

Nov. 1, 1949

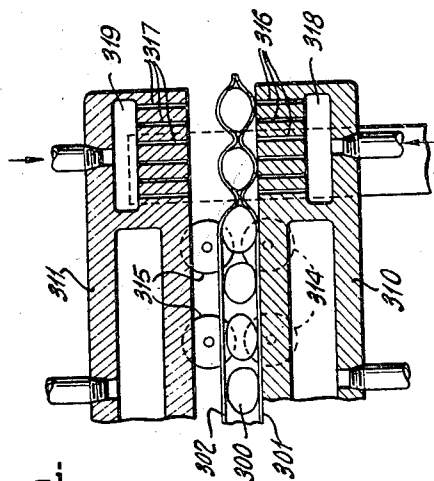
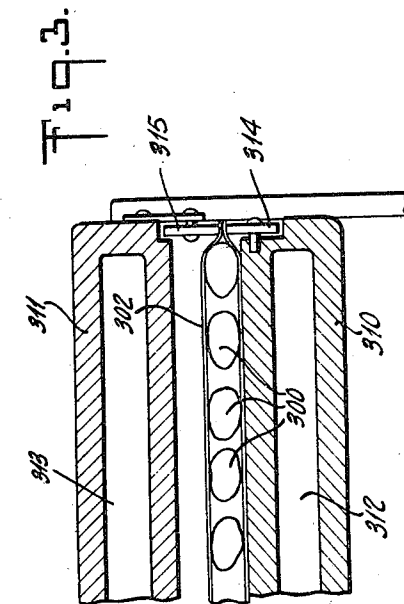
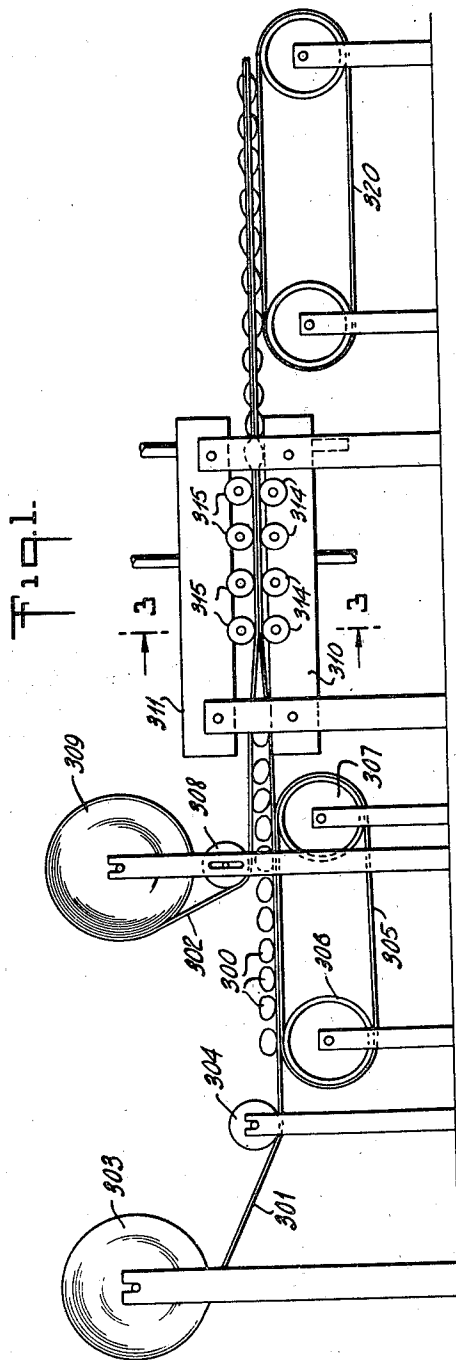
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2,486,759

PACKAGING METHOD AND APPARATUS

Original Filed Feb. 28, 1938

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 4.

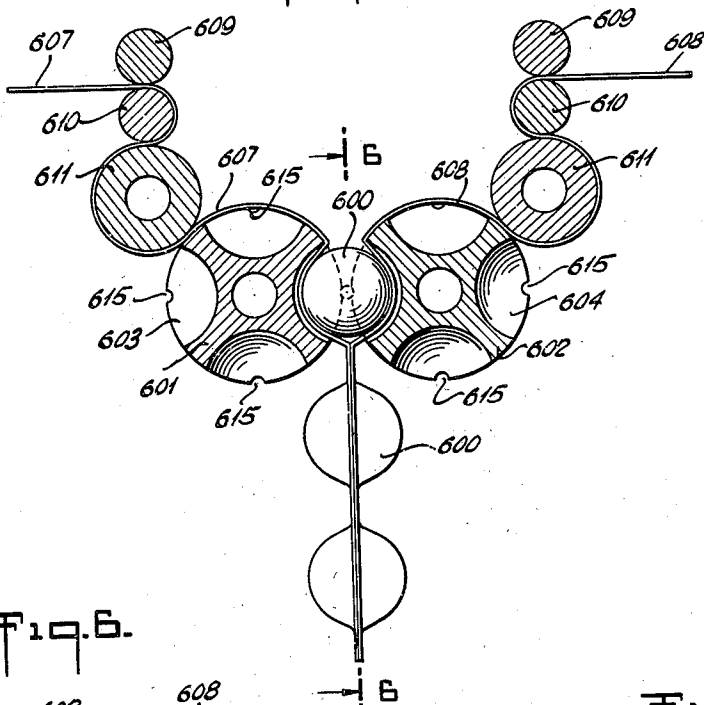


Fig. 6.

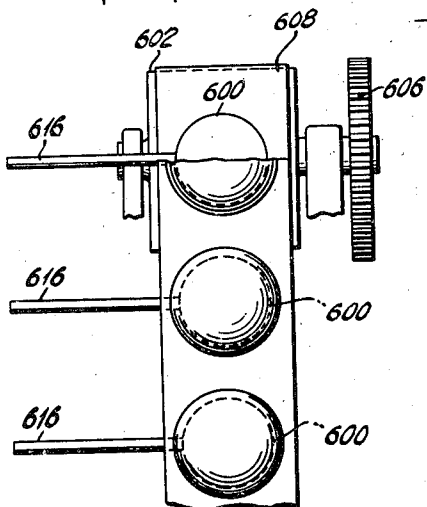
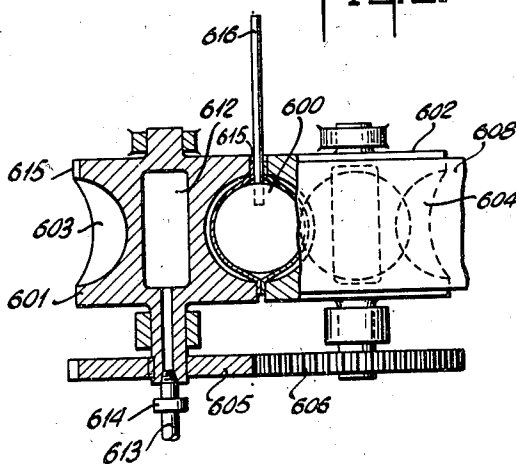


Fig. 5.



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UNITED STATES PATENT OFFICE

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PACKAGING METHOD AND APPARATUS

Fred B. Pfeiffer, Akron, Ohio, assignor of
one-half to Jesse R. CrossanOriginal application February 28, 1938, Serial No.
193,214. Divided and this application April 27,
1946, Serial No. 665,517

19 Claims. (Cl. 18—19)

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This invention relates to methods and apparatus for covering or wrapping objects with sheet materials and to apparatus for practicing such methods.

In wrapping or packaging articles of commerce prior to this invention, it has been customary to employ substantially non-stretchable materials such as paper, fabric, foil, and cellulose film known commercially as "cellophane." Such materials are cut or otherwise provided in blank size and shape of area greater than the surface area of the particular article to be wrapped or covered. Sufficient excess material must always be used to enable the edge portions thereof to be relatively lapped.

As is well known, when non-stretchable wrapping material is used to cover a curved surface, it becomes wrinkled as the necessary crowding of the wrapping material takes place. One example of such wrinkling may be seen in the commercial use of holland cloth or the cellulose film known commercially as "cellophane" to cover the cemented or tacky side of a blow-out patch used as an automobile tire accessory. Another example of the wrapper and also of the excess of wrapping material over the area to be wrapped when non-stretchable material is used to wrap an article with a curved surface is seen in the common use of paper to wrap oranges. With the prior art material, round or irregular-shaped articles could not be wrapped without wrinkling, and all such objects in addition to those having flat sides and geometrical symmetry required an amount of wrapping material considerably in excess of the total surface area of such article or articles. In other words the prior art practices have been objectionable for several reasons and it is the object of the present invention to overcome such objections.

An important feature of the invention in its broad aspect is to provide a novel method and apparatus for wrapping or covering various articles with a minimum of material and with freedom from wrinkles and the like.

More specifically, the invention contemplates the use of a film or sheet of heat-stretchable and heat-sealable material, one type of which is disclosed, for example, in the Calvert Patent No. 1,989,632, such material (a rubber hydrohalide or a rubber hydrochloride film) being manufactured by the Goodyear Tire & Rubber Company of Akron, Ohio, and sold commercially under the name "Pliofilm." This material is characterized by its extreme flexibility and slight stretchability under normal conditions and by its resistance to moisture penetration. I have discovered that I can stretch this material very extensively when it is heated to within certain temperature ranges without injuring or otherwise detracting from either its appearance or its other properties. I

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take advantage of this discovery in practicing my invention by causing the film or sheet, while heated, to conform to the shape and size of article being wrapped, and preferably I stretch or expand the film or sheet very considerably in some instances whereby to effect substantial savings in material as well as to enhance the appearance of the wrapping and to make possible the neat wrapping of any object regardless of its shape. The sheet may be heated over its entire area or over any desired portion of its area dependent upon the requirements of a particular wrapping operation.

By way of example, but without limitation, it is here pointed out that the invention may be employed in the wrapping or covering of fruits, vegetables, confections and other articles. In conjunction with any of the above mentioned or other articles, the film or sheet may be manipulated in various ways as, for example, by stretching or shaping mechanically or by differential fluid pressure. Thus, practice of the invention contemplates the disposition of one or more articles to be wrapped between two sheets or films of the material, and then after heating simultaneously stretching both sheets or films to cause them to follow the shape or shapes of the articles until portions of the opposing sheets meet and fuse together. This may be done with regular shaped bodies such as cigarette packages, razor blades, powder boxes, etc., or with irregular shaped bodies such as potatoes, oranges, sponges, and the like. In either case, the articles may be wrapped individually or in groups, and in the latter case such article will be completely covered and sealed and may be separated from the others in any desired manner.

In the accompanying drawings:

Fig. 1 is a diagrammatic side elevation of a suitable apparatus for practicing the invention according to one method;

Fig. 2 is a fragmentary vertical longitudinal sectional view of the delivery ends of the platens shown in Fig. 1;

Fig. 3 is a fragmentary vertical transverse sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is a transverse sectional view of a suitable apparatus for practicing the invention according to another method;

Fig. 5 is a fragmentary view thereof, partly in horizontal section and partly in elevation; and

Fig. 6 is a view taken approximately on the line 6—6 of Fig. 4.

Referring first to Figs. 1 to 3, the apparatus therein shown is designed for the wrapping or covering of irregular and odd-shaped objects, such as potatoes, although the invention contemplates the wrapping or covering of many other articles of natural growth or of manufacture.

In practicing this form of my invention, pota-

toes 300 are placed between two sheets 301 and 302 of substantial width of covering material such as previously referred to hereinabove as being of the type disclosed in the Calvert Patent No. 1,989,632.

The sheet 301 may be drawn or otherwise fed from a roll 303 or other suitable source, and it is led under a guide roll 304 and onto an endless conveyor belt 305 which runs over pulleys 306 and 307. Either or both of these pulleys may be driven in any suitable manner and at any appropriate speed. As the sheet 301 is carried on the upper reach of the conveyor belt, the potatoes 300 (or other articles being wrapped) are placed upon it either manually or automatically and in relatively spaced sequence. As the motion of the sheet 301 and the potatoes 300 continues, they pass under another guide roll 308 at which place the sheet 302 is laid down on top of the potatoes, said sheet 302 being drawn or otherwise fed from a roll 309 or other suitable source. The so-assembled sheets and potatoes are then passed from the conveyor belt 305 and into a suitable heating and uniting device. While its form may vary, the heating and uniting device shown diagrammatically in the drawings, comprises a lower platen 310 and an upper platen 311, said platens being spaced apart sufficiently to permit ready passage of the materials. Heat may be applied to the platens in any desired manner, as by circulation of hot water through jackets 312 and 313. At their side edges, the platens carry a plurality of sealing rollers 314 and 315 which are so formed and arranged that they cooperate to press the side edges of the sheets 301 and 302 tightly together. Since the sheets have become heated by their passage between the platens, the pressure thus exerted by the rollers 314 and 315 will permanently unite the sheets at said edges.

Adjacent their delivery ends the platens 310 and 311 are formed with a multiplicity of ports 316 and 317 through which blasts of air pass from chambers 318 and 319, which in turn may be supplied with compressed air from any suitable source. These blasts of air impinge against the lower and upper surfaces respectively of the heated sheets 301 and 302 with sufficient force to shape said sheets snugly about or against the individual potatoes, and portions of said sheets coming into contact with each other in the spaces between the potatoes. If desired, the air flowing through the ports 316 and 317 may be heated to further facilitate the union of the sheets 301 and 302 at their various points of mutual contact.

From the foregoing, it will be evident that the potatoes (or other objects to be covered) may be very easily and quickly disposed between two sheets of the desired wrapping material. The operation is continuous, and as it progresses, the sheets are heated sufficiently to soften their surfaces, and eventually said sheets are shaped about the individual articles, sealing each one and leaving them all connected together by merged or fused portions of the sheets. After leaving the delivery ends of the platens, the so-connected materials may be taken away by a conveyor 320, from which they may be removed, separated, inspected, or otherwise handled preparatory to packing and shipping.

Referring now to Figs. 4 to 6, the apparatus therein shown is intended primarily for covering lollipops, but with principles capable of use in similarly covering other specific articles. In this form a pair of cooperating members such as rolls 601 and 602 are mounted for simultaneous rota-

tion in opposite directions. These members have their surfaces formed with cavities 603 and 604 of size and shape corresponding with, but slightly larger than, the confection 600 which is to be covered. The members may be driven in any suitable manner as by gears 605 and 607 and may be journaled in bearings of any desired form. Strips 607 and 608 of rubber hydrochloride film or other selected material are respectively applied to the rolls 601 and 602 in such manner that said strips are brought together and pressed together. The strips 607 and 608 may be slightly narrower than the rolls 601 and 602 but wider than the cavities 603 and 604. At an appropriate point in the operation of the device and before the strips are actually brought together the lollipop 600, or other article being covered, is positioned between the strips either manually or automatically as desired. The arrangement is such that with the progressive rotation of the members 601 and 602 the confection 600 becomes positioned between the strips of covering material in such manner as to register with the opposing cavities 603 and 604. As this occurs the covering material is stretched to conform to the shape of the confection and as the movement continues the edge portions of the strips and the intermediate portions between the successive confections are sealed together by pressure and heat.

In order to supply the strips of the covering material they may be fed from supply rolls or the like through or between feed rolls 609 and 610 to surface heating drums 611 and thence to the rolls 601 and 602. The drums 611 are mounted for rotation preferably in synchronism with the rolls 601 and 602 and may be heated internally by hot water or electric heating elements as may be preferable. The degree of heating is, of course, dependent upon the properties of the selected wrapping material and by way of example it is here noted that "Pliofilm" should be heated to within the range of 120° to 150° F. By having the feed rolls 609 and 610 relatively cool the strips may be drawn from the source of supply without undue or premature stretching. If desired additional heat may be supplied to the rolls 601 and 602 as by circulation of a heating fluid in or through central chambers 612 such fluid being supplied through a tube or pipe 613 fitted with swivel joints 614.

At one edge each of the rolls 601 and 602 is formed notches 615 which extend into the cavities 603 and 604 and provide clearance for the confection handle 616. Obviously as the machine operates the corresponding portions of the covering material are shaped to fit snugly around these handles 616 giving a moistureproof seal and neat appearance.

From the foregoing it will be evident that a multiplicity of articles can easily and quickly be covered by continuous operation of the machine, such articles with their covers emerging from the machine in strip form and capable of being severed individually or in groups.

The invention is susceptible of numerous modifications other than those specifically described and illustrated, and the right is herein reserved to make such changes as fall within the scope of the appended claims without departing from the spirit of the invention.

This application is a true division from application Serial No. 193,214, filed February 28, 1938. Having thus described my invention, what I claim is:

1. A method of wrapping an object, including

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the steps of providing two blanks of heat-stretchable and heat-sealable sheet material, heating the blanks concurrently to impart to them the requisite stretchable and sealable properties, placing the object to be wrapped between said blanks, and pressing the blanks together to seal them around the object while at the same time causing the object by direct contact therewith to stretch the blanks and shape them thereto.

2. A method of wrapping objects, including the steps of providing two strips of heat-stretchable and heat-sealable sheet material, assembling the objects between said strips, heating said strips concurrently to impart to them the requisite stretchable and sealable properties, and forming the strips by simultaneous stretching and sealing into covers about the objects.

3. A method of wrapping objects, including the steps of providing two strips of heat-stretchable and heat-sealable sheet material, assembling the objects between said strips, heating said strips concurrently to impart to them the requisite stretchable and sealable properties, forming the strips by simultaneous stretching and sealing into covers about the objects, and severing the strips between the covered objects to form separate packages.

4. A method of wrapping objects, including the steps of providing two strips of heat-stretchable and heat-sealable sheet material, passing said strips between a succession of cooperating mold cavities, heating the strips concurrently to impart to them the requisite stretchable and sealable properties, placing the objects to be covered one after another between said strips in the regions of the mold cavities, and simultaneously stretching and sealing the strips about the objects by registering the mold cavities.

5. A method of wrapping an object, including the steps of providing two blanks of heat-stretchable and heat-sealable sheet material, supporting said blanks across cooperating cavities, heating the blanks concurrently to impart to them the requisite stretchable and sealable properties, placing the object between the blanks and causing it to stretch and shape the blanks into a complete cover about itself by entering said cavities, and simultaneously sealing said blanks together to unite them about the object.

6. The method of packaging articles in material capable of being softened under heat, consisting in continuously feeding strips of said material in opposed relation to each other, heating said strips to soften them sufficiently to impart to them the requisite stretchable and sealable properties, pressing small areas of longitudinal zones of said strips into contact with each other progressively longitudinally of the strips to form longitudinal seals, pressing said strips together periodically along spaced zones transverse of the strips to form transverse seals, and depositing an article between said strips subsequently to the formation of one transverse seal and prior to the formation of the next following transverse seal to form a chain of hermetically sealed packages each containing an article.

7. The method of packaging articles in material capable of being softened under heat, consisting in feeding sheets of said material in opposed spaced relation to each other, heating said strips to soften them sufficiently to impart to them the requisite stretchable and sealable properties, pressing together said sheets along a zone extending transversely across said sheets to form

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a transverse seal, depositing an article between said sheets above said seal so that the article is held spaced from the seal by contact with the unsealed portions of the sheets, continuing feeding of said sheets with said article between them and pressing together small areas only of said sheets progressively along the longitudinal marginal zones of said sheets in spaced relation to said article to form longitudinal seals and at the same time stretching the other portions of the sheets over the article, and then pressing together said sheets along another zone transverse of said sheets in spaced relation to and at the side of said article opposite the first transverse seal to form a second transverse seal and complete a hermetically sealed package containing said article.

8. A method of wrapping objects, including the steps of providing two strips of heat-stretchable and heat-sealable sheet material, heating said strips to impart to them the requisite stretchable and sealable properties, passing the strips over and between a pair of rollers formed with a series of complementary cavities of a size to accommodate the objects to be wrapped, causing the strips to maintain substantial arcs of contact with the rollers during their rotation whereby to anchor the strips securely around the perimeters of the cavities during the wrapping operation, placing the objects between the strips in position to enter the cavities as the latter come into registration and causing the objects to stretch those areas of the strips bridging said cavities to conform said areas to the objects, and causing the rollers to press the strips together into sealing contact in the areas surrounding the cavities, whereby to form a chain of hermetically sealed packages each containing an object.

9. A method of wrapping objects, including the steps of providing two strips of heat-stretchable and heat-sealable sheet material, feeding said strips longitudinally in spaced relation, placing the objects to be wrapped between the strips in separated condition, heating the strips to impart to them the requisite stretchable and sealable properties, sealing the edges of the strips together as they approach the wrapping station, and forcing the strips together into face to face sealing contact by differential pressure at the wrapping station except in those areas surrounding the objects while at the same time causing said objects to stretch such areas of the strips and conform them thereto.

10. A method of wrapping an object, including the steps of providing two blanks of heat-stretchable and heat-sealable sheet material, heating the blanks concurrently to impart to them the requisite stretchable and sealable properties, placing the object to be wrapped between said blanks, and pressing the blanks together by differential fluid pressure to seal them around the object while at the same time causing the object by direct contact therewith to stretch the blanks and shape them thereto.

11. A method of wrapping objects, including the steps of providing two strips of heat-stretchable and heat-sealable sheet material, supporting said strips a distance apart, feeding the objects between said strips, heating the strips concurrently to impart to them the requisite stretchable and sealable properties, and forming the strips by simultaneous stretching and sealing into covers about the objects by differential fluid pressure.

12. The method of packaging articles in material capable of being softened under heat, consisting in continuously feeding strips of said material in opposed relation to each other, pressing small areas of longitudinal zones of said strips into contact with each other progressively longitudinally of the strips, pressing said strips together periodically along spaced zones transverse of the strips, heating the contacting portions of said strips in the longitudinal zones and said transverse zones while they are being pressed together to form longitudinal and transverse seals respectively and maintaining the other portions of the strips spaced from each other and free from heat and pressure, and depositing an article between said strips subsequently to the formation of one transverse seal and prior to the formation of the next following transverse seal to form a chain of hermetically sealed packages each containing an article.

13. The method of packaging articles in rubber material capable of softening under heat, consisting in feeding sheets of said rubber material in opposed spaced relation to each other under longitudinal tension, simultaneously heating and pressing together said sheets along a zone extending transversely across said sheets to form a transverse seal, depositing an article between said sheets above said seal so that the article is held spaced from the seal by contact with the unsealed portions of the sheets, continuing feeding of said sheets with said article between them and simultaneously heating and pressing together small areas only of said sheets progressively along the longitudinal marginal zones of said sheets in spaced relation to said article to form longitudinal seals while maintaining the other portions of the sheets unheated and free from pressure and at the same time stretching said unheated portions of the sheets over the article, and then simultaneously heating and pressing together said sheets along another zone transverse of said sheets in spaced relation to and at the side of said article opposite the first transverse seal to form a second transverse seal and complete a hermetically sealed package containing said article spaced from all of said seals.

14. A method of wrapping objects of various sizes and shapes, including the steps of feeding strips of heat-stretchable and heat-sealable sheet material in opposed relation to each other, heating said strips progressively and concurrently to impart to them the requisite stretchable and sealable properties, placing the objects one after another between said strips as the latter are fed along, and pressing the strips together progressively to seal them around the individual objects while at the same time causing the individual objects by direct contact therewith to stretch the strips and fit them thereto.

15. A method of wrapping objects of various sizes and shapes, including the steps of feeding strips of heat-stretchable and heat-sealable sheet material in opposed relation to each other, heating said strips progressively and concurrently to impart to them the requisite stretchable and sealable properties, placing the objects one after another between said strips as the latter are fed along, and forming the strips by stretching and sealing into tight fitting covers about the individual objects regardless of size or shape by the progressive application of yielding pressure which forces the strips together into face to face contact except in those areas surrounding the ob-

jects while at the same time causing said objects to stretch such areas of the strips and conform them thereto.

16. In a machine for wrapping objects of various sizes and shapes in heat-stretchable and heat-sealable material, the combination of means for feeding strips of said material in opposed relation to each other through the machine, said means being arranged to permit the articles one after another to be placed between the strips as the latter are fed along, means for heating the strips progressively and concurrently to impart to them the requisite stretchable and sealable properties and means acting progressively on the strips and the intermediate articles by the application of yielding pressure to form the strips into tight fitting covers about the individual objects regardless of size or shape.

17. In a machine for wrapping objects in heat-stretchable and heat-sealable material, the combination of means for feeding strips of said material in opposed relation to each other through the machine, said means being arranged to permit the articles one after another to be placed between the strips as the latter are fed along, means for heating said strips progressively and concurrently to impart to them the requisite stretchable and sealable properties, and means acting progressively on the strips and the intermediate articles by the application of yielding pressure to form the strips into tight fitting covers around the individual objects.

18. In a machine for wrapping objects in heat-stretchable and heat-sealable material, the combination of a pair of supply rolls, means for drawing strips of material from said rolls and feeding them in opposed relation to each other through the machine, said means being arranged to permit the articles one after another to be placed between the strips as the latter are fed along, means for heating the strips progressively and concurrently in advance of the wrapping station to impart to them the requisite stretchable and sealable properties, and means acting progressively on the heated strips and the intermediate articles by the application of yielding pressure to form the strips into tight fitting covers around the individual objects.

19. A method of wrapping objects, including the steps of feeding two continuous strips of heat-sealable sheet material in opposed spaced relation to each other, heating the strips progressively and concurrently before they reach the wrapping station to render them sufficiently sealable, and pressing the heated strips together progressively at the wrapping station to seal them around successive objects placed therebetween to form a series of individual packages.

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