J. CLARK.

PROCESS OF MAKING CLAMPING RINGS FOR PIPE COUPLINGS.

APPLICATION FILED FEB. 18, 1907.

1,060,320. Patented Apr. 29, 1913.

Fig. 1.

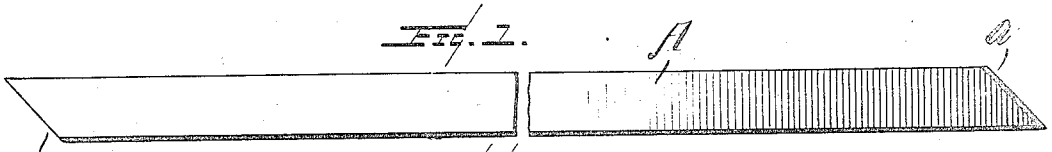


Fig. 2.

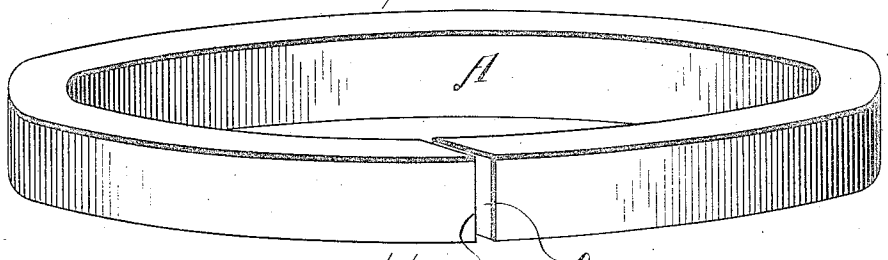


Fig. 3.

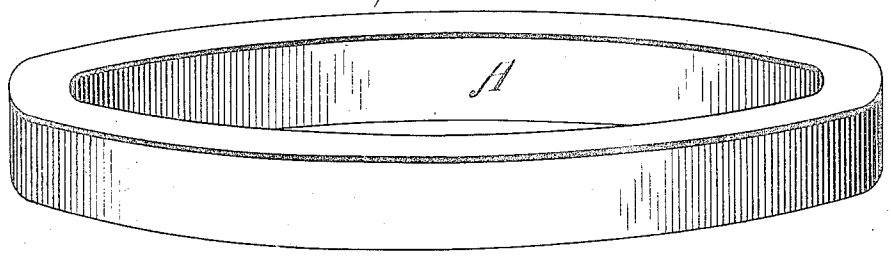


Fig. 4.

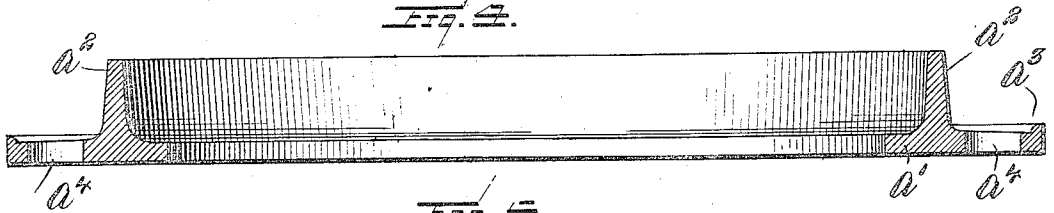


Fig. 5.

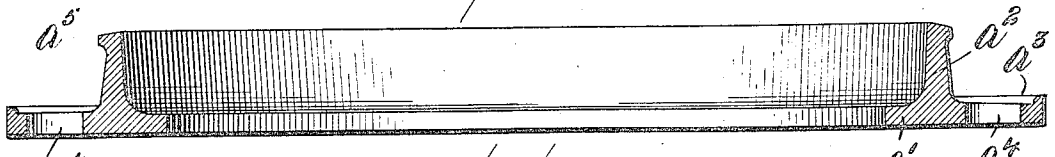
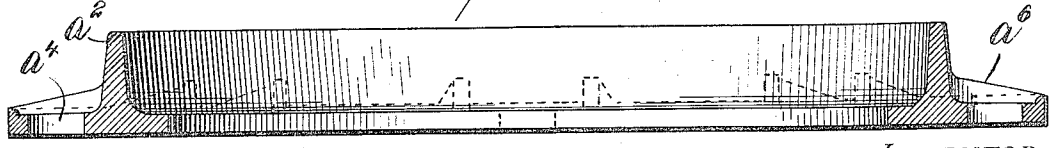


Fig. 6.



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PROCESS OF MAKING CLAMPING-RINGS FOR PIPE-COUPLINGS.

1,060,320. Specification of Letters Patent. Patented Apr. 29, 1913.

Application filed February 18, 1907. Serial No. 357,970.

To all whom it may concern:

Be it known that I, JAMES CLARK, a citizen of the United States, residing at Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Processes of Making Clamping-Rings for Pipe-Couplings; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists in the novel features hereinafter described reference being had to the accompanying drawing which illustrates one form in which I have contemplated carrying said invention into effect, and said invention is fully disclosed in the following description and claims.

In the manufacture of pipe couplings, the clamping rings or "flanges" as they are termed, are ordinarily made from cast metal, and the object of my present invention is a process for making the said clamping rings from wrought metal such as wrought iron or steel whereby great strength is obtained with the added quality of toughness, and freedom from the danger of cracking under strain, which sometimes occurs with cast metal rings.

In carrying out my invention I take a bar of steel or wrought iron, preferably rectangular in cross section and of less dimension in both directions than a section of the finished ring and bend it into the shape of a ring and weld the ends together. I then subject the ring so formed to the action of forming dies by compression drop forging, or to the action of forming rollers and form therefrom a clamping ring having a plate member disposed perpendicularly to the axis of the ring and provided with a central aperture and an annular flange member surrounding the central pipe aperture and projecting from one side or face of the plate member.

In the drawings, Figure 1 represents a plan view of a blank employed in carrying out my improved process. Fig. 2 is a perspective view of the blank bent into ring form before welding. Fig. 3 is a similar view showing the welded blank. Fig. 4 is a sectional view of the clamping ring formed from said blank by the action of the forming dies or rolls. Fig. 5 is a similar view showing a slightly modified form of clamping ring, in which the end of the flange member has been upset. Fig. 6 is a sectional view of another form of ring, formed from said blank, and provided with reinforcing webs connecting the plate and flange members of the ring.

In carrying out my improved process I first form a blank A from a bar of steel or wrought iron, preferably square or oblong in cross section, and having its ends beveled and parallel as shown at *a a*, in Fig. 1. This blank is bent into circular form, as shown in Fig. 2 with the beveled ends *a a* overlapping and the ends are welded to form a ring as shown in Fig. 3. The ring blank is then compressed in a direction parallel with the axis of the ring while heated, between suitable dies, so as to force the metal into one of the forms shown in Figs. 4, 5 and 6. The compression of the ring blank is conveniently effected by acting upon the blank with die rollers having the required configuration, or I may place the heated ring blank between dies which will operate upon the whole of the blank at once and by compression, as by means of a hydraulic press, or by drop forging, forge it into the desired form. The die rolls or dies are so constructed as to expand portions of the blank adjacent to one face, in a direction perpendicular to the axis of the ring, to form what I term the plate member, and to expand portions of the blank adjacent to the opposite face, in a direction parallel to the axis of the ring, to produce an annular flange member projecting from one face of the plate member as shown in Figs. 4, 5 and 6.

In Fig. 4 I have shown one form of ring made from the blank A, in which a' represents the plate member having a central aperture for the passage of the pipe which will ordinarily be of less diameter than the internal diameter of the ring blank, and a^2 represents the flange member projecting from one face of the plate member a'. The plate member a' is also provided with an exterior reinforcing flange a^3 on the same side as the flange member a^2, and with a plurality of bolt holes a^4 punched therein and located at intervals around the flange member. The bolt holes may be formed

simultaneously with the formation of the ring, or they may be formed after the completion thereof.

Fig. 5 shows a ring formed from the blank A and identical with the ring shown in Fig. 4 except that the outer end of the flange member a^2 is upset all around as shown at a^5.

Fig. 6 shows another form of ring formed from the blank A and identical with the form shown in Fig. 4 except that the metal of the blank is forced into radially disposed reinforcing webs a^6, which extend from the flange member a^2 to the exterior reinforcing flange a^3, and are preferably located in pairs on opposite sides of the bolt holes as shown in Fig. 6. In carrying out my improved process, important results are obtained affecting the quality, toughness and strength of the rings produced thereby. In the first place, as the forming operation is performed on the ring while hot, and after the bar blank has been welded, it follows that the weld is obliterated and the metal at the weld is by the forming operation reworked, thus making it homogeneous with the other portions of the ring, or in other words making the ring practically endless. Again by the reworking of the welded bar blank to bring it to the form shown in the drawing the metal is thinned to form the plate member of the ring and the annular flange member projecting therefrom. This reworking and thinning of the metal raises the quality of the metal, as the thinner it becomes, the higher the tensile strength and elastic limit is raised. In other words, the metal becomes refined with reworking and the finished ring has a higher tensile strength and elastic limit in proportion to its section than does the bar blank from which it is formed. The resulting ring is, therefore, particularly adapted for use as a clamping ring for pipe couplings, in which great tensile strength and a high elastic limit are particularly desirable, to withstand the bolt strain to which such rings are subjected in use.

What I claim and desire to secure by Letters Patent is:—

1. The herein described process of making a clamping ring for pipe couplings which consists in first forming a wrought steel bar blank of different cross section from that of the finished ring, and of less width and thickness than a section of the finished ring, bending the blank into circular form and welding the ends together, then reworking the welded ring while hot, and compressing portions of the same from the inner and outer sides of the ring wall toward the center of the cross section of the ring wall, to thin the same and increase its length in a direction parallel with the axis of the ring, beyond the corresponding dimension of the blank, to produce an annular flange member, and compressing portions adjacent to the inner and outer edges of the ring wall transversely to the plane of the ring to thin the same, and expand them in the plane of the ring to form a plate member extending inwardly and outwardly from the annular flange member and of greater width than the corresponding dimension of the blank whereby the weld is obliterated, and the tensile strength and elastic limit of the metal of the ring is raised above that of the blank.

2. A clamping ring for pipe couplings formed from a single bar of wrought metal, of less width and thickness than a section of the finished ring, said ring being welded at the junction of the ends of said bar, and having an annular flange member parallel with the axis of the ring extending above the base of the ring a greater distance than the thickness of said bar, and a flat annular plate member extending inwardly and outwardly from the base of the flange member and of greater width than the said bar, the weld being obliterated, and the metal of said flange and plate members having its tensile strength and elastic limits raised above that of the blank.

In testimony whereof I affix my signature, in the presence of two witnesses.

JAMES CLARK.

Witnesses:
F. P. SHOONMAKER,
J. P. RYAN.