Jan. 23, 1951 M. H. SIDEBOTHAM 2,539,356

APPARATUS FOR MAKING FLUTED CONTAINERS

Filed Dec. 11, 1947

Fig. 1

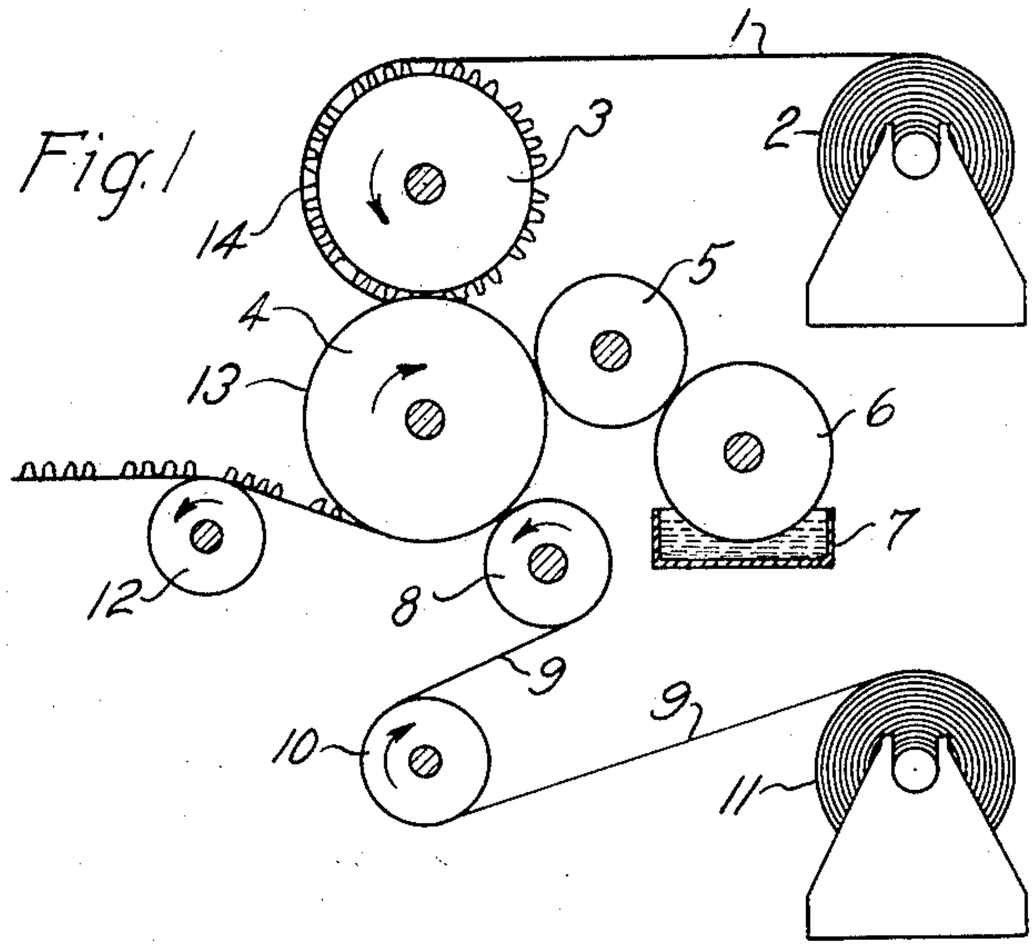



Fig. 2

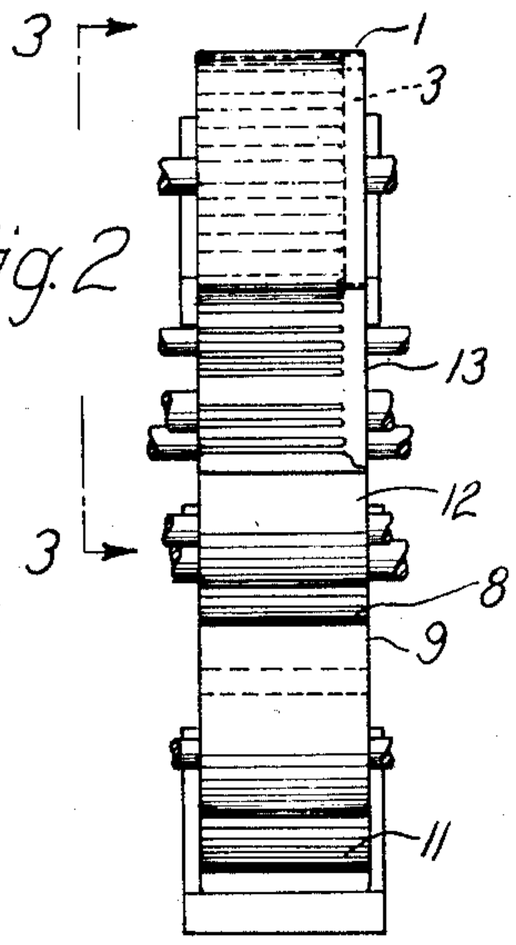



Fig. 3

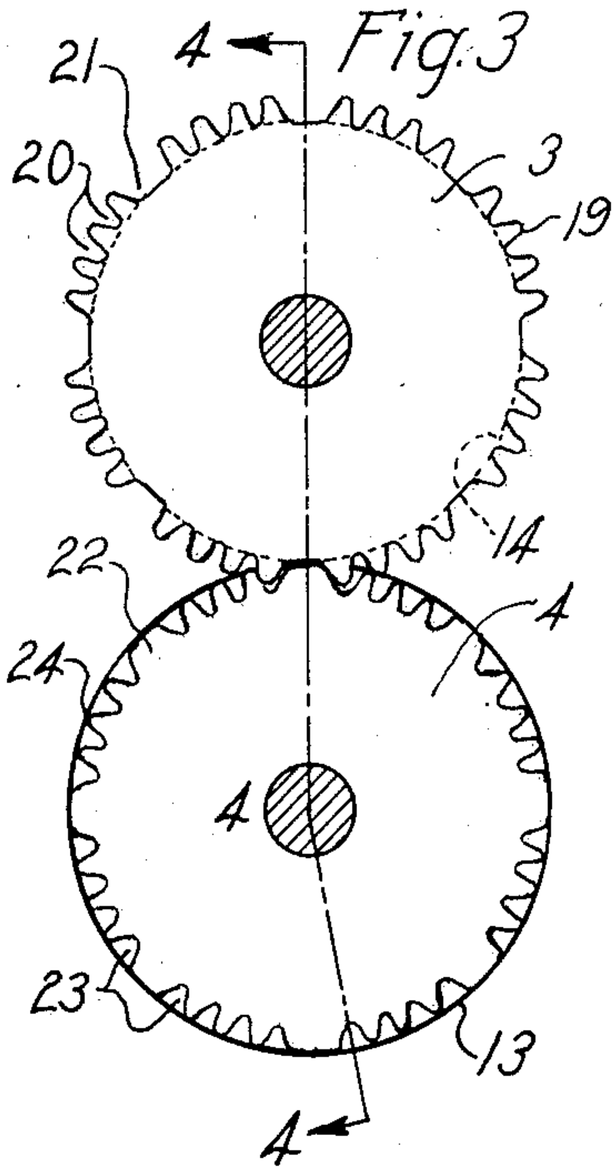



Fig. 4

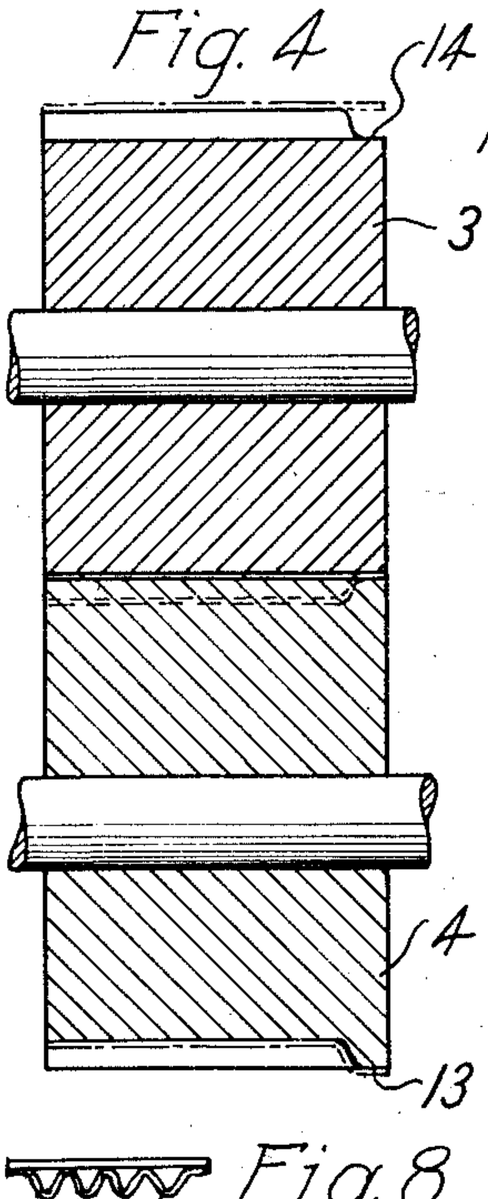



Fig. 6

Fig. 5

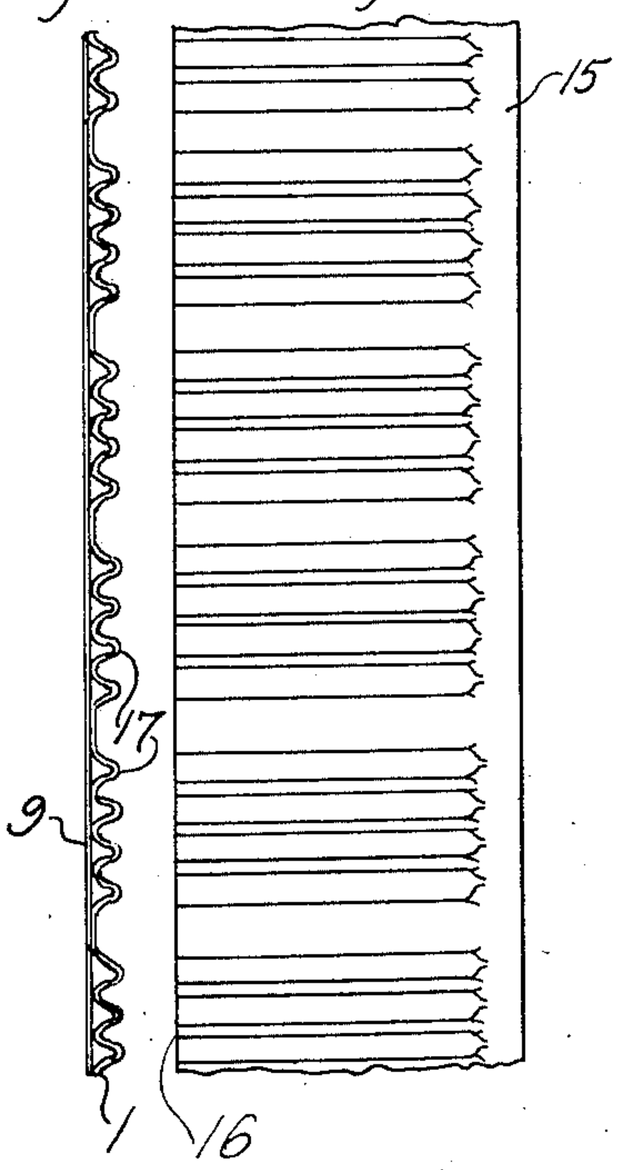



Fig. 8

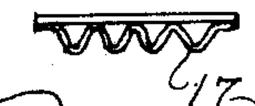



Fig. 9

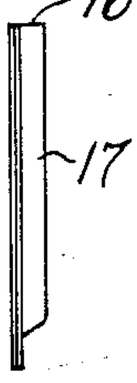
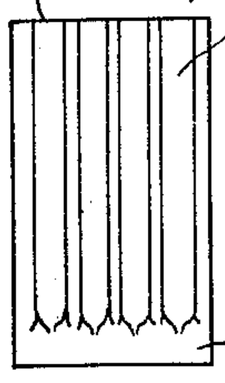



Fig. 7

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Patented Jan. 23, 1951 2,539,356

# UNITED STATES PATENT OFFICE

2,539,356

## APPARATUS FOR MAKING FLUTED CONTAINERS

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Application December 11, 1947, Serial No. 790,994

2 Claims. (Cl. 154—31)

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My invention relates to corrugated products generally and more particularly to the production of small corrugated containers wherein the flutes of the corrugations serve as the packaging medium.

This present invention has to do with the manufacture by automatic machinery of containers of the kind described and claimed in the application of Roderick Wm. Hoag, for "Shaker Dispensers" filed in the United States Patent Office on June 22, 1945, to which Serial No. 601,022, now Patent No. 2,499,313, has been assigned.

One object of this present invention is to provide a method and device for making, at high speed, from two webs of paper, a continuous series of transversely positioned, fluted units for packaging small products.

Another object of this invention is to provide, in a corrugating machine, a method and means for closing flat, the ends of the flutes which form the container elements.

With said objects in view, and others which will be apparent to persons skilled in the art of making containers, my invention consists in the machine hereinafter described and claimed.

Of the accompanying drawings:

Fig. 1 is a schematic illustration, in elevation, of a device for making container elements from two webs of paper.

Fig. 2 is an end view of Fig. 1.

Fig. 3 is a partial section at 3—3 of Fig. 2, drawn to a larger scale.

Fig. 4 is a partial section at 4—4—4 of Fig. 3.

Fig. 5 is an elevation showing a strip of the product of the machine, comprising a plurality of flutes with one end of each flute closed to form each flute into a container element, and showing a space between each set of four flutes.

Fig. 6 is an edge view of Fig. 5.

Fig. 7 is a front elevation of one set of four flutes cut from a section such as is shown in Fig. 5.

Fig. 8 is a top view of Fig. 7.

Fig. 9 is a side view of Fig. 7.

Similar reference characters indicate similar parts or features in all of the views.

Referring first to Figs. 1 and 2, there is shown the principal elements of a machine for making the containers. In the operation of the machine, a web of paper 1 is drawn from a supply roll 2 and advanced to ride on the top of the corrugating teeth on the upper corrugating roller 3 which rotates counterclockwise and meshes with teeth on the lower corrugating roller 4 which rotates clockwise. With the rotation and meshing of the teeth on the corrugating rollers 3 and 4, the web of paper 1 on the corrugating roller 3 is drawn between the said corrugating rollers and caused to be formed to take the shape of the periphery of the teeth on the lower corrugating roller 4. With the further rotation of corrugating roller 4 the formed web is treated by having adhesive applied to parts of the web 1, formed over the top of the teeth, by contact with adhesive roller 5 which is coated with liquid adhesive by contact with adhesive feed roller 6 rotating in liquid adhesive contained in supply reservoir 7. The further rotation of the lower corrugating roller 4 moves the adhesively treated, corrugated web 1 positioned thereon to engage web pressing roller 8 which serves to press a face paper web 9 firmly against the adhesively treated crowns of the corrugated web 1 carried on corrugating roller 4. The face paper web 9 is advanced to the pressing roller 8 by feed roller 10 which draws the face paper web from the face paper supply roll 11. The further rotation of corrugating roller 4 advances the corrugated web 1, combined with the face web 9, out of contact with corrugating roller 4 and pressing roller 8, thence the completed web is drawn over delivery roller 12 to be picked up for use. A section of the completed web is shown in Figs. 5 and 6.

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In the operation of forming the web 1 about the teeth of the corrugating roller 4, one margin of the paper after it has been formed over the teeth is then flattened out by being pressed between the flange element 13 (Figs. 1, 3 and 4) on the lower corrugating roller 4 and the shoulder diameter 14 on the upper corrugating roller 3. When the corrugated web 1 is formed over the teeth of corrugating roller 4 the web is also formed over the flange element 13, and when the adhesive is applied to the crowns of the corrugations, adhesive is also applied to that part of the corrugated web formed over the outside diameter of the flange element 13, so that when the face paper web 9 is pressed and secured to the adhesively treated areas of the corrugated web 1, a series of pockets is formed with one end of each pocket closed and one end of each pocket open as shown in Figs. 5 to 9 inclusive, the closed end being marked 15 and the open end marked 16.

In the embodiment herein shown and described the corrugating rollers are designed to form a container unit having four open end flutes or corrugations 17.

The upper corrugating roller 3 (Figs. 1, 3 and 4) is provided on its outer periphery with teeth 19

which mesh with corresponding teeth 22 and 24 in the lower corrugating roller 4.

The corrugating rollers 3 and 4, together with pressing roller 8, and the adhesive applying device, operate on paper webs 1 and 9 to provide a single faced corrugated web. This is a conventional method of making single faced corrugated webs. However, the single faced corrugated web produced by the devices disclosed in this instant application has two novel features, consisting first of closed flutes for the corrugations on one margin of the web. The other feature consists in the grouping of the corrugations to provide a series of four flute elements which may be separated into multi-flute containers.

The flutes of the corrugations are closed flat as shown at 15 of Fig. 5, along one margin of the web by the operation of corrugating rollers 3 and 4. The corrugating roller 3 is provided with an annular shoulder at the bottom diameter of the corrugating teeth, as shown at 14 in Fig. 4. The corrugating roller 4 is provided with an annular flange 13 of the same diameter as the outside diameter of the teeth on the said corrugating roller 4 as shown in Fig. 4.

In the operation of the corrugating rollers the web of paper 1 is advanced from the supply roll 2 (Fig. 1). One side margin of the web 1 is positioned to project over the ends of the teeth on corrugating roller 3 as shown by dot-dash lines in Fig. 4. With the rotation of corrugating roller 3 the paper web 1 riding on the top of said roller 3 is drawn into the bight of the teeth of corrugating rollers 3 and 4 (Fig. 1), the web is formed to the contour of the teeth on roller 4, and the margin of the web which projects over the ends of the teeth of corrugating roller 3 is formed flat against the diameter of the projection 14 by contact with the flange element 13 on corrugating roller 4. Thus it will be apparent that after the web 1 has passed through the mesh of the teeth on the corrugating rollers 3 and 4 and been acted upon by shoulder 14 and flange element 13, the said web 1 is formed to the contour of the teeth on corrugating roller 4, and the projecting margin of the web 1 is formed over the flange element 13 on roller 4 as shown by dot-dash lines on Figure 4. While the web 1 is still in formed condition on the corrugating roller 4 adhesive is applied to the portions of the web 1 which are drawn over the top of the teeth on corrugating roller 4 and on flange 13 by contact with adhesive applying roller 5 which is coated with adhesive by rotary contact with adhesive feed roller 6 which revolves in liquid adhesive contained in adhesive reservoir 7. After the adhesive has been applied to the corrugated web 1 a second web or face sheet 9 is drawn from supply roll 11 and advanced over rolls 10 and 8 and pressed against the adhesively treated and formed web 1 on corrugating roller 4. The completed web assembly is then removed from contact with corrugating roller 4 and advanced over roller 12 to any suitable hopper where the composite web of container elements may be picked up for filling and cutting apart to provide separate package units as shown in Figs. 7, 8 and 9.

For purposes of illustration the embodiment of my invention herein described and shown provides for the production of container units having four flutes each. It will be obvious that the number of flutes may be any number from one or more flutes as desired. The space between the flutes of each unit is preferably greater than the space between the flutes comprising a unit, to



provide space for cutting the units from the composite web without damage to the units. The wide space between each group of four flutes or corrugations is accomplished by providing teeth 19 suitably spaced on corrugating roller 3 to fit corresponding recesses 23 in corrugating roller 4. Thus with the rotation of corrugating rollers 3 and 4, the teeth 19 enter recesses 23 on corrugating roller 4, and at the same time teeth 24 and 22 on corrugating roller 4 enter recesses 20 and 21 respectively on corrugating roller 3.

It will be understood that those skilled in the art may vary the details of construction as well as the arrangement of parts without departing from the spirit of my invention, and therefore I do not wish to be limited to such features, except as may be required by the claims.

Having described my invention I claim:

1. In a device for making corrugated webs for use as container elements, a corrugating roller with transversely positioned teeth on the outer periphery thereof, the teeth being spaced apart to provide a plurality of sets of teeth about the perimeter of the roller, with the radial space between the sets of teeth being greater than the radial space between the teeth in each set of teeth, and an annular element on one side of the roller adjacent to the ends of the teeth and of about the same diameter as the root diameter of the teeth on the corrugating roller; and a second corrugating roller, a plurality of transversely positioned teeth on the second corrugating roller fashioned to fit the spaces between the teeth and to mesh with the teeth on the first corrugating roller, and an annular element adjacent to the ends of the teeth on the second corrugating roller and of approximately the same diameter as the outside diameter of the teeth on the said second corrugating roller.

2. In a device for making corrugated webs, a corrugating roller with transversely positioned teeth on the outer periphery thereof, and an annular shoulder on one side of the roller adjacent to the ends of the teeth and of about the same diameter as the root diameter of the teeth on the corrugating roller; and a second corrugating roller, a plurality of transversely positioned teeth on the second corrugating roller fashioned to fit the spaces between the teeth and to mesh with the teeth on the first corrugating roller, and an annular flang adjacent to the ends of the teeth on the second corrugating roller and of approximately the same diameter as the outside diameter of the teeth on the said second corrugating roller.

MELVIN H. SIDEBOTHAM.

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