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N. W. LYON ET AL
WRAPPING MACHINES

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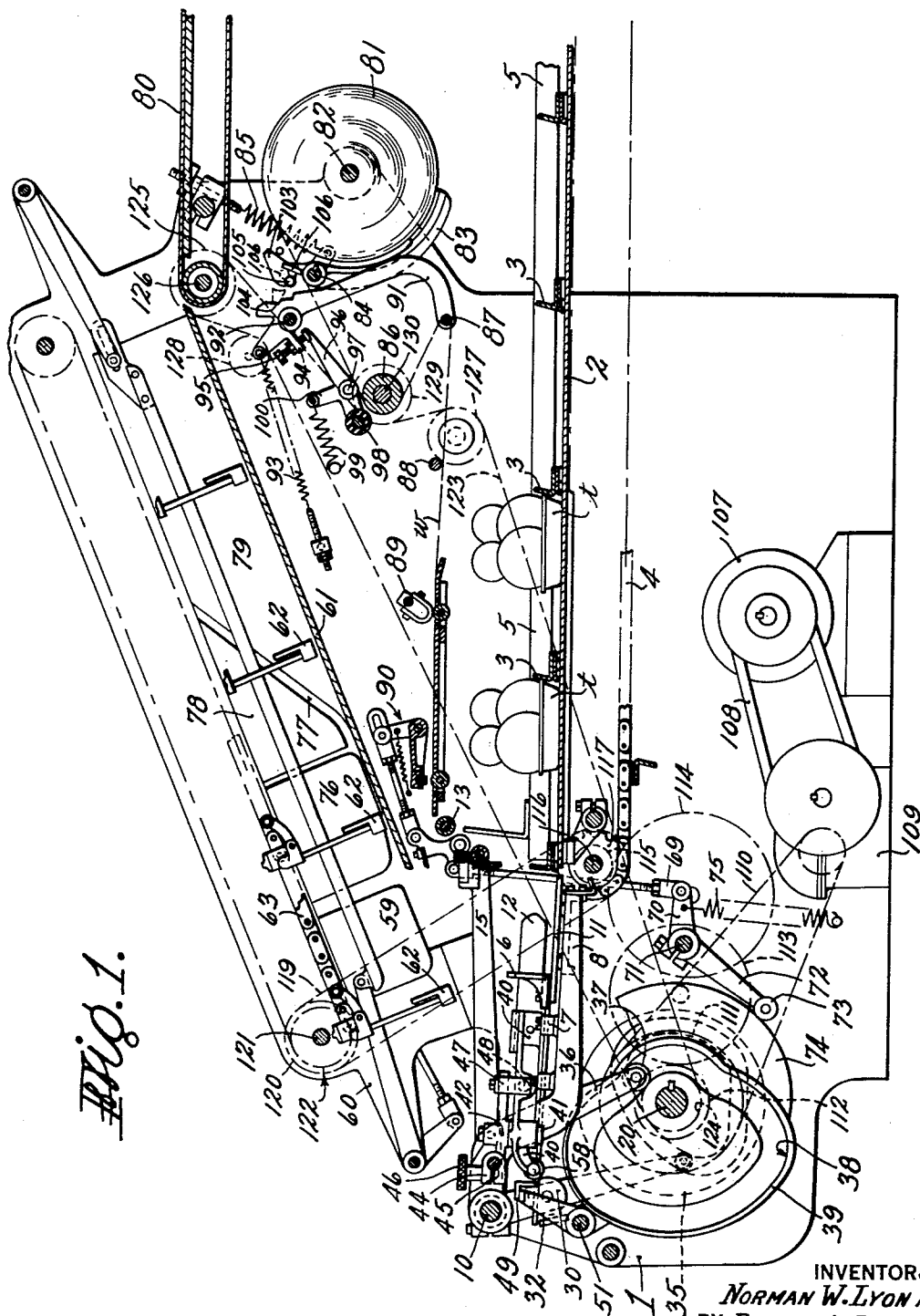


Fig. 1.

INVENTORS
NORMAN W. LYON AND
BY ROLAND A. LABINE
Chapin & Neal
ATTORNEYS

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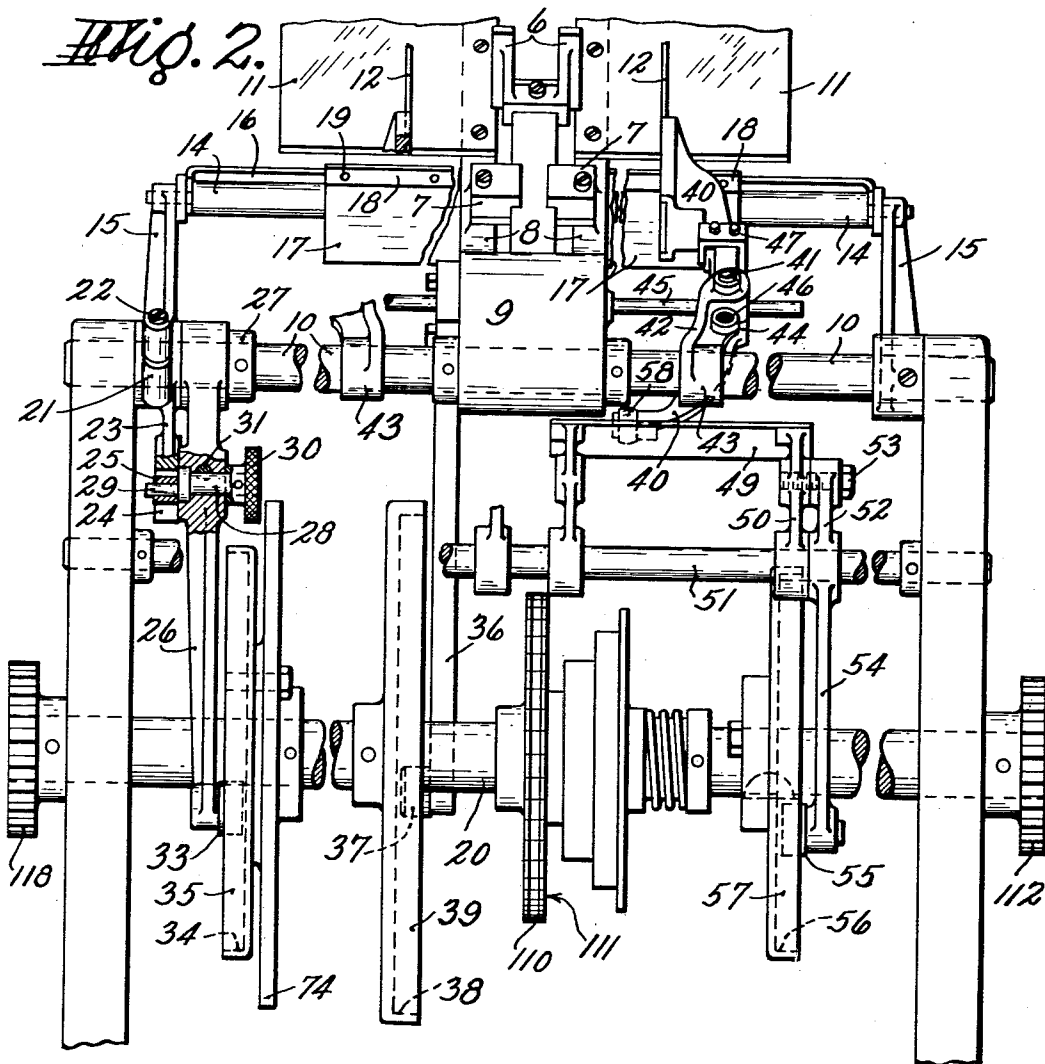
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INVENTORS
NORMAN W. LYON AND
BY ROLAND A. LABINE
Chapin & Neal
ATTORNEYS

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Fig. 3.

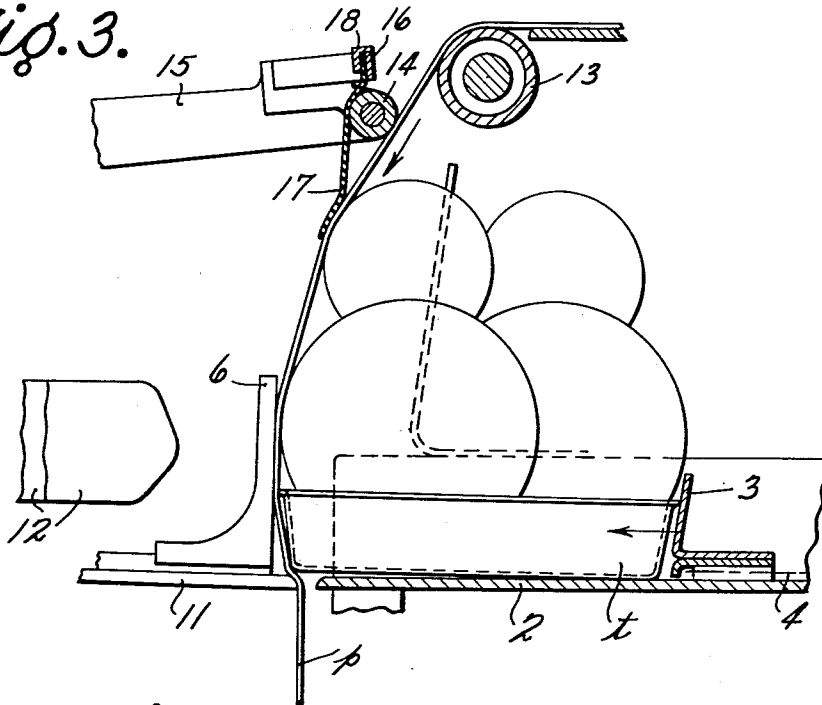
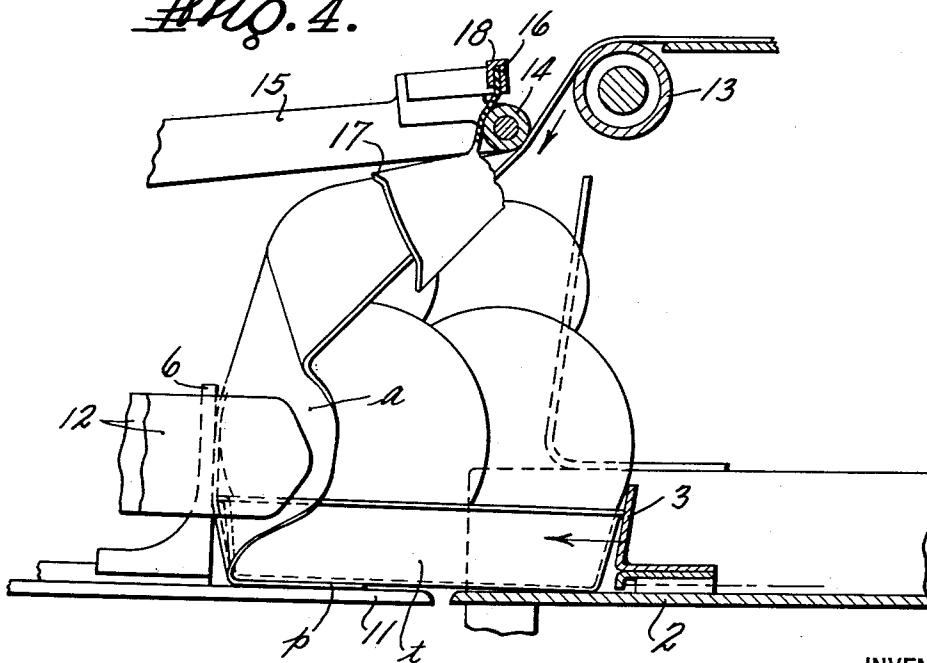


Fig. 4.

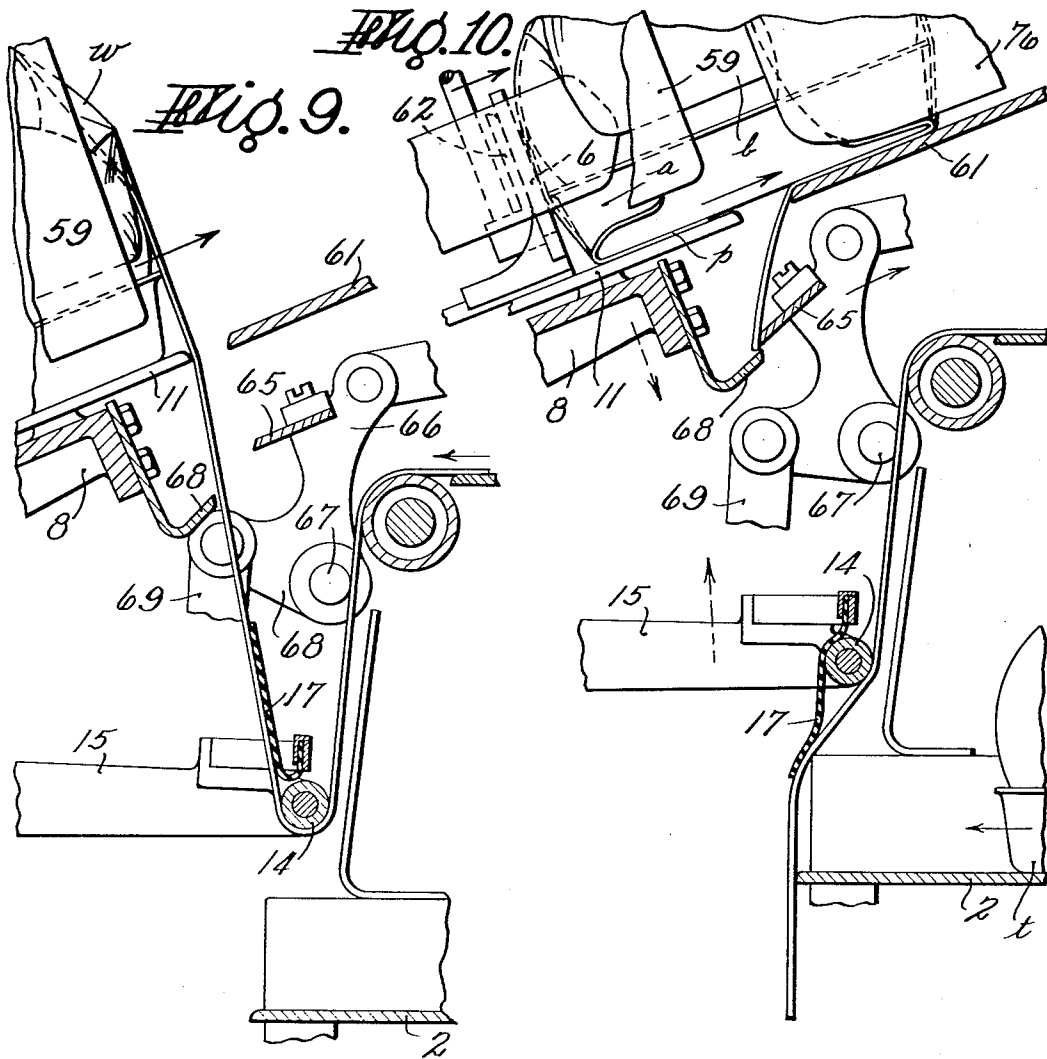
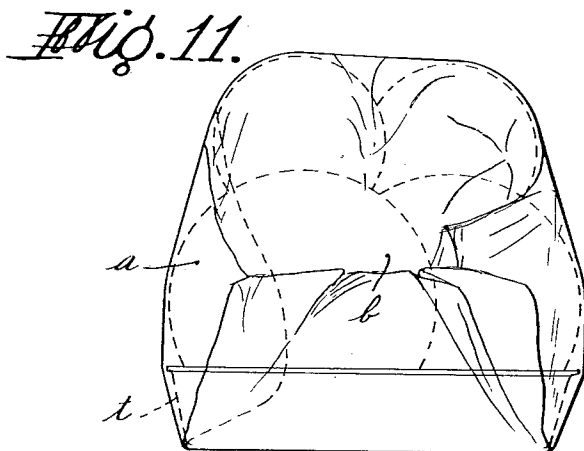


INVENTORS
NORMAN W. LYON AND
BY ROLAND A. LABINE
Chapin & Keel
ATTORNEYS

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INVENTORS
NORMAN W. LYON AND
 BY *ROLAND A. LABINE*
Chapin & Neal
 ATTORNEYS

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2,727,344

WRAPPING MACHINES

Norman W. Lyon and Roland A. Labine, Springfield, Mass., assignors to Package Machinery Company, East Longmeadow, Mass., a corporation of Massachusetts

Application November 5, 1948, Serial No. 58,592

1 Claim. (Cl. 53—111)

This invention relates to an improvement in machines for wrapping articles of irregular contour, and in which the amount of wrapping paper drawn from the wrapper supply is automatically adjusted to the article on material being wrapped.

One object of the invention is to provide a machine for accurately and effectively enclosing objects such as a tray piled with fruit or vegetables, or other loose articles, in a wrapper.

A further object is to provide means for drawing the wrapper tightly and smoothly over an irregular surface, such as is represented by a pile of articles or a single article of irregular contour.

Another object is to provide means for wrapping such articles which in addition are relatively yielding or deformable in character.

Other and further objects residing in the details of construction will be pointed out in the following specification and claim.

In the accompanying drawings which show an illustrative embodiment of the invention,

Fig. 1 is a side elevational view, parts being broken away;

Fig. 2 is an end elevational view on a larger scale looking from the left in Fig. 1;

Figs. 3 to 10 inclusive are fragmentary detail views showing successive steps in the wrapping operation; and

Fig. 11 is a view of a completely wrapped article.

Referring to Fig. 1 the frame 1 of the machine supports a substantially horizontal table 2 along which trays *t* of vegetables or other articles to be wrapped are advanced by a series of pushers 3 carried by conveyor chains 4. The table 2 is provided with side guides 5 between which the trays are guided in their travel.

At the delivery end of the table the end portion of a wrapper web *w* is fed across the path of the advancing articles by means later described. As a tray is advanced to the end of the table the wrapper is clamped between the leading face of the tray and a clamping member 6 which is slidable against frictional resistance in guides 7 carried by arms 8 extending from a hub 9 pivoted on a shaft 10. The arms 8 also support elevator platform members 11 upon which the trays are delivered by the pushers, the members 11 being spaced (Fig. 2) to permit the pushers to pass downwardly between them.

As shown in Figs. 3 and 4 the depending portion *p* of the wrapper is folded beneath and against the bottom of the tray by the forward edges of the platform members 11 as the tray is pushed onto the platform against the frictional resistance of the member 6 in its guides.

As the tray advances onto the platform it enters between two folding members 12, later more fully described, which fold the leading end extensions of the wrapper against the ends of the tray, and the articles contained therein as indicated at *a*. The advance of the tray onto the platform draws the wrapper web from its supply roll over a guide roll 13 and beneath a draping roll 14

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which is carried by arms 15 adjustably secured to the shaft 10.

The arms 15 also carry a bar 16, positioned above roll 14, to which the upper edge portion of a flexible blanket member 17 is secured by an angle member 18 and screws 19. As shown in Figs. 1 and 3 the blanket hangs downwardly and forwardly of roll 14 in front of the wrapper web, and the tray and its contents in moving onto the elevator passes beneath roll 14 drawing the wrapper forwardly beneath roll 14 and blanket 17 with the latter extending along the web as shown in Figs. 4 and 5. In this movement of the tray the wrapper is drawn snugly over the advancing face of the tray and its contents and over the upper leading "edge" of the tray or its contents if the latter, as is frequently the case, extends above the edge of the tray. As the tray is seated on the elevator the roll 14, with blanket 17, starts to swing downwardly to the rear of the tray, as indicated in Fig. 6, carrying the web down over the top and rear "edge" of the contents of the tray. Roll 14 with blanket 17 moves downwardly to the position shown in Fig. 7. In the meantime the elevator 15 starts its upward movement reaching the position shown in Fig. 7 as the roll and blanket arrive at the position shown in the latter figure.

Both the elevator and roll 14 and the blanket move upwardly together from the positions of Fig. 7, the elevator moving at a faster rate. When the roll 14 reaches the dotted line position shown in Fig. 7 it dwells until the elevator reaches the position of Fig. 8. As the elevator continues to move upwardly roll 14 starts to return to its lowermost position, the parts coming to rest in the position of Fig. 9. This temporary upward movement of the roll 14 is to ease the tension of the wrapper and slow the rate at which the wrapper is drawn from the roll during the rapid upward movement of the elevator, the final downward movement of the roll withdrawing the amount of web needed to establish the desired length of the underfold portion *p* for the next wrapping operation.

The movement of the roll and blanket, and of the elevator are controlled from a cam shaft 20, Figs. 1 and 2. One of the arms 15 which carry the roll 14 and blanket 17 extends from a split hub 21 which is clamped to shaft 10 by a screw 22 threaded in the hub. A short arm 23 extends from the hub 21 and terminates in a fork 24 in which a block 25 is slidably fitted. An arm 26 is loosely mounted on shaft 10 and is held in place by a collar 27. Intermediate its ends, arm 26 is provided with a stub shaft 28 carrying at one end an eccentric pin 29 extending through an opening in block 25 and provided at the opposite end with a knurled head 30 by which the angular relation of arm 26 and the adjacent arm 15 may be adjusted. A notched lock pin 31 is drawn into clamping engagement with shaft 28 by a threaded knurled nut 32 (Fig. 1) to hold the shaft 28 in adjusted position. By the adjustment just described the extent of the downward movement of roll 14 can be nicely adjusted. The free end of arm 26 carries a cam roll 33 engaging in groove 34 of a positive motion cam 35 secured to shaft 20.

Extending from one of the elevator supporting arms 8 is an arm 36 carrying a cam roll 37 engaging in a cam groove 38 in positive motion cam 39 by which the elevator is raised and lowered in timed relation to the movement imparted to roll 14 and blanket 17 by cam 35. The end folders 12, previously mentioned, move with the elevator. The folders 12 are carried by arms 40 which are pivoted on vertical pivot pins 41 carried by bracket members 42. The bracket members, one of which is shown in Fig. 2, are each formed with a hub 43 slidably mounted on shaft 10 and with a split hub 44 slidably engaging a rod 45 extending from hub 9 of the elevator supporting arms. A knurled screw 46 threaded into the split hub holds the bracket in transversely adjusted position. The

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bracket carries a yoke member 47, the sides of which straddle the arm 40 and a spring 48 positioned between one side of the yoke 47, and arm 40 normally maintains the folding members 12 in substantially parallel relation. The folding members 12 are adapted to be separated slightly to facilitate entrance of the tray between them by rotation of arms 40 about the pivots 41 within the limits permitted by yoke 47. This pivotal movement is effected by bars 49 which are carried by arms 50 secured to a rock shaft 51. One arm 52 of a bellcrank lever mounted on shaft 51 is bolted at 53 to one of the arms 50. The other arm 54 of the lever carries a cam roll 55 engaging in a groove 56 of a positive motion cam 57, mounted on shaft 29, by which shaft 51 is rocked to bring bars 49 into engagement with rolls 58 carried by the ends of arms 40 and thereby swing the latter against the action of springs 48 to slightly separate the folders 12 as the trays and wrapper enter between them.

As the elevator carries the tray upwardly and the roll 14 and blanket 17 carry the wrapper downwardly the blanket, which is preferably formed of sheet rubber, exerts a flexible, frictional drawing pressure which shapes the wrapper over the irregular surface of the contents of the tray, Fig. 7. The upward swinging movement of the elevator tilts the contents of the tray to the left as viewed in Figs. 3 to 10 inclusive, with the result that the action of gravity tends to shift the contents of the tray downwardly and to the left. At the same time the pull exerted on the wrapper by roll 14 and the frictional pressure of the blanket tends to shift the contents to the right. These opposing forces tend to balance each other and in the case of piled generally round articles such as cherries, apples and the like and loose material such as spinach this balance of forces is important in maintaining a symmetrical package. The force exerted by the wrapper must be kept light particularly in the case of articles like ripe tomatoes, berries, shredded cabbage, spinach and mixed greens, and the slight gravitational force resulting from the tilting of the trays in one direction in opposition to the pull of the wrapper, combined with the gentle smoothing action of the blanket has made it possible to wrap a wide range of vegetables, fresh fruits and various other foods and loose articles rapidly and neatly. Transparent cellophane or the like is a preferred wrapping material.

As the elevator moves upwardly the tray and its contents are carried between stationary top end folders 59, supported by frame members 60, which fold the top end extensions of the wrapper downwardly over the folders 12 as indicated at *b*. It will be noted that the folders 12 operated along the sides of the tray, that is at the lower portion of the package considered as a whole which allowed free shaping of the wrapper about the upper corners of the package and permitting the folders 59 to freely gather the irregularities of the top end extensions and fold them downwardly over the portions still held in place by the folders 12.

When the package is completely between the folders 59, the platform 11 of the elevator has swung into alignment with the floor 61 of the final wrapping channel as shown in Fig. 9. At this position the member 6 is engaged by a pair of a series of pairs of pusher members 62 carried by intermittently operated chains 63 and extending downwardly at either side of a light vertically movable central guide bar of conventional form. The pushers 62 advance the partially wrapped tray and its contents from the elevator onto and, upon the subsequent movement of the pushers, along floor 61 of the folding channel. In the movement of the package from the elevator the member 6 is returned by the pushers to its initial position at the free edge of the elevator.

As the package moves from the elevator a further amount of wrapper web is drawn from the wrapper supply and the web is then cut as shown in Fig. 10, after the final under fold is firmly held between the tray and floor 61.

The cutting of the wrapper is effected by a knife 65

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carried by arms 66 pivoted at 67, the arms being formed with extensions 68 connected by adjustable links 69 (Fig. 1) to arms 70 of a bell crank secured to a cross shaft 71. The arm 72 of the bell crank carries a cam roll 73 engaging an edge cam 74 secured to the back of cam 35 on cam shaft 29. A spring 75 holds the roll 73 against its cam.

As shown in Fig. 9 the downward looping of the wrapper web by roll 14 causes the blanket 17 to be bent sharply upward along the portion of the wrapper web below the knife and as the web is severed the resilience of the blanket snaps the severed end portion of the web downwardly, freeing it from the knife and bringing it quickly and accurately into position across the path of the next incoming tray. The lowermost position or extent of travel of roll 14 carried by arms 15 is adjusted, as earlier described by knurled knob 30, so as to acquire the desired length of underlap of the web *w* designated as *p* on the drawings. By accurately setting this adjustment, the length or position of the underlap on the package may be obtained as desired.

As the pushers 62 advance the trays into the folding channel the elevator 11 swings downwardly, withdrawing the member 6. As the package moves into the channel, the leading end extensions of the wrapper are engaged by stationary folders 76 which fold the said extensions rearwardly over the ends of the package and upon the succeeding movements of the pushers the bottom end extensions are folded upwardly by the inclined slot 77 formed between stationary folders 78 and 79 to complete the wrapping operation. The folding members 79 are extended and heated by any suitable means, not shown, to seal the wrapper folds in position. From the wrapping channel the packages are discharged onto a horizontal conveyor 80.

The wrapper web is fed from a supply roll 81 freely mounted on a supporting shaft 82. A brake member 83 pivoted at 84 is drawn against the surface of the supply roll by a spring 85 to prevent overrunning of the roll. From the supply roll the web passes around a driven steel roll 86 and around a tension roll 87 beneath a guide rod 88 and beneath conventional holding members, generally indicated at 89 and 90 to rolls 13 and 14 previously mentioned. The roll 87 is carried at the lower ends of a pair of levers, one of which is shown at 91, pivoted intermediate their ends at 92. The upper end of the lever 91 is connected to an adjustable spring 93, tending to draw the web into engagement with the surface of driven roll 86. Lever 91 is provided with an arm 94 having an adjustable screw 95 engaging one end of a lever 96 pivoted at 97, the other end of the lever carrying a rubber roll 98. A spring 99 connected to a projection 100 extending from the hub of lever 96 tends to rock lever 96 in a direction to cause roll 98 to press the web into contact with driven roll 86. As will be apparent the action of spring 99 opposes the action of spring 93 while tension on the web at the roll 87 tends to overcome spring 93 and permit roll 98 to engage the web and press it into driven contact with the driven roll 86 by spring 99. Such forward feeding action by roll 86 relieves the tension on the web at roll 87 thereby permitting spring 93 to relieve the pressure of roll 98 on roll 86. By suitably adjusting screw 95 and the tension of spring 93 the desired tension may be imparted to the web as it is drawn out by the movement of the package and roll 14, and this tension will be uniformly maintained with extreme uniformity by the tension control devices just described. For convenience in threading the paper through the machine a dog 103 is provided which when swung to the dotted line position in Fig. 1 engages a shoulder 104 on lever 91 to hold roll 98 spaced from roll 86. At the same time a pin 105 carried by dog 103 engages a projection 106 of brake member 83 to move, and hold, the latter out of contact with the web supply roll.

The cam shaft 29 is driven in any suitable manner as from an electric motor 107, Fig. 1, through belt 108, gear

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box 109, and sprocket chain 110, driving a sprocket 111 secured to the shaft. Conveyor chains 4 are intermittently driven from shaft 20 through a gear 112 secured thereto and driving a gear 113 which carries one member of a geneva, the other member of the geneva being carried by a gear 114. Gear 114 meshes with a gear 115 secured to shaft 116 upon which the sprockets 117 of conveyor chains 4 are mounted.

The chains 63 to which pushers 62 are attached are intermittently driven in timed relation to chains 4 and the various cam operated members from a gear 118 (Fig. 2) through a gear-geneva-sprocket drive, not shown but similar to 113—114—117 just described, which drives chain 119 (Fig. 1) passing around sprocket 120 secured to shaft 121. Shaft 121 carries sprockets 122 which drive the chains 63.

Roll 86 and discharge conveyor 80 are conveniently driven from shaft 20 by means of a sprocket chain 123, Fig. 1, connecting a sprocket 124 on shaft 20 and sprocket 125 on shaft 126 of conveyor 80, and engaging guide sprockets 127 and 128 and a sprocket 129 on shaft 130 to drive roll 86.

What we claim is:

In a wrapping machine of the type which includes means to advance an article against the end portion of a wrapper web and onto a carrier movable between an

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infeeding and delivery station to encircle the article in the leading end portion of the wrapper web; said carrier at the infeeding station being in a horizontal position, means to swing said carrier upwardly from said position about a horizontal axis forwardly of the carrier to an inclined position at the delivery station, a draping roll, means to move the draping roll downwardly to the rear of the article on the carrier as the carrier is swung upwardly, an inclined folding channel aligned with the carrier at the delivery station, means to move the article from the carrier into the folding channel, a flexible blanket member, and a common support for said blanket member and the draping roll, said blanket member positioned to follow in the path of the draping roll and overlie the wrapper web.

References Cited in the file of this patent

UNITED STATES PATENTS

1,140,522	Mettler	May 25, 1915
1,508,637	Armstrong	Sept. 16, 1924
1,626,379	Armstrong	Apr. 26, 1927
1,953,097	Becker	Apr. 3, 1934
1,993,488	Schmidt et al.	Mar. 5, 1935
2,060,501	Hoppe	Nov. 10, 1936
2,260,332	Petskeyes	Oct. 29, 1941