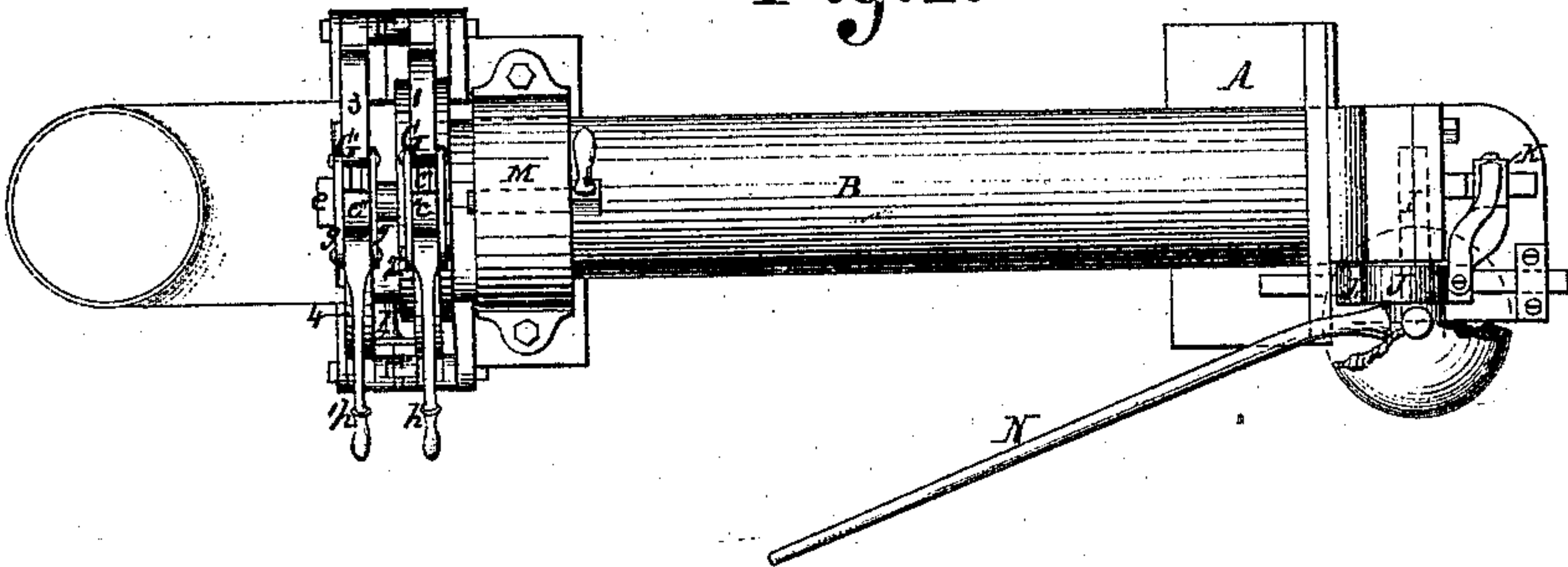


*C. Hoeller,*  
*Bending Mach.*

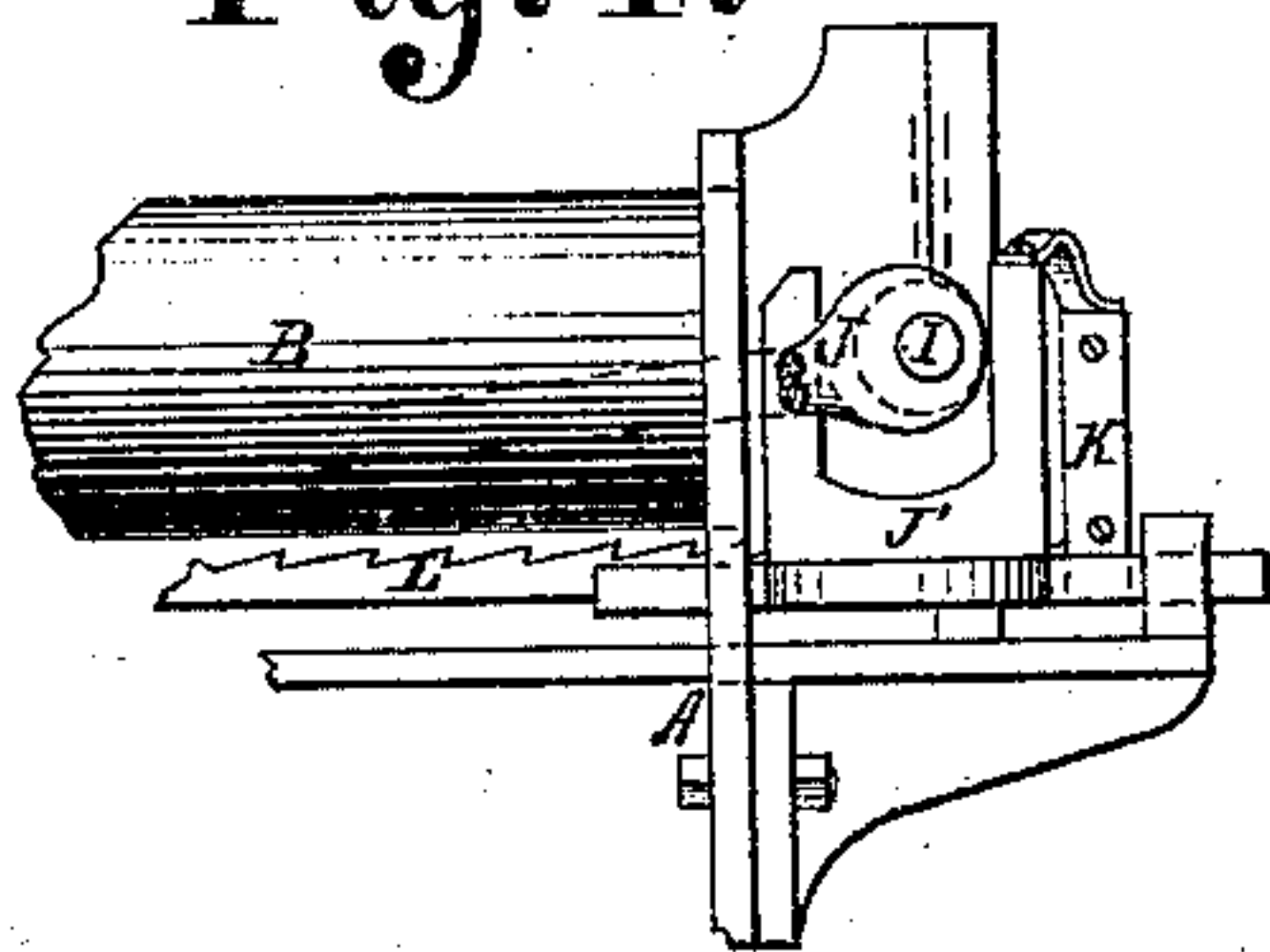
*No. 113,107.*

*Patented Mar. 26. 1871.*

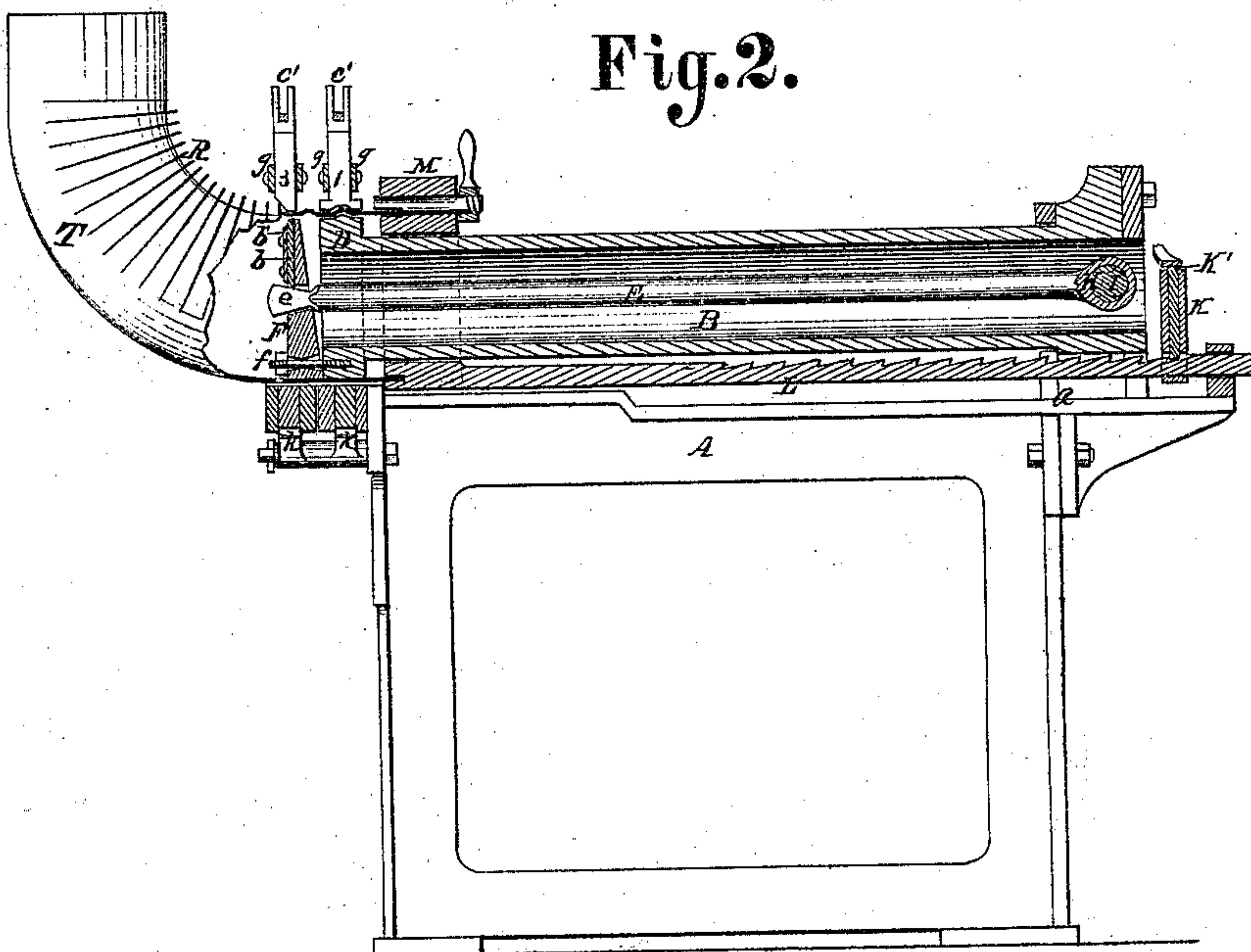
**Fig.1.**



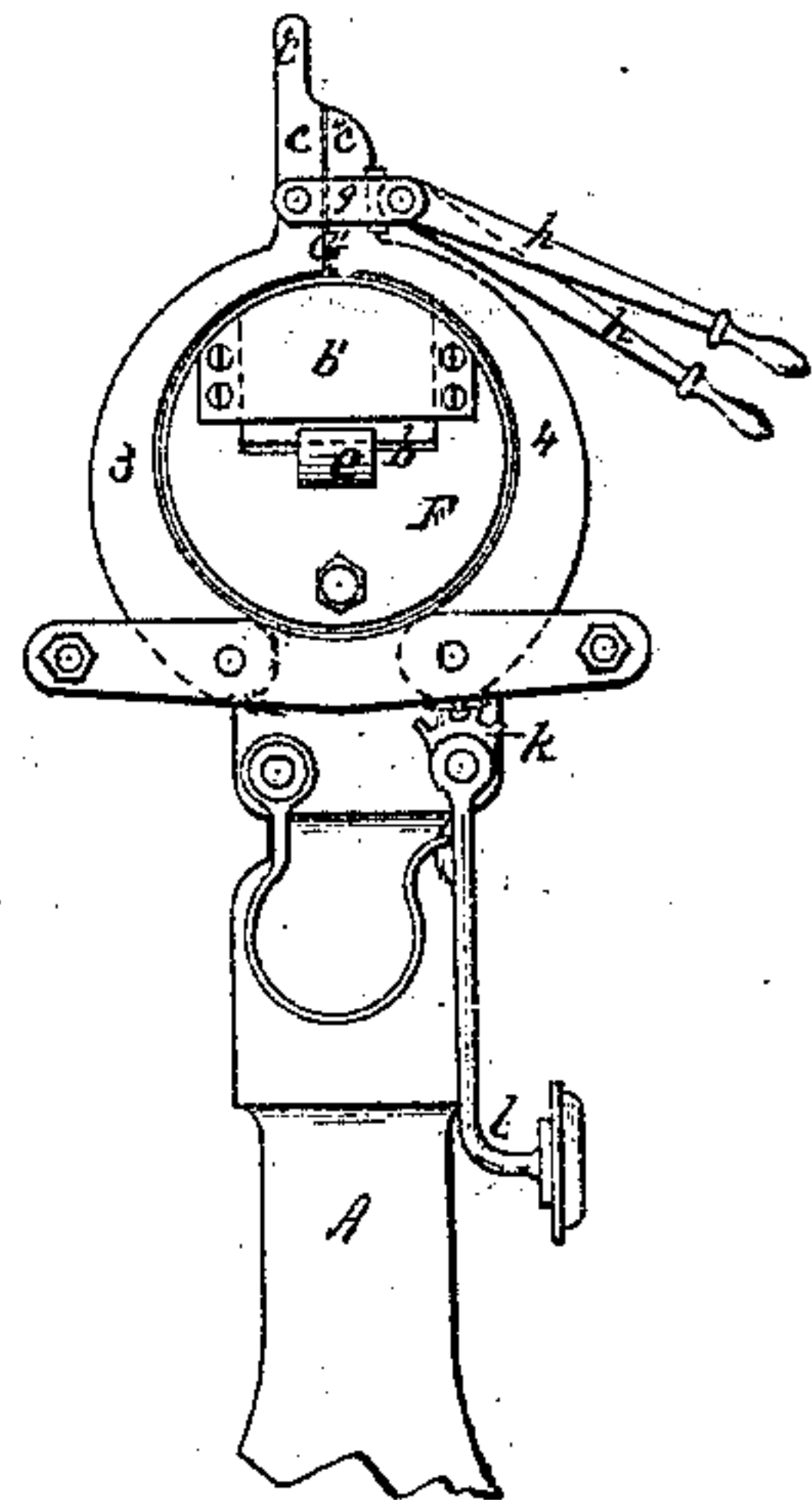
**Fig.4.**



**Fig.2.**



**Fig.3.**



*Witnesses:*

*C. L. Fisher*  
*Chas. W. Cole*

*Inventor.*

*Charles Hoeller*



# UNITED STATES PATENT OFFICE.

CHARLES HOELLER, OF CINCINNATI, OHIO, ASSIGNOR TO HIMSELF AND  
HENRY S. HOELLER, OF SAME PLACE.

## IMPROVEMENT IN MACHINES FOR FORMING PIPE-ELBOWS.

Specification forming part of Letters Patent No. **113,167**, dated March 28, 1871.

*To all whom it may concern:*

Be it known that I, CHARLES HOELLER, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a certain Improved Machine for Forming Elbows for Stove and other Pipes, of which the following is a specification:

The first part of my invention relates to an open cylinder secured at one end to the frame of the machine, and having pivoted or hinged to its free end a circular compressor, so constructed and operated in combination with concentric clamps that the straight tube of sheet metal, when secured in place between the cylinder-head, circular compressor, and their respective concentric clamps, will be folded in the form of a rib, outwardly, the object of this part of the invention being to curve the straight tube by folding the metal upon one side only.

The second part of my invention relates to the device for feeding out the tube of sheet metal to form the elbow. It consists in a cylindrical collar, which is moved freely upon the outside of the open cylinder by the attached ratchet-bar, to which motion is imparted at stated intervals by the operation of an eccentric connected with a pawl or plunger engaging the ratchet-bar.

Figure 1 is a plan of my improved machine for forming elbows. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is an end elevation of the forming end of the machine. Fig. 4 is a side elevation of the rear end of the machine.

A is the frame of the machine, to the rear end *a* of which is firmly secured the open cylinder B. The cylinder is isolated throughout its entire length. Its free end is enlarged, forming the cylinder-head D, which is enlarged up in the shape of a semi-ellipse in the center and top, and gradually vanishing before completing the circle.

The piston E, located in the open cylinder, has one end wedge-shaped, *e*. The faces thereof flare outwardly. This wedge-shaped end *e* is located in the central opening in the circular compressor F, which is hinged or pivoted by bolt *f*, at its lower edge, to the end of the cylinder-head D.

A steel plate, *b*, is let into a recess in the compressor F, to which it is confined by the cover-plate *b'*. The pressure-plate *b* is made of steel. It rests upon the top of the wedge-shaped end of the piston.

G is the concentric clamp, constructed in two parts, which surrounds the cylinder-head D. Its interior surface is recessed to correspond with the raised central part of the face of the head D.

One of the clamps, 1, is pivoted, beneath the head D, to the frame A. Its other end terminates in an arm, *c*, extending outwardly, and bifurcated at *c'*. The clamp 2 is also recessed on its interior surface, while the free end terminates in a shorter arm, *c''*, and is rounded off on its outer face. Links *g* are pivoted to the clamp 1, below the bifurcation, and to the ends of the lever *h*. The lower end of the clamp 2 is pivoted to an independent arm, and is provided with a toothed surface, which engages the pinion *k*, attached to and operated by the presser-bar *l*.

G' is the clamp concentric to the circular compressor F, and differs from the clamp G in one respect—the inner surfaces of its two parts, 3 and 4, are without the groove, quite narrow, and the side is beveled off outwardly.

One end of the piston E is connected with the eccentric H on the shaft I, which is journaled in the rear end of the machine. An eccentric, J, also secured to the shaft I, is located in the sliding box J'. This box is attached to the plunger-guide K, within which is located the freely-moving plunger K', with its lower end in contact with the teeth of the ratchet-bar L, which is secured to the cylindrical collar M.

In the front end of the freely-moving collar M is a circular groove for the reception of one end of the tube for forming the elbow.

N is the lever, attached to the shaft I, by means of which the eccentrics are rotated.

A sheet of metal of the requisite dimensions having been rolled in the form of a cylinder is passed over the cylinder-head D and circular compressor F, and its end inserted in the groove in the face of the movable collar M, to which it is fastened by a small eccentric-lever. The tube, with the collar M, is then pushed



back so far that but three or six inches of the other end extends outwardly from the compressor F.

The clamp G is closed up on the tube by means of the eccentric-lever *h*, whereby an elevation of the metal is induced between the faces of the cylinder-head and clamp, the former having an elevation and the latter a corresponding groove in their surfaces. Opening clamp G and lowering lever N, the collar M, with the attached tube, moves forward a distance due to the length of ratchet-teeth on the bar L, which places the elevation which forms a semicircle about the tube exactly between the compressor F and head D. Both clamps, G and G', are closed upon the tube, firmly locking the tube upon the head D and compressor F, which are hinged together on the lower side, and stand apart on the upper side a distance equal to twice the depth of the rib to be formed. The lever N is then moved upwardly, turning the eccentric connected with the piston E, thereby drawing together the compressor F, with its locked clamp G', and the head D, with clamp G, in consequence of which the already-corrugated metal will be folded outward, and, being compressed with great force, forms a sharply-defined rib, R, which projects from the surface of least curvature of the elbow T. This operation is repeated as often as necessary for the production of a complete elbow.

An important feature of my invention is the provision of the bead and groove in the head D and clamp G, respectively, the head having

a projection gradually decreasing on each side from the top to points near the bottom of head D, and the groove in the clamp corresponding in shape. This device gives a preliminary crimp or corrugation to the metal, which enables it to bend easily and correctly in the formation of the final crimp between the compressor F and head D.

I claim as my invention—

1. The cylinder-head D, compressor F, and clamps G G', combined, constructed, and operating substantially in the manner herein shown and described.

2. The combination of cylinder B D, sliding collar M, and mechanism for feeding the sliding collar by successive steps, substantially as and for the purpose specified.

3. The clamp G, hinged compressor F, and piston E, when constructed and operating substantially in the manner and for the purpose described.

4. The combination and arrangement of the open cylinder B, head D, compressor F, clamps G G', collar M, piston E, and pinions K, with their appurtenances, operating substantially as and for the purpose set forth.

5. The provision, in the head D and clamp G, of a bead and groove, substantially as shown, or equivalent crimping device, as and for the purpose specified.

CHARLES HOELLER.

Witnesses:

C. L. FISHER,  
CHAS. W. COLE.