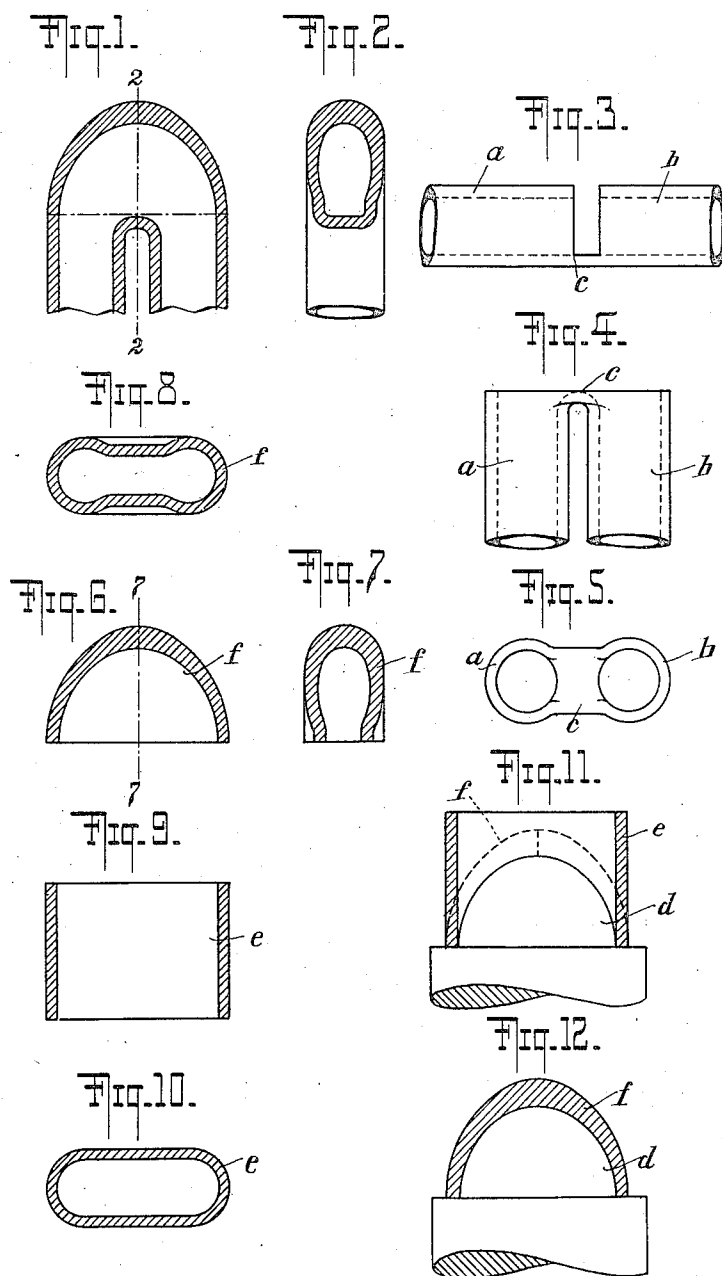


P. ESCH.
METHOD OF MAKING U-SHAPED PIPE BENDS.
APPLICATION FILED MAY 1, 1913.

1,075,201.

Patented Oct. 7, 1913.



WITNESSES

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METHOD OF MAKING U-SHAPED PIPE-BENDS.

1,075,201.

Specification of Letters Patent,

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To all whom it may concern:

Be it known that I, PETER ESCH, a subject of the German Emperor, and a resident of Dusseldorf, Germany, have invented certain new and useful Improvements in Methods of Making U-Shaped Pipe-Bends, of which the following is a specification.

This application is a division of my application similarly entitled, filed September 22, 1910, Serial No. 583,171.

My invention concerns the making of U-shaped pipe bends and particularly such bends when used in connection with boilers, superheaters and generally when exposed to high temperatures or when used to carry steam or fluids under pressure.

My invention relates particularly to such bends as aforesaid when the two legs of the bend are required to be very close together.

A primary object of my invention is to provide a method of making pipe bends which shall involve very simple tools and accessories and an inexpensive labor factor and yet result in the production of bends of great strength and uniform character.

Other objects of my invention will appear as the specification proceeds.

My improved method of making U-shaped pipe bends consists essentially in first preparing by any suitable method an element comprising two lengths of tube connected by a bridge piece and then welding to such bridge piece and the adjacent tube ends the edge or rim of an appropriate bell or dome-shaped cap.

Referring to the drawings, Figure 1 represents a central section through the two legs of a preferred form of U bend made according to my invention; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Figs. 3 and 4 show the first and second steps in the production of the element to which the cap is to be welded; Fig. 5 is a plan view of Fig. 4; Fig. 6 represents a longitudinal section through a preferred form of cap; Fig. 7 is a section taken along the line 7—7 of Fig. 6; Fig. 8 is a sectional plan view taken from below of Fig. 6; Fig. 9 is a longitudinal section taken on the longer axis of the flattened tube from which the cap of Fig. 6 is made; Fig. 10 is a cross section of the same tube; Fig. 11 illustrates the way in which the cap of Fig. 6 is made, the dotted construction showing

the two steps of the method; Fig. 12 shows a modified form of cap together with a mandrel used in this construction.

The form of bend shown in the figures is preferably made as follows: A tube of suitable bore and wall thickness is selected and a pair of transverse cuts made nearly through, the incomplete ring lying between these cuts then being removed; this results in a pair of ends, *a*, *b* connected by a narrow bridge piece *c*. These two legs *a*, *b* are then bent downwardly about a transverse axis through the bridge piece *c* (Fig. 4) and constitute the legs of the bend which is to be formed; the length of the bridge piece *c*, itself fixed by the distance between the original cuts, determines the distance between the legs. To complete the U bend a flattened piece of tube *e*, (Figs. 9 and 10), the cross-section of which is such that its curves will coincide with the curves of the two lengths *a*, *b*, is employed. This tube is mounted upon a mandrel *d*, (Fig. 11) and its free end or edge suitably folded or formed upon the mandrel until it assumes the shape shown dotted in Fig. 11, the butt-joint being finally closed by welding. The cap *f* thus produced has its sides bent inwardly (Figs. 7 and 8) so as to conform with the two bends *a*, *b*, and their connecting bridge piece, and is then welded in position, thus producing a completed bend as shown in Figs. 1 and 2. The mandrel *d* may be varied in shape according as taste or special requirements may dictate. Furthermore, instead of forming the cap *f* from a piece of flattened tube mounted upon a mandrel, I may, if I desire, make this cap by pressing from a single piece of metal. Other ways of making this cap may conceivably be employed.

An advantage of making tube bends in the manner described is that it is unnecessary to do any welding in the often very narrow and unaccessible portion lying between the two legs *a*, *b*. (Fig. 4). Furthermore, in forming the bend, it is only necessary to handle two elements, namely, the two tube lengths connected by the bridge piece and the cap.

When the caps are made as has just been described for Figs. 9 to 12, the thickening or reinforcement of the tip or cap is obtained entirely from the material of the cap

itself and results naturally from the folding over of the tube edges. This thickening at this particular point is very desirable, as it is at this point as a rule that the bend is exposed to the hottest furnace gases. The known method of adding extra material by welding is obviously more expensive as well as less durable and strong.

The process and product as above described substantially utilizes all the raw material, while possessing the additional advantage that the legs of the bend may be placed as close together as may be desired.

Having described my invention, I claim:

1. The method of making pipe bends which consists in removing an incomplete ring from a length of tube so as to produce two legs united by a bridge piece, bending said legs in a plane perpendicular to the bridge piece, and then uniting the open edges of a cup-shaped or hollow cap to the edges of the bridge piece and adjacent legs, substantially as and for the purpose described.

2. The method of making pipe bends which consists in removing an incomplete ring from a length of tube so as to produce two legs united by a bridge piece, bending said legs symmetrically to said bridge piece in a plane perpendicular thereto, and then uniting the open edges of a cup-shaped or hollow cap to the edges of the bridge piece and adjacent legs, substantially as and for the purpose described.

3. The method of making U-shaped pipe bends which consists in removing an incomplete ring from a length of tube so as to produce two legs having squared ends and

united by a bridge piece, bending said legs substantially parallel to one another in a plane perpendicular to the bridge piece, and then uniting the open edges of a cup-shaped or hollow cap to the edges of the bridge piece and adjacent legs, substantially as and for the purpose described.

4. The method of making U-shaped pipe bends which consists in removing an incomplete ring from a length of tube so as to produce two legs having squared ends and united by a bridge piece, bending said legs in a plane perpendicular to the bridge piece, and then uniting the open edges of a cup-shaped or hollow cap to the edges of the bridge piece and adjacent legs, substantially as and for the purpose described.

5. The method of making U-shaped pipe bends which consists in making two parallel transverse cuts nearly through a length of tube and removing the incomplete ring thereby formed so as to produce two legs having squared ends and united by a bridge piece, bending said legs symmetrically in a plane perpendicular to the bridge piece until substantially parallel with one another, and then uniting the open edges of a cup-shaped or hollow cap to the edges of the bridge piece and adjacent legs, substantially as and for the purpose described.

In testimony whereof, I have hereunto set my hand and seal in the presence of two subscribing witnesses.

PETER ESCH. [L. s.]

Witnesses:

PETER REINHARD,
GUSTAV PAMPES.