

W. T. FARRE.  
Machines for Bending Tubing.

No. 144,449.

Patented Nov. 11, 1873.

Fig 1.

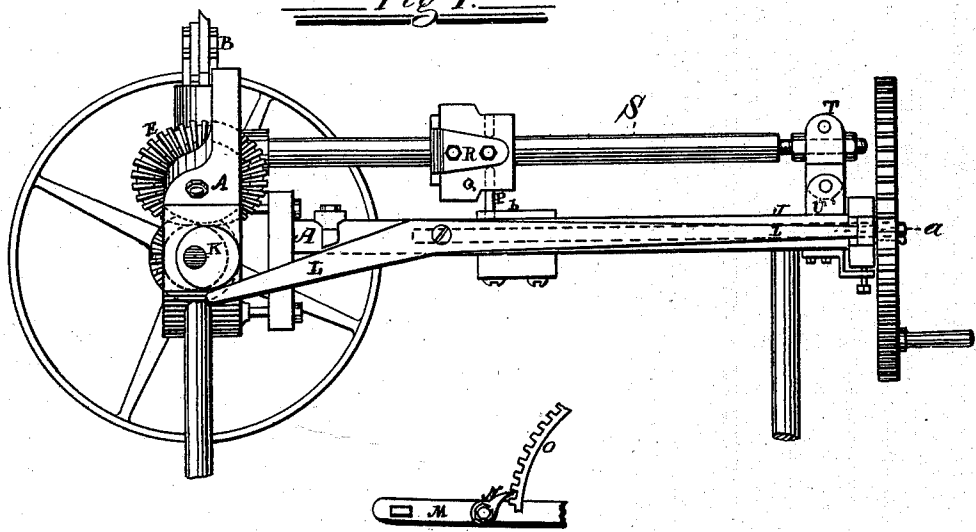
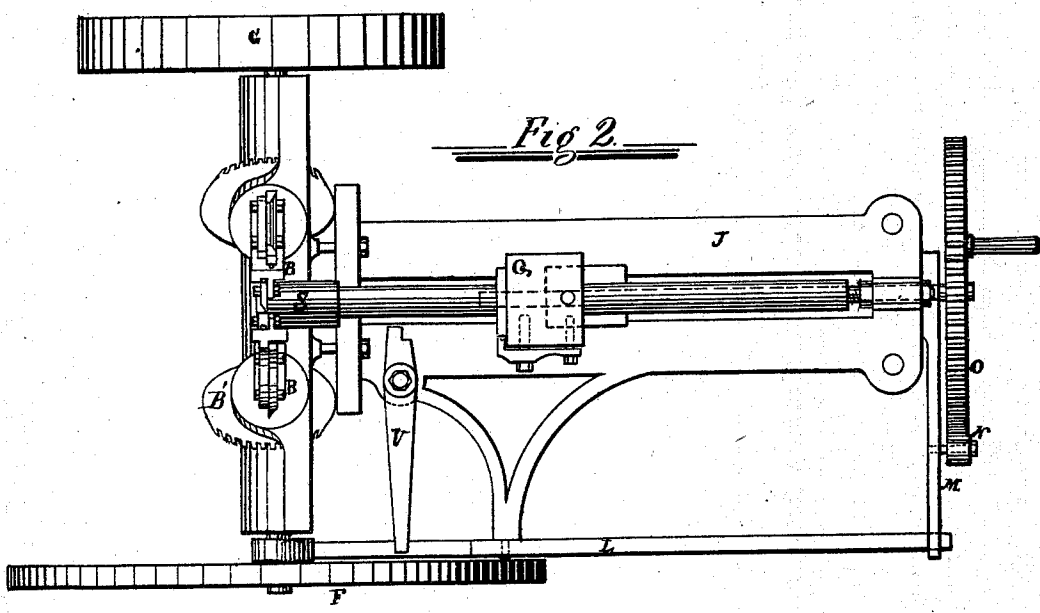


Fig 2.



Witnesses.

John M. Reid  
B. B. Clark

Inventor.

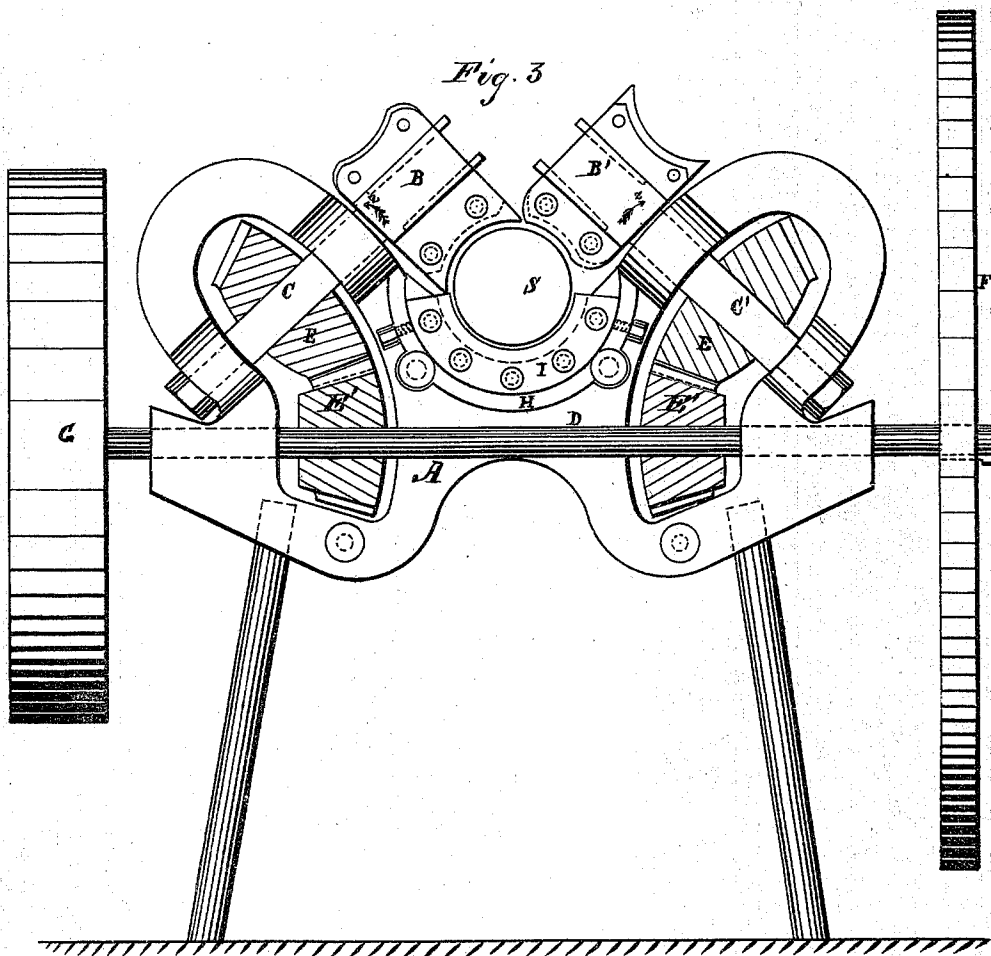
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# UNITED STATES PATENT OFFICE.

WILLIAM T. FARRE, OF MONTREAL, CANADA.

## IMPROVEMENT IN MACHINES FOR BENDING TUBING.

Specification forming part of Letters Patent No. **144,449**, dated November 11, 1873; application filed June 30, 1873.

### *To all whom it may concern:*

Be it known that I, WILLIAM T. FARRE, of the city of Montreal, District of Montreal, Province of Quebec, Dominion of Canada, have invented an Improvement in a Machine for Bending Tubing, of which the following is a specification, reference being had to the accompanying drawings forming part thereof.

On the 3d day of December, 1872, Letters Patent of the United States were issued to me, numbered 133,636, for a machine for making curved tubes of soft metal. This present invention is an improvement upon the machine described in the schedule attached to that patent. The general design of the machine, the form of the soft-metal tube to be acted upon and bent or curved, and the result produced by the machine, are particularly described and shown in the schedule above referred to, and the drawings accompanying the same, to which reference is here made. In the machine there described, two dies only are employed—one stationary die, and the other a double-faced revolving die, the two faces supplementing the lower stationary die, to form together a circle, which entirely embraces the tube operated upon. But a difficulty sometimes occurs in the use of a single revolving die, which increases with the size of the pipe to be operated upon. The outer limbs or segments of a single die necessarily strike the tube before the center does, the motion and the range of contact along the surface of the tube increasing in proportion to the distance from the center. The sides of the tubes are thus subjected to undue strain or drawing. My present improvement consists in the combination of two revolving dies that revolve on different axes at right angles to each other, the face of each die being about one-half of that of the single die shown in the patent above referred to.

Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a plan, and Fig. 3 an end elevation, of the same.

A is the frame of the machine, upon which the working parts are mounted. B B' are two revolving double-faced dies, mounted and operating on separate shafts C C'. They receive motion from the shaft D through the beveled gears E E'. The shaft D has a fly-wheel, F, to equalize its motion, and may be driven by

a belt acting on the pulley G. The dies should be made to revolve in the direction of the arrows. In the casting or semicircular bed H is fixed the lower die I, the working face of which is formed as described in my former patent, above referred to. Lying in this die is seen the end of the mandrel S, on which the pipe is supported to be operated upon. This lower die has a length of only about three-sevenths of the center circumference of the pipe to be operated upon; B B', the revolving concave dies or beaters, each having two faces, constituting it, in effect, two dies, opposite each other on the die-shaft. The faces of the two dies on each shaft differ a little in the length of the limb which strikes the top side of the tube, but so arranged that the larger die on one shaft strikes the pipe simultaneously with the shorter die on the other shaft. They thus supplement each other and work slightly across each other's path, thus preventing the raising of a fin on the tube between the ends of the two sets of dies. The lower ends or limbs of the lower faces of the revolving dies just meet the upper ends of the lower dies. The dies, in action, operate upon about four-sevenths of the circumference of the pipe, and thus supplement the lower die in completing the circle. The dies are inclined, as described in my former patent, before referred to, thereby producing a drawing and burnishing action on the lead casting. On the frame A is fastened, as shown in Fig. 1, the bed-plate J for the feed-motion. This plate is provided with a left-threaded feed-screw, a, working the slide b. The feed-screw receives its motion from the eccentric K' by means of the lever L, pawl-carrier M, pawl N, and ratchet-wheel O. The slide b transfers its motion to the tube to be milled by means of the pin P and the feed-block Q, which latter is provided with a clamp, R, for holding the tube securely. The feed-block Q slides on the mandrel-stem. The mandrel S is supported in a post hinged to lugs attached to T, the bed-plate. The mandrel-stem is provided on the end with screw-threads and two nuts to regulate the length to a nicety. When the slide b is fed up toward the dies, and is nearing the mandrel-head, it will, with its left corner, push the end of the lever V before it. This lever V is pivoted on a screw in

the bed-plate, and, whenever the slide pushes its one end forward, the opposite end is ascending the incline on the lever L, and gradually cutting off the feed by withholding the lever from the eccentric K. The feed is intermittent, feeding only when the dies are not working.

The lead pipe is put on and worked as described in the former patent.

It is evident that, by this combination of two sets of revolving dies, instead of the set on a single shaft, several advantages are secured, the principal of which are, that, each die extending around only a little more than one-fourth of the circumference of the tube, the long scraping action of the outer ends of the single semicircular dies, described in my former patent, is avoided; and, also, that more than one-half of the circumference of the tube

may be subjected to the bending and drawing action of the revolving dies.

A more particular description of the manner in which this machine operates to form a curved pipe will be found in my former patent, above referred to, and upon which the invention here intended to be claimed is an improvement; and it is not deemed necessary here to report such description.

I claim as my invention—

In a machine for making curved tubes of soft metal, the combination of the two sets of revolving dies B B', constructed and operating substantially as and for the purpose specified.

W. T. FARRE.

Witnesses:

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BEN. S. CLARK.