

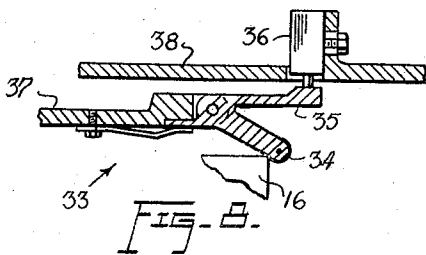
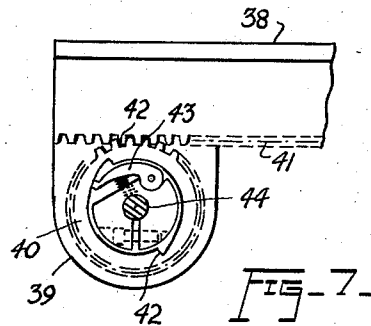
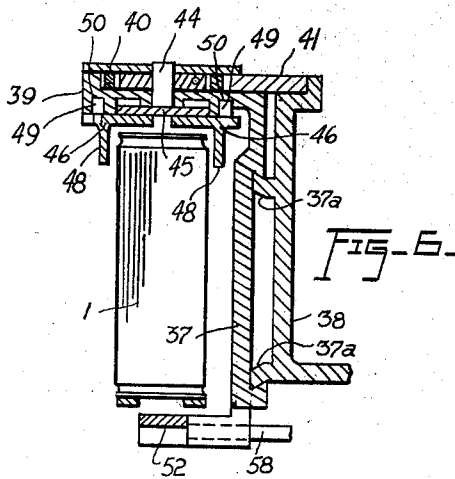
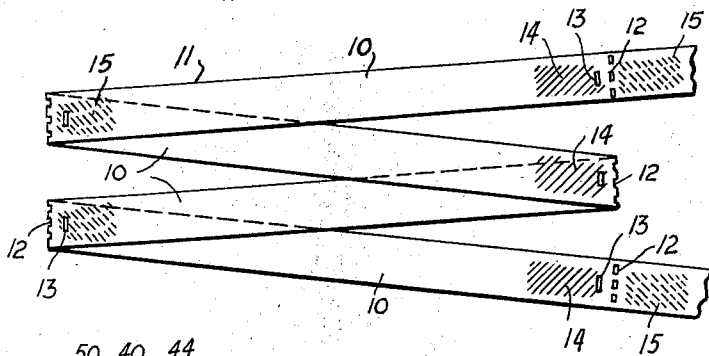
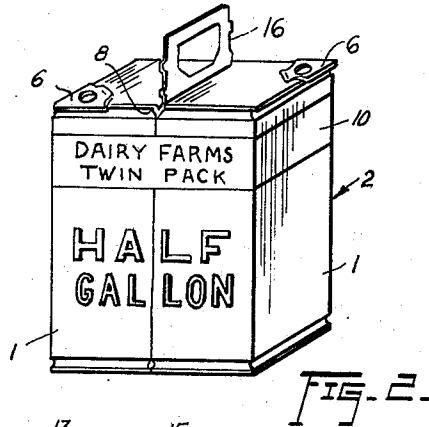
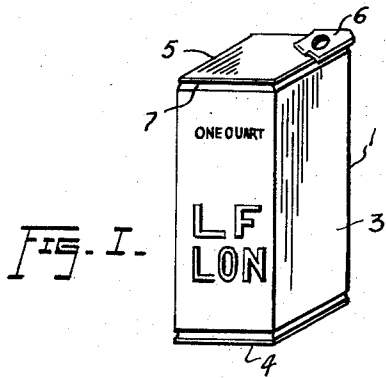
May 12, 1959

A. WEISS
BANDING MACHINE

2,885,839

Filed Jan. 11, 1955

5 Sheets-Sheet 1



INVENTOR

Adolph Weiss

BY

A. John Michel

ATTORNEY

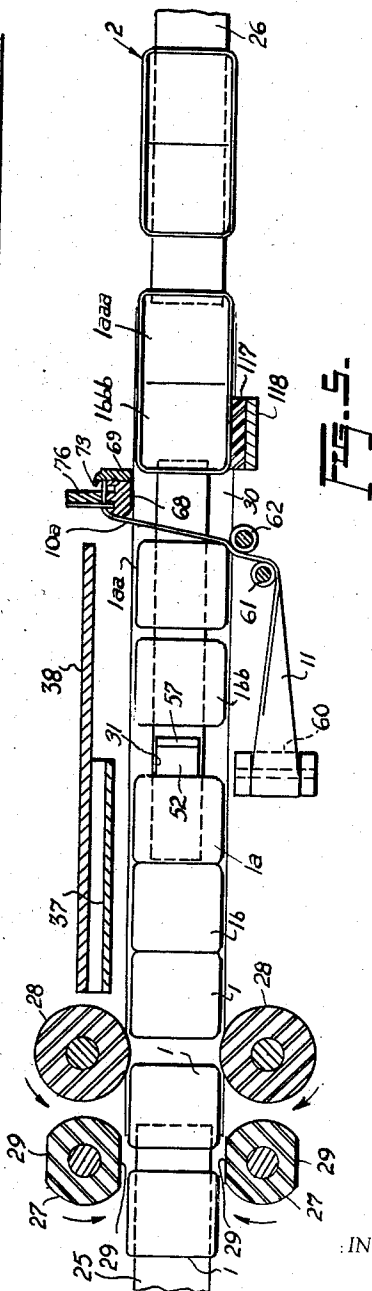
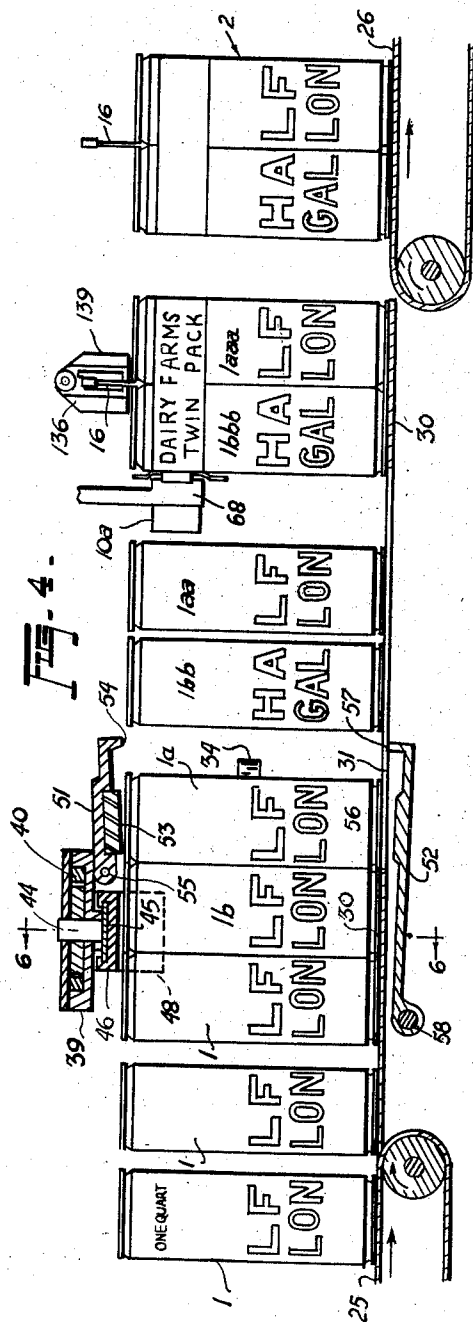
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5 Sheets-Sheet 2



:INVENTOR

Adolph WEISS

A. John Michel

ATTORNEY

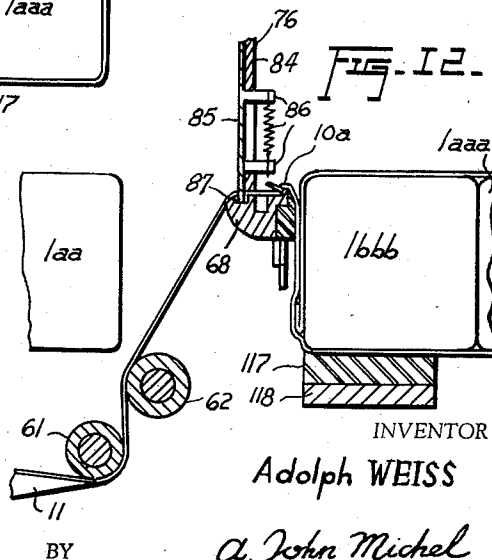
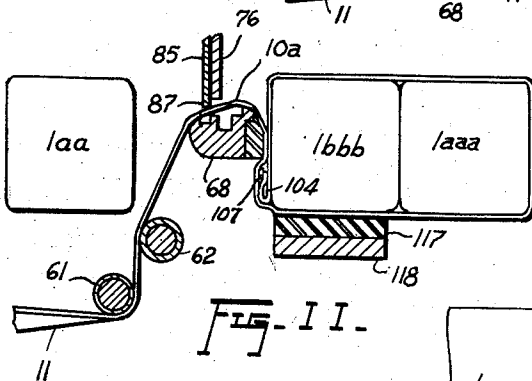
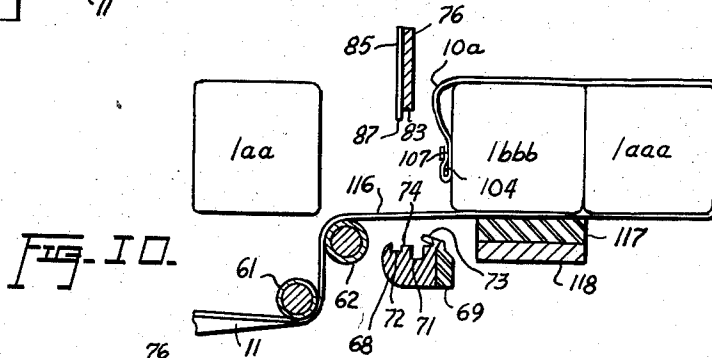
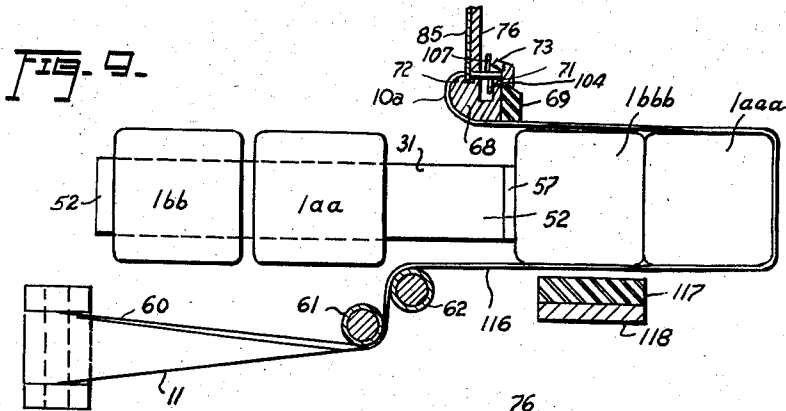
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A. WEISS
BANDING MACHINE

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5 Sheets-Sheet 3



INVENTOR

Adolph WEISS

a. John Michel

ATTORNEY

May 12, 1959

A. WEISS
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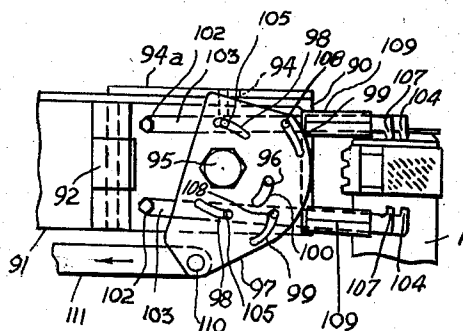
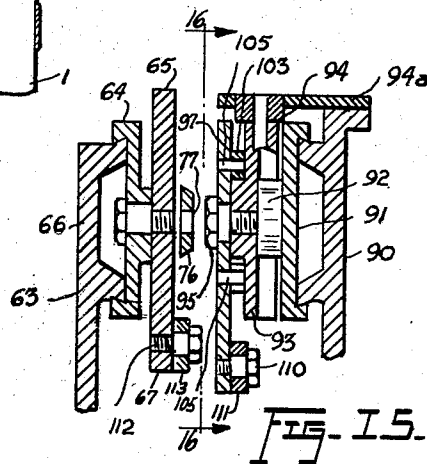
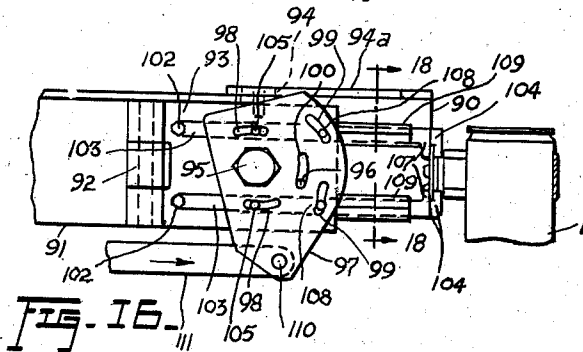
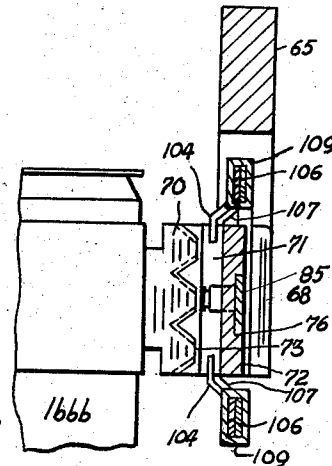
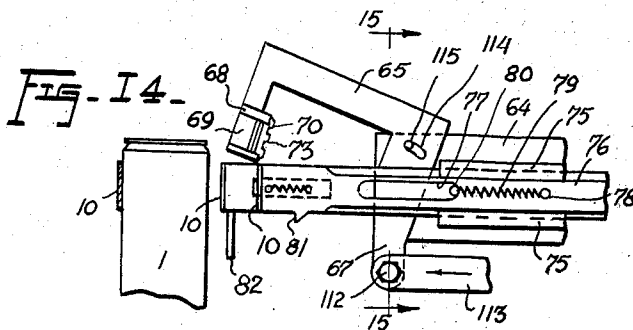
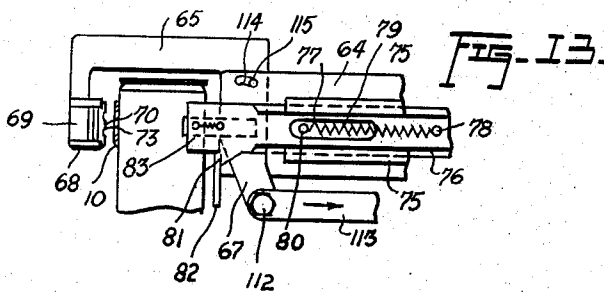


FIG. 17.

BY

INVENTOR
Adolph WEISS
A. John Michel
ATTORNEY

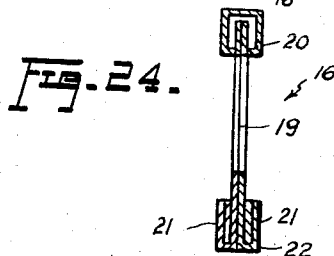
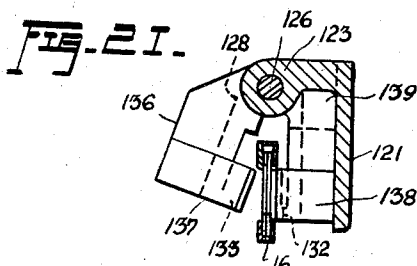
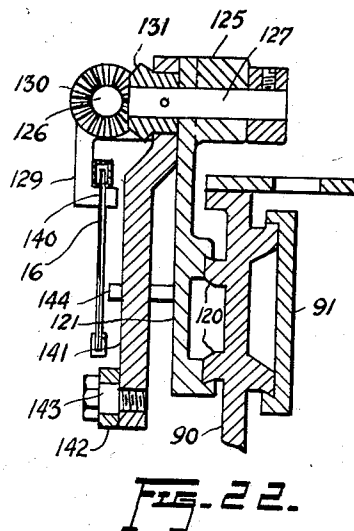
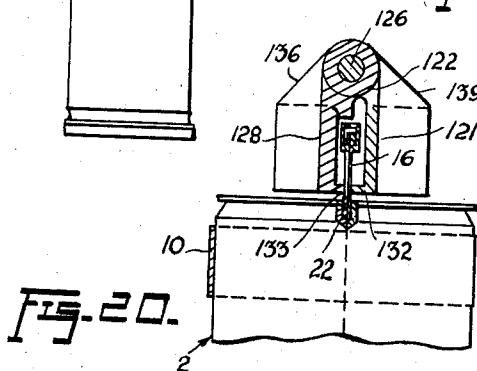
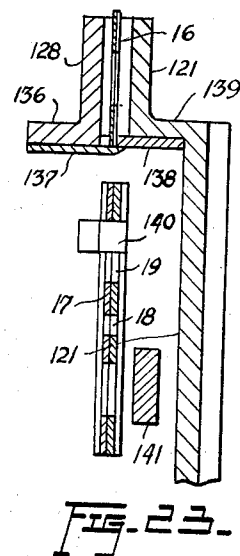
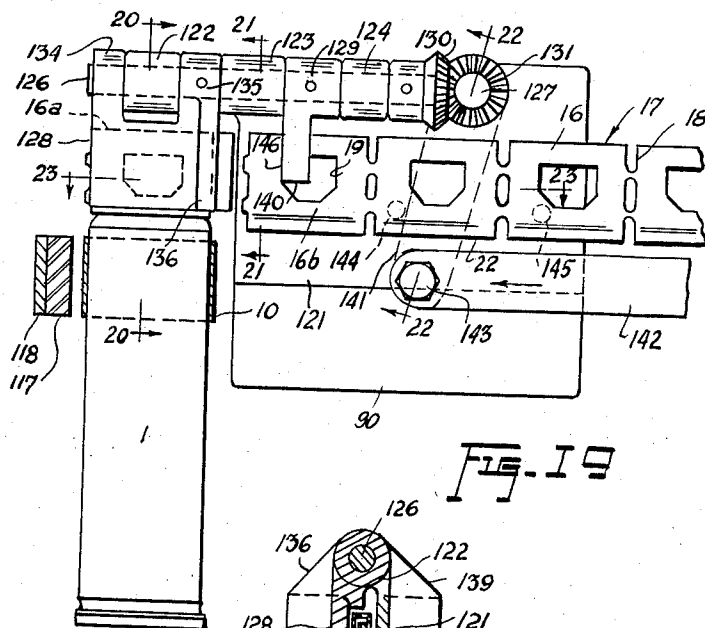
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A. WEISS
BANDING MACHINE

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5 Sheets-Sheet 5



INVENTOR

Adolph WEISS

BY

a. John Michel

ATTORNEY

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2,885,839

BANDING MACHINE

Adolph Weiss, Brooklyn, N.Y., assignor to American Can Company, New York, N.Y., a corporation of New Jersey

Application January 11, 1955, Serial No. 481,140

25 Claims. (Cl. 53—3)

This invention relates to new and useful improvements in the art of packaging, and more particularly concerns itself with the combining of several individual items into a unitary package wherein such items are secured together by an encircling band.

One example of the environment in which the invention may be utilized is in the dairy industry where milk, cream, etc. is packaged in a fibrous container or carton of a given capacity such as a quart or a pint. In such an environment the invention may be used for combining and securely holding together two such containers or cartons so that they may be handled as a unit of double capacity. It is to be understood, however, that the invention is not limited to this particular field and may be used in many other environments where two or more items are to be united into a package of multiple capacity or number.

The principal object of the invention is to provide an apparatus whereby the article banding operation may be quickly and easily effected in an automatic manner which substantially reduces, if not completely eliminates, the need for skilled manual labor and which utilizes inexpensive material for the banding operation so that the cost of packaging is not unduly increased.

Another important object of the invention is to embody in the apparatus means for affixing a handle to the banded articles so that the package, as a unit, may be conveniently carried.

With the above more important objects and features in view and such other objects and features as may become apparent as this specification proceeds, the invention resides in the details of construction and arrangement of parts as shown in the accompanying drawings, wherein like characters of reference are used to designate like parts and wherein:

Figure 1 is a perspective view of an individual container or carton prior to being united with another similar container into a package;

Figure 2 is a perspective view showing two similar containers banded into a package and provided with a handle;

Figure 3 is a perspective view of the band ribbon;

Figure 4 is a side elevational view illustrating the general arrangement of the apparatus, certain portions thereof being shown in cross-section;

Figure 5 is a top plan view of the apparatus shown in Figure 4, certain parts being omitted for sake of clarity;

Figure 6 is a sectional view, taken substantially in the plane of the line 6—6 in Figure 4;

Figure 7 is a top plan view of the mechanism shown in Figure 6;

Figure 8 is a cross-sectional detail of the feed detector;

Figures 9, 10, 11 and 12 are plan views, similar to that shown in Figure 5 and illustrating the apparatus in various operating positions;

Figures 13 and 14 are side elevational views showing two different positions of the looper mechanism;

Figure 15 is a sectional view on an enlarged scale,

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taken substantially in the plane of the line 15—15 in Figure 14;

Figures 16 and 17 are side elevational views showing two different positions of the gripper mechanism;

Figure 18 is a sectional view on an enlarged scale, taken substantially in the plane of the line 18—18 in Figure 16;

Figure 19 is an elevational view of the handle feeding and affixing mechanism;

Figure 20 is a sectional view taken substantially in the plane of the line 20—20 in Figure 19;

Figure 21 is a sectional view taken substantially in the plane of the line 21—21 in Figure 19;

Figure 22 is a sectional view taken substantially in the plane of the line 22—22 in Figure 19;

Figure 23 is a sectional view taken substantially in the plane of the line 23—23 in Figure 19; and

Figure 24 is a vertical cross-sectional view of one of the handles.

Referring now to the accompanying drawings in detail, particularly to Figures 1, 2 and 3, the item or article to be packaged may be in the form of a rectangular fibrous milk container or carton 1 of the type disclosed in United States Patent 2,085,979 issued July 6, 1937 to John M. Hothersall entitled "Container." Two such containers may be combined into a unitary package 2 of double capacity.

The container 1 comprises the usual front, rear and side walls 3 forming a rectangular tube of equal length and width and of substantially greater height, provided with the bottom panel 4 and the top panel 5. The latter is equipped with the customary hinged closure 6 located in one corner portion thereof. At the junction of the side walls 3 with the top panel 5 is an indentation or groove 7 and when two containers are placed in juxtaposed, abutting relation, these indentations form an open-ended channel 8.

The containers are secured together by an encircling band 10 which is supplied to the apparatus in the form of a continuous ribbon 11. The individual band sections of the ribbon are zig-zag folded into a stack wherein the band sections 10 are placed upon each other with the face of each alternate band section reversed. The band sections in the ribbon 11 are separated by transverse perforations 12 and a registration slot 13 is formed in each band section adjacent each row of perforations. Moreover, each band section is provided at the opposite sides of its opposite end portions with coatings of adhesive 14, 15, respectively. This adhesive coating is applied at a substantially considerable time prior to the use of the band ribbon and forms a part of the fabrication of the ribbon itself. The adhesive utilized is of a pressure sensitive character and may be a rubber latex adhesive. During the prefabrication it is allowed to become partially set and to form a substantially dry film which renders these adhesive coatings to be non-adherent towards paper or metallic surfaces in order that the stacks of bands may be shipped or otherwise handled without the hazard of blocking with each other. This type of substantially dry adhesive, which will for all practical purposes adhere only to itself, may be referred to as a dry self-sealing adhesive.

However as will be hereinafter more fully described, when the end portions of the band 10 are overlapped and the adhesive coatings 14 and 15 are brought into overlapping pressure contact these films bond with each other. The union so produced is immediately and highly effective and capable of resisting a longitudinal pull in proportion to the area so joined. In comparison the bond provided by a wet adhesive is slippery and not capable of resisting longitudinal pull. It must be held

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under constant tension and pressure until the adhesive has sufficiently set.

The characteristics of the preset and pressure sensitive adhesive coatings selected for this application are utilized as follows:

(1) By prefabricating or preapplying the adhesive coatings, the dairies are relieved of the burdens of operating and maintaining glue fountains, adhesive applicators and other equipment which would otherwise be necessary to insure the proper film thickness, tackiness and consistency of wet adhesives.

(2) The tension applied to the band during the banding operation is maintained effectively and immediately upon overlapping of the adhesive coatings, thus dispensing with the otherwise conventional pressure pads and other apparatus for securing such tension. The adjustments of such means are usually quite delicate, requiring experience, skill and mechanical judgment. My invention achieves these results without any operating care and by means of very simple apparatus.

(3) The adhesive coatings herein specified retain the said characteristics for a period of several months after fabrication and consequently may be stored for that period without deterioration.

With reference again to Figures 1 and 2, it will be noted that the individual containers 1 are of a unitary capacity, such as for example, one quart, while the combined capacity of the package 2 is two quarts or one-half gallon. In order to make this clearly apparent, the containers 1 are provided on their side walls 3 with indicia reading "HA" and "GAL" on one side and "LF" and "LON" on the other side with respect to the position of the closure 6 in one of the top corners. When the containers are placed in a row with the like sides thereof in common planes, the above mentioned indicia do not spell out any legible words. However, when each alternate container in the row is rotated through 180°, the indicia on each pair of juxtaposed containers will read "Half Gallon," as will be clearly apparent from Figure 4.

It will be also noted that when the alternate containers in a row are rotated as above described, the closures 6 will occupy positions in the diagonally opposite outside corners of the package 2, as shown in Figure 2. In this manner either of the two containers may be emptied without interfering with the other container and without the need for breaking the band 10.

If desired, the package 2 may be provided with a handle 16 for convenience in carrying, this handle being located centrally between the juxtaposed containers and projecting above the top panels 5. The handle is preferably supplied to the apparatus in the form of a continuous ribbon 17 wherein the individual handle members are separated by transverse perforations 18, as is best shown in Figure 19. The handle ribbon is fabricated from light weight cardboard folded into a double ply and provided with a finger hole 19. Tabs resulting from the formation of the finger hole are turned to provide a rolled edge 20 at the top of the finger hole, as is best shown in Figure 24. The lower portions 21 of the handle are folded upon themselves to provide a flange 22 which roughly corresponds in cross-section to the channel 8 of the package 2.

It may be mentioned at this point that the handling and packaging of milk in the dairy industry is a highly mechanized operation in which the need for skill and manual labor is reduced to a minimum. Furthermore, all operations must conform to rigid sanitation standards. Thus, all equipment servicing this industry must maintain these conditions and the instant invention is intended to meet the same requirements.

Under normal operating conditions the containers 1 are automatically fed into a filling machine in a continuous sequence and are transported through the machine to be filled and closed, dated and discharged onto a con-

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veyor which carries them to a packing station where they are manually or mechanically packed into cases for delivery. On the discharge conveyor the containers travel in a more or less uniformly spaced relation. The filling machine embodies various devices for detecting imperfect containers which are ejected prior to delivery and whenever this occurs, a gap will result in an otherwise uniformly spaced row of containers on the discharge conveyor.

The machine of the present invention, which is installed intermediate the ends of the discharge conveyor, that is, between the filling machine and the packing station, is adapted to automatically adjust itself to any differences in the spacing of the containers travelling on the discharge conveyor and the automatic operation of the instant machine takes place while the containers are in transit, whereby the continuous flow of containers from the filling machine to the packing station remains uninterrupted.

It is to be understood, of course, that the apparatus constructed in accordance with the invention is in the form of an automatic machine having a variety of sub-assemblies which are so disposed as to be able to perform their various respective operations on the containers as they pass from the filling machine to the packing station. These various sub-assemblies are mounted on or otherwise associated with suitable supporting structure which need not be described in detail. However, the general arrangement of the apparatus and the positional relationship of its various sub-assemblies will be observed in Figures 4 and 5.

In these figures the reference numeral 25 designates the conveyor extending from the filling machine, while the conveyor 26 extends to the packing station. The instant machine is disposed between these two conveyors and the feed conveyor 25 may be driven by the filling machine, if so desired.

The machine of the instant invention embodies in its construction two pairs of vertical feed rollers 27, 28 which are driven by the conveyor 25 at such ratio that each revolution of the rollers is equivalent to the conveying of two containers on the conveyor. The rollers 27 have two non-operative portions or chordal faces 29 and the rollers 27, 28 are tangentially spaced apart longitudinally of the conveyor by a distance greater than the front to rear dimension (length) of the side wall 3 of a container 1. The active portions of the rollers 27 are substantially equal in arcuate surface length to the length of a side wall 3 and the lengths of the arcs subtended by the inactive portions 29 conforms approximately to the normal spacing of the containers 1 on the conveyor. The rollers 28 have a greater diameter than the rollers 27, thus affording a comparatively higher surface speed and resultant feeding rate.

A platform 30 extends between the conveyors 25, 26 and provides support for the containers at this point which may be identified as the work receiving station. The platform 30 is provided with an elongated opening or slot 31.

The rollers 27, 28 serve in the nature of a metering means to insure that only the required number of containers enters the work receiving station for each operational cycle. Because of the rate at which the rollers are driven by the conveyor 25, the rollers 27 will accommodate two containers per revolution. Normally, a container upon being engaged by the active arcuate feed portion of the rollers 27 will be moved forward for a distance equal to its own length and will be brought to rest on the platform 30 just out of contact with the rollers 28. While the inactive portions 29 of the rollers 27 pass by, the next container in line arrives for subsequent engagement by the feed portions of the rollers 27 and movement toward the platform 30. The second container in its course of movement pushes the first container into en-

gagement with the rollers 28 which, because of their

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relatively greater surface speed, move the first container out of contact with the second container and past the center line of the rollers 28 before the second container arrives at its rest position between the rollers 27, 28. Thus a positive separation is achieved between the first and second containers and not more than two containers can enter the work receiving station during any single rotation of the rollers 27. In the event that the active feed portions of the rollers 27 engage a container for a peripheral length less than the length of the side wall 3, the container is stranded for the time that the inactive portions 29 pass by and the feeding action is completed during the next half of the feed cycle. During the idle time the following container will have approached sufficiently to be engaged during the remainder of the same feed cycle and will be forwarded, while its predecessor will have been moved away from its rest position by the rollers 28.

Although the drive of the rollers 27, 28 is synchronized with the speed of the conveyor 25, it is permissible that the banding apparatus be operated at a greater speed than the filling machine inasmuch as the occurrence of the banding operation is intermittent and is governed by the presence of the required number of containers at predetermined positions on the platform 30 past the feed point of the rollers 28. In the event of a higher speed of the banding machine, the pause between the banding operations will be automatically increased in duration. This provision for indirect timing between the two machines compensates for the previously described irregularity in the discharge of containers by the filling unit.

The banding apparatus is driven through the medium of a single-revolution clutch (not shown) from the drive means of the conveyor 25 and feed rollers 27, 28. These drive means are in constant motion irrespective of the presence of any containers. The driven portion of the single-revolution clutch is operatively connected to the banding apparatus and becomes energized in response to the actuation of a solenoid which, in turn, is actuated by a detector mechanism 33 (see Fig. 8) disposed at one side of the platform 30.

The detector mechanism 33 consists of a roller 34 carried by a bell crank 35 which engages a micro-switch 36, the crank 35 being mounted upon a slide 37 while the micro-switch 36 is attached to a stationary wall 38. As the containers 1 are moved by the rollers 28 onto the platform 30, the leading container engages the roller 34 at the end of its forward movement and the resultant rocking of the crank 35 closes the switch 36. The latter, in turn, will energize the single-revolution clutch as above outlined and the banding apparatus will be set in motion. The clutch, completing its single revolution, will thereupon again render the banding apparatus inactive.

The single-revolution clutch is operatively connected to the slide 37 carried by guideways 37a of the wall 38. The slide is provided at the top thereof with a housing 39 (see Figs. 6 and 7) which accommodates a rotatable ring gear 40. The latter meshes with the teeth of a rack 41 provided at the top of the wall 38 and stationary therewith. The gear 40 is equipped with two ratchet teeth 42 engageable by a pawl 43 which is secured to the stem portion 44 of a guide 45. The stem portion 44 is rotatably mounted in the housing 39 and the guide 45 slidably supports a pair of L-shaped clamps 46 comprising clamping jaws 48 and cam rollers 49 (see Figs. 4 and 6). The latter are movable in a cam track 50 provided in the housing 39.

The slide 37 also carries a pair of clamps 51, 52 (see Fig. 4) which are pivotally mounted thereon. The clamp 51 includes a resilient pad 53 and a pusher member 54, the stud 55 serving to pivotally attach the clamp to the slide. The clamp 52 includes a pad 56, a pusher member 57 and a mounting stud 58. The studs 55, 58 are secured to the respective clamps 51, 52 and are provided with suitable means to engage cam tracks in the wall 38

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whereby the studs and the associated clamps are rocked during movement of the slide. The pusher member 57 of the clamp 52 is received in the slot 31 of the platform 30, while the clamp 51 is disposed adjacent the housing 39.

The two leading containers on the platform 30 beyond the feed rollers 28 are designated by the numerals 1a and 1b. When the banding mechanism is not active, the slide 37 is so positioned that the pads 53, 56 are substantially in alignment with the respective top and bottom walls 4, 5 of the container 1a and the jaws 48 are disposed rearwardly of the container 1b. The jaws 48 are clear of the containers and disposed in a plane parallel to the direction of travel of the latter.

When the container 1a engages the detector 33 and thereby initiates forward movement of the slide 37, the pads 53, 56 are closed into engagement with the container 1a, lifting the same above the platform 30 and carrying the same forwardly and spacing it ahead of the container 1b. When the center of the housing 39 arrives in substantial alignment with the center of the container 1b, the pawl 43 is engaged by the ratchet 42 of the gear 41 and thereby imparts a rotary movement to the guide 45 and clamps 46. Coincidentally, the cam track 50 causes the rollers 49 to move the jaws 48 inwardly to clampingly engage the sides of the container 1b. Thus, the container 1b is rotated and moved forward behind the container 1a but clear of the latter. Prior to the end of the forward movement of the slide 37 the pads 53, 56 are opened to the extent that the pad 56 retracts below the platform 30 and the pad 53 is clear of the top of the container 1a so that the latter is released prior to the release of the container 1b. The latter, in the meantime, is near the end of its rotation of a half-turn and the jaws 48 are opened again by the cam track 50 at the end of the forward movement of the slide 37.

In this manner the containers 1a and 1b are substantially juxtaposed at the end of their travel and in this position are designated as 1aa and 1bb (see Figs. 4, 5 and 9).

During the return of the slide 37 the pads 53, 56 are further retracted so that they properly clear the containers and at the same time the jaws 48 are also clear of the containers. Although the gear 40 rotates in a reverse direction during the return movement of the slide, the pawl 43 is not affected by that rotation. The extent of rotation of the gear 40 exceeds 180° in either direction and the surplus rotation is consumed during the time that the containers 1a and 1b are engaged and moved so that they are sufficiently separated to facilitate rotation of the container 1b.

At the end of the return movement of the slide 37 the pusher members 54, 57 are disposed somewhat rearwardly of the container 1bb (see Figs. 4 and 5). At the commencement of the next forward movement of the slide and coincidentally with the movement of the pads 53, 56, the pusher members 54, 57 are positioned so as to engage the rear of the container 1bb and move it forwardly. The container 1bb coincidentally moves the container 1aa in the same direction and both containers thus assume a new position 1aaa and 1bbb in the next station of the machine, at which station the banding operation is performed. On the return trip of the slide the pusher members 54, 57 clear both containers.

The apparatus is provided with a suitable magazine to receive the continuous band ribbon 11 which is guided by suitable outlet rollers 60, 61 and 62 (see Fig. 5) so that the leading portion of the frontmost component band section 10 intercepts the path of the containers 1aa, 1bb as the latter are being pushed to the positions 1aaa and 1bbb, respectively, by the pushers 54, 57. The leading end of the band section 10 is shown at 10a and is held by means later to be described. During the forward movement of the containers 1aa and 1bb the container 1aa engages the intercepting portion 10a of the

band section 10 and upon further movement the median portion of the band section 10 is wrapped around the side walls of the containers in the form of a U-shaped loop. At the end of the forward movement of the containers, the leading end of the band is still held and the trailing end is still attached to the main body of the ribbon 11.

A vertical wall 63 extends at right angles to the wall 38 and carries a slide 64 (see Figure 15), which pivotally supports a looper arm 65 mounted on a stud 66. The arm 65 includes a link portion 67 and a U-shaped upper portion terminating in a looper member 68. The member 68 is provided with a resilient pad 69 and includes a knife portion 70 (see Fig. 18) and grooves 71, 72 (see Fig. 10). These grooves are separated by a land or facing 74. The knife portion 70 is preferably composed of a plurality of spaced segments or hooks 73.

The slide 64 is also provided with guideways 75 (see Fig. 13) carrying a sub-slide 76, the latter having a slot 77 and a projecting post 78. A tension spring 79 extends from this post to a stop pin 80 on the slide 64. The pin 80 protrudes through the slot 77 and limits movement in one direction of the sub-slide 76 against the tension of the spring 79.

The front edge 83 of the sub-slide 76 is in alignment with the face 74 of the looper member 68 and in the position shown in Figures 5 and 12 is held in engagement therewith by the action of the spring 79. Thus the sub-slide 76 moves together with the slide 64 in contact with the face 74. The sub-slide is provided with a stop ledge 81 which is engageable with a suitable stop 82 conveniently affixed to the frame of the apparatus. When the slide 64 is moved in the direction of the arrow in Figure 14, the ledge 81 is engaged by the stop 82 to prevent further movement of the sub-slide while the spring 79 absorbs the remaining portion of the movement of the slide 64. In so doing the front portion or deflector edge 83 of the sub-slide is disengaged from the face 74 during the idle part of such movement. The sub-slide 76 is provided with guideways 84 which in turn accommodate a latch 85 (see Figures 12, 18). By means of posts, tension spring and slot designated collectively by the numeral 86 (see Fig. 12) the front portion 87 of the latch 85 projects beyond the edge 83 of the sub-slide 76, but may be retracted against the relatively light tension of the spring 86. The latch 85 is in alignment with the groove 72 of the looper member 68 and during the time that the edge 83 is in contact with the face 74, the edge 87 is disposed to enter into the groove 72. The size and position of the latch 85 and particularly of the front portion 87 coincides with the registration slot 13 of the band 10.

During the idle period of the banding mechanism as indicated in Figure 5, the latch 87 projects through the slot 13 of the band 10 and the portion of the band between the slot and the perforations 12 is compressed by the edge 83 against the face 74. In this manner the leading end of the band is firmly held.

Parallel to the wall 63 is another vertical wall 90 which carries a slide 91 (see Figures 15, 16, 17). The slide 91 is provided with a bracket 92 which pivotally supports a housing 93. The latter is equipped with a roller 94, a stud 95 and a stop pin 96. The roller 94 moves in a cam groove of a stationary cam plate 94a secured to the top edge of the wall 90. Thus the housing 93 with the mechanism carried thereby may be rocked on the pivot of the bracket 92 of the slide 91 as the slide is moved along the wall 90.

The stud 95 functions as a pivot for a cam plate 97 provided with arcuate cam slots 98, 99 and 100. The housing 93 is provided with studs 102 which pivotally support a pair of gripper arms 103 having jaw portions 104 at their free ends. Rollers 105 carried by the arms 103 are disposed in the cam slots 98 of the plate 97.

Parallel with and slidably supported on the grippers

103 are movable grippers 106 having jaw portions 107 at one end thereof and provided with rollers 108 which are disposed in the cam slots 99 of the plate 97. Intermediate portions of the grippers 103, 106 which extend beyond the housing 93 are encased in tubular sheaths 109 which are secured to the grippers 103.

The plate 97 accommodates a stud 110 which pivotally supports a cam link 111. The latter is operatively connected to the single-revolution clutch previously mentioned. In a similar manner the link portion 67 of the looper arm 65 is provided with a stud 112 and a cam link 113 which is also connected to the clutch.

To move the slide 64 the link 113 is moved first in the direction indicated by the arrow in Figure 14. At the initial state of this movement the looper arm 65 is rocked upwardly until one end of an arcuate slot 114 in the looper arm engages a stop pin 115 on the slide 64. On further movement both travel as a unit. On the return stroke (in the direction of the arrow in Figure 13) the arm 65 rocks rearwardly until the pin 115 engages the opposite end of the slot 114, whereupon the parts move in unison.

In a similar manner the slide 91 is moved by the link 111 first in the direction indicated in Figure 16, whereby the plate 97 is rocked upwardly until the pin 96 engages the bottom end of the slot 100, whereupon the parts travel in unison. On the return stroke the plate 97 rocks downwardly until the pin 96 engages the opposite end of the slot 100 (see Fig. 17), whereupon the parts move together. It will be noted that Figs. 14 and 16 are views taken from opposite directions, and thus the arrows in these figures point in a common direction, although they are reversed in the drawing. This is also true of Figs. 13 and 17.

During the upward movement of the cam plate 97 the pins 105 in the slots 98 bring the gripper arms 103 toward each other and the grippers 106 also move together. On further movement the pins 108 in the slots 99 cause the gripper jaws 107 to move towards the jaws 104. Thus, the initial movement of the link 111 results in bringing the gripper arms into a substantially horizontal position and then to be closed. On the return movement the link 111 moves along the slide 91 (see Figure 17). It will be also noted that due to the disposition of the cam track 94a and the cam roller 94, the grippers are furthermore given a secondary movement toward and away from the container 1bbb.

With reference again to Figures 5, 9, 10, 11, 12, 13, 14, 16 and 17, during the forward movement of the slide 37 and of the containers 1aa and 1bb the slides 64 and 91 are at rest, except as will be hereinafter described. The lead end portion 10a of the band ribbon is held by the looper 68 as already explained. At the end of the slide movement the disposition of these parts is indicated in Figure 9. When the slide commences to return, the cam link 113 is moved in the direction of the arrow in Figure 14, thus raising the looper member 68 above the band portion 10a and disengaging its contact with the edges 83 and 87. On further movement the looper 68 moves in a raised position up to the end of the movement of the slide 64 while the sub-slide 76 is arrested in its coincidental movement by the stop 82.

Prior to the termination of a previous operational cycle the grippers 103 had engaged the lead end of the frontmost band section 10 in a manner to be later described and were holding the lead end, as were also the looper member 68, the latch 85 and the pressure edge 83. Thus, the disengagement of the looper member 68 leaves the grippers 103, 106 as the sole means of holding this end. Upon extraction of the looper member 68 the band portion 10a maintains the form of a U-shaped loop which coincides substantially with the contour of the member extending beyond the container 1bbb and the linear

length of this loop is approximately equal to the width of the rear wall 3 of the container 1bbb.

During the period that the looper slide 64 moves in the direction shown by the arrow in Figure 14, the gripper slide 91 also moves in the same direction. In the course of such travel the grippers 103, 106 maintain their grip on the band and gradually consume or tighten the loop. Moreover, the grippers are simultaneously moved angularly from the position shown in Figure 9 toward the rear wall of the container 1bbb until they reach the position shown in Figure 11. At that time the grippers and the leading end of the band 10a are in intimate contact with the container rear wall. Due to the disposition of the grippers and of the original loop at the end position, this movement of the grippers results in the leading end portion of the band 10 being folded outwardly and backwardly upon the band and in contact with the inner face of the gripper jaws 107. A continuation of the folded end passes between the two jaws and extends onto the outer face of the jaws 104. The band then loops around the jaws 104 onto the inner face of the jaws 104 and extends inwardly of the jaws 107 and is stretched tightly along the rear wall of the container 1bbb. The resultant effect of so wrapping the lead end portion of the band 10a around the jaws 104 is the provision of what may be called an anchoring post which enhances the grip of the grippers for more effective tensioning of the band.

Simultaneously with the action of the grippers the looper member has reached the end of its forward movement, passing over the trailing end portion 116 of band section 10 which extends between the guide roller 62 and the container 1bbb, as indicated at 116 in Fig. 10. The direction of movement of the link 113 is then reversed, thus causing the looper member 68 to descend behind the band portion 116. During its return trip the looper member engages the band portion 116 and exerts a pull on the band in the direction of its travel. The disposition of the guide rollers 60, 61, 62 causes a moderate resistance on the band as it is being pulled by the looper member. In the course of its travel the friction pad 69 exerts a moderate pressure on the outer face of the band portion 116, thus forcing the inner face of the band portion into intimate and moderate pressure contact with the outer face of the band portion held under tension by the grippers 103, 106.

The material of the friction pad 69 is not only resilient but is also tractional (such as rubber) and consequently, the effect of the movement of the pad on the tail end portion of the band is the causing of a drag pull thereon, thus materially enhancing the tensioning of the band.

It will be noted that the lead and tail end portions of the band 10 are now brought into overlapping relation against the rear wall of the container 1bbb. The adhesive coating 14 is on the exterior face of the lead end and the adhesive coating 15 is on the inner face of the tail end, and when the two ends are brought into contact, the coatings are brought into adhesive engagement with each other. The gripper jaws 104 and 107 engage the upper and lower edge portions of the band and the resilient pad 69 is relieved to provide clearance for the jaws.

Although the aforementioned tensioning action may suffice, there are provided auxiliary tensioning means in the form of a friction pad 117 carried by a slide 118. During the forward movement of the slide 37 the pad 117 is free of contact with the band 10 and is in a retracted position adjacent the container 1aaa. However, approximately at the time when the looper member 68 is approaching to contact the band portion 116, the pad 117 is brought into a moderate pressure contact with the band 10 and is then moved slowly in the direction counter to the path of travel of the containers (see Figs. 9 and 12). The tractional pull of the pad 117 is suf-

ficient to eliminate any slack in the band wrapped around the containers and will even augment the tension created by the grippers 103, 106, but without tearing the band or pulling the same out of the grippers. Any surplus pull is absorbed by slippage of the pad over the band. During the overlapping travel of the tail end portion of the band the movement of the pad 117 is slowed somewhat, but is maintained until the major portion of the adhesive coatings 14, 15 is united. The pad 117 is then disengaged and returned to its initial position during the forward movement of the slide 37 in the next operational cycle.

During the return trip of the looper member 68 across the rear end of container 1bbb, the tail end of the band 10 slides across the face containing the grooves 71, 72, the face 74 and around the corner formed by the knife hooks 73. The tension created as the band 10 is pulled over the rollers 60, 61, 62 causes the band to maintain intimate contact with the looper member 68. As the perforations 12 of the band approach the hooks 73, the pressure edge 83 and the latch 87 approach the face 74 and groove 72 of the looper member. Upon meeting, the edge 83 and the latch 87 contact the band with moderate pressure exerted by the springs 79, 86. Thus, the tension on the band is increased and the band portion spanning the opposite corners of the looper member 68 and raised above the grooves 71, 72 is indented. Further movement of the looper causes the hooks 73 to enter the perforations 12 of the band 10. The hooks 73 are provided with inclined cutting edges (see Figs. 14 and 18) and continued movement of the looper member 68 causes these cutting edges to sever the band transversely between its perforations, so that the band is separated from the main body of the band ribbon 11.

As this occurs, the latch 87 passes through the slot 13 of the band section next in line in the ribbon and enters the groove 72, thus arresting backward movement of the lead end of this succeeding band section. Coincidentally, upon separation of the wrapped band section, the pressure edge 83 clamps the extreme front portion of the succeeding band to the face 74 of the looper member to further secure the same, and also cause said extreme front portion to lie flat over the groove 71. Completion of the return movement of the looper member 68 finishes the sealing of the ends of the wrapped band and carries the leading end portion of the succeeding band section to the position shown in Figure 5.

During the return trip of the looper and after a substantial portion of the adhesive coatings 14, 15 are united, the gripper jaws 104, 107 are opened and are next moved apart as indicated in Figure 17. The gripper slide 91 is also returned to its starting position. During this travel the grippers 103, 106 pass the looper member 68 and the housing 93 is guided by the cam roller 94 to position the gripper jaws 104 so as to arrive at the end of the movement of the slide 91 in vertical alignment with the groove 71 of the looper member 68 when the latter has reached its resting position. Next the cam link 111 is moved in the direction shown in Figure 14, causing the jaws 104, 107 to dip inwardly. During this movement the extreme front end of the succeeding band is located between the open jaws and the jaw 104 enters into the groove 71. The jaws 104, 107 are then closed to grip the edge of the extreme forward end portion of the succeeding band. At that time the operational cycle of the looper and of the grippers is completed and they remain at rest, awaiting the next cycle of operation. At the same time the slide 37 has also completed its return movement and has positioned the detector 33 to await the arrival of the next container 1a to start the next cycle.

The package 2 may be provided with a carrying handle 16 and the affixing of this handle may be effected automatically and in coordination with the banding operation.

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The handles 16 are supplied to the machine in the form of a ribbon 17 (see Fig. 19) wherein the individual handles are zig-zag folded and the apparatus is equipped with a suitable magazine to receive the ribbon.

The vertical wall 90 is also provided with guides 120 (see Fig. 22) carrying the slide 121 having bearing projections 122, 123 and 124 parallel with the wall and a bearing projection 125 at right angles thereto.

The projections 122, 123 and 124 accommodate a shaft 126 while the projection 125 receives a stub shaft 127. The shaft 126 carries a clamp bracket 128, a feed finger 129 and a gear 130 which meshes with a gear 131 on the shaft 127.

The slide 121 is also provided with a clamping pad 132 cooperating with a similar pad 133 on the bracket 128. The latter also has bearing portions 134, 135 which are spaced apart between the bearing projection 122 of the slide 121. The bracket 128 is also equipped with a flange 136 extending at right angles to the clamping pad 133 and has fastened thereto a knife blade 137 (see Fig. 21). A coating knife plate 138 is fastened to a flange 139 of the slide 121.

The feed finger 129 is positioned between the bearing projections 123 and 124 and includes a pusher 140. A link 141 is fastened to the gear 131 and has a cam link 142 pivoted thereto by a stud 143. The link 142 is actuated by the single-revolution clutch already mentioned.

When the link 142 is moved in the direction shown in Figure 19, the link 141 is rocked until it engages the stop pin 144 on the slide 121. On further movement of the slide on its guides the slide and the parts carried thereby move as a unit. When the link 142 is moved in the opposite direction it will first rock the link 141 over to a second stop pin 145 on the slide 121 and then move the slide and its components as a unit.

The forward rocking movement of the link 141 is transmitted by the gears 130, 131 to the shaft 126, imparting rotation to the bracket 128 and finger 129 toward the wall 90. The handle ribbon 17 is guided by suitable means to the position shown in Figure 19. When the mechanism is idle, the cutting edges of the knives 137, 138 are in vertical alignment with the perforations in the ribbon.

To start the handle feeding operation the ribbon is manually moved through the guides and the leading handle 16a is placed in a position wherein the perforations at its trailing edge are in alignment with the knives 137, 138. This positioning will automatically locate the finger hole 19 of the next handle 16b to be somewhat advanced from the pusher 140 of the feeder 129. It will be also noted that when the device is idle, the members 128, 129 are in the position shown in Figure 21 so that the handles 16a and 16b are disposed between the open clamping pads 132, 133. The knives 137, 138 and the pusher 140 are also clear of the handles.

When the mechanism is energized, the resultant rotation of the knives 137, 138 first cuts through the connecting portions of the perforated handle ribbon so that the handle 16a is severed from the handle 16b. Next, the clamping pads 132, 133 firmly clamp the handle 16a to the slide 121 and at the same time the pusher 140 enters into the finger hole 19 of the handle 16b.

When the slide 121 is next moved, the handle 16a moves therewith while the handle 16b is left behind until the pusher 140 has consumed the space therebetween to engage the edge 146 of the finger hole 19 and carries the same along. The movement of the handle 16b coincidentally results in a forward movement of the ribbon 17. At the end of the forward movement the position shown in Figure 19 is reached. On the return stroke the pad 133, the knife 137 and the pusher 140 rotate outwardly and return clear of the handle 16b, which now assumes the previous location of the handle 16a. In this manner automatic feeding of the handle ribbon is achieved.

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The disposition of the handle guiding and feeding means is such as to bring the ledges 22 of the handles 16a and 16b into horizontal lateral alignment with the channel 8 of the package 2. In this manner, when the reciprocal pads 132, 133 move the handle forward between the containers 1aaa and 1bbb, the ledge 22 of handle 16a will enter the channel 8. On the return trip the clamping pads release the handle and permit it to stay in the channel.

The movement of the slide 121 begins after the pusher slide 37 has fully completed its forward movement and the containers 1aaa and 1bbb have reached their destination. Also, the forward movement of the slide 121 is completed coincidentally with the completion of the forward movement of the gripper slide 91 to assure that when the overlapping portions of the band 10a are adhesively joined, the handle 16a is in readiness in its proper position for the package 2.

Since the handle 16 is affixed to the package 2 only by the clamping engagement of the containers 1aaa and 1bbb with the ledge 22 of the handle, the tautness of the band 10 encircling the containers is essential. Because of the fact that the weight of the package is transmitted by the top panels 5 to the portions 21 of the handle ledge 22, the portions 21 tend to spread the containers apart and thus counteract the pressure of the containers against the band.

When the handle 16 is omitted from the package, or when the package is carried by either one of the containers, the uniting effect of the band must be such as to prevent any shifting of the containers relative to each other. It is essential that the adhesive coatings 14, 15 meet in registered relation to produce proper bonding effect and the adhesive to be used should be such as to create a proper bond immediately after the end portions of the band are united.

The package produced by the instant method and apparatus is such that the individual containers 1 are so firmly united with each other that they in effect constitute a single unit. Thus if the package 2 is engaged, or lifted or carried by grasping one of the containers at any portion thereof its mate will follow along undisturbed without essentially changing its relative position.

Reviewing the salient features of the invention, it will be noted that it provides a fully automatic and foolproof banding operation which can be completely integrated with the normal filling and packaging operations of the dairy without the need of additional or of particularly trained or skilled help.

Irregularity in the feeding of containers by the filling machine is automatically corrected by means of vertical feed rollers 27 and 28 which prevent the entry of containers in excess of the operational requirements of the banding machine. The coordination of the banding operation with that of the filling machine is automatically obtained by means of the platform 30 and the detector 33.

The arrangement of the containers to properly position the advertising matter on their side walls is automatically achieved by means of the turning device; the propulsion of the containers from one operating station to the other and the proper positioning of the containers at said stations are also fully automatic. The same applies to the forwarding of the completed package to the conventional packaging station. Thus the operator is completely relieved of supervision and attendance to these matters.

The band and the handle stock are supplied to the machine in continuous ribbon form having approximately 1000 individual sections per stack, this avoids unduly frequent replenishment of bands and of handles.

The multifunctional and coactive arrangement of the looper and of the gripper mechanisms provide an inherent simplicity of operation. These mechanisms automatically accommodate themselves to reasonable variations in dimensional and other characteristics of the arti-

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cles to be banded and of the bands and handles. Thus the need for frequent readjustments is avoided. They function effectively to sustain tension upon their respective end portions of the band until the union between the adhesive coatings is fully secured.

The knife portion 70 of the looper member in conjunction with the perforations 12 insures the separation of the individual band sections on the line of perforation and the coaction between the register slot 13, the latch 85, the looper 68, the clamp 76 and the grippers 103, 106 insures the registration of the printed text on the bands with the side panels of the package 2 and further assures the meeting of the adhesive coatings 14 and 15.

These accomplishments are achieved by the instant invention without the aid of an electric eye, registering devices, or complicated feeding and cutting devices.

Although in the foregoing there has been described and shown the preferred embodiment of the invention, various modifications may become apparent to those skilled in the art to which the invention relates. Accordingly, it is not desired to limit the invention to this disclosure and various modifications may be resorted to which lie within the spirit and scope of the appended claims.

What is claimed as new is:

1. In a machine for combining a plurality of individual articles into a unitary package by an encircling band, said band being initially an integral section of a continuous ribbon and separated from the succeeding band section by at least one perforation, each band section being provided with preset and pressure sensitive adhesive coatings located at opposite ends and on opposite faces thereof, the combination of a supply magazine for said band ribbon, means for supporting and arranging a predetermined number of articles in juxtaposed relation at a banding station, means for guiding the frontmost band section from said magazine, means for engaging the leading end of said band section and for withdrawing and locating said band section in a predetermined position preparatory to a banding operation, means for wrapping the median portion of said withdrawn band section around the major outer periphery of the group of articles to be combined, means frictionally engageable with said band section for tensioning the said median portion longitudinally so that said major periphery of the articles is firmly embraced thereby, means for overlapping and joining said coated end portions of said band sections under sustained tension around the remaining outer periphery of said articles, and means operable after said coated end portions have been joined for severing the trailing and joined end portion of said band section from the remainder of said band ribbon on the line of the perforation.

2. The combination as set forth in claim 1 wherein the means for severing the band sections comprises a cutting knife engageable within said perforation to insure severing of said ribbon at the proper position.

3. The combination as set forth in claim 1 wherein the said joining means comprise a gripper and a looper member, the said members being adapted to respectively engage the said opposite end portions of said frontmost band section, to move them into overlapping relationship, to tension them and to press the respective adhesive coatings into intimate surface engagement and to maintain the tension on the said end portions while the said coatings are being united.

4. The combination as set forth in claim 1 wherein the said machine includes an auxiliary station for assembling the required number of articles for a package and means for forwarding the assembled articles into the said banding station and wherein the said band guiding means are adapted to cause the frontal portion of the band to intercept the path of the articles as they are so being moved, whereby the median portion of the band is wrapped in the form of a loop around the major outer periphery of the said articles.

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5. The combination as set forth in claim 3 wherein the said looper member is adapted to cooperate in securing and locating the lead end portion of the succeeding band section after it has been severed from the tail end portion of the preceding band section.

6. The combination as set forth in claim 3 wherein the said gripper member comprises respective pairs of relatively stationary and relatively movable gripping jaws which are adapted to engage and to grip the top and bottom edges of the extreme forward end of the lead portion of the frontmost band section and are furthermore operable to wrap the said extreme forward end around the said jaws during the movement of the said lead end into joining position to form a loop of said extreme forward end around said jaws to thereby assist in the tensioning said lead portion.

7. In a machine for combining a plurality of individual articles into a unitary package by an encircling band having preset and pressure sensitively adhesively coated end portions, the combination of a work receiving station, means for feeding a plurality of articles at a controlled rate to said station, means for detecting the presence in said station of the required number of articles which are to be combined into a package, means for arranging the articles in said station in groups wherein the articles in each group are juxtaposed in a predetermined relation, means for passing a band around a group of articles in said station whereby the adhesively coated end portions of the band are superposed but spaced apart, means for placing the stated band under tension longitudinally of itself so that the juxtaposed articles are firmly embraced thereby, means for bringing the adhesively coated end portions of the band together under sustained tension and joining the adhesive coatings so that from the instant of union they are able to resist a counterpull from the direction of the tension applied to them and are therefore able to maintain a firm embracement of the band around said articles and means for discharging groups of banded articles.

8. In a machine as characterized in claim 7, the additional means for guiding and inserting a carrier handle provided with oppositely extending lateral projections between the juxtaposed articles with said projections positioned beneath contiguous overhanging surfaces of said articles, the said handle to be secured in that position by means of the pressure exerted by the engaging surfaces of said articles as the result of the firm embracement of said band.

9. The combination as said forth in claim 8 and including a supply reservoir for plurality of such handles joined into a continuous ribbon, means for guiding said ribbon, means for feeding said ribbon at a pace of a single handle section per each operational cycle and means for severing the frontmost handle section from the main body prior to it being inserted between said articles.

10. In a machine for combining a plurality of individual articles into a unitary package by an encircling band, the combination of means for feeding, for arranging and for supporting a predetermined number of articles to be combined; said feeding means comprising a pair of feed rollers having interrupted feed surfaces and a pair of feed rollers with uninterrupted feed surfaces and a separating platform between the feed centers of said rollers adapted to accommodate at least one of said articles in such manner that the article fed onto said platform by the interrupted feed rollers will require the assistance of the next succeeding article to be brought into feeding engagement with the uninterrupted set of rollers, whereby the rate of feeding is limited by the number of revolutions and the number of interruptions of the first set of feed rollers.

11. A method of combining groups of juxtaposed articles into unitary packages by wrapping around each of said groups a narrow flexible band which comprises an integral component section of a continuous ribbon of

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such bands and is provided with a pair of self-sealing adhesive coatings respectively disposed on opposite faces of its opposite ends, comprising the steps of stretching a portion of the frontmost band section of said continuous ribbon across a path of travel of a said group of juxtaposed articles, holding the leading end of said band section at one side of said path of travel, advancing said group of articles along said path of travel into engagement with said stretched band section portion adjacent said held leading end, continuing the advancement of said articles beyond said held leading band section end while paying out said band section from the opposite side of said path of travel to wrap the median portion of said band section around the front and side surfaces of said group of articles, moving the leading end of said frontmost band section transversely across said path of travel into engagement against the rear surface of said partially wrapped group of articles, moving the trailing end of said frontmost band section in a direction substantially opposite to the direction of movement of said leading end and into overlapping face to face engagement with said leading end to join said adhesively coated portions while simultaneously carrying the attached leading end of the succeeding band section of said ribbon across the path of travel of the articles to position said succeeding band section for the next banding operation, and severing said frontmost wrapped band section from said succeeding band after said adhesively coated portions have been at least partially joined.

12. The method of claim 11 as applied to juxtaposed articles having contiguous overhanging surfaces, and wherein is added the step of inserting between said articles, prior to joining said adhesively coated portions of said frontmost band section, a carrier handle having lateral projections engageable beneath said overhanging surfaces.

13. In a machine for combining a selected number of individual rectangular containers into a unitary package by wrapping therearound a narrow flexible band which comprises an integral component section of a continuous ribbon of such bands and is provided with a pair of self-sealing adhesive coatings respectively disposed on opposite faces of its opposite ends, the combination of conveyor means for delivering containers in a single lane, a container supporting platform, feeding means disposed adjacent one end of said platform for feeding said containers onto said platform at a rate within the operating capacity of said machine and in such manner that each container fed by said feeding means will push the preceding containers along said platform, a banding station disposed adjacent the other end of said platform, means for stretching the leading end portion of the frontmost band section of said continuous ribbon across the entrance to said banding station, detector means operable by the frontmost of said pushed containers when at least the selected number of containers is present on said platform, means actuated by said detector means for advancing the selected number of containers in juxtaposition into engagement with said stretched band portion and into said banding station to wrap the median portion of said band around the exposed front and side walls of said juxtaposed containers, means for overlapping the end portions of said frontmost band section against the exposed rear wall of said juxtaposed containers to form a lap seam between said self-sealing adhesive coatings and for simultaneously carrying the attached leading end portion of the succeeding band section of said ribbon into position across the entrance to said banding station preparatory to the next banding cycle, and means for severing said wrapped frontmost band section from said ribbon.

14. In a machine for combining into a unitary package a pair of individual rectangular containers, each of which is provided with a pouring opening in one corner of its upper end, by wrapping around said containers a narrow flexible band which comprises an integral component section of a continuous ribbon of such bands and is pro-

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vided with a pair of self-sealing adhesive coatings respectively disposed on opposite faces of its opposite ends, the combination of conveyor means for delivering containers in a single lane with their pouring openings oriented in the same direction, a container supporting platform, feeding means disposed adjacent one end of said platform for feeding said containers onto said platform at a rate within the operating capacity of said machine and in such manner that each container fed by said feeding means will push the preceding containers along said platform, detector means operable by the frontmost of said pushed containers when at least two containers are present on said platform, means actuated by said detector means for advancing the two leading containers on said platform to an intermediate portion of said platform, means operable during said advancement to rotate one of said advancing containers 180° to bring its pouring opening into position diagonally opposite the pouring opening of the other of said containers, a banding station disposed at the other end of said platform, means for stretching the leading end portion of the frontmost band section of said continuous ribbon across the entrance to said banding station, means for advancing the two containers in juxtaposition from said intermediate portion of said platform into engagement with said stretched band portion and into said banding station to wrap the median portion of said band around the exposed front and side walls of said juxtaposed containers, means for overlapping the end portions of said frontmost band section against the exposed rear wall of said juxtaposed containers to form a lap seam between said self-sealing adhesive coatings and for simultaneously carrying the attached leading end portion of the succeeding band section of said ribbon into position across the entrance to said banding station preparatory to the next banding cycle, and means for severing said wrapped frontmost band section from said ribbon.

15. The combination of claim 14 when used with containers provided with overhanging surfaces adjacent their upper ends and wherein is provided means disposed at said banding station for inserting between said juxtaposed containers, prior to the overlapping of the end portions of said band section, a carrier handle having lateral projections engageable beneath said overhanging container surfaces.

16. In a machine for combining a plurality of juxtaposed articles into a unitary package by wrapping an encircling band therearound, said band initially comprising an integral section of a continuous ribbon and having a leading end and a trailing end adapted to be overlapped to form a lap seam, the combination of a banding station having an entrance to receive said juxtaposed articles, a supply magazine for said continuous ribbon, means disposed on one side of said banding station entrance for guiding said ribbon from said magazine, means disposed on the opposite side of said banding station entrance for holding the leading end of the frontmost band section of said ribbon to stretch a portion of said band section across said banding station entrance, means for advancing said articles towards said banding station into engagement against said stretched band portion and for thereafter continuing the advancement of said articles into said banding station to pull said band section through said guiding means and to simultaneously wrap the median portion of said band section around the exposed front and side surfaces of said juxtaposed articles, gripper means for taking over control of the leading end of said frontmost band section from said holding means and for moving said leading end transversely across said banding station entrance behind said juxtaposed articles and into engagement with the exposed rear surface of said articles, means for moving the trailing end of said foremost band section and the attached leading end of the succeeding band section across said banding station entrance in a direction opposite to the direction of movement of the leading end of said frontmost band section to bring said

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trailing end into overlapping engagement against the leading end of said frontmost band section to form a lap seam and to simultaneously position the leading end of the succeeding band section for engagement by said holding means preparatory to the next banding cycle, and means for severing said frontmost band section from said succeeding band section.

17. In a machine for combining a plurality of individual juxtaposed articles into a unitary package by wrapping therearound an encircling band which initially comprises an integral component section of a continuous ribbon containing a plurality of such band sections each of which is set off from its succeeding band section by at least one separating perforation and is provided with a pair of self-sealing adhesive coatings respectively disposed at its leading and trailing ends and on opposite faces thereof, the combination of a banding station having an entrance for receiving said articles, a supply magazine for said continuous ribbon, means disposed at one side of said banding station for guiding said ribbon from said magazine, means disposed at the other side of said banding station entrance for holding the leading end of the frontmost band section of said ribbon to stretch a portion of said band section across the entrance of said banding station, means for advancing said juxtaposed articles against the stretched portion of said frontmost band section and through said entrance into said banding station while the leading end of said band section is held by said holding means to pull said continuous ribbon through said guide means during advancement of said articles and effect a wrapping of the median portion of said frontmost band section around the exposed front and side surfaces of said juxtaposed articles, means for overlapping the adhesively coated ends of said frontmost band section against the exposed rear surface of said juxtaposed articles to form a lap seam, said means also being operable to stretch the leading end of the attached succeeding band section of said ribbon across the entrance of said banding station and to deliver its leading end to said holding means preparatory to the next banding operation, and cutting means carried by said overlapping means and engageable within the separating perforation between the trailing end of said frontmost band section and the attached leading end of the succeeding band section for transversely cutting said ribbon on the line of said separating perforation.

18. In a machine for combining a plurality of individual juxtaposed articles into a unitary package by wrapping therearound an encircling band which initially comprises an integral component section of a continuous ribbon containing a plurality of such band sections each of which is provided at its leading end with a registering slot, is set off from its succeeding band section by at least one separating perforation, and is provided with a pair of self-sealing adhesive coatings respectively disposed at its leading and trailing ends and on opposite faces thereof; the combination of a banding station having an entrance for receiving said juxtaposed articles, a supply magazine for said continuous ribbon, means disposed at one side of said banding station entrance for guiding said ribbon from said magazine, means disposed on the other side of said entrance for holding the leading end of the frontmost band section of said ribbon to stretch a portion of said frontmost band section across said banding station entrance, said means including a latch engageable within said registering slot, means for advancing said juxtaposed articles against the stretched portion of said frontmost band section and into said banding station while the leading end of said band section is held by said holding means to withdraw said ribbon through said guiding means to effect a wrapping of the median portion of said frontmost band section around the exposed front and side surfaces of said advanced articles, means for overlapping the adhesively coated ends of said frontmost band section against the

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exposed rear surface of said juxtaposed articles to form a lap seam, said overlapping means also being operable to carry the leading end of the attached succeeding band section of said ribbon across the banding station entrance and to bring its registering slot into registry with said latch preparatory to the next banding cycle, and cutting means carried by said overlapping means and engageable within the separating perforation between the trailing end of said frontmost band section and the leading end of said succeeding band section for transversely severing said ribbon on the line of said separating perforation.

19. In a machine for combining a plurality of individual juxtaposed articles into a unitary package by wrapping therearound an encircling band which initially comprises an integral component section of a continuous ribbon containing a plurality of such band sections each of which is set off from its succeeding band section by at least one separating perforation and is provided with a pair of self-sealing adhesive coatings respectively disposed at its leading and trailing ends and on opposite faces thereof; the combination of a banding station having an entrance for receiving said juxtaposed articles, a supply magazine for said continuous ribbon, means disposed at one side of said banding station entrance for guiding said ribbon from said magazine, a looper head initially disposed on the other side of said banding station entrance, means cooperable with said looper head for holding the leading end of said frontmost band section to stretch a portion of said band section across said band station entrance, gripper means adjacent said looper head for gripping another portion of said leading end of said frontmost band section, means for advancing said juxtaposed articles against said stretched band portion and into said banding station to pull said frontmost band section through said guide means and to wrap the median portion of said frontmost band section around the exposed front and side surfaces of said juxtaposed articles, means for disengaging said looper head from the leading end of said frontmost band section, means for moving said disengaged looper head across the entrance of said banding station and into position outwardly of the trailing end of said frontmost band section, means for moving said gripper means across said banding station entrance to move the gripped leading end of said frontmost band section against the rear surface of said juxtaposed articles, means for moving said looper head into engagement against said trailing end of said frontmost band section and reversely across the banding station entrance to wipe said engaged trailing band section end into face to face engagement against said leading band section end to form an adhesively secured lap seam between said adhesive coatings and to simultaneously carry the attached leading end of the attached succeeding band section across said band station entrance to position it preparatory to the next banding cycle, and cutting means carried by said looper head and engageable within the separating perforation between the trailing end of said frontmost band section and the attached leading end of the succeeding band section for transversely cutting said ribbon on the line of said separating perforation during the reverse movement of said looper head.

20. The combination of claim 19 wherein said means cooperable with said looper head to hold the leading end of said band section comprises a pressure member for pressing said leading end against said looper head.

21. The combination of claim 20 wherein said means cooperable with said looper head to hold the leading end of said band section also includes a latch engageable within a registration slot in said band section to accurately register said band section for said banding operation.

22. In a machine for combining a plurality of juxtaposed articles into a rectangular unitary package by means of an encircling band having opposite end portions adapted to form a lap seam when overlapped, the combination of means for wrapping the median portion of

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said band around three walls of said package while leaving the two end portions of said band projecting from the plane of the fourth wall, means for gripping the opposed side marginal edges of one of said end portions, means for moving said gripping means along said fourth wall for positioning said gripped end portion flatly against said fourth wall under tension, pressure means for overlapping the other end portion of said band against said positioned and tensioned end portion to form a lap seam while said first end portion is gripped by said gripper means, and means for disengaging said gripper means from the marginal side edges of said band after formation of said lap seam.

23. The machine of claim 22 wherein said gripper means includes two sets of jaws which are operable to grip the opposed side marginal edges of said band.

24. The machine of claim 23 wherein each set of jaws is carried on a pair of slides which are longitudinally movable relative to each other to open and close said jaws.

25. In a machine for combining a plurality of juxtaposed articles into a rectangular unitary package by means of an encircling band having opposite end portions adapted to form a lap seam when overlapped, the combination of means for wrapping the median portion of said band around three sides of said package while leaving the two end portions of said band projecting from the plane of the fourth side with one of said end por-

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tions bent outwardly and reversely upon itself to form a U-shaped loop, means for gripping the outer leg of said loop, means for moving said gripper means inwardly across the mouth of said U-shaped loop and along said fourth side to tighten said loop around said gripper means to increase its grip thereon and to position the remainder of said gripped end portion flatly against said fourth side under tension, pressure means for overlapping the other end portion of said band against said positioned and tensioned first end portion to form a lap seam while said first end portion is gripped by said gripper means, and means for disengaging said gripper means from said first end portion of said band after formation of said lap seam.

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