

PATENT SPECIFICATION (11)

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(54) APPARATUS FOR PACKAGING ARTICLES

(71) I. FRANCESCO TORRE, of Via Bascheris, Dalmine/Bergamo (I), Italy, of Italian nationality, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement: —

This invention relates to packaging apparatus for packaging articles of different kinds by heat-shrinking an envelope of a plastics material onto the article.

The packaging apparatus of the invention is suitable for packaging products and articles of different kinds, such as foodstuffs, books or magazines and the like, within an envelope of a heat-shrunk plastics material.

Apparatus of this kind is well known and usually comprises a conveyor belt passing through a stove arranged downstream of a station for hotwelding plastics film to form the envelope. At this station the plastics film is welded and the welded plastics film envelope containing its article is brought into the stove by the conveyor belt for heat-shrinking the plastics envelope onto the article contained therewithin.

This procedure in two steps, i.e. welding the plastics film and heat-shrinking the plastics envelope onto the article contained therewithin, beside the inherent drawback of involving two separate steps, which steps unduly increase the size and manufacturing cost of the apparatus, involves also the utilisation of stoves, the side walls of which usually are not transparent and accordingly it is impossible to check the heat-shrink operation by visual observation.

An object of the invention is to provide an improved apparatus of the kind set forth.

In accordance with the present invention there is provided apparatus for packaging an article within an envelope of heat-shrinkable plastics film, comprising a housing defining an open-topped welding and shrinking chamber, a hinged lid for closing said chamber, a heating box within said housing and containing electrical air-heating resistance heating elements, means in said chamber for supporting an article between two layers of heat-

shrinkable plastics film, at least one welding blade positioned at the upper edges of the chamber to be engaged by said film layers when said lid is closed, a fan in said chamber arranged to circulate within the chamber air which has been heated in said heating box, and means responsive to movement of said lid to the closed position for energising the at least one welding blade, the resistance elements and the fan simultaneously to weld and heat-shrink said plastics film onto the article.

The lid is preferably transparent to permit the welding and heat-shrinking operations to be monitored visually.

The means responsive to movement of the lid to closed position is preferably a micro-switch.

Suitably a door is provided between the heating box and the chamber and means are provided for opening the door when the lid is closed.

The apparatus preferably also comprises an article-receiving platform arranged at one end of and outside the housing, and means for feeding the plastics film both below the platform and above an article placed on the platform. The platform may be adjustable transversely of the film feeding direction to accommodate articles of different dimensions and film of different widths.

A preferred embodiment of the invention will now be described with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a perspective view of apparatus in accordance with the invention with the lid open,

Figure 2 is a side view partly in section of the apparatus of Figure 1,

Figure 3 is a cross-sectional view through the chamber and lid of the apparatus of Figures 1 and 2,

Figure 4 illustrates the opening of the heating box, and

Figure 5 shows diagrammatically film feeding means.

Referring to the drawings, reference 1 generally indicates apparatus in accordance with the invention, comprising a housing 2

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within which a plurality of devices, such as timers, thermostats, as well as other circuit elements are received which are of conventional construction so that detailed description thereof is not deemed necessary.

The housing 2 defines a welding and shrinking chamber 3 that can be opened and closed by means of a hinged lid 4, preferably made of a transparent material. A fan 5 is mounted within chamber 3, which fan operates to circulate air within chamber 3 during heating.

A heating box 6 is also provided within the housing 2 and contains electrical air-heating resistance elements 8. A hinged door 9 controls communication between the heating box 6 and the chamber 3.

A lever 10 (see Figure 4) is provided to open and close door 9 when the lid 4 is closed and opened respectively, the base 12 of lid 4 acting against said lever.

A plurality of welding blades are arranged on the upper edges of chamber 3, at 13 and 14. A perforated sheet or grate 15 allows air to circulate through it and is positioned as a support surface in the chamber 3.

Means for feeding heat-shrinkable plastics film is arranged at one end of the chamber 3 and comprises a supply reel 16 supported from the housing 2 by a bracket 17. The film on reel 16 is a continuous web folded lengthwise, so that when unrolled two superimposed continuous layers of plastics film are obtained, the layers passing over a roller 18 and then one above and the other below a support surface or platform 19 where the article to be packaged is placed in the position indicated by numeral 20, between platform 19 and the upper layer 21 of film.

Upon leaving platform 19 the article is between the two film layers.

The film is then moved forward together with the article to be packaged onto grate 15 in chamber 3.

Closing of the lid 4 then causes a micro-switch (not shown) to trip and actuate the electric elements of welding blades 13 and 14 and the resistances 8 of heating box 6. Simultaneously also fan 5 will be operated.

As a result, welding blades 13 and 14 will weld the film edges while resistances 8 are heating the air within heating box 6. Simultaneously, hinged door 9 has been opened by the lid edge 12 and hot air leaving box 6 is circulated by fan 5 around onto the package on grate 15 within the chamber 3, causing the film to contract onto the article, in a very quick and uniform manner, since, due to the swirling movement of the air flow, all sides of said package are uniformly heated.

When, through transparent lid 14, the user has ascertained that the welded film has fully contracted onto the article, he will

raise lid 4, thus causing the micro-switch to trip to the open position and stopping the heating of the resistance elements 8 and welding blades 13, 14.

Moreover also door 9 of box 6 will be closed.

If desired lid 4 can be made of an opaque material and the film contraction can be monitored by a suitable optical device arranged externally of the chamber 3.

Moreover, means can be provided which open and close the lid 4 automatically without any manual operation.

Means can be provided for automatically feeding the plastics film.

Finally it should be noted that the support 19 can be made to slide transversely to accommodate articles of different sizes with plastics film of different widths.

WHAT I CLAIM IS:—

1. Apparatus for packaging an article within an envelope of heat-shrinkable plastics film, comprising a housing defining an open-topped welding and shrinking chamber, a hinged lid for closing said chamber, a heating box within said housing and containing electrical air-heating resistance heating elements, means in said chamber for supporting an article between two layers of heat-shrinkable plastics film, at least one welding blade positioned at the upper edges of the chamber to be engaged by said film layers when said lid is closed, a fan in said chamber arranged to circulate within the chamber, air which has been heated in said heating box, and means responsive to movement of said lid to the closed position for energizing the at least one welding blade, the resistance elements and the fan simultaneously to weld and heat-shrink said plastics film onto the article.

2. Apparatus as claimed in Claim 1, wherein said lid is transparent to permit the welding and heat-shrinking operations to be monitored visually.

3. Apparatus as claimed in Claim 1 or Claim 2, wherein the means responsive to movement of the lid to the closed position is a micro-switch.

4. Apparatus as claimed in Claim 3, wherein a door is provided between said heating box and the chamber, and means are provided for opening the door when the lid is closed.

5. Apparatus as claimed in any preceding claim and comprising an article-receiving platform arranged at one end of and outside the housing and means for feeding said plastics film both below the platform and above an article placed on the platform.

6. Apparatus as claimed in Claim 5, in which the platform is adjustable transversely of the film feeding direction.

within which a plurality of devices, such as timers, thermostats, as well as other circuit elements are received which are of conventional construction so that detailed description thereof is not deemed necessary.

The housing 2 defines a welding and shrinking chamber 3 that can be opened and closed by means of a hinged lid 4, preferably made of a transparent material. A fan 5 is mounted within chamber 3, which fan operates to circulate air within chamber 3 during heating.

A heating box 6 is also provided within the housing 2 and contains electrical air-heating resistance elements 8. A hinged door 9 controls communication between the heating box 6 and the chamber 3.

A lever 10 (see Figure 4) is provided to open and close door 9 when the lid 4 is closed and opened respectively, the base 12 of lid 4 acting against said lever.

A plurality of welding blades are arranged on the upper edges of chamber 3, at 13 and 14. A perforated sheet or grate 15 allows air to circulate through it and is positioned as a support surface in the chamber 3.

Means for feeding heat-shrinkable plastics film is arranged at one end of the chamber 3 and comprises a supply reel 16 supported from the housing 2 by a bracket 17. The film on reel 16 is a continuous web folded lengthwise, so that when unrolled two superimposed continuous layers of plastics film are obtained, the layers passing over a roller 18 and then one above and the other below a support surface or platform 19 where the article to be packaged is placed in the position indicated by numeral 20, between platform 19 and the upper layer 21 of film.

Upon leaving platform 19 the article is between the two film layers.

The film is then moved forward together with the article to be packaged onto grate 15 in chamber 3.

Closing of the lid 4 then causes a micro-switch (not shown) to trip and actuate the electric elements of welding blades 13 and 14 and the resistances 8 of heating box 6. Simultaneously also fan 5 will be operated.

As a result, welding blades 13 and 14 will weld the film edges while resistances 8 are heating the air within heating box 6. Simultaneously, hinged door 9 has been opened by the lid edge 12 and hot air leaving box 6 is circulated by fan 5 around onto the package on grate 15 within the chamber 3, causing the film to contract onto the article, in a very quick and uniform manner, since, due to the swirling movement of the air flow, all sides of said package are uniformly heated.

When, through transparent lid 14, the user has ascertained that the welded film has fully contracted onto the article, he will

raise lid 4, thus causing the micro-switch to trip to the open position and stopping the heating of the resistance elements 8 and welding blades 13, 14.

Moreover also door 9 of box 6 will be closed.

If desired lid 4 can be made of an opaque material and the film contraction can be monitored by a suitable optical device arranged externally of the chamber 3.

Moreover, means can be provided which open and close the lid 4 automatically without any manual operation.

Means can be provided for automatically feeding the plastics film.

Finally it should be noted that the support 19 can be made to slide transversely to accommodate articles of different sizes with plastics film of different widths.

WHAT I CLAIM IS:—

1. Apparatus for packaging an article within an envelope of heat-shrinkable plastics film, comprising a housing defining an open-topped welding and shrinking chamber, a hinged lid for closing said chamber, a heating box within said housing and containing electrical air-heating resistance heating elements, means in said chamber for supporting an article between two layers of heat-shrinkable plastics film, at least one welding blade positioned at the upper edges of the chamber to be engaged by said film layers when said lid is closed, a fan in said chamber arranged to circulate within the chamber, air which has been heated in said heating box, and means responsive to movement of said lid to the closed position for energising the at least one welding blade, the resistance elements and the fan simultaneously to weld and heat-shrink said plastics film onto the article.

2. Apparatus as claimed in Claim 1, wherein said lid is transparent to permit the welding and heat-shrinking operations to be monitored visually.

3. Apparatus as claimed in Claim 1 or Claim 2, wherein the means responsive to movement of the lid to the closed position is a micro-switch.

4. Apparatus as claimed in Claim 3, wherein a door is provided between said heating box and the chamber, and means are provided for opening the door when the lid is closed.

5. Apparatus as claimed in any preceding claim and comprising an article-receiving platform arranged at one end of and outside the housing and means for feeding said plastics film both below the platform and above an article placed on the platform.

6. Apparatus as claimed in Claim 5, in which the platform is adjustable transversely of the film feeding direction.



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within which a plurality of devices, such as timers, thermostats, as well as other circuit elements are received which are of conventional construction so that detailed description thereof is not deemed necessary.

5 The housing 2 defines a welding and shrinking chamber 3 that can be opened and closed by means of a hinged lid 4, preferably made of a transparent material. A
10 fan 5 is mounted within chamber 3, which fan operates to circulate air within chamber 3 during heating.

A heating box 6 is also provided within the housing 2 and contains electrical air-heating resistance elements 8. A hinged door 9 controls
15 communication between the heating box 6 and the chamber 3.

A lever 10 (see Figure 4) is provided to open and close door 9 when the lid 4 is closed and opened respectively, the base 12
20 of lid 4 acting against said lever.

A plurality of welding blades are arranged on the upper edges of chamber 3, at 13 and 14. A perforated sheet or grate 15 allows
25 air to circulate through it and is positioned as a support surface in the chamber 3.

Means for feeding heat-shrinkable plastics film is arranged at one end of the chamber 3 and comprises a supply reel 16 supported from the housing 2 by a bracket 17.
30 The film on reel 16 is a continuous web folded lengthwise, so that when unrolled two superimposed continuous layers of plastics film are obtained, the layers passing
35 over a roller 18 and then one above and the other below a support surface or platform 19 where the article to be packaged is placed in the position indicated by numeral 20, between platform 19 and the upper layer 21
40 of film.

Upon leaving platform 19 the article is between the two film layers.

The film is then moved forward together with the article to be packaged onto grate
45 15 in chamber 3.

Closing of the lid 4 then causes a micro-switch (not shown) to trip and actuate the electric elements of welding blades 13 and 14 and the resistances 8 of heating box 6.
50 Simultaneously also fan 5 will be operated.

As a result, welding blades 13 and 14 will weld the film edges while resistances 8 are heating the air within heating box 6. Simultaneously, hinged door 9 has been opened
55 by the lid edge 12 and hot air leaving box 6 is circulated by fan 5 around onto the package on grate 15 within the chamber 3, causing the film to contract onto the article, in a very quick and uniform manner, since,
60 due to the swirling movement of the air flow, all sides of said package are uniformly heated.

When, through transparent lid 14, the user has ascertained that the welded film
65 has fully contracted onto the article, he will

raise lid 4, thus causing the micro-switch to trip to the open position and stopping the heating of the resistance elements 8 and welding blades 13, 14.

Moreover also door 9 of box 6 will be closed. 70

If desired lid 4 can be made of an opaque material and the film contraction can be monitored by a suitable optical device arranged externally of the chamber 3. 75

Moreover, means can be provided which open and close the lid 4 automatically without any manual operation.

Means can be provided for automatically feeding the plastics film. 80

Finally it should be noted that the support 19 can be made to slide transversely to accommodate articles of different sizes with plastics film of different widths. 85

WHAT I CLAIM IS:—

1. Apparatus for packaging an article within an envelope of heat-shrinkable plastics film, comprising a housing defining an open-topped welding and shrinking chamber, a hinged lid for closing said chamber, a heating box within said housing and containing electrical air-heating resistance heating elements, means in said chamber for supporting an article between two layers of heat-shrinkable plastics film, at least one welding blade positioned at the upper edges of the chamber to be engaged by said film layers when said lid is closed, a fan in said chamber arranged to circulate within the chamber, air which has been heated in said heating box, and means responsive to movement of said lid to the closed position for energising the at least one welding blade, the resistance elements and the fan simultaneously to weld and heat-shrink said plastics film onto the article. 90 95 100 105

2. Apparatus as claimed in Claim 1, wherein said lid is transparent to permit the welding and heat-shrinking operations to be monitored visually. 110

3. Apparatus as claimed in Claim 1 or Claim 2, wherein the means responsive to movement of the lid to the closed position is a micro-switch. 115

4. Apparatus as claimed in Claim 3, wherein a door is provided between said heating box and the chamber, and means are provided for opening the door when the lid is closed. 120

5. Apparatus as claimed in any preceding claim and comprising an article-receiving platform arranged at one end of and outside the housing and means for feeding said plastics film both below the platform and above an article placed on the platform. 125

6. Apparatus as claimed in Claim 5, in which the platform is adjustable transversely of the film feeding direction. 130

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7. Apparatus for packaging an article
within a heat-shrinkable plastics film, con-
structed and arranged substantially as herein
described and as shown in the accompany-
5 ing drawings.

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