

(No Model.)

3 Sheets—Sheet 1.

G. JONES.
STEAM HEATER.

No. 344,968.

Patented July 6, 1886.

Fig. 1.

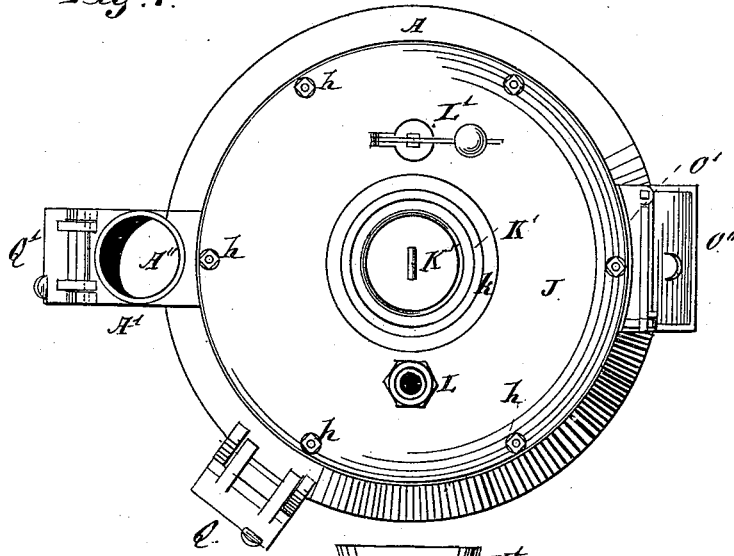


Fig. 2.

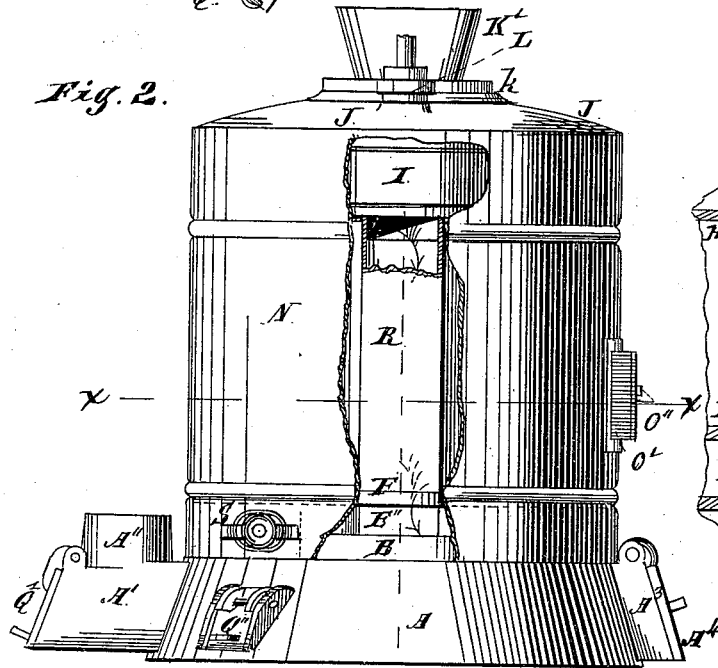
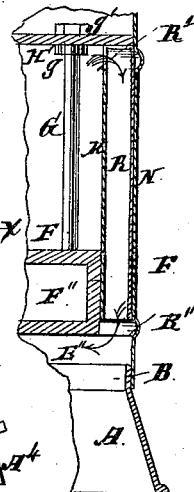


Fig. 3.



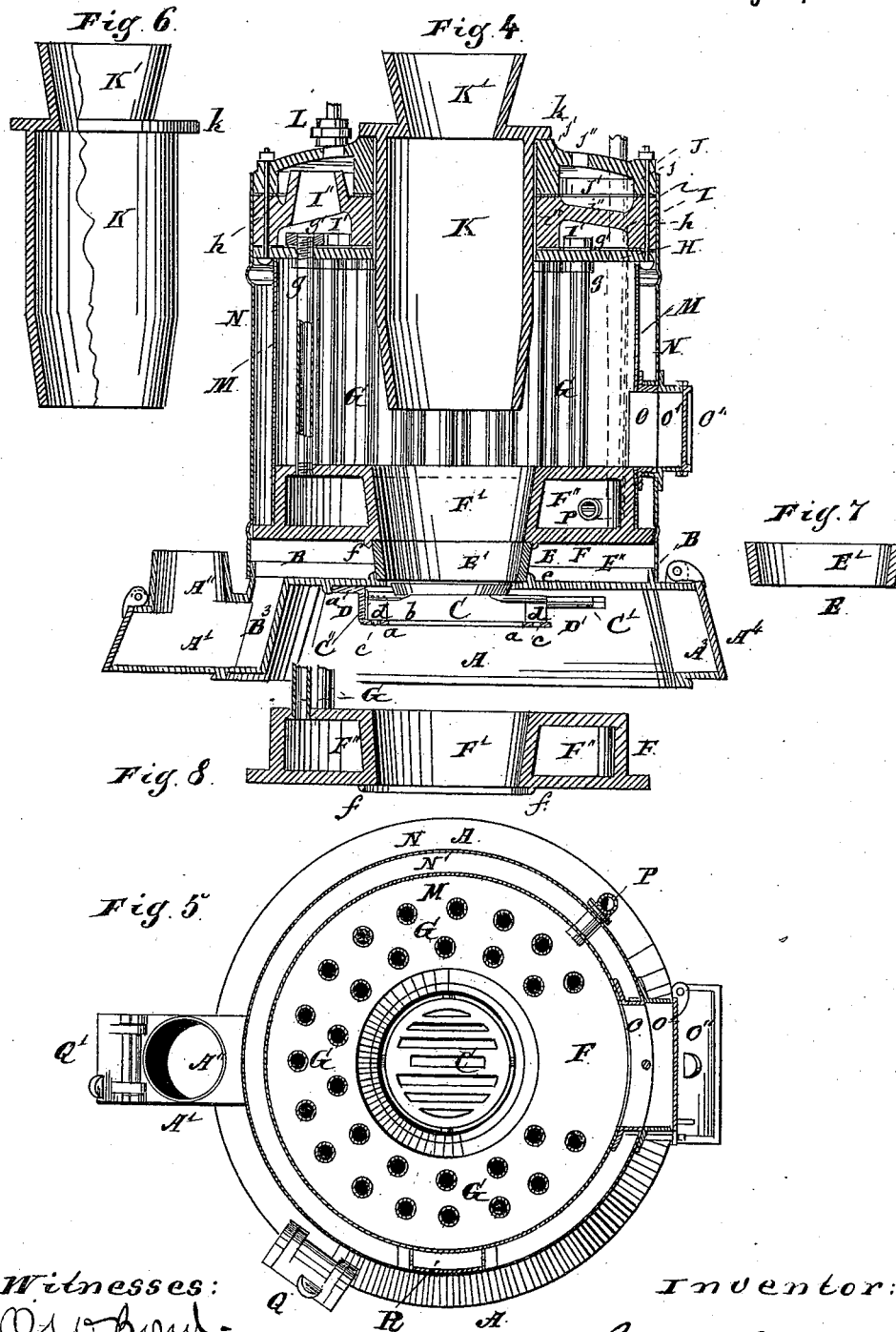
Witnesses:
O. W. Bond
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Inventor:
George Jones

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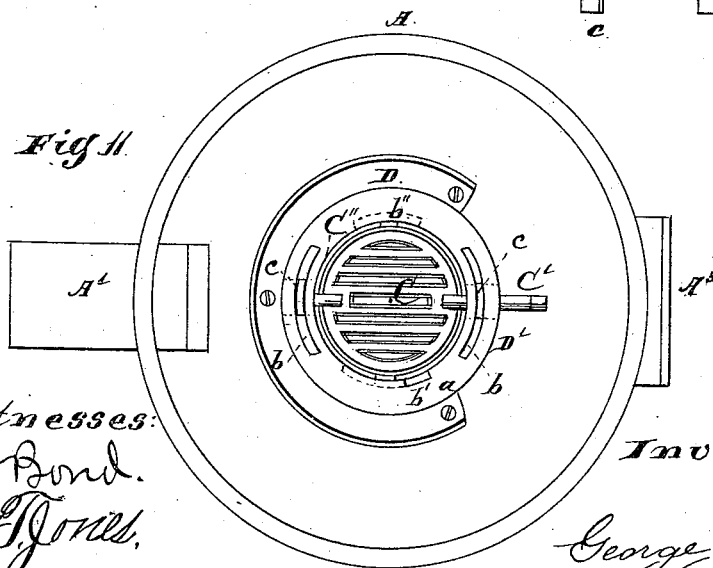
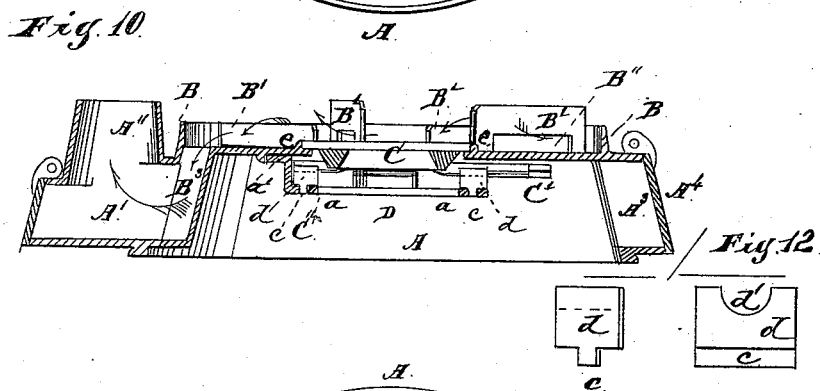
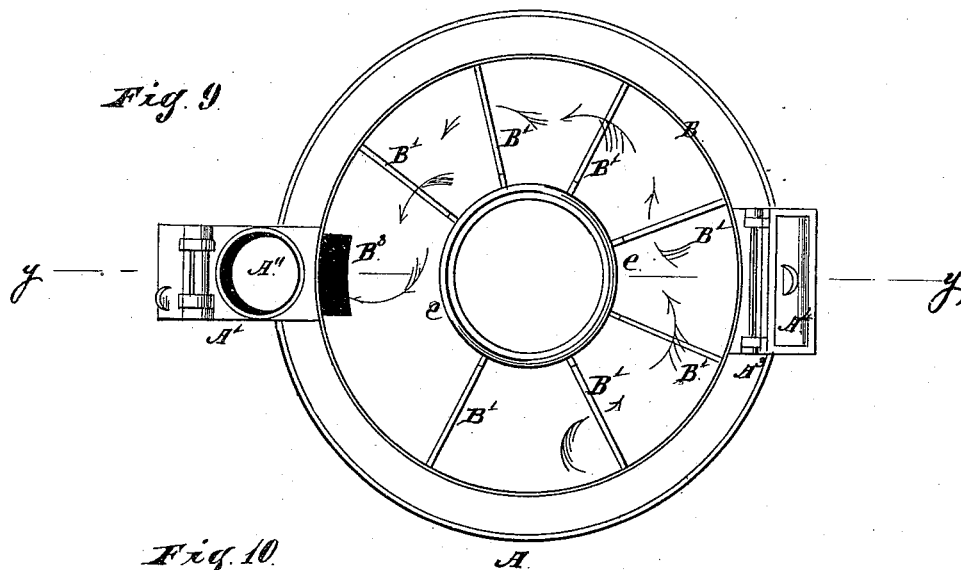
3 Sheets—Sheet 3.

G. JONES.

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No. 344,968.

Patented July 6, 1886.



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UNITED STATES PATENT OFFICE.

GEORGE JONES, OF CHICAGO, ILLINOIS.

STEAM-HEATER.

SPECIFICATION forming part of Letters Patent No. 344,968, dated July 6, 1886.

Application filed September 11, 1885. Serial No. 176,815. (No model.)

To all whom it may concern:

Be it known that I, GEORGE JONES, residing at Chicago, in the county of Cook and State of Illinois, and a citizen of the United States, have invented a new and useful Improvement in Steam-Generators, of which the following is a full description, reference being had to the accompanying drawings, in which—

Figure 1 is a top or plan view; Fig. 2, a side elevation with the exterior casing broken out to show the smoke-conduit; Fig. 3, a sectional elevation showing the smoke-conduit; Fig. 4, a sectional elevation of the complete heater; Fig. 5, a cross-section through the heating-chamber on line *xx* of Fig. 2; Fig. 6, a detail, partly in section and partly in elevation, of the feed-chamber; Fig. 7, a detail in section of the ring forming the continuation of the fire-pot; Fig. 8, a detail in section of the water-chamber; Fig. 9, a top or plan view of the base; Fig. 10, a vertical section on line *yy* of Fig. 9; Fig. 11, an under side view of the base; Fig. 12, details of the bearings for the grate.

This invention is designed for the production of steam to be used for heating dwellings and for other heating purposes, and has for its objects to construct an efficient and reliable heater, occupying but a small space, as compared with steam-boilers, and of a capacity sufficient to heat an ordinary dwelling; to improve the construction and operation of the steam-producing devices; to improve the steam chamber or dome and its arrangement in relation to the water chamber or base; to improve the connection between the water-chamber and the steam-chamber; to improve the smoke conduit or passage and the fire-chamber, and to improve generally the devices entering into the construction of the heater as a whole; and its nature consists in the several parts and combinations of parts hereinafter described, and pointed out in the claims as new.

In the drawings, A represents the base, made of cast-iron or other suitable material, and, as shown, of a circular form, having a wall or side, and a top plate with an open bottom, the wall having on one side a contin-

uation laterally, forming a chamber, A', with a ring, A², on its upper side, to receive a pipe leading to the chimney or other exit, and, as shown, the inner end of the chamber A' extends some distance into the interior of the base A, and the side wall, on the opposite side from the extension A', has an opening or extension, A³, closed by a door, A⁴, through which access can be had to the interior of the base A, the base, in effect, forming an ash-pit.

B is a circumferential flange on the top of the base, and extending from the inside of this flange to the opening at the center of the top plate of the base is a series of tangential flanges B', some of which are higher than the flange B, and some corresponding in height, or nearly so, to the flange B, as shown in Fig. 10, and, as shown, these flanges B' are arranged to have a high and low flange alternate, and the high flanges are provided with an opening, B², as shown in Fig. 10, thus forming a smoke-passage around the top of the base, by which the smoke is deflected—that is, passing under the high flanges and over the low flanges—and the top plate of the base, at a point in line with the exit or chamber A', is provided with an opening, B³, through which the smoke passes into the chamber and out therefrom to the chimney or other exit, the smoke being made to pass in one direction only by making the flange on one side of the smoke-exit B³ of sufficient height and solidity to close the passage-way at that point, turning the smoke to pass around over the top of the base and out at the exit B³, as shown by the arrows in Fig. 9.

C is the grate, of a circular form, as shown, and fitting a circular opening therefor in the top of the base A, the grate on one side having a bar, C', with a square end to receive a shaker, as usual, and having on the other side, in line with C', a journal, C², a portion of the bar C' forming the other journal, on which the grate can be turned or tipped.

D is a support attached to the under side of the top of the base by screws or bolts passing through a flange, a'. This support, on the side of the rod C' of the grate, is open to allow the grate to be shaken, and the bottom of the support has a flange or ring, a, in opposite sides of which are curved slots b, as shown in Fig.

11, each of which receives a projection, *c*, on a block or head, *d*, each block or head having a semicircular recess, *d'*, to receive the journals *C C'* of the grate. The slots *b* are of sufficient length to allow of the necessary movement to shake the grate, and are struck on the arc of a circle corresponding to the circle of the grate. This arrangement gives a firm support for the grate, and at the same time allows perfect freedom in oscillating the grate for shaking purposes, and in order to allow the grate to be tipped for dumping purposes the ring portion *a* of the support is provided with a notch or recess, *b'*, and the edge of the opening in the top plate is provided with a notch, *b''*, in line with the notch *b'*, so that by bringing the supporting-lugs of the grate in line with these notches *b' b''*, the grate can be turned edgewise through the rod or bar *C'*; and it will be seen that in thus dumping the grate the bearings *d* are still supported by the ring *a*, so that the grate cannot drop down when turned for dumping purposes, as is the case with ordinary grates, and in putting the grate into place no trouble will be experienced, as all that is necessary is to drop the grate into the bearing *d*, insert the ends *c* of the bearings in the curved slots *b*, and then secure the support *D* to the top plate by screws or bolts passing through the flange *a'*, and when in position the grate is perfectly free to be shaken or dumped.

E is a fire-pot, of a circular tapering shape, as shown, its lower end fitting within a bead or rim, *e*, formed on the upper side of the top plate, and the interior opening, *E'*, of the pot fitting around the opening in the top plate above the grate.

F is a casing or shell having an interior tapering opening, *F'*, to coincide with the opening *E'*, so that the walls of the two openings *E' F'* form, in effect, the walls of the fire-pot, and this shell or casing *F*, around the opening *F'*, has a chamber, *F''*, forming the water-chamber, as shown in Figs. 4 and 8, and as shown, the bottom wall of the shell or casing *F* is provided with a rim or flange, *f*, to receive the upper end of the ring *E*.

G is a series of pipes, the lower ends of which are screw-threaded or otherwise entered into the upper wall of the shell or casing *F*, so as to have communication with the water-chamber *F''*, and as shown, these pipes are arranged in circles nearly around the entire top of *F*. (See Fig. 5.)

H is a plate, through which the upper ends of the pipes *G* pass, and, as shown, the pipes are secured in the plate *H* by a nut, *g*, which comes on the under side of the plate, and a nut, *g'*, which comes above the plate, the end of the pipe projecting above the plate to receive the nut, and by means of these nuts *g g'* a very close connection can be produced, and at the same time the plate *H* is supported without having any connection between it and the shell or casing *F*, so that the pipes are free to expand without straining or breaking either the plate *H*, shell *F*, or the pipes themselves,

as there is no fixed connection between the water-chamber and the head or plate *H*.

I is a plate or cap-piece, formed of an exterior ring portion, *i*, and an interior ring portion, *i'*, the two ring portions being connected by a solid web or flange, *i''*, so as to leave between the under surface of the flange and the upper surface of the plate *H* a chamber or space, *I'*, which forms a secondary steam-chamber, into which the water of condensation or any water drawn from the boiler can pass, to be there evaporated or returned through the pipes *G* to the water-chamber without producing any ill effects from standing water, and from this chamber *I'*, into which the steam first passes from the pipes *G*, the steam produced is allowed to pass out through an opening, *I''*, in the flange or web *i''*. (Shown in Fig. 4.)

J is a cap or plate formed of an exterior ring, *j*, and an interior ring, *j'*, the two rings being connected by a flange or web, *j''*, and between this flange *j''* and the flange *i''* of the cap or plate *I* is a space, *J'*, which forms the steam-chamber proper, into which the steam from the chamber *I'* passes through the opening *I''*, to be conducted from the chamber *J'* through suitable pipes to a heating-coil. The caps or plates *I J* are connected together and to the plate *H* by bolts *h* passing through the plate *H* near its periphery and through the exterior ring portions, *i j*, of the respective caps or plates *I J*; and in order to make the chambers *I' J'* steam-tight, suitable packing is to be placed between the plate *H* and the rings *i i'*, and between the rings *i i'* and the rings *j j'*, as shown in Fig. 4.

K is a feed-chamber entering a suitable opening formed by the rings *i' j'*, and projecting into the space above the water-chamber, so as to have its mouth in line with the openings *E' F'*, for the fuel to pass from the feed-chamber to the fire-pot, as required, and, as shown, the upper end of the feed-chamber *K* has a mouth or opening, *K'*, with an interior taper, and this feed-chamber *K* is held in place and supported by a flange, *k*, which rests on the upper edge of the ring *j'*.

L is a coupling attached to the web or flange *j''*, to receive a pipe or conduit for carrying the steam to the heating-coil.

L' is a safety-valve attached to the web or flange *j''*, and having communication with the steam-chamber *J'*, as does also the coupling *L*.

M is a shell or casing fitting at the bottom around the exterior of the water-chamber shell *F*, and extending up and encircling the space occupied by the pipes *G*, and coming in contact with the under face of the plate *H*.

N is a shell encircling the flange *B* at its lower end, and extending up and encircling the exterior rings, *i j*, of the cap or plates *I J*. This shell *N* lies outside of the shell *M*, leaving a space, *N'*, between them.

O is a frame inserted in the space *N'*, between the shells *M N*, to form an opening through the shells, and this frame adjoins

another frame, O', attached to the exterior shell, N, and having a door or flange, O², the two frames forming an opening or passage through which access can be had to the space occupied by the tubes G and feed-chamber K, for cleaning or other purposes.

P is a pipe leading from the water-supply (not shown) into the water-chamber F², for supplying the water to such chamber.

Q is a damper on the base A, and Q' a damper on the end of the extension A', which dampers are of the usual construction for the purpose of regulating the draft, and can be connected, if so desired, with the coils so as to operate automatically in any usual and well-known manner.

R is a conduit, the upper end of which communicates with an opening, R', at or near the top of the shell M, the lower end of which communicates with an opening, R², leading to the smoke-chamber E², between the water-chamber and the base A, as shown in Fig. 3, the opening being at that side of the stop-flange B', to insure the passage of the smoke around, as shown by the arrows in Fig. 9.

S is a series of man-holes around the shell N near its lower end, through which a communication can be had with the smoke-chamber E², for cleaning and other purposes.

The heater is put together by placing the grate in position and securing it there through the medium of the support D, as before described. The ring E is dropped into place with its lower end within the flange *e*. The water-chamber is placed in position with the flange *f* encircling the upper end of the ring E, and the pipes G screwed into the top plate of the water-chamber. The plate H is dropped onto the upper ends of the pipes G, so as to rest on the nuts *g*, and the nuts *g g'* adjusted to support the plate, as required. The cap or plate I is dropped into place on the plate H and the cap or plate J onto the plate I, and the two caps or plates secured together and to the plate H by the bolts *h*, a suitable packing being inserted to close the joints between the parts for the steam-chambers I' J'. The feed-chamber K is dropped into place and supported by the flange *k*, and the coupling L and safety-valve properly attached to the cap or plate J, and, as shown, for the complete apparatus, a close-fitting cover, K², is provided to enter the mouth K' and prevent the escape of gas. The interior and exterior shells, M N, are to be applied, and the doors and ventilators attached, when the apparatus will be ready for setting and for use, and when set, the steam-pipe leading to the heating-coil is attached to the connection L and such other connections made as required for the number of heating-coils.

In use the fuel is fed from the chamber K as required, and the steam for heating purposes is produced by the action of the heat on the water in the water chambers and pipes G, and such steam passes up into the secondary chamber I', thence through the opening I² into

the main chamber J', to be conducted therefrom to the coils, and as the pipes and chamber for the water are in close proximity to the fire-pot it will be seen that the production of steam will be very quick, and the heater being a self-feeder for its fuel, no attention will be required constantly in this connection, and it will also be seen that the water-chamber and the top plate for the pipes have no fixed or rigid connection to be acted on by different degrees of heat and cold, and contracted and expanded, producing injurious effects on the connections for the pipes or the water-chamber, the connection being simply through the pipes themselves, which are thus left free to expand and contract without injurious effects. The secondary chamber I', into which the steam first enters, provides a receptacle, into which water, if drawn, will pass, and any water of condensation formed will be returned through the pipes G back to the water-chamber. The smoke and other products of combustion pass into the space for the pipes G, thoroughly and effectually heating the pipes and passing out through the opening R' into the conduit R, and thence through the opening R² into the smoke-space E², is deflected up and down by the flanges or ribs B', which act to delay the passage of the smoke and thereby increase the heating capacity. The pipe-chamber can be kept clean and clear through the opening O O', and the smoke-chamber can be cleaned through the holes S, and the arrangement is one which brings all of the co-acting parts into very small compass, and in such relation one to the other, as to produce the best and most economical results.

The devices which support the grate, the same being the ring D and bearing-blocks *d*—are made the subject-matter of another application, said application being a division of this application, Serial No. 176,845.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a fire-pot, of a base, A, provided with a rim or flange, B, alternating high and low radial flanges B', and smoke-exits B² and A', substantially as described.

2. The combination, with a fire-pot and boiler-shell, of a base, A, and a water-chamber, F², located above the base and forming in connection therewith a smoke passage or chamber, substantially as described.

3. The base A, in combination with the ring E', and water shell or casing F, for forming a water-chamber and fire-pot, substantially as specified.

4. A water-chamber, F², in combination with the tubes G, plate H, and set-nuts *g g'*, for connecting the tubes and the plate H, and furnishing a support for the plate with a free expansion of the tubes, substantially as and for the purpose specified.

5. The plate H, in combination with the plate or cap I, for forming a chamber or passage, I', to receive water, substantially as and for the purpose specified.

6. The combination, with a water-chamber, F², pipes G, and plate H, of the cap or plate I, forming a chamber, I', substantially as and for the purpose specified.
- 5 7. The combination, with the water-tubes G, and the water-chamber F², connected with the lower ends thereof, of the secondary chamber I', located directly around the upper ends of the tubes for receiving the overflow, and the
- 10 main steam-chamber J', directly over said secondary chamber and forming in connection therewith the steam-dome of the boiler, substantially as described.
8. A steam-dome consisting of three parts,
- 15 H I J, and having two chambers, I' J', substantially as and for the purpose specified.
9. The combination, with a water chamber or shell, F², pipes G, and plate H, of the caps or plates I J, forming a steam-dome, with two chambers, as and for the purpose specified. 20
10. The combination, with the base A, water-chamber F², tubes G, shell M, and smoke-chamber E², between the water-chamber and the base, of the conduit R, communicating at its upper end with the interior of the shell 25 and at its lower end with the smoke-chamber at one side of the water-chamber, substantially as described.

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