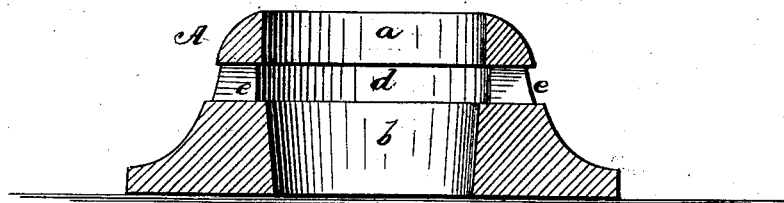
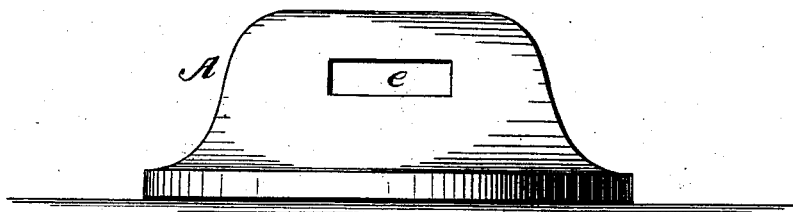


M. L. RITCHIE.  
Dies for Welding and Reducing Tubes.  
No. 221,101.      Patented Oct. 28, 1879.

*Fig. 1.*



*Fig. 2.*



WITNESSES  
*Robert Everett*  
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# UNITED STATES PATENT OFFICE.

MATTHEW L. RITCHIE, OF NEW YORK, N. Y.

## IMPROVEMENT IN DIES FOR WELDING AND REDUCING TUBES.

Specification forming part of Letters Patent No. **221,101**, dated October 28, 1879; application filed June 21, 1879.

*To all whom it may concern:*

Be it known that I, MATTHEW L. RITCHIE, of New York, in the county of New York and State of New York, have invented a new and valuable Improvement in Dies for Welding and Reducing Tubes; 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 drawings, 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 vertical section of my device, and Fig. 2 is a side-elevation view of the same.

My invention relates to an improvement in dies for cleaning, welding, and reducing tubes of all kinds, and is particularly adapted for reworking old boiler-tubes.

The usual means heretofore employed to accomplish this work are a single parallel die or a single tapering die. The parallel die is found to remove too much metal, while the tapering die compresses into the metal itself the scales, which should be removed.

My invention consists in combining in one die a parallel die of sufficient size to remove all the scales and a tapering or other die to compress or reduce the tube, as will be hereinafter more fully set forth.

The annexed drawings, to which reference is made, fully illustrate my invention.

A represents the combined die, having at the outer end the bore *a*, made cylindrical or with parallel walls, while at the inner end the bore *b* is made tapering, as shown, or may be of any form that will reduce the tube.

The outer bore or die, *a*, should always be parallel, and of a size sufficient to remove the scales, and the inner bore or die, *b*, of such size and form as to compress or reduce the tube to the desired degree.

Between the two bores or dies *a b* may be a groove, *d*, with one or more openings, *e*, as shown, said groove and openings being of sufficient size and form to receive and discharge any scales that might possibly accumulate between the two dies.

The entire die may be either in one piece or in sections.

The tube is drawn through the bore *a*, which removes the rough outside without compressing, and then, passing through the bore *b*, is compressed or reduced and welded.

I am aware that a device for finishing the surface of tubes, &c., consisting of a series of adjustable scraping-dies combined with an annular burnisher, has been used, and I do not lay claim thereto.

I claim—

The die *A*, formed with the parallel die or bore *a* and tapering die or bore *b*, with intermediate groove *d*, having one or more openings, *e*, substantially as and for the purposes herein set forth.

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

MATTHEW L. RITCHIE.

Witnesses:

SAML. CAMPBELL,  
J. LANGAN.