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(54) Labelling machine

(57) A labelling machine for printing and labelling containers comprising:

- an adhesive tape reel (1);
- a reel unwinding system (1);
- optional photocell (4);
- tape (5) adhesivized on the internal side of the reel;
- printing group (3), comprising a printing system wherein the contact between the print head (3b) and the adhesivized tape (5) is carried out by means of a driving roll in anti-adherent material (3a), which cyclically inverts the rotation direction;
- cutting system (2), constituted by:
  - a cutting blade (2a) having an inclined cutting edge having an angle between 2° and 45° with respect to the tape to be cut (5);
  - one counterblade (2b); the blade and counterblade cutting surfaces are covered with solid anti-adhesives;
- applying pad (6);

the cutting system (2) being adjacent to the printing group (3).

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Description

[0001] The present invention relates to a machine for printing and applying self-adhesive labels starting from adhesivized reels, in particular usable for identification systems to be applied to boxes, small parcels, packages, containers in general, pallets.

[0002] More specifically the present invention relates to labelling machines applying labels in real time and capable to operate also with packages coming from different lines, the labels having also different sizes and content.

[0003] Machines applying prepunched labels are known in the prior art. The labels are formed by an adhesivized substratum (paper, plastic film, etc.) applied on an antiadhesive support, usually siliconized, constituting the label carrier and release. In the application step the label is printed, removed from the support and applied. The drawback of said systems is that the support, carrier of the labels, is completely discarded and must be disposed as special waste.

[0004] The need was felt to have available a machine for printing and applying labels on boxes, etc. having the following advantages in comparison with the printing and labelling machines of the prior art:

- absence of processing waste;
- application in real time of the last printed label (the label coming out from the printing group) from adhesivized reels;
- possibility to change the sizes and the text of the various labels while the machine is working, and with the possibility to print the whole label surface;
- utilization of the machine also on packages coming from different lines.

[0005] It has been surprisingly and unxpectedly found by the Applicant a machine able to print and apply labels on containers, etc., solving the above technical problem.

[0006] An object of the present invention is a machine for printing and applying the labels on containers, etc., said machine, see Fig. 1 comprising:

- an adhesive tape reel (1) from which the labels are formed;
- an unwinding system of tape reel (1) comprising at least an unwinding roll (8) and a tape tensioning device (9);
- optional photocell (4);
- tape (5) adhesivized on the internal side of the reel;
- printing group (3), comprising a printing system wherein, see Fig. 3, the contact between the print head (3b) and the adhesivized tape to be printed (5) is carried out by a driving roll in antiadherent material (3a), which cyclically inverts the rotation direction;
- cutting system (2), represented in detail in Fig. 2, comprising:
  - a cutting blade (2a) moving perpendicularly to the direction of the tape to be cut, from which the formats (labels) are obtained;
    the cutting blade (2a), shown in Fig. 2 in a raised position, has the cutting edge inclined of an angle comprised between 2° and 45°, preferably between 2° and 30° with respect to the tape (5) to be cut;
  - a counterblade (2b); the blade and counterblade cutting surfaces are covered with antiadhesives, preferably solid;
- applying pad (6);

the cutting system (2) being adjacent to the printing group (3) .

[0007] The cutting systems can have variable sizes; generally their size is preferably lower than 60 mm, measured along the tape, still more preferably 40 mm. From the working point of view of the applying machine, it is preferable to use cutting systems having the lowest possible size for example 15-40 mm.

[0008] In Fig. 1 the unwinding roll (8) is preferably driven by an engine. The applying pad (6) is preferably driven by an electropneumatic device (7). In Fig. 3 the roll (3a) is preferably driven by a motor cyclically inverting the roll rotation direction.

[0009] With reference to Fig. 2, the cutting blade (2a) is preferably driven by a linear pneumatic cylinder (2c); the counterblade (2b) is mounted on a plate fixed or oscillating, preferably fixed; the contact between the counterblade (2b) and the blade (2a) is assured by a system (2d) acting on the counterblade (2b) or on the blade (2a); preferably the device (2d) assuring the contact between (2a) and (2b) acts on the mobile blade (2a). The system (2d) can be a spring or a pneumatic cylinder or a pusher.

[0010] The cutting blade (2a) can have flat or slightly curved vertical section, the bend having a radius generally from 500 mm to 6,000 mm preferably from 1,500 mm to 4,000 mm. A flat blade is preferred.

[0011] Preferably both sides of the blade (2a) and counterblade (2b) are covered with solid antiadhesives. The antiadhesive treatment of the blade and counterblade surfaces avoids that the adhesive tape adheres on said surfaces. The antiadhesive treatment can, for example, be carried out by using materials based on (fluoro)silicones and/or fluoropolymers to obtain antiadhesive solid coatings. One can mention, for example, coatings with the commercial name of Plasma Coating® PC 918F, PC 936, PC 915, PC 915S, PC 934, PC 934S, PC 932, PC 918-C, PC 434, PC 432, 40601/4001F.

[0012] The roll (3a), as said, is made of antiadherent material, i.e. the adhesivized tape (5) does not adhere to the roll (3a). The roll (3a) is, for example, made by silicone resins, for example silicone rubbers.

[0013] As said, the engine acting on the roll (3a) cyclically inverts the rotation direction. Alternatively, the progress/inversion movement of the engine can for ex-

ample be programmed by modifying the printing group firmware.

[0014] In the printing group, when the tape is moved backward from the roll (3a), the distance covered preferably corresponds to a space from 1 mm to L mm, wherein L is the distance, reported in Fig. 3, between the cutting blade and the printing head. The distance L depends on the cutting system volume (size); generally it is comprised between 15 and 60 mm. The back movement of the tape depends on the printing requirements. For example, when the print zone starts at a distance of 2 mm from the upper edge of the label, the moving back space is L - 2. With upper edge of the label it is meant the label side coming out first from the printing head.

[0015] The Applicant has indeed surprisingly and unexpectedly found that, with the printing system of the present invention machine, it is possible to print the adhesivized tape even near the upper edge of the label.

[0016] The support film of the adhesive tape forming the labels has a thickness from about 30 micron to about 80 micron, preferably from 50 micron to 60 micron.

[0017] The adhesive amount spread on the support film, calculated on the dry product, ranges from 10 to 30 g/m^2, preferably from 15 to 22 g/m^2.

[0018] The labels have various sizes depending on the requirements. Generally the label width depends on the tape used. Generally the tape width is up to 180 mm, usually from 10 mm to 180 mm, preferably from 30 mm to 150 mm; the length is variable, for example up to 250 mm, generally from 20 mm to 200 mm, preferably from 30 mm to 180 mm.

[0019] The preferred tape for the labelling system is in plastic material with the internal side adhesivized.

[0020] The tape plastic film is preferably formed of bioriented polypropylene, polyester, polyethylene, polyvinylchloride, or also laminates, or plastic coupled articles in general.

[0021] The used adhesive is available on the market and is selected among those allowing a permanent adhesion. In particular the adhesive is preferably a water acrylic adhesive, in aqueous emulsion form, based on a C_3-C_5 ester of the acrylic acid, for example butyl acrylate, or a "hot melt" adhesive formed of thermoplastic rubbers and hydrocarbon resins in general.

[0022] Using a preprinted adhesivized tape reel, it is possible to determine the label size through an optical reading system (photocell 4) in Fig. 1) which determines the cutting position.

[0023] As already said, the printing group (3), see Fig. 3, is carried out by a driving roll in antiadherent material (3a) on which the adhesivized tape to be printed (5) arrives. The tape (5) passes between the roll (3a) and the head (3b).

[0024] Another system to pass the tape (5) between the roll (3a) and the head (3b) is to advance the tape (5) towards the printing group (3) in contact with a conveyor belt (3c), see Fig. 5, said conveyor belt coming into contact with the adhesivized side of the tape (5) through the roll (3e) downhill of the unwinding system of the reel (1), by passing with the tape between the driving roll (3a) and the head (3b), and being then engaged by the bar (3d), placed before the cutting group (2), around which it turns detaching itself from the tape; the conveyor belt is then engaged by the roll (3e) and brought again into contact with the tape (5) advancing towards the printing group (3).

[0025] Also in this embodiment the contact between the printing head (3b) with the adhesivized tape to be printed (5) and the conveyor belt (3c) is carried out through a driving roll (3a). In this case it is not necessary that the driving roll (3a) is in antiadherent material. The material of the driving roll (3a) can, for example, be selected among those commonly used for the roll manufacture. In this case the conveyor belt (3c) must be in antiadherent material, or the conveyor belt surface, coming into contact with the tape adhesive side, is coated with antiadherent maetrial.

[0026] For the embodiment with the conveyor belt, see Fig. 5, in particular Fig. 6.

[0027] In the printing group (3), as said, the roll (3a) drives the tape (5) in the first embodiment of Fig. 1 and Fig. 3, or drives both the tape (5) and the conveyor belt (3c) in the embodiment of Fig. 5 and Fig. 6.

[0028] The conveyor belt (3c), as said, is carried out in antiadherent material; the adhesivized tape (5) does not adhere to the belt (3c). The belt (3c) is formed, for example, by a composite formed, for example, by an external layer of silicone resins, for example silicone rubbers, spread on a flexible material support, for example a natural or synthetic fiber cloth.

[0029] The conveyor belt has a width not lower than that of the label (tape (5)), generally the width is about 180 mm. The belt length is determined by the distance between the roll axes (3a) and (3e), generally the distance is in the range 30 mm-500 mm, preferably 200-300 mm.

[0030] The bar (3d) is preferably formed of a wear-lasting material of the conveyor belt (3c) passage. Generally the bar is in metal, special steels, for example tempered steels, etc. Generally the bar (3d) length is lower than length L.

[0031] The working process of the present invention machine is the following. Tape (5), see Fig. 1, is unwound from the reel (1) by the unwinding system comprising (8) and (9), proceeds into the printing group (3) for the label print. Successively, see Fig. 2, the tape (5) enters the cutting system (2) moving in a direction perpendicular to the cutting blade (2a) ; the blade (2a) cuts the tape maintaining an inclination, preferably constant, the contact point between the blade (2a) and counterblade (2b) during the cut moves transversally in a continuous way through the tape section (5) . After the cut the printed label is immediately applied on the container by the applying pad (6) (Fig. 1).

[0032] With reference to Fig. 3, after the label application, the adhesivized tape (5) is moved backward by

the roll (3a), to allow to the printing head (3b) to start printing near the upper edge of the label being formed. At this point the tape (5) proceeds again into the cutting system (2), a new label is cut and the cycle starts again.

[0033] The backward tape movement under the printing head, after the label application, represents a remarkable advantage of the labelling machine of the present invention in comparison with the prior art as the available surface of the label is substantially completely used.

[0034] It has been found by the Applicant that, with the present invention cutting system, adhesive deposits on the cutting blade and on the counterblade are not formed, thus allowing a high label application speed, avoiding machine stops for the adhesive removal.

[0035] Furthermore, during the machine working, it is not required the application of lubricating oils, which could stain the label and the container. The use of lubricating oils is rather critical, especially for food packages, since they represent a critical contamination source for the rules and procedures HACCP (Hazard Assessment Critical Control Point) . According to these rules the oil must not come into contact, directly or indirectly, with the food or their packages. Furthermore oil traces on the adhesive part of the label reduce the adhesion on the package.

[0036] The label printing is preferably carried out by the thermal transfer process.

[0037] The label text is previously programmed by the user, for example' with a software inside a PC. Generally the text written on the label contains for example the following information: identification code of the product, of the customer, supplier, producer, etc. and can be personalized as desired.

[0038] By the use of the management program, it is possible to memorize labels having different features as regards both the format and the text (logo, firm data, production codes, expiry dates, etc.). In connection with the production requirements the labels are recalled from the memory, made and applied on the product on the packaging line.

[0039] By using the present invention machine it is possible to change on the packaging line the sizes and the label text from a package to another, even more times or even in a continuous way, if required; without interrupting the production cycle.

[0040] It is indeed possible, by application of software available on the market, to identify on the packaging line the package to which the corresponding label, for sizes and contents, is to be applied. It is thus possible to use only one labelling station downhill of more packaging lines.

[0041] As a matter of fact it is not required the tape substitution with a tape of different sizes, bringing the new label to be printed, provided that the label sizes are compatible with the tape strip, i.e. they have the same tape width. When labels, having a width greater or lower than that of the used tape (5), are desidered, it is necessary to use a tape (5) having the desired width.

[0042] The printing/labelling machine of the present invention allows to obtain labels having a variable length in function of the content or the text of the labels. This represents a remarkable advantage with respect to the systems of the prior art, wherein labels having a fixed format are used. In these known systems when the label length is to be changed, it is necessary to change the label reel with the desired format. Furthermore another advantage of the present invention machine is that the siliconized support of the punched labels, the label punching step and the consequent waste are avoided.

[0043] The present invention machine is advantageous in comparison with the machine of the comparative Example 3 since with the latter it is not possible to apply in real time the last printed label.

[0044] The cut number (cycles) of the machine according to the present invention depends on the label length. For labels having a format for example of 80 x 60 mm the cut number is of the order of 10-50 strokes/minute at most. From the industrial point of view the labelling machine of the present invention assures a very high productivity.

[0045] The label application can be carried out with various systems. For example, in Fig. 1 it is reported a piston system (7) to apply the labels on the upper part of the container.

[0046] The working process of the present invention machine, when the printing group uses the conveyor belt (3c) is the following. Tape (5), see Fig. 5, is unwound from the reel (1) by means of the unwinding system comprising (8) and (9), successively, see Fig. 6, the tape comes into contact with the belt (3c) in correspondence of the roll (3e) downhill of the reel unwinding system (1) ; it proceeds into the printing group (3) for the label overprint; the tape is then separated from the belt in a point comprised between the printing head (3b) and the cutting system (2), i.e. at the end of the bar (3d). For the cutting.system see the above described Fig. 2. As said, after the cut, the printed label is immediately applied on the container through an applying pad (6).

With reference to Fig. 6, after applying the label, the adhesivized tape (5) with the belt (3c) is moved backward by the roll (3a), to allow the printing head (3b) to start printing near the upper edge of the label being formed; the tape (5) enters again the cutting system (2), a new label is cut and the cycle continues.

[0047] A further advantage of the present invention machine is that it is not necessary to have available tapes with prepunched labels having a different format (length) according to the production requirements.

[0048] For comparison with the labelling machine of the present invention, the Applicant has carried out a labelling machine as represented in Fig. 4. In particular:

- (1) represents the unwinding of the adhesive tape from which the labels are formed;
- (3) the printing group;

- (2) the cutting system.

[0049] After the label printing step (printing group 3), the printing pitch determines the size of the label itself through an optical reading system (photocell (4) of Fig. 4) determining the cutting position.

[0050] The printing method used is the thermal transfer method.

[0051] In the applying machine the distance between the printing unit (3) and the cutting unit (2) is 240 mm. In Fig. 4, between the photocell (4) and the cutting unit (2), the tape driving roll (1) is represented.

[0052] The comparative Examples 3 and 4, wherein the comparative applying machine of Fig. 4 is used, show the lower performances of this machine in comparison with the invention machine of Fig. 1 (see the Examples 1 and 2).

[0053] The following Examples illustrate the invention and do not limit the scope thereof.

EXAMPLE 1

[0054] At the outlet of a fine Beretti line mod. MS30 carton wrapping machine, a machine for printing and applying labels according to the present invention has been inserted (Fig. 1).

[0055] The machine is connected to a computer with a management program allowing to print on the formats the requested information. The boxes which have been labelled had 380 X 250 X 300 mm sizes. The applied labels had 120 X 80 mm sizes and have been formed by directly cutting the tape of a 50 μm polypropylene reel adhesivized with acrylic adhesive Primal® PS 83d (Rohm & Haas), weight 20-22 g/m^2, having a width of 120 mm and a length of 800 m.

[0056] On the label the following product information were printed by a thermal transfer printer: product type, number of pieces contained in the box, lot number, bar code, progressive package number, date, exact hour of the label'application. The information were distributed on the whole label surface, up to a distance of 2 mm from the upper edge.

[0057] The last label printed by the machine was applied in a real time on the first container moving to the labelling station.

[0058] The line working was continuous on a daily workshift of 8 hours. The line production speed was 18-20 boxes/minute. During the test no inconveniences on the machine occurred and to each package a label was applied bearing the above information. The printed and applied labels resulted equal to the model prepared on the computer.

[0059] The labelling process with the labelling machine according to the present invention does not show any inconvenience from the industrial point of view, even though one or more packages are removed from the line uphill of the labelling machine for the most various reasons, for example due to unsuitable packaging. Even in this case it is possible to maintain the progressive number of the box packaging.

EXAMPLE 2

[0060] The labelling/applying machine of the Example 1 is placed on a collecting conveying tape on which three packaging lines of three different products join, made up in packages having the following sizes:

- product A: 200 mm x 150 mm x 70 mm;
- product B: 200 mm x 150 mm x 90 mm;
- product C: 200 mm x 150 mm x 110 mm.

[0061] The labels were applied in a real time on one of the two sides of the box having a lower perimeter.

[0062] The labels had a different content and respectively the following sizes:

- product A: 120 mm x 60 mm;
- product B: 120 mm x 80 mm;
- product C: 120 mm x 100 mm.

[0063] The used reel was of the same type as that used in the Example 1.

[0064] By means of a detector placed at the outlet of each of the three lines, it is detected the transit and the origin line of the box on which the label is to be applied.

[0065] The detector sends a signal to the printer which, on the basis of the collection of the label formats available in the own database residing on personal computer, prints and applies in real time on the box in transit under the labelling station a label bearing the information concerning the product identified by the origin line, along with the date and the transit time.

[0066] The line working was continuous on a daily workshift of 8 hours. The line production speed was 18-20 boxes/minute. During the test no inconveniences on the machine occurred and to each package a label was applied bearing the above information.

[0067] During the whole processing cycle 9,100 boxes were labelled and it was not necessary to change the adhesive tape reel.

[0068] This is an advantage, since, using for example a reel of prepunched labels on siliconized paper, the reel diameter being equal, a remarkable lower number of applied labels would have been obtained.

[0069] The labelling process with the labelling machine according to the present invention does not show any inconvenience from the industrial point of view, even though one or more packages are removed from one or more lines uphill of the labelling machine for the most various reasons, for example due to unsuitable packaging. Even in this case it is possible to maintain the progressive number of the box packaging.

[0070] This Example shows that it is possible to apply labels having different sizes even containing different information on the different packages coming from the

three lines.

EXAMPLE 3 (comparative)

[0071] Print and application of labels from adhesivized tape using a printing and labelling machine having a fixed distance between the printing group and the cutting group (see Fig. 4).

[0072] This applying machine has been carried out by the Applicant for comparative purposes with the applying machine of the invention and is characterized by a fixed distance between the printing group and the cutting group for a better management of the electropneumatic apparatus.

[0073] The printing and labelling machine is placed at the outlet of a fine Beretti line mod. MS30 carton wrapping machine.

[0074] The fixed distance in the machine used in this Example between the cutting group and the print head is 240 mm and it determines the label size.

[0075] The machine is connected to a computer with a management program which allows to print on the formats the requested information. As in the Example 1, the boxes which have been labelled had 380 x 250 x 300 mm sizes. The applied labels had 120 x 80 mm sizes.

[0076] The labels have been formed by directly cutting the tape of a reel of the same type as that used in the Example 1.

[0077] On the label the following information were printed by a thermal transfer printer: product type, number of pieces contained in the box, lot number, bar code, date.

[0078] The machine does not allow to apply in real time the label, since between the applying pad and the printer there is an adhesive tape segment corresponding to the space taken up by three labels.

[0079] Therefore on the labels it was not possible to print the progressive package number and the transit time of the package under the labelling station. Indeed, even considering the phase displacement due' to the three labels still in the machine, during the labelling process one or more packages could be removed from the line uphill of the labelling machine for the most various reasons, for example due to unsuitable packaging. In this case, from the industrial point of view, it is extremely complicated to succeed in maintaining the progressive box packaging number.

[0080] Furthermore this machine of the Example 3 cannot be used to label packages of products coming from different packaging lines, for example as described in Example 2. Indeed in the machine three labels are ready to be applied already printed with determinate information.

[0081] The line working was continuous on a daily workshift of 8 hours. The line production speed was 18-20 boxes/minute.

[0082] It has been found that, by passing to a different production lot, three labels of the previous lot remained in the machine, which had to be removed since no longer suitable for the batch to be started. Therefore, with the machine of the comparative Example 3, at the end of each batch there are some waste which must be disposed before starting the successive production. This represents a further drawback in comparison with the applying machine of the present invention as shown in the Examples 1 and 2.

EXAMPLE 4 (comparative)

[0083] Example 2 was repeated but by using the applying machine of the Example 3 (Fig. 4).

[0084] The labelling resulted unsuitable, since labels with information not corresponding to the package content were applied. This inconvenience occurred when the packages reaching the labelling station came from different lines.

Claims

1. A machine to print and apply labels on containers, (Fig. 1) comprising:

- an adhesive tape reel (1) from which the labels are formed;
- a reel unwinding system (1) comprising at least an unwinding roll (8) and a tape tensioning device (9);
- optional photocell (4);
- adhesivized tape (5) on the internal side of the reel;
- printing group (3), comprising a printing system wherein, see Fig. 3, the contact between the print head (3b) and the adhesivized tape to be printed (5) is carried out by a driving roll in antiadherent material (3a), which cyclically inverts the rotation direction;
- cutting system (2), represented in detail in Fig. 2, comprising:
  - a cutting blade (2a) which moves perpendicularly to the direction of the tape to be cut, from which the formats (labels) are obtained; the cutting blade (2a), shown in Fig. 2 in a raised position, has the cutting edge inclined of an angle comprised between 2° and 45°, preferably between 2° and 30° with respect to the tape (5) to be cut;
  - a counterblade (2b) ; the blade and counterblade cutting surfaces are covered with solid antiadhesives;
- applying pad (6);

the cutting system (2) being adjacent to the printing

group (3).

2. A machine according to claim 1, wherein the cutting system size, measured along the tape, is lower than 60 mm, preferably 40 mm, still more preferably 15-40 mm.

3. A machine according to claims 1-2, wherein the unwinding roll (8) is driven by an engine; the applying pad (6) is driven by an electropneumatic device (7); the roll (3a) is driven by a motor cyclically inverting the roll rotation direction.

4. A machine according to claims 1-3, wherein (Fig. 2), the cutting blade (2a) is driven by a linear pneumatic cylinder (2c); the counterblade (2b) is mounted on a fixed or oscillating plate, preferably fixed; the contact between the counterblade (2b) and the blade (2a) is assured by a system (2d) acting on the counterblade (2b) or on the blade (2a); preferably (2d) acts on the blade (2a).

5. A machine according to claims 1-4, wherein the cutting blade (2a), in vertical section, is flat or has a bending having a radius from 500 mm to 6,000 mm, preferably a flat blade is used.

6. A machine according to claims 1-5, wherein both sides of the blade (2a) and counterblade (2b) are covered with solid antiadhesives.

7. A machine according to claims 1-6, wherein the distance L (Fig. 3) between the cutting blade and the print head ranges from 15 to 60 mm.

8. A machine according to claims 1-7, wherein the support film of the adhesive tape forming the labels has a thickness from about 30 micron to about 80 micron, preferably from 50 micron to 60 micron.

9. A machine according to claims 1-8, wherein the tape width is up to 180 mm, preferably from 10 mm to 180 mm, still more preferably from 30 mm to 150 mm.

10. A machine according to claims 1-9, wherein the tape plastic film is formed of bioriented polypropylene, polyester, polyethylene, polyvinylchloride, or also laminates, or plastic coupled articles in general.

11. A machine according to claims 1-10, wherein the tape (5) moves towards the printing group (3) in contact with a conveyor belt (3c), see Figures 5 and 6, said conveyor belt coming into contact with the adhesivized side of the tape (5) through the roll (3e) downhill of the unwinding system of the reel (1), by passing with the tape between the driving roll (3a) and the head (3b), and being then engaged by the bar (3d), placed before the cutting group (2), around which it turns detaching itself from the tape; said conveyor belt being then engaged by the roll (3e) and brought again into contact with the tape (5) advancing towards the printing group (3).

12. A machine according to claim 11, wherein the conveyor belt (3c) is in antiadherent material, or the belt surface coming into contact with the adhesive side of the tape (5) is covered with antiadherent material.

13. A machine according to claims 11-12, wherein the conveyor belt (3c) is a composite formed by an external layer of silicone resins on a flexible material support, preferably a natural or synthetic fiber cloth.

14. A machine according to claims 11-13, wherein the conveyor belt (3c) has a width not lower than that of the tape (5), preferably it is about 180 mm.

15. A machine according to claims 11-14, wherein the distance between the roll axes (3a) and (3e) is in the range 30 mm-500 mm, preferably 200-300 mm.

16. A process for printing and applying the labels which uses the printing/labelling machine (Fig. 1) of claims 1-10, wherein:

- the tape (5) is unwound from the reel (1) by the unwinding system comprising (8) and (9), enters the printing group (3) for the label overprint;
- (Fig. 2) the tap (5) enters the cutting system (2) moving in a direction perpendicular to the cutting blade (2a) ; the blade (2a) cuts the tape maintaining a preferably constant inclination; the contact point between the blade (2a) and counterblade (2b) during the cut moves transversally in a continuous way through the tape section (5);
- the printed label after the cut is immediately applied on the container by the applying pad (6);
- (Fig. 3) after the label application, the adhesivized tape (5) is moved backward by the roll (3a), and the printing head (3b) starts printing near the upper edge of the label being formed;
- the tape (5) proceeds again into the cutting system (2) to form the next label.

17. A process according to claim 16, wherein the label print is carried out by the thermal transfer process.

18. A process according to claims 16-17, wherein the moving back space is L - 2 if the printing zone begins at a distance of 2 mm from the upper edge of the label.

19. A process according to claims 16-18, wherein the

label text is previously programmed by the user, preferably with a software inside a computer.

20. A process according to claim 19, wherein the text written on the label contains the following information: identification codes of the product, of the customer, supplier, producer, optionally personalized.

21. A process according to claims 19-20, wherein in the management program labels having different features as regards both the format and the text, are memorized.

22. A process according to claims 16-21, wherein the sizes and the label text of the packaging line packages can be varied from a package to another, even more times or in a continuous way, without interrupting the production cycle.

23. A process according to claim 22, wherein only one labelling station placed downhill of more packaging lines is used.

24. A process according to claims 16-23, wherein the labels have a variable length in function of the content or the text of the labels.

25. A process according to claims 16-24, to print and apply the labels which uses the printing/labelling machine of claims 11-15, wherein:

- the tape (5), see Fig. 5 and Fig. 6, is unwound from the reel (1) by means of the unwinding system comprising (8) and (9) and successively, see Fig. 6, the tape comes into contact with the belt (3c) in correspondence of the roll (3e) downhill of the reel unwinding system (1); it proceeds into the printing group (3) for the label overprint, the tape is then separated from the belt in a point comprised between the printing head (3b) and the cutting system (2), at the end of the bar (3d); the cutting system being as in Fig. 2;
- the printed label after the cutting is immediately applied on the container through an applying pad (6);
- with reference to Fig. 6, after the label application, the adhesivized tape (5) with the belt (3c) is moved backward by the roll (3a), to allow the print head (3b) to start printing near the upper edge of the label being formed; at this point the tape (5) enters again the cutting system (2), a new label is cut and the cycle continues.

Fig. 1

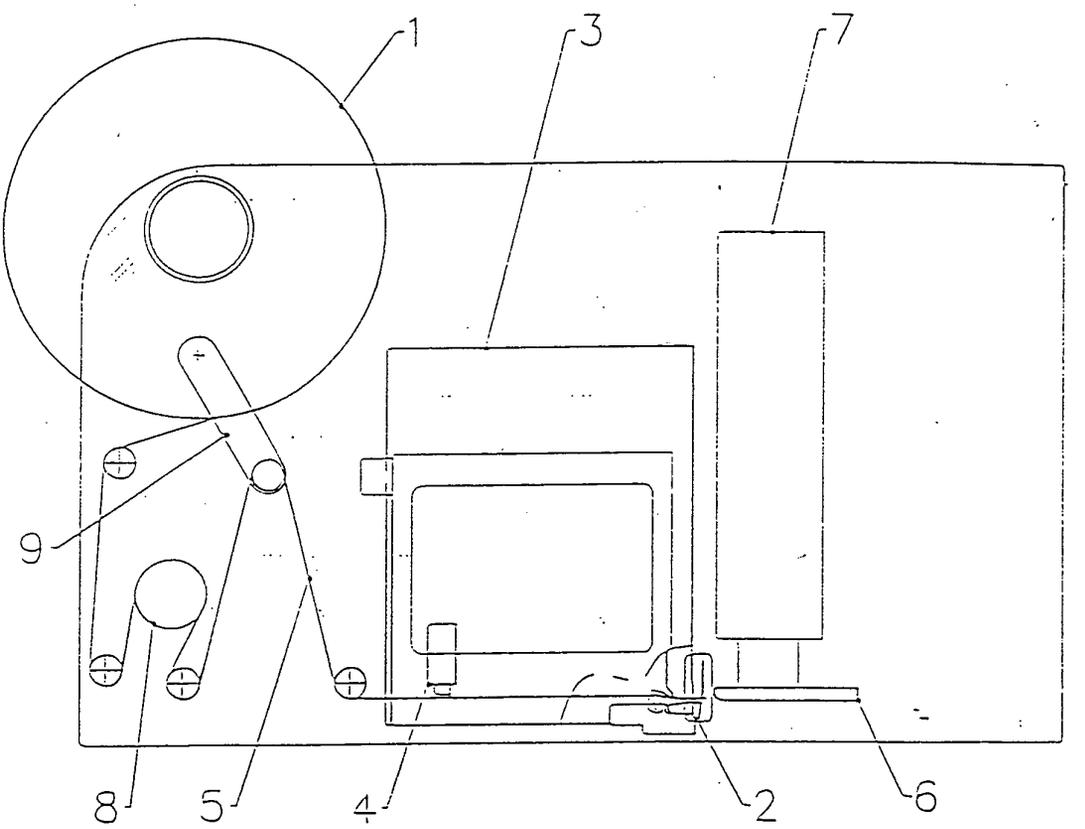


Fig. 2

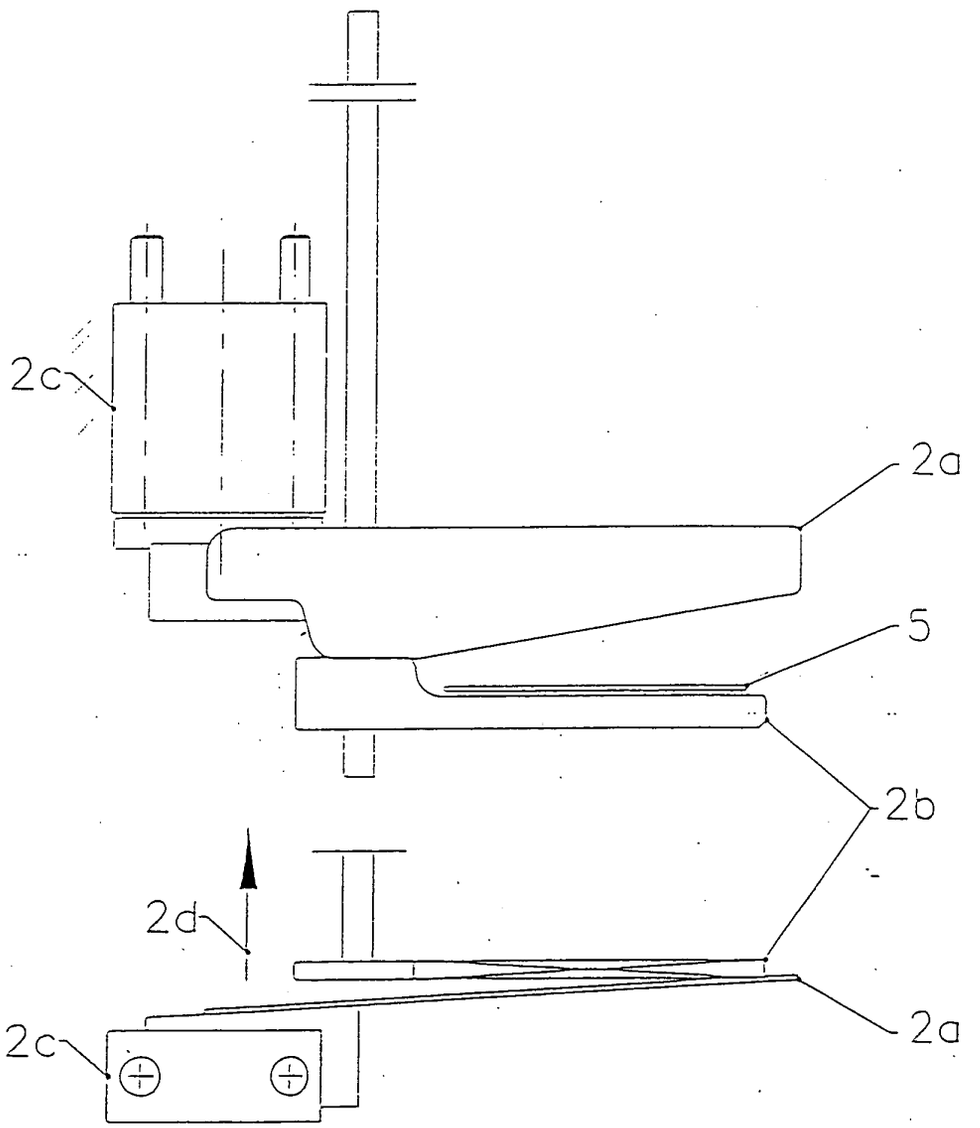


Fig. 3

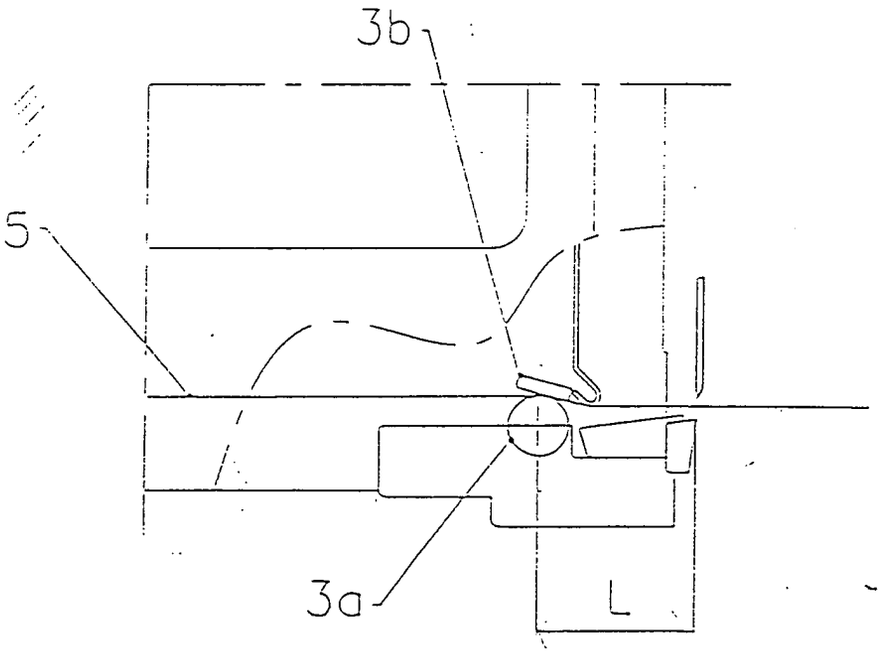


Fig. 4

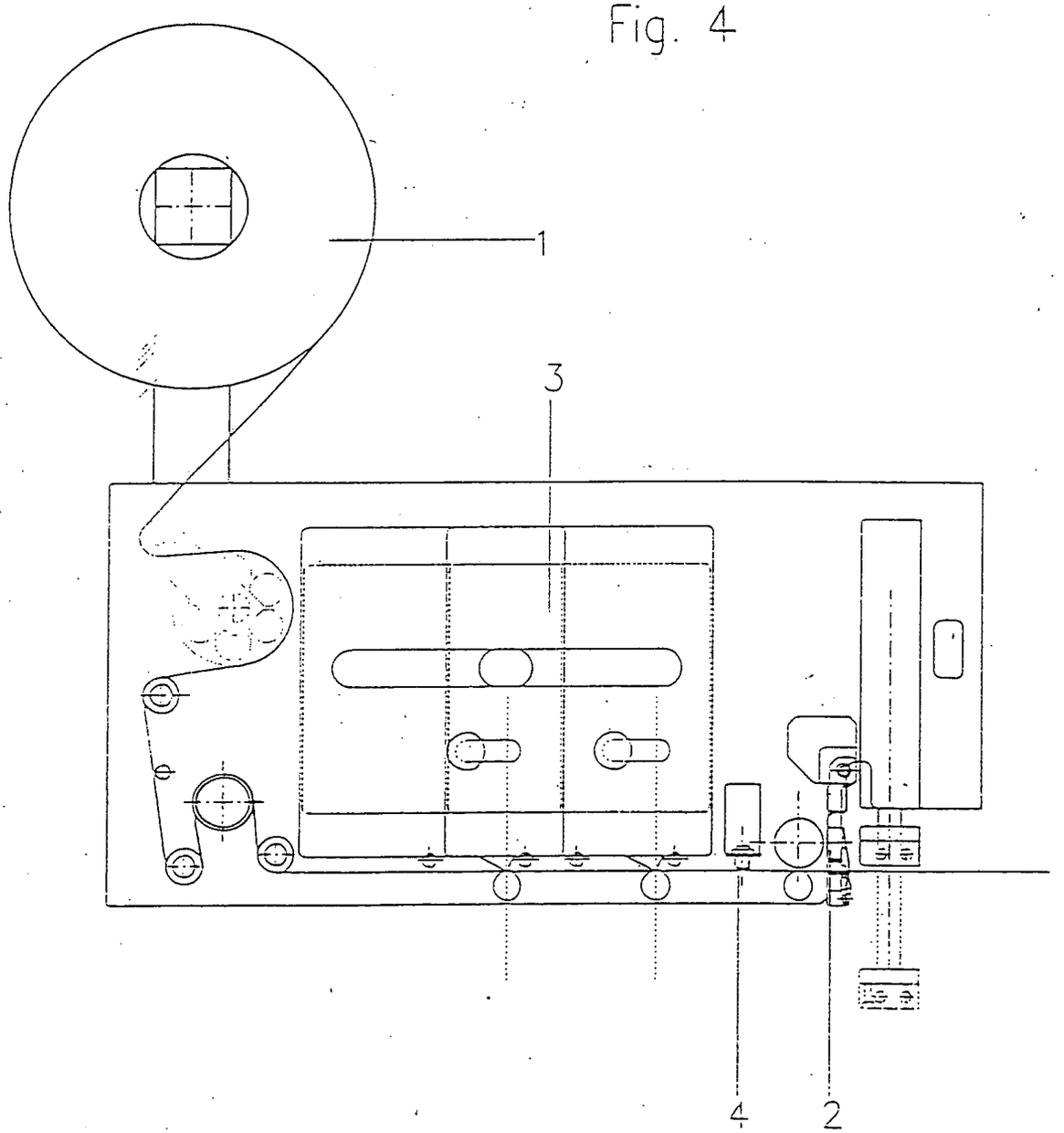


Fig. 5

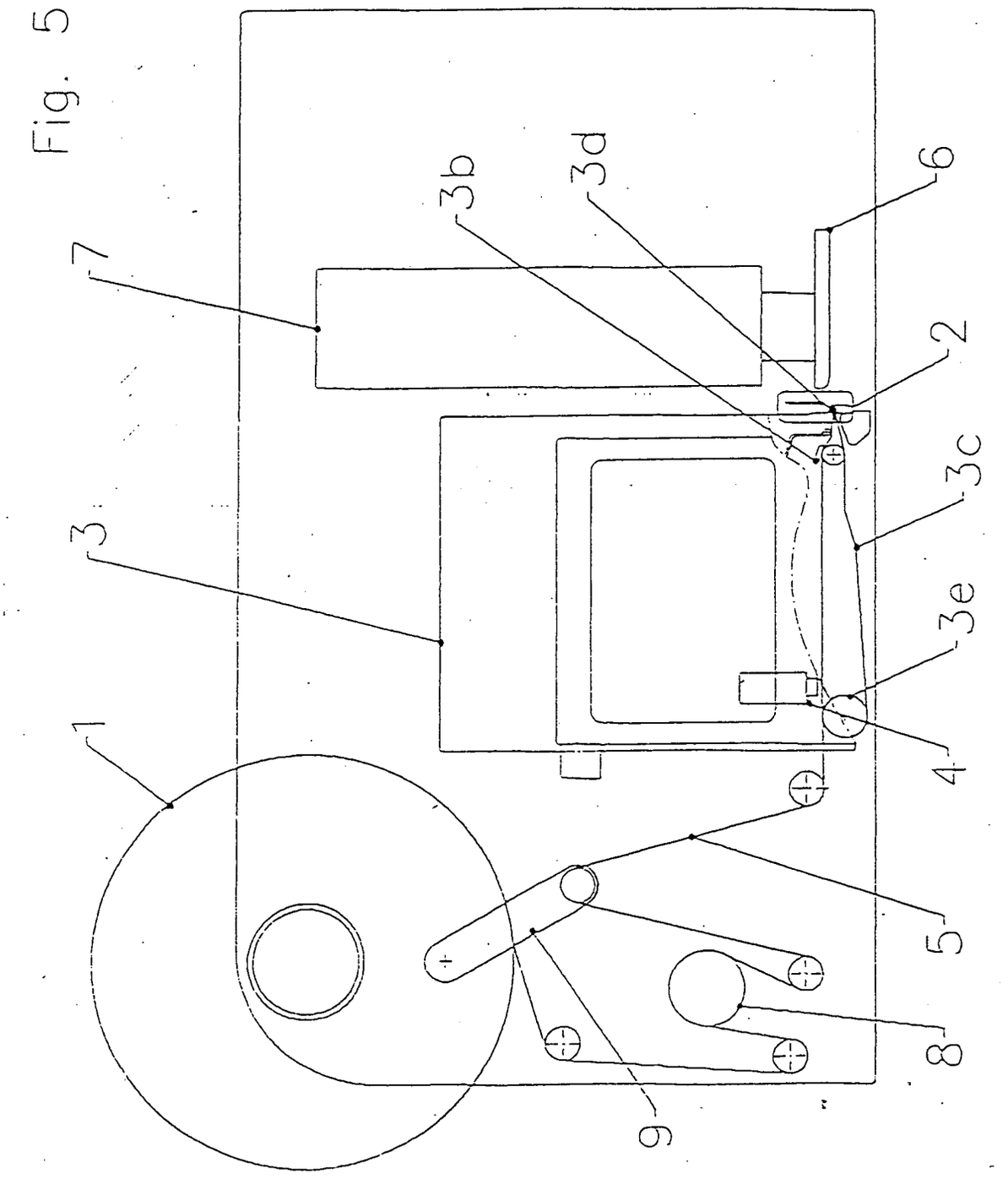
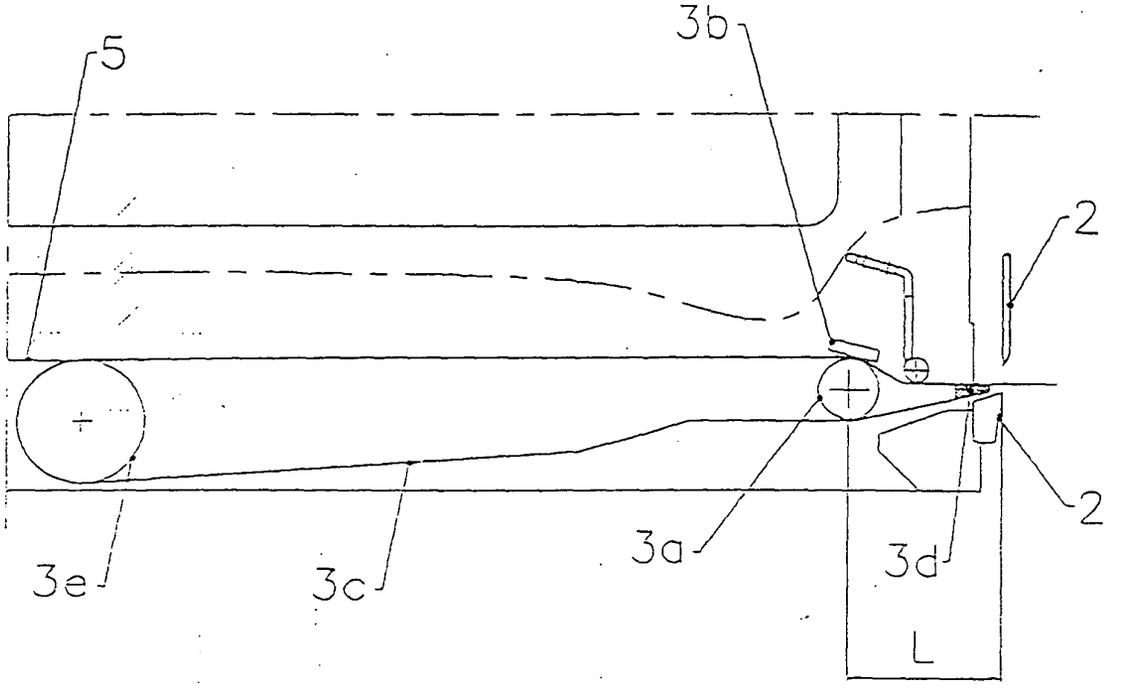


Fig. 6



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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 1634

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)
Y	US 4 784 714 A (SHIBATA TOMOO) 15 November 1988 (1988-11-15) * column 6, line 58 - line 65 * * column 8, line 18 - line 27 * * column 8, line 47 - line 57 * * column 9, line 31 - line 51; figures 1,2,8 *	1-10, 16-24	B65C9/18 B65C9/42 B65C9/46
Y	US 4 276 112 A (FRENCH JOHN B ET AL) 30 June 1981 (1981-06-30) * column 3, line 22 - line 31 * * column 4, line 31 - line 55 * * column 4, line 64 - column 5, line 2; figure 1 *	1-10, 16-24	
Y	US 6 145 423 A (BOREALI JEFFREY J ET AL) 14 November 2000 (2000-11-14) * column 4, line 39 - line 61 * * column 4, line 62 - column 5, line 21; figure 3 *	1-10, 16-24	
A	US 3 861 303 A (DORN JR FRANK E) 21 January 1975 (1975-01-21) * abstract; figure 1 *	1,16	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B65C
A	US 5 531 853 A (CUBOW JOSEPH ET AL) 2 July 1996 (1996-07-02) * column 4, line 55 - line 65; figure 1 *	1,16	
A	US 5 813 772 A (SELLERS JR GEORGE T ET AL) 29 September 1998 (1998-09-29) * column 4, line 38 - line 47 * * column 6, line 20 - line 31; figures 1,5 *	1,16	

-/--

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 May 2004	Wartenhorst, F

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
EP 04 00 1634

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 0 577 241 A (MOORE BUSINESS FORMS INC) 5 January 1994 (1994-01-05) * column 4, line 19 - line 36 * * column 5, line 21 - line 38; figure 1 * ---	11,25	
A	US 3 483 778 A (FORTHMANN FREDERICH F JR) 16 December 1969 (1969-12-16) ---		
A	EP 0 062 162 A (LEPTONS ITALIA SRL) 13 October 1982 (1982-10-13) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)

The present search report has been drawn up for all claims

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CATEGORY OF CITED DOCUMENTS

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EPO FORM 1503 03.82 (P04C01)

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13-05-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4784714 A	15-11-1988	US 4707211 A	17-11-1987
US 4276112 A	30-06-1981	NONE	
US 6145423 A	14-11-2000	AU 712470 B2	04-11-1999
		AU 7239496 A	01-04-1997
		BR 9606636 A	16-09-1997
		CA 2203502 A1	20-03-1997
		CN 1164841 A ,B	12-11-1997
		DE 69617386 D1	10-01-2002
		DE 69617386 T2	25-07-2002
		DK 790928 T3	18-02-2002
		EP 0790928 A1	27-08-1997
		ES 2166908 T3	01-05-2002
		JP 10509125 T	08-09-1998
		KR 232425 B1	01-12-1999
		NZ 319794 A	27-04-1998
		WO 9710148 A1	20-03-1997
US 3861303 A	21-01-1975	NONE	
US 5531853 A	02-07-1996	AU 3956095 A	23-05-1996
		WO 9613435 A1	09-05-1996
US 5813772 A	29-09-1998	US 5658647 A	19-08-1997
		AU 6044096 A	30-12-1996
		WO 9640508 A1	19-12-1996
EP 0577241 A	05-01-1994	US 5674345 A	07-10-1997
		AU 4163293 A	06-01-1994
		CA 2096384 A1	02-01-1994
		DE 9321009 U1	24-08-1995
		DE 69301342 D1	29-02-1996
		DE 69319139 D1	16-07-1998
		EP 0577241 A2	05-01-1994
		EP 0673839 A1	27-09-1995
		JP 2567562 B2	25-12-1996
		JP 6080131 A	22-03-1994
		MX 9303558 A1	28-02-1994
		NZ 248016 A	29-01-1997
		NZ 272907 A	29-01-1997
US 3483778 A	16-12-1969	NONE	
EP 0062162 A	13-10-1982	IT 1136878 B	03-09-1986
		EP 0062162 A1	13-10-1982

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82