(No Model.) 2 Sheets—Sheet 1.

W. J. RICHARDS.

BOILER FURNACE.

No. 494,028. Patented Mar. 21, 1893.

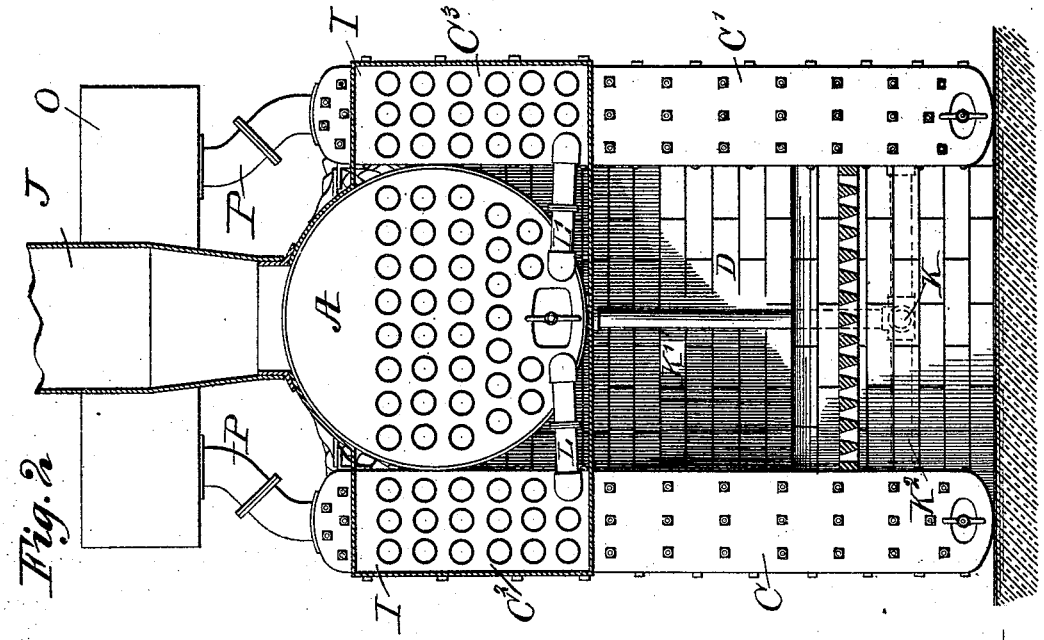

Fig. 2.

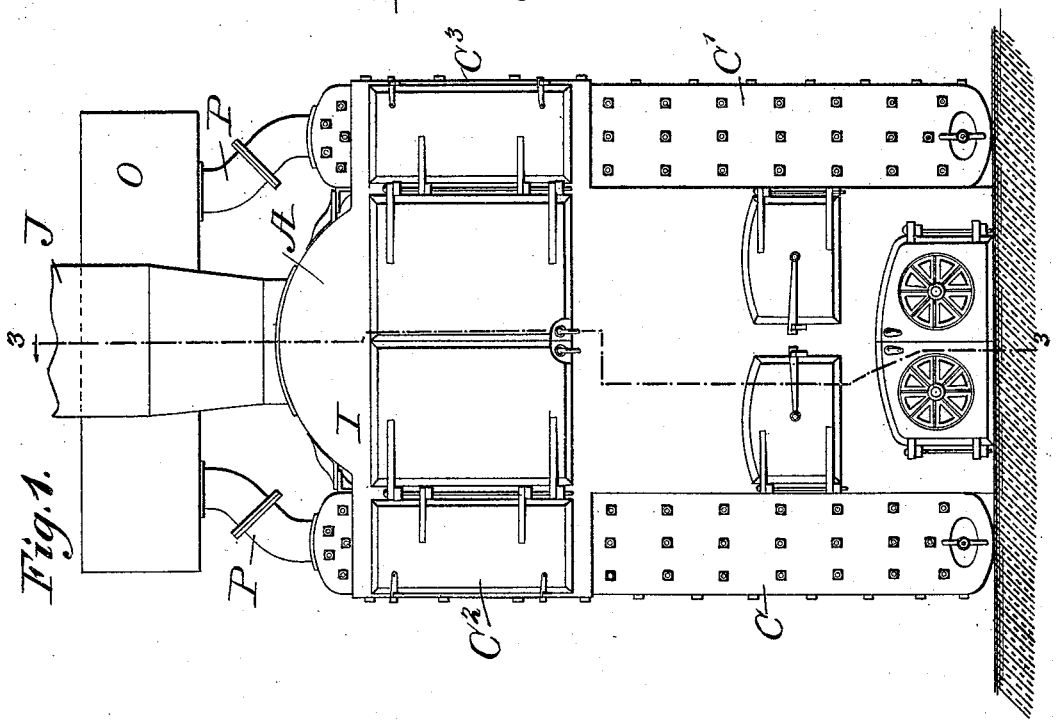

Fig. 1.

WITNESSES:
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C. Sedgwick

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(No Model.) 2 Sheets—Sheet 2.

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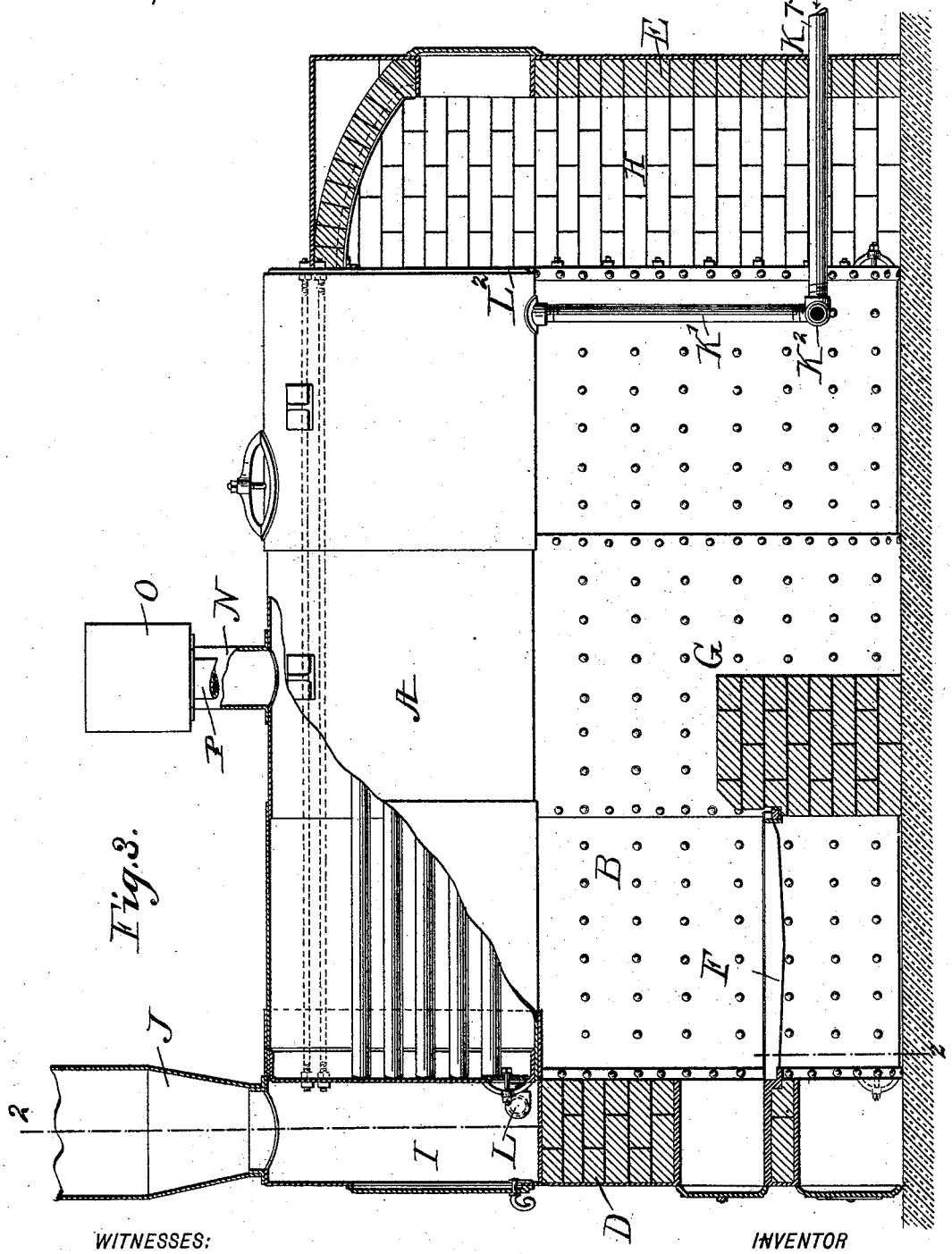

Fig. 3.

WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM J. RICHARDS, OF MARQUETTE, MICHIGAN.

BOILER-FURNACE.

SPECIFICATION forming part of Letters Patent No. 494,028, dated March 21, 1893.

Application filed December 19, 1892. Serial No. 455,641. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. RICHARDS, of Marquette, in the county of Marquette and State of Michigan, have invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in steam boiler furnaces, whereby a large heating surface is obtained and very little heat is lost by radiation from the brick walls.

The invention consists in the construction, arrangement, and combination of parts as hereinafter described and more specifically indicated in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front view of the improvement. Fig. 2 is a transverse section of the same on the line 2—2 of Fig. 3; and Fig. 3 is a sectional side elevation of the same on the line 3—3 of Fig. 1.

The improved boiler furnace is provided with a central longitudinally-extending boiler A of any approved construction, and heated from the burning fuel in a fire box B, the sides of which are formed by water legs of two side boilers C and C′ extending throughout the length of the boiler A at the sides thereof, so that the said side boilers also form the side walls of the entire furnace.

The front D of the furnace is provided with the usual firing door and ash pit door, and the said doors as well as the rear or end wall E of the furnace, are built of iron or steel and lined with brick with suitable doors at the back so as to gain entrance in case of repairs. The rear wall E is set a suitable distance from the rear ends of the boilers A, C and C′, as plainly shown in Fig. 3, so that the smoke and gases after arising from the fuel, burning on the grate F in the fire box B and passing over the bridge wall G, pass through the combustion chamber H to the rear ends of the said boilers and through the flues of the same to the smoke box I, common to the front of the boiler A and the upper ends C^2 and C^3 of the side boilers C and C′.

The smoke box I is connected with a suitable chimney or smoke stack J to carry off the smoke and gases. The feed pipe K is provided with an upwardly-extending branch pipe K′ discharging into the central boiler A at the bottom thereof near the rear end, as plainly shown in the drawings and from the inner end of the said feed pipe K also lead branch pipes K^2 discharging into the water legs of the side boilers C and C′. The front ends of the water compartments of the boiler A and the upper ends C^2 and C^3 of the boilers C and C′, connect with each other by the pipes L and L′ respectively, and in a like manner, the rear ends of the said boilers are connected with each other to establish a free circulation of the water in the three boilers. From the top of the central boiler A extends a branch pipe N, leading to the steam dome O arranged transversely and connected near its ends by pipes P with the steam compartments in the upper parts C^2 and C^3 of the boilers C and C′. Now, it will be seen that when the fuel is burning on the grate F in the fire box B, the heat heats the side boilers C and C′ as well as the central boiler A so that steam is generated in a very short time. It will further be seen that the smoke and gases passing from the fire box over the bridge wall G pass to the rear ends of the boilers, then through their flues to the hot smoke box I, and then out through the chimney J. Now, the heat generated in the furnace is thus taken up in its longitudinal passage by the side boilers C and C′ to heat the water therein and by the under side of the boiler A, and then again heat is radiated to the water at the time it passes through the flues of the boiler A and the flues in the upper parts C^2 and C^3 of the side boilers C and C′. Thus the fuel burned in the fire box B is utilized to the greatest advantage and no heat is lost by radiation from brick walls, which usually form the sides of the furnace.

The side boilers C and C′ may be readily removed in case of repairs, by disconnecting the pipes leading from the said boilers to the main central boiler. The construction of this boiler permits of arranging the large heating surface in case series of such boilers are used to form a battery for a large plant, it being

understood two adjacent boilers use the same side boiler C or C′ so that the latter is heated on both faces.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A furnace, comprising a central boiler, side boilers connected at their front ends with the smoke box of the central boiler and at their rear ends with the rear end of the furnace, the said side boilers having water legs forming the side walls for the furnace, substantially as shown and described.

2. A furnace, comprising a central boiler, side boilers connected at their front ends with the smoke box of the central boiler and at their rear ends with the rear end of the furnace, the said side boilers having water legs forming the side walls for the furnace, and pipes connecting the water compartments of the said central boiler and side boilers with each other at the front and rear ends, substantially as shown and described.

WILLIAM J. RICHARDS.

Witnesses:
JAMES HEARD,
ABEL RICHARDS.