

Jan. 20, 1970

A. C. MONAGHAN
PACKAGING MACHINE

3,490,194

Original Filed June 6, 1961

5 Sheets-Sheet 1

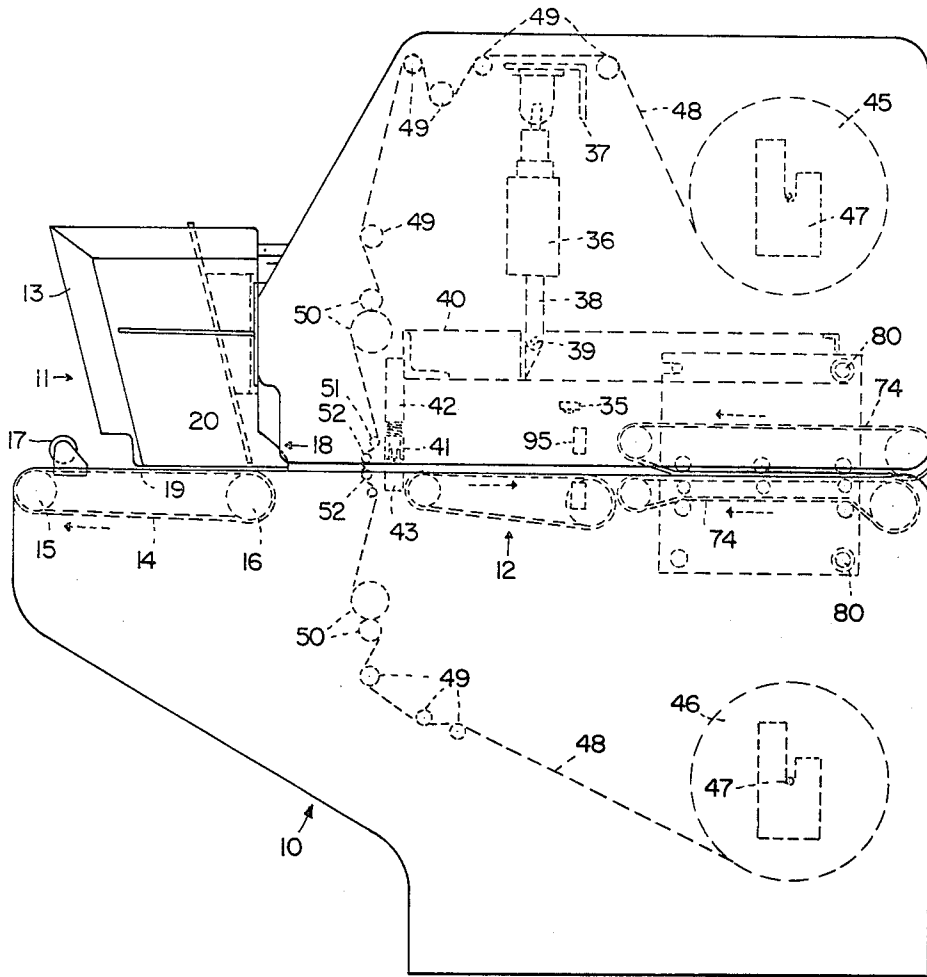


FIG. 1

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PACKAGING MACHINE

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5 Sheets-Sheet 2

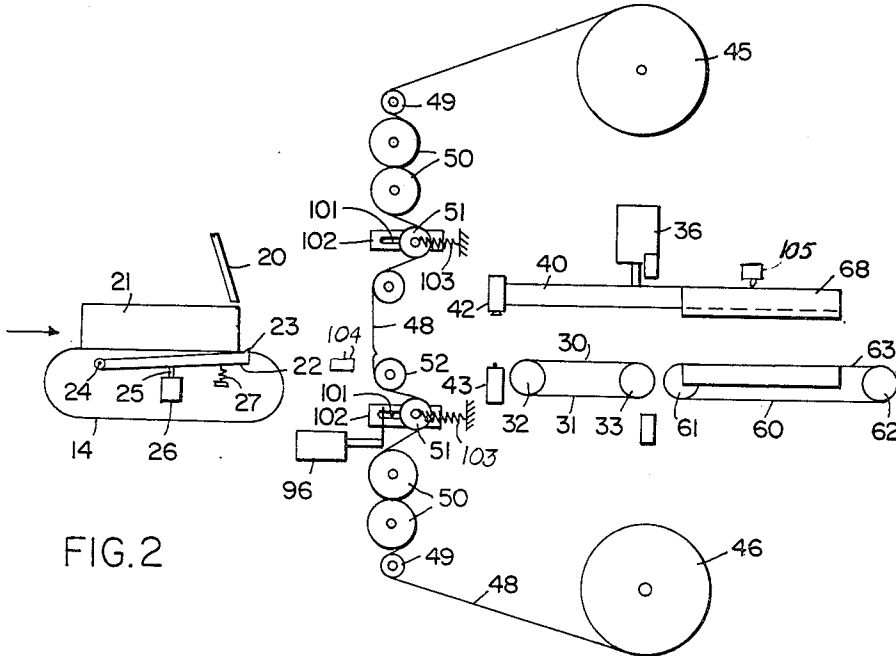


FIG. 2

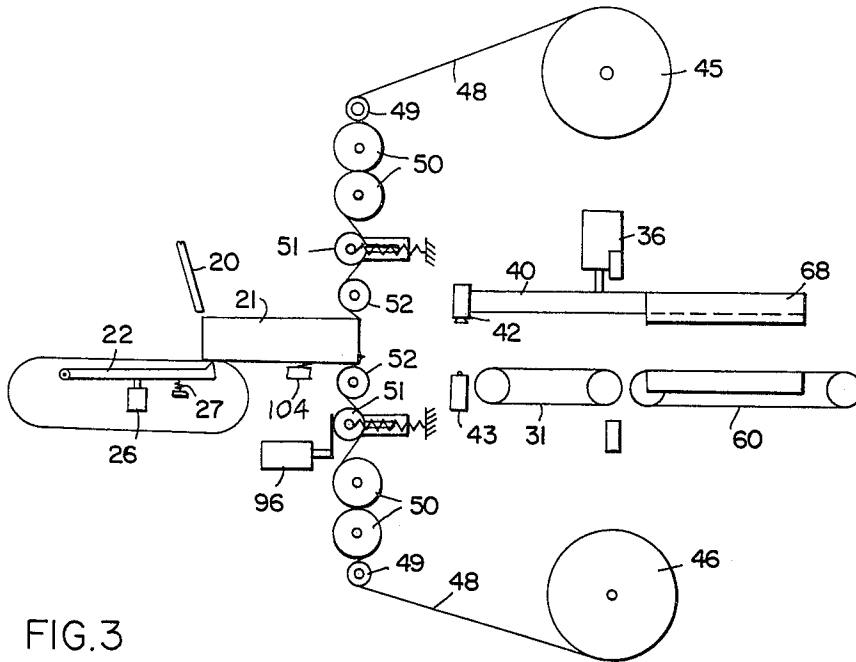


FIG. 3

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PACKAGING MACHINE

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5 Sheets-Sheet 3

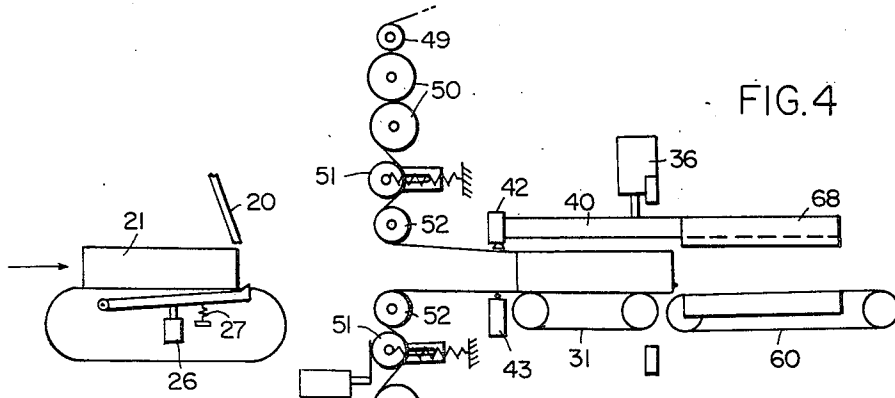


FIG. 4

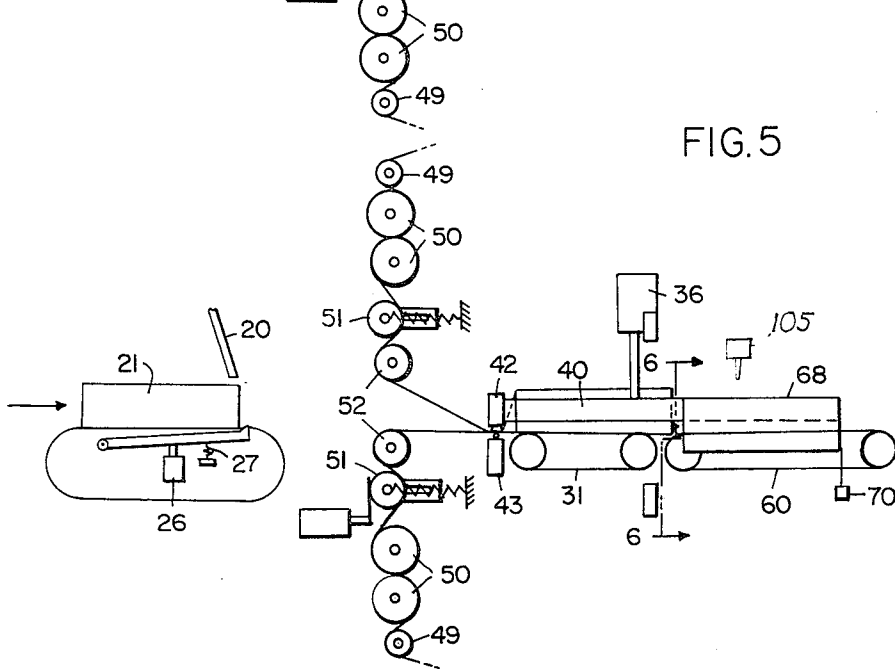


FIG. 5

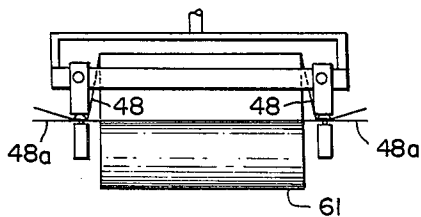


FIG. 6

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PACKAGING MACHINE

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5 Sheets-Sheet 4

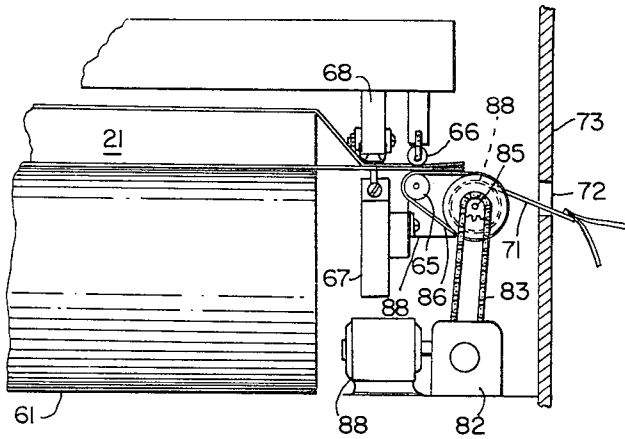


FIG. 7

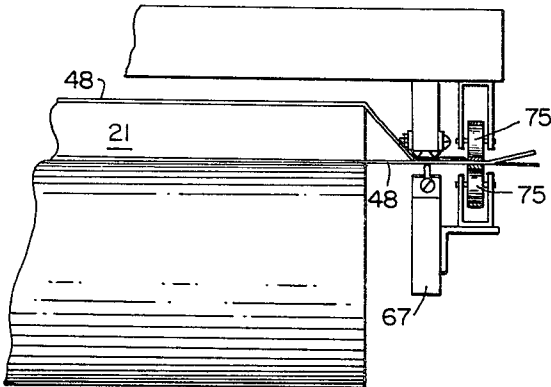


FIG. 8

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PACKAGING MACHINE

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5 Sheets-Sheet 5

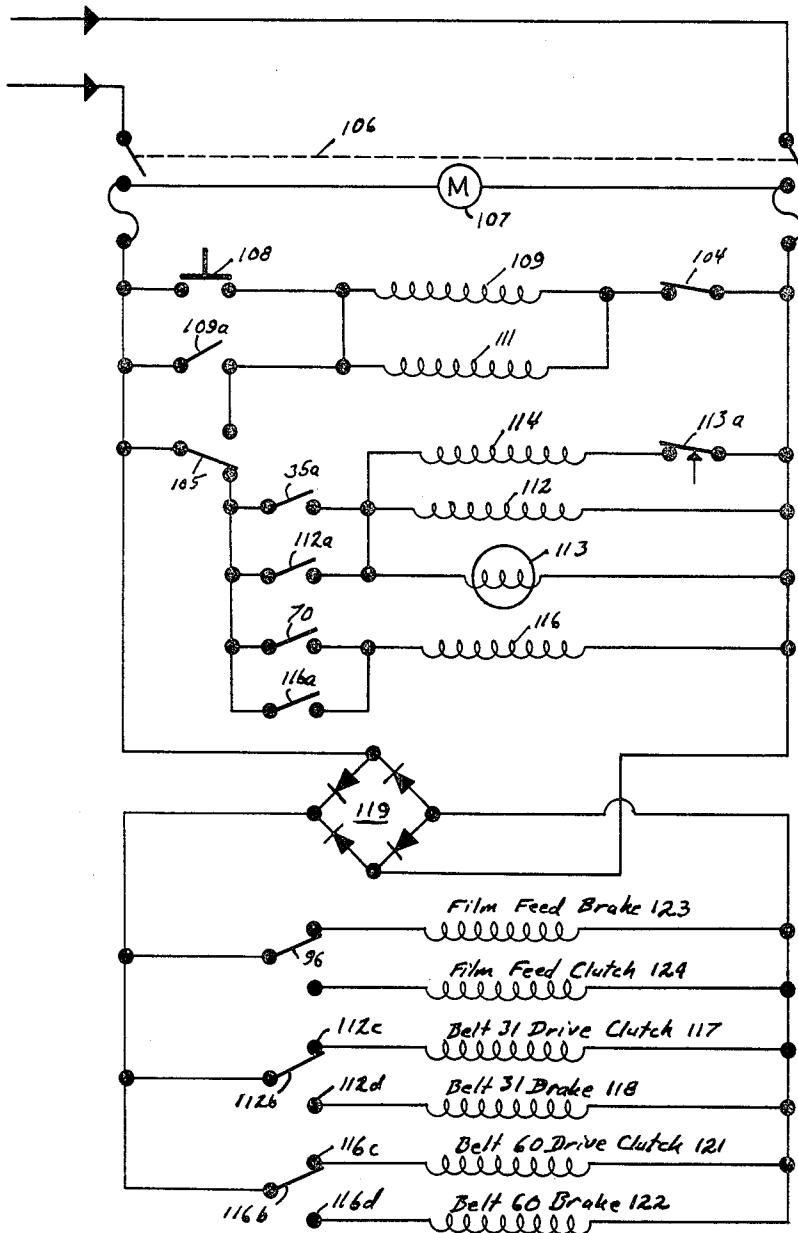


FIG. 9

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3,490,194

PACKAGING MACHINE

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Continuation of application Ser. No. 115,123, June 6, 1961. This application Aug. 9, 1965, Ser. No. 482,989

Int. Cl. B65d 81/00

U.S. Cl. 53-28

13 Claims

ABSTRACT OF THE DISCLOSURE

Packaging machine and method for automatically wrapping articles in a film of material of the type which is fusible under pressure in the presence of heat. The sheet of film material is stretched under tension between two sources of supply of the material in the path of the article to be wrapped. The film is releasable from both supply sources upon the tension thereof being overcome by moving the article into engagement with the film and continuing to move the article and the film in the same directions for a distance greater than the length of the article whereby the film becomes folded about the leading edge of the article and along opposite faces thereof. At this stage each sealing of fusing unit including a presser device shaped to the contour of the sides and following end of the article is moved to place the side margins and a portion of the film at the following end of the article in contact under pressure for application of heat thereto to fuse the film thereby enclosing the article therein. The film is then severed throughout its width in the fused area at the following end of the article whereby the wrapped article is released as a free unitary structure and the film by virtue of its fusing in the area of its severance remains extending as a continuous sheet between the supply sources ready for engagement by a succeeding article for a repetition of the wrapping operation.

This application is a continuation of application, Ser. No. 115,123, filed on June 6, 1961, now abandoned.

The present invention relates to packaging machines, and more particularly to a machine for, and the method of, automatically wrapping articles in a film of material of the type which is fusible under pressure in the presence of heat. Machines of this character comprise a very crowded and complex art and fall into many categories, since their development has resulted from attempts to keep pace with the rapid and diversified requirements of the modern packaging of a multitude of different products. As is well known, such products take various forms and present a variety of problems dealing with such things as difficulty in handling, perishability in storage, peculiar characteristics as to packaging requirements in the field of marketing, and many others. Also, rapid advances have been made in recent years in the development of packaging materials with regard to their physical and chemical compositions and in their functional characteristics. Furthermore, advances have been made in the category which concerns itself with packaging techniques to best accomplish the wrapping or packaging of an article in a new, or simplified, or better manner than heretofore.

The present invention falls in the latter category and has as its objective the provision of a novel means and method for automatically wrapping articles in a film of the so-called thermo-plastic type of materials which are transparent, fusible by the application thereto of heat and pressure and, in some instances, shrinkable in the presence of heat whereby the film may be caused to conform snugly to the contour of the article around which it has been previously wrapped.

This is a continuation of my co-pending application S.N. 115,123, filed June 6, 1961. In its broader aspects, the present invention relates to a means and method as set forth in my co-pending application Ser. No. 50,532, filed Aug. 18, 1960, now Patent No. 3,158,973 of which the aforesaid application S.N. 115,123 was a continuation-in-part, for the wrapping of an article in a film of material of the type which is fusible under pressure in the presence of heat. In accordance with the disclosure in my said co-pending application, the article to be wrapped is utilized by the movement thereof to engage a sheet of the wrapping material and measure off the necessary length of material required to wrap it, whereby the loose edges of the material along the sides of the article and an area thereof following the article are in position to be brought into contact under the application of pressure and heat to fuse the material and thus envelop the article, and the material is then severed in the fused area following the wrapped article to release the latter as a seal-wrapper unit.

More specifically, the invention relates to a machine wherein a sheet of film material of the character referred to is stretched under tension between two sources of supply of the material and in the path of the article to be wrapped. The film is releasable from both supply sources upon the tension thereof being overcome and this is accomplished by moving the article into engagement with the film, which is wider than the article, and continuing to move the article and the film in the same direction for a distance greater than the length of the article, whereby the film becomes folded around the leading edge of the article and along opposite faces thereof. At this stage a heat sealing or fusing unit including a presser bar, shaped to the contour of the sides and following end of the article, is moved to place the side margins and a portion of the film at the following end of the article in contact under pressure and apply heat thereto to fuse the film, thus enclosing and sealing the article therein. The film is then severed throughout its width in the fused area at the following end of the article, whereby the wrapped article is released as a free unitary structure and the film, by virtue of its fusing in the area of severance, remains extending as a continuous sheet between the supply sources ready for engagement by a succeeding article for a repetition of the wrapping operation. When heat shrinkable material is employed, the wrapped article can be momentarily subjected to heat sufficient to cause it to shrink into snug contact with the article to form a smooth, neat covering therefor, the shrinking heat having an effect on the fused portions of the film whereby they contract into an almost inconspicuous bead.

The present invention contemplates improvements in the construction and operation of the machine disclosed in my said copending application including an automatic feed of articles to be wrapped, means controlled by the movement of the article to be wrapped into engagement with the wrapping film to effect the feeding of the film as said article advances to the wrapping station, and means to control the timed operation of the automatic feed of articles to be wrapped. The present invention also contemplates a new and improved method and means for wrapping to insure a proper and complete wrapping, functioning in two stages of operation, the first stage of which can be used independently to provide a sleeve or bond wrap and an additional feature of providing an excess of wrapping material at the sides of the article which can then be sealed, severed and automatically disposed of when a side seal is required.

Other objects, and features of the present invention will appear and be clear to those skilled in the art from the detailed description, with reference to the drawings, which follows.

In the accompanying drawings, the invention has been shown merely by way of example and in preferred form and obviously many variations and modifications thereof may be made which will still be comprised with its spirit. It is to be understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are set forth in the appended claims.

Referring to the drawings:

FIG. 1 is a view diagrammatically showing the machine in side elevation;

FIG. 2 is a view diagrammatically showing the feed and wrapping mechanisms in position to commence operation;

FIG. 3 is a view similar to FIG. 2, showing the article to be wrapped advanced into engagement with the wrapping film;

FIG. 4 is a view similar to FIGS. 2 and 3, showing the article in the first wrapping position;

FIG. 5 is a view similar to FIG. 4, showing the relation of the parts when sealing and severing the wrapping film;

FIG. 6 is a vertical transverse view, taken on the line 6-6 of FIG. 5, showing the side sealing and severance of the wrapping film with the article in the second wrapping position;

FIG. 7 is an enlarged view of the right-hand portion of the structure shown in FIG. 6, including means for removing excess wrapping material after the side seal has been effected;

FIG. 8 is a view similar to FIG. 7, showing a modification of the mechanism for removing the excess wrapping material; and

FIG. 9 is a schematic diagram of the circuit for operating the machine of FIG. 1.

In the drawings, the major elements only of the machine with which the present invention is concerned have been shown diagrammatically, and for the sake of clarity, the description will be confined to those portions of the machine which have to do with its general construction and operation and with the novel features resulting from the concept of the present invention. The machine will be referred to in general terms for the purpose of orientation of its structure and functions as a whole, which will be clear to those skilled in the art.

The machine as shown in FIG. 1 comprises a frame structure 10 which supports two main units comprising an article delivery unit 11 and an article wrapping unit 12. The delivery unit 11 comprises a hopper 13 supported in the frame 10 in a position above an endless conveyor belt 14 running on spaced-apart rollers 15 and 16 journaled in the frame 10. Disposed above the belt 14 and mounted in the frame 10 is an idle roller 17, which is provided as guide for directing article in the hopper 13 toward the delivery end 18 thereof.

The motive power for operating the belt 14 and other power driven mechanisms of the machine has not been shown herein because it is disclosed in detail in my said co-pending application Ser. No. 50,532, now Patent No. 3,158,973 to which reference may be had if desired.

Referring to FIGS. 1-5, it will be seen that the hopper 13 has associated therewith a vertically adjustable guide finger 20, the lower end of which may be variably positioned in spaced relation to the top run 19 of the belt 14 and set at a distance slightly greater than the thickness of an article 21 to be wrapped, so that the latter can be carried thereunder by the movement of the belt 14 in the direction of the arrow as the finger 20 acts as an abutment to restrain the movement of the next and succeeding articles stacked one upon the other in the hopper 13. A lever arm 22, formed with an upstanding nose 23 at the forward end thereof, is pivoted at its opposite end, as at 24, to the frame 10 or to a bracket (not shown) secured thereto. Approximately midway of its length the arm 22 is pivotally fixed to a piston rod 25 extending

upwardly from an air cylinder 26 also mounted in the frame 10 and connected to a supply of compressed air. A compression spring 27 is arranged between a fixed bracket 28 in the frame 10 and the undersurface of the arm 22 to exert its expansion force against the arm 22 and normally maintain the arm in a raised position with the nose 23 thereof extending above the plane of the upper run 19 of the belt 14.

The article 21 is adapted to be moved by the belt 14 from the hopper 13 into the wrapping and sealing unit 12, the relation of the parts being such that the belt 14 will carry the article 21 a sufficient distance to bring it into engagement with the upper run 30 of an endless conveyor belt 31 running in the direction of the arrow on power driven rollers 32 and 33. The conveyor belt 31 carries the article forward and brings it to rest in the first wrapping and sealing position within the wrapping unit 12 (see FIG. 4). In its final movement into first position, the forward end of the article 21 moves beneath an electric eye control 35. The eye control 35 effects the operation of an air cylinder 36 mounted in a bracket 37 extending in the frame 10 and having a downwardly extending piston rod 38 pivotally connected as at 39 to a sub-frame 40. The sub-frame 40 carries a presser bar 41 yieldably mounted in a fixed base 42 secured to the front end of the sub-frame. The operation of the air cylinder 36 moves the sub-frame 40, together with the pressure bar 41, downwardly into engagement with a fixed platen 43 mounted with its upper surface substantially in the horizontal plane of the upper run 30 of the conveyor belt 31. It is pointed out that the presser 41 may be heated to effect the sealing of the film and have associated therewith a knife blade for severing the film but, preferably, a heated element is employed for this purpose since it will simultaneously effect a severance and seal of the film without exerting a drag or pull, as is possible in the case of a knife blade, which tends to move the overlapping films relative to one another.

Two rolls of wrapping film 45 and 46 located, respectively, above and below the horizontal plane of the wrapping unit 12 are each mounted on cores journaled in end brackets 47 secured to the frame 10. The rolls 45 and 46 are controlled by clutch and brake mechanisms (not shown) operable to permit or prevent their free rotation in timed relation to the feeding of the article 21 into the first wrapping position of the wrapping unit 12. In setting up the machine for initial operation with new rolls 45 and 46 of the film 48, the film is unrolled from each of the rolls 45 and 46 and the separate sheets of film are threaded over an upper and lower series of guide and tension rollers 49, then between power driven rollers 50 (one of which may be an idling roller in peripheral contact with the other which is power driven), thence over a dancer or tension roller 51 which is mounted for limited horizontal movement, and finally over a fixed guide roller 52. Initially, the free edges of the two films 48 are brought together in superposed relation and threaded between the rollers 52 and over the platen 43, whereupon the presser bar 41 with its heated wire is caused to sever the film and seal the two severed ends of the film together. When the presser bar 41 is thereafter released, the dancer rollers 51, which have been tensioned by the threading of the film 48 through the rollers 52, relax and in so doing return the joined sheets of film to a position in front of the rollers 52 so that a continuous sheet of film is presented to extend vertically across the horizontal path of transfer of an article 21 from the belt 14 to the belt 31 (see FIG. 2). In this condition, the machine is prepared for operation and once it has been started by the closing of a main switch supplying electric current to a motor which drives the conveyor belts 14, 31 and other driven mechanisms of the machine, the operation proceeds automatically thereafter to wrap a succession of articles 21.

Coming now to the second position in the wrapping and sealing unit 12, the article 21 is moved by the belt 31 onto

another belt 60 in line therewith and driven over rollers 61 and 62, its upper run 63 lying in the same horizontal plane as the upper run 30 of the belt 31. At the time that the second or following article 21 has reached the first position in the unit 12, passing beneath the electric eye 35 and coming to rest, the preceding and partially wrapped article 21 will have been transferred to the belt 60 and come to rest thereon in the second position in the unit 12. Belt 60 will run until the package blocks the second eye or switch 70, which stops the belt. During this travel of the said preceding article 21, the side edges of the sheets of film 48 extending laterally beyond each side of the article are brought together in superposed relation and fed between fixed rollers 65 and spring-pressed rollers 66 (FIG. 7), and above a pair of spaced-apart platens 67 extending one along each side of the belt 60 and in vertical alignment each with one of a pair of overlying presser bars 68, the latter being formed and supported substantially in the manner of the presser bar 41 and mounted on the same sub-frame 40 which is actuated by the air cylinder 36. The platens 67 and presser bars 68 are adjustable laterally to accommodate articles 21 of different widths and each is equipped with an element adapted to be heated by electricity for severing and sealing the film 48 along the sides of the article 21, such action being carried out simultaneously with the severing and sealing action of the presser bar 41 at the following end of the succeeding article 21 which is then in the first position.

It is pointed out that simultaneously with the movement of the succeeding article 21 beneath the electric eye 35 to stop the belt 31, the article 21 in the second position moves into engagement with a switch 70 to stop the rotation of the belt 60.

When the severance and sealing of the film 48 along the side edges of the first article and the following end of the succeeding article have been effected, the sub-frame 40 is raised, separating the presser bars from their respective platens and through a suitable switch arrangement restarting the belt driving mechanism to move the article 21 forward again. At the same time the belt 60 is again set in motion and the rollers 65 and 66 whose rotation was not interrupted propel the severed edges 48a of the film 48 sidewise and discharge them to slide down respective inclined chutes 71 (one only being shown) and through openings 72 in the wall of a casing 73 enclosing the framework and operating parts of the wrapping unit 12, whence they are collected in a scrap material receiving receptacle. Thus at position 2 in the wrapping unit 12, the article 21 has been completely enclosed and hermetically sealed at all four sides thereof in a relatively loose fitting wrapping of the film 48.

A modification of the mechanism for removing the scrap material severed from along the side edges of the article 21 is shown in FIG. 8. Instead of the rollers 65 and 66 rotating in a direction at right angles to the direction of travel of the belt 60, the edges of the film 48 travel between a pair of endless belts 74 running continuously one on an upper and one on a lower set of rollers 75, the rollers of each set being arranged in series to extend in the same linear direction as the upper run 63 of the belt 61; and when the film 48 has been sealed and severed along the side edges of the article 21, the severed film edges 48a are carried to the rear of the machine and disposed of there.

It should be pointed out that the extent of movement of the sub-frame 40 carrying the presser bars 41 and 68 is sufficient to accommodate articles 21 ranging in thickness from that of a thin, flat object such as a phonograph disc or record to one of several inches. Actually the thickness, length and width of articles which can be wrapped by the machine of the present invention vary considerably and in different existing models the dimensions of the articles may vary from 3" wide and 6" long in the smallest model to 20" wide and 60" long in the largest model.

The thickness may vary in accordance with the article to be wrapped and the maximum thickness which a particular machine can accommodate is, of course, determinable in advance according to the extent to which the presser bars 41 and 68 are raised above their respective platens 42 and 67.

The machine is adapted to handle such items as packaged foods (frozen or unfrozen), games, stationery, household items, folded linens and textiles, phonograph records, clothing, newspapers, books, etc., and in the different models, variances in the thickness of articles to be wrapped are, as already stated, automatically taken care of by the clearance between the presser bars and plants, i.e., the extent of travel of the sub-frame 40. Variances in the width of an article to be wrapped are taken care of by virtue of the fact that the side sealing presser bars 68, platens 67, scrap disposal rollers 65 and 66 (75 in FIG. 8) are mounted on shafts 80 (FIG. 1) having reverse screw threads running in opposite direction from mid-length thereof to move those elements toward and away from one another. It is unnecessary that the conveyor belt 60 be adjustable since it is located to provide adequate non-tilting support for the article 21, which is afforded additional support by the scrap material disposal rollers in gripping the side edges 48a of the film 48 as shown in FIG. 6.

As shown in FIG. 7, the scrap disposal rollers 65 and 66 are operated by an independent electric motor 81 through reduction gearing and a sprocket wheel 84 mounted on a drive shaft 85 from which the roller 65 is rotated through a belt connection 86 running over a pulley 87. The shaft 85 mounting the sprocket wheel 84 and a pulley 87 are mounted in a bracket 88 connected with the platen 67, and throughout a limited but sufficient extent the chain 83 will rock about its vertical axis to follow the lateral movements of the shaft 85.

The relation of the parts as shown in FIG. 1 indicates that the machine has been adjusted to bring the guide rollers 52 and the dancer rollers 51 into close proximity for handling a thin article such as a phonograph record, not shown. In the remaining figures, however, the rollers 52 have been adjusted to a greater spaced relationship so as to handle a thicker article 21 and the retaining finger 20 accordingly has been adjusted upwardly. The operation of the machine will be described in conjunction with the showing in FIGS. 2-8.

Although only one article is shown therein, assume that a stack of articles 21 is placed in the hopper 13 with the lowermost article resting on the upper run 19 of the belt 14. When the machine is started initially by manually firing a switch 95 (FIG. 1) another switch 96 is in closed condition to inaugurate the operation of the conveyor belts 31 and 60, and at the same time, actuate the air cylinder 26 to pull the stop arm 22 downward against the action of the compression spring 27 and release the lowermost article 21 for transport toward the film 48 extending across the space between the rollers 52. A switch 104 is actuated by the leading end of article 21 to deactivate air cylinder 26, allowing arm 22 to be raised by compression spring 27 so that its nose 23 rides along the bottom surface of article 21. Upon continued transport of the article 21, the following end thereof rides off the nose 23 and allows the spring 27 to raise, the arm 22 to present the nose 23 thereof in the path of a successive article 21 (FIG. 4) and restrain it from further movement. When the front or leading end of the article 21 has been moved into engagement with the film 48 as shown in FIG. 3, but its following end has not yet cleared the nose of the stop arm 22, the pressure of the front end of the article 21 against the film 48 exerts a tension thereon which is transmitted to the dancer rollers 51. The rollers 51 are mounted to slide in horizontally disposed slots 101 formed in brackets 102 mounted in the frame 10, against the pull of light tension springs 103. As the rollers 51 approach their forward position as shown in FIG. 3, the

lower one of the rollers 51 opens the switch 96 releasing brakes on rolls 45 and 46 of film 48 and commencing the drive of the film feed rollers 50.

As the article in transit arrives at the first position in the wrapping unit 12 as shown in FIG. 4, either the article 21 itself or indicia on the film 48, as the case may be, moves into the path of the electric eye 35, which effects the application of a clutch brake to stop the movement of the belts 14, 31 and 60 and to activate the air cylinder 36. The air cylinder 36 then operates to move the sub-frame 40 downward to bring the presser bar 41 into position to clamp the superposed sheets of film 43 between it and the platen 43 (see FIG. 5), at which time the heated element simultaneously severs the film 48 and seals the film along the line of severance. Thereafter, when the sub-frame 40 and presser bar 41 are raised by the air cylinder 36, the sub-frame 40 activates a switch 105 which resets the electric cycle, activating the air cylinder 26 and started the rotation of the belts 31 and 60. The portions of film 48 which have been pulled along the top and bottom sides of the article 21 have at this time been sealed together at the following end of the article, and the films 48 running from the two rolls 45 and 46 have been sealed together to maintain them as a continuous sheet of film extending across the space between the guide rollers 52. When the film 48 is released by the presser bar 41, the springs 103 return the dancer rolls 51 to the position shown in FIG. 2, which movement straightens the film 48 to form a vertical curtain thereof between the guide rollers 52 as shown in that figure.

The return of the lower dancer roller 51 to the rearward position shown in FIG. 2 moves it out of contact with the switch 96 braking power driven film feeding rollers 50 and the operation is repeated. This time, however, as the succeeding article is moved into the first position in the wrapping unit 12 the preceding article 21 is transferred by the belt 31 to the belt 60 and into the second position, the unsealed side edges of the film 48 drawn between the scrap material disposal rollers 65 and 66. Upon the descent of the sub-frame 40, the presser bar 41 and the pair of side presser bars 68 are brought into engagement with their respective platens 43 and 67, and the heated elements associated therewith sever and seal the film 48 at the following end of the article 21 in the first position and at the same time sever and seal the film 48 along the sides of the article 21, the scrap material 48a being removed and disposed of when the pressure between the platens 67 and presser bars 68 is relieved. Continued operation of the machine transports the article 21 from the second position to discharge it from the belt 60 at the right-hand end thereof (as shown in FIGS. 2 and 5), the succeeding article 21 is moved to the second position, and the next succeeding article 21 is moved into the first position in the wrapping and sealing unit 12. When discharged from the belt 60, the article 21 is loosely wrapped in the film 48 although hermetically sealed therein along its front, rear and side edges. Subsequently, if the film is heat shrinkable the wrapped article 21 is transported through a heating tunnel, not shown, wherein the film is shrunk into intimate contact with the article.

It was stated earlier herein that the film 48 is wider than the article 21, whereby it overhangs and is sealable along the sides of the article. It is pointed out that the side presser bars 68 are readily removable so that a film 48 of a width narrower than that required for complete overwrapping of an article 21 may be employed and severed and sealed by the presser bar 41 and its heated element to effect a banding wrap or tie of the article. This might be desirable for use on newspaper, bundles or stacks of articles, and the like, or for tying together a plurality of articles 21 previously wrapped as described heretofore. It is also contemplated that the presser bars 41 and 68 may be hingedly secured to the sub-frame 40

to be selectively swung into and out of operative position for cooperation with their respective platens 42 and 67, suitable means being provided for each presser bar to hold it in its operative or inoperative position. Thus one machine may be employed selectively for hermetic seal packaging or for banding, as desired.

Insofar as the electrical operation of the machine and the timing features thereof are concerned, the use of electrical components such as voltage transformers, relays, and circuitry, including timing and safety switches, are all within the knowledge of the skilled electrician. In order to clarify the operation of the machine reference will be made to the schematic circuit of FIG. 9.

To start the machine a circuit breaker 106 is closed. This supplies power to the drive motor 107 and makes power available to the rest of the circuit. In order to begin the first cycle of operation, a push button 108 is closed momentarily to complete a circuit through a relay coil 109 and the switch 104. The relay has contacts 109a connected in series with its coil 109 and in parallel with the switch 108 to be closed when the coil is energized. As a result the coil will remain energized even after pressure on the push button 108 is released.

A solenoid valve 111 to control the package release cylinder 26 is connected in parallel with the coil 109 to be energized as long as the coil is energized. As the first package is released and passes the switch 104, it opens the switch and breaks the circuit to both the coil 109 and the solenoid valve 111, which actuates the cylinder 26 as that a second package cannot get through until the first package has moved to the proper location.

At this time all three of the belts 14, 31 and 60 are running, and as the package reaches the electric eye 35 and breaks the light beam, a switch 35a controlled thereby is closed. Of course the electric eye and the switch could be replaced by an impulse switch of the same type as the switch 104, for example. The closing of the switch 35a supplies current to a relay coil 112 which closes the contacts 112a of the relay and short circuits the switch 35a to hold the relay closed. The relay 112 also has a second arm 112b which moves between contacts 112c and 112d. The contact 112c is connected to the drive clutch 117 on the belt 31 while the contact 112d is connected to the brake 118 on the belt 31, and when the relay 112 is energized, the arm 112b is moved from the drive clutch contact 112c to the brake contact 112d, thereby halting the belt 31. The drive clutch 117 and the brake 118 are both operated by rectified current from a rectifier 119.

At the same time that the coil 112 is energized, a timer coil 113 and a solenoid valve 114 controlling the platen cylinder are also energized. Actuation of the solenoid valve 114 causes air to be applied to the cylinder 36 to bring down the sealing platen. At a predetermined time after the timer 113 has been energized, its contacts 113a open, releasing the solenoid valve 114 and retracting the platen cylinder.

As the platen is released to rise up, it actuates the switch 105, which is a momentary impulse switch, and releases the relay 112. The belt 31 restarts and, since the movement of the arm of the switch 105 to its opposite contact closes the circuits to the relay 109 and the solenoid valve 111, this is the equivalent of actuating the push button 108 and starts a new package on its way by causing the cylinder 26 to retract.

As the new package enters, the first package moves on to the belt 60 and is carried along until it contacts the switch 70, which may be an impulse switch or an electric eye and which is connected in series with a relay coil 116. The relay 116 has contacts 116a that close when the relay is energized so as to short circuit the switch 70 and hold the relay closed after the switch 70 opens up. It will be realized that at this time the arm of the switch 105 has returned to the position shown in FIG. 9. The relay 116 also has another arm 116b which moves between contacts 116c and 116d. Contact 116c is connected to the

drive clutch 121 for the belt 60 and contact 116d is connected to the brake 122 for the belt 60. As a result when the relay 116 is energized, the arm 116b moves from the drive clutch contact 116c to the brake contact 116d and stops the belt 60.

The first package waits in the position to which the belt 60 has brought it until the following package passes the electric eye 35 and initiates a new sealing cycle. After the second package has been sealed, it moves past the switch 105 and operates it, which results in removing the circuit that supplies current to the relay 116. The relay 116 thereupon opens and the arm 116b moves back to the drive clutch contact 116c, thereby restarting the belt 60.

After this the operation of the machine continues on an automatic basis, and packages are moved and film is fed as required. The film feed switch 96 is a demand switch. When it is in the position shown in FIG. 9, which is the deactivated position, the film brake 123 is applied and when it is in the other position, the film feed clutch 124 is engaged so the film is fed into the sealing area of the machine. This circuit is completely independent of the rest of the circuitry.

As already stated, the invention has been shown only in preferred form and by way of example and, therefore, the appended claims are not to be construed as containing limitations which are not expressly set forth therein.

Having thus described my invention, what I claim is:

1. A machine for wrapping an article in a film of wrapping material which is laced under tension and fed along with the article as the latter is delivered to a wrapping position in the machine, comprising the combination of supply means for supplying a quantity of said wrapping material, said supply means having support means for a pair of rolls of said film, one of said rolls being positioned on each side of the feed path of said article; and sealing and severing means sealing and severing said film at the following end of said article, said supply means including means for extending said film across the feed path of said article after said film has been sealed and severed at the following end of said article, restraining means coating with said supply means to prevent the film from being withdrawn from said supply means, means for feeding said film from said supply means into the wrapping position in the machine, and control means including switch means actuatable upon the tensioning movement of the film to release said restraining means restraining said rolls of film, said control means arranged in cooperative relation to said film and responsive to the tensioning movement of the film to also effect the operation of said feeding means.

2. A machine for wrapping an article in a film of wrapping material which is placed under tension and fed along with the article as the latter is delivered to a wrapping position in the machine, comprising the combination of supply means for supplying a quantity of said wrapping material, said supply means having support means for a pair of rolls of said film, one of said rolls being positioned on each side of the feed path of said article; and sealing and severing means sealing and severing said film at the following end of said article, said supply means including means for extending said film across the feed path of said article after said film has been sealed and severed at the following end of said article, restraining means on each side of said feed path coating with said supply means to prevent the film from being withdrawn from said supply means, means for feeding said film from said supply means into the wrapping position in the machine, and means actuated to release said restraining means to permit the withdrawal of the film from said supply means and control means arranged in cooperative relation to said film to release said restraining means and permit withdrawal of the film from said supply means and to effect the operation of said feeding means.

3. A machine for automatically wrapping an article in a film of wrapping material, comprising means supplying

the film in continuous sheet form across the path of movement of the article into the machine so as to be engaged by the leading end of the article and carried therewith in the transport of the article into the machine, a movable feed conveyor and a two stage wrapping station, said feed conveyor transporting the article and the film engaged thereby to an article to the first stage of said wrapping station, feeding means operable to feed the film in timed relation to the transport speed of the article, and means arranged in the path of movement of the article and operable thereby to stop the article in said wrapping station and wherein the means for stopping the article in said wrapping position comprises an electrical sensing device arranged to be sensitized by indicia formed on the film.

4. A machine for automatically wrapping an article in a film of wrapping material, comprising means supplying the film in continuous sheet form across the path of movement of the article into the machine so as to be engaged by the leading end of the article and carried therewith in the transport of the article into the machine, a movable feed conveyor and a two stage wrapping station, said feed conveyor transporting the article and the film engaged thereby to an article to the first stage of said wrapping station, feeding means operable to feed the film in timed relation to the transport speed of the article, and means arranged in the path of movement of the article and operable thereby to stop the article in said wrapping station and wherein the sheet of film is wider than the article to an extent of more than twice the thickness of the article and is adapted to be overlaid and sealed to itself on opposite sides of the article along a line spaced inward from the free edge of the film, the edge portion of the film outward from the seal line being severed from the sealed film, and including means for removing said severed portion from the machine and wherein said film removing means comprises a moving belt mechanism with which the edge portion of the film enters into engagement as the article and film are transported into said second wrapping position.

5. A machine for automatically wrapping an article in a film of wrapping material, comprising means supplying the film in continuous sheet form across the path of movement of the article into the machine so as to be engaged by the leading end of the article and carried therewith in the transport of the article into the machine, a movable feed conveyor and a two stage wrapping station, said feed conveyor transporting the article and the film engaged thereby to an article to the first stage of said wrapping station, feeding means operable to feed the film in timed relation to the transport speed of the article, and means arranged in the path of movement of the article and operable thereby to stop the article in said wrapping station and wherein the sheet of film is wider than the article to an extent sufficient to be overlaid and sealed to itself along opposite sides of the article, and including means for sealing the film to itself along the sides of the articles and including means movably mounting said side sealing means, and means for moving said mounting means laterally outward and inward for cooperation of the sealing means with articles of different widths.

6. The method of wrapping an article in a film of material of the type which is fusible under pressure in the presence of heat, which method comprises providing a sheet of said material which is wider than the article to an extent greater than the thickness of the article to extend under tension between two sources of supply thereof from which the film is released as required, moving an article into engagement with the film at a point between the supply sources and in position whereby the film extends beyond the side edges of the article, continuing to move the article and the film for a distance greater than the length of the article and into a first wrapping position, smoothing the film against opposite faces of the article, bringing the film extending beyond the following

ends of said opposite faces together in superimposed relation to one another, applying heat and pressure to the superimposed film to fuse it, cutting the film through and entirely across in the fused area thereof to release the partially wrapped article from the supply of film and to leave the film from the two sources of supply joined in sheet form, moving the partially wrapped article to a second wrapping position, bringing the portions of film extending beyond the side edges of the article together in superimposed relation, applying heat and pressure to the superimposed film at the side edges of the article to fuse the film throughout substantially the length thereof and inward from each edge of the film, cutting the film to trim away an excess at the side edges thereof, and removing the severed edge portions of the film as scrap.

7. The method set forth in claim 6 wherein the film employed is also shrinkable in the presence of heat, and including as a final step subjecting the wrapped article as a whole to an application of heat sufficient to shrink the film into intimate contact with the article by directing heat of greatest intensity onto two opposite surfaces only of the film covered article while at the same time permitting heat to circulate across the remaining surfaces of the film covered article.

8. The method set forth in claim 6, carried out successively on a series of articles with the film sealing and cutting operations on an article in the first wrapping position and an article in the second wrapping position being performed simultaneously.

9. A machine for wrapping an article in a film of wrapping material comprising:

- (a) a feeding station including a feed conveyor;
- (b) a wrapping station spaced from said feeding station;
- (c) means for supplying a continuous web of said material interposed between said feeding station and wrapping station in the path of the article being transported from the former to the latter, whereby the movement of the article by said feed conveyor exerts a tension on said web;
- (d) means actuated by the tension imparted to said web to effect feeding of the material from said supply means as said article moves to the wrapping station;
- (e) stop means operatively associated with said feed conveyor to restrain the movement of an article to be transported by said conveyor;
- (f) an actuating means connected to said stop means to effect movement of said stop means between operative to inoperative position;
- (g) means rendering said actuating means operative to effect release of the article restrained thereby, and
- (h) means responsive to the released article to deactivate said actuating means to render said stop means operative to restrain the next succeeding article.

10. The invention as defined in claim 9 wherein said wrapping station includes:

- (a) a first and second stage;
- (b) each of said stages including an article conveyor;
- (c) means operatively associated with each of said stages for severing and sealing the ends of said severed sheet of film material;
- (d) said film material being severed and sealed adjacent the following end of the article at the first stage, and sealed along the opposed sides of the article in second stage.

11. A machine for wrapping an article in a film of wrapping material comprising:

- (a) a feeding station; and
- (b) a wrapping station including a first stage and a second stage;
- (c) said wrapping station and said feeding station being spaced apart and adapted to have disposed therebetween a continuous web of said material;

- (d) said feeding station including a feed conveyor for receiving said feeding an article to be wrapped to the first stage of said wrapping station;
- (e) means for controlling the feed of the articles to be wrapped in seriatim from the feed conveyor to the wrapping station, whereby the web disposed across the path of movement of the article to the wrapping station is engaged by the leading end thereof and carried therewith to the first stage of said wrapping station so that the material enwraps the top and bottom of the article;
- (f) means for severing and sealing the severed ends of the material adjacent the following end of said article in the first stage;
- (g) means for sequentially advancing said article from said first stage to said second stage as another article is fed from the feeding station to said first stage;
- (h) means for severing and sealing the material along the opposed side edges of the article at the second stage;
- (i) means for removing the severed scrap of said material from said second stage;
- (j) and means for extending said film across the feed path of said article after said film has been sealed and severed at the following end of said article.

12. A machine for wrapping an article in a sheet of fusible film wrapping material comprising:

- (a) a feeding station including a feed conveyor;
- (b) a wrapping station including a first stage conveyor and a second stage conveyor;
- (c) means for supplying a continuous web of said material interposed between said feed conveyor and first stage conveyor whereby said web is disposed substantially normal to the path of the article being transported from said feeding conveyor to said first stage conveyor;
- (d) means for braking said supply means;
- (e) a stop means operatively associated with said feed conveyor to restrain the movement of an article;
- (f) an actuating means connected to said stop means to effect movement of said stop means between operative and inoperative position;
- (g) control means for rendering said actuating means operative to effect release of the article restrained thereby;
- (h) means responsive to the movement of said released article to deactivate said actuating means to render said stop operative to restrain the next succeeding article;
- (i) said article engaging said web of material with its leading end to exert a tension thereon;
- (j) means responsive to the tension imparted to said web to effect release of said means braking said supply means as said article carries said web along therewith;
- (k) means for stopping said conveyors when said article reaches a predetermined position in said first stage;
- (l) cutting and sealing means operatively associated with said first stage;
- (m) said stopping means rendering said cutting and sealing means operative whereby said web is severed adjacent the following end of said article and sealed thereat, the ends of said web being fused to maintain its continuity;
- (n) means activated by said cutting and sealing means after said cutting and sealing of said web to effect operation of said conveyors whereby said article in the first stage is transported to said second stage, and the succeeding article moved from the feeding station to said first stage;
- (o) a second cutting and sealing means operatively associated with said second stage;
- (p) said second cutting and sealing means being operated simultaneously with said first mentioned cut-

13

ting means to sever and seal the opposed side edge of said film enwrapping said article;
 (q) and means for removing the waste.
13. The combination according to claim 2 wherein said control means is responsive to the tensioning movement of the film to release said restraining means and to effect the operation of said feeding means.

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14

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53—30, 59, 74, 75, 182, 372

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CERTIFICATE OF CORRECTION

Patent No. 3,490,194 Dated Jan. 20, 1970

Inventor(s) ALFRED C. MONAGHAN

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, line 2, "laced" should read -- placed --.

Claim 11, paragraph (d), line 2, "said" should read -- and

Claim 12, paragraph (p), line 4, " enwrapping" should read
-- enwrapping --.

SIGNED AND
SEATED
SEP 29 1970

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(SEAL)

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