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3,764,434

BAG-FORMING MACHINE

Filed Nov. 29, 1968

3 Sheets-Sheet 1

Fig. 1.

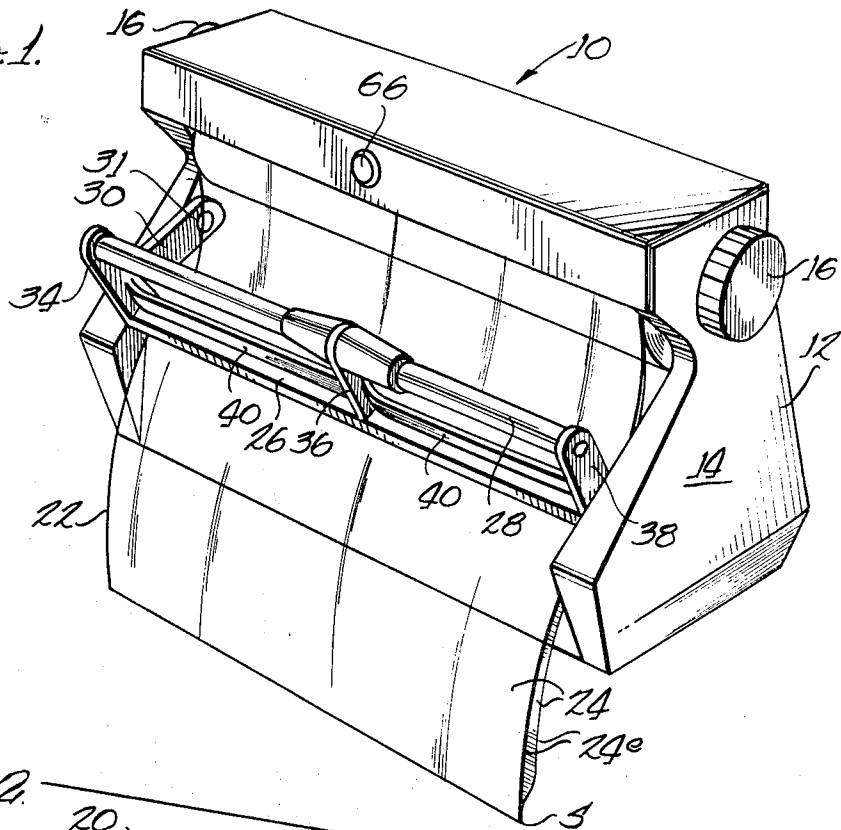
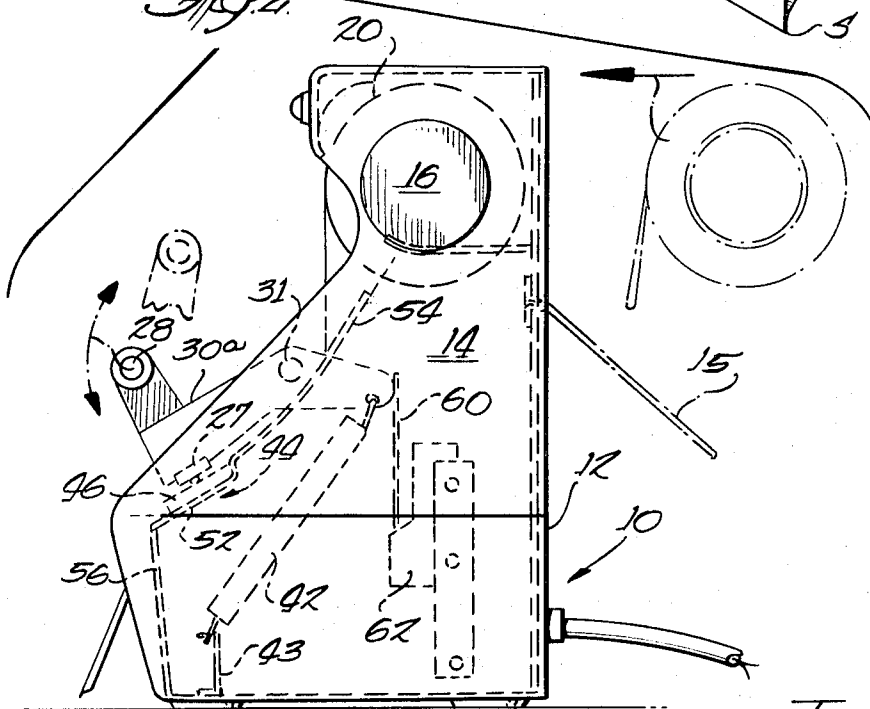


Fig. 2.



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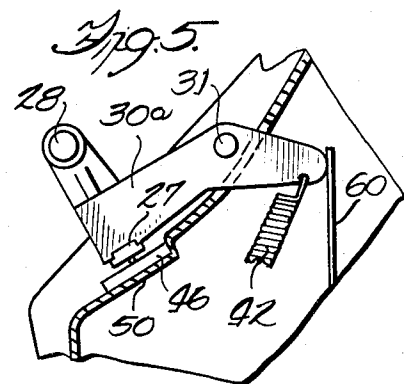
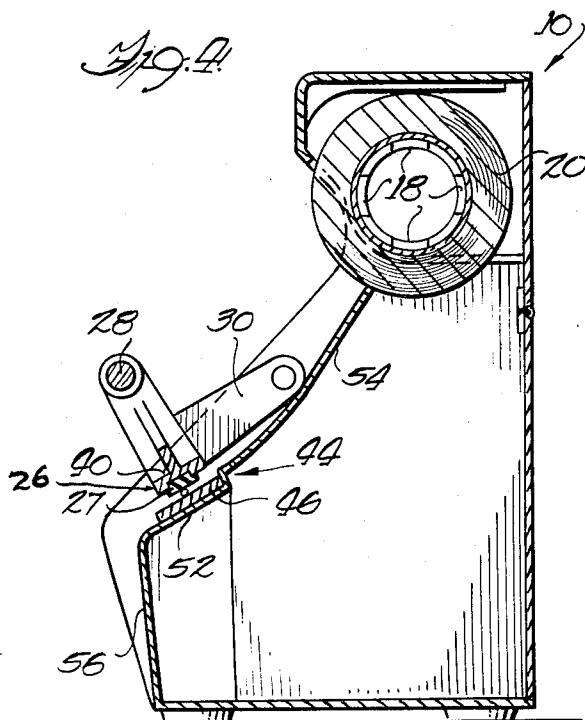
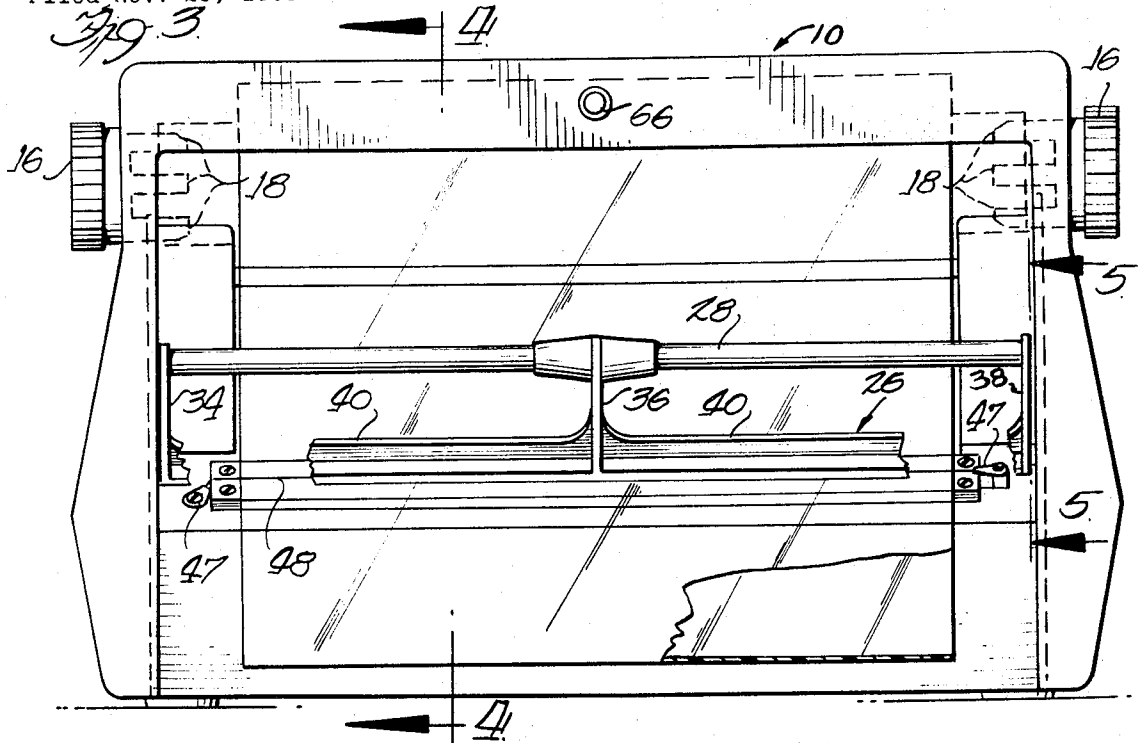
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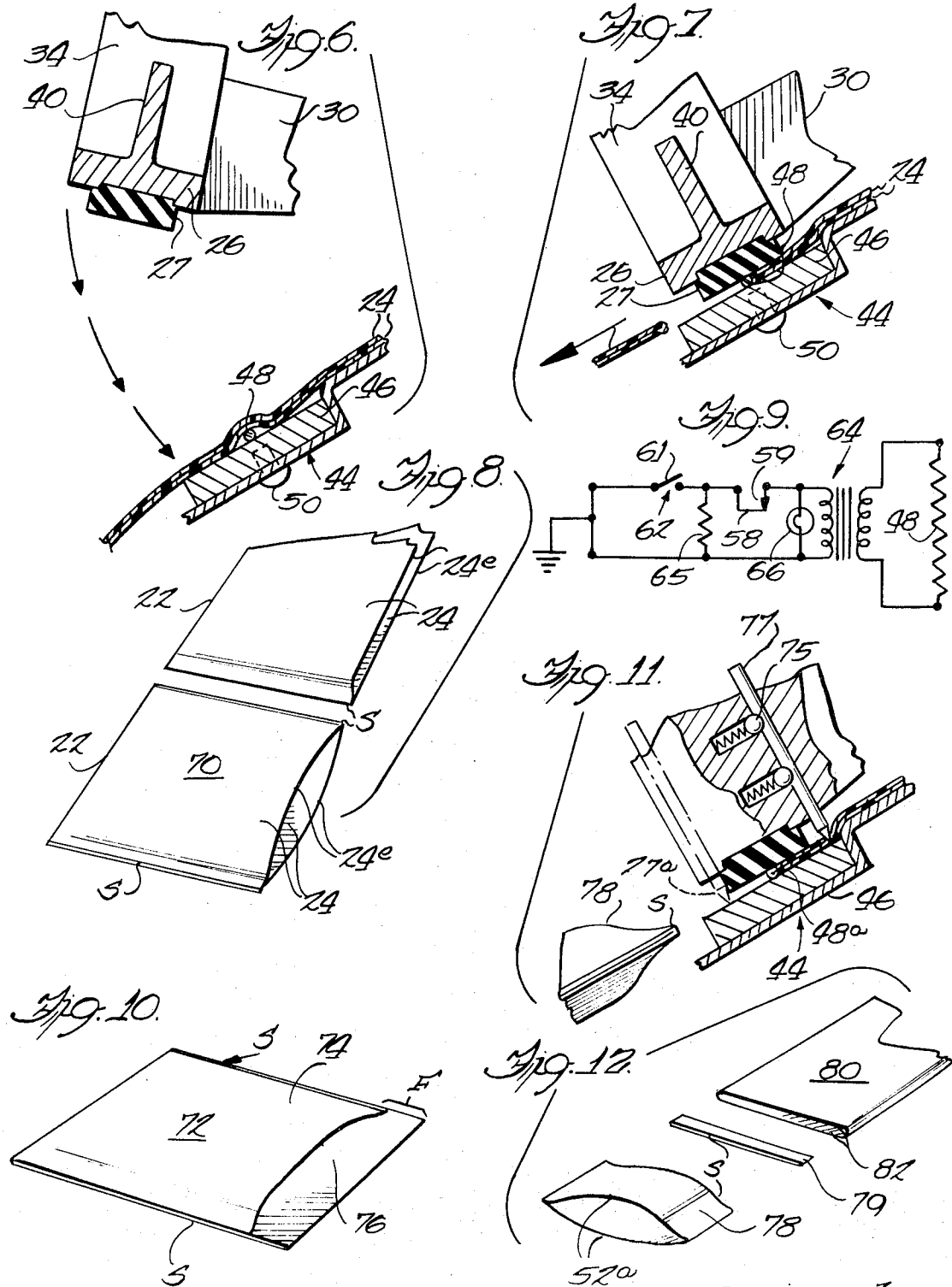
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BAG-FORMING MACHINE

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3 Sheets-Sheet 3



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BAG-FORMING MACHINE

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4 Claims

ABSTRACT OF THE DISCLOSURE

A bag-forming machine adapted for use in the home employs a compact housing having rotatably mounted therein a roll of longitudinally folded thermoplastic sheet material. A sealing station is disposed beneath the roll and utilizes a stationary anvil surface on which a resistance wire is mounted. A pivotally mounted, manually actuated sealing bar urges a selected transverse band of the film plies over the wire until a desired sealing and cutting action has been effected.

BACKGROUND OF THE INVENTION

This invention relates to a bag-forming machine, and more particularly pertains to the use of a portable unit adapted to form bags of desired size from plastics such as polyethylene.

The ability of the plastics to retain foods such as fruits and vegetables in a fresh, moist condition is well recognized as is their ability to maintain enclosed items in a clean, dust-free condition. Certain plastics are also capable of functioning as efficient gas barriers. Consequently, plastics are used at an ever increasing rate in the home and particularly the kitchen, as well as restaurants, bakeries, food marts, and in general wherever foods are stored and handled. The use of plastic bags is increasing in hospitals as medicament containers, as well as in a variety of specialized applications such as packaging of expensive tool parts.

In an attempt to satisfy the increasing home need for plastic bags, continuous rolls of bags sealed at one end and perforated for ready removal from the roll at the opposite end are available. However, these bags are made in a small number of standard sizes, thereby rendering the bags suitable for limited use.

One of the most common usages for plastic bags is preservation of meal leftovers for future use, such preservation being increasingly important with advances in food prices. The leftovers will obviously vary in amount and volume, oftentimes rendering preformed plastic bags of little or no use.

In accordance with this invention, a compact, portable bag-forming device is adapted to form plastic bags of desired width thereby satisfying a variety of needs for such bags about the home. Thus, small bags may be formed to preserve small pastry items and larger bags formed to preserve large pieces of leftover poultry, roasts or the like.

The machine of this invention comprises a compact housing in which is disposed a hand-operable rotary mount for a rolled plastic sheet or tube to be formed into bags. The housing also supports a sealing station having a sealing bar and anvil which cooperate to simultaneously form a bag seal and cut a formed bag of desired width from the roll. A signal light informs the machine user of the completion of the sealing cycle.

It is an object of this invention, therefore, to provide a portable, light-weight bag-forming machine for forming bags of desired size in a rapid manner.

It is a further object of this invention to provide a bag-forming machine which is adapted to simultaneously form discrete bags by a cutting action while forming two adjacent bag seals.

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It is yet another object of this invention to provide a bag-making machine having a sealing bar arrangement adapted to readily form an open-ended bag, and if desired, readily seal such open end to form a bag closed about its entire periphery.

It is another object of this invention to provide a bag-forming machine formed of readily available parts which may be used in the home in complete safety. Its simplicity of operation enables it to be efficiently used by all family members, except very young children, as will hereinafter become apparent.

The above and other objects of this invention will become more apparent from the following detailed description when read in the light of the accompanying drawings and the appended claims.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of one embodiment of a bag-forming machine formed in accordance with this invention;

FIG. 2 is an end elevational view of the apparatus of FIG. 1, illustrating certain internal parts in dotted lines; FIG. 3 is a front elevational view of the apparatus of FIG. 1;

FIG. 4 is a sectional view taken on line 4—4 of FIG. 3; FIG. 5 is an enlarged sectional view taken on line 5—5 of FIG. 3;

FIG. 6 is an enlarged, fragmentary sectional view illustrating a stationary anvil and pivotally movable sealing bar of the provided invention with the sealing bar in an upper position;

FIG. 7 is a sectional view of the elements of FIG. 6 in which the sealing bar is in a lower sealing position;

FIG. 8 is a perspective view of a bag member formed from a roll of plastic film which has been folded upon itself;

FIG. 9 is a schematic wiring diagram of the sealing system employed in the provided apparatus;

FIG. 10 is a perspective view of a modified bag which may be formed by the provided apparatus;

FIG. 11 is a sectional view similar to FIG. 7 illustrating a sealing arm employing a cut-off knife; and

FIG. 12 is a perspective view illustrating a bag member formed from a continuous tubular film member utilizing the apparatus of this invention.

DESCRIPTION OF THE INVENTION

We are referring now to FIG. 1—a bag-forming machine 10 as illustrated, which is of compact size and which may be readily placed on a kitchen counter while occupying a minimum of space. Whereas the machine may serve many applications in the ordinary household, it will become apparent that the apparatus described hereinafter may be used to advantage in many businesses such as bakeries, grocery stores and the like.

The bag-forming machine 10 comprises an outer housing 12 having opposed side wall portions 14 in which are rotatably mounted hand-engaging knobs 16 having a knurled periphery to facilitate turning thereof. As is most apparent from FIG. 3, each knob 16 has inner projecting prong portions 18 which are adapted to resiliently engage the inner peripheral portions of opposed ends of a core of a roll of a thermoplastic material such as roll 20, most clearly seen in FIG. 4. Hinged back panel 15, see FIG. 2, facilitates roll insertion and core removal.

It will be noted from FIG. 1 that the plastic material of roll 20 comprises a longitudinally folded strip which has a longitudinal bight edge portion 22 and opposed longitudinal free ends 24e defined by superposed plies 24. It is the function of the bag-making machine 10 to form transverse seals extending across the width of the plies 24 of the thermoplastic material whereby the bight edge

22 of the roll 20 will form the bottom and the transverse seals will form the opposed sides of the formed bag. Portions of the free edges 24e of the film define the open end of the formed bag, as in bag 70 of FIG. 8.

The plies 24 of the roll of thermoplastic film 20 must be sealed to form a side seam therebetween such as the seam S illustrated in FIG. 1. Such a transverse seal is formed by pivotally movable sealing bar 26 having a strip 27 of resilient heat-resistant material, such as a silicone rubber, secured to the undersurface thereof, see FIGS. 4 through 7. Spaced vertical supporting strip portions 34, 36 and 38, see FIGS. 1 and 3, join bar 26 with a spaced transversely extending hand-engageable rod or handle portion 28 centrally disposed in the machine. Strips 34 and 38 are connected to or integrally formed with arms 30 and 30a pivotally mounted in the opposed walls 14 of the housing at 31, see FIGS. 1, 2 and 5. Reinforcing ribs 40 extend between strips 34, 36, 38 on the top of sealing bar 26.

A coil spring 42 anchored at one end to bracket 43, secured to the bottom of housing 12, see FIG. 2, engages at an opposed end limit, a terminal portion of a pivotal arm 30a, see FIGS. 2 and 5. In the normal position of rest, arms 30 and 30a will be pivoted to move the handle 28 and sealing bar 26 into an upper position as illustrated in FIG. 6. Upon manually urging handle 28 in a downward direction in opposition to spring 42, the resilient strip 27 mounted on the bottom of sealing bar 26 will be urged against a fixed anvil assembly 44 in the manner seen in FIG. 7. Anvil assembly 44 comprises a transverse insulator strip or bar 46 on which is centrally mounted a resistance wire 48, see FIG. 1, extending between terminals 47. The insulator bar 46 is secured by fasteners 50 or the like in a transversely extending ledge portion 52 comprising a continuation of a guide plate 54 which guides plies of the thermoplastic roll 20 into proper overlying disposition on the transverse anvil assembly 44 as seen from FIGS. 2 and 4. A continuation 56 of the transverse ledge 52 extends to and is integrally formed with the bottom of the housing 14.

As seen in FIG. 5, the end of the spring-engaging arm 30a effects a camming action against a switch actuator arm 60 of a switch 62, see FIG. 2, resulting in a current passing through resistance wire 48 mounted on the insulator bar 46 of the machine sealing station.

In the normal course of use of the bag-forming machine 10, the free end of roll 20 mounted between knobs 16 is pulled over the guide plate 54 until a bag to be formed of desired width has a side to be sealed positioned over the sealing resistance element 48. The sealing bar assembly is manually engaged by means of the transverse handle portion 28 and pivoted in a downward direction until the overlying plies 24 of the roll of film 20 are tightly urged by the resilient sealing strip 27 over the sealing wire 48 and the transversely extending insulator bar 46 in the manner illustrated in FIG. 7.

As the sealing arm moves downwardly the camming action of the end portion of arm 30a on switch actuator arm 60 will close the switch 62 completing an electrical circuit energizing the resistance wire 48 after the voltage of incoming current has been appropriately reduced by means of a step-down transformer 64 as shown in FIG. 9. Simultaneously with the energization of the resistance element 48 a signal light 66 centrally mounted in an upper portion of the housing 12, see FIG. 1, will be energized, informing the user of the machine that the resistance element is being energized and the sealing action is taking place.

In order to apprise the user of the machine 10 as to the completion of the sealing operation a warp-out strip 58 which may comprise a strip of two dissimilar metal laminations, may be employed in conjunction with a resistance element 65 for breaking the circuit to the signal light 66 and the resistance element 48 after a predetermined time period. Element 65, after a period of time

adequate to seal and sever plies 24 of the thermoplastic material, will have heated strip 58 to the extent it will warp, breaking the circuit at contact 59, see FIG. 9. A regulatable timer, not illustrated, may be substituted for the resistance element 65 and strip 58 for purposes of breaking the circuit to the resistance element 48 and signal light 66 after a desired period of time has elapsed. At the end of the predetermined period of time dictated by strip 58, the current flow to the resistance element 48 and signal light 66 is broken. The operator of the machine is then visually informed that the sealing operation has been completed and the pivotally mounted sealing bar is released.

A bag, such as bag 70 illustrated in FIG. 8, results from the aforescribed sealing operations, such bag having opposed side seams S resulting from two consecutive operations of the sealing bar 26 at the sealing station of the apparatus. The closed bottom of the bag 70 will comprise a portion of the bight 22 of the folded-over sheet of the roll 20, and the free ends of the bag 70 will comprise segments of the free longitudinal edges 24e of the plies 24 of such roll.

FIG. 8 also illustrates a terminal end of the roll 20 which has a seal S, identical to adjacent parallel seal S, both of which were formed as a result of the sealing and severing steps illustrated in FIGS. 6 and 7. It is seen from these latter figures that the resistance wire mounted on insulation 46 is able to provide a melting heat where it engages the thermoplastic plies 24. The force exerted by pad 27 readily divides the plies where contact is made with wire 48. This axis of contact defines the line of severance between the bag 70 and remainder of the roll 20. The ply areas adjacent the axis of severance form the twin seals S—S, shown in FIG. 8. Thus, the provided sealing station is able to simultaneously seal and sever a formed bag from roll 20.

Assuming that it is desired to seal the open end of the bag 70, illustrated in FIG. 8, the overlying portion of the roll 20 is rolled up out of the path of the sealing bar 26 and free edges of bag 70 are placed in position over the transverse insulator bar 46 after insertion of the contents to be protected in the bag, and the sealing bar moved into sealing position in the manner illustrated in FIG. 7.

FIG. 10 illustrates a bag 72 formed from a modified form of plastic roll which may be utilized for the formation of bags. Bag 72 is formed of an overlying ply 74 and an underlying ply 76 in which the overlying ply is narrower so as to leave an underlying extending flap portion F which may have a pressure-sensitive adhesive disposed on its inner surface. Bag 72 may then be readily sealed by hand after formation of the second lateral seal S, by folding the flap portion F over an underlying portion of the upper ply 74.

As a still further modification of a bag member which may be formed from the above described apparatus 10, a bag 78 illustrated in FIG. 12 may be formed from a roll of flattened, tubular material 80 comprising the source of the thermoplastic material to be formed into bags. Inasmuch as the circumference of such a tubular member formed into roll 80 is continuous, the only seals which need be formed are those adjacent the upper end, and if desired, a seal closing the lower end of such bag.

FIG. 11 illustrates a sealing station, similar to that illustrated in FIGS. 6 and 7. In FIG. 11 a knife 77 is spaced above sealing wire 48a in the direction of the plastic roll. Knife 77 is axially movable out of the operative position illustrated by pulling the same upwardly thereby freeing the same from the spring-loaded detent bearings 75 which engage receiving sockets in the knife side.

Since the material sealed in the station of FIG. 11 is tubular, the sealing step illustrated performs a sealing of one end of the bag being formed as by formation of seal S of bag 78 illustrated in FIG. 11, and simultaneously

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severs a thin waste strip 79 illustrated in FIGS. 11 and 12 and forms free ends 82 on the remaining flattened portion of roll 80 which will comprise the open end of the next bag to be formed. The width of the waste strip is desirably maintained as narrow as possible and is defined by the interval between sealing wire 48a and the cutting edge of knife 77. Assuming that it is desired to seal together free ends 82a of bag 78 shown in FIG. 12, formed from a segment of roll 80, such edges are disposed over the sealing element 48a short of knife 77, and pad 27a is urged into the position illustrated.

The knife, or if desired, perforator may be disposed on the delivery side of the heating element as shown in dotted lines. Utilizing the latter arrangement, the end of the bag immediately being formed would be open and the next bag to be formed would have a closed end formed simultaneously. However, in the event that sealing of the free ends of the latter bag is desired, a knife such as knife 77a in FIG. 11, must be retracted from the cutting position to prevent severance of the formed seal from the remainder of the bag.

As a still further modification, a retractable knife may be employed with a resistance heating wire which may be de-energized by the operator from the housing exterior as by a push button switch. In such an arrangement the wire 48a and knife edge are used alternately thereby eliminating formation of a waste strip. The thermoplastic material may then be sealed and severed by the wire 48a with the knife retracted, and then severed by a knife edge with the heating element 48a in inoperative condition.

It is seen from the foregoing description, therefore, that a novel, compact, bag-forming machine has been provided which is adapted for many uses about the house, particularly in the kitchen. Pastry items which must be maintained in a moist, fresh condition in order to be palatable, may be inserted into a bag member which has been custom formed so as to adequately contain the item therein, and the free ends either rolled closed or sealed closed by means of a sealing element. Although the sealing elements are illustrated in a stationary position in the drawings mounted on stationary insulation members, the sealing element and insulator bar on which mounted may be pivotally movable and the resilient surface may comprise the fixed surface against which the element moves. The foregoing description has made apparent the flexibility of which the provided apparatus is capable. A number of bags and seals may be formed utilizing the machine 10 as has been above explained.

I claim:

1. In a bag-making machine adapted to form bags from a roll of collapsed, tubular, thermoplastic material, the

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combination comprising means for simultaneously severing a distal section of said tubing from said roll along a severance axis and simultaneously forming heat seals between the plies of said tubular material along axes straddling said axis of severance, and means for at least partially cutting a portion of said tubing along a second axis parallel to and spaced from said axis of severance operative concurrently with said severing means.

2. The machine of claim 1 in which said means for cutting said tubing along a second axis is retractable into an inoperative position.

3. The machine of claim 1 in which said means for simultaneously severing and forming heat seals is a resistance wire mounted on a planar insulated surface.

4. The machine of claim 3 in combination with means for applying a current to said resistance wire sealing element when said sealing element engages said planar surface, signal means responsive to the passage of current to said resistance wire, and timer means responsive to the passage of current between the current supplying means and said resistance wire adapted to terminate passage of current to said resistance wire after expiration of a predetermined period of time.

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