

Sept. 6, 1938.

F. E. BICKFORD

2,128,982

PACKAGE MAKING MACHINE

Original Filed Sept. 21, 1934 5 Sheets-Sheet 1

Fig. 1

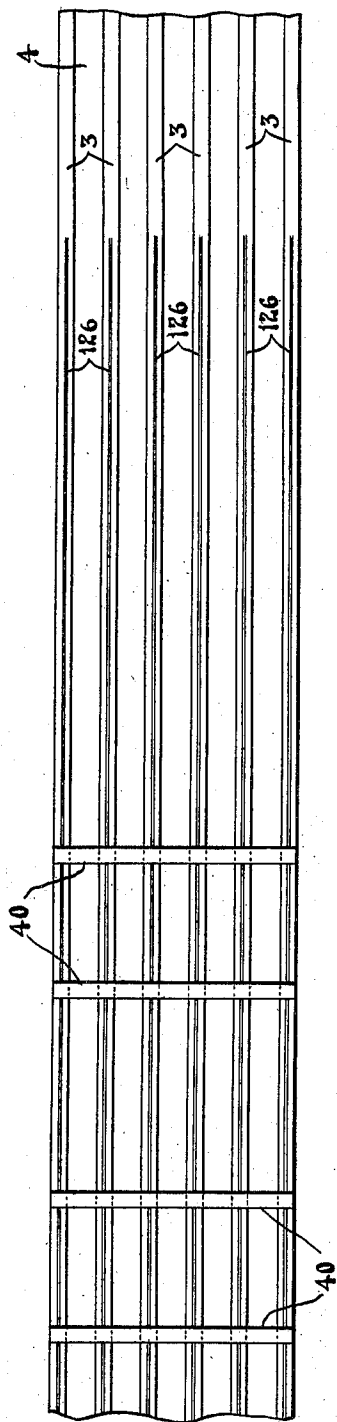
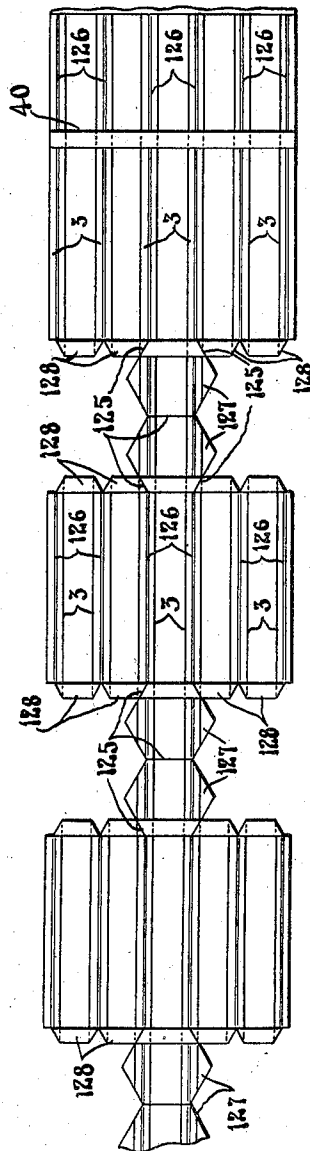


Fig. 2



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Fig. 4

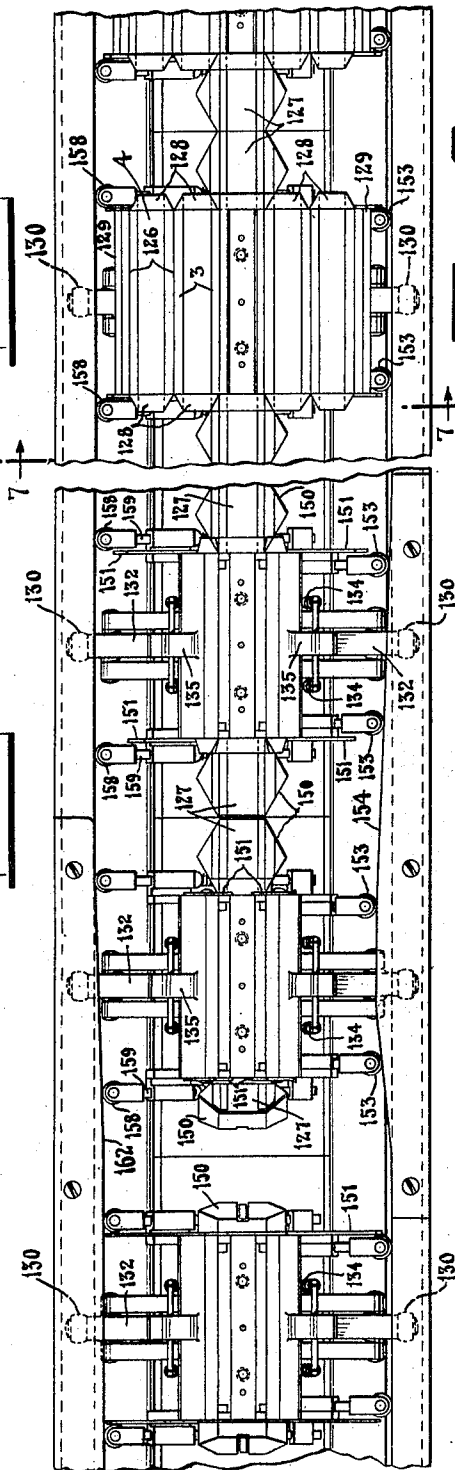


Fig. 5

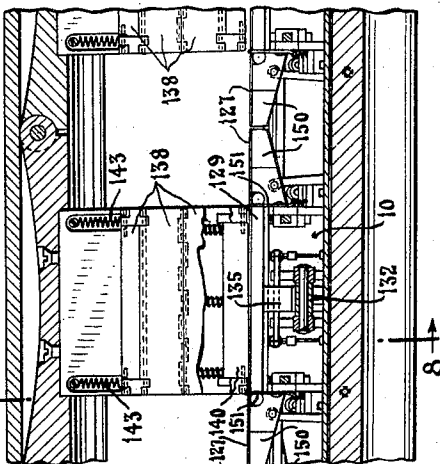
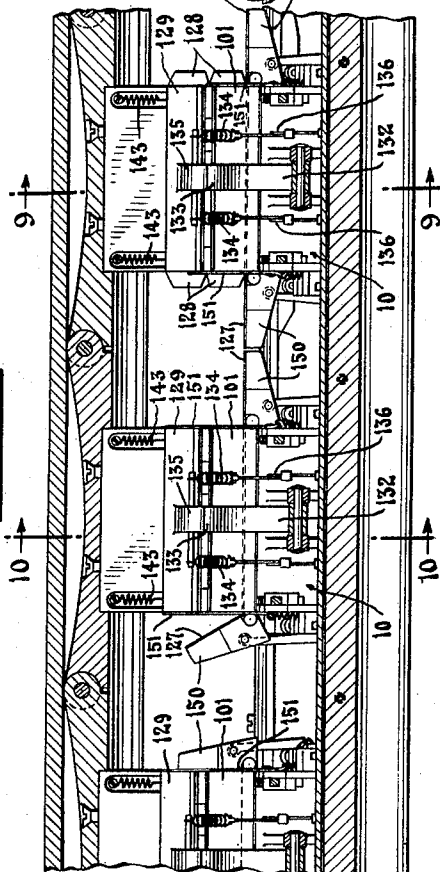


Fig. 6



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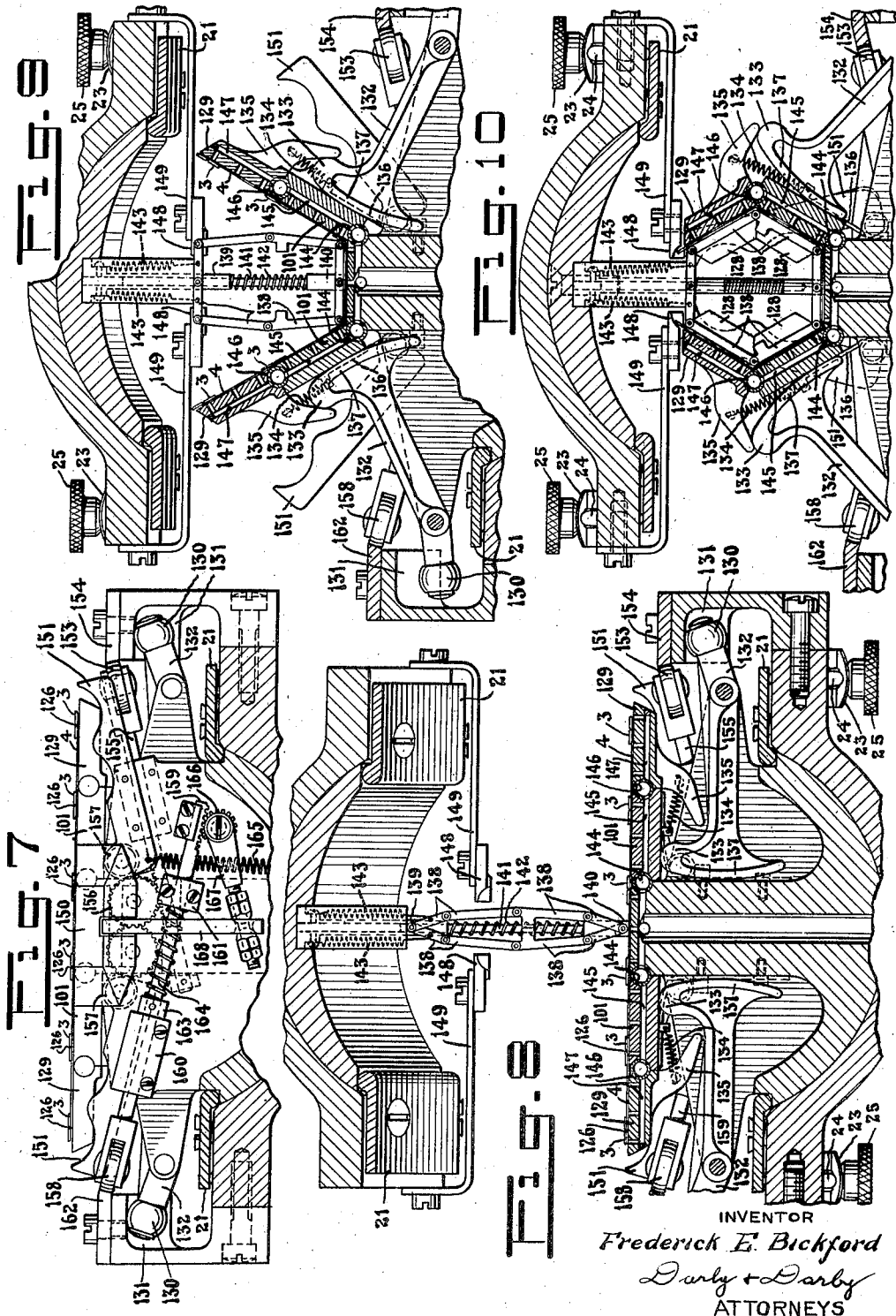
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PACKAGE-MAKING MACHINE

Original Filed Sept. 21, 1934 5 Sheets-Sheet 4

Fig. 11

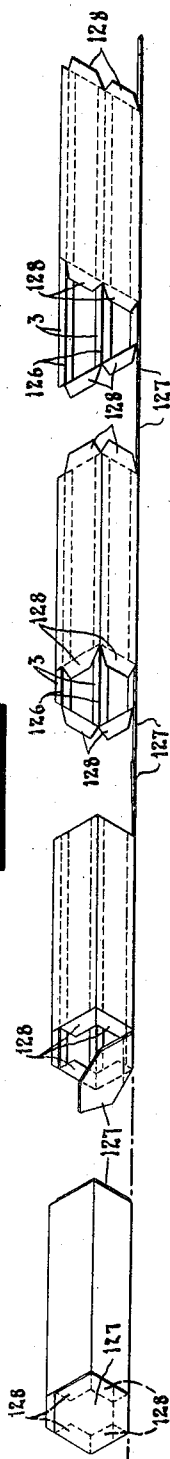


Fig. 12

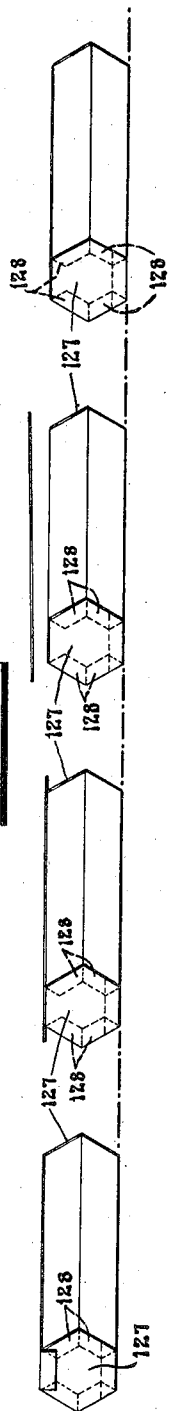
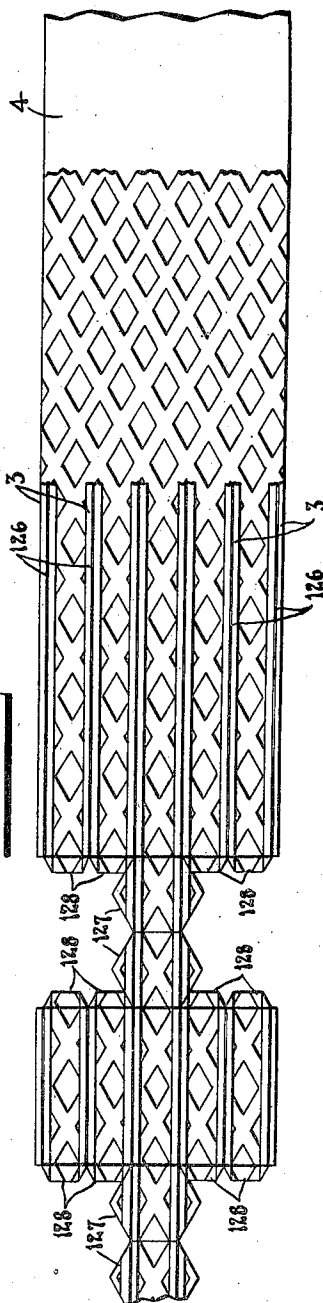


Fig. 13



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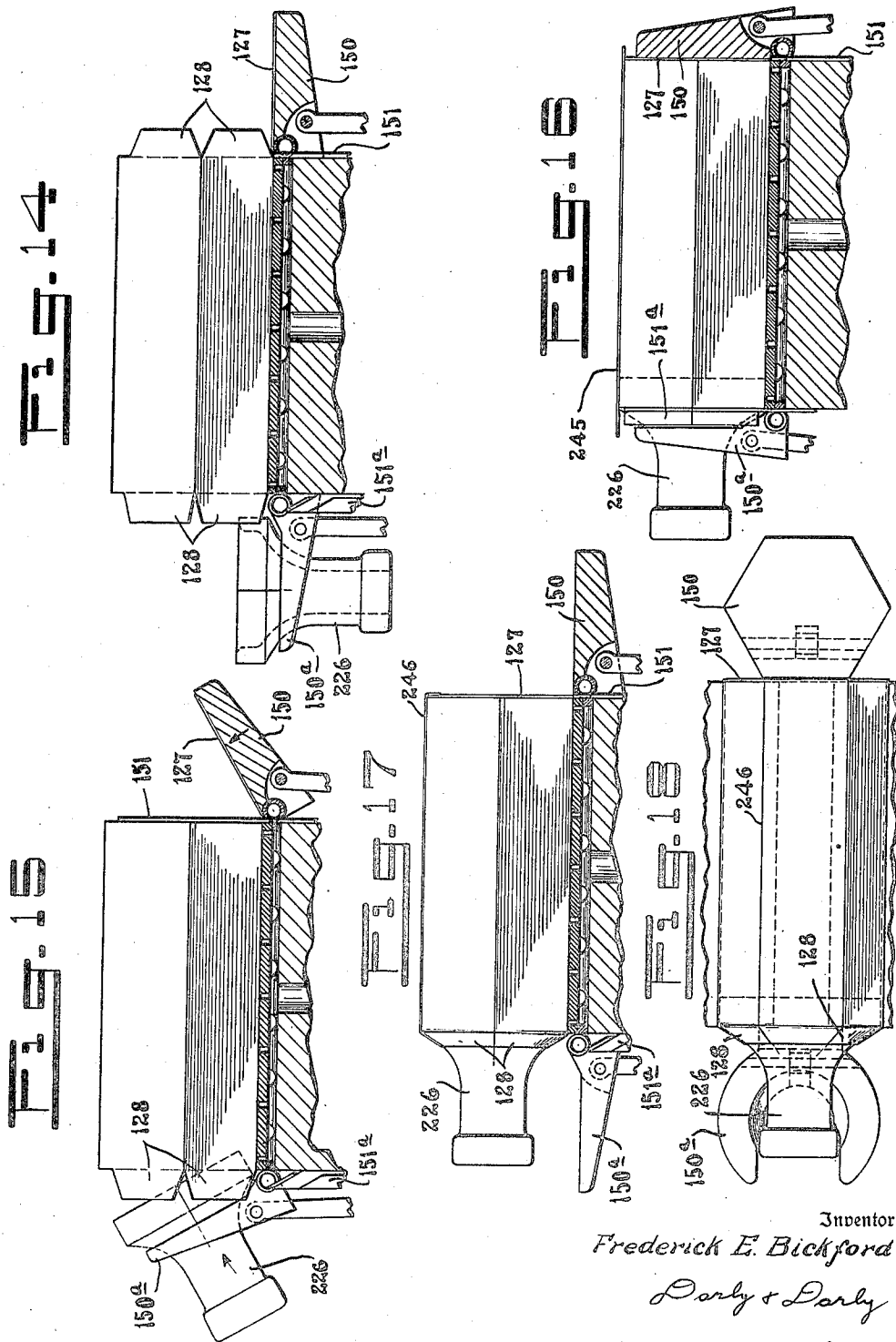
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PACKAGE MAKING MACHINE

Original Filed Sept. 21, 1934

5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,128,982

PACKAGE MAKING MACHINE

Frederick E. Bickford, Rye, N. Y.

Original application September 21, 1934, Serial No. 744,928. Divided and this application August 17, 1937, Serial No. 159,463

18 Claims. (Cl. 93—39)

This invention relates to a machine for making packages or containers, and particularly to a machine for making such packages or containers from a thin, pliable material, as for example "Cellophane".

The present application is a division of my application Serial No. 744,928, filed September 21, 1934.

An object of the invention is to provide a machine for making the containers of "Cellophane" or like materials which shall have sufficient rigidity to maintain their shapes while empty.

Another object of the invention is to provide a machine for making bottles, jars, and like containers from thin, pliable, flexible material.

Other objects and features of the invention will appear when the following description is read in connection with the annexed drawings, in which—

Figure 1 is a diagrammatic view of a package shape for forming a package having a plurality of sides;

Fig. 2 is a diagrammatic view of the continuation of the package shape shown in Fig. 1, showing particularly how it is cut before being formed;

Fig. 3 is a plan view of the carriers which form the package referred to in connection with Figs. 1 and 2; showing hinged carriers, similar to the carriers 10 of Fig. 1 of the original application mentioned above;

Fig. 4 is a plan view of the apparatus of Fig. 3 at a slightly earlier stage in its movement;

Fig. 5 is a side view, partly in section, of the apparatus shown in Fig. 3 with the shaping members coming into engagement therewith;

Fig. 6 is a side view, partly in section, of the apparatus shown in Fig. 4 illustrating the shaping members coming into engagement therewith;

Fig. 7 is a sectional view along the lines 7—7 of Fig. 4;

Fig. 8 is a section along the lines 8—8 of Fig. 6; Fig. 9 is a section along the lines 9—9 of Fig. 5;

Fig. 10 is a section along the lines 10—10 of Fig. 5;

Fig. 11 is a diagrammatic view illustrating the operation of the apparatus shown in Figs. 3 and 5 and 9 and 10;

Fig. 12 is a continued diagrammatic view showing the application of a cover sheet to this type of package, which is accomplished in the same manner as with the package for which the apparatus is shown in the drawings;

Fig. 13 is a diagrammatic view of a modified

form of the arrangements shown in Figs. 1 and 2 illustrating an openwork construction without transverse reinforcing strips;

Fig. 14 is a view, partly in section, illustrating the formation of a bottle in a modified form of my invention; the neck and shoulder of the bottle may be of molded, plastic material;

Fig. 15 is a similar view at a later stage in the operation;

Fig. 16 is another view showing the application of a cover sheet to complete the bottle;

Fig. 17 is a view showing diagrammatically the cover sheet and end flaps secured; and

Fig. 18 is a plan view of Fig. 17.

Figs. 1 to 10 of the drawings illustrate a form of the invention in which a container of hexagonal shape is made. A strip or strips 4 are secured together and supplied with longitudinal reinforcing strips similar to the strips 3 of Fig. 1 of the copending application mentioned above. These strips are then supplied with additional cross strips 40 by apparatus described in the copending application and illustrated at D in Fig. 1 of that application, and likewise in Figs. 15D to 20D thereof. In this case the cross strips 40 are applied before the container blanks are cut. The blanks may be cut out by any suitable means, such as that illustrated as the cutting member in Fig. 1 of the copending application. In this case the material is cut as illustrated in Fig. 2, the cuts being along the lines indicated on the material which is omitted and also by the lines 125. The longitudinal strips 3 are scored down their centers, as indicated at 126 (Figs. 1 and 2). The material is then folded up along the lines 126 so that the section between each pair of longitudinal strips 3 becomes one side of a hexagonal container. It will be noted that there are five such sections. On being folded up they form five sides of the container, leaving the top open so that the container may be filled with material and the sixth side applied after it is filled. End tabs 127 fold over the ends of the container so formed and are adhered to the tabs 128 which are folded in to form the surface to which the tabs 127 may adhere.

The sides and ends of the package or container material are folded up by apparatus illustrated in Figs. 3 to 10. In this case the shaping members, similar to those indicated at E (Fig. 1) of the copending application, cooperate with the carriers to shape the package.

In Figs. 4 and 6 the package material is shown on a carrier just before it engages one of the shaping members. Figs. 3 and 5 illustrate, from

right to left, successive stages in the operation of shaping a container. The first step is to fold up the inner hinged sections 101, best illustrated in Fig. 7. This is accomplished by means of rollers 130 which engage cam surfaces 131. The rollers are mounted on levers 132 (Fig. 8) having a surface 133 which engages the bottom of the inner hinged sections 101. Gravity tends to restore these sections after portion 133 of lever 132 is removed. As the carriers 10 continue their movement to the point at which cross section of Fig. 9 is taken, it will be seen from that figure that the rollers 130 continue to ride along the cam surfaces 131 until surface 133 engages the under surfaces of arm 135 (Fig. 9) which are attached to the outer hinged sections 129 of the carriers 10. These sections are accordingly folded up as shown in Fig. 10. Thin leaf springs 136 are provided which help to restore the inner hinged sections 101 when the levers 132 have been removed. The surface 137 of lever 132 keeps the inner hinged section in position while the surface 133 is engaging arms 135.

As this folding operation is being performed the shaping members have come into engagement with the hinged sections and are supplying a mold around which the material is being folded. These molding or shaping members have eight hinged plates 138 which are hinged at 139 to a sleeve and at 140 to a collar mounted on a shaft 141. As the shaping members come into engagement with the carriers 10 the hinged points 139 and 140 are forced toward one another. This movement is resisted by movement of springs 142 which cause the plates 138 to withdraw to their original position when the molding members are withdrawn. The upper plates 138 are acted upon by springs 143, best shown in Figs. 5 and 6. This causes the upper pair of plates to spread apart at the same time that the lower pair of plates spread apart. As the carriers and shaping members progress in their movement hinged plates 138 successively assume the positions shown in Figs. 8 to 10. At the same time the hinged sections of the carriers 10 are being folded up in the manner already described, as illustrated in the same figures, so that the container material is folded along the scoring lines 126 to form five sides of the ultimate container.

As this is occurring the material 4 creeps outward towards the edges of the hinged sections 129 due to the fact that the hinged sections of the carriers 10 are pivoted below the surface of those carriers.

From Fig. 8 it will be noted that the suction ports 144 are closed at this point so that no suction is applied to the two outer hinged sections, one on either side of the carrier. At Fig. 9 the suction ports 144 have made contact with the passages 145 so that at this point, where the paper need do no further creeping along the two inner hinged sections, the suction is applied to those sections. It will be further noted from Fig. 9 that the suction ports 146 are still closed at this point; but, from Fig. 10 it will be seen, that at this point the suction ports 146 have come into communication with the channels 147 and apply a suction to the outer hinged sections.

When the sides have been completely folded up, as shown in Fig. 10, the outer ends of each of the two outer strips 3 are projecting beyond the carrier. These portions engage fingers 148 mounted on arms 149 and are folded down to form tabs or flaps to which the sixth side of the package, or cover, may be secured. The cover

applying mechanism may be the same as that shown in Fig. 3 of the above mentioned co-pending application.

As the side hinged sections have been folding up as described the end hinged sections 150 (Fig. 3) of the carriers have also been folding up. Prior to the time when these end sections are folded against the ends of the container, however, fingers 151 (Fig. 7) fold over the end tabs of the package to form the surface which is to adhere to the end pieces 127. This is accomplished by means of rollers 153 (Fig. 3) which engage cam surface 154 and actuate the mechanism illustrated in Fig. 7. The rollers actuate racks 155, which in turn rotate pinions 156. The pinions 156 operate through suitable gears to engage the teeth of gears 157 on which the fingers 151 are mounted. Fingers 151 are accordingly moved upward and fold in tabs 128. The fingers 151 may be seen indicated partially in dotted lines in Fig. 10, where the end tabs 128 are shown folded down. These fingers are shaped in the manner illustrated in order to permit the end hinged sections 150 to catch the end tabs 128 before the fingers are entirely withdrawn. The end tabs 128 or the end pieces 127 may be supplied with adhesive by suitable apparatus, not shown, to cause them to adhere to each other.

Additional rollers 158 (Fig. 3) are secured to arms 159 and slide in bearings 160 and 161. These arms terminate in a rack, as shown in Fig. 7. They are actuated by cam surfaces 162 (Fig. 3), which are arranged slightly further along in the travel of the carriers than the surfaces 154. The arms 159 operate to turn up the hinged sections 150 and the end pieces 127 thereon. It will thus be seen that these sections are turned up after the fingers 151 have folded down the tabs 128.

Secured between a collar 163 and bearing 161 is a spring 164 which assures that the arms 159 are returned to their original position when the rollers 158 leave the cam surfaces 162. Springs 165 (Fig. 7) are provided to return the fingers 151 to their normal position. When the arms 159 are actuated by the cam surfaces 162 the rack at the end of that arm operates a pinion 166 to move lever 167 against depending arms 168 which are hinged to the end sections 150. The end sections are accordingly folded up so that the end tabs 127 come in contact with the tabs 128.

In Fig. 11 there is illustrated diagrammatically the operation which has just been described in connection with Figs. 3, 5 and 9, 10. Here it will be seen that as the package travels from right to left of the figure the sides are first folded up, the tabs 128 are then folded in, and then the end tabs 127 are folded up over the end tabs 128.

In Fig. 12 is shown a continued diagrammatic view of the development of a package or container formed by the operations illustrated in Fig. 11. Fig. 12 shows a cover sheet being applied to the package and the end tabs of the cover sheet being turned down over the ends of the package.

From the above it will be understood that the container may be filled and the cover applied to complete the package either during the original machine operations or at a subsequent time in a separate machine.

In Fig. 13 is illustrated another arrangement of the sheets of "Cellophane" or other similar material to form a container or package. In this figure is shown a sheet from which diamond shaped sections have been cut for decorative, strengthening, or other purposes.

In Figs. 14 through 18 are shown apparatus for forming a bottle in accordance with the present invention. The operation of the mechanism shown in these figures is similar to that already described and will be obvious from that description. Here a bottle head 226, which may be made of molded plastic material, is applied to one end of the package instead of covering that end with flap 127. The hinged section 150^a operates in the same manner as the end hinged section 150. The bottle heads 226 are automatically placed in position by mechanism not shown. The end tabs 128 are folded down over the shoulder of the bottle head 226 and secured thereto by means of an adhesive which has been applied to that portion of the head. Padded fingers 151^a fold down these tabs in the manner similar to that which the fingers 151 fold in the tabs 128. The cover sheet 245 is then supplied, as illustrated in Fig. 16, and its ends are turned down and secured to the rest of the container, as shown in Figs. 17 and 18.

Obviously an annular ring may be supplied in place of the bottle head for forming jar-like containers.

While the preferred embodiments of my invention have been described herein it is to be understood that the scope of my invention is not defined by that description but is to be limited solely by the appended claims.

What is claimed is:

1. A machine for making containers of thin pliable material comprising a plurality of hinged sections parallel to one another, means for applying thin pliable container forming material to said sections, means for causing said material to be held to said sections, and means for turning up said sections to form a polygonal container of said material.

2. A container making machine comprising a plurality of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, means for turning up said sections to form the body of a polygonal container, additional sections hinged about axes perpendicular to the axes of said first sections, means for applying container material to said last mentioned sections, means to cause said material to be held to said sections, and means to turn up said sections to form ends for said container.

3. In a container making machine in combination a plurality of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, hinged shaping members adapted to be extended to the desired container shape, means for turning up said sections about said extended shaping members to form a polygonal container, and means for collapsing said shaping members and removing the collapsed structure from said container.

4. In a container making machine, in combination, a plurality of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, hinged shaping members adapted to be extended to the desired polygonal container shape, means for turning up said sections about said extended shaping members to form the body of a polygonal container, additional sections hinged on axes perpendicular to the axes of said first mentioned sections, means for applying container making material to the last mentioned sections, means

to cause said material to be held to said sections, and means to turn up said sections to form ends for said container.

5. In a container making machine, in combination, a plurality of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, hinged shaping members adapted to be extended to the desired polygonal container shape, means for turning up said sections about said extended shaping members to form the body of a polygonal container, additional sections hinged on axes perpendicular to the axes of said first mentioned sections, means for applying container making material to the last mentioned sections, means to cause said material to be held to said sections, means to turn up said sections to form ends for said container, and means to adhere said ends to the body of said container.

6. A machine for making containers of thin pliable material comprising an odd number of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, and means for successively turning up sections on opposite sides of the central section in pairs to form a polygonal container.

7. A machine for making containers of thin pliable material comprising an odd number of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, means for successively turning up sections on opposite sides of the central section in pairs to form the body of a polygonal container, additional sections hinged about axes perpendicular to the axes of said first mentioned sections, means for applying container making material to said last mentioned sections, means to cause said material to be held to said sections, and means to turn up said sections to form ends for said containers.

8. In a container making machine, in combination, an odd number of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, a hinged shaping member comprising a plurality of sides equal to the number of sections, means for lowering said shaping member to register its central side with the central one of said sections and with the central portion of said material, means for extending said shaping member to the desired container shape, and means for successively turning up pairs of opposite sections about said extended shaping member to form a polygonal container from said material.

9. In a container making machine, in combination, an odd number of hinged sections parallel to one another, means for applying container making material to said sections, means to cause said material to be held to said sections, a hinged shaping member comprising a plurality of sides equal to the number of sections, means for lowering said shaping member to register its central side with the central one of said sections and with the central portion of said material, means for extending said shaping member to the desired container shape, means for successively turning up pairs of opposite sections about said extended shaping member to form a polygonal container, and means for collapsing said shaping member and removing the collapsed structure from the formed container.

10. In a container making machine, in combination, an odd number of hinged sections parallel to one another, means for applying container making material to said sections, means to cause
 5 said material to be held to said sections, a hinged shaping member comprising a plurality of sides equal to the number of sections, means for lowering said shaping member to register its central side with the central one of said sections and
 10 with the central portion of said material, means for extending said shaping member to the desired container shape, means for successively turning up pairs of opposite sections about said extended shaping member to form the body of a
 15 polygonal container, additional sections hinged about axes perpendicular to the axes of said first mentioned sections, means for applying container making material to said last mentioned sections, means to cause said material to be held to said
 20 sections, means to turn up said last mentioned sections to form ends on said container body, and means for collapsing said shaping member and removing it from the container.

11. In a container making machine, in combination, an odd number of hinged sections parallel to one another, means for applying container making material to said sections, means to cause
 25 said material to be held to said sections, a hinged shaping member comprising a plurality of sides equal to the number of sections, means for lowering said shaping member to register its central side with the central one of said sections and with the central portion of said material, means for
 30 extending said shaping member to the desired container shape, means for successively turning up pairs of opposite sections about said extended shaping member to form the body of a polygonal container, additional sections hinged about axes perpendicular to the axes of said first mentioned
 35 sections, means for applying container making material to said last mentioned sections, means to cause said material to be held to said sections, means to turn up said last mentioned sections to form ends on said container body, means for
 40 adhering said ends to said container body, and means for collapsing said shaping member and removing it from said container.

12. A machine for making a bottle of thin pliable material having n sides comprising means
 50 for applying the neck and shoulders of a bottle in position, means for folding $n-1$ sides of said material around said shoulder, means for applying a cover sheet to the other side and sealing said sides and cover sheet to said shoulder, and
 55 means for applying a bottom to said bottle and sealing the same thereto.

13. A machine for forming a container of thin pliable material having n sides, comprising means
 60 for positioning an n sided annular ring for operations thereon, means for folding $n-1$ sides of said material around said ring, means for applying a cover sheet to the other side and sealing said sides and cover sheet to said ring, and means for applying a bottom to said container and sealing the same thereto.

14. A machine for making containers of thin pliable material comprising a plurality of hinged sections parallel to one another, means for supplying vacuum through the hinges to said sections for registering the container material with
 5 said sections, and means for turning up said sections to form a polygonal container.

15. A machine for making containers of thin pliable material comprising a plurality of parallel sections hinged together by hinges having passages therein and having valves between sections, means for supplying suction through said hinges
 10 to said sections for registering the container material with said sections, means for turning up said sections to form a polygonal container, and means to open said valves and increase the suction on each section as that section is folded up.

16. A machine for making a bottle of thin pliable material having n sides, comprising $n-1$ hinged sections parallel to one another, means
 20 for applying container making material to said sections, means for causing said material to be held to said sections, means for applying the neck and shoulders of a bottle in position, means for folding said sections to fold the sides of the material around said shoulder, means for applying a
 25 cover sheet to the remaining side and sealing said sides and cover sheet to said shoulder, and means for applying a bottom to said bottle and sealing the same thereto.

17. A container making machine, comprising a plurality of hinged sections parallel to one another, means for applying container making material to said sections, means including suction
 30 ports for causing said material to be held to said sections, and means for turning up said sections to form the body of a polygonal container, said means comprising cams and cam followers operated thereby, said followers terminating in arms which move against the under-surfaces of said
 40 sections and in contact with extensions thereof to cause said folding.

18. A container making machine, comprising a plurality of hinged sections parallel to one another, means for applying container making material to said sections, means including suction
 45 ports for causing said material to be held to said sections, means for turning up said sections to form the body of a polygonal container, said means comprising cams and cam followers operated thereby, said followers terminating in arms which move against the under-surfaces of said
 50 sections and in contact with extensions thereof to cause said folding, additional sections hinged about axes perpendicular to the axes of said first sections, means for applying container material to said last mentioned sections, and means to turn up said last mentioned sections to form ends for said container, said means comprising cams
 55 and cam followers operated thereby, said cam followers including toothed plungers cooperating with gears to cause rotation of said hinged sections about their hinges.