Sept. 17, 1929. J. M. HOTHERSALL 1,728,410

PROCESS AND APPARATUS FOR MAKING SEALING RINGS FOR CONTAINERS

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Fig. 1

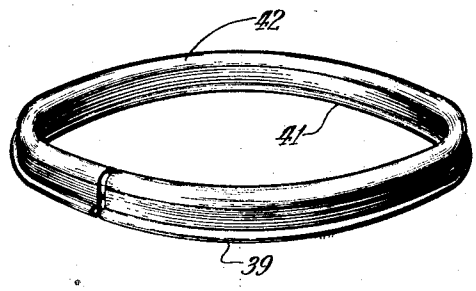


Fig. 2

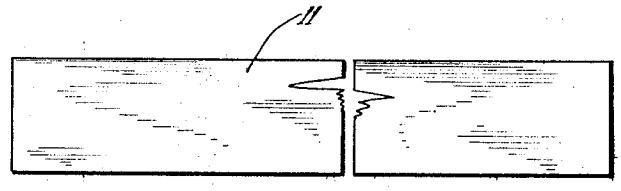


Fig. 3

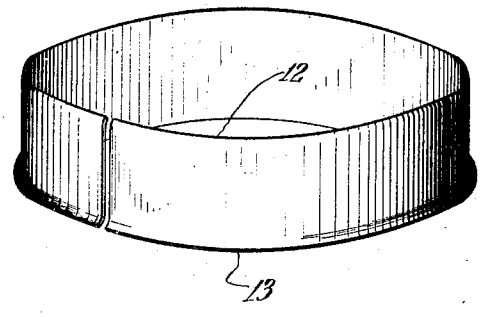
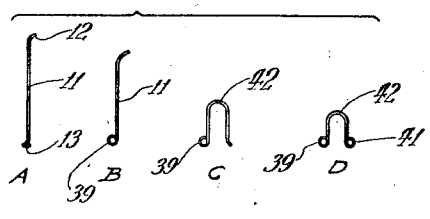


Fig. 4



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Fig. 5

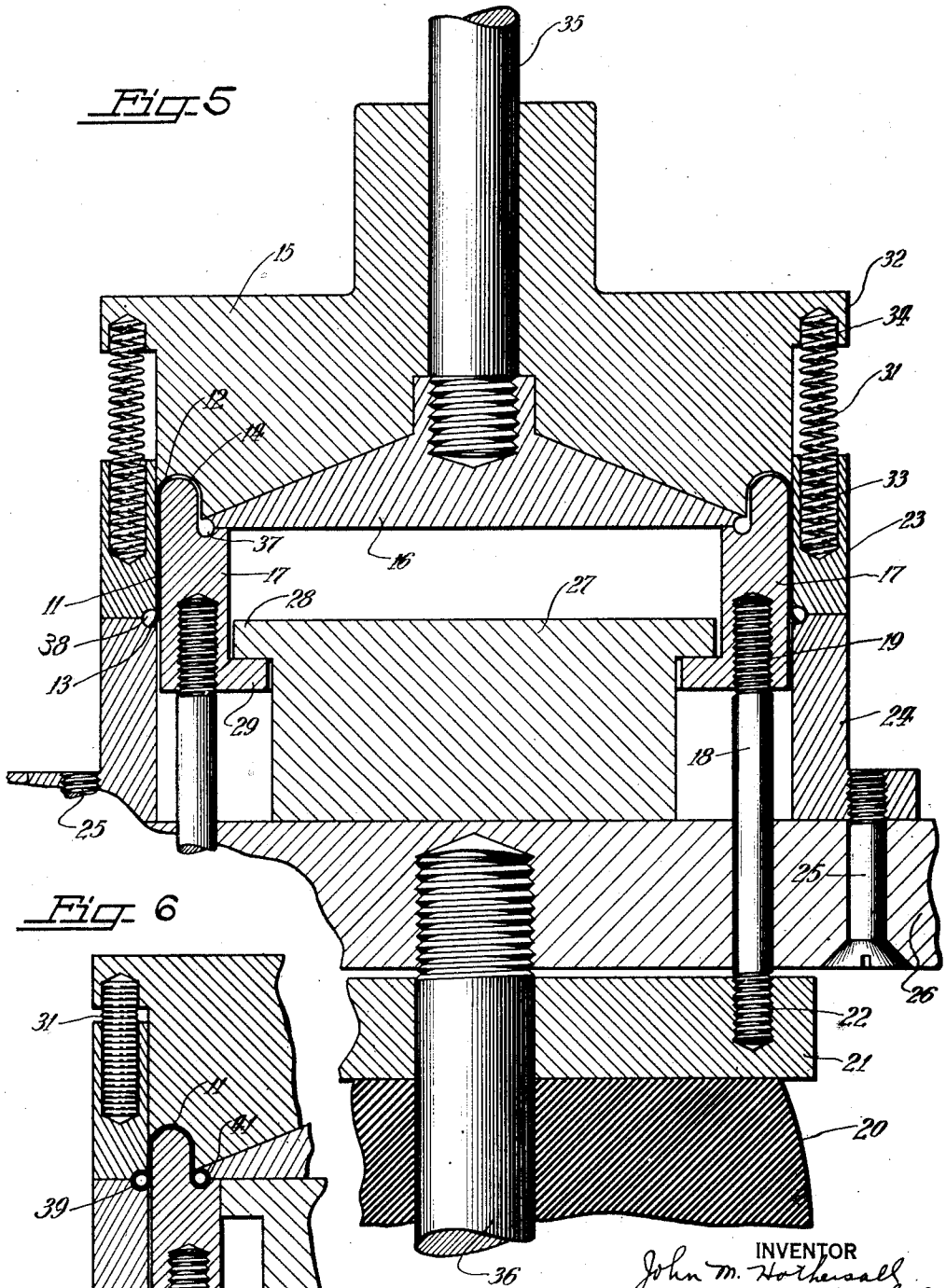


Fig. 6

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UNITED STATES PATENT OFFICE

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PROCESS AND APPARATUS FOR MAKING SEALING RINGS FOR CONTAINERS

Application filed April 16, 1925. Serial No. 23,476.

The principal object of the present invention is to provide an efficient and economical process for forming sealing rings for containers, though from its broader aspects, the invention may be adapted for shaping sheet metal members or the like for other purposes.

Another object is the provision of efficient apparatus for the practice of the process.

Sealing rings of the type produced by my new process are particularly adapted for use in closing containers in which the cover and body parts are so related as to provide a bead, or false wire rim at the top, over which the ring may be positioned to hold the cover in closed relationship, said ring being removable, preferably by hand, to permit the opening of the container.

The method of positioning the ring upon the container forms the subject of a separate invention and the purpose of the present process is to produce a ring of proper form and construction for use in said first-mentioned process. The invention contemplates the production, from a substantially flat blank or metal strip, of a ring of inverted U-shape and having rolled or curled edges, the operation being performed by a single stroke of properly related die members.

Numerous other objects and advantages of the invention will be apparent as it is better understood from the following description, which, taken in connection with the accompanying drawings, discloses a preferred embodiment thereof.

Referring to the drawings,

Figure 1 is a perspective view of a sealing ring produced by the process of my invention;

Fig. 2 is a broken view of the blank from which the ring is produced;

Fig. 3 is a perspective view of said strip arranged in circular form, which it assumes when placed between the dies preparatory to the forming stroke thereof;

Fig. 4 is a diagrammatic view showing the different stages of development of the ring under the action of the dies;

Fig. 5 is a partial sectional view of a suitable form of die members used in the practice of my process, the position being that just prior to the stroke of the movable die; and

Fig. 6 is a fragmentary view of said die members upon completion of said stroke.

On the drawings, illustrating the best manner in which I have thus far contemplated applying the principles of my invention, the reference character 11 indicates a metal strip or blank prior to its being fed into the dies, this blank, when arranged between the dies and prior to the operative stroke thereof, being of the form shown in Fig. 3, with the ends thereof separated by a short distance and with the top and bottom edges curved in opposite directions, as indicated at 12 and 13, the form of the blank at this stage being clearly shown at A in Fig. 4.

Referring now to Fig. 5, it will be observed the upper edge 12 of the blank 11 is disposed at the entrance of a groove 14 provided between die parts 15 and 16 and a forming ring 17, which latter is held in fixed relationship to the other parts during the operative stroke thereof by means of rods 18 threaded at their upper ends into said ring, as indicated at 19, and threaded at their lower ends into a plate 21, as indicated at 22, this plate being yieldably supported upon a compressible disk or buffer 20, of rubber or the like, it being obvious that a spring might be used, if desired. Separable rings 23 and 24 are provided on the exterior of the forming ring 17, the ring 24 being secured by means of screws 25 to a bed plate 26 supporting a block 27 having a peripheral flange 28 disposed above in inwardly extending flange 29 on the ring 17. Springs 31 are interposed between the ring 23 and a flange 32 at the top of the die member 15, these parts being provided with sockets 33 and 34 to receive the ends of said springs. Said ring 23 is connected with the movable die unit by any suitable means (not shown), so that it is lifted off the member 24 when said unit is raised. The connection is such as to permit relative downward movement of said unit after the member 23 comes into contact

with the top of the member 24 and it will be understood that in the remainder of the downward stroke, the forming ring 17 is held tightly against the member 16 to provide an exact and well-defined groove 14 through which the blank may pass without buckling. The movable die unit is carried on a rod 35 and the bed plate 26 is supported upon a rod 36, both rods being suitably related to a press mechanism (not shown.)

The groove or passage 14 terminates in a recess 37 and the members 23 and 24 are cut out at the junction thereof to provide a recess 38, similar to the recess 37. The lower curved edge 13 of the strip 11 is disposed in the recess 38 and upon downward movement of the movable die unit, said edge 13 is first curled around the wall of the recess 38 to provide a curl, indicated by the reference character 39 in Fig. 6, the body of the strip being caused to flow through the passage 14 and the opposite edge thereof being curled in the recess 37, as indicated at 41. The springs 31 and the buffer 20 are compressed in this action and when the die is lifted, the completed ring, identified by the numeral 42 in Fig. 1, may be removed and is ready to be applied to a container. The successive stages of development of the blank into the ring 42 are illustrated in Fig. 4, the curl 39 being first formed, the blank being then bent to U-shape and the curl 41 being formed at the end of the stroke.

It is thought that the invention and many of its attendant advantages will be understood from the foregoing description, and it will be apparent that various changes may be made in the form, construction and arrangement of the parts, without departing from the spirit and scope of the invention, or sacrificing all of its material advantages, the form hereinbefore described being merely a preferred embodiment thereof.

I claim:

1. The process of forming sealing rings and the like, which consists in arranging a strip of bendable material in cylindrical form in forming mechanism provided with a curved passage of a width equal to the thickness of said material and of substantially the configuration of the article to be produced, and exerting pressure upon said strip to direct it curvilinearly through said passage and thereby bend it in accordance with the configuration of the passage and then bending the forward extremity of the strip into a curl.

2. The process of forming sealing rings and the like, which consists in arranging a strip of flat bendable material in circular form in forming mechanism provided with a passage of substantially U-shape, and exerting pressure upon said strip to direct it through said passage and thereby bend it in accordance with the configuration of the passage while the strip as a whole is maintained in circular form.

3. The process of forming sealing rings and the like, which consists in arranging a strip of bendable material in annular form in forming mechanism provided with a passage of substantially U-shape with return portions at the ends thereof, and exerting pressure edgewise upon said strip to direct it through said passage and maintaining the strip in said annular form, and thereby producing a circular closure ring of substantially U-shape with curled edges arrangeable upon a container to secure a cover to the body wall thereof.

4. The process of forming sealing rings and the like which consists in forming a strip of sheet metal into circular form, and then forcing it edgewise in a sinuous curvilinear course, and forming the strip with a curl at its rear edge, a U-shape at its intermediate part, and a curl at its advanced edge, and thereby producing a circular strip U-shaped in cross section, with its edges curled.

5. The process of forming sealing rings and the like which consists in forming a strip of sheet metal into circular form, and then forcing it edgewise in a sinuous curvilinear course, and forming the strip with a curl at its rear edge, a U-shape at its intermediate part, and a curl at its advanced edge, and thereby producing a circular strip U-shaped in cross section, with its edges curled and its ends separate from each other.

6. The process of forming sealing rings and the like which consists in forming a strip of sheet metal into circular form, then forming one edge of the strip into a substantially cylindrical curl extending around the circle of the strip, then forcing the strip edgewise and curvilinearly by force applied to the completed curl and forming the strip into U-shape in cross section, and continuing said force to thereby form the advanced edge of the strip into a substantially cylindrical curl, and thereby producing a circular U-shaped strip curled at both edges.

7. The process of forming sealing rings and the like which consists in forming a strip of sheet metal into circular form, then forming one edge of the strip into a substantially cylindrical curl extending around the circle of the strip, then forcing the strip edgewise and curvilinearly by force applied to the completed curl and forming the strip into U-shape in cross section, and continuing said force to thereby form the advanced edge of the strip into a substantially cylindrical curl, and thereby producing a circular U-shaped strip curled at both edges and having its ends separate from each other.

8. The process of forming sealing rings and the like which consists in forming a

strip of sheet metal into circular form, then applying edgewise pressure to the rear edge of the strip only and forming said rear edge into a substantially cylindrical curl extending around the circle of the strip, then forcing the strip edgewise and curvilinearly by force applied to the completed curl and forming the strip into U-shape in cross section, and continuing said force to thereby form the advanced edge of the strip into a substantially cylindrical curl, and thereby producing a circular U-shaped strip curled at both edges and having its ends separate from each other.

9. The process of forming sealing rings and the like which consists in forming a strip of sheet metal into circular form, then forming one edge of the strip into a substantially cylindrical curl extending around the circle of the strip and at the same time advancing the strip edgewise and reversely bending its forward edge, then forcing the strip edgewise and curvilinearly by force applied to the completed curl and forming the strip into U-shape in cross section, and continuing said force to thereby form the advanced edge of the strip into a substantially cylindrical curl, and thereby producing a circular U-shaped strip curled at both edges and having its ends separate from each other.

10. Apparatus for forming sealing rings and the like, comprising relatively movable die members formed to provide a U-shaped annular passage of substantially the configuration of the article to be formed, movement of one of said die members being adapted to direct substantially flat material in the form of an annular blank through said passage and thereby bend the same in accordance with the configuration of the passage.

11. Apparatus for forming sealing rings and the like, comprising relatively movable die units, one thereof being formed to provide a U-shaped annular passage of substantially the configuration of the article to be produced and the other being formed to receive one edge of substantially flat material in the form of an annular blank of bendable material with the opposite edge arranged at the entrance of said passage, whereby movement of one of said die units causes said blank to flow through said passage and conform to the shape thereof.

12. Apparatus for forming sealing rings and the like, comprising relatively movable die units each formed to provide a portion of a U-shaped annular passage of substantially the configuration of the article to be produced whereby movement of one of said units with substantially flat material in the form of an annular blank arranged with its opposite edges disposed respectively in the portions of said passage in the different die units causes said blank to flow through said passage and conform to the shape thereof.

13. Apparatus for forming sealing rings and the like, comprising relatively movable die units each formed to provide a portion of a U-shaped annular passage of substantially the configuration of the article to be produced whereby movement of one of said units with substantially flat material in the form of an annular blank arranged with its opposite edges disposed respectively in the portions of said passage in the different die units causes said blank to flow through said passage and conform to the shape thereof, said passage being of substantially an inverted U shape.

14. Apparatus for forming sealing rings and the like, comprising relatively movable die units each formed to provide a portion of a U-shaped passage of substantially the configuration of the article to be produced whereby movement of one of said units with substantially flat material in the form of an annular blank arranged with its opposite edges disposed respectively in the portions of said passage in the different die units causes said blank to flow through said passage and conform to the shape thereof, said passage being of substantially an inverted U shape and being formed at the ends thereof to produce curled edges on the ring.

15. Apparatus for forming sealing rings and the like, comprising relatively movable die units forming a U-shaped annular passage and including shaping elements and being formed to engage respectively the opposite edges of substantially flat material in the form of an annular blank and, upon relative movement, to direct said blank between said shaping elements and thereby bend it in accordance with the configuration thereof.

16. Apparatus for forming sealing rings and the like, comprising relatively movable die units forming a U-shaped annular passage and including shaping elements and being formed to engage respectively the opposite edges of substantially flat material in the form of an annular blank and, upon relative movement, to direct said blank between said shaping elements and thereby bend it in accordance with the configuration thereof, said shaping elements being adapted to form the blank to substantially inverted U shape and to curl the edges thereof.

17. The process of forming drawn articles, which consists in arranging a blank of bendable material in forming mechanism provided with a U-shaped annular passage of substantially the configuration of the article to be produced, and exerting pressure upon said blank to direct it through said passage and thereby bend it in accordance with the configuration of the passage.

18. Apparatus for forming drawn articles, comprising relatively movable die members formed to provide a U-shaped annular passage of substantially the configuration of the articles to be formed, movement of one of said members being adapted to direct a blank through said passage and thereby bend the same in accordance with the configuration of the passage.

JOHN M. HOTHERSALL.