

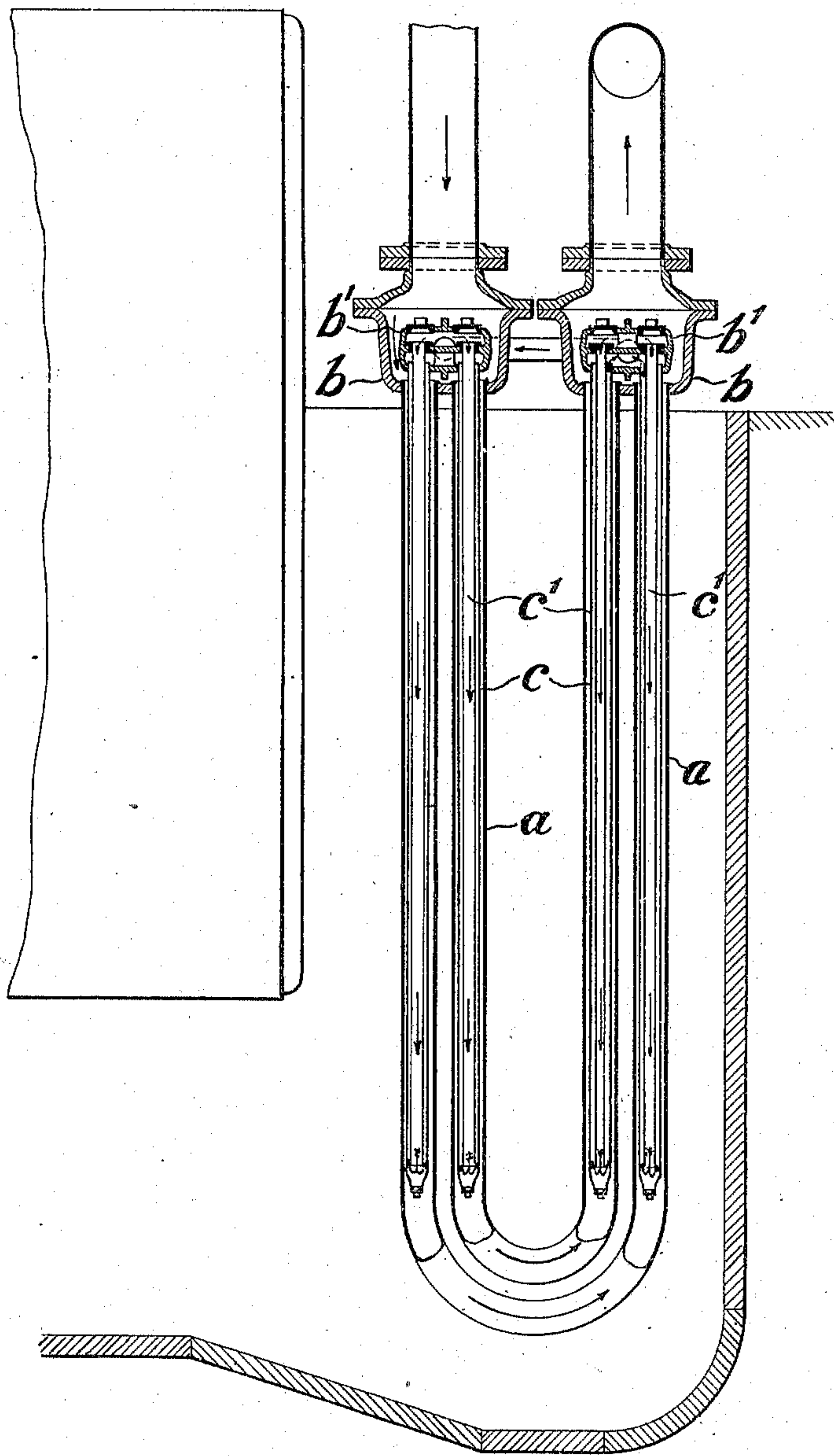
H. CRUSE.
 APPARATUS FOR SUPERHEATING STEAM.
 APPLICATION FILED SEPT. 20, 1909.

957,939.

Patented May 17, 1910.

5 SHEETS—SHEET 1.

Fig 1.



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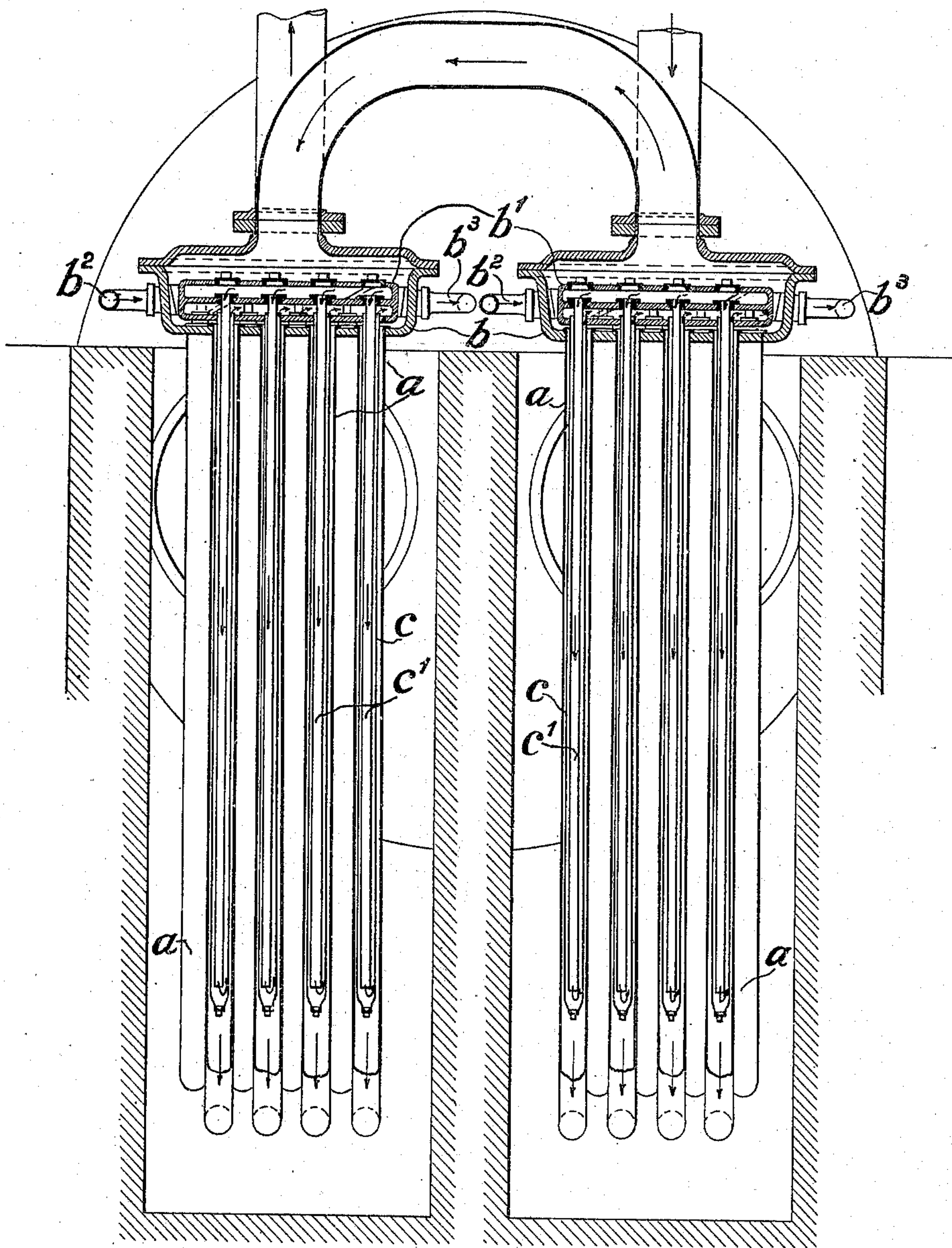
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5 SHEETS—SHEET 2.

Fig 2.



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5 SHEETS—SHEET 3.

Fig 3.

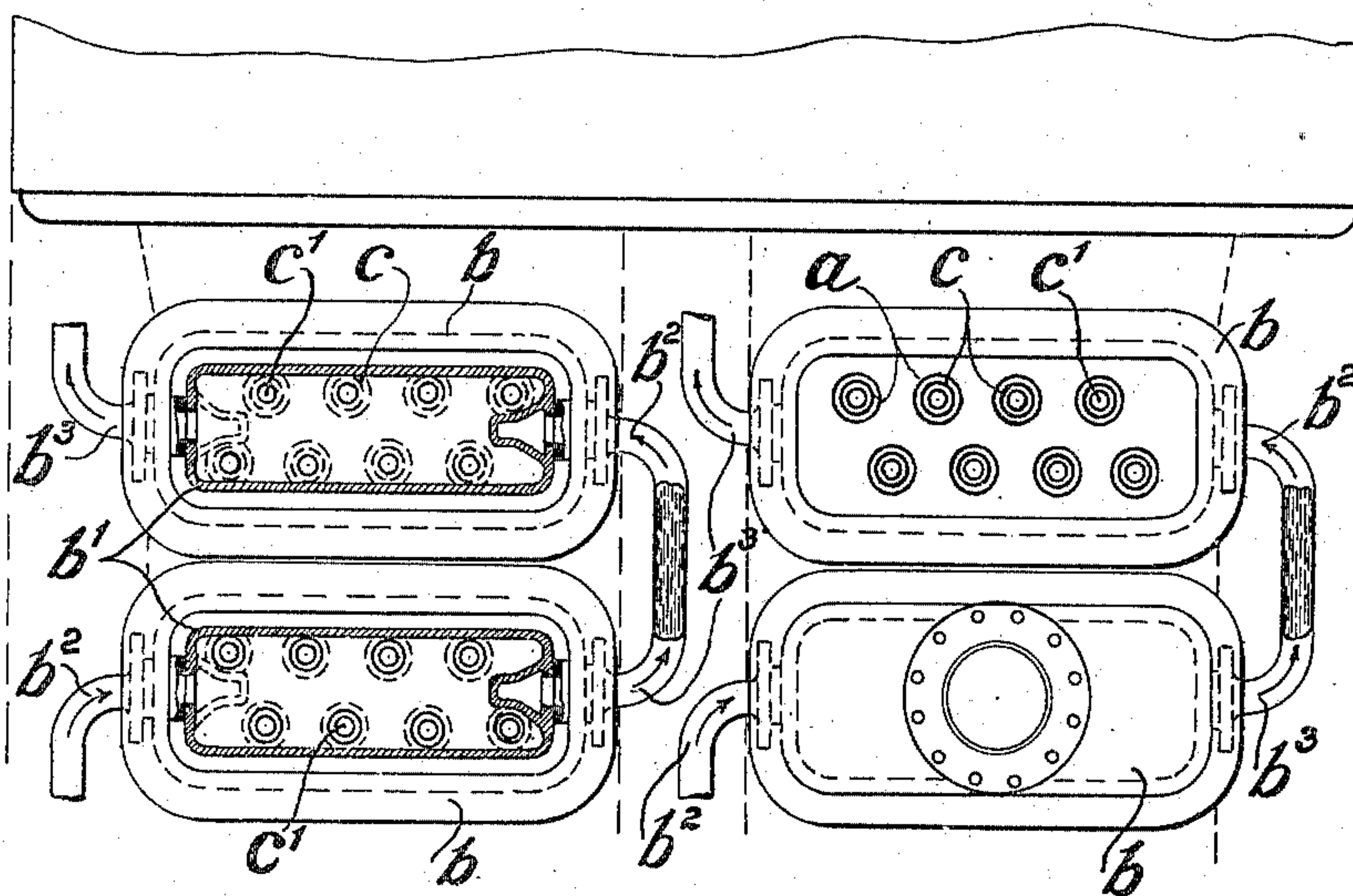


Fig 4.

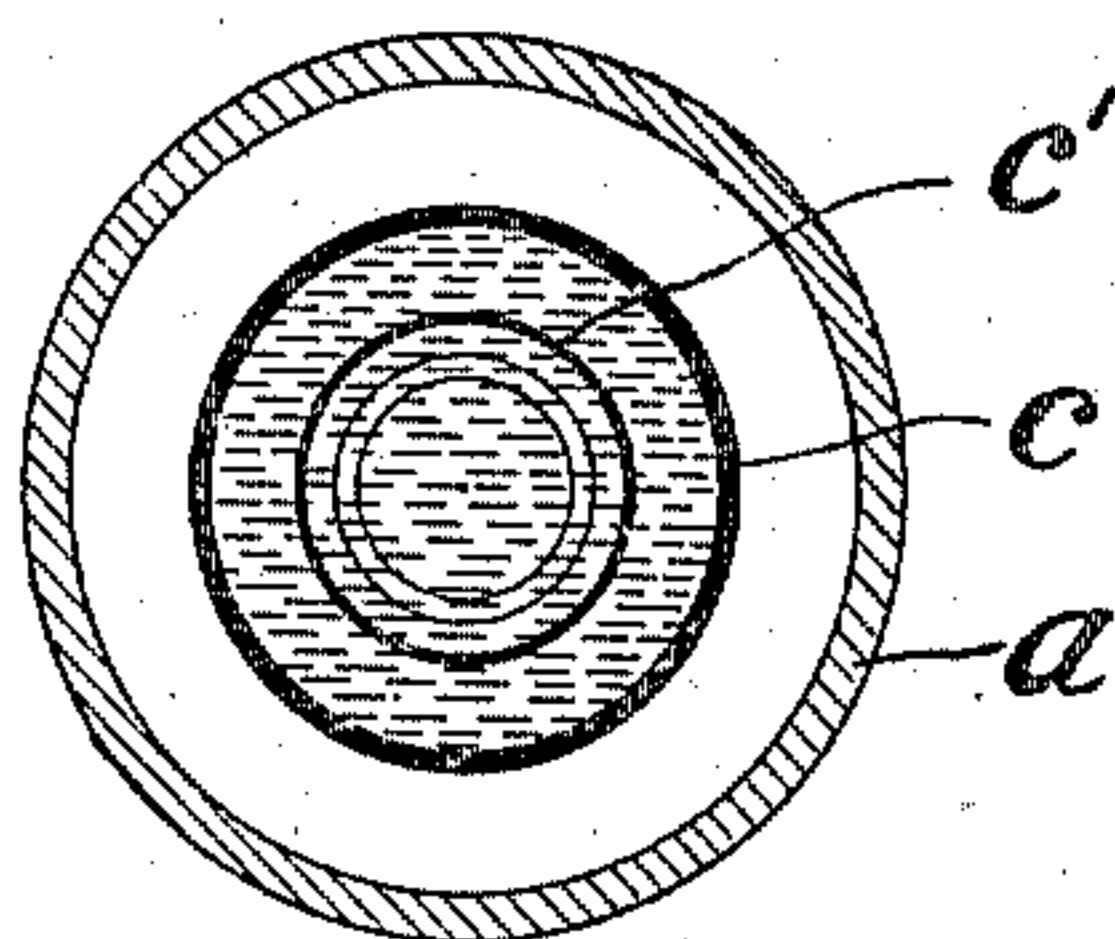
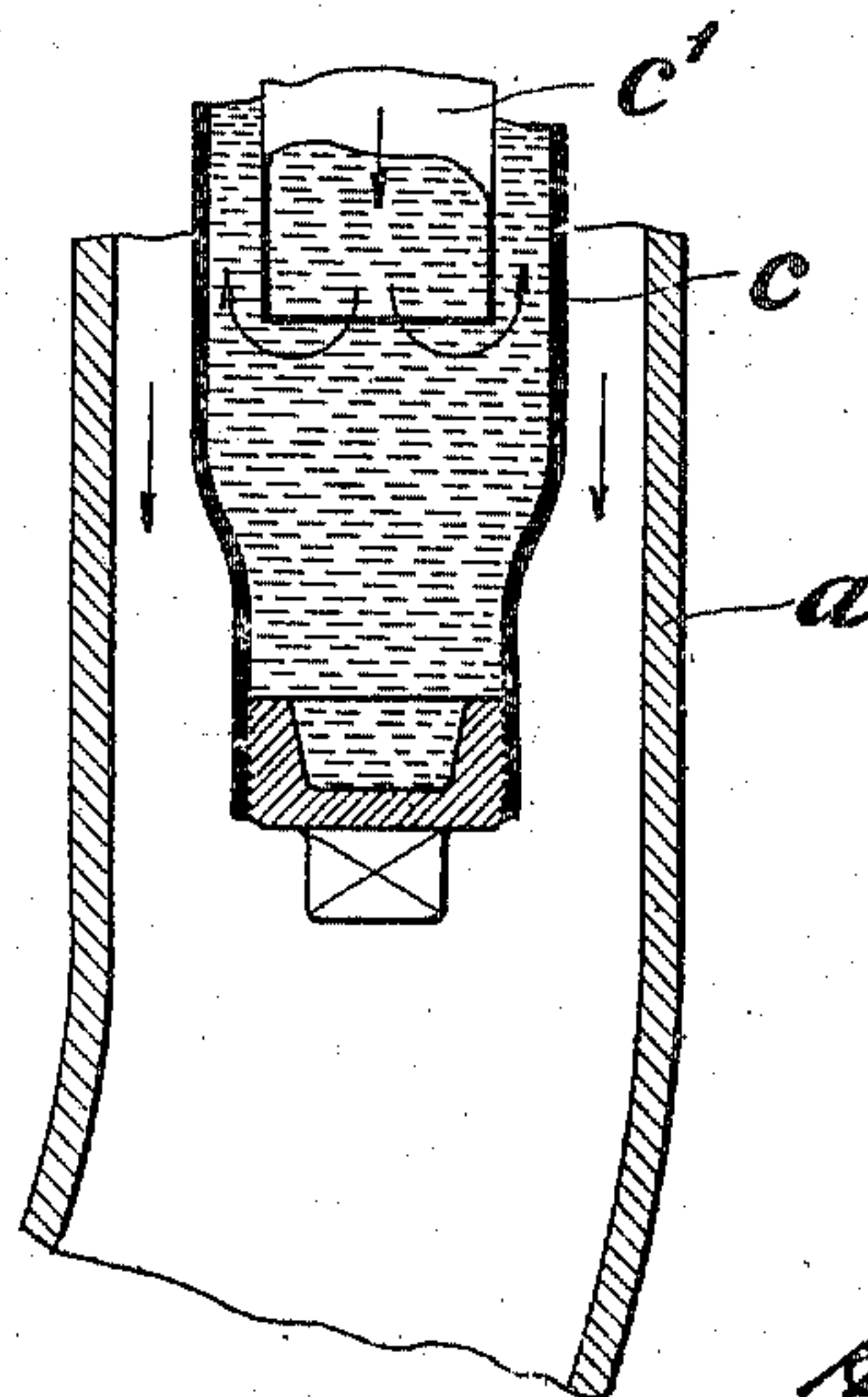


Fig 5.



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5 SHEETS—SHEET 4.

Fig 6.

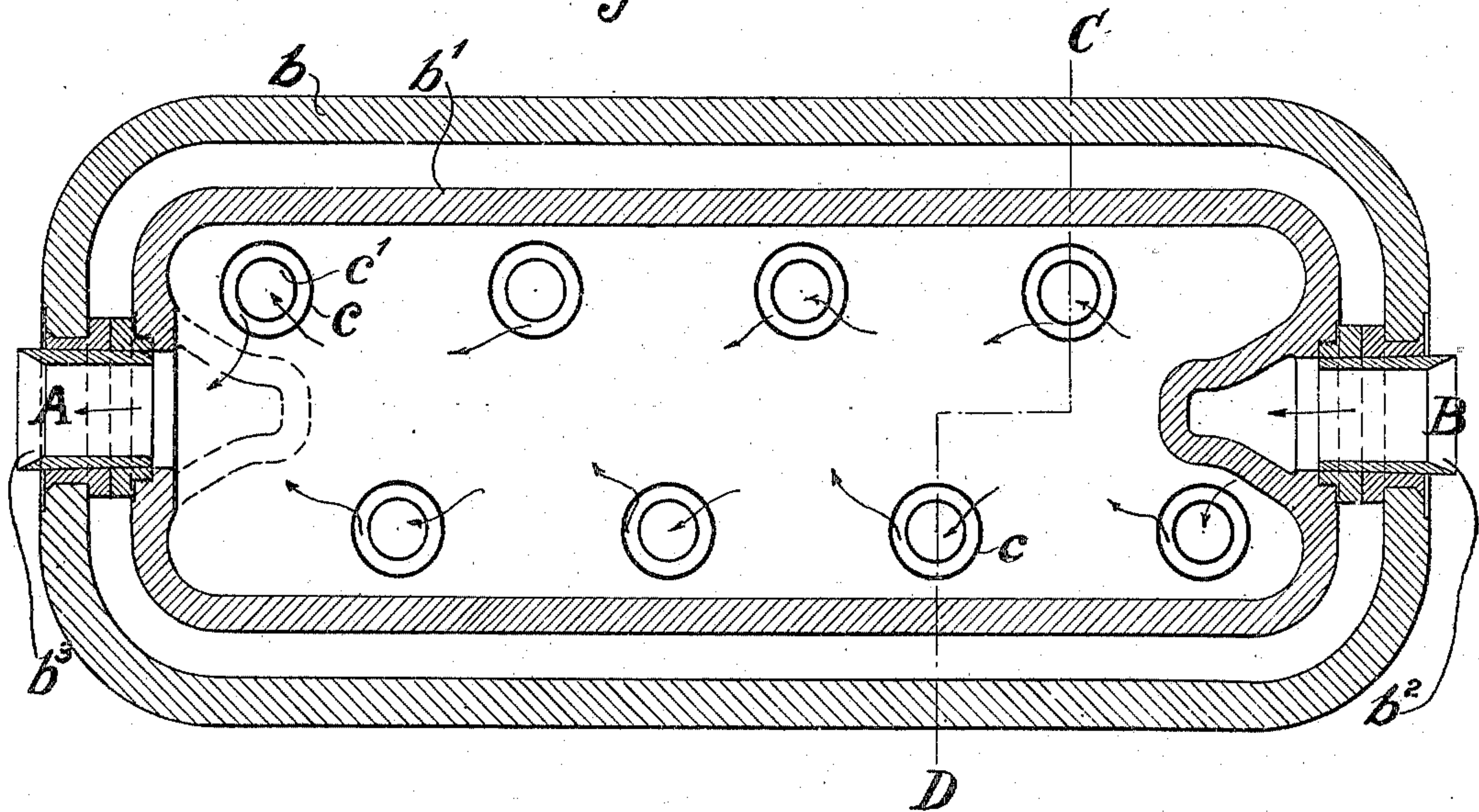
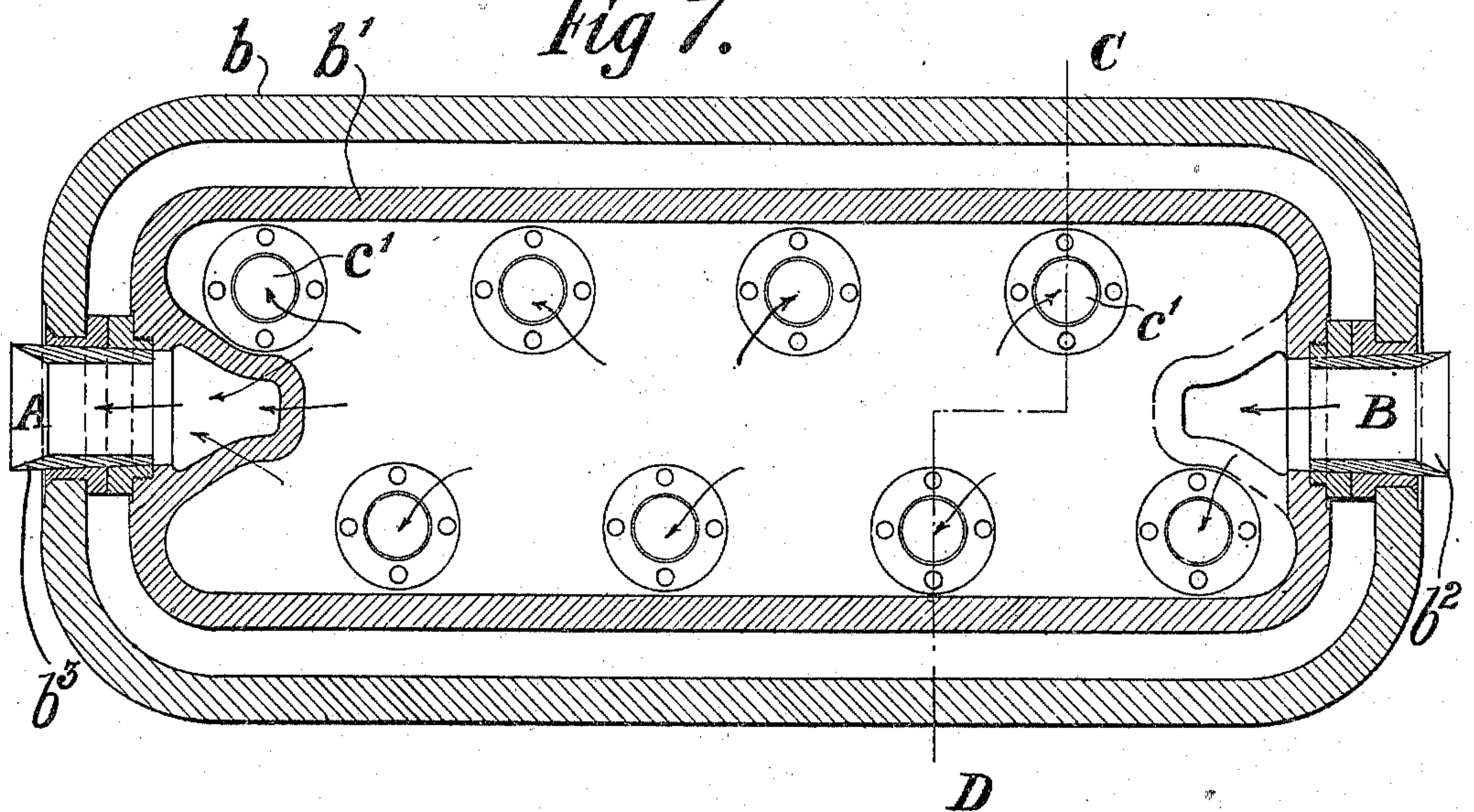


Fig 7.



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5 SHEETS—SHEET 5.

Fig 8.

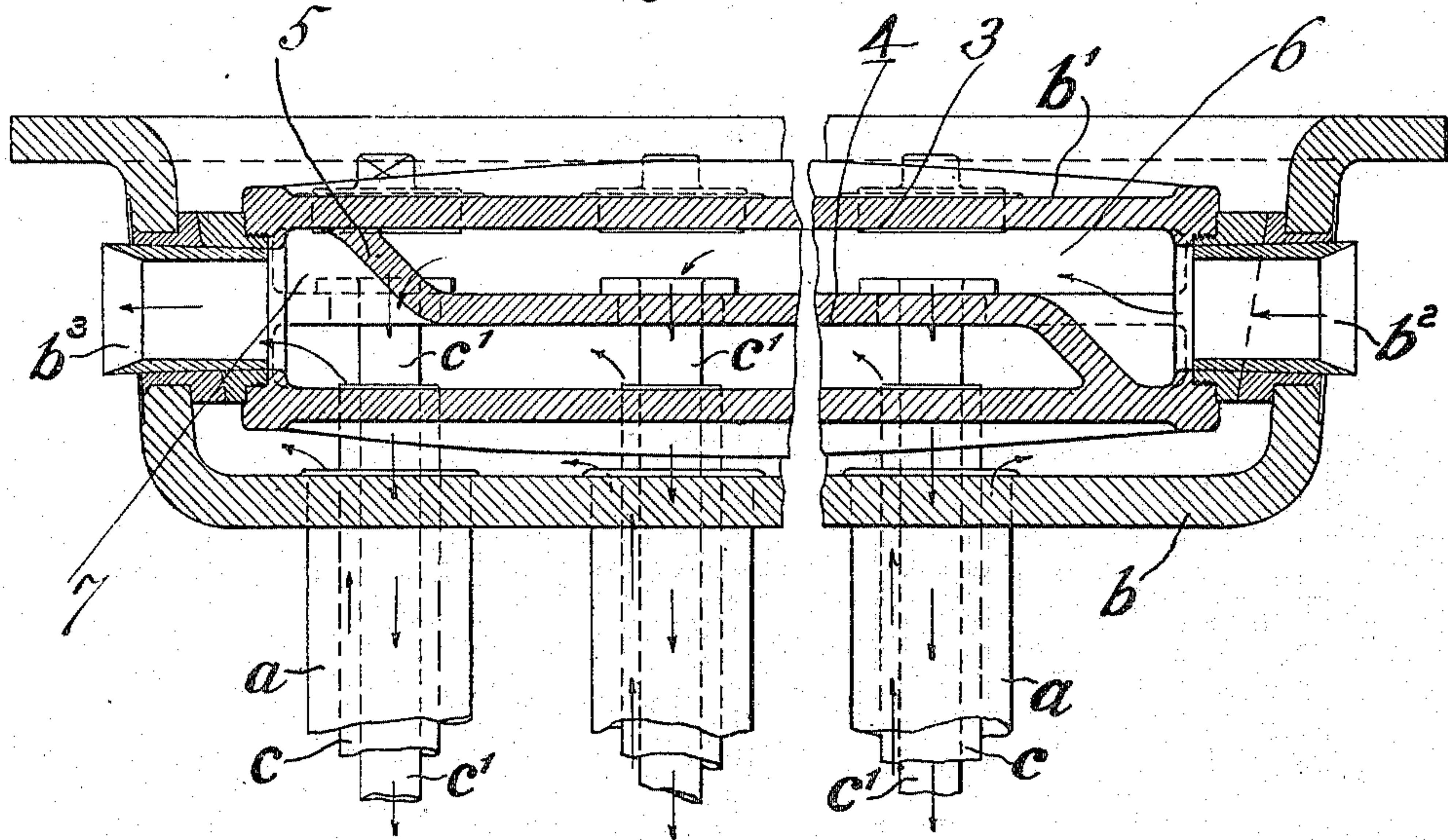
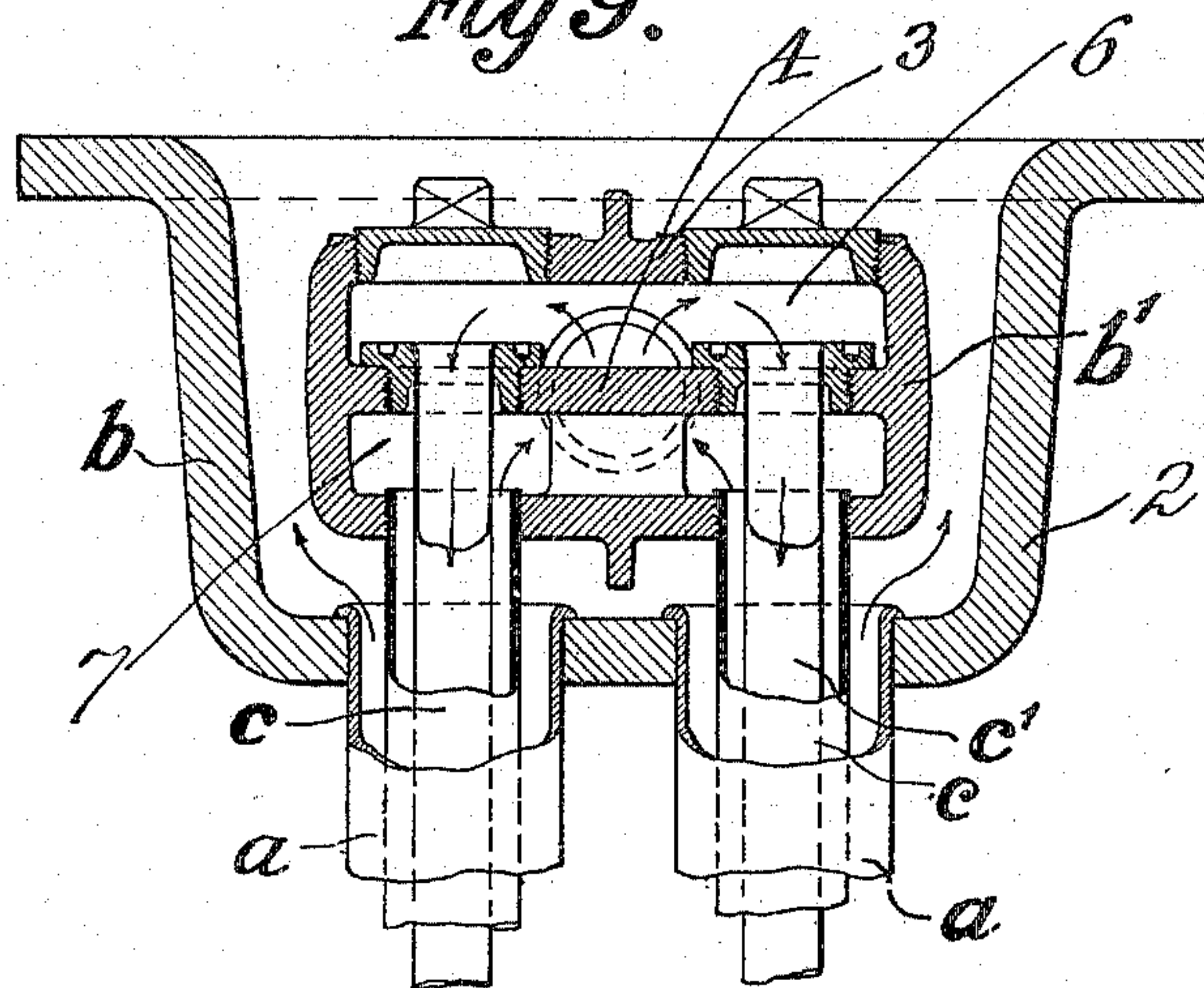


Fig 9.



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UNITED STATES PATENT OFFICE.

HENRY CRUSE, OF SALFORD, LANCASTER, ENGLAND.

APPARATUS FOR SUPERHEATING STEAM.

957,939.

Specification of Letters Patent.

Patented May 17, 1910.

Application filed September 20, 1909. Serial No. 518,652.

To all whom it may concern:

Be it known that I, HENRY CRUSE, a subject of the King of Great Britain, residing at 5 Blackfriars street, Salford, in the county of Lancaster, England, have invented new and useful Improvements in Apparatus for Superheating Steam, of which the following is a specification.

My invention relates to improvements in apparatus for superheating steam, and particularly to apparatus known as the Cruse controllable superheater, as patented by me in Great Britain under Number 5103 of 1898 and subsequent patents.

In the original apparatus and in subsequent forms it has been the practice to employ two sets of headers or boxes one set at each end of the tubes for the steam. The water tubes have either formed loops at one end running from one steam tube to another steam tube through the steam boxes or the water tubes have been connected at both ends by independent water boxes inside the steam boxes.

In another arrangement without headers the steam to be superheated, circulated from the boiler through a series of cylinders divided by diaphragms or equivalents, such as U shaped pipes, up and down and through coupling tubes from one cylinder to another and finally into the steam supply pipe, while an arrangement of pipes for heating the feed water passed up one side and down the other side of the diaphragm in each cylinder and forward through coupling pipes between the cylinders to the boiler.

My present improvements consist essentially in a novel combination and structural arrangement of the steam superheating tubes and water controlling tubes whereby I am enabled to dispense with one set of headers.

In the accompanying 5 sheets of drawings,—Figure 1 is a longitudinal sectional elevation. Fig. 2 is a sectional end elevation and Fig. 3 a sectional plan of my improved controllable steam superheater. Figs. 4 and

5 are detail views of the lower extremity of one of the Field water tubes inside one of the steam tubes. Figs. 6 and 7 are plans in section of the steam and water boxes. Fig. 8 is a longitudinal section on the line A—B, Figs. 6 and 7, and Fig. 9 is a cross section on the line C—D, Figs. 6 and 7.

In carrying my improvements into effect I form each steam tube a of U or equivalent loop shape so that the steam passes from say for convenience of description, one of the top set of headers b , down one leg of the tube a and returns upward through the other leg to one of the same set of headers, thus enabling the bottom or other set of headers to be dispensed with. In each leg of each U or loop shaped steam tube a I place a "Field" tube c, c' for the controlling water so that the water returns up the same leg of the steam tube to the same set of boxes or headers b' , although not necessarily to the same compartment in that set.

The steam and water circulation may be arranged in any convenient manner but in all cases both steam and water return to the one set of steam and water headers, at the top in the example illustrated. In the arrangement shown the water enters the header b' through the nipple b^2 descends the inner tube c' of the "Field" tube in the leg of the steam tube a returns through the exterior tube c of the "Field" tube to the lower compartment of the water box or header b' which it leaves through the outlet nipple b^3 .

As will be seen from Fig. 8, I form the steam and water boxes from an outer casing 2 and an inner casing 3, said casing 3 being divided by a central partition 4 having inclined ends 5 into two chambers 6 and 7, the inlet pipe b^2 for the water communicating with the chamber 6 and the chamber 7 communicating with the outlet b^3 for the water, while the steam flows through the space between the inner and outer casings. As will be seen from Fig. 5 the Field tube is formed by an outer tube c having one end closed

and an inner tube c' of less length than the outer tube and having its end opening into said outer tube.

What I claim as my invention and desire
5 to secure by Letters Patent of the United States is:—

A steam superheater comprising a single set of steam and water boxes, external steam
10 tubes of looped shape having their ends connected with the steam boxes, and internal

Field tubes for the water located in some of the legs of the steam tubes and connected with the water boxes.

In testimony whereof I have signed my name to this specification in the presence of 15 two subscribing witnesses.

HENRY CRUSE.

Witnesses:

S. W. GILLETT,

HERBERT ROWLAND ABBEY.