

Apparatus for automatically advancing a carrier tape (1) bearing a row of closely arranged mutually sequential self-adhesive labels (2) for accurately placing one label at a time in a position intended for printing the label and/or for applying the label to an article. The carrier tape (1) is drawn forwards with the aid of a motor-driven feed means (3, 4) which is arranged to temporarily halt the tape each time the tape is advanced through a distance corresponding to the length of a label (2). Along the path travelled by the tape (1) between a storage reel and the feed means (3, 4) is a freely rotatable roller (11), over which the tape is arranged to pass. The roller is arranged to be driven by the tape (1), without slipping or sliding, means (13) being arranged for sensing the rotary movement of the roller and, in response thereto, to deliver a control signal for stopping the feed means (3, 4) each time the roller has rotated through a distance corresponding to the length of a label (2). The invention also relates to a method for advancing labels.

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A METHOD AND APPARATUS FOR ADVANCING A TAPE
BEARING SELF-ADHESIVE LABELS

The present invention relates to a method for automati-
cally advancing a carrier tape or ribbon which carries a
row of closely arranged, mutually sequential self-adhesive
labels, for accurately positioning the labels, one at a
time, in a station in which the label is printed and/or
is affixed to an article, said carrier tape being drawn
forward by means of a motor-driven feed means, which is
arranged to halt the tape temporarily each time said tape
is advanced through a distance corresponding to the length
of a label.

Labelling of goods manually in stores for example, with
the aid of labelling guns and like devices, is a labo-
rious, time-consuming and expensive task. It is possible
to eliminate this task, if the goods can be labelled
directly on the premises of the distributor or in the
store, with the aid of automatically operating apparatus.
Apparatus for fixing onto articles self-adhesive labels
arranged in mutually spaced relationship, in a row on a
carrier ribbon or tape are at present known. For the
purpose of halting the tape, such apparatus include means
for sensing the space between two mutually adjacent labels.
Sensing can be effected, for example, photoelectrically
or, for example, with the aid of mechanical thickness-
measuring devices.

In recent years it has become more and more usual to use
label-bearing tapes on which the labels are placed very
close together, in a row, i.e. without any real spacing
between said labels but separated by a slit only. In
order to simplify manufacture and to render said manu-
facture less expensive, these labels are normally placed
on a tape having corrugated or wave-shaped edges. There are



available at present perfectly good, hand-operated pin-
cners with which such labels can be affixed to selected
goods. On the other hand, there is no simple automatic
device which will perform this task. Among other things,
5 this is due to the difficulty in controlling the forward
feed of such a tape automatically, because there is
virtually no space between mutually adjacent labels
which can be sensed for the purpose of sending a con-
trol signal to the drive means.

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The object of the present invention is to solve the
aforementioned problems and to provide a method and
apparatus for automatically advancing accurately and
step-wise a tape bearing mutually sequential labels
15 placed in close relationship one with the other.

This object is achieved in accordance with the invention
by means of a method of the aforementioned kind
which is characterized in that during its passage be-
20 tween a storage reel and the feed means, the tape
bearing the separate labels is caused to pass over
a freely rotatable roller and to drive said roller with-
out slipping or sliding; and in that the rotary move-
ment of said roller is sensed and utilized for control-
25 ling the feed means.

The method according to the invention enables the feed
of the label-bearing tape to be controlled very pre-
cisely, for example completely independent of any slip
30 between tape and feed roller.

The invention also relates to apparatus for carrying out
the method. In accordance with one embodiment of said
apparatus, the structure of the outer cylindrical sur-
35 face of the roller may be such that when the tape is
pressed against said roller the friction generated is
sufficient to prevent sliding or slipping therebetween.



In a further embodiment, particularly intended for a tape having at least one irregular edge, the roller is provided with means arranged to co-act with said irregularity of the tape, in a manner to prevent sliding or slipping of the tape relative to the roller.

For the purpose of sensing the rotary movement of the roller, the apparatus includes suitably stationary electrooptical or pneumatic means arranged to sense the passage of markings on or recesses in the cylindrical surface of the roller or the end surface thereof, said markings or recesses being arranged at precise distances apart, for delivering a stop signal to the feed means or to the roller-drive means. The sensing means suitably has the form of a fork arranged to sense recesses in a sleeve which surrounds the roller and which projects beyond one end of said roller, the other edge of said roller having an irregular shape for co-action with a corresponding shape on the tape. In accordance with one embodiment intended for tape where both edges thereof are irregular, normally wave-shaped, a sleeve is suitably arranged around the roller at both ends thereof, each of said sleeves having an irregular inner edge corresponding to said tape, so as to form therebetween a groove which is precisely adapted to the tape.

The invention will now be described in more detail with reference to an exemplary embodiment illustrated in the accompanying drawings.

Figure 1 is a schematic side view of an apparatus according to the invention.

Figure 2 is a top plan view of the apparatus illustrated in Figure 1.

Figure 3 is a schematic perspective view of the sensing roller incorporated in the apparatus illustrated in



Figures 1 and 2.

In the illustrated apparatus of Figures 1 and 2 the reference 1 identifies a wave-shaped label-bearing
5 tape on which there is arranged a row of closely packed, mutually sequential self-adhesive labels 2, said tape arriving from a storage reel and being rolled-up onto a collecting reel when the labels have been removed from the tape. For the sake of simplicity said
10 reels are not illustrated in the drawing. The tape is drawn forwards by means of a drive means including two rollers 3 and 4, of which rollers the roller 3 is driven from a motor 5. During its passage through the apparatus, the tape 1 passes over a plurality of guide
15 rollers 6, 7 and 8, and is guided, in a conventional manner, over the edge of a tongue 9 intended for loosening each separate label 2 from the tape 1. Those articles to be labelled pass beneath the tongue 9, whereupon a loosened label is affixed to a respective
20 article, with the aid of a pressing roller 10. This operational mode is totally conventional, and will not be described in further detail here.

The application of successive labels to articles passing
25 ing beneath the tongue 9 requires, however, the tape 1 to be stopped temporarily in exactly the correct position in relation to the position of the label to be applied relative to the guide edge of the tongue 9. In accordance with the invention, the tape 1 is, to
30 this end, passed over a roller 11 which is freely rotatable about its axis. The tape is pressed against the outer cylindrical surface of the roller 11 by means of the guide rollers 7 and 8. In the exemplary embodiment in which a wave-shaped tape 1 is used, the
35 roller 11 is provided with a corresponding wave-shaped groove around its cylindrical surface, which



means that the roller will be driven fully synchronous-
ly with the forward movement of the tape. Thus, by
sensing the rotary movement of the roller 11, it is
possible to establish exactly how far the tape has been
5 advanced.

In this respect, the roller 11 of the illustrated em-
bodiment is provided on one edge thereof with a plura-
lity of slots 12 which are arranged in an outwardly
10 projecting flange and the distance apart of which
corresponds exactly to the pitch between the labels
2 on the tape 1. For the purpose of sensing the slots
12 there is used a stationary reading fork 13, arranged
to sense, for example electrooptically or pneumatically,
15 the passage of each slot 12 and therewith to deliver a
stop signal to the drive motor 5 of the roller 3.

The construction of the roller having a groove provided
with wave-shaped edges for the wave-shaped tape 1, and
20 sensing means 13 for the slots 12 is illustrated more
clearly in Figure 3. In the illustrated roller, the
wave-shaped groove has been formed by arranging around
the roller 11, at respective ends thereof, two ring-
shaped sleeves 14 having internal, wave-shaped edges.
25 One of said sleeves 14 projects beyond the roller,
and is provided with the slots 12 sensed by the reading
fork 13. In order to stop the drive roller 3 at de-
sired time intervals, the guide signals from the fork
13 can be applied directly to the motor 5 driving the
30 roller 3, or, for example, to a magnetic clutch which
disengages the motor from the roller 3.

It will be understood that the described apparatus can
be modified in several respects, inter alia with re-
35 spect to the technique used to sense the rotary move-
ment of the roller 11 and the manner in which sensing



of said rotary movement is used to influence the drive means. For example, the roller 11 can be provided with automatically readable indications of a kind other than the recesses 12, or may be provided with other means.

5

Although the apparatus has been described with reference to a wave-shaped label-carrying tape, the invention can also be applied, in principle, with label-carrying tapes having straight edges, provided that
10 the requisite friction can be obtained between the tape and the cylindrical surface of the roller 11, to prevent sliding or slipping therebetween. This can be achieved, for example, by applying a suitable coating to the cylindrical surface of the roller 11, or by
15 providing said surface with a suitable structure. It will also be understood that carrier tapes having one wave-shaped edge and one straight edge can also be used.

20 In addition to applying labels onto respective articles, the same requirement of exact positioning of successive labels prevails when said labels are to be printed prior to being affixed to said articles. As will be understood by those skilled in this art, the afore-
25 described invention can also be applied to this end.

One important advantage afforded by the invention is that driving of the tape is not critical per se, since the invention enables the length of the tape actually
30 fed forwards passed the edge where the labels are separated from the tape to be constantly monitored in a precise manner. Any relative movement between tape and feed roller will not therefore affect the accuracy.

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C L A I M S

1. A method for automatically advancing a carrier tape bearing a row of mutually sequential, closely arranged self-adhesive labels, for accurately placing one label at a time in a position intended for printing text on the label and/or for affixing said label to an article, said carrier tape being drawn forwards by means of a motor-driven feed means which is arranged to temporarily halt the tape each time it is moved forwards through a distance corresponding to the length of a label, characterized in that during its passage between a storage reel and said feed means the tape is caused to pass over and to drive a freely rotatable roller, without slipping or sliding; and in that the rotary movement of said roller is sensed and utilized for controlling the feed means.
2. A method according to Claim 1, characterized by sensing the rotary movement of said roller with a stationary electrooptical or pneumatic means, said means being arranged to sense the passage of markings on or recesses in the cylindrical surface or end surface of the roller or on a means driven by the roller, said markings or recesses being spaced apart at accurately determined distances therebetween, for the purpose of delivering a stop signal to the feed means.
3. An apparatus for automatically advancing a carrier tape (1) which bears a row of closely arranged, mutually sequential self-adhesive labels (2) for accurately placing one label at a time in a position intended for printing text on the label and/or for sticking the label onto an article, said carrier tape (1) being advanced by means of a motor-driven feed means (3, 4) arranged to



temporarily halt the tape each time said tape has been advanced through a distance corresponding to the length of a label (2), characterized in that said apparatus includes a freely rotatable roller (11) arranged between
5 a storage reel and said feed means (3, 4); in that the tape is arranged to pass over said roller, which is arranged to be driven by said tape without slipping or sliding; and in that means (13) are arranged to sense the rotary movement of the roller (11) and to deliver
10 control signals to the feed means (3, 4, 5) in response thereto.

4. An apparatus according to Claim 3, characterized in that the structure of the cylindrical surface of said
15 roller (11) is such that, when the tape is pressed against the roller, the friction against said tape (1) is sufficient to prevent slipping or sliding therebetween.

20 5. An apparatus according to Claim 3, intended for a tape having at least one irregular edge, characterized in that the roller (11) is provided with means arranged to co-act with said irregularity of said tape (1), to prevent sliding or slipping between said tape and said
25 roller.

6. An apparatus according to any one of Claims 3-5, characterized in that for the purpose of sensing the rotary movement of the roller (11) said apparatus
30 includes stationary electrooptical or pneumatic means (13) arranged to sense the passage of markings on or recesses (12) in the cylindrical surface or end surface of the roller (11) or of a means driven by the roller, said markings or recesses being spaced apart at accurately
35 determined distances therebetween, for the purpose of



delivering a stop signal to the feed means (3, 4, 5).

7. An apparatus according to Claims 5 and 6, characterized in that said sensing means has the form of a
5 fork (13) arranged to sense recesses (12) in a sleeve (14) which surrounds the roller (11) and which projects beyond the end of said roller, and the other end of which sleeve has an irregular shape for co-action with a corresponding shape of the tape (1).

10

8. An apparatus according to any one of Claims 3, 5, 6 or 7 intended for a tape of which both edges are irregular, characterized in that a sleeve (14) is arranged around the roller (11) at both ends thereof,
15 each of the sleeves having an irregular inner edge corresponding to the tape (1), so as to form therebetween a groove accurately adapted to the tape.



Fig. 1

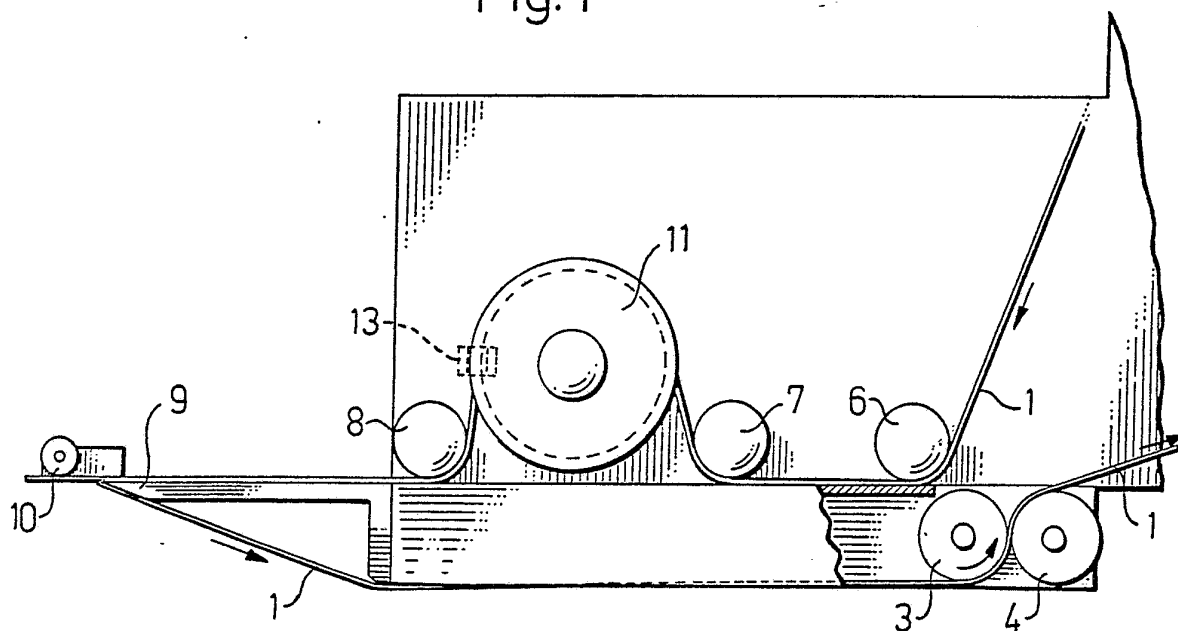


Fig. 2

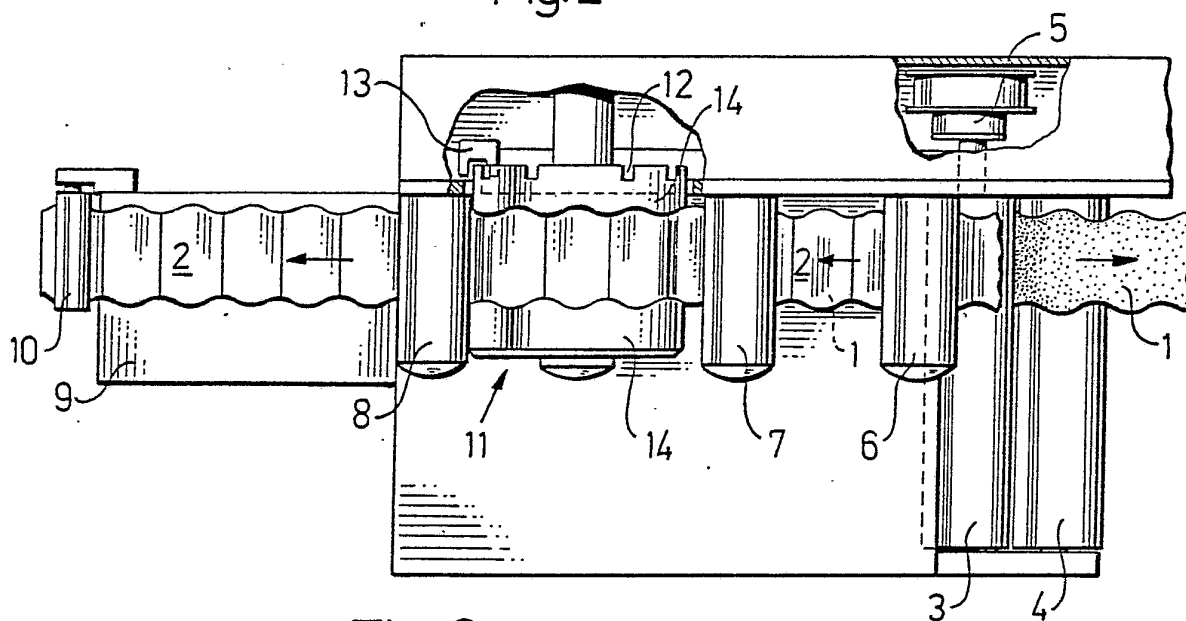
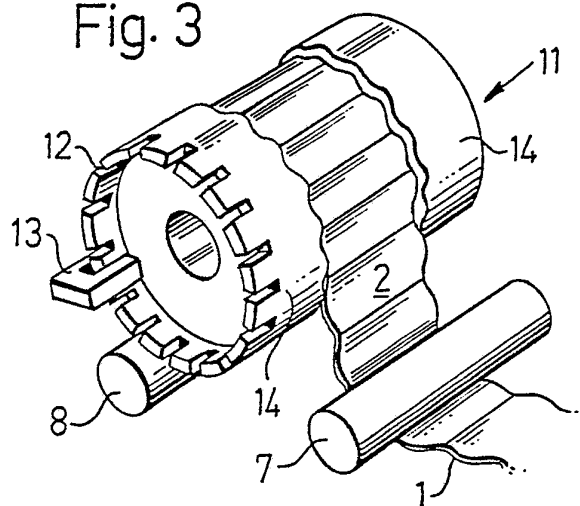


Fig. 3



INTERNATIONAL SEARCH REPORT

International Application No PCT/SE83/00202

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ³ According to International Patent Classification (IPC) or to both National Classification and IPC ³ B 65 C 9/18																	
II. FIELDS SEARCHED Minimum Documentation Searched ⁴ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%; font-size: 0.8em;">Classification System</th> <th style="font-size: 0.8em;">Classification Symbols</th> </tr> <tr> <td style="padding: 5px;">IPC 3</td> <td style="padding: 5px;">B 65 C 5/02, 9/06, 18, 40, 42, 11/00, 02, B 65 H 25/02, 06, 10, 32</td> </tr> <tr> <td style="padding: 5px;">National C1</td> <td style="padding: 5px;">81b:5/02, 9/06, 18, 40, 42, 11/00, 02; 81b:3</td> </tr> <tr> <td style="padding: 5px;">US C1</td> <td style="padding: 5px;">156:350, 361, 384, 521, 522, 538-541, 584</td> </tr> </table> Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁵ SE, NO, DK, FI, classes as above			Classification System	Classification Symbols	IPC 3	B 65 C 5/02, 9/06, 18, 40, 42, 11/00, 02, B 65 H 25/02, 06, 10, 32	National C1	81b:5/02, 9/06, 18, 40, 42, 11/00, 02; 81b:3	US C1	156:350, 361, 384, 521, 522, 538-541, 584							
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III. DOCUMENTS CONSIDERED TO BE RELEVANT ¹⁴ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; font-size: 0.8em;">Category ⁶</th> <th style="font-size: 0.8em;">Citation of Document, ¹⁶ with Indication, where appropriate, of the relevant passages ¹⁷</th> <th style="width: 15%; font-size: 0.8em;">Relevant to Claim No. ¹⁸</th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">FR, A5, 1 485 823 (ADHESIVE TAPES LTD) 23 June 1967</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1 - 8</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">EP, A1, 001 081 (BASF AKTIENGESELLSCHAFT) 21 March 1979 & DE, 2 739 565 JP, 54 047 961</td> <td style="text-align: center; vertical-align: top; padding: 5px;">2. 6, 7</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">EP, A2, 0 040 960 (TOKYO ELECTRIC CO LTD) 2 December 1981 & JP, 57 001 045 JP, 57 008 190</td> <td style="text-align: center; vertical-align: top; padding: 5px;">1 - 8</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">A</td> <td style="padding: 5px;">SE, B, 351 609 (METO-GESELLSCHAFT OSCAR KIND MBH) 4 December 1972 fig. 5, 6</td> <td style="text-align: center; vertical-align: top; padding: 5px;">5, 8</td> </tr> </table>			Category ⁶	Citation of Document, ¹⁶ with Indication, where appropriate, of the relevant passages ¹⁷	Relevant to Claim No. ¹⁸	Y	FR, A5, 1 485 823 (ADHESIVE TAPES LTD) 23 June 1967	1 - 8	Y	EP, A1, 001 081 (BASF AKTIENGESELLSCHAFT) 21 March 1979 & DE, 2 739 565 JP, 54 047 961	2. 6, 7	Y	EP, A2, 0 040 960 (TOKYO ELECTRIC CO LTD) 2 December 1981 & JP, 57 001 045 JP, 57 008 190	1 - 8	A	SE, B, 351 609 (METO-GESELLSCHAFT OSCAR KIND MBH) 4 December 1972 fig. 5, 6	5, 8
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⁹ Special categories of cited documents: ¹⁵ "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family																	
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search ¹ 1983-07-25 </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report ² 1983-07-29 </td> </tr> <tr> <td style="padding: 5px;"> International Searching Authority ¹ Swedish Patent Office </td> <td style="padding: 5px;"> Signature of Authorized Officer ¹⁰ Sture Grütting </td> </tr> </table>			Date of the Actual Completion of the International Search ¹ 1983-07-25	Date of Mailing of this International Search Report ² 1983-07-29	International Searching Authority ¹ Swedish Patent Office	Signature of Authorized Officer ¹⁰ Sture Grütting											
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