L. S. BUSH.

HOUSE HEATING BOILER.

APPLICATION FILED FEB. 26, 1908.

948,413.

Patented Feb. 8, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

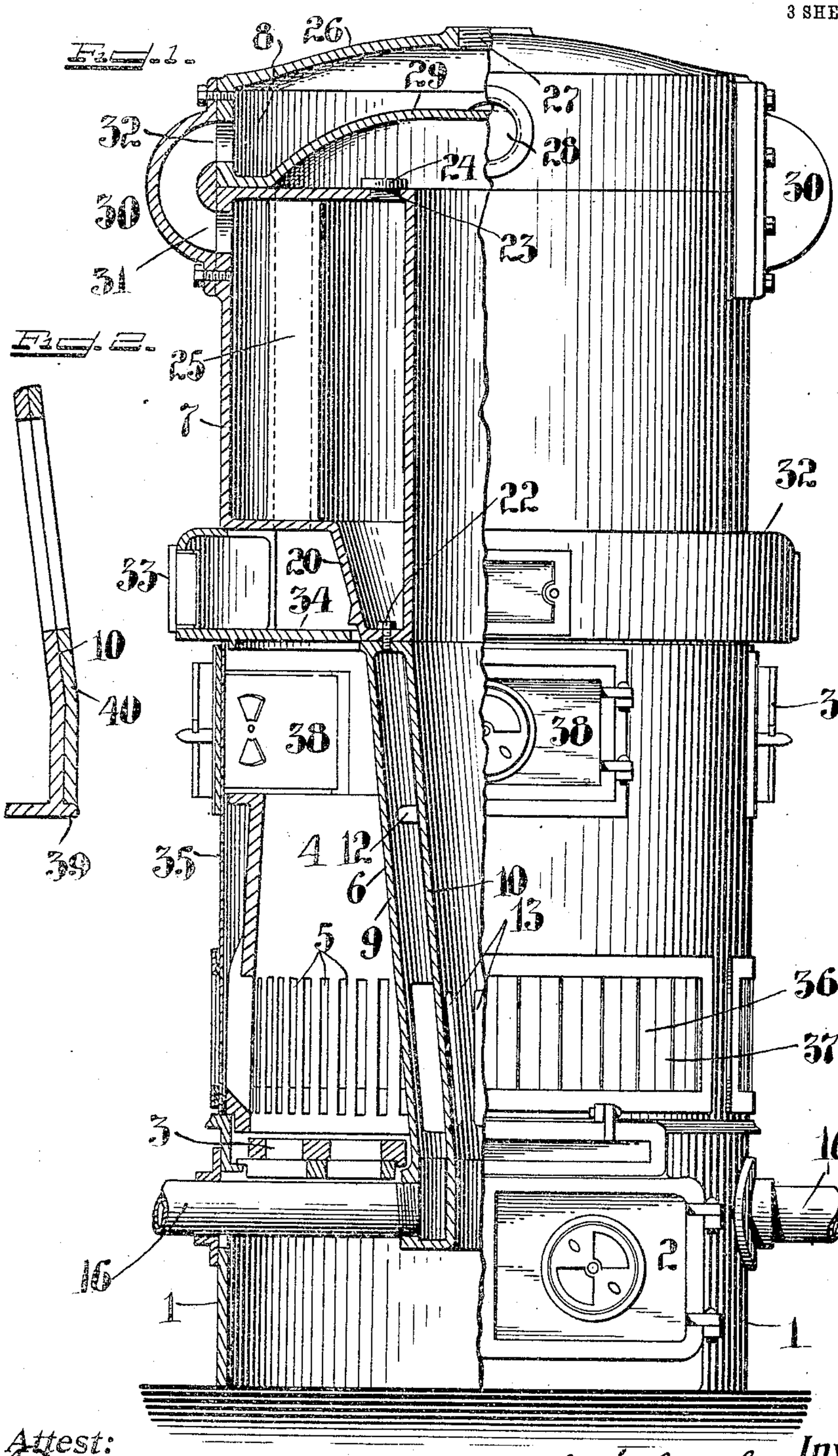

Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 2.

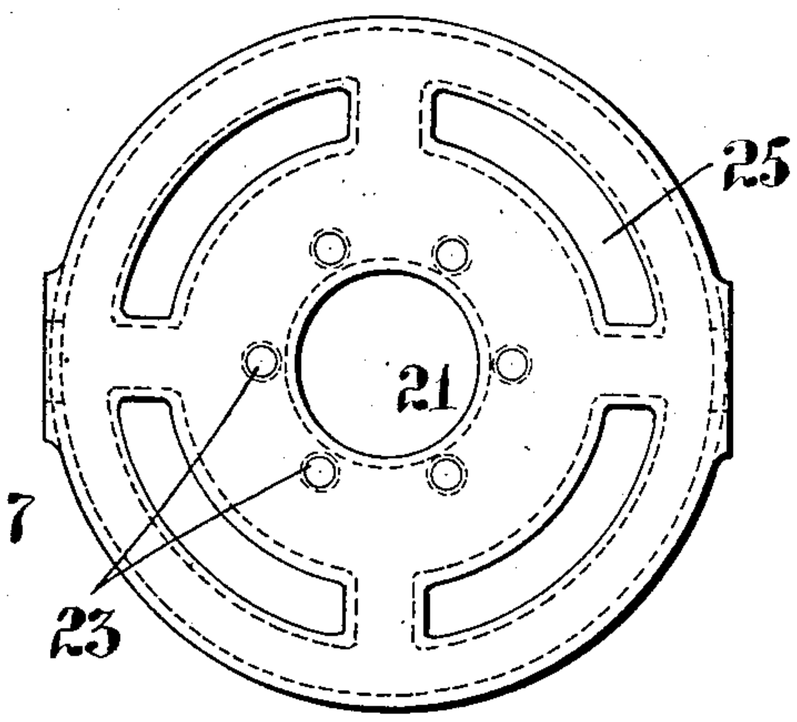

Fig. 4.

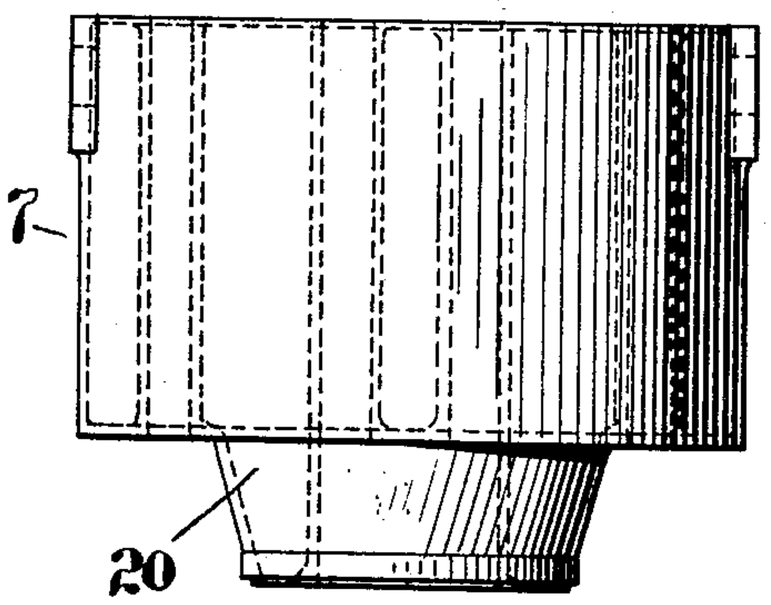

Fig. 5.

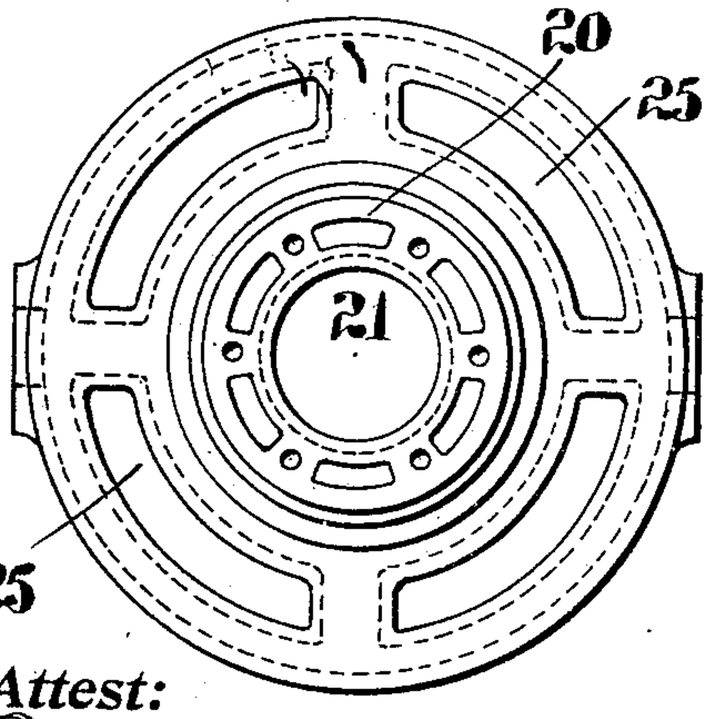

Fig. 6.

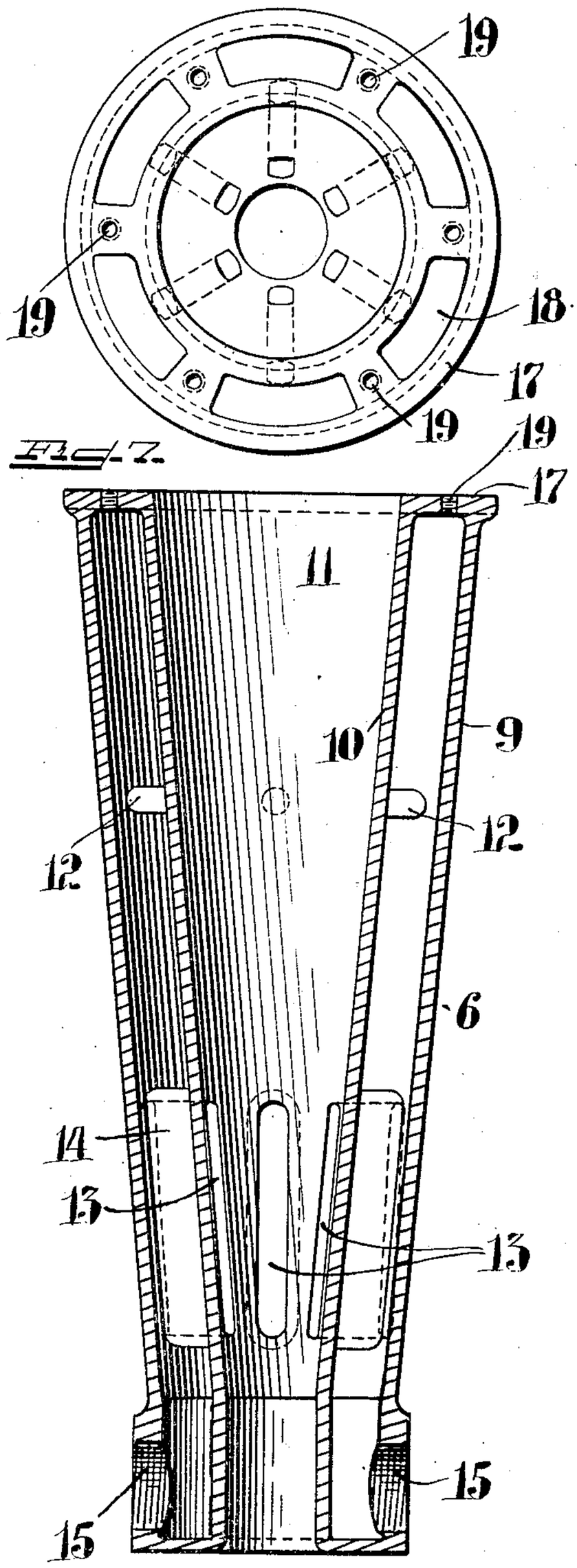

Fig. 7.

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3 SHEETS—SHEET 3.

Fig. 8.

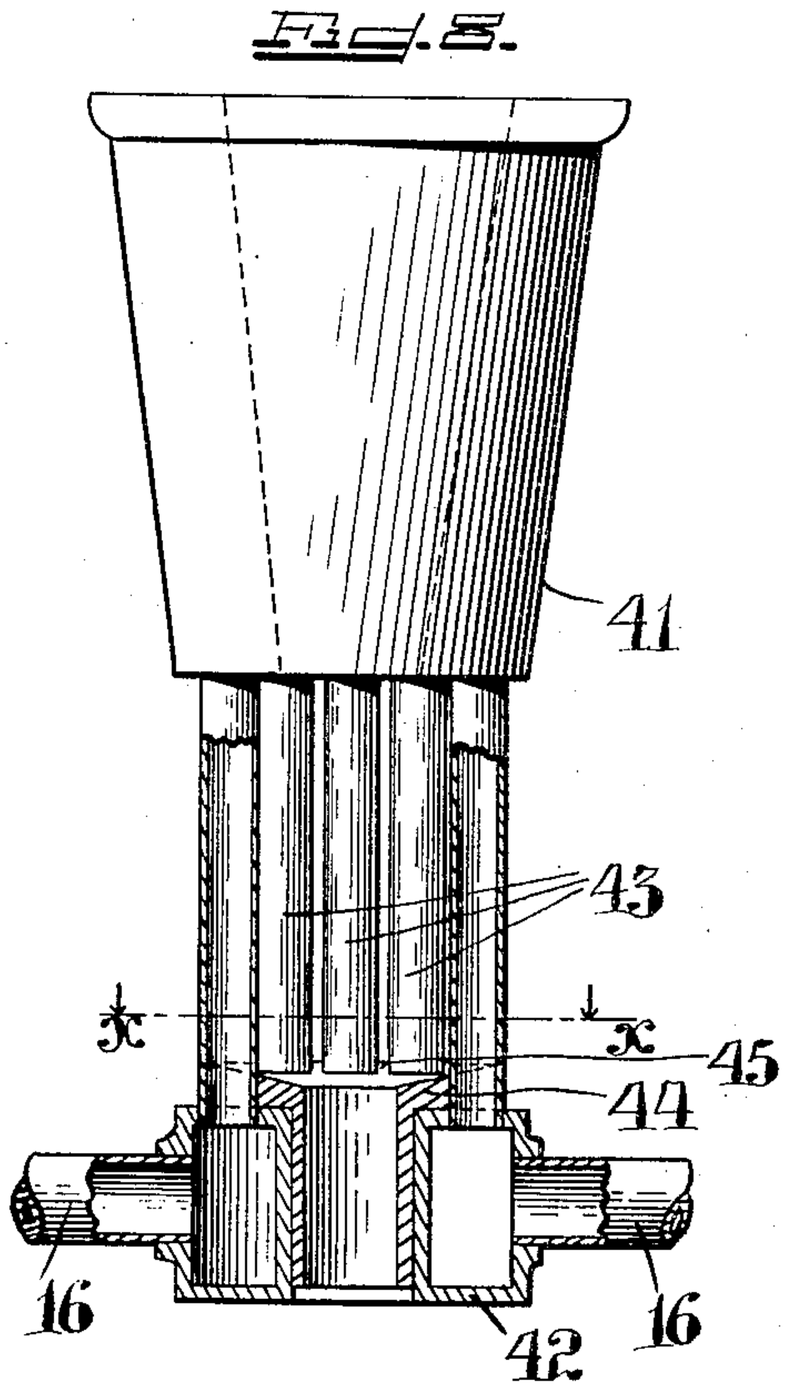


Fig. 10.

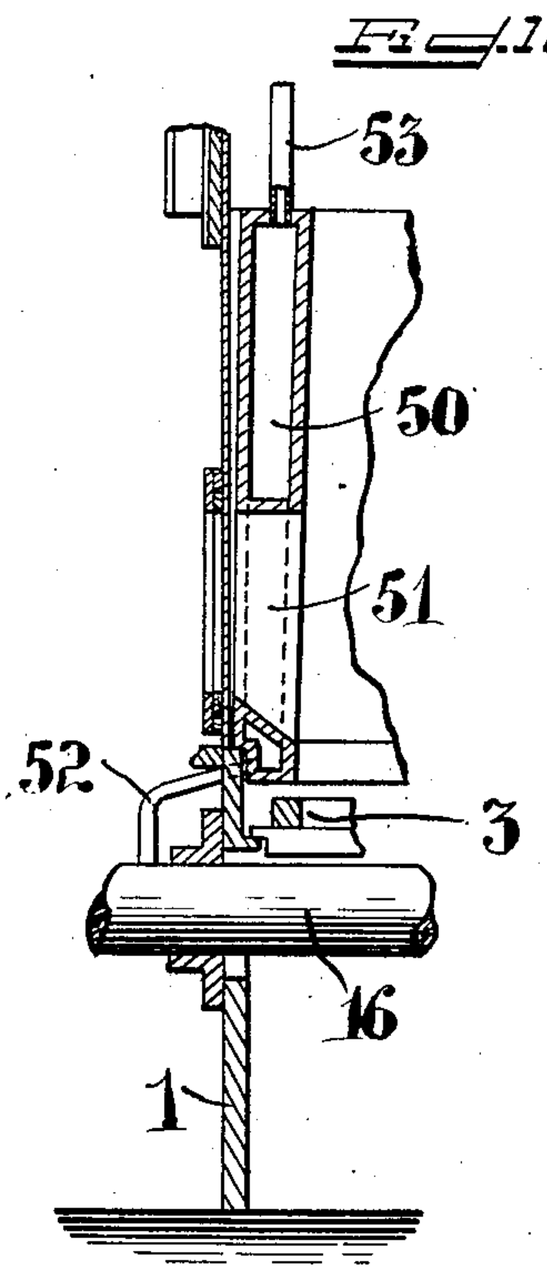
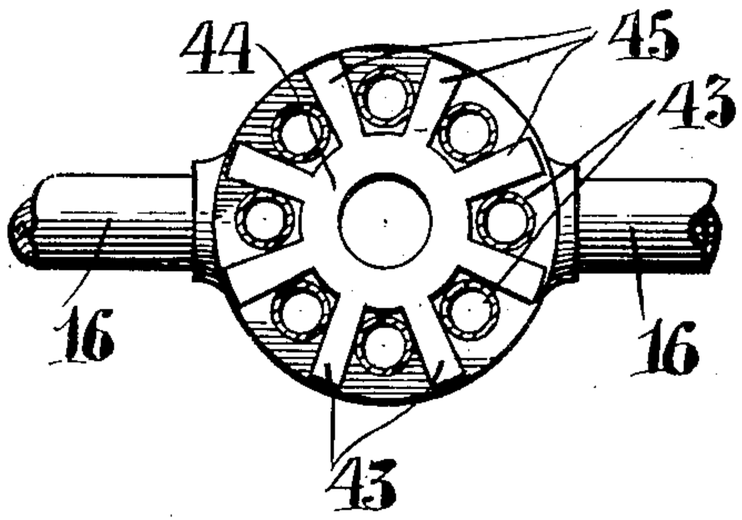


Fig. 9.



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UNITED STATES PATENT OFFICE.

LUTHER S. BUSH, OF MILWAUKEE, WISCONSIN.

HOUSE-HEATING BOILER.

948,413. Specification of Letters Patent. Patented Feb. 8, 1910.

Application filed February 26, 1908. Serial No. 417,814.

To all whom it may concern.

Be it known that I, LUTHER S. BUSH, a citizen of the United States, and a resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in House-Heating Boilers, of which the following is a specification.

This invention relates to improvements in house heating boilers and the object of my invention is to provide a new and improved house heating boiler which can be used for water or low pressure steam, which boiler is simple in construction, economical and effective in use and is compact.

In the accompanying drawings, in which like characters of reference indicate like parts in all the figures:—Figure 1 is a side elevation of my improved heating boiler, parts being broken away and parts shown in section. Fig. 2 is a detail sectional view of part of the lowest section of the interior of the boiler, snowing a slight modification. Fig. 3 is a plan view of the top of the intermediate section of the boiler. Fig. 4 is a side view of the intermediate section of the boiler. Fig. 5 is a view of the underside of the intermediate section of the boiler. Fig. 6 is a plan view of the bottom section of the boiler. Fig. 7 is a longitudinal vertical sectional view of the bottom section of the boiler. Fig. 8 is a vertical sectional view of a modified form of the bottom section, parts being in elevation. Fig. 9 is a horizontal sectional view on the line *x*—*x* of Fig. 8, showing the cleaning device used with the modification shown in Fig. 8. Fig. 10 is a vertical sectional view showing a modified form of the fire box.

The entire boiler rests upon a base 1 provided with one or more doors 2 for removing the ashes from the pit formed and bounded by said base. The grate 3 is annular in shape and of any suitable construction and supported on the top of the base 1. The fire pot 4 which is annular in shape, rests upon the base and is provided with a series of vertical slots 5 in its lowest portion which slots form draft openings. The water space of the boiler is formed of a bottom section 6, intermediate section 7 and a top section 8. The bottom section 6 as shown in Fig. 7 is composed of an annular chamber having an outer wall 9 and an inner wall 10, the said walls 9 and 10 being connected at the top and bottom so as to form this closed chamber. The inner wall 10 forms the boundary for a flue 11 for the products of combustion and the diameter of this lower section 6 as well as the flue 11 increases gradually from the bottom to the top. Stay bolts 12 are preferably provided between the two walls 9 and 10. Draft openings 13 are formed in the lower part of this bottom section 6 in the form of vertical slots in the outer wall 9 and inner wall 10 which slots are surrounded by a wall 14 uniting the inner and outer walls 9 and 10.

Openings 15 are formed in the bottom part of the bottom section 6 and in said openings the water supply pipes or cold water pipes 16 are secured which pass from the bottom of this bottom section 6 directly beneath the grate 3 through the ash pit and through suitable openings in the base 1 to be connected with the circulating pipes of the heating system. The top 17 of the lower section 6, which top unites the outer and inner wall of this bottom section, is provided with a series of segmental openings 18 and in the portions of this top 17 between said openings 18 tapped holes 19 are provided for a purpose that will appear hereinafter. The intermediate section 7 which is shown in the drawings, on a smaller scale than the bottom section 6, is circular in shape and is provided on its underside with a hollow inverted conical projection 20 through which a central draft opening 21 is formed which is open at the top and bottom and which at the bottom is of the same diameter as the upper end of the draft flue 11 in the lower section 6 so as to register therewith, as appears from Fig. 1. The bottom edge of the tapered portion 20 of the intermediate section 7 fits on the top 17 of the bottom section 6 and the two are united by screw bolts 22 passed through openings in the bottom of the tapered portion 20 and screwed into the tapped holes 19 in the closed top portion 17 of the bottom section 6, as shown in Fig. 1. To permit of turning these screws, openings 23 are formed in the top wall of the intermediate section and are closed by screw plugs 24 so that when these screw plugs are removed a tool of suitable length can be inserted through the holes 23 for turning the bolts 22. Within this intermediate section 7, four more or less, segmental draft flues are formed which extend from the flat top to the flat bottom portion of the sec-

tion 7 outside of the tapered bottom part. The top section 8 of the boiler is of the same diameter as the intermediate section 7 and is provided with an upwardly curved top plate 26 provided with a screw neck 27 for attaching the outflow pipe for the hot water or steam and this section may likewise be provided with a similar opening 28 in its side. The bottom of the top section 8 is curved upward to form a dome or baffle plate 29 which extends to near the outer edge of this upper section. For the purpose of connecting the intermediate section 7 and the upper section 8 two or more water legs 30 are provided which are held by screws on the sides of the section 7 and 8, which sections are provided with holes 32 and 31 that communicate with the water leg so that the water can pass from one section to the other through these two water legs. Between the top of the fire box 4 and that portion of the bottom of the intermediate section 7 outside of the central tapered part 20, the draft box 32 is located which is provided with a suitable opening 33 for attaching the exit pipe, and this draft box is closed at its bottom by a horizontal partition 34 and its top is formed by the horizontal portion of the intermediate section 7 and the inner wall of this draft chamber is formed by the tapering bottom part 20 of the intermediate section. A sheet metal jacket 35 surrounds the fire pot and is provided with draft openings 36 which can be closed by a curved grating 37 through which draft openings the air can pass to the slots 5 in the fire pot. This casing 36 is provided with one or more fuel doors 38 through which the fuel is filled into the fire pot.

As shown in Fig. 2 the bottom section 6 is provided at its bottom with a ledge 39 upon which a fire grate lining 40 can rest which lining may extend a greater or less distance upward into the central flue formed in the bottom section. The burning fuel rests upon the grate and the products of combustion pass through the slots 13 in the bottom section of the boiler into the central flue 11 and from the same through the central flue 21 formed in the intermediate section 7 and in passing upward strike the dome or baffle plate 29 and are deflected laterally and to the downwardly extending draft flues 25 in the intermediate section from the lower ends of which they pass into the draft box 32 about the middle of the height of the boiler and then pass off through the exit pipe. Incoming water passing through the pipes 16 is heated to a certain extent by passing through the hot ash pit and by the radiation from the fire on the grate and this water rises through the space between the walls 9 and 10 of the bottom section and through the registering openings 18 in the bottom section and in the intermediate section, into said intermediate section and surrounds the draft flues 25 and through the water legs 30 passes into the top section 8 from which it passes to the radiators of the heating system and then through suitable return pipes back to the pipes 16 and so on. In the modification shown in Figs. 8 and 9 the bottom section of the boiler is formed of a downwardly tapering upper portion 41, a bottom portion 42 with which the pipes 16 are connected in the manner previously described and the parts 41 and 42 are connected by a circle of vertical pipes 43 so that the water can pass from the part 41 to the part 42 through said pipes and the openings between these pipes form the passages for the products of combustion from the fire pot to the central flue. For the purpose of cleaning the space between the pipes, a circular frame 44 is placed loosely in this flue and is provided with a series of radial arms 45 so that one passes between each two pipes 43. By means of a suitable implement such as a poker or the like, this frame 44 can be raised or lowered so as to remove clinkers ashes or other deposits from between the pipes 43. In other respects the boiler is constructed in the manner shown above. As shown in Fig. 10 the walls of the fire pot are made hollow so as to form closed water chambers 50 through which the draft slots 51 are formed. These chambers 50 are connected at the bottom by a suitable pipe 52 with the return pipe 16 and at the top by a pipe 53 with either the water space in the bottom or intermediate section of the boiler.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. A heating boiler constructed with a bottom section having a central flue, and a water chamber, a fire pot surrounding said section, said section having slots for establishing communication between the fire pot and the central flue formed in said section and a grate at the bottom of the fire pot beneath which grate the lower part of said section extends and return pipes connected with that part of the bottom section projecting beneath the grate, substantially as set forth.

2. A heating boiler constructed with a bottom section having a central flue and a water chamber, a fire pot surrounding said section, said section having slots for establishing communication between the fire pot and the central flue formed in said section and a grate at the bottom of the fire pot beneath which grate the lower part of said section extends, and return pipes extending across the grate directly beneath the underside of the same and connected with that part of the bottom section projecting beneath the grate, substantially as set forth.

3. In a heating boiler, the combination

with a fire box, of a bottom section having a central flue open at the top and bottom, an intermediate section resting upon the bottom section and having a tapering bottom projection of less diameter than the top of the intermediate section, which intermediate section also has a central draft flue and a series of vertical draft flues surrounding the central flue and terminating at their lower ends in the flat portion of the intermediate section surrounding the central bottom part and a draft box formed between the top of the bottom section and the bottom of the intermediate section, said bottom and intermediate sections forming water spaces which are in communication with each other, substantially as set forth.

4. The combination with a fire box, of a bottom water section having a central draft flue open at the top and bottom, an intermediate water section having a central draft flue communicating with the draft flue of the bottom water section, a draft box at the bottom of the intermediate water section, and draft flues surrounding the central flue and communicating at their lower ends with the surrounding draft box, and a top section secured on the top of the intermediate section and forming a baffle plate above the upper end of the vertical flue and the flues surrounding the central flue, substantially as set forth.

Signed at New York city in the county of New York and State of New York this 20th day of Feby. A. D. 1908.

LUTHER S. BUSH.

Witnesses:
FRANK E. RAFFMAN,
S. M. BAEDER.