

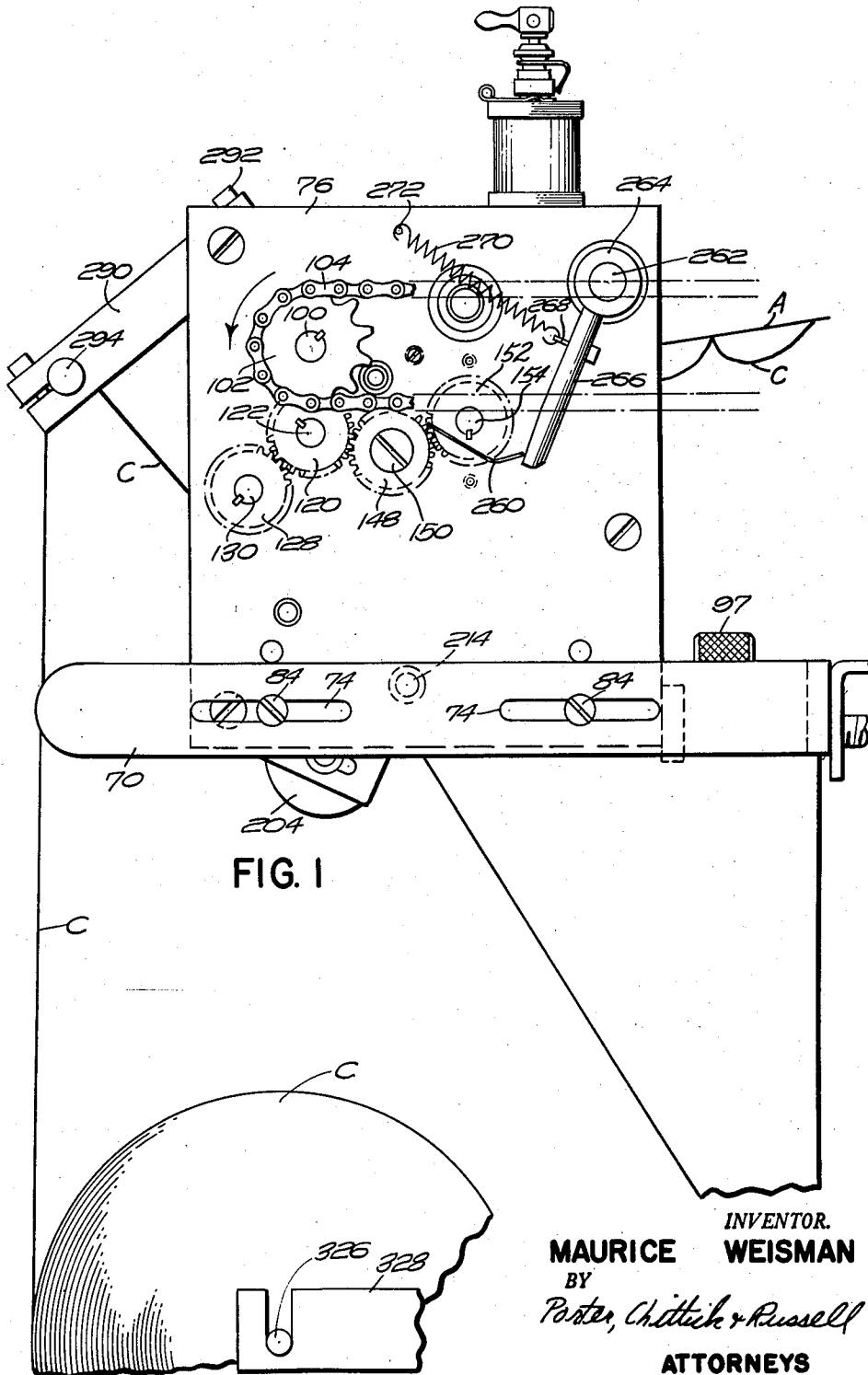
**Nov. 25, 1958** **M. WEISMAN** **2,861,403**  
INFUSION PACKAGE WITH TAB AND METHOD AND APPARATUS  
FOR MANUFACTURE THEREOF  
**Filed Feb. 27, 1956** **5 Sheets-Sheet 1**

958 M. WEISMAN 2,8  
INFUSION PACKAGE WITH TAB AND METHOD AND APPARATUS  
FOR MANUFACTURE THEREOF

**2,861,403**

Filed Feb. 27, 1956

5 Sheets-Sheet 1



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5 Sheets-Sheet 2



# FIG. 4

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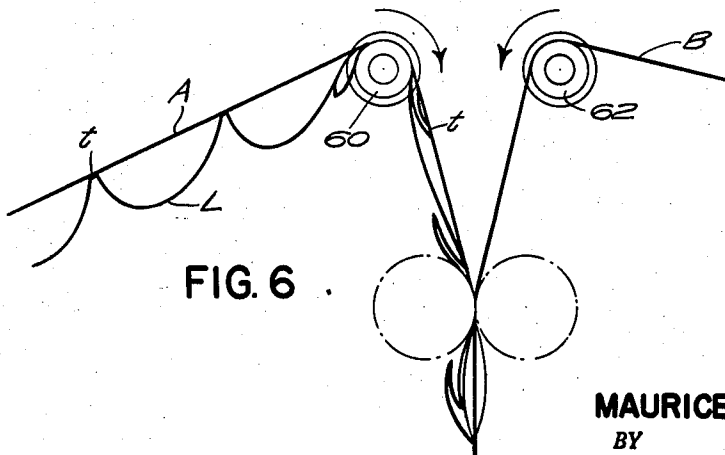
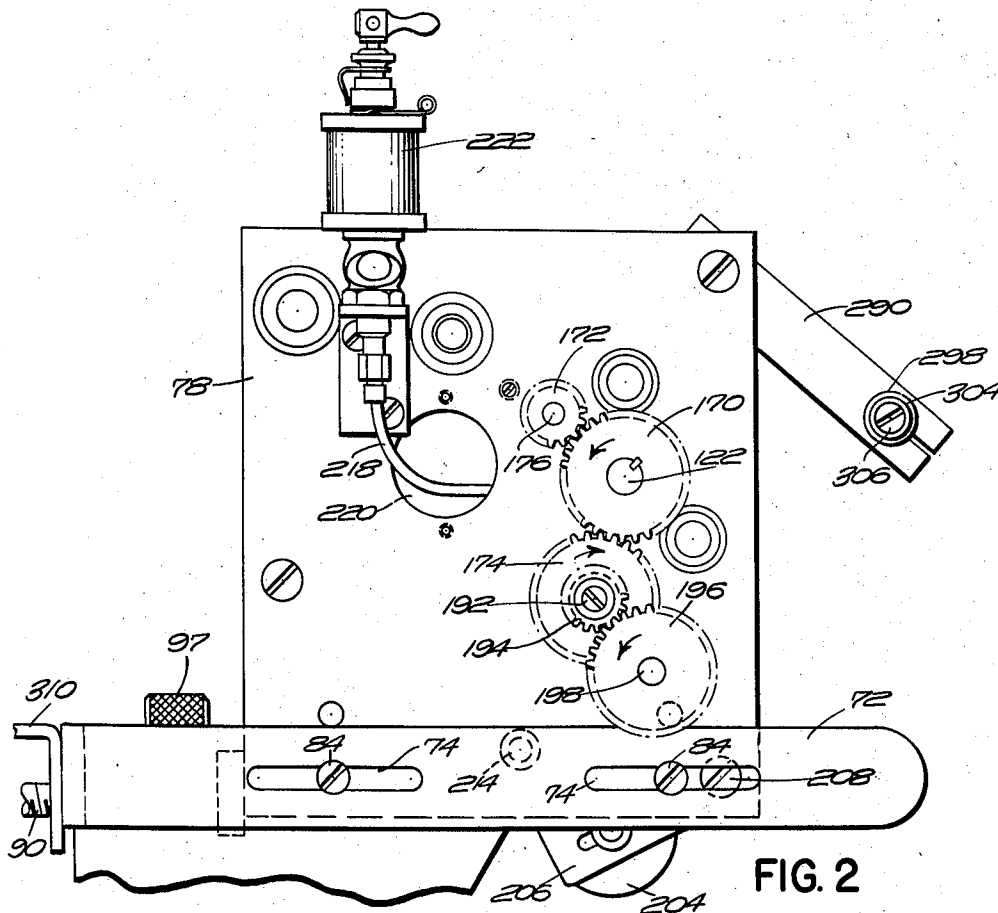
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5 Sheets-Sheet 4

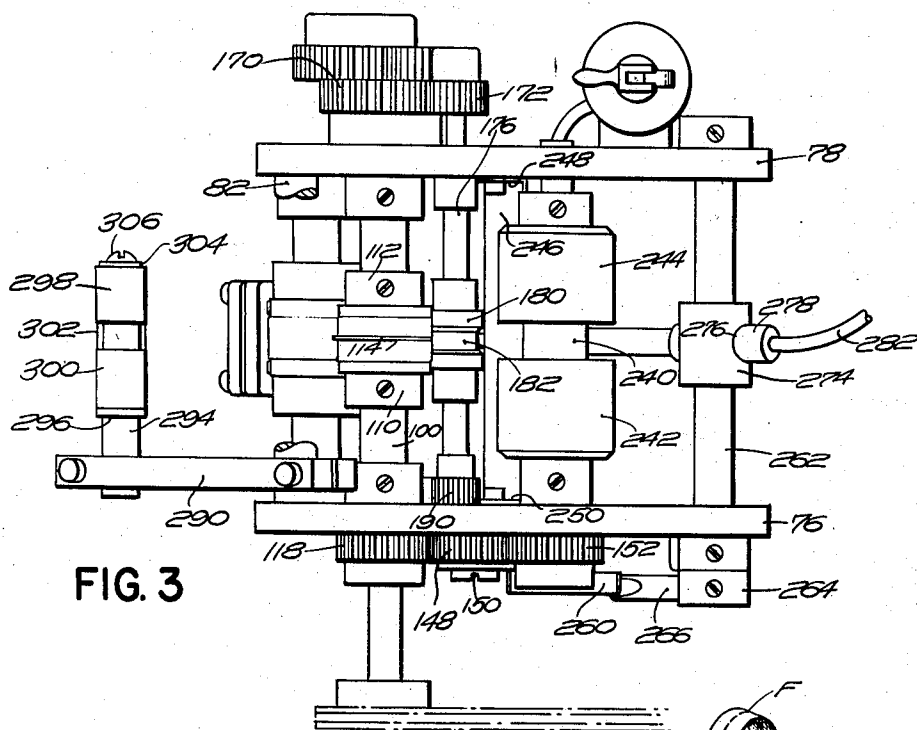


FIG. 3

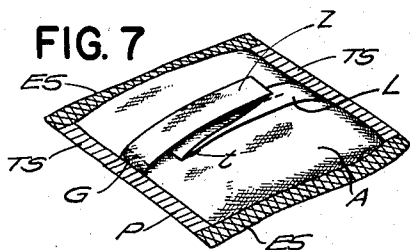


FIG. 7

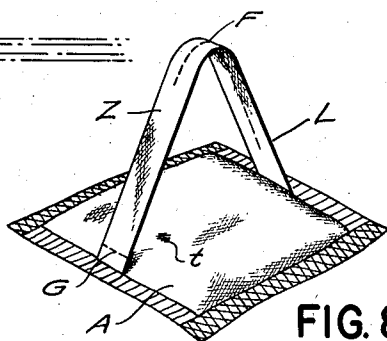


FIG. 8

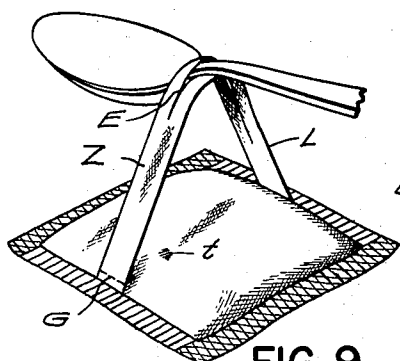


FIG. 9

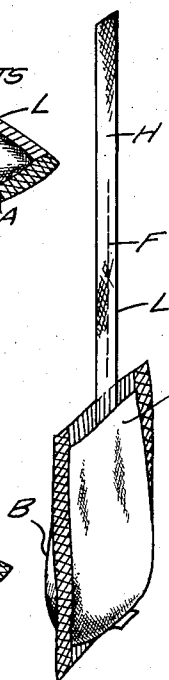


FIG. 10

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INFUSION PACKAGE WITH TAB AND METHOD AND APPARATUS  
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5 Sheets-Sheet 5

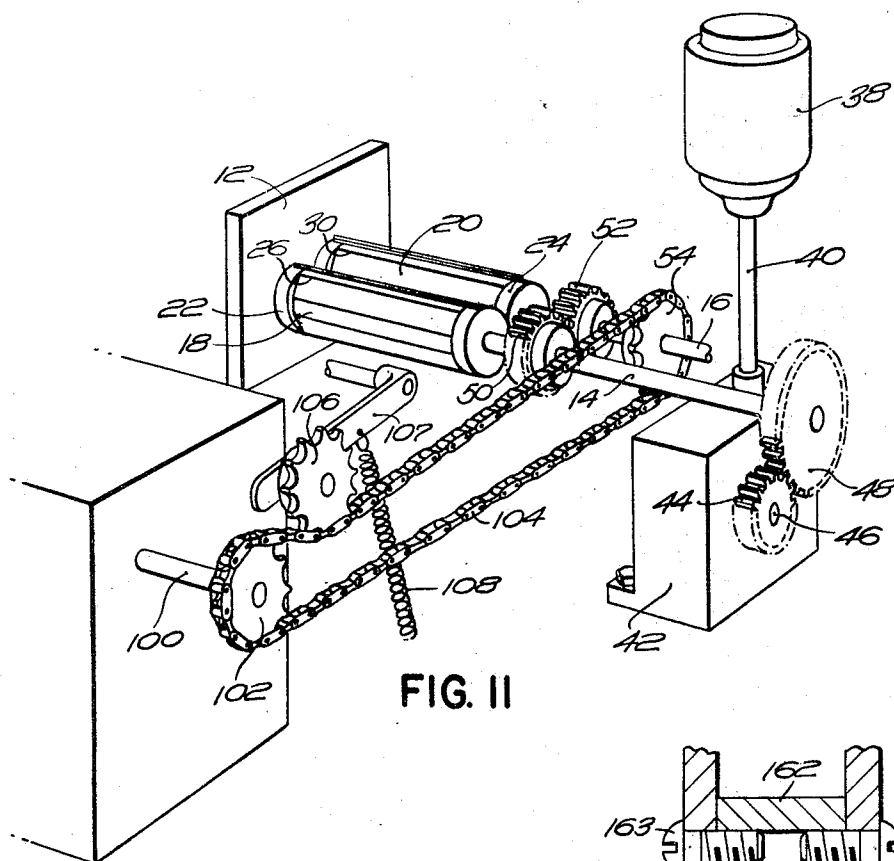


FIG. II

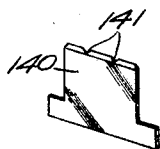


FIG. 13

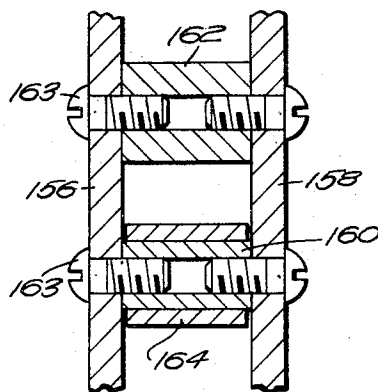


FIG. 12

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2,861,403

## INFUSION PACKAGE WITH TAB AND METHOD AND APPARATUS FOR MANUFACTURE THEREOF

Maurice Weisman, Newton, Mass., assignor to Modern Coffees, Inc., Boston, Mass., a corporation of Massachusetts

Application February 27, 1956, Serial No. 567,964

6 Claims. (Cl. 53—14)

This invention relates to an infusion package and more particularly to the manufacture of a bag having an improved handle or tag formed integral therewith.

Heretofore various attempts have been made to provide handles for tabs for infusion packages such as tea or coffee bags so that the bags may be manipulated and supported during the brewing operation which may be carried out in a cup or pot. Each construction heretofore known to me has been limited in one or more respects. Thus, for example, the provision of string handles or tags is objectionable because of (1) the cost of additional materials, (2) the additional steps required to attach the string handles and tags complicates invention, and (3) the strings tend to become entangled when a large number of bags are packed in a carton or container.

An alternative approach is to provide a true cut along the seam border flange of the bag so that a portion of the border flange will function as an integral handle. This is objectionable because (1) it weakens the bag, (2) the handle is of limited length, and (3) the handle is so narrow in width as to be relatively weak.

A third approach has been to slit a seam border flange or a part of its length so that a tip of a spoon may be inserted through the slit to support the bag. This third approach is not satisfactory for the reason that the bag readily slips off of the spoon into the cup or pot, thereby necessitating fishing with the spoon to again catch the bag so that it may be lifted free of the cup or pot. Other constructions are beset with similar disadvantages.

Accordingly, it is the object of this invention to provide an infusion bag characterized by a novel handle formed integrally therewith that avoids the aforesaid weaknesses and disadvantages of related constructions known to the prior art.

A concomitant object of this invention is to provide a method and apparatus for forming a new and improved handle construction attached to an infusion bag for essence-containing products such as tea or coffee.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings, wherein:

Fig. 1 is a side elevation of the tab and loop mechanism constructed according to this invention;

Fig. 2 is a view in elevation of the opposite side of the same mechanism;

Fig. 3 is a plan view of the same mechanism;

Fig. 4 is a sectional view in elevation of the same mechanism in association with a bagging machine;

Fig. 5 is a perspective view of certain elements of the same mechanism;

Fig. 6 is a schematic view in elevation showing how the loops formed according to this invention are folded back;

Fig. 7 is a perspective view of a tea or coffee bag constructed according to this invention;

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Fig. 8 is a perspective view of the same bag with the tab loop unfolded away from the bag;

Fig. 9 is a perspective view similar to Fig. 8 showing a spoon inserted through the longitudinal slit in the unfolded tab loop of the bag;

Fig. 10 is a perspective view showing the tab after it has been severed so as to provide a long handle for the bag;

Fig. 11 is a schematic perspective view illustrating the drive mechanism utilized in the present invention;

Fig. 12 is an enlarged sectional view of certain elements shown in Fig. 5; and

Fig. 13 is an enlarged perspective view of a knife utilized in the present invention.

The present invention is designed as an adjunct for machines adapted to make tea or coffee bags. While the present invention is adaptable for use with various types of bagging machines, I have chosen to describe and illustrate it herein as it is used in connection with the bagging machine shown and described in my co-pending United States application Ser. No. 335,339, filed February 5, 1953, for Method and Apparatus of Making and Filling Coffee Bags.

Pertinent details of my bagging machine are illustrated in Fig. 4. For the purposes of better understanding the present invention a brief description of my bagging machine in so far as it is illustrated in Fig. 4 appears to be required.

The tea bagging machine comprises a frame of suitable horizontal and vertical frame members 2, 4 and 6 as well as other frame elements not shown. Supported on the frame is a feeding and sealing assembly generally identified by the numeral 10. This assembly comprises two side plates, only one of which is shown and identified by the numeral 12. Journaled in the side plates are two shafts 14 and 16. Keyed to these two shafts 14 and 16 are two sealing rolls 18 and 20 respectively. The opposite ends of the two sealing rolls 18 and 20 are provided with circular shoulders 22 and 24 respectively which make the marginal or longitudinal seals of the bags. Intermediate shoulders 22, the body of sealing roll 18 is of oblong cross-section and includes two diametrically opposed surfaces 26 and 28 which function to make the transverse seals of the bags. Roll 20 is provided with identical surfaces 30 and 32. Surfaces 26 and 28 are also provided with two grooves or slots 34 which function to receive the edges of knife blades 36 fixed in cavities formed in surfaces 30 and 32 of roll 20. Knife blades 36 act to sever successive bags from each other.

Fig. 11 illustrates how the two sealing rolls are driven. A motor 38 drives the input shaft 40 of a gearbox 42. A gear 44 on the output shaft 46 of gearbox 42 meshes with a gear 48 attached to the end of shaft 14 to drive sealing roll 18 in a clockwise direction. A gear 50 mounted on shaft 14 meshes with a gear 52 attached to shaft 16 to drive sealing roll 20 counterclockwise in synchronism with sealing roll 18. A sprocket 54 referred to hereinafter is also mounted on shaft 16.

A feed tube 56 for delivering tea or coffee is positioned with its outlet terminating just above the point where the circular shoulders of the two rolls engage each other. While not shown, it is to be understood that material is fed in successive charges to feed tube 56 by means of a suitable metering device operating in synchronism with sealing rolls 18 and 20. A delivery chute 58 mounted below the sealing rolls functions to direct completed bags away from the machine.

A pair of idler rolls 60 and 62 carried by rotatable shafts 64 and 66 are positioned on opposite sides of delivery tube 56. Over the two rolls are run two webs of paper A and B which are utilized to make the bags. It is to be under-

stood that the paper webs pass over rolls 60 and 62 down along the sides of feed tube 56 and between the two sealing rolls 18 and 20. The shoulders 22 and 24 continuously seal the two webs together at their margins. The surfaces 26 and 30 cooperate to seal the webs together along transversely extending areas. Surfaces 28 and 32 also cooperate to seal the webs along transversely extending areas. The transverse seals are spaced from each other a distance determined by the diameter of shoulders 22 and 24. It is understood that one bag is completed and filled for each one half revolution of the sealing rolls, one of the successive charges leaving feed tube 56, just as a transverse seal is being completed or shortly thereafter.

To accommodate the present invention, the tea bagging machine is provided with a pair of parallel horizontally extending arms 70 and 72 each provided with a pair of elongated slots 74. Disposed between arms 70 and 72 are a pair of side plates 76 and 78. The side plates are attached to each other by suitable rods 80 and 82 (Fig. 4). A plurality of bolts 84 received by tapped openings in the bottom portions of plates 76 and 78 extend through the slots 74 in arms 70 and 72 and cooperate with the latter to support frames 76 and 78 thereon.

Plates 76 and 78 function as a frame for the various elements forming the present invention. The frame is movable relative to the bagging machine due to the fact that bolts 84 are movable in slots 74 of arms 70 and 72. In order to adjust the position of the plates 76 and 78 relative to the tea bagging machine, there is provided a screw element 90 which is in threaded engagement with horizontal frame element 6 of the tea bagging machine. One end of screw element 90 has a cylindrical extension 92 which extends through a bar 94 connected to and extending between plates 76 and 78. The screw element 90 is journaled in bar element 94 and has a collar 95 and 96 disposed on opposite sides of bar 94. Formed integral with screw element 90 is a knurled head 97 whereby the screw element may be manually rotated. It is believed apparent that when the screw element is rotated it functions to draw the frame elements 76, 78 toward or away from the tea-bagging machine depending upon the direction of rotation. As explained hereinafter the reason for providing the aforesaid means for manually adjusting the position of side plates 76 and 78 relative to the tea bagging machine is to place the present invention in register with the sealing rolls of the tea bagging machine proper.

The mechanism carried by plates 76 and 78 will now be described in detail.

Journaled in side plates 76 and 78 is a shaft 100 provided at one end with a sprocket 102 over which rides a chain 104. Chain 104 is connected to sprocket 54 and thus is driven in a predetermined time relation with the sealing rolls of the tea bagging machine. An idler sprocket 106 meshes with chain 104. Sprocket 106 is carried by a pivoted arm 107. A tension spring 108 connected at one end to arm 107 and at the other end to the frame of the bagging machine acts to pull arm 107 downward so that sprocket 106 will keep chain 104 taut when the frame elements 76 and 78 are moved toward or away from the bagging machine. Carried on shaft 100 are two collars 110 and 112 between which is frictionally sandwiched a knife or perforating element 114. The edge of knife element 114 is serrated for a predetermined distance as at 116. Also carried by shaft 100 is a gear 118 which drives a gear 120 carried by a shaft 122. Shaft 122 is also journaled in plates 76 and 78. Affixed to shaft 122 is a roller 124 having a circumferentially extending groove 126 for receiving the edge of knife element 114.

Gear 120 meshes with a gear 128 carried by a shaft 130. Mounted on shaft 130 is a roller 132 having a pair of radially aligned bores 134 and 136 and a longitudinally extending radial slit in which is disposed a knife element 140. Knife element 140 is retained in the slit by

a spring 142 which is compressed by a screw 144 threaded in bore 134. The spring 142 extends through a bore provided in shaft 130. The cutting edge of knife element 140 is provided with two V-shaped notches 141 so as to form three spaced transversely extending slits or cuts on the paper strip with which it comes in contact.

Roller 124 is also provided with a second axially extending groove 149 to receive the edge of knife element 140.

Gear 120 also meshes with an idler gear 148 carried by a stub shaft 150. Gear 148 meshes with a gear 152, carried by a shaft 154. Shaft 154 is journaled in side plate 76 and terminates less than half way between plate 76 and plate 78. Attached to the inner end of shaft 154 is a circular plate or wheel 156 (Figs. 4, 5 and 12). Spaced from wheel 156 is an identical wheel 158. Wheel 156 is connected to wheel 158 by two shafts 160 and 162 and screwbolts 163. Shaft 160 is provided with a rotatable sleeve 164. The spacing between the two wheels 156 and 158 is slightly larger than the width of the paper strip to be processed by the mechanism now being described.

Attached to the opposite end of shaft 122 outside of side plate 78 is a large gear 170. Gear 170 meshes with a small gear 172 and a large gear 174. Small gear 172 is mounted on a shaft 176 which is journaled in side plates 76 and 78.

Mounted on shaft 176 is a guide roll 180 having a circumferential groove 182. Also journaled on side plates 76 and 78 immediately below shaft 176 is a shaft 186 provided with a guide roll 188 whose width coincides with the width of the circumferential groove 182 of the top guide roll 180. The shafts 176 and 186 are so spaced that guide roll 188 resides in groove 182 of the top guide roll 180. The shaft 186 has a gear (not visible) which meshes with and is driven by a gear 190 carried by shaft 176. Thus guide rolls 180 and 188 rotate together. Gear 174 is mounted on a stub shaft 192. Gear 174 is an idler gear. Also secured to stub shaft 192 is a small gear 194 which meshes with a large gear 196. Gear 196 is fixedly secured to a shaft 198 which is journaled in the two side plates 76 and 78. Secured to and rotatable with shaft 198 is a printing wheel 200, whose peripheral surface is adapted to receive printing fonts 202. Printing roll 200 engages an ink transfer roll 204 rotatably carried by an arm 206 which itself is rotatably mounted on a transversely extending shaft 208. Arm 206 is split at its end and is provided with a set screw 210 which, by drawing the split ends of arm 206 together, acts to adjustably locate the transfer roll 204 in touching engagement with printing roll 200. Also contacting transfer roll 204 is an ink roll 212 rotatably carried by a shaft 214 journaled in side plates 76 and 78. In contact with ink roll 212 is a felt padding element 216 which is wrapped around a tube 218. Tube 218 extends through an opening 220 in side plate 78 (Fig. 2) and leads to an ink reservoir assembly generally identified at 222. Ink flowing through tube 218 saturates the material 216 and, by way of capillary action, is transferred from the felt material to the ink roll 212. The ink on roll 212 is picked up by ink transfer roll 204 and transferred by the latter to the fonts 202 of the printing roll 200.

Journaled in side plates 76 and 78 immediately above shaft 154 is a shaft 240 provided with a pair of guide rolls 242 and 244. Guide rolls 242 and 244 are spaced from each other. Rearwardly of and slightly below shaft 240 is a guide plate 246 whose ends are provided with up-standing flanges 248 and 250 which are secured to the two side plates. It is to be noted that the guide plate 246 is so positioned as to lie very close to the roll 164 when the latter is in the eleven o'clock position (Fig. 4). The spacing between the wheels 156 and 158 and the guide plate 246 is just large enough to accommodate a strip of paper passing therebetween.

Looking now to Fig. 1 it is to be noted that the hub of gear 152 is provided with a slot in which is fixedly secured a cam element 260. Cam element 260 is preferably made

of flat spring steel stock capable of being bent and of retaining its bent position. Journaled in side plates 76 and 78 adjacent their upper edges at their front ends is a shaft 262. Shaft 262 is provided outside of plate 76 with a fixed collar 264. Fixedly carried by collar 264 and extending radially away from the latter is an arm 266. Attached to arm 266 at 268 is a tension spring 270. The opposite end of spring 270 is attached to side plate 76 at 272. Shaft 262 has an enlarged portion 274 intermediate its ends. Enlarged portion 274 is provided with a diametral bore 276 in which is removably secured a heating element 278. The tip of heating element 278 is bevelled as shown at 280 in Fig. 4. A line cord 282 conducts electrical energy to the heating element.

When the cam 260 rides off of the arm 266, the spring 270 pulls the arm clockwise (Fig. 1). The arm rotates only a limited extent due to the fact that the heating element 278 engages the shaft 240 carrying the two guide rolls 242 and 244. The heating element moves in between the two guide rolls 242 and 244 and lies against the shaft 240 as the latter rotates.

Secured to shaft 82 is an arm 290 which may be adjusted in any position desired by means of a set screw 292. At the opposite end of arm 290 is secured a shaft 294 provided with a flange 296. Rotatably mounted on shaft 294 are two large guide rolls 298 and 300 and a slightly smaller guide roll 302. The axial length of guide roll 302 is approximately the same as the width of groove 182 of roll 180. A washer 304 and a screw 306 received in shaft 294 acts to hold the three rolls on the shaft.

Attached to frame element 6 of the machine is a bracket 310. Securely fastened to bracket 310 and extending upwardly therefrom is a second bracket 312 having an elongated slot 314. A bolt 316 provided with a nut 318 acts to hold an arm 320 in adjustable secured relation with bracket 312. The free end of arm 320 is provided with a shaft 322 on which is rotatably secured a roller 324. Arm 320 is positioned as shown at a slight angle to the vertical.

Mounted below horizontal arms 70 and 72 is a roll 326 of paper C having a width slightly less than the width of groove 182. Feed roll 326 is rotatably carried by a pair of arms. One arm 328 is illustrated in Fig. 1. It is to be understood that the other arm is of identical construction. Arm 328 and its companion arm are preferably attached to the frame of the bagging machine in the same manner that arms 70 and 72 are attached thereto.

In operating the machine the web of narrow paper C from the feed roll 326 is run over guide roll 302, then down between the printing roll 200 and the knife roll 132, between knife roll 132 and roll 124, around roll 124 in between it and knife 114, forward between rolls 180 and 188, beneath plate 246 and forward between the wheels 156 and 158 and below top guide rolls 242 and 244. At the same time a web A is carried down around the guide rolls 242 and 244 and forward between the latter guide rolls and the two wheels 156 and 158. The width of web A determines the width of the bag to be formed and is preferably about  $2\frac{3}{8}$ " wide as compared to the narrow web C which is preferably about  $\frac{3}{8}$ " wide.

The two webs of paper come in contact with each other in advance of guide plate 246. Both webs of paper are coated on one side only. The narrow web C is run through the machine with its coated side facing upwardly toward the wider web A. The wider web A is run through the machine with its uncoated side facing the narrower web C. When the two webs come together, they are in position to be tacked together by the bevelled tip 280 of the heating element 278. The heating element 280 is oscillated by the action of the cam 260 on the arm 266. When the cam strikes arm 266 it forces the arm in a counter-clockwise direction (Fig. 1) drawing the heating element down into momentary sliding engagement with the upper surface of the top web A, to tack the wider web A to the smaller web C. The downward

movement of the heating element is synchronized so as to come into engagement with the webs just as the roller 164 between wheels 156 and 158 is in approximately 12 o'clock position. The roller 164 acts as a supporting member for the two webs so as to facilitate tacking by the heating element.

Web A is continuously drawn toward the tea bagging machine by the sealing rolls 18 and 20, passing under guide roll 324 and over guide roll 60. The linear velocity of web A, as determined by the angular velocity of sealing rolls 18 and 20, is less than the linear velocity of narrow web C as it is drawn forward by rolls 180 and 188. The various gears driven by chain 104 have ratios such as to move web C at a speed equal to two and less than three times the velocity of web A. Consequently, after the narrower web C is tacked to web A by the heating element, it tends to accumulate in between the wheels 156 and 158 rearwardly of roll 164 as the wheels continue to rotate in a clockwise direction (Fig. 4). When the roll 164 again comes around to about the 9 o'clock position, it urges the narrow web C upwardly toward the guide plate 246 so that the accumulated portion of the narrow web forms a loose loop. When roll 164 is again advanced to the 12 o'clock position, the heating element again moves down into engagement with web A to tack the two webs together and thus make the loose loop permanent.

Fig. 6 illustrates how the two webs appear as they leave the tacking mechanism and proceed over roll 60. It is to be understood that arm 320 is adjusted so that roll 324 acts to hold web A relatively taut between it and guide roll 60. Thus as the combined webs A and C pass over roll 60, the roll acts to retard the loops L, thereby causing the loops to be folded back upon themselves with the tacked portions of the narrow web C being covered by the folded portions of the loops. The tacked portions of the loops L are identified by the letter t.

The sealing rolls and the tacking wheels 156 and 158 are operating in synchronism. Thus, by properly adjusting the position of side plates 76 and 78 relative to the tea bagging machine by means of nut 97, it is possible to register the composite web (webs A and C) so that the sealing rolls form transverse seals alternately with the tacked portions t of the narrow web. Thus, when the finished bags P leave the bagging machine through the delivery chute 58, they appear as illustrated in Fig. 7. The narrow loop L is tacked at t and sealed to the web A at the transverse seals TS made by the sealing surfaces 26, 28, 30 and 32 of the two sealing rolls. The edge seals ES of the bag are formed by the shoulders 22 and 24 of the two sealing rolls.

The bag may be used in various ways. In Fig. 8, for example, the tack t has been severed and the loop unfolded so as to accommodate a spoon or the user's fingers. In Fig. 9 the loop is shown with a longitudinal slit E formed by tearing or pulling the web apart along the score line F formed by serrated edge 116 of knife 114. In Fig. 10 the loop has been completely severed at the location of the partial cut G formed by knife 140 so as to form an elongated handle H that may be grasped by the user to suspend the bag in a cup or pot. It should also be noted that the handle H may be secured to the handle of a cup by splitting the web along score line F so that the handle of the cup can be inserted through slit E.

It is to be noted that the fonts 202 on printing wheel 290 are so positioned that the information printed on the narrow strip C is located between longitudinal slit F and the transverse slit G. Thus on the completed bag the printing will occur on the top fold Z of loop L.

The tab provided according to this invention has the advantage of being integrally joined to the bag, capable of various uses, lying flat against the bag so as to facilitate packing in a carton, and of being attached to the bag as it is being constructed and filled.

Obviously, many modifications and variation of the present invention are possible in the light of the above teachings. Therefore, it is to be understood that the invention is not limited in its application to the details of the construction and arrangement of parts specifically described or illustrated, or that within the scope of the appended claims it may be practised otherwise than as specifically described or illustrated.

I claim:

1. The method of attaching a handle to a tea bag as it is being manufactured comprising the steps of feeding a first web of paper at a predetermined rate of speed, simultaneously feeding a second web of paper at a greater speed, converging said webs, periodically tacking said two webs together at spaced points so that said second web is attached to said first web in loops, folding said loops rearwardly as said webs advance, bringing said first web into facing engagement with a third web, continuously sealing said first and third webs together at their longitudinal edges, sealing together transversely extending areas of opposed portions of said first and third webs from edge to edge to form a transverse seal, depositing a charge of commodity in powdered form between said first and third webs, and forming a second transverse seal after said charge has been deposited between said first and third webs.

2. Method of claim 1, further including the step of partly severing said second web from one edge to the other at spaced intervals before it converges with said first web.

3. Method of claim 1, further including the step of cutting said second web longitudinally at spaced intervals.

4. Apparatus for forming a bag having a handle attached to one wall thereof, comprising, means for feeding a first web of paper from a first feed roll at a predeter-

mined rate of speed, means for simultaneously feeding a second web of paper from a second feed roll at a greater speed, means for converging said webs, means for periodically tacking said two webs together at spaced points so that said second web is attached to said first web in loops, means for folding said loops rearwardly as said webs advance, means for bringing said first web into facing engagement with a third web, means for continuously sealing said first and third webs together at their longitudinal edges, means for repeatedly sealing said first and third webs together from edge to edge to form a transverse seal of limited width in the longitudinal direction of said first and third webs, means for delivering a charge of commodity in particle form to a point of discharge wherein said commodity will fall between said first and third webs alternately with the formation of successive transverse seals, and means for severing said webs along said transverse seals whereby to separate successive packages from each other.

5. Apparatus as defined by claim 4 further including means for partly severing said second web transversely thereof at spaced intervals before it converges with said said first web.

6. Apparatus as defined by claim 4 further including means for scoring said second web longitudinally at spaced intervals before it converges with said first web.

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