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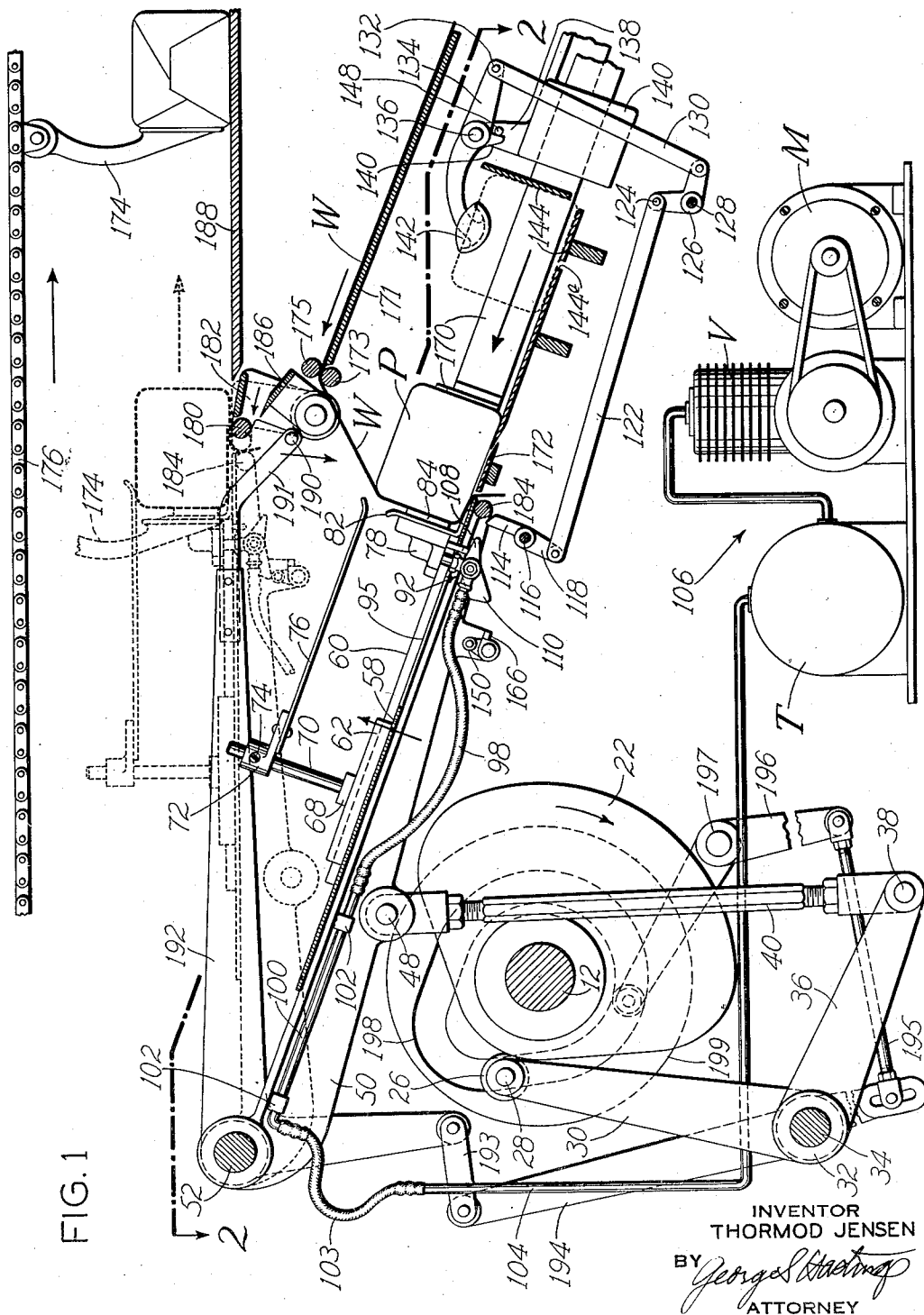
T. JENSEN

2,385,706

WRAPPING MECHANISM

Filed May 13, 1943

3 Sheets-Sheet 1



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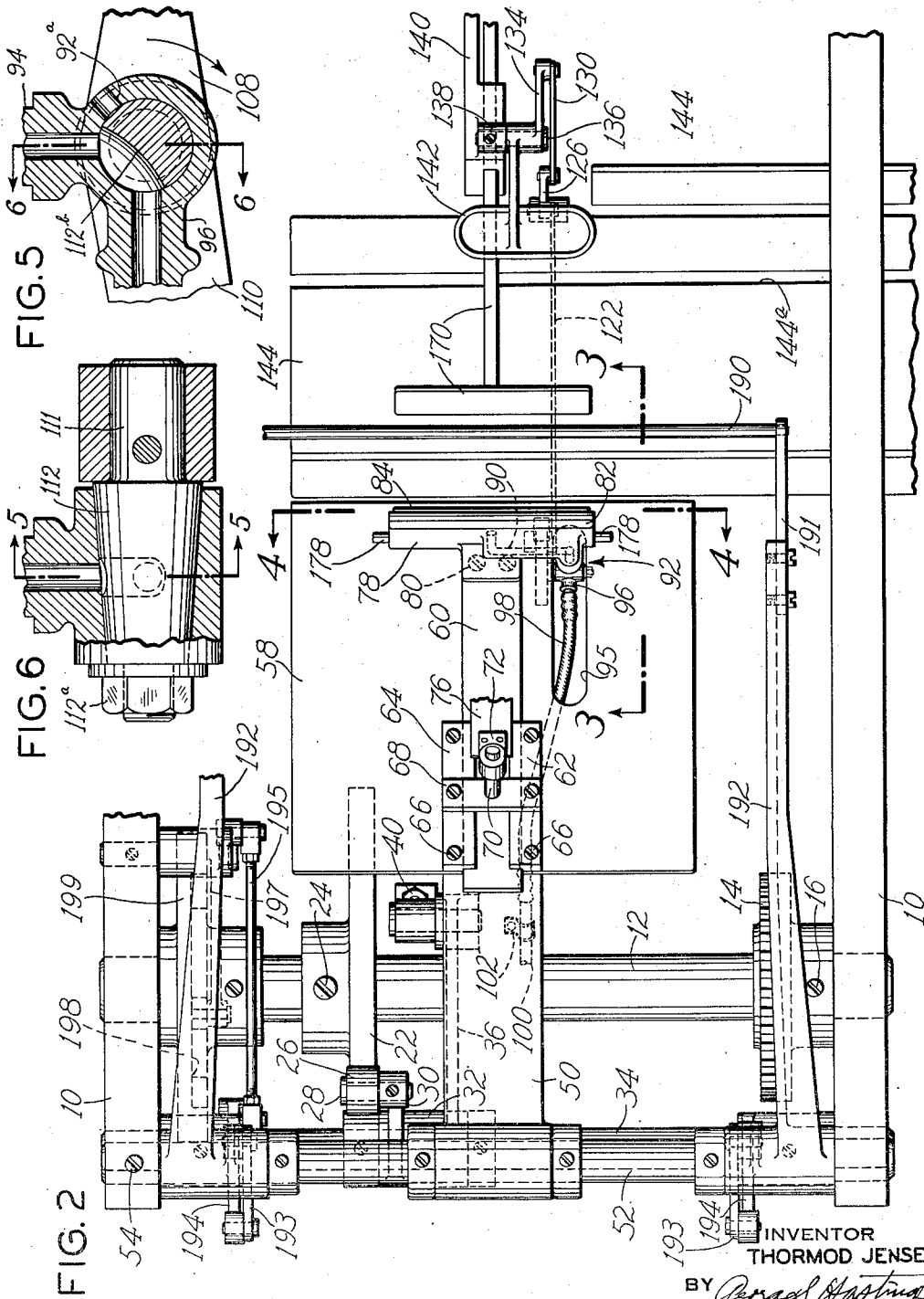
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FIG.3

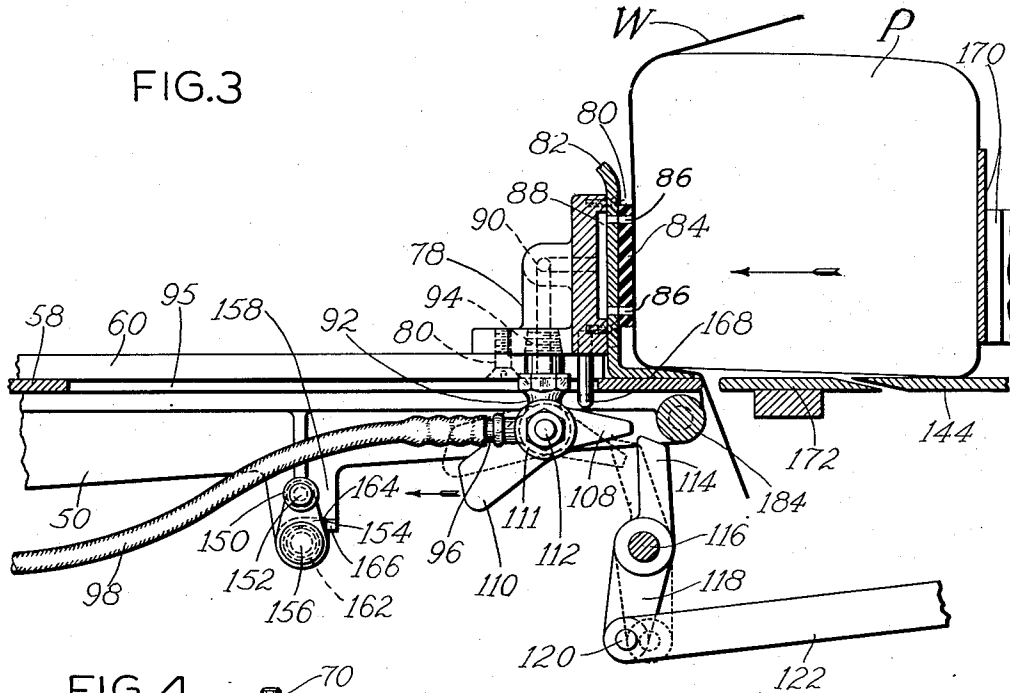


FIG. 4

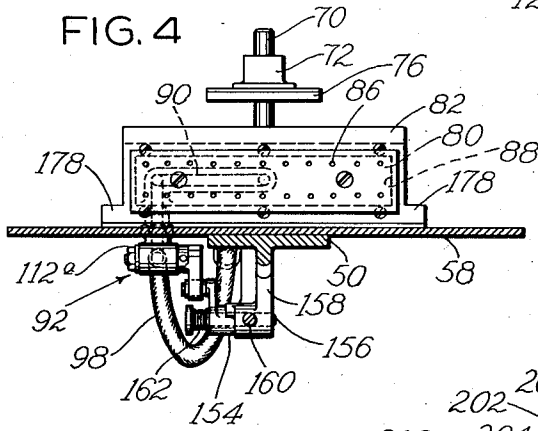
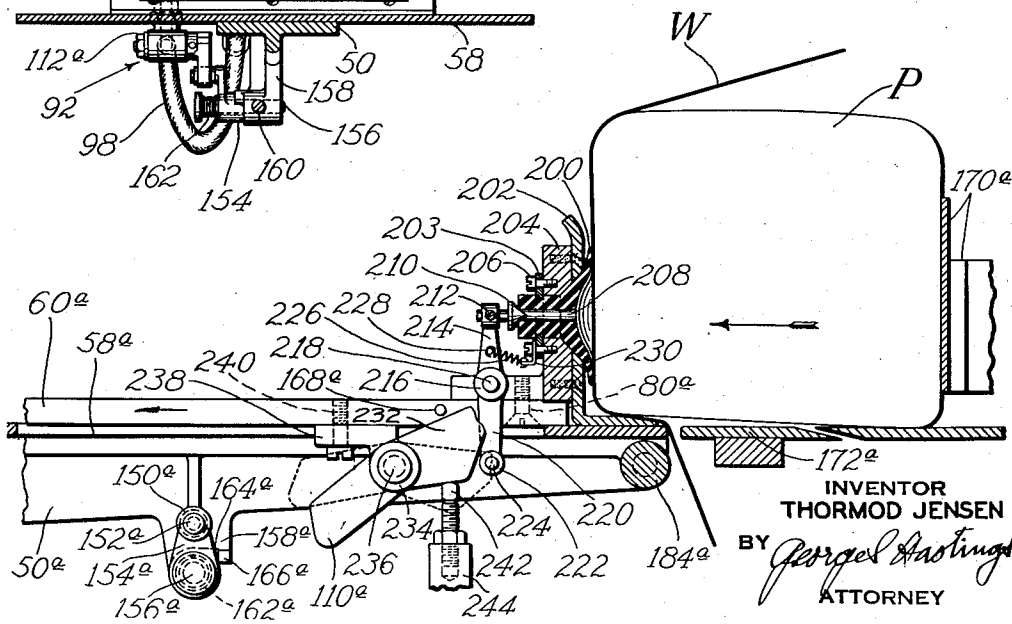


FIG. 7



UNITED STATES PATENT OFFICE

2,385,706

WRAPPING MECHANISM

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10 Claims. (Cl. 93—2)

This invention relates to wrapping machines, more particularly to improvements in the construction of the back tension plate and the mechanism for operating the lap roller.

One of the main objects of the invention is to prevent slippage of the wrapper as it is draped about the girth of the article to be wrapped. To this end, the back tension plate, which is slidably supported on the lifter table to press the wrapping material against the leading face of an article delivered to the table, may be provided with a pad provided with holes communicating with a suction chamber whereby the wrapping material will be suctionally held against the pad until the desired wrapper length is severed. Thus the wrapping material will be firmly held and slippage thereof will be prevented. In an alternative construction selected to exemplify the invention, suction cups may be mounted on the back tension plate to hold the wrapping material. With either type of construction a saving of paper is possible, since there is greater certainty that the exact length of wrapper required will be severed and therefore shorter wrapper lengths may be employed because more uniform overlaps are obtained. Therefore an excessively wide overlap will not be required to provide for occasional slippage.

Another object of the invention is to reduce the speed at which the wrapping material is drawn downwardly by the lap roller over the rear face of the article on the lifter table and eliminate the jerky motion which is imparted to the lap roller by operating mechanism now employed. To this end the lap roller is moved downwardly at a speed which is approximately 50% slower without dwelling at a midway point, as heretofore, at which the severing of the wrapping material takes place. Thus a slower continuous drag is exerted on the wrapping material which in conjunction with the improved construction of the back tension plate will further reduce lap variations and minimize compression of soft loaves.

In the accompanying drawings, which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a sectional side elevation of a wrapping machine equipped with the preferred form of back tension plate;

Fig. 2 is a plan view of the same taken from line 2—2 of Fig. 1;

Fig. 3 is a side elevation on an enlarged scale

illustrating the suction valve control mechanism, taken on line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken from line 4—4 of Fig. 2;

Fig. 5 is a detail sectional view of the suction valve;

Fig. 6 is a cross-section of the valve taken on the line 6—6 of Fig. 5;

Fig. 7 is a detail view of a modified form of the invention, illustrated in a view similar to Fig. 3.

Referring to Figs. 1-4 of the drawings, the side frames 10 of the wrapping machine support a cam shaft 12 which carries a gear 14 secured thereon by a set screw 16 (Fig. 2). This gear is driven by another gear on the motor (not shown) of the machine. A cam 22 fixed to shaft 12 by a set screw 24 (Fig. 2) engages with a cam roller 26 supported on a stud 28 fixed to an arm 30 of a cam lever 32 loosely mounted on a stationary cross shaft 34, supported in frames 10. Cam lever 32 has another arm 36 which is connected by a stud 38 to an adjustable link 40 pivoted on a stud 48 secured to a lifter table arm 50. Arm 50 is loosely mounted on a stationary shaft 52 supported in frames 10 and secured therein by a screw 54. In Fig. 1 the arm 50 is shown in an inclined position, and when moved by the action of cam 22, it is elevated to the horizontal position indicated by broken lines.

On arm 50 is fastened a plate 58 on which is slidably mounted the base 60. Base 60 is guided between two guide strips 62 and 64 fixed to arm 50 by screws 66. On guides 62 and 64 there is secured a cross piece 68 carrying an upright rod 70 on which a bracket 72 is adjustably held by set screw 74, and on bracket 72 is mounted a top tension plate 76.

The slide or base 60 carries a bracket 78 fastened thereto by screws 80. To said bracket is secured a back tension plate 82 on which is fastened a rubber suction pad 84. The latter has a plurality of holes 86, which communicate through corresponding holes in back tension plate 82 with a suction chamber 88 formed in bracket 78.

A duct 90 extends from said chamber to the base of bracket 78. A two-way suction valve 92 is provided with a nipple 94, through which it communicates through duct 90 with chamber 88 the nipple extending through a slot 95 in plate 58 and being screwed into bracket 78. The valve cock 112 of said suction valve is free to rock from a position at which its port 112b is in communication with the port 92a and the bore in nipple 94

to relieve the suction in the suction chamber 88 to a position shown in Fig. 5 at which it places the latter in communication with a source of suction through a nipple 96 thereof on which is mounted one end of a flexible air-hose 98. The other end of the latter is mounted on a tube 100 fastened to lifter table arm 50 by clamps 102. The purpose of said flexible hose is to compensate for the sliding movement which will be described later. From tube 100, another flexible hose 103 extends to a stationary tube 104 leading to a source of suction 106, which may consist of a vacuum tank T and a vacuum pump V driven by a motor M arranged as shown in Fig. 1.

The angular movement of valve cock 112 from one position to the other, previously mentioned, is effected by means of a block provided with two fingers or cam lugs 108 and 110 and secured to the stem 111 of valve cock 112 which projects at one end of the valve seat formed in valve 92. On the other end of the valve cock is threaded a nut 112a which maintains the cock in the valve seat. The finger 108 which turns cock 112 to the position at which suction is applied to chamber 88, is engaged at the last part of the downward stroke of arm 50, by a finger 114, pivoted on a stationary stud 116, and having an arm 118 which is pivotally connected by a stud 120 to a link 122 connected by a stud 124 to one end of a bell-crank 126 pivoted on a stationary stud 128. On the other end of said bell-crank is pivotally mounted a link 130 connected by a stud 132 to a feeler lever 134 fulcrumed on a stud 136 fastened in an arm 138 of a stationary bracket 140. Said feeler lever has a feeler "shoe" 142 positioned over a material feed runway 144 in such a way that a bread loaf or other article being advanced on said runway by the flights of an endless conveyor (not shown), will raise said feeler "shoe" 142 up to a position which, through the above described linkage, moves finger 114 into the dotted position (shown in Fig. 3) where it may engage with cam lug 108 during the descent of the lifter table and turn valve cock 112 to the "suction on" position shown in Fig. 5.

The flights of the endless conveyor pass through a slot 144a in the runway 144, and reference may be had to my prior Patent 2,304,048 for the details of construction thereof. In the "suction on" position of cock 112, the port 112b thereof establishes communication between the nipples 94 and 96.

As shown in Fig. 1, the feeler mechanism is normally in the inactive position and the weight of "shoe" 142 holds a lug 146 of the feeler "shoe" against a pin 148 secured in arm 138. The cam lug 110 is positioned to engage, when the back tension plate is moved backwardly with a cam roller 150 mounted on a stud 152 secured to an arm 154 which is pivoted on a stud 156 secured in an extension 158 of arm 50 (Figs. 3 and 4). A torsion spring 162 having one end fixed in the head of stud 156 and the other end held in arm 154 urges a lug 164 on said arm against a stop lug 166 on extension 158.

When cam lug 110 is moved in the direction shown by the arrow (Fig. 3), during the displacement of the back tension plate by a package or article delivered upon the lifter table, said cam-lug 110 pushes the cam roller 150 out of its way. In order to prevent the impact between them from shifting the valve cock 112, a stop 168 secured to slide 60 is provided, said stop coacting with cam lug 108 to limit the angular movement of the valve cock. When cam lug 110 is moved in the

opposite direction, during the forward movement of the back tension plate, it slides against and is thereby displaced upwardly by cam roller 150, which now is backed up by lug 166.

The valve cock 112 thereby is turned from the "suction on" position shown in Fig. 5 to the "suction off" position, thereby placing the bore of the nipple 94 in communication with the port 92a of the valve 92 and destroying the suction in the suction chamber 88.

The web of wrapping material W is guided from a roll of wrapping material (not shown) over a stationary plate 171 and passes between a pair of guide rollers 173 and 175 and hangs loosely in front of a gap closer 172 ready for an article to be wrapped therein. An article is moved along on runway 144 by the flights of the endless conveyor (not shown) and thereby lifts "shoe" 142 so that the valve cock 112 will be moved to "suction on" position during the descent of the lifter table. The package is then advanced by the pusher 170, which is slidably mounted in bracket 140 and actuated by mechanism not shown, forwardly across the gap-closer 172, into the position shown in Fig. 3 where the package has just brought the wrapping material into engagement with the rubber suction pad 84 to cover the suction holes 86 thereof, whereby said wrapping material is held firmly, so that no slippage thereof will occur while the package is still further advanced on to the lifter table and comes into contact with the top tension plate 76 and while the lifter table swings upwardly to draw off an additional length from the roll sufficient to encompass the girth of the article.

After the back tension plate has thus been displaced to the limit of its backward movement, the lifter table is moved up to the horizontal position shown in broken lines (Fig. 1) where it dwells while the wrapping material is drawn downwardly over the rear side of the article by a lap roller 190 operated by mechanism hereinafter described. At the same time the package is being advanced off the lifter table by two transfer arms 174 carried by two endless chains 176 running over pairs of sprockets (not shown), one pair of sprockets being suitably driven in timed relation with the operation of the lifter table. Since the construction of these transfer arms and chains, and the mechanism for driving the same is similar to that shown in the patent to F. R. Schmitt, No. 1,851,295, further description thereof is deemed unnecessary. The lower ends of said transfer arms 174 engage with the ledges 178 of back tension plate 82 (Figs. 2 and 4) and thereby advance the package from the lifter table over a roller 180 and the top of the operating arm 182 on which roller 180 is supported, on to the delivery table 188. The arm 182 is operated by suitable mechanism such as shown in said patent to F. R. Schmitt, No. 1,851,295, to cause the roller 180 to pinch the wrapping material against a roller 184 on the lifter table before the package leaves the lifter table, and thus clamp the wrapping material while the lap roller 190 descends to its lowermost position, the knife 186 cutting the wrapping material while the lap roller is descending. Reference may also be had to said patent for the details of the mechanism for operating knife 186. While the back tension plate is being returned to the initial position by the transfer arms 174, the cam lug 110 moves against cam roller 150 and the suction valve cock 112 is shifted to "suction off" position, releasing the wrapping material from the suction pad 84. As

the lifter table now goes down, ledges 178 of the back tension plate 82 drop out of engagement with transfer arm 174 and the latter then engage the package and forward it across arm 182 and on to the delivery table. In this manner the folding of the wrapper about the girth of the article is completed when the outer bottom flap of the wrapper is wiped under the bottom of the package by the front edge of the table 188, the rear and bottom end flaps being then folded by stationary folders. It may be noted that front flaps are folded in by tuckers (not shown) during delivery of the loaf P to the lifter table, and the top flaps are folded down by folders (not shown) during the ascent of the lifter table. The position of the back tension plate 82 when disengagement with transfer arms 174 occurs, is such that it is ready for the next package and the position of cam lug 108 is such that it will be engaged and valve stem 112 shifted to "suction on" position at the last part of the downward movement of arm 50.

If however, as previously described, there is no package present on material feed runway 144, the finger 114 will remain in its normal position and consequently there will be no suction on rubber suction pad 84. This latter feature prevents the wrapping material hanging over the edge of gap-closer 172, from adhering to pad 84 and thereby being improperly positioned, if no package is present.

Fig. 7 shows a modified form of the invention wherein instead of a suction pad, the necessary suction is provided by a suction cup (or plurality of suction cups) 200. For this purpose the cup 200 is mounted in a cone shaped opening formed in back tension plate 202 and has a shank projecting through an opening in a supporting bracket 204 and secured in the same by two half-washers 203 fitted into a groove in the shank of cup 200 and fastened to bracket 204 by screws 206. In order to relieve the suction in suction cup 200, it is provided with an axial hole 208, the outer end of which forms a seat for a valve 210, secured by a screw 212 to an arm 214 of a lever 216 pivoted on a stud 218 fixed in bracket 204. The latter is fastened by screws 80a to slide 60a which is similar to slide 60 of the preferred form of the invention described above. Lever 216 also has an arm 220, which carries a cam roller 222 pivoted on a stud 224. Valve 210 is urged toward a closed position by a spring 226 held at one end by a stud 228 fixed to arm 214 and at the other end hooked on to an angle piece 230 fastened by the lower screw 206. This valve is controlled by means of a cam lug 232 of a cam piece 234 pivoted on a stud 236 held in a bracket 238 fastened by screws 240 to slide 60a. The latter is slidably mounted on a lifter table 58a secured to an arm 50a, the mounting of table 58a on arm 50a and of slide 60a on table 58a being similar to that shown in Figs. 1 and 2. To close the valve 210 after it has been opened, as hereinafter described, cam lug 232 coacts during the descent of lifter table 58a with a stop screw 242 secured to a fixed bracket 244, which displaces cam lug 232 into the position shown in full lines in Fig. 7 whereby the spring 226 closes valve 210.

Parts 50a, 58a, 60a, 80a, 110a etc., are similar to parts 50, 58, 60, 80, 110 etc., of the preferred form of the invention, wherefore further description of their construction is deemed unnecessary. However it may be noted that the cam roller 150a is mounted on a stud 152a on arm 154a fastened on a stud 156a supported in an extension 158a of

arm 50a. A torsion spring 162a, which has one end fixed in the head of stud 156a and its other end secured in arm 154a, maintains the lug 164a on arm 154a against a stop lug 166a on extension 158a. When cam lug 110a passes over cam roller 150a while the slide 60a is moving in the direction shown by the arrow, the angular position of cam 234 remains the same. When it returns to initial position, cam lug 110a engages with cam roller 150a and cam 234 is thereby moved to the position shown in broken lines (Fig. 7), thereby opening valve 210 and releasing the partial vacuum formed in the space between the suction cup 200 and the wrapping material W, so that slippage of the latter as it is wrapped around an article P is prevented.

It should be pointed out, however, that when the package or article P is being delivered to the lifter table 58a and thereby displaces the back tension plate 202 in the direction of the arrow and presses the wrapper W against the suction cup 200 a partial vacuum is formed in the latter which prevents displacement of the wrapper W while it is folded about the girth of article P by mechanism similar to that shown in Figs. 1 and 2. The partial vacuum is maintained in suction cup 200 while lifter table is swung upwardly to a horizontal position from the inclined position represented in Fig. 7, and until the cam lug 232 engages the roller 222 while in the dotted position shown, the lifter table then being at its horizontal position. Then while the lifter table swings downwardly to the position shown in Fig. 7, the stop screw 242 returns the cam lug 232 to the position shown in full lines and thereby permits spring 226 to close valve 232. It should be noted that to prevent excessive displacement of cam lug 232 by the impact on stop screw 242 a stop 168a is provided on slide 60a.

The lap roller 190 is supported in the free ends of arms 191 carried by bell cranks 192 loosely mounted on the shaft 52. Links 193 connect the bell cranks 192 to arms 194 fastened on shaft 34. An extension on one of the arms 194 is connected by a link 195 to a cam lever 196 fulcrumed on a stud 197 supported in the side frame 10. Cam lever 196 is provided with a cam roller engaging a cam track 198 in a cam 199 fastened on shaft 12. The shape of the cam track is such that the loop roller 190 will be lowered slowly without dwelling, as in prior machines, at a point midway of its descent while the wrapping material is being cut. With the present cam the speed with which the paper is pulled down by the lap roller is reduced approximately 50% during this part of the cycle and instead of a jerky motion there will be a continuous drag which, in conjunction with the improved construction of the back tension plate, will greatly reduce lap variations and compression of soft loaves.

What is claimed is:

1. In a wrapping machine, the combination with a support adapted to receive an article, of mechanism for delivering an article to said support and folding a wrapper about the girth thereof while it is positioned upon said support, and a device for holding a portion of the wrapper while it is being folded about the girth of said article, a movable feeler arranged to be engaged and displaced by an article advanced by said mechanism, and instrumentalities controlled by said feeler for operating said device when said feeler is displaced by an article being delivered to said support.

2. In a wrapping machine, the combination

with a support adapted to receive an article, of mechanism for delivering an article to said support and folding a wrapper about the girth thereof while it is positioned upon said support, and a device for suctionally holding a portion of the wrapper while it is being folded about the girth of said article, said device including a suction cup arranged to engage a portion of the wrapper being folded by said mechanism about the girth of the article and thereby create suctional adhesion of said wrapper portion to said cup, and instrumentalities for relieving the suction created in said cup to release said wrapper portion.

3. In a wrapping machine, the combination with a vertically movable lifter table adapted to support an article to be wrapped and transport it from one level to another level, of a back tension plate mounted on said table in position to engage and be displaced rearwardly on said table by an article delivered to said table, a device supported on said plate in position to engage and suctionally hold a wrapper, a pusher for delivering an article to said table at one level thereof, means for positioning wrapping material in front of said table at the level at which said pusher delivers the article thereto whereby said wrapping material will be displaced toward said plate by the article delivered to said table by said pusher and be suctionally held by said device, said device including a suction cup arranged on said plate in position to engage the portion of said wrapper displaced toward said plate during the delivery of the article to said table and thereby suctionally hold said wrapper portion, and instrumentalities for relieving the suction in said cup when said table has transported said article to the other of said levels.

4. In a wrapping machine, the combination with a vertically movable lifter table adapted to support an article to be wrapped and transport it from one level to another level, of a back tension plate mounted on said table in position to engage and be displaced rearwardly on said table by an article delivered to said table, a device supported on said plate in position to engage and suctionally hold a wrapper, a pusher for delivering an article to said table at one level thereof, means for positioning wrapping material in front of said table at the level at which said pusher delivers the article thereto whereby said wrapping material will be displaced toward said plate by the article delivered to said table by said pusher and be suctionally held by said device, a movable feeler arranged to be engaged and displaced by an article positioned in front of said pusher, and mechanism controlled by said feeler for connecting said device to a source of suction when said feeler is displaced by an article positioned in front of said pusher.

5. In a wrapping machine, the combination with a vertically movable support adapted to transport an article from one level at which an article is delivered to said support to another level, of means for supporting wrapping material in front of the level at which said support receives an article whereby the article will be partially enfolded in the wrapping material during its delivery to said support, a back tension plate mounted on said support and adapted to be displaced rearwardly thereon by an article delivered to the support, a suction device arranged on said plate in position to engage and suctionally hold a portion of the wrapping material during the delivery of the article to the support and while said support moves to the other of said

levels, a feeler arranged in the path of an article being delivered to said support and adapted to be displaced by said article, and mechanism controlled by said feeler for connecting said device to a source of suction when the feeler is displaced by an article.

6. In a wrapping machine, the combination with a vertically movable support adapted to transport an article from one level at which an article is delivered to said support to another level, of means for supporting wrapping material in front of the level at which said support receives an article whereby the article will be partially enfolded in the wrapping material during its delivery to said support, a back tension plate mounted on said support and adapted to be displaced rearwardly thereon by an article delivered to the support, a suction device arranged on said plate in position to engage and suctionally hold a portion of the wrapping material during the delivery of the article to the support and while said support moves to the other of said levels, a feeler arranged in the path of an article being delivered to said support and adapted to be displaced by said article, and mechanism controlled by said feeler for connecting said device to a source of suction when the feeler is displaced by an article, and instrumentalities for disconnecting said device from the source of suction when said support reaches the other of said levels.

7. In a wrapping machine, the combination with a support adapted to receive an article, means for draping wrapper material in front of said support, mechanism for pushing an article into said wrapper material and on to said support to enfold the article in the wrapper material, a back tension plate movably mounted on said support resisting the movement of said article on to said support and tending to hold the wrapper material against said article while said article displaces said plate rearwardly during delivery by said mechanism to said support, and periodic means acting in timed relation to the movement of said pusher for temporarily securing said wrapper to said back tension plate to secure said wrapper against sliding movement between said back tension plate and the adjacent face of said article, a device for moving said plate forwardly on said support to advance the article enfolded in wrapping material from said support, and instrumentalities operated by the forward movement of said plate for releasing the wrapper from said plate.

8. In a wrapping machine, the combination with a movable support adapted to receive an article, devices imparting periodic movement to said support, means for draping one end of a continuous strip of wrapping material in front of said support at one position thereof, mechanism for pushing an article into said material and on to said support, said support operating to pull off a length of said wrapping material and enfold the article therein as a result of the movement of said support, a back tension plate resisting the movement of said article on to said support and tending to hold the wrapper material against said article, and means operating in timed relation to the movement of said support for temporarily securing said wrapper to said back tension plate to secure said wrapper against slippage between said back tension plate and the adjacent face of said article, said means operating in timed relation and including suc-

tion devices and instrumentalities for periodically rendering said devices inoperative.

9. In a wrapping machine, the combination with a lifter table having a to and fro motion in a generally vertical direction and adapted to support an article to be wrapped, and be moved from one level at which an article is delivered to the table to another level at which the wrapped article is removed from the table, of a pusher for advancing an article on to the table, a back tension plate slidably mounted on said table in position to engage and be displaced rearwardly by an article delivered to the table by the pusher, devices for positioning a wrapper between said support and pusher to be folded about the article delivered to the table by the pusher, suction means on the wrapper engaging face of the back tension plate for preventing slippage of the wrapper while it is being folded about the article, and a device for interrupting the suction in said means after the table has been moved to the level at which the wrapped article is removed from the table.

10. In a wrapping machine, the combination with a lifter table having a to and fro motion in a generally vertical direction and adapted to support an article to be wrapped, and be moved from one level at which an article is delivered to the table to another level at which the wrapped article is removed from the table, of a pusher for advancing an article on to the table, a back tension plate slidably mounted on said table in position to engage and be displaced rearwardly by an article delivered to the table by the pusher, devices for positioning a wrapper between said support and pusher to be folded about the article delivered to the table by the pusher, suction means on the wrapper engaging face of the back tension plate for preventing slippage of the wrapper while it is being folded about the article, and a device for thereafter interrupting the suction in said means prior to the removal of the wrapped article from the table.

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