

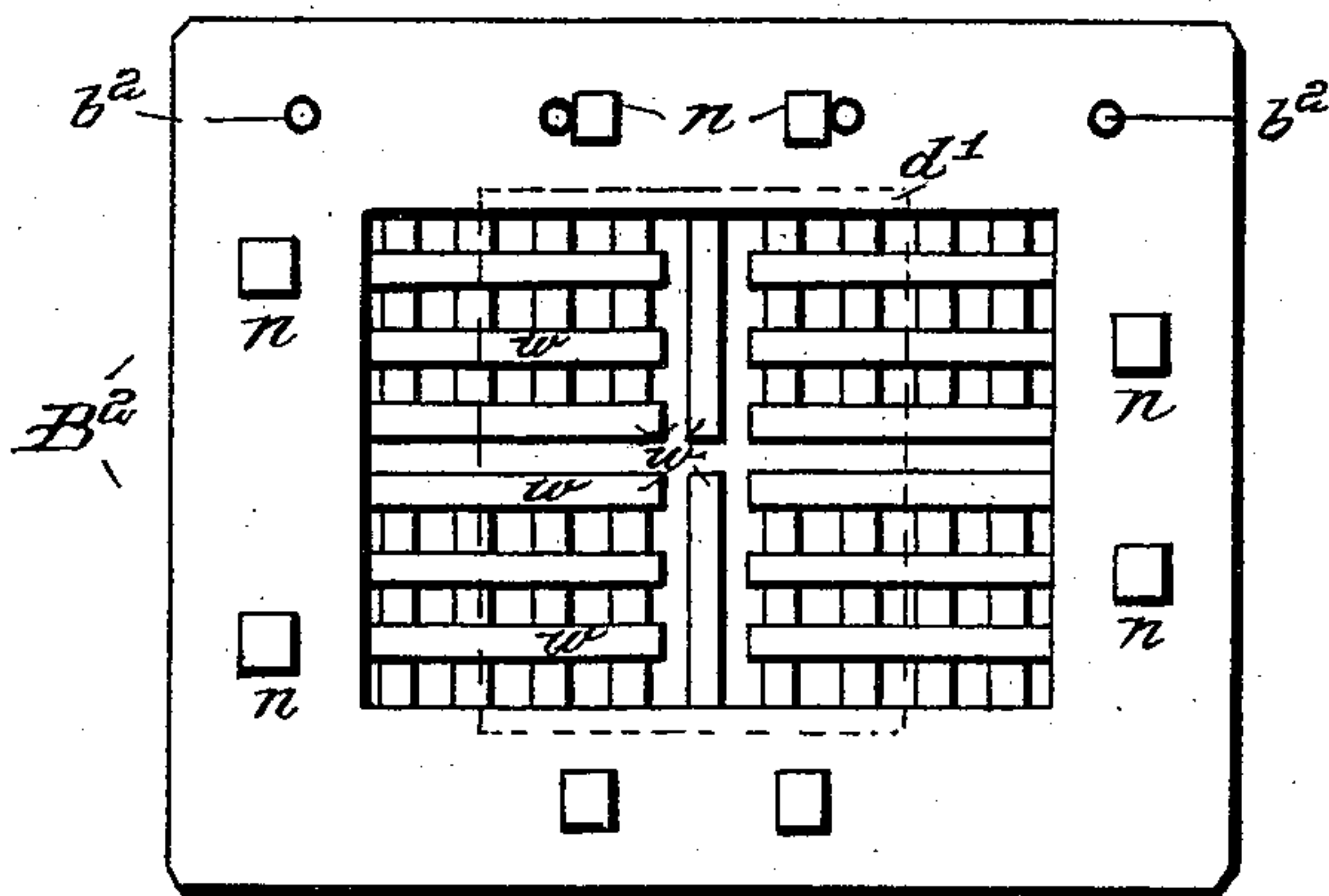
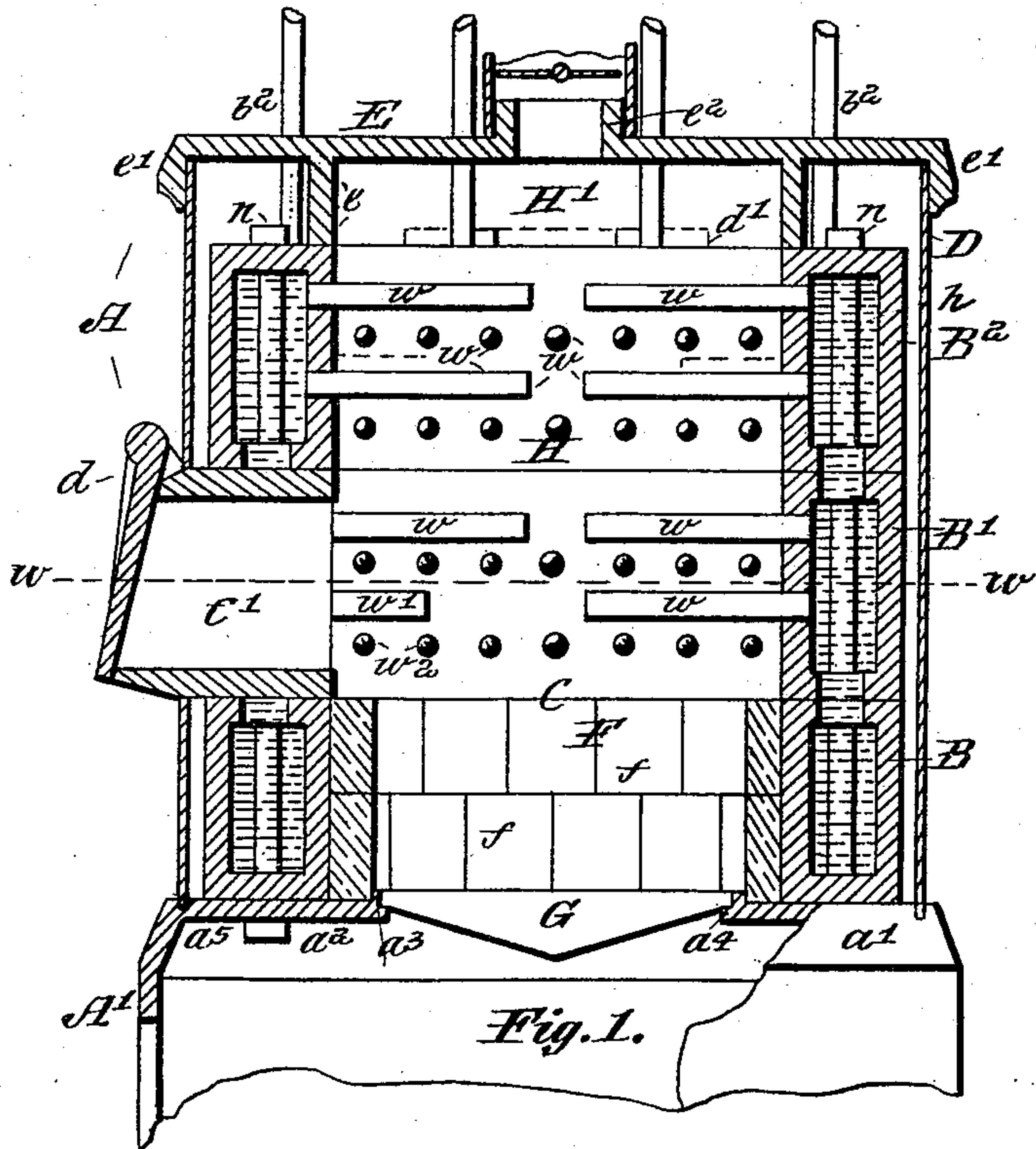
(No Model.)

2 Sheets—Sheet 1.

F. WILSON.
WATER HEATER.

No. 407,561.

Patented July 23, 1889.



Witnesses:
Arthur Ashley
James F. Duhamel

Inventor:
Frank Wilson
By J. H. Ashley

2 Sheets—Sheet 2.

No. 407,561.

Patented July 23, 1889.

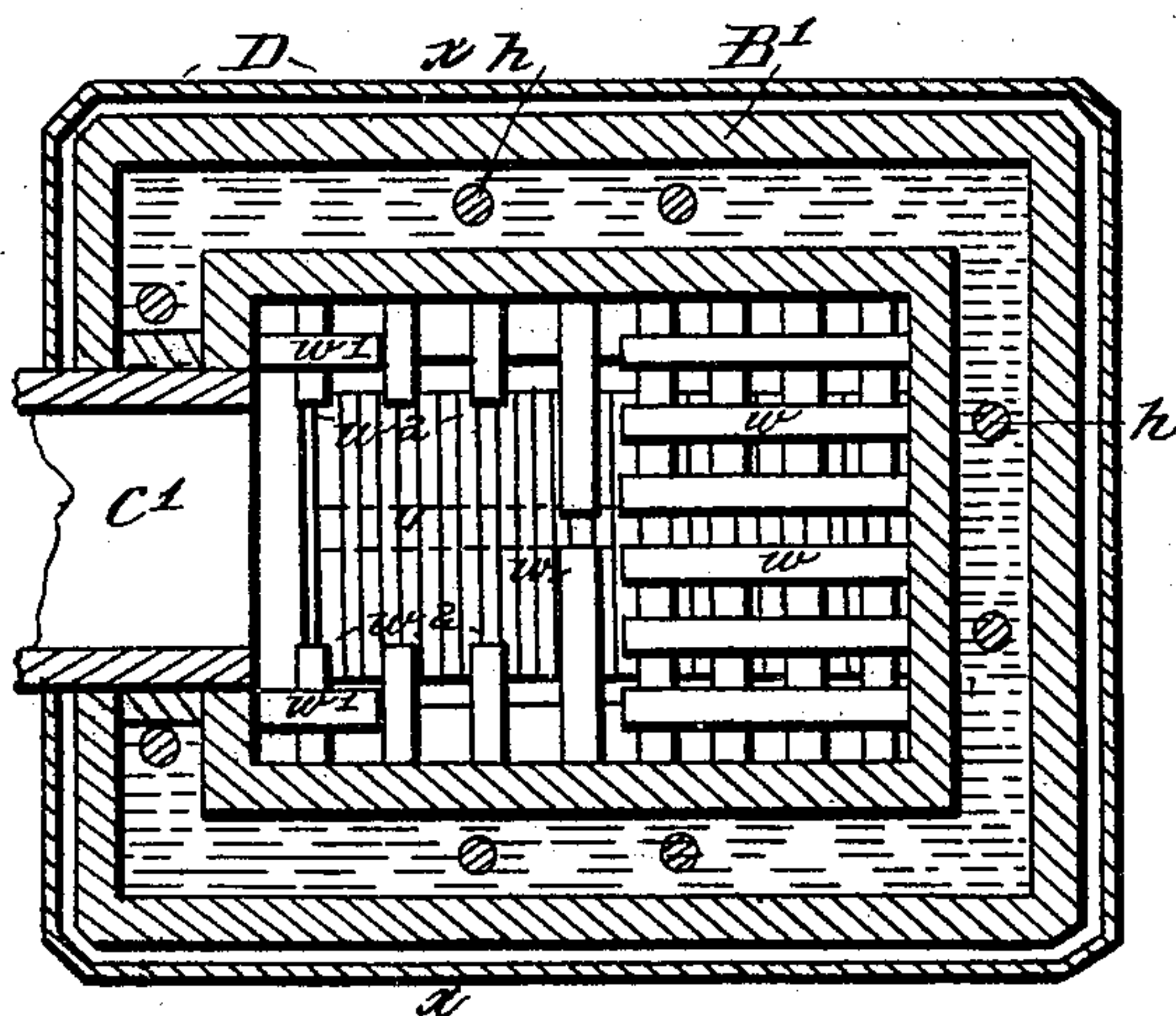
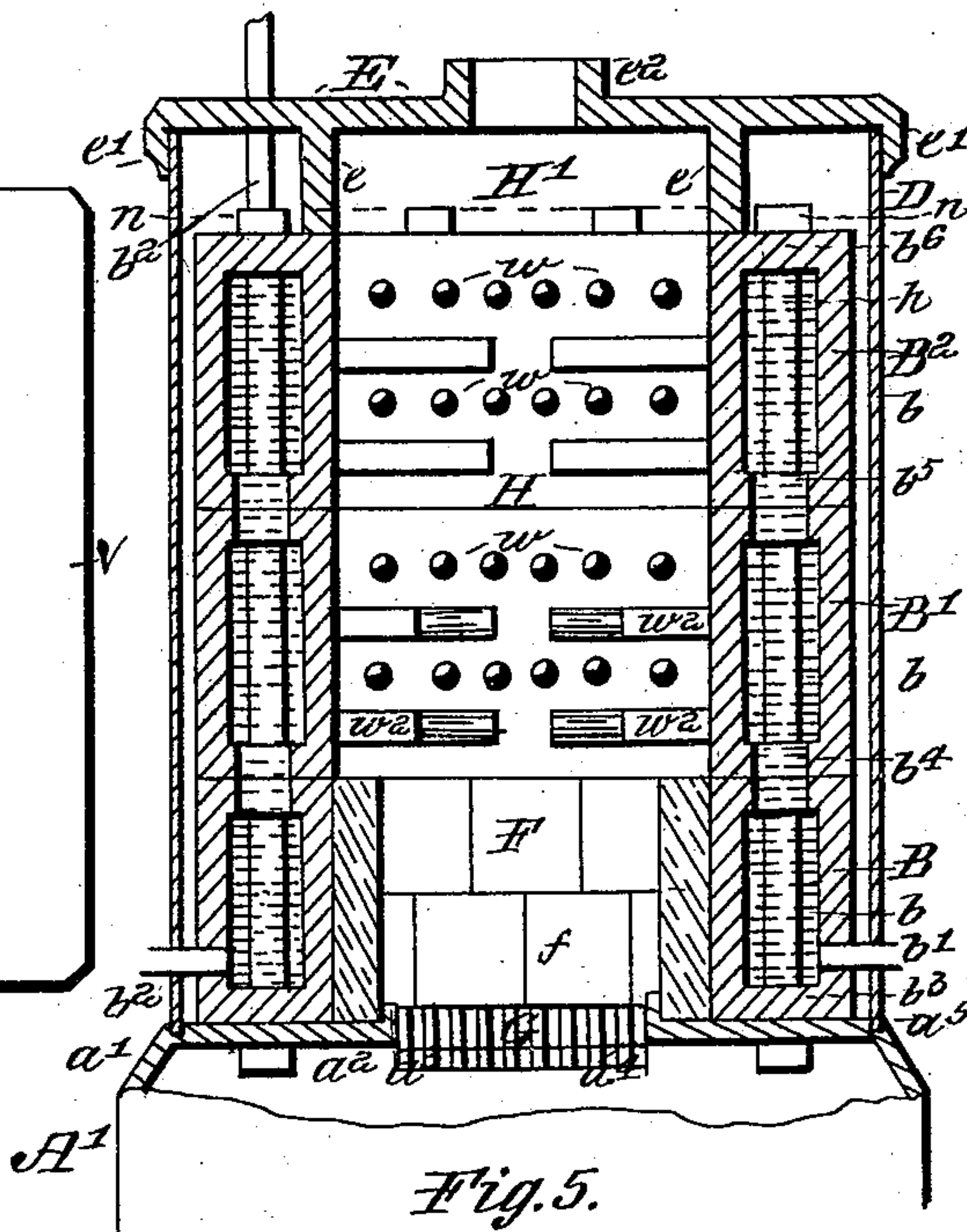


Fig. 4.

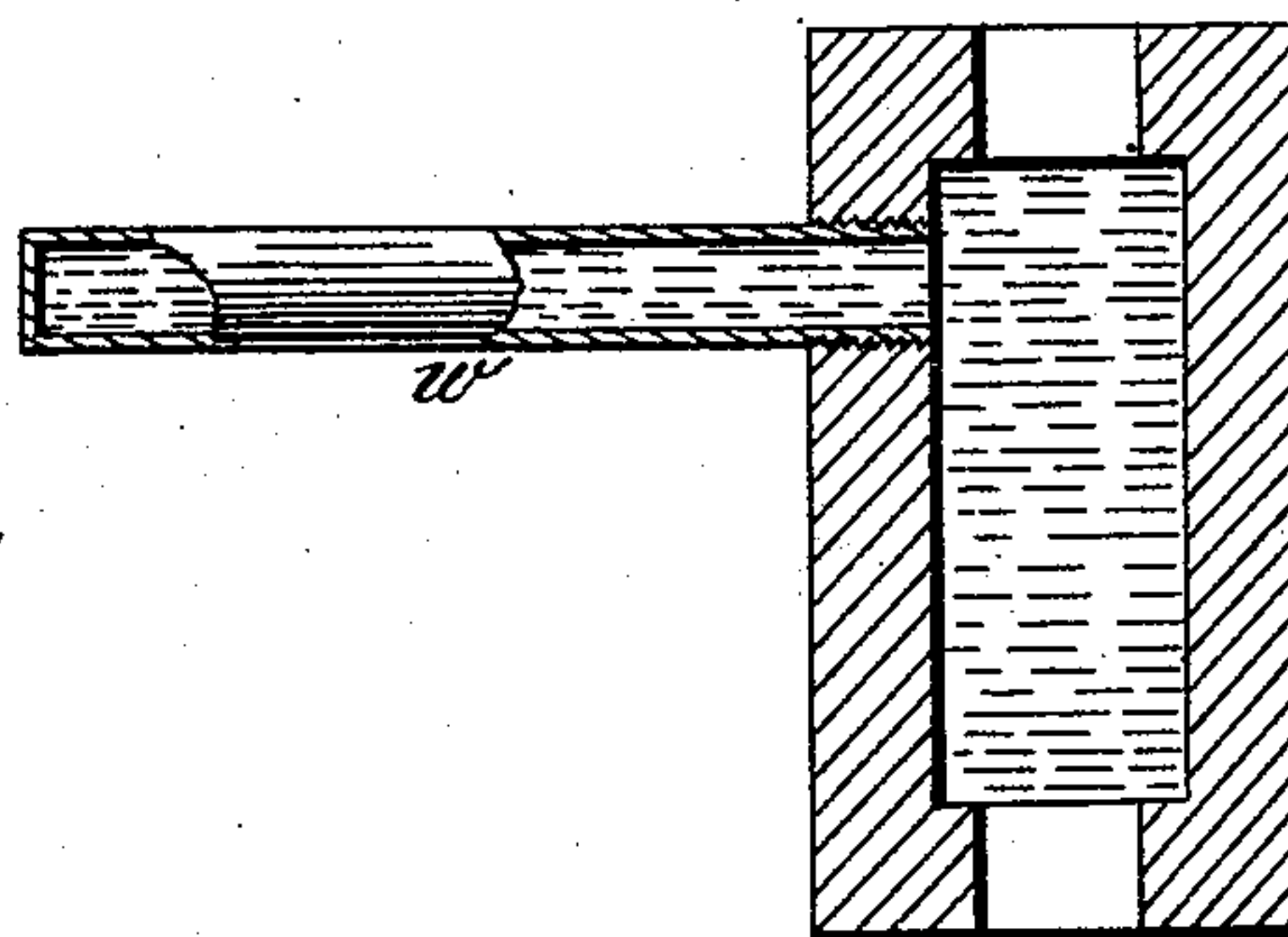


Fig. 6.

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UNITED STATES PATENT OFFICE.

FRANK WILSON, OF EASTON, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS
TO JOHN L. WILSON AND JAMES E. WILSON, OF SAME PLACE.

WATER-HEATER.

SPECIFICATION forming part of Letters Patent No. 407,561, dated July 23, 1889.

Application filed April 19, 1889. Serial No. 307,801. (No model.)

To all whom it may concern:

Be it known that I, FRANK WILSON, a citizen of the United States, and a resident in Easton, in the county of Northampton, in the State of Pennsylvania, have invented a new and useful Hot-Water-Heating Apparatus, of which the following is a description.

As is implied by the title, the invention relates to that class of heaters for dwellings and other buildings in which a body of water is heated in a central reservoir, which is provided with an inlet-pipe and with any desired number of outflow and return pipes, which, in connection with the main or central water-chamber, constitute a series of circuits by means of which heat evolved through combustion is distributed through the medium of the water to any desired number of apartments, the expansion of the water in proximity to the fire-chamber causing a rapid upward flow of heat particles, and the condensation thereof through exposure to the lower temperature of the upper apartments through which the pipe-circuits extend causing them to descend rapidly through the return-pipes, the process being continued so long as heat is maintained, and its rapidity varying with the activity of the combustion within the fuel-chamber.

The invention consists in various novel parts and in various novel combinations of parts in a hot-water-heating apparatus, as will appear from the following detailed description of the same and from the several clauses of claims following such description.

In the accompanying drawings, which constitute a part of this specification, Figure 1 represents a central vertical longitudinal section of the water-heater proper, the line of section being indicated at $v v$ in Fig. 2. Fig. 2 represents a top plan view. Fig. 3 is a top plan view of the upper water-section detached. Fig. 4 is a horizontal section of the heater in the line $w w$ of Fig. 1. Fig. 5 is a transverse section in the line $x x$ of Fig. 4. Fig. 6 is a detail showing one of the water-arms in vertical section.

The base or ash-pit section A' of the water-heater A may be of metal, as represented in Fig. 1, or the vertical main portion may be of brick masonry, while the remaining in-

drawn and horizontal portion or cap a' may be of iron. Under either construction the inwardly-extending flange-plate a^2 of the cap will have an upwardly-extending flange a^3 , coincident horizontal flanges or grate supports $a^4 a^4$, and a top groove a^5 . The base A' thus constructed receives the lowermost water-section B , in which is formed the continuous water-chamber b , which is provided with water-supply pipe b' , return-pipes $b^2 b^2$, &c., bottom openings b^3 for holding-rods, and top water-openings b^4 in any suitable number. Within the space between the inner wall of this section and the vertical flange a^3 of the base-cap a' are fitted the sections f of the fire-brick lining F , and upon the oppositely-placed supports a^4 is received a grate G of any suitable construction.

The intermediate or fuel-supply water-section B' , like the water-section B , has a water-chamber b , which is continuous or intercommunicating along three sides thereof, but is closed at the sides of the fuel-supply-chamber chute C' , as best seen in Fig. 5. This section is provided with a pivoted door d and with several series of water-arms w of uniform length, which extend in horizontal planes from the water-chamber inwardly to a point near the longitudinal and transverse central lines of the heater. In the front portion of the section are shorter water-arms w' w' and w^2 , which provide a central vertical feed-opening o for supplying the fuel-chamber C .

The upper water-section B^2 has water-passage b , which is continuous, as in the section B , bottom water-openings b^5 , water-arms w , top openings b^6 for the holding-rods h , and suitable openings for the outflow and return tubes b^2 , as clearly indicated in Fig. 2.

The exterior sheet-metal casing D , which is stepped in the groove a^5 of the base-cap a' , incloses the water-sections, as shown, a small space being left between the sections and the casing.

The cap or top plate E has an inner vertical depending flange e , which is in a plane with the vertical inner wall of the water-sections, an exterior vertical rim or flange e' , which embraces the upper extremity of the exterior casing D , a preferably central pipe-

collar e^2 to receive the smoke-exit pipe, and suitable openings for the insertion of the water-tubes b^2 .

In assembling the parts the water-sections
5 are first secured to the base or ash-pit section A' by means of the holding-rods h and the nuts n , the rods extending through the coincident water-openings of the sections, and suitable packing-rings being applied to
10 guard against leakage. The cap or top plate E being then fitted in its position, the ends of the water-tubes are passed through the openings in the plate and turned to their engagement with the tapped openings in the top
15 of the water-section B^2 .

It will be observed that through the provision of the depending flange e upon the lower face of the top plate or covering-plate E an unobstructed upward extension H' of the
20 smoke or combustion chamber H is formed above the plane of the water-sections proper, and that the exterior flange or downturned rim e' of such plate firmly secures the casing D against displacement.

In operation, fuel being ignited in the chamber C , water will be supplied through the inlet-pipe b' until the water-sections and the outflow and return pipes b^2 are filled, whereupon the supply or inflow may be cut off.
30 The temperature of the water in the sections being raised through their contiguity to the burning fuel, a circulation of heat will be established and continued in the manner already indicated.

Through the arrangement of the several series of intersecting water-arms in alternation a net-work, as it were, is formed, producing numerous rectangular openings for the upward movement of the products of combustion.
40 These will in their passage envelop the water-arms, and the heat contained in such products will be imparted to the arms and their contents, thus thoroughly utilizing it.

In situations in which the draft is so strong as to carry the products of combustion upward so quickly as to prevent their thorough utilization it may be found desirable to employ one or more baffling or deflecting plates,
50 as d' , either in connection with the water-arms or directly upon the top of the upper water-section.

Although I have herein described and shown in connection with the fuel-chamber a lining of fire-brick, I desire that it shall be understood that I do not restrict myself to the use
55 of a lining of any kind, as I have ascertained that the apparatus can be advantageously operated without it.

Having described my invention, I claim— 60

1. In a hot-water-heating apparatus, the combination, with a grooved base or ash-pit section having securing perforations and an upwardly-extending flange, of a fuel-chamber water-section having vertical passages corresponding to the securing perforations in the
65 base, a casing adapted to the groove in the base, and fire-brick sections between the inner face of the water-sections and the upwardly-extending flange of the base. 70

2. In a hot-water-heating apparatus, a water-section which is provided with a fuel-supply chute, front, rear, and side series of water-arms of uniform length which extend toward transverse and longitudinal central lines
75 of the heater, and transverse and longitudinal short water-arms in the front portion of the water-section, whereby a vertical fuel-opening at the ends of the short water-arms is produced. 80

3. In a hot-water-heating apparatus, the combination, with the base or ash-pit section, of the fuel-chamber water-section, the feed-chute water-section having water-arms forming vertical fuel-opening, and the upper water-section, the three water-sections and the
85 base or ash-pit section being secured together by the holding-rods h , substantially as shown and described.

4. In a hot-water-heating apparatus, the combination, with the base or ash-pit section, of the described water-sections secured together and to such base, as set forth, the vertical exterior casing supported upon the base-section, and the flanged cap or top plate resting upon the upper water-section and upon
95 the vertical exterior casing, substantially as specified.

FRANK WILSON.

Witnesses:

H. D. MAXWELL,
KATE REIGEL.