May 21, 1957 G. MELIDONIS 2,792,623

METHOD AND APPARATUS FOR FORMING METAL BLANKS

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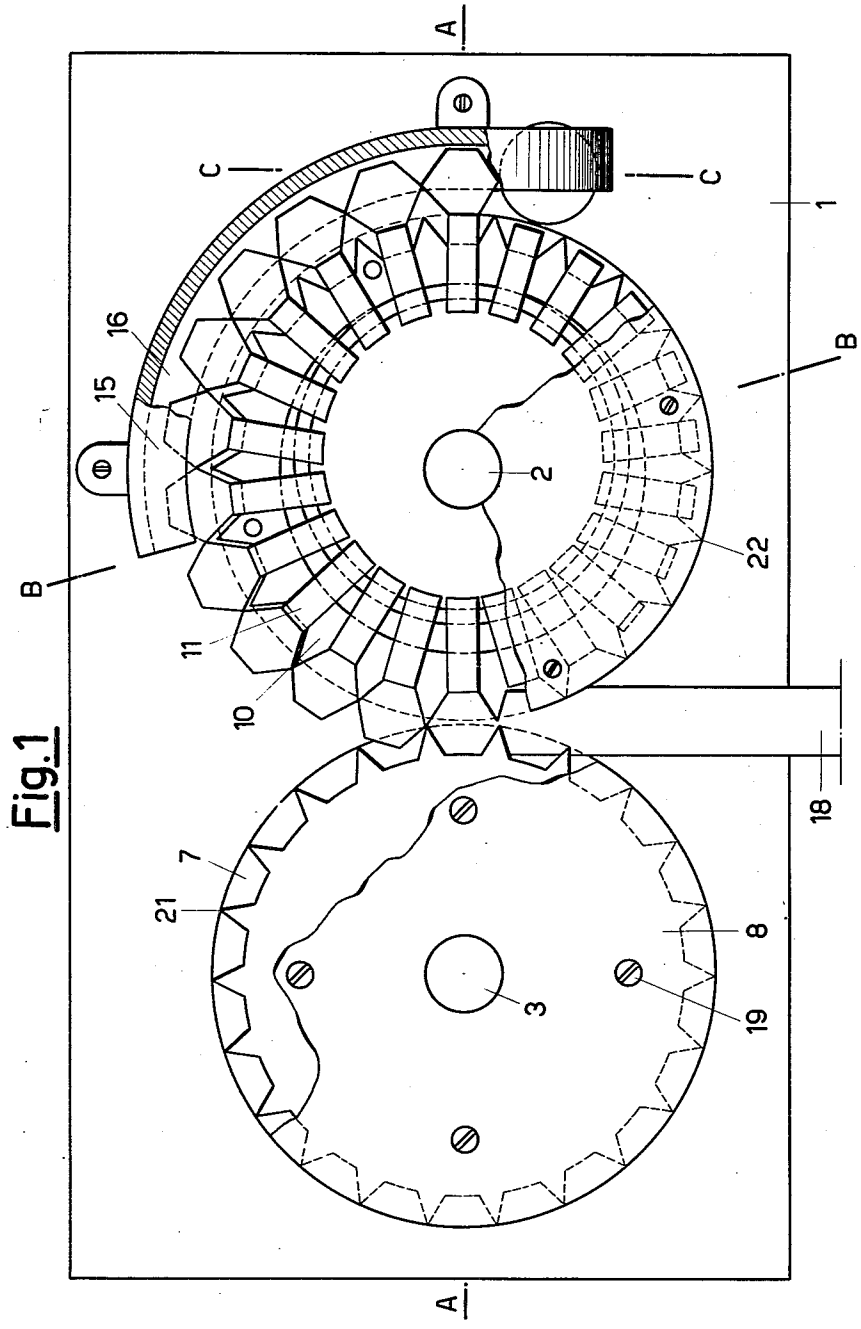

Fig. 1

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Fig.2

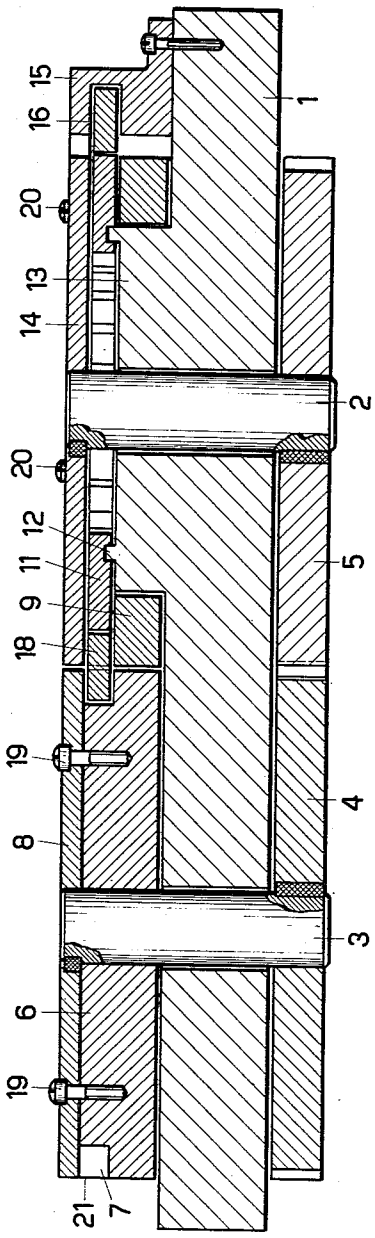


Fig.3

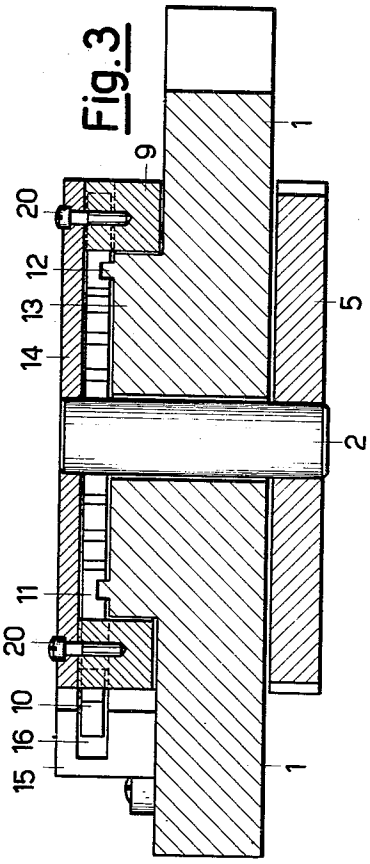
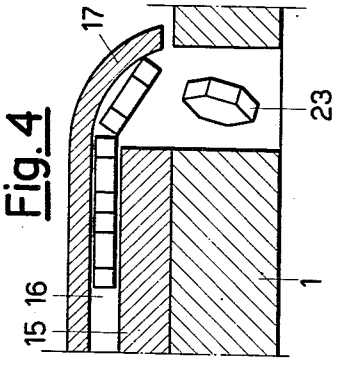


Fig.4



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United States Patent Office 2,792,623 Patented May 21, 1957

2,792,623

METHOD AND APPARATUS FOR FORMING METAL BLANKS

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Application January 26, 1953, Serial No. 333,064

Claims priority, application Italy January 30, 1952

3 Claims. (Cl. 29—413)

For the manufacture of hollow cylindrical articles with the extrusion method and particularly to manufacture collapsible tubes for tooth-paste, for foodstuffs, for medicinals or the like, one may stamp out from sheet or band of convenient thickness small cylinders having suitable diameter and height, and then subject these small cylinders to the extruding operation, which creates the container having a closed or perforated bottom or projecting extensions as the case may be, in accordance with the requirements of the proposed use.

The stamping out of these small cylinders and small discs from sheet metal produces waste which in theory is little more than 10% but in practice, for technological reasons, is usually as high as 30% or more. Instead of using sheet metal as a starting material, it is possible to use rolled material having rectangular section, which is generally of lower cost per unit weight as compared with sheet metal; however, in stamping out from such rolled material a single row of small discs, the theoretical waste of material amounts to 27% and in practice to more than 40%, whence the advantage of lower cost of the starting material is lost.

The present invention has the object of rendering possible the utilization of rolled material for the manufacture of hollow bodies by extrusion, by not only reducing the percentage of waste in stamping out as compared to that produced with sheet metal, but by eliminating such waste completely.

According to the invention, the aforementioned blanks are not obtained by stamping, but by deformation and subsequent breaking of the rolled material.

In particular, a rolled metallic material having rectangular section and width smaller than the external diameter of the hollow body to be obtained, is subjected to deformation by compressing portions spaced from one another of its smaller faces symmetrically towards the axis of the rolled material while this is made to advance while being guided loosely on its two larger faces. The rolled material shaped in this way is then broken in correspondence with its restricted sections resulting from that deformation.

The invention also concerns a device for carrying out this process. Said device comprises two coupled rollers arranged to turn at the same peripheral speed and provided with peripheral grooves facing each other and of a width slightly larger than the thickness of the profiled material and of a depth larger than half the width of the profiled material; the bottom of each of these grooves is provided with projections over their entire length, which projections extend almost to the periphery of the roller.

One example of the method and means for proceeding according to the present invention is illustrated merely by way of explanation in the accompanying drawings, wherein:

Fig. 1 is a view, partly broken away, of the device in accordance with this invention;

Fig. 2 is a section along line A—A of Fig. 1;

Fig. 3 is a section along line B—B of Fig. 1;

Fig. 4 is a section along line C—C of Fig. 1.

As it appears from the diagrammatical illustration in the drawings, the device is composed of a support **1**, which supports two shafts **2** and **3** driven respectively by the gears **4** and **5**.

On the shaft **3** there is fitted a disc **6** provided peripherally on one of its faces with trapezoidal recesses **7** separated by tips **21**; against this face there is applied by means of screw **19** a disc of equal diameter **8**.

On the shaft **2** there is fitted a disc **14** and to this disc there is connected, by means of screws **20**, a ring **9** carrying on one of its faces pentagonal projections **10**, the shape of which is shown in Fig. 1, the tips **22** which extend to within the region of the peripheral circumference of the ring **9**; in the spaces existing between said projections **10** there are mounted radially slidable prismatic pieces **11**, which by means of a groove provided in the proximity of one of their ends, engage with an eccentric circular rib **12** provided on a projection **13** of the plate **1**.

The disc **6** and ring **9** and the respective discs **8** and **14** applied thereto have such diameters as to be tangential and are so arranged that the respective tips **21** and **22** pass in alignment in proximity to each other, when the discs are rotated.

In front of one portion of the periphery of the rotating unit **9–14** there is fixed on the plate **1** a curved member **15** provided with a groove **16**, which lies in the plane of the projections **10** and of the slidable members **11**.

One part of the end of member **15** lies farther from the point of tangency of the two discs, extending, on the side of the groove **16**, with a portion **17** bowed towards the plate **1**, as indicated at **17** in Fig 4.

The operation of the device hereinbefore described is as follows:

After starting rotation by any suitable means (not shown) of the two shafts **2** and **3** by means of the gears **4** and **5**, a rolled flat piece of metal **18** is introduced into the jaws formed of disc **6** and the ring **9**, viz. in correspondence with the peripheral cavities mentioned hereinbefore. The section of said rolled piece is rectangular; its thickness is smaller than the thickness of the trapezoidal cavities **7** and smaller than the thickness of the projections **10** and its width is smaller than double the depth of said cavities **7**. The rolled piece **18** is therefore gripped by the tips **21** and **22** and is squeezed and shaped in correspondence with said tips and enters into the subsequent cavities of the discs where it remains with a little play, assuming the shape of a chain of hexagons connected with one another by thin webs of residual material.

It should be noted that at the point of tangency between the two discs the prismatic pieces **11** are in a completely retracted position towards the spindle **2**, by action of the eccentric rib **12**.

The shaped rolled piece leaving the point of tangency of the two rollers is held adherent to the ring **9** and is made to pass into the groove **16** of the member **15**. During this travel the prismatic pieces **11** are gradually displaced by the rib **12** towards the periphery of the disc and push the shaped profiled piece outwards in this way as can be seen in Fig. 1.

After covering about half turn, the profiled piece lies completely outside the respective cavity of the ring **9** and is guided exclusively by the groove **16**. Arriving at the end of said groove, it is bent laterally by action of the curved end **17** and this new deformation of the profiled piece causes it to break at its points of restriction so small roughly hexagonal prisms **23** are detached, which then fall for instance through a hole **20** provided in the plate **1** into a collector not represented in the drawing.

These pieces **23** are then subjected preferably to an operation of trimming and rounding of the edges by making them roll loose in a conventional manner in a rotary drum, whereafter they are ready for the extruding operation.

The method as described hereinbefore is susceptible of many variations. The shape of the piece **23** may be different from that hereinbefore described and it may be for instance a regular polygon or slightly irregular with a different number of sides or even a circle. The device for carrying out the method may be of different shape; for instance, the mechanism for extracting the shaped rolled piece from the ring **9** may be of different shape, the separation of the various pieces **23** from one another may be effected by members placed in the very disc, or the breaking in correspondence with the restricted zones of the rolled piece may be effected by bending the shaped rolled piece in another manner; many other contrivances and variants are possible as will be evident to one skilled in the art, with the aid of the preceding description and without departing from the scope of the present invention.

What I claim is:

1. A device for forming successive blanks to be used in the forming of hollow bodies therefrom; said device comprising two rollers mounted for rotation about parallel axes and in rolling contact with each other, each of said rollers having a circumferential groove of rectangular axial cross-section and spaced apart, wedge-shaped projections reaching out to the periphery of the related roller so that radially opening, trapezoidal cavities are defined between the successive projections in the groove, whereby a strip of rectangular cross-section fed between said rollers while the latter are rotated will have the edges thereof pressed together at spaced locations by said projections and the portions of the strip between the spaced locations are free to expand into said cavities to define blank forming portions connected by thin webs having their major axes parallel to said axis of rotation of the roller, a fixed curved guide extending along a portion of the periphery of one of said rollers and increasing in radial distance from the axis of rotation of said one roller in the direction of rotation of the latter, and means for progressively ejecting the blank forming portions of the strip from said cavities and against said guide, said guide having a terminal portion departing from the plane of rotation of said one roller so that each blank forming portion is bent relative to the portion next in line during travel along said terminal portion of the guide in the direction perpendicular to the major axis of the connecting web to tear the latter and thereby separate the successive blank forming portions.

2. Apparatus for continuously cutting a rectangular strip at spaced locations along the latter so that the volumes of material between the successive spaced locations provide blanks to be used in the forming of hollow bodies; said apparatus comprising two continuously rotated rollers having axially spaced peripheral flanges in planes perpendicular to the related axis of rotation and a series of wedge-shaped, circumferentially spaced partitions extending between said flanges to define circumferentially segregated, radially opening cavities in the peripheries of the rollers which register at the point of tangency of the rollers, the axial spacing between the flanges of each roller being slightly greater than the thickness of the strip to be cut so that, as the strip is fed between the rotated rollers with the relatively wide surfaces of the rectangular strip disposed parallel to said planes of the flanges, the latter guide and position the strip relative to the rollers, the circumferential spacing between the successive wedge-shaped partitions of the rollers being equal to the distance between the spaced locations at which the strip is to be cut so that the relatively narrow edges of a rectangular strip fed between the rotated rollers are pinched together at the desired spaced locations, and the volumes of the cavities registering at said point of tangency of the rollers being greater than the volumes of material for providing the desired blanks so that the volumes of material cut from the strip only incompletely fill said registering cavities to avoid molding of the material and to facilitate withdrawal of the blanks from between the parallel flanges and partitions defining the cavities.

3. A process for forming successive blanks to be used in the forming of hollow bodies therefrom; said process comprising continuously rotating two rollers in rolling contact with each other and having radially opening cavities in the peripheries thereof which are circumferentially segregated by wedge-shaped peripheral portions having their thin outer edges extending axially, said cavities of the rollers registering at the point of tangency of the rollers, feeding a strip of rectangular cross-section between said rollers, said strip having relatively wide surfaces parallel to the plane of rotation of the rollers and relatively narrow opposite edges connecting said surfaces and which are pressed together sequentially at spaced locations into thin webs by said peripheral portions between the cavities with the major axes of said webs extending normal to said surfaces of the strip, said rectangular cross-section of the strip being sufficiently small so that, after pressing together of said edges, blank forming portions between said spaced locations and connected together by said thin webs are entirely included in and only incompletely fill said cavities of the rollers thereby avoiding any waste of said strip, and bending each of said blank forming portions with respect to the blank forming portion next in line about an axis perpendicular to said major axis of the thin connecting web thereby to tear the latter and effect separation of the successive blank forming portions.

References Cited in the file of this patent

UNITED STATES PATENTS

658,598	Stevens	Sept. 25, 1900
1,170,676	Safford	Feb. 8, 1916
1,436,931	Albrecht	Nov. 28, 1922
1,707,778	Witherow	Apr. 2, 1929
1,719,446	Peirce	July 2, 1929
2,248,720	Pruckner	July 8, 1941
2,327,894	Hodgson	Aug. 24, 1943
2,537,464	Holmberg	Jan. 9, 1951