Oct. 2, 1945. H. F. WATERS 2,385,897

CONTINUOUS FILLING AND PACKAGING MACHINE

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Fig. 1

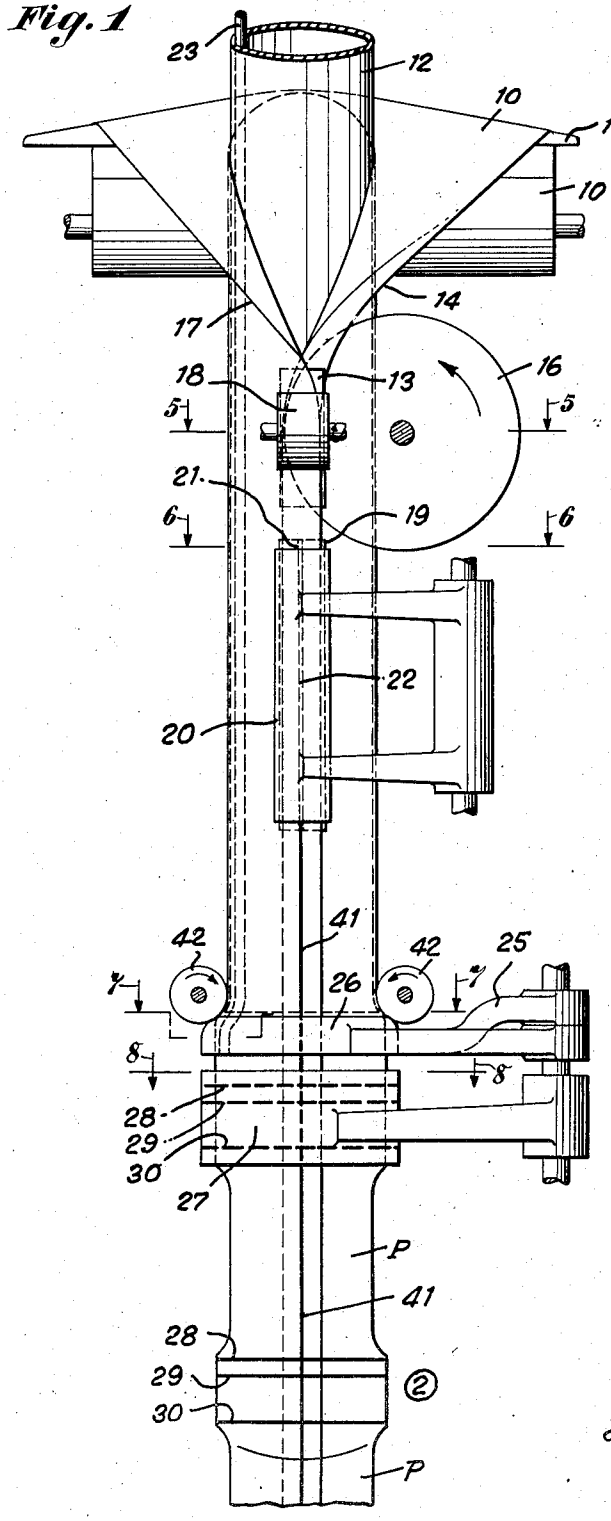
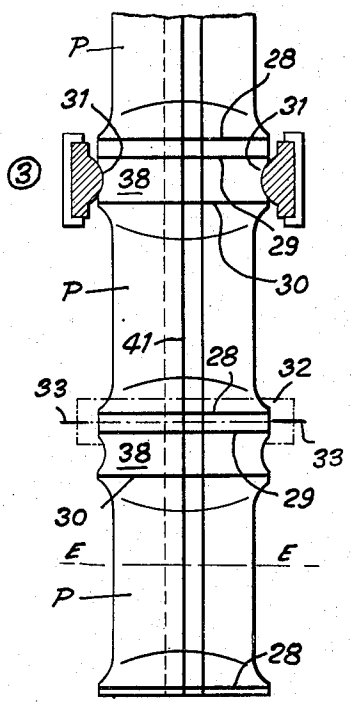


Fig. 2



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Fig. 3

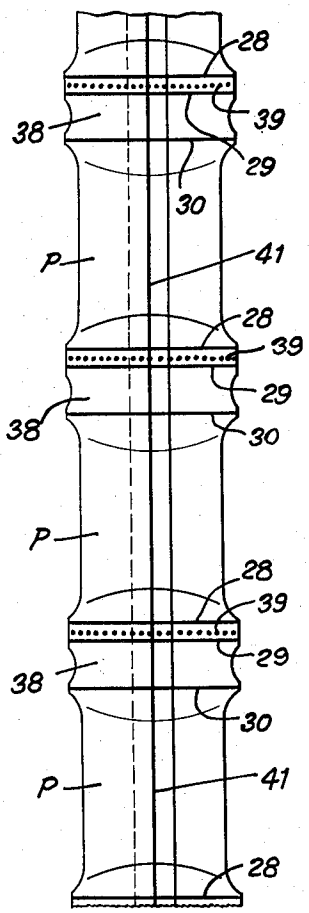


Fig. 4

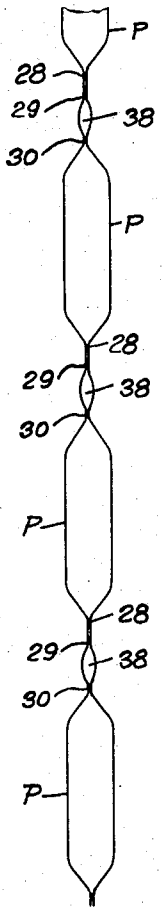


Fig. 5

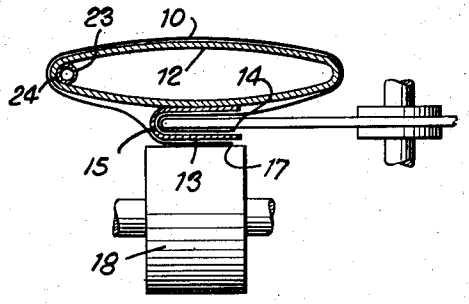


Fig. 6

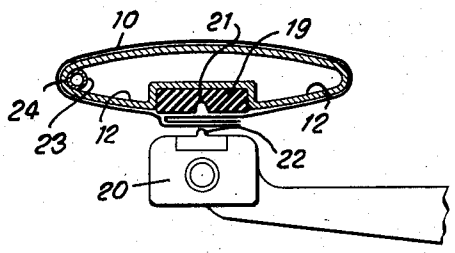


Fig. 7

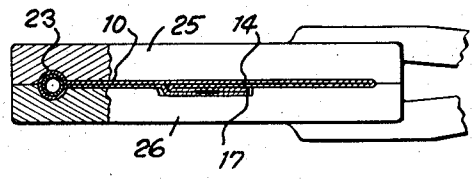
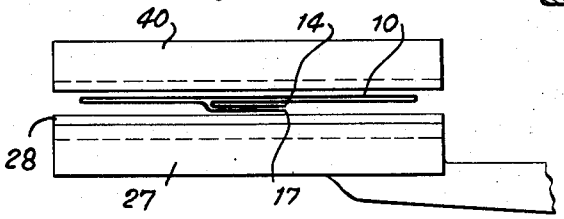


Fig. 8



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CONTINUOUS FILLING AND PACKAGING MACHINE

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Fig. 9

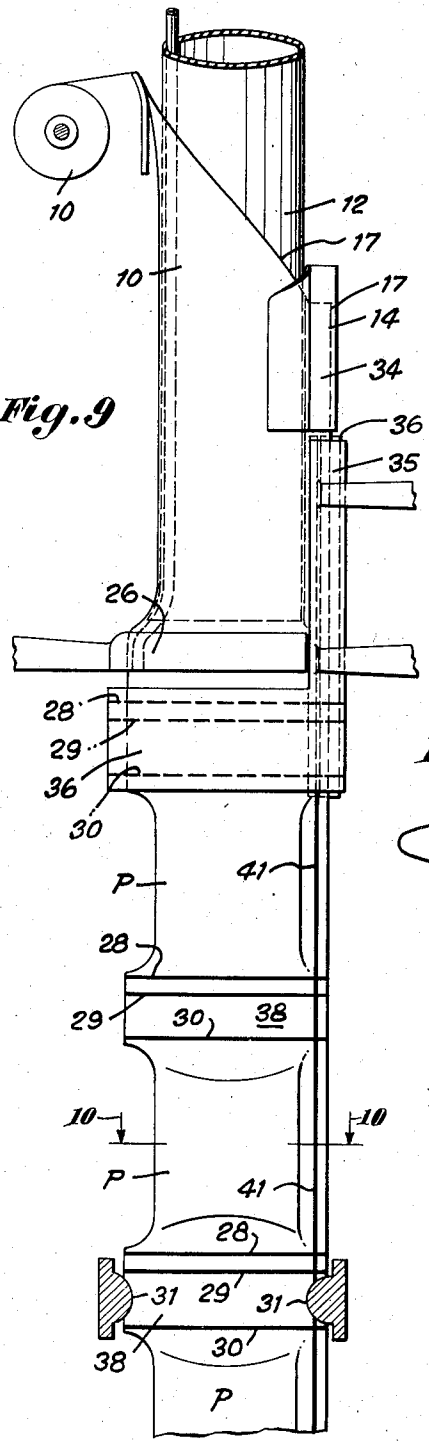


Fig. 10

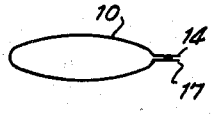


Fig. 11

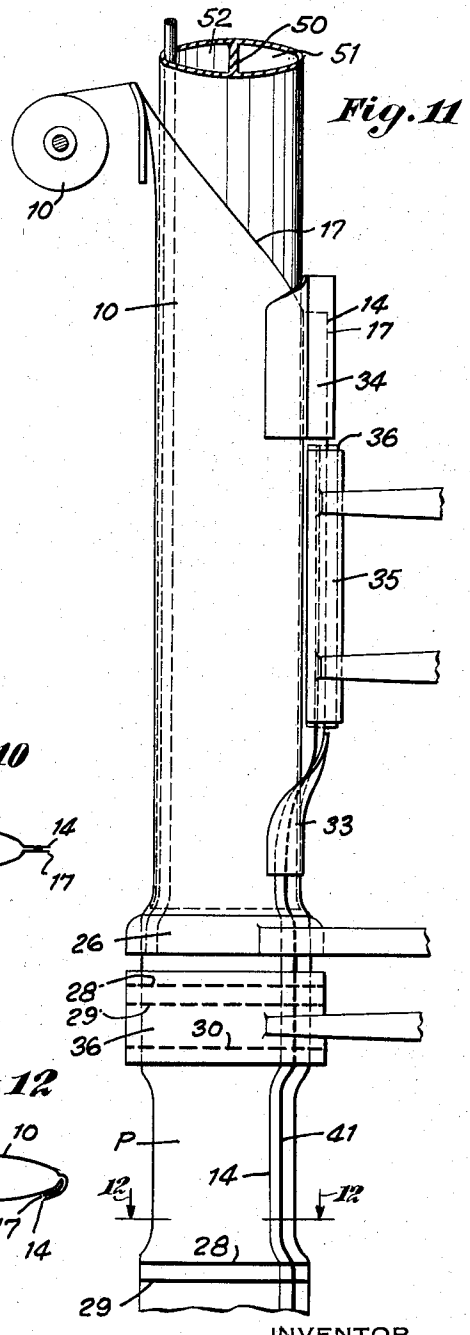
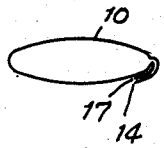


Fig. 12



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2,385,897

UNITED STATES PATENT OFFICE

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CONTINUOUS FILLING AND PACKAGING MACHINE

Harry F. Waters, New York, N. Y.

Application September 4, 1942, Serial No. 457,266

5 Claims. (Cl. 93—3)

The present invention relates to an automatic package making and filling machine, and more particularly to a machine for making and filling a continuous chain of integral packages which may be severed into individual packages or groups of packages.

I am aware of the existence of machines of this type and the present invention aims to provide certain improvements therein. The invention is particularly directed to the packaging of one or more small articles either singly or in bulk, and is especially adapted for pulverulents or granular material, and with the proper suitable material, liquids and wet contents may be packaged. The machine may have a gravity feed or may have a measured quantity feed, depending upon the product to be packaged.

One of the main objects of the present invention aims to provide a far superior sealed package than is now thought to be produced on the present type of machinery.

Heretofore packages were made with the longitudinal seam overlapping with the inside surface overlying the outside surface and heat sealed by crimping which produced a very inferior seal, since only one fusible face seals against a non-fusible face, and each end of the package which was sealed, cirmped or corrugated would permit the pulverized contents to sift out through the ends thereof, and as for vacuum packaging of these packages with the present type of seals, it is practically impossible to prevent leakage.

The present invention obivates these difficulties, by providing a continuous sheet of preferably thermoplastic material formed around a preferably tubular filling hopper, so that the longitudinal marginal edges of said sheet will have face to face contact of fusible material to form a fin on the tube, which when heat sealed and folded down against the tube will produce a gas tight seal. After the longitudinal fin seal is made, a transverse gas tight heat seal is formed transversely of the tube intermittently thereof, to form a chain of individual integral packages. The packages when filled and vacuumed will be liquid proof, gas proof, and durable in structure and will withstand an enormous amount of abuse without sifting or rupturing.

The drawings presented herewith in the present application illustrate more or less diagrammatically the improvements of the present invention and is thought that those skilled in the art may readily apply these improved features to the present type of machinery, as for example, the machines shown in the patent to Zwoyer, Patent No. 1,986,422, and in the patent to Maxfield, No. 2,145,941.

Other objects and advantages of the present invention will be obvious as brought out in the following specification and claims.

Reference will be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts throughout the several views, in which:

Fig. 1 is a diagrammatic front elevation of the present invention;

Fig. 2 is a continuation of the bottom portion of Fig. 1;

Fig. 3 is a modified form of a plurality of packages;

Fig. 4 is a diagrammatic sectional view of Fig. 3;

Fig. 5 is a cross sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a cross sectional view on the line 6—6 of Fig. 1;

Fig. 7 is a sectional view on the line 7—7 of Fig. 1;

Fig. 8 is a sectional view on the line 8—8 of Fig. 1;

Fig. 9 is a diagrammatic front elevation of a modified form of sealing the package;

Fig. 10 is a cross section on the line 10—10 of Fig. 9;

Fig. 11 is a front elevation of another modified form of sealing the package, and

Fig. 12 is a cross section on the line 12—12 of Fig. 11.

Referring to the drawings, wherein I have shown, by way of illustration merely, a roll 10 of preferably thermoplastic material, or any other suitable fusible material, which will lend itself to heat sealing, and in some instances packages not requiring heat sealing, or vacuum sealing, we may use an inferior material with a suitable adhesive to close the longitudinal seams and may also use adhesive or heat seal on the transverse seams. To fabricate a finished package, with the present invention, a sheet of suitable material 10 is urged over a bar 11, which is inclined at each end to direct one marginal edge 14 of the material around a mandrel or filling hopper 12 and is then passed into a former plate 13, which will form one marginal edge 14 of the material 10 into a U-shaped pocket 15, by the introduction of the periphery of a disc 16 into the U-shaped former plate 13. The other marginal edge 17 of the material 10 is directed between the out-

side surface of the former plate 13, and a roller 18 so that in passing beyond the former plate 13 the two marginal edges 14 and 17 will be in registry with each other, and the inside surface of the sheet 10 surrounding the mandrel 12 will be in face to face contact, to form a fin and if desired another roller may be placed under the former plate 13 to flatten down the marginal edges 14 and 17 before they pass over the anvil 19. The material 10 is then urged downwardly around the mandrel 12 by means of a pair of rubber clamps or any other suitable means not shown. After the material passes from the bottom of the forming plate 13, it then passes over a resilient and preferably rubber anvil 19, which is embedded in the tubular mandrel 12 so that its surface will be substantially flush with the outside surface of the mandrel 12.

A projection 22 on a heat sealing bar 20 directly over the anvil 19 will operate with suitable mechanism to press the marginal edges 14 and 17 of the material 10 into a groove 21 in the resilient anvil 19, so that the marginal edges 14 and 17 will be heat sealed at 41 and the material 10 will then become a tube. After the longitudinal seam is heat sealed the material which we shall now describe as a tube, is led downwardly over the lower end of the mandrel 12, which at this point is much wider, as shown in Figures 1, 5 and 6, to accommodate a vacuum pipe 23, lying close to the outer edge 24 of the mandrel 12 for purposes of evacuating the air from a package P after it has been filled and heat sealed transversely on the bottom thereof by the heat sealing bar 27 and the anvil 40, which have ridges and grooves thereon similar to the heat sealing bar 20 and anvil 19. To prevent leakage of air, at the bottom of the mandrel 12 during the evacuating process, I provide a pair of squeeze rollers 42 to hold the material 10 in close contact with the edges of the mandrel 12. When the package P is evacuated of atmosphere, the tube 10 is then flattened as shown in Figure 7 between two resilient members 25 and 26, which are grooved out to accommodate the pipe 23 and the surrounding material 10. These members 25 and 26 are adapted to be separated while the package passes through, and brought together to form a tight seal on the material 10, while the evacuating of air from the package takes place.

The transverse heat sealing bar 27 has three heat sealing projections 28, 29 and 30 respectively, which all seal simultaneously across the tube. When the package P or tube is transversely sealed it is then urged downwardly in registry with a pair of cut out dies 31, as shown in Figure 2 which clip off the edges of the flattened tubular portion at the top of each package for the purpose of which will be hereinafter described. After this is accomplished, the package P will then move to the cut-off or severing station indicated at 32 in Figure 2 and if it is desired to sever individual packages, the knives 33 may operate in unison with the transverse heat sealing mechanism, but if it is desired to have say three or four packages integral in a group, the knives 33 may be stopped until the proper time comes to sever a multiplicity of integral packages.

In Fig. 3, I have shown a modified way of severing the packages P by utilizing transverse lines of perforations 39 which may be used for separating the packages either at the plant or by the purchaser of the package. The modified form of seal shown in Figure 9, shows the material 10 wrapped around the mandrel 12 so that the marginal edges 14 and 17 of the material 10 will have face to face contact and project as a fin from the side of the mandrel 12 where it is urged downwardly and received between a pair of former plates 34 which guide the fin down in between a heat sealing bar 35 and a resilient anvil 36 which seals the fin at 41 longitudinally similar to the way it was sealed in the preferred form shown in Figure 1. This sealing bar 35, however, may be an L-shaped bar which has at the bottom thereof an integral right angle transverse heat sealing unit 36, for sealing the three heat seal lines 28, 29, and 30 on the tube or material 10. The packages P are fed down in the same way as heretofore described for the preferred form shown in Figure 1 and they are also punched out at the edges to form open ended tubular portions at the top of each package and severed in the same way.

The modification shown in Figure 11 also operates in the same way as the preferred form shown in Figure 1 with the exception that the package P will have a different type of seal thereon. In this form the longitudinal heat sealing element 35 does not have the bottom transverse heat sealing element 36 thereon for the reason that the fin, after it leaves the heat sealing bars 35, is then folded upon itself by a former plate 37 to overlie the tube 10 where it is then led down to a separate transverse heat sealing unit 36 which, in this case, seals across the tube and also the folded portion of the fin.

It will of course be understood that the fin, when folded over upon itself, if desired may be adhesively sealed to the major portion of the package. The general operation of the machine is as follows:

Inasmuch as I have referred to the tubular portion 12 as a mandrel it will be understood that it is also a feeding tube for the material which is to be fed into the package.

In Fig. 1, I have shown the mandrel broken away, but in practice on a finished machine it is led up to a hopper which automatically feeds the material down by gravity or forced feed, depending upon the product to be packaged. The transverse heat sealing bar 30 first seals and closes the bottom of the tubes shown by the heat sealing line 28 formed across the tube 10 so that the product may be fed into the tube as the tube is descending down the mandrel 12. After the bottom of the package reaches the position shown by the numeral 2 in Figure 1, the product is then in the tube and the jaws 25 and 26 will then come into play to squeeze the two sides of the tube as shown in Figure 7 so that the package may be readily evacuated of air, and gas may be introduced therein as desired for the purpose of preserving the contents therein.

After the package is evacuated and sealed again at the top it is then moved down to the position shown by the numeral 3 in Figure 2 where the marginal edges are cut out to form an open ended tubular portion 38 as shown in Figure 4. The purpose of this tubular portion 38 is to permit the purchaser of the package to pass this tube over a small rod for purposes of displaying the package to the consumer. These packages may be hung on a rod singly or in a group and in packages of this character it would be more desirable to have perforations 39 transversely therebetween as shown in Figure 3.

It will be seen from the foregoing description that this machine in conjunction with a fin type sealed envelope will produce a very desirable and

efficient package which has heretofore been unknown on a machine of this character, and any suitable material may be used, depending upon the product to be packaged—for example, if we were packaging a product which did not require heat-sealing we could seal with adhesive, and the material could be very inexpensive. In packaging a product which is likely to spoil in the atmosphere we may use a high grade of fusible material which will hermetically seal the contents.

I also propose to use this machine for the packaging of liquids in conjunction with a high grade of preferably laminated material having a heat fusible material on the inside and flexible sheets of suitable material on the outside thereof, several of which may be adhesively laminated or they may be separated.

I also propose to use this machine for making individual envelopes by utilizing the mechanism shown in Fig. 1 with the exception that the filling mechanism will be shut off and the package P is transversely severed on the line EE of Fig. 2 simultaneously with the knives 33, thereby severing the package P in half, and producing two individual envelopes sealed on three sides.

In packaging mixed products, I may provide a partition 50 in the mandrel 12 which will divide the feeding tube into two feeding chambers 51 and 52 to introduce different kinds of material into the package P, wherein it will mix.

It will of course be understood that the mechanism shown in Fig. 1 may be duplicated on the machine for increasing quantity production, and the mandrel 12 may be a separate tube surrounding the filling tube in the event we do not choose to vacuum the packages.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:

1. In a continuous package making and filling machine, the combination which comprises a filling tube over which web material is drawn, means for wrapping the web material around said tube, forming means including a U-shaped plate and a cooperating disc for bringing the longitudinal margins of said web material together to form a fin-type seam folded back upon itself, means for heat-sealing said margins while in such position to form a tube, means for transversely sealing said tube at spaced intervals to form a plurality of packages, and means for severing a predetermined number of packages from the web.

2. In a continuous package making and filling machine, the combination which comprises a tubular hopper, means for guiding a web of laminated heat-sealable material around said hopper, means including a U-shaped former plate and a cooperating disc for bringing the longitudinal margins of said web into face to face position to form a fin-type seam folded back upon itself, longitudinal heat-sealing means for bending said margins while in such position to form a tube, transverse heat-sealing means for applying pairs of parallel-spaced transverse seams to the flattened tube at spaced intervals, and means for severing individual packages between the said pairs of transverse seams from said tube.

3. In a continuous package making and filling machine, the combination which comprises an elongated filling hopper, means for guiding a web of heat-sealable material around said hopper to bring its longitudinal marginal edges into contact, means for heat-sealing said marginal edges to form a tube, transverse heat-sealing means for applying pairs of parallel-spaced transverse seams to the flattened tube at uniform intervals thereby to define packages separated by sealed narrow interspaces, means for opening the lateral ends of said interspaces, and means for severing the individual packages having an open transverse tube at one end adapted to be slipped over a peg for storage and display.

4. In a continuous package making and filling machine, the combination which comprises a tubular filling hopper, means for guiding a web of heat-sealable material around said hopper to bring its longitudinal marginal edges into face to face contact, means including a longitudinal and a pair of parallel-spaced transverse heat-sealing bars for heat-sealing said marginal edges and providing a pair of transverse seams in a single heat-sealing operation thereby defining packages separated by sealed transverse interspaces, means for cutting open the lateral ends of said interspaces, and means for severing individual packages having an open transverse tube at one end thereof adapted to be slipped over a peg for storage and display of the package.

5. In a continuous package making and filling machine, the combination which comprises a tubular filling hopper, means for guiding a web of heat-sealable material around said hopper to bring its longitudinal marginal edges into face to face contact, means including an inverted F shaped heat-sealing bar for applying a longitudinal seam to said marginal edges and a pair of closely parallel-spaced transverse seams in a single heat-sealing operation thereby defining packages separated by sealed transverse interspaces, means for cutting open the lateral ends of said interspaces, and means for severing individual packages having an open transverse tube at one end thereof adapted to be slipped over a peg for storage and display of the package.

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