Nov. 12, 1963 J. T. SCHOOLER 3,110,143

WRAPPING MACHINE

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FIG. 1

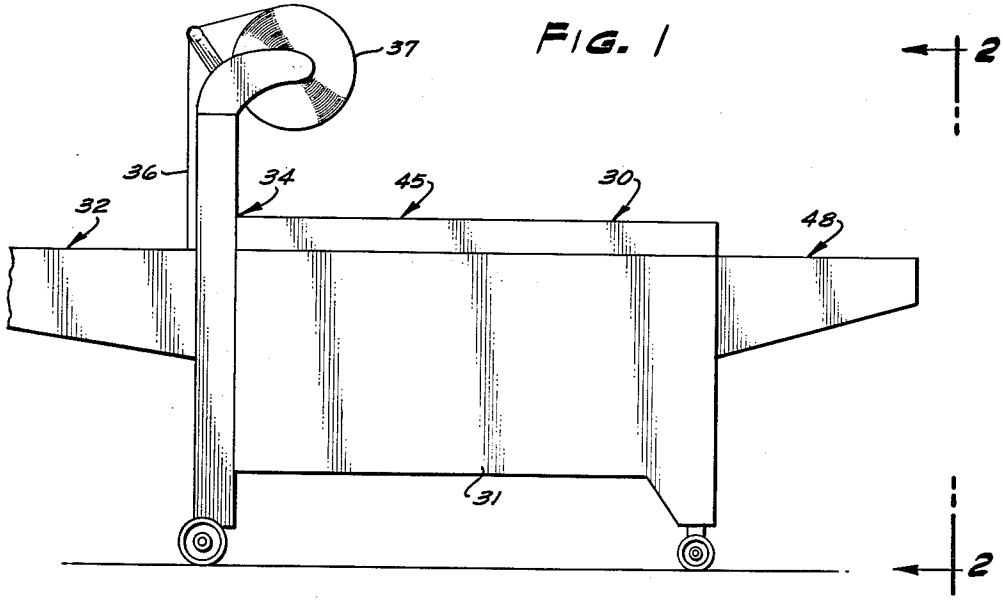


FIG. 2

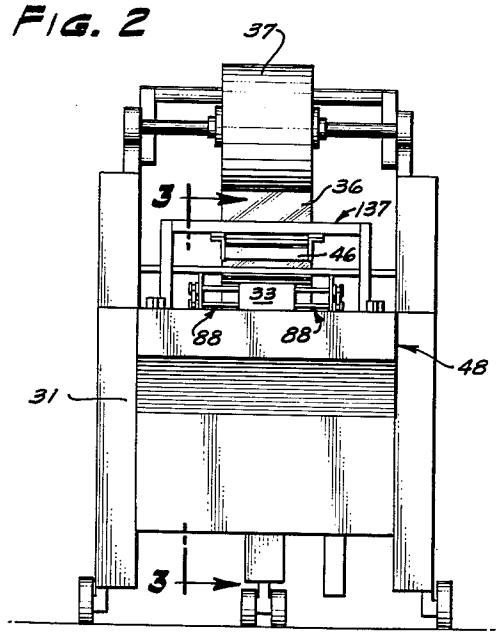
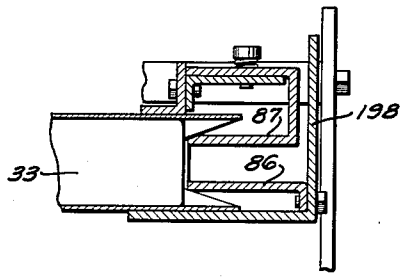


FIG. 22



JOSEPH T. SCHOOLER,
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BY R. E. Beaugue

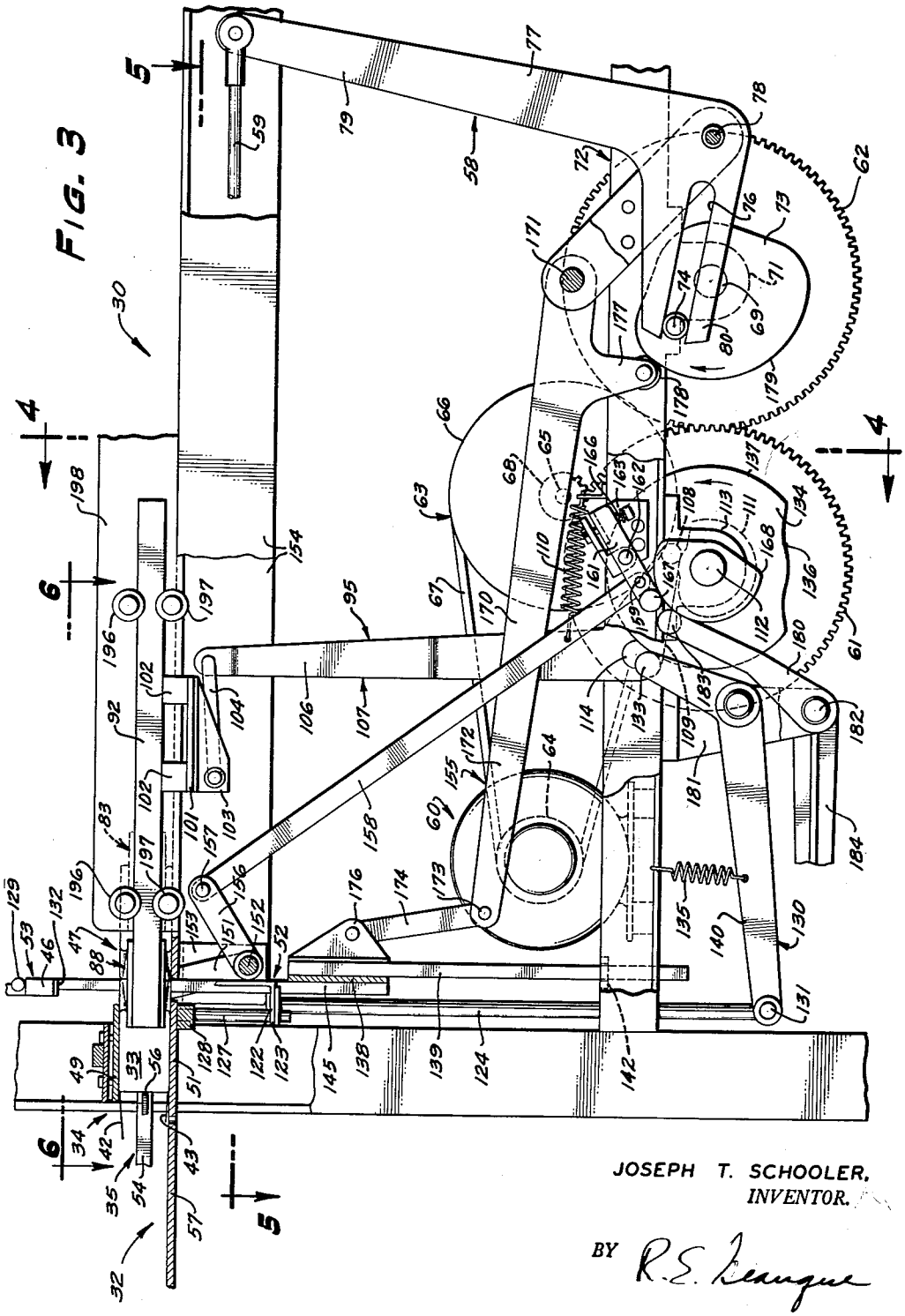
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WRAPPING MACHINE

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FIG. 3



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WRAPPING MACHINE

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FIG. 4

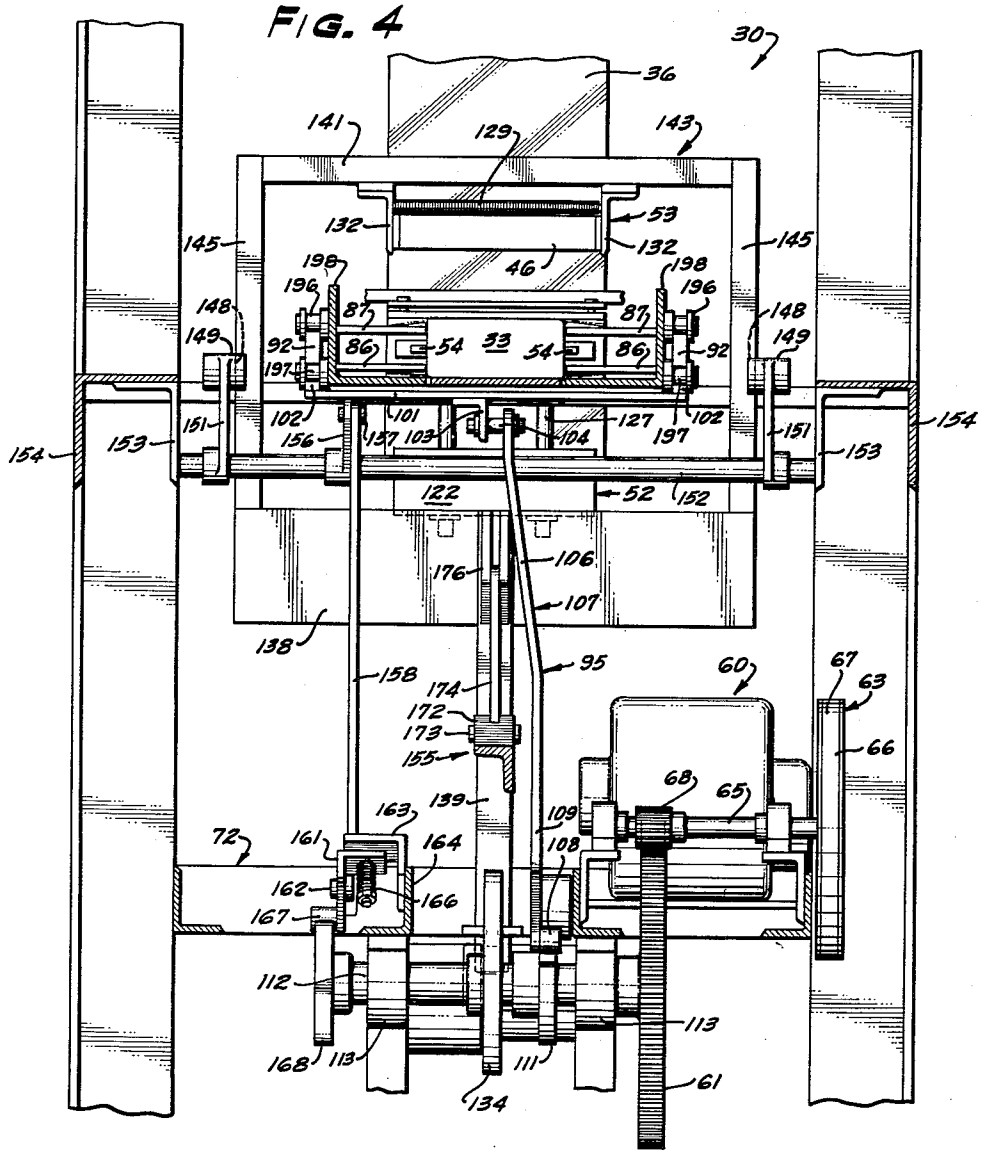
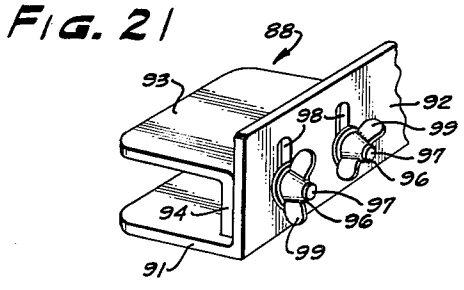


FIG. 21



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BY R. E. Beaugureau

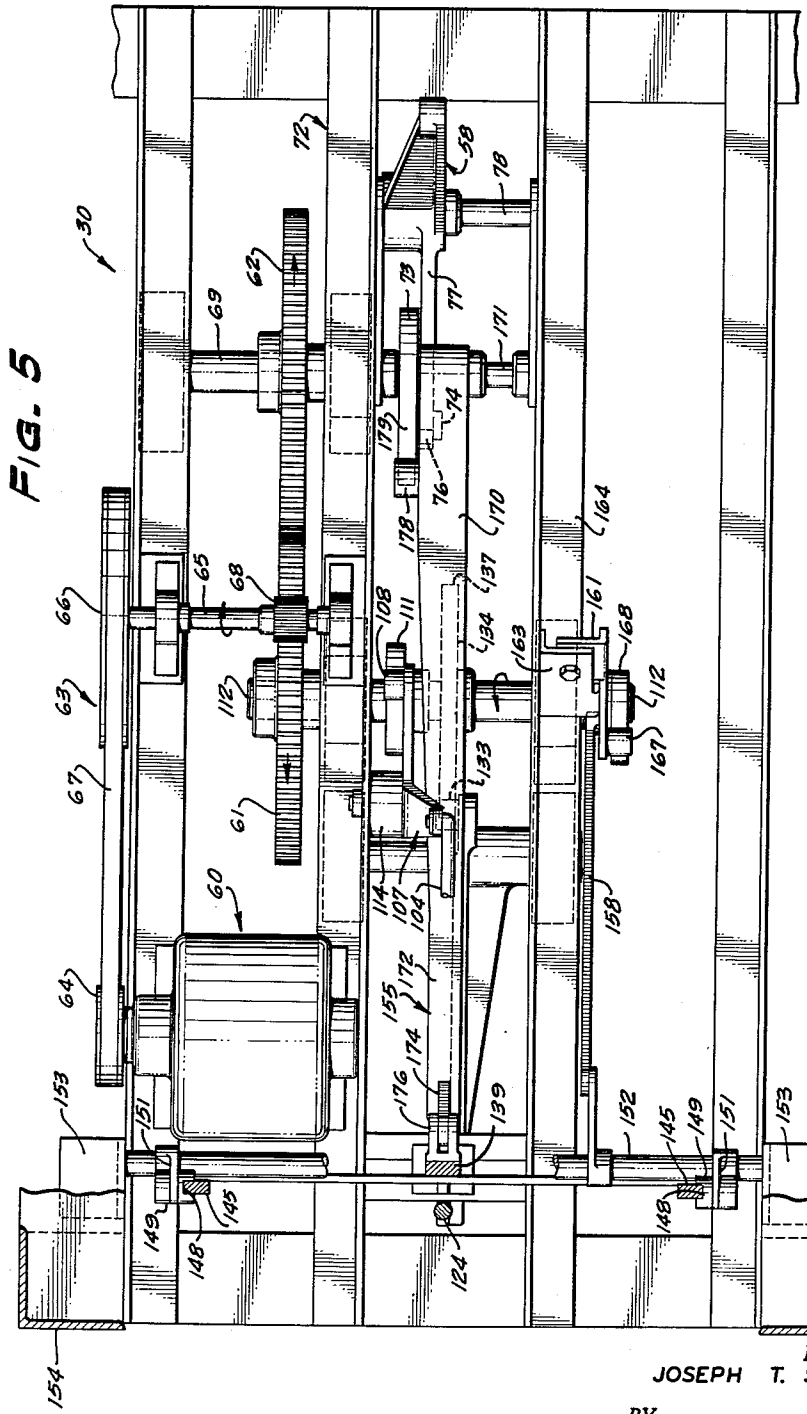
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WRAPPING MACHINE

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FIG. 5



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WRAPPING MACHINE

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FIG. 6

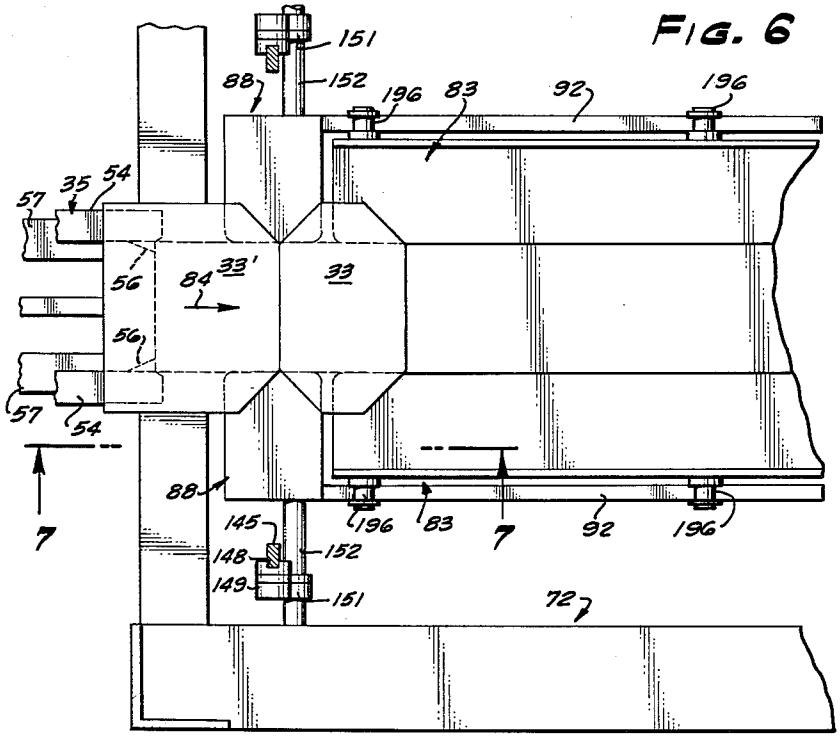
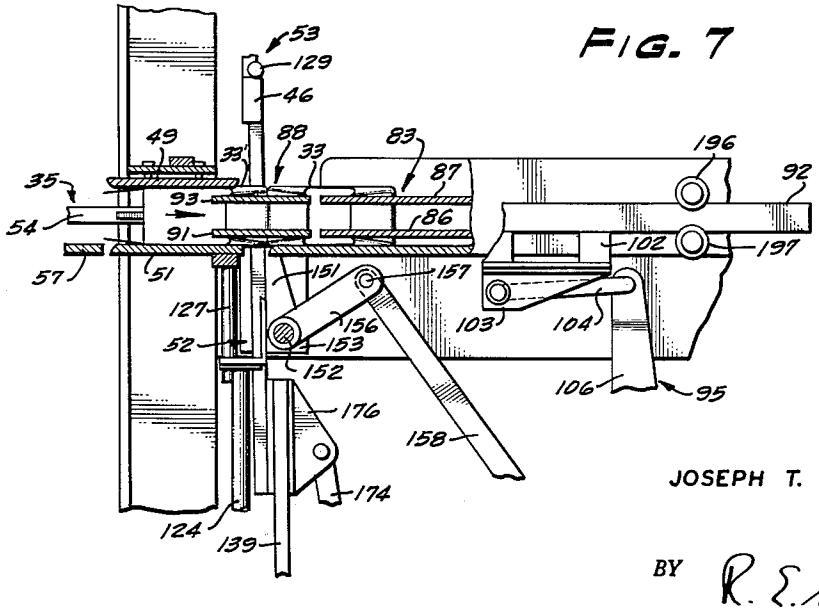


FIG. 7



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WRAPPING MACHINE

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FIG. 8

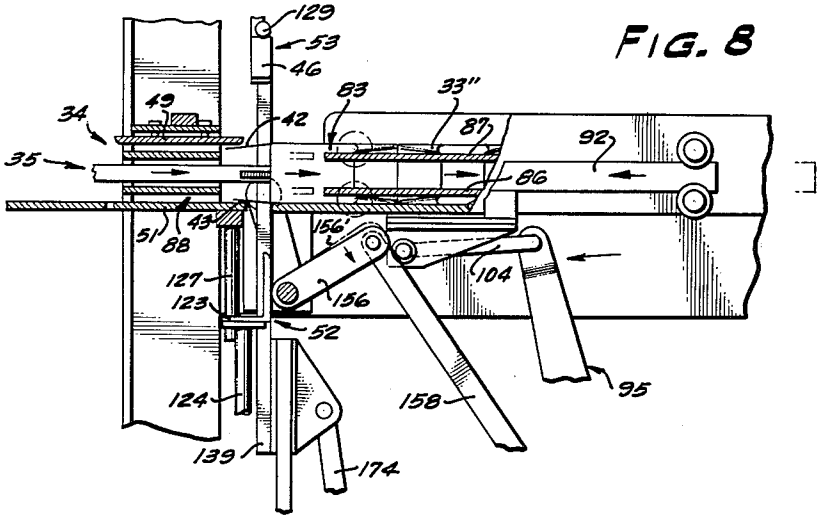


FIG. 9

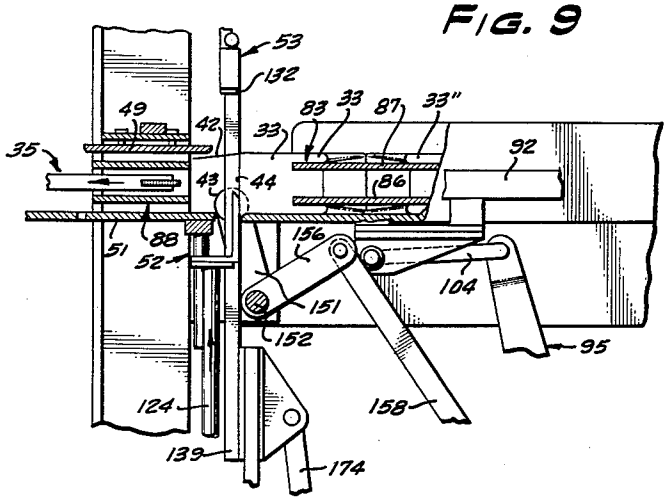
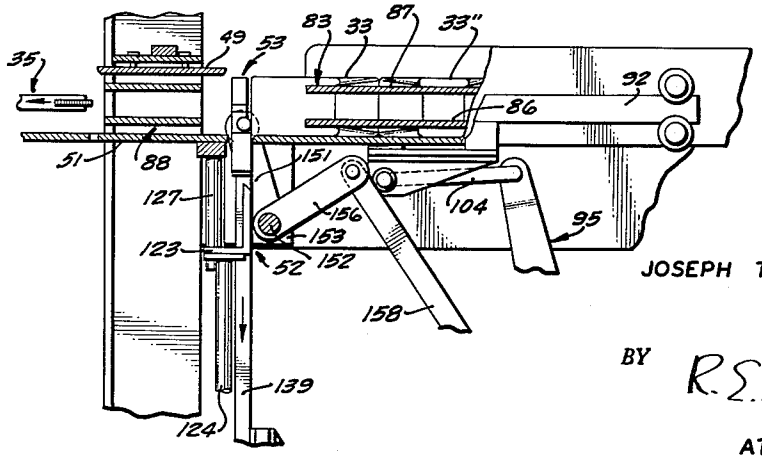


FIG. 10



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FIG. 11

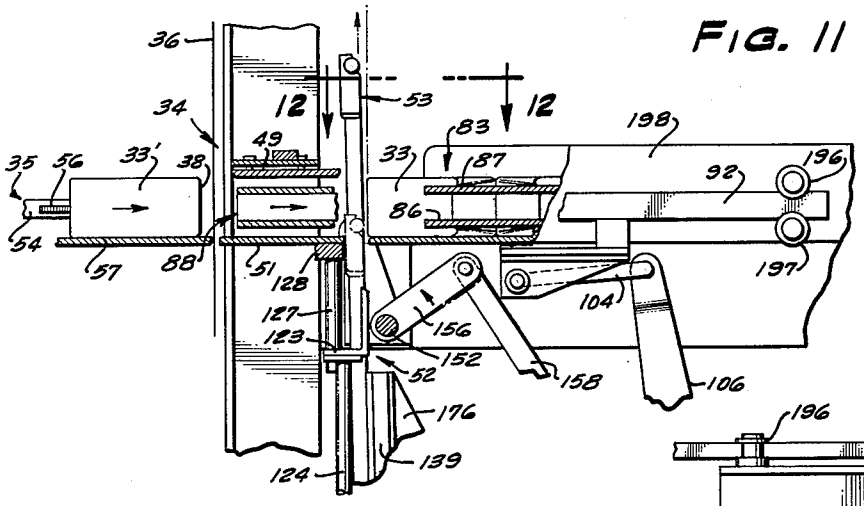


FIG. 12

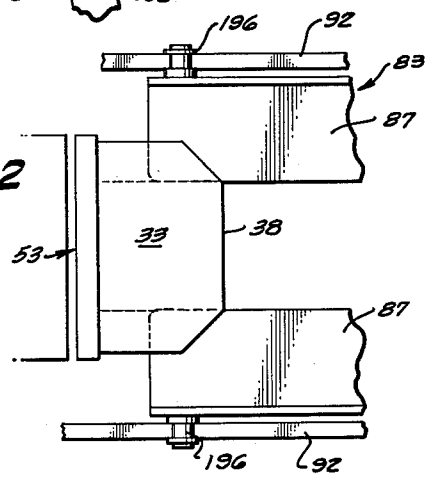
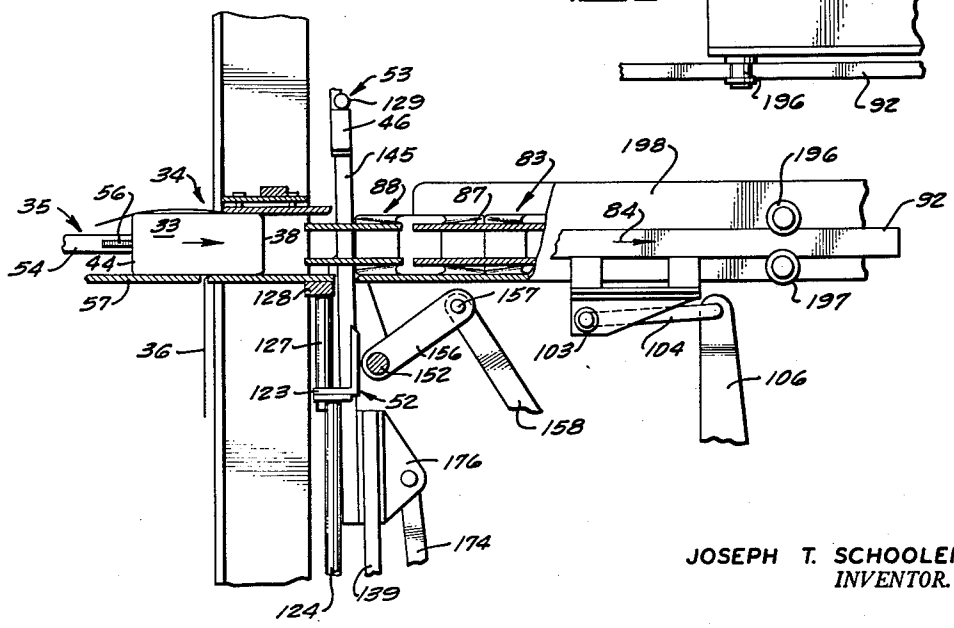


FIG. 13



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Nov. 12, 1963 J. T. SCHOOLER 3,110,143

WRAPPING MACHINE

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FIG. 14

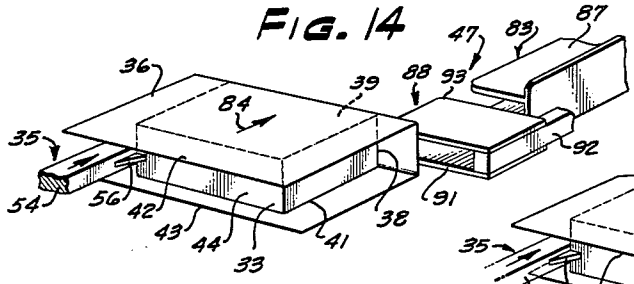


FIG. 15

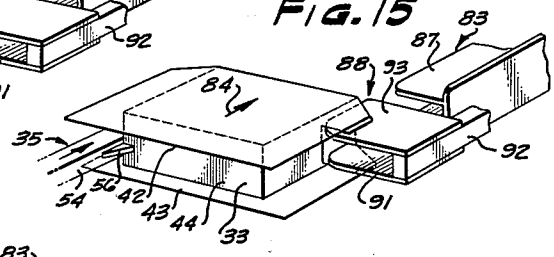


FIG. 16

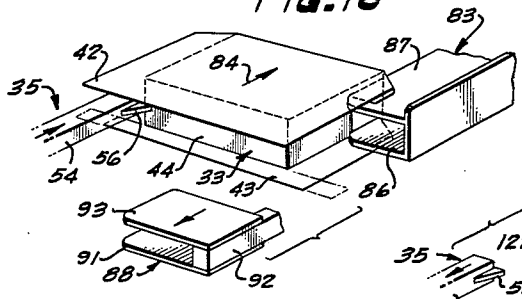


FIG. 17

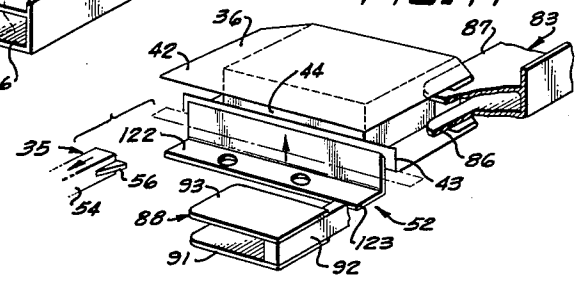


FIG. 18

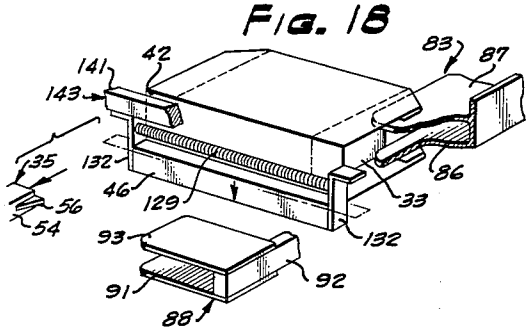


FIG. 19

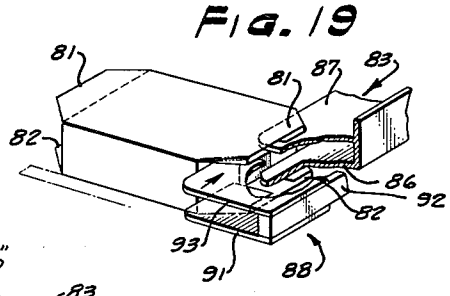
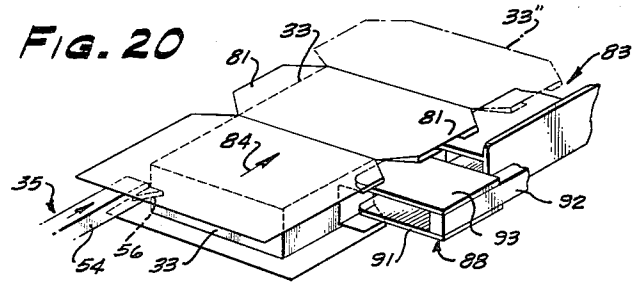


FIG. 20



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BY R. E. Jeangue

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United States Patent Office 3,110,143 Patented Nov. 12, 1963

3,110,143

WRAPPING MACHINE

Joseph T. Schooler, 11341 San Fernando Road, Pacoima, Calif.

Filed May 22, 1961, Ser. No. 111,846
8 Claims. (Cl. 53—220)

This invention relates to a wrapping machine and more particularly to a machine having improved means for intucking the excess wrapping material surrounding a square or rectangular package wherein the wrapping material is substantially wider than the package and is draped across the leading face thereof, rearwardly across the top and bottom thereof and having trailing ends trailing rearwardly thereof.

This invention is an improvement of my co-pending application for a Banding Machine, Serial No. 39,641, filed June 29, 1960, in which a band of wrapping material substantially narrower than the package is draped across the leading face, the top and bottom faces thereof, and provides means for folding trailing ends thereof to cover the trailing face of the package after which the ends are sealed on the trailing face of the package by heat-sealing means.

This invention is further an improvement of my wrapping machine, Patent No. 2,745,234, in which a package having a circumferential wrapping of thermo-plastic material has its ends intucked and folded but with the ends of the wrapping material being overlapped on its bottom face.

Inasmuch as a major purpose for wrapping or banding a package is to provide convenient means for relaying a merchandizing message to potential purchasers, it has been found more practical and advantageous to wrap the package so that the overlap of the package is located at one edge thereof and preferably adjacent to a corner of the edge so that all panels are unbroken and undivided. If the overlap is located at one end face thereof, such as the trailing face discussed above, full panels are provided available for merchandizing messages on the four sides of the package with end flaps being located at the ends of the package. Previously, when the overlap was centrally located on the bottom panel of the package, the bottom panel was broken up into two discrete sections which, because of wrapping procedures, necessitated complete merchandizing information on each section rather than on the face as a whole, as preferred. More specifically, if the overlapping edge of the wrapping is located at a corner of the package identical full face advertising can be placed on both the top and bottom faces rather than on the top alone whereby the identifying marks and advertising show clearly regardless of the position of a package in a merchandizing bin.

The present means draping the wrapping material, described and claimed in my copending application refererd to above and incorporated herein, operates while a package is moved in a straight line of travel thereby eliminating the necessity for the use of elevators for draping and sealing as in other machines presently used substantially for the same purpose. Ability to move the package in a straight line of travel to drape the material over the package greatly increases the speed of operation and eliminates extra heavy construction, extra parts and the longer travel required during elevation, besides providing a machine of more compact design with its bed of travel being in a straight line and on a single level.

Furthermore, in wrapping machines using elevators, complicated construction must be provided to adjust the elevator to compensate for varying widths of packages, or entire elevators must be removed and replaced with one of another dimension to adapt the machine for use for a package of a differing width. It is excessively costly to accomplish either. The machine of the instant invention,

on the other hand, is not concerned with varying widths of packages and will operate efficiently and precisely with an assortment of widths of packages without the need for adjustment. During the travel of the package on the bed in a straight line of travel, the tucking of the ends and folding of the trailing ends of wrapping material is accomplished in the same relationship to the bed regardless of the width of the package.

In the use of my issued patent for a wrapping machine, referred to above, the wrapping material is initially circumferentially wrapped around the package and overlapped at the bottom face thus making possible intucking of the trailing end prior to intucking of the leading edge of the package while the package is being delivered to flap folding means.

In the banding machine of my pending patent application, the banding material is substantially narrower than the package and therefore can be wrapped around the package with its trailing ends of wrapping material folded over the trailing face of the package without presenting intucking problems.

The instant application, wherein a package is wrapped with a wrapping material substantially wider than the package, but in accordance with the teaching of my copending application for a Banding Machine, for the purpose of forming flaps at the ends thereof, provides intucking means synchronously operated with the feeding means and trailing end folding means for intucking the excess material at the trailing ends and form flaps prior to presentation to flap folding means such as the flap folding means of the issued patent.

It is therefore an object of this invention to provide a new and improved wrapping machine for packages having a strip of thermo-plastic wrapping material substantially wider than the package draped across the leading face thereof, rearwardly across the top and bottom thereof and trailing rearwardly to form trailing ends adapted to cover the trailing face of the package so as to fold the trailing ends over the rear or trailing face and intuck excess wrapping material to form foldable flaps on the ends of the package.

Another object of this invention is to provide a new and improved wrapping machine which incorporates heat sealing means for sealing the trailing ends subsequent to folding thereof.

A further object of this invention is to provide a new and improved wrapping means in which the intucking and folding is synchronous with operation of feeding means for feeding the packages on the machine.

Yet another object of the invention is to provide heat sealing means of the character described which is automatically shifted in a manner to avoid repeated contact with the trailing ends after having sealed the ends on the package.

Still another object of the invention is to provide a new and improved wrapping machine which wraps a wrapping material around the package to provide an overlap of trailing ends at an edge thereof so as to provide unbroken panels available for advertising or other merchandising information.

Another object of this invention is to provide a new and improved wrapping machine which is capable of being operated at high speeds for high efficiency of wrapping a package and intucking the ends of the wrapping material for forming foldable flaps at the ends.

Still another object of this invention is to provide a new and improved wrapping machine which is readily adjustable to fit packages having a wide range of dimensions.

A further object of this invention is to provide a new and improved wrapping machine of the character described which is economical to manufacture and is capable of mass production.

Yet another object of this invention is to provide a new and improved wrapping machine of the character described in which the package is moved in a straight line of travel and in one plane.

A general object of this invention is to provide a new and improved wrapping machine of the character described which generally overcomes disadvantages of prior means and methods heretofore intended to accomplish generally similar purposes.

These and other objects of this invention will be more apparent from the following detailed description, drawings and appended claims.

In the drawings:

FIGURE 1 is a side view, in elevation, of a wrapping machine embodying this invention;

FIGURE 2 is an end view thereof, as viewed along the line 2—2 of FIGURE 1;

FIGURE 3 is a vertical, cross sectional view as taken substantially along the line 3—3 of FIGURE 2;

FIGURE 4 is a vertical, cross sectional view as taken substantially along the line 4—4 of FIGURE 3;

FIGURE 5 is a horizontal, cross sectional view as taken substantially along the line 5—5 of FIGURE 3;

FIGURE 6 is a horizontal, cross sectional view as taken substantially along the line 6—6 of FIGURE 3;

FIGURE 7 is a fragmentary, vertical, cross sectional view as taken substantially along the line 7—7 of FIGURE 6;

FIGURE 8 is a fragmentary, vertical, cross sectional view, similar to the upper left hand portion of FIGURE 3, showing parts thereof in changed position;

FIGURES 9–13, inclusive, are fragmentary cross sectional views, similar to FIGURE 8, showing successively changed positions of parts thereof to better illustrate the operation of the machine in accordance with this invention;

FIGURE 14 is a diagrammatic, perspective view, illustrating more clearly the feeding and tucking means of this invention in relation to a package having wrapping material initially wrapped thereto;

FIGURES 15–20, inclusive, are diagrammatic perspective views, similar to FIGURE 14, illustrating diagrammatically subsequent movement of the feeding and tucking means of this invention and including means for folding and heat sealing trailing ends of the wrapping material;

FIGURE 21 is a perspective view, in elevation, illustrating the tucking means of this invention in greater detail; and

FIGURE 22 is a vertical, cross sectional view illustrating a second tucker member of this invention in greater detail.

Referring in detail to the drawings, there is shown by way of illustration, but not of limitation, a wrapping machine designed and constructed in accordance with this invention and generally designated by the numeral 30. The wrapping machine 30 generally comprises a support cabinet 31 constructed from suitable structural material, the sides of which are preferably enclosed so as to protect the operator from the operating mechanism of the machine. The specific structure of the cabinet, as such, does not constitute a part of the present invention and is therefore not described in detail. Broadly, the cabinet 31 defines a loading station 32 having a feeding mechanism for feeding packages of square or rectangular configuration to a draysing station 34 where a thermo plastic or other suitable wrapping material 36, drawn from a roll 37, is draped over a package 33, across the leading face 38 thereof, rearwardly across the top and bottom faces 39 and 41 thereof and trailing rearwardly to form trailing ends 42 and 43 adapted to cover the trailing face 44 of the package, prior to delivery thereof by the feeding means, generally referred to by the numeral 35, to a tucking station 45 wherein the excess wrapping material is intucked to form flaps which are foldable by a flap folding means disclosed in my issued

patent referred to above. At the tucking station 45, the trailing ends 42 and 43 are consecutively and respectively folded over the trailing face 44 of the package 33 and sealed by a heat sealing means 46 incorporated therein. The draping station 34 preferably includes means for cutting the strips 36 of the wrapping material as disclosed and claimed in my co-pending application for a banding machine as discussed above.

An important feature of this present invention comprises the tucking means, generally designated by the numeral 47, wherein means are provided for intucking the excess material of the wrapping material to form flaps while incorporating means for folding the trailing ends 42 and 43 so as to cover the trailing face 44 of the package.

The various operations of feeding of packages, draping of wrapping material therearound, cutting of the material, folding of the trailing ends of the material, intucking of the excess material and folding of flaps formed therein are cyclically and synchronously operated by drive means operatively associated with a common power drive means of the device so as to provide a continuous feeding operation of packages and ultimately delivering the packages to an unloading station indicated by the numeral 48.

Generally, in operation, the package 33 is moved by the feeding means 35 a distance sufficient to actuate the paper draping mechanism at station 34 to drape a predetermined length of wrapping material, through suitable pressure plates 49 and 51 to drape the material across the leading face 38 and the upper and lower faces 39 and 41, respectively, of the package with ends 42 and 43 of the wrapping material trailing behind the package 33. The length of the trailing ends 42 and 43 are preferably predetermined so that the upper end 42 can overlap the lower end 43 and have the outermost edge of the end 42 substantially aligned with a lower most corner of the trailing face 44 when folded. In a subsequent sequence B, the lower trailing end 43 of the wrapping material is folded upwardly, snugly against the trailing face 44 of the package by a fold member 52 (see FIGURES 9 and 17). In sequence C (see FIGURES 10 and 18), an upper fold member 53 of the folding means is caused to move downwardly in synchronized movement with a return downward movement of the fold member 52 to fold the upper trailing end 42 of the wrapping material downwardly and over the lower end 43. The fold member 53 has preferably incorporated therewith the heat sealing means 46 so that during the holding and folding operation, the wrapping material is heat sealed to the package.

In sequence D (see FIGURE 11), the fold member 53 is caused to move, or shift, substantially horizontally and rearwardly a predetermined distance, prior to vertical movement back to its position above the package. This horizontal shift of the member 53, upon completion of the folding and sealing operation, permits this member to be returned to its starting position without ripping or unsealing the freshly sealed ends 42—43 of the wrapping material. To avoid wrinkling or bunching of the material, the members 52 and 53 are preferably the same width or greater than the ends 43 and 42, respectively.

The package 33 is moved on the machine 30, in a straight line of travel by engagement of a pair of spaced feed fingers 54 of the feeding means 35, having inwardly extending package engaging lugs 56, on a substantially horizontal bed or spaced rails 57 of the machine. The rails 57 may be rigidly secured as shown, or adjustably, as shown in my pending application to accommodate packages of varying lengths.

As best seen in FIGURE 3, the feeding means 35 is operated by a drive means 58 connected thereto by a connecting rod 59 and operated by a power drive means 60 in the form of a motor. More specifically, a pair of driven gears 61 and 62 are rotated in opposite directions by a power transmission means 63 which includes a

pulley 64 secured to a driven shaft of the motor 60 for rotation therewith. The pulley 64 is connected to an enlarged pulley 66 fixed on a shaft 65, as by a friction belt 67, to rotate a pinion gear 68 common to the shaft 65 and having gear teeth meshed with the gear teeth of the gear 61. The gear 61 transmits rotation of the gear 61 to the gear 62 in an opposite direction. The gear 62 is mounted on a shaft 69 suitably supported in bearings 71 secured to the frame 72 of the machine 30. A cam 73 is secured to the shaft 69 for rotation therewith and includes a force transmitting roller member 74 extending outwardly therefrom and engaging a slot 76 of a bell crank 77 forming a part of the driving means 58. The bell crank 77 is pivotally mounted on a shaft 78 supported on the frame 72 by suitable bearings and has one end 79 secured to the connecting rod 59 and an opposite end 80 having the slot 76.

As the cam 73 rotates, the roller 74 causes the bell crank 77 to rock back and forth and transmit a linear movement to the connecting rod 59 so as to move the feeding means 35 back and forth relative to the longitudinal bed 57 of the machine 30. In this manner, the feed fingers 54 are reciprocated back and forth to bias a package in a straight line of travel relative to the bed 57.

During the straight line of travel of the feed fingers 54, the package 33 is progressively moved through the draping station 34 where the wrapping material is draped therearound, in the manner previously described, with trailing ends 42 and 43 and subsequently to the tucking station 45 where the trailing ends are folded and the excess material is intucked to form the flaps 81 and 82 at each end of the package.

The tucking means 47 includes a pair of tuck holding members 83, spaced transversely relative to the line of travel of the package 33, indicated by the arrowed line 84 (FIGS. 14, 15 and 16).

Each holding member 83 is provided with a lower holding element 86 and an upper holding element 87, the upper element 87 being adjustable, as best seen in FIGURE 22, relative to the lower holding element 86 to compensate for the variance in the thickness of the packages 33. In all other figures, the tuck holding member 83 is shown as having its upper holding element 87 rigidly secured relative to the lower tucking element 86, for simplicity and clarity in disclosing the invention. In practice, however, the elements 86 and 87 are preferably, but not necessarily, adjustable relative to each other.

A pair of movable tucking members 88 are movably mounted relative to the frame 72 for linear movement, in unison, relative to the tuck holding members 83. The tucker members 88 are in transversely spaced relationships of the line of travel 84 of the package 33 and are movable from a position adjacent to their respective holders 83 and to a position substantially rearwardly of the trailing face 44 of the package 33. Each tucker member 88 includes a lower tucking element 91 secured to an elongated arm 92 and an upper tucker element 93 adjustably supported on the arm 92 relative to the element 91.

FIGURE 21 illustrates the preferred construction of the tucker element 88 in which the lower tucking element 91 is secured to or formed integrally with the arm 92 and wherein the upper tucking element 93 is adjustable relative to the lower tucking element 91. Preferably, the upper tucking element 93 has a flange 94 secured thereto or formed integrally therewith and juxtaposed to the arm 92, the flange 94 and the arm 92 having a plurality of fasteners 96 extending therethrough for securing the tucking elements 93 in adjusted relationship to the tucking elements 91. Each fastener 96 preferably includes a bolt 97 extending through an opening in the flange 94 and an aligned vertical slot 98 of the arm 92 and has a wing nut 99, or the like, associated therewith for securement of the element 91 after adjustment.

The tucker members 88 are driven in unison by a drive mechanism 95 connected to the driven gear 61 so as to reciprocate back and forth in a manner to be hereinafter described. Each arm 92 of the tucker members 88 is supported as between opposed upper rollers 196 and lower rollers 197 mounted on the frame 72, the rollers 196 and 197 being rotatably supported on the side plates 198 of the first tucker members 83. As best seen in FIGURES 3 and 4, the arms 92 are connected by a transverse plate 101 and vertical legs 102 to a bracket 103. The bracket 103 is connected by a connecting link 104 to a bell crank 106 forming a part of a drive means 95.

The bell crank 107 is provided with a cam follower 108 secured to an opposite end 109 thereof which is in engagement with an eccentric cam 111 mounted on a shaft 112 supporting the driven gear 61. The shaft 112 is supported for rotation by suitable bearings 113 secured to the frame 72.

As will be more clearly understood from the foregoing description, the tucker members 88 of the tucking means 47 are linearly movable by virtue of the arms 92 supported in the opposed rollers 196 and 197 and driven by the drive means 95 through the link 104, bracket 103 and transverse plate 101. The drive means 95 is actuated by the gear 61 which rotates the cam 111 to cause the end 109 of the bell crank 107 to rise and fall by virtue of the contact of the cam follower 108 with the cam 111. The cam follower 108 is biased into contact with the cam 111 by spring means 110. The bell crank 107 thereby pivots about the axis of a shaft 114 mounted on the frame 72 to reciprocate the bracket 103 and thereby the arms 92 and their respective tucking members 88. The cam 111 is synchronized in time with the drive means 58 so as to drive the tucking members 88 in predetermined timed relationship thereto as will be hereafter described.

The lower folding member 52, as previously mentioned, is mounted for vertical linear travel, up and down in timed sequence so as to fold the lower trailing end 43 of the wrapping material against the trailing face 44 of the package 33 prior to downward folding of the trailing end 42.

The lower folding member 52 is preferably in the form of an angle section 122, a horizontal leg 123 of which is fixed by suitable means to one end of a connecting rod 124 and a vertical leg of which functions as the wrapping material folding member. The pair of vertical posts 127 depend downwardly from a rigid frame member 128 and are slidably received in suitable openings formed in the leg 123 for guiding the up and down movement of the fold member 52 in a predetermined path of movement. The other end of the connecting rod 124 is connected to a drive mechanism 130 as at one end 131 of a bell crank 140 forming a part thereof. The ball crank 140 has an opposite end 133 bearing against the perimeter of a cam 134 driven by the shaft 112. The end 133 of the bell crank 140 is biased against the cam 134, in any suitable manner, such as a spring 135, so as to raise the opposite end 131, and thereby the folding member 52 when the end 133 engages a surface 136 of the cam, in timed relationship to the operations previously described. When the end 133 is following the enlarged perimeter 137 of the cam 134, the lower fold member 52 is retracted into its normal lower position shown in FIGURE 3. The uppermost position of the fold member 52 is shown in FIGURE 9 in which the lower trailing end 43 is folded upwardly and into engagement with the trailing face 44 of the package 33. The angle section 122 is preferably of a length substantially the same or greater than the width of the wrapping material so as to avoid buckling or tearing of the excess material extending beyond the package 33 when folding the end 43 from a substantially horizontal position to the vertical position adjacent to the end face 44 of the package.

Subsequent to the action of the lower fold member 52 and prior to complete disengagement of the fold member with the end 43 so as to hold the end 43 in place until

the end 42 has overlapped the end, the upper fold member 53 is caused to move downwardly so as to fold the trailing end 42 over the trailing end 43 and the face 44.

The upper fold member 53, as previously mentioned, preferably includes a heat seal element 46 so that during the folding operation the trailing ends 42 and 43 of the wrapping material will be heat sealed together. The upper fold member 53 is supported between a pair of spaced brackets 132, see FIGURES 3 and 4, by suitable fasteners. A suitable roller 129 is located in trailing relationship to the heat sealing means 46 so as to follow and cool the folded wrapping material after the sealing operation. The roller 129 is provided with circumferential grooves, or is otherwise provided with cooling means so as to cause a temperature drop at the seal sufficient to congeal the thermo-plastic material or coating of the wrapping material.

Brackets 132 are secured, by welding or other suitable means, to a transverse bar 141 of a support carriage generally designated by the numeral 143, a lower transverse plate 138 of the carriage being fixed by suitable means to one end of a guide rod 139. The guide rod 139 is slidably received in an opening formed in a guide plate 142 and the guide plate is fixed by suitable means to the frame 72 so as to be in predetermined fixed position.

A pair of vertical legs 145 of the carriage 143 are interconnected with each of adjacent ends of the top and bottom members 141 and 138 of the carriage and are slidable in slots 148 formed in spaced bushings 149 pivoted in the ends of a pair of legs 151 of a rock shaft 152, the rock shaft 152 being rotatably supported adjacent its ends by suitable brackets 153. The brackets 153 are secured by suitable means to a pair of spaced rigid members 154 of the frame 72. In this manner, the position of the rock shaft 152 determines the predetermined vertical path of the movement of the carriage 143 and consequently of the member 53, and any rocking of the rock shaft 152 in one direction will be responsible for shifting the fold member 53 in the same and substantially horizontal direction.

The other end of the guide rod 139, see FIGURE 3, is connected to a drive mechanism 155 which causes the carriage 143 to move in its predetermined up and down sequence of travel as will be hereinafter more clearly described.

An arm 156, which constitutes another leg of the rock shaft 152, is pivotally connected as at 157 to one end of a push rod 158, the other end of the push rod being pivotally connected as at 159 to a lever 161. The lever 161 is fulcrumed about the axis of a pivot pin 162 pivotally securing the lever 161 to a bracket 163 fixed on a horizontal member 164 of the frame 72. One end of the lever 161 is spring loaded to bracket 163 by an adjusting spring 166 while an opposite end 167 includes a follower riding upon the perimeter of a cam 168 driven by the shaft 112. As will be more fully described hereinafter, the action of the cam 168 upon which the cam follower 167 rides, will, at the proper sequence of operation, push the rod 158 a distance sufficient to rock the rock shaft 152 that predetermined distance in one direction to cause the upper fold member 53 to move horizontally the distance necessary for the heat sealing means 46 to clear the trailing face of the package when the upper fold member 53 is being returned to its normal uppermost position. This distance is indicated by the dotted broken line position of the arm 156 indicated by the numeral 156' in FIGURE 8. This shift is effected by movement of the carriage 143 by reason of the sliding engagement of the members 145 in the slots 148 of the bushings 149. Therefore, while the up and down movement of the fold member 53 is controlled by the drive mechanism 155, the path of travel of this member is controlled by the position of the rock shaft 152 which of course is responsive to the action of the cam 168 upon the push rod 158.

The drive mechanism 155 controls the up and down movement of the upper fold member 53 as previously mentioned. This drive mechanism comprises a rock arm 170 which is rotatably carried adjacent to one of its ends on a suitable stub shaft 171. A force transmitting leg 172 is pivotally connected by suitable means as at 173 to a link 174 secured in turn to a bifurcated bracket 176 fixed to the upper end of the guide rod 139 so that up and down rocking movement of the rock arm 170 about the axis of the shaft 171 will impart a similar up and down movement to the rod 139 and, as previously described, to the upper fold member 53. A depending leg 177 of the arm 170 is provided with a cam follower 178 which is in frictional engagement with a cam surface 179 of the cam 73. It will be appreciated that the weight of the arm 170 maintains the follower 178 in frictional engagement with the cam surface 179. It will also be appreciated that the rotative speed of the power gear 62, the shape and the relationship of the cam surface 179 and the path of movement of the force transmitting roller 74 can be so interrelated that the linear force transmitted to the rod 139 will be in timed relationship to the force imparted to the connecting rod 59.

Another arm 180 is pivotally mounted on a bracket 181 supporting the bell crank 140 for rotation with a shaft 182. The arm 180 includes a cam follower end 183 in engagement with the cam 168 so as to rock the shaft 182 and another arm 184 extending therefrom which operates a shuttle or paper guide, in synchronism with the operation of this machine, to guide the downward travel of the paper 36 prior to cutting thereof as described and claimed in the aforementioned pending application.

Operation

As will now be more clearly understood from the foregoing description, the various functions and operations of the instant invention are cyclically and synchronously performed to automatically feed packages 33 in a predetermined straight line of travel, indicated by the arrowed line 84, drape wrapping material thereover across the leading face, rearwardly across the top and bottom faces thereof and trailing rearwardly to form trailing ends 42, 43 adapted to cover the trailing face 44 of the package.

Initially, the package 33 is moved through the draping station 34 for accomplishment of the draping of the wrapping materials therearound and cut so as to form trailing ends 42 and 43, the trailing end 42 being of a length substantially equal to the thickness of the package whereas the end 43 is of lesser dimension. At this time, the tucking members 88 are retracted to a position adjacent to the tuck holding members 83 and are therefore positioned to intercept the excess material of the wrapping material initially, as indicated in FIGURES 14 and 15, wherein the lower and upper tucking elements 91 and 93 intuck the excess material of the leading edge of the package.

Subsequently, the arms 92, by means of the drive means 107 are caused to travel linearly away from the tuck holding member 83, as indicated in FIGURES 16–18, a distance sufficient to extend rearwardly of the trailing ends 42 and 43. The FIGURES 16 and 18 also designate the end of the straight line of travel 84 of the package 33 as imparted by the feeding members 54 of the feeding means 35. At this time, the feeding means 35 is retracted away from the package 33 while the lower fold member 52 is elevated (see FIGURES 9 and 17) by the drive means 130 as previously described. The lower fold member 52 engages the trailing end 43 of the wrapping material to fold the end 43 upwardly and against the trailing face 44 of the package.

Subsequently, the lower fold member 52 is withdrawn, downwardly, by the action of the cam 134. While the lower fold member 52 is descending, the upper fold member 53 is caused, by the drive means 155, to descend

and engage the upper trailing end 42 of the wrapping material downwardly and against the face 44 of the package to overlap the upwardly folded end 43 prior to complete disengagement thereof by the lower fold member 52. At the same time, the heating element 46 of the upper member 53 heat seals the upper trailing end 42 to the lower trailing end 43 to seal the overlap of wrapping material, as illustrated in the FIGURES 10 and 18, with the trailing cooling element 129 following the heat sealing means 46 so as to cool the melted thermo-plastic material prior to return of the upper member 53 to its normal uppermost position. As the member 53 is caused, by the action of the drive means 53 to extend upwardly, the rock shaft 152 is rocked by the cam 168 to shift the member 53 and its heat sealing means 46 away from the face 44 of the package 33 and avoid contact therewith as it returns to its uppermost position.

In the next sequence, the tucking members 88 are caused to return to a position adjacent to the tuck holding members 83 (FIGURE 19) and thereby engage the excess material of the trailing edge of the wrapping material to intuck the material thereat and form upper and lower foldable flaps 81 and 82, respectively. In this position, the flaps 81 and 82 are held in their intucked relationship by both the stationary tuck holding members 83 holding the intuck of the leading edge and the tucking member 88 engaging the intuck of the trailing end.

At this time, a subsequent draped package 33' is delivered by the feeding means 35 to have the forward excess material of the package intucked by the tucking means 88 as it progresses along its line of travel to a point where it abuts the first package 33 and finally moves it into a stopped position, at the end of its line of travel, indicated by the broken line 33'' in FIGURE 20. Therefore, in this position of FIGURE 20, the package 33' is stopped at the position formerly occupied by the package 33 wherein the tuck holding member 83 holds the forward intuck thereof and the package 33 is moved along the tuck holding member 83 to a flap folding means referred to in reference to the issued patent above. The flap folding means, not being a part of this invention, is therefore not disclosed or claimed herein.

It will be more clearly understood at this point, that the packages like 33 progressively push previously delivered packages along the bed of the machine to progress the packages to a flap folding and sealing mechanism and finally outwardly of the machine. The length of the line of travel of the feeding means 35 is such as to position each package 33 in engagement with the tuck holding member 83 so that the forward intuck is held by the forward intucking means. The trailing intucking is accomplished before the package like 33 is moved to the position 33'' by abutment of subsequent packages fed by the feeding means 35.

An important feature of this invention is in the fact that no adjustment is necessary to compensate for varying widths of packages. During the travel of a package in a straight line of travel, the tucking of the ends and folding of the trailing ends of the wrapping material is accomplished in the same relationship to the bed regardless of the width of the package. If desired, adjustment for varying lengths of packages may be provided in the same manner disclosed and claimed in my copending application for a Banding Machine, referred to above, by providing laterally adjustable supporting rails.

It is to be further noted that by eliminating cumbersome elevators and instead, forwarding the packages like 33 in a straight line of travel, many of the disadvantages of the use of elevators are overcome, heavier and larger packages may be wrapped and packages may be wrapped in multiples, if desired, with appropriate modification or adjustment of the machine.

While there is herein shown and described what is conceived to be the most practical and preferred embodiments of this invention, it is recognized that departures may be made therefrom within the scope of this invention which is not limited to the details disclosed herein but is to be accorded the full scope of the claims so as to embrace any and all equivalent devices.

What is claimed as new and desired to secure by Letters Patent is:

1. A wrapping machine for packages having a strip of wrapping material substantially wider than the package draped across the leading face thereof, rearwardly across the top and bottom faces thereof and trailing rearwardly to form trailing ends adapted to cover the trailing face of the package, comprising: means for feeding said package in a predetermined straight line of travel; tuck forming means for intucking excess wrapping material of the leading face of the package during said line of travel; means for holding the tucks formed by said tuck forming means, means for folding the trailing ends of said material against the trailing face of said package upon said package reaching the end of its line of travel; and means synchronized with said feeding means for actuating said tucking means to intuck the excess material of the wrapping material on the trailing face of the package subsequent to the folding of said trailing ends of the wrapping material and while said first formed tucks are held by said tuck holding means.

2. A wrapping machine as defined in claim 1, wherein said wrapping material is thermo-plastic and said folding means includes heat sealing means incorporated therewith and engageable with said trailing ends of said wrapping material in overlapped relationship.

3. A package wrapping machine as defined in claim 2, including heat dispersing means positioned in trailing relationship relative to said heat sealing means for effecting an immediate temperature drop in said seal following the sealing operation said heat dispersing means comprising a circumferentially grooved roller.

4. A wrapping machine as defined in claim 1, wherein said tuck forming means is movably mounted for linear movement relative to said tuck holding means, parallel to said predetermined straight line of travel and in synchronization with movement of said feeding means, said tuck forming means being movable to a forward position adjacent to said tuck holding means so as to intuck said forward excess wrapping material on said package and prior to completion of the predetermined travel thereof, a position spaced rearwardly of said package after the completion of said predetermined travel and prior to folding of said trailing ends thereof and subsequently back to said forward position adjacent to said tuck holding means so as to intuck the excess wrapping material of the trailing ends subsequent to folding of said trailing ends, and said tuck holding means being engageable with said forward intucked end after completion of said line of travel for holding said package while said trailing ends are folded and intucked.

5. A wrapping machine as defined in claim 4, wherein said tuck holding means comprises a pair of spaced, oppositely disposed upper and lower holding elements, each pair being parallel to the other and to the path of linear travel of said package; and means adjusting said upper holding elements relative to said lower holding elements to accommodate for the variation in the thickness of packages.

6. A wrapping machine as defined in claim 4, wherein said second tucker means comprises a pair of spaced, oppositely disposed upper and lower tucking elements, each pair being parallel to the other and to the path of linear travel of said package; and means adjusting said upper tucking elements relative to their respective lower tucking elements to accommodate for variations in the thickness of the packages.

7. A wrapping machine as defined in claim 1 wherein said tuck holding means is stationary and is positioned at the end of said line of travel to hold the forward

intuck thereat, and wherein said means for actuating said tucking means includes means for moving said tucking means in a straight line of travel, and includes means to first position said tucking means adjacent the said tuck holding means so as to intuck excess wrapping material of the leading edge of the package prior to the end of the line of travel, to then move said tucking means away from said tuck holding means and to thereafter reposition said tucking means adjacent to said tuck holding means so as to intuck the excess wrapping material of the trailing edge of the package synchronously in response to the operation of said feeding means.

8. In a wrapping machine as defined in claim 1 wherein said tuck holding means is positioned to hold both the

tuck formed from the excess wrapping material at the leading face of the package and the tuck formed from the excess wrapping material at the trailing face of the package upon a further movement of said package following the tucking of said excess material at the trailing face.

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