

**No. 679,532.**

**Patented July 30, 1901.**

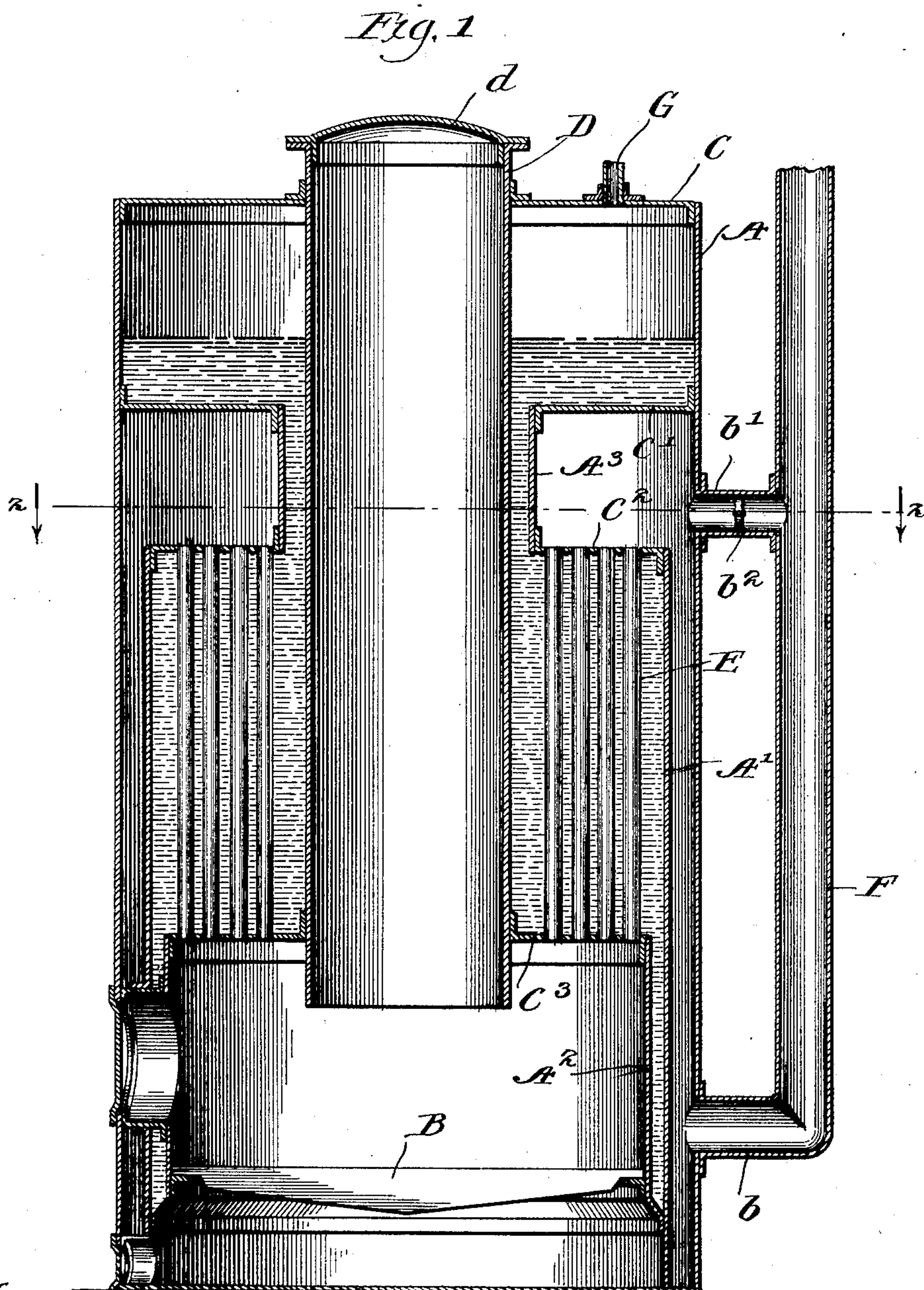
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## STEAM BOILER.

(Application filed Feb. 20, 1901.)

(No Model.)

**2 Sheets—Sheet 1.**



*Witnesses*

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2 Sheets—Sheet 2.

Fig. 2.

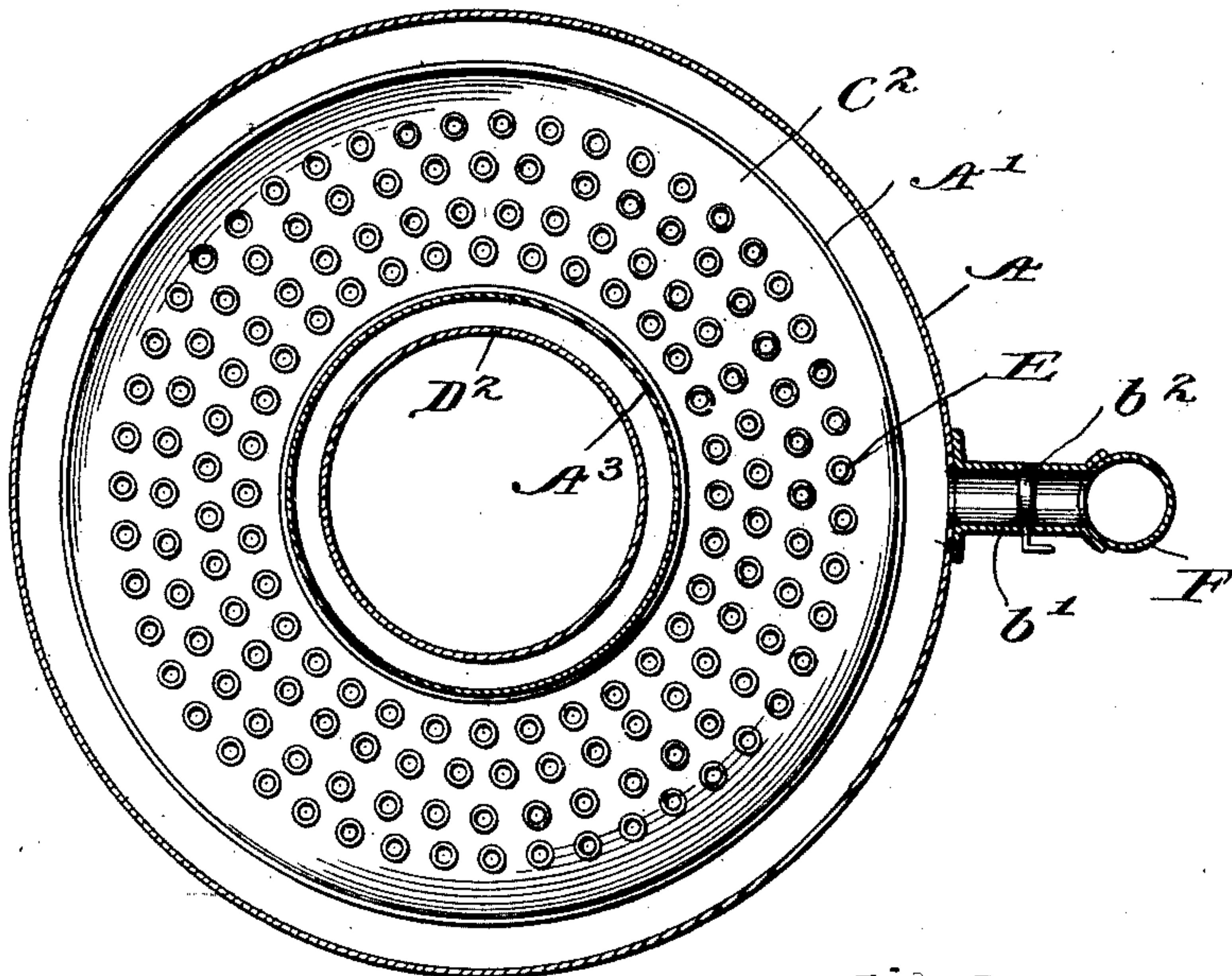
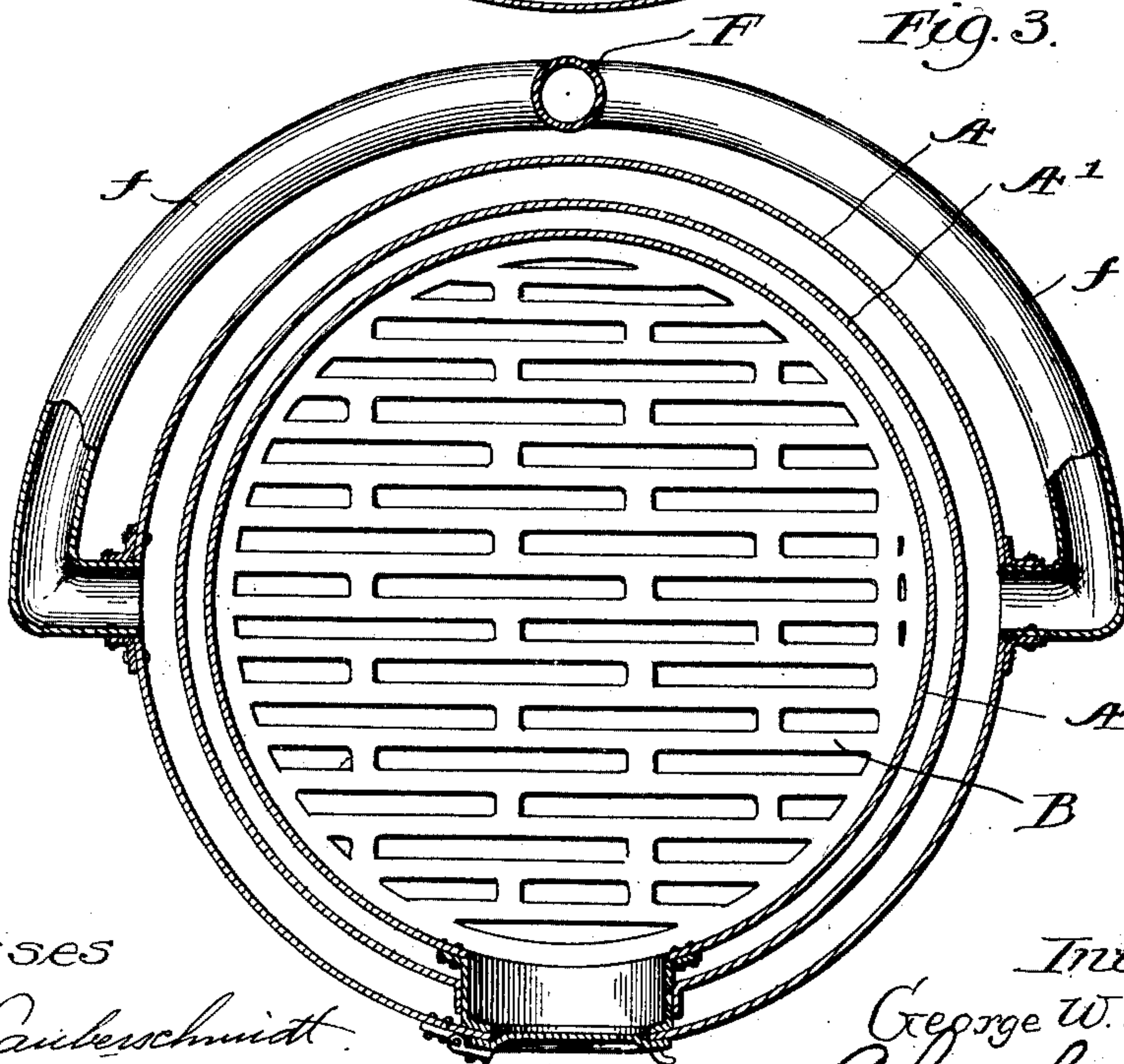


Fig. 3.



Witnesses

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# UNITED STATES PATENT OFFICE.

GEORGE W. MATHEWS, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO  
WALTER STOKES, OF SAME PLACE.

## STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 679,532, dated July 30, 1901.

Application filed February 20, 1901. Serial No. 48,098. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. MATHEWS, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in steam-boilers, and more particularly to steam-boilers designed for use for steam heating. Heretofore it has been common to employ steam-boilers for this purpose which have usually been of large size and expensive. Owing to the expense and size flat-buildings heated by steam have ordinarily employed one boiler for heating a plurality of flats, thereby necessitating at times a much larger consumption of fuel than would be the case if each flat were provided with its own heating plant and boiler and also preventing the occupant controlling and regulating the temperature in his apartments.

The object of my invention is to provide a boiler for heating purposes of cheap and simple construction and of small size especially adapted for individual heating plants for flats and small houses.

My invention consists of the matters hereinafter described, and more fully pointed out and defined in the appended claims.

In the drawings, Figure 1 is a vertical section of a device embodying my invention. Fig. 2 is a section taken on line 2 2 of Fig. 1. Fig. 3 is a horizontal section taken near the base of the boiler.

As shown in said drawings, A indicates the outer shell of an upright boiler, the middle and lower portion of which form a jacket for the lower part of the boiler, which is provided with an inner shell A'.

A<sup>2</sup> indicates the lining of the fire-box, which is spaced a sufficient distance from the inner shell to form a water-leg extending below the grates B. Said boiler is provided with four heads, of which the upper, C, has an outer diameter approximately equal to the inner di-

ameter of the outer shell and is rigidly secured therein by bolting or the like. Two of said heads are located centrally of the boiler, of which the upper, C', is provided with a peripheral flange adapted to be secured to the outer shell A. The lower, C<sup>2</sup>, is also provided with a peripheral flange and is adapted to be secured at the top of the inner shell A'. The lowermost head C<sup>3</sup> is of a diameter equal to the diameter of the lining of the fire-box and provided with a flange adapted to be secured in the top of said lining by riveting, bolting, or the like. Each of said heads is provided with a circular central aperture extending therethrough, through which passes a cylindrical shell D, designed as a fuel-magazine, which is provided at its top with a cover d and which extends below the head C<sup>3</sup> into the fire-box. Said shell has an outer diameter equal to the diameter of the apertures through the heads C and C<sup>3</sup> and is rigidly secured therein by riveting or by bolting or like means, said heads having flanges thereon to receive the same. The apertures through the heads C' and C<sup>2</sup> are of greater diameter than those in the heads C and C<sup>3</sup>, and supplemental inner shell A<sup>3</sup> is rigidly secured on flanges of said heads by means affording a water-tight joint. It will be seen by the construction described that the interior of said boiler is divided into two unequal chambers, the lower of which is of greater height but of less diameter than the other, which serves as a steam-dome for the boiler and is connected with the said lower chamber by the small annular passage surrounding said magazine.

A plurality of fire-tubes E pass upwardly through the lower chamber of the boiler and are secured at their extremities in the heads C<sup>2</sup> and C<sup>3</sup> in the usual manner.

F indicates a smoke-flue leading to a stack or chimney and connected with the chamber surrounding the lower middle portion of the boiler through the shell A near the bottom of the same by the elbow f and also communicating with said chamber between the heads C' C<sup>2</sup> by the connection f'. Said connection f' is provided with a damper f<sup>2</sup> of any desired construction and designed to entirely close the passage therethrough or to



permit the same to be opened when a stronger draft is desired. The modification illustrated in Fig. 3 shows two connections of the pipe F at its lower end with the outer chamber of the boiler, said connections being on opposite sides of the boiler through the shell A'.

G indicates a steam-pipe adapted to conduct steam to the radiators of a building or to the point where it is designed to use the steam.

The operation of my device is as follows: Said boiler is filled with water above the head C', but leaving an adequate steam-space above the surface to serve as a dome. Heat being applied in the usual manner in the fire-box, the heated gases of combustion rise through the tubes E into the annular chamber located between the heads C' and C<sup>2</sup>. It is to be observed that the head C' projects beyond the head C<sup>2</sup>, thereby obtaining the greatest possible heating effect from the hot gases contained in said chamber. Said damper f<sup>2</sup> being opened, the gases of combustion are drawn off into the pipe F and conveyed to the chimney in a familiar manner. After, however, the draft is established said damper may be closed and the gases of combustion drawn downwardly from the upper portion of said chamber between the outer and the inner shells to escape through the passages f<sup>4</sup> f<sup>4</sup> into said pipe F, as indicated in Fig. 1. Obviously said downward passage of said heated gases along the inner shell serves to still further heat the water contained within said boiler. It is to be observed also that the casing A<sup>3</sup> approaches so closely to the magazine B that but little water is contained in the passage between said casings, the effect being to greatly accelerate convection by the heat of said shell and casing and more rapidly convert the water into steam. Obviously metal of any desired weight and strength may be used in the construction of boilers embodying my invention, and any desired means may be used for securing the parts of said boiler together. Obviously, also, any construction of fire-box, fire-doors, ash-doors, or grates may be employed without departing from the principle of my invention.

I claim as my invention—

1. A steam-boiler, comprising an upper and a lower water chamber or compartment an annular combustion-chamber located between the same and surrounding the lower chamber, and a fuel-magazine located centrally of said boiler and extending into the fire-box and an

annular passage surrounding the magazine and between the magazine and combustion-chamber and connecting the water-chambers.

2. An upright steam-boiler comprising an upper and a lower water chamber or compartment of unequal diameters, an annular chamber between said chambers and partly surrounding the lower and adapted to receive the gases of combustion, a vertical tubular fuel-magazine located centrally of the boiler and extending into the fire-box, and fire-tubes extending through said lower water-chamber and opening into the fire-box and combustion-chamber and an annular water-passage surrounding the magazine and between the same and the combustion-chamber and connecting the respective water chambers or compartments.

3. A fire-tube boiler comprising an outer and an inner shell, horizontal heads dividing said boiler into an upper and a lower water-chamber, a central annular combustion-chamber between said water-chambers and extending downwardly between the shells and adapted to receive the gases of combustion, a fuel-magazine opening into the fire-box, fire-flues leading from the fire-box to the combustion-chamber through said lower water-chamber, the inner walls of said combustion-chamber lying in close proximity with the walls of the magazine thereby providing a thin annular water-passage surrounding the magazine and pipes or flues communicating with the combustion-chamber designed to convey away the gases of combustion.

4. In a device of the class described, a fire-box, an upper and a lower water-chamber located above the same, a small annular water-passage connecting the same, a water-leg surrounding the fire-box, a combustion-chamber between said upper and lower water-chambers partly surrounding said lower water-chamber and adapted to receive the gases of combustion, a flue connected near the bottom of the same and a fuel-magazine passing through said upper and lower water-chambers and the water-passage connecting the same.

In witness whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

GEORGE W. MATHEWS.

Witnesses:

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