Feb. 10, 1959 J. DREEBEN 2,872,762

FORMING AND FILLING PACKAGES AND APPARATUS THEREFOR

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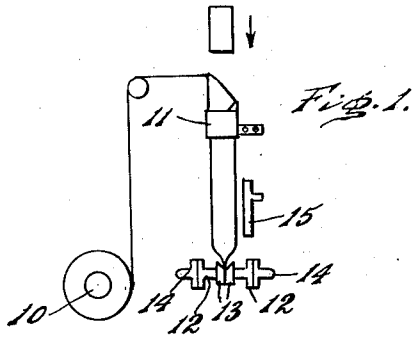


Fig. 1.

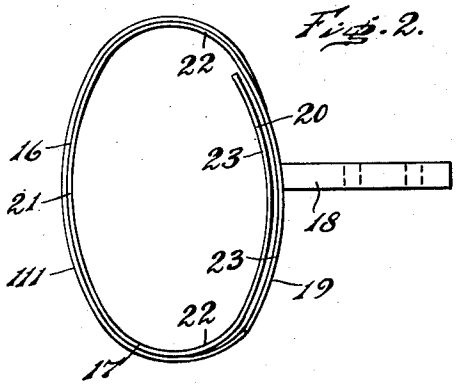


Fig. 2.

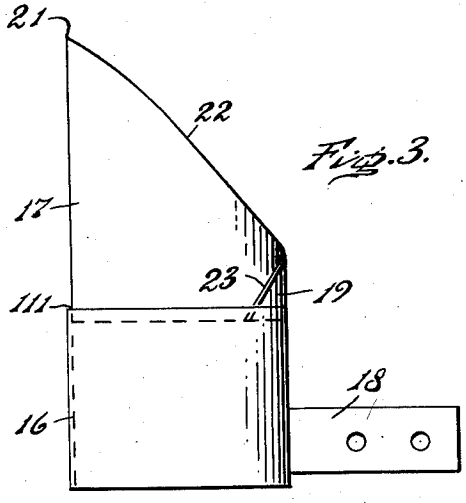


Fig. 3.

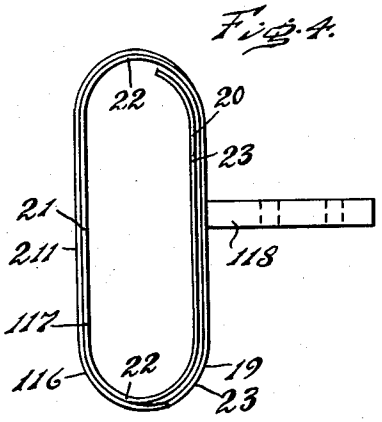


Fig. 4.

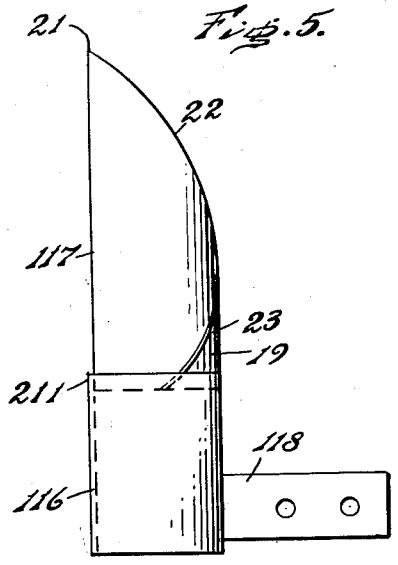


Fig. 5.

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FORMING AND FILLING PACKAGES AND APPARATUS THEREFOR

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8 Claims. (Cl. 53—28)

This invention relates to forming and filling packages and apparatus therefor.

It has heretofore been proposed to draw transparent synthetic plastic sheet material from a web roll, form the web about a tube into a bag or envelope and apply a longitudinal seal along the web, fill the bag or envelope through the tube, seal the top of one package with simultaneous sealing of the bottom of the succeeding package, and sever the seal intermediate its top and bottom edges to separate the packages, this all being effected in a timed sequence.

The materials heretofore employed have been of the non-elongatable type, such as regenerated cellulose in sheet form, available as cellophane, and also of the highly elongatable type, such as polyethylene.

The forming tubes heretofore available were suitable for forming packages where loose fill of the package was permissible but were not satisfactory where a tight fill or minimum of clearance between the article and the bag or envelope was desired.

It has heretofore been considered essential to support the material of which the package was made by an abutment, usually in the form of a filling tube, towards which the longitudinal heat sealer was advanced to provide the longitudinal seal at the overlapped edges of the web.

It is the principal object of the present invention to effect the filling of the package with a minimum of clearance between the contents and the side wall of the package.

It is a further object of the present invention to provide an improved character of web forming device for package making and with which a wide range of transverse package shapes can be formed with the side wall of the package conforming to the shape of the article or contents packaged.

It is a further object of the present invention to provide an improved character of web forming device with which a minimum clearance between the contents and the side wall of the package can be attained with single or solid articles.

It is a further object of the present invention to provide a simple but effective attachment for package forming machines by which sheet material from the web roll can be formed into a tube for longitudinal sealing and other operations where a tight fill of the package is required.

It is a further object of the present invention to provide, for package forming and filling machines, a simple but effective forming and filling device with which a package conforming closely to the shape of an article therein can be made.

Other objects and advantageous features of the invention will be apparent from the description and claims.

The nature and characteristic features of the invention will be more readily understood from the following description taken in connection with the accompanying drawings forming part thereof, in which:

Figure 1 is a diagrammatic view of apparatus for forming and filling packages illustrative of the invention;

Fig. 2 is a top plan view of one form of package forming and filling shoe in accordance with the invention;

Fig. 3 is a side elevational view of the shoe shown in Fig. 2;

Fig. 4 is a top plan view of another form of package forming and filling shoe in accordance with the invention; and

Fig. 5 is a side elevational view of the shoe shown in Fig. 4.

It should, of course, be understood that the description and drawings herein are illustrative merely, and that various modifications and changes can be made in the structure disclosed without departing from the spirit of the invention.

Like numerals refer to like parts throughout the several views.

It has heretofore been proposed to provide package making machines which include a web roll **10** as shown in Fig. 1 having thereon a supply of sheet material to be made into a succession of longitudinally sealed tubular packages with transverse seals at each end.

The prior package making machines also included a forming shoe **11** to which the sheet material was advanced from the supply on the web roll **10**, the advancing being effected by a pair of horizontally separable gripping jaws **12** in engagement with the tubular web. The gripping jaws **12**, customarily provided with heat sealing portions **13** were reciprocated in a vertical path by their supports **14**, the length of the stroke determining the length of the package. The supports **14** were separated at the bottom of the stroke and moved upwardly in open position, then closed at the top of their stroke to bring the heat sealing portions **13** of the jaws **12** into gripping relation to the tubular conformation of the sheet material provided by the forming shoe **11**.

Either during a period of rest or during the downward movement of the web of sheet material a longitudinal seal was provided by a longitudinal heat sealer **15** and the articles were delivered into the tubular formed web through a filling tube interiorly disposed in spaced relation to the forming shoe **11**.

During the downward movement of the jaws **12**, also, a transverse seal was applied to the tubular sheet material which was severed intermediate the top and bottom margins of the transveresly sealed area so that the transverse seal provided a sealed transverse top margin of the filled package and a sealed transverse bottom margin of the package to be filled. Repetition of the operations just referred to provided a succession of filled, sealed and separated packages.

It was heretofore considered essential to employ a filling tube which extended below the shoe and provided an abutment for the longitudinal heat sealer. Such tubes and the shoes used therewith were customarily circular in cross section. The thickness of the tube prevented complete filling of and elimination of the space between the article and the inner face of the side wall of the package.

In accordance with the present invention the hollow circular filling tube formerly employed is discarded and a web tube forming shoe having different major and minor axial distances in horizontal cross section is employed, as hereinafter explained.

For packages of highly elongatable material, web feeding or slack control mechanism interposed between the web roll **10** and the shoe **11** can be employed, as shown in my prior application for patent filed July 20, 1956, Serial No. 599,204, which is now abandoned.

Referring now to Figs. 2 and 3, a shoe **111** is there shown which is particularly suited for the making of packages of the character referred to and wherein the article has a minimum clearance or substantially no

clearance with respect to the inner face of the tubular web.

The shoe **111** has a lower solid mounting ring section **16** and an upper section **17**. The shoe **111** is shown as having both the lower section **16** and the upper section **17** elliptical in horizontal cross section, and having major and minor axes of the proper length to accommodate the article to be packaged. Merely by way of illustration it can be noted that the shoe **111** is suitable for use in packaging individual loaves of bread of elliptical, oval or similar cross section.

The lower section **16** of the shoe **111** has a mounting bracket arm **18** connected thereto and extending therefrom for supporting the shoe **111** in the machine.

The upper section **17** is secured to and carried by the lower section **16** and has overlapping end portions **19** and **20** free from direct attachment to the lower section **16** and in spaced relation to provide clearance for the web.

The top margin of the upper section **17** has an elevated part **21** with downwardly sloping parts **22** on each side and overlapping end parts **23**. As shown, the difference in elevation between the highest part of the top margin of the upper section **17** and the intersection of the overlapped parts of the top margin is suitable for the non-elongatable materials although, if desired, the top margin can have parts with differences in elevation to accommodate highly elongatable materials, as shown in my prior application filed August 1, 1956, Serial No. 601,529, which is now Patent No. 2,840,966.

Referring now to Figs. 4 and 5, a shoe **211** is there shown which is also suited for the making of packages wherein the article has a minimum clearance or substantially no clearance with respect to the inner face of the tubular web.

The shoe **211** has a lower solid mounting ring section **116** and an upper section **117**. The shoe **211** is shown as flattened with straight flat sides and semi-circular ends, and having major and minor axes of the proper length to accommodate the article to be packaged. Merely by way of illustration it can be noted that the shoe **211** is suitable for use in packaging individual folded handkerchiefs, sponges, soap, and the like, of comparable cross section. The term "article" as used herein has reference to one or more items which when enclosed by the web do not have any marked tendency to disperse, and which inherently provide some measure of rigidity.

The lower section **116** of the shoe **211** has a mounting bracket arm **118** connected thereto and extending therefrom for supporting the shoe **211** in the machine.

The shoe **211** has overlapping end portions **19** and **20**, as before, and marginal portions **21**, **22** and **23**, as previously explained.

In use, a web of sheet material to be formed into a tube for package making is delivered in flat condition from the web roll **10** and is delivered over the top marginal edge of the shoe **111** or **211** and then downwardly in the interior thereof with one marginal edge of the web being guided by the end **19** and the other by the end **20** into crossed and overlapped relation and so as to be straight in their overlapped downward movement. The web edges thus maintain themselves in their proper position for longitudinal sealing.

The article to be packaged is introduced into the shoe **111** or **211** during the downward movement of the jaws **12**.

The hollow tubular web as thus formed and with the article therein and prior to the completion of the downward stroke is ready for longitudinal sealing by the heat sealer **15**, the article and the tension imparted by the jaws **12** to the web providing a sufficient support or abutment for the pressing action of the heat sealer **15** against the overlapped margins. The heat sealer **15** is of sufficient length to provide a longitudinal seal which is longer than the article and the completed package so that there is no unsealed longitudinal margin. The hollow tubular web can also have transverse seals simultaneously applied thereto by the heat sealing portions **13** of the jaws **12**.

The tubular web will conform to the transverse external shape of the article so that rectangular, square, elliptical, oval, or other shapes of packages can be made which differ from the interior shape of the shoe **111** or **211**, and with the article having a light fit with respect to the inner face of the web in the finished package. None of the interior area of the package is required to be occupied during filling by anything other than the article itself.

I claim:

1. The method of making packages from a continuous web of sheet material which comprises advancing the sheet material and forming the same under tension into a vertical tube with the longitudinal edges in overlapped relation and with the tube having a lower transverse seal, inserting an article into the tube in close engagement with the inner face of the tube and supported by the transverse seal and the tension of the tube, and vertically longitudinally heat sealing said edges together with the article providing an interior support for the longitudinal sealing, the portion of the tube at which the sealing of the edges is effected being free from sidewise restraint other than that of its own tension.

2. The method of making packages from a continuous web of sheet material which comprises advancing the sheet material over an internally unobstructed tube former and forming the web under tension into a vertical tube with the longitudinal edges in overlapped relation and with the tube having a lower transverse seal, inserting a solid article through the former into the tube in close engagement with the inner face of the tube and supported by the transverse seal and the tension of the tube, and vertically longitudinally heat sealing said edges together with the article providing an interior support for the longitudinal sealing, the portion of the tube at which the sealing of the edges is effected being free from sidewise restraint other than that of its own tension.

3. The method of making packages from a continuous web of sheet material which comprises sequentially advancing the sheet material over an internally unobstructed tube former and forming the web under tension into a vertical tube with the longitudinal edges in overlapped relation and with the bottom closed by a transverse seal, inserting an article through the former into the tube in close engagement with the inner face of the tube and supported by the closed bottom and the tension of the tube, and vertically longitudinally heat sealing said edges together with the article providing an interior support for the longitudinal sealing, the portion of the tube at which the sealing of the edges is effected being free from sidewise restraint other than that of its own tension.

4. The method of making packages from a continuous web of sheet material which comprises advancing the sheet material in predetermined lengths over an internally unobstructed tube former and forming the web under tension into a vertical tube with the longitudinal edges in overlapped relation and with the bottom closed by a transverse seal, inserting an article through the former into the tube in close engagement with the inner face of the tube and supported by the closed bottom and the tension of the tube, and vertically longitudinally heat sealing said edges together with the article providing an interior support for the longitudinal sealing, the portion of the tube at which the sealing of the edge is effected being free from sidewise restraint other than that of its own tension.

5. In apparatus for the continuous packaging of articles from a web of sheet material, an upright forming and article introducing shoe having spaced overlapping end portions for forming the web into a vertical tube

with overlapped edges, members movable below said shoe for advancing said tube downwardly of said shoe under tension and for transversely sealing said tube, and said shoe being non-circular in transverse cross section, and a longitudinal heat sealing member engaging said tube below said shoe for longitudinally sealing said tube, said movable members and said tube providing a support for said article, said shoe and said movable members retaining said tube under tension at the locations of engagement of said longitudinal heat sealing member, said article providing an internal abutment for the tube for the longitudinal sealing thereof, and the tension of tube and the article providing the sole restraint of said tube against sidewise movement during engagement of said longitudinal heat sealing member.

6. Apparatus as defined in claim 5 in which said shoe is free from internal obstructions.

7. In apparatus for the continuous packaging of articles from a web of sheet material, an upright forming and article introducing shoe having spaced overlapping end portions for forming the web into a vertical tube with overlapped edges, members movable below said shoe for advancing the tube downwardly of said shoe under tension and for transversely sealing said tube, said shoe being elliptical in transverse cross section, and a longitudinal heat sealing member engaging said tube below said shoe for longitudinally sealing said tube, said movable members providing a support for said article, said shoe and said movable members retaining said tube under tension at the locations of engagement of said longitudinal heat sealing member, said article providing an internal abutment for the tube, and the tension of

said tube and the article providing the sole restraint of said tube against sidewise movement during engagement of said longitudinal heat sealing member.

8. In apparatus for the continuous packaging of articles from a web of sheet material, an upright forming and article introducing shoe having spaced overlapping end portions for forming the web into a vertical tube with overlapped edges, members movable below said shoe for advancing said tube downwardly and transversely sealing said tube, said shoe being oval in transverse cross section, and a longitudinal heat sealing member engaging said tube below said shoe for longitudinally sealing said tube, said movable members providing a support for said article, said shoe and said movable members retaining said tube under tension at the locations of engagement of said longitudinal heat sealing member, said article providing an internal abutment for the tube for the longitudinal sealing thereof, and the tension of the tube and the article providing the sole restraint of said tube against sidewise movement during engagement of said longitudinal heat sealing member.

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