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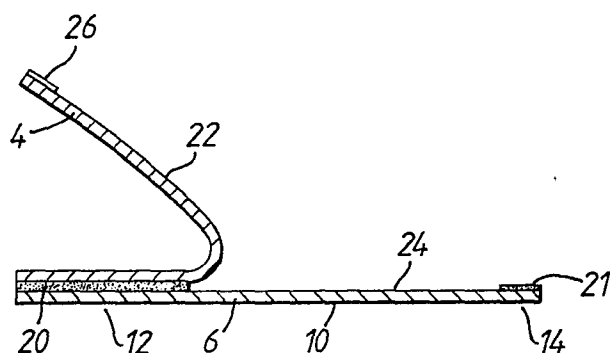
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⑤④ Labels and manufacture thereof.

⑤⑦ A label (2) for a container comprising two superposed webs (4, 6) of sheet material which are adhered together at two regions (20, 21) spaced from each other, there being between those regions (20, 21) two opposed inner web surfaces (22, 24), at least one of which carries printed information, at one of the said regions (21) the two webs (4, 6) being releasably adhered together so that the two webs (4, 6) can be separated thereby to reveal the information by pulling the webs (4, 6) apart in that region (21).

There is also provided a method and apparatus for making such labels in a continuous process.



LABELS AND MANUFACTURE THEREOF

The present invention relates to a label for a container and to a method and apparatus for making a label, and in particular to a label which is intended to be stuck on to a container such as, for example, a box, packet, bottle or tin.

Owing to present day regulations governing the information which manufacturers have to provide to customers when selling products, particularly chemical products such as agrochemicals, pesticides, and industrial chemicals in general, it is becoming necessary to give an ever-increasing amount of information to the customers of the products; it is often necessary to supply the information on the container of the product rather than on a separate sheet supplied with the container.

One convenient way of arranging for this textual information to appear on the container is to supply it on the label of the container. However, it is often the case that the label, or even the container itself, is not large enough to accommodate all the information which the manufacturer must supply to the purchaser of the product.

In my co-pending British Patent Applications Nos. 8305905 and 8316796 I have disclosed a folded label which is or can be adhered to a support web. The labels disclosed in those applications are not suitable for some applications and, although they provide a large surface area for printed information, they are not particularly inexpensive or easy to manufacture.

The present invention provides a label for a container comprising two superposed webs of sheet material which are adhered together

at two regions spaced from each other, there being between those regions two opposed inner web surfaces, at least one of which carries printed information, at one of the said regions the two webs being releasably adhered together so that the two webs can be separated thereby to reveal the information by pulling the webs apart in that region.

The present invention further provides a method for making labels in a continuous process, comprising the steps of:-

- (a) providing a first elongate web of sheet material;
- (b) printing information on at least one side of the first web;
- (c) providing a second elongate web of sheet material;
- (d) printing information on at least one side of the second web;
- (e) superposing the two printed webs and adhering the two printed webs together so that the webs are adhered together at a succession of regions spaced from each other along the composite web so formed, each or every other of these regions including a portion at which the two webs are releasably adhered together and there being between successive pairs of those regions two opposed inner web surfaces, at least one of which carries printed information; and
- (f) cutting the composite web so as to produce labels, each label including a pair of the opposed inner web surfaces and incorporating two of the adhered regions, one of those regions having a respective one of the releasably adhered portions.

The present invention further provides an apparatus for making labels in a continuous process, comprising a first printing station for printing information on a side of a first elongate web

of sheet material, a second printing station for printing information on a side of a second elongate web of sheet material, means for superposing the two printed webs and adhering the two printed webs together so that the webs are adhered together at a succession of regions spaced from each other along the composite web so produced each or every other of those regions including a portion at which the two webs are releasably adhered together and there being between successive pairs of those regions two opposed inner web surfaces, at least one of which carries printed information, and a cutting device for cutting the composite web so as to produce labels, each label including a pair of the opposed inner web surfaces and incorporating two of the adhered regions, one of those regions having a respective one of the portions.

In this specification, the term "printing" is to be construed in its broadest sense to include printing processes, such as, for example, gravure, lithography, letterpress, flexography, and screen printing.

Embodiments of the present invention will now be described by way of example with reference to the accompanying drawings, in which:-

Figure 1 shows a plan view of a label in accordance with the invention;

Figure 2 shows a section on line A - A of the label of Figure 1;

Figure 3 shows a section through the label of Figure 2 when it has been opened;

Figure 4 shows a row of the labels of Figure 1 when mounted on a releasable backing sheet; and

Figure 5 shows schematically apparatus for continuously producing a number of the labels of Figure 1.

Referring to Figures 1 and 2, a label 2 consists of two strips 4, 6 of a sheet material such as, for example, paper. The two strips 4, 6 have substantially the same area and are preferably rectilinear (e.g. rectangular) in shape. The two strips 4, 6 are superposed over each other so that one strip 4 constitutes an upper strip, the front surface 8 of which is visible when the label 2 is affixed to a container, and the other strip 6 constitutes a lower strip, the rear surface 10 of which is to be affixed to the container.

The two strips 4, 6 are attached together at two regions 12, 14 which are spaced from each other and extend across the width of the strips 4, 6 at a respective end thereof. Dotted lines 16, 18 in Figure 1 show an edge of the respective region 12, 14, each region 12, 14 being defined at its other edges by the edges of the strips 4, 6. When the strips 4, 6 are composed of paper, they may be attached by means of a layer 20, 21 of a suitable adhesive, such as, for example, a water-based adhesive, which layer 20, 21 extends across the respective region 12, 14. The label 2 can carry printed information, such as textual information, concerning the product in the container, on the front surface 8. The two opposed inner surfaces 22, 24 of the label carry further printed information. In order to render visible the two inner surfaces 22, 24, the two strips 4, 6 are separated so as to open the label 2 in the manner which is described hereinbelow.

Preferably, the front surface 8 of the label 2 carries a high quality lithographically-printed image.

As is shown more clearly in Figure 3, at one of the regions 12 the two strips are attached together so that they cannot be separated in that region 12 whereas at the other one of the regions 14 the two strips are releasably attached together. In a preferred arrangement when the strips 4, 6 are composed of paper and are attached by means of a layer of water soluble adhesive, upper strip 4 is provided with a band 26 of a material which renders the paper hydrophobic, thereby to allow the upper strip 4 to be selectively detached from and re-attached to the lower strip so as to be able repeatedly to open and close the label 2. The band 26 is preferably co-extensive with the adhesive layer 21 in region 14 and the arrangement is such that the adhesive layer 21 cannot contact the upper strip 4 directly but only via the band 26. Preferably, the material which renders the paper hydrophobic is a polysiloxane such as, for example, a polysiloxane manufactured under the code name WS7CM and WS78L by Wacker and sold in Great Britain by Ambersil Limited, Basingstoke, Hants. as Silicone Fluid FI00. In order to open the label 2, an edge of the upper strip 4 which is adjacent the band 26 is pulled upwardly and away from the lower strip 6. The band 26 is separated from the adhesive layer 21 thereby to allow the label 2 to be bent into the open position and reveal the inner surfaces 22, 24.

When a material which renders the paper of the label hydrophobic is applied as band 26 to the inner face of upper strip 4, preferably the adhesive layer 21 consists of a water - borne pressure sensitive adhesive, such as an acrylic copolymer pressure sensitive adhesive. A particularly preferable adhesive is an adhesive sold by National Adhesives, of Slough, Berkshire, United Kingdom, under the trade name Nacor 360.

One disadvantage of using a polysiloxane is the tendency of the polysiloxane to migrate or spread by capillary action along the fibres in the paper across the paper surface. Hitherto, due to that tendency to migrate, materials such as polysiloxanes have been considered only for applications where the polysiloxane is to be spread over a large area on a surface of a material such as paper where the edges of the polysiloxane layer are defined by the edges of the material itself. In the past, due to the migration of the polysiloxane it has proved difficult to define on the surface of a paper web the edge of a layer of polysiloxane. The migration tends to reduce the resealability of the label and results in the band 26 being messily formed on upper strip 4.

A further disadvantage of using polysiloxane is that it is generally difficult to achieve satisfactory resealability, especially when the label is to be opened and closed a number of times. The formulations of the adhesive and of the polysiloxane must be closely controlled so as to provide sufficient adhesive strength of the adhesive and sufficient hydrophobic strength of the polysiloxane in order to provide a sufficiently strong and resealable bond.

In accordance with the preferred embodiment of the invention, the material which renders the paper of the label hydrophobic consists of a mixture of a polysiloxane, such as that described above, and a varnish. Preferably the varnish is an overprinting varnish of the type which is in common use in the printing industry. An example of such a varnish is an overprinting varnish made by Fishburn and having the code name XF 05546. Preferably, the mixture contains from 90 to 99.5 vol % polysiloxane and from 0.5 to 10 vol % varnish, the percentage values being based on the total volume of the mixture.

The incorporation of the varnish into the polysiloxane substantially overcomes the above-described two disadvantages of polysiloxane. First, it is possible to apply a well defined band of the mixture to the inner face of upper strip 4 with substantially no migration of the polysiloxane across the edges of the band. It is believed that the migration of the polysiloxane is prevented by the relatively rapid hardening of the varnish after the application of the mixture thereby retaining the polysiloxane within the confines of the band as originally applied. Second, the resealability of the label is improved since the presence of the varnish tends to enhance the adhesion of the adhesive 21 onto the upper strip 4, even after the label has been opened and closed a number of times. Furthermore, there is sufficient polysiloxane to allow the label readily to be opened. In practice, the amount of varnish should preferably not exceed 10 vol % of the volume of the mixture otherwise there is a tendency for the adhesive 21 to adhere too firmly to upper strip 4 which can result in the label being torn when opened.

In addition, the amount of varnish should preferably not be less than 0.5 vol % of the volume of the mixture otherwise the effect of the varnish is not significant and migration of the polysiloxane can occur and the resealability of the label is reduced.

It is readily apparent from the foregoing that the label 2 may be any desired size and shape and may be composed of any suitable sheet material e.g. paper, plastics sheet, etc. When plastics sheets are employed, the plastics sheets may be attached by heat sealing.

In addition, in an alternative arrangement the band 26 and the adhered layer 21 could be provided instead on the lower strip 6 and the upper strip 4, respectively.

Furthermore, the size and shape of the attached regions 12, 14, and the band 26 accordingly, may be varied as desired. The band 26 does not have to be positioned at the edge of the label 2. To facilitate manual opening of the label 2, adhesive layer 21 and band 26 may be disposed inwardly of an edge of the label 2 so as to provide an unadhered region, between that edge and the band 26/adhesive layer 21 adhered region, in which the two strips 4,6 can readily be separated manually prior to pulling apart that adhered region. The band 26 should be at least coextensive with the adhesive layer 21. If desired, as shown in Figure 4, a number of the labels 2 may be carried in succession on a length of release backing material 40 which for convenience of handling can be wound into a reel. When subsequently labelling containers, the reel can be unwound so that the labels 2 can be removed successively from the backing material 40 and applied to containers to be labelled. The backing material 40 may be composed of a waxed paper sheet. The labels 2 can be removably attached to the backing material 40 by providing on the rear surface 10 a layer of pressure-sensitive adhesive so that the label 2 is self-adhesive.

An apparatus and method for making the labels 2 will now be described with reference to Figure 5. The apparatus shown in Figure 5 is employed to make the labels 2 in the form shown in Figure 4, in which a number of the labels 2 are carried on a release backing material 40.

A first reel 42 comprises a wound-up web 44 of self-adhesive paper on a release backing material. In Figure 5 the release backing material is on the lower side of the web 44. The web 44 is fed out from reel 42 to a first printing station 46 comprising a pair of cylinders, one 48 being a print cylinder and the other 50 being an impression cylinder. At the first printing station 46 textual

information is printed at successive positions along the length of the web 44 in one colour on the upper surface of the paper.

There may also be provided, downstream of the first printing station 46 further printing stations to print textual information in other colours onto the upper surface of the paper. The printed upper surface of web 44 is to constitute the inner surface 24 of the labels 2. The web 44 is then fed to an adhesive applying station 52 comprising a pair of cylinders, one 54 being an adhesive applying cylinder and the other 56 being a backing cylinder.

Alternatively, adhesive applying station 52 may comprise an adhesive extruder for extruding adhesive onto the web 44.

Adhesive is applied to desired areas in successive positions along the length of the web 44, those areas being between the successive printed areas on the upper surface of the paper so as to form the adhesive layers 20, 21 which are shown in Figure 2. If desired, continuous layers of adhesive can be applied at successive positions along the length of the web 44, each layer being defined by lines 16 and 18 and the edges of the web 44. On cutting the individual labels (as described hereinbelow) the two separate regions 20, 21 are formed from each said layer, each region 20, 21 being associated with a respective label 2. The web 44 is then fed to a pair of nip rollers 58.

A second reel 60 comprises a wound-up web 62 of paper. The web 62 is fed successively along a plurality of printing stations 64, each of which comprises a respective pair of cylinders and at each of which textual information is printed onto a side of the paper at successive locations along the length thereof. Both sides of the paper are printed. The upper surface of web 62 is to constitute the upper surface 8 of the labels 2 and the printed lower surface of the web 62 is to constitute the inner surface 22 of the labels 2. The printed web 62 is then fed to a further pair

of cylinders 66. The cylinders 66 apply to the lower surface of the web 62 at successive positions therealong between the printed areas the band 26 of hydrophobic material, the band 26 being transverse to the web 62. The web 62 is then fed to the nip rollers 58.

The nip rollers 58 squeeze the two webs 44, 62 together so that they are stuck together by the adhesive layers 20, 21. There is precise longitudinal alignment of the two webs 44, 62 so as to ensure that when the subsequent labels 2 are produced, the printed inner surfaces 22, 24 are fully visible when the label 2 is opened and the band 26 is correctly aligned with that layer of adhesive which is to constitute layer 21 in the resultant label. A combined web 68 emerges from the nip rollers 58 and is then fed to a die cutting station 70, comprising a die-cutting cylinder 72 and a backing cylinder 74. At the die-cutting station 70, the individual labels 2 are cut out by cutting through both of the continuous paper sheets. The release backing material is not cut and the resultant die-cut web has an appearance similar to that shown in Figure 4. The excess paper 76 is taken off continuously and wound into a reel 78. The die-cut web is wound into a reel 80.

It will be apparent from the foregoing that for web 44 the printing and adhesive applying steps may be interchanged as desired and that for web 62 the printing and hydrophobic material applying steps may be interchanged as desired.

When the upper strip 4 of the label 2 bears on its upper surface 8 a lithographically printed image, the label 2 is not made by the apparatus and method which are described with reference to Figure 5, since the upper strip 4 must be applied as an individual sheet bearing a lithographically printed image rather than as a web.

The label 2 having the lithographically printed image may however be made by the method and apparatus which are disclosed in my British Patent Specification No. 2122968 published on 25th January 1984 the disclosures of which are incorporated herein by reference. Each of the individual lithographically printed sheets to constitute upper strip 4 has the band 26 of hydrophobic material applied thereto prior to being adhered to lower strip 6. The support web (which is to constitute the lower strip 6 of the labels 2) to which the individual lithographically printed sheets are adhered is coated with a succession of spaced bands of adhesive and then the lithographically printed sheets are applied in succession to the bands of adhesive so that in each resultant label each lithographically printed sheet is adhered by two layers 20,21 of adhesive, with the layer 21 of adhesive being in registry with the band 26 of hydrophobic material.

The individual labels are then cut out in the release backing material as described in that specification.

CLAIMS:

1. A label for a container comprising two superposed webs of sheet material which are adhered together at two regions spaced from each other, there being between those regions two opposed inner web surfaces, at least one of which carries printed information, at one of the said regions the two webs being releasably adhered together so that the two webs can be separated thereby to reveal the information by pulling the webs apart in that region.
2. A label according to Claim 1, wherein the two webs are composed of paper and are adhered together by a water-soluble adhesive.
3. A label according to Claim 2, wherein one of the webs has applied to that portion of its inner surface which is to be releasably adhered to the other web a material which renders the paper hydrophobic thereby to allow the two webs to be selectively detached from and reattached to each other so as to be able repeatedly to open and close the label.
4. A label according to Claim 3, wherein the material which renders the paper hydrophobic is a polysiloxane.
5. A label according to any foregoing claim, wherein one web has on its outer surface printed information and the other web can be adhered to a container.
6. A label according to Claim 5, wherein the outer surface of the said other web is self-adhesive.
7. A label according to Claim 6, wherein the label is stuck by the self-adhesive surface onto a support web of a release backing material.

8. A reel of release backing material carrying thereon a succession of labels as claimed in any one of the foregoing claims.

9. A method for making labels in a continuous process, comprising the steps of:-

- (a) providing a first elongate web of sheet material;
- (b) printing information on at least one side of the first web;
- (c) providing a second elongate web of sheet material;
- (d) printing information on at least one side of the second web;
- (e) superposing the two printed webs and adhering the two printed webs together so that the webs are adhered together at a succession of regions spaced from each other along the composite web so formed, each or every other of these regions including a portion at which the two webs are releasably adhered together and there being between successive pairs of those regions two opposed inner web surfaces, at least one of which carries printed information; and
- (f) cutting the composite web so as to produce labels, each label including a pair of the opposed inner web surfaces and incorporating two of the adhered regions, one of those regions having a respective one of the releasably adhered portions.

10. A method according to Claim 9 further comprising the step of applying adhesive to the first web by means of which adhesive the two webs are adhered together as aforesaid.

11. A method according to Claim 10, wherein the adhesive is applied by passing the first web through a pair of cylindrical rollers by means of which adhesive is printed onto the first web.

12. A method according to Claim 10 or Claim 11, wherein the first and second webs are composed of paper and the adhesive is a water-soluble adhesive, and further comprising the step of applying to the second web a transverse band of a material which renders the paper hydrophobic, the position of application being such that during the step of superposing and adhering the band is squeezed against a corresponding band of adhesive on the first web so that the two bands are releasably adhered together.

13. A method according to any one of Claims 9 to 12, wherein in the cutting step the adhered webs are passed through a pair of die-cutting cylindrical rollers.

14. A method according to any one of Claims 9 to 13, wherein the two webs are composed of paper and the first web has a self-adhesive surface via which the first web is mounted on a release backing material.

15. A method according to Claim 14, wherein during the step of cutting only the two paper webs are cut through so as to produce a row of labels on the release backing material.

16. An apparatus for making labels in a continuous process, comprising a first printing station for printing information on a side of a first elongate web of sheet material, a second printing station for printing information on a side of a second elongate web of sheet material, means for superposing the two printed webs and adhering the two printed webs together so that the webs are adhered together at a succession of regions spaced from each other along the composite web so produced each or every other of those regions including a portion at which the two webs are releasably adhered together and there being between successive pairs of those regions two opposed inner web surfaces, at least one of which carries printed information, and a cutting device for cutting the composite web so as to produce labels, each label including a

pair of the opposed inner web surfaces and incorporating two of the adhered regions, one of those regions having a respective one of the portions.

17. An apparatus according to Claim 16 further comprising means for applying adhesive to a surface of the first web so that the two webs are adhered as aforesaid.

18. An apparatus according to Claim 17, wherein the means for applying adhesive comprises a pair of cylindrical rollers.

19. An apparatus according to any one of Claims 16 to 18 further comprising means for applying to the second web which is composed of paper a transverse band of a material which renders the paper of the second web hydrophobic, the position of application being such that when the webs pass through the means for superposing and adhering the band is squeezed against a corresponding band of adhesive, which is water-soluble, on the first web, which is also composed of paper, so that the two bands are releasably adhered together.

20. An apparatus according to Claim 18, wherein the means for applying the transverse band is a pair of cylindrical rollers which print the band onto the second web.

21. An apparatus according to any one of Claims 16 to 19, wherein the cutting device is a die-cutting device which comprises a pair of cylindrical rollers, one of which is provided with a relieved cutting surface.

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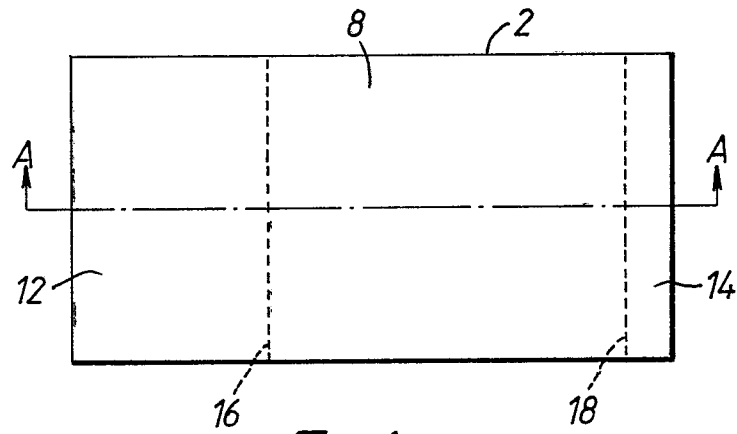


FIG. 1.

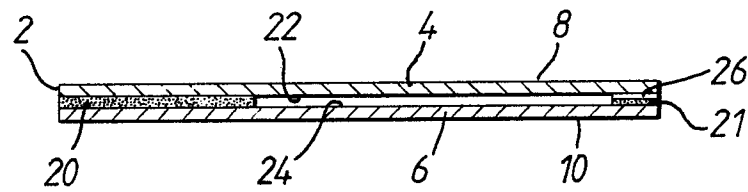


FIG. 2.

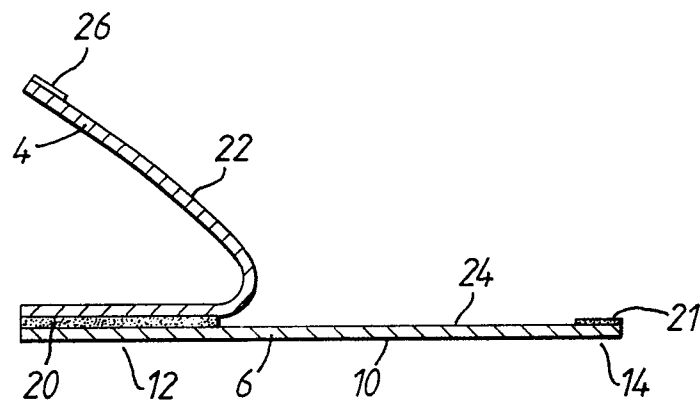


FIG. 3.

