

No. 652,658.

Patented June 26, 1900.

F. F. BISCHOFF.
PROCESS OF MAKING TUBING.

(Application filed Oct. 16, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

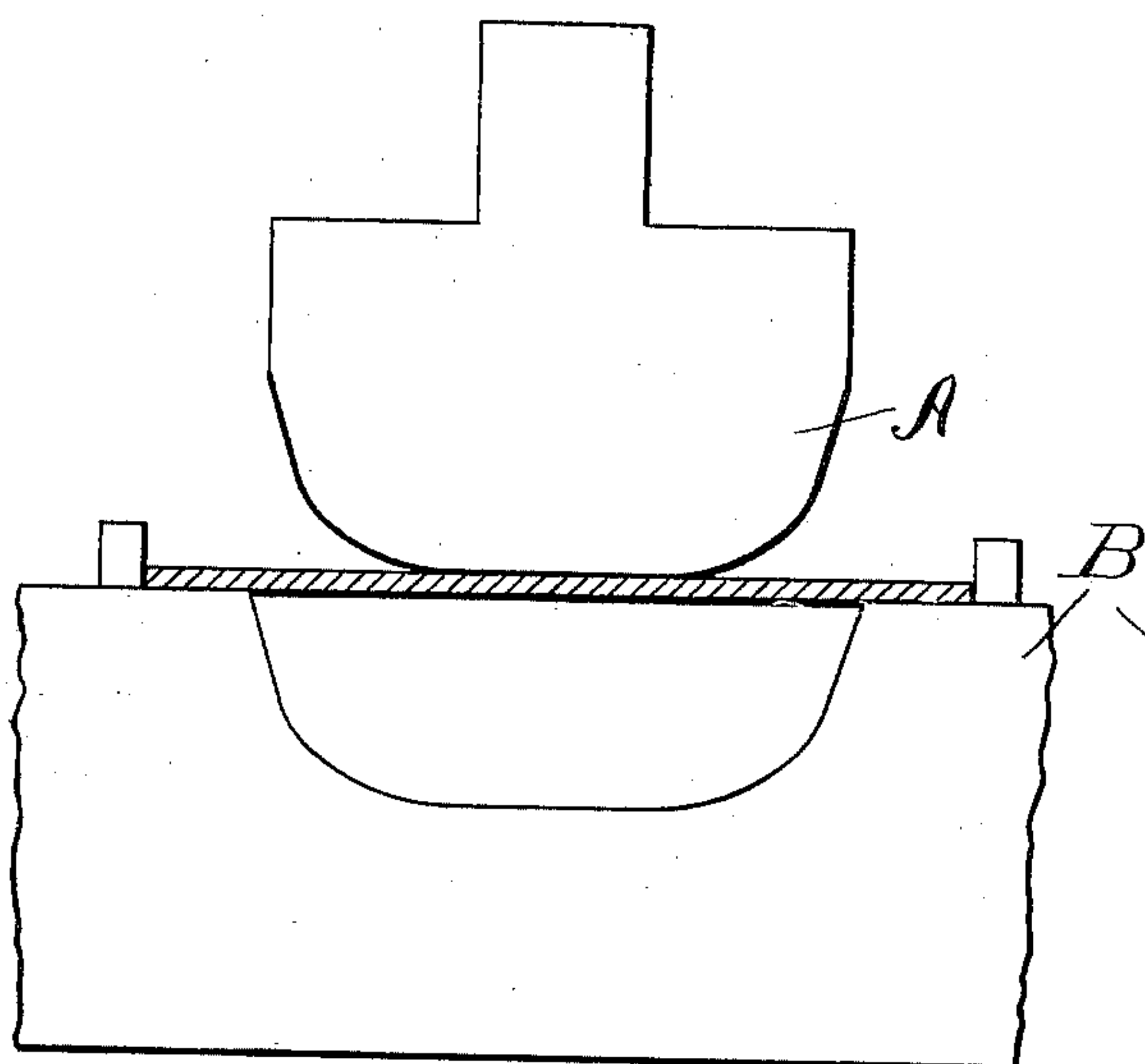


Fig. 2.

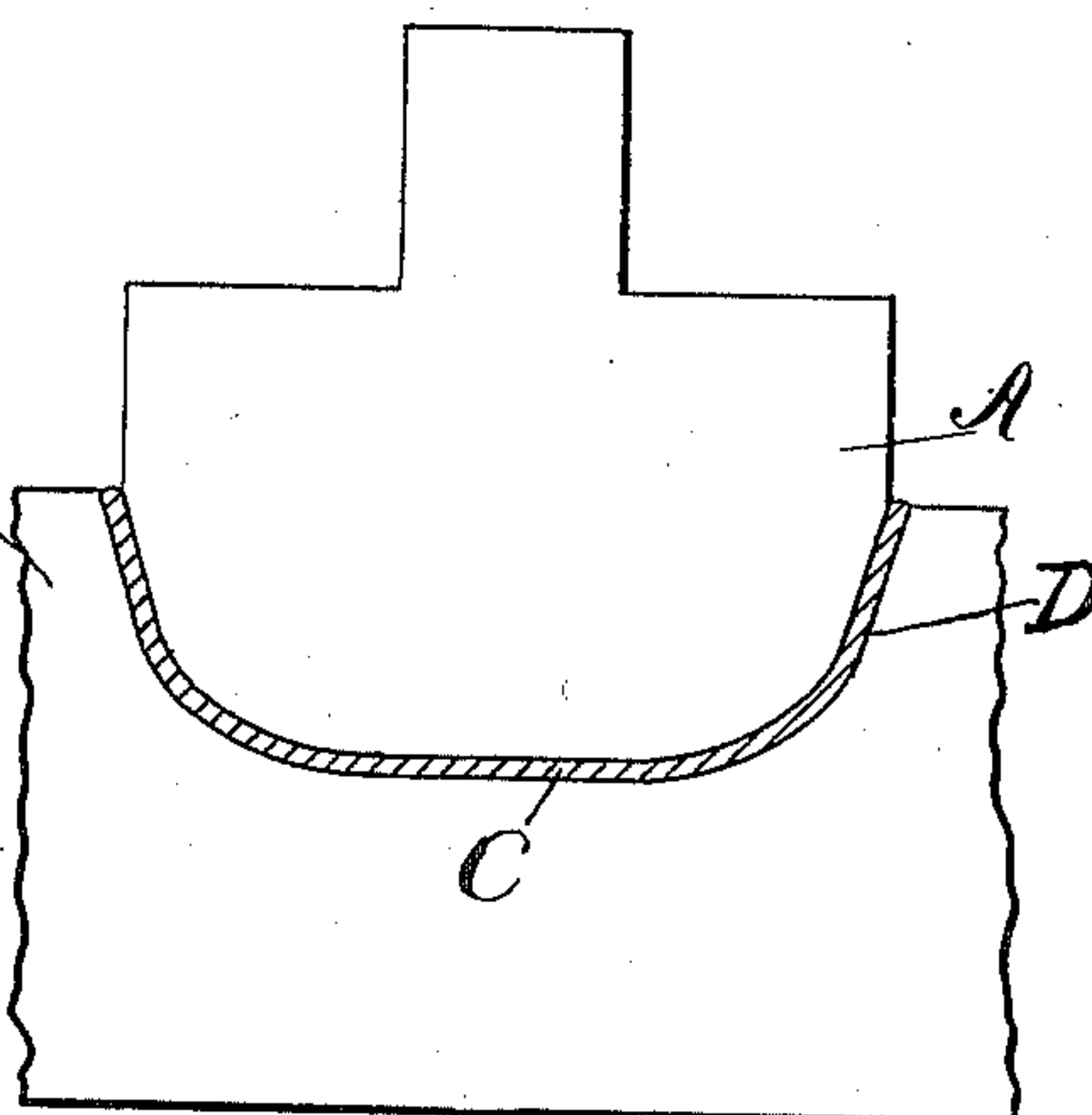


Fig. 3.

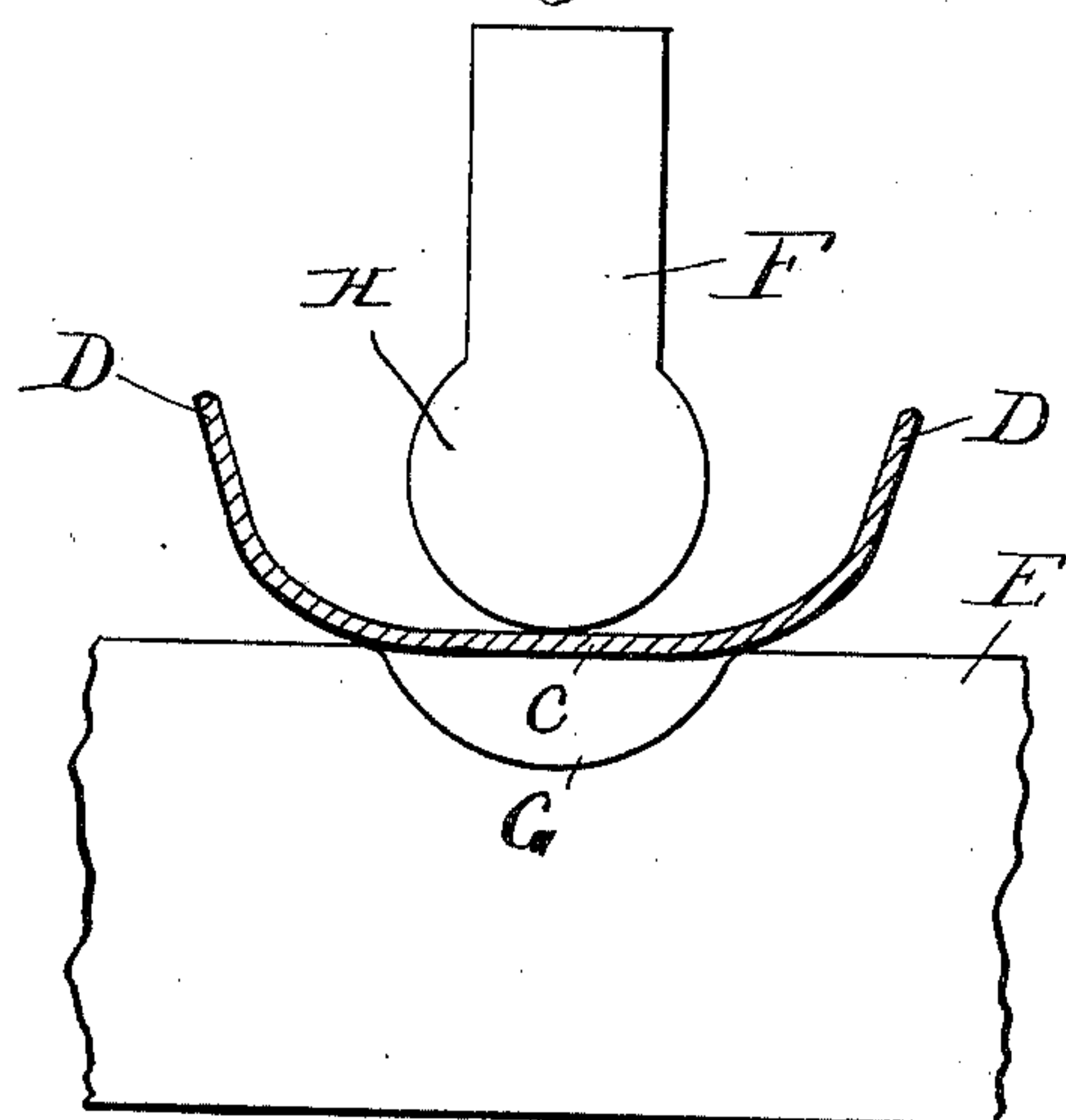
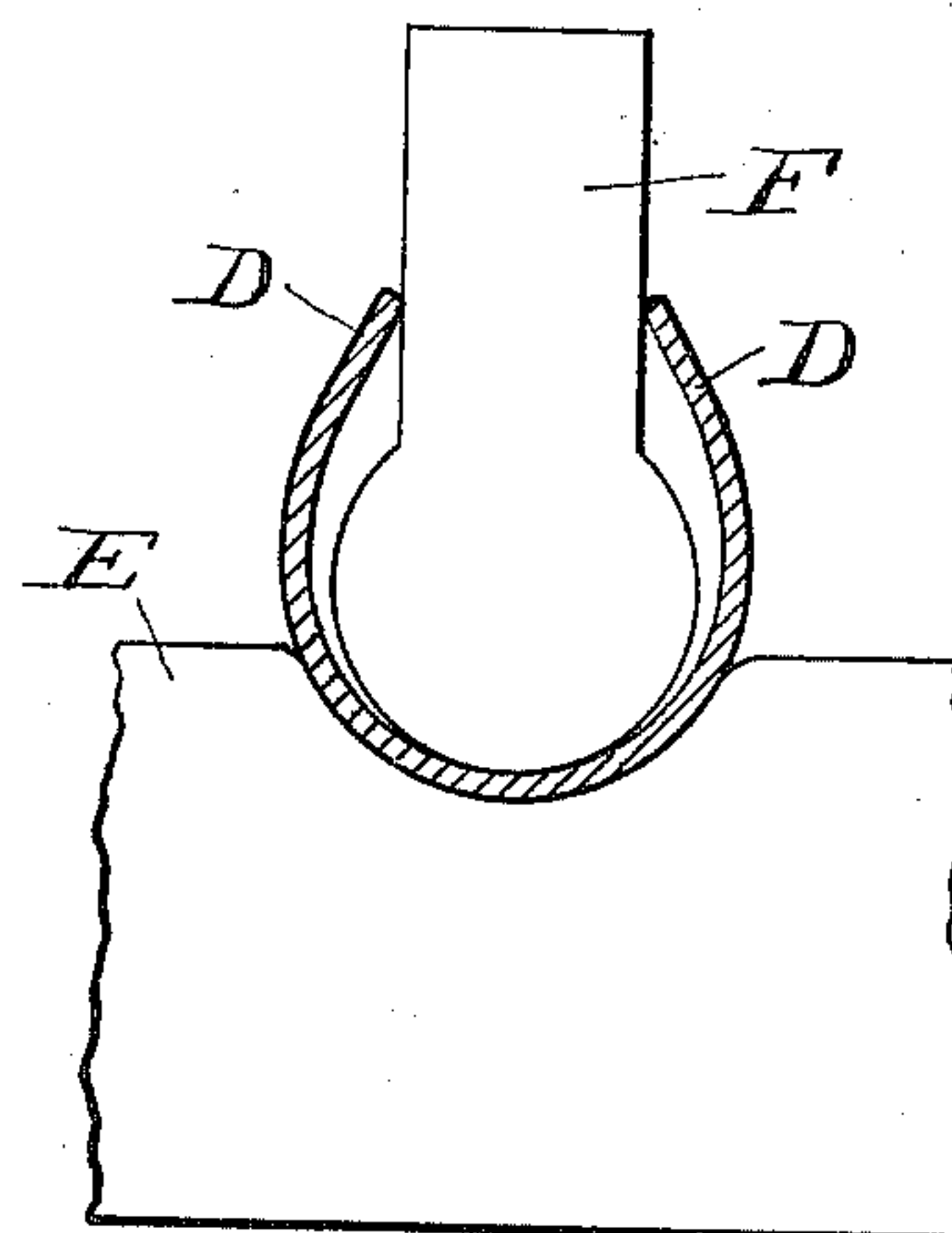


Fig. 4.



Witnesses

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2 Sheets—Sheet 2.

Fig. 5.

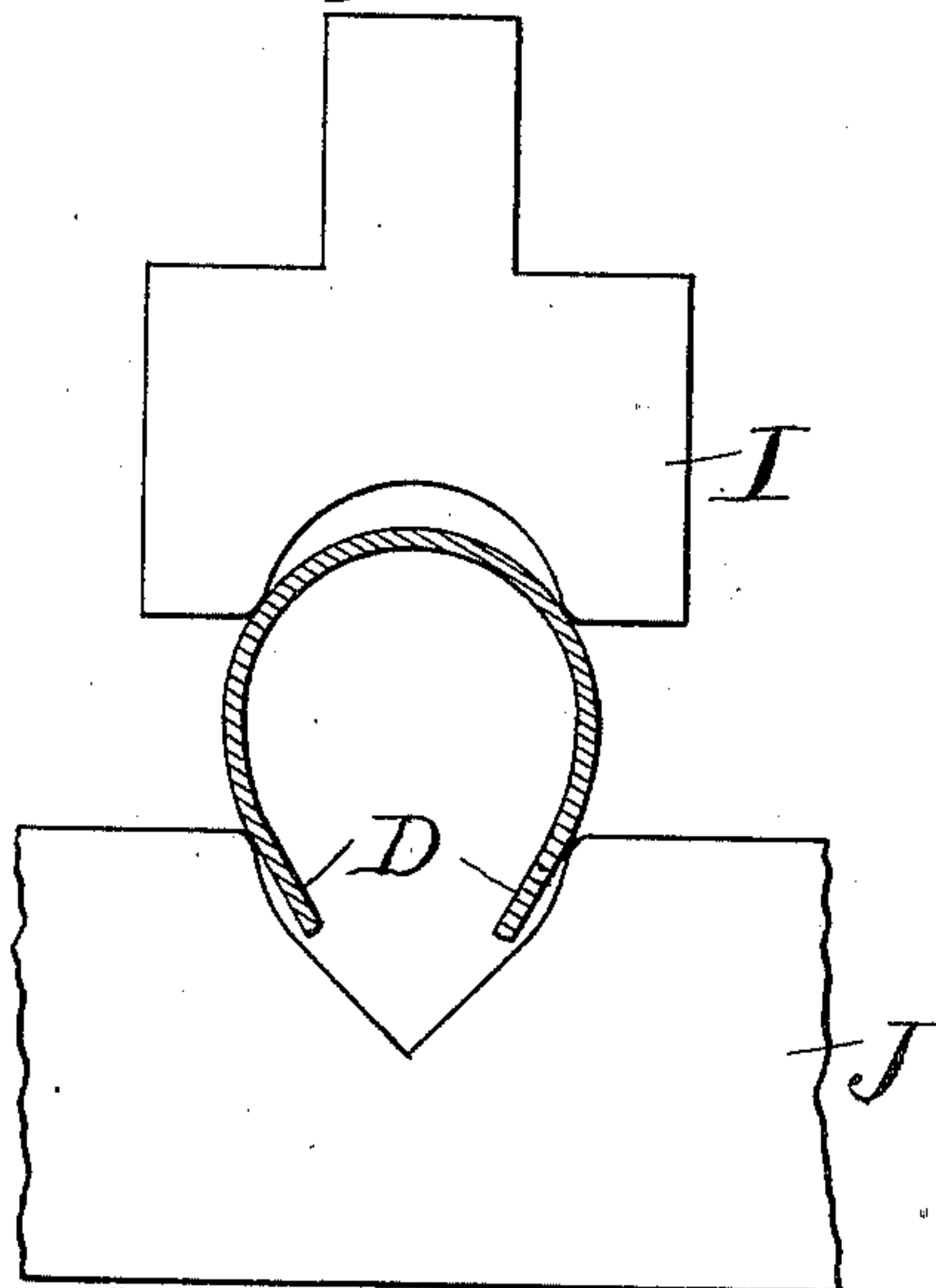


Fig. 6.

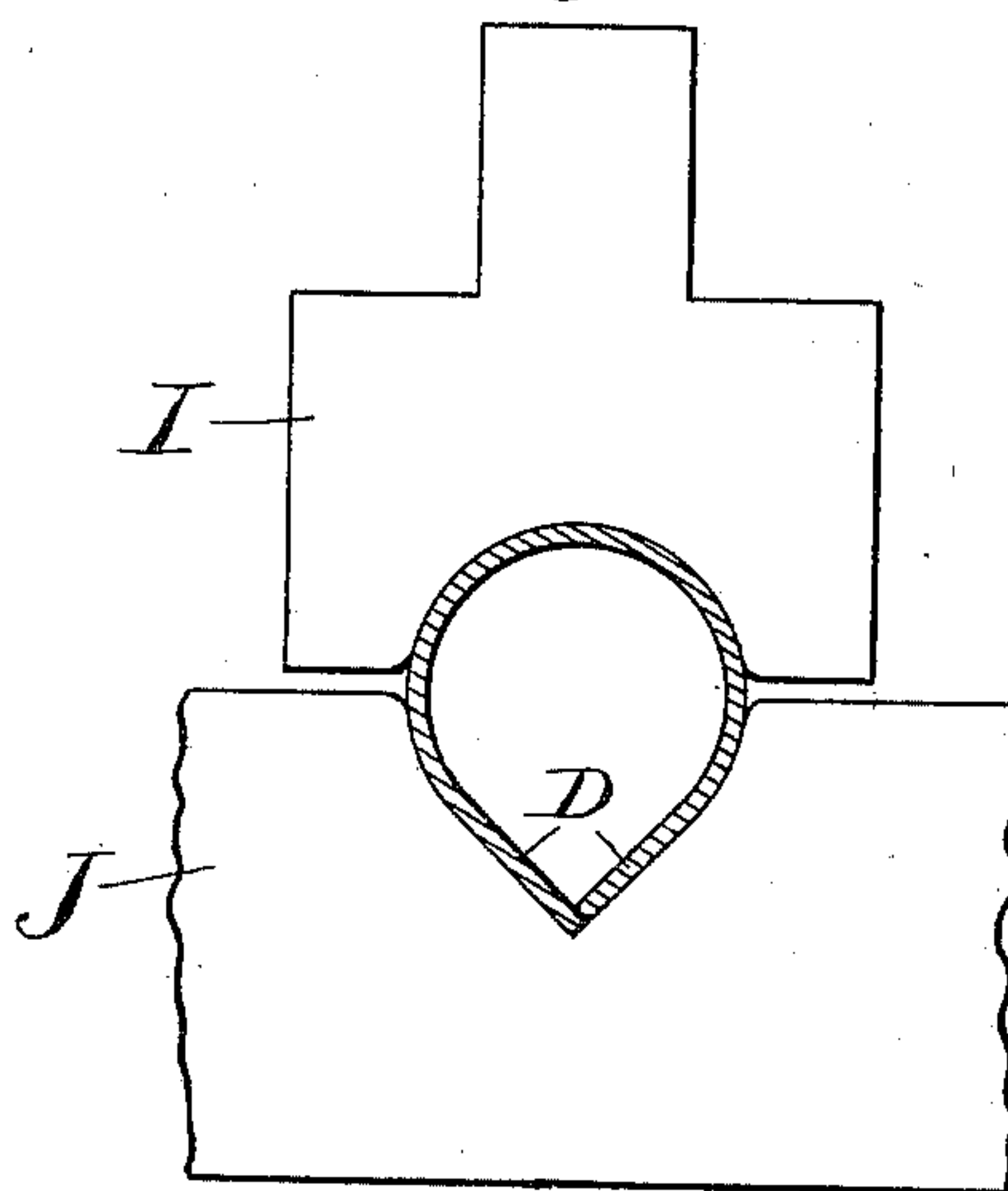


Fig. 7.

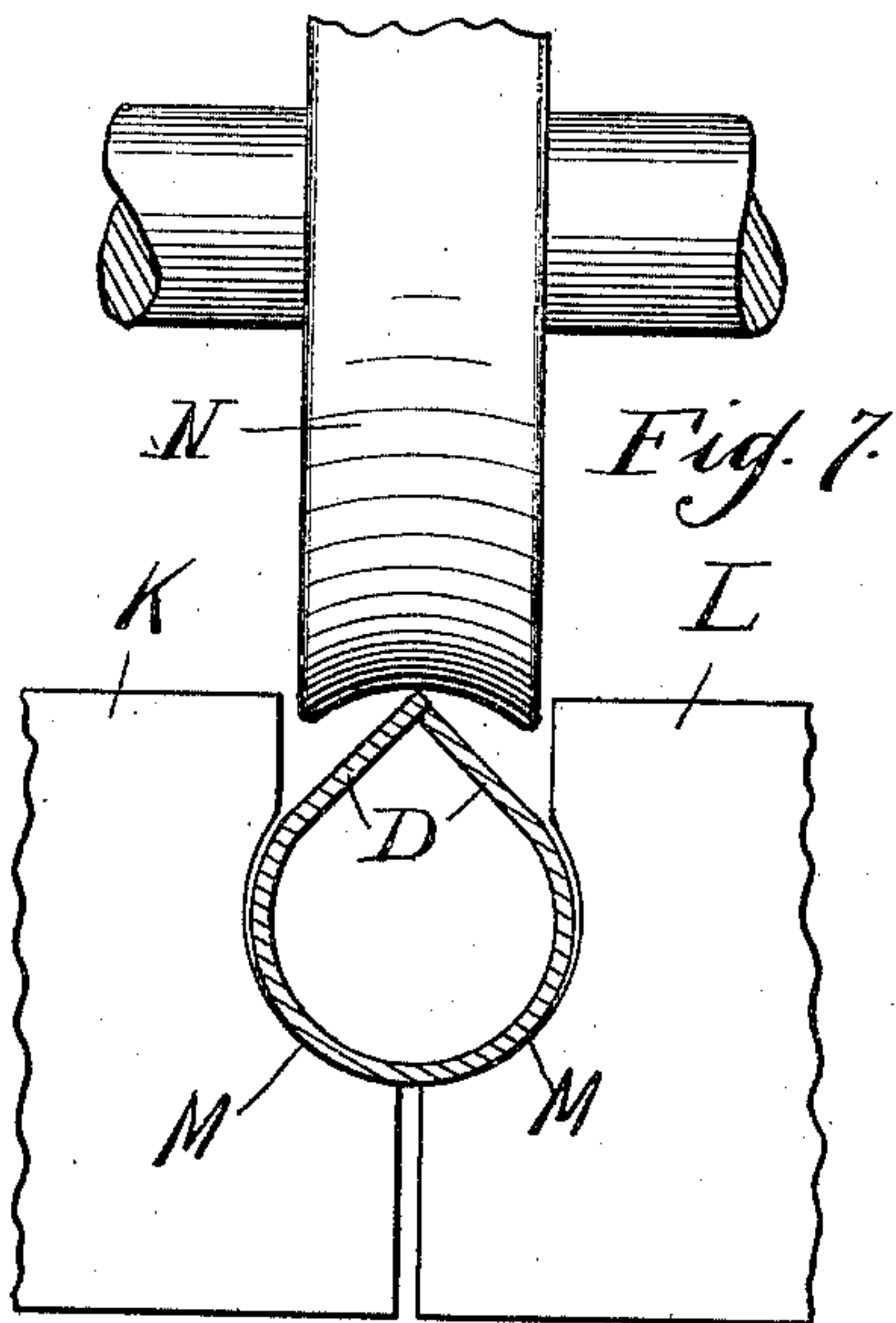
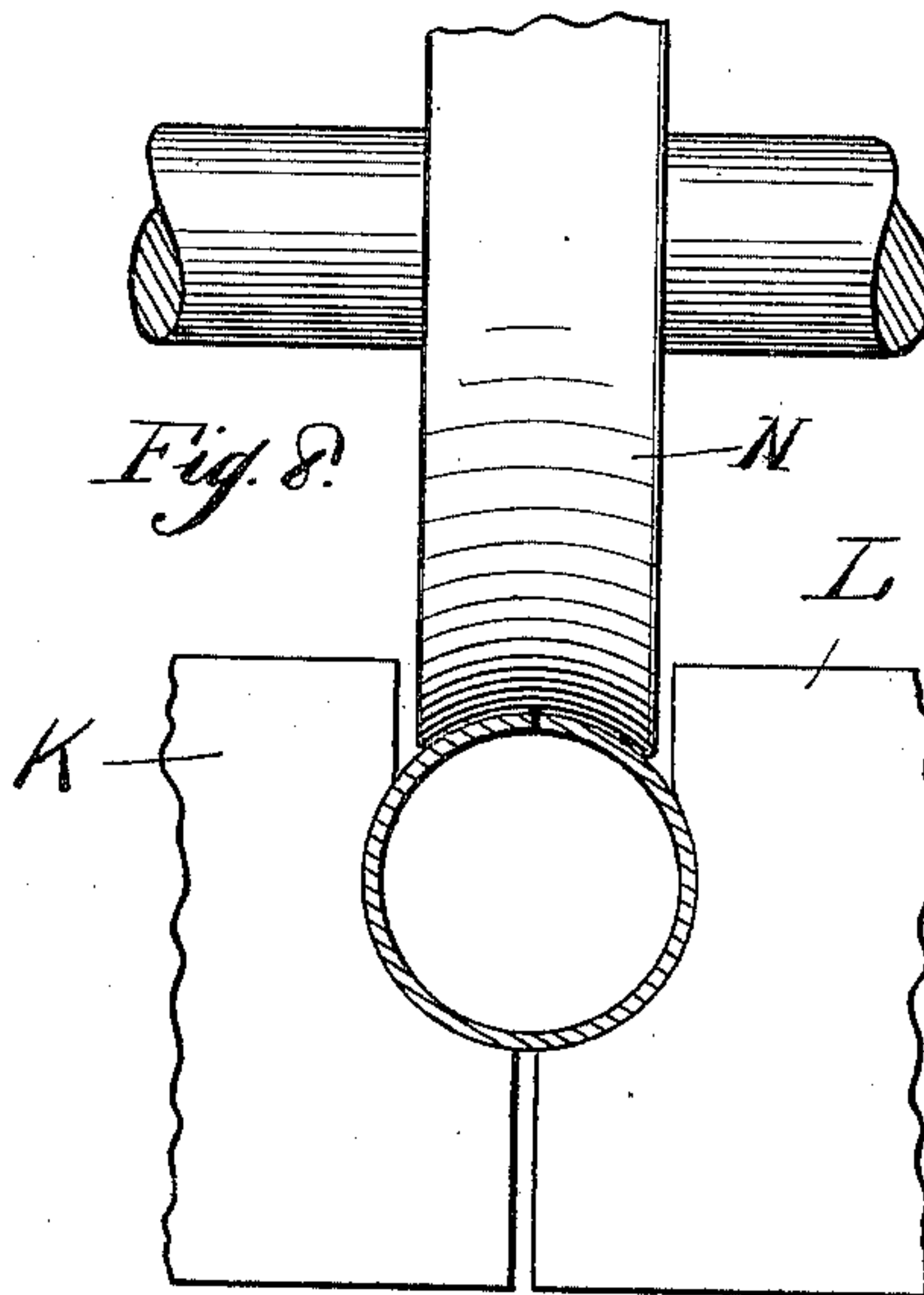


Fig. 8.



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UNITED STATES PATENT OFFICE.

FREDERICK F. BISCHOFF, OF CHICAGO, ILLINOIS.

PROCESS OF MAKING TUBING.

SPECIFICATION forming part of Letters Patent No. 652,658, dated June 26, 1900.

Application filed October 16, 1899. Serial No. 733,712. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK F. BISCHOFF, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Processes for Making Tubing; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a novel process for making tubing of sheet metal, the object being to provide a cheap process of forming a practically-perfect tube in which the edges of the sheet metal are forced into such close contact as to form a joint which is not readily perceptible; and it consists in the various steps of the process, as hereinafter fully described and claimed.

In the accompanying drawings, illustrating the steps of my process, Figure 1 is an end elevation showing male and female die members with a strip of sheet metal between same in readiness for the first operation. Fig. 2 is a similar view showing the first operation completed. Fig. 3 is an end elevation of a second set of dies for performing the second operation with the bent strip in place. Fig. 4 shows the second operation completed. Figs. 5, 6, 7, and 8 illustrate the third and fourth operations.

My invention relates particularly to a process of making what is known as "butt-joint" tubing—that is, tubing which is formed of flat sheet metal the edges of which abut against each other.

My process consists in first bending a strip of sheet metal between two die members A and B to a form approximating that of a channel-iron, the middle portion of said strip forming a flat web C and the side edges forming flanges D, the latter being flat and extending at an obtuse angle to the web, the portions between flanges and web forming a curve of larger radius than the finished tube. Said strip is then placed between die members E and F, the former or female member having a concave groove G less than semicircular and of a width at its mouth practically equal to the width of said web C, and the male mem-

ber F having a cylindrical lower end H of less radius than said groove G, said cylindrical end H being at the lower end of a shank of less width than the diameter of said end H. The said die members E and F serve to bend said web C to a cylindrical form and force said flanges D together, thereby giving said strip the form of a horseshoe in cross-section. Said flanges D are so forced together that they clamp said shank of the member F between them and must be drawn from said member F lengthwise. Said strip is then placed between two die members I and J in an inverted position, said member I having a groove of less radius than the web C, and the member J having a groove practically of V shape, the sides terminating in short curves at the mouth of said groove. Between said die members I and J the flanges D are forced together to abut against each other and the curved portion is contracted to a smaller radius than that of the finished tube. This is one of the most essential features of my process, as will be obvious from the following.

The final step of my process consists in placing the tube as formed in the third operation between two plates K and L, having curved grooves M in their meeting faces having the radius desired for the finished tube, such radius being greater than that of the tube formed after the third operation. When said plates K and L are brought together, as shown in Figs. 7 and 8, said grooves M together form a groove of greater than semicircular form having a mouth with parallel sides. In this groove said partially-finished tube fits loosely, the V-shaped portion of same projecting into the mouth. A roller or other suitable device N having a curved face the radius of which coincides with the radius of the finished tube is then brought to bear upon the V-shaped edge of the tube and moves reciprocally over same, thereby depressing said edge and expanding the curved portion to fit closely within said grooves M and likewise gradually bending the flanges D to a curve coinciding with said curved face of said roller and coinciding in radius with the remaining portions of the tube, thus forming a practically-perfect tube.

By means of my manner of performing the

finishing operation—that is, expanding the tube—the latter retains a tendency to contract, thereby exerting a pressure upon the abutting edges, thus obviously keeping said edges in close contact.

I claim as my invention—

1. The process of making tubing from sheet metal which consists in first bending a strip of sheet metal to the form of a channel-bar having a flat web, round corners and flat diverging flanges, and subsequently bending said web and flanges to a curve of common radius.

2. The process of making tubing from sheet metal which consists in first bending a strip of sheet metal to the form of a channel-bar having a flat web, round corners and flat diverging flanges, and subsequently bending said web on a curve tangential with said corners and converging said flanges, and subsequently bending the latter on a curve having a center common to said web and round corners.

3. The process of making tubing from sheet metal which consists in first bending a strip of sheet metal to the form of a channel-bar having a flat web, round corners and flat diverging flanges, and subsequently bending said web on a curve tangential with said corners and converging said flanges, then forcing said flanges together at their edges and simultaneously contracting the curvature of said web and round corners to a radius less

than that of the finished tube, and subsequently bending said flanges.

4. The process of making tubing from sheet metal which consists in first bending a strip of sheet metal to the form of a channel-bar having a flat web, round corners and flat diverging flanges, and subsequently bending said web on a curve tangential with said corners and converging said flanges, then forcing said flanges together at their edges and simultaneously contracting the curvature of said web and round corners to a radius less than that of the finished tube, and subsequently bending said flanges and expanding said web and corners, whereby the latter and said flanges are bent on the same general curve.

5. The process of making tubing of sheet metal which consists in first forming a tube of partially-cylindrical and partially V-shaped cross-section, said cylindrical portion being of less radius than the finished tube, and subsequently bending said V-shaped portion and expanding said cylindrical portion, whereby both said portions are curved on the same radius.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK F. BISCHOFF.

Witnesses:

RUDOLPH WM. LOTZ,
JOHN D. WILLIAMSON.