

Sept. 17, 1935.

F. A. CHEKIAN

2,014,555

PACKAGE FORMING AND SEALING MACHINE

Filed Oct. 13, 1933

3 Sheets-Sheet 1

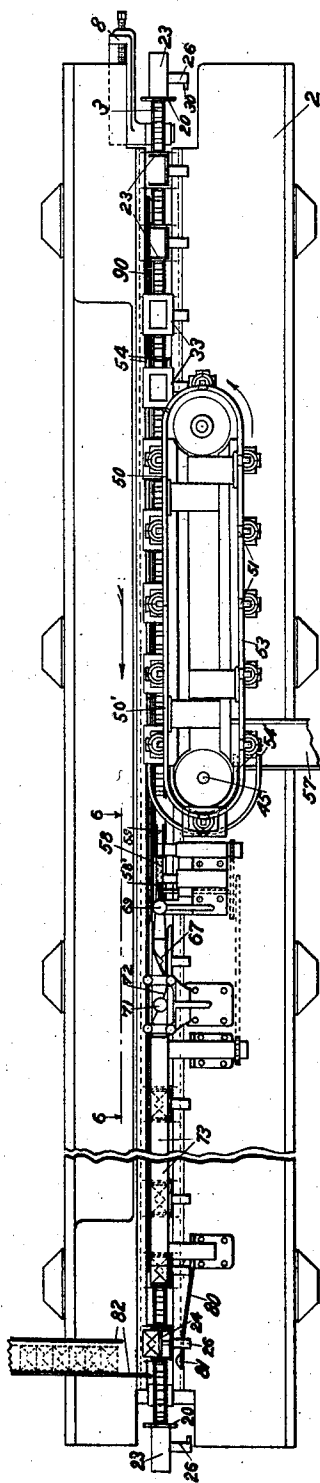


FIG. 2.

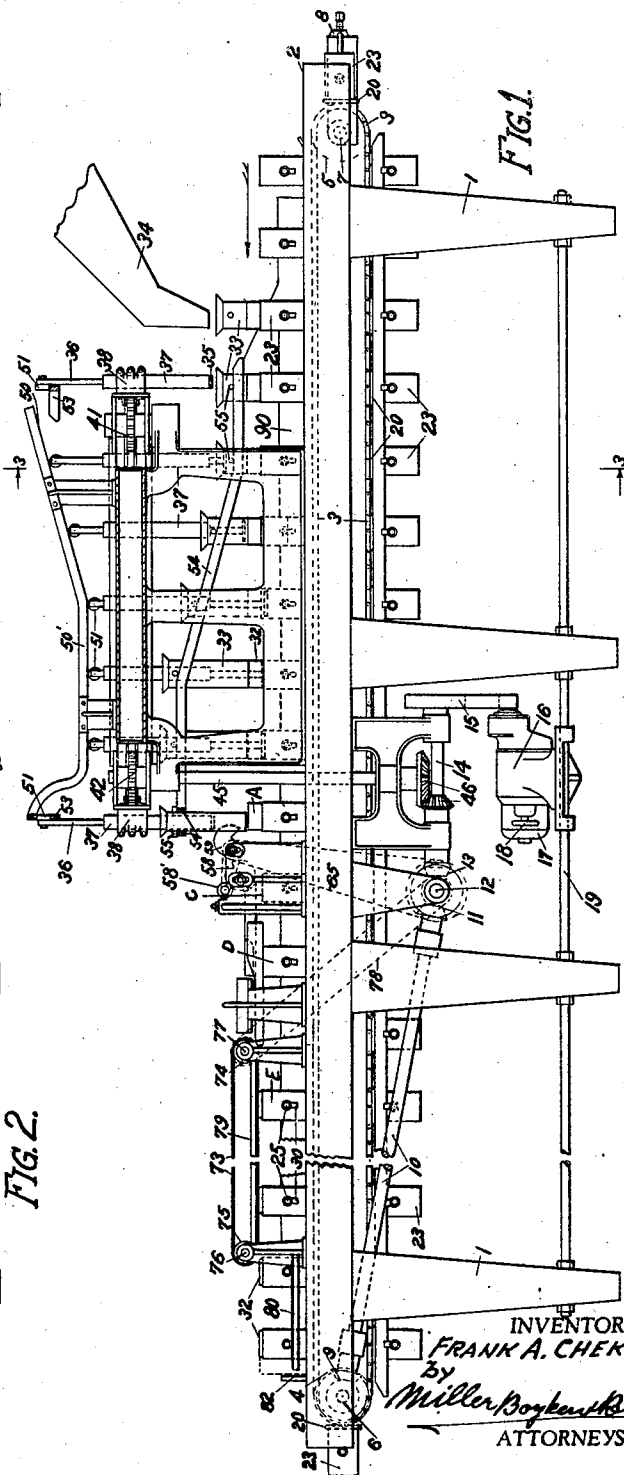


FIG. 1.

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FIG. 3

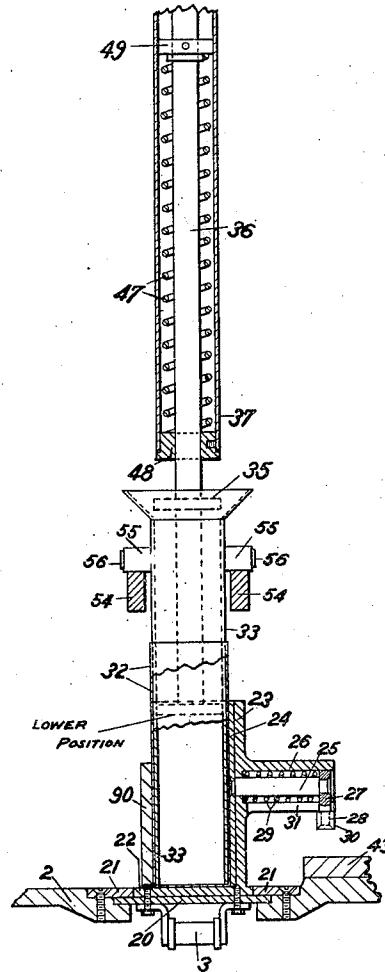
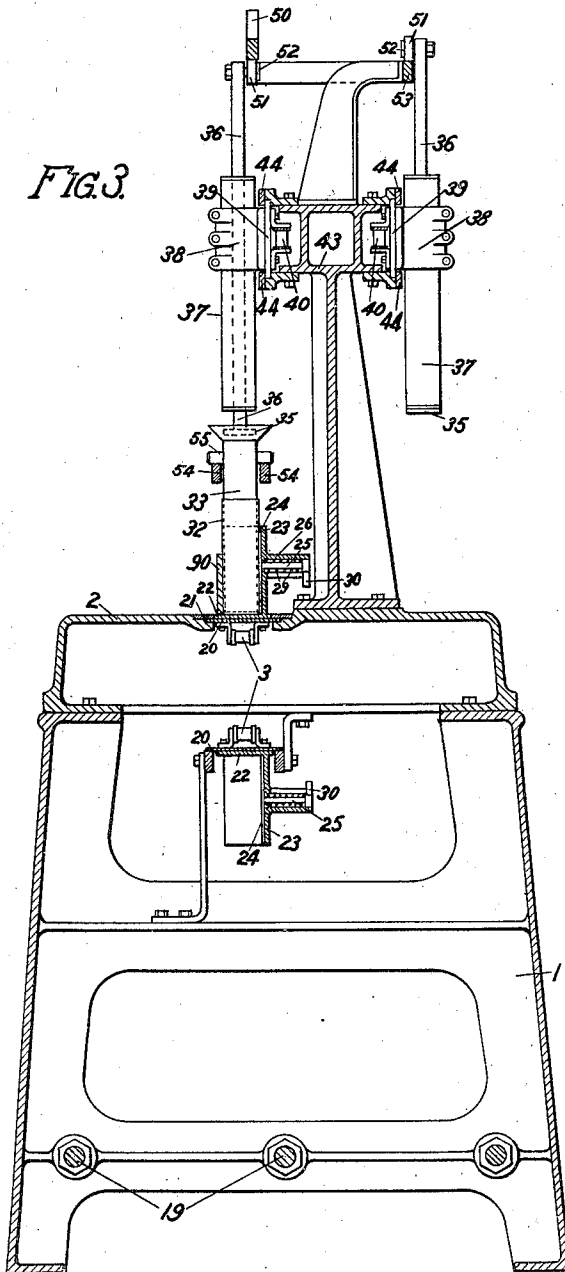


FIG. 4.

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3 Sheets-Sheet 3

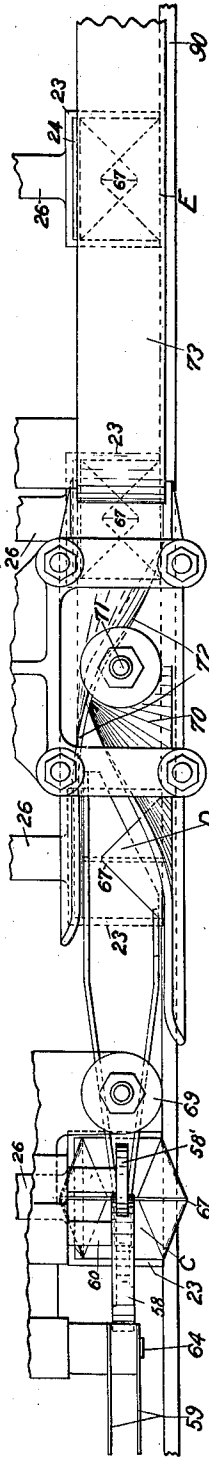


Fig. 7.

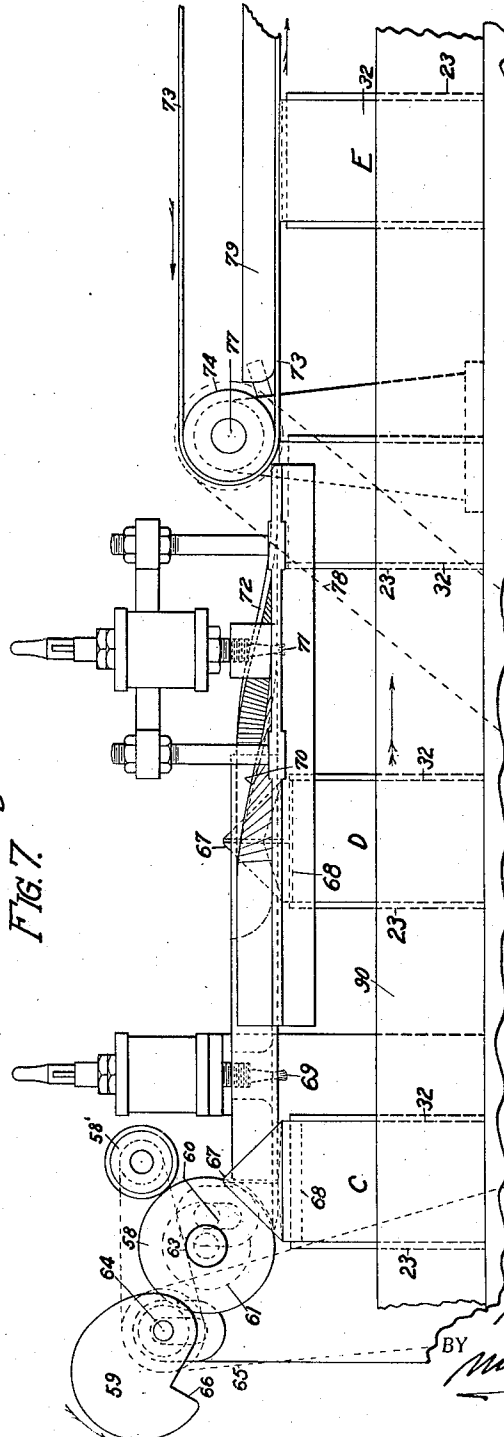


Fig. 6.

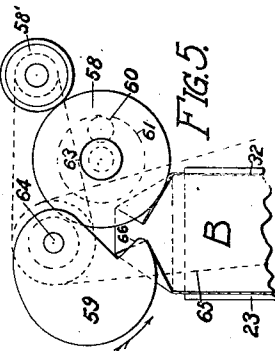


Fig. 5.

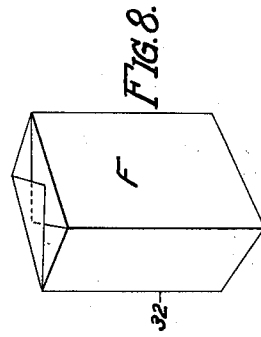


Fig. 8.

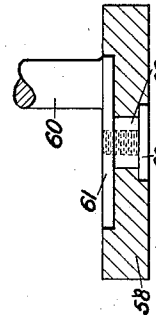


Fig. 9.

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UNITED STATES PATENT OFFICE

2,014,555

PACKAGE FORMING AND SEALING
MACHINE

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Application October 13, 1933, Serial No. 693,442

15 Claims. (Cl. 93—6)

This invention relates to machines for packing food products into bags and sealing the ends of the bags, and the objects of the invention are to provide a machine and process particularly adapted to compress dried fruit such as dried raisins, dried prunes, dried apricots, dried figs and other dried fruits, and/or materials having a resilient or springy nature, tightly into paper or more particularly transparent regenerated cellulose bags, fold and seal the end of the bag, all as a continuous process while retaining the bag in a rectangular mold so that the finished package will present a clean-cut carton-like appearance and be tightly filled with the dried fruit or other product. Other features and advantages of the invention will appear in the following description and accompanying drawings.

In the drawings Fig. 1 is a side elevation of the machine broken in length and with portion of the plunger controlling mechanism shown in section.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is an enlarged end view in section as seen from the line 3—3 of Fig. 1.

Fig. 4 is a still further enlarged view partly in section of the plunger and housing portion of Fig. 3.

Fig. 5 is an enlarged side view of the first bag closing operation of the folding cams and roller as seen from the far side of Fig. 1.

Fig. 6 is an enlarged side elevation of a portion of the machine as seen from the line 6—6 of Fig. 2 showing the successive folding of the flaps.

Fig. 7 is a plan view of Fig. 6.

Fig. 8 is a perspective view of a finished and sealed regenerated cellulose bag as of dried raisins, as produced by the machine.

Fig. 9 is an enlarged sectional detail of the flap folding idler wheel showing its manner of mounting.

Briefly described the machine comprises a series of traveling rectangular bag supporting forms each with one side open and into which a regenerated cellulose bag is positioned, the bag having a sealed lower end and inwardly supported by a sheet metal rectangular funnel which projects out of the upper end of the bag and may be filled with the desired quantity of dried fruit before inserting in the traveling forms or may be filled after placing in the form. As the bags and their funnels travel along, plungers descend to compress the fruit within the funnels while at the same time the funnels are drawn upwardly out of the bags. The fruit is compressed into the

bags below the point desired in the finished package, the plungers are withdrawn, upper ends of the bags quickly folded and sealed with quick drying cement, but not folded tightly against the fruit, as the fruit was compressed below the point where the bags are folded and sealed. The sealed packages then pass along under a traveling belt for a time to permit the compressed fruit to expand upward to take up the room left at top of the bag and force the folded flaps tightly together against the under side of the belt until the cement is set, and after which an ejector carried by each form is operated to eject the finished package out of the open side of the form.

In further detail the drawings show at 1 the frame of the machine, 2 a long flat table-like top in a central slot in which runs an endless chain conveyor 3 passing over sprockets 4 and 5 at opposite ends, mounted on transverse shafts 6, 7, the latter being equipped with suitable take-up boxes 8 for preserving proper working tension and the former geared at one end to a pinion 9 on a drive shaft 10 in turn geared at 11 to a transverse shaft 12 in turn geared at 13 to a shaft 14 belted or chain-driven as at 15 to a suitable speed reducing gear set in casing 16 in turn driven by an electric motor 17, the speed reducing gear set being of any conventional type and provided with a hand wheel 18 or other device for changing the output speed to suit, the whole being preferably carried on the machine bracing 19 as indicated.

Chain conveyor 3 (see Figs. 3 and 4) is fitted with attachment links carrying plates 20 which slide along in rabbets formed in the table and are held down by flat strips 21 secured flush in the table top, while secured to the outer or upper sides of plates 20 are the flat bases 22 of the open-sided metal forms 23 which have three vertical walls and one open side as shown best in Figs. 6 and 7. Lying within each form and normally positioned against the rear wall thereof is a flat ejector plate 24 provided with an actuating stem 25 projecting rearwardly into a guiding boss 26. This stem has a collar 27 secured to its outer end and a pin 28 projecting downwardly from the collar through a slot 29 in the boss and carrying a smaller roller 30 for operation in a manner to be later described to eject the package, while a coiled spring 31 within the boss normally retracts the ejector plate to the position shown.

The regenerated cellulose bags, 32, used are pre-made with a closed bottom and each is fitted over the outside of a rectangular sheet metal funnel 33 before being brought to the machine,

and the funnel with its bag fits snugly into the open side of the form with the funnel resting at its lower end on the flat bottom of the bag in turn supported on the flat base 22 of the form. This assemblage of bag and funnel may, as stated, be previously filled with the desired quantity of measured or weighed fruit or other commodity, or may be filled on the machine as from a supply spout 34 if desired.

As the vertically disposed bags and their funnels travel along (in direction of the arrow in Fig. 1) they come under plungers 35 which descend within the funnels to compress the fruit. These plungers (see Figs. 3 and 4) are mounted on the lower ends of square rods 36 vertically slidable in hollow guides 37 in turn carried by clamping brackets 38 secured to plates 39 carried by an endless conveyor chain 40 which passes over horizontal sprockets 41, 42 carried on a superstructure 43, and which also forms guides in which plates 39 slide while being retained in position by strips 44, the guide for the chain being in plan like a flat sided oval with one run directly in line over the run of chain 3 below.

Sprocket 42 is mounted on the upper end of a vertical shaft 45 geared at its lower end as at 46 to shaft 14 in a manner to drive the upper chain 40 in direction of the arrow (Fig. 2) and maintain the plungers in register with the funnels being carried on the lower chain.

Plungers 35 are rectangular to fit freely within the rectangular funnels and they are normally drawn upward to the limit of their stroke by spiral springs 47 within each guide 37 reacting between the lower head 48 of the guide and a collar 49 secured to the rod 36, and they are forced downward into the funnels during the travel of the same by means of an angularly arranged fixed track or cam 50 which overlies the path of travel and ride over rollers 51 carried on pins 52 extending laterally from the upper ends of rods 36. This track cam forces the plunger down to a point about a half inch more or less than the desired height of the fruit in the package and holds it there for some time during the horizontal run of the track indicated at 50', and then suddenly releases it and the plunger moves outwardly and its roller engages over a second track 53 which continues for a distance only around the oval path of travel to positively hold the plungers out and relieve the springs of this work.

While the plungers are thus being forced downward into the funnels the latter are being withdrawn upward by the engagement of a pair of similar cam tracks 54 but at their upper edges with small rollers 55 carried on pins 56 projecting from opposite sides of the funnels (see Fig. 4). The funnels are thus entirely withdrawn from the bags and they fall from the machine at the end 54' at the end of their lifting tracks either to a chute 57 or they may be taken by an operator for reinsertion in another bag and refilling for replacement on the machine as described.

After the operations just described the compressed package proceeds with the empty upper end of the bag projecting above the three-sided form as shown at A in Fig. 1 for the first folding operation, and which is carried out by means of the combined effects of a driven wheel 58 and a pair of revolving cam plates 59 which sweep across opposite sides of said wheel. The wheel 58 and cam plates are only about a third of the width of the bag as will be seen by reference to Fig. 7 wherein the bag being operated on is dis-

nated C. Said wheel is supported by means of a bracket arm 60 carrying a circular plate 61 countersunk into the side of wheel 58 and from which the pivot 62 of the wheel extends to a smaller disk 63 countersunk in the opposite side of the roller. This construction is to permit the spaced cam plates 59 to work close to opposite sides of the wheel without interfering with shaft or hubs. The wheel 58 is driven by a wheel 58' provided with a non-skid peripheral surface of rubber or similar material disposed in driving contact with the outer surface of wheel 58. The wheel 58' is adapted to be positively driven by a sprocket and chain (as indicated in Figs. 5 to 7) at a rate of speed slightly faster than the speed at which the package is advanced.

Cam plates 59 are carried on a short horizontal shaft 64 positively driven as by chain drive 65 from shaft 12. The plates 59 are somewhat oval-shaped with a shoulder at 66 arranged to come around and strike the outside of the rear wall of the projecting bag about the time the wheel 58 strikes the leading wall. Fig. 1 shows at A the bag before being engaged by the cam plates, while Fig. 5 shows position B of the bag with both cam plates and wheel as having bent the regenerated cellulose inwardly, and position C shows the bag leaving the wheel with the top of the bag folded to the horizontal and with the pointed side flaps as at 67 projecting upwardly at opposite sides of wheel 58 ready to be folded over one on top of the other and glued in place as the bag advances.

It should be noted that the setting of wheel 58 and cam plates 59 does not result in folding the bag down upon the fruit level 68 but preserves an air space above it for subsequent expansion of the fruit. After leaving position C a fountain brush 69 charged with rapid setting adhesive suitable for regenerated cellulose, smears a small streak across the folded upper layer of the package, and this is closely followed at position D by a curved sheet metal fin 70 which is formed to bend one of the pointed side flaps inwardly and then ride over it. A second fountain brush 71 then smears a little cement upon the top of the folded side flap as it passes under the brush, and a second curved plate or fin 72 engages the remaining or opposite side flap and folds it over against the pasted top of the first one. The package still within its three-sided form 23 continues its travel along the machine and rides under a flat overlying belt 73 passing over pulleys 74, 75 mounted on horizontal shafts 76, 77, either one being driven at the same surface speed as the package conveyor as by means of a chain drive 78 from shaft 12.

The lower run of belt 73 is arranged to hold the cemented flaps down, and it may be backed up by a rigid guide 79 if required as it is the object to ride the packages along under it for a time period to permit the compressed fruit to expand and force the folded layers of regenerated cellulose outward from below against the belt and maintain the pressure until the cement is set. This, however, takes but a few moments by reason of the quick setting cement used so that the belt contact need not be more than a few feet in length as the expansion of the dried fruit creates a considerable upward pressure and forces a tight contact of the regenerated cellulose layers.

As the sealed and completed packages pass from under the last belt pulley 75 the roller 80 on the stem 25 of the ejecting plate 24 comes

into contact with an angularly placed guide 80 (Figs. 1 and 2) which forces it to eject the package through the open side of the form, the final ejecting movement being in the nature of an abrupt kick achieved through means of a hump 81 on the rear end of the guide 80 and which insures the package clearing the form as it is engaged by the walls of a receiving chute or laterally extending guide 82. One of the completed packages is shown in perspective at F in Fig. 8.

The empty package forms pass over the extreme end of the conveyor and return below the table of the machine for a repetition of the travel described.

Having thus described my method and apparatus for sealing dried fruit into thin regenerated cellulose or paper packages by a combination of pressure and expansion the invention will be seen to be especially adapted for all products of a springy nature which may be compressed downward by the plungers and will thereafter slowly expand upward when the pressure is released, though it will be evident to those skilled in the art that the invention has value for packing various products, even if all of its advantages are not realized in the packing of some products.

It is also to be noted that I preferably provide a guide member 90 on the upper side of the table 2, extending alongside the open side of the forms 23. This guide member is a long strip positioned edgewise to the plane of the table and functions to assist in keeping the funnels in the forms 23 during that portion of their travel in which the funnels are engaged in the bags 32 and also to assist in supporting the packages of raisins.

Means may also be provided for successively cleaning the end surfaces of the plungers before they enter the funnels to press the fruit into the packages, and such means may comprise a wiper of any desired form, such means not being shown nor specifically claimed.

Having described my invention, I claim:

1. The method of packaging resilient material which comprises compressing the material into a flexible paper-like bag confined in a form, and forcing the material to a level below that desired, folding the open end of the bag over and at a point spaced above the material and applying cement thereto, then confining the outside folded top of the bag until the expanding material has forced the folded layers tightly together, and thereafter removing the bag from confinement.

2. The method of packaging resilient material which comprises compressing the material into a flexible bag while sustaining the same against bursting, and forcing the material to a level below that desired in the completed package, folding and cementing the open end of the bag over the compressed material before the material has expanded to the desired level of the completed package, then confining the outside of the folded end at the desired level of the completed package until expansion of the material forces a tight joint of the folds retained by the cement.

3. In a machine for packaging dried fruit and other materials, an endless conveyor, a series of rectangular forms carried by said conveyor a plurality of rectangular funnels adapted to each fit into a bag as of regenerated cellulose to be filled and the funnel and its bag to fit within any of said forms, a series of plungers arranged to descend

into the funnels when supported in the forms and compress the contents means for forcing the plungers to descend during the travel of the conveyor, means for extracting the funnels from the bags while the plungers are respectively in compressing position, and means for thereafter extracting the plungers from the bags.

4. In a machine for packaging dried fruit and other materials, an endless conveyor, a series of rectangular forms carried by said conveyor, a plurality of rectangular funnels adapted to each fit into a bag as of regenerated cellulose to be filled and the funnel and its bag to fit within any of said forms, a series of plungers arranged to descend into the funnels when supported in the forms and compress the contents, means for forcing the plungers to descend during the travel of the conveyor, means for extracting the funnels from the bags while the plungers are respectively in compressing position, and means for thereafter extracting the plungers from the bags, said forms provided with one open side and end for the insertion of the funnel with its bag in place.

5. In a machine as specified in claim 4, means for ejecting the filled packages from the side of said forms.

6. In a machine as specified in claim 3, means along the run of the conveyor for folding and sealing the open end of the bag, and means for ejecting the sealed bags from the side of the forms.

7. In a machine as specified in claim 3, means along the run of the conveyor for folding and sealing the open ends of the bags including a belt traveling with the packages and holding the folded ends closed until the folds adhere, and means for ejecting the sealed bags from the side of the forms.

8. In a packaging machine, an elongated table, an endless conveyor on horizontal axes arranged with its upper run in said table, a plurality of bag-holding forms carried by said conveyor, a second endless conveyor on vertical axes arranged above said table with one run aligned over the upper run of the form conveyor, a series of plungers carried by the upper conveyor each aligned over one of said bag-holding forms, means for causing both conveyors to travel at the same speed, and means for successively lowering and raising the plungers relative to the second conveyor into the bag-holding forms.

9. In a packaging machine, an elongated table, an endless conveyor on horizontal axes arranged with its upper run in said table, a plurality of bag-holding forms carried by said conveyor, a second endless conveyor on vertical axes arranged above said table with one run aligned over the upper run of the form conveyor, a series of plungers carried by the upper conveyor each aligned over one of said bag-holding forms, means for causing both conveyors to travel at the same speed, a series of funnels each with a bag to be filled slipped thereover and fitting within said forms, means for successively lowering and raising the plungers in the funnels for compressing any contents thereof and means for successively lifting the funnels out of the bags during the lowered position of the funnels.

10. In a construction as specified in claim 8, the means for lowering the plungers comprising a cam, and the raising means a spring.

11. In a construction as specified in claim 8, the means for lowering the plungers comprising a cam and the raising means a spring and means 75

for locking the plungers against descent during a portion of their travel.

12. In a machine for filling containers such as paper bags, tubular members adapted each to fit within a container, a rigid form into which the tubular member and its bag fits and is supported at the bottom, a plunger arranged above the tubular member when in place in the form, means for causing the plunger to descend to compress material placed in the tubular member, means for holding the plunger depressed for a period of time, separate means for withdrawing the funnel and plunger respectively, means for simultaneously moving the form, tubular member, and plunger along a path of travel.

13. The method of packaging resilient material which comprises applying pressure to the top of resilient material within a paper-like bag to compress the material to substantially below the desired level of the top of the closed bag while sustaining the sides and bottom of the bag against bursting, removing the pressure from the top of said resilient material, folding and cementing the top of the bag over the compressed material during upward expansion of the resilient material and before it has expanded to the height of the folded top, then confining the folded top of the bag against upward movement at the point of the desired level of the folded bag until expansion of the resilient material forces a tight joint of the folds retained by the cement.

14. In a packaging machine, means for compressing dried fruit and the like into flexible bags as of regenerated cellulose to a point below the desired level defined by the top of the bag when the top is folded and sealed, means supporting the bags against injury during compression of the fruit therein, separate means for folding and sealing the top of the bags at a point spaced above the contents after compression, and means for

supporting the closed bags until expansion of the compressed contents to thereby form tight folds at the top of the bags, the means for folding the top of the bags including a wheel passing against and across the tops of the bags in a manner to bend the bags inward over the contents, and a pair of devices lying to opposite sides of said wheel arranged to move across the bags in a direction toward said wheel to fold the opposite edge inward over the contents and thereby forming two pointed flaps on each bag at the two other sides of the bag, and means for folding down the pointed flaps.

15. In a packaging machine, means for compressing dried fruit and the like into flexible bags as of regenerated cellulose to a point below the desired level defined by the top of the bag when folded and sealed, means supporting the bags against injury during compression of the fruit therein, separate means for folding and sealing the top of the bags at a point spaced above the contents after compression, and means for supporting the closed bags until expansion of the compressed contents to thereby form tight folds at the top of the bags, the means for folding the top of the bags including a wheel passing against and across the tops of the bags in a manner to bend the bags inward over the contents, a pair of devices lying to opposite sides of said wheel arranged to move across the bags in a direction toward said wheel to fold the opposite edge inward over the contents, and thereby forming two pointed flaps on each bag at the two other sides of the bag, means for folding down the pointed flaps comprising curved fins adapted to engage the flaps in succession as the package is moved along and ride over the flaps, and means for so moving the package.

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