

(No Model.)

W. P. HARTHAN.
STEAM HEATING APPARATUS.

No. 353,451.

Patented Nov. 30, 1886.

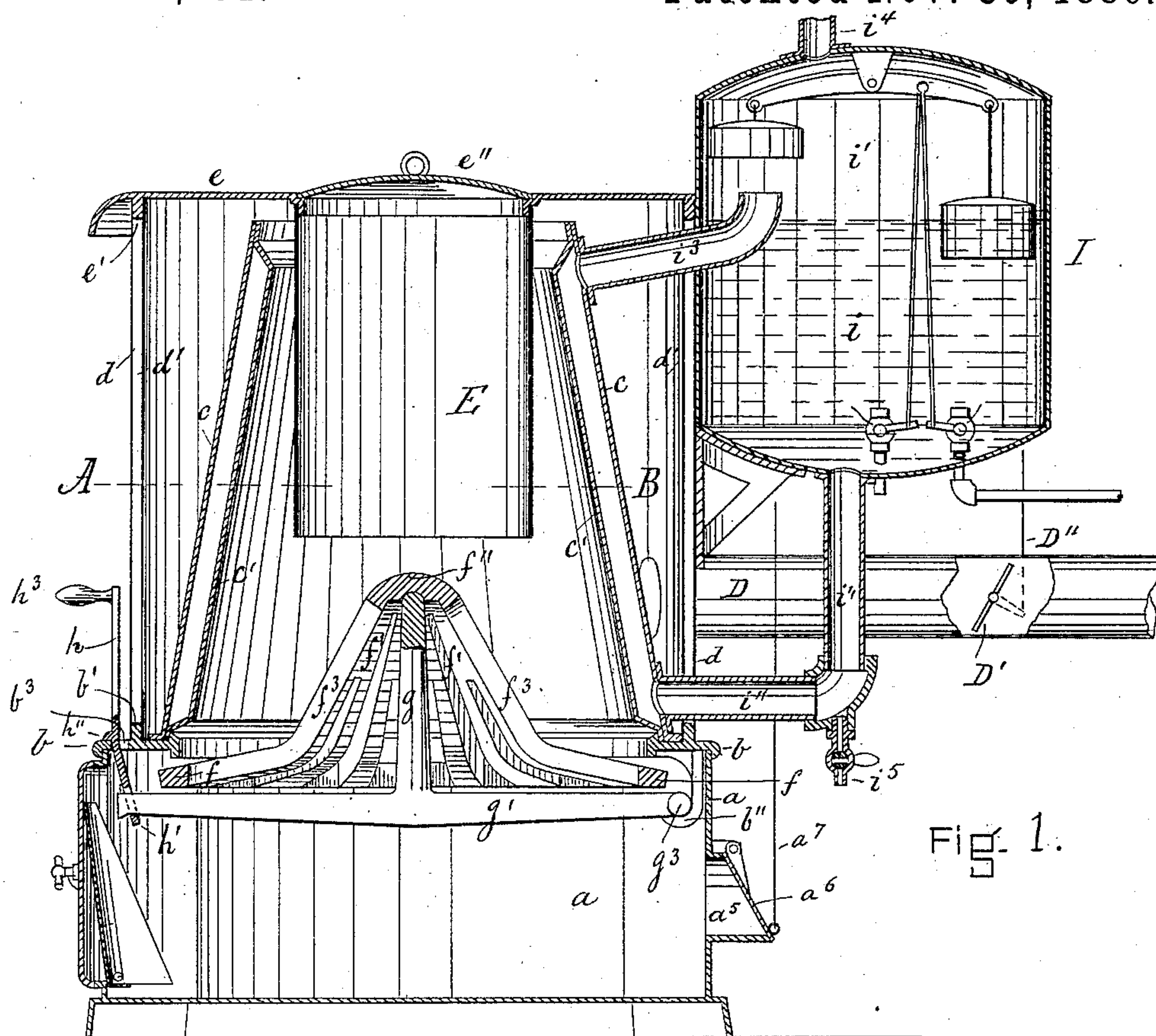


Fig. 1.

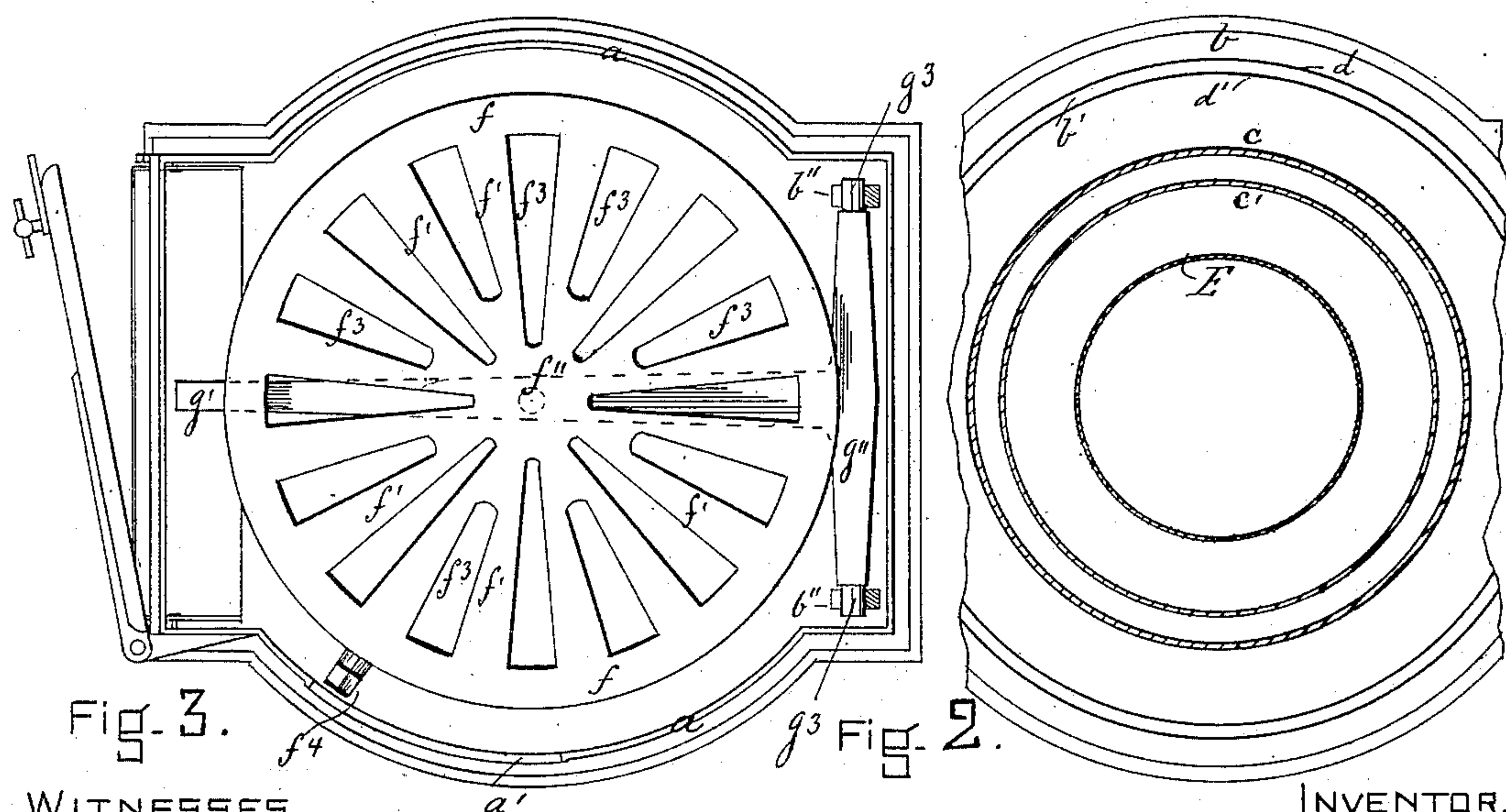


Fig. 3.

Fig. 2.

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STEAM-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 353,451, dated November 30, 1886.

Application filed June 25, 1885. Serial No. 169,731. (No model.)

To all whom it may concern:

Be it known that I, WARREN P. HARTHAN, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Steam-Heating Apparatus; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This invention relates to improvements in steam-heating apparatus, and it is carried out as follows, reference being had to the accompanying drawings, where—

Figure 1 represents a central longitudinal section of the invention. Fig. 2 represents a horizontal section on the line A B in Fig. 1, showing the outer annular shell, the annular boiler, and central magazine or hopper for feeding the fuel to the grate; and Fig. 3 represents a plan view of the grate, the outer annular shell, boiler, and central hopper being removed.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a is the ash-pit, on the top of which rests the annular plate *b*, that serves as a support for the annular boiler *c c'* and the annular double jacket *d d'*, as shown in Figs. 1 and 2. The annular boiler is preferably made conical, with its smaller end at top, as shown in Fig. 1, and is composed of two annular shells, *c* and *c'*, located a small distance apart, so as to heat the water and generate steam very quickly.

c is the outer shell, and *c'* is the inner shell, of the boiler, such shells being riveted together in their upper and lower ends, as shown. The lower end of the annular boiler *c c'* rests on or is secured to the annular plate *b*, on top of ash-pit *a*, as shown in Fig. 1.

b' is an annular rib projecting upward on the upper side of plate *b*, as shown in Fig. 1. To prevent the heat from boiler *c c'* from radiating into the cellar or other room in which the heating apparatus is located, I surround the boiler with a double jacket composed of two annular shells, *d* and *d'*, of which *d* is the outer one and *d'* is the inner one, as shown in Figs. 1 and 2, with an air-space between the said shells to prevent heat radiation. The

lower ends of said shells *d* and *d'* fit on the outside and inside, respectively, of the annular rib *b'* on plate *b*, and may be riveted or otherwise secured thereto, if so desired.

e is the top plate of the jacket *d d'*, and it is provided on its under side with an annular rib, *e'*, fitting between the shells *d* and *d'* at their upper ends, as shown in Fig. 1, and riveted or otherwise secured thereto, if desired. In the center of top-plate, *e*, is made a perforation that is covered by the detachable cover *e''*, hinged or otherwise attached to plate *e*, and to the under side of the latter is secured the downwardly-projecting magazine feeder or hopper *E*, that extends downward for some distance within the fire-place, said hopper being open from end to end and covered in its upper end by means of cover *e''* at all times, except when the fuel is introduced from above into said hopper.

For the purpose of bringing the live fuel as much as possible in contact with the interior of the annular boiler, and thus obtain the best results from the fuel without much waste of heat, and also to prevent the fuel from accumulating in the center of the fire-pot, as well as to increase the air-spaces in the grate, I construct the latter as follows: The grate is cast in one single piece, and has in its lower end an annular ring, *f*, from which extend the curved or upwardly-tapering grate-bars *f' f'*, which are united in their upper ends by being cast in one piece with the central pivot-plate, *f''*, (shown in Figs. 1 and 3,) such pivot-plate extending into the fire-pot at or near the lower end of hopper *E*. *f³ f³* are the air-spaces between the grate-bars *f' f'*, as shown.

On the under side of the pivot-plate *f''* is a recess, into which fits loosely the central grate-supporting post, *g*, that is cast in one piece with or secured at its lower end to the horizontal bar *g'*, provided at its rear end with a cross-bar, *g''*, having trunnions *g³ g³*, that are loosely supported or otherwise hinged to bearings or brackets *b'' b''* on plate *b*, as shown in Figs. 1 and 3. The forward end of the horizontal bar *g'* is supported in a hook or eye, *h'*, in the link or bar *h*, that projects upward through a slotted perforation, *b³*, in plate *b*, and has a locking tooth or projection, *h''*, adapted to rest on top of plate *b*, when the

grate is in its working position, as shown in Fig. 1. To the upper end of link or rod h is secured a handle, h^3 , by means of which the grate may be operated to drop it down into the ash-pit when it is desired to remove clinkers, &c., or otherwise cleaning the grate, and to do this it is only necessary to push the rod h toward the jacket-shell d sufficiently to permit the locking projection h'' to enter slot b^3 , when the weight of the grate and its supporting-bar g' will cause the latter to swing downward on its trunnions g^3 g^3 into the ash-pit, when access may be had to any part of the grate, for the purpose set forth.

f^4 is a radial projection on one side of the lower grate-ring, f , opposite a slotted perforation, a' , in the side of the ash-pit. By means of a suitable shaker, passed through the slot a' and applied to the projection f^4 , the grate may be oscillated on its fulcrum-post g in a horizontal direction whenever it is necessary to shake the grate, and this can be done with the greatest ease and without much frictional resistance, as the grate is only supported in its central upper end upon the post g , and is perfectly free to move otherwise.

a^5 is the air inlet or draft opening to the ash-pit a , such opening being provided with a suitable damper or valve, a^6 , that may be regulated by hand or connected by means of a rod or wire, a^7 , (shown in Fig. 1,) to any suitable automatic damper-regulator. From the jacket d d' leads the smoke-pipe D to a suitable chimney, and within said smoke-pipe is arranged the valve or damper D' , that may be regulated by hand or connected by means of a wire or rod, D'' , to any suitable automatic regulator.

In connection with the boiler c c' , I use the tank I , the lower part of which serves as a reservoir, i , for the feed-water, and the upper part, i' , serves as a steam-drum to receive the steam from boiler c c' . From the lower end of tank I leads a pipe, i'' , to the lower end of boiler c c' , as shown in Fig. 1, and from the upper end of the latter leads the steam-supply pipe i^3 into the steam-space i' of the tank I . As will be seen by reference to Fig. 1, the upper end of steam-pipe i^3 is made to enter tank I , so as to terminate above the level of the water therein, and thus to prevent the unpleasant noise usually made when steam has to pass upward through a body of water.

i^4 is the steam-delivery pipe leading from top of tank I to the radiators, as usual.

i^5 is a blow-off cock on pipe i'' , to be opened from time to time, as occasion may require,

so as to withdraw sediment from the bottom of the boiler. Within the tank I is arranged an automatic feed-water regulator, as shown in Fig. 1.

By the construction as above set forth and described I obtain several important advantages in a steam-heating apparatus, among which may be mentioned: The fuel is introduced at the top and directly within the annular boiler; the steam can be made very quickly and retained at the desired pressure, and with a minimum of fuel; the waste heat is prevented from too rapid radiation in the room where the apparatus is located; the grate will cause the ignited fuel to act on the interior wall of the boiler to the best effect; abundant air-supply to the fuel is provided; the grate can be shaken with a minimum of frictional resistance and be let down in the ash-pit with great ease, and unpleasant noises caused by the steam from the boiler passing through the feed-water is prevented.

Having thus fully described the nature, construction, and operation of my invention, I wish to secure by Letters Patent and claim—

1. In a steam-heating apparatus, the annular double-shell boiler c c' ; annular double-shell jacket d d' , top plate, e , and base-plate b , combined with the downwardly-projecting hopper E and upwardly-projecting grates f' f'' f^3 , as and for the purpose set forth.

2. The combination of the annular plate b , having ears b'' and opening b^3 , the cross-bar g'' , journaled in said ears and having an arm, g' , provided with a central grate-supporting post, g , the grate-bars f' f' , having a central pivot-plate, f'' , and the holder h , extending through the opening b^3 in the plate b , said holder being provided with an eye to engage the end of the arm g' , and having a lip, h'' , that rests on said plate, substantially as described.

3. The combination of the double-shell annular boiler c c' , the double-shell jacket d , having smoke-pipe D , the tank I , the pipe i'' , leading from the bottom of the tank to and through the double-shell jacket and into the lower part of the annular boiler, and the steam-pipe i^3 , leading from the upper part of the annular boiler through the jacket and into the tank, substantially as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

WARREN P. HARTMAN.

Witnesses:

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HENRY J. JENNINGS.