2 Sheets—Sheet 1.

F. HOELTGE.

STOVE-PIPE ELBOWS.

No. 183,926. Patented Oct. 31, 1876.

Fig. 1.

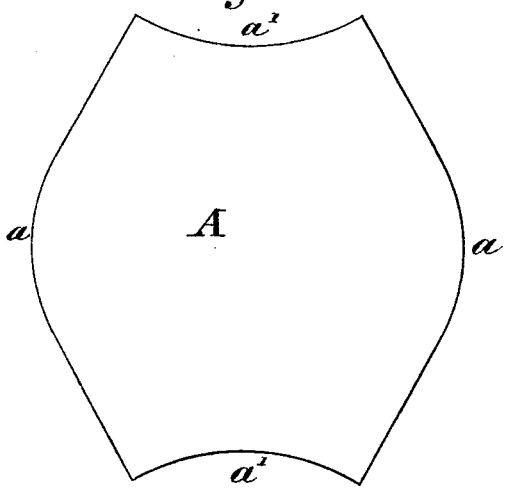


Fig. 2.

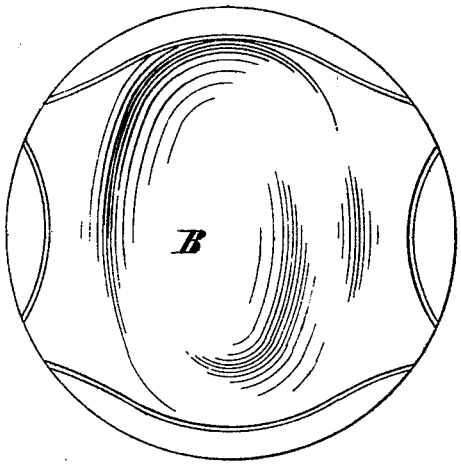


Fig. 3.

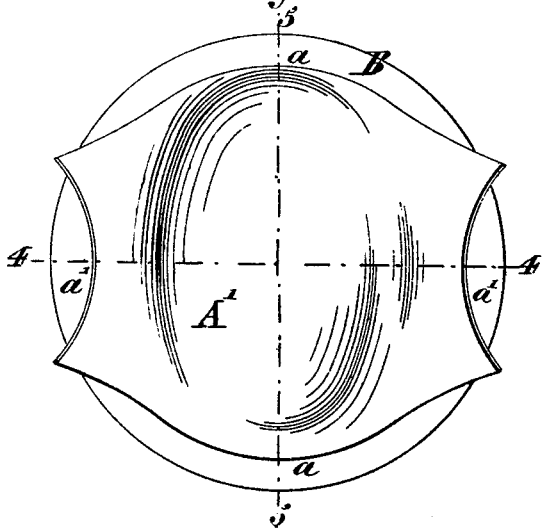


Fig. 4.

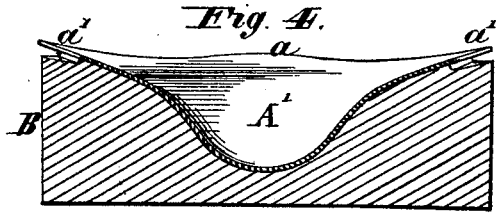
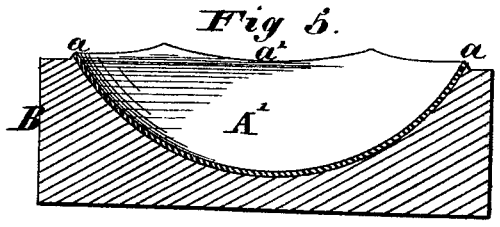


Fig. 5.



WITNESSES

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2 Sheets—Sheet 2.

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STOVE-PIPE ELBOWS.

No. 183,926. Patented Oct. 31, 1876.

Fig. 6.

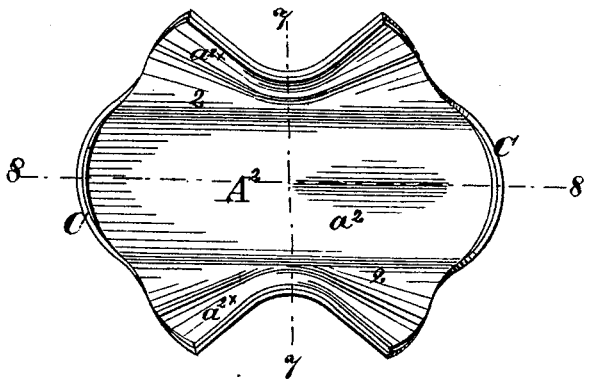


Fig. 8.

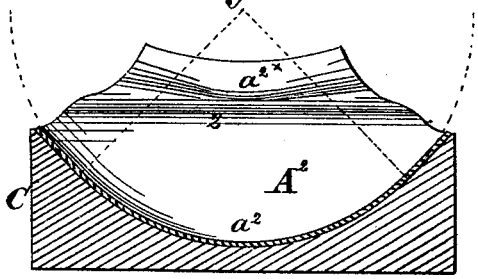


Fig. 7.

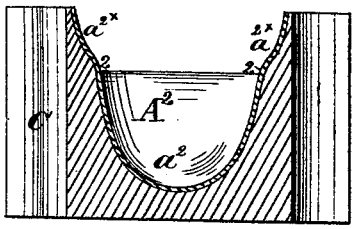


Fig. 9.

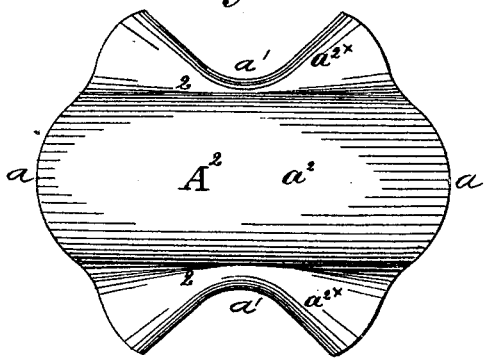
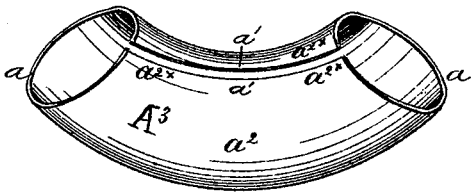


Fig. 10.



WITNESSES

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A. Blatt.

INVENTOR

Frederick Hoeltge

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UNITED STATES PATENT OFFICE.

FREDERICK HOELTGE, OF CINCINNATI, OHIO, ASSIGNOR TO AUGUSTUS HOELTGE, OF SAME PLACE.

IMPROVEMENT IN STOVE-PIPE ELBOWS.

Specification forming part of Letters Patent No. **183,926**, dated October 31, 1876; application filed September 30, 1876.

To all whom it may concern:

Be it known that I, FREDERICK HOELTGE, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Processes and Appliances for Making Stove-Pipe and other Elbows of Sheet Metal; and I hereby declare that the following is a full and exact description of my said invention, reference being had to the accompanying drawings, making part of this specification.

My invention consists, in part, in a process of forming elbows of sheet metal by stamping a blank in successive dies, so as to form a deep elliptical concavity in its central part, and a convexity at each side of the said central concavity, separated therefrom by straight or nearly straight lines, so that by bending the sides of the blank forward on these dividing-lines until their edges meet, the curved sides will become concentric, or nearly so, with the middle of the blank, the latter forming the outer curve of the elbow, while the meeting sides form the inner curve.

The invention further relates to the construction of blanks and dies employed to form elbows, as above set forth.

In the accompanying drawing, Figure 1 is a plan of the blank employed. Fig. 2 is a plan of the die in which the first stamping is performed. Fig. 3 is a plan of the pressed blank in position in the first die. Fig. 4 is a transverse section on the line 4 4, Fig. 3. Fig. 5 is a longitudinal section on the line 5 5, Fig. 3. Fig. 6 is a plan or top view of the die for the second operation. Fig. 7 is a transverse section of the same on the line 7 7, Fig. 6, showing the pressed blank in position. Fig. 8 is a longitudinal section of the same on the line 8 8, Fig. 6. Fig. 9 is a rear view of the pressed blank as it comes from the die shown in Fig. 6, in readiness for bending into an elbow. Fig. 10 is a perspective view of the elbow completely formed and ready for riveting.

A, Fig. 1, represents a blank, which may be cut in the form shown, out of common sheet-iron, or other sheet metal of uniform thickness as it comes from the mill. The said blank has two convex sides, *a a*, which form the ends of the finished elbow, and two concave sides, a^1 a^1, which are brought together at the inner curve of the elbow. B is a die, the form of which is shown in plan in Fig. 2, and in section in Figs. 4 and 5. This die is used in connection with a drop or a drawing press, in either way well known to those skilled in the art of stamping sheet metal. C is a second die, for imparting to the dish-shaped blank A^1, coming from the die B, three parallel concavities. A^2 represents the blank as it comes from the die C, a^2 being the central concavity therein, and $a^{2\times}$ curved sides adapted to be bent into positions concentric with the central concavity a^2, being separated therefrom by straight lines at 2 2. A^3, Fig. 10, represents the elbow completely formed and ready for joining at its edges by riveting or other means.

Operation: The blank A, Fig. 1, is placed over the die B, Fig. 2, and is forced therein by means of a draw-press operated by screw, cam, hydraulic, or other power, in customary manner; or, if the operation is to be performed by a drop-press, the blank is brought to the form shown in Figs. 3, 4, and 5 by successive stampings in dies of graduated depth and shape, on the principle well known to those skilled in the art of stamping sheet metal. The pressed blank A^1 is then stamped by a drawing or drop press, as before, and by means of the die C is brought to the shape shown at A^2 in Figs. 6, 7, 8, and 9. The sides of the blank are then bent on the straight lines 2 2, forward and toward each other, until the edges a^1 a^1 meet and the curves $a^{2\times}$ $a^{2\times}$ become concentric with the central concavity a^2. In applying the elbow thus formed to use, the edges a^1 a^1 are lapped to any necessary extent to give the elbow the required diameter, and they are then joined by riveting or other means. The longitudinal curvature or bowl form of the concavity a^2 adapts it to give the required contour to the outside of the finished elbow, and by reversing the sides of the blank in the manner described the bends $a^{2\times}$ therein are made to produce precisely the required contour of the inner curve.

By my mode of manufacture I produce from common sheet-iron of uniform thickness perfectly-formed elbows, without crimping or transverse cutting, and with the least possible violence to the metal. It is not gathered and stretched again at any point, but receives a moderate stretching at the part which is to form the external bend of the elbow. This stretching is rendered comparatively slight in extent by the peculiar mode of cutting and stamping the blank. The shape of the blank is such as to involve but little waste of metal. That the lateral bends $a^{2\times}$ may be formed with less violence, I prefer to produce in the first stamping operation slight concavities at the sides of the blank where the lateral ridges are subsequently to be formed.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent:

1. The process herein described of forming sheet-metal elbows by stamping in a suitably-formed blank a central concavity and two lateral ridges, and bending the sides forward and toward each other, so that the bends therein will form the inner curve of the elbow, and the central concavity will form the outer curve.

2. The blank A, formed with two convex sides, a a, and two concave sides, a^1 a^1, to adapt it to be stamped and bent into the shape of an elbow, as set forth.

3. The successive dies B C, the former having an oblong or elliptic cavity, and the other a similar or deeper cavity, contracted at the sides by transverse ridges.

4. The final die C, constructed, as shown, with a central longitudinal cavity and transverse ridges, flanked by diagonal depressions, adapted to stamp a sheet-metal blank into the required shape to be bent into elbow form, in the manner explained.

F. HOELTGE.

Witnesses:
OCTAVIUS KNIGHT,
LE BLOND BURDETT.