

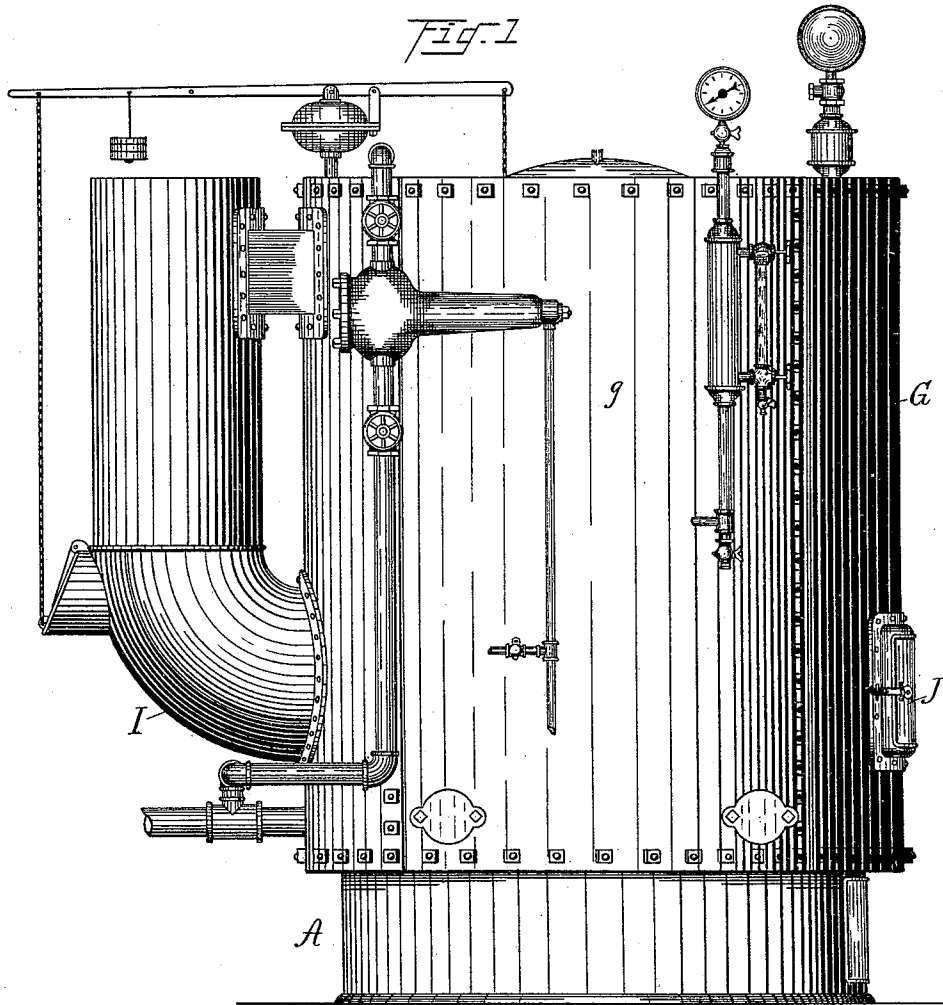
(No Model.)

2 Sheets—Sheet 1.

D. CONNELLY & C. E. SCHAFER.
STEAM BOILER.

No. 526,024.

Patented Sept. 18, 1894.



WITNESSES.

H. Griswold
Helen M. Hood.

INVENTORS:

David Connelly
Christian E. Schafer
By Wing & Thurston
their attys

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FIG. 3

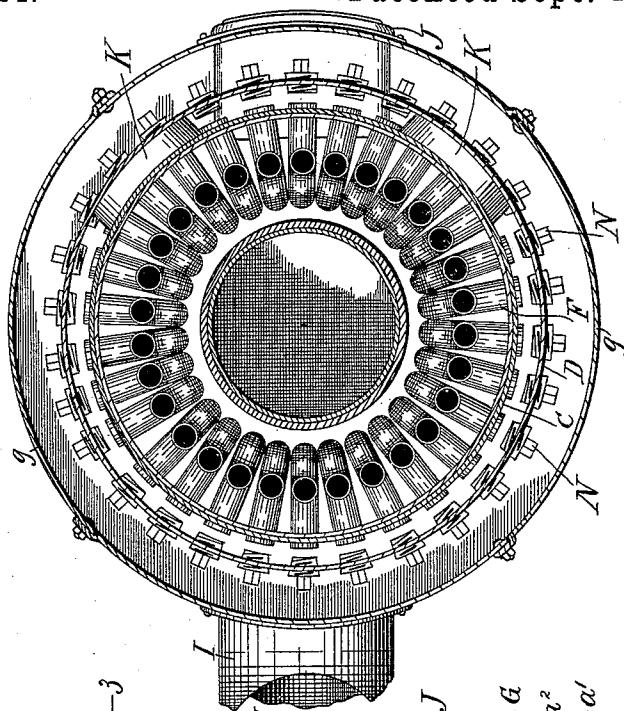
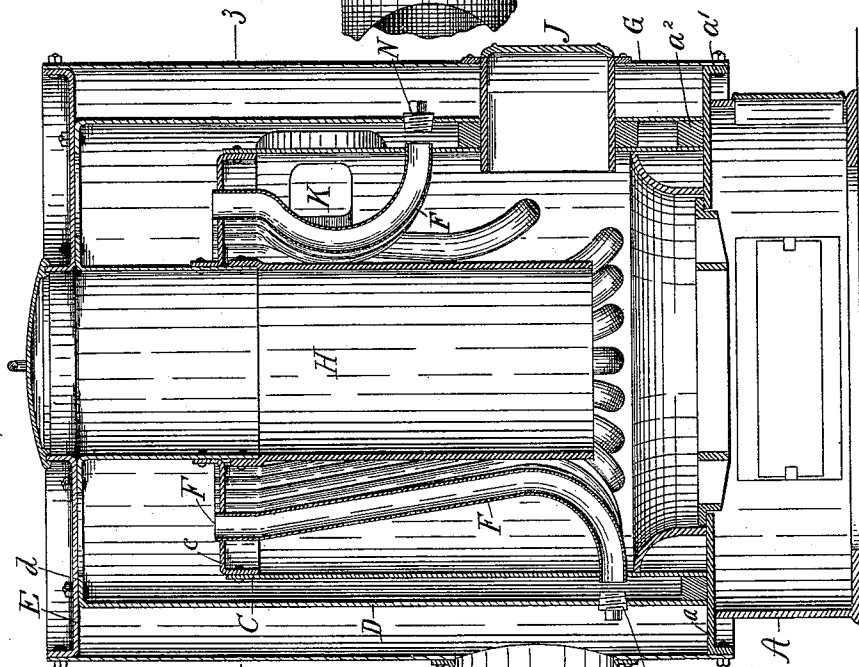


FIG. 2



WITNESSES.
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UNITED STATES PATENT OFFICE.

DANIEL CONNELLY AND CHRISTIAN E. SCHAFER, OF CLEVELAND, OHIO.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 526,024, dated September 18, 1894.

Application filed April 18, 1894. Serial No. 508,012. (No model.)

To all whom it may concern:

Be it known that we, DANIEL CONNELLY and CHRISTIAN E. SCHAFER, citizens of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Steam-Boilers; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in tubular steam boilers, especially adapted for generating steam for steam heating plants. The apparatus is also adapted for use as part of a hot water heating plant.

The invention consists in the construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of an apparatus containing our invention. Fig. 2 is a central vertical sectional view thereof; and Fig. 3 is a horizontal sectional view thereof on the line 3—3 of Fig. 2.

Referring to the parts by letters, A represents the base which forms the ash pit and which is preferably made of cast iron in the form of a cylinder. On this base a plate *a* is set, which plate has an annular flange *a'*. The cylindrical furnace shell *G* is made up of separable sections *g*, which are bolted to each other and to the annular flange *a'*.

Inside of the furnace shell two concentric cylinders *C* and *D* of different diameters are secured to the plate *a*. The preferred means for making this connection is through the ring *a²* which is secured to said plate *a*, and to which the lower ends of said cylinders are riveted. A flanged crown sheet *c* is riveted to the upper end of the cylinder *C*. The space within the inner cylinder, between said crown sheet and the grate and fire box which rest upon the plate *a*, is the combustion chamber, or fire space as it is commonly called. A removable flanged head *E* is bolted to the top of the shell *G*, and to the flange *d* on the upper end of the cylinder *D*. The bent water tubes *F* lie in the fire space. Their lower ends enter holes in the cylinder *C*, and their upper ends enter holes in the crown sheet *c*. The ends of said tubes are expanded in the usual manner to secure them to said cylinder and

crown sheet. A cylindrical fuel magazine *H* extends down through the head *E* and through the crown sheet *c* into the fire chamber. It is riveted to a flange on the crown sheet, and it is bolted to a flange on the head; and, in the fire space, it lies within the annular row of tubes *F*. Above the front door *J* of the furnace and on opposite sides thereof two flues *K K* extend through the annular water space inclosed between the two cylinders *C* and *D*; and the heat and products of combustion pass from the fire space through these flues into the annular space around the boiler inclosed by the shell *G* to the smoke stack *I* which is secured to the rear side of the shell *G* near the lower part thereof.

The tubes *F* and the space bounded by the two cylinders *C* and *D*, the crown sheet and the head, contain the water to be heated. It is evident that in the described construction there is a very large surface exposed to the action of the heat in the fire box and in the space between the furnace shell and outer cylinder. It is also believed that this is the first steam heating apparatus, suitable for domestic uses, which is self-feeding; and this result is secured through the fuel magazine which passes through the upper end of the boiler as described. When it becomes necessary to remove one of the tubes *F* and to replace it with a new tube, the head *E* is unbolted and removed from the shell *G* and cylinder *D*. This renders the upper ends of the tubes *F* which are secured in holes in the said head accessible. One of the sections *g* of the shell *G* is next unbolted from its fellows and removed. In the cylinder *D*, opposite the end of each pipe which is set in the cylinder *C*, is a hole which is normally closed by the screw plug *N*. When the proper section *g* is removed, one of the plugs *N* is removed, whereby access may be had through the hole thus opened to the end of the tube *F* which it is desired to remove or fix in place by expanding its end.

Having described our invention, we claim—

1. The combination of two concentric cylinders *C* and *D* inclosing a water space, a crown sheet secured to the top of cylinder *C*, and water tubes lying in the fire space having their ends set in said crown sheet and cylinder *C*, with a furnace shell, composed of re-

movable sections, a removable head secured to said shell and cylinder D, and screw plugs screwed into the cylinder D opposite to the lower ends of said water pipes, substantially as and for the purpose specified.

5 2. The combination of a base, the cylinder C secured thereto, the surrounding concentric cylinder D also secured to said base and having an annular radial flange at its upper end,
10 a magazine cylinder concentric with and lying within the cylinder C, an outer boiler shell secured to the base, a crown sheet secured to the cylinder C and to the magazine cylinder which passes through said crown sheet, a se-

ries of bent water tubes lying between the 15 cylinder C and the magazine cylinder having their ends set into said cylinder C and crown sheet, and a cap plate secured to the magazine cylinder, to the flange on the upper end of cylinder D, and to the boiler shell, substan- 20 tially as and for the purpose specified.

In testimony whereof we affix our signatures in presence of two witnesses.

DANIEL CONNELLY.
CHRISTIAN E. SCHAFER.

Witnesses:

E. L. THURSTON,
L. F. GRISWOLD.