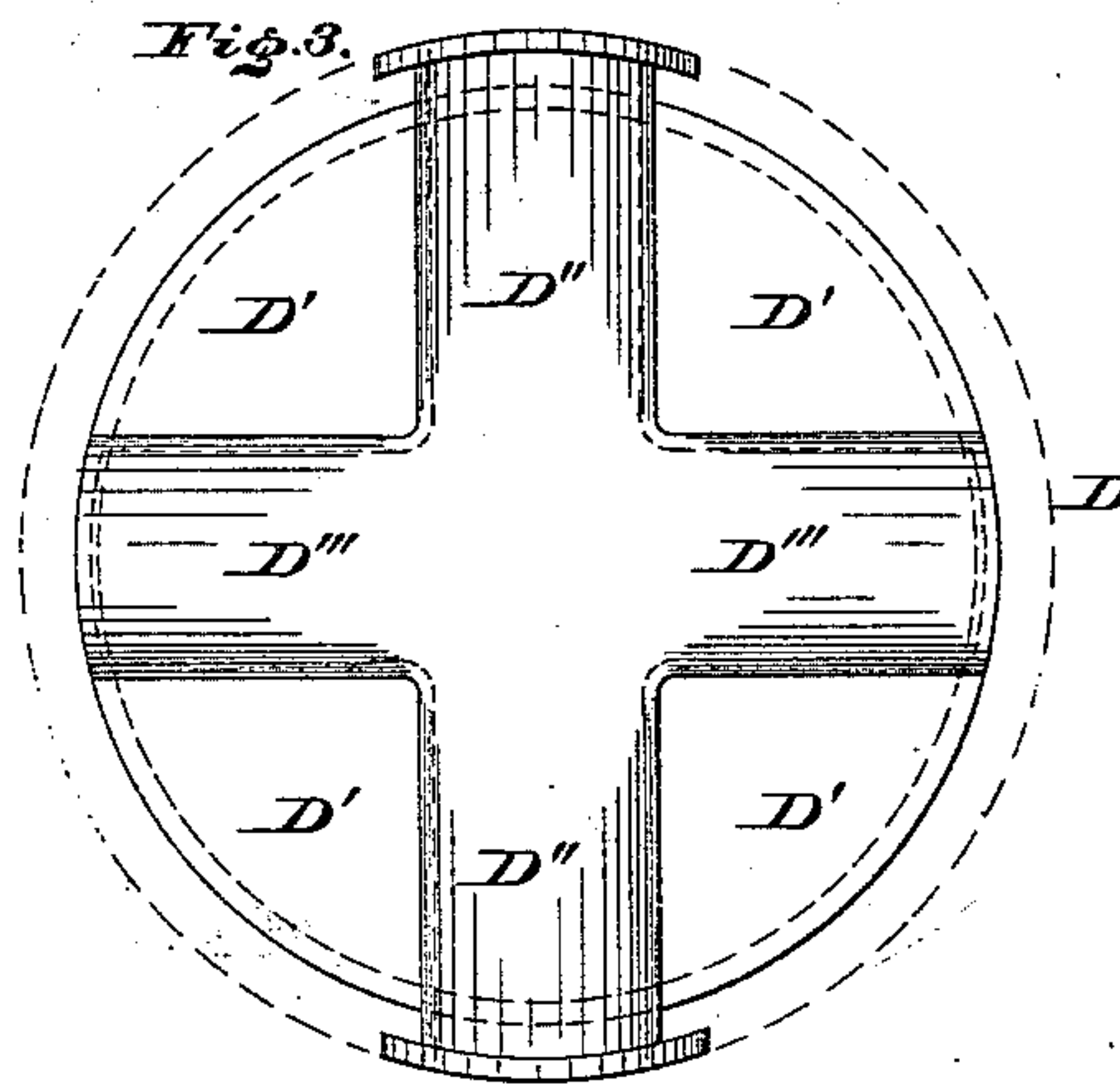
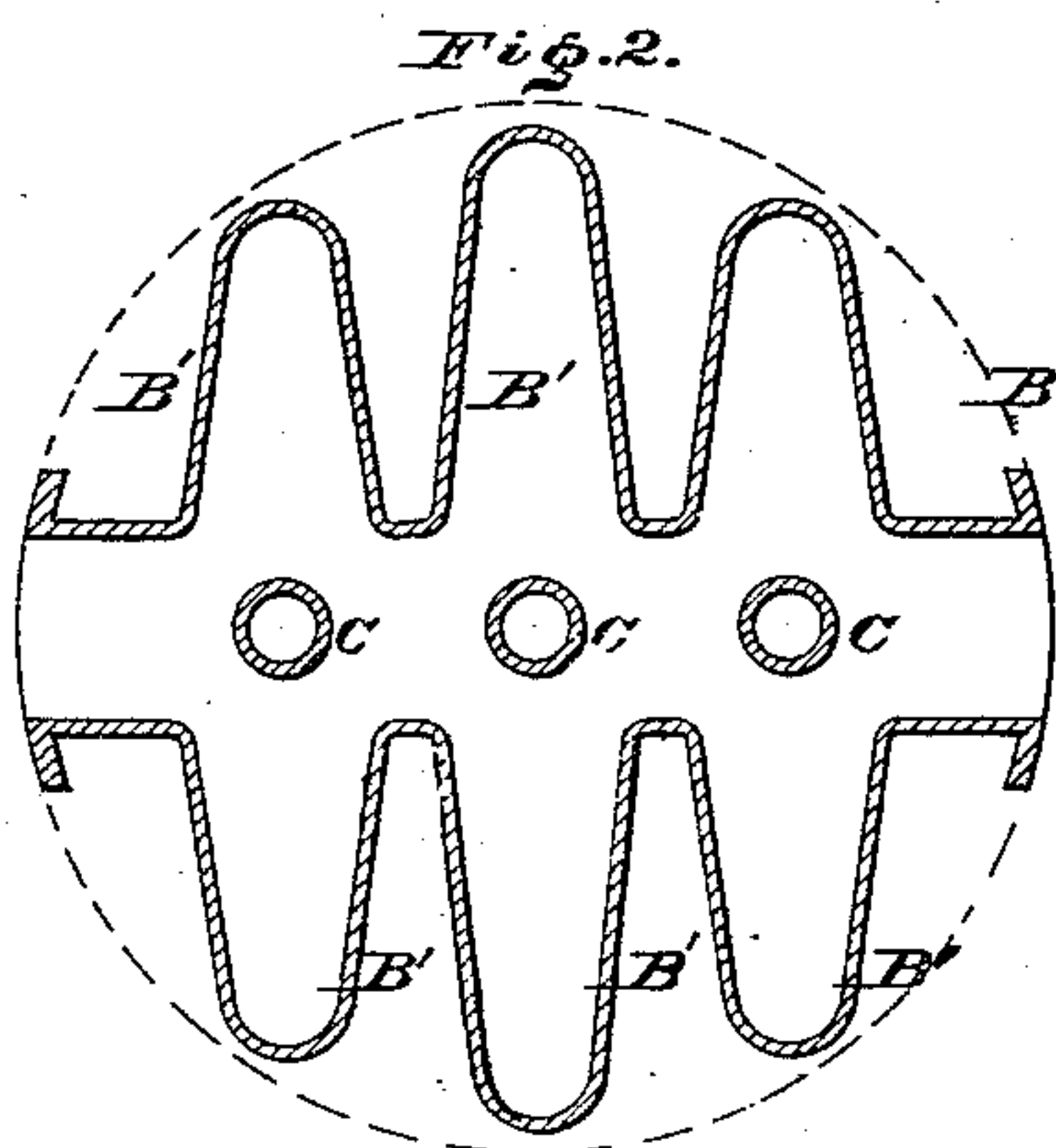
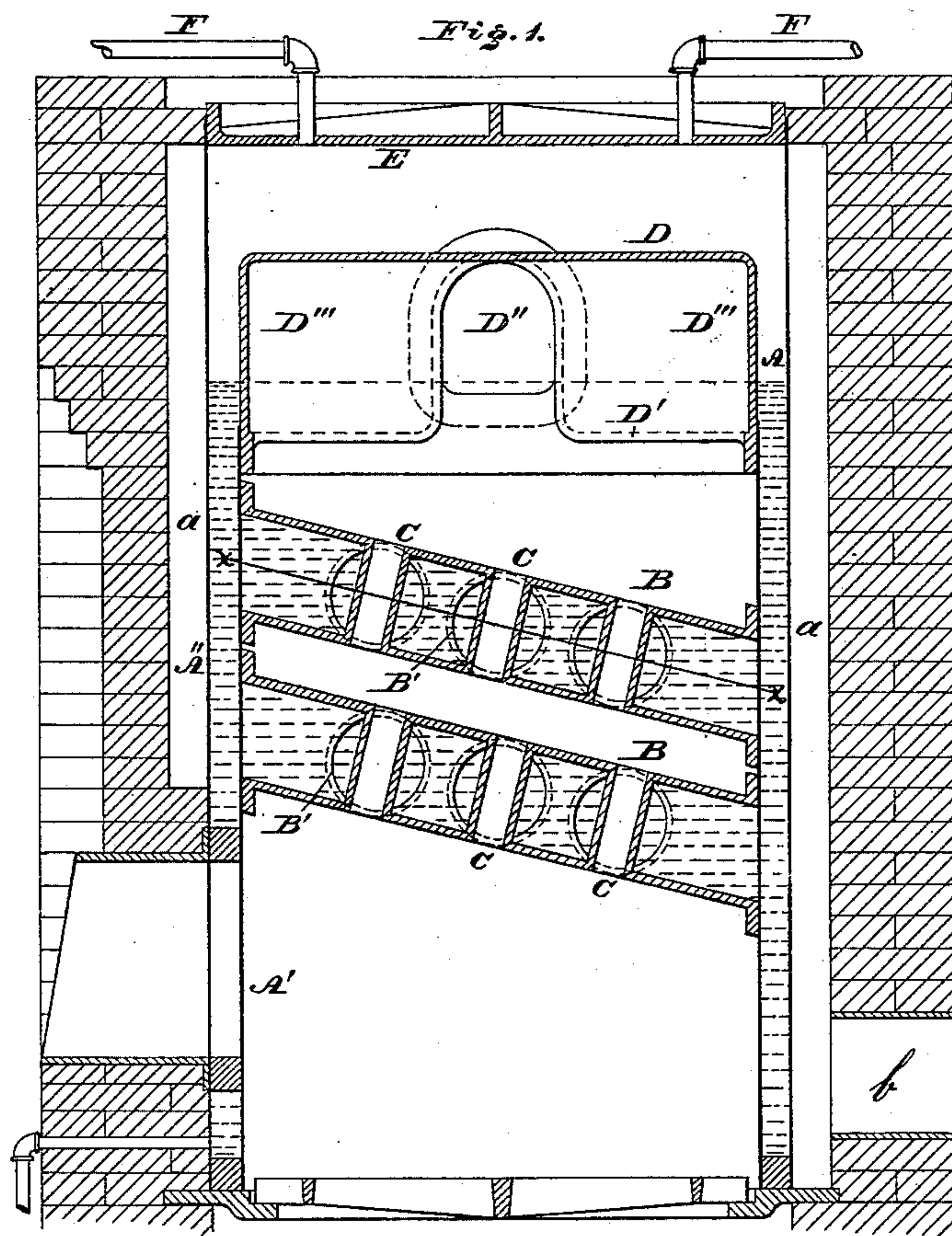


(No Model.)

W. P. COX.
STEAM GENERATOR.

No. 259,293.

Patented June 13, 1882.



WITNESSES:

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WILLIAM P. COX, OF PHILADELPHIA, PENNSYLVANIA.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 259,293, dated June 13, 1882.

Application filed January 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. COX, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Steam-Generators, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a vertical section of the steam-generator embodying my invention. Fig. 2 is a section in line *x x*, Fig. 1. Fig. 3 is a top or plan view of the crown-plate.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists of a steam-generator having flues formed with large water-spaces and heating-surfaces and a crown-plate of peculiar construction, the operation and advantages whereof will be hereinafter fully set forth.

Referring to the drawings, A represents a water-jacket formed by the inner shell, A', and outer shell, A'', said jacket being inclosed by a wall of masonry, sheet-iron, &c., between which and the jacket is a flue-space, *a*.

B represents tubes, which extend horizontally or horizontally inclined across the combustion-chamber formed by the inner shell, A', and communicate with the jacket A, their ends being secured to said inner shell, A'.

Secured to the top and bottom sheets of the tubes B are flues C C, which communicate with the combustion-chamber, so as to permit the products of combustion to pass through them.

D represents a crown-plate, which is sustained on the inner sheet, above the flues C, and E represents the boiler-head closing the top of the generator, and formed with pipes F, by which the steam is directed to the place of service.

The tubes B are formed with communicating laterally-projecting wings B', and the crown-plate D is formed of the crown-sheet D' and a horizontally-extending flue, D'', said sheet having an opening in its center which communicates with the opening at the center of said flue, the latter opening communicating with the combustion-chamber. The flue D'' is open at both ends and sustained on the outer shell, A'', so as to communicate with the space *a*, and said flue may have communicating lat-

erally-projecting wings D''', whose ends may be open or closed, as desired. It will be seen that the flue D'' leaves a water-space between its walls and the outer shell, A'', said space being shown in the present case of the form of quadrants, owing to the flue having the wings D''', which extend right angular to the flue. The products of combustion are directed by the flue D'' into the space *a*, as a flue in which they descend to the exit *b*, leading to the chimney or stack.

The operation is as follows: The jacket and tubes are properly supplied with water, and the products of combustion rise through the vertical flues C, enter the horizontal flue D'', and reach the flue-space *a*. It will be seen that the tubes B are heated on their exterior by the direct action of the products of combustion, and on the interior by the heat passing through the flues C, and as the wings B' increase the water capacity of the tubes B and the heating-surface thereof it is evident that the water is subjected to great heat and steam rapidly generated in large volumes. The water in the jacket A is subjected to heat on both sides of said jacket by the heat within the combustion-chamber and that descending in the flue-space *a*. Furthermore, the water in the crown-plate is subjected to heat from below and that passing through the flue D'', these additional means vastly increasing the steam-generating capacity. The steam enters the steam-space above the crown-plate, and leaves the same by means of the pipes F, as has been stated.

It will be seen that part of the flue D'' is above the water-line and occupies a position within the steam-space, thus acting as a super-heater of the steam.

The wings B' are conical in form, the widest part or bases being at the place of junction with the body of the tube. By this construction, as the water is subjected to violent ebullition at the narrow ends, the widening or enlargement of the wings permits a free and easy circulation of the water from one wing to the other, and consequently to the jacket, owing to the increased area provided by said widening or enlargement and the facility with which the water ascends from the narrow ends to the wide ends of the conical-shaped wings.

The water-tubes B obviously brace the sides of the shell A', besides conducting water across it from side to side. These tubes are strengthened by the lateral wings B' and the transverse tubes C.

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

1. A horizontal flue extending across the crown-sheet and communicating with the space between the inner and outer shell, in combination with said shells and crown-sheet, substantially as set forth.

2. In a steam-generator, the combination of an outer and an inner shell, the transverse water-tubes B, and a crown-sheet having a horizontal flue extending across the same and com-

municating with the space between the inner and outer shell, substantially as set forth.

3. In a steam-generator, the combination of an outer and an inner shell with transverse water-tubes B, having rings B' and flues C, and a crown-sheet having a horizontal flue extending across the same and communicating with the space between the inner and outer shell, substantially as set forth.

4. The horizontal flue D'', having hollow lateral wings, in combination with the crown-sheet, the two shells and exterior wall having a space for the passage of air between it and the outer shell.

Witnesses:

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JOHN A. WIEDERSHEIM,

W. F. KIRCHER.