

(No Model.)

J. WALRATH.
STEAM BOILER.

No. 327,841.

Patented Oct. 6, 1885.

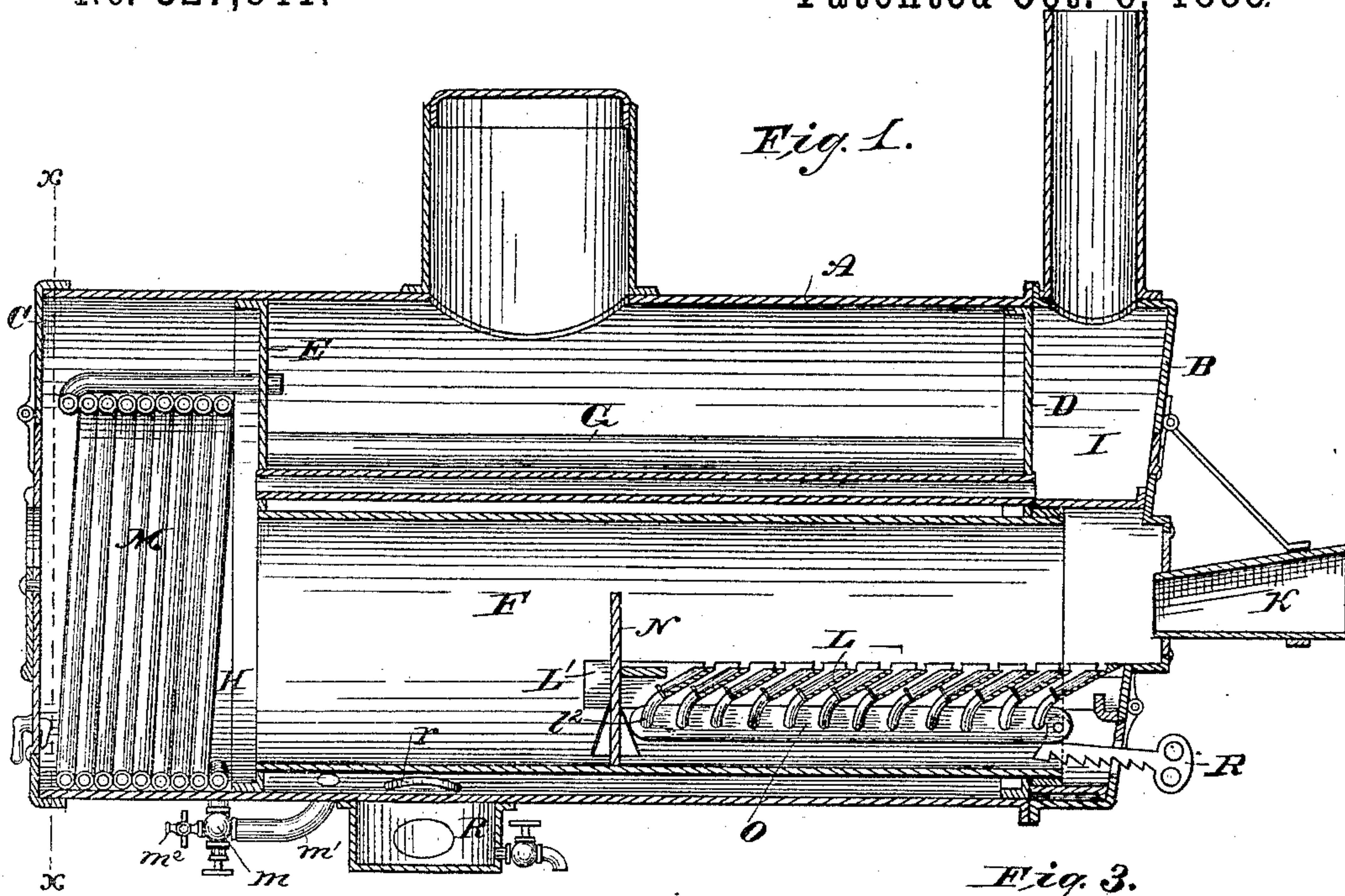
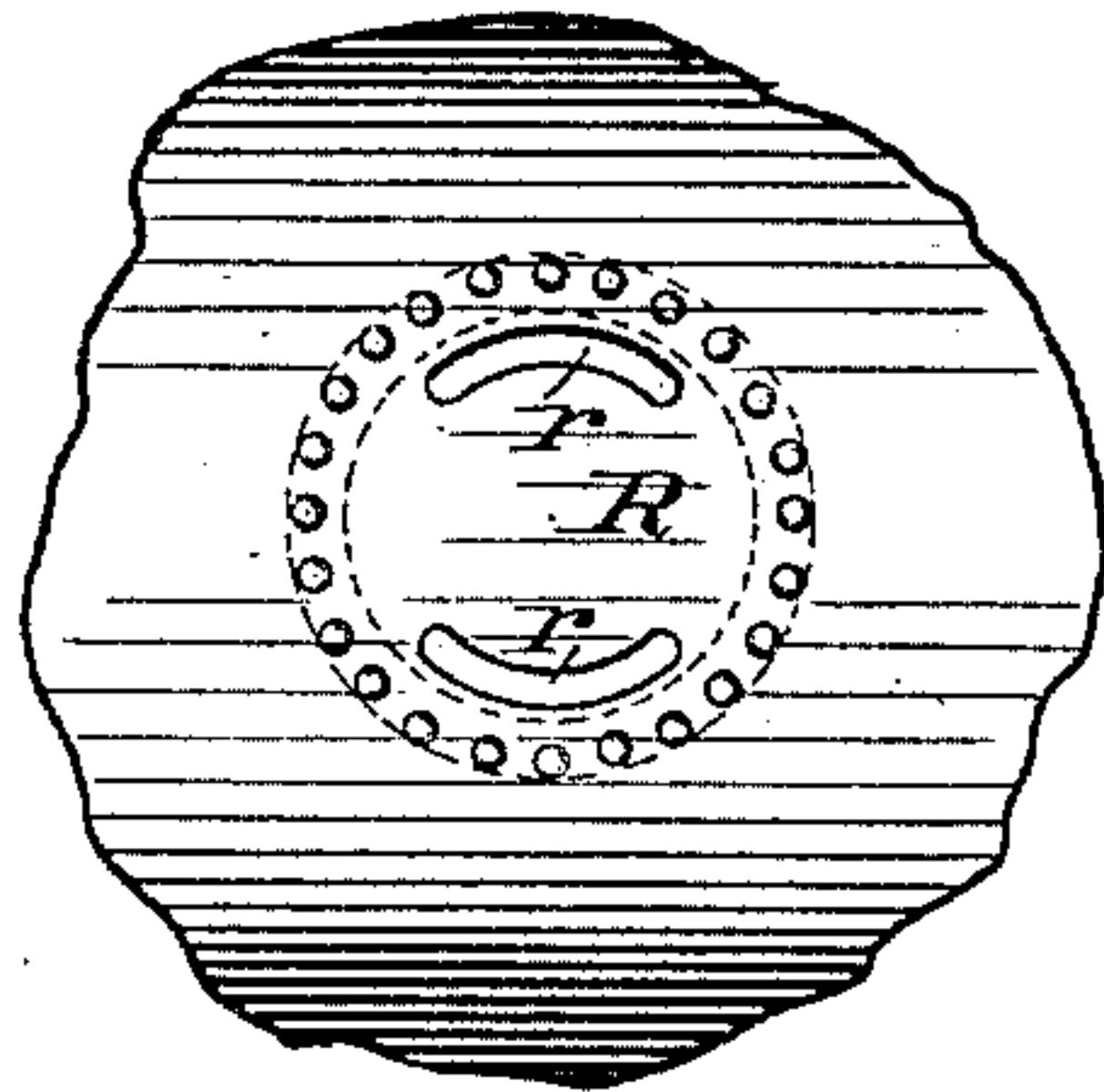
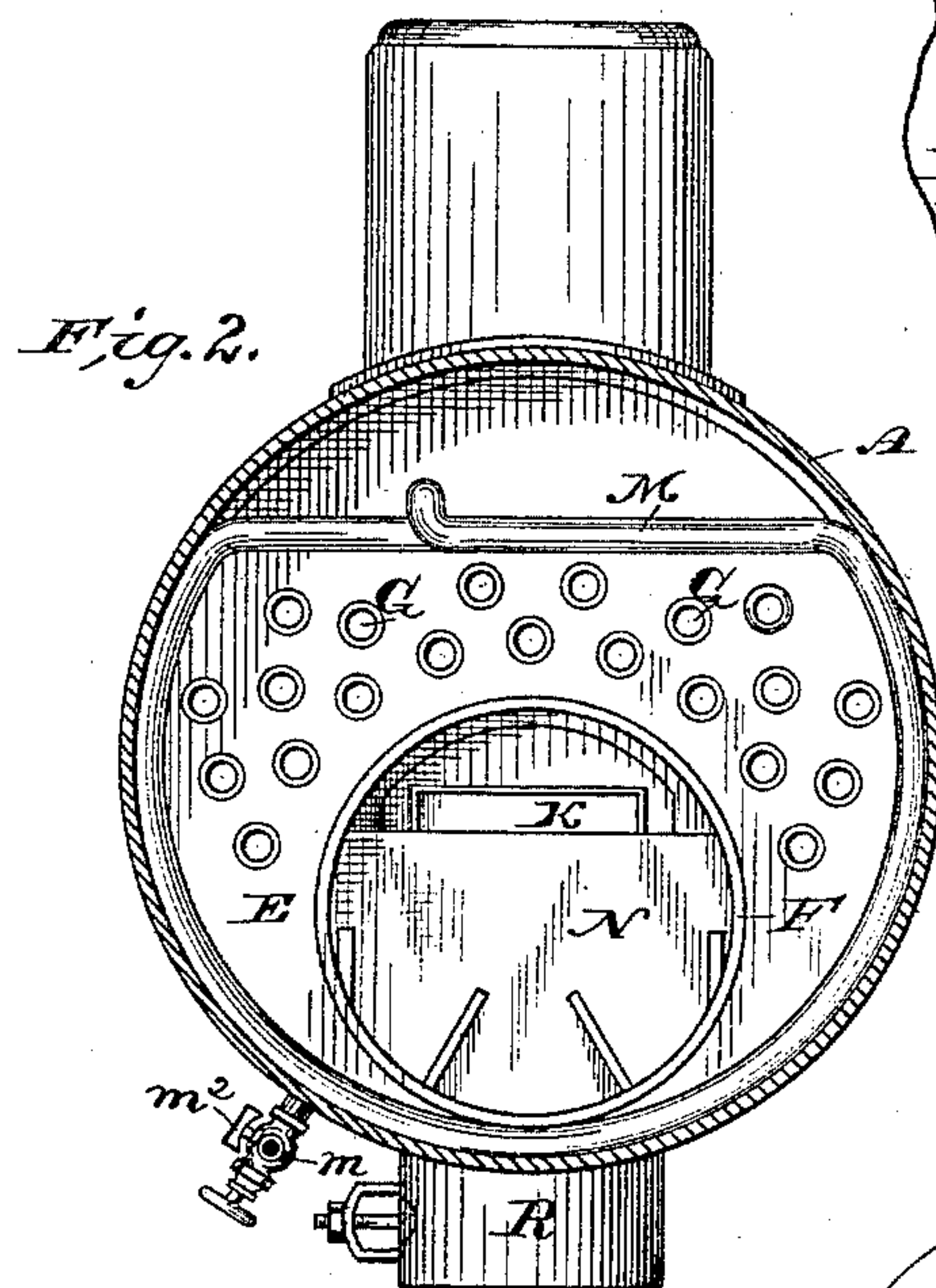


Fig. 3.



Witnesses:

E. J. Walker

Wm. C. Woodward

Inventor:

Inventor:
Jesse Walrath
by his attorney
O. F. Eick

UNITED STATES PATENT OFFICE.

JESSE WALRATH, OF RACINE, WISCONSIN, ASSIGNOR TO THE J. I. CASE
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STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 327,841, dated October 6, 1885.

Application filed June 16, 1885. Serial No. 168,883. (No model.)

To all whom it may concern:

Be it known that I, JESSE WALRATH, a citizen of the United States, residing at Racine, in the county of Racine and State of Wisconsin, have invented certain new and useful Improvements in Steam-Boilers; and I 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, reference being had to the accompanying drawings, and to the letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to the type of steam-boilers constructed with a large direct flue which at one end contains the grate and issues at the other end into a combustion-chamber, and with a number of small return-flues by which the products of combustion are returned to the other end of the boiler, where the unconsumed portions enter the smoke-box and finally escape through the uptake.

My improvement consists of a hollow coil arranged in the combustion-chamber so as to extend from near the flue-sheet to near the exterior head of said chamber, and to encircle an area somewhat greater than that covered by the direct and return flues in the flue-sheet.

This coil serves to effect an active circulation of the water in the boiler to protect the exterior shell of the combustion-chamber from the flame and heat, and also enables the boiler to make steam very quickly after starting the fire.

It consists, also, of certain details of construction relating to the coil and its adjuncts, which will be more especially pointed out in claims at the close of this specification.

In order that my invention may be clearly understood, I have illustrated in the annexed drawings, and will proceed to describe, a practical form thereof.

Figure 1 represents a longitudinal section of my improved steam-boiler. Fig. 2 represents a transverse section thereof, taken in the plane indicated by broken line *xx* of Fig. 1. Fig. 3 represents a detached portion of the boiler, showing the openings by which the boiler communicates with the mud-drum.

The same letters of reference indicate identical parts in all the figures.

The shell A, heads B and C, flue-sheets D and E, direct flue F, and return-flues G may be constructed and combined as shown in the drawings, differing in no essential particular from the well-known construction of horizontal boilers of this type, a combustion-chamber, H, being formed between the rear flue-sheet, E, and rear head, C, and a smoke-box, I, between the front flue-sheet, D, and front head, B. The front end of flue F forms the furnace, being provided with a grate, L, and the front head, B, is provided with a suitable furnace-door, which, since the boiler illustrated is adapted for burning straw when desired, is provided with a straw-feeding chute, K, which may be permanently attached or detachable, and may be provided with a self-closing flap, if required. The combustion-chamber H contains a hollow coil, M, which extends from near the rear flue-sheet to near the rear head, as shown in Fig. 1. The upper portion of the coil is flat and extends horizontally across the combustion-chamber in a plane a little above the highest return-flues, while the remainder of the coil is curved, so as to lie close against the boiler-shell, all as clearly shown in Fig. 2. Thus the interior space of the hollow coil covers the whole area occupied by the direct and return flues in the rear flue-sheets, and affords ample space for the flame and other products of combustion. The upper end of the coil projects through the rear flue-sheet, E, at a point at about the water-line, though it may issue either above or below the said water-line. The lower end of the coil projects through the bottom of the combustion-chamber, and is connected through a valve, *m*, and a pipe, *m'*, with the lower part of the water-space of the boiler.

A blow-off cock, *m*², is provided, so that on closing valve *m* the coil may be blown off at any time, and while the boiler is in operation, and may also be emptied, when required, to prevent freezing. The coil provides increased heating-surface in the combustion-chamber, so that the generation of steam at this point is greatly augmented. The circulation of water through the coil is not affected to any ex-

tent by such changes in the water-level as occur on a traction-engine boiler when the traction-engine is ascending or descending grades, so that there is no danger of overheating the coil during such changes of the general water-level.

A mud-drum, R, is secured to the bottom of the boiler, which connects therewith by holes *r r*. The drum is provided with the usual blow-off cock.

The grate shown was constructed with the view of adapting it more especially for the burning of straw, although other light fuels and wood can be successfully burned upon it. This grate is fully described and claimed in my application for a United States patent filed August 5, 1885, Serial No. 173,621.

I claim as my invention—

1. The combination, substantially as before set forth, with the direct and return flues and the combustion-chamber into which said flues open, of a hollow coil in the said combustion-chamber, both ends of which coil communicate with the interior of the boiler.

2. The combination, substantially as before set forth, of the hollow coil in the combustion-chamber, the valve and pipe for connecting it with the lower portion of the water-space of the boiler, and the blow-off cock.

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

JESSE WALRATH.

Witnesses:

M. GOULD,

CHAS. H. MINER.