

Feb. 4, 1947.

C. M. LAMB, JR., ET AL

2,415,292

METHOD OF AND APPARATUS FOR PACKAGING OF FOOD PRODUCTS

Filed Feb. 7, 1942

4 Sheets-Sheet 1

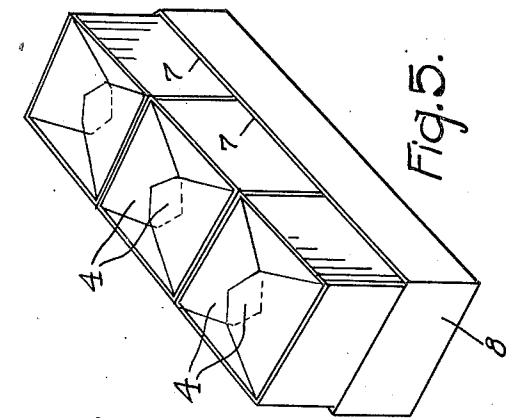


Fig. 5.

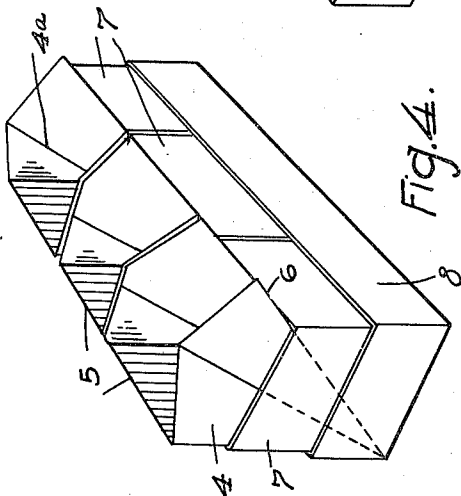


Fig. 4.

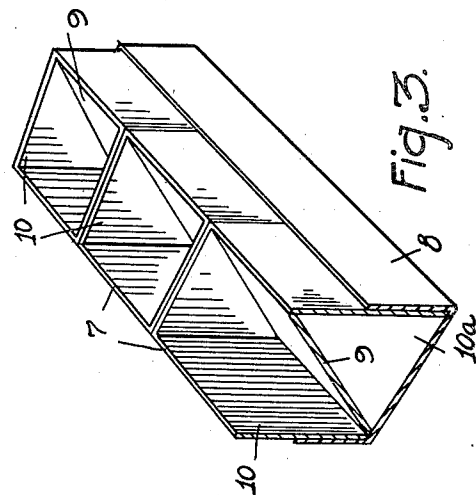


Fig. 3.

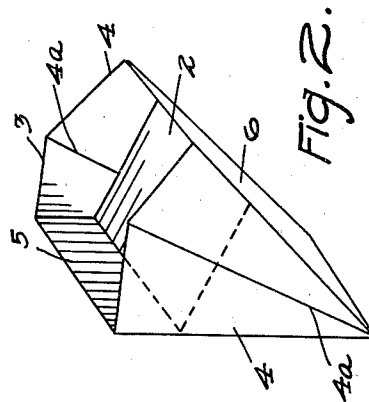


Fig. 2.

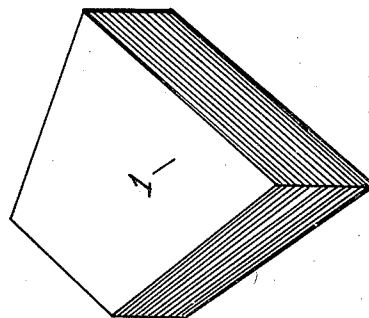


Fig. 1.

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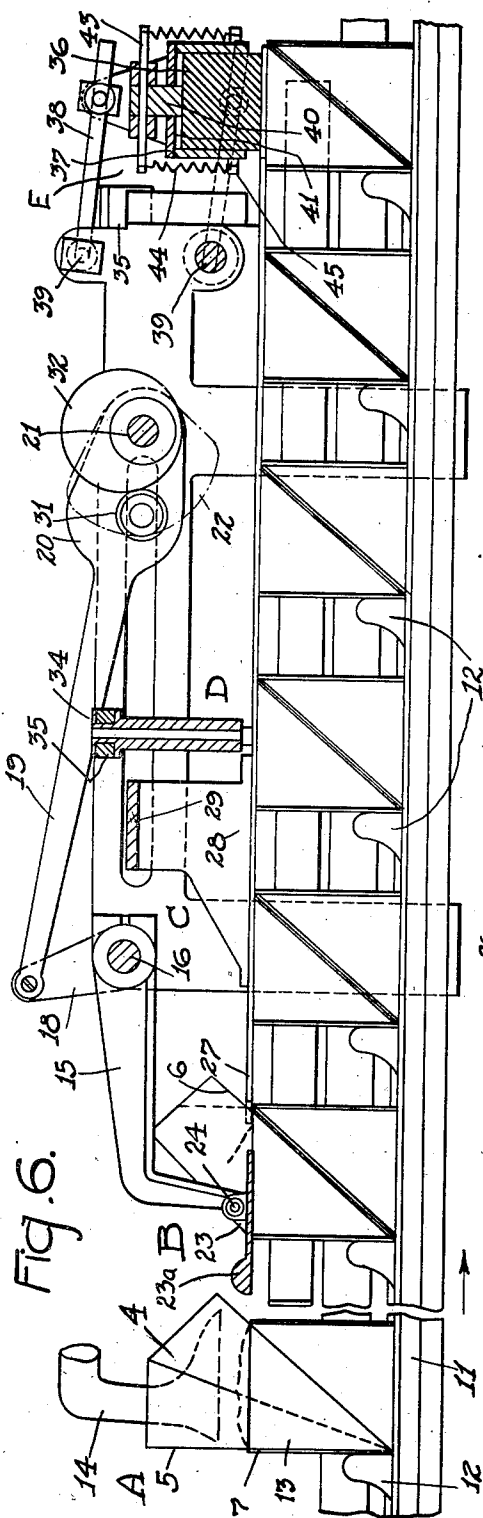
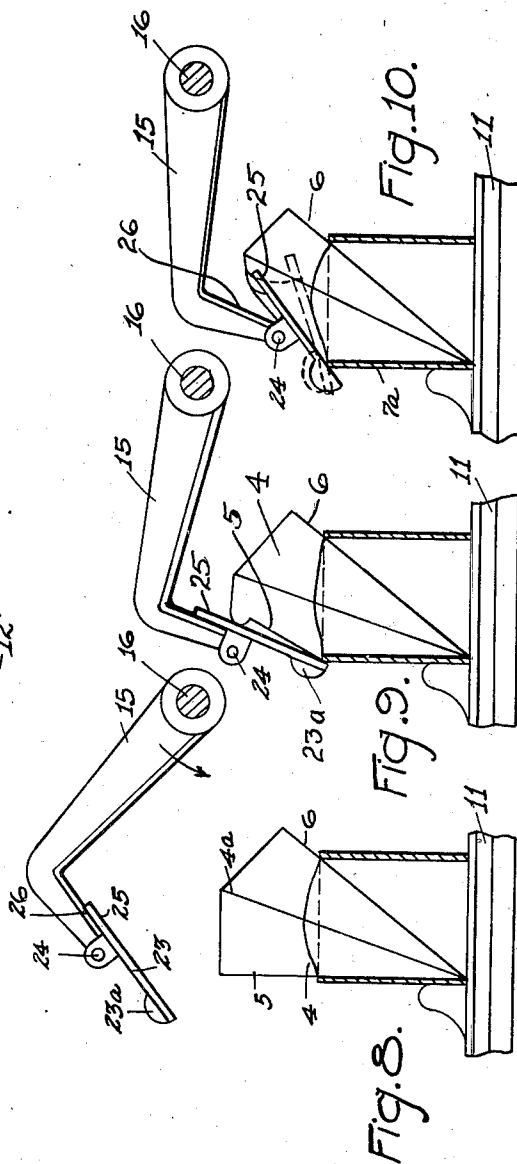
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4 Sheets-Sheet 2



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4 Sheets-Sheet 3

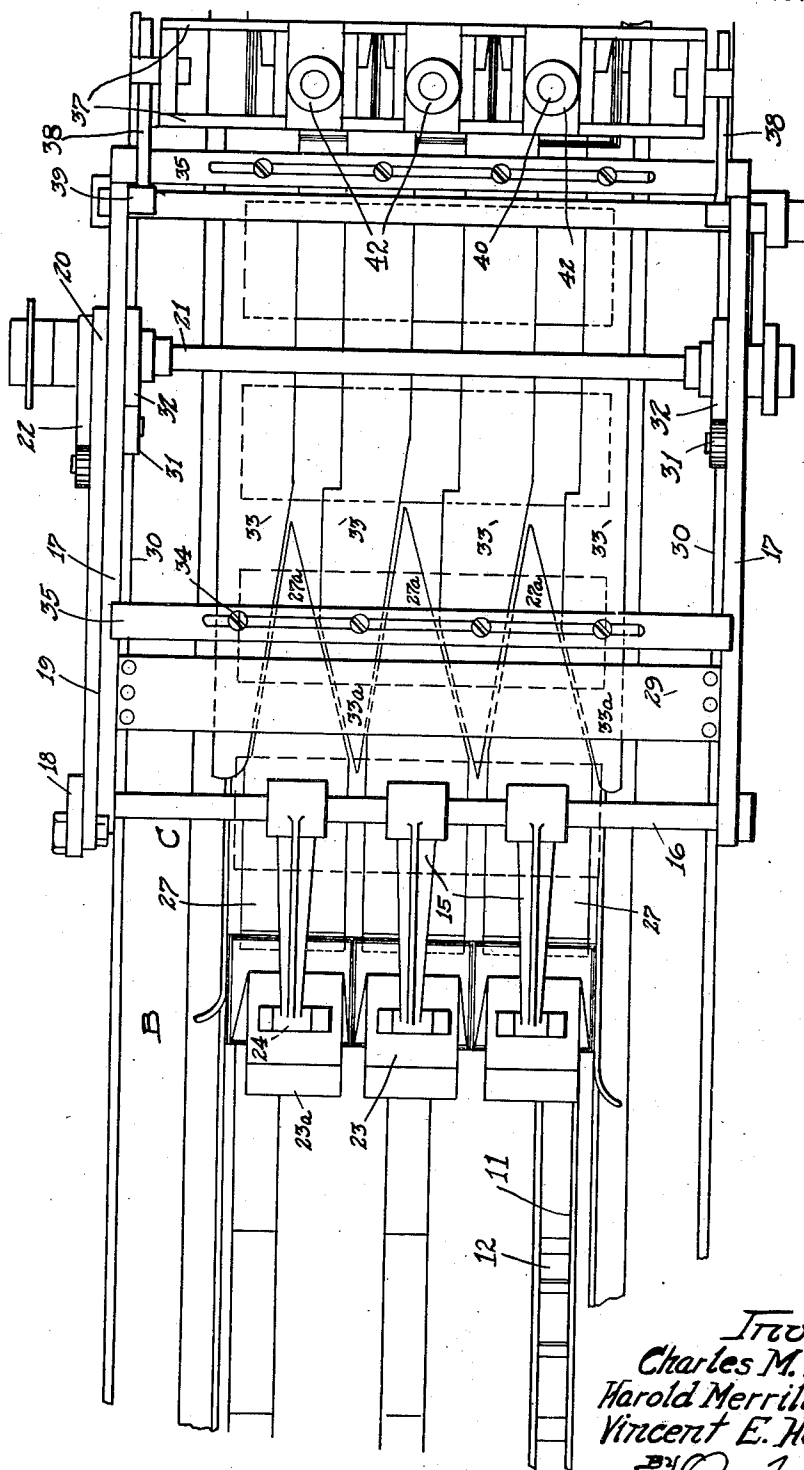


Fig. 7.

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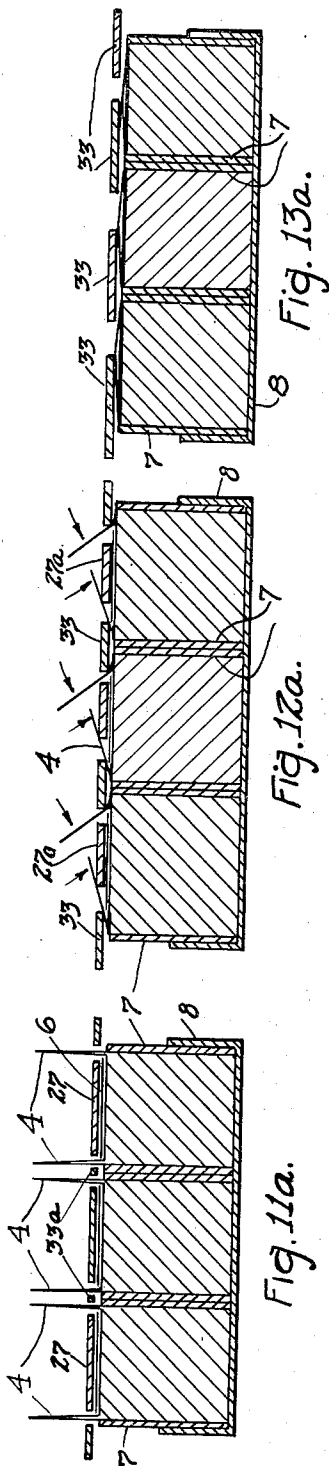
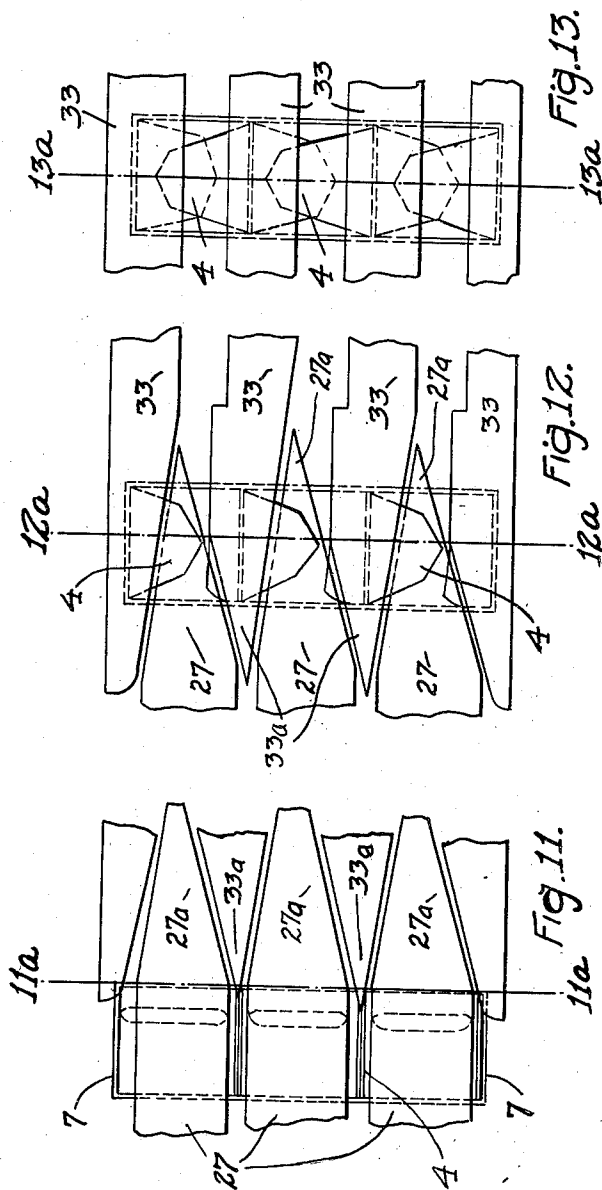
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METHOD OF AND APPARATUS FOR PACKAGING OF FOOD PRODUCTS

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4 Sheets-Sheet 4



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2,415,292

METHOD OF AND APPARATUS FOR
PACKAGING OF FOOD PRODUCTS

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8 Claims. (Cl. 93—6)

1

The present invention relates to an improved method of and apparatus for packaging food products in such a manner that several containers may be filled and sealed simultaneously, ready for marketing, with the assurance that the food products in the containers will remain in an airtight, and therefore sterile, condition. While the method and apparatus of the present invention are particularly adapted for the packaging and sealing of food products in a semi-plastic condition, such as cheese, the invention is also adapted for use in connection with the packaging of any food product that lends itself to being distributed evenly inside a preformed container of flexible, or at least foldable, material.

Briefly stated, the invention resides in assembling a number of identical containers in a predetermined group relation, with the material of the containers being initially preformed, so as to be in an open condition suitable for receiving the food product which it is desired to package. Preformed and open-mouthed containers are then advanced step by step as groups, for the reception of the food product, followed by the automatic performance of successive operations on the extended walls of the containers, which result in folding the walls into overlying relation, followed by a sealing operation on overlying layers of the container material. Each group of sealed containers then emerges from the machine, ready for display and marketing, without having been subjected to any handling, such as might possibly result in contamination of the food product within the containers.

The above and other advantageous features of the invention will hereinafter more fully appear from the following description considered in connection with the accompanying drawings, in which:

Fig. 1 is a view in perspective of a number of flat containers involved in the practice of our invention, arranged in stack form.

Fig. 2 is a view in perspective, illustrating the preforming of such containers, preparatory to their assembly for loading and sealing.

Fig. 3 is a view in perspective, and partially in section, showing an assembly or carton of package holders for receiving the preformed containers shown in Fig. 2.

Fig. 4 is a view in perspective of a group of preformed containers arranged in their group holders, preparatory to being placed on the assembly line of our improved machine.

Fig. 5 is a perspective view of a carton con-

2

taining completely loaded and sealed containers in their holders as delivered from the end of the assembly line of the machine.

Fig. 6 is a view, partially in section and partially in side elevation, of a mechanism for carrying out the present invention.

Fig. 7 is a plan view of the mechanism shown in Fig. 6.

Figs. 8, 9 and 10 are fragmentary views, illustrating successive steps in the operation of a portion of the folding mechanism shown in Fig. 6.

Figs. 11, 12 and 13 are fragmentary views, illustrating the functioning of the remainder of the folding mechanism.

Figs. 11a, 12a and 13a are sectional views along the lines 11a, 12a and 13a, respectively, of Figs. 11, 12 and 13.

Referring to the drawings, there is shown in Fig. 1 a stack of flat containers suitable for the packaging of food products in accordance with the present invention. For purposes of illustration, these containers are shown as being of the type having parallel walls joined by edge seams, with the longer side of the container being open.

These containers 1 are produced from thin, flexible, moisture-proof, transparent material, preferably having the characteristics of being rendered cohesive through the application of heat, such, for example, as the material known commercially as Pliofilm (rubber hydrochloride in thin sheet form). As will hereinafter appear, there are other thin flexible moisture-proof and transparent materials having the desired properties for the packaging of food products, such as Cellophane and the like, some of these materials having heat-sealing qualities, while others require the use of adhesives or solvents, to obtain cohesion between overlying layers.

In preparation for carrying out the method of the present invention, the containers 1 are removed individually from the stack of Fig. 1, and are each preformed as shown in Fig. 2, into an open-mouthed expanded condition, wherein the container is of generally wedge shape form. One convenient way of so preforming each container 1 is by the insertion of a wedge shaped block 2, either manually or by mechanical means. It is obvious from a consideration of Fig. 2, that entry of the block 2 between the walls of a container 1, will convert these walls into a generally wedge-shaped form, having a substantially rectangular perimeter indicated at 3.

With the container so extended, it is to be noted that its edge seams 4a extend in parallel relation substantially midway of the parallel

3

wall 4 of the container. Therefore, the preformed container tends to maintain its shape, with the parallel seams 4a presenting more resistance to folding operations than do the divergent walls of the container, indicated at 5 and 6, for a purpose which will shortly appear.

A number of containers 1 having been preformed as indicated in Fig. 2, the next step in carrying out the invention resides in inserting these preformed containers by means of their blocks 2 into a row of identical open package holders 7, shown in Fig. 3. These holders 7 are, for purposes of convenience in assembly and subsequent handling after loading, seated in an open box or carton 8, one end of which is cut away and shown in section. Each holder 7, prior to receiving the preformed containers, is provided with a diagonal partition 9, which fits snugly into the holder and divides it into two wedge shaped compartments 10 and 10a. Therefore, when a series of preformed containers 1 are inserted in a series of open holders 7 and the blocks 2 removed, the assembled open-mouthed containers appear as shown in Fig. 4. The carton 8 carrying a group of assembled holders 7 and preformed containers 1, is then ready for placing on the assembly line of the loading, folding and sealing mechanism, which will next be described with reference to Figs. 6 to 13 inclusive.

Referring to Fig. 6, this mechanism consists of a conveyor 11, driven in any suitable manner with an intermittent motion, in the direction of the arrow. The conveyor provides suitable dogs 12, arranged at regular intervals, with a spacing greater than the width of a carton 8 containing a group of holders 7 and preformed containers 1. After being placed on the conveyor, each group of open-mouthed containers carried by a carton 8, is brought to a station A, at which each container is loaded with a food product 13, such as cream cheese, by any suitable means such as a tube 14, which extrudes the product into that portion of the container which is supported by the walls of the upper chamber 10 of each holder 7. It will be noted that after loading the food product 13 within a container 1, the surface of the food will be irregular, as indicated. Obviously, food products of a granular character can as readily be poured into the open containers, so as to fill them substantially to the top of the carton wall, as shown.

The conveyor 11 is shown as being of indeterminate length in Fig. 6, and it will be assumed that the food loading station A is displaced from a first folding station B a distance corresponding to the spacing between several of the dogs 12. The purpose of this spacing is to permit complete withdrawal of the tube 14, or other food loading device from within the open mouth of a loaded container, in advance of the arrival of the loaded container at the first folding station B.

Referring now to Figs. 8, 9 and 10, there is shown the various operations that are performed on each loaded container, following the arrival of a group of containers at the loading station A. That is to say, beginning with Fig. 8, the various stages of folding the divergent walls 5 and 6 of a given container are shown in sequence, with Figs. 9 and 10 showing stages subsequent to Fig. 8, and Fig. 6 showing completion of the first folding operation. Figs. 11, 12 and 13 show various stages of folding in the parallel walls 4 in which the seams 4a are located as a group of containers are moved from the first folding station B to a second and third folding stations C and D.

As best shown in Figs. 6 and 7, the machine

4

provides a plurality of folding arms 15 mounted on a shaft 16 extending across the machine between suitable side frames 17. The several arms 15 are adapted to be turned in unison with the shaft 16, by means of an arm 18 mounted on one end of the shaft 16 beyond a frame member 17. The arm 18 is pivotally connected to a link 19 terminating in a fork 20 embracing a drive shaft 21, and a cam 22 is adapted to impart a reciprocatory movement to the link 19. The oscillatory movement thus imparted to the shaft 16, causes the folding arms 15 to move between the extreme positions shown in Figs. 6 and 8, once for each complete revolution of the drive shaft 21.

The folding arms 15 are in the fully raised position of Fig. 8, when movement of the conveyor 11 positions a series of holders 7 and open-mouthed containers 1 beneath the arms. In this position, a folder 23 freely supported on a pivot 24 at the lower end of each arm overhangs the trailing wall 5 of each container. The lower end of each folder 23 is weighted at 23a, so as to bias the folder 23 in the position shown in Fig. 8, with a tail portion 25 in engagement with a flat surface 26 on the arm.

The cam 22 on the shaft 21 is so timed that as the conveyor 11 comes to rest in the position of Fig. 8, the arms 15 start to move downwardly through turning of the shaft 16 in the direction of the arrow. As this occurs, the folders 23 simultaneously engage the walls 5 of a series of containers 7 and start to fold the walls over, as indicated in Fig. 9. This initial folding of each container is confined entirely to the wall 5, since as previously pointed out, the parallel side walls 4 of the container are to some extent stiffened by the presence of the seams 4a. The thin flexible material of the wall 5 offers but little resistance as it yields, and since the weighted portion 23a overcomes this slight resistance, there is no tendency to turn a folder about its pivot 24. The tail portion 25, therefore, remains in engagement with the surface 26 of the arm, as the wall folding progresses, see Fig. 9.

By the time the arm 15 has nearly reached the end of its downward swing, the wall 5 has bent inwardly to the extent that the weighted end of the folder 23 engages the upper edge of the holder wall 7a. Since by this time the folder pivot 24 has swung inside the edge of the carton wall, continued turning movement of the shaft 21 causes each folder 23 to turn into the position of Fig. 10, wherein the tail 25 has left the surface 26, due to turning of the folder about a new fulcrum provided by the holder's edge. By the time the arm 15 has reached its lowermost position, the folder 23 has assumed the horizontal position shown in Fig. 6, wherein the wall 5 has been completely folded down and the surface of the food has been flattened out from its original irregular form.

As the folders 23 complete their folding down of the several container walls 5, a series of folding plates 27 simultaneously engage the forwardly inclined walls 6 of the containers to impart an initial folding of these walls 6 in the direction of the then completely folded-down walls 5. As best shown in Figs. 6 and 7, the plates 27 are carried by spaced brackets 28 extending downwardly from a cross bar 29. The bar 29 is connected at its ends to parallel slides 30, movable on the frames 17, and each slide 30 carries a roll 31 bearing on a cam 32 mounted on the drive shaft 21. The cams 32 are in the form of eccentrics, and each com-

5

plete revolution of the shaft 21 imparts a reciprocatory movement to the cross bar 29, and with it, the several folding plates 27.

When a series of open containers reaches the folding station B, as shown in Fig. 8, the folding plates 27 are retracted to a position in which the ends of the plates are barely in engagement with the forwardly inclined container walls 6. As the folders 23 move downwardly to fold over the several walls 5, the plates 27 remain stationary. However, as the folders 23 substantially reach the extreme lowermost position of Fig. 6, the cams 32 shift the cross bar 29, and with it, the plates 27 to the left, as viewed in Fig. 6. This has the effect of imparting an initial fold to each wall 6 in the direction of the then completely folded-down wall 5, as indicated in dotted lines in Fig. 6.

From a consideration of Fig. 7, it is apparent that the folding plates 27 extend beneath the shaft 16, so as to overlie the tops of a series of holders 7 that are in position at the second folding station C, with each plate 27 being entirely clear of the upstanding side walls 4. Therefore, when a series of containers having their walls 5 completely folded down, as previously described, are shifted from station B to station C on the next step of the conveyor, the plates 27 complete folding down of the walls 6 into overlying relation with the walls 5.

It is to be noted that the folding plates 27 are each tapered rearwardly from the station C, and that the tapered plate portions 27a fit between reversely tapered portions 33a of a series of fixed folding plates 33. These folding plates 33 are mounted at the ends of a series of studs 34 extending downwardly from a pair of cross frame members 35 extending between and secured to the longitudinal frame members 17. The plates 33 lie in the same plane as the plates 27, and the co-operation between the interlocking plate surfaces is such as to fold in the upstanding side walls 4 of the containers as a series of holders 7 is moved by successive stages from the third folding station D to a sealing station E.

As best shown in Fig. 7, the pointed ends of the stationary plate portions 33a extend forwardly toward the folding station C, so that these pointed ends overlie the leading edges of a series of holders 7 as the latter come to rest at the station C. The forward edges of the several holders are shown in dotted lines in Fig. 7, from which it is evident that the points of the plates 33 are adapted to enter between the upstanding side walls 4 of adjacent containers, as shown in Fig. 11. As a result of the entrance of the plate points between the upstanding container walls 4 when the conveyor comes to rest with a carton 8 positioned at station C, the upstanding side walls 4 of adjacent containers are definitely separated, preparatory to folding over of these walls when a series of containers resumes its travel on the conveyor.

In Fig. 12 there is shown, partially in elevation and partially in section, a series of containers after they have left folding station C. In this position, the decreasing widths of the tail portions 27a of plates 27 is still sufficient to hold down the previously folded walls 5 and 6, while the increasing widths of the plate portions 33a has caused folding over, in opposite directions, of the side walls 4 of the containers. By the time the conveyor has moved a series of containers to the position of Fig. 13, the folded-over side walls 4 have been forced into overlying relation with the previously flattened end walls 5 and 6 by the

6

parallel portions of the plates 33, it being evident that the side walls 5 and 6 are then completely clear of the tapered portions 27a of the plates 27.

It is evident from a further consideration of Fig. 7 that beyond the third folding station D, the several folding plates 33 extend beneath the drive shaft 21, in the direction of movement of the conveyor 11, a distance several times the displacement between adjacent sets of dogs 12 which convey the loaded cartons 8. Therefore, by the time a loaded carton 8 reaches the sealing station E, the folded over container walls 4, 5 and 6 have been pressed out flat upon the contents of each loaded container. Such a loaded carton is shown in perspective in Fig. 5.

As a loaded carton 8 comes to rest at the sealing station E, it will be noted from Fig. 6 that the extremities of the plates 33 overlie the rear edges of a group of holders 7 just enough to firmly hold down the last folded container side walls 4, so that there is no possibility of these walls springing up as the leading portions of the containers clear the plates 33. It will also be noted that the overlying folded down wall portions 4, 5 and 6 are entirely exposed beyond the extremities of the plates 33, so that the folds may be engaged by a group of sealing elements 36 supported for up and down movement beyond the ends of the frame members 17. The function of these sealing elements is to engage the folded-over walls of each container and to cause the overlying surfaces of these walls to adhere to each other as a result of the application of heat, assuming that the containers are composed of heat-sealing material as previously described.

As best shown in Fig. 7, the several sealing elements 36 are carried between the cross members 37 of a frame that is carried at the ends of pairs of parallel arms 38, adapted to turn about spaced pivots 39 at the ends of the main frame members 17. That is to say, the several sealing elements 36 are adapted to move as a group to simultaneously engage folded down walls 4, 5 and 6 of the several containers in a carton 8 in response to downward movement of the supporting frame.

Referring again to Fig. 6, each sealing element 36 is slidably mounted between the side frames 37, and a stud 40 on each element extends through an opening in a top plate 41 of the frame. Each stud 40 carries a collar 42 through which extends a pin 43 transversely of the heating element frame. The ends of each pin 43 are connected by springs 44 to fixed pins 45, so that these springs 44 tend to yieldingly maintain each sealing element 36 somewhat extended beyond the frame members 37 when the frame is raised to permit the positioning of a loaded carton at the sealing station E. Obviously, when the frame carrying the heated sealing elements 36 is swung downwardly by turning of the arms 38, the lower ends of the elements 36 engage the folded-over walls with a yielding pressure, which pressure is sustained following initial contact due to retraction of the elements within the frame as the latter reaches its lowermost position, as shown in Fig. 6. The net result is maintenance of contact with the container tops for an appreciable period sufficient to insure a welding or fusion between the overlying layers of the folded-down container walls 4, 5 and 6.

Therefore, when the frame carrying the sealing elements is raised to the dotted line position of the arms 38, Fig. 6, the several containers in each carton 8 have been completely sealed in a sterile manner, so as to make each container air-

tight throughout and insure that the food product within the container will be maintained in a sterile condition. It has been found that when a food product, such as cheese, is thus sealed within the containers, it will keep in a palatable condition for an indefinite period.

As previously pointed out, the carton 8 containing a group of loaded and sealed containers, appears as shown in Fig. 5, when further movement of the conveyor delivers the carton beyond the sealing station E. The carton is then reversed with respect to the loaded containers, thereby presenting a fresh series of open chambers 10a in each of the holders 7. Flat containers 1 are then preformed by the use of the blocks 2, as previously described, followed by insertion in the chambers 10a, whereupon the reversed carton appears as in Fig. 4, with the then lower chambers completely loaded.

All the previously described steps of the method are again performed on the fresh series of preformed containers, so that each carton is finally delivered by the conveyor, with two series of loaded and sealed containers accessible from opposite sides of the carton. A completely loaded carton is thus ready for handling and marketing, and obviously, the separate holders 7 serve to maintain the individually loaded containers in good condition, until all the containers have been sold.

From the foregoing, it is apparent that by the present invention there is provided an improved method of and apparatus for the packaging of food products, characterized by the assembly of identical preformed containers in a predetermined group relation and in open condition for convenient loading with the food products. In carrying out the method, the groups of preformed and open-mouthed containers are advanced step-by-step for the reception of the food product, followed by the simultaneous performance of successive operations on the adjacent extended walls of the several containers of each group, which operations result in folding the walls into overlying relation, and subsequent sealing of overlying layers of the container walls. The resulting loaded and sealed containers are therefore adapted to maintain the food product in the same sterile condition as at the time of loading, since the folding and sealing operations are performed entirely automatically, and without handling the containers.

We claim:

1. A method of packaging food products characterized by the assembly of identical preformed open-mouth containers in group relation for loading, with said containers having adjacent extended walls, and then conveying groups of loaded containers to successive stations for the simultaneous performance of different folding operations on the adjacent extended walls of the several containers in each group at the different stations, with one folding operation being performed on one group of containers at one station, while a different folding operation is being performed on another group of containers at another station.

2. A method of packaging food products characterized by the assembly of identical preformed open-mouth containers in group relation for loading, with a food product, said containers having adjacent extended walls and then conveying each group of loaded containers to suc-

cessive stations for the simultaneous performance of different folding operations on the adjacent extended walls of the several containers in each group and the closing in and sealing of overlying layers of the folded walls over the food product therein, with the separate folding, closing in and sealing operations being performed simultaneously on containers in separate groups.

3. A method of packaging food products characterized by the assembly of identical preformed open-mouth containers in group relation for loading, with said containers having adjacent extended walls, and then conveying several groups of loaded containers to successive stations for the simultaneous performance of folding operations on the adjacent extended walls of the several containers in each group at one station and the closing in of the folded walls of another container group at a different station, with the folding operation on one group of containers being performed while closing in the folded walls on another group of containers.

4. A method of packaging food products, characterized by the assembly of identical preformed open-mouthed containers in group relation for loading, with the several containers of a group providing upstanding walls in side-by-side relation, and then conveying the loaded containers as a group, for the separation of walls of adjacent containers coincident with the folding down of the walls of each container into overlying relation, with further conveyance of a group of containers with folded down walls serving to present such walls in position for sealing the overlying layers with the separation and folding of the walls of one group of containers being performed simultaneously with the sealing of the folded walls of another group of containers.

5. Apparatus for the packaging of food in containers, comprising in combination, a conveyor for supporting, at regular intervals, cartons each containing a group of loaded containers providing upstanding walls in side-by-side relation, folding stations spaced along said conveyor, and means for advancing said conveyor to successively present each carton with its group of containers at separate stations for the simultaneous performance of successive folding operations on the adjacent extended walls of the several containers in each carton.

6. Apparatus for the packaging of food in containers, comprising in combination, a conveyor for supporting, at regular intervals, cartons each containing a group of loaded containers providing upstanding walls in side-by-side relation, folding stations spaced along said conveyor, means for advancing said conveyor to successively present each carton with its group of containers at separate stations, means at one station for folding divergent walls of adjacent containers into overlying relation, and means at a second station for separating the parallel walls of adjacent containers coincidentally with folding over such walls, upon movement of said carton to a third stage.

7. Apparatus for the packaging of food in containers, comprising in combination, a conveyor for supporting, at regular intervals, cartons each containing a group of loaded containers providing upstanding walls in side-by-side relation, folding stations spaced along said conveyor, means for advancing said conveyor to successively present each carton with its group of containers at separate stations, means at one sta-

tion for folding over divergent walls of each container into overlying relation, without affecting the parallel relation between walls of adjacent containers and folding elements at another station adapted to enter between and to separate walls of different containers, with said elements serving to fold over said parallel walls into overlying relation coincidentally with further advancement of said carton by said conveyor to a sealing station.

8. Apparatus for the packaging of food in containers, comprising in combination, a conveyor for supporting, at regular intervals, cartons each containing a group of loaded containers providing upstanding walls in side-by-side relation, folding stations spaced along said conveyor, means for advancing said conveyor to successively present each carton with its group of containers at separate stations, means at one station for folding over divergent walls of each container into overlying relation, without affecting the parallel relation between walls of adjacent containers, and folding elements at another station adapted to enter between and to separate the walls of different containers, with said elements serving to fold over said parallel walls into overlying relation coincidentally with further advancement of said carton by said conveyor to a sealing station, and means at said

sealing station for sealing overlying layers of the folded-down walls under pressure.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,228,603	Berch	July 7, 1942
2,350,912	Marshall	June 6, 1944
251,281	Pritchard	Dec. 20, 1881
2,054,832	Potdevin	Sept. 22, 1936
1,054,433	Masse	Feb. 25, 1913
1,313,975	Anderson	Aug. 26, 1919
1,245,561	Braecklein	Nov. 6, 1917
1,916,515	Kraft	July 4, 1933
1,958,762	Mirobella	May 15, 1934
2,157,054	Gammeter	May 2, 1939
2,267,320	Berch	Dec. 23, 1941

FOREIGN PATENTS

Number	Country	Date
4,328	British	1909
451,257	British	July 29, 1936