MEASURED CHARGE SUPPLY CONTROL FLOW MECHANISM
FOR AUTOMATIC PACKING MACHINE OPERATIONS

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This invention relates to the manufacture of infusion packages and more particularly is directed to an improvement including a measured charge supply control flow mechanism for use in high-speed automatic packaging machine operations.

Among the objects of the invention is to generally improve the manufacturing of infusion packaging operations in high-speed production which shall provide a readily incorporated improved measure charge supply control flow mechanism in automatic packaging machines for both newly constructed and presently operating equipment, which mechanism shall comprise few and simple parts that are easily assembled and installed to operate in timed relation with the filling of the packages, which shall be reliable to constantly control measured charge supply operations for permitting uninterrupted high speed infusion package manufacture, which shall be cheap to manufacture, and which shall be efficient and practical to a high degree in use.

The subject matter of this application is a continuation in part of my invention shown and described in Patent No. 2,490,056, granted December 11, 1949.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in steps of the method of manufacture and features of construction, combinations of elements and arrangement of machine parts which will be exemplified in the method and construction hereinafter described and of which the scope of application will be indicated in the following claims.

Fig. 1 is a front elevational view showing a fragmentary portion of super high-speed automatic infusion package manufacturing machine equipped with an improved measured charge supply control flow mechanism constructed to embody the invention, partly broken away to expose certain normally covered power transmission portions.

Figs. 2 and 4 are enlarged cross-sectional views taken on lines 2—2 and 4—4, respectively, in Figs. 1 and 3, respectively, Fig. 2 showing a top view of the transfer reciprocating member of said mechanism, and Fig. 4 the sliding outlet gate of said transfer member.

Fig. 3 is an enlarged sectional view showing in detail portion of measured charge supply control flow of the installation shown in Fig. 1 with said improved mechanism in operation, and

Fig. 5 is a sectional view taken on line 5—5 in Figs. 4, and also showing parts of cam actuating transmission of the flow control gate in dot and dash lines as phantom illustration.

Referring in detail to the drawings, 10 denotes generally a fragmentary portion of a fully automatic super high speed machine for the manufacture of infusion packages and incorporating a measured charge supply control flow mechanism 20 for infusion essence contents, such as tea leaves 7 embodying the invention.

Said machine 10, as seen from Figs. 1, 4 and 5, may have a web 11 of heat-sealing filter, or other similar suitable material fed continuously therefrom a supply source (not shown) in the well understood manner through a former 12 which provides a longitudinally central extending fold 11c forming a close bottom for packages or bag forming sections M, said former 12 arranging oppositely free longitudinally extending edge portion 11b of said web 11 into an open top. The heat-sealing filter sheet material web 11 when used for making infusion packages such as tea balls may be of any suitable foraminous construction, for example, filter paper of high wet strength treated or coated on one surface thereof with a dry thermo-setting plastic lamina or coated film surface. The filter sheet material forming web 11 in passing through former 12 has the coated surface or lamina folded web 11 positioned to form the interior surfaces of the tea balls, so that, border edge joint seams may be pressure heat-sealed on placing said coated surface in a face to face relation and applying pressure and heat at fusion temperature by suitable heating means H in the well understood manner.

The web 11 with fold 11c, as it leaves former 12 is gripped transversely the length thereof between continuously moving pairs of uniformly closely spaced plunger jaws 13 of machine 10, the jaws 13 of each pair as shown in Fig. 5, being mounted for movement towards and away from each other on spaced apart pivots 13c which are carried by spring actuated linked members 12b of an endless chain 12c. Said jaws 13 are controlled for effective opening and closing by suitable camming action of rollers 12d riding on rails 13e. The jaws 13 may be made U-shaped and grip the folded strip web 11 transversely the length thereof to sectionalize the latter into successively moving empty bag forming sections M, each extending between U-shaped portions of the jaws 13 and leaving top edges 11b of said sections M open and projecting there-above as is clear from Figs. 1, 4 and 5.

Chain 12c may be continuously driven from a suitable gearing and power transmission shaft 14.
which operates machine 10 and advances the jaws 13 with the folded web 11 to provide successive constantly advancing bag forming sections M.

While it is contemplated in practicing the invention to incorporate mechanism 20 in any type of high-speed automatic infusion package manufacturing equipment of new construction or those presently operating, as here shown, machine 10 so far described is a super high-speed automatic infusion package manufacturing machine constructed to operate such as the毅 described in detail and described in my patented No. 2,475,617 granted on July 12, 1949 for an Infusion Package Manufacture.

In my said patented manufacture, the business ends of said U-shaped jaws 13 firmly grip the folded web 11 temporarily about each of the lower or outlet ends of spaced spouts or funnels 16 inserted within the folded web 11 as shown in Figs. 1, 3 and 5. Thus said successive bag forming sections M which continuously advance with the jaws 13, are each partially filled with a measured quantity of infusion for essence products, namely, tea leaves T, which during part of advancing movement of said sections M pass down in time relation through top openings 11b of said section M from a suitable measured charge dispenser 15, as shown in Figs. 1, 3 and 5. It is by means of a series of said spouts or funnels 16 mounted for movement part way along the path of movement of the jaws 13 with said bag section M, and by having funnels 16 also constructed and actuated for movement in time relation to be extended down into and then retracted by an upward movement of the interior of each of said sections M through said top opening 11b thereof that said bag section filling operation is accomplished.

As seen in Fig. 5, said spouts or funnels 16 may be carried by sliding link connections 17a of an endless drive chain 17, and are guided by suitable depressing and raising stationary cams. These cams may be formed on horizontally extending spaced bars 17b each having a lower guide rail portion 17c and one of said bars 17 having an upper guide rail portion 17d which control the elevation of a pair of rollers 17b carried by spouts 16.

Thus as bag sections M are being continuously formed of the web 11 and take a position corresponding to the sections line 5—5 in Fig. 5, cam rail portions 17c and 17d fully depress or lower the outlet ends 16d of some of the spouts 16 between unfolded portions of the web 11. Meanwhile the upper ends or mouths 16c of the spouts 16 have also been lowered under mechanism 20 in position for receiving supplies of uniform quantities or tea charges T theretofrom to partially fill bag sections M in the manner hereinbefore described.

After the spouts 16 are entered into the bag sections M while the latter constantly advance and charge T is delivered thereto by spouts 16, the latter are raised, that is, retracted free from the top openings 11b while travelling continuously away from path of movement of the filled bag sections, now denoted as M1, as is clear from Figs. 1, 3 and 5.

Thereafter machine 10 operates on said partially filled sections M1, to heat seal top openings and the transversely extending side closures between joining bag section M1 by suitable means, such as electric heater H, to form permanent top and side edge joint seam closures after which the tea balls are completely finished all in the manner fully described and shown in my said Patent No. 2,475,617.

Dispenser 15 may be of any well understood construction, and when used for the purposes here described and shown may be like that fully described as shown in my said Patent No. 2,490,056 granted December 6, 1949, for Measuring Device Using a Rotating Trap Chamber Having a Varying Peripheral Speed.

In operating super high speed automatic infusion package manufacturing machines such as machine 10, it is known in quantity production of 300 or more completely filled packages per minute, and particularly when manufacturing such infusion packages in multiple, that is, completing a plurality of such infusion packages simultaneously, it is necessary that dispenser 15, or the like, which supplied measured quantities of charges of tea T, to such packaging machines, simultaneously provide a plurality of identical measured charges through suitable independent chutes 15c, from suitable bulk supply source, in the manner for example as described in my said Patent Number 2,490,056, predetermined measured quantity of such charges being controlled through setting of manual regulator hand knob 15c.

When, as heretofore, such measured charges were delivered directly from chutes 15c in machines not incorporating mechanism 20, through spouts or funnels 16 to the empty bag forming sections M, or the like, thereunder, irregularities of operation often occur, that is, proper uniform charge filling for bag sections M have not been found entirely reliable to turn out commercially desirable finished filled packages at top production speed.

The cause of such irregularities may be attributed to inherent operating characteristics of the dispenser which merely operates to uniformly dump and deliver successive charges through a plurality of separate chutes 15c, there being present an appreciable difference in dribbling effect of the several flowing streams of tea T. Mechanism 20 is here provided to eliminate such possible undesirable transitional operations in operation, and also to speed up output production, that is, utilise and change the flow cycle for greater efficiency by controlling the measured charge supply. Said mechanism 20 to that end is interposed in the path of flow between lower ends of dispenser chute 15c and the top inlet ends 16c of funnels 16 in the manner and by the method thereinbefore described and shown.

As seen from Figs. 1 and 5, funnels 16 which are mounted to move in uniform spaced relation on said slide connections 17a linked in horizontally extending endless drive chain 17 to pass directly over the path of continuously advancing moving sections M, and M1, said linked slide connections 17a being provided with a slide shoe 17e supported on a suitable aligning guideway 17f formed in one of said bars 17 and said mechanism 20 served as a depending bracket and also carries said cam guide rail portion 17c and 17d on which funnel rollers 16b ride for said lowering and raising movements over or with respect to said guideway 17f, that is, for downward movement of funnels 16 to enter and for upward movement to withdraw lower funnel ends 16d from the interior of filled bag sections M1 through the top openings thereof after a measured charge has been dumped therein.

Mechanism 20 which as shown in the drawing interposed between dispenser 15 having four
chutes 15a in double spaced aligned rows and funnels 16 may comprise a transfer charge carrier 21 mounted for horizontal sliding movement on track flanges 17b of said bars 17b just below the level of lower ends of chute 15a. Said carrier 21 may be formed with recessed channelled chambers 21a extending down from the upper or top surface 21b of carrier 21, one channel chamber 21a for aligning with each chute 15a. Said channel chambers 21a as seen from the top surface 21b in Fig. 2, each has an elongated top opening inlet 21c with sloping side walls 21d of V-shaped cross-sectional configuration terminating in circular shaped outlet openings 21e on a lower side of carrier 21, opposed to said upper surface 21b.

A slide gate 22 is fitted for horizontal movement in said lower side of carrier 21 as is clear from Figs. 1 and 2, said gate 22 having circular shaped through-passage 22a to correspond in size and spacing with said outlet openings 21e for registering alignment when said gate 22 is positioned to empty measured charges of tea T from chamber 21a. To retain said gate 22 in proper sliding position, carrier 21 may be provided with a lever 23 having a free end 23a engaging and actuating said gate 22, and being pivotally mounted on the other end 23b thereof on a suitable fixed bearing pin 24. Lever end 23b connects with an end 25a of a crank arm 25, the free end 25b of which carries a roller 25c in offset relation to lever end 23a. Said rollers 25c ride in a grooved track 25 which extends horizontally as shown in Figs. 1, 3 and 5, said track 25 being spaced from an upright stationary post P and pivotally mounted thereon by spaced bracket bale arms 26a. For swinging said arms 26a with track 25 in timed relation to the 21a/21c sequence of dispensing bag sections 26c and M1, said arms 26a may be adapted to said bag sections M and as the filled bag sections M1 continue to advance spouts 16 which are also advancing are retracted to a position with the lower ends 16d thereof above the level of the tops 11d of bag sections M1 so as not to interfere with the continuation of advancing movement thereof to final completion of the manufacturing operation by machine 10.

The above described cycle of operation with the intermediate control of flow of charges of tea T by mechanism 20 between dispenser 5 and the moving empty bag sections M is repeated continuously in the operation of machine 10 on successive groups of four bag sections M, the reciprocating movement of bracket stanchion 18a which slidingly move carrier 21 being transmitted through the interconnection with thrust rod 19.

The camming operation transmitted from the cam disc shaft 28a, cam disc 28, roller 28d, cam lever 27c and shaft 27 to bracket arm 26a takes place smoothly for automatically opening and closing of gate 22.

From the above description and the drawings it is now clear that the improved method embodying the invention contemplates generally the inclusion of stop or stops necessary to control the flow stream of a measured charge or plurality of charges from a dispenser so as to provide maximum time period of discharge flow from the dispenser and of delivery to the continuously advancing bag forming sections, in groups of one or more, that is, in said method for filling bags with flowing material, such as tea T, in quantity production there is required some or all of the following mechanism and delivery of a predetermined charge or charges of said material at a uniform rate from a bulk source in a given time interval, intercepting and retaining said delivered charge or charges while moving along a given path during part of said time interval, and dumping said retained charge or charges into aligned bag receptacles containing the charges 15a. This replenishment operation may continue to permit the flow during substantially the entire period of time while carrier 21 with the closed gate 22 moves to the other extreme left position, directional movement of the carrier 21 being indicated by the double pointed arrow in Fig. 1.

When successive groups of four said moving bag sections M come into alignment with carrier outlet openings 21e of mechanism 20 the latter then having reached an extreme left extended position and just as it commences to move to the right, slide gate 22 is caused to be fully opened by being actuated in timed relation due to swinging movement of lever 23 through the operation of said other levers, linkages cam power drives above described, so that, through-passages 22a register in alignment with said carrier outlet openings 21e permitting dumping of the measured charged of tea T retained in carrier chambers 21a. Said tea charges in flowing from chambers 21a pass into funnels 16 and hence into said bag sections M.

Since both the bag sections M and carrier 21 during said dumping operation are then simultaneously advanced in the same direction and at the same speed the measured time period of delivering the multiple charges to each bag section M is made available thereby eliminating possible spillage and irregularities in filling.

When the bag sections M are in said charge receiving position the spouts 16 have already fully entered into said bag sections M and as the filled bag sections M1 continue to advance spouts 16 which are also advancing are retracted to a position with the lower ends 16d thereof above the level of the tops 11d of bag sections M1 so as not to interfere with the continuation of advancing movement thereof to final completion of the manufacturing operation by machine 10.
stantly moving under said path during substantially the entire remaining part of said time interval.

It is thus therefore seen that there is provided an improved method of manufacture and a machine in which the objects of the invention are achieved and which are well adapted to meet all conditions of practical use.

As various possible embodiments may be made in the above invention for use for different purposes and as various changes might be made in the embodiments and method above set forth, it is understood that all the above matters here set forth or shown in the accompanying drawings are to be interpreted as illustrative and not in a limiting sense.

Thus having described my invention, I claim as new and desire to secure by Letters Patent:

1. In a machine of the character described a mechanism comprising, an intercepting carrier for controlling successive flowing measured charges of a product received from a dispenser gate during the empty bag sections advancing in a direction along one path, means for moving said carrier over said path to and fro with respect to said direction, said carrier being advanced by said means in said direction after intercepting said charges received from the dispenser and being moved in the opposite direction during the intercepting of said charges.

2. In a machine of the character described a mechanism comprising, an intercepting carrier for controlling successive flowing measured charges of a product received from a dispenser gate to and fro with respect to said direction, while actuating said dispenser in timed relation with the advancing bag sections, said means moving the carrier to and fro with respect to said direction, and a dumping gate for said carrier for delivery to empty bag sections advancing in one direction, means for moving said carrier while actuating said dispenser in timed relation with the advancing bag sections, said means moving the carrier to and fro with respect to said direction, and a dumping gate for said carrier for delivering said charges to said empty bag sections during the advancing of the carrier in said direction, said moving means being interconnected to close the dump gate during the carrier movement relative to reverse to said advancing direction.

3. A machine for manufacturing packages, a mechanism comprising a movable mounted carrier interposed between a measured charge dispenser and successively moving empty bag sections thereunder for intercepting flowing measured charges from the dispenser to said sections, a gate for said carrier, and means actuated in timed relation with the movement of said bag sections for closing and opening said gate to alternately retain the flowing measured charges in the carrier and then to dump said charges while said bag sections are in motion, said means serving to reciprocate the carrier and to open the gate in the direction of the carrier movement in a direction in unison with the bag section movement and to close the gate during the carrier movement in a relative direction opposite to said carrier movement.

4. For a machine of the character described, means for measuring charges of filling material for infusion packages, and a transfer carrier for said measured charges mounted for reciprocating movement with respect to said means having a channeled chamber recessed from an upper surface thereof, said chamber at said upper surface formed with an opening inlet elongated in the direction of said movement, sloping side walls for said chamber from said inlet to terminate in opening outlet of smaller area than said inlet on a lower side of said carrier opposite said opening inlet, and a slide gate mounted for movement on said lower carrier side to open and close said opening outlet in timed relation with the reciprocating movement of the carrier.

5. A machine for manufacturing infusion packages, comprising means for forming empty bag sections having open tops while constantly advancing said bag sections and emptying and emptying said bag sections, a reciprocating charge dispenser arranged in spaced relation above the path of movement of said constantly advancing bag sections, a reciprocally mounted transfer carrier interposed between said dispenser and said constantly advancing bag sections, and means for discharging the measured charges from said carrier into said bag sections as the carrier moves in the direction of movement of said bag sections, and for refilling said carrier with other measured charges from said dispenser when said carrier is moved in the reverse direction of movement.

6. A machine for manufacturing infusion packages as defined in claim 5, in which said transfer carrier having channelled chambers recessed from a first side surface thereof facing said dispenser, each chamber at said surface formed with an opening inlet elongated in the direction of said movement, side walls for each chamber sloping from said inlet to terminate in an opening outlet on a second side side surface of said carrier opposite said first side surface, and a slide gate mounted for movement on said second side surface to open and close said opening outlet in timed relation with the directional movements of the discharging and refilling of said carrier.

7. A machine for manufacturing infusion packages as defined in claim 5, in which said means for discharging measured charges from the carrier includes vertically movable funnels which reciprocate in registering timed relation between outlets of said carrier and into and out of said bag section open tops.

8. In a machine for manufacturing infusion packages, means for forming empty bag sections with open tops while constantly advancing along a path through the machine, means for successively filling each bag section with a measured charge of a product through said tops while continuously advancing the bag sections, said filling means including a dispenser for delivering said measured charges in a required sequence and timed relation over the path of said advancing bag section tops, and a transfer carrier mounted for movement below said dispenser positioned to receive each of said delivered charges and to thereafter move said charges in operating said filling means when the carrier is moved in the same direction as said bag section advancement path.

9. In a machine for manufacturing infusion packages as defined in claim 8, in which said transfer carrier includes a flow gate mounted for predetermined reciprocable movement to control said charge dumping and to retain said measured charges received when the carrier is moved in a reverse direction with respect to said bag section advancement path.

10. In a machine for manufacturing infusion packages from a web constantly travelling along one path of advancing movement to provide empty bag sections with open tops through each of which a measured charge of a flowing product
is delivered into successive empty bag sections, a movably mounted transfer carrier interposed over said path for intercepting each measured charge of said product prior to said delivery, and flow control means carried by said carrier for retaining each charge in the carrier before said delivery while travelling in a direction opposite said advancing movement of said bag sections and thereafter dumping each retained charge from said carrier while travelling in the same direction as said advancing movement.

11. For a machine of the character described in which empty bag sections are successively advanced along one path of movement for filling each bag section with a measured charge of a product during said advancing movement, a mechanism interposed over said path of movement of said bag sections, comprising an intercepting transfer carrier to control flowing of the measured charges prior to and during said filling, means for moving said carrier intermittently in the advancing direction of said bag sections after retaining a measured charge in the carrier, and means for releasing said measured charge for filling a bag section during said advancing direction movement of the carrier.

12. A method of the character described, comprising the steps of forming empty bag sections with open tops in continuous succession while constantly advancing along a path, supplying measured charges of a flowing product from a bulk source for filling said advancing bag sections through the open tops thereof during uniform time intervals, intercepting said measured charges being supplied while moving said charges in a direction opposite to said advancement of said bag sections, and dumping said measured charges while moving in a direction over said path and in unison with the advancement of said bag sections into said open tops.

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