

(No Model.)

2 Sheets—Sheet 1.

C. A. KNIGHT.

CONNECTING BOX FOR WATER TUBE BOILERS.

No. 434,601.

Patented Aug. 19, 1890.

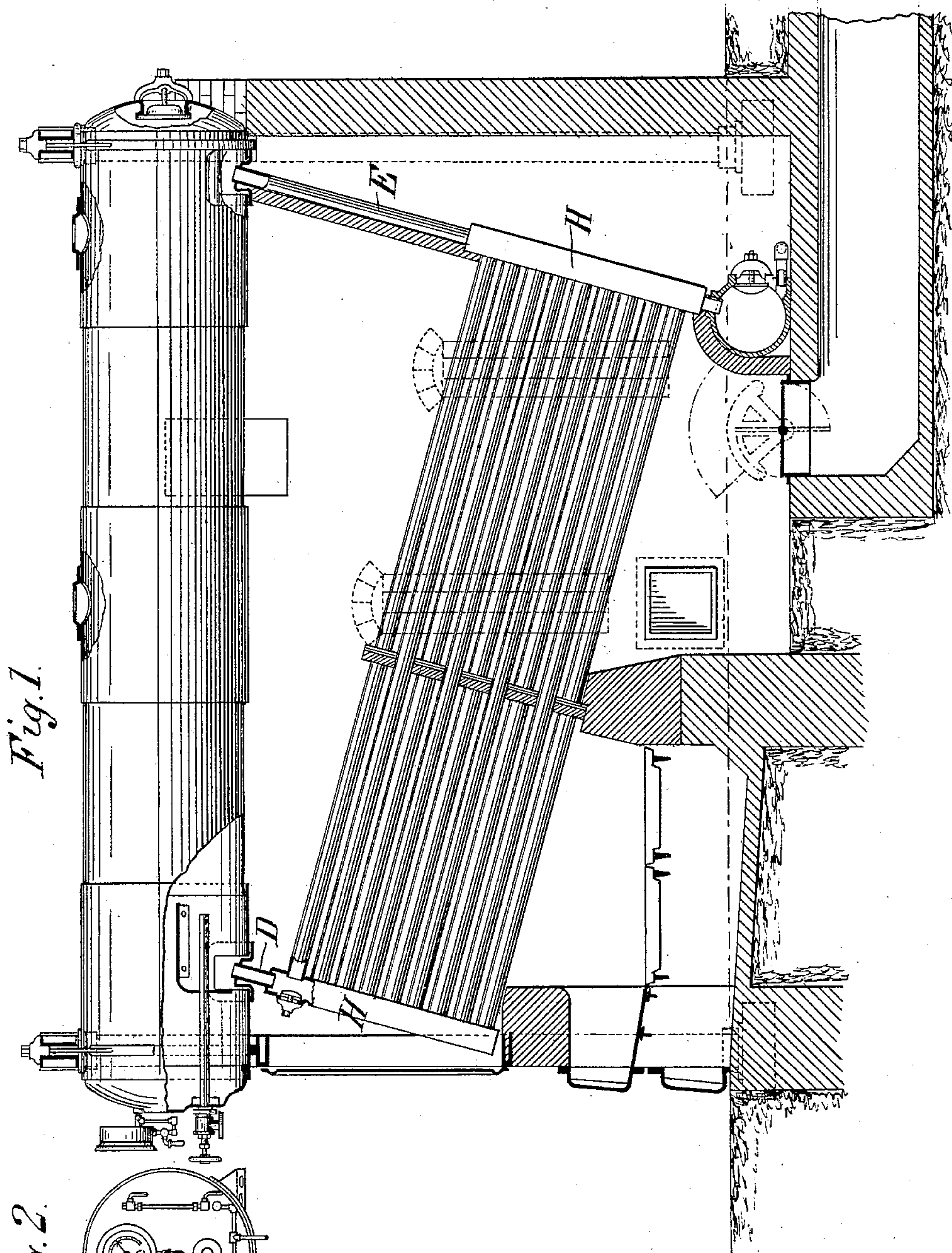


Fig. 1.

Fig. 2.

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(No Model.)

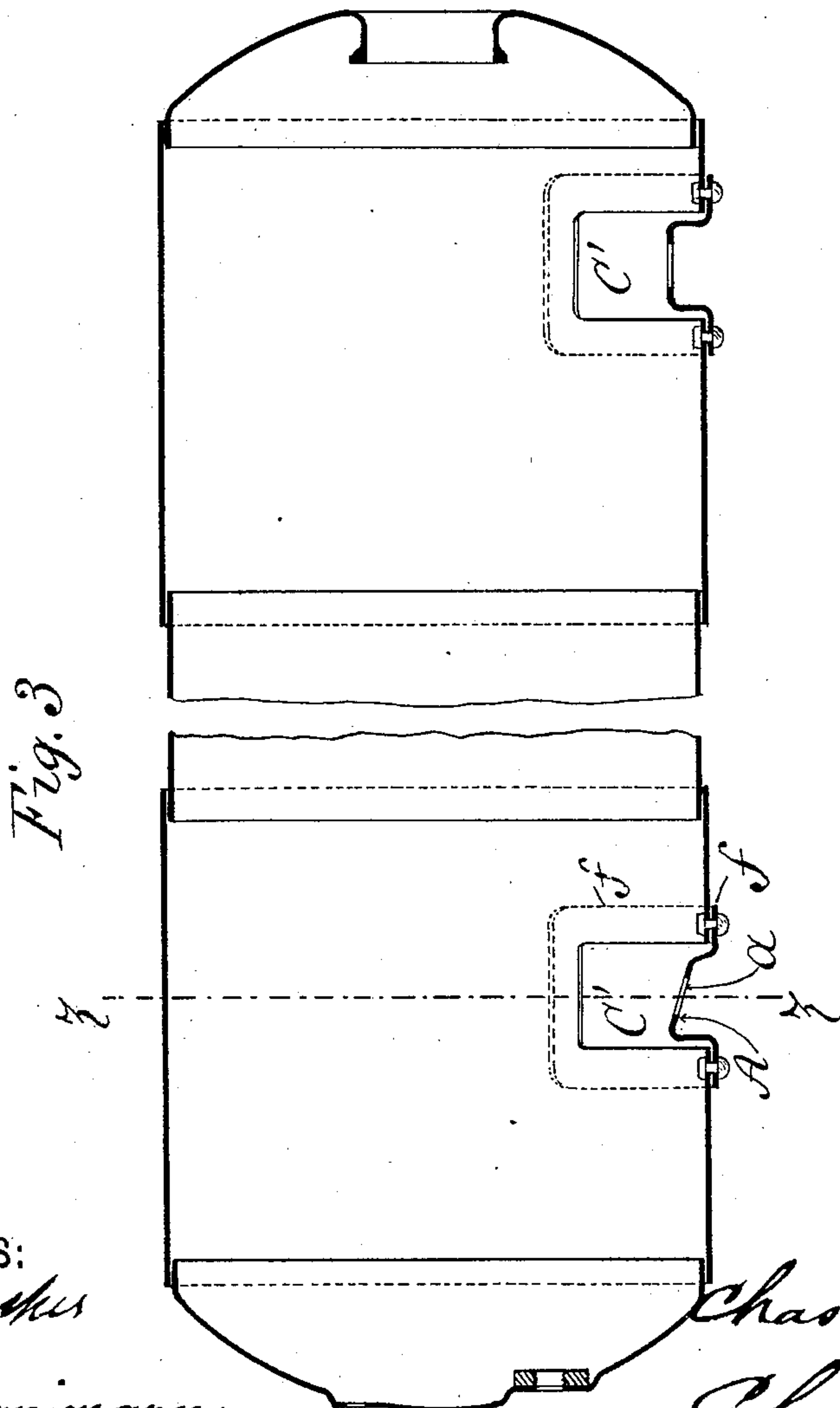
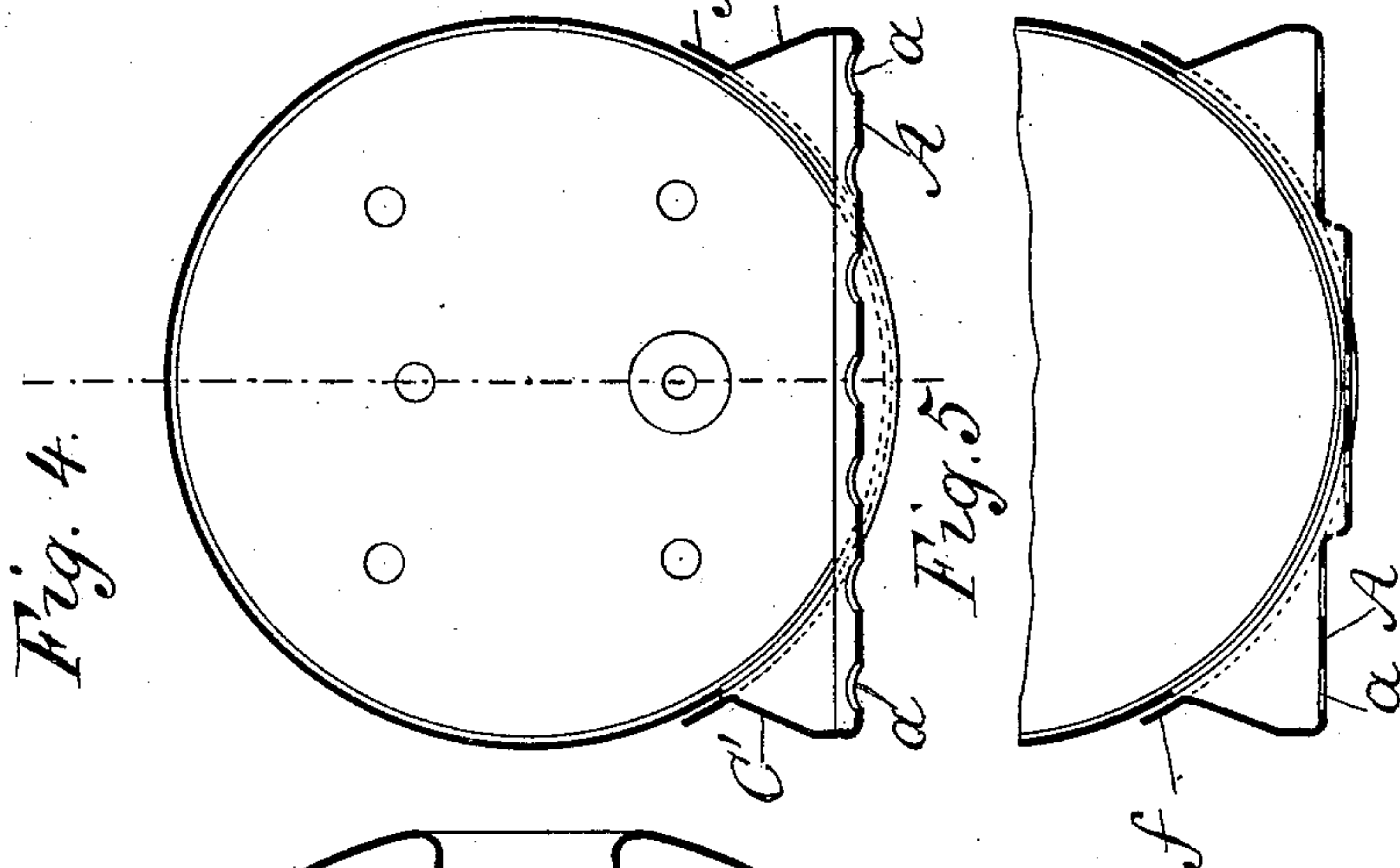
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UNITED STATES PATENT OFFICE.

CHARLES ALBERT KNIGHT, OF GLASGOW, SCOTLAND.

CONNECTING-BOX FOR WATER-TUBE BOILERS.

SPECIFICATION forming part of Letters Patent No. 434,601, dated August 19, 1890.

Application filed April 26, 1889. Serial No. 308,763. (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 28, 1889, No. 656; in New Zealand April 4, 1889, No. 3,616; in Austria-Hungary April 13, 1889, No. 13,650 and No. 2,452; 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 Connecting-Boxes for Water-Tube Boilers, (for which I have obtained patents 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 28, 1889, No. 656; in New Zealand April 4, 1889, No. 3,616; in Austria-Hungary April 13, 1889, No. 13,650 and No. 2,452; 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.

My improvement has for its object to reduce the amount of metal required for making connecting-boxes, to so construct them that they may be pressed by means of dies from a single sheet, and also to promote freedom of circulation, avoiding the intervention as far as possible of a separately-chambered water-box between the tubes and the drum.

Referring to the accompanying drawings, Figure 1 is a sectional side elevation of a water-tube boiler of the type referred to, showing the application of the invention thereto; Fig. 2, an end view of the drum; Fig. 3, an enlarged longitudinal section of a drum provided with my improvement; Fig. 4, a cross-section of Fig. 3 on the line $z z$, and Fig. 5 a cross-sectional view illustrating a modification.

A single sheet is pressed into a saddle form at its open side by means of suitable dies operated by hydraulic or other pressure, and riveted or welded to the side of the drum

around the edges of an orifice cut out of the cylindric drum-sheet. The saddle-piece when attached constitutes in effect a pocket or portion of the drum having an integral tube-sheet A lying at or above the level of the lowermost surface of the drum, and having vertical sides B and ends C', the latter terminating at or nearly beneath the junction of the pocket with the cylindrical surface of the drum. The tube-sheet A of the connecting-box thus formed may be inclined at an angle to the axis of the drum, as seen at the left-hand portion of Fig. 3 and also in Fig. 4, or such tube-surface may be made horizontal or parallel with the axis of the drum, as at the right-hand portion of Fig. 3, according to the relative position of the boiler-tubes or nipples E or D. The tube-sheet A may be pressed with such relation to the saddle-shaped flanges f that a part of its surface lies in a transverse line corresponding with a chord intersecting the circular cross-section of the drum, the ends or pockets C' C' extending out so as to form a continuous tube-sheet in a single plane. Again, the middle part of the transverse tube-surface may be made to lie in a different or relieved plane than the end or pocket portions of the box, as illustrated in Fig. 5, all parts of the tube-receiving surface or sheet thereby lying exterior to the circle represented by the periphery of the drum. This feature possesses the merit of locating as much of the metal as possible approximately in a line with the endwise surface of the drum, contributing to strength.

In Fig. 5 the feature of locating a part of the tube-receiving surface in the chord of the circle represented by the periphery of the drum is dispensed with, and such part of the tube-receiving surface is located in an offset or relieved plane, so as to bring as much of the impression as possible approximately in a line with the endwise surface of the drum.

I claim as my invention—

1. A connecting-box for water-tube boilers, consisting of a saddle pressed from a single plate of wrought metal adapted to fit and close an opening in the side of a drum.

2. A connecting-box for water-tube boilers, compressed of a single sheet of wrought metal, having a flat tube-receiving surface or surfaces, and having a saddle-shaped flange
5 integral therewith projecting externally around its open side, by which it may be secured to a cylindric sheet of the drum without the intervention of other parts.

3. A connecting-box for water-tube boilers,
10 composed of a single sheet of wrought metal, having a saddle-shaped open side to fit the cylindric surface of a drum, and a plane transverse tube-receiving surface intersecting the line of the cylindric surface.

15 4. A connecting-box for water-tube boilers, composed of a single sheet of wrought metal, having a saddle-shaped open side to fit the

side of the drum, having flat tube-receiving surfaces exterior to the cylindric surface of the drum, and lying in different parallel
20 planes.

5. The herein-described water-box for steam-drums, the transverse tube-receiving surface or bottom of which intersects the line of the cylindric surface of the drum and lies in a
25 plane at an angle to the center line of the drum.

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