May 3, 1966 C. LITTLEFIELD 3,248,848

WRAPPING MACHINE

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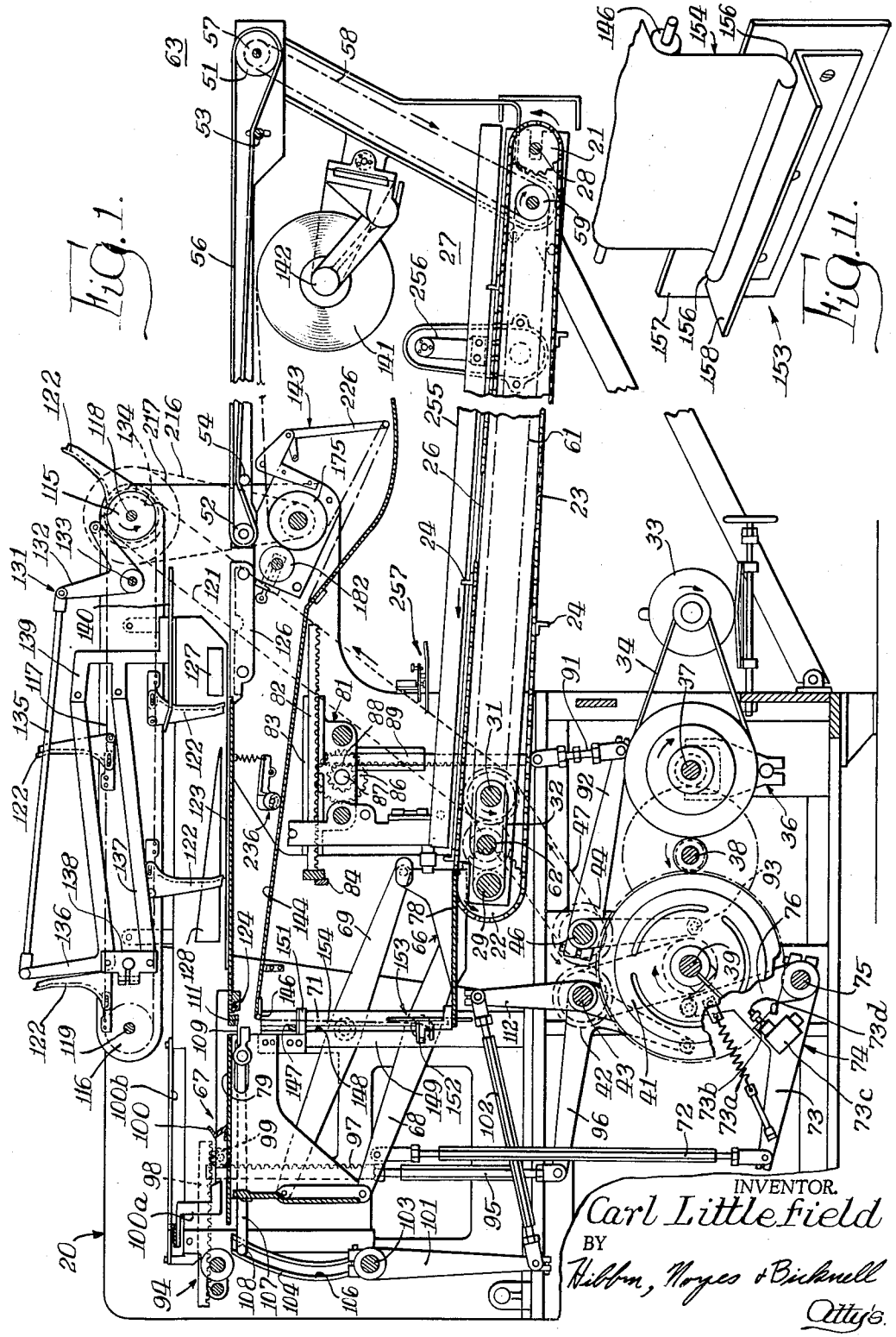


FIG. 1.

FIG. 11.

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WRAPPING MACHINE

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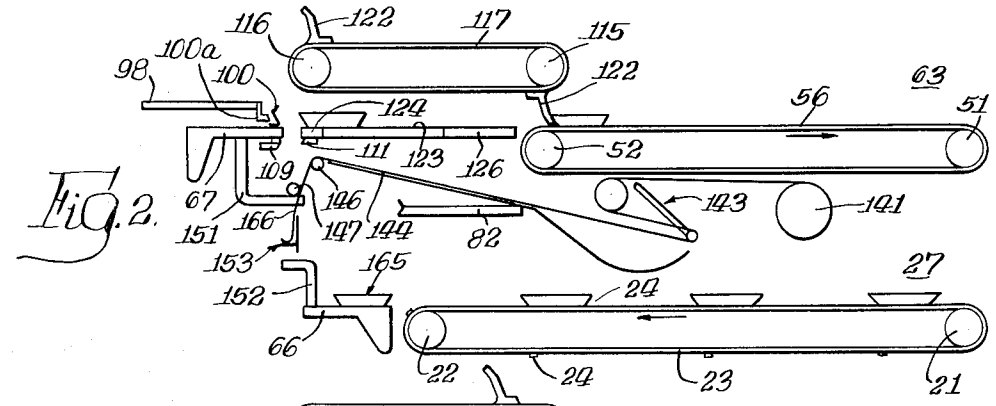


Fig. 2.

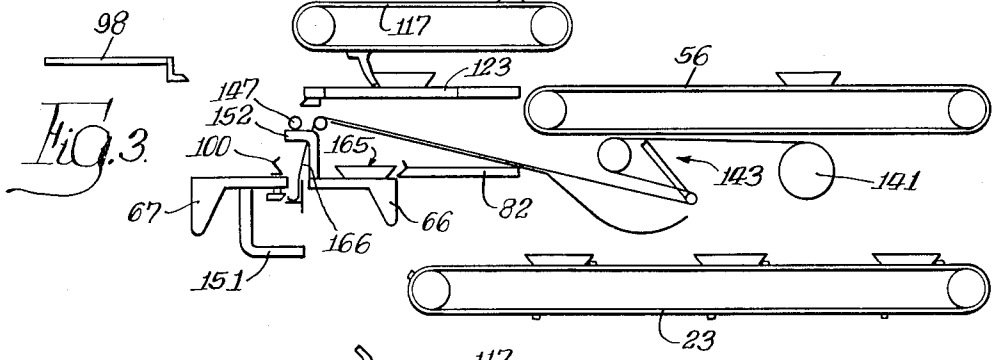


Fig. 3.

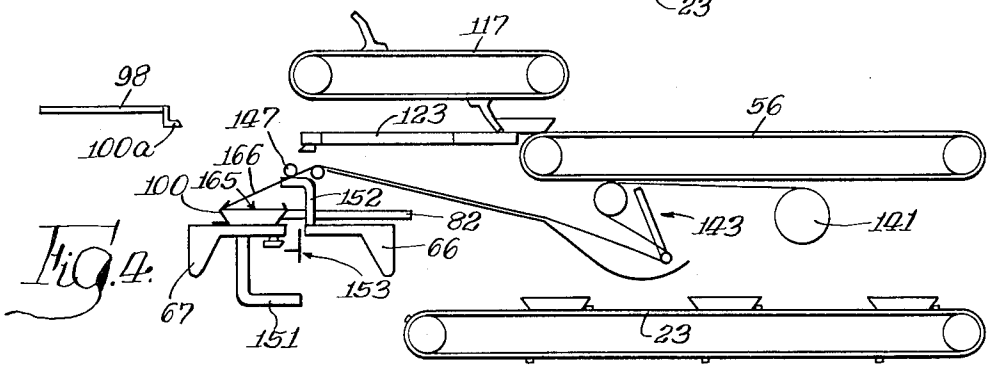


Fig. 4.

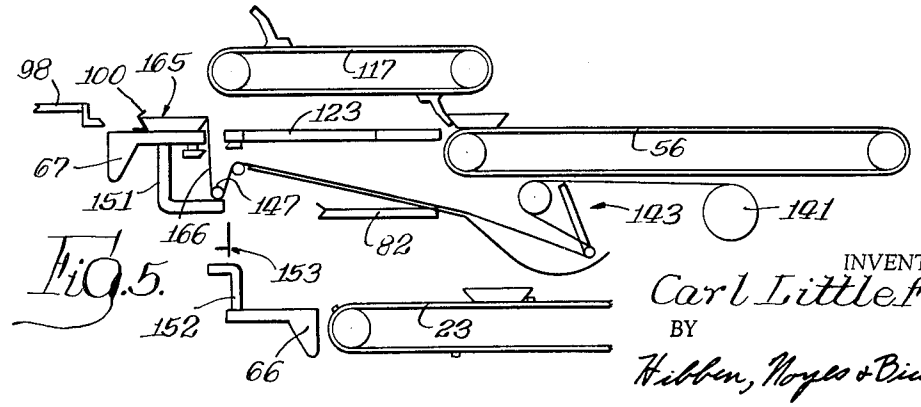


Fig. 5.

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WRAPPING MACHINE

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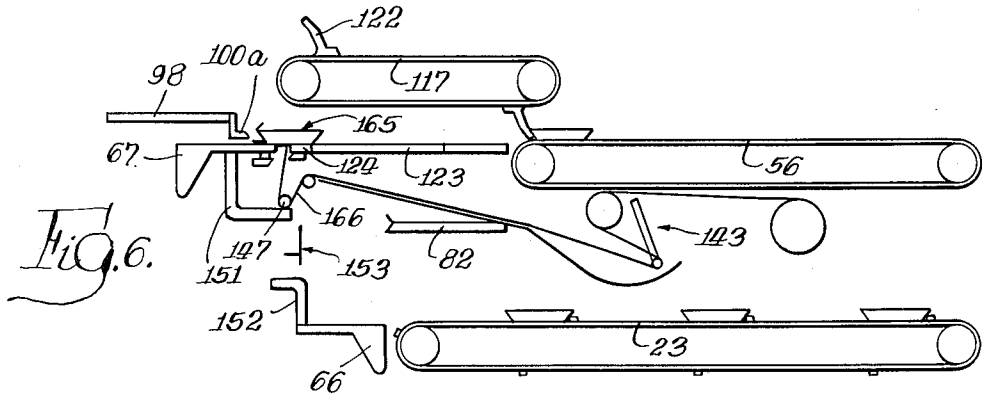


Fig. 6.

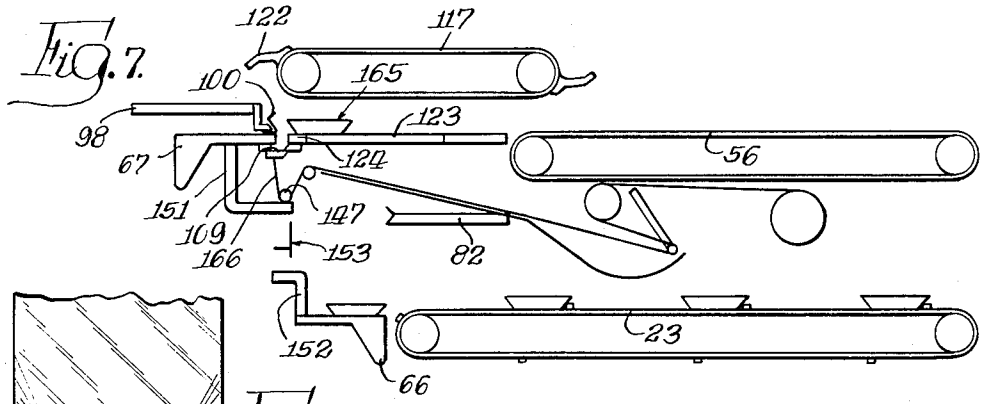


Fig. 7.

Fig. 12.

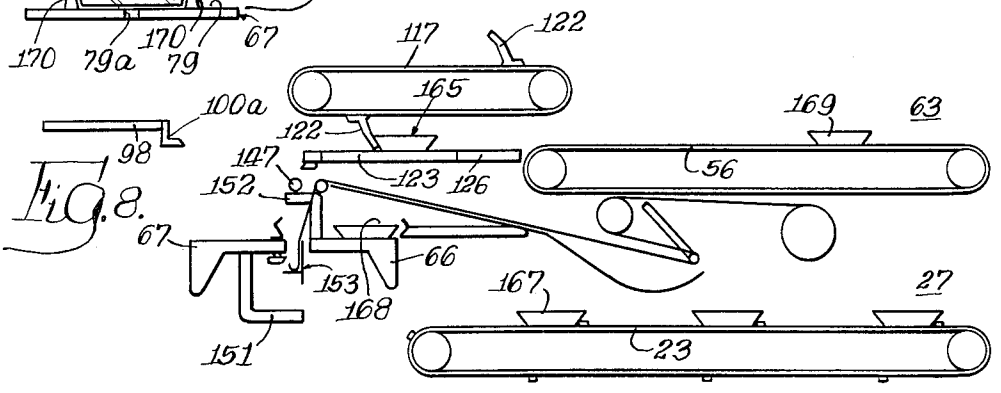


Fig. 8.

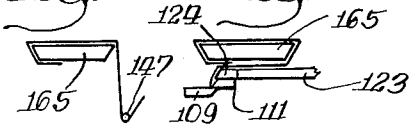


Fig. 9. Fig. 10.

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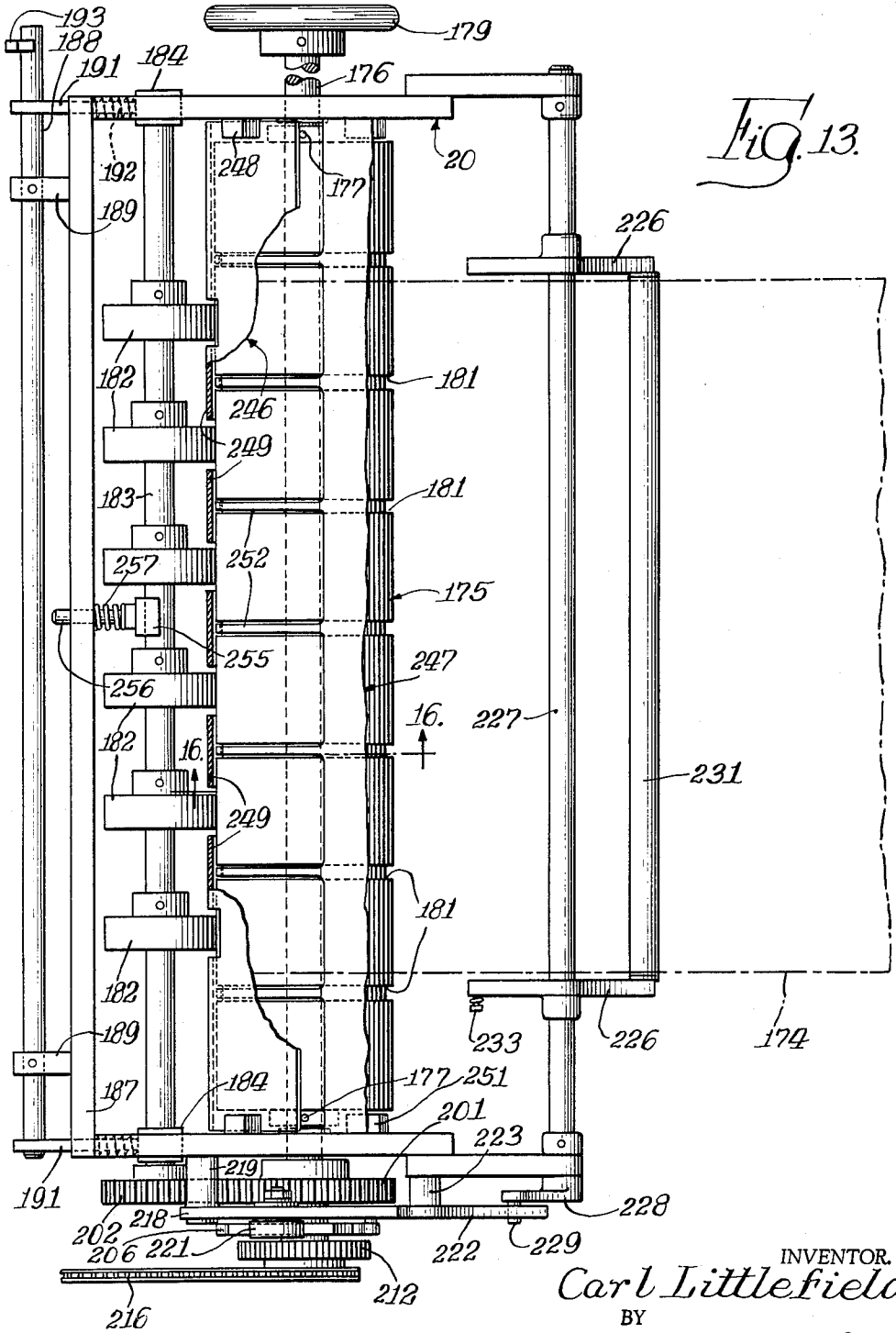


Fig. 13.

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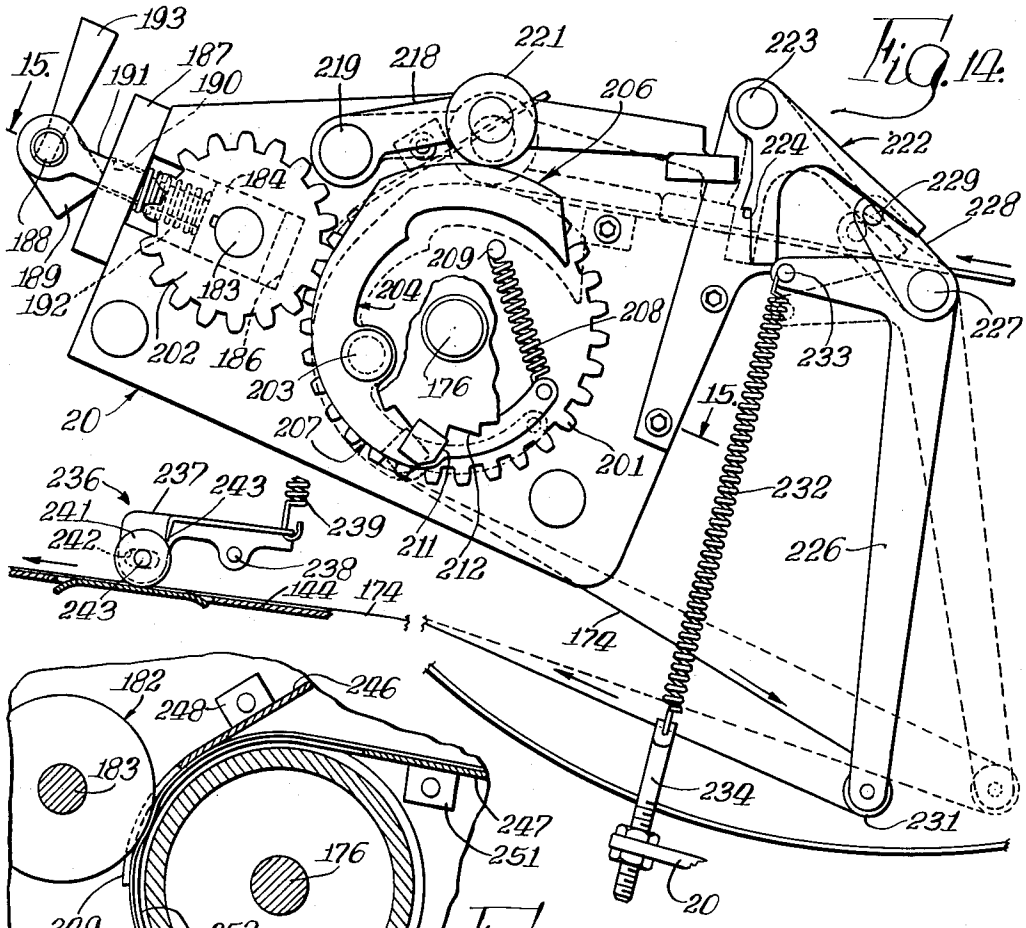


Fig. 14.

Fig. 16.

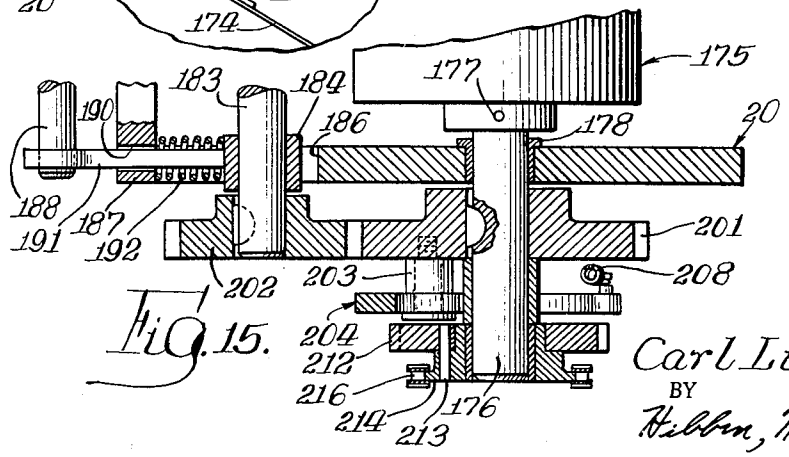


Fig. 15.

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United States Patent Office 3,248,848 Patented May 3, 1966

3,248,848

WRAPPING MACHINE

Carl Littlefield, Bluffton, Ind., assignor to Franklin Electric Co., Inc., Bluffton, Ind., a corporation of Indiana

Filed Aug. 27, 1962, Ser. No. 219,482
15 Claims. (Cl. 53—210)

This invention relates to wrapping machines and, more particularly, to a wrapping machine for wrapping articles such as foodstuffs in a protective film.

A primary object of this invention is to provide an improved machine for automatically wrapping articles in a thin transparent film.

It is another object to provide a wrapping machine of the foregoing character, including an improved film feed mechanism.

Another object is to provide a machine of the foregoing character, including an improved film tension actuated feed mechanism and wrapping mechanism, the wrapping apparatus causing tension on the film to actuate the feed mechanism.

Still another object is to provide a wrapping machine of the foregoing character, which will produce tightly wrapped packages of various widths and heights without machine changeover.

A further object is to provide a wrapping machine of the foregoing character, including means for preventing curling of the film wrapping material.

A still further object is to provide a wrapping machine of the foregoing character, including means for preventing film wrapping material from clinging to a drive roller for the wrapping material.

Other objects and advantages of the invention will be apparent from the following detailed description taken in conjunction with the accompanying figures of the drawings, in which:

FIG. 1 is a side view of the machine embodying the features of the invention, with some parts broken away to show underlying parts;

FIGS. 2 to 10 are schematic diagrams illustrating the wrapping operation of the machine;

FIG. 11 is a perspective view of a film stabilizing device of the machine;

FIG. 12 is an elevational view of a portion of the wrapping mechanism of the machine;

FIG. 13 is an elevational view of a portion of a film feed and transport mechanism of the machine;

FIG. 14 is an enlarged elevational view of a part of the mechanism shown in FIG. 13;

FIG. 15 is a sectional view taken generally along the line 15—15 of FIG. 14; and

FIG. 16 is a sectional view taken generally along the line 16—16 of FIG. 13.

Generally, a wrapping machine embodying the invention comprises a frame, a wrapping mechanism mounted on the frame, input means mounted on the frame for moving articles to be wrapped from an input station to the wrapping apparatus, output means mounted on the frame for moving articles from the wrapping apparatus to an output station, means mounted on the frame for supporting a supply of film to be used for wrapping, and a film feed and transport mechanism mounted on the frame for transporting the film along a path from the film supply to the wrapping mechanism and maintaining a predetermined tension on the film during the wrapping of an article.

The film path extends in one direction across the machine from the supply to the wrapping mechanism which includes means for vertically suspending a predetermined length of the film. An article to be wrapped is deposited by the input means into the wrapping mechanism which positions the forward side of the article adjacent the length of film and above the lower or free end of the latter. The article is then moved in said one direction against the film, causing the article to move over a portion of the film and rest on the free end of the latter. The article, and the portion of the film under it, are then moved upwardly to substantially the level of the output means, this movement causing the film to fold over the top of the article and downwardly on its rearward side. The article is then moved horizontally in a direction opposite said one direction, causing the film to pass under the article and overlap the free end. The ends of the overlapped portion are tack sealed together and then the film is cut off. Thereafter the film at each end of the article is folded and sealed to make an airtight package which is passed by the output means to the output station.

The novel film feed mechanism of the machine is actuated by tension on the film and it maintains a predetermined tension on the film while an article is being wrapped. It further includes means for preventing the film from clinging to feed and pressure rolls of the mechanism. The wrapping mechanism further includes means to prevent vertical curling of the suspended length of the film, means to exert tension on the film to actuate the feed mechanism, and means for providing a new predetermined length of film after each article is wrapped.

In greater detail, the numeral 20, FIG. 1, indicates generally the frame of the wrapping machine, the frame comprising chiefly a pair of laterally spaced members. The input means of the machine is in the form of a chain conveyor and includes two pair of sprockets and two chains, one of each pair of the sprockets being shown and indicated by the numerals 21 and 22, and one chain being shown at 23. Attached between the two input chains 23 are a plurality of angle irons 24 which push an article placed between the chains from right to left as seen in FIG. 1 when the sprockets 21 and 22 are driven in a counterclockwise direction. The articles, when pushed by the angle irons 24, slide along the upper surface of a plate 26 mounted below the angle irons 24 from an input station, indicated generally by the numeral 27, to a wrapping mechanism to be described hereinafter.

The sprockets 21 and 22 are secured to shafts 28 and 29 which in turn are rotatably mounted on the frame 20. The shaft 29 has a sprocket which is driven by means of a chain link 32 meshing with another sprocket. The drive for the shaft 31, and all other mechanisms of the machine, includes an electric motor 33 connected by a belt 34 and a clutch 36 to a rotatable shaft 37. The shaft 37 is coupled by suitable means, such as gears, to two rotatable shafts 38 and 39. The shaft 39 is connected by a chain link 41 to drive a gear 42 rotatably mounted on another shaft 43. The gear 42 meshes with another gear 44 rotatably mounted on a shaft 46, and the gear 44 rotatably drives the shaft 31 through sprockets and a chain link 47. When the electric motor 33 rotates in a clockwise direction, the shaft 29 and the sprocket 22 are rotated in a counterclockwise direction, causing the upper angle irons 24 to move from right to left and force articles to be wrapped toward the left.

The output means of the machine comprises two end rollers 51 and 52 and two idler rollers 53 and 54, A belt 56 is positioned around the rollers 51 and 52 and over the rollers 53 and 54. The roller 51 is fastened to a sprocket 57 which is connected to be driven by a chain link 58. The lower end of the chain 58 is connected to a rotatable sprocket 59 which is connected by a chain link 61 to another rotatable sprocket 62. The shaft on which this latter sprocket 62 is mounted is driven by a gear connection with the shaft 31. When the shaft 31 is rotated counterclockwise by its chain 47, the sprocket 62, the chain 61, the sprockets 59 and 57,

and the output belt **56** are all turned in the clockwise direction, so that belt **56** moves any article placed on it from left to right to an output station indicated generally by the numeral **63**.

The wrapping mechanism comprises a bottom elevator **66** and a top elevator **67** which are supported by two pairs of bars **68** and **69**, one bar of each pair being shown in FIG. 1. One bar of each pair is pivotally connected to one side of each of the elevators **66** and **67** and at substantially their centers to a vertical member **71** of the frame **20**. One of the lower bars **68** is also pivotally connected to a vertically extending link **72** which has its lower end pivotally connected to one arm **73** of a bell crank **74**. The bell crank **74** is rotatably mounted on a shaft **75** near the bottom of the frame, and its other arm **76** forms a cam follower which rides in a groove formed in the face of a cam plate (not shown) secured to the rotating shaft **39**. As the shaft **39** and the cam plate rotate, the arm **76** moves toward and away from the shaft **39**, and the elevators **66** and **67** through the link **72** move substantially vertically between horizontally aligned positions and vertically displaced positions. The elevators **66** and **67** have substantially flat upper surfaces **78** and **79**, respectively. When the elevators are in the vertically displaced positions, illustrated in FIG. 1, the surface **78** of the bottom elevator **66** is at the level of the left end of the plate **26** of the input means, and the surface **79** of the elevator **67** is substantially at the level of the belt **56** of the output means. When the elevators are in the horizontally aligned positions, the surfaces **78** and **79** are at the same level, as shown in FIG. 3, for example, but located between the input and output means.

The two arms **73** and **76** are pivotally mounted on the shaft **75**, and are yieldably held in fixed angular relation relative to each other by a tension spring **73***a* secured between them and by abutting surfaces **73***b*. A limit or jam switch **73***c* is secured to the arm **73** and a block **73***d* is secured to the other arm **76**, the block **73***d* being positioned to hold the switch **73***c* closed when the arms are in their normal positions shown in FIG. 1. In the event an article jams in the machine and prevents the elevators **66** and **67** and the link **72** from moving, rotation of the shaft **39** will increase the angle between the two arms **73** and **76** and the switch **73***c* will open. The switch **73***c*, which acts as a control means, is connected to shut off the power means or motor **33** when the arms **73** and **76** yield relative to each other as described.

The wrapping mechanism further includes a lower pusher assembly indicated generally by the numeral **81**, this assembly being adapted to push an article deposited on the surface **78** of the bottom elevator **66** by the input means horizontally from right to left onto the surface **79** of the top elevator **67** when the elevators are in the horizontally aligned positions. The pusher assembly **81** comprises a horizontal rack **82** slidably mounted on a frame **83**, the rack **82** having a cross bar **84** attached to its forward end. This bar **84** is substantially equal to the width of the surface **78** and it sweeps over this surface **78** when the rack **82** moves toward the left. The rack **82** is driven by a pinion **86** secured to a rotatable shaft **87**. A second pinion **88** is also secured to the shaft **87**, which meshes with a vertical rack **89**. The lower end of the rack **89** is connected by a linkage **91** to one arm of a bell crank **92** mounted on the shaft **46**. The other arm **93** of the bell crank **92** forms a cam follower which rides in a groove formed in the face of a cam plate attached to the rotating shaft **39**. The groove in the cam plate for the cam follower **93** causes the follower **93** to move substantially horizontally toward and away from the shaft. **39**. As the cam groove forces the follower **93** toward the right, the linkage **91** is forced upwardly, and the vertical rack **89** causes the pinions **88** and **86** to rotate in the counterclockwise direction. The pinion **86** then causes the horizontal rack **82** to move toward the left.

An upper pusher assembly of the mechanism is indicated generally by the numeral **94**, this latter assembly being designed to move an article on the top elevator **67** horizontally in the direction of the output means. This assembly **94** includes a linkage **95**, bell crank **96** mounted on the shaft **43**, and two racks **97** and **98** and pinions **99** meshing with the racks, similar to that provided for the lower pusher assembly **81**. The surface **79** of the top elevator **67** is provided with a groove **79***a* (FIG. 12) and a floating pusher **100** (FIG. 1) is slidably mounted in this groove such that it can be moved longitudinally back and forth. A foot **100***a* is slidably mounted in a slot in a member **100***b* mounted on the machine frame **20**. This foot **100***a* is positioned behind the floating pusher **100** and is attached to the horizontal rack **98**. The lower end of the bell crank **96** forms a cam follower which cooperates with a suitable grooved cam plate secured to the rotating shaft **39**. When the cam follower of the member **96** moves toward the left, the linkage **95** and the rack **97** attached to it move upwardly. This upward movement causes, through pinions **99**, the rack **98** and the shoe **100***a* to move toward the right and to engage the floating pusher **100**, and push it and an article on the elevator **67** from left to right.

The wrapping mechanism further includes means for severing the wrapping film after an article has been wrapped. This mechanism includes two pivotally connected links **101** and **102** (FIG. 1), the upper end of the link **101** being mounted on a shaft **103** which in turn is mounted on the machine frame **20**. An arcuate cam member **104** is also mounted on the shaft **103** and hence is coupled to the link **101**. A groove **106** is formed lengthwise of the cam member **104**. A bar **107** is slidably mounted on the top elevator **67** and has one end bent to provide a cam follower **108** which rides in the groove **106**. The other end of the lever **107** is connected to a knife or shear blade **109**, which when moved toward the right, acts in conjunction with another shear blade **111** to sever film between them. The blade **109** is caused to move by a bell crank **112** which is pivotally connected to the link **102** and is mounted on the shaft **43**. The lower end of the bell crank **112** forms a cam follower which cooperates with a cam plate mounted on the shaft **39**. When the link **102** is moved toward the left due to the action of the bell crank **112** and the cam plate, the cam member **104** pivots slightly in a clockwise direction and causes the blade **109** to move toward the right past the blade **111**. The cam member **104** and the groove **106** are made arcuate so that the cam follower **108** can slide up and down in this groove **106** as the top elevator **67** swings up and down. The curvature of the groove **106** is the same as that of the path followed by the elevator **67** as it swings around the pivotal mountings of the arms **68** and **69**.

The wrapping mechanism still further includes means for sealing the ends of the film being wrapped around an article and moving the article to the output means. This means comprises two pairs of sprockets **115** and **116** which have two chains **117** connected to them. The pair of sprockets **115** are fastened in laterally spaced relation to the opposite ends of a shaft **118**, and the sprockets **116** are similarly fastened to a rotatable shaft **119**. Each one of the chains **117** is meshed with one of each pair of sprockets **115** and **116**. The shaft **118** is coupled by a suitable sprocket and chain link **121** to the shaft **31**. It will be recalled that the shaft **31** is connected to be driven in the counterclockwise direction, so that the sprockets **115** and **116** are similarly rotated in the counterclockwise direction. A plurality of transport arms **122** are attached to each of the chains **117**, and the ends of these arms **122** pass over the upper surface of a longitudinally

extending plate 123, mounted between the top elevator 67 and the belt 56 of the output means. It is apparent that when an article is pushed by the upper pusher mechanism from the top elevator 67 onto the plate 123, the article will be pushed by one of the arms 122 from left to right and onto the belt 56 of the output means. At the left end of the plate 123 is a heater 124 and at the right end of the plate 123 is a second heater 126, the heaters heating the overlapped film ends and sealing the article in the film as will be explained hereinafter. A pair of heaters 127 may also be provided to seal the film at the ends of the article. Means such as a pair of plows 128 may be mounted on the machine adjacent the ends of the article to fold that portion of the film projecting beyond said ends underneath the article.

A compressor assembly 131 may also be provided to press the article firmly against the heater 126. This compressor assembly 131 comprises a bell crank 132 pivotally mounted on a shaft 133, one arm of the crank 132 contacting a cam 134 fastened to the rotating shaft 118. The other arm of the crank 132 is pivotally fastened to a connecting rod 135 which has its other end pivotally connected to one arm of a bell crank 136. The other arm of the bell crank 136 and a lower bar 137 are in parallel relation and the bell crank 136 and one end of the lower bar 137 are pivotally connected to a fixed support 138. Said other arm of the bell crank 136 and the lower bar 137 are also pivotally connected to a plate hinge 139 and a shoe 140 which are mounted between the transport arms 122 and the chains 117. When the bell crank 132 moves clockwise, the connecting rod 135 moves toward the right and causes the bell crank 136 and lower bar 137 to pivot clockwise, and the shoe 140 moves downwardly and compresses an article under it.

A supply roll 141 of a heat sealable film material such as cellophane is rotatably mounted on a shaft 142 attached to the machine frame 20. A film feed and transport mechanism 143, to be described in greater detail hereinafter, transports film from this roll 141 over the top of a flat sheet 144. The film then passes over the top of a laterally extending suspension bar 146, and a predetermined length of the film hangs downwardly adjacent and between the elevators 66 and 67. The length of the suspended film is determined by the position of a laterally extending dancer roller 147 which has its ends positioned in vertical slots 148 formed in a pair of vertical members 149, these members 149 also supporting the bars 68 and 69 supporting the two elevators. When the elevators 66 and 67 are in their vertically displaced positions, the dancer roller 147 is supported by a pair of lifts 151, one lift 151 being attached to each side of the top elevator 67. When the elevators are in the horizontally aligned positions, the dancer roller 147 is supported by a pair of lifts 152, as shown in FIG. 3, one lift 152 being attached to each side of the bottom elevator 66.

The lower or free end of the suspended length of film hangs adjacent a stabilizing device 153, best shown in FIG. 11. It has been found that, when a length of film such as a length 154 is permitted to hang freely for a short time, its side or vertical edges, indicated generally by the numeral 156, tend to curl inwardly about substantially vertical axes. Vertical curling at the edges of the film is undesirable because, in effect, it reduces the lateral width of the film so that the ends of the article will not be properly wrapped. This is prevented by the stabilizing device 153 which comprises a vertical plate 157 and a horizontal plate 158. The vertical plate 157 extends laterally of the machine and the film, and its ends are secured to the frame of the machine. The horizontal plate 158 is preferably secured to the vertical plate 157. These two plates are positioned such that the end of the film rests on the horizontal plate 158, which causes a slight curling about a horizontal axis of the film as shown in FIG. 11. The horizontal curl prevents vertical curling and it does not interfere with the wrapping operation.

The machine illustrated in FIG. 1 automatically wraps articles in a protective film regardless of the height of each article and the distance between its forward and rearward sides without readjustment of the machine for a particular size article. The sequence of steps in the wrapping of an article is illustrated schematically in FIGS. 2 to 10, and this sequence will be described as one article, indicated generally by the numeral 165, is wrapped.

An operator of the machine, standing at the input station 27, places a series of articles on the flat plate 26 and between the angle irons 24 attached to the chains 23. The sprockets 21 and 22 are rotated in a counterclockwise direction and cause the angle irons 24 to push the articles toward the left. As seen in FIG. 2, the article 165 has just been pushed by one of the angle irons 24 off of the plate 26 and onto the bottom elevator 66. The movement of the chains 23 and the position of the angle irons 24 are adjusted so that each time an article is pushed off the plate 26, the elevators 66 and 67 are in their vertically displaced positions where the bottom elevator 66 is in horizontal alignment with the left end of the plate 26.

After the article 165 is deposited on the bottom elevator 66, rotation of the shaft 39, FIG. 1, and the cam plates attached to its cause the bars 68 and 69 supporting the bottom and the top elevators to rotate in the counterclockwise direction to the point where bottom and top elevators in their horizontally aligned positions, shown in FIG. 3.

As will be seen from FIGS. 2 and 3 film from the roll 141 follows a path through the feed and transport mechanism 143, over the top of the plate 144 and the suspension bar 146, and downwardly between the two elevators 66 and 67, the lower end of the film resting on the horizontal plate 158 of the stabilizer means 153. When the elevators are in their horizontally aligned positions, the lifts 152 attached to the bottom elevator 66 rise with the bottom elevator and lift the dancer bar 147 and hold it out of the way of the article and the film.

With the elevators in their horizontally aligned positions, the horizontal rack 82 of the lower pusher mechanism 81 moves toward the left and pushes the article 165, causing the forward side of the article 165 to contact the suspended length of film 166 and slide over the end of the film onto the top elevator 67, it engages the floating pusher 100 mounted on the top elevator 67 and pushes it lower toward the left. As shown in FIG. 4, the film 166 is held between the forward end of the article 165 and the floating pusher 100 and further movement toward the left of the article 165 causes tension to be exerted on the film 166. As previously mentioned, the feed and transport mechanism 143 is actuated by tension on the film 166, so that its mechanism 143 is actuated to cause additional film to be fed into the wrapping mechanism.

With reference to FIG. 12, two guides 170 are fastened to the upper surface of the top elevator 67, and the article is positioned between them. The guides are closely adjacent the article and cause the film at the ends of the article to fold upwardly against the ends of the article. Thus, these guides also cause the end of the film to be held tightly against the bottom of the article.

The article 165 is shown as comprising a tray or box into which items, such as foods of various sorts and shapes, may be placed. Thus for one size of tray the length and width of the article will be constant although the height may vary. Of course, it will be apparent that trays of various sizes may be wrapped in the machine.

After the article 165 is transferred to the top elevator 67, the horizontal rack 82 of the lower pusher mechanism 81 is retracted and the elevators 66 and 67 are rotated clockwise to their vertically displaced positions shown in FIG. 5. As the article 165 moves upwardly on the elevator 67, the film 166 contacts the under surface of the dancer bar 147, which is below the level of the article 165 at that point and substantially vertically aligned with the rearward side of the article 165. As the article moves

upwardly, the film **166** folds over the upper surface of the article **165** and downwardly on the rearward side of the article. Tension on the film **166** is continued because of the additional film required to fold around the article, and this tension continues to actuate the film feed mechanism **143**. As can also be seen from FIG. 5, the top lifts **151** attached to the top elevator **67** support the dancer bar **147** as the bottom elevator **66** and the lower lifts **152** move downwardly.

With reference to FIG. 6, when the top elevator **67** is horizontally aligned with the plate **123**, the horizontal rack **98** of the upper pusher mechanism **94** is moved toward the right causing the shoe **100***a* (FIG. 1) to engage the floating pusher **100** and thereby push the article toward the right off of the top elevator **67** and onto the plate **123**. The guide **170** at the ends of the article, by maintaining the film tightly stretched across the bottom of the article, prevent the end of the film from catching on the edges of the opening between the top elevator **67** and the plate **123**, and the film overlaps its free end as transfer of the article to the plate **123** is completed. Thereafter, the overlapped portions of the film pass over the first heater **124** as shown in FIG. 7 which tack seals the ends, and then the shear blade **109** is moved toward the right and cooperates with the opposing blade **111** to sever the film **166**.

Once the article is on the plate **123**, a pair of the transfer arms **122** engage the article **165** and move it toward the right, past the plows **128** which fold the ends of the package. When the article **165** reaches the second heater **126**, the compressor assembly **131**, shown in FIG. 1 presses the article **165** downwardly and causes it to firmly contact the heater **126** in order to obtain a better seal. Thereafter, the transfer arms **122** move the article **165** onto the upper surface of the conveyor belt **56**, which in turn moves the article to the output station **63**. If the article is of such size and shape that the film projects beyond the ends of the article sufficiently for the folded ends to be turned under the article, then the second heater **126** not only firmly seals the ends of the film under the bottom of the article, but also seals the folded end portions against the bottom. The heaters **127** contacting the ends of the wrapped article will effect a seal of the folded portions of the film at the ends of the article. If the film does not project beyond the ends of the article sufficiently to be folded over the ends and then under the article and merely enclose the ends, then the end heaters **127** will effect a sealing of the folded ends to firmly close the wrapping on the article.

It will be noted that the input station **27** and the output station **63** are at the same end of the machine as shown in the drawing, but of course the input means could extend inwardly from the left, as shown in FIG. 1, to feed articles onto the bottom elevator **66** from the left. It will also be noted that the machine is capable of simultaneously handling and processing a series of articles. In other words, as shown in FIG. 8, while the article **165** is being moved across the plate **123**, another article **167** is being moved by an angle iron **24** toward the wrapping mechanism, another article **168** is positioned on the bottom elevator **66** ready to be transferred to the top elevator **67**, and still another article **169** is on the belt **56** of the output means being transferred to the output station **63**.

It will be recalled that a predetermined length of film **166** is suspended between the two elevators **66** and **67** at the beginning of each wrapping cycle. The length of the suspended film is determeined by the position of the dancer bar **147** just before the film is severed. The length of the suspended film is equal to the distance from the upper surface of the suspension bar **146**, to the lower side of the dancer bar **147** and up to the shear blade **111**. The positions of the suspension bar **146** and the shear blade **111** are ordinarily fixed so that, when it is desired to vary the length of the suspended film, the height of the dancer bar **147** is changed by varying the position of the upper lift **151** on the top elevator **67**.

FIGS. 13 to 16 illustrate the film feed mechanism **143** of the wrapping machine in greater detail. It comprises a feed roll **175** (FIG. 13) secured to a shaft **176** by suitable means such as pins **177**. The shaft **176** in turn is rotatably mounted in bearings **178** (FIG. 15) on a portion of the wrapping machine frame **20**, and a hand wheel **179** may be secured to one end of the shaft **176** if desired. The feed roll **175** is preferably made of a relatively hard material, such as aluminum, and is formed with a plurality of axially spaced annular grooves **181**.

A plurality of pressure rollers **182**, made of a yieldable material such as rubber, are secured in axially spaced relation to another shaft **183**. The axis of the shaft **183** is parallel to that of the shaft **176**, and, as shown in FIG. 13, the pressure rollers **182** are spaced to coincide with the portions of the feed roll **175** between the grooves **181**. The shaft **183** is rotatably mounted in two bearings **184**, each of these two bearings **184** being positioned in slots **186**, FIGS. 14 and 15, formed in the machine frame **20**, for movement toward and away from the feed roll **175**.

A device for moving the shaft **183** in order to shift the pressure rollers **182** into and out of contact with the feed roll **175** comprises a bar **187** secured to the frame **20**, a lift shaft **188**, and two lift cams **189** secured to the shaft **188** by suitable means such as set screws. As is best shown in FIGS. 14 and 15, the outer ends of the lift shaft **188** are rotatably mounted in two lift members **191** which extend through openings **190** formed in the bar **187**, and are attached to the bearings **184** for the shaft **183**. A compression spring **192** is positioned around each lift member **191** between the bar **187** and the movable bearings **184**, the springs **192** urging the shaft **183** and the pressure rollers **182** toward the feed roll. A handle **193** is secured to one end of the shaft **188** to rotate the lift cams **189**, and each cam **189** is adapted to engage the plate **187** and shift the shaft **183** toward the left and hold the pressure rollers **182** out of contact with the feed roll **175**. In this condition, film from the roll **141** (FIG. 1) may be threaded between the feed roll **175** and the pressure rollers **182**. By turning the handle **193**, the cams **189** are moved out of engagement with the bar **187**, which permits the compression springs **192** to force the pressure rollers **182** toward the feed roll **175**. When film is threaded around the feed roll **175**, it is held tightly against the feed roll **175** by the pressure rollers **182**, and slippage of the film relative to the feed roll **175** is prevented.

A clutch for connecting the feed roll **175** and the pressure rollers **182** to a drive, comprises two gears **201** and **202** (FIGS. 14 and 15) secured to the shafts **176** and **183** respectively. These two gears are positioned to mesh, and the gear ratio is set such that the surface velocity of the feed roll **175** is equal to that of the pressure rollers **182**. The gear **201**, connected to the feed roll **175**, is secured by means of a pin **203** to a cam **204** having a raised surface **206** and a depressed surface **207**. This cam **204** is pivoted about the pin **203**, and a tension spring **208** attached between an end of the cam **204** and a pin **209** on the gear **201**, tends to pivot the cam **204** in a counterclockwise direction about the pin **203** as shown in FIG. 14. A dog **211** is secured to the cam **204** on one side thereof between the pin **203** and the spring **208** and, when the cam is pivoted counterclockwise, the dog **211** engages one of the teeth of a ratchet **212** rotatably mounted on the shaft **176**. This ratchet **212** is fastened by means of a pin **213** (FIG.15) to a sprocket **214**, the sprocket **214** being driven by a chain **216**, also shown in FIG. 1. It will be recalled that the shaft **118** is driven in a counterclockwise direc-

tion. The chain 216 is coupled to the shaft 118 by a sprocket 217 and, accordingly, the sprocket 214 and the ratchet 212 are also driven in the counterclockwise direction as seen in FIG. 14.

A cam latch 218 (FIG. 14) is pivotally mounted by means of a pin 219 on the frame 20, and carries a roller 221. The roller 221 is positioned over and rides the surface 206 of the cam 204 when the latter rotates, as will be described. A release trigger 222 having two arms is pivotally mounted on a pin 223 adjacent the free end of the latch 218, and has an indentation 224 formed in one arm, which is adapted to catch the end of the cam latch 218 when this end is pivoted downwardly and the trigger 222 is pivoted clockwise.

With reference to FIGS. 13 and 14, a pair of tension levers 226 are secured in spaced apart relation to a shaft 227 which is rotatably mounted on the frame 20. A latch crank 228 secured to one end of the shaft 227 has a pin 229 projecting from it, which is positioned to engage the other arm of the trigger 222 and rotate it in the counterclockwise direction. A tension roller 231 is rotatably fastened between the tension arms 226, and a tension spring 232 is connected between a pin 233 on the upper end of one of the tension levers 226 and a threaded member 234 mounted in the frame 20. The position of this latter member 234 is adjustable on the frame 20 so that the strength of the spring force tending to pivot the tension levers in the counterclockwise direction may be adjusted.

At the beginning of a wrapping operation when a supply roll 141 is initially mounted on the machine, the film 174 is threaded through the feed and transfer mechanism 143 by first rotating the handle 193 to draw the pressure rollers 182 away from the feed roll 175. The film 174 is then threaded over the top of the feed roll 175, downwardly between the feed roll and the pressure rollers 182, around the right side of a tension roller 231 (FIG. 14), and toward the left and upwardly over the top of the plate 144 toward the wrapping mechanism. The handle 193 is then turned to permit the compression springs 192 to force the pressure rollers 182 against the film around the feed roll 175.

When the electric motor 33 is operating, the chain 216 rotates in the counterclockwise direction and drives the sprocket 214 and the ratchet 212. When an article is being wrapped and is being pushed from the bottom elevator to the top elevator, shown in FIG. 4, tension or a pull is exerted on the film 174 which pulls the tension levers 226 in the clockwise direction against the force of the tension spring 232. This is the solid line position shown in FIG. 14. The latch crank 228 and the pin 229 pivot the trigger 222 in the counterclockwise direction, and the indentation 224 is maintained away from the free end of the cam latch 218, and the roller 221 is free to pivot about the axis of the pin 219. The tension spring 208, therefore, is allowed to pull the cam 204 in the counterclockwise direction about the axis of the pin 203 and cause the dog 211 to engage one of the teeth of the rotating ratchet 212. The cam 204 accordingly rotates with the ratchet 212 and carries the gears 201 and 202 with it. Since these two gears are secured to the shafts 176 and 183, the feed roll 175 and the pressure rollers 182 are also driven.

After an article is wrapped and the film is severed by the shear blades 109 and 111, a pull is no longer exerted on the film. The feed roll 175 continues to rotate, however, and the additional film fed after the severing permits the tension levers 226 to rotate in the counterclockwise direction to the dashed line position shown in FIG. 14. In this position, the release trigger 222 is permitted to pivot in the clockwise direction to its dashed line position. As the cam 204 rotates with the ratchet 212, the roller 221 on the cam latch 218 moves up and down as it rides on the raised and depressed surfaces 206 and 207, respectively, of the cam 204. During the next portion of the cycle where the cam latch 218 is at its lowered position after the trigger 222 is rotated clockwise, the free end of the cam latch 218 catches underneath the indentation 224 on the trigger 222 and is held in this position. When the raised surface 206 of the cam 204 next passes the roller 221, it is forced downwardly, and the cam 204 is pivoted clockwise around the pin 203 against the force of the spring 208, and it moves the dog 211 out of engagement with the ratchet 212. The drive is thereby disconnected from the feed roll 175 and the feed mechanism ceases to feed film toward the wrapping mechanism. The amount of film fed out by the feed roll 175 after the film has been severed is taken up by the tension levers 226 which may move to or beyond the dashed line position shown in FIG. 14. The amount of this overfeed may be controlled by varying the length of the raised surface 206 of the cam 204, by varying the length of the tension levers 226, or by varying the diameter of the feed roll 175.

To prevent the shaft 183 supporting the pressure rollers 182 from bowing outwardly away from the feed roll 175, a center support is provided which comprises a center bearing 255 attached to a pin 256. This pin 256 extends through an opening formed in the bar 187, and between the bearing 255 and the bar 187. The force of the spring holds the bearing 255 against the shaft 183 and give it support at its center.

A check mechanism 236 is also provided which permits movement of the film only toward the wrapping mechanism and prevents the film from being pulled back by the spring 232 and the tension levers 226 after the film is severed. This check means 236 comprises an arm 237 pivotally mounted on a pin 238. The arm 237 is biased in the counterclockwise direction by a tension spring 239 connected to one end of the arm 237, which forces a check roller 241, mounted on the other end of the arm 237, toward the plate or bed 144. An elongated slot 242 is formed in said other end of the arm 237, the axle 243 of the check roller 241 being supported in the slot 242. The arm 237 is further provided with a brake 243 adjacent the check roller 241 to permit free rotation of the check roller 241 in one direction but prevents rotation in the other direction.

In operation, the check roller 241 rotates in the clockwise direction as film is fed into the wrapping mechanism and holds the film tightly against the plate 144. After an article is wrapped and the film is severed, the force of the tension spring 232 attached to the tension levers 226 tends to pull the film back toward the feed mechanism 143. Such movement is prevented, however, by the check roller 241 which is pulled toward the right by the film until the check roller 241 engages the brake 243, the elongated slot 242 permitting such movement. Counterclockwise rotation of the check roller 241, which the film tends to produce as it is being pulled back, causes the check roller 241 to become wedged between the plate 144 and the brake 243, thereby preventing further rearward movement of the film.

A check means is preferably provided at each side of the film in order to maintain uniform tension across the width of the film. The check means may comprise either one arm 237 and one check roller 241 extending laterally across the plate 144 of the machine for a distance equal to the width of the film, or two separate arms 237 and two rollers 241, one adjacent each edge of the film. In the event an irregularly shaped article is being wrapped, for example, an article which is higher at one end than at its other end, one portion of the film will be held taut while the other portion may be slack. By having a check means on each side of the film, the possibility that the end of the film suspended between the elevators 66 and 67 may not be horizontal is eliminated.

It has been found that, when a film material such as cellophane is passed around a feed roll, static electricity tends to cause the film material to cling to the roll.

To prevent the film from wrapping around either the feed roll **175** or the pressure rollers **182** in the event the film tears at a point ahead of the check means **236**, two stripper plates **246** and **247** (FIGS. 13 and 16) are provided. The first stripper plate **246** extends laterally of the machine and is mounted by two end flanges **248** on the frame **20** adjacent the feed roll **175**. A plurality of fingers **249** are formed on the plate **246** and extend between the pressure rollers **182**. The plate **246** and the fingers **249** attached to its are spaced outwardly from the outer surface of the feed roll **175** and curve around this feed roll at the line of contact where the pressure rollers press the film against the feed roll. The fingers **249** are curved so that the ends thereof extend away from the outer surface of the pressure rollers on the side of the line of contact where the film passes beyond the pressure rollers.

The second stripper plate **247** is fastened by two end flanges **251** to the machine frame **20** and is also mounted adjacent the feed roll **175** and extends laterally of the machine. This stripper plate **247** also includes a plurality of fingers **252** which are positioned within the grooves **181** formed in the feed roll **175**. These fingers **252** are spaced inwardly from the outer surface of the feed roll **175** within the arc of contact of the film with the feed roll and the fingers **252** have end portions **253** which extend from the outer surface of the feed roll **175** where the film passes beyond the feed roll **175**. The plates **246** and **247**, and the fingers formed on them, are spaced from each other to permit the film to pass between them.

In the event the film should tear, it is apparent that the fingers **249** will prevent the film from wrapping around the pressure rollers **182**, and the fingers **252** will prevent the film from wrapping around the feed roll **175**.

The wrapping machine may also be provided with guide rails **255** (FIG. 1) mounted adjacent the chains **23** of the input means for the purpose of guiding articles down the center of the plate **26**. An adjusting mechanism **256** may also be provided to obtain lateral movement of the guide rails **255** to accommodate articles of different lengths. This same adjusting mechanism may also be connected to vary the lateral spacing of the chains **117**, and the transport arms attached to them, and the lateral position of the shoe **100***a* of the top pusher.

Further, a high package stop **257** may be mounted above the input means, adapted to turn off the machine in the event an unusually high article is placed on the input means.

I claim:

1. A machine for wrapping articles in a protective film, comprising means for supporting a supply of film, a wraping mechanism, feed mechanism for transporting film from the supply to said wrapping mechanism and maintaining a constant tension on the film during the wrapping operation, said wrapping mechanism including means for positioning an article to be wrapped on top of an end of the film, means for folding the taut film around the article to overlap said end, means for tack sealing the overlapped portions of the film, and means for severing the portion of the film around the article from the supply of film after the film has been tack sealed.

2. In a wrapping machine for wrapping an article in a protective film, the machine having an article input means, an end folding means, and means for supplying film and holding the film under tension during the wrapping operation, the improvement of mechanism for wrapping the article in the film comprising a bottom elevator adapted to receive an article from said input means and to position the forward side of the article adjacent a vertically suspended length of film with the article above the end of said length of film, a top elevator, a bottom pusher for moving the article in a first direction from said bottom elevator onto said top elevator to bring its forward side against the film and cause the article to slide over said end of the film, said top elevator moving the article upwardly to cause the film to fold over the top of the article and downwardly around its rearward side, said end folding means including a plate mounted above said bottom elevator at the level of the uppermost position of said top elevator, a tack sealer, a top pusher for moving the article in a direction opposite to said first direction onto said plate and said tack sealer to cause the film to be folded under the article and overlap said end, said top pusher moving said article to a position where said overlapped portions of the film are over said tack sealer means for severing the portion of the film around the article from the supply after said overlapped portions have been tack sealed together, said end folding means being adapted to receive the article from said sealing means and engage the article and move the article through said end folding means after said film has been tack sealed and severed.

3. In a wrapping machine for wrapping an article in a protective film, the machine having an article input means, an article output means, and means for supplying film under tension, the improvement of mechanism for wrapping the article in the film comprising a bottom elevator adapted to receive an article from said input means and position the forward side of the article adjacent a vertically suspended length of film with the article above the end of said length of film, a top elevator, a bottom pusher for moving the article in a first direction onto said top elevator to bring its forward side against the film and cause the article to slide over said end of the film, said top elevator moving the article upwardly to cause the film to fold over the top of the article and downwardly around its rearward side, a plate mounted above said bottom elevator at the level of the uppermost position of said top elevator, a top pusher for moving the article in a direction opposite to said first direction onto said plate to cause the film to be folded under the article and overlap said end, means for severing the portion of the film around the article from the supply, and means for sealing the ends of the severed portion of film together, said output means being adapted to receive the article from said sealing means, said wrapping mechanism further including actuating means for moving said elevators in synchronism between horizontally aligned positions and vertically displaced positions with the top elevator uppermost, said bottom pusher being mounted adjacent said elevators and adapted to push an article from said bottom elevator to said top elevator when said elevators are in said horizontally aligned positions, and said top pusher being mounted adjacent said top elevator when said elevators are in said vertically displaced positions, said actuating means comprising a pair of parallel bars pivotally mounted intermedite their ends, said elevators being pivotally secured to the respective ends of said bars and said bars maintaining said elevators horizontal throughout their movement, and said actuating means also including means for pivotally moving said bars and including a pair of angularly related actuating arms yieldably held in fixed angular relation to each other and adapted to yield relative to each other when one of said elevators becomes jammed, power means for driving said actuating means, and control means for said power means adapted to shut-off said power means when said arms yield relative to each other.

4. In a wrapping machine for wrapping an article in a protective film, the machine having an article input means, an article output means, and means for supplying film under tension, the improvement of mechanism for wrapping the article in the film comprising a bottom elevator adapted to receive an article from said input means and position the forward side of the article adjacent a vertically suspended length of film with the article above the end of said length of film, a top elevator, a bottom pusher for moving the article in a first direction onto said top elevator to bring its forward side against the film and cause the article to slide over said end of the film, said top elevator moving the article upwardly to cause the film to fold over

the top of the article and downwardly around its rearward side, a plate mounted above said bottom elevator at the level of the uppermost position of said top elevator, a top pusher for moving the article in a direction opposite to said first direction onto said plate to cause the film to be folded under the article and overlap said end, means for severing the portion of the film around the article from the supply, and means for sealing the ends of the severed portions of film together, said output means being adapted to receive the article from said sealing means, said severing means comprising a pair of shear blades, one mounted on said plate and the other slidably mounted on said top elevator, said mechanism further including means for moving said articles across said plate to the output means after they have been pushed onto said plate by said top pusher from said top elevator, said sealing means being attached to said plate and sealing the ends of the film as an article is moved across the plate, and said mechanism further including a compressor assembly mounted over said sealing means for pressing an article firmly against said sealing means.

5. In a wrapping machine for wrapping an article in a protective film, the machine having means for supplying film and holding the film under tension during the wrapping cycle, the improvement of mechanism for wrapping an article in the film comprising means for suspending a length of film from the film supply, a bottom elevator adapted to receive an article and for positioning the forward side of the article adjacent the length of film with the article above the end of the length of film, a top elevator, a bottom pusher for moving the article in a first direction onto said top elevator to bring said forward side against the film and cause the article to slide over said end of the film, said top elevator and said film suspension means being relatively movable to place said top elevator in an upper position relative to said film suspension means, a vertically movable dancer bar mounted such that it is positioned below said film suspension means when said top elevator is in said upper position, the film folding over the top of the article and downwardly on its rearward side, and under said dancer bar when said top elevator is in said upper position, a plate mounted at the level of said upper position, a top pusher for moving the article onto said plate to cause the film to be folded under the article and overlap said end, means for tack sealing the overlapped portions of film, and means for severing the portion of film around the article from the supply after said overlapped portions of the film have been tack sealed together.

6. In a wrapping machine as in claim 5, and further including a stabilizing plate for preventing curling of the vertical edges of the length of film, said stabilizing plate comprising a horizontally disposed plate mounted under said film suspension means and above the end of the suspended length of film, whereby the end of the length of film rests on said stabilizing plate and curls the horizontal end of the film.

7. In a wrapping machine for wrapping an article in a protective film, the machine having means for supplying film under tension, the improvement of mechanism for wrapping an article in the film comprising means for suspending a length of film from the film supply, a bottom elevator adapted to receive an article and for positioning the forward side of the article adjacent the length of film with the article above the end of the length of film, a top elevator, a bottom pusher for moving the article in a first direction onto said top elevator to bring said forward side against the film and cause the article to slide over said end of the film, said top elevator and said film suspension means being relatively movable to place said top elevator in an upper position relative to said film suspension means, a dancer bar mounted such that it is positioned below said film suspension means when said top elevator is in said upper position, the film folding over the top of the article and downwardly on its rearward side, and under said dancer bar when said top elevator is in said upper position, a plate mounted at the level of said upper position, a top pusher for moving the article onto said plate to cause the film to be folded under the article and overlap said end, means for tack sealing the overlapped portions of film, means for severing the portion of film around the article from the supply, said dancer bar being mounted for vertical movement, and being substantially at the level of said film suspension means while the article is being pushed by said bottom pusher onto said top elevator, a top lift and a bottom lift for selectively supporting said dancer bar, said top lift being attached to said top elevator and supporting said dancer bar when the top lift is above the bottom lift, and said bottom lift being attached to said bottom elevator and supporting said dancer bar when the bottom lift is above the top lift.

8. In a wrapping machine for wrapping an article in a protective film, the machine having means for supporting a supply of film, means for wrapping an article, and a drive, the improvement of a mechanism for feeding and transporting film along a film transport path from the film supply and maintaining tension on the film while an article is being wrapped, said mechanism comprising a feed roll, means for holding the film against said feed roll to prevent the film from slipping relative to the feed roll, a clutch mechanism including a movable tension lever for coupling said feed roll to said drive, said lever being movable between a first position where said feed roll is driven and a second position where said feed roll is stationary, and means for biasing said tension lever to said second position, the film from the supply roll following said path from said feed roll and then about said tension lever such that when sufficient tension is placed on the film said tension lever is moved from said second position to said first position and causes said feed roll to be connected by said clutch to said drive and the film is thereby fed, said means for holding the film against said feed roll to prevent slippage comprising a plurality of pressure rollers rotatably mounted on an axis parallel to and adjacent the axis of said feed roll, said pressure rollers being mounted in axially spaced relation, and said feed mechanism further including means for preventing the film from clinging to said pressure rollers due to static electricity comprising a plate mounted adjacent said feed roll, said plate having a plurality of fingers formed thereon extending between said pressure rollers at the line of contact where said pressure rollers press the film against said feed roll, said fingers being curved and extending away from the outer surface of said feed roll at the side of said line of contact where the film passes beyond said pressure rollers.

9. In a wrapping machine for wrapping an article in a protective film, the machine having means for supporting a supply of film, means for wrapping an article, and a drive, the improvement of a mechanism for feeding and transporting film along a film transport path from the film supply and maintaining tension on the film while an article is being wrapped, said mechanism comprising a feed roll, means for holding the film against said feed roll to prevent the film from slipping relative to the feed roll, a clutch mechanism including a movable tension lever for coupling said feed roll to said drive, said lever being movable between a first position where said feed roll is driven and a second position where said feed roll is stationary, and means for biasing said tension lever to said second position, the film from the supply roll following said path from said feed roll and then about said tension lever such that when sufficient tension is placed on the film said tension lever is moved from said second position to said first position and causes said feed roll to connected by said clutch to said drive and the film is thereby fed, said feed roll having a plurality of annular grooves formed therein, said grooves being axially spaced over the length of said feed roll, and said feed mechanism further including means to prevent the film from clinging to said feed roll comprising a plate mounted adjacent said feed

roll, said plate having a plurality of fingers formed thereon which extend into said grooves within the arc of contact of the film with said feed roll, said fingers being curved and extending outward from the outer surface of said feed roll where the film passes beyond said feed roll.

10. In a wrapping machine for wrapping an article in a protective film, the machine having means for supporting a supply of film, means for wrapping an article, and a drive, the improvement of a mechanism for feeding and transporting film along a film transport path from the film supply and maintaining tension on the film while an article is being wrapped, said mechanism comprising a feed roll, means for holding the film against said feed roll to prevent the film from slipping relative to the feed roll, a clutch mechanism including a movable tension lever for coupling said feed roll to said drive, said lever being movable between a first position where said feed roll is driven and a second position where said feed roll is stationary, and means for biasing said tension lever to said second position, the film from the supply roll following said path from said feed roll and then about said tension lever such that when sufficient tension is placed on the film said tension lever is moved from said second position to said first position and causes said feed roll to be connected by said clutch to said drive and the film is thereby fed, said means for holding the film against said feed roll to prevent slippage comprising a plurality of pressure rollers rotatably mounted on an axis parallel to and adjacent the axis of said feed roll, said pressure rollers being mounted in axially spaced relation, and said feed mechanism further including means for preventing the film from clinging to said pressure rollers due to static electricity comprising a plate mounted adjacent said feed roll, said plate having a plurality of fingers extending between said pressure rollers where they press the film against said feed roll and curving away from said pressure rollers where the film passes beyond said pressure rollers, said feed roll having a plurality of axially spaced annular grooves formed therein, and said feed mechanism also including means for preventing the film from clinging to said feed roll comprising a plate mounted adjacent said feed roll and having a plurality of fingers extending into said grooves and curving away from the outer surface of said feed roll where the film passes beyond said feed roll, the fingers on the respective plates being spaced from each other to permit the film to pass therebetween.

11. A wrapping machine for wrapping an article in a protective film, comprising means for supporting a supply of film, a wrapping mechanism, and a feed mechanism responsive only to tension on the film for feeding a section of film from the supply means into said wrapping mechanism each time an article is placed in said wrapping mechanism and holding the film under tension during the wrapping operation, said wrapping mechanism including means for moving the forward side of the article into contact with the film with the article overlying the end of the film to cause tension to be exerted on the film and thereby actuate said feed mechanism, means for folding the taut film around the article to fold the film over the top of the article, then over the rearward side of the article, and then under the article and overlapping said end of the film, a dancer roll engaging the film during the folding of the film over the rearward side of the article and under the article, a tack sealer for tack sealing overlapped portions of the film, and means for severing the portion of the film around the article from the supply of film after the overlapped portions of the film have been tack sealed together, the weight of said dancer roll maintaining the tension of the film around the article and continuing the tension for actuating said feed mechanism while said overlapped portions of the film are being tack sealed together and until the film is severed.

12. A wrapping machine as in claim **11**, wherein said wrapping mechanism also includes means for severing the section of film wrapped around the article, and lift means engaging said dancer roll when the latter is maintaining tension on the film for maintaining the dancer roll in predetermined spaced relation to said severing means, whereby the severed end of the film will be of a predetermined length for wrapping the next article.

13. A machine for wrapping articles in a protective film, comprising a wrapping mechanism, a film feed and transport mechanism for transporting a film from a supply of the film to said wrapping mechanism, a generally vertically movable elevator, means for bringing the forward side of an article to be wrapped against the film and moving the article in one direction onto said elevator whereby the article is positioned on top of an end of the film, means for moving said elevator upwardly, means for folding said film over the top of the article and downwardly over the rearward side of the article, a tack sealer, means for moving the article in the opposite direction to cause the film to be folded under the article and thereby cause portions of the film to overlap, said moving means moving the article up to a tack seal position where said overlapped portions overlie said tack sealer and are tack sealed together, severing means for severing the portion of the film around the article after said overlapped portions of the film have been tack sealed, apparatus for folding the film at the ends of the article, and transport means separate from said moving means for moving the article from said tack seal position through said end folding apparatus, the timing of said transport means relative to said moving means being such that the article is momentarily stationary while said overlapped portions are over said tack sealer.

14. A wrapping machine for wrapping an article in a protective film, comprising means for supplying film, means for suspending a length of film from said supply of film, a bottom elevator adapted to receive an article and position the article with its forward side adjacent said length of film, a top elevator, means to move the article into said length of film and onto said top elevator, a vertically movable dancer bar movable in a plane which extends substantially between said elevators, means attached to said bottom elevator for holding said dancer bar in an upward position as said article is moved onto said top elevator, means for moving said top elevator and said article upwardly, means for tack sealing and severing the film wrapped around the article, and means for supporting said dancer bar at a lower position which is below said upward position while the film is being tack sealed and severed, the film being looped around the underside of said dancer bar before severing, said lower position being such that a new length of film of the proper dimension is provided after said film has been severed.

15. A machine as in claim **14**, wherein said means for supporting said dancer bar in said lower position is attached to said top elevator.

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