

Dec. 14, 1943.

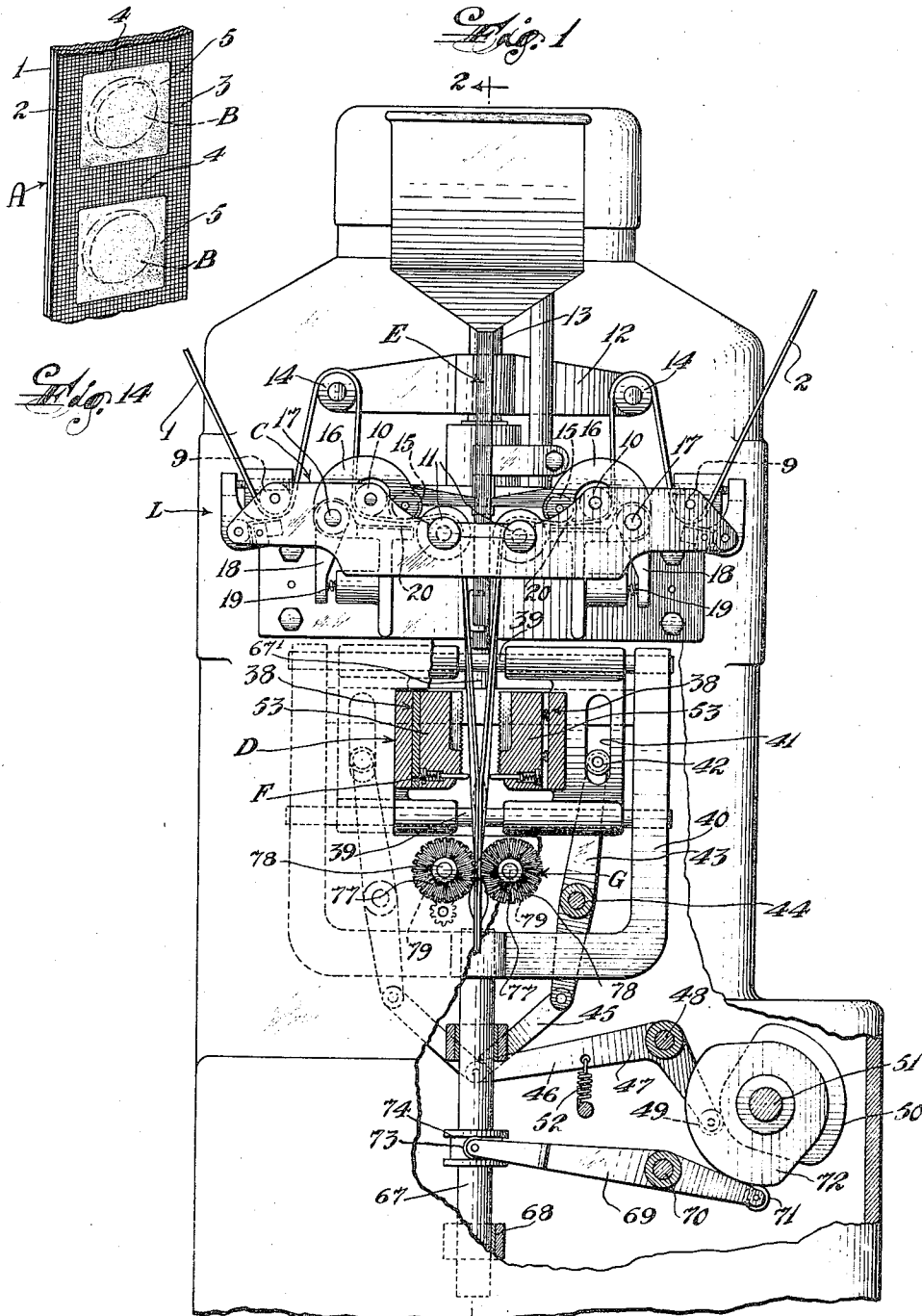
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2,336,962

PACKAGE MAKING AND FILLING MACHINE

Filed Feb. 18, 1943

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

Fig. 2

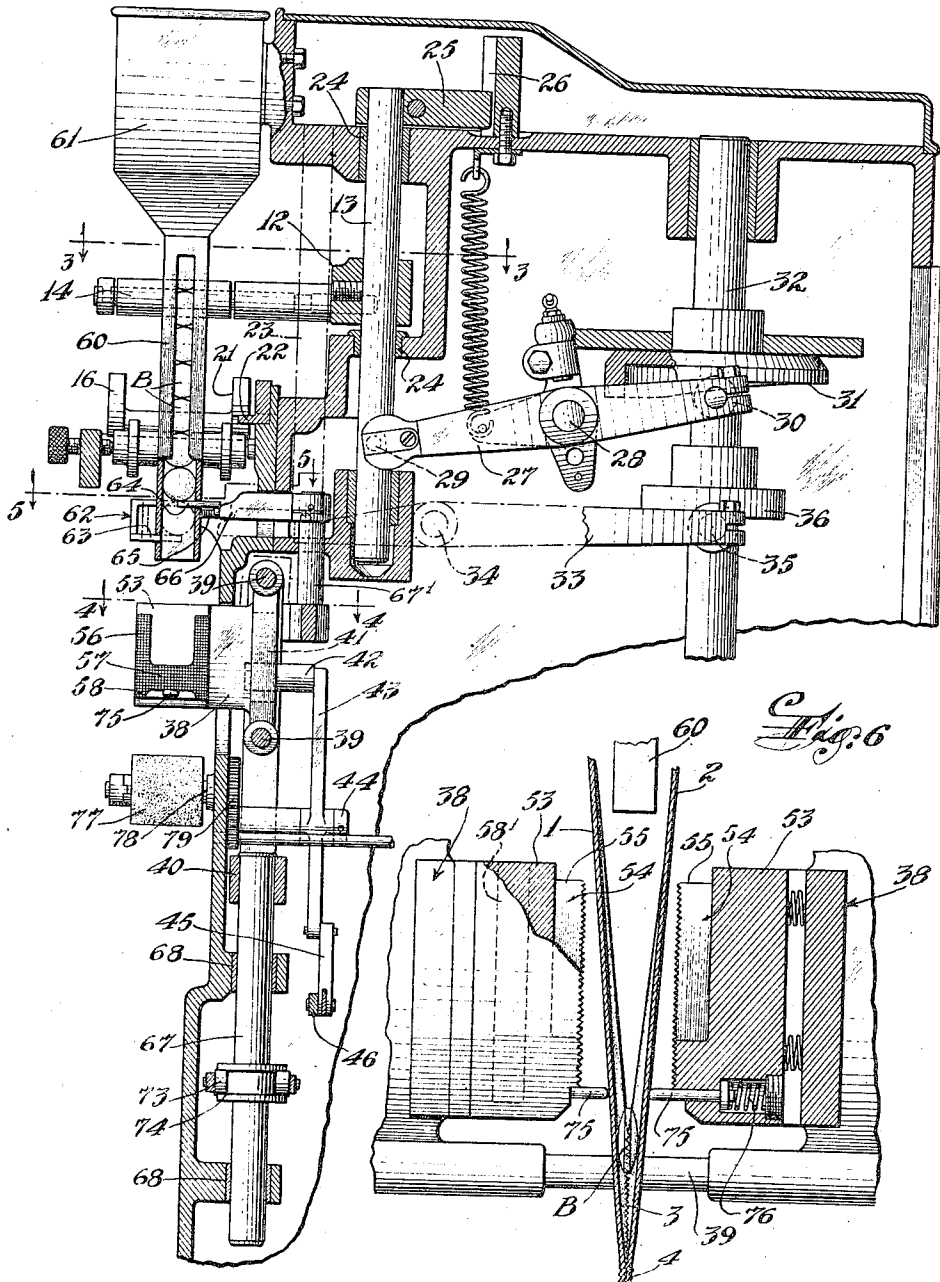


Fig. 6

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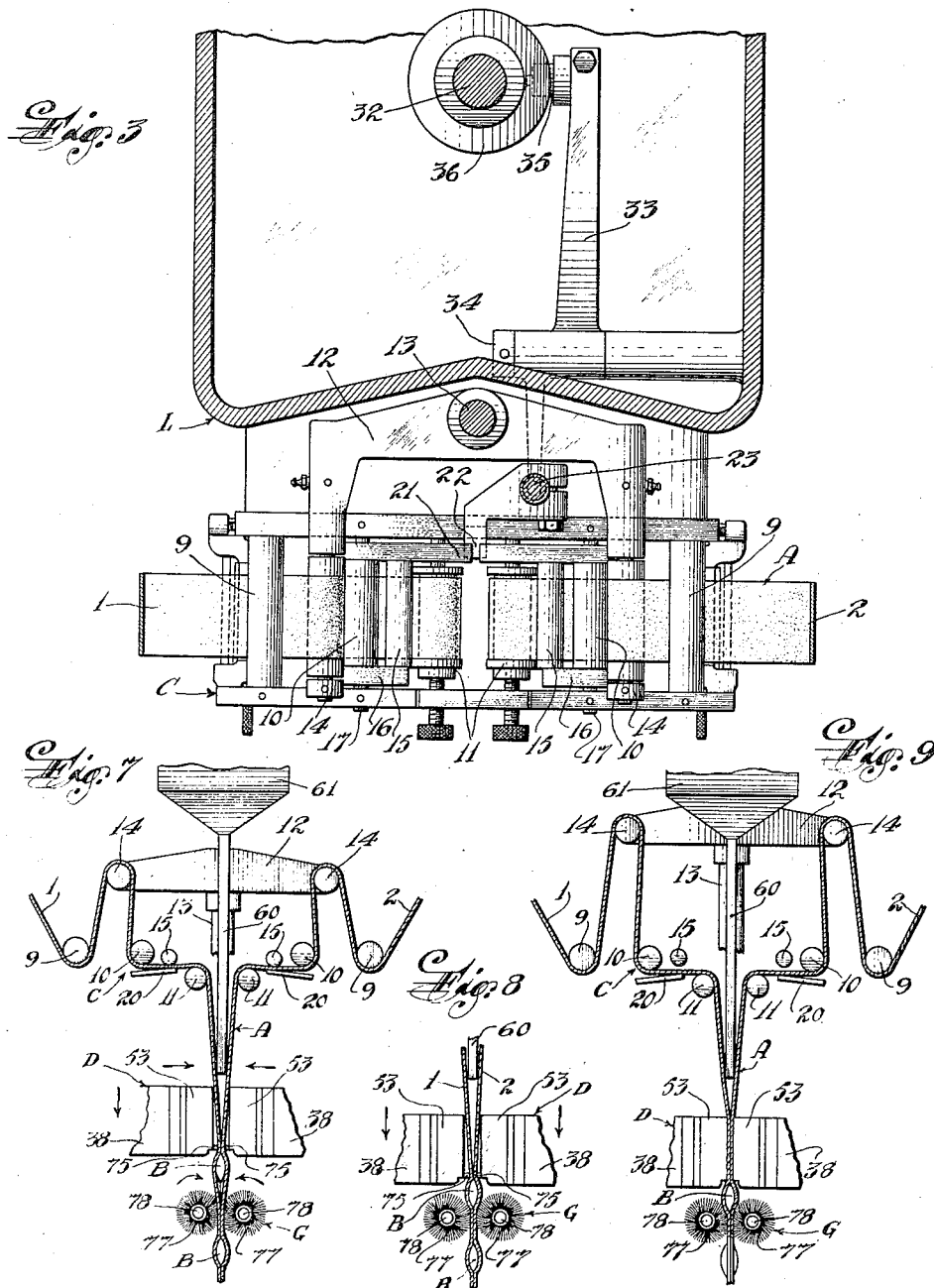
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PACKAGE MAKING AND FILLING MACHINE

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4 Sheets-Sheet 3



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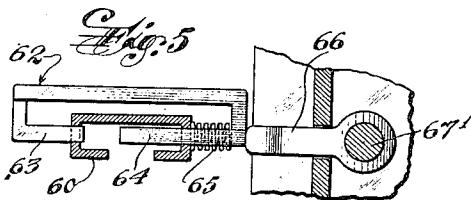


Fig. 4

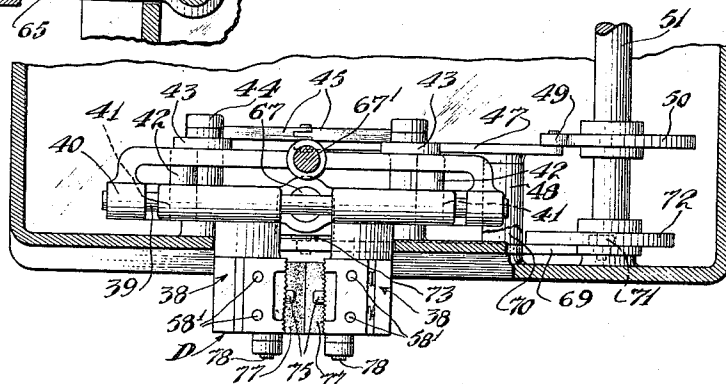


Fig. 10

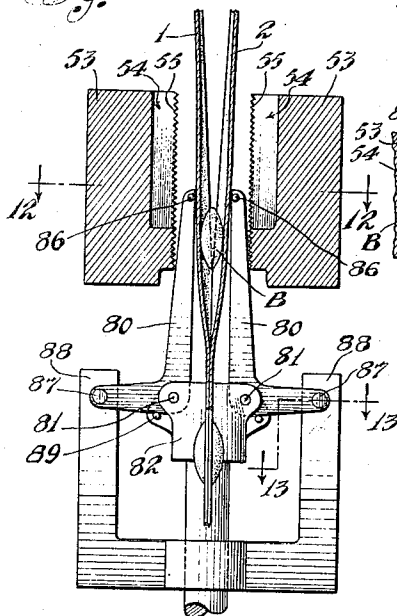


Fig. 12

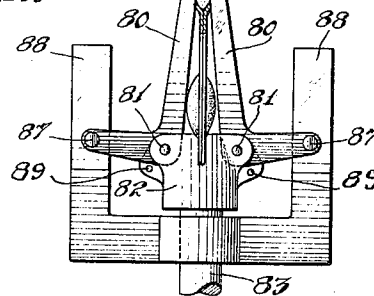


Fig. 11

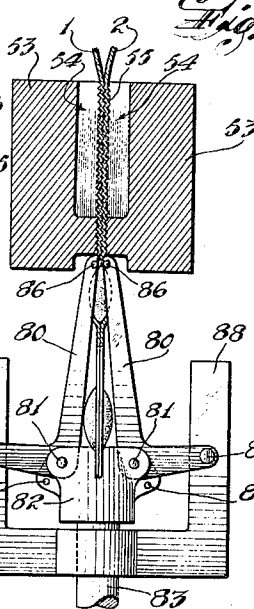
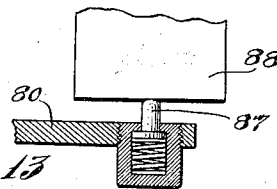


Fig. 13



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UNITED STATES PATENT OFFICE

2,336,962

PACKAGE MAKING AND FILLING MACHINE

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Application February 18, 1943, Serial No. 476,291

7 Claims. (Cl. 93—3)

This invention relates in particular to package making and filling machines of the type wherein two layers of packaging material, for example strips of "Cellophane," "Pliofilm," metal foil, paper or the like, are fed into juxtaposition and sealed together to form a bag having an upwardly facing open end after which an article or commodity is inserted into said bag and then the said open end of the bag is closed. Especially my invention contemplates a machine of this character wherein a plurality of such bags or packages are made in succession from continuous strips of packaging material.

It is desirable that the size or capacity of the article- or commodity-containing compartment of the bag shall not be any greater than necessary to contain the article or commodity. In other words, it is preferable that the article or commodity shall fill said compartment as nearly as possible to its full capacity, both to permit the bag to be as small as possible so as to conserve the packaging material, and also to avoid deception of the purchaser as to the size or volume of the contents of the bag which often occurs as the result of "loose packaging."

Therefore prime objects of my invention are to provide novel and improved means for accomplishing the aforesaid desirable result such that the size or capacity of the bag or package shall be as nearly as possible the size of the article or the volume of the commodity to be packaged; and thus to provide a packaging machine having novel and improved mechanism for forcing the article or commodity being packaged into snug contact with the walls of the bag or package prior to the closing of the bag.

While my invention may be utilized with many different packaging machines of the general character described, it is especially useful in machines such as shown by my United States Patents Nos. 2,245,827 and 2,162,230 wherein continuous strips of packaging material are fed between reciprocable dies which periodically press the strips between them to seal the strips together and form the bag or package. Also the invention is most useful where the article or commodity to be packaged is solid or rigid.

Other objects, advantages and results of the invention will appear from the following description in conjunction with the accompanying drawings in which

Figure 1 is a schematic front elevational view of a machine embodying my invention, with portions broken away.

Figure 2 is a vertical longitudinal sectional view on the line 2—2 of Figure 1.

Figure 3 is a horizontal sectional view on the line 3—3 of Figure 2, with portions omitted for clearness in illustration.

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 2.

Figure 5 is a fragmentary horizontal sectional view on the line 5—5 of Figure 2.

Figure 6 is an enlarged fragmentary sectional-front elevational view of the sealing jaws and pressers.

Figure 7 is a diagrammatic front elevational view of the feeding mechanism for the strips of packaging material and the sealing jaws, showing the first step in the operation of pressing the substance into the bag-like container.

Figure 8 is a similar view showing the completion of said operation.

Figure 9 is a view similar to Figure 7 showing the operation of sealing the two strips of packaging material together to form a bag-like container.

Figure 10 is a schematic front elevational view of a modified form of presser mechanism for forcing the contents of the bag-like container into the bag illustrating the parts at the beginning of the pressing operation.

Figure 11 is a similar view showing the parts at the completion of the operation.

Figure 12 is a horizontal and sectional view on the line 12—12 of Figure 10.

Figure 13 is an enlarged horizontal sectional view on the line 13—13 of Figure 10, and

Figure 14 is an enlarged fragmentary perspective view of one of the packages.

While my method and machine may be utilized for making many different packages, for the purpose of illustration I have shown the invention in conjunction with a known type of package A which comprises two strips 1 and 2 of flexible packaging material which are secured together at their longitudinal margins 3 and at spaced points transversely of the length of the strips as at 4 to form containers or compartments 5 to receive an article or commodity to be packaged. Generally a plurality of the compartments 5 are formed in succession in a continuous chain or strip, after which the strip may be divided into sections, each comprising one or more of the compartments 5 surrounded by the sealed margins 3 and 4.

The package may be formed of any suitable material, for example, paper, "Cellophane," "Pliofilm," or metallic foil, and especially sheet material which itself is thermoplastic and can be softened by heat or has a thermoplastic or fusible coating so that juxtaposed layers of the material can be fused or caused to adhere together by application of heat and pressure to form a seal. Where the material is not thermoplastic, a suitable adhesive may be applied between the portions of the layers to be secured together.

My invention may be embodied in many types of packaging machines, but for convenience in il-

illustration I have shown it in conjunction with a machine of the general type disclosed in my Patents Nos. 2,245,827 and 2,162,230 and my co-pending application Serial No. 425,384 filed January 1, 1942.

Describing my method and machine generally, the two strips 1 and 2 of packaging material are drawn step-by-step from a suitable supply into juxtaposition or side by side relation by feeding mechanism C. At the end of each step of movement the two strips 1 and 2 are sealed together by sealing mechanism D along their longitudinal edges and transversely to form a bag-like container having its mouth facing upwardly between the strips and to simultaneously close the open end of the next preceding container that was formed at the end of the immediately preceding step of movement. In the interval between the steps of movement and prior to the formation of each bag-like container above-described, the substance or article to be packaged, for example, a tablet B is deposited by a filling mechanism E into the mouth of the preceding bag-like container, and is pressed or forced into the container toward the bottom thereof by a presser mechanism F.

The feeding mechanism C draws at each step predetermined quantities of the strips 1 and 2 required to form a single package or bag-like container, and an auxiliary feeding mechanism G constantly exerts tension on the strips so as to draw said quantities of the strip downwardly into proper position relative to the sealing means D, and at the same time moves the package strip or chain of packages downwardly to a severing mechanism (not shown) which severs the individual package or groups of packages from the strip.

More specifically describing the machine the strip feeding mechanism C is mounted on a main frame L and includes two fixed bars 9 under which the respective strips 1 and 2 pass from the supply, and idler rollers 10, one between each bar 9 and a pair of guide rollers 11.

A yoke 12 is mounted on a vertically reciprocable shaft 13 and has a strip pulling roller 14 disposed between the guide bars 9 and the idler rollers 10 at each side of the frame L. Each strip of packaging material is led from the corresponding supply under the corresponding bar 9 over the corresponding pulling roller 14, under the corresponding idler roller 10 and downwardly over the corresponding guide roller 11, the two strips being thus brought into juxtaposition or opposed side by side relation to each other and guided toward the sealing means D.

Between the rollers 10 and 11 are soft non-rotatable bars 15, each journaled on a yoke 16 that is in turn pivotally mounted on the frame L at 17 and has an arm 18 normally influenced by a spring 19 so as to press the corresponding brake bar 15 toward a brake platen 20 that is fixedly mounted on the frame L, so as to positively clamp the corresponding strip 1 or 2 between the roller and the platen and hold the strip against longitudinal movement. Each yoke 16 also has an arm 21 which is underlaid by a finger 22 that is mounted on a vertically reciprocable rod 23.

The shaft 13 on which the yoke 12 is mounted is reciprocable in guides 24 in the frame of the machine and is held against rotation by a guide arm 25 that is slidable in a guide block 26 mounted on the frame. The shaft 13 is reciprocated by a lever 27 that is pivotally mounted on the shaft 28 in the frame and has a pin and slot connection 29

at one end with the shaft 13 and carries a roller 30 at its other end which follows a cam 31 on the drive shaft 32 of the machine, which is connected to any suitable source of power such as an electric motor.

The rod 23 that carries the finger 22 is reciprocated by a lever 33 which is pivotally mounted on a shaft 34 on the frame and has one end underlying and abutting the end of the rod and its other end provided with a roller 35 that follows a cam 36 on the drive shaft 32.

In operation of the machine so far described, periodically the strips 1 and 2 are held against longitudinal movement between brake bars 15 when the yoke 12 is at the lower limit of its stroke as shown in Figure 7, and during upward movement of the yoke into the position shown in Figure 9 so that a predetermined length of strip to form a bag-like container is withdrawn from the supply of packaging material. Then the rod 23 is actuated upwardly so that the finger 22 will swing the brake roller yokes 16 upwardly against the influence of the spring 19 to disengage the brake rollers from the corresponding strips, after which the yoke is lowered and simultaneously the auxiliary feeding means G draws the strips 1 and 2 downwardly through the sealing mechanism.

The sealing mechanism D includes two sealing jaws 38 that are mounted to reciprocate toward and from each other in a horizontal plane at opposite sides of the strips 1 and 2 and are guided in accurate alinement with each other during such movement by guide rods 39 which are fixedly secured in a mounting frame or yoke 40. Each jaw has a vertical slot 41 in which is a roller 42 that is mounted at one end of a lever 43 which in turn is pivoted intermediate its ends at 44 on the main frame of the machine and has its other end pivotally connected to a link 45 which is in turn connected to one arm 46 of a bell crank lever 47 which is pivotally mounted at 48 on the frame of the machine and carries on its other arm a follower roller 49 which engages a cam 50 that is mounted on a counter-shaft 51. The counter-shaft 51 may be driven from any suitable source of power like the drive shaft 32 of the machine and the roller 49 is maintained in engagement with the cam 50 by a spring 52 connected between the bell crank lever and the frame of the machine. With this construction, it will be observed that upon rotation of the cam 50 the levers 43 will be oscillated about their pivots 44 so as to move the jaws 38 toward and from each other.

The mounting yoke 40 has a vertical shaft 67 which is reciprocable in bearings 68 that are carried by the main frame L of the machine. The shaft 67 is vertically reciprocated to move the yoke up and down by a lever 69 that is pivotally mounted intermediate its ends at 70 on the frame of the machine and has one end carrying a follower roller 71 which follows a cam 72 on the countershaft 51, and has at its other end a fork the arms of which carry rollers 73 arranged in a grooved collar 74 on the shaft 67. With this construction, rotation of the cam 72 will cause oscillation of the lever 69 and consequent vertical reciprocation of the mounting yoke 40. In turn, the movement of the yoke 40 will cause vertical movement of the sealing jaws 38.

The two jaws 38 are substantially identical in construction and each includes a crimping and sealing block 53 which has a recess 54 in its face that is surrounded on three sides by a rim 55

having suitable corrugations or serrations. Where the bag-like container is to be approximately rectangular in shape as shown, each sealing block has two vertically disposed series of corrugations 56 to grip the longitudinal edges of the package strips 1 and 2, and horizontal series of corrugations 57 to grip the packaging strips transversely. The length of the series 56 is somewhat less than the length of the corresponding sides of the package to be formed, and below the transverse series 57 is a pair of short series of corrugations 58 to supplement the series 56. The transverse series 57 is of a width corresponding to the width of the bottom edge of one bag-like container and the top edge of the next preceding container.

In beginning operation of the machine to form the packages, the sealing blocks 53 initially are separated as shown in Figure 6 and the packaging strips are pulled downwardly into juxtaposition to the sealing blocks. Thereupon the sealing blocks are moved toward each other by swinging of the levers 43 so as to cause the corrugations 56 and 57 to press the strips together and partially form a package or produce a bag-like container having its upper end open between the strips as shown in Figure 6, and simultaneously close the open end of the next preceding container as shown in Figure 9. Where the presser mechanism F is mounted on the sealing blocks as in this case, the movement of the jaws toward each other will be momentarily interrupted while the jaws are moved downwardly for operation of the presser mechanism as hereinafter described.

Where the strips 1 and 2 are to be thermoplastically sealed together the sealing blocks 53 will have suitable electric heaters 58'.

After the strips have been sealed as above described the sealing blocks are separated by oscillation of the levers 43 and the portion of the packaging strip that will have been supplied by the feeding mechanisms C for the next package will be pulled downwardly by the auxiliary feeding means G preparatory to the partial formation of the next package. Then the substance or article to be packaged, specifically a tablet B, is deposited into the partially formed package or bag-like container as shown in Figures 1 and 6. Any suitable depositing mechanism may be utilized but I have shown a discharge chute 60 which conducts the tablets B by gravity downwardly from a hopper 61, the end of the chute being disposed immediately above the sealing jaws 38 and between the strips 1 and 2. A valve 62 has arms 63 and 64 slidable through openings in the chute 60 to release one tablet at a time. When the arm 63 is retracted to release the lowermost tablet the arm 64 prevents the tablets above from being released as shown in Figures 1 and 5. The valve may be operated in any suitable manner but as shown is normally influenced by a spring 65 so as to move the arm 63 into the chute and is actuated in the other direction by a cam arm 66 which is carried by a vertical stud 67 secured to the mounting yoke 40 which is above described.

In accordance with this form of the invention the sealing jaws 38 carry the presser means F for forcing the substance or tablets B into the bag-like containers or compartments 5. This presser mechanism is shown as comprising a blade or pin 75 slidably mounted in each of the sealing blocks 53 and projecting toward and in alignment with the corresponding blade of the

other sealing block, as shown in Figures 1 and 6. These blades are located so that they will engage the packaging strips 1 and 2 above the substance or tablets B in the bag-like containers as the sealing blocks are moved toward each other, and as shown the blades 75 are projected from the sealing blocks by compression springs 76 which will yield as the blocks move toward each other to permit the blades to retract into the sealing blocks.

In operation of the sealing and presser mechanism, the substance or tablet B is dropped into the open end of the bag-like container while the sealing blocks 53 are at their uppermost position as shown in Figures 1 and 6. After deposit of the substance or tablet, the sealing blocks are moved toward each other a short distance to cause the presser pins 75 to squeeze the layers 1 and 2 of packaging material between them at the side of the substance or tablet opposite the bottom of the bag-like container as shown in Figure 7. Thereupon the yoke 40 is lowered to move the sealing blocks and presser blades 75 downwardly with the latter in sliding frictional engagement with the layers 1 and 2, whereby the substance or tablet B is forced or pressed downwardly toward the bottom of the bag-like container as shown in Figure 8. The sealing blocks are further actuated toward each other so as to simultaneously seal or close the open end of the bag-like container and partially form the next succeeding container as shown in Figure 9. The sealing blocks are then moved apart and elevated to their initial position and the strips 1 and 2 are pulled downwardly by the auxiliary feeding mechanism G preparatory to the formation of the next package.

It will be observed that the cam arm 66 on the mounting yoke 40 will actuate the valve 62 so as to release the lowermost tablet from the chute 60 as the mounting yoke is elevated, the cam arm pushing the valve to the left against the influence of the spring 65 as shown in Figure 2. As the mounting yoke descends the spring 65 will move the valve 62 so as to permit another tablet to drop into engagement with the arm 63 ready for the next depositing operation.

The auxiliary feeding mechanism may be of any suitable form but is shown as comprising two brushes 77 that receive the package strip between them and are mounted on shafts 78 which may be rotated in opposite directions by any suitable means such as two meshing pinions 79, one on each shaft 78 one of which may be driven from any suitable source of power.

A modification of the presser mechanism is shown in Figures 10 to 13 inclusive wherein each presser comprises a bell crank lever 80 which is pivotally mounted at 81 on a head 82 secured to a vertically reciprocable shaft 83 which may be mounted as is the shaft 67 and which may be reciprocated by a lever 84 and cam 85 corresponding to the lever 69 and cam 72. Each presser lever has a laterally projecting rod 86 on its vertical arm disposed approximately parallel to the general plane of the strips 1 and 2 and adapted to frictionally engage a corresponding strip when said arm is swung toward the strip. The other arm of each presser lever has a spring pressed stud 87 projecting laterally therefrom and frictionally engaging a friction block 88 so that as the head 82 is reciprocated the levers 80 initially may be oscillated about their pivots relatively to the head and thereafter will be moved longitudinally with the head.

In the operation of this form of the invention, the levers 80 will be located so that the rods 86 will be spaced apart to permit the substance or tablet B to be dropped between them into the bag-like container as shown in Figure 10 and the levers will be at their uppermost position. Then the shaft 83 will be moved downwardly so that initially the rods 86 will be moved toward each other to squeeze the layers 1 and 2 of packaging material between them above the substance or tablet B, and thereafter the levers 80 will be moved downwardly with the shaft 83 so as to squeeze or force the substance or tablet downwardly toward the bottom of the bag-like container as shown in Figure 11. Thereupon the sealing blocks 54 will be actuated toward each other to seal the bag-like container and to form the next succeeding container.

Thereafter the sealing blocks 54 are moved apart and the shaft 83 and levers 80 are moved upwardly to locate the rods 86 in their initial position as shown in Figure 10, movement of the levers 80 in the direction to separate the rods 86 being limited by stop pins 87.

It will be observed that with this form of the invention the sealing blocks 54 will not move vertically but can be actuated horizontally toward and from each other in the same manner as shown in Figures 1 to 9 inclusive.

Various other modifications and changes in the details of construction of the invention will occur to those skilled in the art as within the spirit and scope of the invention.

What I claim is:

1. A packaging machine comprising the combination of means for forming opposed layers of flexible material into a bag-like container having an open end, means for depositing a substance to be packaged through said open end into said container, and means for exerting pressure upon said layers of flexible material between said substance and said open end of the container simultaneously from opposite sides of said container and toward the bottom of the container to force said substance into said container.

2. A packaging machine comprising the combination of means for forming opposed layers of flexible material into a bag-like container having an open end, means for depositing a substance to be packaged through said open end into said container, a presser at each of opposite sides of said container and movable toward and from the other presser to squeeze and release respectively said layers of material between them above said substance, said pressers being also movable simultaneously longitudinally of said container toward and from said open end, means for actuating said pressers toward and from each other, and means for actuating said pressers so as to move them toward the bottom of said container during the squeezing of said layers of material between said pressers, whereby to force said substance into said container.

3. A packaging machine comprising the combination of means for feeding layers of packaging material in juxtaposition, opposed jaws, means mounting said jaws for movement toward and from each other, said jaws having portions successively to grip said layers between them to form a bag-like container having an open end, and thereafter to release said layers, means for depositing a substance to be packaged into said container through said open end, said jaws being movable also longitudinally of said container

toward and from said open end, a presser on each jaw to yieldingly engage the corresponding said layer at the side of said substance opposite the bottom of the container and movable toward each other as said jaws move toward each other to press said layers of packaging material together, and means for actuating said jaws and said pressers longitudinally of said container toward the bottom thereof while said layers of material are pressed together by said pressers, whereby to force said substance into said container.

4. The packaging machine set forth in claim 3 wherein each said presser is a blade slidably mounted in the corresponding jaw and projecting toward the other jaw.

5. A packaging machine comprising the combination of means for feeding layers of packaging material in juxtaposition, opposed jaws, means mounting said jaws for movement toward and from each other, said jaws having portions successively to grip said layers between them to form a bag-like container having an open end and thereafter to release said layers, means for depositing a substance to be packaged into said container through said open end, means supporting said mounting means to permit movement of said jaws longitudinally of said container toward and from said open end, a presser on each jaw to yieldingly engage the corresponding layer of material at the side of said substance opposite the bottom of the container and movable toward each other as said jaws move toward each other to press said layers of packaging material together, means for actuating said jaws toward and from each other on said mounting means, and means for actuating said mounting means to move said jaws and pressers longitudinally of said container away from the open end thereof while said layers of material are pressed together by said pressers, whereby to force said substance into said container.

6. The packaging machine set forth in claim 2 wherein each presser constitutes a lever pivoted to swing on an axis parallel to the planes of said layers toward and from said layers of material, each lever having a rod to engage the corresponding layer.

7. A packaging machine comprising the combination of means for feeding layers of packaging material in juxtaposition, opposed jaws, means mounting said jaws for movement toward and from each other, said jaws having portions successively to grip said layers between them to form a bag-like container having an open end and thereafter to release said layers, means for depositing a substance to be packaged into said container through said open end, a presser lever at each of opposite sides of said container, means mounting said levers to swing on axes parallel to the planes of said layers toward and from said layers, each lever having a laterally projecting rod to engage the corresponding layer at the side of said substance opposite the bottom of the container as said lever swings toward the layer, whereby to squeeze said layers between said rods, and means for actuating said mounting means to move said levers and said rods longitudinally of said container toward the bottom thereof while said layers are squeezed together by said rods whereby to force said substance into said container.

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