2 Sheets--Sheet 1.

W. F. BROOKS.

Cores for Tubing.

No. 163,148. Patented May 11, 1875.

Fig. 1.

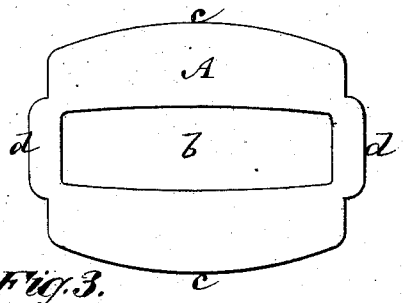


Fig. 2.

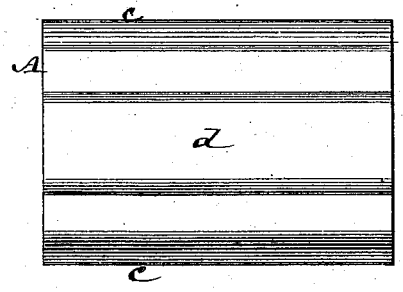


Fig. 3.

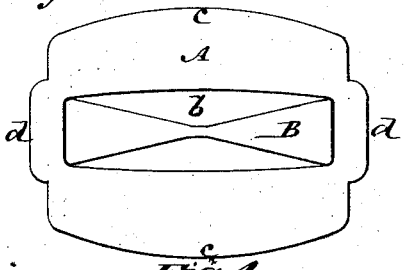
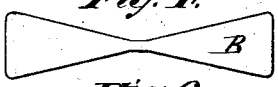


Fig. 4.



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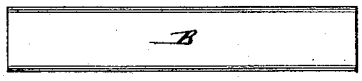


Fig. 6.

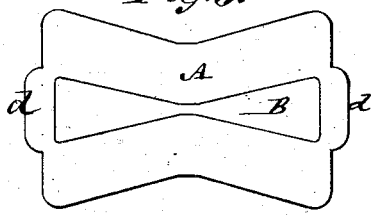


Fig. 7.

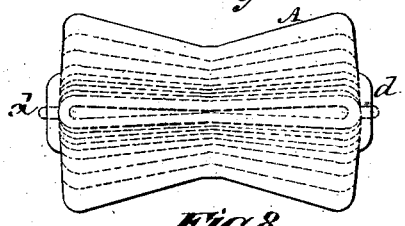


Fig. 8.

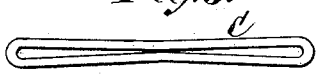


Fig. 9.

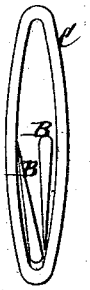


Fig. 10.

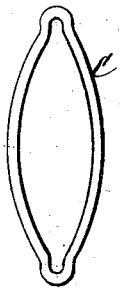
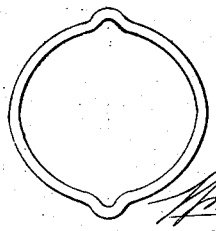


Fig. 11.



Witnesses
John Becker
Fred Haynes

Wm. F. Brooks
by his Attorneys
Brown & Allen

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W. F. BROOKS.

Cores for Tubing.

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Fig. 15.

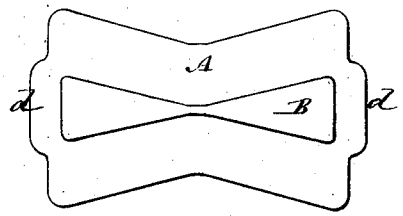


Fig. 16.

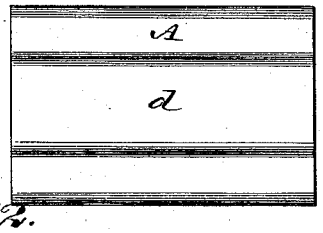


Fig. 12.

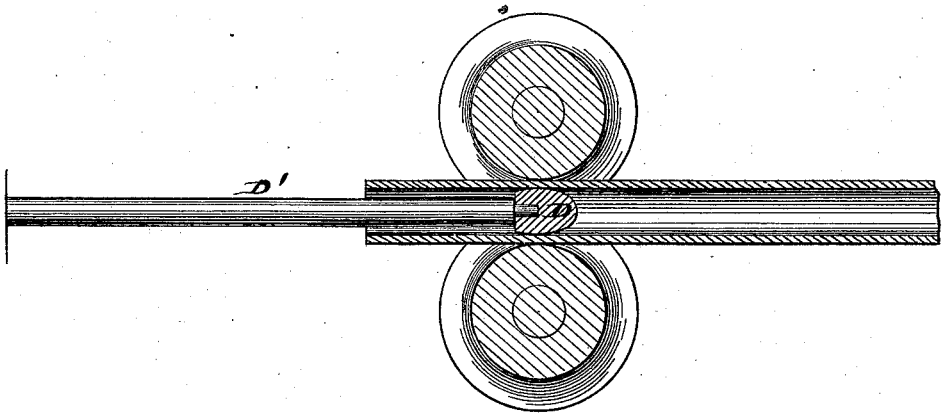


Fig. 13.

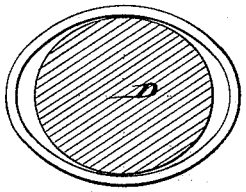
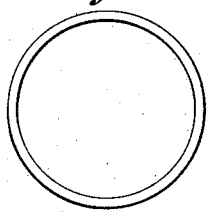


Fig. 14.



Witnesses.
John Becker
Jno. Haynes

Wm F. Brooks
by his Attorneys
Brown & Allen

UNITED STATES PATENT OFFICE.

WILLIAM F. BROOKS, OF NEW YORK, N. Y., ASSIGNOR TO GEORGE J. BROOKS, OF BRATTLEBOROUGH, VERMONT.

IMPROVEMENT IN CORES FOR TUBING.

Specification forming part of Letters Patent No. **163,148**, dated May 11, 1875; application filed December 1, 1874.

To all whom it may concern:

Be it known that I, WILLIAM F. BROOKS, of the city, county, and State of New York, have invented a new and useful Improvement in the Manufacture of Metal Tubing; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification.

This invention relates to the manufacture of seamless tubes from homogeneous iron, steel, yellow metal, copper, and other metals by a process for which Letters Patent No. 146,868 were issued to Elisha P. Wilbur, as assignee of myself, January 27, 1874, and in which the seamless tube is produced from a block having a passage formed through it, and which is afterward shaped and reduced or drawn by external and internal pressure, due in part to the action of the rolls, a metal core being inserted within the block, and the latter being exposed to side and edge rolling preparatory to finally opening and finishing or shaping the tube from the slab produced from the block.

The novel feature of this invention, having reference to said process, consists in a reversely taper or wedge shaped core for use within a block of similar construction, whereby, after the block, with the core in it, shall have been passed through rolls to bring down the shell of the block on the core, or the shell otherwise be made to form a close fit with the core, the exterior of the core and the interior and exterior of the block will be parallel, or nearly so, on all sides, so that the block and core will subsequently roll uniformly and keep their proportionate form irrespective of any particular amount of rolling-draft. This uniform rolling of the block and core experience has demonstrated cannot be so perfectly attained when a flanged or I-shaped core is used within a block to suit. The regular taper of the improved core from reverse ends to its center and corresponding block, also absence of abrupt flanges, admits of the most perfect and easy reduction, in a uniform manner, of the block and core.

Figure 1 represents an end view of a block which may be cast or otherwise produced with a rectangular passage through it, and with its longest sides of a convex shape externally, also with bosses on its shortest opposite sides or edges, and from which block a seamless tube may be made in accordance with this invention. Fig. 2 is an outside edge or side view of the same. Fig. 3 is an end view of said block after being heated, and with a cold core inserted in it. Fig. 4 is an end view, and Fig. 5 an edge view, of the core. Fig. 6 is an end view of the block, with its core, after rolling to bring the shell of the block down on or in close contact with the core; and Fig. 7, an end view of the same after being heated and prepared to roll into a slab, the successive changes, as produced by repeated rollings, being indicated by dotted lines. Fig. 8 is an end view of the slab. Fig. 9 is an end view of the slab slightly opened, by which the core is loosened; and Fig. 10 is a similar view of the slab, but opened still more, and with the core removed. Fig. 11 is a further like view of the same when opened ready to be heated preparatory to a final opening and finishing. Fig. 12 represents a longitudinal section, upon a smaller scale, of the tube formed from the opened slab, and as passing, while hot, between rolls and over a bulb connected with a thrust-rod, and onto it. Fig. 13 represents a cross-section of said bulb (which is slightly oval) with the tube passing over it. Fig. 14 is an end view of the finished tube. Figs. 15 and 16 represent end and side views of a block with its core made ready for rolling into a slab, as hereinafter described, without any preparatory operation of closing the shell of the block on the core.

To make my invention available in the process of manufacturing a seamless-metal tube, I adopt either one or the other of the following preparations of the block with its core: Thus, in the one case take the block A, shown in Figs. 1 and 2, produced by casting or otherwise, and formed with a rectangular passage, *b*, through it, and with convex exterior opposite sides *c c*, also bosses or projections *d d* on its other sides or edges, and, after heating the said block, insert in its passage *b* a cold core, B, of the same length as the passage *b*, and with its ends of the width thereof, but being of a diminishing taper toward its center from either end; or, in other words, of a double re-

verse wedge shape, substantially as shown in Figs. 3 and 4. The core may be coated with graphite prior to entering in within the block, and this, taken in connection with the core, being cold, prevents the welding of the core with the block, and insures a smooth interior surface of the latter. I then side-roll the hot block with the cold core in it and close the shell of the block down on or in close contact with the core, as represented in Fig. 6, and which is the starting-point, as it were, in the subsequently rolling of the block and close-fitting core, with the exterior of the core and interior and exterior of the block parallel, or nearly so, on all sides, whereby the block and core will, in the further prosecution of the work, be rolled uniformly and keep their proportionate form irrespective of any particular amount of rolling-draft. Thus the block shown in Fig. 6, and having the core in it, has its edges one-half thicker than its center, which latter, as compared with the edges, is as two to three, so that taking twenty per cent., or any other per cent., as the rolling-draft, the reduction of the block, with its core, would be two parts at the center for three parts at the edges, thereby maintaining the same proportionate form, as shown in Fig. 7. The same result is obtained by first making the block or casting A, as shown in Figs. 15 and 16, of the same form as shown in Fig. 6, by making the core B, Fig. 15, of the same kind of metal as the casting or block A, and, after placing said core in the mold, running the metal of which the block is composed around the core, or the core may be of different material and be removed after the block is cast, and a metal core, either introduced in a fluid or solid state, be inserted in place of the primary and removed core.

The block A, having the core in it, as represented in Fig. 6, being reheated, is then side rolled by a succession of passes or rolling operations, which gradually and proportionately reduce the block with its core, as represented by dotted lines in Fig. 7, to the form of a slab, after which, or before the last or two last passes, the same is run though cutting-rolls that remove the projections or bosses *d d* after being rolled into fin shape, bringing the block with its core to the form of a perfect slab, C, as represented in Fig. 8. Said slab is then cut off at its one end and its severed end opened by a hand tool, and the slab passed through grooved rolls, which loosen the core B or broken portions thereof, as represented in Fig. 9. The slab, having the core removed, is then further side and edge rolled to open it still farther, as shown in Fig. 10, and subsequently still further rolled to bring it to the form shown in Fig. 11, ready to be reheated, the previous rollings of the slab being performed cold. The tube formed from the slab then being heated, it is passed between rolls and over a bulb, D, connected with a thrust-rod, D′, and onto the same. This bulb is slightly oval in conformity with the similar and irregular shape of the tube, as introduced onto it and for the purpose of taking out the kinks, Figs. 10 and 11, produced on the opposite edges of the slab. After this, the tube, being fully and finally opened, may be sized and finished by well-known methods, as represented in Fig. 14.

I claim—

The reversely taper or wedge shaped core for use within a block of similar construction externally and internally, substantially as and for the purpose herein set forth.

WM. F. BROOKS.

Witnesses:

HENRY T. BROWN,

MICHAEL RYAN.