

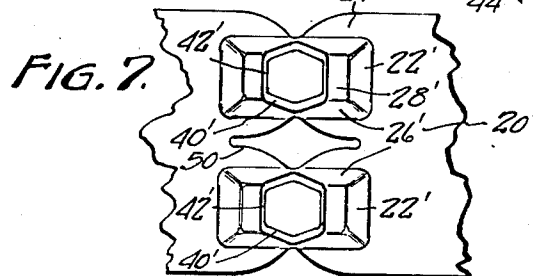
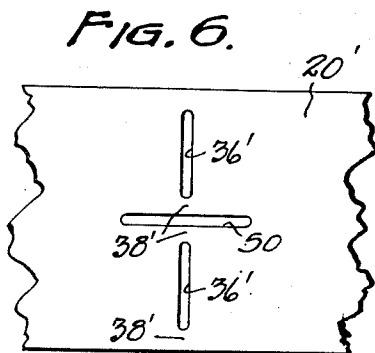
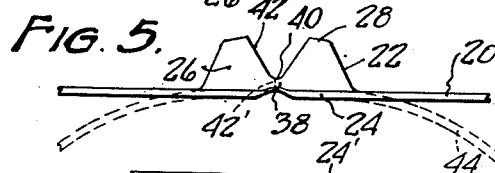
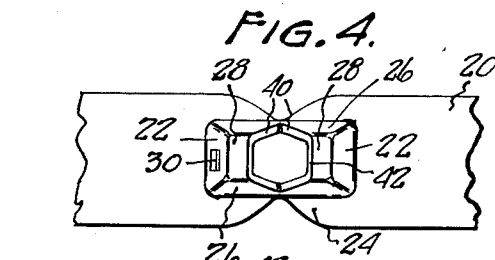
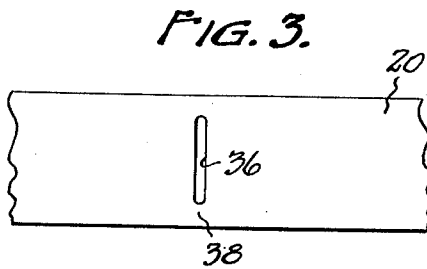
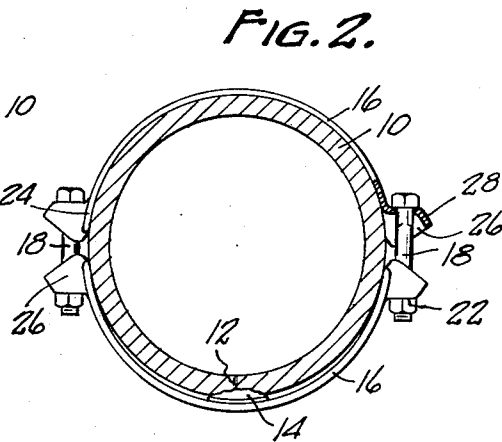
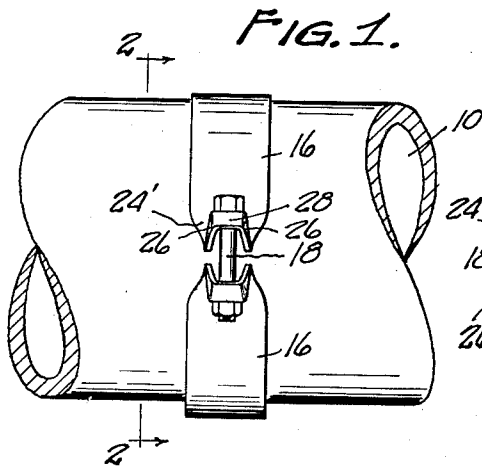
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METHOD OF MAKING PRESSED METAL CLAMPS

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1

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METHOD OF MAKING PRESSED METAL CLAMPS

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2 Claims. (Cl. 29—414)

This invention relates to a method of making a pressed metal clamp particularly suitable for use for repairing pipes which have developed leaks at pitted or corroded parts thereof, said clamp being employed for the purpose of applying and pressing a resilient leak sealing element, such as a plug, in sealing engagement with the leaking pipe portion.

The primary object is to provide a novel method for forming a pressed metal clamp inexpensively, expeditiously and quickly to provide a strong contoured bolt-mounting end portion.

Other advantages and objects will be apparent from the following specification considered with the accompanying drawing.

In the drawing:

Fig. 1 is a view of the clamp in side elevation as applied to a pipe.

Fig. 2 is an end view of the clamp as viewed on line 2—2 of Fig. 1.

Fig. 3 is a view of the blank illustrating a preliminary step in the fabrication thereof.

Fig. 4 is a view of the blank from which the clamp parts are formed, illustrating another step in the process of producing the clamp.

Fig. 5 is a side view of the blank portion shown in Fig. 4, illustrating in dotted lines the shape of the clamp when acted upon by a subsequent step of the process.

Fig. 6 is a view of a wider blank at the same stage of the process illustrated in Fig. 3.

Fig. 7 is a view of the blank of Fig. 6 at the same stage illustrated in Fig. 4.

Referring to the drawings, the numeral 10 designates a pipe which may have a portion 12 thereof which is pitted and corroded or otherwise subject to leakage, which leakage it is intended to seal by a sealing element, such as a rubber plug, pad or the like 14, which may be of any size, shape or character found suitable. The plug 14 is held in place by means of the arcuate clamp members 16 which are connected and drawn together by the draw-bolts 18.

The novel features of this invention relate to the construction of the clamp members 16, and particularly the end portions thereof at which the draw-bolts 18 are connected or anchored. The body of the clamp member is formed of a flat band 20 of sheet steel usually approximately $\frac{3}{16}$ of an inch in thickness and of any width found suitable. The band is of substantially arcuate form, being flat in cross-section throughout its major extent, that is, flat in a direction parallel to the axis around which it is bent. The end portions are characterized by an outwardly projecting shoulder 22, which shoulders are substantially flat and extend at an angle to the body, with the shoulder portions 22 at opposite ends of the completed arcuate clamp member 16 lying in substantially the same plane, as best seen in Fig. 2. The clamp member 16 will preferably be slightly less than 180 degrees in extent so that the clamp parts will be spaced apart when encircling a pipe of the size upon which they fit. The shoulder portion 22 is of a width substantially narrower than the width of the band 20, as best seen in Figs. 1 and 4, and portions 24 forming continuations of the transversely flat metal body of the band extend at opposite sides of said shoulder portion. A skirt projects angularly from the margins of each shoulder portion 22 merging therewith and with the clamp portions 24, said skirt portions including side skirt portions 26 and an end skirt portion 28, the same being integral or uni-

2

tary, as best seen in Fig. 4. The skirt portions 26 and 28 are substantially U-shaped in cross-section with the clamp portions 24 forming flanges projecting outwardly from the sides of said U-shaped parts and thereby providing substantial strength.

The shoulder portion 22 is provided with a central opening 30 therein, preferably of square shape as illustrated in Fig. 4, the same being adapted to receive the squared shank portion (not shown) of a conventional draw-bolt 18 in such a manner as to prevent rotation of said draw-bolt incident to tightening of a nut. The skirt portions 26 and 28 will extend around the draw-bolt in the same general direction as said draw-bolt, thereby providing webs or rigidifying portions which derive their strength from their position endwise relative to the bolt. It will be observed in this connection that the portions 24 at the opposite sides of the skirt portions 26, 28 also extend substantially alongside and in the general direction of the bolt, and the integral formation thereof with the skirt portions 26, 28 further serves to rigidify the bolt. The provision of the central portion 28 of the skirt is of particular value in the reinforcing function inasmuch as it insures that the free or outer portion of the shoulder remote from the body of the clamp will be reinforced and supported.

The method by which this clamp construction is formed is best illustrated in Figs. 3 to 7, inclusive. Figs. 3 to 5 illustrate the various steps in the formation of a clamp of comparatively narrow width and having only a single reinforcing end portion. The clamp parts are formed from a continuous metal band 20, and the lengths of the individual clamps to be formed are determined by the spacing between transverse elongated slots 36 formed at spaced intervals along the length of the band 20. Each of the slots 36, as best seen in Fig. 3, extends for a major portion of the width of the band and its ends are positioned equispaced from the opposite side edges of the band. After the step of forming the slot 36 has been performed as by a punch operation, the band is then positioned to have the slotted portion thereof acted upon by a forming die to form the band to the shape illustrated in Figs. 4 and 5 either in a single operation or in a series of operations. The shaping serves to form the portions 22, 26 and 28 and incident thereto draws the metal at the opposite ends of the slot 36 laterally inwardly so as to cause the tapered formation of the parts 24 of the clamp. The tapered shape of the band parts 24, the twisting of the plane of the band parts 38 at opposite ends of the slot 36, and the shaping of the end portions 22, 26 and 28 all are accommodated by a cold flow of the metal in such a way as to avoid substantial reduction of the thickness of the metal at any point. Observe in this connection the manner in which the slot 36 is reshaped, the end portions 40 thereof diverging inwardly, as best seen in Fig. 5, and the central portions 42 thereof being spaced apart a distance substantially greater than the width of the slot 36 as originally formed. The cold flow of the metal without reduction in thickness or section thereof insures retention of the full measure of strength of the metal in its shaped form and accommodates the desired shaping of the metal, as hereinbefore described. The parts at opposite sides of the slot 38 are formed symmetrically.

Subsequent operations will include severing of the portions 38 along dotted lines 42' of Fig. 5 to separate the individual clamp parts from the band, bending of the band to arcuate form as illustrated in dotted lines at 44 in Fig. 5, and formation of the bolt-receiving apertures 30 in the shoulder portions 22.

In cases where the clamp is formed of material of substantial width, it may be desired to provide a plurality of spaced bolt anchors upon the clamp. This can be accomplished in the manner illustrated in Figs. 6 and 7 in which the band 20' has one or more central longitudinal slots 50 formed therein adjacent each end portion of the clamp members to be formed from the band, and transverse aligned elongated slots 36' are formed in the band at opposite sides of the elongated slot 50, said slots 36' being preferably spaced equally from the outer side edges of the band 20' and from the central slot 50 at their opposite ends to form the band portions 38'.

3

The dies which are used to shape this blank are substantially the same as those employed to shape the blank illustrated in Figs. 3 to 5, being characterized, however, by the inclusion of multiple forming parts equal in number to the number of slots 36' and spaced apart a distance corresponding to the center spacing of the slot portions 36' so that they may perform the operations of shaping the band parts on opposite sides of the shoulder slot 50 in the same manner in which the parts are formed where the single offset only is formed at each end, as will be apparent.

While the preferred embodiment of the invention has been illustrated and described herein, it will be understood that changes may be made in the construction within the scope of the appended claims without departing from the spirit of the invention.

I claim:

1. The method of forming a pressed metal clamp consisting of forming a transverse elongated opening in a metal band to extend for a major portion of the width of the band with its ends equispaced from the side edges of the band, pressing the portions of the band on opposite sides of and inwardly from the edges of said opening between dies shaped to form a laterally projecting shoulder surrounded by a continuous skirt and in a manner to widen the central portion of said opening and drawing inwardly and deflecting at an angle to the plane of the band the portions of said band between the ends of said opening and the side edges of said band whereby the laterally projecting shoulder and skirt are formed without substantially reducing the thickness of said band and then severing the band transversely on a line through the center of said opening.

2. The method of forming a pressed metal clamp consisting of forming an elongated longitudinal slot and a pair of transverse elongated slots in a metal band, the

4

transverse slots being disposed on opposite sides of said longitudinal slot and extending for a major portion of the width of the band portions between the edges of the longitudinal slot and side edges of said band, pressing the portions of the band on opposite sides of and inwardly from the edges of said transverse slots between dies shaped to form laterally spaced off-sets each having a shoulder portion surrounded by a continuous skirt and in a manner to widen the central portion of said transverse slots and drawing inwardly and deflecting at an angle to the plane of the band the portions of said band between the ends of said transverse slots and edge of said band and edge of said longitudinal slot whereby said off-sets are formed without substantially reducing the thickness of said band and then severing the band transversely on a line through the center of said transverse slots.

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