(No Model.)

C. B. COOPER.

PIPE ELBOW OR SECTION.

No. 409,631. Patented Aug. 20, 1889.

Fig. 1.

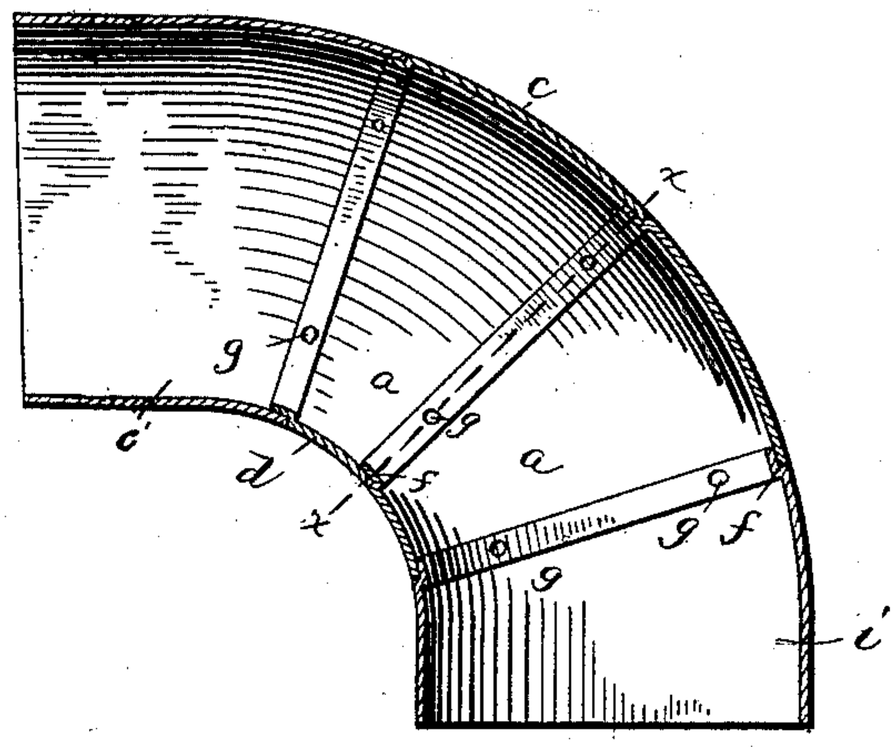


Fig. 2.

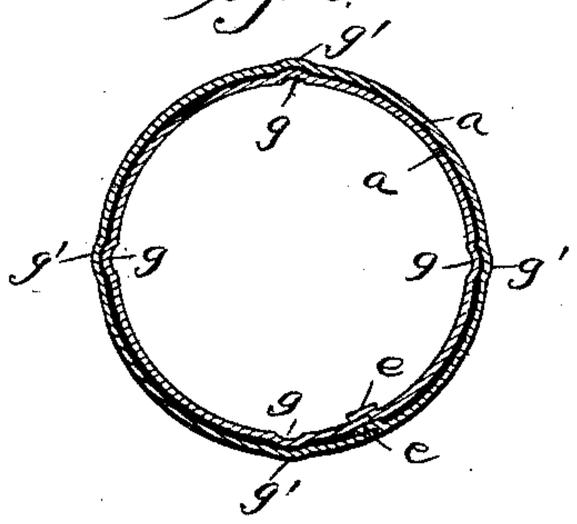


Fig. 3.

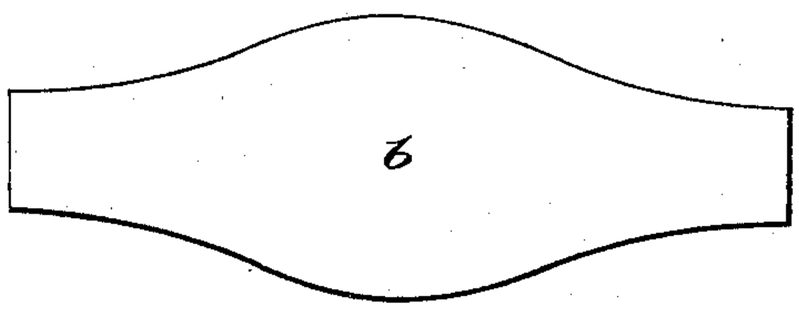


Fig. 4.

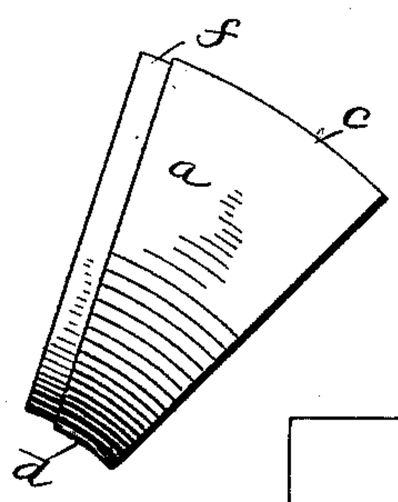
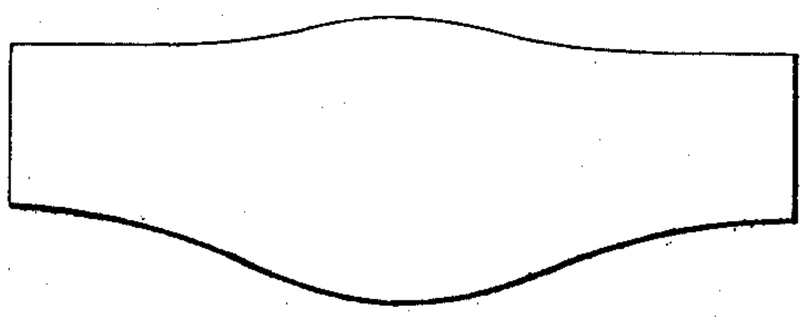


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES B. COOPER, OF NEW YORK, N. Y.

PIPE ELBOW OR SECTION.

SPECIFICATION forming part of Letters Patent No. 409,631, dated August 20, 1889.

Application filed March 11, 1889. Serial No. 302,770. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. COOPER, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Pipe Elbows or Sections; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to an improvement in pipe-elbows or curved sections.

The object of the invention is to provide a strong, durable, and cheap curved pipe-section composed of a suitable number of transverse sections joined together in an improved manner to form an elbow convex on the back and concave in the throat.

These objects are accomplished by, and my invention consists in, certain novel features of construction and combinations of parts, more fully described hereinafter, and particularly pointed out in the claims.

Referring to the accompanying drawings, Figure 1 is a longitudinal section of the elbow. Fig. 2 is a cross-section on line *x x*, Fig. 1. Fig. 3 is a plan of a blank. Fig. 4 is an elevation of the blank bent circular to form a section. Fig. 5 is a plan of a flat blank used to form an end section of an elbow.

The curved pipe is composed of a suitable number of transverse sections *a*, each section being preferably formed from a blank *b*, cut from sheet metal and tapering from the center to the ends, and of such length that the ends of the blank will overlap when the same is bent circular to form a section of the desired diameter. After the blank is cut the same is bent circular—that is, the ends are brought around to overlap each other to form a hollow section—gradually decreasing in length from the back to the inner side or throat, and the back and throat are curved, as shown, preferably from the same center, so that the outer side *c* will be convex and the inner side *d* concave. One of the ends of the blank forming a transverse section is depressed or bent in the thickness of the metal, as shown at *e*, to form a seat for the other end, so that when these ends are secured together the outer surface of the section will present no sharp edges or corrugations. These transverse sections are jointed together to form a curved elbow having its outer wall free from transverse corrugations by sinking a shallow corrugation or depression *f*, corresponding with the thickness of the metal used, around one edge of each section of the elbow, (except, of course, one end section,) and this depression or corrugation, when overlapped by the straight edge of an adjoining section, lies close to its inner wall, making, when joined, a true sectional curved tube.

For elbows to be used for conveying liquids, &c., the joints of which have to be air-tight, small indentations *g*, Fig. 2, are made in but not through the shallow corrugation *f*, encircling one rim of the sections *a*, and similar corresponding indentations *g'* are formed in the opposite corresponding straight edges of the sections, so that when the sections are placed together the indentations in the corrngations fit in the corresponding indentations in the straight edges, thereby firmly pinning the sections together in addition to the soldering necessary to make them air-tight.

Another feature of this invention consists in forming the end sections *i* of the elbow curved a portion of their length to conform to the arc of the elbow and straight or tapered the remainder of the length to fit into the full-sized end of a pipe or another elbow, whereby a less number of transverse sections are required. These end sections are formed from blanks such as shown in Fig. 5, having one longitudinal edge of the same contour as the edges of blanks *b*, and the other edge approximately straight, with an outward bulge at the central portion.

The intermediate and end sections are formed from the flat blanks of Figs. 3 and 5, as follows: The blanks are bent into circular form with their ends overlapping, and then placed in the bore of a die internally corresponding in shape with the form of section to be produced. Internal outward pressure is then applied to the blank in the die, which is thereby forced to permanently assume the

interior form of the die. As the end sections are curved a portion of their length, the blanks are provided with the outward bulge mentioned to compensate for the decrease of length in a straight line caused by curving the blank to form the convex portion of the back of the section, and so that the plane of the outer end edge of the section will be at right angles to the longitudinal axis of the elbow.

The herein-described curved elbow-sections are made as new articles of manufacture, and are so formed that they can be readily joined by the mechanic using them. These sections, when being transported or stored, can be nested, thereby occupying less space and costing less for storage and transportation.

What I claim is—

1. A curved pipe-elbow consisting of a series of transverse sections, each convex on the back and concave at the throat and composed of a single blank narrowed toward the ends, which ends overlap and are secured together, one end or edge of each section being depressed inwardly the thickness of the metal, or formed with an annular corrugation, said corrugation and the opposite end of the section being provided with transverse indentations, whereby, when the sections are secured together, the straight edge of one section fits on the corrugation of the next and the indentations intermesh, substantially as described.

2. A curved pipe-elbow consisting of transverse sections concave at the throat and convex at the back, each formed of a single blank having its ends secured together, said sections being secured together at their ends, and the two end sections of the elbow at about half their length departed from a curved form and made straight or tapering at the outer ends, for the purpose set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHARLES B. COOPER.

Witnesses:
JAMES FOX,
H. S. STALLKNECHT.