

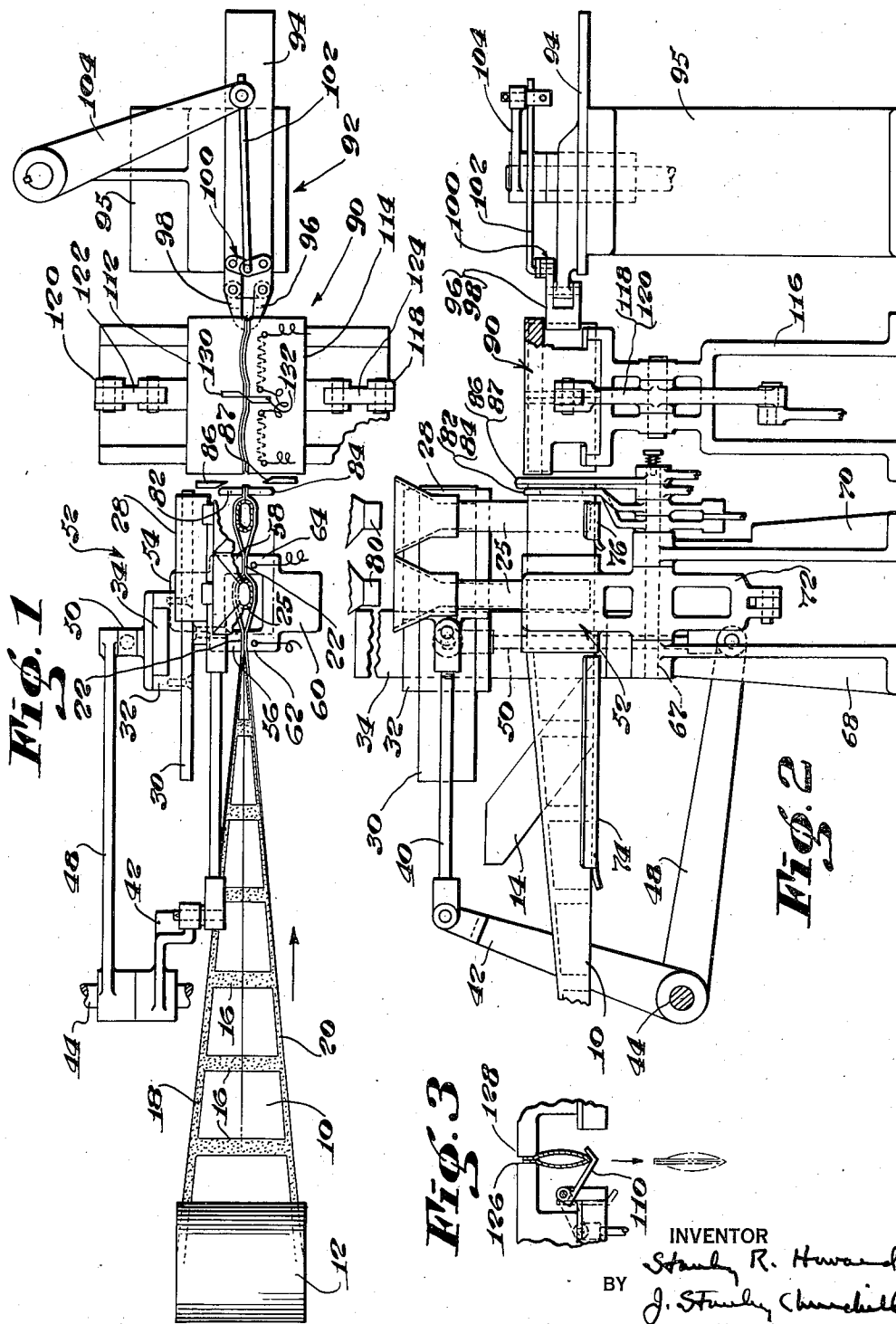
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S. R. HOWARD

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APPARATUS FOR MAKING AND FILLING BAGS

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APPARATUS FOR MAKING AND FILLING
BAGS

Stanley R. Howard, Milton, Mass., assignor to
Pneumatic Scale Corporation, Limited, Quincy,
Mass., a corporation of Massachusetts

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This invention relates to apparatus for making and filling bags and particularly tea bags.

The invention has for an object to provide novel and improved apparatus for producing individual bags of tea, coffee or other commodities in a rapid, economical and efficient manner.

With this general object in view and such others as may hereinafter appear, the invention consists in the apparatus for the production of bags of the character specified and in the various structures, arrangements and combinations of parts hereinafter described and particularly defined in the claims at the end of this specification.

In the drawing illustrating a preferred form of the apparatus, Fig. 1 is a plan view of a machine embodying the present invention; Fig. 2 is a side elevation of the apparatus shown in Fig. 1; and Fig. 3 is a detail view showing a portion of the top sealing mechanism, to be referred to.

In general, the present invention contemplates apparatus for the production of individual bags from a web of bag forming material having transverse bands of heat sealing adhesive spaced in accordance with the bag sections to be formed, and longitudinal bands of adhesive along the edges of the web. Provision is made for forming the bag forming material into a strip having a closed bottom and open top and for sealing the strip transversely to form the side seams of the bag sections. The strip may and preferably will be intermittently moved into position for effecting the transverse sealing operation and into registered position with relation to a cutter by a hollow filling member arranged to be positioned within the strip and to be moved into engagement with a sealed side seam to advance the strip. In the illustrated embodiment of the invention, two bag sections are formed and filled simultaneously and upon advancement of the strip, the two end-most filled bag sections are severed from the strip and positioned by grippers between heat sealing mechanism arranged to seal the top of the bags and to simultaneously sever the bags through the connecting side seam to produce individual filled and sealed bags.

Referring now to the drawing illustrating the preferred embodiment of the invention, 10 represents a web of bag forming material which is withdrawn from a roll 12 and formed into a strip having a closed bottom and open top by a suitable forming or shaping guide 14 as the web is drawn therepast. The bag forming material preferably comprises a paper web having thermoplastic adhesive applied thereto in transverse

spaced bands 16 corresponding to the bag sections to be formed and also along the longitudinal edges 18, 20 thereof, as shown.

In general, provision is made in the preferred embodiment of the invention for heat sealing the transverse bands 16 of the strip to form side seams 22 and for introducing a hollow filling member within the folds of the strip and into engagement with a sealed side seam to advance the strip into a position to be operated upon by the transverse heat sealing mechanism to form a succeeding heat sealed side seam or seams and also into registered relation to a cutter for severing the previously formed and filled bag section or sections from the strip.

In the illustrated embodiment of the invention, a plurality of hollow filling members 25, herein shown as two filling members, are mounted to be moved as a unit to intermittently advance successive pairs of adjacent bag sections into operative position to be transversely sealed and subsequently severed from the strip. The hollow filling members 25 are carried by a bracket 28 mounted to be moved longitudinally of the strip on a horizontal slide member 30, the latter being carried by a bracket 32 mounted to be moved vertically on a vertical slide bar 34 so that in operation, the filling tubes are moved through a path of such character as to first lower the tubes to present them between the halves of the folded strip, then horizontally to present the foremost tube into engagement with the rear of a previously formed side seam and to advance the strip a distance equal to two bag sections, then upwardly to withdraw the filling tubes from the bag sections and then rearwardly and downwardly to again position the tubes in the rear of a succeeding side seam. Such motion of the tubes is preferably through a rectangular path. As herein shown, the tubes are arranged to be moved horizontally through connections including a link 40 connected to the slide bracket 28, and a lever 42 mounted on a rocker shaft 44 which may be rocked through any suitable cam operated means, not shown, to reciprocate the tubes horizontally in timed relation to the vertical movement of the tubes. The vertical movement of the filling tubes, as herein shown, may be effected through any usual or preferred cam operated means including a lever 46 also mounted on the shaft 44 and a link 50 connected to the slide bracket 32.

As above stated, the filling tubes 40 are arranged to be moved to present the bag sections

into operative relation to heat sealing means for sealing the transverse side seams of adjacent bag sections presented thereto and as herein shown, the transverse heat sealing mechanism indicated generally at 52 may comprise a relatively stationary member 54 having portions 56, 58 engageable with the strip, and a rockingly mounted member 60, having portions 62, 64 cooperating with the stationary portions 56, 58 to effect the heat sealing operation. The member 60 may be electrically heated, as indicated. The portions 56, 58 of the stationary member 54 and the portions 62, 64 of the movable member 60 are spaced apart in accordance with the spaced bands of adhesive 16 for forming the individual bag sections and, in practice, the width of the heat sealing portions engageable with the strip is preferably wider than the corresponding adhesive bands in order to assure complete sealing of the side seams 22.

As herein shown, the member 60 is rockingly mounted upon a cross shaft 67 journaled in bearings formed in brackets 68, 70 forming a part of the machine frame. The rocking of the member 60 may be effected through any usual or preferred cam operated mechanism connected to a lever 72 extending from and formed integrally with the heat sealing member 60, and adapted to rock the latter in timed relation to the movement of the hollow filling members 40. Suitable V-shaped guides 74, 76 may be provided to support the bottom of the strip as it is moved into sealing position.

From the description thus far it will be observed that, in operation, the transverse heat sealing mechanism indicated generally at 52 is arranged to seal the side seam disposed between the two filling tubes 40, when the latter are in their forward position, and to also seal the side seam immediately behind the rear filling tube. While the tubes are still inserted in the bag sections a quantity of tea or other commodity being packaged is introduced through the tubes by suitable feeding mechanism of any usual or preferred form, indicated generally at 80 arranged to deposit a predetermined amount of the material into each bag section. Thereafter, the tubes are elevated and moved back a distance corresponding substantially to two bag sections. Suitable cam operated grippers 82, 84 pivotally mounted upon the cross shaft 67 are arranged to grasp the forward end of the strip to support the bag sections while the filling tubes are being withdrawn. The filling tubes are thereafter again lowered between the two halves of the strip as above described and advanced to present the foremost tube into engagement with the side seam formed during the preceding sealing operation and to advance the strip into position to present the succeeding two adjacent bag sections into transverse sealing position. Thus it will be seen that positive and accurate advancement of the strip may be effected by the movable filling tube in engagement with the previously sealed edge to present the adhesively banded portions 16 in accurate registration with the transverse sealing mechanism 52.

Provision is made for severing the two filled and transversely sealed bag sections from the strip, and as herein shown, the two endmost bag sections which are necessarily advanced upon the presentation of two new bag sections into transverse sealing position, are severed by a cutter comprising shears 86, 87 pivotally mounted on the cross shaft 67 and arranged to be cam oper-

ated in timed relation to the movement of the filling tubes. In operation, the forward tube in engagement with the sealed side seam is arranged to advance the strip into a predetermined position with relation to the cutter at the same time that the strip is advanced into transverse sealing position so as to effect severance of the bag sections through the center of the side seam being cut.

Provision is made for supporting the forward end of the two filled and transversely sealed bag sections while the strip is being advanced into cutting position and for positioning the unit comprising the two bag sections after severance from the strip to present the unit between heat sealing mechanism, indicated generally at 90, for sealing the open top of the bags. As herein shown, the mechanism for supporting and positioning the filled and transversely sealed bag sections as above described, may comprise a longitudinally movable gripper unit 92 including a slide member 94 supported in a frame member 96 and provided with gripper jaws 98, 98 at its forward end. One of the grippers 98 is fixed on the slide and the other gripper 98 is arranged to be rocked to open and close upon the strip through mechanism including a toggle linkage 100, connecting link 102, and lever 104. With this construction, it will be observed that when the lever 104 is rocked in a clockwise direction as viewed in Fig. 1, the toggle mechanism will first operate to open the gripper jaw 98 and upon further movement of the lever, the slide will be moved bodily to present the grippers into operative position to grasp the end of the strip in its transverse sealing position. Upon movement of the lever 104 in a counterclockwise direction, the grippers will first be operated to grasp the end of the strip, and upon continued movement, the slide will be moved to present the strip into operative position to the top sealing mechanism 90.

The lever 104 may be actuated through any usual or preferred driving mechanism including a cam, not shown, arranged to move the grippers in timed relation to the movement of the hollow filling tubes. In operation, the grippers may be arranged to grasp the end of the strip and to move along therewith supporting the two endmost bag sections as the strip is being advanced by the filling tubes into transverse sealing, filling and severing position. It will be understood that the grippers do not effect advancement of the strip, serving only as a support therefor during the advancement by the hollow filling member to present the unit into cutting position. Upon severance of the two bag section unit as above described, further movement of the gripper slide operates to position the unit into operative position to the top sealing unit 90, the bottom of the strip being supported by a hinged bridge plate 110, as shown in Fig. 3.

The top sealing mechanism, as herein shown, comprises two opposed reciprocatory slide members 112, 114, slidably mounted in a supporting member 116, and arranged to be reciprocated toward and away from operative engagement with the two bag unit by any known driving mechanism. The driving mechanism may include the two armed levers 118, 120, pivotally mounted in the supporting member 116 and connected by links 122, 124 to the slide member 112, 114 respectively. The two armed levers 118, 120 may be actuated through cam operated mechanism, not shown, arranged to close in upon the two bag

unit in timed relation to the operation of the gripper slide unit 92.

The opposed slide members 112, 114 are provided with longitudinal sealing surfaces 126, 128 adapted to engage and seal the top edges of the two bag unit, one of the members being electrically heated, as shown. Provision is also made for severance of the two bag unit to form individual filled and sealed bags simultaneously with the top sealing operation, and as herein shown, a pair of cutters 130, 132 mounted in the opposed slide members 112, 114 are arranged to sever the two bag unit through the connecting side seam 22 when the opposed sealing members are brought together to perform the top sealing operation. In operation, upon completion of the top sealing and cutting operations to produce the individual bag sections, the slide members are retracted and the hinged bridge plate 110 is rocked out of the way to permit the completed bags to fall, as illustrated in Fig. 3, into a container or upon a delivery belt, not shown, to discharge the bags from the machine.

From the above description it will be seen that the present apparatus is particularly adapted for the production of tea bags from a web of bag forming material previously provided with spaced bands of thermo-plastic adhesive in a rapid economical and efficient manner.

While the preferred form of the invention has been herein illustrated and described, it will be understood that the invention may be embodied in other forms within the scope of the following claims.

Having thus described the invention, what is claimed is:

1. In apparatus for making and filling bags, in combination, means for forming bag forming material into a strip having a closed bottom and open top, sealing means for sealing the bag forming material transversely to form the side seam of a bag section, a hollow filling member, means for imparting to the hollow filling member movement downwardly in a path to position the hollow filling member within the strip in the rear of said sealed side seam and for then moving the strip horizontally by the engagement of the filling member with the rear edge of said seam to advance the strip into a position for sealing a second side seam, and for subsequently moving the filling member upwardly and then rearwardly and downwardly to again position it in the rear of a succeeding sealed side seam, means for introducing a commodity into the hollow filling member before the same is withdrawn from the bag section, and a cutter for severing successive filled bag sections from the strip.

2. In apparatus for making and filling bags, in combination, means for forming bag forming material into a strip having a closed bottom and open top, sealing means for sealing the bag forming material transversely to form the side seam of a bag section, a plurality of hollow filling members, means for imparting to the hollow filling members as a unit movement downwardly in a path to position the first hollow filling member within the strip in the rear of said sealed side seam and for moving the strip horizontally by the engagement of the first filling member with the rear edge of said seam to advance the strip through an increment equal to a plurality of bag sections corresponding to the number of filling members and for subsequently moving the filling members upwardly to withdraw them from the strip and then rearwardly and downwardly to

again position them in the rear of a succeeding sealed side seam, means for introducing charges of a commodity into the hollow filling members before the same are withdrawn from the strip, means for sealing the strip between adjacent filling members, and cutting means for severing the filled bag sections from the strip

3. In apparatus for making and filling bags, in combination, means for forming bag forming material into a strip having a closed bottom and open top, sealing means for sealing the bag forming material transversely to form the side seam of a bag section, a plurality of hollow filling members, means for imparting to the hollow filling members as a unit movement downwardly in a path to position the first hollow filling member within the strip in the rear of said sealed side seam and for moving the strip horizontally by the engagement of the first filling member with the rear edge of said seam to advance the strip through an increment equal to a plurality of bag sections corresponding to the number of filling members and for subsequently moving the filling members upwardly to withdraw them from the strip and then rearwardly and downwardly to again position them in the rear of a succeeding sealed side seam, means for introducing charges of a commodity into the hollow filling members before the same are withdrawn from the strip, means for sealing the strip between the aforesaid successive sealed seams to subdivide the increment into a plurality of bag sections, and cutting means for severing the bag sections from the strip.

4. In apparatus for making and filling bags, in combination, means for forming bag forming material into a strip having a closed bottom and open top, sealing means for sealing the bag forming material transversely to form the side seam of a bag section, a hollow filling member, means for imparting to the hollow filling member movement downwardly in a path to position the hollow filling member within the strip in the rear of said sealed side seam and for then moving the strip horizontally by the engagement of the filling member with the rear edge of said seam to advance the strip into a position for sealing a second side seam, and for subsequently moving the filling member upwardly and then rearwardly and downwardly to again position it in the rear of a succeeding sealed side seam, means for introducing a commodity into the hollow filling member before the same is withdrawn from the bag section, and a cutter for severing successive filled bag sections from the strip, means for sealing the top of said severed bag section, and gripping means for presenting the severed bag section to said top sealing means.

5. In apparatus for making and filling bags, in combination, means for forming bag forming material into a strip having a closed bottom and open top, sealing means for sealing the bag forming material transversely to form the side seam of a bag section, a plurality of hollow filling members, means for imparting to the hollow filling members as a unit movement downwardly in a path to position the first hollow filling member within the strip in the rear of said sealed side seam and for moving the strip horizontally by the engagement of the first filling member with the rear edge of said seam to advance the strip through an increment equal to a plurality of bag sections corresponding to the number of filling members and for subsequently moving the filling members upwardly to withdraw them from the strip and then rearwardly

and downwardly to again position them in the rear of a succeeding sealed side seam, means for introducing charges of a commodity into the hollow filling members before the same are withdrawn from the strip, means for simultaneously sealing the tops of a plurality of bag sections, and cutting means for severing the bag sections.

6. In apparatus for making and filling bags, in combination, means for forming bag forming material into a strip having a closed bottom and open top, sealing means for sealing the bag forming material transversely to form the side seam of a bag section, a plurality of hollow filling members, means for imparting to the hollow filling members as a unit movement downwardly in a path to position the first hollow filling member within the strip in the rear of said sealed seam and for moving the strip horizontally by the engagement of the first filling mem-

ber with the rear edge of said seam to advance the strip through an increment equal to a plurality of bag sections corresponding to the number of filling members and for subsequently moving the filling members upwardly to withdraw them from the strip and then rearwardly and downwardly to again position them in the rear of a succeeding sealed side seam, means for introducing charges of a commodity into the hollow filling members before the same are withdrawn from the strip, a cutter for severing a unit from the strip comprising a plurality of said bag sections, top sealing means for sealing the top of said plurality of bag sections, gripping means for presenting said unit to the top sealing means and cutting means for cutting individual bag sections from the unit.

STANLEY R. HOWARD.