No. 829,990. PATENTED SEPT. 4, 1906.

W. McKEE.

PIPE FORMING APPARATUS.

APPLICATION FILED NOV. 16, 1904.

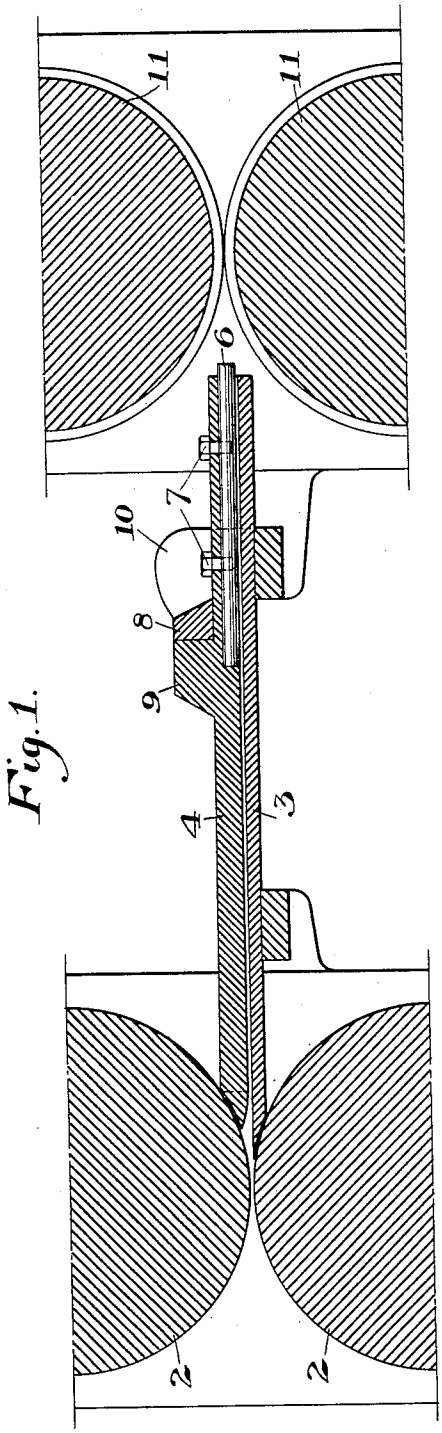

Fig. 1.

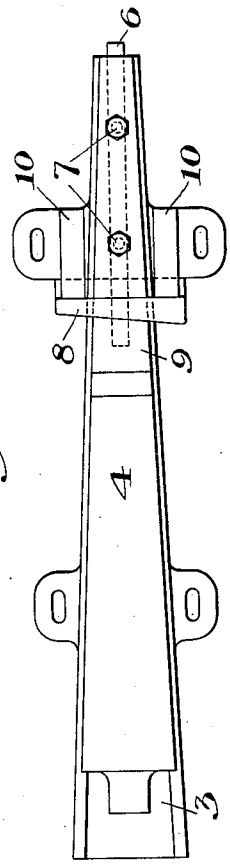

Fig. 2.

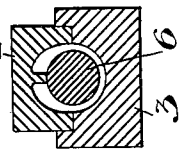

Fig. 6.

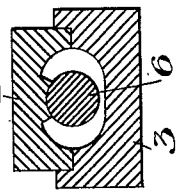

Fig. 5.

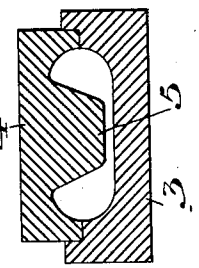

Fig. 4.

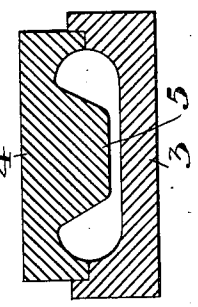

Fig. 3.

WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIS McKEE, OF ELYRIA, OHIO, ASSIGNOR TO THE ELYRIA IRON & STEEL COMPANY, OF ELYRIA, OHIO, A CORPORATION OF OHIO.

PIPE-FORMING APPARATUS.

No. 829,990. Specification of Letters Patent. Patented Sept. 4, 1906.

Application filed November 16, 1904. Serial No. 232,978.

To all whom it may concern:

Be it known that I, WILLIS McKEE, of Elyria, Lorain county, Ohio, have invented a new and useful Pipe-Forming Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section of my improved tube-machine. Fig. 2 is a top plan view of the forming-dies, and Figs. 3, 4, 5, and 6 are cross-sections on corresponding lines of Fig. 2.

My invention relates to the apparatus employed for turning up flat skelp into tube form with the edges butted together, and is designed to overcome difficulties in the apparatus heretofore employed for this purpose. With such apparatus as usually constructed the flat skelp passes between the pair of rolls and then through a forming-die around a mandrel and through a succeeding set of rolls with a circular pass. In such constructions one end of the mandrel projects into the circular pass of the last set of rolls, while the other end projects within the forming-dies, the mandrel being loosely supported, usually pivoted. The difficulty with such constructions is that the mandrel is not rigid and the tube being formed can push it a little to the side and not be properly shaped before it reaches the last forming-rolls. If the strip or skelp on one side is feeding faster than on the other, there is a tendency to force the mandrel to one side out of its position, distorting the metal and causing the mandrel to interfere with the removal of the distorted blank. My invention overcomes this difficulty and provides a forming-die and mandrel which confines the metal both on the inside and outside. The mandrel is supported rigidly with respect to the forming-die, so that the metal is confined on the outside by the forming-die and on the inside by the mandrel.

In the drawings, 2 2 represent forming-rolls of the usual character from which extends the die, consisting of the lower trough-shaped part 3 and the upper cover portion 4. This forming-die is tapered in cross-section, as shown in Fig. 2, and is properly shaped to gradually turn the flat skelp into cylindrical form. The two die portions are arranged to provide curved edges, which, in connection with the rib portion 5 of the cover, gradually shapes the blank as it feeds forward. Within the outer portion of the forming-guide is placed the mandrel 6, which is rigidly secured to the cover portion by set-screws 7 or other suitable securing means. This mandrel forms an extension of the rib portion 5, which is gradually narrowed, as indicated in the successive cross-sections. The cover portion of the die may be secured in any desirable manner—for example, by the key 8, driven in between the transverse projection 9 and the lugs 10 of the base portion. I have shown the mandrel as stopping short of the circular pass within the last forming-rolls 11 11, and I prefer this form.

When the skelp feeds forward through the first set of forming-rolls and the forming-dies, the mandrel is held rigidly, so that it is impossible for the blank to get out of shape as it passes through the forming-dies. The mandrel supports and confines it rigidly on the inside and the die gives the external support and confining means. The clearance is greater above the mandrel than below near its end, as shown in Fig. 6.

The advantages of my invention will be apparent to those skilled in the art, since distorted tubes are prevented and the blank held from distortion or getting out of shape before it reaches the final forming-rolls. The mandrel can be adjusted for different thicknesses of tube-wall by shimming up under the mandrel, as the clearance on the side of the tube opposite the seam is not material. The clearance on the side of the seam must be such that one edge of the blank cannot be passed by the other. The same construction may be employed for forming square, hexagon, or other shaped tubing by changing the form of the outside forming-die and the inside die or guide—that is, the fixed mandrel. Many other variations may be made in the form and arrangement of the rolls and the inside and outside dies without departing from my invention.

I claim—

1. In tube-forming apparatus, an outer forming-die having an inwardly-projecting rib, a removable mandrel forming an extension of the rib, and rigid securing means for the mandrel arranged to prevent movement

thereof relative to the outer die, said parts being arranged to turn the blank into tubular form; substantially as described.

2. In tube-forming apparatus, the combination with two sets of forming-rolls, the pass in the second set being arranged to shape the tube, of an outer forming-die extending between the two sets, an inner forming-die within said outer die, and terminating short of the pass of the second set of rolls, and rigid securing means for the inner die arranged to prevent movement thereof relative to the outer die, said dies being arranged to turn the skelp into tubular form to enter the pass of the second set of rolls; substantially as described.

In testimony whereof I have hereunto set my hand.

WILLIS McKEE.

Witnesses:
P. J. MITCHELL,
WM. T. BENTZ.