

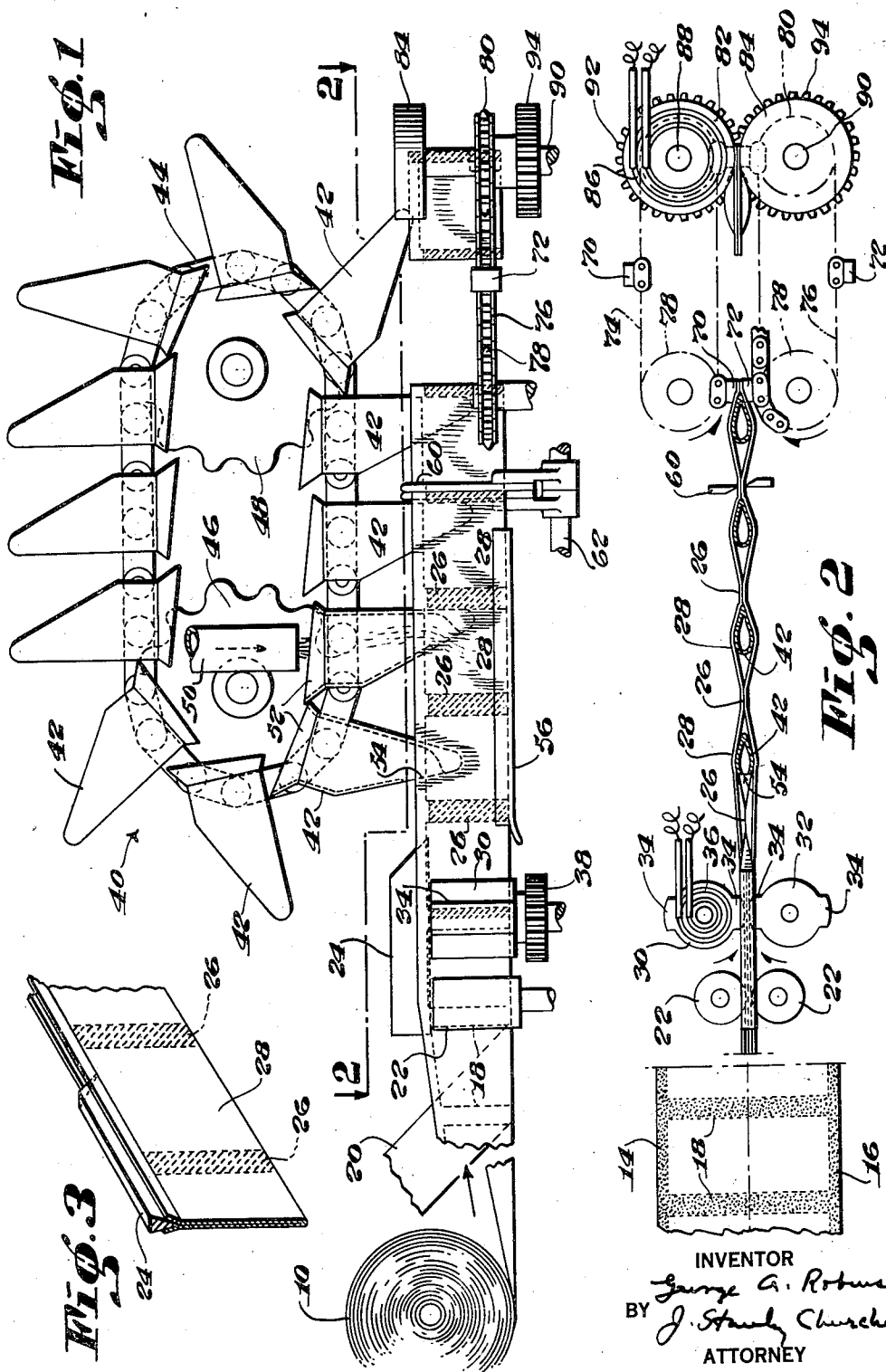
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METHOD OF AND APPARATUS FOR PRODUCING BAGS

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METHOD OF AND APPARATUS FOR
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This invention relates to a method of and apparatus for producing bags.

The invention has for an object to provide a novel and improved method of and apparatus for the production of tea, coffee and similar bags in an efficient, economical, rapid and practical manner.

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

In the drawing illustrating the present method and a preferred form of apparatus for practicing the same in accordance with the present invention; Fig. 1 is a diagrammatic side elevation of the apparatus; Fig. 2 is a plan view of the apparatus shown in Fig. 1, the upper portion of the apparatus being shown in cross-section as viewed from the line 2—2; and Fig. 3 is a perspective detail view to be referred to.

In general, the present invention contemplates a method and apparatus for practicing the same, for forming tea, coffee and similar bags wherein a strip of bag forming material in the form of a series of connected bag sections open at their tops are successively filled by the introduction of the commodity through hollow filling members mounted to be inserted into successive bag sections through the tops thereof. The strip is moved into registered relation to a cutter by the engagement of the hollow filling members with the interior of the bag section at the forward side seams thereof. Provision is also made for gripping each bag severed by the cutter and moving it into a position to be sealed at its top and preferably heat sealed.

Referring now to the drawing illustrating a preferred form of apparatus for practicing the present method, 10 represents a roll of the bag forming material which may and preferably will comprise paper of the character now used in the production of tea bags, but which may comprise any of the other bag forming materials suited for such purposes. The bag forming material is first formed into the form of a strip comprising a series of connected bag sections open at their tops, and as illustrated herein, such a strip may be formed by first preparing the web 10 with stencilled strips of thermoplastic along the longitudinal side edges 14, 16 and in transverse strips 18 spaced in accordance with the width of the individual bags to be produced. The strip of material thus prepared is passed through suitable forming mechanism for folding the strip longitudinally and such mechanism may include a V-shaped forming member or shoe 20 and a pair of idler rolls 22. Provision is also made for

the forming operation in order to facilitate the insertion of the filling members at a subsequent station. As illustrated in detail in Fig. 3, such spreading means may comprise a stationary V-shaped member 24 suitably supported above the strip and disposed between the upper edges of the strip as shown.

After the folding operation has been performed, provision is made for heat sealing the adjacent transverse portions 18 in order to provide side seams 26 between adjacent bag forming sections 28. As herein illustrated, the heat sealing mechanism may include a pair of driven rollers 30, 32 having raised portions 34 thereon arranged to cooperatively engage and press the strip at spaced intervals corresponding to the transverse portions to which the thermoplastic adhesive has been previously applied. One of the rollers 30 is provided with a heating element indicated generally at 36 which is arranged to heat the roller 30 to perform the heat sealing operation. It will be observed that each roller 30, 32 is provided with two opposed raised portions 34, the corresponding raised portions of each roller being arranged to cooperate to perform the heat sealing operation as the strip of bag forming material is advanced and during the rotation of the rollers. The circumferential spacing of the raised portions is substantially equal to the pitch distance between the intervening web portions 26 and in operation, the rollers are rotated in timed relation to the rate of movement of the strip through any suitable driving mechanism including the gearing connections indicated generally at 38.

The thermoplastic sealing material may and preferably will be of a quick setting character so that the web portions 26 may be thoroughly dry and securely attached when the strip is advanced to the filling and registering mechanism, indicated generally at 40. If desired, in practice, the registering mechanism may be disposed at a substantial distance from the heat sealing elements 30, 32 in order to further insure that the web portions 26 are sufficiently dry and tightly sealed when the strip arrives at the registering mechanism.

As herein shown, the filling and registering mechanism 40 comprises a plurality of funnel shaped filling members 42 carried by an endless chain 44 arranged to run over sprockets 46, 48 one of which may be driven through any usual or preferred driving mechanism, not shown. The filling members 42 are equally spaced along the chain, the distance between successive members being equal to the distance between successive bag sections 28. Successive filling members are arranged to enter their respective bag sections substantially midway between the side seams 26 in a manner analogous to sprocket teeth entering between the links of a chain and are thereafter

rapidly moved to cause the filling members to engage the forward side seam of the bag sections and to advance the strip in timed relation and in properly registered position with respect to the heat sealing elements 30, 32 and with respect to a cutter for severing successive bag sections from the strip.

In operation, the end of a filling member 42 is arranged to enter its respective bag section as it is being carried around the sprocket 46 and at a point substantially centrally of its bag section. As the strip is advanced by the preceding filling members, the partially introduced member is swung around from its angular and substantially radial position with relation to its sprocket to a substantially vertical position, in which position the member engages the interior of the forward side seam of its bag section to move the strip along.

As illustrated in Figs. 1 and 2, when a funnel shaped filling member 42 is inserted into its respective bag, it is arranged to pass a continuously operating feeding device, as indicated generally at 50, adapted to feed a substantially uniform stream of the commodity to be packaged. Each funnel 42 is provided with flared edges 52 at its upper end which are arranged to overlap the flared edges of a succeeding funnel, as shown in Fig. 1, so that in operation, the continuously advancing funnels 42 being advanced at a constant rate of speed, are each provided with a predetermined quantity of the tea or other material being packaged. The material thus deposited in a funnel is permitted to gradually pass through an opening 54 provided at the lower end thereof, into its respective bag section as it is being moved along. Thus the strip may be continuously advanced during the filling operation, that is, the rate of movement of the strip need not be retarded in order to permit time for the material to be deposited as would be the case where a stationary filling device might be used. The strip may be supported along its bottom or folded edge, as it is advanced, by any suitable supporting means, such as a narrow trough or guide member 56, as shown in Fig. 1.

From the description thus far it will be observed that in operation, the continuously moving filling members operate to move the strip along at a predetermined rate of speed, and as hereinbefore described, the heat sealing members 30, 32 are operated in timed relation to the movement of the strip so that the cooperating raised portions 34 will coincide with the transverse strips 18 of thermoplastic adhesive to form the bag sections, as described. It will also be observed that the members 30, 32 do not effect feeding of the strip but merely engage the strip at predetermined points as it is drawn therepast. The cut out portions 33 in the rolls permit the strip to be drawn between the rollers independently thereof between sealing operations.

In accordance with one feature of the present invention, the successively inserted filling members 42 which have a pitch distance equal to the normal pitch distance of successive bag sections, are effective to compensate for any inadvertent irregularity in the spacing between adjacent web portions 26. Since each entering filling member is arranged to take up the feed of the strip, any irregularity in spacing of the preceding bag sections will not be multiplied in the succeeding bag sections as would occur if the strip were being advanced at a definite rate by means of conven-

tional forms of a continuously operating strip feeding device. Thus, coincidence of the members 30, 32 with the sealing strips 18 is assured.

Provision is made for severing the strip at the side seams 26 in order to form individual bag sections, and for this purpose any suitable cutter may be employed. As herein shown, this operation may be performed by a pair of shears 60 arranged to be moved along with the strip and to cut the endmost side seam during the forward movement thereof. The shears 60 may and preferably will be slidably mounted upon a longitudinally disposed shaft 62 and, in operation, after an endmost bag has been severed during the forward movement of the shears with the strip, the shears may be brought back until they coincide with the next succeeding side seam 26 whereupon the shears are again moved forwardly at the same rate as the strip, during which time another severing operation is performed. Any usual or preferred mechanism (not shown) may be provided for actuating the shears and for reciprocating the shearing unit in timed relation to the movement of the strip.

It will be observed that each filling member 42, in engagement with the forward edge of the interior of its individual bag section, effects positive registration of its bag section with relation to the shears 60. In other words, any slight variation between the pitch distance of the filling members and of the successive bag sections are compensated for during the movement of the filling member into engagement with the edge of the side seam 26 of its individual bag. In the event that the pitch distance of a preceding bag section is greater than normal, a filling member inserted in an adjacent succeeding bag will operate to advance the strip into proper register. In the event that the pitch distance of a preceding bag section is less than normal, it will be seen that the filling member inserted in the adjacent succeeding bag section will not engage the forward edge of the interior of its bag section until the preceding and subnormal bag section has been severed, and when this occurs, the strip will momentarily lag until the filling member in the adjacent succeeding bag section engages the side seam 26 to continue the feed thereof in proper registered relation to the cutter. Thus, any slight variation between the pitch distance of the filling members and the succeeding bag sections will not be multiplied and correct registration assured.

Substantially simultaneously with the severance of the endmost bag section from the strip, as above described, the forward edge of the severed bag section is grasped between grippers 70, 72 and advanced to a position to be operated upon by mechanism for sealing the upper edges of the bag. As herein shown, the grippers 70, 72 are carried upon endless chains 74, 76 which run over sprockets 78, 80. A plurality of gripper pads are carried upon each chain in spaced relation and in operation, the pad on one chain registers with the pad of the other chain to grip the leading edge of the severed bag section. Provision may be made for driving the cooperating gripper chains 74, 76 in timed relation to the arrival of a bag section to be advanced, and the chains are preferably arranged to travel at a faster rate than the strip in order that the severed bag may be carried away from the end of the strip as illustrated in Fig. 1.

As herein shown, it will be observed that the

filling member 42 is withdrawn from its bag section as the latter is being carried away from the end of the strip after severance therefrom. The sprocket 48, about which the filling members are carried, is so disposed with relation to the advancing bag sections that its filling member is withdrawn as it assumes a substantially radial position when passing around the sprocket 48. In practice, the rate of advancement of the severed bag section carried by the grippers 70, 72 is such as to accommodate the increase in velocity of the end of the filling member as it is carried around the sprocket so that such member will not interfere with the sealed side seams of the bag.

The mechanism for sealing the open top of the bag sections may and preferably will comprise a pair of driven rollers 82, 84 one of which may be provided with an electrical heating element 86 as shown in Fig. 2. The rollers 82, 84 are mounted upon the sprocket shafts 88, 90 over which the chains 74, 76 are arranged to run, and the shafts, as herein shown, may be connected together by gears 92, 94 to run at the same speed. As illustrated in Fig. 2, it will be observed that the gripper pads 70, 72 retain their grasp upon the bag section until it is gripped between the heat sealing rollers 82, 84 whereupon the rollers operate to press and seal the top edges of the bag together to complete the production of the bag.

From the above description of the invention, it will be observed that the present method and the apparatus for practicing the same enables the production of individual filled and sealed bags for tea, coffee and similar material in an efficient, economical and rapid manner.

While the preferred embodiment 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 operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow filling members mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip.

2. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow filling members mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip, the movement of said hollow filling members and the movement of the gripper being 75

related to one another to enable the gripping member to be withdrawn from the bag section.

3. In combination, means for forming bag forming material into a strip having a closed bottom and open top, means for sealing the bag forming material of such strip transversely at predetermined spaced intervals to form the side seams of a series of bag sections, a cutter for severing a bag section from the strip, a plurality of hollow filling members mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip.

4. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of members mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip.

5. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow filling members each mounted to be inserted into the bag section through the central portion of the open top thereof and then moved into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip.

6. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow members each mounted to be inserted into a bag section through the open top thereof and then moved into engagement with the forward side seam of the bag section to move the strip into a position to register the aforesaid side seam with relation to the cutter, said hollow filling member being mounted to be moved at a higher speed with relation to the speed of the strip during the inserting operation and until the hollow member has engaged the forward side seam to be thereafter moved at the speed of the strip.

7. The combination with means for filling a plurality of connected bag sections including a plurality of funnels mounted to dispose the lower portion of a funnel in each of a plurality of said bag sections, and means for moving said funnels, of a cutter for severing successive filled bag sections, and movable gripper members for gripping successive bag sections as they are being severed, said gripper members being moved at a speed greater than the speed of movement of the funnels.

8. In a machine of the character described,

in combination, means for forming bag forming material into the form of a strip having a closed bottom and open top, means for sealing the bag forming material of such strip transversely at predetermined spaced intervals to form the side seams of a series of bag sections, filling means for filling said bag sections including a plurality of movable funnels arranged to move with the bag sections, a cutter for severing successive filled bag sections, and movable grippers for gripping the bag sections as they are severed by the cutter, said grippers being arranged to be moved at a speed slightly above that of the speed of movement of the funnels.

9. The combination with means for filling a plurality of connected bag sections including a plurality of funnels mounted to disposed the lower portion of a funnel in each of a plurality of bag sections, a cutter, means for moving the funnels to move said bag sections into registered position with relation to the cutter, and movable grippers for gripping the bag sections severed by the cutter, said grippers being moved at a speed greater than the speed of movement of the funnels.

10. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow filling members mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip, each of said hollow filling members being adapted to move its respective bag section into predetermined registered relation to said severing means irrespective of variations in the distance between successive side seams of the strip.

11. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow filling members mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, a stationary member arranged to spread the top edges of the strip to facilitate the introduction of said hollow filling members, and gripping means for gripping and moving the severed bag section from said strip.

12. 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, means for sealing the bag forming material of such strip transversely at predetermined spaced intervals to form the side means of a series of bag sections, means for moving said strip comprising a plurality of equally spaced hollow filling members, means for moving said members through an arc to cause successive filling members to enter successive bag sections in the center thereof and for thereafter progressively moving the filling members in a horizontal

plane to operatively engage the forward portion of its bag section to effect movement of the strip, a cutter movable with the strip and arranged to sever successive endmost bag sections at said side seams, each of said hollow filling members being arranged to move its respective bag section into predetermined registered relation to said cutter irrespective of variations in the distance between said side seams.

13. In a method of making individual filled bags, the steps comprising forming bag forming material into the form of a strip having a closed bottom and open top, sealing the bag forming material of such strip transversely at predetermined spaced intervals to form the side seams of a series of bag sections, successively inserting a series of equally spaced hollow filling members into successive bag sections and into engagement with the rear edge of the forward side seams thereof whereby to move the strip to present succeeding portions of the strip in predetermined relation to said transverse sealing means and to present preceding portions of the strip into predetermined relation to a cutter, depositing charges of a commodity through said filling members while being thus moved, and severing successive endmost bag sections thus registered with the cutter.

14. In the method of making individual filled and sealed bags from a strip of material previously provided with a coating of thermoplastic material at selected portions thereof corresponding to the bag sections to be formed, the steps comprising folding the strip longitudinally into substantially U-shape, heat sealing adjacent portions of the strip transversely at said selected portions to form a series of bag forming sections open at the top and connected by sealed side seams, successively introducing a series of filling members spaced in accordance with said bag sections into successive bag sections, moving said filling members into engagement with the forward edge of the interior of their respective bag sections to move the succeeding portions of the strip into predetermined relation to the heat sealing means, and to move the preceding portions of the strip into predetermined relation to a cutter, depositing a charge of material through said filling members and into successive bag sections while thus being moved, successively severing the endmost bag sections thus registered with the cutter to produce an individual bag section open at its top, withdrawing the registering member from said individual bag section, and thereafter heat sealing the open top edges of the bags to complete the production thereof.

15. In apparatus for making and filling bags, in combination, means for operatively supporting a strip of bag forming material comprising a series of connected bag sections open at their tops, a cutter for severing a bag section from the strip, a plurality of hollow filling members spaced in accordance with said bag sections and mounted to be successively inserted into successive bag sections through the tops thereof and to be moved after insertion into a bag section into engagement with the rear edge of the forward side seam thereof to move the strip into a position to register the aforesaid side seam with relation to the cutter, and gripping means for gripping and moving the severed bag section from said strip.

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