

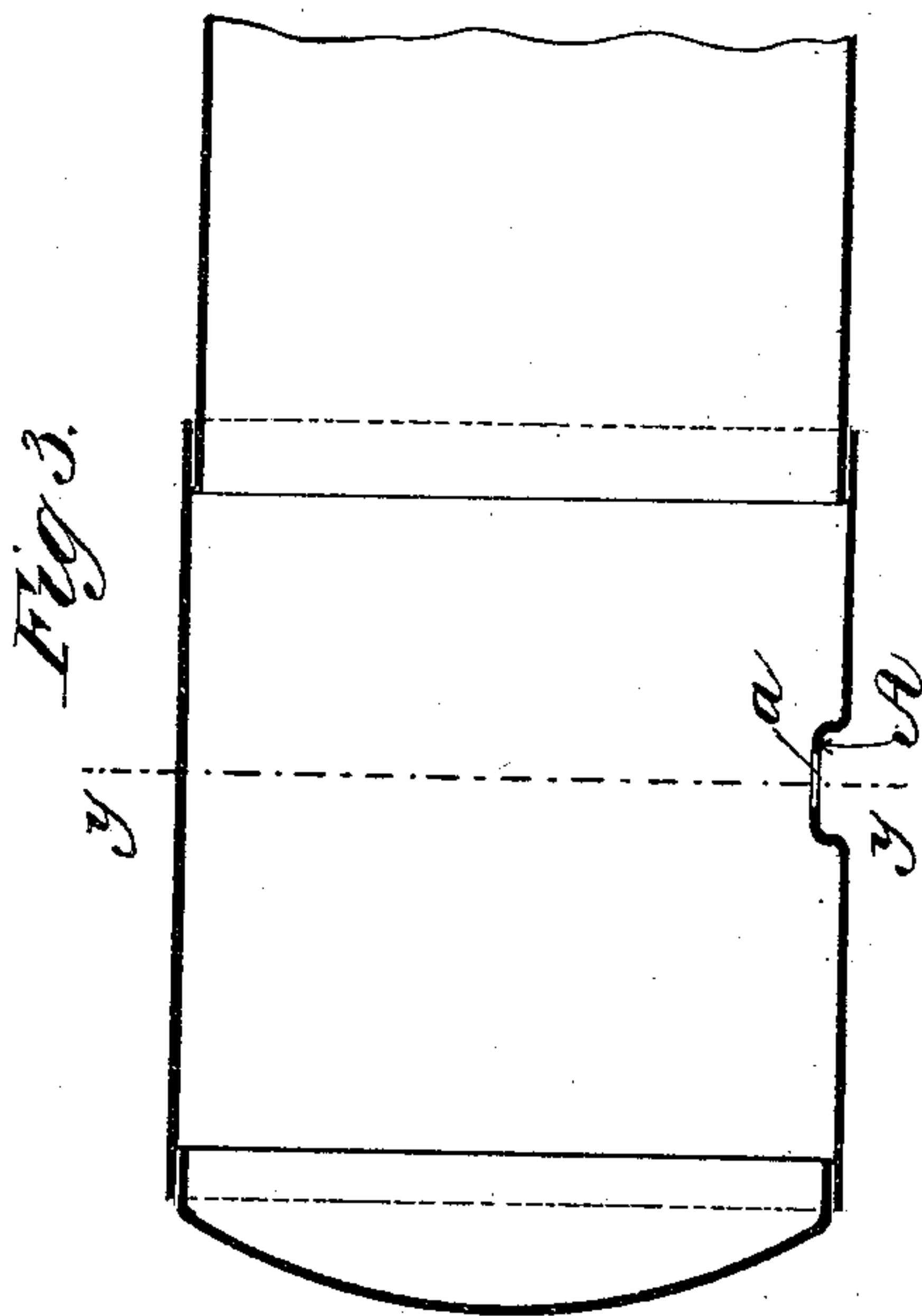
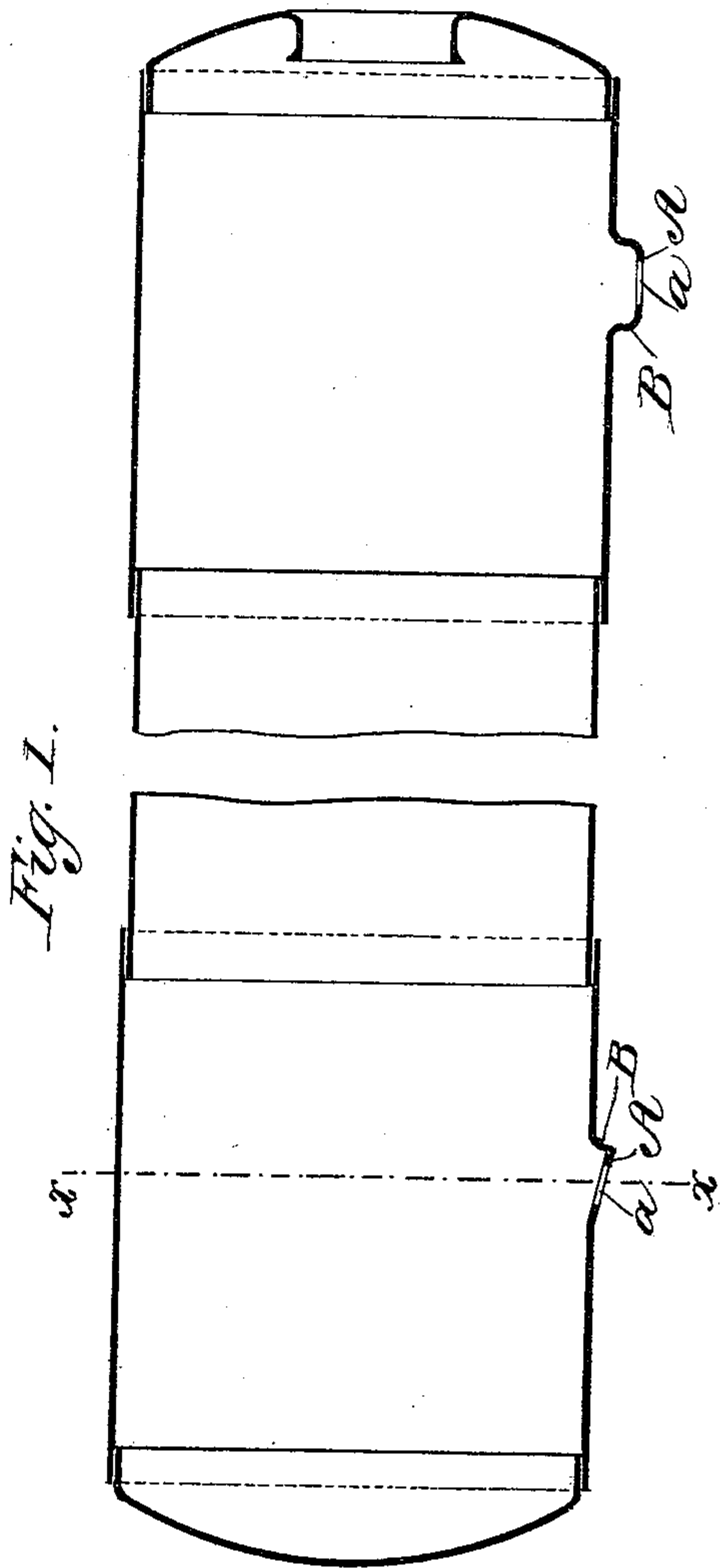
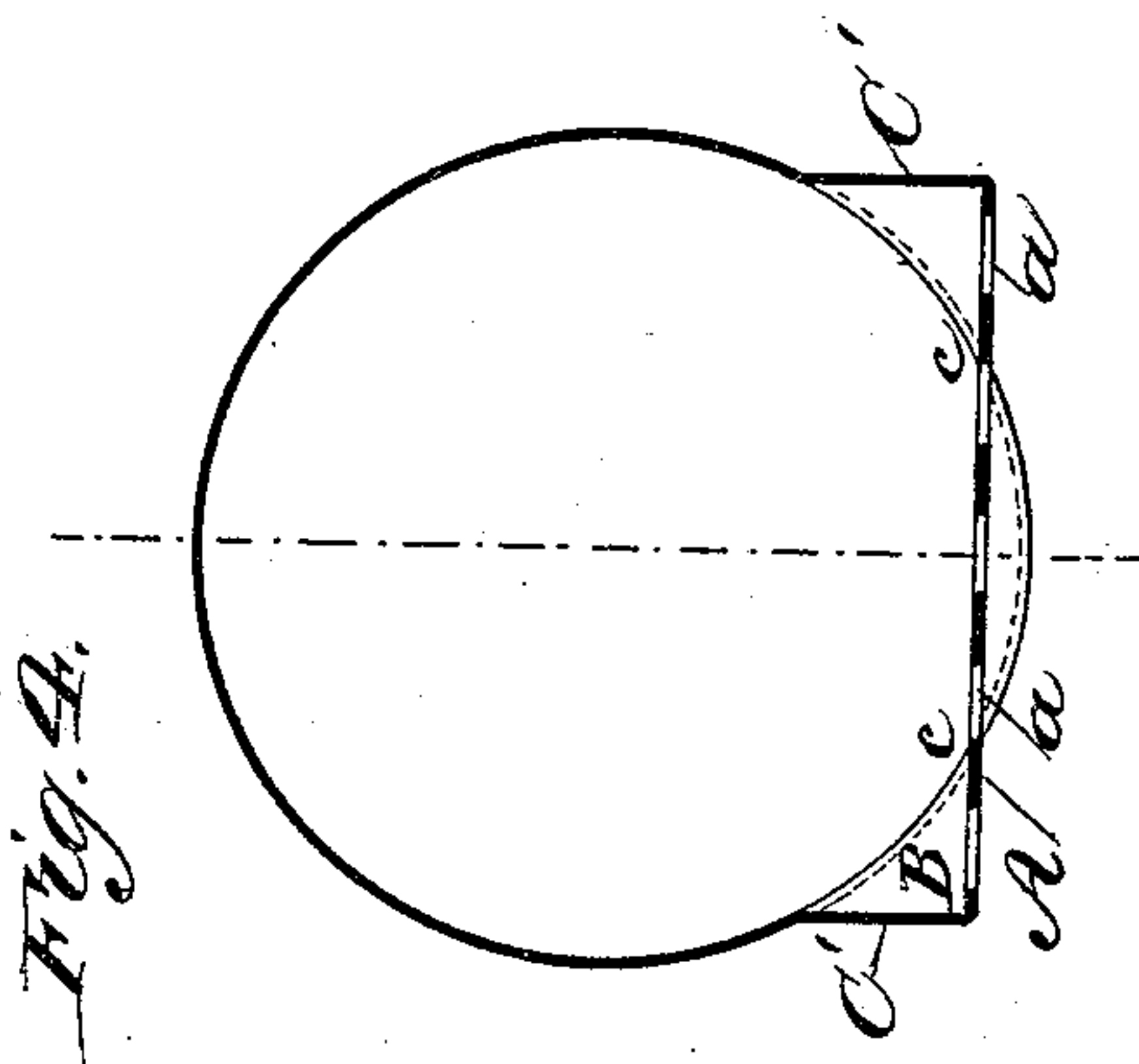
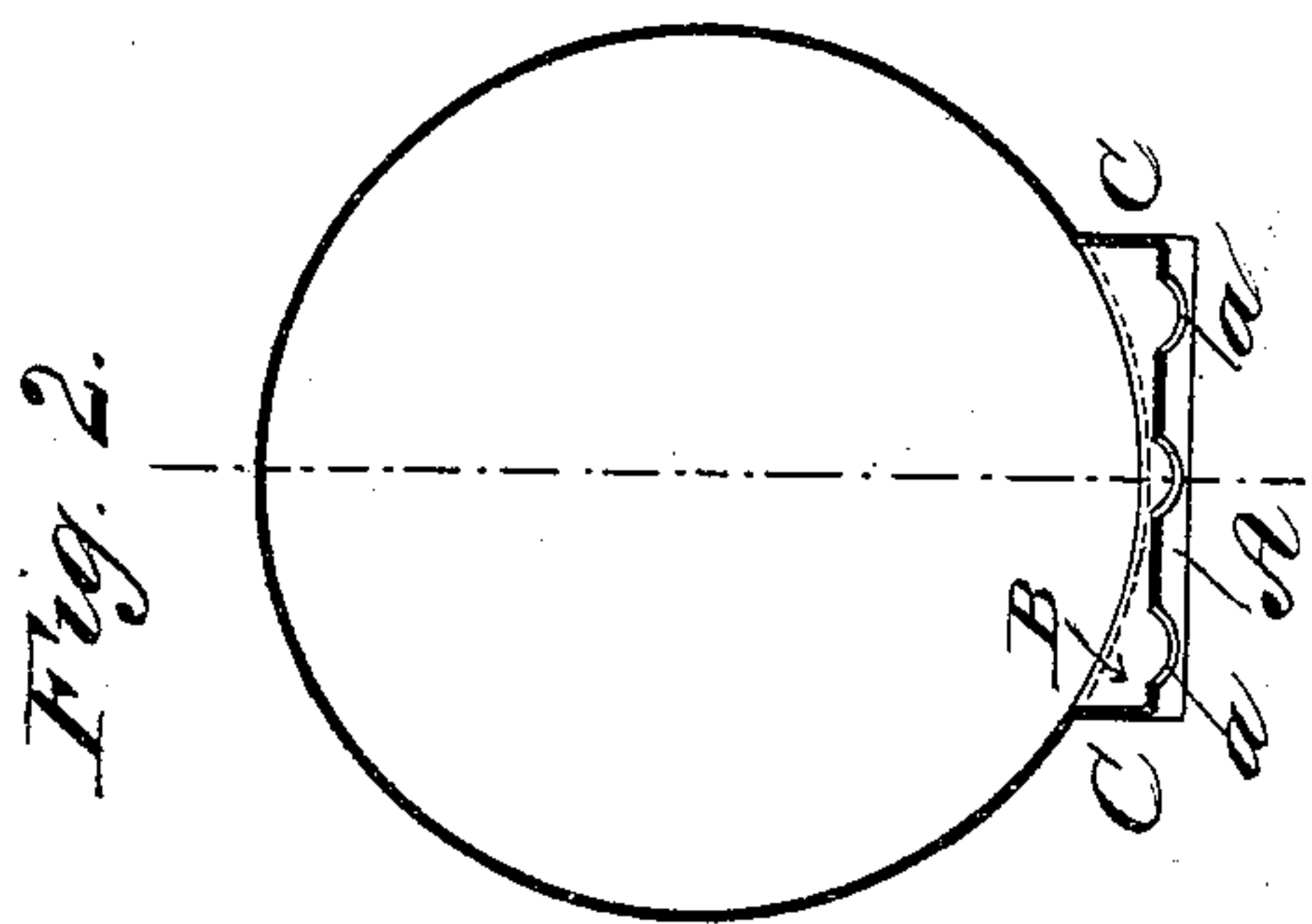
(No Model.)

C. A. KNIGHT.

STEAM DRUM FOR SECTIONAL STEAM BOILERS.

No. 438,776.

Patented Oct. 21, 1890.



WITNESSES:

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CHARLES A. KNIGHT, OF GLASGOW, SCOTLAND.

STEAM-DRUM FOR SECTIONAL STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 438,776, dated October 21, 1890.

Application filed November 22, 1889. Serial No. 331,219. (No model.) Patented in England December 6, 1888, No. 17,804; in France December 19, 1888, No. 194,889; in Belgium December 20, 1888, No. 84,359; in South Australia March 15, 1889, No. 1,257; in New South Wales March 18, 1889, No. 1,299; in Victoria March 25, 1889, No. 6,623; in Switzerland March 28, 1889, No. 656; in New Zealand April 4, 1889, No. 3,616; in Austria-Hungary April 13, 1889, No. 2,452 and No. 13,650; in Spain May 15, 1889, No. 9,295, and in Queensland August 7, 1889, No. 713.

To all whom it may concern:

Be it known that I, CHARLES ALBERT KNIGHT, a citizen of the United States, residing at Glasgow, Scotland, have invented certain new and useful Improvements in Steam-Drums for Sectional Steam-Boilers, (patented in Great Britain December 6, 1888, No. 17,804; in France December 19, 1888, No. 194,889; in Belgium December 20, 1888, No. 84,359; in South Australia March 15, 1889, No. 1,257; in New South Wales March 18, 1889, No. 1,299; in Victoria March 25, 1889, No. 6,623; in Switzerland March 28, 1889, No. 656; in New Zealand April 4, 1889, No. 3,616; in Austria-Hungary April 13, 1889, No. 2,452 and No. 13,650; in Spain May 15, 1889, No. 9,295; and in Queensland August 7, 1889, No. 713,) of which the following is a specification.

My invention relates to sectional water-tube boilers in which a longitudinal drum is made to connect with transverse series of vertical connecting-tubes from the headers of the inclined tubular structure beneath the drum, and which drum is employed as a collector for the steam disengaged from the water, and also as a reservoir for water circulating through the tubes within the furnace or combustion-chambers thereof.

The present improvement has mainly for its object to cheapen and simplify parts of such generators by so constructing the drum as to permit of direct connection of the tubes of the end headers to the drum without the intervention of a separate connecting water-box.

Referring to the accompanying drawings, Figure 1 is an enlarged longitudinal section of a drum made according to my invention; Fig. 2, a cross-section of Fig. 1 on the line *xx*; Fig. 3, a longitudinal section of a drum, showing a different form of impression, similar in character, however, to that illustrated in Figs. 1 and 2; and Fig. 4, a cross-section of Fig. 3 on the line *yy*.

In Fig. 1 the tube connecting-surface *A* is formed integral with the drum by pressing out a portion of one of the plates composing the drum, near the front and rear ends thereof, in the cylindric sheets so as to form a pocket

having a flat lower side *A* and vertical or slightly-inclined sides *B* and ends *C*, terminating at the line of junction of the pocket with the cylindrical contour of the main part of the drum. This pocket is pressed out by suitably-formed dies in a hydraulic or other suitable press, and orifices *a* are thereafter formed by drilling or punching for the connection of the nipples or tubes, which are expanded therein, establishing communication between the drum and the water-tube headers beneath at each end of the boiler. The tube receiving-surface thus formed may be inclined from front to rear, as represented at the left hand of Fig. 1 and by Fig. 2, to suit the inclination of the headers, or may be horizontal throughout, as indicated at the right-hand end of said Fig. 1.

As shown by Figs. 3 and 4, the pocket *A* may be pressed in such manner that a part of its horizontal or inclined under side *A* forms a chord *cc* to a segment of the circle represented by the periphery of the drum, the ends of the impression bulging outward at *C'* to such an extent as to form a wide base in line with the chord *cc* for the reception of a larger number of tubes than attainable by the form of impression in Figs. 1 and 2. Again, the middle part *cc* of the transverse tube-surface may be made to lie in a different or relieved plane than that at the end or pocket portion *B* of the impression, as illustrated in Fig. 5 of my patent application filed April 26, 1889, Serial No. 308,763, all parts of the tube-receiving surface thereby lying exterior to the circle represented by the periphery of the drum.

I claim as my invention—

1. In a water-tube boiler, a steam and water drum and a water-box or saddle for cross-connection of the end headers formed integral with the adjacent sheet of the shell of the drum.

2. A cylindric steam and water drum for water-tube boilers, having portions of its cylindric surface pressed into angular box form, a flat side of which is perforated for the reception of connecting tubes or nipples.

3. The combination, with the steam and

water drum of a water-tube boiler, of a water-box integral with the side of the drum, having a flat tube-receiving surface in a transverse line exterior to the circle of the periphery of the drum.

5 4. The combination, with the steam and water drum of a water-tube boiler, of a water-box integral with the side of the drum, having a flat tube-receiving surface in a transverse line, a portion of which forms the chord

of the circle of the drum, the remaining portion or portions being exterior to such circle.

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