

April 10, 1962

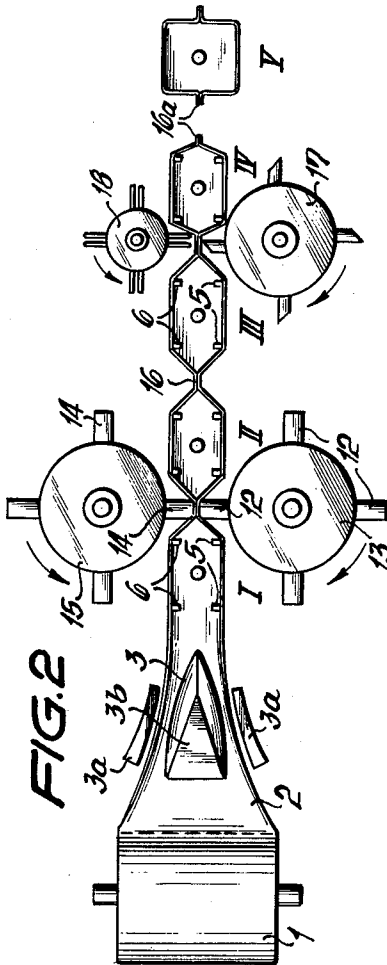
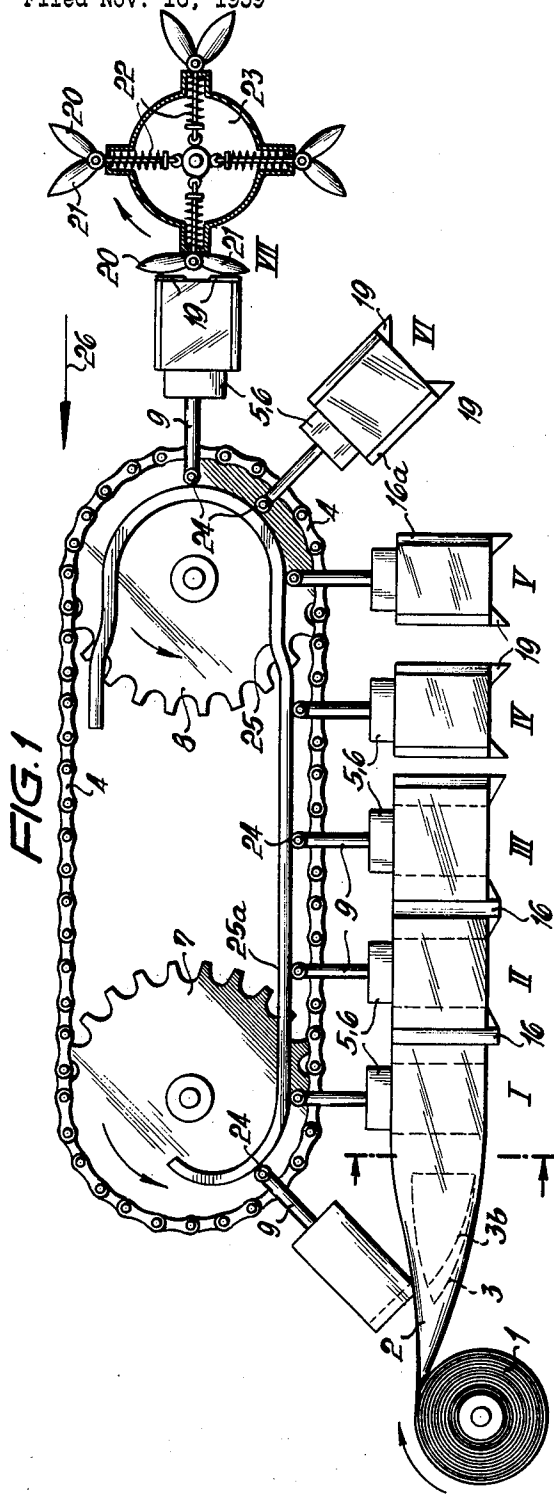
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3,028,796

CONTAINER FORMING AND SEALING MACHINE

Filed Nov. 16, 1959

7 Sheets-Sheet 1



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CONTAINER FORMING AND SEALING MACHINE

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7 Sheets-Sheet 2

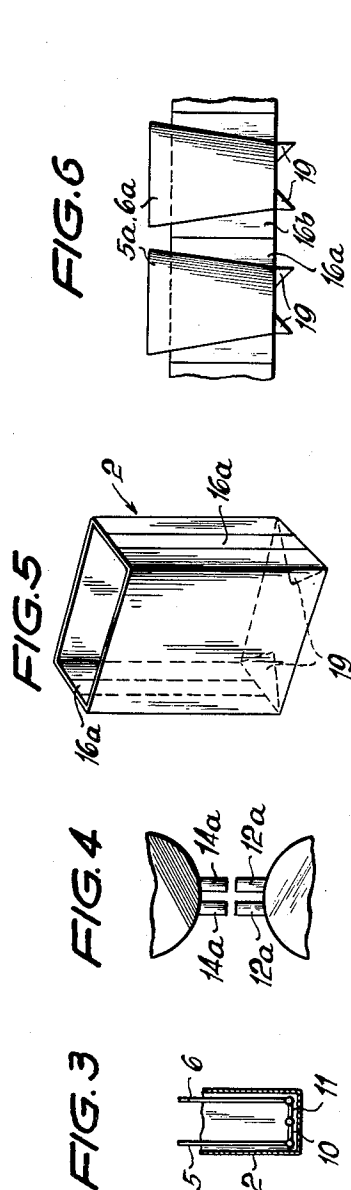
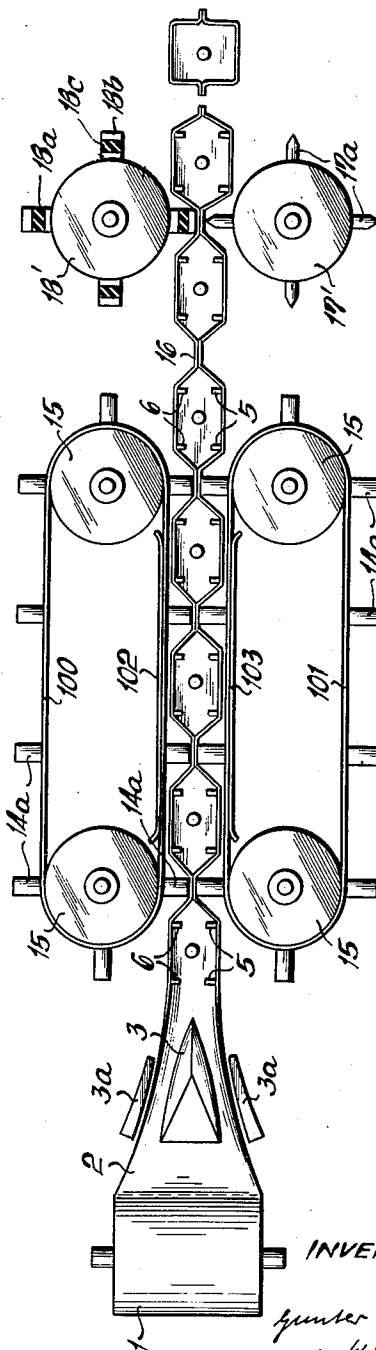


FIG. 7



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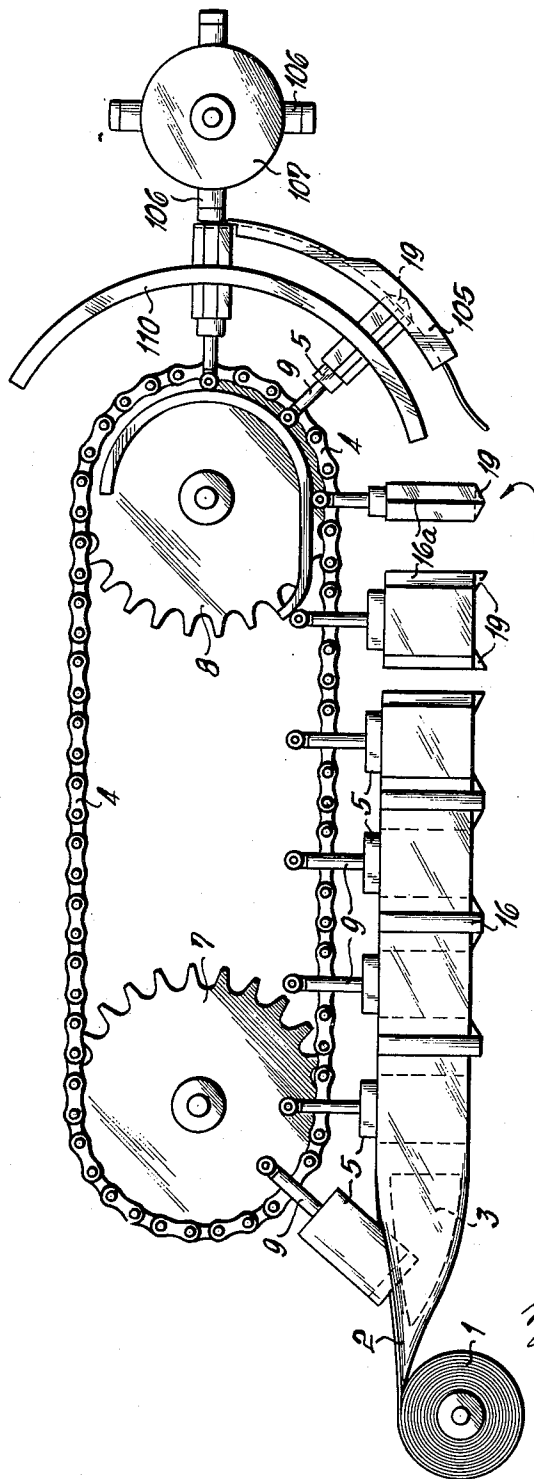
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FIG. 8



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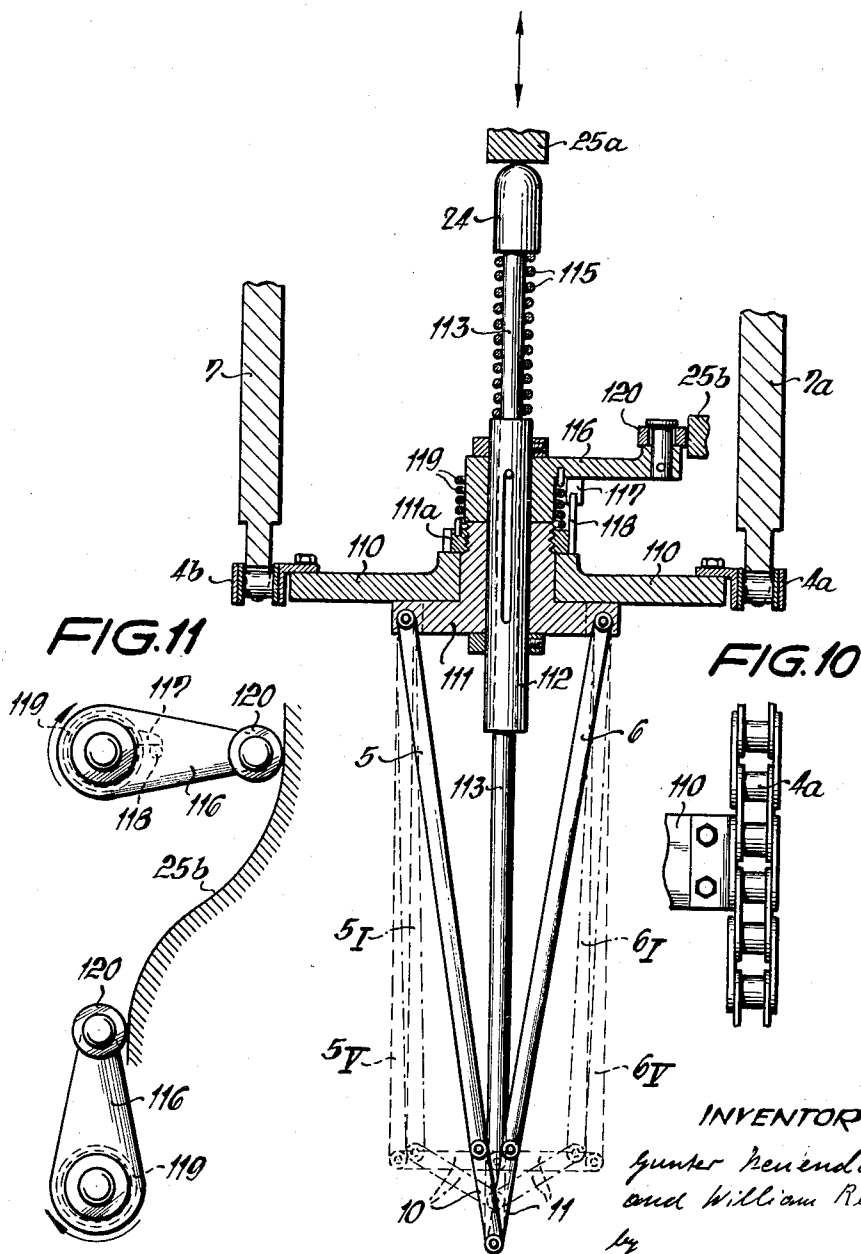
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CONTAINER FORMING AND SEALING MACHINE

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7 Sheets-Sheet 4

FIG. 9



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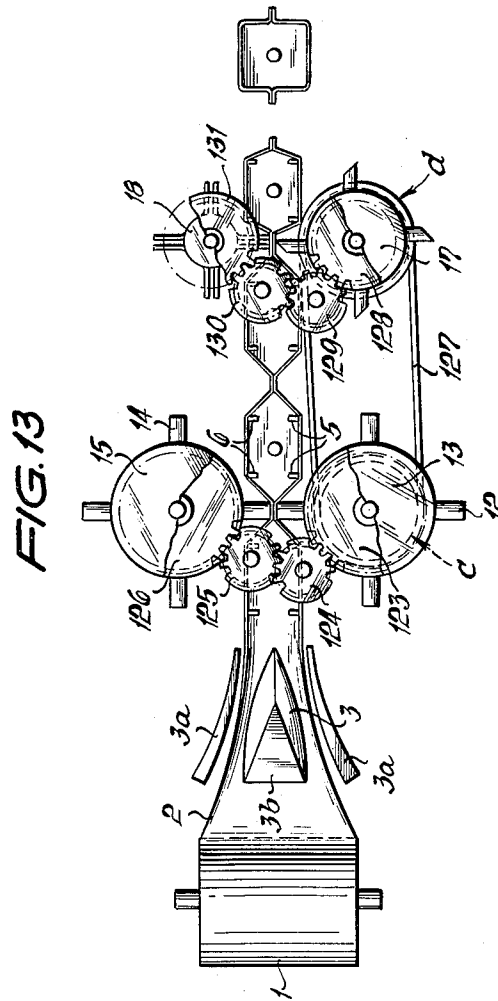
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CONTAINER FORMING AND SEALING MACHINE

Filed Nov. 16, 1959

7 Sheets-Sheet 6

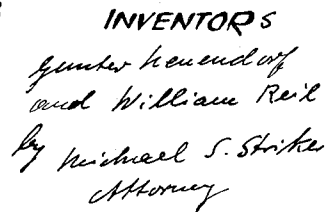


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CONTAINER FORMING AND SEALING MACHINE

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3,028,796

CONTAINER FORMING AND SEALING MACHINE
Gunter Neuendorf, Darmstadt-Eberstadt, and Wilhelm Reil, Elmshausen, Germany, assignors to Habra-Werk, Wilhelm F. Ott, Darmstadt, Germany
Filed Nov. 16, 1959, Ser. No. 853,310
Claims priority, application Germany Nov. 15, 1958
4 Claims. (Cl. 93--12)

The present invention relates to a container forming and sealing machine, and more particularly to a machine for making containers having a substantially square seamless bottom and lateral heat-sealed seams.

It is one object of the present invention to provide a machine of this type which is particularly efficient, and reliably forms and seals the containers.

Another object of the present invention is to provide a machine which produces containers in a continuous operation from a band-shaped web.

Another object of the present invention is to provide a machine which by the operation of core members on which the containers are later formed, draws the web from a supply roll, while the band-shaped web is simultaneously folded to assume a U-shaped cross section so that the finished containers have a flat seamless bottom.

A further object of the present invention is to fold and seal to the bottom of the container, triangular flaps which are produced during the formation of the lateral seams of the containers.

With these objects in view, one embodiment of the present invention comprises supply means for a band-shaped web, folding means for folding the web into an elongated channel-shaped body; a plurality of core members supported on movable conveyor means and being successively moved to a position projecting into the channel-shaped body to give the same a U-shaped cross-section and to transport the U-shaped body; a plurality of pairs of cooperating clamping means located on opposite sides of the channel-shaped body; means for successively moving the clamping means to a clamping position located between adjacent core members for clamping side wall sections of the U-shaped body into an abutting position and for simultaneously bonding the abutting side wall sections to each other; and cutting means for cutting the U-shaped body along said bonded portions whereby separate containers are formed.

In accordance with an important aspect of the present invention, the core members engage the inner surfaces of the side walls of the U-shaped web body for drawing the web from a supply roll.

Preferably, each core member includes a pair of spreading members which are controlled to move apart for engaging the side walls of the U-shaped web body, and for finally reshaping the cut and separated containers.

Each core member supports the bottom of the container while folding and sealing means engage triangular flaps in the region of the bottom of the container and fold and seal such flaps to the bottom part.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a schematic side view of one embodiment of the present invention;

FIG. 2 is a fragmentary schematic plan view of the embodiment of FIG. 1;

FIG. 3 is a fragmentary schematic section taken on

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line 3—3 in FIG. 1 and illustrating the position of the spreading members at the station V in FIG. 2;

FIG. 4 is a schematic fragmentary plan view illustrating a modified construction of the clamping and sealing members;

FIG. 5 is a perspective view illustrating a container manufactured by the machine of the present invention;

FIG. 6 is a fragmentary side view illustrating a portion of the U-shaped web on which containers of a modified form are made;

FIG. 7 is a schematic plan view of a modified embodiment of the present invention;

FIG. 8 is a schematic side view of a modified embodiment of the present invention;

FIG. 9 is a fragmentary cross sectional view of the operating arrangement for the spreading of the core members which is advantageously used in all embodiments of the present invention;

FIG. 10 is a fragmentary plan view of a detail of a conveyor chain used in the construction of FIG. 9;

FIG. 11 is a schematic view illustrating a detail of FIG. 9 which is particularly used in the embodiment of FIG. 8;

FIG. 12 is a schematic side view corresponding to the embodiment of FIG. 1 and illustrating drive means;

FIGS. 12a and 12b are detailed views of the drive means shown in FIG. 12;

FIG. 13 is a plan view of the apparatus shown in FIG. 12;

FIG. 14 is a cross sectional view on an enlarged scale illustrating the details of the arrangement shown schematically in FIG. 4;

FIG. 15 is a cross sectional view illustrating an embodiment of the clamping and sealing means used in the embodiments of FIGS. 1, 7 and 12; and

FIG. 16 is a cross sectional view illustrating the folding and sealing means schematically shown at station VII in FIG. 1.

Referring now to the drawings, and more particularly to FIGS. 1 and 2, the machine of the present invention forms containers of a web 2 which is taken from a let-off supply roll 1. The web may consist of a synthetic foil, or of paper, and is covered on both sides with a substance which is adapted to be sealed and bonded by the application of heat, for example a thermoplastic artificial material. The web may be covered only on one side with the layer of thermoplastic bonding material, and in this event, the layer is on top in the position of the web illustrated in FIGS. 1 and 2.

The web passes under a wedge 3 whose bottom edge curves upwardly toward the roll 1, and which is located equally spaced from the ends of the roll so as to form a depression in the web 2. Curved folding means 3a are located laterally of the web and opposite the wedge 3, so that the web is folded into a channel-shaped body when it is drawn off the let-off roll 1. The lateral folding means 3a are best seen in FIGS. 2, 12 and 13.

Referring now to the embodiment illustrated in FIGS. 1, 2, 12, and 13, conveyor means are provided which include an endless belt means 4 passing over a pair of rolls 7 and 8. FIGS. 9 and 10 show the arrangement in greater detail, and it will become apparent that a pair of chains 4a, 4b is provided which are driven by two pairs of rolls, of which only the rolls 7 and 7a are shown in FIG. 9. The belt means 4 support a set of core members each of which includes two spreading members 5, 6 connected by operating means which are generally indicated at 9 to cam followers 24 which cooperate with stationary control cam means 25 during the movement of the conveyor. FIG. 3 schematically shows the spreading members 5 and 6 to be connected by articulated bottom parts 10 and 11 to each other and located in the U-shaped web

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body 2. As best seen in FIG. 9, the spreading members 5 and 6, and the articulated bottom members 10 and 11 can be moved between the position shown in solid lines in FIG. 9, and intermediate position 5_I, 6_I, and a spread position 5_V and 6_V in which the bottom parts 10, 11 form a first square bottom. A connecting rod 113 is articulated to the pivot means which connect the bottom parts 10 and 11, and passes through a sleeve 112 which is mounted on a part 110, 111 fixed to the pair of chains 4a and 4b. The upper ends of the spreading members 5 and 6 are also articulated to member 111, and it is evident that movement of rod 113 from the illustrated position to a higher position will effect movement of the spreading members 5, 6 to the spread positions illustrated in broken lines.

A spring 115 abutting against sleeve 112 and cam follower means 24 urges the rod 113 to a higher position in which the spreading members 5 and 6 are spread. Cam follower means 24 slides on the part 25a of the control cam 25 so that the spreading members 5 and 6 are spread within the channel-shaped web body, when required.

The core members are introduced into the channel-shaped web body 2 in the completely collapsed position, and then spread into the intermediate position 5_I, 6_I to engage the inner surfaces of the side walls to form a U-shaped web body at the station I shown in FIGS. 1 and 2. In this manner, a U-shaped web body is drawn off the let-off roll 1 as each core member moves gradually to station I.

A pair of rotary members 13, 15 is arranged on opposite sides of the web body, and each rotary member carries clamping members 12, 14 which during the rotation of members 13 and 15 successively assume a cooperating closely spaced position in which they clamp side wall portions 16 of the U-shaped web into an abutting position. Heating means are provided in the clamping members 12 and 14, so that the abutting side wall portions of the web are heat-sealed to each other. As is clearly shown in FIGS. 1, 2, 12 and 13, the core members 5, 6 are held in a row by the belt means 4, so that consecutive core members from stations I, II, III, IV and V, whereupon the core members are carried along a circular path to the stations VI and VII. The spreading members 5 and 6 are in the positions 5_I and 6_I while they pass through the stations I to IV.

Between stations III and IV, cutting means are provided as shown in FIG. 2. The cutting means of this embodiment include a rotary member 17 provided with radially projecting cutting knives, which cooperate with a rotary member 18 having means for forming recesses into which the edges of the cutting knives project during rotation of members 17, 18. In this manner, the abutting and bonded side wall portions 16 of the web body are cut, so that the container portions of the web are separated from each other, and move on the respective core member to station V where cam 25 spreads the spreading members 5 and 6 to the position shown in FIG. 3 to give the separated container a substantially square cross section.

As shown in FIG. 1, the clamping members 12, 14 will form triangular flaps in the bottom region of the containers. Such triangular flaps remain after the containers are separated, and it is necessary to fold such flaps 19 against the bottom portion of the container, and to bond or seal the flaps to the bottom portion at the station VII.

The apparatus for folding the flaps 19 is shown in detail in FIG. 16. A drum 23 has projecting portions 147 to which pairs of links of 146 are articulated. The other ends of links 146 are articulated to a pair of folding and sealing fingers 20, 21 which are provided with heating means, not shown, for sealing the flaps 19 to the bottom parts of the containers. A rod 148 is articulated to the folding fingers 20, 21 and terminates in a cam

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follower means 248 which rides on a cam 149 during rotation of member 23. A spring urges the cam follower into engagement with cam 149 so that the folding fingers 20 and 21 are properly spread by rod 148 to urge the flaps 19 against the bottom of the container, as shown in FIG. 1.

It is necessary that the rotary members 13, 15 with the clamping and sealing members 12 and 14 operate in synchronism with the movement of the core members. As shown in FIGS. 12 and 13, a pulley 221 is connected to the wheel 7 for rotation, and is connected by a belt 121 to another pulley 222 which is connected for rotation to a bevel gear 122 meshing with another bevel gear secured to the shaft of rotary member 13. Gears 123, 124, 125, 126 connect the rotary member 15 to the rotary member 13, so that both rotary members, and thereby the clamping members 12 and 14 are operated in synchronism with the movement of the core members. A belt drive 127 drives the rotary cutting means 17, which is connected through gear means 128, 129, 130 and 131 to the rotary member 18. The shaft of the wheels 8 supports another pulley which is connected by belt 133 to a pulley 233 which drives drum 23.

The clamping and sealing members 12 and 14 are shown in detail in FIG. 15. Clamping members 142, 143 contain electric heating elements 144 of known construction. Springs 145 urge the clamping members 142 and 143 into an abutting position, and guide rods 250 guide the clamping member when the same are resiliently displaced. On the sides of the clamping members, cooperating pairs of plates 140, 141 are provided which have matching edges and recesses so that score lines or fold lines are pressed into the web which facilitate the folding of the projecting seams 16a on the cut-off containers from the position shown in FIG. 1 to the position shown in FIG. 5 by means which are not an object of the present invention.

In the modified embodiment shown in FIG. 7, clamping and sealing members 14a, which are constructed as shown in FIG. 15, are secured to movable conveyor belts 100 and 101. Guide rails 102 and 103 support the portions of the conveyor belts 100 and 101 where pressure is to be applied by the clamping and sealing members 14a on the abutting portions of the side walls of the web.

The cutting means shown in FIG. 7 are also different from the cutting means of FIGS. 1 and 2, and are shown to include a cutting drum 17' with cutting knives 17a cooperating with a drum 18' on which members 18a are mounted. Members 18a cooperate with the cutting knives 17a during rotation of the rotary members 17' and 18'. Resilient parts 18c are incorporated into members 18a, so that the cutting knives 17a can cut through sections 16 of the web while members 18a, 18c slightly give. The parts 18b where the knife edges abut, are of a suitable hardened material. The embodiment of FIG. 8 corresponds generally to the embodiment of FIGS. 1 and 2 as far as the conveyor arrangement for the core members 5, 6 is concerned. The clamping, sealing and cutting means in stations I to V are not shown in FIG. 8, and may be constructed either in accordance with FIG. 2 or in accordance with FIG. 7. As described with reference to the other embodiments, triangular flaps 19 are formed on the containers, and have to be folded to the bottom part of the containers and sealed thereto. The folding and sealing means for these flaps are modified in the arrangement of FIG. 8, and include a heated guide means 105 forming a pair of channels in which flaps 19 are received and gradually flattened to lie on the bottom portion of the container. The folded flaps are then sealed by heated sealing members 106 which are mounted on a rotary drum 107 and consecutively moved into a position engaging the bottom part of the container and the folded flaps 19 while the bottom part of the container is supported from the interior of the container by the core member 5, 6 in

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spread position of spreading members 5 and 6 in which bottom members 10 and 11 are flat and aligned as shown in FIG. 3.

Before guide means 105 can be effective, it is necessary to turn the core members from the position in station IV through 90° to the position shown in station V in FIG. 8. Such turning movement of the core members is obtained in station V by means which will now be described with reference to FIGS. 9 and 11.

An arm 116 is connected to member 111 for turning movement therewith, and with sleeve 112 within member 110. Consequently, turning of arm 116 will effect turning of the spreading members 5, 6 through member 111. A member 111a is secured to member 111 and holds one end of a spring 119 whose other end is secured to arm 116. Spring 119 tends to turn the lever 116 in clockwise direction as viewed in FIG. 11 into a position in which a stop 117 on arm 116 engages a stop 113 on the non-turnable member 110. A cam follower roller 120 is mounted at the free end of arm 116, and co-operates with a stationary cam track 25b extending in the region of stations IV and V.

When arm 116 is in the position shown in the upper part of FIG. 11, and also shown in FIG. 9, the spreading members are in the intermediate position 5_r, 6_r, in which they pass through stations I to IV. Before the core members reach station V, cam track 25b becomes effective, and arm 116 is turned into the position shown in the lower portion of FIG. 11 in which the core member is turned through 90° against the action of spring 119. In this manner, the cut-off containers are turned as required for insertion of the two triangular bottom flaps into the two guide channels of the folding guide 105 shown in FIG. 8.

In the embodiments of FIGS. 1 and 7, cutting means are described which are arranged at a separate station to which the still connected containers are moved. In a modified arrangement, the clamping and sealing means 12 and 14 shown in FIG. 2, and 14a shown in FIG. 7 are combined with cutting means so that no independent station is necessary for the cutting operation. A pair of combined clamping, sealing, and cutting members is shown in FIG. 14 to be mounted on the rotary members 14c which correspond to the arrangement of rotary members 13 and 14. Rotary members 14c are hollow drums, and one of members 14c envelops a stationary cam 139.

A cutting member 17a is slidably mounted in the body portion 14d, and has a cam follower roller engaging cam track 135 so that during rotation of rotary member 14c, the knife 17a will be advanced at the proper moment to engage a hardened plate 18b which is mounted on a resilient member 18c. A pair of pressure rods 137 is secured to body portion 14d, and projects into the clamping plates 134 and 135. Springs 138 urge the clamping members into clamping position. Heating elements 136 are embedded in the clamping members for sealing superimposed portions of the web as described with reference to the other embodiments. A pair of plates 140 and 141 is provided on the sides of the clamping elements in order to form score lines in the web adjacent the sealed web sections.

The arrangement is schematically indicated in FIG. 4 in which two clamping and sealing members 12a are shown to be located opposite to corresponding clamping and sealing members 14a. In the space between each pair of clamping and sealing members, the cutting knife and its anvil is arranged as explained with reference to FIG. 14.

FIG. 6 illustrates a modified arrangement in which the core members, and more particularly the spreading members are of trapezoidal shape. The containers formed about the score members have a corresponding shape tapering toward the bottom which facilitates removal of the containers from the core members.

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The apparatus according to the present invention operates as follows:

The spreading members 5, 6 are initially in the completely collapsed position shown in FIG. 9, and pass in this position through a recess 3b in the wedge-shaped member 3. The web is folded between folding members 3a and wedge 3 to assume a substantially channel-shaped cross section which is formed into a U-shaped cross-section by the first pair of spreading members 5, 6 which is shifted to the position 5_r, 6_r by cam track 25a as shown in FIG. 9. In this position, the spreading members 5, 6 engage the inside of the side walls of the U-shaped web body, and due to the frictional engagement between members 5 and 6 and the web body, the latter is pulled off the supply roll 1. The spreading members retain this position while passing through the positions I, II, III, IV, that is until the side wall sections of the web body intermediate the core members are clamped, sealed, and cut as above described. The arrangement of FIG. 7 has the advantage that the clamping and sealing members remain for a longer period of time in engagement with the side wall sections of the wall so that a perfect bonding and sealing is assured. The cutting of the still connected container parts can be effected at a separate station as shown in FIGS. 2 and 7 after the sealing has been carried out, or may be done simultaneously with the sealing operation as explained with reference to FIG. 14. In any event, separated cut-off containers having triangular flaps will be carried toward a station VI at which the triangular bottom flaps formed by the clamping members are folded against the bottom and sealed to the same. Before this operation is carried out, the spreading members 5 and 6 are spread by stationary cam 25 to the position 5_v, 6_v shown in FIG. 9, and also in FIG. 3 so that the containers assume a substantially square cross section.

In the embodiment of FIG. 8, the core members are turned through 90° as described with reference to FIGS. 9 and 11, before the triangular flaps 19 enter the heated guide channels in which they are placed flat on the bottom part of the container, whereupon they are heat-sealed by rotary means 106, 107.

In the embodiment of FIGS. 1 and 12, the triangular flaps are engaged by folding fingers and pressed against a bottom while the heated folding fingers 20, 21 seal the flaps against the bottom portion of the container.

The final shape of the container appears in FIG. 5 which shows the folded and sealed flaps 19. The laterally projecting portions 16 which consist of superimposed sealed side wall portions of the web are also folded over and sealed by means which are not an object of the present invention. The heating means described with reference to the various sealing members are electrical resistance elements which are heated to a temperature of about 160°, and have between 80 watt and 150 watt. The preferred voltage is 40 to 45 volts.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of container forming machines differing from the types described above.

While the invention has been illustrated and described as embodied in a container forming machine in which the web is drawn off the supply roll by spread core members, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and

are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. Container forming machine comprising, in combination, folding means for engaging a hand-shaped web to form of the same an elongated channel-shaped body extending in one direction, a plurality of core members, each core member including a pair of spreading members movable in a direction transverse to said one direction between a closer spaced position and a farther spaced position; movable conveyer means supporting said core members spaced from each other for successive movement to a position located relative to said folding means to project into said channel-shaped body, said core members moving successively to positions arranged in a row extending in said one direction so as to be located in said body between longitudinally spaced pairs of side wall sections of the same so that said spreading members engage said sections to give said body a U-shaped cross-section and transport said body in said one direction; control means for engaging and moving said pairs of spreading members between said positions; clamping means movable to and for a clamping position located between adjacent core members of said row for clamping other side wall sections of said channel-shaped body into an abutting position whereby triangular folded flaps are formed in the bottom region of said channel-shaped body, at least one clamping means of each pair including means for bonding said other side wall sections to each other whereby interconnected containers are formed of said body; cutting means for cutting said channel-shaped body along said bonded portions to form separate containers; and folding means located along said conveyor means behind said cutting means for folding the triangular flaps of separate containers carried by said core members, said folding means including a rotary support, a plurality of pairs of spring-loaded pivotally connected folding fingers mounted on said support, cam means, and actuating means connected to each pair of folding fingers for operating the same between different angular positions and including a cam follower engaging said cam means.

2. Container forming machine comprising, in combination, a let-off roll for a band-shaped web; a wedge means located on one side of said roll, and lateral guide means located on opposite sides of said wedge means, said wedge means and guide means constituting folding means for engaging the web to form of the same an elongated channel-shaped body extending in one direction; a plurality of core members, each core member including a pair of spreading members movable toward and away from each other, and operating means for said spreading members including a cam follower in a direction transverse to said one direction; movable conveyer means supporting said core members spaced from each other for successive movement to a position located relative to said folding means to project into said channel-shaped body for drawing the web from said let-off roll and through said folding means, said core means moving successively to positions arranged in a row extending in one direction so as to be located in said body between longitudinally spaced pairs of side wall sections of the same so that said spreading members engage said sections to give said body a U-shaped cross-section and transport said body in said one direction; control cam means in the region of said conveyer means engaged by said cam follower so as to effect movements of said spreading members to a position adapted to engage said side wall sections of said body; clamping means movable to and from a clamping position located between adjacent core members of said row for clamping other side wall sections of said channel-shaped body into an abutting position whereby triangular folded flaps are formed in the bottom region of said channel-shaped body, at least one clamping means of each pair including means for bonding said other side wall sections

to each other whereby interconnected containers are formed of said body; cutting means for cutting said channel-shaped body along said bonded portions to form separate containers; and folding and sealing means located along said conveyor means behind said cutting means for folding and sealing the triangular flaps of separate containers carried by said core members, said control cam means affecting further spreading of said spreading members after the same have passed said cutting means and before arriving at said folding and sealing means to change the shape of the separated cut-off containers to form a flat bottom on the same, said folding and sealing means comprising a rotary support, a plurality of pairs of spring-loaded pivotally connected folding and sealing fingers on said support, cam means, and actuating means connected to each pair of folding and sealing fingers for operating the same between different angular positions and including a cam follower engaging said cam means.

3. A machine as set forth in claim 2 wherein said core members are mounted on said conveyer means for turning movement, and including folding guide means located along the path of said core members for engaging and flattening said triangular flaps, and other control cam means, and other cam follower means cooperating with the same and operatively connected to said core members for turning the same through 90° before reaching said folding guide means.

4. Container forming machine comprising, in combination, a let-off roll for a band-shaped web; a wedge means located on one side of said roll equally spaced from the ends of said roll and having a curved bottom edge, and lateral guide means having a pair of confronting guide surfaces curving outwardly toward the ends of said roll and located on opposite sides of said wedge means, said wedge means and guide means constituting folding means for engaging the web to form of the same an elongated channel-shaped body extending in one direction; a plurality of core members, each core member including a pair of spreading members movable toward and away from each other in a direction transverse to said one direction, and operating means for said spreading members including a cam follower; movable conveyer means supporting said core members spaced from each other for successive movement to a position located relative to said folding means to project into said channel-shaped body for drawing the web from said let-off roll and through said folding means, said core means moving successively to positions arranged in a row extending in one direction so as to be located in said body between longitudinally spaced pairs of side wall sections of the same so that said spreading members engage said sections to give said body a U-shaped cross-section and transport said body in said one direction; control cam means in the region of said conveyer means engaged by said cam follower so as to effect movements of said spreading members to a position adapted to engage said side wall sections of said body; a plurality of pairs of cooperating clamping means, the clamping means of each pair being located on opposite sides of said row of core means, and adapted to be located on opposite sides of said channel-shaped body; means for successively moving the clamping means of each pair to and from a closely spaced clamping position located between adjacent core members of said row for clamping other side wall sections of said channel-shaped body into an abutting position whereby triangular folded flaps are formed in the bottom region of said channel-shaped body, at least one clamping means of each pair including means for bonding said other side wall sections to each other whereby interconnected containers are formed of said body; cutting means for cutting said channel-shaped body along said bonded portions to form separate containers; and folding and sealing means located along said conveyer means behind said cutting means for folding and

sealing the triangular flaps of separate containers carried by said core members, said control cam means effecting further spreading of said spreading members after the same have passed said cutting means and before arriving at said folding and sealing means to change the shape of the separated cut-off containers to form a flat bottom on the same, said folding and sealing means comprising a rotary support, a plurality of pairs of spring-loaded pivotally connected folding and sealing fingers on said support, cam means, and actuating means connected to each pair of folding and sealing fingers for operating

the same between different angular positions and including a cam follower engaging said cam means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,028,796

April 10, 1962

Gunter Neuendorf et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 7, line 6, for "hand-shaped" read -- band-shaped --.

Signed and sealed this 31st day of July 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents