

IN-MOULD LABEL APPLICATOR

The present invention relates to a method of placing labels into a mould prior to a moulding operation. In particular, such moulds are used in blow, injection or compression moulding equipment. The labels may take the form of a roll of strip film or sheet material of foil, paper, cardboard or plastics, or a combination thereof, all of various strengths and compositions, including flimsy plastic film and barrier layer plastic film. The moulding operation serves to incorporate the label into an article formed by the moulding operation.

Heretofore, apparatus for applying labels into a mould served to transfer precut labels from a hopper or stack directly to the mould of injection moulding equipment. Often, depending on the type of label material used, more than one label would be transferred to the mould, which would result in an undesirable moulded article being formed by the moulding operation. Furthermore, the hopper or stack of labels was liable to disruption which resulted in further incorrect or misaligned transfer of a label to the mould prior to the moulding operation.

Furthermore, many prior art moulded articles, for example container lids, have a paper label applied separately to the lid after the article has been moulded. This involves a second, and time consuming, step in the manufacturing process. A separate paper label also presents problems if the moulded article is to be recycled. The paper label needs to be removed before the plastic can be recycled.

Australian Patent No. 522,591 and Patent Application No. 73698/87 each disclose a labelling device which serves to alleviate a problem known with previous prior art label applicator apparatus. The specifications each disclose a device into which a roll of plastic label strip film is fed. the strip film has

pre-printed labels thereon. The film is passed through a cutting device which serves to cut or punch out a label blank in a shape conforming to the periphery of the pre-printed label. A transfer mechanism then
5 positions the cut blank into the mould prior to the injection moulding operation.

Each labelling device disclosed utilises a die component having a cutting edge conforming to the periphery of the pre-printed label. This die component
10 must be kept clean and very sharp, and suffers from high rates of wear when used in a commercial mass production situation. Wear may cause a blank to be improperly cut from the strip or torn from the strip. Also the die component and strip film must be perfectly
15 aligned in order to ensure accurate punching of the strip to obtain a clean label blank. Furthermore, a substantial portion of the strip film material, not forming a part of the cut blank, becomes waste and is often discarded.

20 Additionally, each labelling device disclosed is label shape specific and requires a new die component to be installed where the shape of a new label differs from the shape of a previous label cut by the die component. Thus, each labelling device
25 disclosed requires a number of different die components. This involves a greater capital cost in purchasing or using and maintaining labelling devices.

An object of the present invention is to alleviate problems associated with prior art devices.

30 A further object of the present invention is to provide a method of cutting a label blank from a strip film without regard to the shape and orientation of label imprinted on the strip film.

A still further object of the present
35 invention is to provide a method which reduces waste strip material and material used in a moulding

operation.

5 A still further object of the present invention is to provide a moulding method which alleviates the need for label shape specific die components and thus alleviates capital costs and excessive wear associated with die components.

10 A still further object of the present invention is to provide a moulding method for applying a label in which a cut strip film including a label and excess film juxtaposed the label can be incorporated into a moulded article, thus reducing the amount of other material fed from the moulding apparatus required to be used to mould the article.

15 According to this invention in one aspect, there is provided a method of placing a label in a mould prior to forming a moulded article, including the steps of

providing sheet material having at least one label thereon,

20 severing a portion of the sheet material in order to separate from the sheet material a label and excess sheet material characterized in that,

25 the portion of the sheet material cut is not separated into a label portion and excess portion and the cut portion^{is} placed into the mould for incorporation into the moulded article.

30 According to the invention in another aspect there is provided a process of injection moulding adapted to reduce waste material, including the steps of

providing sheet material having at least one label thereon,

35 severing a portion of the sheet material in order to separate from the sheet material a label and waste material,

placing the label in the mould prior to

injection moulding an article characterized in that,
in the step of severing the portion, the
portion of sheet material is not separated into a label
and waste material, and the severed portion is placed
5 in the mould prior to injection moulding of the
article.

A preferred embodiment of the present
invention will now be described with reference to the
accompanying drawings, wherein:

10 the figure shows an in-mould label applicator
in accordance with the present invention, wherein the
cutting means is a heated wire.

The present invention serves to simplify the
process step of cutting the strip film or sheet
15 material upon which the label is printed. By cutting
the strip film in a manner which is not specific to the
shape of the printed label, shape specific dye
components are not needed. Furthermore, the cut strip
film will include excess strip film, upon which no
20 label printing appears, and which is fed into the
moulding apparatus together with the printed label.
This use of the excess film in the moulding or
formation of the moulded articles serves to alleviate
the problem of disposing of waste strip film and serves
25 to reduce the amount of additional material required to
be used in forming the

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moulded article.

One embodiment of a label applicator 2 is shown in the figure. The applicator 2 is positioned above an injection moulding apparatus 1. The label applicator 2 is equally adapted for use with blow moulding or other moulding apparatus such as compression moulding apparatus in which a label may form a part of an article moulded by the moulding apparatus. Furthermore, the embodiment shown is only one of several possible embodiments as would be clear to a skilled person in applying the present invention.

The applicator 2 has mounted thereon a roll of strip film 4. The film may be foil, paper, cardboard, or various plastics, or a plastic composite, including flimsy and/or barrier layer plastic film. In the embodiment described, the strip film 4a is elongate and is fed by feeder means 5 to the cutting means 7. In the embodiment described the strip film can be made of polyethylene, polypropylene, polyester, or any other plastic material including a multilayer laminate plastic material.

Printed matter, in the form of a separate label, may be adhered onto the strip film 4a for incorporation with an article moulded by the moulding apparatus 1. This serves to avoid the need for a separate label to be applied to the article at a later time.

The cutter means 7 can be adjusted longitudinally of the strip film 4a in order to cut a portion 9 of the strip film 4a of any desired length. The cutter may also be adjusted to cut the strip film in any manner in accordance with the size of label and amount of excess needed to be incorporated into the moulded article. Advantageously, the width of the strip film is selected at the time of printing the labels in order to reduce waste (excess film). In the

embodiment shown, for a plastic strip film, the cutting means 7 may comprise a source of heat, such as a heated wire powered by a power source 11 or a laser. The heated wire is moved toward the strip film 4a at a predetermined time and

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when the heat source contacts the strip film 4a, the film is cut or severed along cutting edge 12. The heat source can then be retracted to a standby position.

5 A cutter comprising a heat source is well suited for plastic strip film, however, a guillotine or scissor-like device (not shown) is equally adapted to cut plastic strip film as well as foil, paper, cardboard or other types of strip film equally adapted to be used in the present invention.

10 The cutting means cuts a portion 9 of strip film, where the portion 9 includes printing in the form of a label 6 thereon and excess strip film 10. In prior art devices, this excess strip film is waste, or must be reprocessed. However, in the present invention, the excess 10 forms a
15 part of the article to be moulded in the moulding apparatus 1. The excess 10 can be compatible with the material injected into the mould to form the article. In this way, the portion 9 is incorporated or becomes a part of the moulded article. Thus a saving of injected material fed
20 from the injection moulding apparatus is realised by using what was previously waste material in the moulded article. Furthermore, accurate die cutting or stamping of the label 6 from the strip film 4a is not needed and savings are possible in the capital cost of not purchasing die equipment
25 and in the reduction of "down-time" due to the more reliable nature of the present invention compared to a high wearing die component.

A transfer means 8 removes the portion 9 from the cutting means of label applicator 2 by means of
30 electostatics and/or suction and places the portion 9 in a mould 3 of the moulding apparatus 1. In the moulding apparatus shown, one half of the mould is slidably mounted, allowing for closure of the mould after the portion 9 is placed in the mould. Injection, compression or blow
35 moulding can then take place to incorporate the portion 9 (and thus label 6) into a moulded article (not shown).

Although the embodiment disclosed relates

particularly to plastics moulding, alternative embodiments are encompassed herein, where such alternatives are known to those skilled in the art and must be utilised to perform the present invention with a strip film of other than plastic material.

In essence, the present invention provides for cutting or separation of a strip film having labels thereon into portions. The portions include the labels and excess strip material. This obviates the need to cut out the labels individually and accurately from the strip film. The excess strip film which was previously waste material is used in the moulded article, and thus allows for a reduction in the amount of injectable material needed to mould the article. There is also a saving in time, energy and cost of reprocessing or recycling material which, in prior art configurations, is regarded as waste in the moulding operation.

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CLAIMS

1. A method of placing a label in a mould prior to forming a moulded article, including the steps of providing sheet material having at least one
5 label thereon,
severing a portion of the sheet material in order to separate from the sheet material a label and excess sheet material characterized in that,
the portion of the sheet material cut is not
10 separated into a label portion and excess portion and the cut portion^{is} placed into the mould for incorporation into the moulded article.
2. A method as claimed in claim 1, characterized in that the sheet material is substantially of plastics
15 material.
3. A method as claimed in claims 1 to 2, characterized in that the portion of sheet material cut is substantially non-specific in relation to the label.
4. A method characterized as claimed in claim 1,
20 substantially as herein described.
5. A method as claimed in any one of claims 1 to 4, used in injection moulding of a moulded article.
6. A process of injection moulding adapted to reduce waste material, including the steps of
25 providing a sheet material having at least one label thereon,
severing a portion of the sheet material in order to separate from the sheet material a label and excess material,
30 placing the label in the mould prior to injection moulding an article characterized in that,
in the step of severing the portion, the portion of sheet material is not separated into a label and waste material, and the severed portion is placed
35 in the mould prior to injection moulding of the article.