

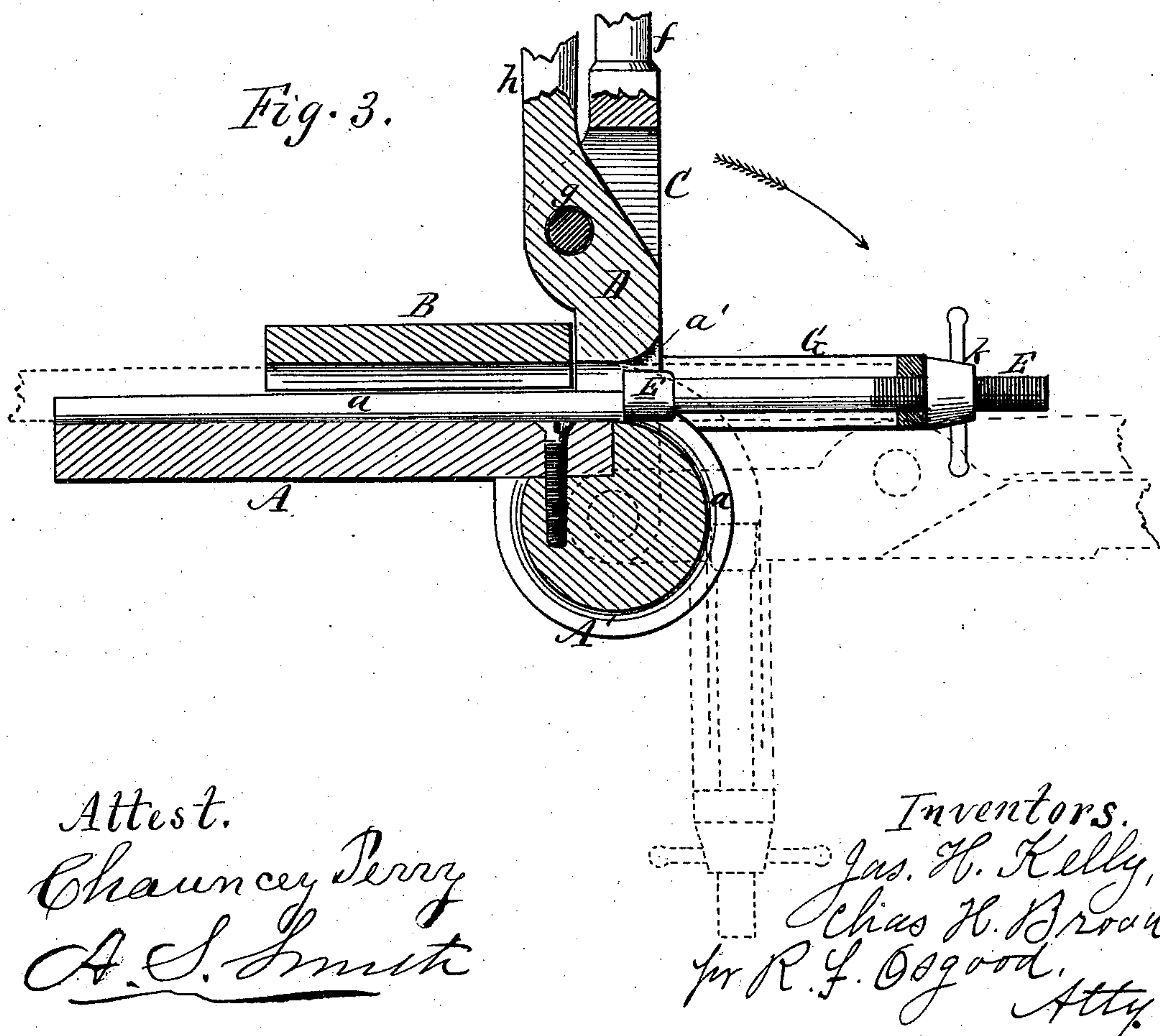
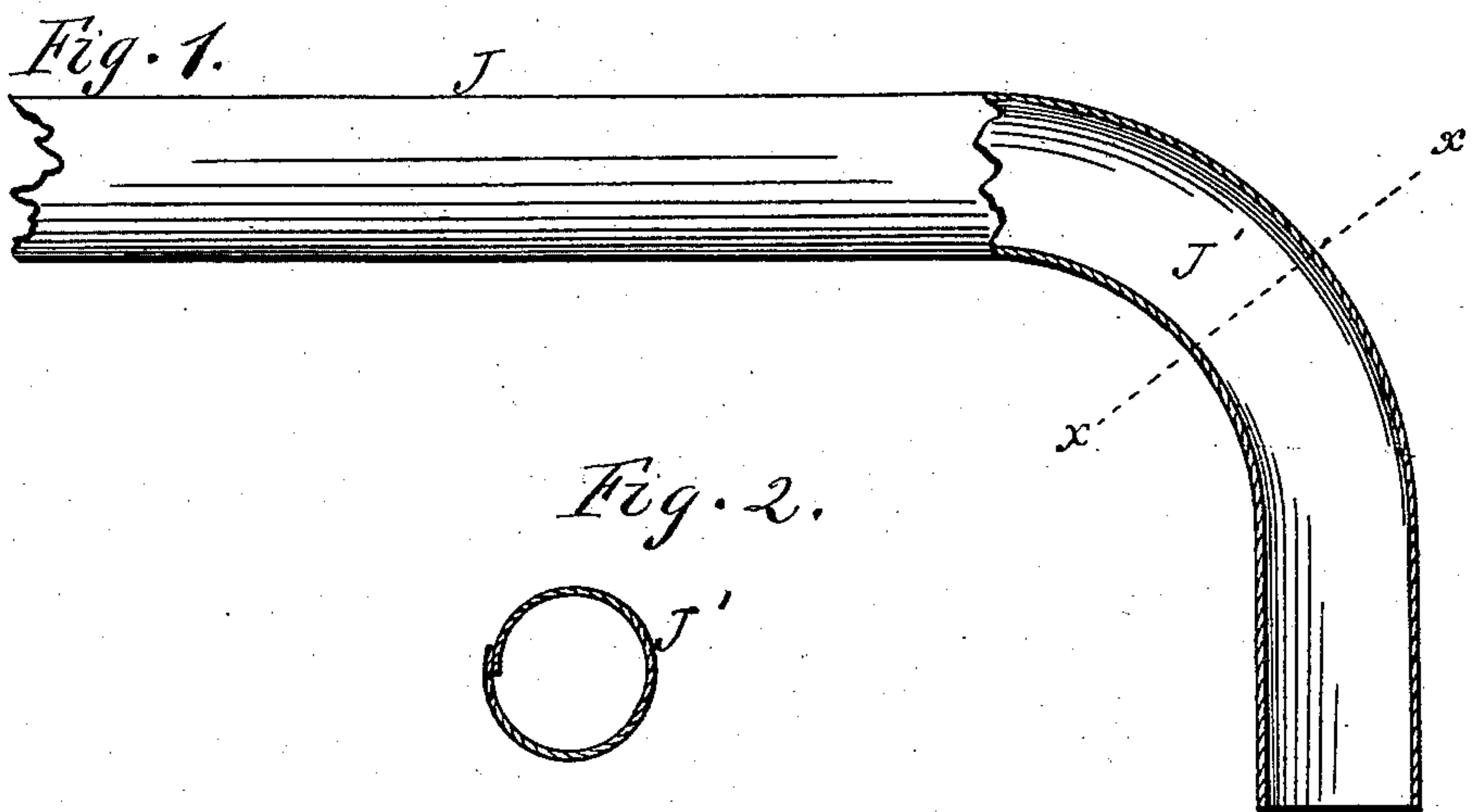
(No Model.)

J. H. KELLY & C. H. BROAD.

TUBE.

No. 369,012.

Patented Aug. 30, 1887.



Attest.
Chauncey Perry
A. S. Smith

Inventors.
Jas. H. Kelly,
Chas H. Broad,
per R. F. Osgood,
Atty.

UNITED STATES PATENT OFFICE.

JAMES H. KELLY AND CHARLES H. BROAD, OF ROCHESTER, NEW YORK;
SAID BROAD ASSIGNOR TO SAID KELLY.

TUBE.

SPECIFICATION forming part of Letters Patent No. 369,012, dated August 30, 1887.

Application filed February 23, 1887. Serial No. 228,611. (No model.)

To all whom it may concern:

Be it known that we, JAMES H. KELLY and CHARLES H. BROAD, both citizens of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented a certain new and useful Improvement in Bent Tubes and Pipes; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings accompanying this application.

Our improvement relates to bent tubes and pipes produced from a single piece and made by bending the tube around a form.

Heretofore it has been the practice to fill the tube with sand or other material, then hold the ends firmly against clamps, and then produce the bending action, the filling preventing the collapse of the tube while it is being bent; but in such case the strain is great and the tube has necessarily to upset or corrugate on the inside of the bend, which is objectionable to the sight, besides which the filling will yield, and the consequence is, the tube is somewhat flattened at the bend and does not preserve a true circle in cross-section. Tubes are also bent by hand in a similar manner.

In contradistinction to such tubes our invention consists of a tube in which the bend is made without necessarily upsetting or corrugating the sides, presenting a smooth surface, and the tube not being flattened, but presenting practically a circle in cross-section at any point, and being of the same diameter its whole extent.

In the drawings, Figure 1 is an elevation of a piece of the bent pipe, the bend being shown in section. Fig. 2 is a cross-section of the same in line $x x$ of Fig. 1. Fig. 3 is a longitudinal vertical section of the machine by which the bending is done, the same being shown of reduced size.

J shows a piece of tube provided with a bend, J', said bend being made of any desired curve and in any part of the tube. In cross-section the tube is practically a circle at any point in its length, as shown in Fig. 2. The tube is also smooth on all sides, and is not necessarily crimped or corrugated in the bend,

as in ordinary tubes bent by machinery over a form.

Fig. 3 shows one form of machine by which the tube is bent. A indicates a bed-plate, and A' a circular forming-head, both provided with a half-circular groove, a , in which the tube is laid.

B is a clamp, also provided with a half-circular groove on its under side, said clamp being forced down by suitable means to fasten the tube in place on the bed.

C is a yoke resting on the journals of the forming-head A' and capable of being turned in a circle, as indicated by the arrow, Fig. 3.

D is a die, pivoted at g in a fork of the yoke, and provided at its lower end with a half-circular groove that fits the tube. The yoke and die have levers or handles $f h$ and swing together around the forming-head. G is a stirrup pivoted or attached to the sides of the yoke and turning with it.

E is a rod resting in the stirrup and inserted in the tube to be bent and extending inward to the right position between the forming-head A' and die D.

When the yoke and die are swung around the forming-head, the rod E will also turn around the forming-head, and will have a drawing movement coincident with the bending of the tube, and the end or head resting at the point where the bending takes place it forms a core and will leave the tube practically circular in cross-section its whole length. The head of the rod E, in drawing around the forming-head, bears against both sides or faces of the inside of the tube and keeps said sides close pressed against the grooved bed in which the tube lies, so that it cannot wrinkle or crimp, and therefore it will be bent with perfectly smooth sides. Nevertheless, by changing the position of the rod E, the tube can be crimped or ribbed at the bend when desired.

Tubes bent in this manner differ materially from tubes bent in the ordinary way by being round in cross-section and having a perfectly smooth exterior and being of the same diameter their whole extent, and therefore not only present a better appearance, but are stronger

and more serviceable, as any flattening of the tube renders it weak and liable to collapse.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. As an improved article of manufacture, a bent tube or pipe made from a sheet-metal blank of uniform width and thickness, having a single longitudinal seam, the bend being at any desired point in the length, circular in cross-section, smooth on the outside, and of the same diameter its whole length, substantially as shown and described.

2. As an improved article of manufacture, a bent tube or pipe made from a sheet-metal blank of uniform width and thickness, having

a single longitudinal seam, the bend being at any desired point in the length, circular in cross-section, smooth on the outside, and of the same diameter its whole length, and having both ends extended in a straight line beyond the curve, substantially as shown and described.

In witness whereof we have hereunto signed our names in the presence of two subscribing witnesses.

JAMES H. KELLY.
CHARLES H. BROAD.

Witnesses:

PARKHURST W. JERAULD,
JACOB A. RITZ.