A. C. ANCONA.

SETTING FLUES AND TUBES IN STEAM-BOILERS.

No. 184,314. Patented Nov. 14, 1876.

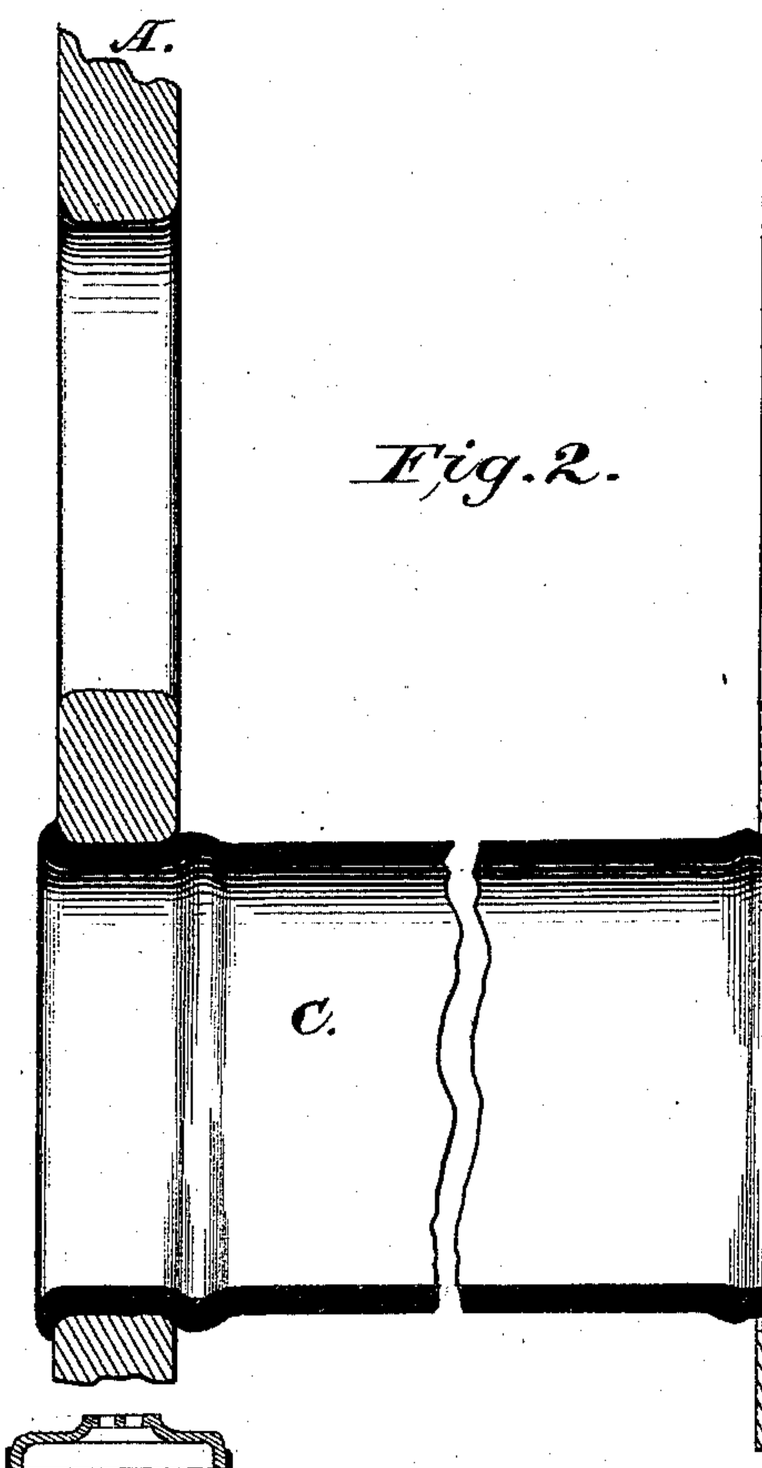

Fig. 2.

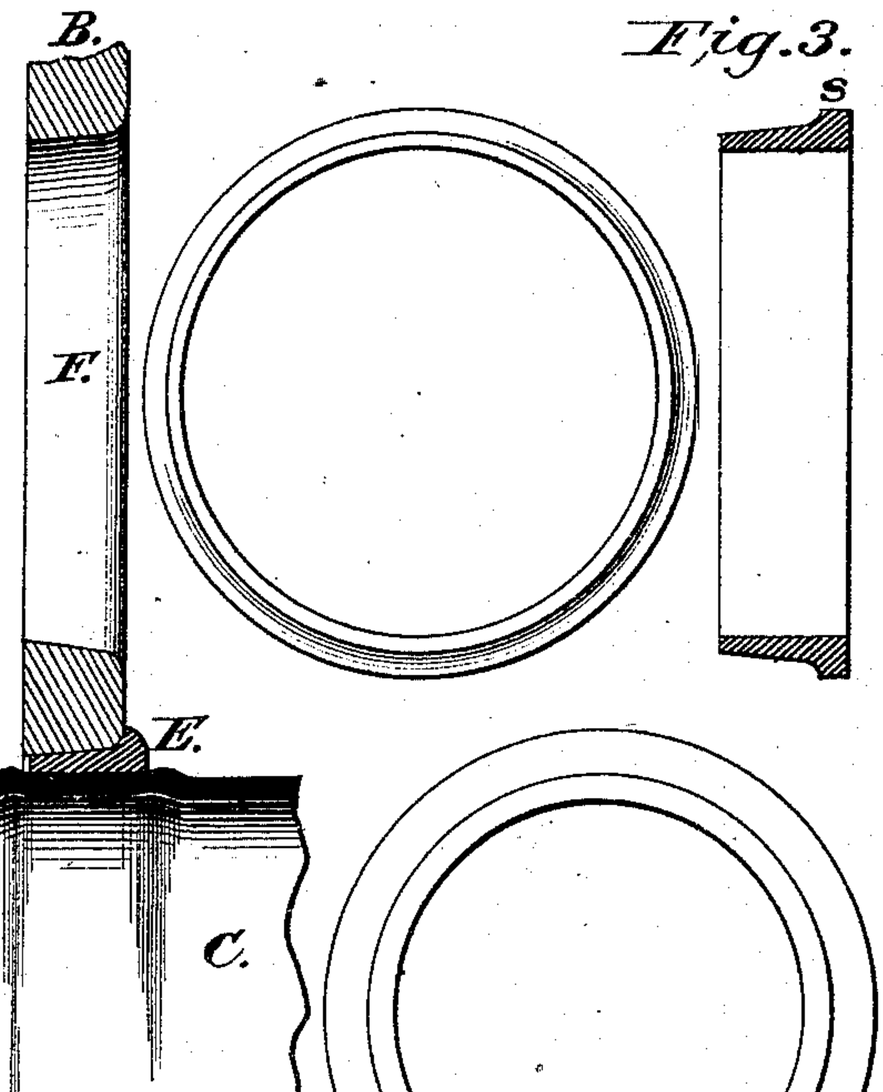

Fig. 3.

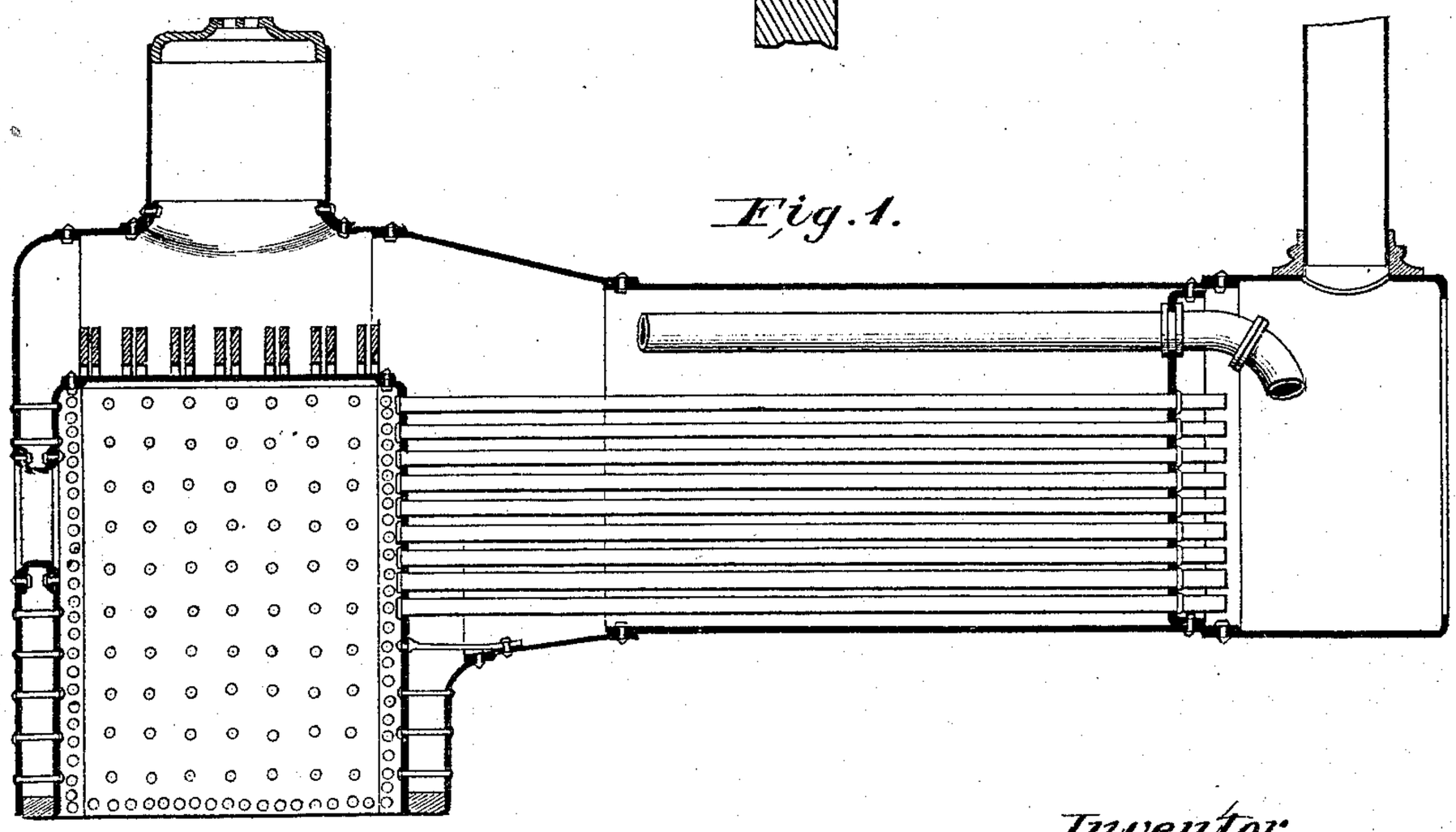

Fig. 1.

Witnesses:
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B. F. Smith

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UNITED STATES PATENT OFFICE.

ASTLEY C. ANCONA, OF EVANSVILLE, INDIANA.

IMPROVEMENT IN SETTING FLUES AND TUBES IN STEAM-BOILERS.

Specification forming part of Letters Patent No. **184,314**, dated November 14, 1876; application filed April 7, 1874.

To all whom it may concern:

Be it known that I, ASTLEY C. ANCONA, of Evansville, Indiana, have invented certain Improvements in Securing the Tubes of Steam-Boilers, of which the following is a specification:

The main object of my invention is to so construct the tubes of a steam-boiler that they may be removed and reset without piecing, a further object being a simple and secure method of attaching the tubes to the front tube-sheet.

In the accompanying drawing, Figure 1 is a longitudinal section of a locomotive-boiler with my improvements; Fig. 2, an enlarged view of the front and rear tube-sheets and corresponding ends of the tubes, and Fig. 3 a sectional view of the retaining ring or ferrule.

A is the rear tube-sheet of a locomotive-boiler, B the front tube-sheet of the same, and C one of the tubes, the latter being secured at one end to the sheet A, at the furnace end of the boiler, but projecting at the other or smoke-box end beyond the sheet B, to which, at the point where it passes through the said sheet, it is secured by means of a ring or ferrule, E, adapted to the opening in the sheet, which opening is enlarged, as shown at F, Fig. 2.

In fitting a tube to the boiler its rear end is inserted through one of the enlarged openings, F, in the front tube-sheet B, and the tube is then passed inward until its rear end projects through the corresponding opening in the rear plate A. To this plate it is attached by swaging or otherwise, and after it is secured the ring or ferrule E is slipped over the opposite end of the tube, and driven tightly into the opening F. The tube is finally expanded both inside and outside the sheet B by means of a suitable tool, so that the said sheet B is stayed against internal pressure, and the ring E prevented from moving independently of the tube.

A rib, *s*, is, by preference, formed around the front edge of the ring E, to prevent the latter from being driven through the sheet so far that a shoulder would be formed on its inner edge in expanding the tube, and which would prevent the removal of said ring when desired.

When it becomes necessary to remove a tube for cleansing, repairs, or otherwise, the swaged portion at the rear end of the tube is cut off, and the tube then driven out through the front sheet, carrying with it the ring or ferrule E. This is then cut off, and, after the tube has been repaired or cleansed, it is again inserted, as before, its rear end swaged to the rear plate, and another ring, E, slipped over the still projecting front end of the tube driven into the front plate, and the tube expanded on the outside of the sheet, the expanded portion, which was before outside, being now inside the sheet.

It will be evident that, by making the tubes longer than the distance between the outside faces of the opposite sheets A and B, and allowing the surplus portion to project beyond the front sheet, the removal and resetting of the tubes can be accomplished without any piecing of the tubes, such as is demanded with the present construction.

I claim as my invention—

1. A boiler in which the tubes extend through and beyond the front tube-sheet, as and for the purpose herein set forth.

2. The combination of the front tube-sheet B, and its enlarged openings F, with the rings or ferrules E, and the tubes C, expanded on both sides of said rings, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ASTLEY COOPER ANCONA.

Witnesses:

THOS. L. ROBERTS,

B. F. SMITH.