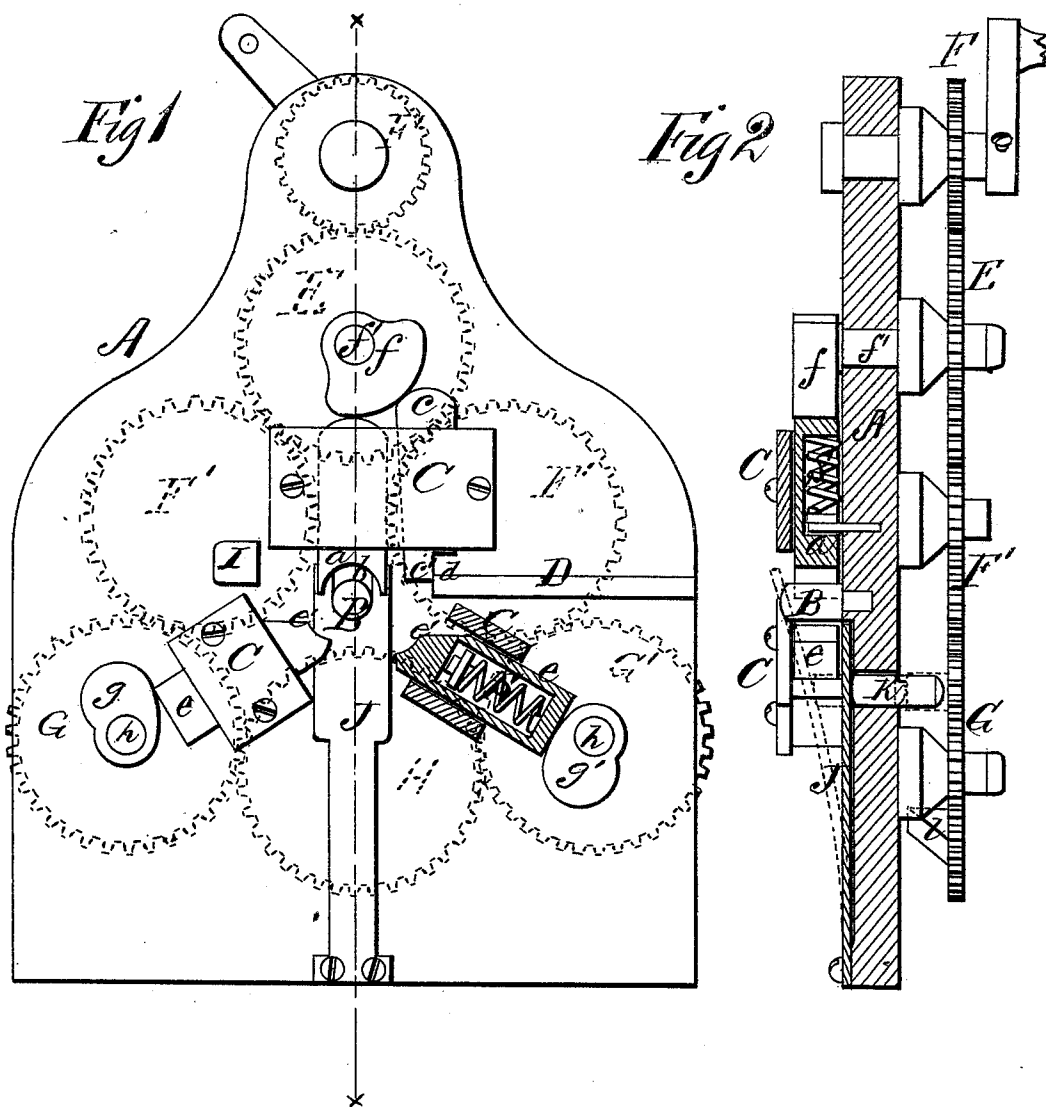


G. LITCHFIELD, Jr.

MACHINE FOR BENDING RINGS AND TUBE COUPLINGS.

No. 175,120.

Patented March 21, 1876.



WITNESSES

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GEORGE LITCHFIELD, JR., OF McKEESPORT, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR BENDING RINGS AND TUBE-COUPPLINGS.

Specification forming part of Letters Patent No. **175,120**, dated March 21, 1876; application filed July 3, 1875.

To all whom it may concern :

Be it known that I, GEORGE LITCHFIELD, Jr., of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and valuable Improvement in Iron-Bending Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawing, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a front view of my bending-machine, with sectional detail; and Fig. 2 is a vertical sectional view of the same.

This invention has relation to improvements in machines which are designed for bending iron or other metals into rings; couplings for gas, steam, or oil pipes, and the like; and the nature of the invention consists in the combination and arrangement of the parts, as will be hereinafter more fully set forth and pointed out in the claim.

In the annexed drawings, A designates the upright frame of my improved bending machine, which is preferably of iron, and is provided with a mandrel, B, projecting out horizontally therefrom. This mandrel is of cylindrical form, and is designed to be detachable from the said frame. C represents strong metallic guide-boxes, arranged one in a horizontal position over the mandrel and the other two below the same, at each side thereof, and in an inclined position. In one end of the guide-box C, above the mandrel, is arranged a forming-die, *a*, having a semicircular recess, *b*, in its lower end, and this die has by its side, in the other end of the said box, a cutting-bit, *c*, the cutting-edge *c'* of which is adapted to be thrown by the reciprocation of the bit below the cutting-edge *d* of a horizontal feed-table, D, rigidly secured to the frame at one side of the mandrel, as shown in Fig. 1.

The lower guide-boxes C each contain a bender, *e*, the operative end of which is beveled and concaved, as shown at *e'*, the concavities of benders *e* and forming die *a* being sufficient to embrace the mandrel. Die *a* and cutting-bit *c* are actuated by a segmental cam, *f*, applied upon the shaft *f'* of a gear-wheel, E,

interlocking with the main operating wheel F above it and with two communicating wheels F' below, which latter also interlock with actuating-wheels G G', by means of which motion is communicated to wheel H, arranged between gears G G', for a purpose hereinafter explained. *g g'* represent cams of the usual well-known form, which are eccentrically keyed upon the ends of the shafts *h* of gear-wheels G G', that while the one is in full engagement with one of the bender-rods *e*, the other cam, with the other bender-rod, shall be in its incipency—in other words, that the actuation of the said rods shall be in succession.

The operation of my improved machine is as follows: The iron to be formed into a ring or coupling is thrust on feed-table D, against a stop, I, in which position the bar will be between the mandrel and the upper bender-rod *a*. Motion is then given to main actuating-wheel F; thereby communicating motion to the entire train of gears above described, and consequently to the cams. The curved surface of the upper cam will be brought forcibly against the upper end of cutting-bit *c*, causing its edge to cut the bar of metal through; the upper cam, continuing its movement, will then cause the bender *a* to press the metal over the mandrel, forming by this means one half of the ring. Bender *a* will rigidly hold the partly-formed annulus on the mandrel until, by the successive action of cams *g g'* on the lower benders *e e*, the remaining portion of the annulus is shaped out. As each bender-rod is released by the rotation of its cams, it will spring outward from the mandrel under the reactive influence of a spring, S, recessed into the said benders, which had been compressed by their forward movement. The moment the bender-rods are retracted the ring is thrown off the mandrel by means of a spring-stripper, J, the upper bifurcated end of which straddles the mandrel. This stripper is actuated by means of an endwise movable rod, K, passing through the frame with one end abutting against the said stripper, and a cam, *l*, rigidly secured to the gear-wheel H, in a position such that at each revolution thereof the cam shall thrust the rod against the stripper, with the result above described.

What I claim as new, and desire to secure by Letters Patent, is—

In an iron-bending machine, the feed-table D, having the cutting edge *d*, cutter-bit *c*, spring-former *a*, and spring-benders *e e*, in combination with the spring-stripper J and the operating mechanism, substantially as described.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

GEORGE LITCHFIELD, JR.

Witnesses:

R. C. FERGUESON,

M. I. DONOVAN.