of the afore-described kind in a manner which will ensure that

labels are advanced reliably to the mould cavity in a simple fashion.

This object is fulfilled by an arrangement according to the invention having the features set forth in Claim 1.

Description of the Drawings.

Figure 1 is a side view of a feed arrangement according to the invention;

10 Figure 2 is a view taken essentially on the line II-II in Figure 1.

Description of a Preferred Embodiment.

15 The main components of the arrangement according to the invention consist of a label magazine, a label transporter, and a label guide arrangement which is mounted on a frame structure 1 located on top of an injection moulding apparatus, not shown. A label E collected by the transporter from the magazine is intended to be inserted into the moulding cavity F of the injection moulding apparatus, said cavity being illustrated schematically in Figure 2 and into which a thermoplastic material is injected in order to form a container while simultaneously affixing the label thereto. Access to the moulding cavity F is not readily achieved, and hence it is necessary to introduce the labels E into the cavity without the assistance of auxiliary means herefor. Consequently, the labels are introduced into the cavity F by permitting the labels to fall freely thereinto via the label guide arrangement located immediately above the cavity.

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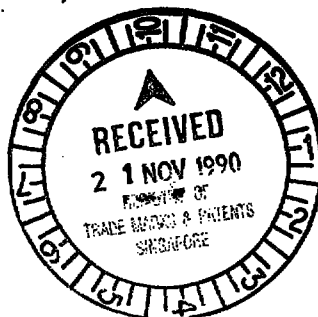
The labels E are stacked on edge in the magazine, in order to avoid undue pressure in the stack and to reduce the risk of the labels becoming



electrically charged with static electricity and subsequent adhering of the labels one to another. The label magazine includes two L-shaped profiled sections 2, which guide the labels as they are advanced in the magazine, a forward plate 3 and a pusher 4. The pusher 4 comprises an angled plate provided with two nuts 5 which are arranged for movement along a screw spindle 6 which is rotatably journaled in the frame structure and which can be rotated in a clockwise and counterclockwise direction by a motor 7. The forwardly located plate 3 limits the extent to which the labels E can be displaced forwardly (to the left in Figure 1), a function which is also fulfilled by a sprung or resilient arm 8 located on a switch 9 attached to the frame structure 1. The switch 9 is operative in applying a signal to the motor 7 for advancing the labels via the components 6, 5 and 4 when the stack of labels no longer exerts pressure on the arm 8. Advancement of the labels continues until the arm 8 is forced by the advancing label to move to the left, through some small distance, whereupon the arm again activates the switch 9, causing the switch to send a stop signal to the motor 7. The advantages afforded by using a sprung arm are that rotation of the motor need not be synchronized with the speed at which the labels are removed from the magazine, and that the arm constantly bears against the label stack with the same pressure, to hold the upper part of the stack in the magazine under a constant force, even in the event of a slight variation in the distance between the pusher 4 and the leading label in said stack.

A shaft 10 is attached to the frame structure 1, parallel with and externally of the screw spindle 6. A thin plate 11 is journaled on the

shaft 10 for movement axially therealong and for pivotal movement at right angles thereto. When desiring to place a further bundle of labels E in the magazine, which can be effected irrespective of the number of
5 labels present in the magazine, the plate 11 is moved manually along the shaft 10 and then swung round said shaft to a position in which the plate is located between two labels or between the pusher 4 and the last
10 label in the stack. The pusher 4 can then be moved to the right as seen in Figure 1, either manually or with the aid of the motor 7, the plate 11 being prevented from moving axially along the shaft 10 by a jamming effect, referred to as the so-called "sticking desk-draw effect", and a further bundle of labels is insert-
15 ed between the pusher and the plate 11, whereafter the pusher is moved to the left, into abutment with the further bundle of labels. The plate 11 is then swung out of engagement with the labels E. While the stack of labels is held in place in the magazine by the
20 plate 11, labels can be taken from the magazine, one at a time, by means of the label transporter, provided that the sprung arm 8 is held, by the label stack or manually, in a position (to the left in Figure 1) in which no signal is sent to the motor to cause the same
25 to move the pusher 4 to the left in Figure 1.



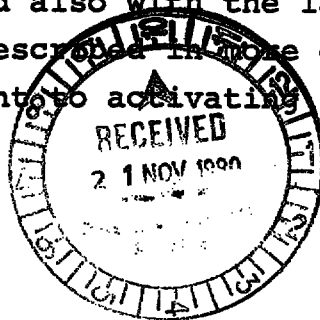
The label transporter incorporates two suction elements in the form of suction cups 12 and 13. When the term suction element is used in the claims, however, it shall be understood to include any manner of device which is capable of holding, moving, and releasing a label or like article by means of suction. The suction cups 12 and 13 are mounted on a carrier element 14 which can be moved towards and away from the label stack by means of a piston-cylinder device 15 attached to the frame structure 1. The

one suction cup, 12, - and optionally also the other suction cup, 13 - is mounted on the carrier element in a manner which will enable the suction cup to be displaced towards said element against the action of a coil spring 16. The suction cup 13 is mounted on the carrier element 14 via a piston-cylinder device 17, which is capable of moving the suction cup towards and away from the carrier element. The suction cups 12 and 13 are located vertically in line with one another, with the upper cup 12 positioned above and vertically in line with the centre of gravity of the label E which is to be gripped by the cups and which is located in the magazine.

The label guide arrangement comprises two mutually identical, vertical profiled sections 18 and 19 which are mounted in spaced relationship on the frame structure 1. The profiled sections are a mirror image of one another and the distance therebetween corresponds to the greatest horizontal width of a label E. The profiled sections present no elements or devices therebetween which might prevent or obstruct movement of the label transporter or transportation of the labels E towards and through the label guide arrangement. Each profiled section 18, 19 comprises an upper part 18a, 19a of L-shaped cross-section, and a lower part (only 18c is shown) of U-shaped cross-section, this lower part being connected to its respective upper part by means of an inclined wall (only 18b is shown).

The manner in which the label transporter operates and its co-action with the leading label in the label stack and also with the label guide arrangement will now be described in more detail.

Subsequent to activating the suction cups



12 and 13, i.e. creating a partial vacuum therein, the piston-cylinder device 15 is activated to move the carrier 14, and therewith also the two suction cups, to the right, away from the starting position shown in Figure 1 and towards the label stack until the cups are in firm suction engagement with the leading label E in said stack. Any variation which may occur in the distance between the suction cup 12 and the stack is compensated by the spring 16. The piston-cylinder device 17 is then activated, so as to cause the suction cup 13 to move the lower part of the label past the plate 3, while the upper part of the label is held firmly by the suction cup 12. This operational stage is illustrated in chain lines in Figure 1. The piston-cylinder device 15 is then activated and moves the carrier 14, with both suction cups 12, 13, to the left at the same time as the piston-cylinder device 17 is activated to move the suction cup 13 to the right. Upon completion of this movement of the piston-cylinder devices the suction cups are located in the positions shown in full lines in Figure 1, in which the cups are located vertically in line with one another, with the label located between the profiled sections 18a, 19a.

When the suction cups 12 and 13 are located in their aforescribed terminal positions, illustrated in Figure 1, firstly the suction cup 13 is deactivated, so that it releases its hold on the label, whereupon the suction cup 12 is immediately deactivated so as to release the label, which at this moment is simply hanging from said cup. Since the suction cup 12 is located vertically above the centre of gravity of the label, the label is released in the absence of laterally acting forces and will therefore

fall straight downwards. The guide arrangement 18, 19 maintains the alignment of the label as it falls freely into the moulding cavity F.

5 An embodiment of the arrangement according to the invention has been described in the foregoing with reference to the drawings. It will be understood, however, that the invention is not limited to this embodiment, but is only restricted by the scope of the following claims.



CLAIMS:

1. An arrangement for advancing labels or like elements from a label magazine to a mould cavity in which a container or some other object made of thermoplastic material is formed and at least one label is affixed thereto, characterized in that the arrangement includes a suction device (12-17) which is displaceable into engagement with the label (E) that is outermost in the label magazine (2-4) for movement of the label to a position above the mould cavity (F) into which the label is intended to fall with the large surfaces of the label located substantially in a vertical plane, when the suction device releases its engagement with the label, said suction device incorporating a suction element (12) which is arranged to engage one large surface of the label at a location vertically above the centre of gravity of the label; the arrangement being such that when the suction element releases the label it falls into the mould unhindered.

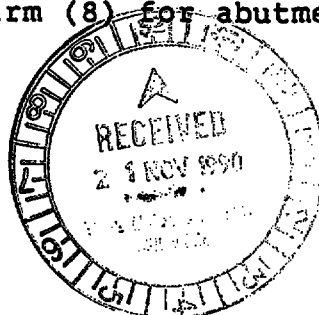
2. An arrangement according to claim 1 incorporating a further suction element (13) in suction engagement with the label; the first suction element (12) being arranged so as to remain engaged with the label until the further suction element (13) has been caused to release its hold on the label.



3. An arrangement according to Claim 1, or Claim 2 characterized by a guide arrangement (18, 19) which is located above the mould cavity (F) and which is operative to guide the label (E) into the mould cavity (E) during the free fall of the label.

4. An arrangement according to Claim 3, characterized in that the guide arrangement includes two mutually spaced, substantially vertical profiled sections (18, 19) between which parts of the suction device (12-17) can move and each of which comprises an upper part (18a, 19a) of L-shaped cross-section and a lower part (18c) which is of U-shaped cross-section and is connected to said upper part.

5. An arrangement according to any of the preceding claims, characterized in that the labels are stacked on edge in the magazine, which is defined in the horizontal plane by a motor-driven, movable rear wall and at least two elements (8, 9, 3) which are intended to engage parts of the label located furthest away from said wall and to support the stack of labels, of which elements one consists of a signal emitter (8, 9) operative to indicate the position of the labels, this one element including a sprung or resilient arm (8) for abutment with said label.



6. An arrangement according to any one of the preceding Claims, characterized in that the suction device (12-17) includes at least two suction elements (12, 13) which are movable by common drive means (14, 15) in directions towards and away from the label magazine (2-4), and of which suction elements one (13) is arranged to be moved in said directions separately of the other suction element (12) and relative thereto, by means of a further drive means (17) for releasing a part of the label (E) from the magazine while the other suction element retains another part of said label.

7. An arrangement according to any of the preceding Claims, characterized in that the suction element (12) is resiliently mounted on the suction device (12-17).

8. An arrangement according to any of the Claims 1-4, characterized in that the magazine (2-4) is intended to accommodate the labels (E) whilst stacked on their respective edges and is defined in the horizontal plane by a movable, motor-driven rear wall (4) and by at least one element (3, 8, 9) which engages the label located furthest from the rear wall in said stack and which holds said stack; and in that a movement limiting device (11) is journaled for movement parallel with the direction of movement of the rear wall and for pivotal movement at



right angles to said direction of movement to a position in which said device is located between the stack of labels and said rear wall or between the labels in the stack, in a manner to support the stack of labels when the rear wall is moved out of engagement therewith.

9. An arrangement according to any preceding Claim, wherein the or each suction element is in the form of a suction cup.

10. An arrangement for advancing labels or like elements substantially as described herein with reference to the accompanying drawings.

