

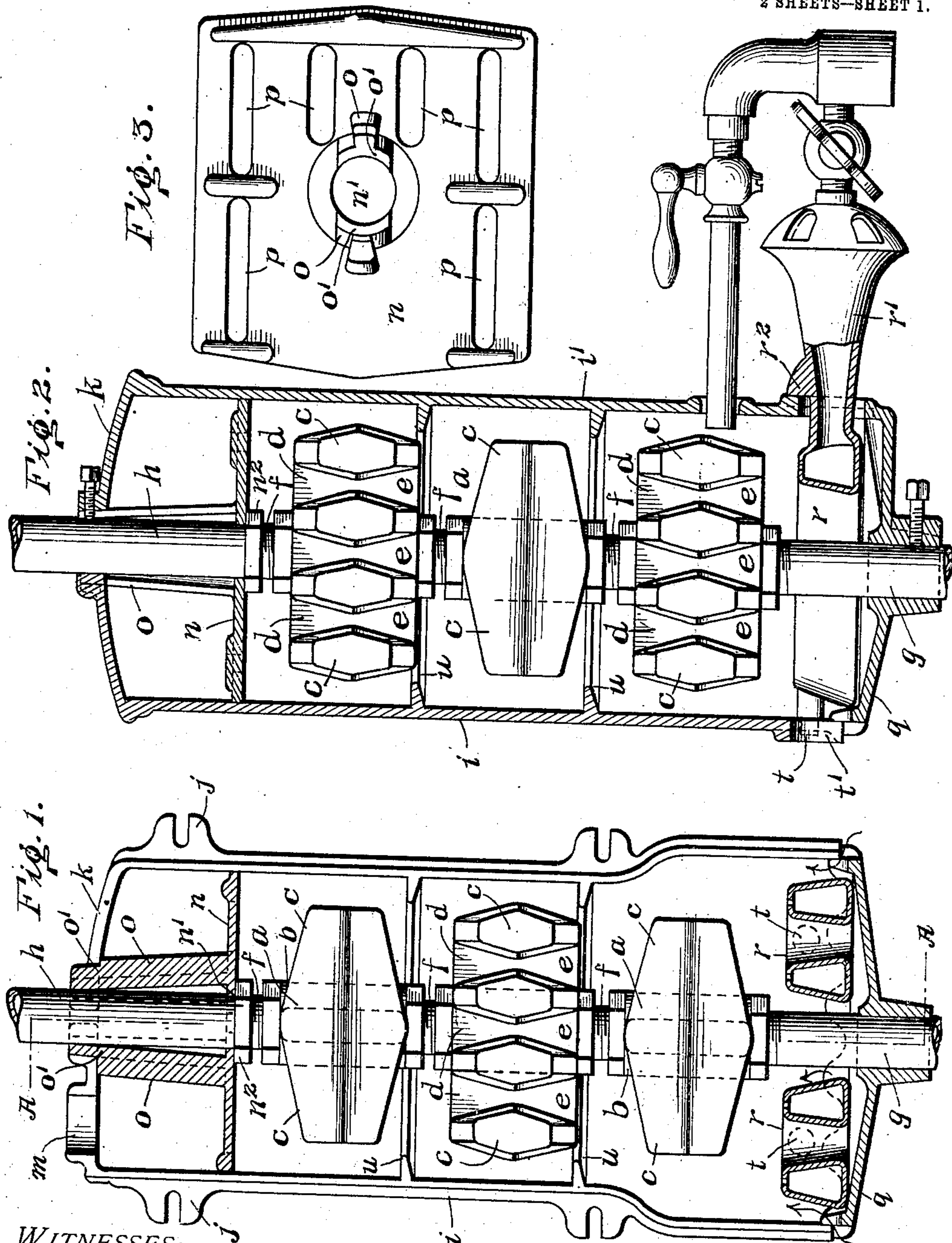
No. 840,220.

PATENTED JAN. 1, 1907.

W. KANE.
WATER HEATER.

APPLICATION FILED AUG. 10, 1906.

2 SHEETS—SHEET 1.



WITNESSES:

Danl. Webster, Jr.
R. M. Kelly.

INVENTOR

Wm. Kane

By

[Signature]

Attorney

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2 SHEETS—SHEET 2.

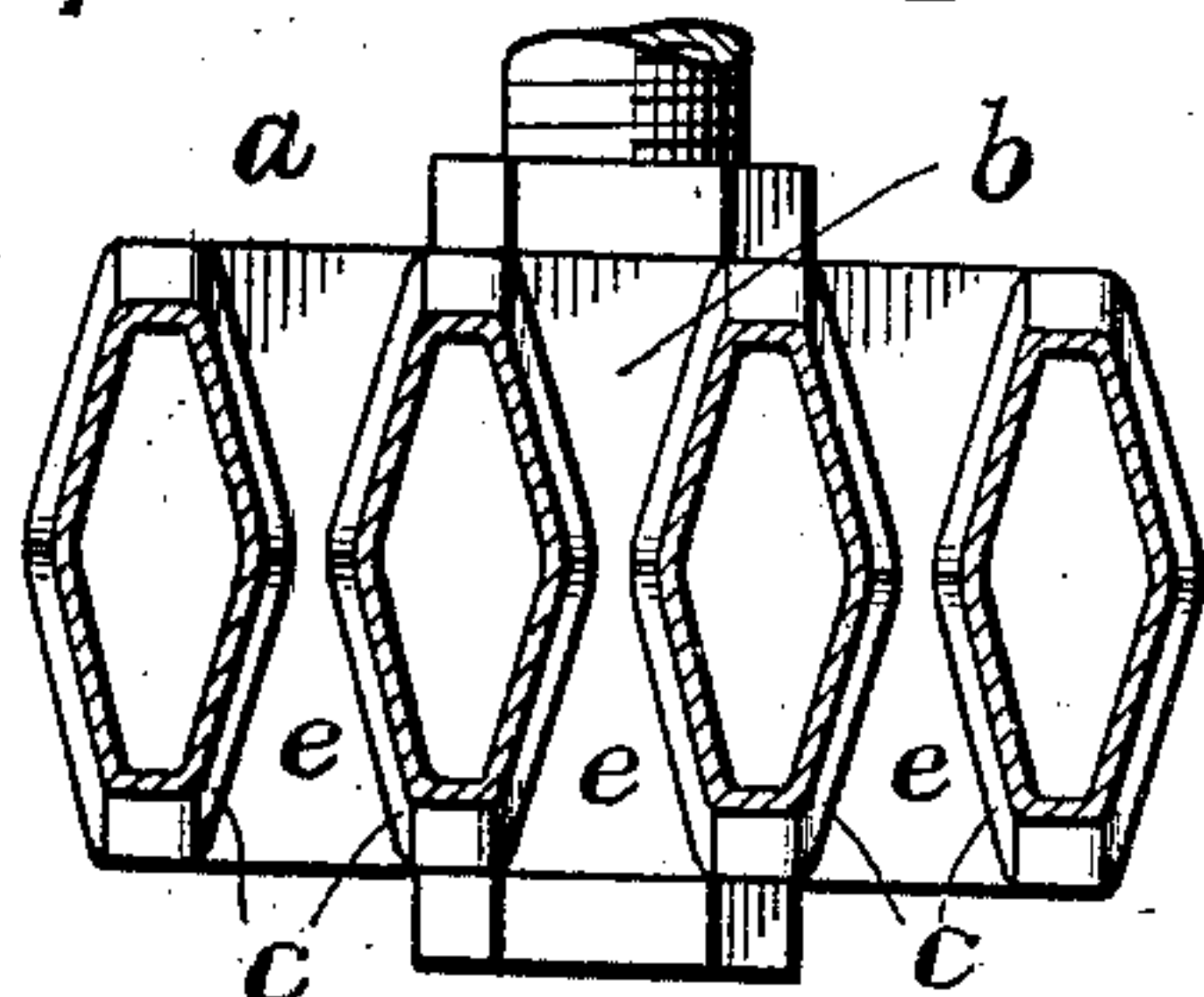
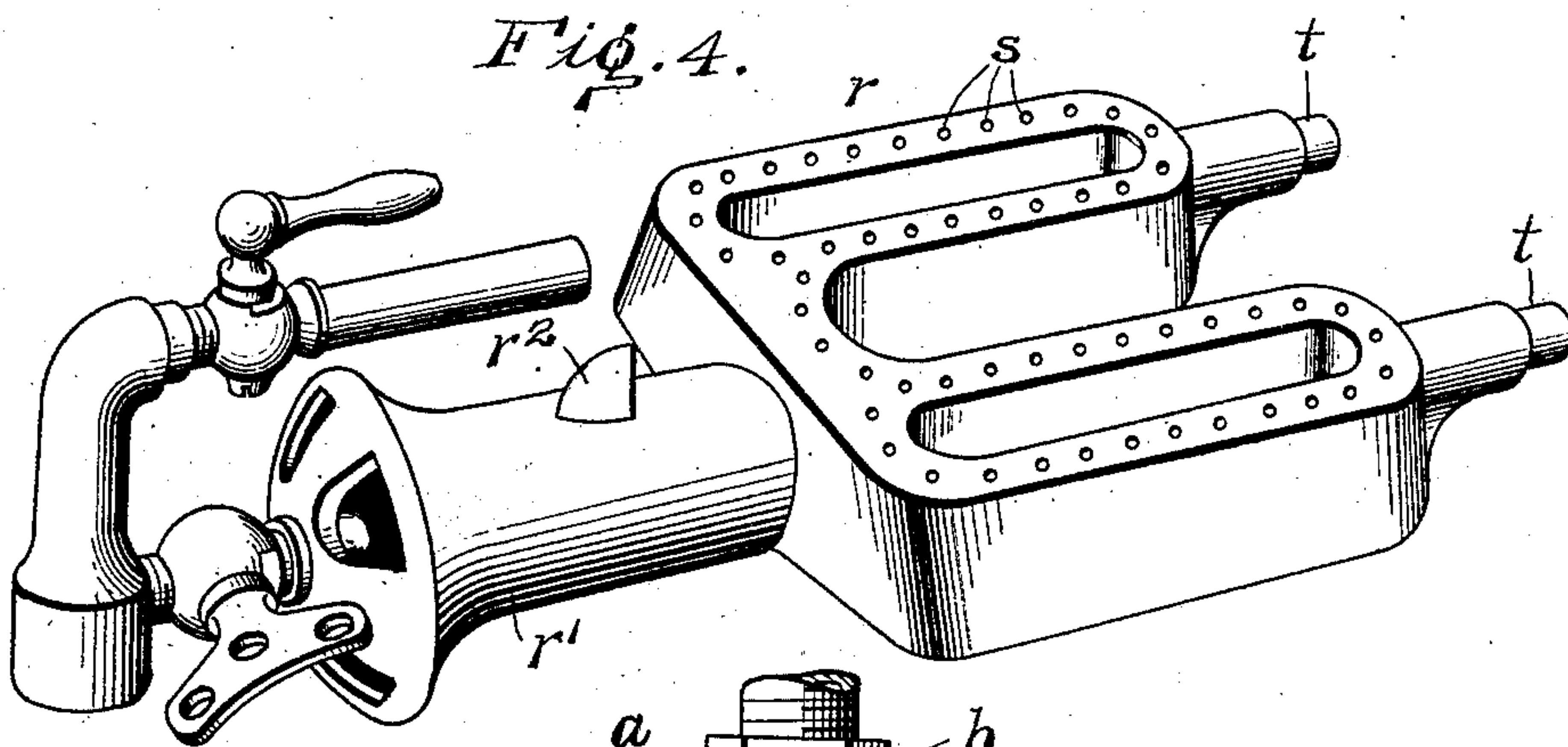


Fig. 6.

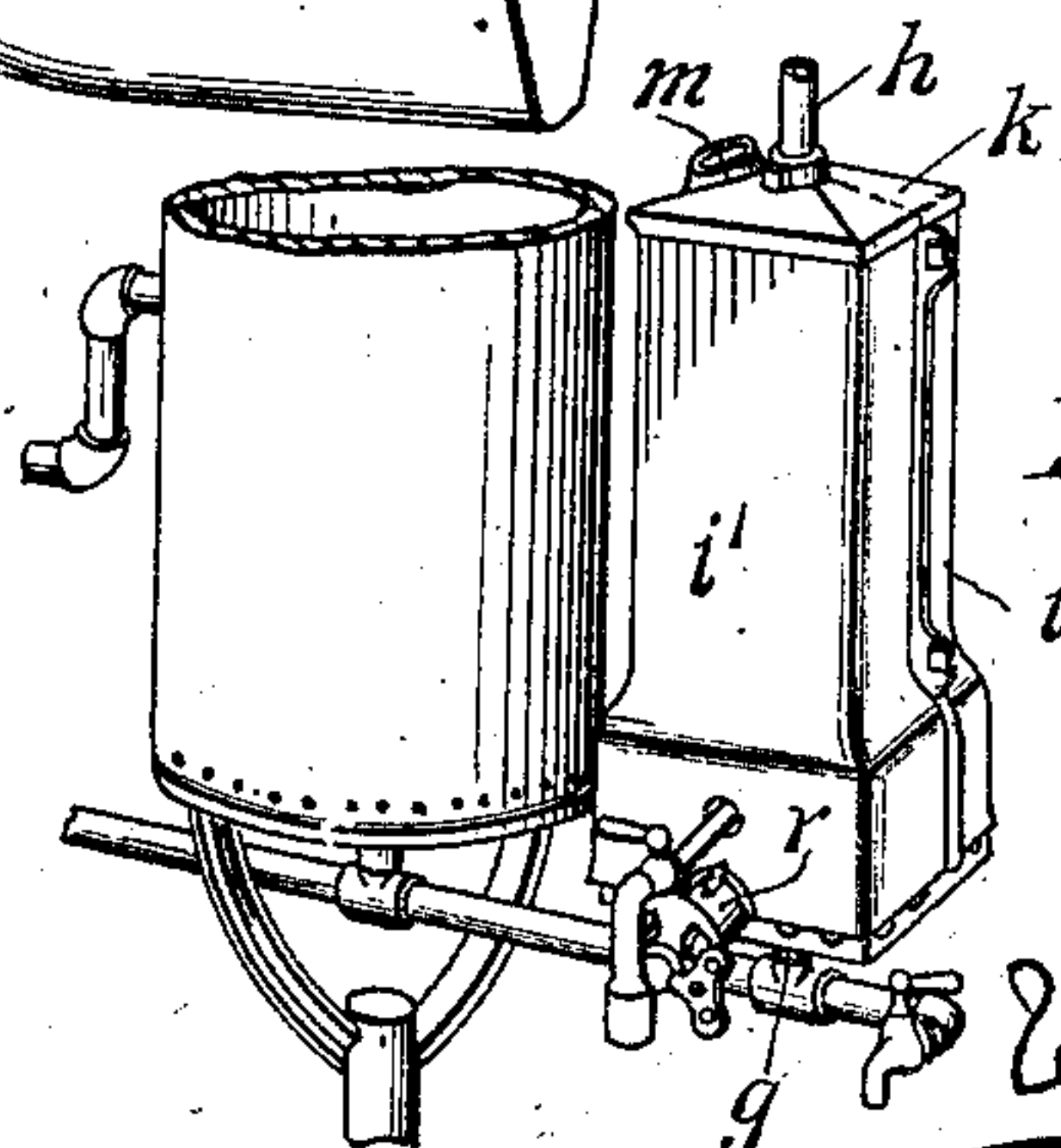
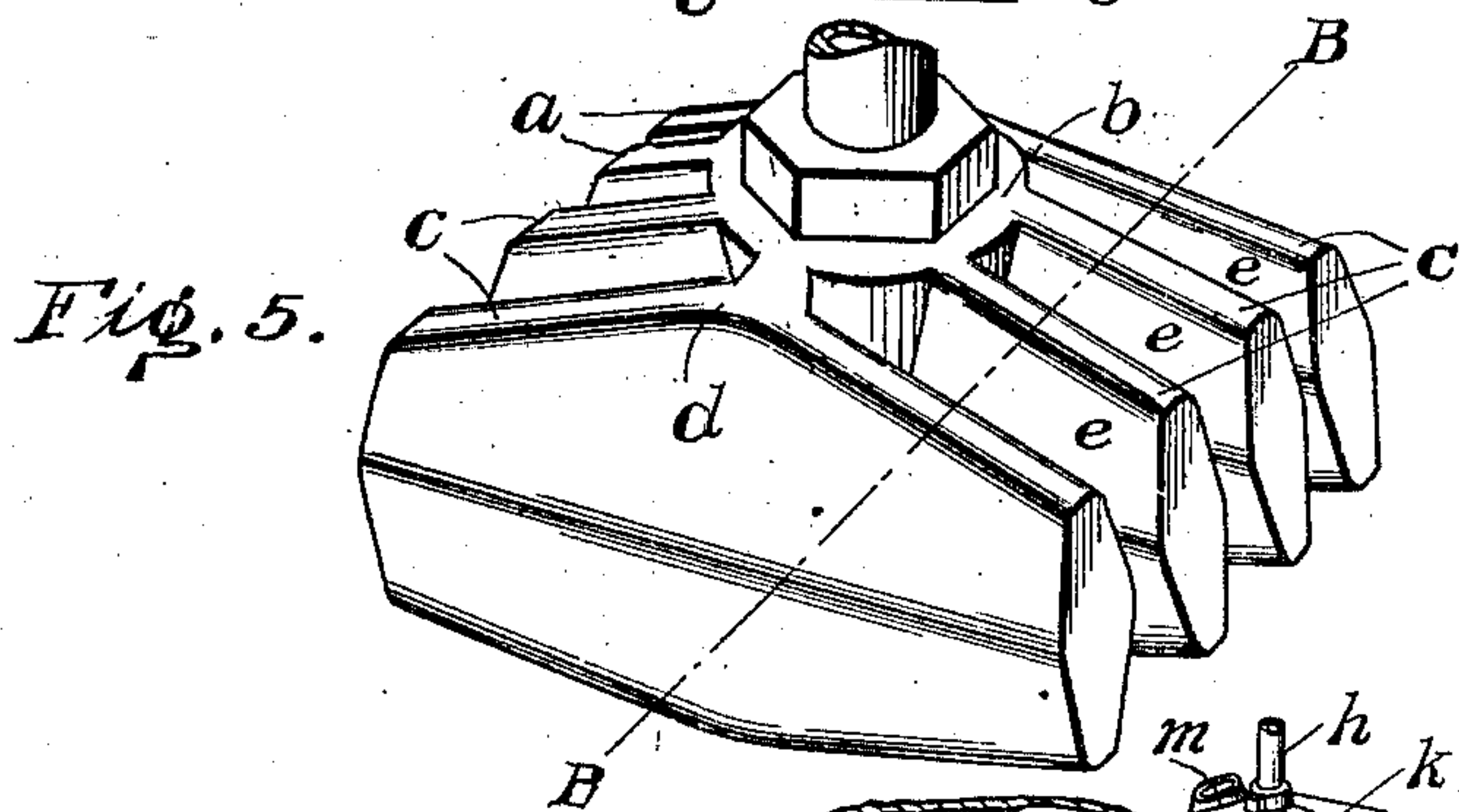


Fig. 7.

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WILLIAM KANE, OF PHILADELPHIA, PENNSYLVANIA.

WATER-HEATER.

No. 840,220.

Specification of Letters Patent.

Patented Jan. 1, 1907.

Application filed August 10, 1906. Serial No. 329,972.

To all whom it may concern:

Be it known that I, WILLIAM KANE, of the city and county of Philadelphia, State of Pennsylvania, have invented an Improve-
5 ment in Water-Heaters, of which the following is a specification.

The invention relates particularly to water-heaters for producing hot water or steam by the use of gas.

10 A part of the improvements relate to the construction of the heating-sections which contain the water, whereby great efficiency is combined with simplicity of construction.

15 The heater consists of a series of hollow sections or castings provided with hollow lateral parallel projections arranged as to subject a maximum surface to the heated products. In the preferred arrangement the sections are staggered, so that the lateral projections of
20 one section are at substantially right angles to the projections of adjacent sections, thus insuring a more perfect contact of the heated products with the walls of the heating-sections as the heated products pass through
25 the heater.

The improvements also relate to means for directing and controlling the heated products to cause them to pass more effectively over the walls of the heater-sections and to im-
30 provements in the construction of the burner, all of which are more fully described hereinafter.

In the drawings, Figure 1 is an elevation of the heater with one of the halves of the outer casing removed and the top and bottom plates and burner in section. Fig. 2 is a vertical
35 section on the line A A of Fig. 1 with the heater-sections in elevation. Fig. 3 is a plan view of the top plate. Fig. 4 is a perspective view of the burner. Fig. 5 is a perspective
40 view of one of the heater-sections. Fig. 6 is a transverse section of the same on the line B B of Fig. 5; and Fig. 7 is a perspective view of the heater, on a reduced scale, showing its
45 connection with the boiler.

The heater consists of a series of hollow sections *a*, each formed of a hollow central portion *b*, and a series of hollow portions *c*, extending laterally on each side and arranged
50 parallel to one another, the end portions being connected with the central portion by short hollow portions *d*. These hollow portions *c* are of oblate form and are arranged on edge with their major axes vertical, and thus
55 form intermediate spaces *e* between adjacent sides. The heater is made up of a series of

these sections or castings arranged one above the other and connected by suitable couplings *f*, and successive sections are arranged at substantially right angles to one another, 60 or staggered, so that the lateral portions *c* of successive sections will extend transversely to the corresponding portions of the adjacent sections. The lower section is connected with the supply-pipe *g* for cold water and the 65 top section with the discharge-pipe *h* for the hot water. The pipes *g* and *h* may be connected with the ordinary domestic "boiler" in the usual manner.

The heater-sections *a* are inclosed in an 70 outer casing, which preferably consists of two vertically-separable halves *i i'*, which may be connected by suitable lugs *j* and fastenings. In Fig. 1 the heater is shown with one of the halves of the casing removed. 75 The casing-sections are closed at the top, as at *k*, to form the top of the heater, and this top is provided with an outlet *m* for the products of combustion.

n is a top plate located above the heater- 80 sections *a* and having an opening *n'*, through which the pipe *h* extends. The plate *n* is supported by a nut *n²* or other support on the pipe and carries on its upper side supporting posts or standards *o o*, on shoulders *o'* 85 of which the tops of the casing-sections rest. This plate *n* is provided with slots *p*, parallel with the portions *c* of the upper heater-sections *a*; but such slots are preferably omitted on the side under the outlet *m*. 90

q is a base-plate having a tubular boss *q'*, fitting on and secured to the supply-pipe *g*, which closes the base of the heater and forms the lower support for the casing-sections *i i'*.

r is the burner, which is located within the 95 heater above the base-plate *q* and below the lower section *a* of the series of heater-sections.

I prefer to employ a burner of the construction shown, consisting of a hollow U- 100 shaped casting, each leg being of flattened oval form having perforations *s* in the top and projections *t* at the extremities, which are adapted to enter sockets *t'* in back casing-section *i*. The neck and mixing-head *r'* 105 of the burner extends through the front of the casing and is preferably provided with a lug *r'*, which abuts against the face of the casing. When the burner is in place, it embraces the pipe *g*, as shown, and is preferably 110 arranged with the two legs in a position transverse to the portions *c* of the lower

heater-section. The products of combustion from the burner *r* pass up within the casing *i i'* about the heater-sections *a* and through the spaces *e* between adjacent portions *c c*.

5 Owing to the construction of the heater-sections, a maximum surface is exposed to the heated products, and by reason of the staggered arrangement of the sections *a* with reference to one-another the heated products
10 are forced to pass over and in contact with the surfaces *c c* of the successive sections. To prevent a portion of the heated products ascending along the inner walls of the casing, I employ the inwardly-projecting ribs *u* on
15 the inner walls of the casing. These ribs are preferably located below the upper heater-sections and act to deflect or turn the heated currents inwardly toward the sections. The heated products after passing about the upper heater-section *a* escape through the slots
20 *p* in the plate *n* and thence through the outlet *m*. The slotted plate *n* acts to restrict the escape of the heated products and to cause them to make proper contact with the
25 walls of the heater-sections. The arrangement of the slots *p*, parallel with the projecting portions *c* of the top section *a*, creates drafts or currents toward points above the projections, and thus causes the heated currents to pass through the spaces *e* and over
30 the walls of the projections *c* in seeking the slots.

While this construction is especially adapted for producing a water-heater, it may also
35 be used as a steam-generator, the steam passing out through the pipe *h* and the water of condensation returning through the pipe *g*, and I do not mean to limit myself to the use of the heater for producing hot water.

40 What I claim as new is—

1. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other and each having a series of lateral hollow projections the hollow projections of one section being arranged
45 at substantially right angles to those of adjacent sections.

2. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other and each consisting of a central portion and hollow lateral projections on each side, the lateral projections of each section being staggered or arranged at right angles to the projections of
50 adjacent sections.

3. A heater-section for the purpose described, consisting of a hollow casting comprising a large vertical hollow center, two oppositely-directed hollow arms forming flattened hollow parts, and a series of lateral hollow projections extending oppositely from the walls of the flattened hollow parts and tapered toward their free ends or extremities.

4. A heater-section for the purpose described, consisting of a hollow casting comprising a series of parallel flattened parts tapering toward their free ends, and united by a flattened hollow part arranged at right angles to the series of parallel parts and having an enlarged central portion.

5. A heater-section for the purpose described, consisting of a hollow casting having a central vertical tubular portion *b* adapted to be coupled with other sections, a series of hollow parallel projections *c* extending from
70 said central portion on each side, oppositely-directed flattened hollow parts *d* also extending from the tubular portion at right angles to the parts *c*, and additional hollow projections from said parts *d* parallel to the
75 parts *c*.

6. In a water-heater, the combination of a series of hollow communicating water-sections arranged one above the other, an inclosing case independent of the water-sections formed of parts detachably united on the sides and having inwardly-projecting deflecting-ribs, arranged intermediate of the water-sections.

7. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other and each having a series of lateral hollow projecting portions extending horizontally, an inclosing casing for said sections, and a slotted top plate
90 within said casing arranged above the upper section in the series.

8. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other and each having a series of lateral hollow projecting portions extending horizontally, an inclosing casing for said sections, and a slotted top plate within said casing arranged above the upper section in the series having its slots arranged
100 parallel with the horizontal projections of said upper section.

9. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other, an inclosing casing for said sections having a closed top provided with an outlet for the heated products, and a slotted top plate within said casing located above the upper section of the series.

10. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other, an inclosing casing for said sections having a closed top provided with an outlet for the heated products, and a slotted top plate within said casing located above the upper section of the series having upright supports for the top of the casing.

11. In a water-heater, the combination of a series of hollow communicating water-sections arranged one above the other, and an inclosing casing for said sections having deflecting-ribs on its inner walls located between independent of the successive water-sections.

12. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other, a supply-pipe communicating with the lower section and a discharge-pipe leading from the upper section, an inclosing casing for said sections, and a burner within said casing below the lower section of the series consisting of a U-shaped casting embracing the supply-pipe.

13. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other, a supply-pipe communicating with the lower section and a discharge-pipe leading from the upper section, an inclosing casing for said sections, and a burner within said casing below the lower section of the series consisting of a U-shaped casting embracing the supply-pipe and having projections *t* at the extremities engaging the base of the casing.

14. In a water-heater, the combination of a series of hollow communicating sections arranged one above the other, a supply-pipe communicating with the lower section, a discharge-pipe leading from the upper section, an inclosing casing for said sections, and a burner within said casing below the lower section of the series consisting of a U-shaped casting, each leg being of flattened oval form, embracing said supply-pipe.

15. In a water-heater, the combination of

a series of water-heating sections connected one above the other, a supply-pipe connecting with the bottom of the lowermost section, a discharge-pipe extending upward from the top of the uppermost section, a base-plate secured to the supply-pipe, and a divided casing supported by the base-plate and inclosing the water-heating sections whereby said casing may be removed to expose said sections without disturbing the base-plate.

16. In a water-heater, the combination of a series of water-heating sections connected one above the other, a supply-pipe connecting with the bottom of the lowermost section, a discharge-pipe extending upward from the top of the uppermost section, a base-plate secured to the supply-pipe, a divided casing supported by the base-plate and inclosing the water-heating sections, and a gas-burner extending through the casing and resting upon the base-plate whereby said casing may be removed to expose said sections and burner without disturbing the base-plate.

In testimony of which invention I have hereunto set my hand.

WILLIAM KANE.

Witnesses:

R. M. KELLY,
ALBERT W. STELLWAG