

HENRY S. HOELLER & CHARLES HOELLER.

Improvement in Sheet-Metal Elbows.

No. 128,146.

Patented June 18, 1872.

Fig.1.

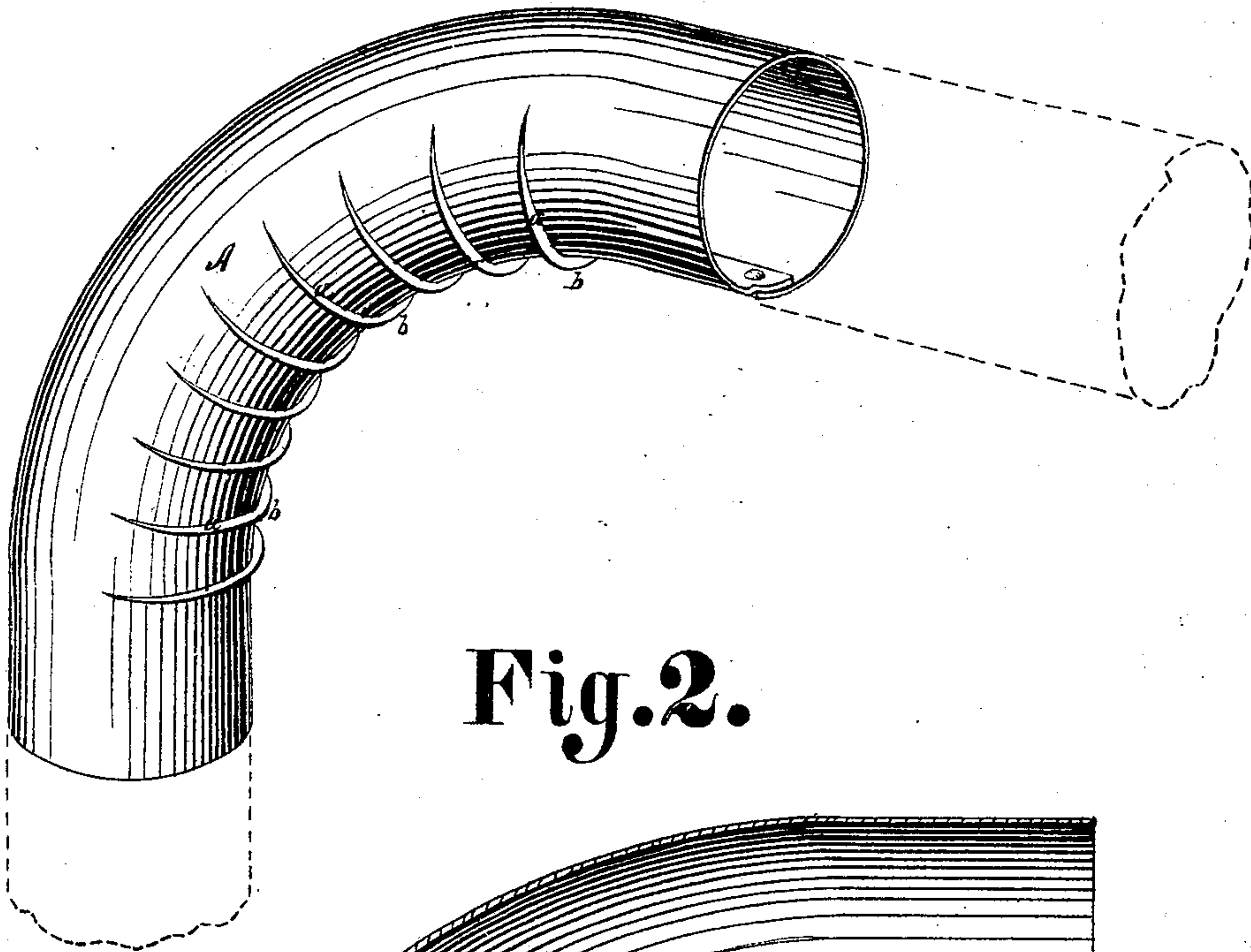
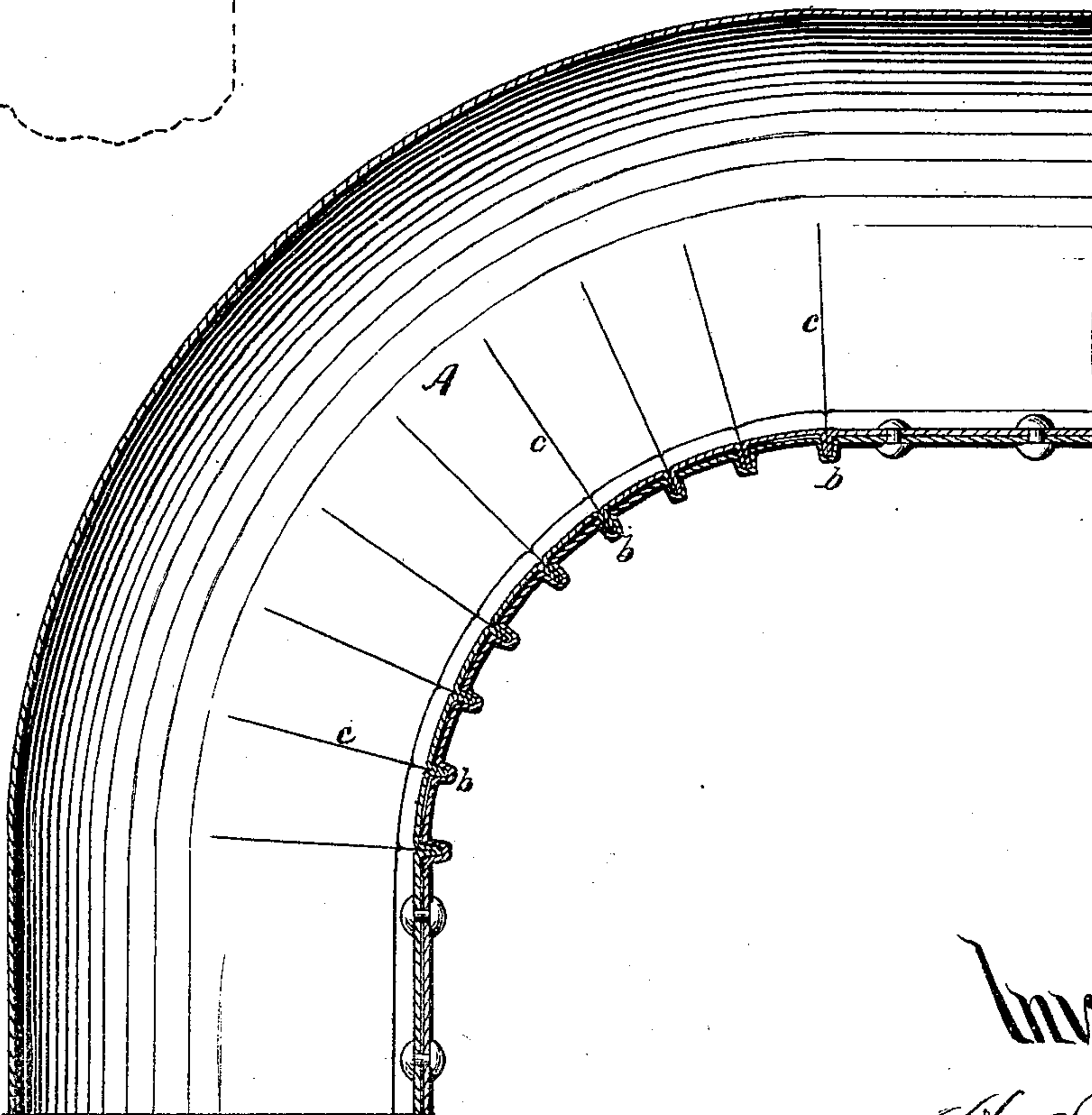


Fig.2.



Inventors.

H. S. Hoeller  
C. Hoeller

Witnesses:

C. L. Fisher  
J. P. Horner

HENRY S. HOELLER & CHARLES HOELLER.

Improvement in Sheet-Metal Elbows.

No. 128,146.

Patented June 18, 1872.

Fig. 2

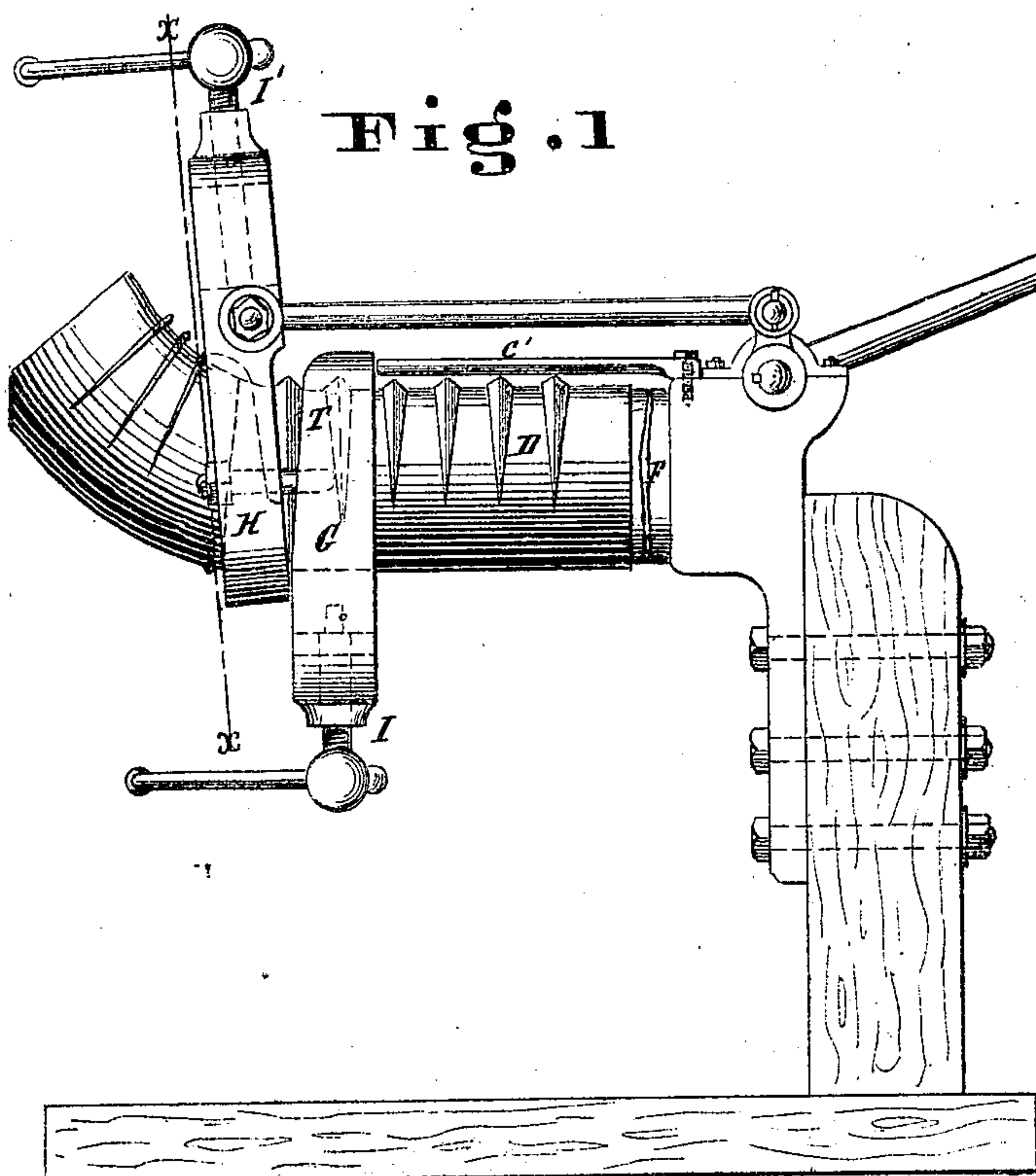


Fig. 1

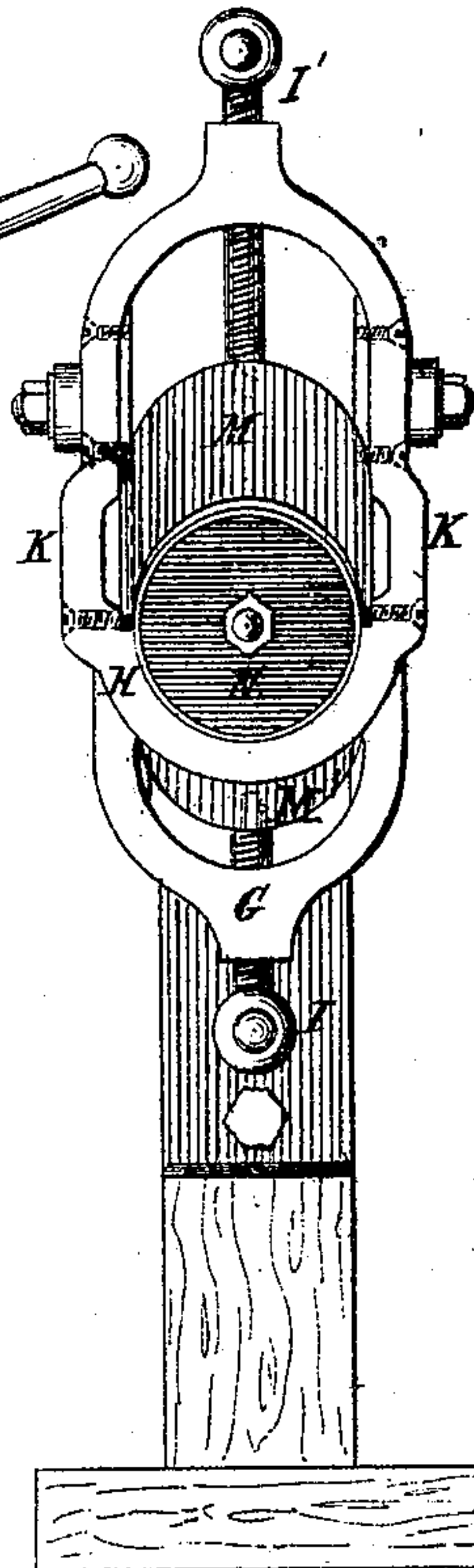


Fig. 4

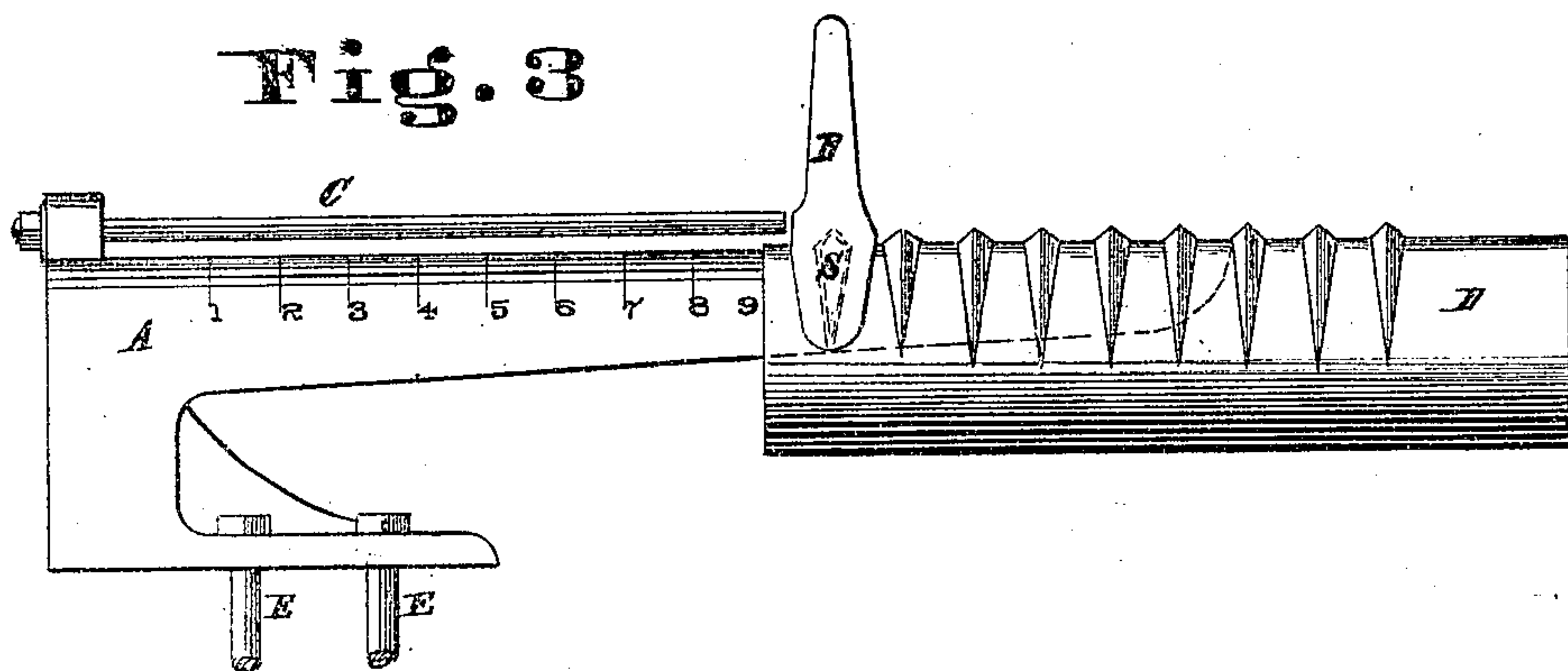
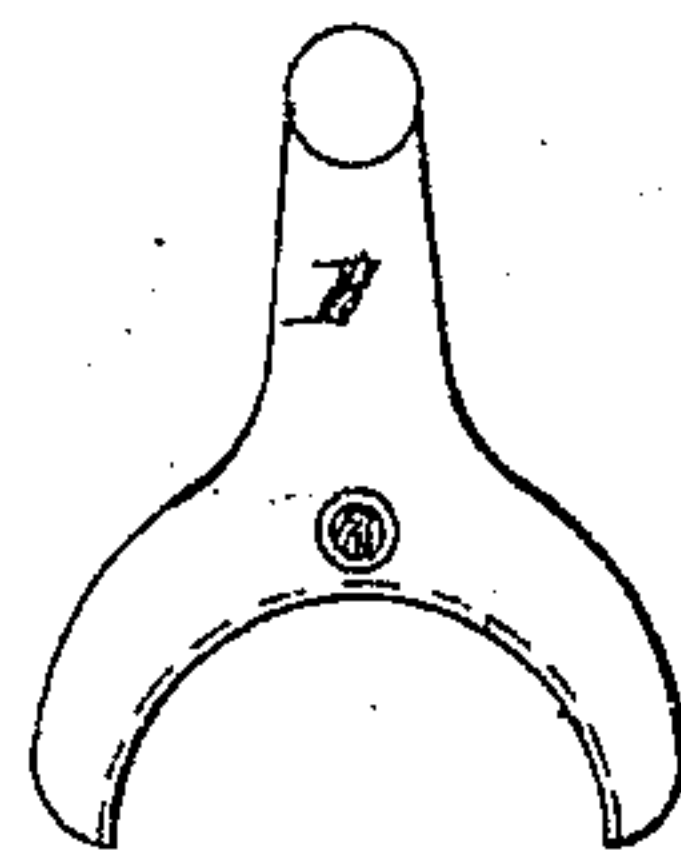


Fig. 3



Attest

*D. S. Morris*  
*M. M. Oliver*

Inventors

*Henry S. Hoeller*  
*Charles Hoeller*



# UNITED STATES PATENT OFFICE.

HENRY S. HOELLER AND CHARLES HOELLER, OF CINCINNATI, OHIO.

## IMPROVEMENT IN SHEET-METAL ELBOWS.

Specification forming part of Letters Patent No. 128,146, dated June 18, 1872.

### SPECIFICATION.

We, HENRY S. HOELLER and CHARLES HOELLER, both of the city of Cincinnati, county of Hamilton, and State of Ohio, have invented an Improved Stove-Pipe and other Elbows, of which the following is a specification:

#### *Nature and Objects of the Invention.*

Our invention consists in the disposition made of the surplus metal produced in bending a straight cylindrical tube into the form of an elbow. In this invention this surplus metal is all thrown outwardly, whereby the interior of the elbow is comparatively smooth, and the surplus of metal, being formed into ribs or folds, serves to greatly strengthen the elbow.

It will be observed that this elbow may be formed of one piece of sheet metal.

#### *Description of the Accompanying Drawing.*

Figure 1, Plate 1, represents a perspective view of our improved elbow. Fig. 2, Plate 1, is a longitudinal section of the same to an enlarged scale. Fig. 1, Plate 2, is a side view of a part of the machinery employed in making our improved elbow, together with a section of pipe being formed into an elbow. Fig. 2, Plate 2, is a section of Fig. 1, Plate 2, taken through the line *x x*. Fig. 3, Plate 2, represents the mechanism employed to start the ribs on the elbow outwardly, together with a section of pipe, showing the ribs in the first stage of formation. Fig. 4, Plate 2, is a round tool, the functions of which will be more fully explained hereafter.

#### *General Description.*

Folded crimps are formed outwardly in the metal of which the pipe or elbow is made, the crimps or folds being preferably equidistant from each other, and of gradually-decreasing projection from the center of the folds to their extremities, where the metal is smooth. As each crimp serves to shorten the line of the pipe on the side of the proposed inner arc and shorten up gradually from this line to the line of the pipe which is to form the outer arc, the pipe is thereby gradually curved to form the elbow. With a given projection of crimp the number of crimps determines the angle of the

elbow, and the closeness of the crimps to each other the shortness of the bend.

We will now describe the manner of manufacturing this improved elbow.

A, Fig. 3, Plate 2, is a mandrel, circular on its upper surface, which is spaced off at suitable and uniform distances, as shown at 1, 2, 3, 4, 5, 6, 7, 8, 9, &c., same figure. B, Figs. 3 and 4, Plate 2, is a round tool, slotted or grooved on its interior face, as shown by dotted lines at S, Fig. 3, Plate 2. C is a rod or bar attached to the mandrel A in the manner clearly shown in the drawing. D is a cylindrical tube of sheet metal to be formed into an elbow. On the mandrel A at S, but not clearly shown in the drawing, though indicated by dotted lines, there is a raised figure of a form to constitute the counterpart of the slot or groove in the round tool B.

As is obvious from the drawing, the first step to be taken in the construction of our improved elbow is to raise corrugations on the tube D, as shown in Fig. 3, Plate 2. This is done as follows: The mandrel A is securely attached, by bolts E E or other suitable means, to some suitable object, so as to make it immovable. The tube D is slipped over the mandrel A, bringing the forward end of the tube to the line 1 on the mandrel. That portion of the tube D that is to form the first corrugation is now over the figure S on the mandrel; and the placing of the tool B over the tube at the end of the guide C brings the slot or groove in the tool B directly over the raised figure at S on the mandrel A, and a vertical blow or pressure on the tool B swages up the first corrugation. The tube is now withdrawn from 1 to 2, and the second corrugation is formed in like manner, and so on until the required number of corrugations shall have been formed on the tube.

The tube is now ready for the second operation—viz., the pinching up of these corrugations into sharp ribs. This is done by means of the machinery and devices shown in Figs. 1 and 2, Plate 2, which we now proceed to describe. F is a cylindrical mandrel, of a diameter equal to, or nearly so, the interior diameter of the tube to be formed over it. At the outer end of this mandrel there is a solid circular block, N, of the same diameter as the mandrel F, and about one and one-half inch thick on



the bottom, and about five-eighths of an inch thick at the top. This circular block is attached to the end of the mandrel F by a bolt and nut, as shown in the drawing, Figs. 1 and 2, Plate 2, the block N being permitted to move freely on the bolt within the range between the nut and the end of the mandrel F. D is the tube undergoing the operation of pinching up the corrugations. G and H, Figs. 1 and 2, Plate 2, are clamps; constructed as plainly shown. On the inner face of the upper end of the clamp G there is a slot or groove corresponding with a corrugation, as shown by dotted lines at T, Fig. 1, Plate 2. M, the inner part of the clamp H, must be thin enough to pass between the corrugations, and, as is seen in the drawing, Fig. 2, Plate 2, is secured to the outer portion of the clamp by means of a tongue and groove and countersunk screws. The inner part of the clamp G (M) is secured in place in the same manner. The clamps are operated by means of the screws I I', as clearly shown in Figs. 1 and 2, Plate 2. It will be observed in Fig. 2, Plate 2, that the sides of the clamps at K are wider apart than the diameter of the tube to be formed into an elbow. The purpose of this is to permit the tube to be freely moved through the clamp during the operation of successively pinching up the corrugation.

The operation is as follows: The tube (corrugated as described) is slipped over the mandrel F, and the clamp G adjusted over the corrugation next to the outer one against the guide C', so as to bring the slot or groove in the upper inner face of this clamp directly over said corrugation, and in this position the tube and mandrel are tightly clamped together by turning the screw I. The clamp H is now accurately adjusted on the tube at the outer edge of the first or outer corrugation, and when so adjusted the tube and block N are tightly clamped together by turning the screw I'. (The clamp H just embraces the block N.) The outer corrugation is now embraced between the clamps G and H, and by a downward force applied to the lever L the upper part of the clamp H is drawn toward the clamp G, and pinches up the corrugation between these clamps into a sharp rib. The clamps are now released by reversing the screws I I', the tube withdrawn from the mandrel F a distance equal to the distance between the corrugations from center to center, the

clamps readjusted, tightened, and the second corrugation is pinched up in the same manner as the first. This operation is repeated until all the corrugations are pinched up into sharp ribs, and the elbow formed, as shown in Fig. 1, Plate 1.

We desire to call attention to the fact that in the drawing the corrugations in the tube as it comes from the mandrel A are more prominent than they are in fact made at this stage of the operation of making our improved elbow. Only a slightly-raised corrugation is necessary to the end in view. In the drawing these corrugations are exaggerated, the more clearly to show the manner of making our improved elbow.

Since the invention by us of the improved elbow hereinbefore described, the above-named CHARLES HOELLER has invented an improved mechanism for manufacturing our improved elbows, and Letters Patent of the United States have been granted him therefor, numbered 113,167, and bearing date the 28th day of March, 1871.

We are aware that Letters Patent of the United States were granted to Frederick Bashert, dated February 13, 1866, the specification accompanying which describes an elbow swaged into the circular form by throwing the surplus of metal on the line of shortest curvature outward, in the form of recesses; hence we do not intend to claim an elbow so constructed. Our invention is upon a different principle. That of Bashert consists in avoiding crimps, while an important feature of ours consists in the increased strength, and the avoidance of soot-traps attained by their use.

#### *Claims.*

We claim as our invention—

1. An elbow made of sheet metal having the surplus of metal thrown into exterior crimps, substantially as shown and described.

2. A round or circular elbow made of one piece of sheet metal, when the curvature of the same is produced by forcing the surplus metal outwardly on the inner arc of the elbow, substantially as described.

H. S. HOELLER.

CHARLES HOELLER.

Witnesses:

M. W. OLIVER,  
S. S. MORRIS.