(No Model.)

H. V. BERNHARDT.

APPARATUS FOR FORMING RINGS.

No. 472,959. Patented Apr. 12, 1892.

Fig. 1.

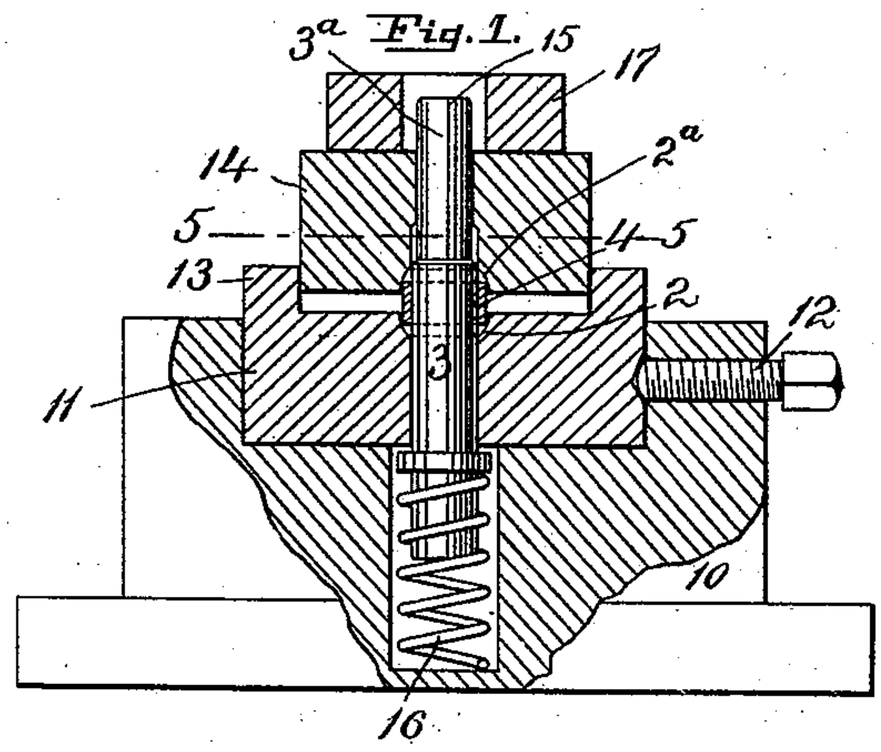


Fig. 4.

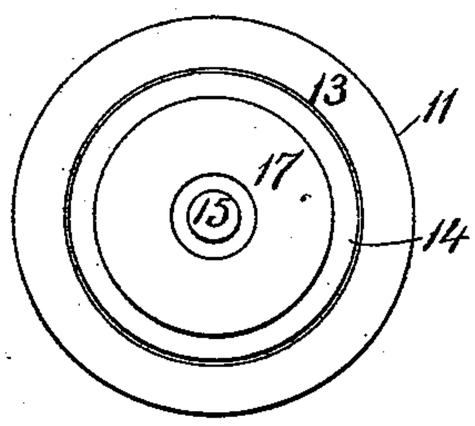


Fig. 2.

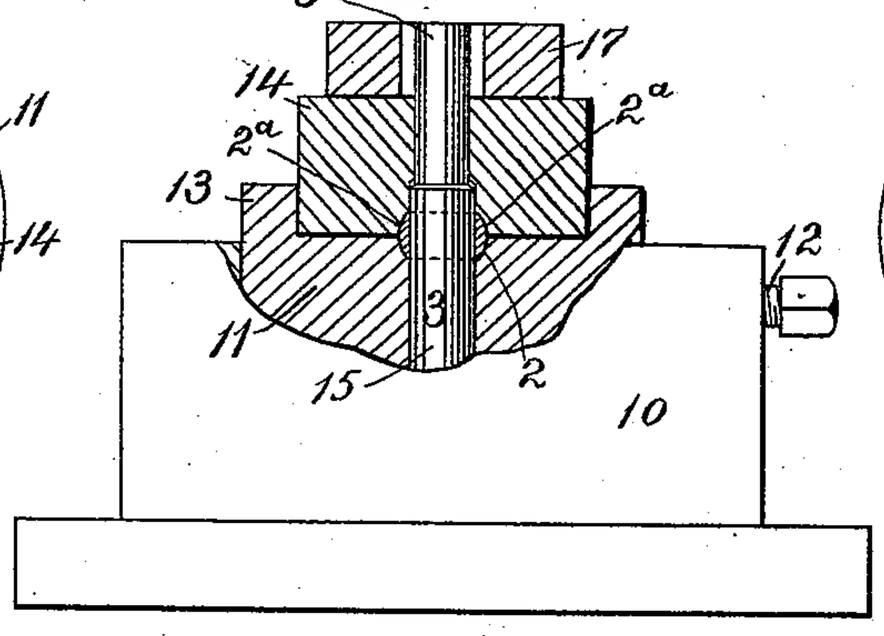


Fig. 5.

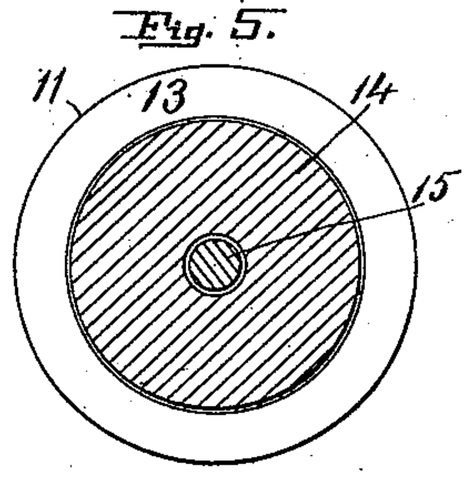
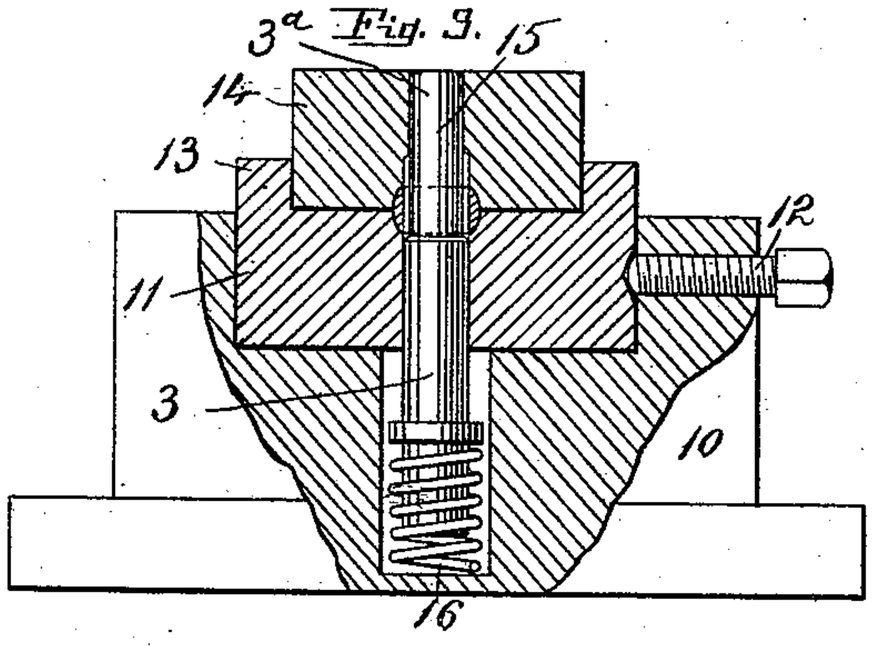


Fig. 3.



WITNESSES:

Arthur L. Kent

Edward Kent

Fig. 4a

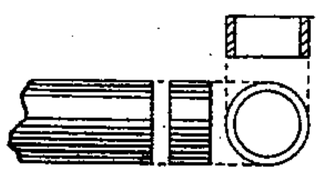
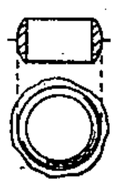


Fig. 5a



INVENTOR

Herman V. Bernhardt

BY

Edward Kent Jr.

ATTORNEY

UNITED STATES PATENT OFFICE.

HERMAN V. BERNHARDT, OF BROOKLYN, NEW YORK.

APPARATUS FOR FORMING RINGS.

SPECIFICATION forming part of Letters Patent No. 472,959, dated April 12, 1892.

Application filed October 28, 1891. Serial No. 410,114. (No model.)

To all whom it may concern:

Be it known that I, HERMAN V. BERNHARDT, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Apparatus for Forming Rings, of which the following is a specification.

My invention relates to the manufacture of seamless rings, the main object of the invention being to provide an apparatus whereby tubular blanks may by a single operation be pressed so as to have almost any desired shape upon their outer faces, the inner surface of the blank remaining parallel, or substantially so, with the blank-axis.

To the end named the invention consists of certain details of construction and combinations of parts in an apparatus of the character named, all of which will be hereinafter so fully explained and particularly pointed out as to render preliminary description unnecessary.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar reference-figures indicate corresponding parts in all the views.

Figure 1 is a side view, in partial section, of the apparatus which I prefer to employ in carrying out my improved method of forming rings, the parts being represented as they appear after the tubular blank has been adjusted to place, but before the dies have been forced together. Fig. 2 is a similar view, the parts however, being represented as they appear after the ring has been formed, but before the mandrel or arbor has been forced downward. Fig. 3 is also a similar view, the parts in this case being shown as they appear after the mandrel or arbor has been forced downward to a position such that its contracted portion will be within the ring. Fig. 4 is a plan view of the dies, the stock not being shown. Fig. 5 is a sectional view on line *v v* of Fig. 1. Fig. 4ª represents the blank as it appears prior to being operated upon, and Fig. 5ª represents the product of the machine.

In the drawings, 10 represents a stock or bed plate that is formed to receive a die 11, such die being by preference held against displacement by a set-screw 12. The die 11 is formed with a flange 13, within which there is fitted an upper die 14, and the two dies are formed with registering openings adapted to receive an arbor or mandrel 15, that is normally held in the position in which it is shown in Figs. 1 and 2 by a spring 16, that is housed within the stock or bed plate 10, as shown. The dies 11 and 14 are formed with annular recesses 2 and 2ª, respectively, the recess 2 being of proper shape to form the lower half of the outer face of the ring, while the recess 2ª is of proper shape to form the upper half of the outer face of said ring when the dies are brought together by a properly-constructed press. (Not shown in the drawings.) The arbor or mandrel is made up of a lower section 3, of a diameter equal to that which it is desired to impart to the ring, and with an upper section 3ª of reduced diameter.

In operation a tubular blank 4—such as is illustrated in detail in Fig. 4ª—is placed upon the arbor or mandrel 15, so that the lower edge of the blank rests within the recess 2, the die 14 at this time being removed. After the blank has been placed upon the mandrel, as just described, the die 14 is placed in position, and upon the die there is placed a ring or collar 17, that extends above the upper end of the mandrel. When the parts have been adjusted, as just described, and as illustrated in Fig. 1, they are subjected to the action of a press, whereby the die 14 will be carried downward to the position in which it is shown in Fig. 2, and the outer face of the blank will be forced to conform to the contour of the recesses 2 2ª, while the inner face of the blank will be brought to bear close upon the peripheral face of the main section of the mandrel or arbor 15, thus forming the ring. Immediately after the formation of the ring as just described the collar 17 is removed, and the press is then brought to bear directly on the mandrel 15 in a manner such that said mandrel will be carried to the position in which it is shown in Fig. 3—that is, to a position such that the reduced section thereof will be within the ring-bore. Then when the die 14 is raised the formed ring may be readily removed.

Although I greatly prefer to support the mandrel by a spring, as shown, in order that it will be automatically returned to its normal position, still under certain circumstances the mandrel could be arranged so that

its frictional contact with the die 11 would uphold it, and in such case the mandrel would, after having been depressed, be returned to its normal position by hand or by a suitable mechanical attachment. Ordinarily when the ring is taken from the forming dies (shown in Figs. 1, 2, and 3) there will be a fin *b* extending outward from the general peripheral face of the ring and at right angles to the ring-axis, and for certain purposes—as, say, for ornamentation—this pin would be valuable, and, if desired, might be enlarged by slightly changing the form of the dies—that is, by cutting away the die-faces at points adjacent to the recesses 2 and 2ª.

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

1. The combination, with a pair of forming-dies, each die being adapted to bear on the outer face of a tubular blank and to shape one-half of the outer surface of a ring, of an arbor or mandrel which enters the die-bodies and is arranged to shape the inner surface of a ring, substantially as described.

2. The combination, with a die formed or provided with a guiding-flange and arranged to bear upon the lower edge and outer face of a blank, of a supplementary die which fits within said guiding-flange and is arranged to bear upon the upper edge and outer face of a blank and an arbor or mandrel which enters the die-bodies and is arranged to shape the inner surface of a ring, substantially as described.

3. The combination, with a pair of dies, of an arbor or mandrel which enters the dies and is formed with a lower section of a diameter equal to that which it is desired to impart to the ring and with an upper section of reduced diameter adapted to receive the ring after it has been formed, substantially as described.

4. The combination, with a pair of dies, of an arbor or mandrel which enters the dies and is formed with a reduced upper section and a spring arranged in connection with the mandrel, substantially as described.

HERMAN V. BERNHARDT.

Witnesses:
WM. M. HARKER,
EDWARD KENT, Jr.