July 17, 1956 A. J. LARSEN 2,754,706

RING FORMING MACHINE

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Fig. 1

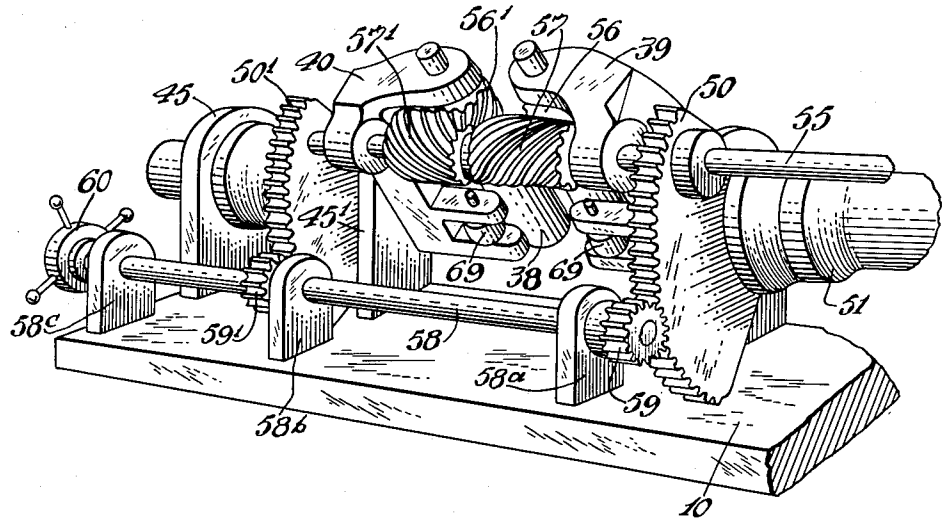
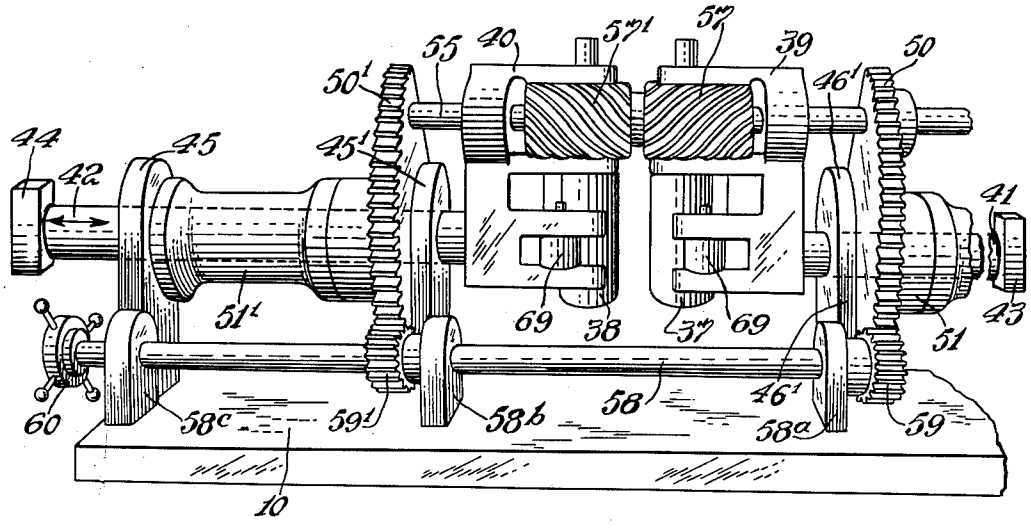


Fig. 2



INVENTOR.
A. J. LARSEN
BY
Harry Sommers
ATTORNEY

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Fig. 3

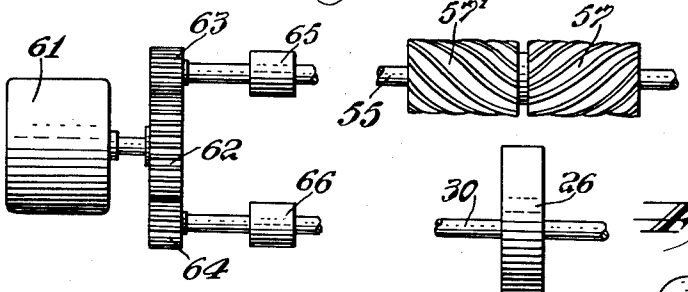


Fig. 7

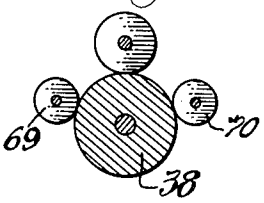


Fig. 4

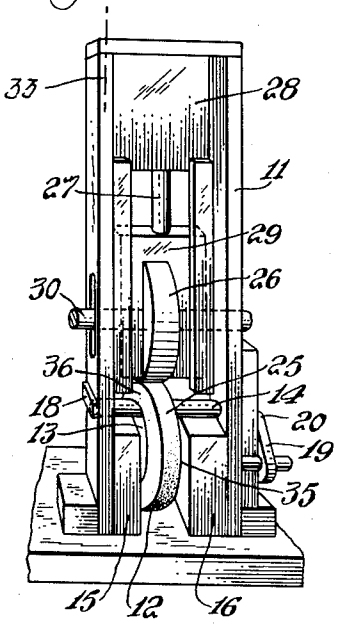


Fig. 6

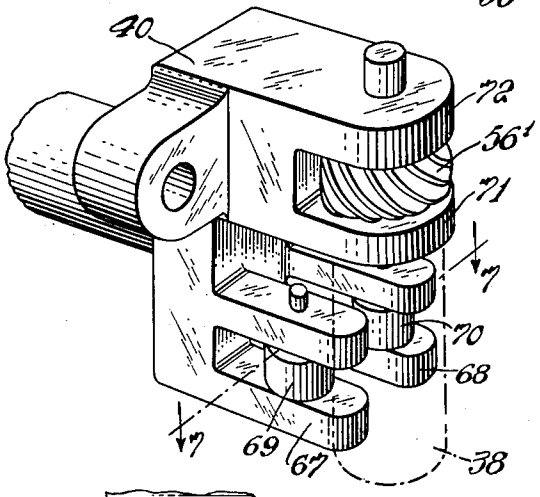


Fig. 5

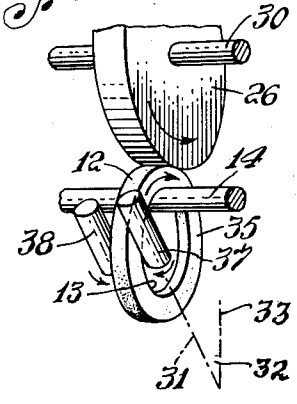
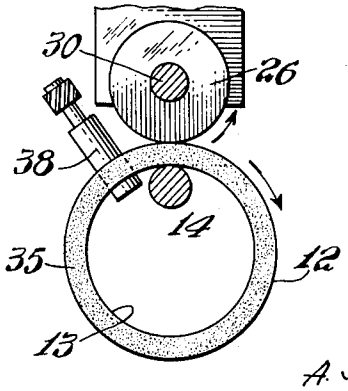


Fig. 8



INVENTOR.
A. J. LARSEN
BY
Harry Sommers
ATTORNEY

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RING FORMING MACHINE

Aksel J. Larsen, Flanders, N. J.

Application May 28, 1952, Serial No. 290,537

3 Claims. (Cl. 80—5)

This invention relates to ring-forming machines and more particularly to a machine of the character described provided with novel means for forming rings of predetermined desired dimension from blanks of different dimensions. The invention consists of the provision of a novel machine for the purpose mentioned, incorporating a number of features more particularly described hereinafter. One of the important features of the invention consists of the provision of novel means for inserting the ring blank into the machine and removing the finished ring therefrom.

A further object of the invention is to provide novel mechanisms in the machine to alter the dimensions of the blank to the desired final dimensions in a novel manner which permits accurate control throughout the manufacturing operation.

A further object of the invention is to provide a novel means for mounting rollers for the purposes mentioned to engage the sides of the blank. A further feature of the invention is to provide novel means for adjusting the vertical angular disposition of said rollers relative to the side walls of the blank during the manufacturing operation.

These and other advantageous objects, which will appear as the description progresses, are set forth in greater detail in the following specification and in the drawings, wherein:

Fig. 1 is a perspective fragmentary view of the unit of the machine containing the rollers to engage the sides of the blank being formed into the ring and having means to adjust the angular disposition thereof and to drive the same.

Fig. 2 is a similar but elevational view showing the rollers adjusted to a different angular position than that indicated in Fig. 1,

Fig. 3 is a schematic view to illustrate a drive mechanism which may be used in carrying out the invention,

Fig. 4 is a fragmentary perspective view of a housing wherein the blank to be formed into the ring, pursuant to the invention, is positioned,

Fig. 5 is a schematic view illustrating the coordination and operation of parts of the machine,

Fig. 6 is a perspective view of one of the roller-bracket members which may be used in carrying out the invention,

Fig. 7 is a horizontal sectional view taken on line 7—7 of Fig. 6, and

Fig. 8 is a fragmentary partly sectional view of the ring holding and forming parts of the mechanism shown in Fig. 4.

As shown in the drawings, the ring-forming machine of this invention may be mounted on any suitable floor or other support **10** and comprises a housing **11** wherein the blank **12** to be formed into the ring of the desired final dimensions is positioned. Pursuant to the present invention, the ring may be formed from blanks of initially rough form, having apertures **13**, pin **14** being passed through the blank aperture **13**, as shown in Fig. 4. The

pin **14** may be mounted on suitable bearings **15**, **16** in the housing, and may be removably inserted in the housing as, for example, by passing one end of the pin partly through an aperture in a wall of the housing and against a stop plate **18** on said wall. A latch member **19** may be pivotally or otherwise secured to the opposite wall of the housing in any convenient manner so that the end **20** of the latch member may, when desired, be positioned against the other end of the pin **14**, and may be readily removed therefrom to permit removal of the pin (and thus the finished ring) when desired.

The outer circumferential edge **25** (Fig. 4) of the ring is formed by roller **26** which is held in constant bearing engagement therewith by suitable means, as, for example, a hydraulic plunger **27** vertically reciprocated in casing **28**, provided with frame **29** on which shaft **30** keyed to roller **26** is rotatably journalled. It will be appreciated that by the use of suitable controls connected to the hydraulic casing **28**, the degree of pressure exerted by the roller **26** on the outer circumferential edge **25** of the blank may be accurately controlled. The side edges **35**, **36** of the blank (Figs. 4 and 5) are engaged and formed by the side edge rollers **37**, **38** journalled in the machine adjacent the housing **11** and in proper alignment therewith so that the said rollers, in conjunction with the outer circumferential edge roller **26**, may be used to predetermine all of the dimensions of the finished ring.

As schematically shown in Fig. 5, wherein the arrows on the various parts indicate preferred directions of rotation thereof, axis **31** of journalling of rollers **37**, **38**, may be adjusted so as to define the desired angle **32** relative to the vertical axis **33** of the housing **11**, so as to assure the rollers being maintained in constant and proper side engagement with the varying dimensions of the blank as it is formed into the final ring. To this end, the rollers **37**, **38**, as shown in Figs. 1 and 2, are journaled in brackets **39**, **40** carried by shafts **41**, **42**. The free ends of said shafts may be housed in units indicated schematically by the rectangles **43**, **44**, and which may be hydraulic plungers, casings or like means which will constantly urge the brackets (and thereby the rollers **38**, **37**) into engagement with the side edges of the ring. The shaft **42** is journalled in bearings **45**, **45'**; the shaft **41** being journalled in corresponding bearings, one of which, **46'**, is shown in Fig. 2; the other bearing for shaft **41** may generally correspond with the bearing **45**. Gear segments **50**, **50'** are freely journalled on said shafts **41**, **42**, suitable spacers **51**, **51'** being interposed between the bearings for the said shafts **41**, **42**, and said gear segments.

A gear drive shaft **55** is journalled in said gear segments **50**, **50'** and rotatably passes through the brackets **39**, **40**, in which the rollers **37**, **38** are journalled. Said rollers **37**, **38** are provided with pinions **56**, **56'** (Fig. 1) to mesh with worm gears or the like **57**, **57'** on the gear drive shaft **55**. By this arrangement, the rollers **37**, **38** may move laterally apart and toward each other pursuant to movement of the shafts **41**, **42** to which the brackets **39**, **40** carrying rollers **37**, **38** are keyed in response to the control exercised by the operator on the source of power for moving the said shafts **41**, **42** laterally. Said rollers **37**, **38** will be constantly rotated notwithstanding such lateral movement thereof, by virtue of the gear arrangement just described.

Any other desired or convenient gear drive mechanism to attain the same end may be substituted, if so desired and suitable controls may be provided for the parts designated as **43**, **44** and **28**; as the invention is not limited to any particular form of controls, no further reference will be made thereto. It will, however, be apparent from a consideration of the foregoing, and particularly the showing in Fig. 5, that the operator, by use of controls, may adjust the degree of pressure exerted by the rollers **37**, **38**

upon the sides of the blank being formed and by the roller **26** circumferentially edgewise thereon so as to permit the operator to completely and accurately control all of the dimensions of the ring fabricated on the machine of this invention.

Pursuant to the invention, the rollers **37, 38** are vertically adjustably mounted, so that the angle **32** of the axis **31** of said rollers relative to the vertical axis **33** of the housing **11** may be adjusted as above described.

In Figs. 1 and 2, a means for attaining this adjustment is shown comprising a pinion shaft **58** journalled in suitable bearings **58***a*, **58***b*, **58***c*. Pinions **59, 59'** are keyed to said pinion shaft **58** and a control mechanism, such as the hand wheel **60** keyed to the shaft **58**, may be used to rotate the shaft and to thereby adjust the angle **32** of the axis **31** of the rollers **37, 38**, relative to a vertical axis **33** of the housing **11**, as desired.

Fig. 3 of the drawings schematically shows a drive mechanism which may be used in carrying out the invention, comprising a source of power **61**, which may be a motor or other power source, driving the gear **62** in mesh with gears **63, 64**, keyed to shafts **30, 55** through flexible connections **65, 66**. By an arrangement of that sort (or other means to that end) the shafts **55, 30** may be synchronously driven.

Fig. 6 illustrates details of construction of the bracket **40** (bracket **39** being of corresponding construction). Bracket **40** is shown provided with horizontally spaced arms **67, 68**, in which the small rollers **69, 70** are rotatably journalled, and with vertically spaced arms **71, 72**, in which the pinion **56'** is journalled. The roller **38**, indicated in dotted lines, is disposed between arms **67, 68**, and engaged by the rollers **69, 70**, which are so arranged, as shown in Fig. 7, as to preferably engage the roller **38** at a point opposite that at which one gear, as **57'** engages one pinion as **56'**. This arrangement is found convenient for assuring the smooth rotation of the roller **38** in the bracket **40**. Other suitable expedients to the same end may be substituted, if so desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A deforming guide for use in conjunction with an apparatus having a housing, means to support an open blank in said housing and roll means to press said blank against said supporting means and thus determine one dimension of the ring to be formed, said deforming guide comprising a pair of elongated rollers for contact with the edges of the blank to deform the same to determine another dimension of the ring to be formed, brackets in which said deformity rollers are journalled, means to pivotally mount said brackets in said machine at a given point, means to urge the brackets together to compress the blank therebetween, and means engaging said brackets for rotating said brackets around said pivot point to thereby progressively adjust the axial disposition of the deforming rollers on the blank as the latter is formed to the desired ring form.

2. In a machine as set forth in claim 1, said means to pivotally mount said brackets in said machine including shafts keyed to said brackets and journalled for pivotal movement wherein said means engaging said brackets does so at points spaced from said pivot points to rotate the brackets about said pivot points.

3. In a machine as set forth in claim 1, said means to pivotally mount said brackets in said machine including shafts keyed to said brackets and journalled for pivotal movement, wherein said means engaging said brackets does so at points spaced from said pivot points to rotate the brackets about said pivot points said last mentioned means comprising driving means operatively connected to gear segments which are pivotally journalled on said bracket shafts, a connecting shaft journalled in said gear segments and in said brackets at points spaced from said bracket shafts, means to drive said connecting shaft, means to operably connect said shaft and said rollers for driving said rollers in said brackets so that the rollers may be constantly rotated even when the brackets are moved toward and away from each other.

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