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Self adhesive labels.

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The invention discloses self adhesive labels in roll form which are for the high speed application to moving articles. A base web material is coated on one side with release material such as a polymerisable silicone resin, and on only a fraction of the other side with pressure sensitive adhesive, to enhance release of the web during unrolling and to prevent extrusion of the adhesive out of the end of the roll. The web has sprocket holes for controlling the feed of same through an applicator machine which preferably cuts the individual labels from the web leaving a skeletal waste.

EP 0 184 610 A2

Self Adhesive Labels

05 This invention relates to self adhesive labels and in particular concerns labels which are supplied in roll form. The labels will mainly be for application, using suitable machinery, to individual articles or objects.

10 Pressure sensitive labels find wide application in the field of produce marketing because because, for example, in supermarkets and other stores the products on sale are typically priced by means of a small pressure sensitive label which is applied to the
15 product, and frequently these labels have to be changed because of price change, making consumption of the label enormous.

Also, huge quantities of labels which are applied to
20 containers such as bottles and cans are used, and indeed there are many areas of application for pressure sensitive labels.

Typically, pressure sensitive labels are mounted on a
25 carrier or backing web which is normally a web of paper coated with a suitable release material such as a silicone compound. The adhesive labels are applied to this carrier or backing web for transportation, storage and utilisation, but the labels can readily be peeled
30 from the backing web as there is a much stronger bond between the adhesive and the material of the label, than between the adhesive and the release material.

Not only is the backing web superfluous after the
35 labels have been peeled therefrom and consumed, but the manufacture of the backing web is a specialist process, and must be performed under carefully controlled

conditions. The equipment to produce the backing web is expensive, and is extremely large, so that only a very few companies are able to finance and perform the backing strip manufacture.

05

There have been proposals to eliminate the backing strip in adhesive labels, but such proposals have not met with any commercial success. One of these proposals is set forth in U.S. Patent No. 3,575,788 wherein a
10 backless roll of labels is produced by printing on clay coated paper on one side with a nitro cellulose base ink, and by covering the ink with a heat - cured thermo setting silicone resin release coating, the other side having a pressure sensitive adhesive applied thereto.
15 The silicone release coating is cured at a temperature of 350°F to 500°F.

It has been proposed as disclosed in U.S. Patent 2,845,728 to provide pressure sensitive labels in the
20 form of a strip or tape, carried by a small dispenser for hand use. The strip of labels comprises an adhesive surface on one side, and a release characteristic on the other side so that the strip can be wound without a backing sheet into roll form. The
25 individual labels are torn from the strip manually by a severing edge on the dispenser, and the labels are applied again manually to products such as fruit and grocery produce.

30 U.K. Patent Application 2,013,613 also discloses that it is known to provide a roll of labels, and on one side of the web is pressure sensitive adhesive whilst on the other side is a release coating to enable the web to be wound into roll form without the use of a
35 backing strip. The roll of labels is placed in a "labelling gun" to enable the feeding of the web to unroll same, and the severing of individual labels from

the roll by transverse cutting thereof. No detailed description is given of how the labelling gun operates, but such guns are probably small hand carried items as they are described as being of a type which are carried
05 by clerks to enable the prices of goods to be marked on the goods by application of the labels thereto. This specification as the United States patent 2,845,728 is therefore more concerned with the provision of small price labels as opposed to the somewhat larger labels
10 which are applied to articles such as bottles and cans.

Where such larger labels are to be applied to articles such as bottles and cans, it has been traditional to use labels which carry heat or moisture activated glue,
15 or to provide that the pressure sensitive labels are carried on a backing sheet which is release material coated.

There has been no disclosure of or attention given to
20 the construction of a continuous web of material for the manufacture of the larger labels of a pressure sensitive nature, and which can be applied at relatively high speed.

25 The invention provides a roll of self adhesive labels for the application of the labels individually to articles which are moved one by one relative to the station at which the labels are applied.

30 According to the invention there is provided self adhesive label stock material which is wound into roll form and can be unwound for use comprising a substrate label web which on one side is printed with repeating and equally pitched label information so that
35 individual labels can be taken therefrom and applied to products, and having sprocket holes for engagement with a sprocket member as the substrate passes through

applicator apparatus, said holes being pitched in register with the pitching of the printing, a self adhesive coating covering only a fraction of the whole of the surface area of one side of the substrate to increase the ease with which the labels can be applied to the products, and wherein there is a release surface which contacts the other side of the adhesive when the stock material is in roll form ensuring that the adhesive will remain adhered to the substrate web when the material is unrolled.

Preferably a non-porous web is used for the label strike and the release characteristic is provided by applying a curable release coating to the non-adhesive side of the web and the release coating is applied in relatively small amounts, which means that the curing time for the release coating is reduced, and lower curing temperatures (as compared to the curing temperatures used in U.S. Patent No. 3,575,788) can be used for the curing. Moreover, it is not necessary to apply a nitrocellulose base ink to the web before application of the release coating.

The web is preferably of a relatively non-extensible material so as to enable the individual labels to be cut therefrom.

As pressure sensitive adhesive covers only a fraction of the surface area the risk of the pressure sensitive adhesive being squeezed from the coil of labels to interfere with the unwinding of the web is minimized and the ease with which the web of labels can be applied to the product is increased. The web may be die cut to define individual labels therein and the release coating is supplied over the cuts to provide extra retention strength holding the labels together or to the remainder of the web, or the labels may be such

that they are cut totally from the web at the time of application to the articles.

05 When the labels are removed from the web there remains a skeletal waste of the web material.

10 The web may be printed to define the labels, the printing being on the side of the web to which the release coating is applied. Preferably, the web is of a synthetic resinous material containing an inorganic filler such as talc or chalk.

15 The web material defining the labels may be of a thickness consistent with the thickness of the labels as conventionally used.

20 For the application of the labels which are defined in the web and are removable from the web to leave a skeletal waste, there may be an applicator arranged to punch a portion of the label from the web to cause that portion to adhere to the appropriate article, and the article and web are relatively movable from this position so that the relative movement causes the remainder of the label to be removed from the web.

25 Where the said labels are defined by perforations, there may be such as to leave sufficient "catchpoints" between the label and the remainder of the web so that the label will remain in position in the web until such times as it is forceably removed or displaced therefrom. The leading edge of the label, which is first attached to the product or article may be free of such catch points so that it will deflect readily out of the web to simplify application.

35 The release coating may be applied to the web by rollers, gravure cylinders or hot melt applicators to

Solvent Heat Cured

15	Curing Time at 120°C	10 seconds
	100°C	15 seconds
	90°C	20 seconds

20

25 a) and b) are used in ratio
of 10:1 typically.

35 d) Q2-7089 (Dow Corning) Release modifying agent. Can be used in varying amounts to

05

raise level of
release of Q2-7046
and gives stable
modified release
levels.

10

e) Q2-7127 (Dow Corning) Accelerator for 02-
7046. Is used in
minute quantities to
accelerate the cure
rate of Q2-7046.
Especially useful
for low temperature
curing on substrates
such as polyethylene
film.

15

20

f) Syloff 297 (Dow Corning) Anchorage additive.
Necessary to provide
abrasion resistance
for off-line work
(except using PEK).

In the following proportions by volume.

25

30

35

	1	2	3	4	5
Syloff 7046	20	20	10	16	13.4
Crosslinker 7047	2	2	1	2.2	3.2
Q2-7090	-	-	-	-	2
Q2-7089	-	-	-	2	-
Q2-7127	-	-	0.04	-	0.03
Syloff 297	-	0.2	-	0.2	-
Solvent	78	78	89	80	82

Bath 1 - Standard bath for in-line use or off-line on
certain substrates such as PEK.

Bath 2 - Standard bath for off-line use, using Syloff 297 anchorage additive.

05 Bath 3 - Special low solids bath for coating films such as polyethylene. Solvent choice important and ethyl acetate best. Uses Q2-7127 as accelerator.

10 Bath 4 - Controlled release bath. Features Q2-7089 as release modifier and Syloff 297 as anchorage additive.

Bath 5 - Premium release formulation involving
15 incorporation Q2-7090 low viscosity fluid and additional Q2-7127 to restore catalyst level.

These are only typical baths and levels of accelerator,
20 release modifier and premium release additive can all be varied.

Curing Conditions

25 Bath 1 and 2 cure in 8-12 seconds at 140°C depending on substrate nature.

Bath 3 will cure in 15-20 seconds at 70°C.

30 Bath 4 cures typically in 15 seconds at 140°C.

Bath 5 cures in 30 seconds at 100°C or 10 seconds at 140°C.

35

Aqueous Systems

A & B SYL OFF 1171* (50%) (Dow Corning)

Organopolysiloxane 14 parts by weight.

05 C.M.C. (Carboxy methyl cellulose) 2
parts by weight.

Catalyst 1171A (Dow Corning) Organo-tin
Acylate 1.4 parts by weight.

10 or Catalyst 164 (Dow Corning) Organo-tin
Mercaptoacetate 3.5 parts by weight.

15 Water To give 100 parts by
weight.

Cure time 10 seconds at 120°C

Solvent Free Silicone

20 A) Syloff 7044 (100%) (Dow Corning) 100 parts by
weight.

25 Crosslinker 7048 (100%) (Dow Corning) 4 parts by
weight.

B) Coating Q2-7069 (100%) (Dow Corning) 100 parts by
weight.

30 Crosslinker 7048 (100%) (Dow Corning) 4 parts by
weight.

Cure time A) 40 seconds at 120°C 10 seconds at
170°C.

35 B) 30 seconds at 170°C

U.V. Cured

- A) Silicone Dehasiv VP 1502 (100%) (Wacker) 100 parts
by weight.
- 05 Crosslinking Agent VP 1503 (100%) (Wacker) 4 parts
by weight.
Catalyst OL (100%) (Wacker) 0.4 parts
by weight.
- 10 B) Silicone X-62-7004 (100%) (Shin-Etsu Chemical Co.
Ltd) 100 Parts by weight.
Catalyst X-92-095 (100%) (Shin-Etsu Chemical Co.
Ltd) 10 Parts by weight.
- 15 Cure rate 0.6 seconds with high pressure mercury
Vapout U. V. Lamp (160 W/cm).

The amount of release coating applied may be in the
order of 0.1 to 1.5 grams/sq. metre depending upon the
20 web. The pressure sensitive adhesive may be applied by
conventional means, and typically may be a solvent or
water based emulsion of which the solvent or water is
dried from the web after application. The pressure
sensitive adhesive may for example be hot melt, water
25 based, or solvent based, examples of which are as
follows:

Hot Melt

- 30 Elvax *40-P (Du Pont) (Ethylene-vinyl acetate resin) -
40 parts by weight.
- Piccovar* L-60 (Hercules Inc.) (Hydrocarbon resin) -
60 parts by weight.
- 35 Irganox *1010 (Ciba Geigy) (Antioxidant) - 0.5 parts
by weight.

Aqueous

Indatex SE2229S (Industrial Adhesives Ltd)

05

Solvent

Vinalak 5150 (Vinyl Products Ltd)

- 10 The labels may be colour printed by any suitable method such as letter press, flexographic, gravure or offset litho.

- 15 For the web material, it is preferred to use polypropylene or high density polyethylene film, including substantial proportions of particulate inorganic material.

- 20 Typically, the inorganic material may be included in the range 20 to 50% of the web by volume, and in the preferred case the web is polypropylene ethylene sequential copolymer, as described in our British Patent No. (1544,143) filled with 40% talc.

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

- 30 Fig. 1 is a perspective view of a roll of labels for use in the present invention;

Fig. 2 is an enlarged sectional elevation of the web shown in Fig. 1;

- 35 Fig. 3 illustrates diagrammatically one embodiment of how the labels are applied to individual cans;

Fig. 4 shows the process of Fig. 3 in side elevation;

Fig. 5 shows in perspective view how a roll of labels is utilised in accordance with another aspect of the invention; and

Fig. 6 illustrates how the labels of Fig. 1 are applied to box shaped products.

Referring firstly to Figs. 1 to 6 of the drawings, in Fig. 1 there is shown a web 10 having perforations 12 defining individual labels 14, each provided with printing 16. Catchpoints 18 serve to hold the labels to the remainder of the web 10, but the catchpoints can be burst or cut to enable removal of labels 14 leaving a residual skeletal waste.

As shown in Fig. 2 the web 10 is made up of a central substrate web 20 which is of a non-fibrous and substantially inextensible material and on one side of which is applied a pressure sensitive adhesive coating and on the other side is applied a release coating 22, and on the other side is applied a release coating 24. The web is shown in greatly enlarged dimension in Fig. 2, to illustrate the slits 12 and also to illustrate how the coating materials 22 and 24 migrate into the said slits 12. The substrate 20, adhesive coating 22 and release coating 24 are of a nature as described herein, and the web is wound so that the adhesive coating 22 is to the inner side of each coil and contacts directly on the release coating 24 of the adjacent inner coil. This arrangement enables the web to be easily unrolled. The web may be wound on a suitable core 26.

In producing the web 10 as illustrated in Fig. 1, the printing 16 (single or multi coloured and of any

desired pattern and/or content) is applied to the substrate 20 prior to the application of the coating 24, and in addition the perforations or slits 12 are formed prior to the application of the said coating 24. The coating 24 in fact has the effect of assisting the holding of the labels 14 in position in the web until they are removed for application to articles. The coating 24 also serves the purpose of preventing migration of the adhesive 22 through the slits 12 when the web is wound on core 26. This tendency to migrate will depend upon how tightly the roll is wound on core 26.

Fig. 3 illustrates diagrammatically how the individual labels 14 may be removed from the web 10 and applied to can bodies such as can body 28. In Fig. 3, the web 10 is shown as travelling round a guide drum 30 in the direction of arrow 32, with the pressure sensitive adhesive coating side outermost. Each can 28 to be labelled comes into contact with the pressure sensitive side of the web 10, and a label 14 is removed from the web 10 and applied to the can body 28, as shown in Fig. 4. Although not shown in Figs. 1 to 4, the web 10 has sprocket holes at each side thereof which will be arranged by suitable sprocket wheels or rollers and the web will be indexed forwards towards the product to be labelled. The leading edge of the label, having regard to its direction of movement (arrows 32), can be released from the web by a suitable knife or by virtue of changing the direction of movement of the web sharply. The contact pressure between the pressure sensitive surface and the product being labelled can be used to effect or assist the complete removal of the label from the web. The removal may if necessary be assisted by severing the remaining catchpoints 18 by means of suitable knives positioned appropriately. The skeletal waste of the

web 10 may be wound up into a suitable coil for disposal.

05 In the arrangement shown in Fig. 5, a web 10 carries printing 16 which repeats at pitch length P, but the web has no perforations or lines of weakening. The web defines labels which have to be cut from the web by suitable cutting equipment located in the region of the application head 36 so that individual labels are cut
10 from the web immediately prior to or during application of the label to the article 28 to which the label is being applied. The individual labels and portions to be cut from the web as indicated in Fig. 1, but in this arrangement also no carrier sheet is required, as the
15 web 10 will be constructed in the same fashion as the web 10 illustrated in Fig. 1 i.e. it will be provided with sprocket holes at each side.

20 In all embodiments the adhesive covers only a fraction of the web surface at one side, to increase the ease with which the labels can be applied to the products and to limit extrusion of the adhesive out of the side of the roll of labels.

25 Fig. 6 shows in somewhat greater detail, how labels in roll form as shown in Fig. 1 may be applied to box shaped products 40. The roll of labels is indicated by numeral 42 and is unwound from this roll by a tractor unit 44 having a suitable sprocket feed device which
30 engages the holes in the margins of the web 10 (the said holes are not shown in the drawings) and is fed through a removal and application station 46. The skeletal residue of the web 10 is wound into roll form as shown by numeral 48.

35

The adhesive side of the web 10 is the upper side and all surfaces which contact this adhesive side are

required to be of a nature so as not to adhere to the adhesive. Such surfaces may be defined by silicone release material.

05 The application method and specific label web coating method are described more fully in European Application No. 82306505.7 from which the present application is divided out and the said European application as referred hereto by reference.

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CLAIMS

1. Self adhesive label stock material which is wound
05 into roll form and can be unwound for use comprising a
substrate label web which on one side is printed with
repeating and equally pitched label information so that
individual labels can be taken therefrom and applied to
10 products, and having sprocket holes for engagement with
a sprocket member as the substrate passes through
applicator apparatus, said holes being pitched in
register with the pitching of the printing, a self
adhesive coating covering only a fraction of the whole
15 of the surface area of one side of the substrate to
increase the ease with which the labels can be applied
to the products, and wherein there is a release surface
which contacts the other side of the adhesive when the
stock material is in roll form ensuring that the
20 adhesive will remain adhered to the substrate web when
the material is unrolled.

2. Adhesive labels according to Claim 1, wherein said
web has either perforations defining individual labels
which can be removed one by one, or having no cuts or
25 other lines of weakening therein.

3. Adhesive labels according to claim 1 or 2, wherein
the web is die cut to define individual labels therein
and the release coating is applied over the cuts to
30 provide extra retention strength holding the labels
together or to the remainder of the web.

4. Adhesive labels according to Claim 1, 2 or 3,
wherein the web is of a synthetic resinous material
35 containing an inorganic filler such as talc or chalk.

5. Adhesive labels according to any preceding claim,

wherein the labels are printed prior to the application of the release coating.

05 6. Adhesive labels according to any preceding claim,
wherein the release coating is applied in quantities in
the order of 2 grams per sq. metre.

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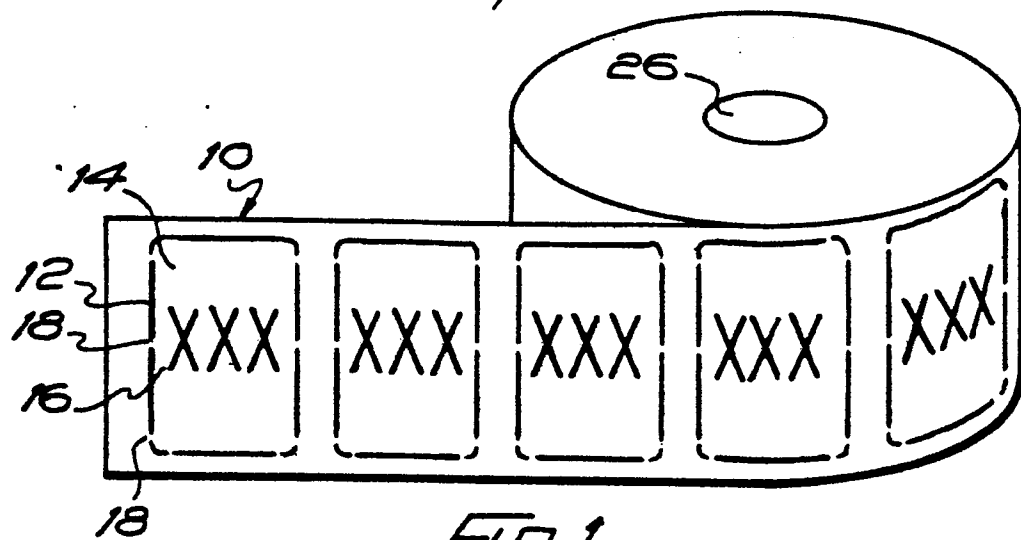


FIG. 1

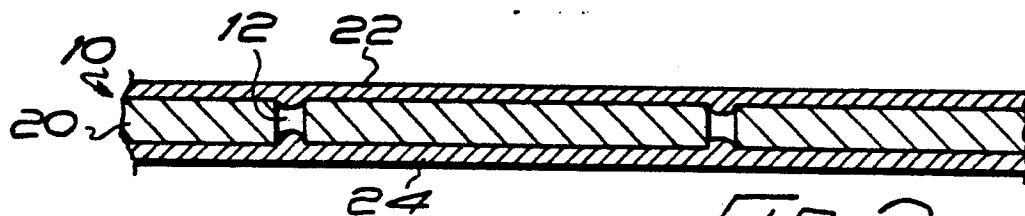


FIG. 2

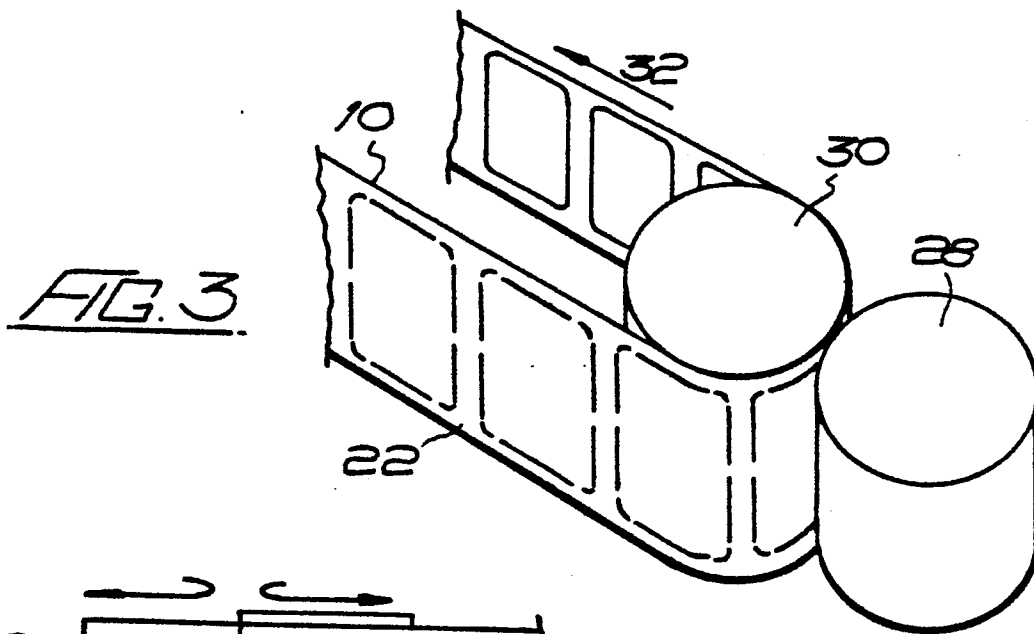


FIG. 3

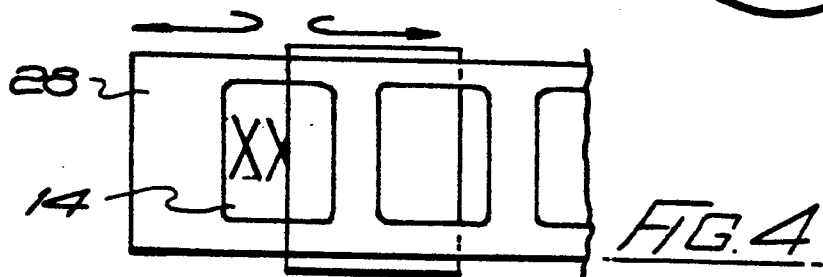


FIG. 4

