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J. H. TAYLOR.

FLANGE MAKING PROCESS.

APPLICATION FILED MAR. 5, 1904.

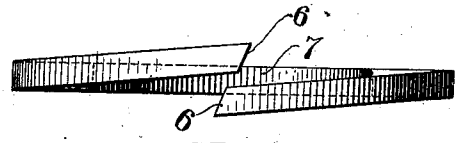


Fig. 1

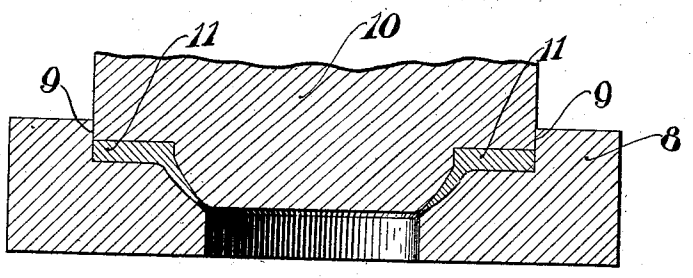


Fig. 2.

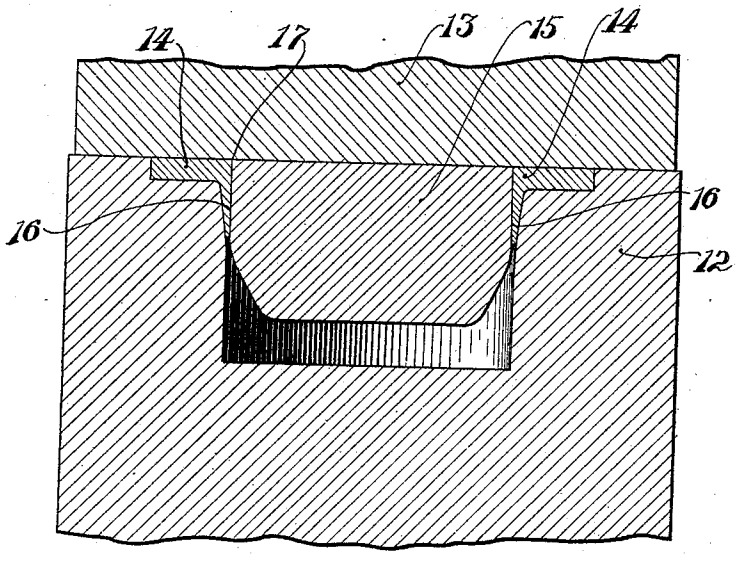


Fig. 3.

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FLANGE-MAKING PROCESS.

No. 879,925. Specification of Letters Patent. Patented Feb. 25, 1908.

Application filed March 5, 1904. Serial No. 196,680.

To all whom it may concern:

Be it known that I, JAMES HALL TAYLOR, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Flange-Making Processes, (Case 9,) of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a process or method of making metal flanges and particularly circular pipe flanges, such as are used in connecting together the adjacent lengths or sections of various kinds of pipe. Such pipe flanges are usually provided with a circular disk-like face having a circular opening around which is formed a cylindrical rim portion. The face is generally provided with bolt or rivet holes by means of which two flanges may be fastened together. The rim is sometimes screw-threaded inside so as to be screwed over the end of a piece of pipe and is sometimes provided with rivet holes by means of which it is riveted in place. In the latter case it is especially desirable to make the rim comparatively thin while the face of the flange may be considerably thicker. It is desirable also that a sharp corner or angle be formed where the inner side of the rim joins the front side of the face. The large majority of these pipe flanges heretofore employed have been cast of iron, malleable iron or steel. The iron flanges are heavy, brittle and weak. The cast steel flanges are some better but very expensive.

It is the object of my invention to provide a method of cheaply making forged steel or iron flanges. And when made in accordance with my invention the flange rims may be made very thin compared with the thickness of the face of the flange and the angle between the inner surface of the rim and the front of the face may be quite sharp.

When it has heretofore been attempted automatically to make forged steel or iron flanges, it has been found impossible to make the rim materially thinner than the face or to make the front face of the flange a good plane surface having a sharp corner at the intersection with the inner surface of the rim. In accordance with methods of the prior art, the flanges have been formed of blanks cut from sheet or plate metal, as distinguished from the method of my invention in which bar steel or iron is employed. Bar steel is considerably less expensive per pound than is plate or sheet steel of the same grade. Furthermore, there is a great deal of waste in connection with the use of sheet or plate metal for the manufacture of flanges, both on account of the trimmings from the exterior of the blank, and also on account of the disks cut from the interior of each blank. The disks from the center of blanks for flanges of large size are too thin for use as blanks for flanges of smaller size. In forming sheet metal blanks of this character, expensive dies are required when worked in accordance with methods of the prior art. This is especially true in those methods in which a circular blank is hammered or forged in such a way as to produce a thin fin upon the forging, for the reason that if it is attempted to hammer this fin until it disappears, it becomes so hard and brittle that it injures the dies, but if it remains upon the forging, it becomes necessary to punch or cut the fin from the forging before the latter can be used.

The method of carrying out my invention will be made apparent by reference to the accompanying drawing, in which

Figure 1 illustrates a flange in its first stage of development and Figs. 2 and 3 represent the steps of the drop forging process which is employed.

In accordance with my invention, a bar of iron or steel is first bent into the form of a ring or flange, as shown in Fig. 1, and for a flange of the cross section, shown in Fig. 3. I prefer to employ a bar of substantially rectangular cross section and of somewhat greater thickness than that of the face of the finished flange. The ends of the bar may, if desired, be scarfed, as illustrated at 6, 6, and the two ends may be lapped over, as shown at 7. The ring is then heated and placed in a die 8 having a circular opening at 9, 9 into which the ring may be easily dropped. A second stamp or die 10 is then dropped or forced upon the heated ring which has been placed upon the lower die, whereby the metal of the ring is forced into the shape of an annulus having the cross section shown at 11, and at the same time welding the joint of the heated ring within the dies. In changing the cross section of the ring or annulus in this way, the metal of the plane ring is first forced toward the plug at the center of the die and

then downward to form the rim. There is maintained in this way a full sharp corner at the intersection of the face of the flange with the inside of the rim, this sharp corner being maintained throughout the process of formation. If so desired, the bar may be bent into ring form and its joint welded before being placed within the forging dies.

After separating the dies 8 and 10, the annulus may be removed and immediately placed in a second set of dies 12 and 13, the die 12 being cut upon its upper face to conform with the lower side of the finished flange, the cross section of which is illustrated at 14, 14. A plug 15 is provided which is first driven through the annulus to spread out and draw the rim 16 of the flange. After the plug has been driven into the flange, the upper die 13 is brought to bear upon the upper side of the flange. The method employed insures a sharp full angle at the point marked 17 where the front face of the flange meets the inner surface of the cylindrical rim. As shown in Fig. 3 by the cross-sectional view of the finished flange, the rim 16 is made very much thinner than the face 14. A flange of this kind is exceedingly well adapted for use in conjunction with thin pipe for the reason that rivet holes may be punched directly through the pipe and the rim of the flange in one operation, whereupon the pipe and flange may be riveted together. The necessary holes in the face of the flange may be drilled or punched either during the formation of the flange or thereafter.

It will be apparent to those skilled in the art that the particular devices used in carrying out my improved process are quite immaterial and also that the precise disclosure herein set forth may be varied without departing from the spirit of my invention.

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

1. The process of making a pipe flange which consists in confining a metal ring between dies, one of which has a conoidal central cavity and the other a conoidal projection, and compressing the ring so as to force the metal into the space between the cavity and projection, and then expanding the conoidal portion of said ring.

2. The method of making a flanged article having a flanged portion and a rim portion extending from the flanged portion, which consists in placing a heated ring having ends in juxtaposition and heated to a welding heat between two dies, one of which dies has a compressing portion and a cavity, the other of which dies has a compressing portion adapted to coöperate with the compressing portion of the first mentioned die, and also a projecting portion smaller than the aforesaid cavity and adapted to extend into the said cavity, compressing the said heated ring between the said dies and while the ends of the ring are at a welding heat, thereby welding the ring and simultaneously causing the metal to flow into the space between the face of the cavity of one of the dies and the projecting portion of the other die.

In witness whereof I hereunto subscribe my name this 16th day of February, A. D., 1904.

JAMES HALL TAYLOR.

Witnesses:
HARVEY L. HANSON,
CHARLES J. SCHMIDT.