

"DEVICE FOR PACKAGING PRODUCTS IN CONTAINERS SEALED WITH
STRETCHABLE PLASTIC FILM"

This invention refers to a device for packaging products housed on a support with plastic film. Supports suitable for this type of packaging are the polystyrene trays sealed with transparent film, commonly used for packaging fruit, vegetables or other products. However, other types of supports are also utilizable, such as for example flat supports made of cardboard or other materials.

In the case of products which do not protrude from the container compartment, the container can be efficiently sealed quite easily with a relatively rigid and non stretchable film, or sheet, secured to the edge of the compartment by various techniques, for example by sealing or rolling along the edge itself. Rigid film is easily handled for sealing over the tray.

On the contrary, whenever the products, due to their shape and size, protrude from the tray or in the case of products on a flat support, it is not possible to use a rigid sheet to seal the container. In this case it is necessary to use a very fine and consequently more difficult to handle stretchable film, which is tightly wrapped around the tray so as to cover the product to be packaged and peripherally have flaps folded underneath the tray, closely adhering. The folding of the flaps can be carried out either manually or mechanically.

It is obvious that, to ensure that the package is

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efficiently sealed, it is necessary to keep the peripheral flaps of the film quite long, resulting in an evident waste of material. Moreover, the integrity of the package cannot be guaranteed over time with absolute certainty; in fact, the adhesion of the film to the tray may diminish or the package may be inopportunately opened and then resealed. The general scope of this invention is to obviate the above-mentioned problems by providing a device for packaging products in containers sealed with tightly stretched extensible plastic film, which makes it possible for the containers to remain sealed over time and to save a considerable quantity of film.

This scope is achieved according to the invention by providing a device for packaging products with plastic film on a base supporting the product, comprising means for housing a support in a position to receive the film, means for gripping and applying the film on the support and means for sealing the film over the support, characterized by the fact of comprising a movable stretching frame to press the film, made of extensible material, against the outer edge of the support to stretch the film over the product on the support.

The innovative principles of this invention and its advantages with respect to the known technique will be more clearly evident from the following description of a possible exemplificative embodiment applying such principles, with reference to the accompanying drawings, in which:

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- Fig. 1 shows a partially cutaway front view of a packaging device according to the invention.

- Fig. 2 shows an enlarged detail, viewed along the line II-II of Fig. 1, of the device according to the invention during a first phase of the packaging operation.

- Fig. 3 shows a view similar to that of Fig. 2, during the subsequent phase of the packaging operation.

- Fig. 4 shows a view similar to that of Fig. 3, during a further phase of the packaging operation.

- Fig. 5 shows a view similar to that of Fig. 4, referring to a variation in the embodiment of the device according to the invention.

- Fig. 6 shows a schematic view of a different embodiment of the film gripping loop.

With reference to Fig. 1, a device 10 for packaging products 11 contained in a compartment of a container 12, for example a normal polystyrene tray comprises a frame 13 secured to a bedplate 14. Sliding along the bedplate on runners 15 (visible in Fig. 2) is a saddle 16 to support the container 12.

The saddle 16 is fastened, by means of an arm 17, to a drive cable or belt 18 running in a closed loop around a plurality of pulleys 19 disposed on a substantially vertical plane inside the frame 13.

Disposed along the path of the saddle 16, defined by the runners 15, are detents 20, 21 for positioning the saddle in respective operating positions, which will be described further on. The saddle can be movable between these two

positions by manual operation, by means of an appropriate handle 22; in this case, the belt 18 and the pulleys 19 are idle, and made to move by the saddle itself.

Alternatively, the saddle can be driven by the belt, by

5 providing a suitable motor drive (not shown) in correspondence with one of the pulleys.

The device 10 also comprises a sealing head 23 (shown only schematically in Fig. 1), which will be described in detail further on, with reference to figures 2, 3 and 4.

10 The sealing head is borne on a carriage 24 sliding in a horizontal plane along runners 25 disposed in the upper part of the frame 13. Like the saddle 16, the carriage 24 is fastened to the belt 18 by means of an arm 26.

Advantageously, the carriage 24 is connected to a leg of
15 the belt 18 movable in the opposite direction to the leg of the belt to which the container-bearing saddle 16 is fastened. In this way, the carriage 24 and saddle 16 can be operated synchronously with a reciprocal approach/drawing apart motion.

20 The sealing head 23 is movable vertically with respect to the carriage 24 by means of a known kinematic drive mechanism, for example a coupling between a rack 27 and a motor-driven pinion 28.

The packaging device 10 also comprises a feed unit for the
25 plastic film 29, composed of a rotatable support 30 for a reel 31 of extensible film and a surface 32 for resting the leading end of the film being unwound from the reel. Advantageously disposed at the end of the surface 32 is a

blade 33 for cutting the portion of film 29 necessary for packaging a container.

As can be clearly seen in figures 2, 3, 4, the sealing head 23 comprises an upper plate 34 integral with the rack

5 27, which is connected to an intermediate plate 35 along runners 36, secured to said intermediate plate. Disposed along the runners 36 are counter springs 37, so as to maintain the two plates in the rest position as far apart from each other as possible. The intermediate plate 35, 10 by means of respective spacers 38, 39, rigidly supports a frame or loop 40 for gripping and stretching the film 29 and a sealing frame or loop 41, containing an appropriate heating element, and also slidably supports, along runners 42, a stretching pressing loop or frame 43.

15 Disposed along the runners 42 are further counter springs to maintain the pressing loop at rest as far away from the plate 35 as possible.

It should be noted that, in order to achieve a correct sealing of the film on the container, the loops 41 and 43, 20 and preferably also the gripping loop 40, are made in such a way as to follow the edge of the compartment containing the product to be packaged.

As will be clear further on, the pressing frame is shaped so as to press the taut film against the container in a 25 more internal position with respect to the sealing frame.

The film gripping and stretching frame, on the contrary, is disposed outside the sealing frame.

A brief description will now be given of the operating

cycle of the packaging device according to the invention.
The saddle 16 is shifted to the stroke end against the
detent 20 (position represented by the broken line in Fig.
1), where it is loaded with a container 12 with the

5 product 11 to be packaged. Simultaneously, thanks to the
interconnection between the saddle 16 and the carriage 24
by means of the belt 18, the carriage 24 is pushed into
position overlying the surface 32 supporting the film 29,
(position also represented by the broken line in Fig. 1).
10 Here the carriage operates a microswitch 45 which controls
the lowering of the sealing head 23 by the rack-pinion
coupling.

The head 23 descends towards the surface 32 until the film
29 can be gripped by the gripping loop 40.

15 Advantageously, the film can be gripped by cohesion or by
electrostatic adhesion, by providing the gripping loop 40
with a suitable surface 46. The head then returns to the
raised position.

At this point, the saddle 16 can be guided towards the
20 other stroke end 21, arranging itself in a suitable
position to seal the container 12 with the film 29.

Simultaneously the carriage 24, pulling the film with it,
is shifted by the belt 18 exactly above the container 12
(position shown by the continuous line in Fig.1). Here the
25 carriage 24 operates a second microswitch 47 which
controls the descent of the sealing head 23 towards the
container 12. The head 23 is now in the position
illustrated in Fig.2.

During the first part of the downward stroke of the head 23, the film 29 is cut by the blade 33 in the length required to seal the container 12.

The descent of the frame 40 below the edge of the tray
5 causes the film to be suitably stretched.

Further descent of the head 23 brings the pressing loop 43 into contact with the edges of the container 12, thereby blocking the taut film over the part of the product protruding from the package. This situation is clearly

10 visible in Fig. 3.

At this point, the pressing loop 43 is blocked in its descent by the container 12. Thanks to the mobility of the intermediate surface 35 with respect to the pressing loop 43 along the runners 42, in contrast with the springs 44,
15 said surface 35 continues its downward stroke, together with the sealing loop 41 and the gripping loop 40.

The film is thus arranged adhering to the edge of the container, despite it being stretched and curved over the product.

20 When the sealing loop 41 reaches the container 12, as shown in Fig. 4, the film 29 is sealed onto the edge of the container. It should be noted that the presence of the runners 36, with the springs 37, between the intermediate surface 35 and the upper surface 34 enables the latter to
25 be lowered slightly even further while the film is being sealed, making it possible to exert a substantially uniform sealing pressure around the edge of the container 12.

By using an appropriate timer (not shown in that it is obvious to the expert in the field) it is possible to keep the sealing loop 41 in contact with the edge of the container 12 for a length of time necessary to seal the film completely; after which the head 23 is made to rise. Lastly, the saddle 16 is returned to the stroke end position that it was in at the beginning of the cycle, so as to allow the sealed container to be removed and replaced with one still to be packaged. Simultaneously, the head 23 returns above the surface 32 and, thanks to the operation of the microswitch 45, descends to grip the end of the film again.

Upon completion of the sealing operation, there may remain a fine strip of film around the edge of the container (easily removable by hand or mechanically), corresponding to the distance between the sealing loop 41 and the gripping loop 40. However, it consists of a portion of waste substantially negligible compared to the strip used for the folding required by conventional packaging systems.

Obviously, thanks to the external frame 40 the film is stretched taut even if the product does not protrude from the tray. By adjusting the length of the supports 38 it is also possible to adjust the stretching of the film.

Fig. 5 shows a variation on the embodiment of the sealing head 23, in which the pressing loop and the film gripping and pulling loop are composed of a single loop 48 provided, in correspondence with the lower edge, with a

portion 49 having a cohesive or electrostatic surface for adhesion of the film 29.

This embodiment is particularly advantageous, in that it does away entirely with the problem of scraps of film and makes it possible to simplify the structure of the sealing head 23 by eliminating the loop 40 and relevant supports 38.

It is obvious that the packaging device according to the invention, shown here operating on a tray type container, can also be used with other types of containers, for example, flat supports, with appropriate modifications to the housing 16.

The foregoing description of an embodiment applying the innovative principles of this invention is obviously given by way of example in order to illustrate such innovative principles and should not therefore be understood as a limitation to the sphere of the invention claimed herein. For example, the film gripping and pulling loop can be operated by suction, instead of by cohesion or electrostatic adherence. As shown schematically in Fig. 6, the gripping loop 40, 48 can be internally provided with an annular chamber 50, connected by means of ducts 51 and solenoid valves 52, to a vacuum pump 53. Suction nozzles 54 connect the annular chamber 50 with the lower film gripping surface.

Moreover, the translation of the film and the container can be achieved in a different way to the one shown. For example, translation of the film to the position above the

container to be sealed can be achieved by making the support 32 forming part of the film feed unit horizontally movable. In this case, the sealing head 23 can be fixed in the horizontal plane and simply provided with means for
5 movement in a vertical direction. Likewise, as regards the vertical movement, the head 23 can be made fixed, with the support for the container 12 vertically movable.

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CLAIMS

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1. Device for packaging products (11) with plastic film (29) on the base of a support (12) for the product (11) comprising means (16) housing a support (12) in a position to receive the film (29), means (23) for gripping and
5 applying the film (29) on the support (12) and means (41) for sealing the film on the support, characterized by the fact of comprising a movable stretching frame (40, 43, 48) for pressing the plastic film, made of stretchable material, against the outer edge of the support (12) in
10 order to stretch the film over the product on the support (12).

2. Device as claimed in claim 1, characterized in that the means (23, 41) for applying and sealing the film (29) and the stretching frame (40, 43, 48) are vertically movable
15 on the position for receiving the film (29) by the support (12).

3. Device as claimed in claim 1, characterized in that the stretching frame (40, 43, 48) imprisons the film between itself and the edge of the compartment.

20 4. Device as claimed in claim 1, characterized in that the means (23, 41) for gripping, applying and sealing the film (29) and the stretching frame (40, 43, 48) consist of concentric elements with a substantially annular lower edge to follow the contours of the support, the innermost
25 element (43) constituting the film pressing frame.

5. Device as claimed in claim 4, characterized in that the





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sealing element (41) is disposed between the pressing element (43) and a gripping element (40).

6. Device as claimed in claim 4, characterized in that the element (43) constituting the film pressing frame (29) is
5 elastically movable in a vertical direction with respect to the elements constituting the means for gripping (40) and sealing (41) the film (29), which in turn are elastically movable in a vertical direction with respect to a support (34) which is vertically movable with respect
10 to the support (12) supporting the product to be packaged.

7. Device as claimed in claim 4, characterized in that the elements for gripping and stretching the film (29) consist of a single loop (48) elastically movable in a vertical
direction with respect to the sealing element (41), which
15 in turn is elastically movable in a vertical direction with respect to a support (34) which is vertically movable with respect to the support (12) supporting the product to be packaged.

8. Device as claimed in claims 6 and 7, characterized in
20 that it comprises springs (37, 44) inserted along respective runners (36, 42) for said elastic movability of the parts.

9. Device as claimed in claim 4, characterized in that the loops (40, 48) for gripping the film (29) are provided
25 with a portion (46, 49) having a cohesive surface for adhesion of the film.

10. Device as claimed in claim 4, characterized in that the loops (40, 48) for gripping the film (29) are provided



with a vacuum chamber (50) with suction nozzles (54) for gripping the film.

11. Device as claimed in claim 10, characterized in that the vacuum chamber (50) is connected to a vacuum pump
5 (53).

12. Device as claimed in claim 1, characterized in that the elements constituting means (23, 41) for gripping, applying and sealing the film (29) and the stretching frame (40, 43) are supported in a head (23) which is
10 vertically movable to bring it close to the support for the product to be packaged.

13. Device as claimed in claim 12, characterized in that the head (23) is movable horizontally between a first position in which it grips the film (29) from a film feed
15 unit (31, 32) and a second position in which it attaches the film onto the support (12) of the product to be packaged.

14. Device as claimed in claim 1, characterized in that the means housing the support (12) consist of a saddle
20 (16) movable in a horizontal plane between a first position for loading a support to be packaged and unloading a packaged support and a second position for receiving the film (29).

15. Device as claimed in claims 13 and 14, characterized
25 in that the saddle (16) and the head (23) are movable in synchronism between the respective first and second operating positions.

16. Device as claimed in claim 15, characterized in that



the saddle (16) and the head (23) are secured to a belt-driven pulling means (18), in correspondence with legs of the belt movable in opposite directions to each other in order to achieve a reciprocal approach/drawing apart movement of the saddle (16) and head (23).

17. Device as claimed in claim 13, characterized in that the head (23) is supported, vertically movable, by a carriage (24) horizontally movable on a plane (25) between two positions corresponding to said first and second position of the head (23).

18. Device as claimed in claim 17, characterized in that the head (23) is vertically movable with respect to the carriage (24) by means of a rack coupling (27, 28).

19. Device as claimed in claim 13, characterized in that the film feed unit comprises a surface (32) for resting a leading portion of the film (29) from a feed reel (31), a blade (33) being disposed at the end of the surface (32) for cutting the portion of film necessary to package a support (12).

20. Device as claimed in claim 17, characterized in that, disposed in correspondence with the stroke end positions of the carriage (24) are microswitches (45, 47) for automatic control by the carriage of the vertical movement of the head (23).

21. Device as claimed in claim 1, characterized in that the support (12) consists of a tray at least partially housing the product (11).

