A package for pre-prepared food comprises a plastics tray (1) for containing a pre-prepared food product (3). The tray (1) is sealed by a transparent plastics membrane (2). A plastics sleeve (5) encloses the tray (1). The plastics sleeve (5) covers the plastics membrane (2) substantially completely in the assembled package. A method for packaging pre-prepared food comprises: providing a plastics tray (1) for containing a pre-prepared food product (3), the tray being sealed by a transparent plastics membrane (2); forming a plastics sleeve (5) about a mandrel (8); removing the plastics sleeve (5) from the mandrel (8); and sliding the plastics sleeve (5) onto the sealed plastics tray (1). The package is more recyclable and less expensive than known equivalent packaging.
PACKAGE WITH TRAY AND SLEEVE AND METHOD FOR PACKAGING A PRODUCT

FIELD OF THE INVENTION

[0001] This invention relates to a packaging system and in particular to a package for pre-prepared food and to a method of packaging prepared food.

BACKGROUND TO THE INVENTION

[0002] It is known from the prior art for prepared meals ("ready meals") to be packaged in a plastics tray with a covering membrane of transparent plastics. The covering membrane is sealed to the plastics tray, for example with an adhesive. The sealed tray is generally enclosed in a cardboard sleeve on which the details of the contents and instructions for preparation are printed. FIG. 1 depicts such a conventional food tray arrangement comprising a conventional food tray 1 made from an appropriate plastics material, which after filling with product 3 is covered and sealed with a suitable plastic film 2. A cardboard outer cover 4 is slid over the sealed tray to provide the outer covering.

[0003] There are a number of problems with such packaging arrangements. Firstly, as the overall package is made up of at least two different materials, the recycling of the packaging is relatively complicated.

[0004] Secondly, it is desirable for the customer to be able to see the product they are buying through the transparent membrane and customers will often slide aside the cardboard sleeve to view the product. While the cardboard outer sleeve could be provided with a window, or an aperture could be cut in the sleeve to provide viewing of the contents, this adds to the cost of production. The cardboard outer is itself relatively expensive and it is an expensive process by which it is fitted to the food tray, usually involving manual labour. Printing of product specific data such as date and batch number is typically carried out before the cardboard sleeve is brought to the food tray for fitting, which can result in errors and wastage.

[0005] Finally, the cardboard outer is easily removed in the supermarket or any store, and the enclosed plastic tray with its transparent cover can be inserted into the cardboard outer of a lower cost product which has the same physical dimensions, in order to defraud the retailer. If this is not noticed at the checkout, a lower price will be paid than the product should command. There is also the risk that important food allergy information that appears on the cardboard sleeve may not be available to the customer if the cardboard sleeve is removed or substituted, which could be potentially life-threatening.

[0006] The present invention at least in its presently preferred embodiments seeks to address at least some of these problems.

SUMMARY OF THE INVENTION

[0007] Viewed from a first aspect, the invention provides a package for a product, such as pre-prepared food. The package comprises a plastics tray for containing the product. The tray is sealed by a transparent plastics membrane. A plastics sleeve encloses the tray. The plastics sleeve covers the plastics membrane substantially completely in the assembled package.

[0008] The package according to the invention has the advantage that it can be made less expensive, more recyclable and with enhanced visibility of the contained product than for existing packaging.

[0009] The product to be packaged may be a pre-prepared food product, such as a "ready meal". However, the packaging of the invention may be applied to a wide range of products, including cosmetics or paint, for example.

[0010] The plastics sleeve may be, at least partially, transparent. In this way, the plastics sleeve can allow the customer to view the content of the package, for example through a window defined in the sleeve. The plastics sleeve may be printed. Typically, the printing on the plastics sleeve will obscure some of the product that would otherwise be visible through the transparent membrane.

[0011] Typically, the plastics sleeve is formed as a loop of plastics film material joined at its two ends. The amount of the overlap between the two ends may be selected according to the desired characteristics of the package.

[0012] Conveniently, the ends of the loop of plastics sheet material may be ultrasonically bonded together. Alternatively, other bonding methods may be used, such as adhesive bonding or heat sealing. However, ultrasonic bonding is preferred as it is quick and has only a minimal effect on the appearance of the film.

[0013] Typically, the tray may be generally rectangular in plan, but this is not intended to be restrictive. For example, the tray may be circular, hemispherical or generally bowl-shaped. In the presently preferred embodiment, the tray is of plastics material, as this facilitates recyclability. However, the tray may be formed of other material, such as metal foil, molded paper pulp or cardboard.

[0014] Viewed from a further aspect, the invention provides a method for packaging a product, such as pre-prepared food. The method comprises:

[0015] providing a tray for containing the product, the tray being sealed by a transparent plastics membrane,

[0016] forming a plastics sleeve about a mandrel,

[0017] removing the plastics sleeve from the mandrel; and

[0018] sliding the plastics sleeve onto the sealed tray.

[0019] Typically, the mandrel will be approximately the same size and shape as the tray in order that the plastics sleeve is a good fit around the tray.

[0020] The step of forming the plastics sleeve about the mandrel may comprise wrapping a film of plastics material around the mandrel and bonding the film material to itself. The bonding step may involve ultrasonic bonding of the film material to itself. Conveniently, the plastics film may be provided on a continuous roll.

[0021] In embodiments of the invention, the step of wrapping the film around the mandrel may include rotating the mandrel relative to the film to wind the film around the mandrel. Conveniently, the plastics sleeve may be held on the mandrel during forming by a vacuum system. Similarly, the plastics sleeve may be removed from the mandrel during forming by a vacuum system.

[0022] Advantageously, removing the plastics sleeve from the mandrel and sliding the plastics sleeve onto the sealed tray may include transferring the plastics sleeve directly from the mandrel to the sealed tray.

[0023] The invention extends to printed plastics film adapted for use in the method of the invention and to a packaging machine configured to carry out the method.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] Embodiments of the invention are further described by way of example only hereinafter with reference to the accompanying drawings, in which:
FIG. 1 is a schematic view of a food tray arrangement according to the prior art;

FIG. 2 is a schematic view of a food tray arrangement according to an embodiment of the invention;

FIG. 3 is a schematic plan view of a packaging line in accordance with the present invention;

FIG. 4 is a schematic representation of a mandrel for use in a method according to the invention;

FIGS. 5, 6 and 7 are schematic representations of the mandrel of FIG. 4 in use; and

FIG. 8 is a schematic representation of the transfer of a plastics sleeve from the mandrel of FIG. 4 to a food tray in accordance with the invention.

DETAILED DESCRIPTION

FIG. 2 depicts a packaging product according to an embodiment of the present invention. The product comprises a food tray 1 made from an appropriate plastics material. The food tray 1 is filled with a food product 3 and covered and sealed with a suitable plastic film 2. A complete loop of a further plastic film 5 with a joint 6 to form the loop is slid over the sealed food tray 1 to provide the outer covering.

The packaging product according to the present invention provides a means by which the packaging for prepared meals and similar products can be constructed from materials which can be recycled together. The outer plastic sleeve 5 is also much cheaper to apply than a cardboard sleeve and can provide sight of the product contents via a window, if a transparent plastics film is used. The security of the overall product is also enhanced because such an outer sleeve 5 is much more difficult to remove and to replace as it collapses and loses its shape when removed from the inner tray 1.

As a feedstock, the process according to an embodiment of the invention uses a supply of plastic trays 1 of the requisite size, complete with contents 3 and sealed with a plastic film 2 in the conventional way. The plastics film 2 may be sealed to the tray by ultrasonic welding.

FIG. 3 depicts the overall machine arrangement according to an embodiment of the present invention. In FIG. 3 a conveyor arrangement 7 brings filled sealed food trays 1 in readiness for the outer sleeve 5 to be applied. The food tray 1 which is ready for the outer sleeve 5 to be applied is maneuvered into position opposite a mandrel 8 on which the continuous printed film 9 is wound to form a complete loop. After jointing, the loop which forms the outer sleeve 5 is slid onto the waiting food tray 1, which is then maneuvered to the exit conveyor 10 to join food trays which have already had the outer sleeve 5 applied. Printing, date stamping and data logging can occur at this point prior to the completed product being taken away for bulk packing and distribution. The application of product specific data by printing at this point removes the possibility of incorrect marking, and reduces waste. However, the bulk of branding and generic product information will have been pre-printed on the continuous film material which is supplied to the mandrel 8.

FIG. 4 depicts the mandrel 8 which has appropriate dimensions for the food tray 1 to be covered, and is mounted on a rotational shaft 11. The mandrel 8 is secured to the shaft 11 at one end, so that the mandrel 8 can rotate about the axis of the shaft 11, which is generally aligned with the longer dimension of the plastic tray 1 (where the plastic tray is rectangular). A plastic tray 1, filled with product and sealed, is aligned with the axis of rotation of the mandrel 8.

A plastics film 9, printed to suit the packaging requirements for the product is fed in continuous form in a direction perpendicular to the rotation shaft. A retaining mechanism 12, 13 is provided such that the leading edge of the film 9 can be secured to the mandrel 8. The continuous film 9 may be similar or even identical to the film 2 which is used to cover and seal the tray 1. In the presently preferred example, the plastics film 9 is 48 micron clear oriented polypropylene (OPP) film. However, the thickness may range from 20 to 100 microns.

FIG. 5 shows the mandrel 8 onto which the continuous film 9 is fed. The film 9 is retained in place by a vacuum system 12 which applies a partial vacuum along the length of the leading edge of the film 9 by way of a number of apertures 13 such that the film is retained in position while the mandrel 8 is rotated by the rotational shaft 11 so that a complete loop of film is formed around the mandrel 8.

The mandrel 8 is rotated about its axis of rotation, such as to completely wrap the mandrel 8 in the film 9. The film 9 is marked with an indexing point which is typically identified by optical means. The indexing point ensures that when the film 9 is wrapped around the mandrel 8, the printing on the film and any viewing window are correctly located relative to their final position on the tray 1. In this way, when the film is transferred to the food containing tray 1 from the mandrel 8, the printing and window are correctly positioned for illustrating the product and viewing the contents 3.

FIG. 6 shows the mandrel 8 with a complete turn of film 9 around it. The base plate 14 of an ultrasonic horn 15 is fitted to the mandrel 8 so that it is inside the loop of film 5. The ultrasonic horn 15 is moved to make contact with the loop of film 5 and by the application of ultrasonic energy a joint is formed in the film so that it becomes a permanent continuous loop. At the same time a cutter blade 16 cuts the film at the feed point so that the continuous loop remains on the mandrel 8. Thus, the ultrasonic horn 15 moves up to the film 9 which is resting on a base plate 14. The ultrasonic horn 15 and the base plate 14 coming together forms an ultrasonic weld 6 so that the film forms a complete loop 5. As the horn 15 is withdrawn, the blade 16 cuts the film 9 so that a complete bonded turn of film 5 is left on the mandrel and the surplus film is withdrawn ready for the next time that it is required. The film clamping mechanism 12, 13 is then released.

FIG. 7 depicts a vacuum arrangement 17 whereby a partial vacuum is applied through a series of apertures 18 to the top and the two side leading edges of the film loop 5, which is in a continuous loop around the mandrel 8. The set of vacuum devices 17 is presented to the film wrapping of the mandrel 8 along the upper and two sides, at the end of the mandrel furthest from the rotation shaft 11, and nearest to the tray 1 filled with product. Mandrel 8 is aligned in the same orientation as the food tray 1. The arm 17 positions itself over the mandrel 8 and collects the sleeve 5. Application of a partial vacuum pulls the film 5 clear of the surfaces of the mandrel 8 such that when the vacuum device 17 is moved in the direction of the food tray 1, the film 5 slides along the mandrel 8 and on to the food tray 1, in such a manner that the food tray 1 is enclosed, and the orientation of the film loop 5 on the tray is maintained.

FIG. 8 depicts the continuous loop of film 5 sliding from the mandrel 8 on to the food tray 1 to complete the product.

In summary, a package for pre-prepared food comprises a plastics tray 1 for containing a pre-prepared food
product 3. The tray 1 is sealed by a transparent plastics membrane 2. A plastics sleeve 5 enclones the tray 1. The plastics sleeve 5 covers the plastics membrane 2; forming a plastics sleeve 5 about a mandrel 8; removing the plastics sleeve 5 from the mandrel 8; and sliding the plastics sleeve 5 onto the sealed plastics tray 1.

[0043] A method for packaging pre-prepared food comprises: providing a plastics tray 1 for containing a pre-prepared food product 3, the tray being sealed by a transparent plastics membrane 2; forming a plastics sleeve 5 about a mandrel 8; removing the plastics sleeve 5 from the mandrel 8; and sliding the plastics sleeve 5 onto the sealed plastics tray 1.

[0044] The package is more recyclable and less expensive than know equivalent packaging.

[0045] Throughout the description and claims of this specification, the words “comprise” and “contain” and variations of them mean “including but not limited to”, and they are not intended to (and do not) exclude other components, integers or steps. Throughout the description and claims of this specification, the singular encompasses the plural unless the context otherwise requires. In particular, where the indefinite article is used, the specification is to be understood as contemplating plurality as well as singularity, unless the context requires otherwise.

[0046] Features, integers or characteristics described in conjunction with a particular aspect, embodiment or example of the invention are to be understood to be applicable to any other aspect, embodiment or example described herein unless incompatible therewith. All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive. The invention is not restricted to the details of any foregoing embodiments. The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

1-14. (canceled)

15. A method for packaging a product, the method comprising:

providing a tray containing the product, the tray being sealed by a transparent plastics membrane, forming a plastics sleeve about a mandrel, removing the plastics sleeve from the mandrel; and sliding the plastics sleeve onto the sealed tray.

16. A method as claimed in claim 15, wherein the step of forming the plastic sleeve about the mandrel comprises wrapping a film of plastics material around the mandrel and bonding the film material to itself.

17. A method as claimed in claim 16, wherein the bonding step involves ultrasonic bonding of the film material to itself.

18. A method as claimed in claim 16, wherein the plastics film is provided on a continuous roll.

19. A method as claimed in claim 16, wherein the step of wrapping the film around the mandrel includes rotating the mandrel relative to the film to wind the film around the mandrel.

20. A method as claimed in claim 15, wherein the plastics sleeve is formed around the mandrel during forming by a vacuum system.

21. A method as claimed in claim 15, wherein the plastics sleeve is removed from the mandrel during forming by a vacuum system.

22. A method as claimed in claim 15, wherein removing the plastics sleeve from the mandrel and sliding the plastics sleeve onto the sealed tray includes transferring the plastics sleeve directly from the mandrel to the sealed tray.

23. A packaging machine for packaging a product, the machine comprising a mandrel and being configured to carry out the following method steps:

providing a tray containing the product, the tray being sealed by a transparent plastics membrane, forming a plastics sleeve about the mandrel, removing the plastics sleeve from the mandrel; and sliding the plastics sleeve onto the sealed tray.

24. A machine as claimed in claim 23, wherein the step of forming the plastics sleeve about the mandrel comprises wrapping a film of plastics material around the mandrel and bonding the film material to itself.

25. A machine as claimed in claim 24, wherein the bonding step involves ultrasonic bonding of the film material to itself.

26. A machine as claimed in claim 24, wherein the plastics film is provided on a continuous roll.

27. A machine as claimed in claim 24, wherein the step of wrapping the film around the mandrel includes rotating the mandrel relative to the film to wind the film around the mandrel.

28. A machine as claimed in claim 23, wherein the plastics sleeve is held on the mandrel during forming by a vacuum system.

29. A machine as claimed in claim 23, wherein the plastics sleeve is removed from the mandrel during forming by a vacuum system.

30. A machine as claimed in claim 23, wherein removing the plastics sleeve from the mandrel and sliding the plastics sleeve onto the sealed tray includes transferring the plastics sleeve directly from the mandrel to the sealed tray.

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