June 6, 1944. N. S. ROSS 2,350,418

APPARATUS FOR PRODUCING FILLED PACKAGES

Filed Aug. 16, 1941 3 Sheets-Sheet 1

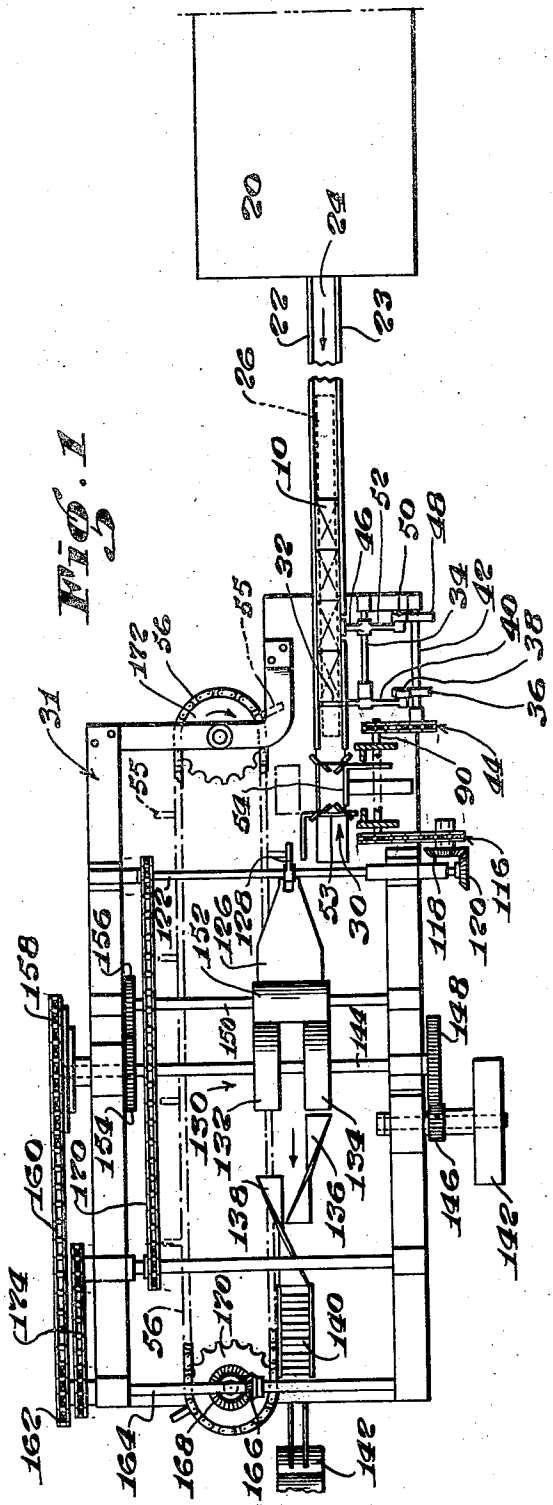


Fig. 1

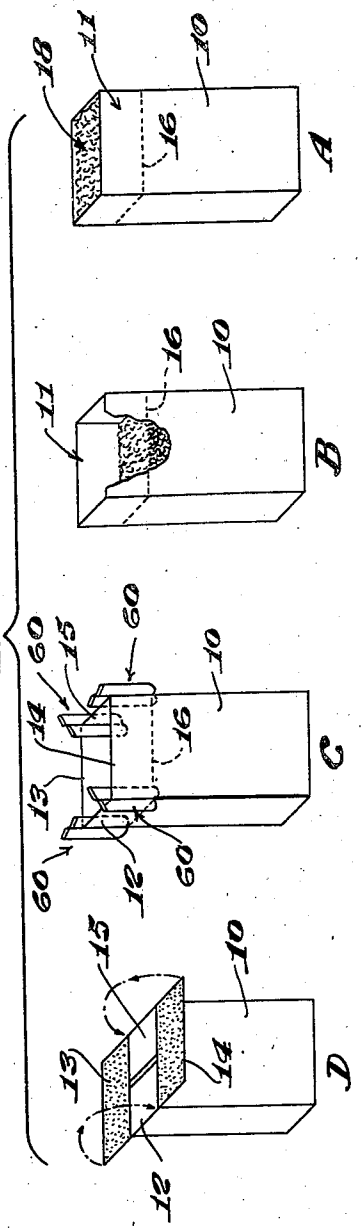


Fig. 2

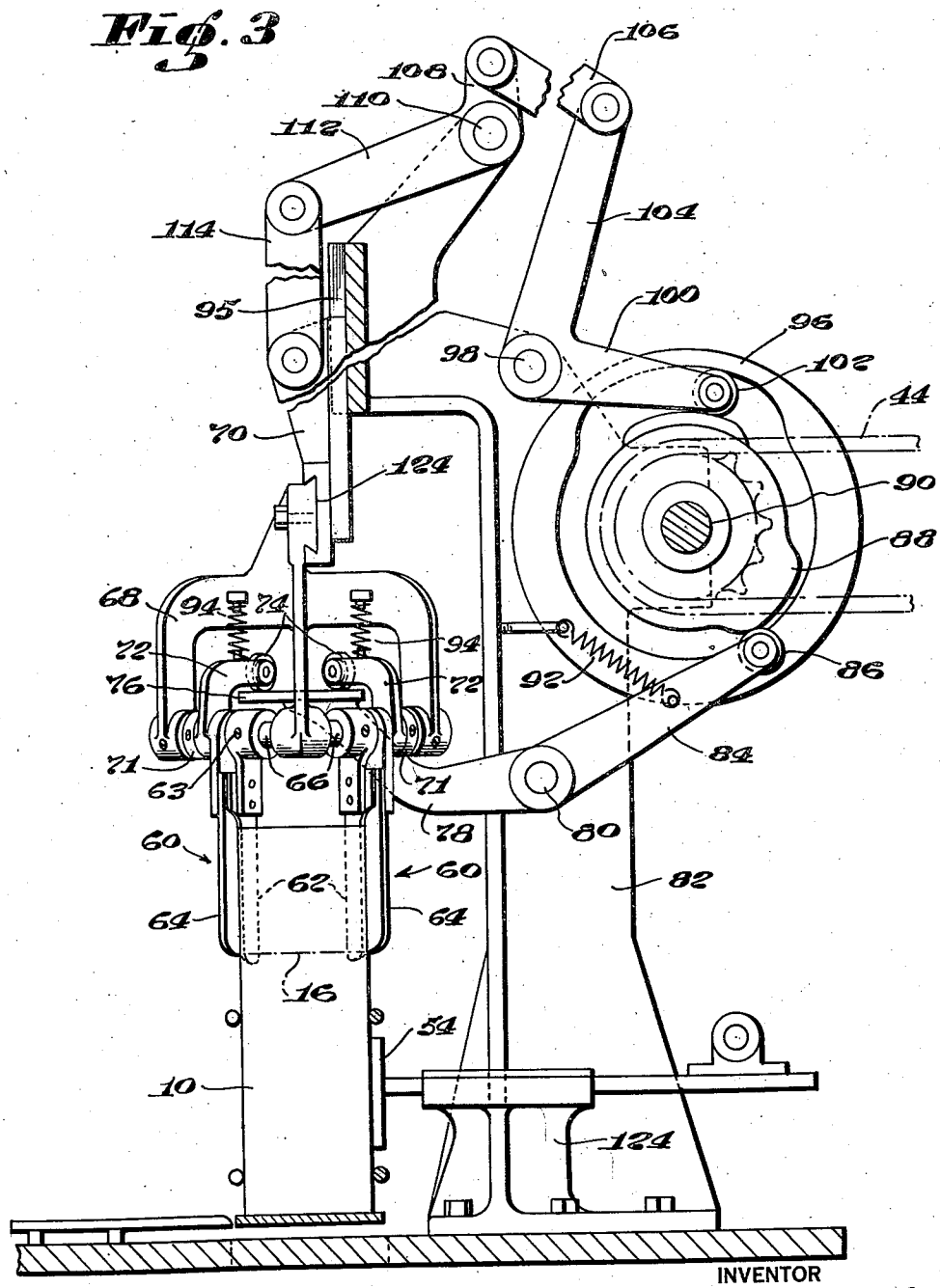
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APPARATUS FOR PRODUCING FILLED PACKAGES

Filed Aug. 16, 1941 3 Sheets-Sheet 2

Fig. 3



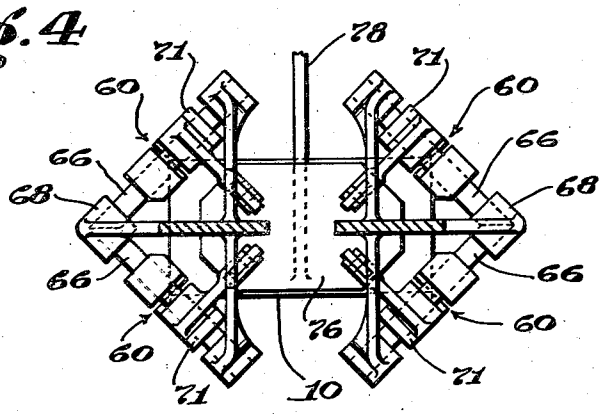
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Filed Aug. 16, 1941 3 Sheets-Sheet 3

Fig. 4



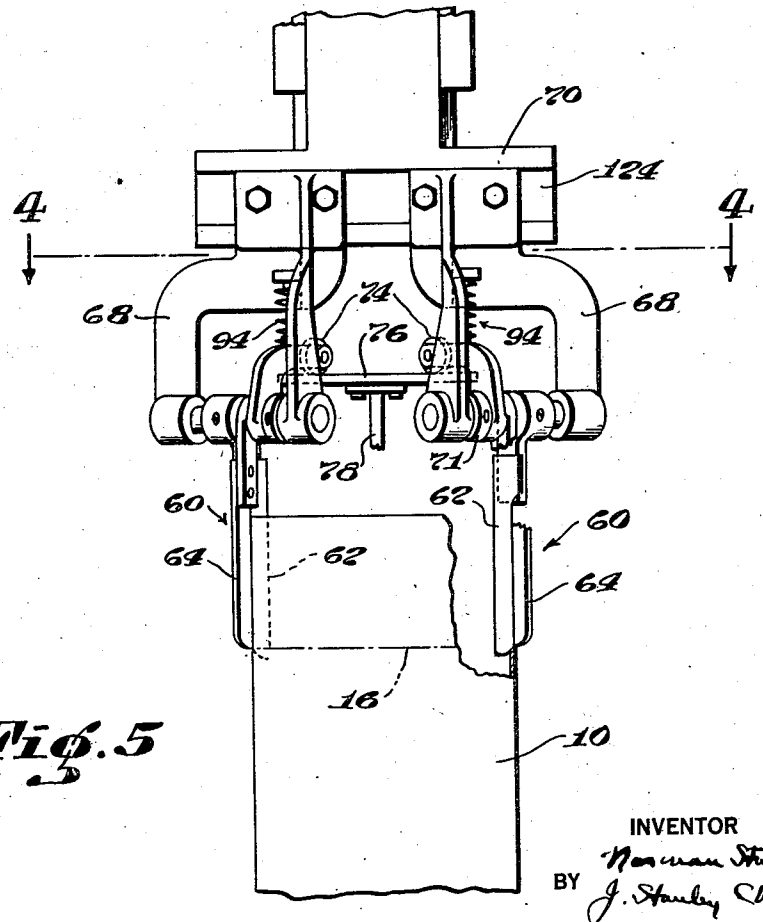


Fig. 5

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UNITED STATES PATENT OFFICE

2,350,418

APPARATUS FOR PRODUCING FILLED PACKAGES

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Application August 16, 1941, Serial No. 407,172

13 Claims. (Cl. 93—6)

This invention relates to a method of and also to apparatus for producing a filled package.

The invention has for an object to provide a novel method of and novel and efficient apparatus for producing a filled package and the invention may be used with particular advantage in the packaging of relatively light, fluffy or aerated materials which during the packaging operation are compacted from their normally loose and expanded condition to a more dense condition.

With this general object in view and such others as may hereinafter appear, the invention consists in the method of and in the apparatus for producing a filled package, 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 drawings illustrating the preferred embodiment of the invention, Fig. 1 is a plan view of apparatus embodying the present invention for producing a filled container; Fig. 2 comprises perspective views illustrating the various steps in the production of the filled and sealed package; Fig. 3 is a side elevation of mechanism for severing the corners of the open end of the filled container to form top closing flaps, as hereinafter described; Fig. 4 is a plan view of the flap severing mechanism as seen from the line 4—4 of Fig. 5; and Fig. 5 is a front view of a portion of the mechanism shown in Fig. 3.

In general, the present invention contemplates a novel method of and apparatus for producing a filled package particularly adapted to facilitate the packaging of commodities which are of a character such that the contents of a package would occupy, in the loose and expanded state before packaging, a substantially greater volume than the capacity of the container in which the commodity is to be packaged and consequently settling of the commodity in the container is required during the packaging thereof in order to deposit a predetermined weight of the material into the package. Such materials include flaky goods such as soap flakes and corn flakes and also finely divided and powdered materials which become aerated in their loose or flowable condition.

In the packaging of many such commodities, it is the usual and preferred practice to package the materials in a plain carton without the use of an inner lining, such lining being deemed unnecessary both as a matter of economy and because of the nonperishable nature of the product. As is commonly known, most free flowing solid materials, when loosely packed into a carton, tend to settle down in the package during transportation so that the consumer receives the package in a partially filled condition unless steps are taken to settle the material during the packaging thereof. Heretofore, in the packaging of such commodities, it has been the practice in some instances to introduce a bulk or primary load of substantially less weight than that required in the final load into the usual carton and to settle the first load down in the container whereupon successive increments are introduced and settled until the package reaches the required predetermined weight. This procedure is open to objection since care must be taken not to introduce material into the carton above the top score line where the hinged flaps join the body portion of the carton in order to prevent spilling of the material through the openings between the adjacent upstanding top closing flaps. Hence, since the final increment introduced into the carton cannot extend above such score line, it will be seen that upon settling of such increment, the contents of the carton will still be a substantial distance below the top score line, making it practically impossible to provide a carton filled to the full capacity thereof by such procedure.

Another expedient previously employed has been to provide a sufficiently large container to hold a predetermined weight of the material in its loose or expanded condition and thereafter settle the material therein leaving a substantial portion of the carton unfilled. Other attempts to overcome this problem include the provision of an inner lining having a mouth portion extending above the score line of the carton and then filling the container with the predetermined weight of material in its loose condition, such material being retained between the walls of the extended lining mouth. Thereafter, the material is settled until it reaches a level below the score line of the carton whereupon the mouth of the lining is closed.

However, such practices are open to objection, in the first instance because, although the consumer receives the full weight of material, yet the proportion of the volume of the material in its settled condition with relation to the capacity of the carton is such as to be misleading to the purchaser. In the second instance, where a lined carton is used, the practice is open to objection

not only from the standpoint of economy in the production of the package, but also in that the lining material and particularly the closure for the mouth thereof takes up an excessive amount of space within the carton which is not apparent to the consumer upon purchasing the package.

In accordance with the present invention, the capacity of the container for packaging products of the character described is selected so as to substantially conform to the volume of the desired predetermined weight of the material to be packaged when in its settled condition. The container employed in practicing the present method may comprise the usual plain unlined carton except that the extensions of the side walls of the carton above the usual score line, and which comprise the top flap forming portions, are left uncut until after the filling and settling operation has been performed. The carton in this condition is filled with a predetermined weight of the commodity in its loose or expanded state, such material occupying a space extending a substantial distance above the score line and being retained between the walls of the uncut top closing flap forming portions. Thereafter, the material in the carton is settled by vibrating the carton until the material reaches a level subsantialy flush with the score line thereof. The top portion of the carton is then cut along each corner thereof to form the usual four top closing flaps. The top closing flaps may then be provided with adhesive and closed and sealed in any usual or preferred manner. Thus, in accordance with the present invention, the required predetermined weight of the commodity in its expanded condition may be introduced into a plain unlined carton, and after being settled therein, will substantially fill the container to the desired level.

Referring now to the accompanying drawings, 10 represents a rectangular carton of a capacity such as to conform to a predetermined weight of a commodity in its settled condition. As indicated at A in Fig. 2, the carton is formed with extensions 11 of the side walls beyond the score line 16 thereof which comprise uncut top closing flap forming portions which are joined at the corners. The carton thus formed is filled with a sufficient quantity of the loosely deposited material 18 to make up the required weight of the package, such a quantity filling the carton to a height well above the score line 16 and being supported within the extended uncut top closing flap forming portions 11. Thereafter the carton may be vibrated to settle the material therein until it reaches a level with the score line 16, as indicated at B in Fig. 2. If found of advantage other methods of effecting the desired compacting of the loose material may be used. Longitudinal cuts in the corners of the flap forming portions 11 of the carton are then made, as indicated at C in Fig. 2, in order to form the usual four top closing flaps 12, 13, 14 and 15. Thereupon, the carton flaps may be provided with adhesive and folded over to seal the top thereof, as indicated at D in Fig. 2, to complete the production of the package.

The above described operations are preferably performed upon automatic machinery, and as illustrated in Fig. 1, the apparatus preferably employed in practicing the present method may include any usual or preferred filling or weighing mechanism, as indicated diagrammatically at 20 by which the carton may be provided with the required weight of material in its loose or expanded form as above described. The weighing machine may be arranged to discharge the filled containers between guide rails 22, 23 and upon a moving belt 24 which passes over a vibratory board or other support 26 disposed beneath the belt, so that in operation, as the cartons are advanced upon the belt, the material is settled in the cartons.

As illustrated in Fig. 1, the belt 24 is arranged to convey the filled cartons to flap cutting mechanism, indicated generally at 30 which may be supported upon and driven through connections from a top sealing machine, indicated generally at 31, and such flap cutting mechanism may form a unitary part of such top closing machine for cutting the corners of the flap forming portions of the carton prior to the passage thereof through the usual top closing mechanisms.

Provision is made in the preferred apparatus for permitting the filled cartons being discharged upon the belt to come to rest against a movable stop member 32 in order to form a line thereof, and also for moving the stop member 32 out of the path of the cartons in order to release successive cartons in the line in timed relation to the operation of the flap cutting mechanism 30. As herein shown, the stop member 32 is pivotally mounted upon a shaft 34 journaled in the machine frame, and is arranged to be rocked into and out of the path of the line of filled cartons by a cam 36 in cooperation with a cam roll 38 carried by a cam lever 40 forming part of the pivotally mounted stop member 32. The cam 36 is mounted fast upon a cam shaft 42 journaled in the machine frame and is arranged to be rotated in timed relation to the flap cutting mechanism 30 through a chain and sprocket connection 44.

A second stop member 46, also pivotally mounted on the shaft 34 is arranged to engage the second carton in the line in order to prevent the line from being advanced upon the continuously moving belt 24 until the foremost carton has been released and the stop member 32 has been again returned into the path of the line of cartons. The second stop member 46 is arranged to be rocked into and out of engagement with the second carton in the line in timed relation to the operation of the first stop member, by a cam 48 cooperating with a cam roller 50 carried by a cam lever 52 extending from the second stop member 46.

Upon being released, the foremost filled carton in the line is advanced against a fixed stop member 53 to present the carton in operative relation to the flap cutting mechanism 30, and in front of a pusher 54 adapted to be operated after the flap forming portions have been cut to transfer the carton into the path of the carrier arms 55 carried by an endless conveying chain 56, forming a part of top sealing machine 31.

Referring now to Figs. 3, 4 and 5, the flap cutting mechanism comprises four similar pairs of shears 60 mounted to be capable of severing the flap forming portions 11 of the upright carton along the corner edges thereof down to the score line 16 to form the top closing flaps 12, 13, 14 and 15. Each pair of shears 60 includes a stationary blade 62 and a movable blade 64 mounted diagonally with respect to the carton upon similar shafts 66 supported in brackets 68 adjustably carried by a vertically movable slide member 70. Each stationary blade 62 is fixed on its shaft 66 by a set screw 63 in a substantially vertical position and its cooperative blade 64 is pivotally

mounted thereon being held from lateral movement by a collar 71. The pivotally mounted blade 64 is provided with an arm 72 carrying a cam roll 74 arranged to cooperate with a cam plate 76 to move the blades to perform the cutting operation. The cam plate 76 is formed upon the end of one arm 78 of a two-armed lever pivotally mounted upon a shaft 80 supported in a bracket 82. A second arm 84 of the two-armed lever is provided with a cam roll 86 arranged to cooperate with a cam 88 mounted fast upon a cam shaft 90 journaled in the supporting bracket 82. A spring 92 serves to hold the cam roll 86 against its cam 88. The pivotally mounted blades 64 are normally held in their open position with respect to the stationary blades by coil springs 94 as clearly shown in Fig. 3.

Provision is made in the preferred embodiment of the invention for raising and lowering the shearing unit into and out of operative relation to the carton. As herein shown, the vertically movable slide member 70, upon which the brackets 68 are mounted, is arranged to be vertically reciprocated in a guideway 95, formed in the supporting bracket 82, by a closed cam 96 mounted fast upon the cam shaft 90, through connections including a bell crank pivotally mounted at 98 in the bracket 82, one arm 100 being provided with a cam roll 102 cooperating with the cam 96. The second arm 104 of the bell-crank is connected by a link 106 to one arm 108 of a second bell-crank pivotally mounted at 110, the second arm 112 of which is connected by a link 114 to the slide member 70. As illustrated in Fig. 1, the cam shaft 90 is arranged to be driven from and in timed relation to the top sealing machine 31 through connections including a chain and sprocket drive 116, and bevel gears 118, 120, the latter being fast on a cross-shaft 122 of the top sealing machine, to be hereinafter described. It will be observed that the chain and sprocket connection 44 previously referred to for driving the cam shaft 42 is operatively connected to the cam shaft 90 of the flap cutting mechanism.

In the operation of the flap cutting apparatus thus far described, the filled carton with the material settled therein is brought into position beneath the shearing unit while the latter is in its elevated position. The shearing unit is then lowered, with the movable blades 64 in their open position, to present the four relatively stationary and vertically disposed blades 62 within the carton and adjacent the four corner edges thereof to a depth corresponding to the score line 16 of the carton, as shown in Fig. 3. Thereupon, the movable shear blades 64 are operated to perform the cutting operation, being actuated by the cam plate 76 being raised into engagement with the rollers 74, as described. The cam plate 76 is then again lowered and the shearing unit elevated out of the way preparatory to transferring the cut carton into the top sealing device and to receive the next succeeding carton to be released from the line of filled cartons.

Provision is made in the preferred embodiment of the invention for adjusting the position of the shears with respect to each other whereby to enable different sizes of cartons to be operated upon in the machine. As herein shown, each bracket 68 carries two pairs of shears 60 and as illustrated in Fig. 5, the brackets 68 may be adjusted toward or away from each other in a V-groove 124 provided in the slide member 70 in order to adjust the shears in one direction. Each individual pair of shears 60 may be adjusted laterally on their shafts 66 in order to accommodate cartons of varying dimensions in another direction.

From the description thus far, it will be observed that the filled carton, with its contents settled and the closing flaps cut as described, is now ready to be transferred into the path of the carrier arms 55 of the top sealing machine 31 to be advanced through the mechanism for closing and sealing the top flaps of the carton. Any usual or preferred transferring device may be employed such as the pusher 54 mounted in a slide bracket 125 secured to the machine frame and which may be arranged to be reciprocated in timed relation to the movement of the carrier arms 55 through any suitable connections (not shown) from the top sealing machine.

The top sealing machine herein illustrated, and indicated generally at 31, may in general comprise the machine forming the subject matter of the United States patent to Scales, No. 930,090, dated August 3, 1909, to which reference may be had for a complete description thereof. The carton closing and sealing mechanism, as diagrammatically illustrated in Fig. 1 includes a stationary curved and flared rail 126 positioned in the path of movement of the carton which operates to fold down the forward end flaps 12 and to spread the side flaps 13 and 14 of the carton. A rotary flap tucker 128, mounted to rotate with the cross shaft 122, is arranged to fold down the rear end flap 15 as the carton passes thereby and to present such flap in a position to be received under the stationary rail 126. The carton, with its side flaps horizontally extended and with its ends flaps folded down is then advanced to the adhesive applying device, indicated generally at 130, where adhesive is applied to the extended side flaps 13, 14 by a pair of glue rolls 132, 134. Thereafter, the carton passes between stationary curved rails 136, 138 which operate to fold the side flaps down one upon the other. The carton then passes under pressure rollers 140 to press the flaps into sealing engagement, and is thereafter discharged from the machine into the usual dryer 142 to firmly set the adhesively secured flaps.

The driving apparatus for the top sealing machine may, in general, comprise the apparatus shown in the Scales patent above referred to, and as herein illustrated, see Fig. 1, may include a pulley 142 driven in any usual or preferred manner which is connected to a glue roll shaft 144 by cooperating gears 146, 148. A shaft 150 upon which a spreader roll 152 is mounted to cooperate with the glue rolls 132, 134, is driven from the shaft 144 through the gears 154, 156. The other end of the glue roll shaft is provided with a sprocket 158 which is connected by a chain 160 to a sprocket 162, the latter being fast upon a cross-shaft 164 arranged to drive the carrier chain 56 through cooperating bevel gears 166, 168. As herein shown, the carrier chain 56 is arranged to run over horizontally mounted sprockets 170, 172. The cross shaft 122 from which the flap cutting apparatus 30 and the carton releasing mechanism is driven, is arranged to be rotated from the cross shaft 164 through sprocket and chain connections indicated at 174 and 176 in Fig. 1.

From the above description, it will be observed that the present invention is particularly adapted for handling those commodities which occupy a greater space in their loose or expanded st

than when settled in the package and that in accordance with the present method and the preferred apparatus for practicing the same, a filled package may be produced utilizing a plain unlined carton in a simple, efficient and economical manner whereby to provide a package in which the contents when settled conform substantially to the capacity of the carton and leaving a minimum of unfilled space within the carton.

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. The combination with container filling means of means for cutting the uncut top closing flaps of the container substantially down to the level of the material after the container has been filled.

2. The combination with carton filling means, of means for cutting the corners of the uncut mouth portion of a filled carton substantially down to the level of the material deposited by said filling means to form the top closing flaps.

3. Packaging apparatus for producing a filled and closed package, having in combination, container filling means operative to deposit a predetermined quantity of material into the container, means for settling the material in the container to a level disposed a substantial distance below the top of the container, and means for thereafter forming the top closing flaps for the container by cutting the uncut mouth portion of the container substantially down to said level.

4. Packaging apparatus for producing a filled and closed package having, in combination, carton filling means operative to deposit a predetermined quantity of material in its loose and expanded condition into the carton, means for settling the material in the carton to a level disposed a substantial distance below the top of the carton, and means for thereafter cutting the corners of the uncut mouth portion of the carton substantially down to said level to form the top closing flaps for the carton.

5. Packaging apparatus for producing a filled and closed package having, in combination, carton filling means operative to deposit a predetermined quantity of material in its loose and expanded condition into the carton, means for settling the material in the carton to a level disposed a substantial distance below the top of the carton, means for thereafter cutting the corners of the uncut mouth portion of the carton substantially down to said level to form the top closing flaps for the carton, and means for closing and sealing said top flaps.

6. The combination with carton filling means, of means for cutting the corners of the uncut mouth portion of a filled carton substantially down to the level of the material in the carton to form the top closing flaps, said cutting means comprising a plurality of pairs of shears.

7. In packaging apparatus for producing a filled and closed package, in combination, means for filling a carton having a body portion, a mouth portion, and a score line defining said portions, the commodity filling the carton a substantial distance above said score line, said mouth portion being uncut whereby to retain the material disposed above the score line within the carton, means for settling the material at least to substantially the level of said score line, and means for thereafter cutting the uncut mouth portion of the carton to form the top closing flaps comprising a plurality of pairs of shears constructed and arranged to sever the longitudinal corners of said mouth portion down to said score line.

8. In packaging apparatus for producing a filled and closed package, in combination, means for filling a carton having a body portion, a mouth portion and a score line defining said portions, the commodity filling the carton a substantial distance above said score line, said mouth portion being uncut whereby to retain the material disposed above the score line within the carton, means for settling the material at least to substantially the level of said score line, means for thereafter cutting the uncut mouth portion of the carton to form the top closing flaps, said means comprising a plurality of pairs of shears, a vertically movable member upon which said shears are mounted, and means for moving said vertically movable member to present said shears into operative relation to the carton to sever the longitudinal corners of said mouth portion down to said score line.

9. In packaging apparatus for producing a filled and closed package, in combination, means for filling a carton having a body portion, a mouth portion and a score line defining said portions, the commodity filling the carton a substantial distance above said score line, said mouth portion being uncut whereby to retain the material disposed above the score line within the carton, means for settling the material at least to substantially the level of said score line, means for thereafter cutting the uncut mouth portion of the carton to form the top closing flaps comprising a plurality of pairs of shears, a vertically movable member upon which said shears are mounted, and means for moving said vertically movable member to present said shears into operative relation to the carton to sever the longitudinal corners of said mouth portion down to said score line, each pair of shears including a relatively stationary blade and a movable blade, said stationary blades being arranged to be inserted within the carton adjacent the corresponding corners of the carton when the shears are lowered into operative relation thereto, and means for operating the movable blades to perform the cutting operation.

10. In packaging apparatus for producing a filled and closed package, in combination, means for filling a carton having a body portion, a mouth portion, and a score line defining said portions, the commodity filling the carton a substantial distance above said score line, said mouth portion being uncut whereby to retain the material disposed above the score line within the carton, means for settling the material at least to substantially the level of said score line, a plurality of pairs of shears for severing the longitudinal corners of said uncut mouth portion down to said score line to form top closing flaps, and means for adjustably mounting said shears to permit the position of the same to be adjusted to accommodate the cartons of different sizes.

11. In packaging apparatus for producing a filled and closed package, in combination, means for filling a carton having a body portion, a mouth portion, and a score line defining said portions, the commodity filling the carton a substantial distance above said score line, said mouth portion being uncut whereby to retain the material disposed above the score line within the carton, means for settling the material at least to substantially the level of said score line, a plurality

of pairs of shears for severing the longitudinal corners of said uncut mouth portion down to said score line to form top closing flaps, and carton feeding mechanism for feeding successive cartons into carton filling and cutting position, said mechanism operating in timed relation to the operation of said shears.

12. In packaging apparatus for producing a filled and closed package, in combination, means for filling a carton having a body portion, a mouth portion, and a score line defining said portions, the commodity filling the carton a substantial distance above said score line, said mouth portion being uncut whereby to retain the material disposed above the score line within the carton, means for settling the material at least to substantially the level of said score line, a plurality of pairs of shears for severing the longitudinal corners of said uncut mouth portion down to said score line to form top closing flaps, and carton feeding mechanism for feeding successive cartons into carton filling and cutting position, said mechanism operating in timed relation to the operation of said shears, and a pusher member operating in timed relation to said shears for discharging the filled cartons from the apparatus.

13. In a machine of the character described, in combination, carton supporting means for supporting a carton filled to a desired depth; and mechanism for severing the carton at the respective corners thereof from the upper end down to a point approximating the level of the material in the carton to form top-closing flaps.

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