May 13, 1941. S. H. BERCH 2,241,942

PACKAGING MACHINE

Filed May 25, 1938 6 Sheets-Sheet 1

Fig. 1

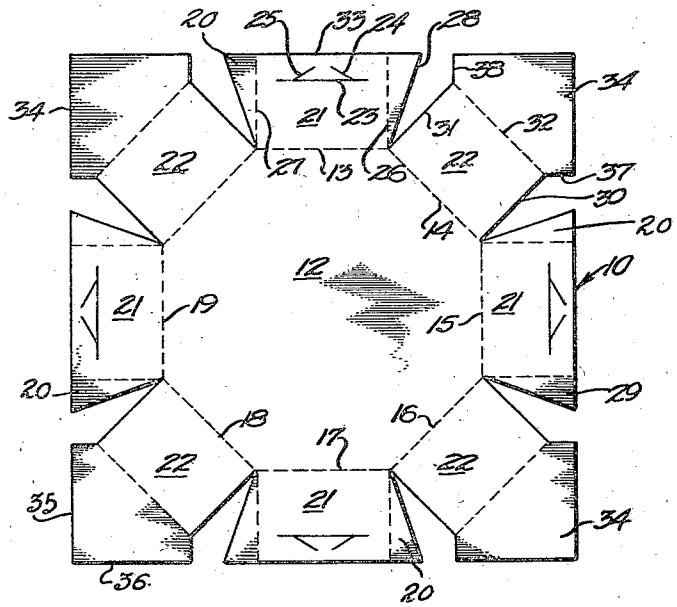
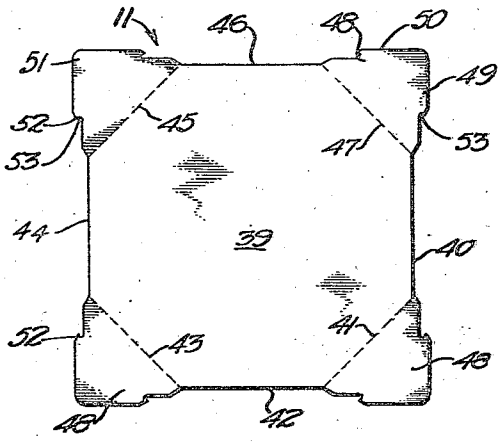


Fig. 2



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PACKAGING MACHINE

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Fig. 3.

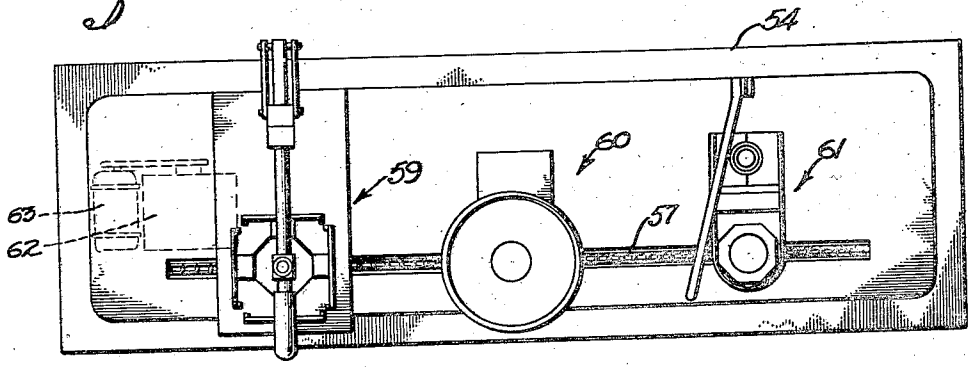
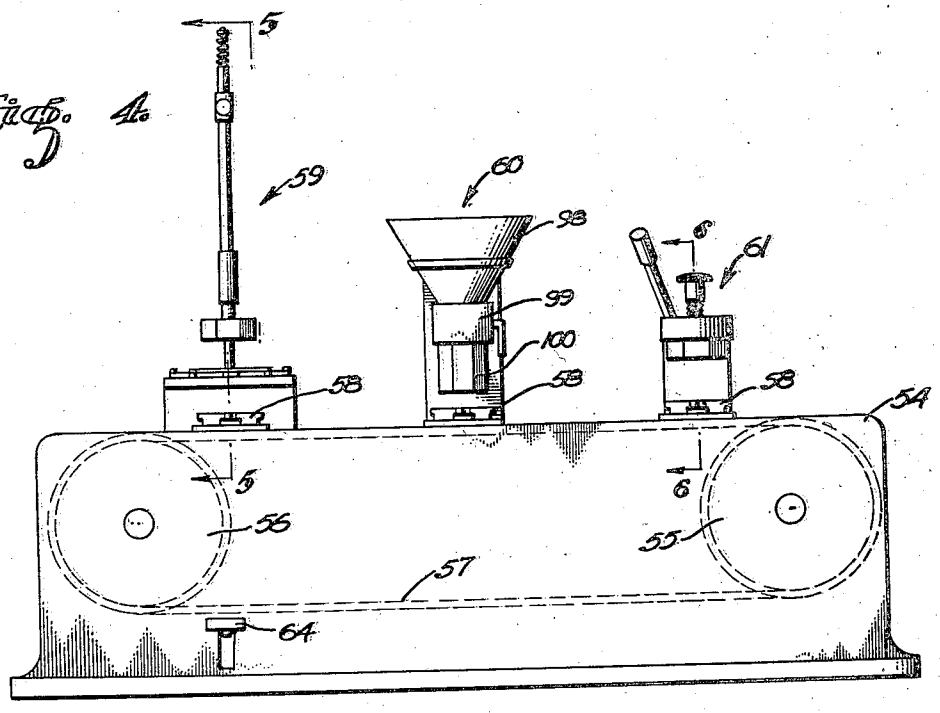


Fig. 4.



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Fig. 3.

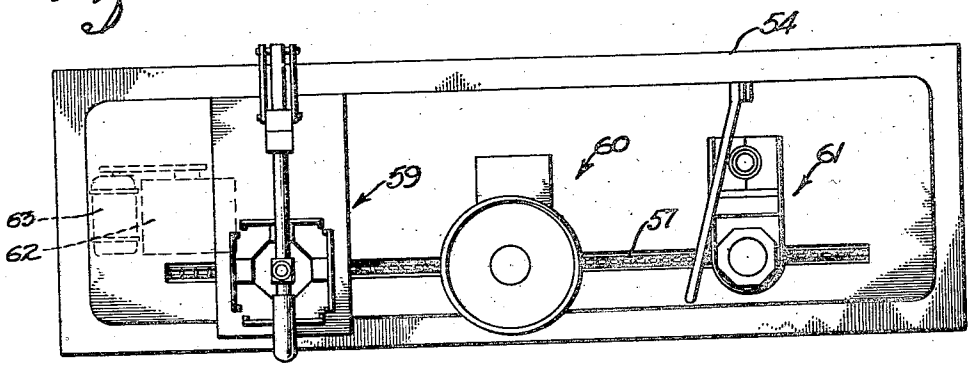
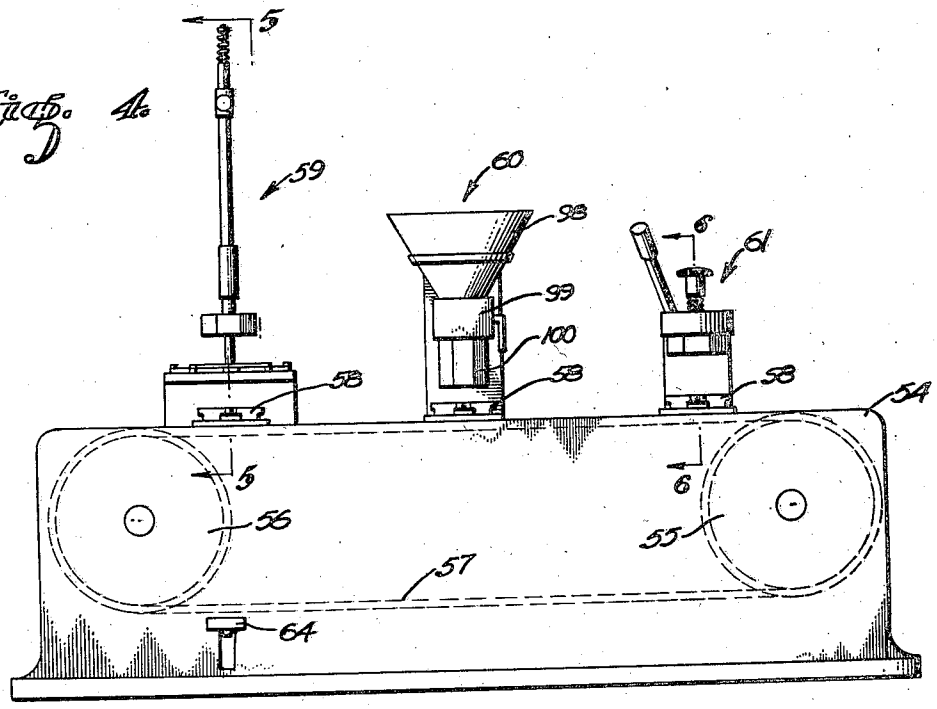


Fig. 4.



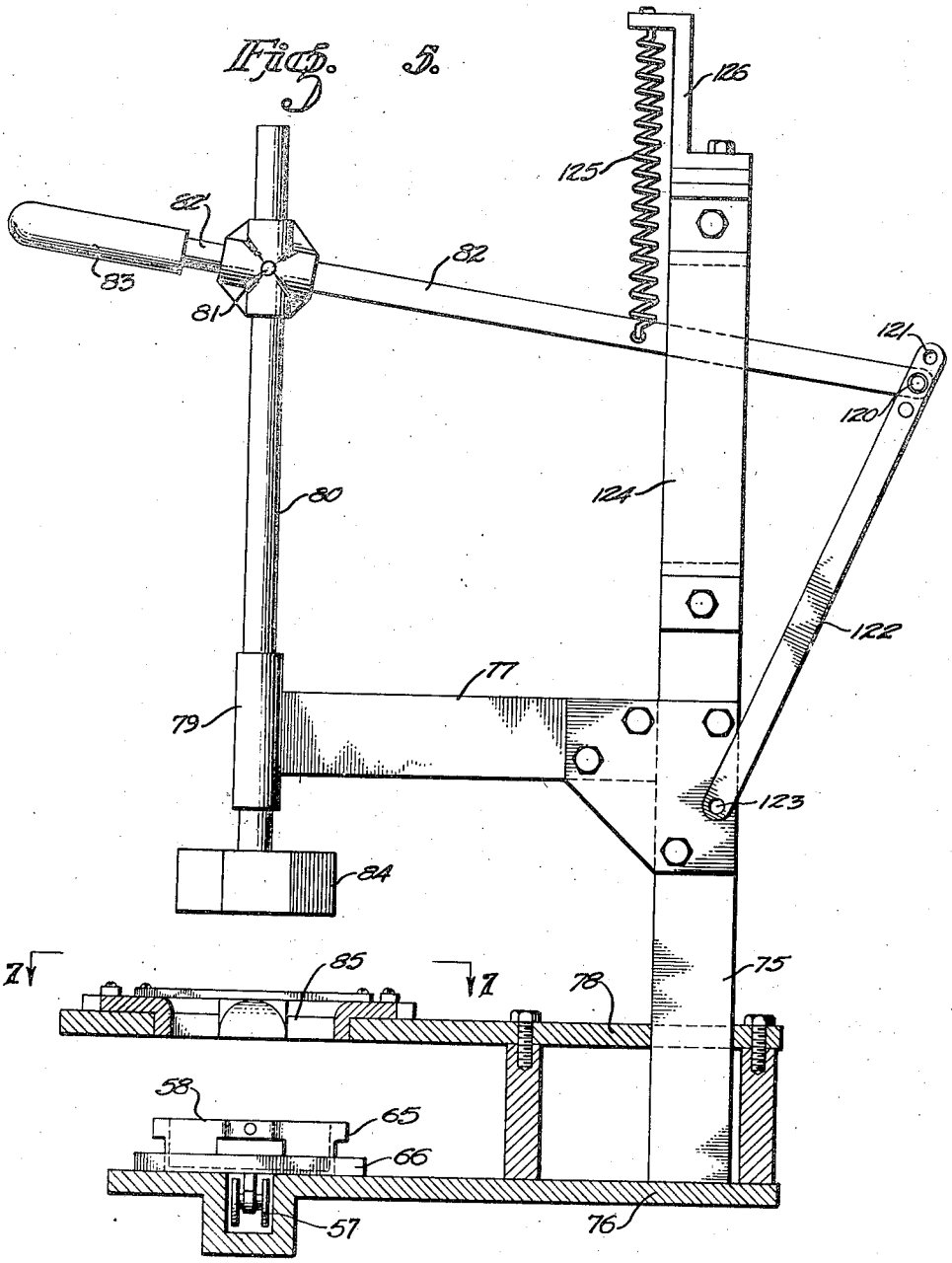
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PACKAGING MACHINE

Filed May 25, 1938 6 Sheets-Sheet 3

Fig. 3.



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PACKAGING MACHINE

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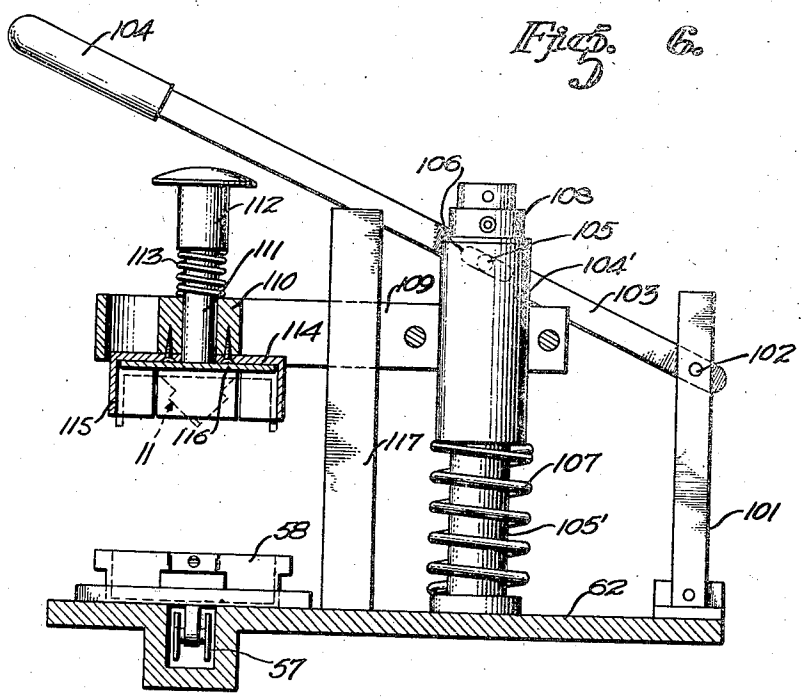


Fig. 6.

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PACKAGING MACHINE

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Fig. 7.

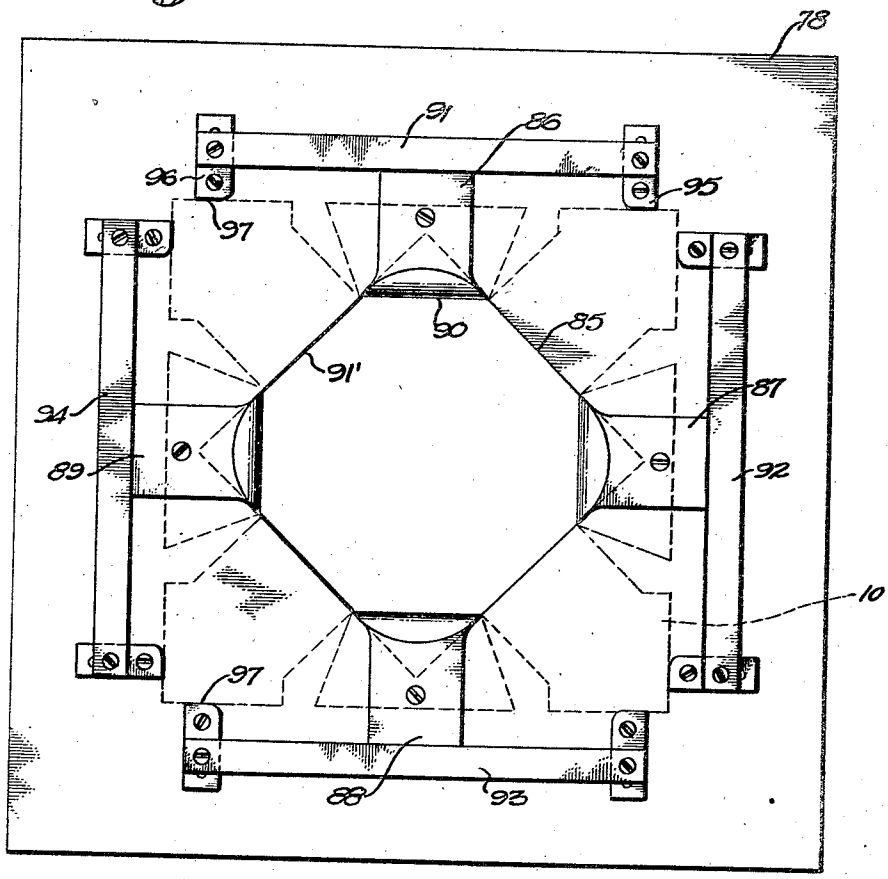
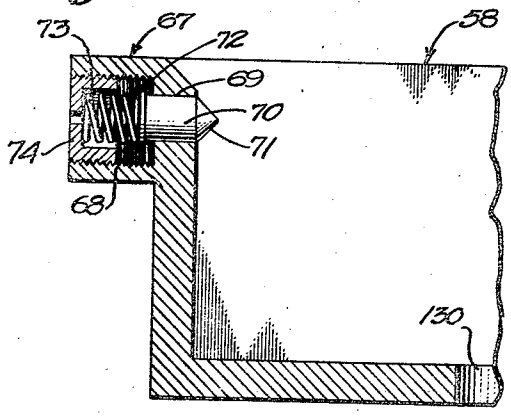


Fig. 10.



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PACKAGING MACHINE

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Fig. 8.

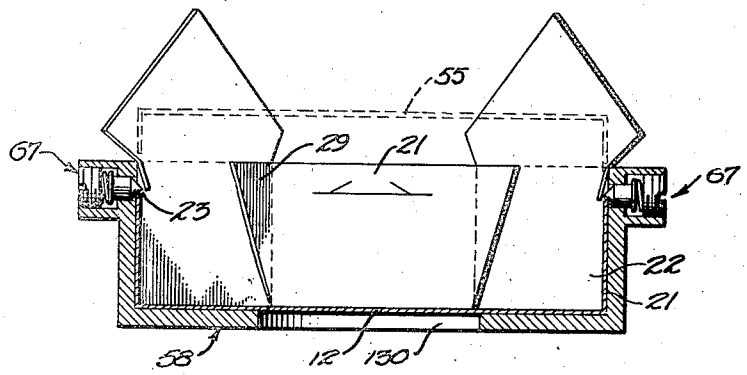
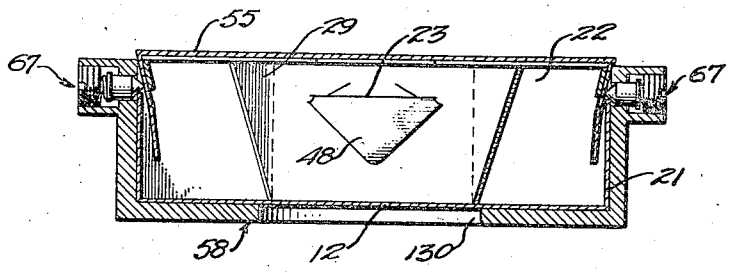


Fig. 9.



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Patented May 13, 1941 2,241,942

UNITED STATES PATENT OFFICE

2,241,942

PACKAGING MACHINE

Samuel H. Berch, Beverly Hills, Calif., assignor to Arden Farms, Co., Los Angeles, Calif., a corporation of Maryland

Application May 25, 1938, Serial No. 210,037

8 Claims. (Cl. 93—3)

This invention relates to apparatus for packing and sealing products in cartons, and particularly pertains to a packaging machine.

In the sealing of products, such as ice cream, cheese, and the like, in cardboard packages, such for example as the carton disclosed in my co-pending application entitled a package for food products and the like, filed May 24, 1938, Serial No. 209,733, it is desirable to provide mechanical means whereby the carton may be shaped from a previously cut blank, thereafter temporarily held in a shaped condition while being filled and then sealed by mechanically operating means, and it is the principal object of the present invention to provide the packaging machine having a carton forming station, a filling station, and a sealing station to and from which a carton may be successively moved, and at which stations the blank will be shaped to receive the food product. The food product will then be placed within the carton and thereafter the partially assembled carton is acted upon at a sealing station to be completely formed and sealed.

The present invention contemplates the provision of a machine having forming, filling, and sealing stations to and from which a mold may be carried, and within which mold a partially formed carton may be placed, thereafter filled, and then sealed by the application of a top member whereby a product will be completely packed and ready for the market.

The invention is illustrated by way of example in the accompanying drawings in which:

Figure 1 is a view in plan showing the blank for the carton to be used in forming the package with which the present invention is concerned.

Fig. 2 is a view in plan showing the blank top member by which the carton is closed and sealed.

Fig. 3 is a view in plan showing a machine embodying the details of the present invention.

Fig. 4 is a view in side elevation showing the machine with which the present invention is concerned.

Fig. 5 is a view in vertical section through the carton forming station as seen on the line 5—5 of Fig. 4.

Fig. 6 is a view in vertical section through the sealing station of the machine as seen on the line 6—6 of Fig. 4.

Fig. 7 is an enlarged view in plan showing the folding die and indicating the carton blank in dotted lines prior to the folding operation.

Fig. 8 is a view in diagram showing the carton when the blank is in its folded position.

Fig. 9 is a view in vertical section and elevation showing the final operation of the sealing apparatus with the cover member in place.

Fig. 10 is an enlarged fragmentary view in vertical section showing the manner in which the flaps of the cover member are disposed in interlocking relation with the side wall of the container body.

Referring more particularly to the drawings, 10 indicates a blank from which a container body is made and with which the present invention is designed to operate. 11 indicates the blank of a cover and sealing member adapted to interlock with the body member and to hold the carton sealed and in package form. The carton is more particularly disclosed in my co-pending application entitled a package for food products and the like, Serial No. 209,733 filed concurrently herewith. The blank 10 is generally square in outline and has an octagonal center portion 12 scored therein. This octagonal field 12 is bounded by score marks 13 to 20, inclusive, and forms the bottom of a container used with the present machine. The sides of the field 12 as represented by the score marks carry side wall sections which when folded at right angles to the bottom field 12 form the side walls of an octagonal container. The wall sections adjoining the score marks 13, 15, 17, and 19, are each designated by the numeral 21. The wall sections adjoining the score marks 14, 16, 18, and 20, are each designated at 22. The sections 21 are interlocking sections to receive lock tangs carried by the cover member 11 as will be hereinafter described. These sections have a transversely extending slit 23 extending parallel to their outer edges and suitably spaced therefrom. To facilitate in the interlocking operation oppositely disposed inclined slits 24 and 25 are formed in the portion of the members 21 between their outer edges and the slits 23, and are disposed a distance from the ends of the slits 23 as will accommodate the lock tangs of the cover member. Parallel score marks 26 and 27 extend from the inner score marks previously described and to the outer edges of the portions 21. The distance between these score marks is a distance representing the length of the score marks bounding the octagonal center field 12. The marginal side edges of the portions 21 flare outwardly as indicated at 28 and form triangular portions 20 which produce overlapping corner flaps for the finished container. The portions 22 have opposite parallel sides 30 and 31 which are spaced a distance apart equal to the length

of the score marks of the octagonal center. The portions 22 are also formed with a transverse score mark 32 which is parallel to the inner score mark of the octagonal field and is spaced a distance from the inner score mark equal to that between the sides of the octagonal field 12 and the outer marginal edge 33 of the portions 21. This distance represents the height of the container. Formed as a part of the portions 22 and extending beyond the score marks 32 is a cover flap 34 which lies at the corner of the blank and has opposite marginal edges 35 and 36 which are in longitudinal alignment with the marginal edges 33 of the portions 21. These edges terminate in shoulders 37 and 38 which are at right angles to the outer marginal edges and meet with the side edges 30 and 31. The cover blank 11 is substantially square in shape and has a hexagonal center portion agreeing in dimensions substantially with that of the hexagonal field 12 of the body blank 10. This hexagonal field is designated at 39 and is bounded by marginal edges 40 to 47, inclusive. The edges 40, 42, 44, and 46 are the outer edges of the blank. The edges 41, 43, 45, and 47 are diagonal score marks adjacent the corners of the blank. These score marks separate locking tangs 48 from the octagonal field 39. The tangs have outer marginal edges 49 and 50 which are at right angles to each other and converge in a rounded point 51. Locking hooks 52 are formed by recessed portions 53 adjacent to the base of each of the tanks. These hooks pass through the slits 23 in the portions 21 of the body member and interlock therewith to hold the cover in place and to hold all of the sides of the body member 10 in their assembled relationship to preserve the shape of a sealed package.

The present invention is particularly concerned with mechanical means for forming, filling, and sealing a package made primarily from the blank 10 and 11 previously described. As shown in Figs. 3 and 4 of the drawings the mechanism is disclosed as embodying a frame structure 54 upon which conveyor sprockets 55 and 56 are rotatably mounted around which a conveyor chain 57 is led. This conveyor chain may have permanently mounted thereon or detachably secured thereto a plurality of molds 58, which molds temporarily hold the blank in their folded position until after the carton has been formed, filled, and sealed. The molds are moved to and from a forming station 59, a filling station 60, and a sealing station 61. This may be done manually or as here shown may be done by moving the molds on the conveyor chain 57. If the molds are moved by the conveyor chain 57 it is evident that a transmission mechanism generally indicated at 62 shall be interposed between a shaft of one of the sprockets 55 or 56 and a power source 63 in order to produce automatic intermittent driving movement for the chain. It is also obvious that the transmission mechanism might be controlled by a clutch treadle 64 by which the chain would be intermittently driven from station to station.

As shown in Fig. 5 of the drawings the mold 58 is hexagonal in shape and may be formed with a marginal flange 65 by which the mold might be lifted from a holder 66 carried by the conveyor. With particular reference to Fig. 10 it will be seen that certain of the side walls of the mold are provided with lock pin structures 67. To accommodate these the mold is formed with a horizontally extending bore 68 terminating in a reduced bore 69. The reduced bore receives the cylindrical shank 70 of a pin which has a point 71 projecting beyond the vertical inner face of the die and at the opposite end of which is an enlarged head 72 which limits outward movement of the point 71. A spring 73 yieldably holds the pin in its outermost position and is held in place by a screw plug 74, the operation of which will be hereinafter described.

Referring more particularly to Figs. 5 and 7 of the drawings, the forming station will be described. This station comprises an upright member 75 which is attached to a frame element 76 carried by the main frame 54. This upright is formed with a horizontally extending arm 77 which overhangs a horizontal table 78. The table 78 is disposed above the upper run of the chain 57 and is in spaced relation above the mouth of the molds 58 carried by the chain 57. The arm 77 is provided with a tubular vertical bearing 79 through which a vertical mandrel 80 extends and reciprocates. The upper end of the mandrel carries horizontally extending trunnion pins 81 which engage bearings in an operating lever 82. The outer end of the operating lever 82 extends beyond the trunnions 81 and is fitted with a handle 83 by which it may be grasped. For convenience the handle portion 82' may be off-set to permit the operator to more easily observe the operations taking place. Mounted at the lower end of the mandrel 80 is a mold block 84. This block as here disclosed is octagonal in shape so that it will shape the carton blank 10 within the mold 58. It is to be understood that the longitudinal axis of the mandrel 80 is coincident with the central axis of the mold 58 at the time the mold is at the forming station so that when the mold block 84 is moved downwardly and into the mold it will accurately register therewith. The table 78 which is interposed between the mold block 84 and the mold 58 at the forming station is formed with an opening 85 through it. The center of this opening coincides with the longitudinal center axis of the vertical mandrel 80 and the center of the mold 58. By reference to Fig. 7 of the drawings it will be seen that the central opening 85 is square and disposed with opposite corner axes in longitudinal alignment with the plane of the path of travel of the chain 57. Disposed across and overhanging these corners are folding members 86, 87, 88, and 89. These members are formed at their inner ends with curved edge faces 90 which intersect the side walls of the opening 85 to form side faces 91'. The length of the side wall faces 91' and the curved edge faces 90 are equal, thus causing the effective shape of the opening 85 to be octagonal and to agree in dimensions and proportions substantially equal to the shape of the cavity within the mold 58. The curved edges 90 curve inwardly and downwardly, and make a folding surface over which the flaps 21 of the blank 10 move as the blank 10 is being delivered to its mold 58. Mounted parallel to the corner axes of the opening 58 and at right angles to each other, are centering units 91, 92, 93, and 94. These units each include guide fingers 95 and 96, the end faces 97 of which are presented to act as centering guides for the edges 35 and 36 of the corner tangs 34 of the blank 10. In Fig. 7 of the drawings a blank properly centered is indicated by dotted lines. It is to be understood that the octagonal opening 85 in the table is positioned so that its sides will agree with the sides of the mold block 84 and the mold 58. Thus insuring that when the mold block 84 is moved downwardly through the open-

ing 85 and into the mold 58 it will properly register therewith and will force the blank 10 downwardly into a folded position within the mold, where it will remain as indicated in Fig. 8 of the drawings until after it has been filled.

The filling station 60 embodies the use of any desired filling structure, such for example as a hopper 98, a control valve 99, and a filling spout 100. The details of the sealing station are more particularly disclosed in Fig. 6 of the drawings where it will be seen that mounted on the frame 62 is a vertical standard 101 carrying a pivot pin 102 adjacent its upper end. Pivotally mounted on this pin is an operating lever 103 which extends transversely of the path of the chain 57, and carries an operating handle 104 at its outer end. Mounted upon the frame 62 at a point intermediate the standard 101 and the chain 57 is a vertical post 105'. The post is fixed to the rame 62 and extends upwardly to a point above and alongside the operating lever 103. Slidably mounted upon the post is a sleeve 104' which carries a pin 105. The pin 105 extends through a slotted opening 106 in the operating lever 103 and thus transmits motion from the lever 103 to the sleeve 104' so that the sleeve will slide vertically upon the post 105'. The sleeve is yieldably held in its uppermost position by a spring 107. The upward movement of the sleeve is limited by a set collar 108 secured to the post 105.' Fixed upon the sleeve 104' is a horizontal arm 109 which overhangs the path of travel of the chain 57 with its molds 58. This arm is preferably made by the use of a pair of spaced bars between which a bearing member 110 is secured. The bearing member 110 has a central vertical axis in longitudinal alignment with the center plane of the chain 57 and the mold 58. Reciprocably mounted through the bearing 110 is a plunger rod 111 carrying a plunger head 112 at its upper end. A spring 113 is interposed between the upper face of the bearing 110 and the lower face of the head 112 to hold the plunger rod 111 in its uppermost position. Mounted on the lower face of the bearing member 110 is a guide cup 114 which has downwardly extending fingers 115 defining the perimeter of an octagonal field as represented by the inside dimensions of the carton which has been formed and is held within the mold 58. Mounted within the cup 114 is an ejector plate 116 which is also of octagonal shape, and conforms to the field subtended by the fingers 115. The ejector plate 116 is fixed upon the lower end of the plunger rod 111 and will be moved downwardly when force is applied to the head 112. It will be seen that the overhanging arm 109 moves downwardly with the sleeve 104 and that when the lower edges of the fingers 115 are in engagement with the upper face of the mold 58 the plunger rod 111 may then be moved downwardly with its ejector disc 116 to force the cover blank 11 down into the mold with its tangs 48 interlocking with the side wall members 21 of the carton body. This is accomplished due to the fact that the cover 11 has been folded and positioned within the guide cup 14 with its locking tangs 48 extending downwardly below the edges of the fingers 115. At the same time the lock spring structures 67 have acted so that the points 71 of the pins of these structures flex the portion of the body blank 12 above the slits 23 inwardly, as shown in Fig. 8 of the drawings. Thus, when the points of the tangs 48 are moved downwardly within the molds 58 they will encounter the tapered points 71 and will be diverted into the slits 23 so that as the guide cup moves downwardly the corner tangs 48 will assume a position through the slits 23 as shown in Fig. 9 of the drawings. In this position the locking hooks 62 will slip through the slits and lock the corner tangs in their assembled position. In order to guide the arm 109 in its vertical path of travel a guide post 117 is fixed to the frame structure 62 and extends upwardly between the guide faces of the arm 109.

In operation of the present invention the carton blanks 10 and 11 are cut and scored as indicated in Figs. 1 and 2 of the drawings. The blank 10 is then placed over the opening 85 in the table 78 and rests upon the members 86 to 89, inclusive. The blank is centered as indicated by dotted lines in Fig. 7 by being placed between the sets of members 95 and 96 on the centering structures 94. While the feed chain 57 stands stationary with a mold 58 beneath the opening 85, the lever 82 is moved downwardly and it forces the mold block 84 down in contact with the blank. This lever is provided with a pivot 120 which passes through one of a series of openings 121 in a swinging support 122. The lower end of the swinging support 122 is mounted on the vertical upright 75 by a pivot pin 123. The lever is held against lateral movement by guide plate 124 and is held in its uppermost position by a spring 125 which engages the lever 82 at one end and a spring hanger 126 at its opposite end. As the lever 82 moves downwardly the hanger 122 will swing to accommodate the lever movement and to force the mandrel 80 downwardly through the tubular guide 79. As the lower hexagonal end of the mold block 84 exerts pressure upon the blank the various flaps 21 and 22 forming the sides of the blank will be folded upwardly so that the hexagonal field 12 will assume a position within the bottom of the mold 58 as shown in Fig. 8 and the side elements 21 and 22 will fold upwardly to form the sides of a hexagonal container. In this position it will be noted that the portions 29 of the side 21 will overlap the sides 22 on the inside of the container and form an overlapping seal for the container joints. Attention is directed to the fact that it is not necessary to use adhesive to seal the present package since all of the parts of the carton will be locked together when the cover blank 11 is placed in position. The mold, however, temporarily holds the parts of the carton in their formed condition preparatory to filling. If desired a suitable liner sheet may be laid upon the flat blank at the forming station and will be folded with the blank to form an impervious liner therefor. An intermittent operation of the drive chain 57 may be effected by movement of the treadle 64 to actuate the clutch mechanism, and to move the mold with the formed blank to the filling station. Here it may be suitable filled with a product, after which a sheet of impervious material may be placed over the top of the product and the mold with its contents may then be moved in another intermittent motion to the sealing station. At this station a top blank 11 is placed within the cup 114 as indicated by dotted lines in Fig. 6 of the drawings. The lever 103 may then be swung downwardly to move the overhanging member 109 and the cup. This movement is continued until the lower edge of the cup 114 rests against the upper face of the mold 58. At this time the corner points 51 of the tangs 58 of the blank 11 will project downwardly over the upper edges

of the sides 21 of the blank. By reference to Fig. 10 of the drawings it will be seen that the portions of the sides 21 occurring above the slits 23 are deflected inwardly by the points 71 of the pins 70. The plunger rod 111 is then moved downwardly and will act upon the ejector plate 116 to force the cover blank 11 from the cup 114 and to force the members 48 of the cover blank downwardly through the slotted openings 23 in the walls 21 until the shoulders 52 have interlocked with the upper edges of slits 23. Release of pressure upon the head 112 will permit the spring 113 to retract the ejector plate 116 into the member 114. Release of pressure upon the handle 104 of the member 103 will permit the spring 107 to lift the entire structure carried by the arm 109. The mold may then be moved from the sealing station, and if desired may be removed bodily from the chain or the package may be removed from the mold by hand, or suitable ejector acting through the opening 130 in the bottom of the mold 58.

It will thus be seen that by the use of the blanks here shown, and the machine for forming, filling, and sealing the same, that a carton will be provided, the parts of which are folded and interlocked with each other in a manner to produce a filled and sealed package which does not require the use of any adhesive material, and which may be rapidly formed and completed.

While I have shown the preferred form of my invention, as now known to me, it will be understood that various changes might be made in the combination, construction, and arrangement of parts, by those skilled in the art, without departing from the spirit of the invention as claimed.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A machine for assembling a body blank and a cover blank to form a carton, the body blank having slits in its side wall and the cover blank having tangs adapted to interlock with the slits when introduced thereinto, a mold for holding the body blank in its normally folded position to form a carton, a member receiving a cover blank in its folded position to be assembled with the carton, and means carried by the body blank for holding the slits thereof in a tang receiving position when the mold and the cover holding member are moved together.

2. A machine for assembling a body blank and a cover blank to form a carton, the body blank having slits in its side wall and the cover blank having tangs adapted to interlock with the slits when introduced thereinto, a mold for holding the body blank in its normally folded position to form a carton, a member receiving a cover blank in its folded position to be assembled with the carton, and means carried by the body blank for holding the slits thereof in a tang receiving position when the mold and the cover holding member are moved together, said means including yieldable members adapted to spread the slit in the body blank whereby the tangs of the cover blank may be introduced thereinto when the body mold and the cover holding device are moved together.

3. A machine for assembling and sealing cartons which cartons comprise a body blank forming an end wall and a plurality of side wall sections folded upwardly at right angles to the end wall portion and a cover blank forming an end wall and a plurality of tangs adapted to be folded downwardly, the side walls of said body blank having transverse slits therein and said tangs being designed to pass into said slits and to interlock therewith, the assembling and sealing structure comprising a mold having the side walls agreeing with the configuration of the end wall of the body blank, whereby the side walls of the body blank may fold upwardly and may be held in carton form, a holder for receiving the cover blank and folding its tangs downwardly to hold them in their sealing position, and means carried by the mold for yieldably spreading the slits in the side walls of the body blank and thus holding them while the tangs of the cover are moved thereinto and interlocked therewith.

4. A machine for assembling and sealing cartons which cartons comprise a body blank forming an end wall and a plurality of side wall sections folded upwardly at right angles to the end wall portion and a cover blank forming an end wall and a plurality of tangs adapted to be folded downwardly, the side walls of said body blank having transverse slits therein and said tangs being designed to pass into said slits and to interlock therewith, the assembling and sealing structure comprising a mold having the side walls agreeing with the configuration of the end wall of the body blank, whereby the side walls of the body blank may fold upwardly and may be held in carton form, a holder for receiving the cover blank and folding its tangs downwardly to hold them in their sealing position, and means carried by the mold for yieldably spreading the slits in the side walls of the body blank and thus holding them while the tangs of the cover are moved thereinto and interlocked therewith, said slit spreading means comprising yieldable pins carried in the side walls of the molds and engaging the portion of the side walls of the body blank above the slits, whereby said portion will be flexed inwardly to spread the slit and to yield as the tang passes thereby and into the slit.

5. In a carton assembling machine adapted to fold a body blank characterized as having an end wall and a plurality of side walls folding upwardly therefrom to form a container, a folding die having a central opening therethrough agreeing in configuration with the end wall of the body blank and being formed with centering means engaging the body blank when the body blank is flat, and a movable die member agreeing in configuration with the end wall of the die and adapted to pass downwardly through said opening whereby the side walls of the die will be folded at right angles to the end wall to form a container.

6. Same as 5, adding the following: . . . and a receiving mold beneath the folding die into which the folding carton is positioned by the movable mold.

7. In a carton assembling machine adapted to fold a body blank characterized as having an end wall and a plurality of side walls folding upwardly therefrom to form a container, the side wall being formed with lateral locking slits, a folding die having a central opening therethrough agreeing in configuration with the end wall of the body blank and being formed with centering means engaging the body blank when the body blank is flat, and a movable die member agreeing in configuration with the end wall of the die and adapted to pass downwardly through said opening, whereby the side walls of

the die will be folded at right angles to the end wall to form a container.

8. Same as 7, adding the following: . . . a receiving mold beneath the folding die into which the folding carton is positioned by the movable mold, a movable holder for receiving a carton cover characterized as having tangs adapted to interlock within the slits in the body member, and means in the receiving mold for holding said slits in an open position to permit the introduction of the tangs.

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