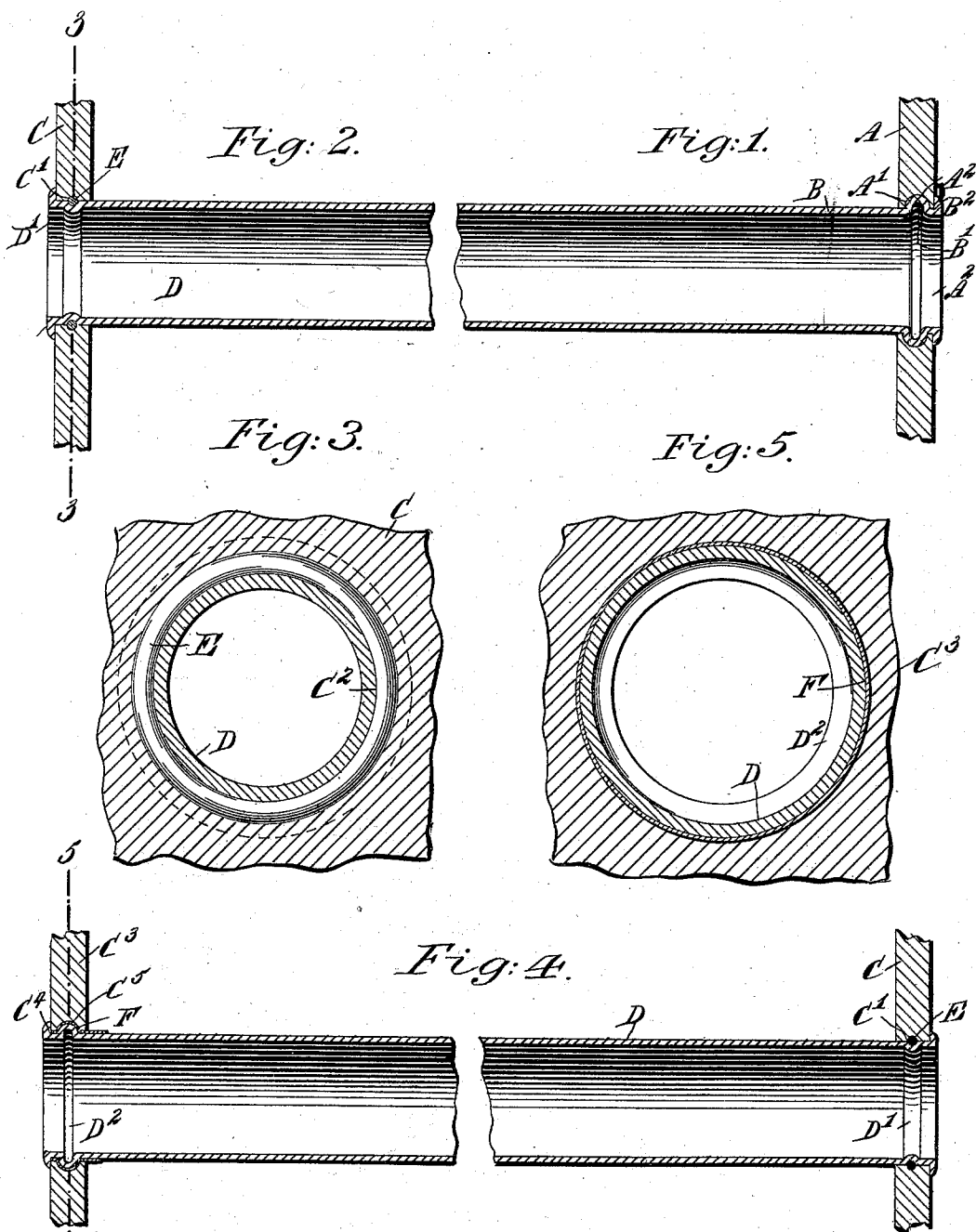


(No Model.)

C. O'TOOLE.
BOILER.

No. 560,919.

Patented May 26, 1896.



WITNESSES:

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UNITED STATES PATENT OFFICE.

CHARLES O'TOOLE, OF DUBUQUE, IOWA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 560,919, dated May 26, 1896.

Application filed August 30, 1895. Serial No. 560,982. (No model.)

To all whom it may concern:

Be it known that I, CHARLES O'TOOLE, of Dubuque, in the county of Dubuque and State of Iowa, have invented certain new and useful Improvements in Boilers, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in boilers, whereby all leakage is prevented and the tubes or flues are securely held in place in the boiler-head even should the usual beads be destroyed by the heat.

The invention consists of a boiler-head formed with an annular groove in the wall of the tube or pipe opening and adapted to receive a bead formed on the tube or flue.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claim.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement. Fig. 2 is a similar view of a modified form of the same. Fig. 3 is an enlarged cross-section of the same on the line 3 3 of Fig. 2. Fig. 4 is a sectional side elevation of the same, and Fig. 5 is an enlarged cross-section of the same on the line 5 5 of Fig. 4.

As illustrated in Fig. 1, the flue sheet or head A of the boiler is formed with the usual tube-openings A', in the wall of each of which is formed an annular groove A², preferably made semicircular in cross-section, as plainly indicated in the said figure. The tube or flue B, extending into the opening A', is beaded into the groove A² by forming a bead B' in addition to the usual bead B², formed on the end of the tube and bearing at its inner face against the outer face of the flue sheet or head A. Now it will be seen that by the arrangement described all leakage is prevented, owing to the bead B' fitting into the groove A² of the flue sheet or head, even should the bead B² be destroyed by the heat. It will fur-

ther be seen that by the employment of the bead B' longitudinal movement of the tube or flue in the sheet is prevented, and consequently the tube is held in place.

In the form of the improvement illustrated in Figs. 2, 3, 4, and 5 the sheet C at the front end of the boiler is formed in the wall of its opening C' with an annular groove C², into which is placed a ring E, made of copper or other material, and upon which bears an internal bead D', formed by beading the flue D accordingly. By this arrangement all leakage is prevented and at the same time the flue is securely held in place.

For the rear sheet C³ of the boiler I place a ferrule F in the flue-opening C⁴, and this ferrule is provided with an external bead C⁵, fitting into a corresponding groove in the wall of the opening C⁴, and into this bead C⁵ is beaded part of the flue D to form the bead D²; as will be readily understood by reference to the left-hand side of Fig. 4. (See also Fig. 5.) In each of the forms described the outer bead is preferably made on the flue. Now it will be seen that neither the copper ring nor the ferrule can be displaced, as they are securely held in the annular grooves in the flue-sheets by the beads formed on the tubes engaging the ring or the ferrule.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

A boiler having its flue or tube head or sheet formed with an annular groove, semicircular in cross-section, in the wall of its tube or flue opening, a copper ring in the said groove; and a tube or flue having its end projecting into the tube or flue opening and expanded therein, whereby an internal bead will be formed in the tube and the metal of the tube forced into contact with the portions of the wall of the opening on opposite sides of the ring to form a tight joint, substantially as described.

CHARLES O'TOOLE.

Witnesses:

CHARLES EIMES MAY,
FREDRICK NEUBAUER.