H. R. BENWELL.

DEVICE FOR FINISHING METALLIC TUBING.

No. 170,806. Patented Dec. 7, 1875.

Fig: 1.

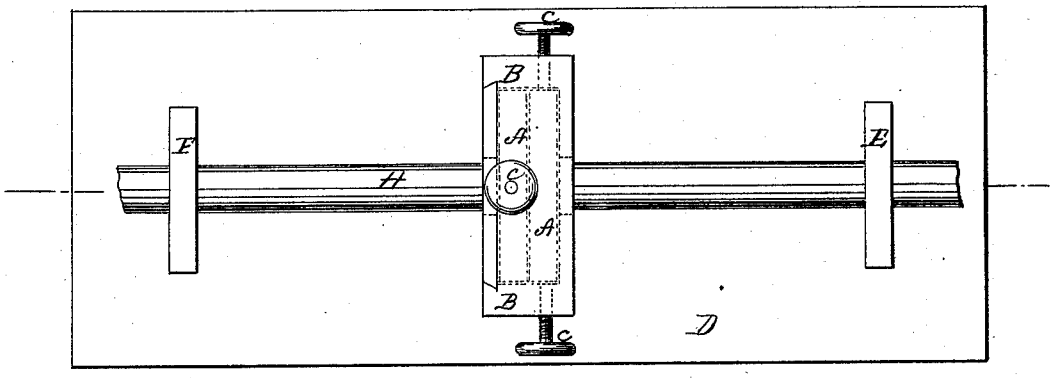

Fig: 2.

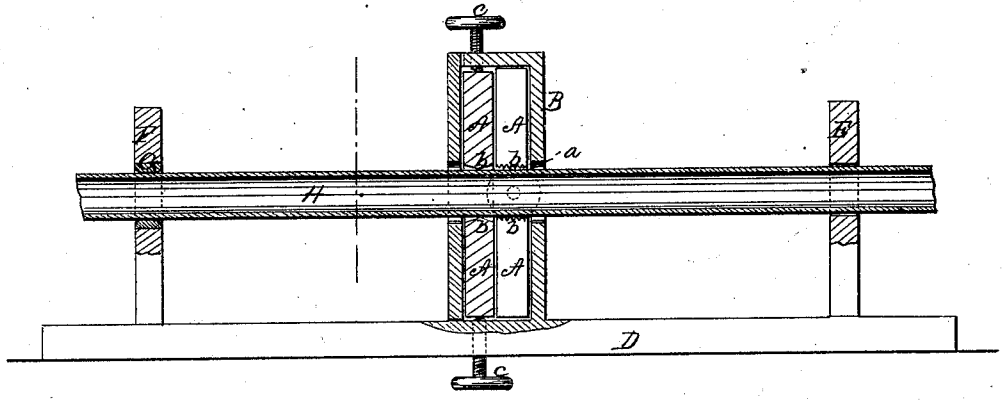

Fig: 4.

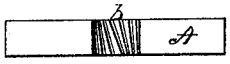

Fig: 3.

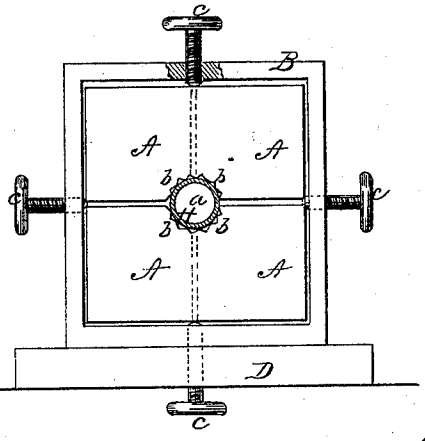

Fig: 5.

Witnesses:

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UNITED STATES PATENT OFFICE.

HENRY R. BENWELL, OF NEW YORK, N. Y.

IMPROVEMENT IN DEVICES FOR FINISHING METALLIC TUBING.

Specification forming part of Letters Patent No. **170,806**, dated December 7, 1875; application filed October 18, 1875.

To all whom it may concern:

Be it known that I, HENRY R. BENWELL, of the city, county, and State of New York, have invented a new and Improved Device for Finishing Tubing, &c.; and that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

This invention is in the nature of an improvement in the process of finishing the surface of tubing, &c.; and the invention consists in a series of dies or cutters, having a series of grooves formed in the inner surface of said dies, concentric with the axis of the orifice which they surround or otherwise; and also an annular burnisher and guide.

The surfaces of tubes, &c., have heretofore been finished by the process of "floating," as it is technically called. This process was the slow one of smoothing the surface of the tube, &c., with files, and afterward burnishing it.

As will be seen, this process is necessarily expensive. By my process, however, the surface of the tubing may be smoothed and burnished without much expense or loss of time, as will be seen from the following description and accompanying sheet of drawings, wherein—

Figure 1 is a plan or top view of my device; Fig. 2, a longitudinal section of same in line *x x*, Fig. 1; Fig. 3, a cross-section in line *y y*, Fig. 2; and Figs. 4 and 5, views of scraping-surfaces of dies.

Similar letters of reference indicate like parts in the several figures.

A represents a series of dies, (four or more,) so constructed that when the full series are placed in position for work an annular opening, *a*, Fig. 3, will be formed, and the interior surface of each of these dies forming this annular opening has a series of grooves, *b*, formed in them. These grooves may be concentric with the axis of the opening, or oblique to it, or of any other desirable form or shape, and the ridges between the grooves are brought to a sharp edge. These dies are fitted within a frame, B, and a series of them are placed behind each other in such manner as to "break joint," and each die is held in place by a set-screw, *c*. The frame containing the dies is secured in any suitable manner to a base, D. Immediately in front of the frame B, and the dies contained therein, is fixed a guide, E, and immediately in the rear of said frame and guide is secured a second frame, F, containing within it a steel annulus, G, the annulus having a burnished interior surface. Now, the tube or bar H that it is designed to finish is placed into and through the guide E, and into the annulus of the dies A, through which annulus it is drawn, and thence through the burnishing-annulus G, which completes the finishing operation. The effect produced is this: As the tube is drawn through the dies A (these dies having been closely set against its surface by the set-screws *c*) they oppose the sharp edges of the threads within the annulus, so that as the tube is forced through these dies the threads scrape its surface, removing it with a uniform motion and depth, and as it passes through these dies, and is forced through the burnishing-annulus G, the smooth and polished interior of the annulus speedily compresses the scraped surface, blending into each other, as it were, all the marks of the scraping-dies, and leaving the surface with a smooth and brilliant polish.

The object in placing the scraping-dies A within the frame B, so that the joints between the several dies will break joints with the joints of the dies next behind them, is to insure the ridges, which would otherwise be formed on the pipe by reason of the several joints, being scraped off or removed by the dies immediately behind such joints.

The surface of the tube to be finished by this process may be at once conducted from the ordinary drawing-bench, through which it is made, to these finishing-dies, and in this way the tube can be drawn and finished by one operation, and materially lessen the cost of its construction and finish. And the scraping-ridges within the dies may, as before stated, be all arranged concentric to the axis of the annulus, or they may be oblique or annular to such axis, or the two kinds of cut-

ting-ridges may be combined in the same frame, as circumstances and experience may determine is best.

I do not, therefore, wish to confine myself to any particular construction of these scrapers or dies; but

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

A device for finishing the surface of tubes, &c., consisting of a series of adjustable scraping-dies, combined with an annular burnisher, substantially as and for the purpose described.

HENRY R. BENWELL.

Witnesses:

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G. M. PLYMPTON.