

(No Model.)

G. STEELE.
STEAM BOILER.

No. 307,599.

Patented Nov. 4, 1884.

Fig. 2.

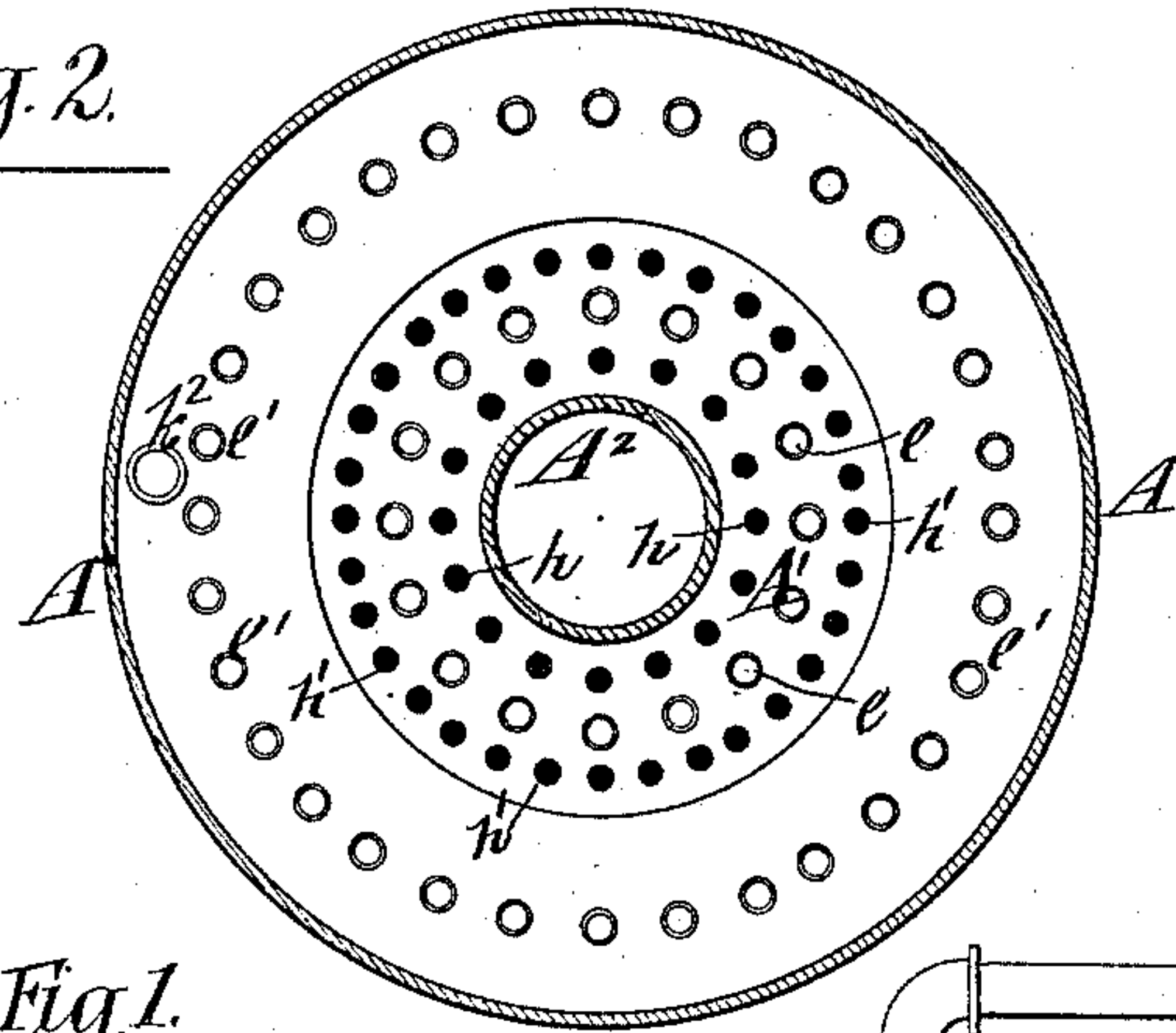
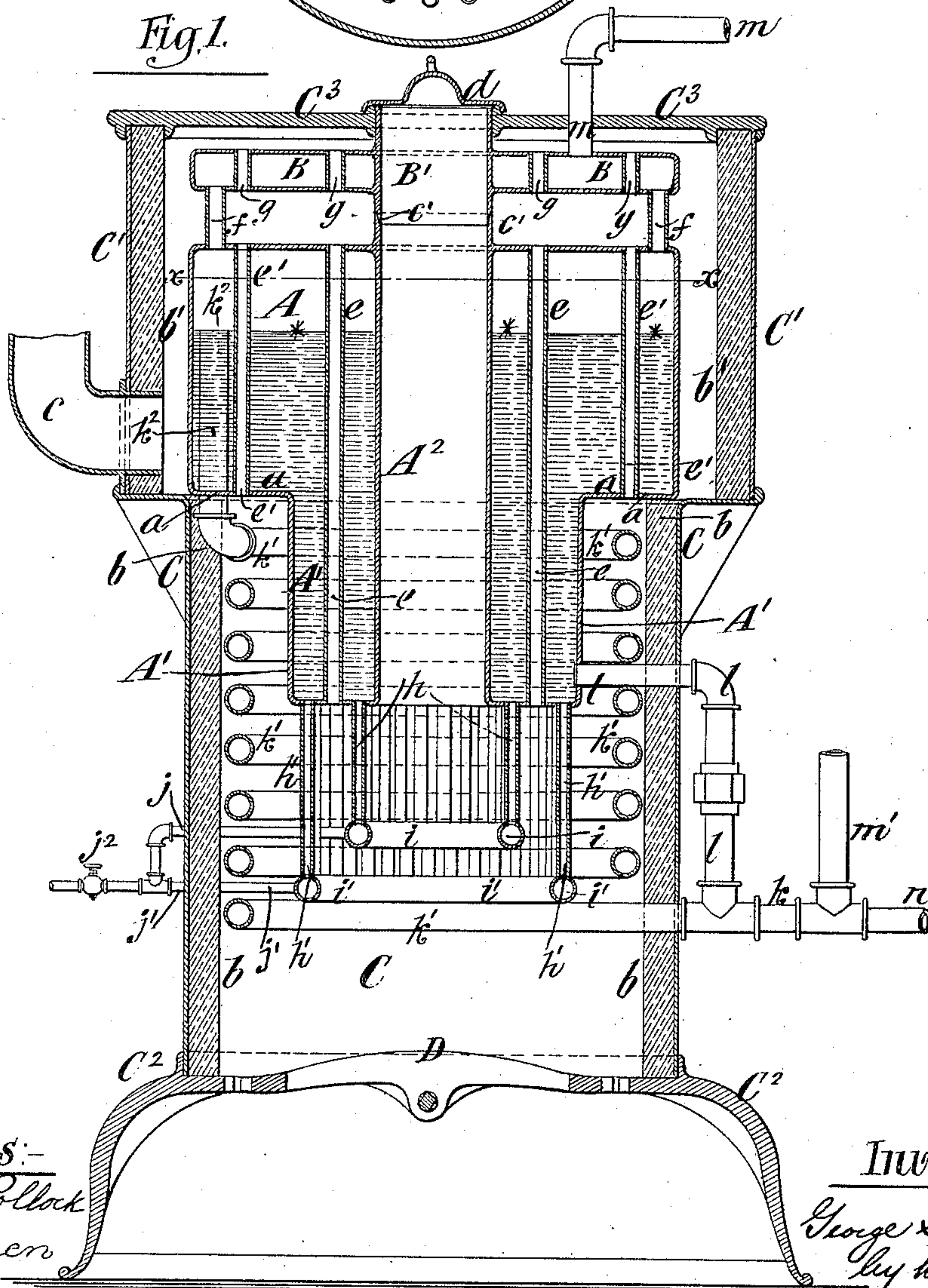


Fig. 1.



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Matthew Pollock
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UNITED STATES PATENT OFFICE.

GEORGE STEELE, OF NEW YORK, N. Y.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 307,599, dated November 4, 1884.

Application filed February 18, 1884. (No model.)

To all whom it may concern:

Be it known that I, GEORGE STEELE, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

My invention relates more particularly to steam-boilers for heating purposes; and an important object of my invention is to provide an effective boiler for such purpose which can be produced at a low cost, and will require but little more care than an ordinary magazine or self-feeding stove. Certain features of the invention may, however, be embodied in boilers for generating steam for other than heating purposes.

In the accompanying drawings, Figure 1 is a central vertical section of a boiler embodying my invention, and Fig. 2 is a transverse section thereof on the dotted line *xx*, Fig. 1.

Similar letters of reference designate corresponding parts in both figures.

A A' designate the body of the boiler or boiler proper, and *B* designates a superheater, here shown as arranged above the boiler *A A'*. The boiler *A A'* consists of two cylindric or circular portions of different diameters, the portion *A'*, which is lowermost, being the smaller, and being joined to the upper and larger portion, *A*, by a horizontally-extending portion or shoulder, *a*.

C designates the furnace, here shown as circular and provided with the usual grate, *D*. The furnace *C* and the upper portion, *C'*, of the inclosing-casing or heating-chamber are lined with fire-brick *b b'*, and the boiler *A A'* is supported in an upright position by reason of the shoulder *a* resting on the fire-brick lining *b* of the furnace. The outer casing, *C C'*, is supported on a metal or other base, *C''*, and from the upper portion, *C'*, the smoke-flue *c* extends. Through the vertical center of the boiler and superheater there extends a fuel-magazine or feeding-throat, *A² B'*, the lower portion, *A²*, which extends through the boiler *A A'*, being formed integral therewith, and the upper portion, *B'*, being formed integral with the superheater *B* and joined with the portion *A²* at *c'*. The upper portion, *C'*, of the outer casing of the boiler is closed by a top

or cover, *C³*, through which extends the portion *B'* of the fuel-magazine, and the upper end of said magazine is closed by a lid or cover, *d*. I prefer to form the superheater *B* and its section *B'* of the magazine integral by casting, and I also may produce the boiler portions *A A'* and the magazine portion *A²* in one piece by casting, as they may be thus cheaply produced.

In the boiler proper are two circular series of vertical fire-tubes, *e e'*, the tubes *e* being arranged in an inner circle and long enough to extend through the two portions *A A'*, and the tubes *e'* being arranged in an outer circle and only long enough to extend through the larger portion *A*, said tubes being secured in the shoulder *a*. The tubes *e e'* may be expanded at the ends into tube-holes prepared for them in the top and bottom of the boiler. The boiler *A A'* is connected with the superheater *B* by tubes *f*, which may be provided with right and left hand threads and screwed into said two parts, or which may have a long thread at one end and a short thread at the other end. The boiler *A A'* is filled with water up to about the line *, and the upper portion of *A* and the superheater *B* constitute the steam-space of the boiler.

In the superheater *B* are short tubes *g*, which are directly over the tubes *e e'* in the boiler, and through which a tube-scraper or brush may be inserted into the tubes *e e'*, for the purpose of cleaning them. The tubes *g* may be cast integral with or expanded into the upper and lower plates of the superheater.

I have here represented two circular series of tubes, *h h'*, extending downward from the part *A'* of the boiler, and connected at their lower ends with annular pipes or chambers *i i'*. The tubes *h* are shorter and are arranged in a smaller circle than the tubes *h'*. Certain of the tubes *h h'* will always be less exposed to the heat than others, and there will therefore always be a downward circulation through certain of the tubes *h h'* and an upward circulation through certain other of the said tubes. Blow-off pipes *j j'* extend from the annular pipes *i i'*, and by opening the valve or blow-off cock *j²* the sediment settling in the pipes *i i'* may be blown off. A pipe, *k*, enters the

furnace from the outside thereof, and within the furnace is continued in a coil, k' , upward to the horizontal portion or shoulder a , where it enters and continues upward by a delivery-pipe, k^2 , nearly to the water-level *. A pipe, l , leads from the pipe k outside the furnace to the boiler portion A' . From the superheater B the steam passes upward through a pipe, m , to the radiators of the heating system, and the steam and water of condensation return through the pipe m' to the pipe k , and thence flow into the boiler through the coil k' and pipe l . The feed-pipe n is or may be connected with the pipe k ; but as all the water of condensation in the radiator system is returned to the boiler the quantity of feed-water supplied need be little. When the water of condensation is not returned to the boiler, the return-pipe m' will be unnecessary, and a larger volume of feed-water must be supplied.

The boiler above described is simple in construction and easy of repair. Its heating-surface is of such character and so arranged as to be very effective, both as to economy of fuel and the circulation produced, and the boiler requires very little attention, and is safe in its operation.

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

- 30 1. The combination, with an upright boiler consisting of the portions $A A'$, of different diameter, joined by the shoulder a , and having the magazine portion A^2 formed integral with said portions $A A'$ and projecting above the portion A , of the superheater B, made separate from the boiler, and having the magazine portion B' formed integral with it and joined to the upper end of the magazine portion A^2 , the tubes f , connecting the superheater and

boiler, the furnace C, supporting the boiler by its shoulder a , and the heat-chamber C' , from which leads the escape-pipe c , and which incloses the portion A of the boiler and the superheater, substantially as herein described.

2. The combination of the boiler consisting of the portions $A A'$, joined by the shoulder a , and constructed with the central fuel-magazine, A^2 , and long and short tubes $e e'$, the furnace C, supporting the boiler by its shoulder a , and the heat-chamber C' , from which leads the escape-pipe c , substantially as herein described.

3. The combination, with the boiler consisting of the portions $A A'$, magazine A^2 , and fire-tubes $e e'$, of the furnace and heat-chamber $C C'$, containing and supporting the boiler, and the pipe k , entering the furnace, continuing therein as a coil, k' , and terminating in a portion, k^2 , entering the boiler, substantially as herein described.

4. The combination, with the boiler $A A'$, A^2 and tubes $e e'$, of the furnace and heat-chamber $C C'$, the pipe k , entering the furnace, continuing therein as a coil, k' , and terminating in a portion, k^2 , entering the part A of the boiler, and the pipe l , leading from the pipe k into the part A' of the boiler, substantially as herein described.

5. The combination, with the boiler $A A'$, A^2 and its fire-tubes $e e'$, of the furnace and heat-chambers $C C'$, and the circular series of heating-pipes $h h'$, extending downward from the portion A' of the boiler, substantially as herein described.

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Witnesses:

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