

(No Model.)

W. F. WETMORE & L. H. BRATT.

WATER TUBE FOR BOILERS.

No. 333,043.

Patented Dec. 22, 1885.

Fig. 1.

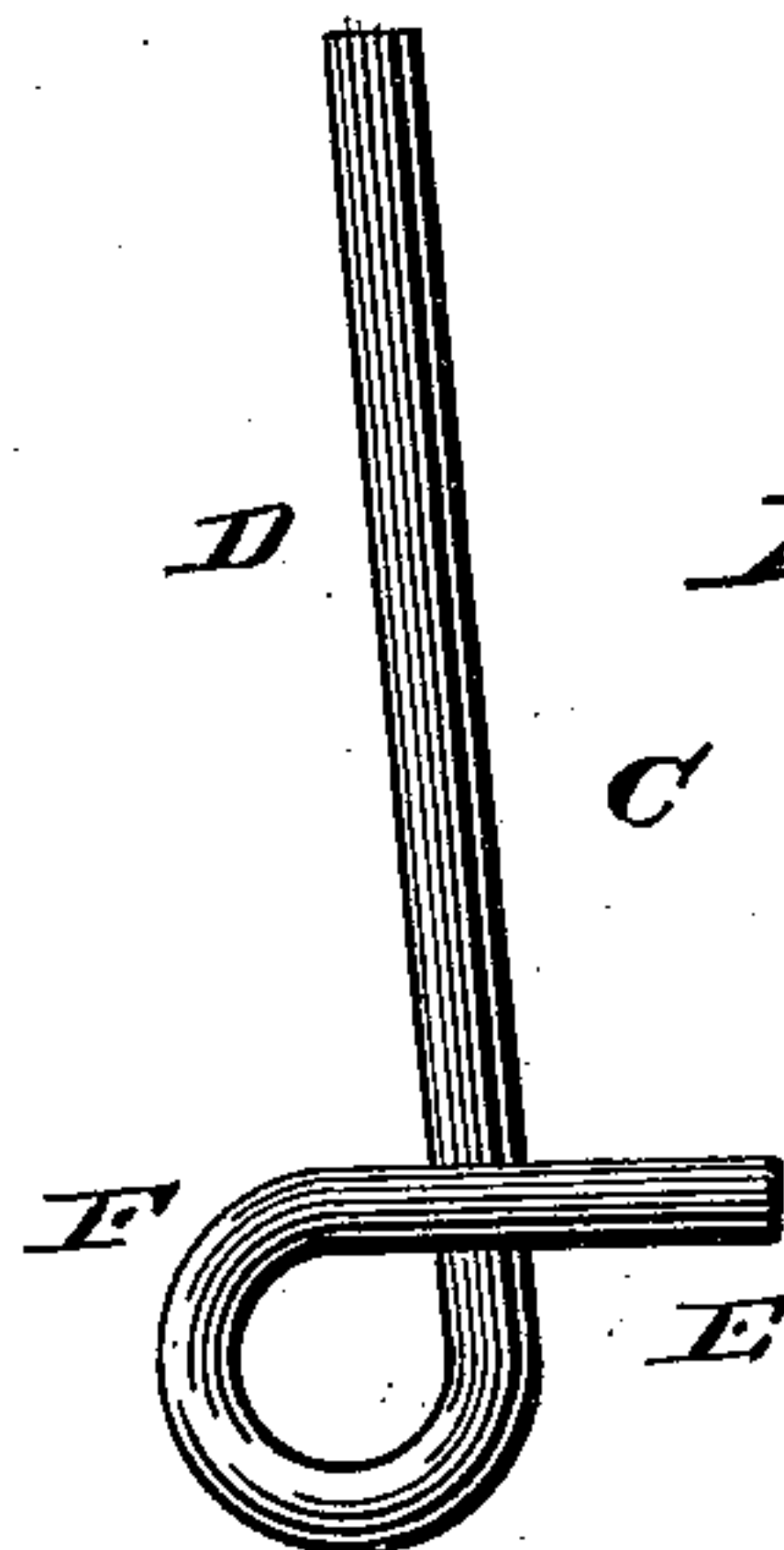
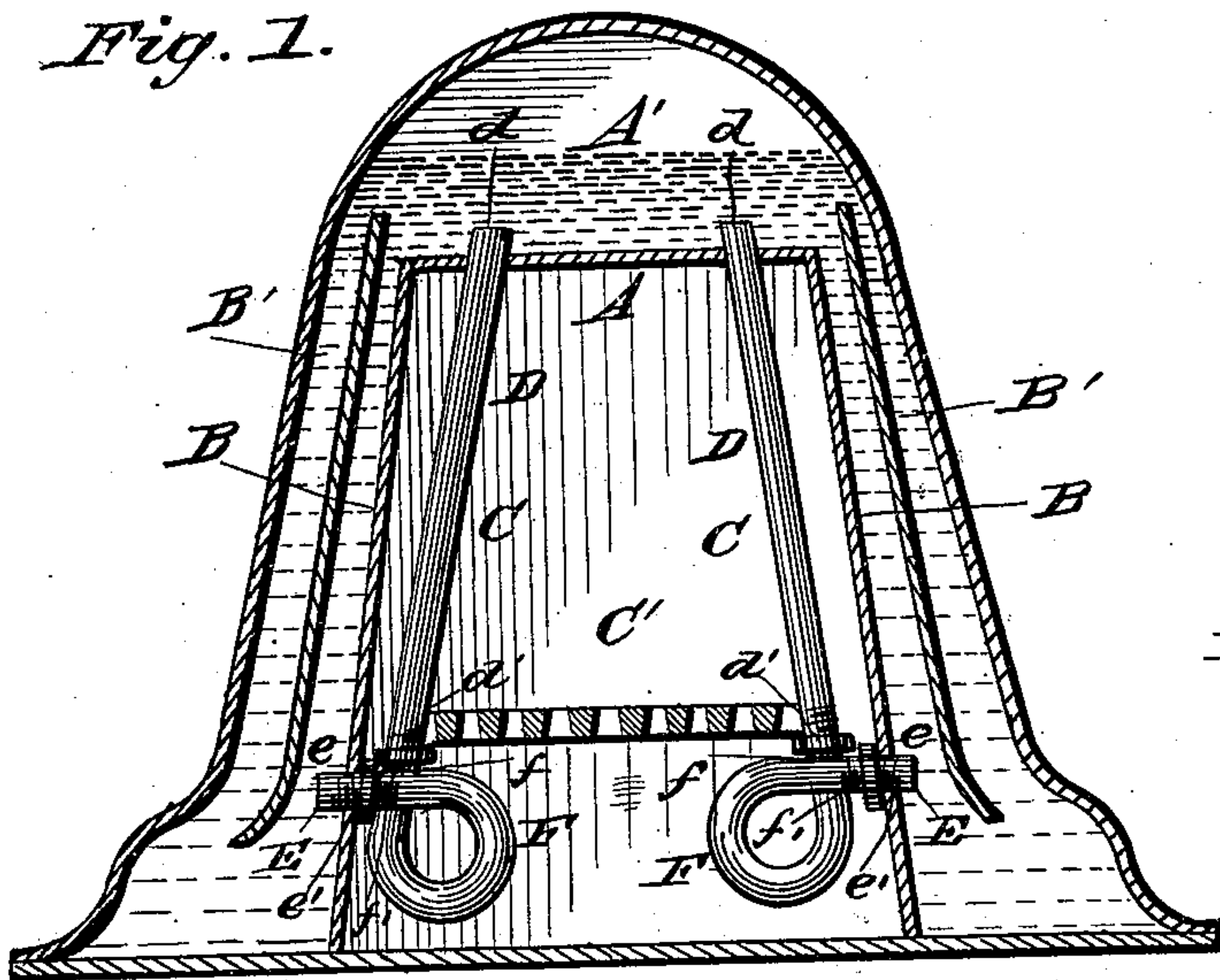


Fig. 2.

Fig. 3.

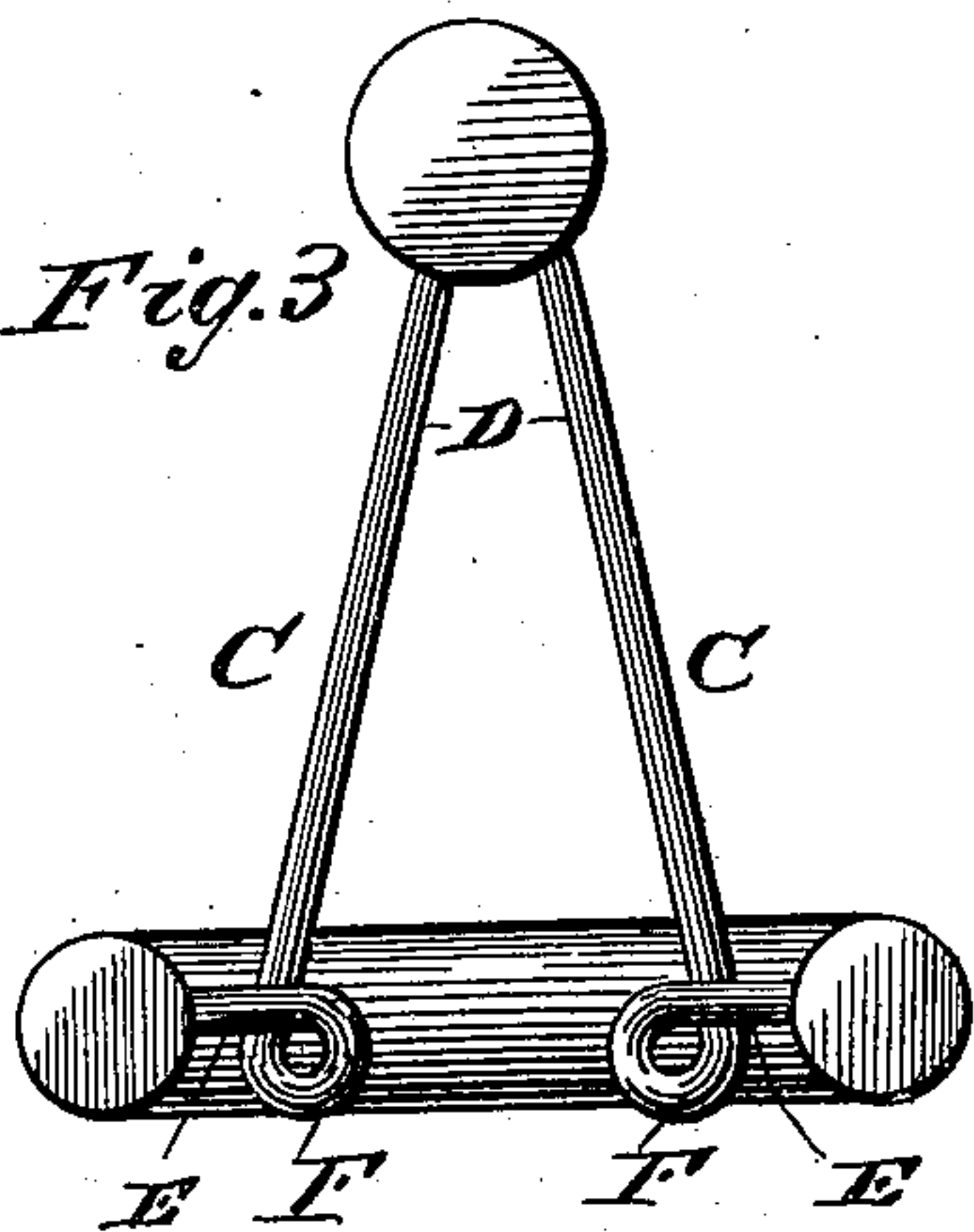


Fig. 5.

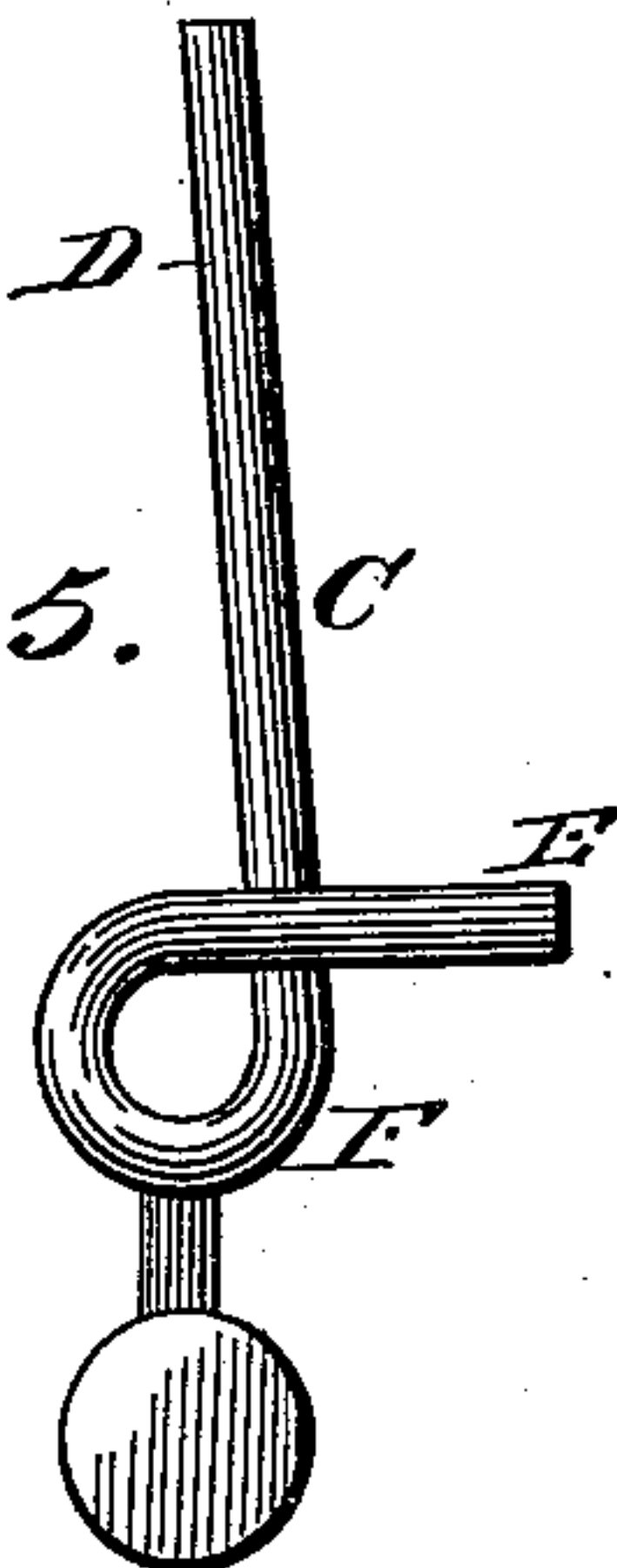
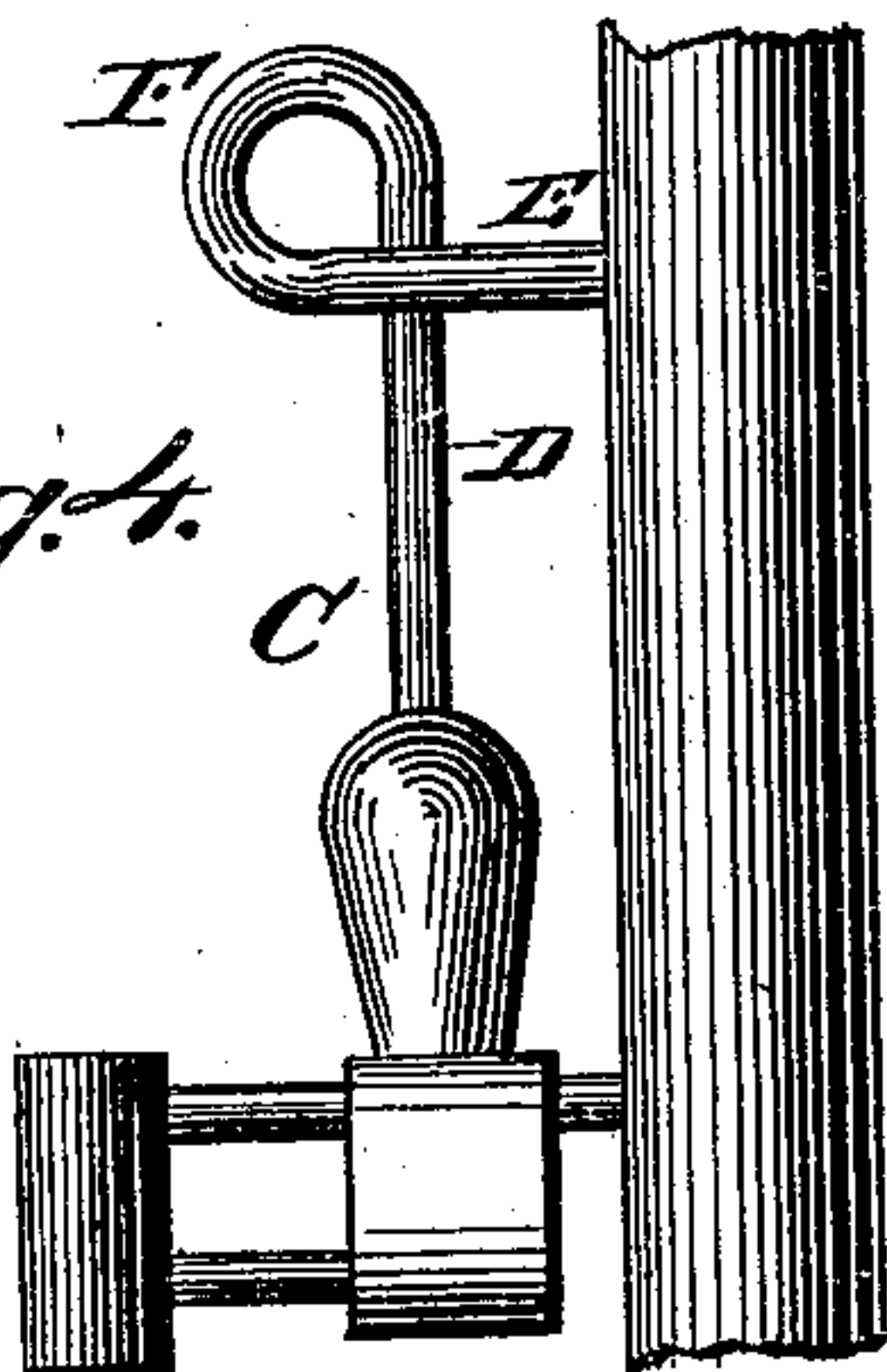


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM F. WETMORE AND LEVI H. BRATT, OF SOUTH BEND, INDIANA,
ASSIGNORS OF ONE-THIRD TO J. BEN BIRDSSELL, OF SAME PLACE.

WATER-TUBE FOR BOILERS.

SPECIFICATION forming part of Letters Patent No. 333,043, dated December 22, 1885.

Application filed May 13, 1885. Serial No. 165,401. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. WETMORE and LEVI H. BRATT, of South Bend, in the county of St. Joseph and State of Indiana, have invented certain new and useful Improvements in Water-Tubes for Boilers; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 represents a side view of the invention; Fig. 2, a similar view of a modification of the same. Figs. 3, 4, and 5 are modifications.

The invention relates to improvements in water-tubes for boilers, referring particularly to the class of tubes connecting water-surfaces at or nearly at right angles to each other; and it consists, substantially, in the form of the compensating or expansion and contraction coil formed on a tube of the said class.

Referring to the accompanying drawings by letter, A designates the crown-sheet of a boiler having a water-space, A', above it.

B is the side wall of a water-space, B', which communicates with the water-space A' above the crown-sheet. The crown-sheet and wall B are inclined to each other at an obtuse angle, preferably, but the angle may be a right angle, or less, if desired.

C is a water-tube situated in the fire-box C', of which the crown sheet A forms the top, and B is the side wall.

The water-tube C is composed of the sections D and E and the compensating coupling-piece F, uniting the said sections. The section D has its upper end, *d*, secured in the crown-sheet and opening into the water-space A'. The section E has its outer end, *e*, secured in the wall B and communicating with the water-space B'. The lower end, *d'*, of the section D and the inner end, *e'*, of the section E are connected to the coupling-piece F, as shown. The coupling-piece F is bent completely around upon itself, and has its upward-extending end *f* connected to the lower end of the section D, and its outward-extending end *f'* connected to the inner end of the section E, as described.

If preferred, the sections may be made in one piece, bent at the proper point to imitate the coupling-piece. The coil is in each case

on the side of the larger angle formed by the pipes D and E. Where the coil is formed in one piece with the pipes, the latter cross each other before the coil is formed.

The action of the compensating coupling-pieces or bent portions of the water-tubes is as follows: When the water-tubes are heated, and thereby extended in length, the bends or circles of the coupling-pieces will enlarge and take up the extension, so that the ends *d* of the sections D and the ends *e* of the sections E will not move in their connections with the crown-sheet and wall B. When the tubes cool, the bends of the coupling-pieces will contract, thereby compensating for the diminished length of the tubes. It is evident that the joints of such water-tubes with the walls of their water-spaces will long outlast those of ordinary construction.

This construction of water-tubes need not be limited to boiler-tubes proper, but may connect an upper steam or water drum with a lower steam or water drum that has no other communication with the former drum; or it may connect an oiler with the supply-pipe of the corresponding cylinder, as shown.

Having described our invention, what we claim is—

1. In a boiler, the combination of two water-space walls inclined to each other at or nearly at an angle of ninety degrees, with a water-tube having an end secured in and opening through each wall and bent on itself to form a single compensating coil on the side of the larger angle formed by the crossing of the two parts of the tube that run in different directions, substantially as specified.

2. In a boiler, the combination of the crown-sheet A and water-space wall B with the water-tube C, composed of the section D, parallel to the wall B, the section E, parallel to the crown-sheet, and the compensating coupling-coil F, connecting the adjacent ends of said sections and situated on the side of the larger angle formed by the extended axes of the sections, substantially as specified.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

W. F. WETMORE.
LEVI H. BRATT.

Witnesses:

CHAS. W. WILEY,
JAMES DUSHANE.