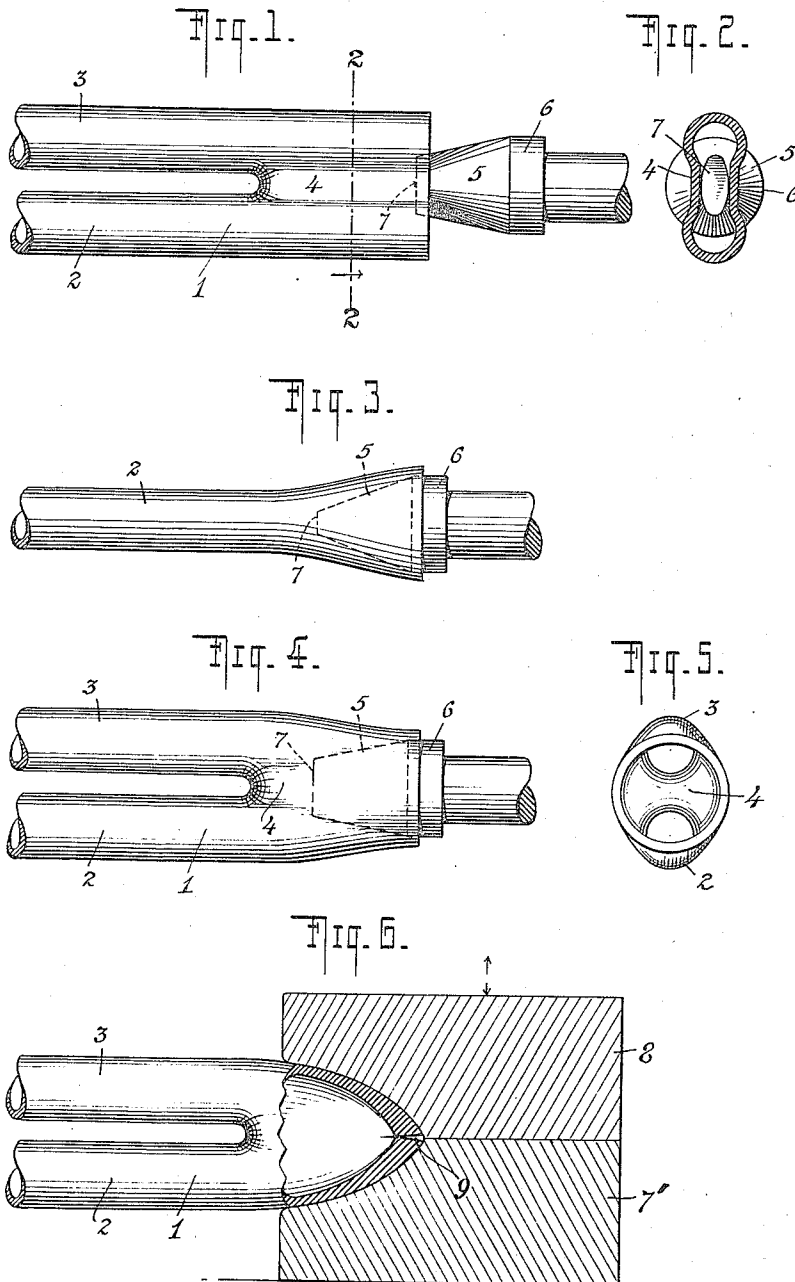


C. H. TRUE & N. T. MCKEE.
METHOD OF MAKING PIPE BENDS.
APPLICATION FILED MAR. 26, 1915.

1,155,110.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.



WITNESSES

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Fig. 7.

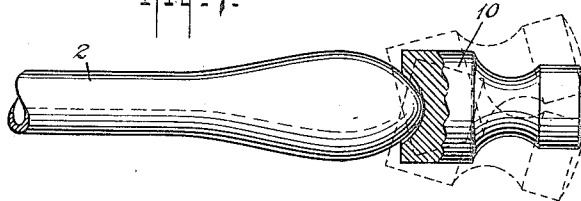


Fig. 8.

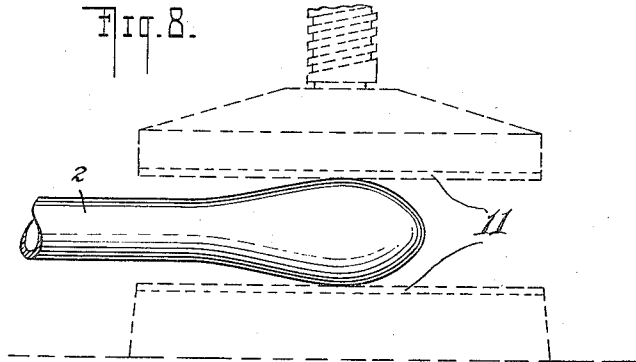


Fig. 9.

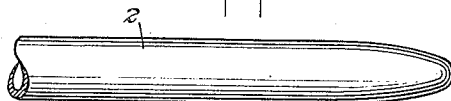
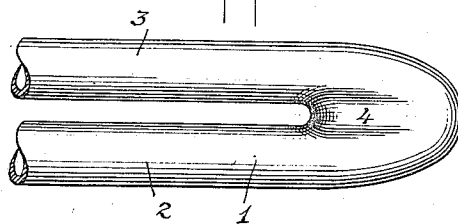


Fig. 10.



WITNESSES

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING PIPE-BENDS.

1,155,110.

Specification of Letters Patent.

Patented Sept. 28, 1915.

Application filed March 26, 1915. Serial No. 17,147.

To all whom it may concern:

Be it known that we, CHARLES H. TRUE and NEAL TRIMBLE McKEE, both citizens of the United States, residing, respectively, at Hammond, Indiana, and at Yonkers, New York, have invented certain new and useful Improvements in Methods of Making Pipe-Bends, of which the following is a specification.

Our invention relates to a method of making pipe bends, and particularly to a method of making what are commonly known as U-shaped bends, which are to be used in connection with boilers, superheaters and heating apparatus generally and exposed to high temperatures, or which are to be used to carry steam or fluids under pressure.

More particularly our invention comprises a step in the method of making pipe bends as specified from two independent pipe lengths, our improvement presupposing that said lengths are already united at their ends by a connecting web or channel but that the extreme end of the united pipe lengths is still open.

In the specification which follows we have described our improved method as applied to the incomplete pipe bend which is obtained as a result of certain initial steps set forth in the method disclosed in our application for Letters Patent No. 835,360, filed April 30, 1914. In such prior application two pipe lengths are arranged parallel to one another, and their adjacent walls slitted, shaped and welded together so as to constitute a pipe bend complete except for closing the extreme end and shaping its contour; in said specification certain general methods are described for effecting this closure and shaping.

Our invention now to be described consists of a novel and particular method of effecting this final closure and shaping.

The object of our invention is to provide a definite, certain and easily applied method for finally closing and shaping the end of the pipe bend which method may be practised by comparatively unskilled labor by utilizing usual mechanical process and tools of known character.

Our invention will be better understood by referring to the accompanying drawings in which—

Figure 1 represents an incomplete pipe

bend as it is about to be subjected to the first step of our present improved method; Fig. 2 represents a cross section taken along the line 2—2 of Fig. 1; Figs. 3 and 4 represent, in edge view and plan, the incomplete bend of Fig. 1 after the first step in the method has been carried out; Fig. 5 is an end view taken from the right of Fig. 4, with the shaping cone removed; Fig. 6 is an elevation, part section, showing the bend as it appears at the end of the next step or swaging operation; Fig. 7 shows the bend as its final closure is being effected; Fig. 8 shows the bend of Fig. 7 as it is about to be pressed flat; and Figs. 9 and 10 show edge and plan views, respectively, of the completed bend.

In the drawings the incomplete pipe bend 1 is constituted of two pipe lengths 2 and 3 united for a certain distance from their ends by a connecting yoke or channel 4; the extreme end of this incomplete bend is open and has the outline shown in Fig. 2. The incomplete bend, as thus shown, is the result of certain steps in the method described in our prior application above referred to.

The first operation in our present improved process is to give the open end of the incomplete bend a circular section instead of the elongated section which it possesses at the start. To accomplish this we insert centrally in said open end a shaping tool or cone 5 at the base of which is a disk member 6 whose periphery has the same length as the periphery of the incomplete bend at its end. The tip 7 of the cone is elliptical and the intermediate portion of the cone tapers uniformly between the circular disk 6 and the elliptical tip. The shaping cone may be pressed home into the incomplete bend by the aid of any preferred means. This will spread the end of the bend and cause it to assume the shape shown in Figs. 3 and 5; here the extreme end is circular tapering outwardly in the plane of the pipe and inwardly at right angles to said plane so as to merge with the rest of the bend. The shaping cone is now removed and the circular end of the bend, as in Figs. 3 and 5, is then heated and subjected to the action of a pair of swaging dies so as to gradually close and shape the end as shown in Fig. 6; the base die 7' is preferably fixed while the operating die 8 is best used with some suit-

able machine. The character of the swaging process is as usual and the bend should be rotated while the swaging proceeds. The swaging process will leave a narrow cleft 9 at right angles to the plane of the pipes and this has now to be closed. For effecting this closure we prefer to use a welding hammer 10, the end of the bend, in the vicinity of the cleft, being first heated to welding heat. After the swaging and cleft closing steps have been completed the bend will have the form shown in Figs. 6 and 7, that is to say, while its contour is approximately correct in the plane of the two pipes, it will bulge at right angles to the two pipes; this bulging is due of course, to the initial spreading produced by the shaping cone. We, therefore, now place the bend, after suitably heating the same, in a suitable press as shown in Fig. 8. Effective surfaces of this press are given a shape complementary to the shape which it is desired that the bend shall finally possess, that is to say, they will be suitably grooved and curved to correspond with the desired final curves of the pipe bend. They will also be provided with a suitable rib portion 11 by means of which the walls of the yoke or passage 4 may be suitably depressed below the imaginary planes which will contact, on each side of the bend, with outside of the pipes 2 and 3. There is thus provided the very advantageous form of pipe bend disclosed and discussed in our prior application referred to. The cleft 9, left at the tip of the bend after the swaging has been completed, need not necessarily be closed by a welding ham-

mer and any other usual equivalent welding operation may be substituted.

Having described our invention, we claim: 40

1. The improvement in the art of making pipe bends from an incomplete bend as described which comprises giving the open end a circular contour, then swaging and shaping the end, closing the remaining cleft 45 by welding, and then pressing the end into final shape.

2. The improvement in the art of making pipe bends from an incomplete bend as described which comprises applying pressure 50 at the inside of the open end so as to give said end a circular contour, then contracting and shaping said end by outside pressure, closing the remaining cleft by welding, and then shaping the end by pressures applied 55 at right angles to the plane of the bend.

3. The improvement in the art of making pipe bends from an incomplete bend as described which comprises reshaping the open end by the insertion of a tapered shaping 60 tool, then swaging down said end and finally closing and shaping said end.

In testimony whereof we have hereunto set our hands each in the presence of two subscribing witnesses.

CHARLES H. TRUE.
NEAL TRIMBLE McKEE.

Witnesses as to Charles H. True:
KATE EMERY,
THOMAS PHILLIPS.

Witnesses as to Neal Trimble McKee:
JAMES K. SCOTT,
JOHN P. McJILTON.