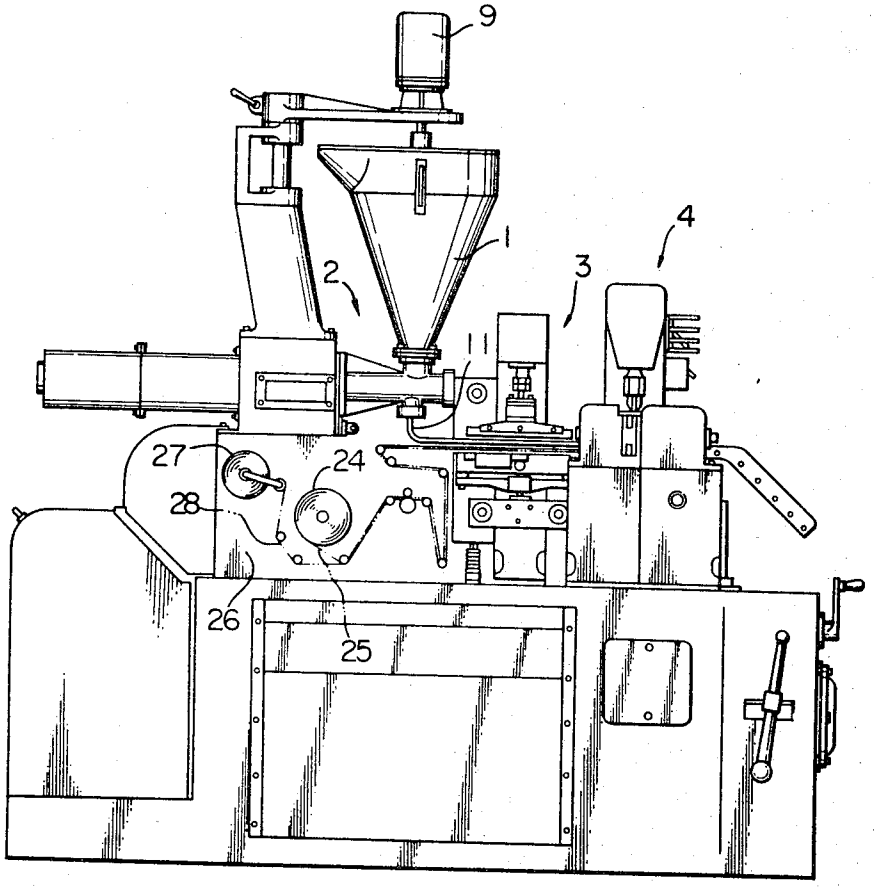
Dec. 31, 1968 SHOZO OMORI 3,419,206

TUBULAR FOOD PACKAGE WITH TEAR STRIP

Filed Oct. 31, 1967 Sheet 1 of 5

Fig. 1

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TUBULAR FOOD PACKAGE WITH TEAR STRIP

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Fig. 2

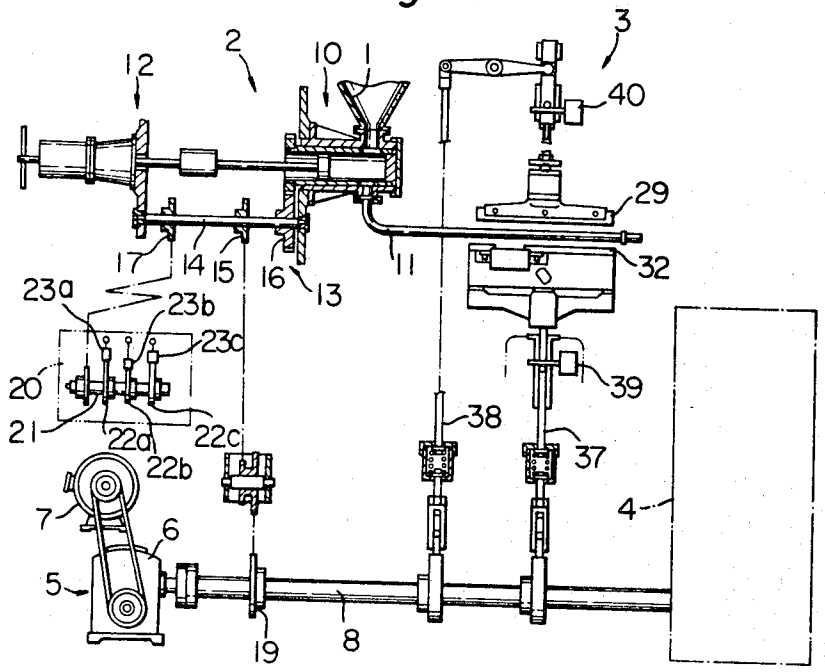


Fig. 3

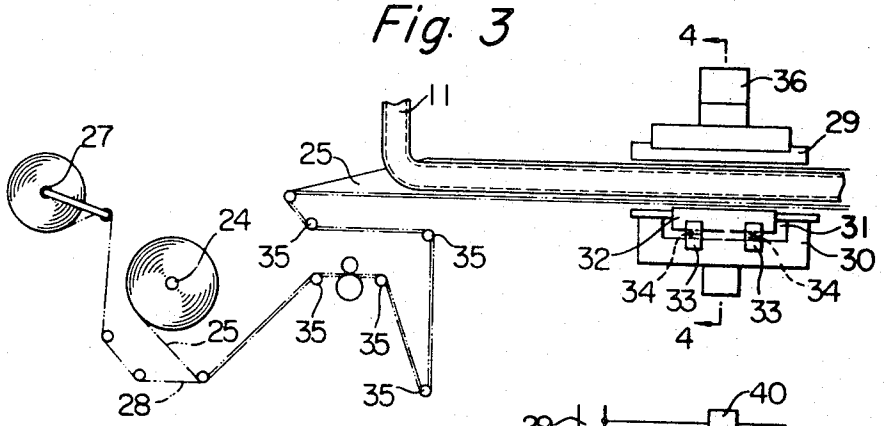


Fig. 4

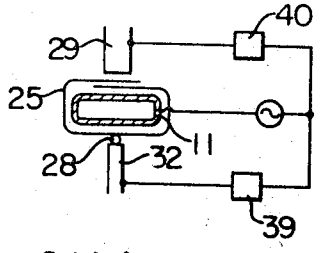


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Fig. 5A

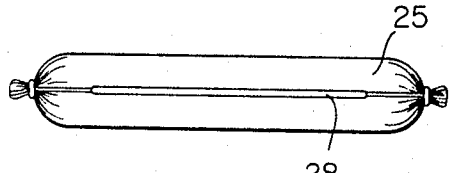


Fig. 5B

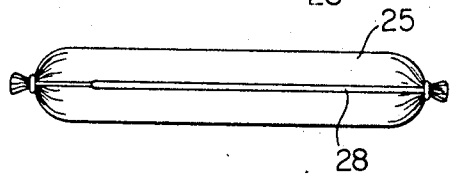


Fig. 5C

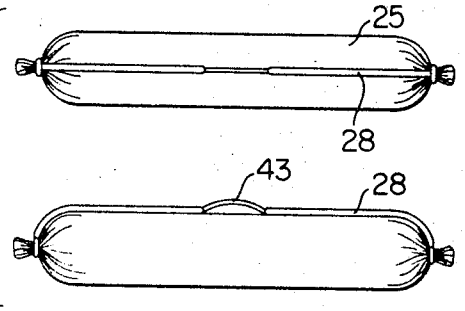


Fig. 5D

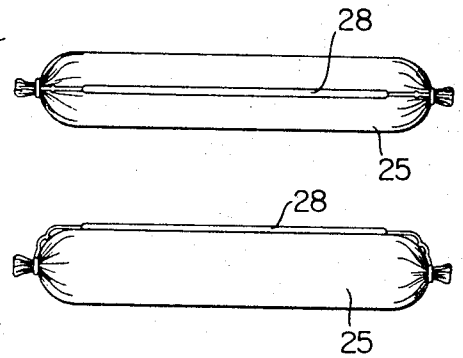


Fig. 5E

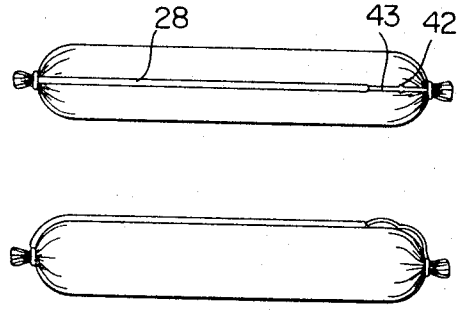


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Fig. 5F

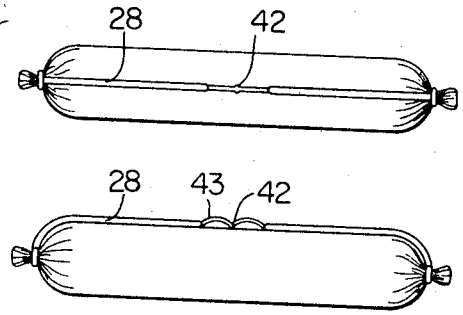



Fig. 5G

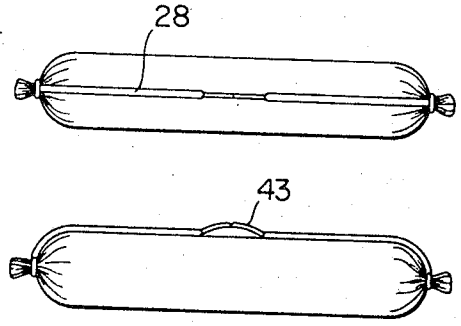
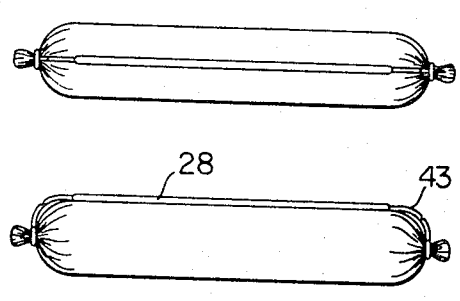



Fig. 5H

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Atty's

Fig. 6

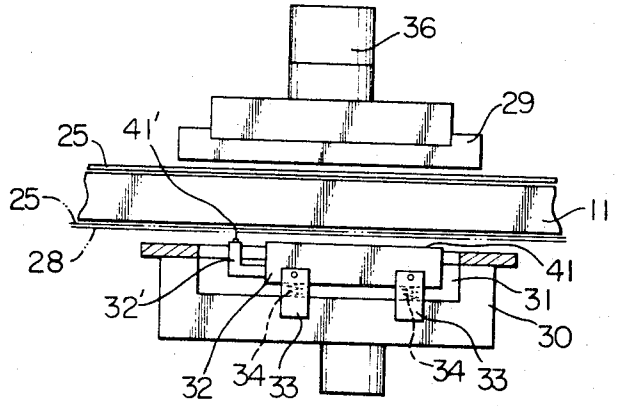
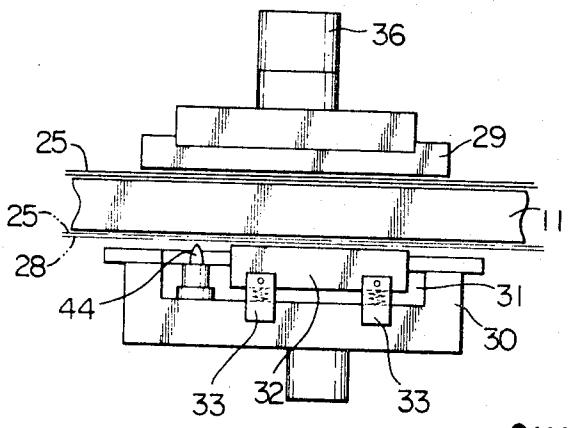



Fig. 7

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United States Patent Office 3,419,206
Patented Dec. 31, 1968



3,419,206

# TUBULAR FOOD PACKAGE WITH TEAR STRIP

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Filed Oct. 31, 1967, Ser. No. 679,354
Claims priority, application Japan, Nov. 11, 1966, 41/74,122, 41/74,123, 41/103,986, 41/103,987
4 Claims. (Cl. 229—66)

## ABSTRACT OF THE DISCLOSURE

A tubular food package having a tear strip sealed thereto and extending the length thereof, with part of said length of the strip remaining unsealed for the ease of tearing the package open. In a modified form, the above unsealed portion of the strip is centrally sealed to the package itself. In another modification, said unsealed portion is partly incised to give free ends on pulling the strip. A method for producing such packages is also described.

*Background of the invention.*—This invention relates, in one aspect, to a tubular package provided with means for tearing the package open and, in another aspect, to a method for producing such a package.

More particularly, the package of this invention is provided with a novel package opening member heat-sealed onto the package the entire length thereof, excepting a partial length of said package opening member remaining unseated. In a modified form of the package of this invention, the unsealed length of said package opening member is sealed onto the package at a point substantially midway of said length to prevent said package opening member from rising out of contact with the package. In still another mode of embodiment of this invention, an incision is formed in the unsealed length of said opening member at a point substantially midway of said length so that the unsealed package opening member may be easily severed at the incision into two portions to provide for the ease of opening the package.

*Description of the prior art.*—Packaged foods, encased in tubular casings of thin, pliable heat sealable material, are conventionally prepared by feeding a continuous web of the heat sealable packaging material, forming the same into a tubular casing, with both edges thereof overlapped, heat sealing said edges into a seam, filling the casing with food, clamping both ends of said package with clips and, finally, severing said casing from the succeeding casing. To provide for ease of opening such a package, it has been proposed to provide the package with a strip of heat sealable material, sometimes sealed onto the casing and sometimes not, with both ends thereof secured to the packaging material by means of the clips clamping the ends of the package. However, when the strip has been sealed, such a package cannot be easily opened by pulling the strip, while the unsealed strip tends to break when it is pulled, or rise out of contact with the package, thus increasing the possibility of the package being ruptured in handling and transit.

*Summary of the invention.*—With the foregoing disadvantages of the conventional package in mind, it is an object of this invention to provide a package having a package opening member which is partially sealed onto the package for ease of opening the package for serving the contents thereof. Another object is to provide a package having a package opening member which is sufficiently durable.

It is still another object of this invention to provide a method, wherein a tubular casing having the package opening member illustrated and briefly described above



may be produced in one operation simultaneously as the side edges of said casing are heat-sealed.

These and other objects, as well as the advantages, of the present invention will become apparent from a perusal of the specification and the claims appended thereto, taken together with the accompanying drawings.

The present invention provides a tubular casing made of heat sealable material in the form of a pliable sheet with its side edges overlapped and heat sealed into a seam, which has a package opening member extending the length of said casing and heat sealed onto the casinng a limited length thereof simultaneously as said seam is formed, with the length of said member other than said limited length remaining unsealed.

In another embodiment of the principle of the invention, the above-mentioned package opening member is further sealed or being incised at a point substantially midway of the unsealed portion thereof.

The invention is also concerned with a method for producing a package, which comprises forming a series of tubular casings from a continuous web of thin, pliable packaging material, with both edges of each casing overlapped, heat-sealing the overlapped edges of said tubular casing into a continuous seam extending the length of said casing with a first electrode and simultaneously heat-sealing a package opening member onto said tubular casing with a second electrode which is dimensioned slightly shorter than the first electrode in the axial direction of the casing, whereby a limited length of said package opening member is sealed onto the tubular casing.

In a modification of the above method, simultaneously as the edges of said tubular casing and the package opening member are sealed by said first and second electrodes, respectively, said package opening member is further sealed onto said casing with a point electrode at a point substantially midway of the unsealed length of said member.

In another modification of said method, simultaneously as the edges and the package opening member are sealed by the first and second electrodes, respectively, said package opening member is incised with a cutter means at a point in the unsealed length of said member.

The invention is further concerned with an apparatus for the production of tubular food packages, which comprises a dispensing and packaging machine for the production of packaged food, comprising means for continuously forming a series of tubular casings from a continuous web of thin, pliable packaging material around a nozzle for supplying the pasty food to said casing therethrough, with both edges of each casing overlapped, a heat sealing mechanism containing an electrode for sealing the overlapped edges of the resulting package into a seam extending the length of said package, means for feeding pasty food into said casing and means for severing the package so formed from a similar package likewise formed subsequent thereto, characterized by the combination with said machine of means for feeding a continuous length of a package opening member made of a material heat sealable to the packaging material, an upper electrode and a lower electrode which are positioned opposite to a nozzle and are supplied with high frequency current, and said lower electrode being dimensioned a little shorter than the upper electrode in the direction of the axis of the package, thereby causing the lower electrode to heat seal said package opening member leaving an unsealed length is the package opening member to provide for ease of tearing open the package for serving the contents thereof.

In a modified form, the above-mentioned apparatus is further characterized by the provision, additionally, of a point electrode for sealing the unsealed length of said

package opening member onto the package at a point substantially midway of said length for the prevention of said package opening member from rising out of contact with said package.

In still another modification, the apparatus of the invention is further characterized by the provision, additionally, of cutter means for incising said package opening member at a point in the unsealed length thereof.

*Brief description of the drawings.*—FIG. 1 is a diagrammatic front view showing a typical dispensing and packaging machine which can be employed in the production of a tubular package provided with a package opening member according to the invention;

FIG. 2 is a schematic view showing the sealing, filing and packaging operations to be carried out with the above-mentioned machine;

FIG. 3 is an elementary view, in section, showing generally the sealing and film feed mechanisms which are employed according to this invention;

FIG. 4 is a sectional view taken along the line **4**—**4** of FIG. 3;

FIGS. 5 are elevational views showing respectively a filled tubular package with an opening member affixed by means of the machine embodying the principles of the invention, wherein FIG. 5*a* shows such a package having an opening member sealed thereon substantially midway along the length of the package and member; FIG. 5*b* shows a similar package with its opening member sealed near one end thereof; FIG. 5*c* shows a package with its opening member sealed near both ends thereof, FIGS. 5*d*, 5*e*, and 5*f* show tubular packages whose opening members have been further point-welded at the middle points, respectively, of the unsealed portions in FIGS. 5*a*, 5*b* and 5*c*; FIG. 5*g* illustrates a tubular package having a package opening member provided with an incision made therein for easily cutting the same; and FIG. 5*h* shows a package having an opening member provided with partial incisions similar to the one referred to above near both ends thereof;

FIG. 6 is a side elevational view showing the structure of the sealing device having a third electrode adapted to produce a tubular package having a cutting seal near one end thereof as illustrated by FIG. 5*b*; and

FIG. 7 is a side elevational view showing the structure of the welding device having a cutter means adapted to produce a tubular package as illustrated by FIG. 5*e*.

*Description of the preferred embodiments.*—Referring, now, to FIGS. 1 and 2, which show a typical equipment in which the present invention can be embodied comprises a hopper **1** for feeding the material to be packaged, a feeding unit **2** adapted to intermittently supply the material from the hopper **1**, a forming and sealing unit **3** for forming the packaging material into a tubular casing and sealing the overlapped edges of the casing, a cutting unit **4** for cutting the packaged material into individual products, and a drive unit **5** for driving the above-mentioned units in synchronism, said driving unit **5** comprising a main motor **6**, a reducer **7** and a main shaft **8**. Referring to FIG. 1, **9** is a motor for driving a screw adapted to knead the material within the hopper **1**.

Referring to FIG. 2, a feeding unit **2** consists of a dispensing cylinder **10** for intermittently supplying the material to be packaged, a feeding nozzle **11** extending through the forming and sealing unit **3**, a hydraulic cylinder **12** for driving the dispensing cylinder **10**, a transmission mechanism **13** consisting of a shaft **14** and gears **15**, **16** and **17** which are fixedly mounted on said shaft **14**. The gear **16** engages with a gear **18**, which is fixedly mounted on the dispensing cylinder **10**, for turning the cylinder **10**. The above-mentioned dispensing cylinder **10** is provided with openings, one of which comes into communication with the bottom opening in the hopper **1**, with the other opening being communicable with the open end of the nozzle **11** as the dispensing cylinder rotates.

In this manner, in cooperation with the piston rod of the hydraulic cylinder **12**, the material to be packaged is intermittently supplied to the nozzle **11**. A gear **19**, which is fixedly mounted on the main shaft **8** is operatively connected with the gear **15**, thereby driving the shaft **14** in synchronism with the main shaft **8**. The gear **17** is connected to a synchronizer unit **20**.

The synchronizer unit **20** consists of a cam shaft **21**, cams **22***a*, **22***b* and **22***c*, and micro-switches **23***a*, **23***b* and **23***c* which are operatively connected with the corresponding cams **22***a*, **22***b* and **22***c*.

The cam shaft **21** is driven by the gear **17** in synchronism with the main shaft **8**. The microswitches **23***a*, **23***b* and **23***c* are operatively connected with the valves for said hydraulic cylinder **12**. The micro-switches **23***a*, **23***b* and **23***c* are operatively connected to the valves (not shown) for the fluid flowing through the pipes which connect said hydraulic cylinder to the valve chest of the fluid reservoir to control the motion of the piston within said cylinder control the motion of said hydraulic cylinder **12**.

Referring to FIGS. 1 and 3, and particularly to FIG. 3, a roller **24** for feeding a thin, pliable packaging material **25** is mounted on a machine frame **26**, on which a roller **27** for feeding a package opening member **28**, which may take the form of an elonagted strip is also mounted. The upper electrode **29** which forms part of a high frequency heat sealing mechanism) seals the overlapped edges of the tubular casing formed from said packaging material **25** by forming mechanism (not shown), and the dispenser nozzle **11** injects a pasty food into the tubular casing. When the pasty food is pushed out of said nozzle **11**, it contacts with the tubular casing made of packaging material **25**. Then the packaging material **25** with opening member **28**, encasing the food, is moved intermittently to cutting unit **4** as said pasty food is ejected from nozzle **11** by the intermittent motion of the hydraulically operated piston of feed unit **10**.

During the cycle in which the food, casing material **25** and opening member **28** are not fed, said upper electrode **29** and lower electrode **32** are moved downwardly and upwardly respectively to push in the form of a sandwich said packaging material **25** and opening member **28** on the surface of nozzle **11**. A movable lower-electrode supporting member **30** has an elongated recess **31** for receiving the lower electrode **32**. The lower electrode **32** is filled with a plurality of depending insulation members **33** extending outwardly with respect to the tubular casing and is supported thereby in the recess **31** formed in said lower-electrode supporting member **30** in slidable relation in parallel with the axis of the tubular casing. A tension spring **34** is interposed between each of said insulation members and said lower-electrode supporting member so that the lower electrode **32** is permitted to press the lateral side of the package facing the same under a predetermined pressure. The lower electrode supporting member **30** has at least one flat surface, or two flat surfaces at both ends thereof, so that when the lower electrode is caused to press the package and package opening member, said surface or surfaces engage the package opening member **28** securely in position, i.e. in alignment with the axis of the casing. Indicated by numeral **35** is a series of guide rollers and **36** is an insulation for said upper electrode **29**. The lower and upper electrodes **29** and **32** are operatively connected with the main shaft **8** through rods **37** and **38**, respectively, in such a manner that the packaging material and package opening member are pressed by said electrodes against the nozzle **11**. Indicated by reference numeral **39** and **40** are switches.

Flow of high frequency current to the nozzle **11** and the electrodes **29** and **32** is enabled by switches **39** and **40**, respectively, which are actuated in response to the vertical movement of the rods **37** and **38**.

To synchronize the supply of high frequency current between the electrode and nozzle with the feeding of the

material to be packaged and the revolution of the main shaft **8**, the switches **39** and **40** operatively connected with the rods **37** and **38**, respectively, are employed above, but an additional micro-switch may be provided at the above-mentioned synchronizer unit **20** so that the supply of power to the electrodes will be thereby controlled in place of said switches **39** and **40**.

Said switches **39** and **40** (or addditional microswitch) are so adjusted in operation as to close the circuit comprising upper electrode **29** lower electrode **32**, additional electrode, nozzle **11** and high frequency generator means, as shown on FIG. 4, in the synchronized fashion in relation to the movement of casing material and rods **37**, **38** so that the high frequency current may be supplied to electrodes only when the motion of pasty food, casing material and electrodes (rods) are stopped.

It should be noticed that the lower electrode **32** is dimensioned somewhat shorter than the upper electrode **29** so that the package opening member **28** is heat sealed only part of the length of the casing. Stated differently, part of the package opening member remain unsealed. It will be apparent that according to whether the lower electrode supporting member has one flat surface or two flat surfaces, the final package has the package opening member of this invention with either one or two portions thereof unsealed.

In FIG. *5a*, the package has its package opening member sealed in the center, with both end portions remaining unsealed.

In FIG. *5b*, a similar package is shown, except that the package opening member remain partially unsealed near one end of the package. FIG. *5c* shows a package having an opening member which is not sealed in the center thereof but at all positions.

In another mode of this invention, there is provided an additional lower electrode (third electrode) **32'** in substantial alignment with the lower electrode **32** on a plane parallel to the axis of the tubular casing. It is preferable, however, that for the reasons to be hereinafter mentioned, the point electrode **32'** be disposed so that the sealing surface is a little closer to the tubular casing than in the sealing surface of the lower electrode **32**. This additional lower-electrode **32'** may be disposed in the position illustrated in FIG. 3, in which case in the final package appears like the one shown in FIG. *5d*. It will be readily seen that by altering the relative position of the lower electrode **32** versus the additional electrode or electrodes **32'**, various packages can be produced as illustrated by FIGS. *5e* and *5f*.

To obtain the package of FIG. *5d*, a recess may be formed in the lower electrode **32**, with the additional electrode **32'** being disposed in the recess. As mentioned above, it is preferable that the point-electrode **32'** be disposed with its sealing surface **41'** extending beyond the sealing surface **41** of the lower electrode **32**.

In this arrangement, the point electrode **32'**, which has a small sealing surface area, is pressed harder against the package opening member and casing than is the lower electrode, producing a comparatively tough nodular joint **42**.

In ripping the package open, therefore, with a finger applied under the unsealed portion **43**, the package opening member is cut at the nodular joint **42** to give a free end. So, the package can be easily ripped open by pulling the free end down the package.

Furthermore, by the nodular joint **42**, the unsealed package opening member is prevented from rising out of contact with the package.

In another mode of embodiment of the present invention, a cutter blade **44** is disposed in place of the point electrode of the foregoing example. Thus, just like the point electrode **32'**, the cutter blade **44** is mounted, adjacent to the lower electrode **32**, on the lower-electrode supporting member **36**, so that the blade makes an impression on the package opening member **28** at a point substantially midway of its unsealed portion. FIGS. *5g* and *5h* show typical products.

The following is a typical specification of the machine which can be employed for the purposes of the present invention.

| | |
|---|---|
| Main motor | 2.2 kw. |
| Reduction motor | 0.4 kw. |
| Power supply | AC 200 v., 100 v. |
| Hydraulic cylinder pressure | 30 kg./cm.$^2$ |
| Cylinder stroke | 40/70 mm. |
| Sealing | High frequency (40, 68 mc.). |
| Packaging film | Vinylidene chloride 0.04 mm. thick. |
| Opening member | Vinylidene chloride 2200 deniers (approx. 0.4 mm. in dia.). |
| Shape of the opening member after sealing. | 1.5 mm. wide, 0.2 mm. thick. |

A significant advantage of the present invention is slat the package opening member of this invention may have various cross-sections, e.g. round, square and rectangular, and as such may be considerably more durable than the strip of heat sealable material conventionally utilized. Furthermore, whereas the conventional strip is usually made of heat sealable plastic material, the package opening member to the employed in accordance with this invention may be made of any material that can be joined with the packaging material under the influence of heat.

A notable advantage of the method of this invention is that because the package opening member is sealed onto the tubular casing simultaneously as the latter is formed by the sealing of its side edges, with the tubular casing remaining in a fixed position throughout the two operations, the timing of feeding said packaging material and package opening member, and of bringing the electrodes to the heat sealing zone is considerably facilitated as compared to the conventional method in which sealing of the overlapping side edges is carried out with casing in one position and affixing a tear strip with the casing in another position. Having thus described the preferred examples of the present invention.

What I claim as my invention is:

**1.** A tubular casing made of heat sealable material in the form of a pliable sheet with its side edges overlapped and heat sealed into a seam, which has a package opening member extending the length of said casing and heat sealed onto the casing a limited length thereof simultaneously as said seam is formed, with the length of said member other than said limited length remaining unsealed.

**2.** The casing of claim **1**, wherein the length of said package opening member other than said limited length is further sealed onto the casing at a point substantially midway of the first-mentioned length.

**3.** The casing of claim **1**, wherein the length of said package opening member other than said limited length is incised to a depth short of the thickness of said package opening member.

**4.** The casing of claim **1**, wherein said package opening member is substantially circular in cross-section.

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DAVID M. BOCKENEK, *Primary Examiner.*

U.S. Cl. X.R.

99—176; 229—51