

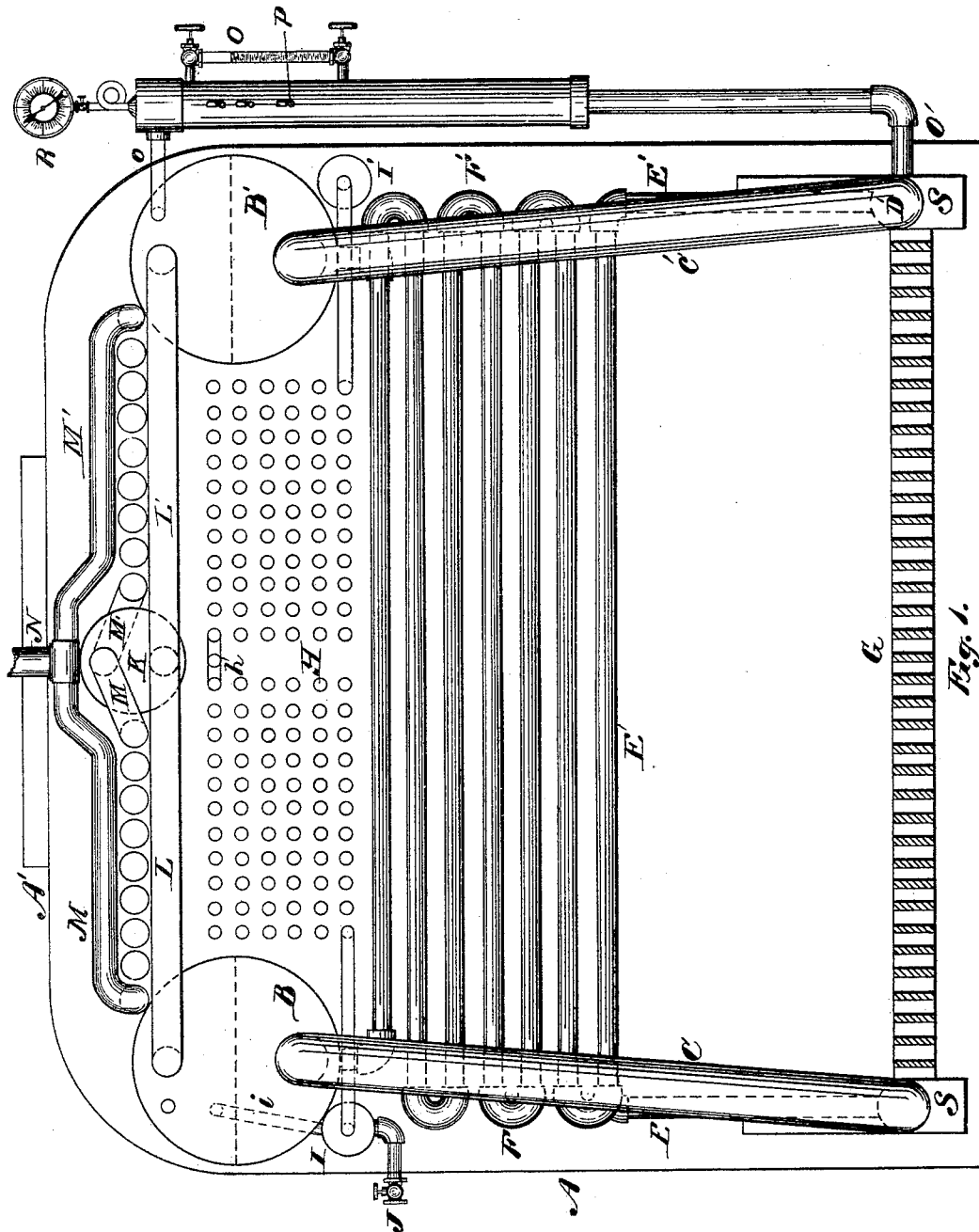
(No Model.)

2 Sheets—Sheet 1.

F. J. ROBINSON.
STEAM GENERATOR.

No. 458,918.

Patented Sept. 1, 1891.



WITNESSES
Charles L. Coffin.
Frederick H. Anderson.

INVENTOR
Frederick J. Robinson

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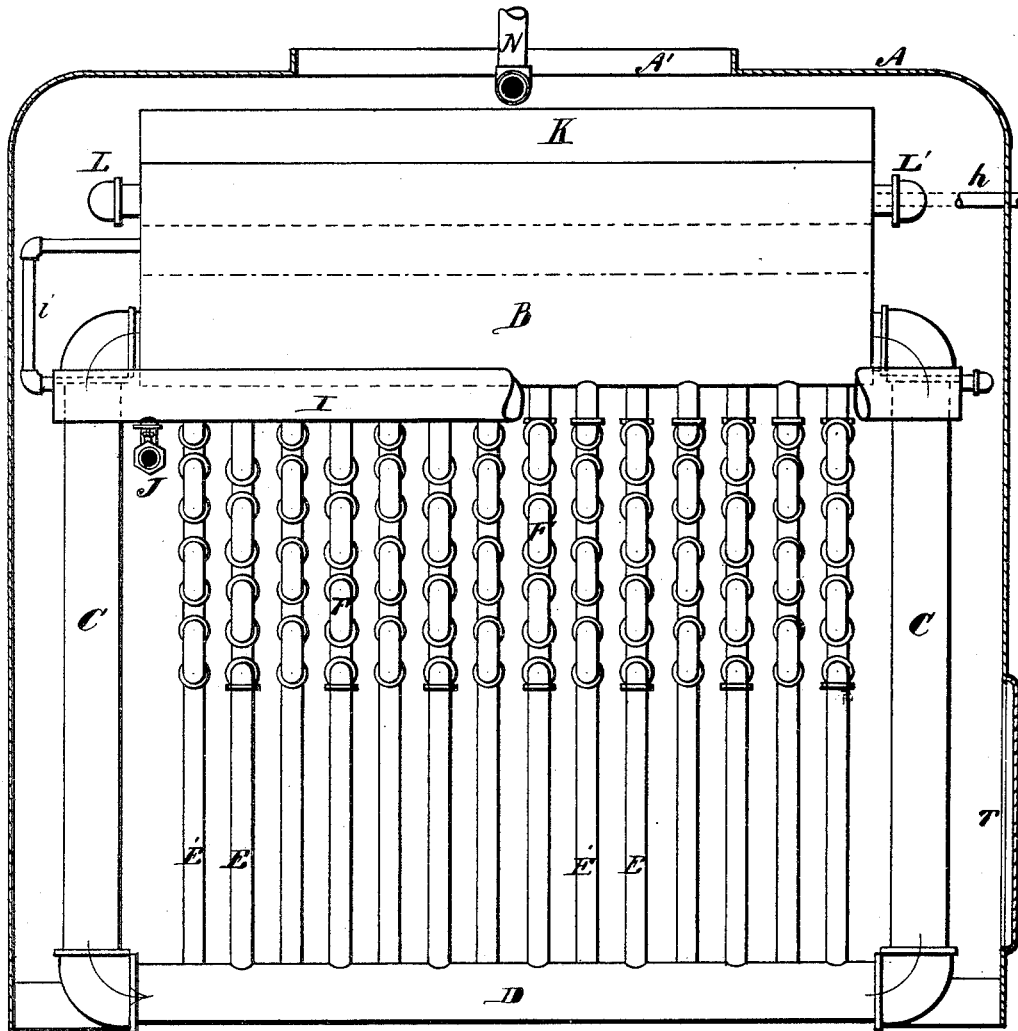


Fig. 2.

WITNESSES
Charles L. Coffin,
Frederic H. Anderson.

INVENTOR
Frederick J. Robinson

UNITED STATES PATENT OFFICE.

FREDERICK J. ROBINSON, OF DETROIT, MICHIGAN.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 458,918, dated September 1, 1891.

Application filed November 22, 1890. Serial No. 372,348. (No model.)

To all whom it may concern.

Be it known that I, FREDERICK J. ROBINSON, of Detroit, in the county of Wayne and State of Michigan, have invented a new and useful Improvement in Steam-Generators, of which the following is a specification.

My invention consists in an improvement in steam-generators hereinafter fully described and claimed.

Figure 1 is an end view with the casing broken away, and Fig. 2 is a side elevation with a longitudinal central section through the casing.

A represents a jacket of iron of suitable thickness, which is to be properly lined with a refractory non-conducting material.

B and B' represent two steam and water drums made of iron plate or pipe of such size and thickness as is required by the size of the boiler and the pressure which is to be carried. These drums lie horizontally in the boiler near the upper part thereof and on each side.

C C represent vertical pipes whose upper ends are connected with the heads of the drum B near the lower part of said drum and whose lower ends are connected by a manifold D. The drum B' is similarly arranged, the pipes C' and D', Fig. 1, being counterparts of the pipes C and D.

E represents a series of coils of pipe which spring from the manifold D, rise vertically to sufficient height to form the fire-box, and then lead backward and forward over the grate G by means of the return-bends F, and finally tap into the lower part of the drum B'. E' represents a similar series of coils springing from the manifold D', alternating with the coils E, and connecting at their upper ends with the lower part of the drum B.

H represents a feed-heating coil, preferably of smaller pipe than coils E E', which lies over said coils E E', and which is connected at its inner ends with a feed-pipe h, into which water from the pump is forced. The feed-heating coil H leads to a mud-drum I, connecting with a blow-off pipe and drum J, from which a pipe i leads to the drum B. There may be two of these mud-drums I I', as shown in Fig. 1, in which case the mud-drum I is connected with drum B and the mud-drum I' with drum B', or the feed-water

may be all discharged from the coil H into a single mud-drum connected with both drums B and B'.

K represents a steam-drum located above the feed-coil H, usually of somewhat smaller diameter than the drums B B', and it is connected at one or both ends by the pipes L L' with the steam-spaces of the drums B B'.

M and N represent superheating-coils leading, respectively, from opposite ends of the drum K, passing over the upper part of the boiler and uniting in a steam-pipe N.

P represents a gage-pipe connected at the top with the steam-space of drum B' by pipe O and at the bottom with manifold D' by pipe O', and Q represents an ordinary water-gage.

R represents a steam-gage.

G represents the grate.

The operation of my invention is as follows: The boiler being filled with water to any desired point, which may be the water-line (indicated by dotted lines) in drums B B', or higher or lower, and a fire being built upon grate G, the water in the coils E E' being directly over the fire and receiving the most intense heat becomes heated and rises in said coils, discharging into the drums B and B', respectively. As fast as the water rises in the coils E E' water descends in the large pipes C C' from the drums B B', passes into the manifolds D D', and then upward through the coils E E' as before, thus maintaining a free and uninterrupted circulation. The heat, after passing through the coils E E', rises through the feed-coil H, striking against the drums B B', then around the steam-drum K and through the superheating-coils M M', and finally passes out through the opening A' of the jacket into the stack. Feed-water forced into the T h passes through the feed-coil H, becoming heated, then into the mud-drum I or drums I I', where its current becomes feeble and drops the mud, and then is discharged into the drums B B' at a point as high as or higher than the T h. The steam which is separated in the drum B B' passes through the pipes L L' to the steam-drum K, where what little water is carried with it separates therefrom and is evaporated in said drum, from whence the steam passes through the superheating-coils M M' to the steam-

pipe N. It is evident that the mud-drum I, or, if two are used, the mud-drums I I', may be placed without the shell A, if it is desired to keep them away from the effect of the fire.

5 What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a steam-generator, the combination of two steam and water drums with a manifold beneath each drum and connected with the
10 ends thereof, coils alternately connecting each manifold with the opposite drum, and a feed-heating coil lying between the drums over the heating-coils, substantially as shown and described.

15 2. The combination, with two water and steam drums, each connected by downpipes with a manifold, and a grate lying between said manifolds, of coils of pipe springing alternately from said manifolds and connecting
20 each manifold with the opposite steam and water drum, a feed-coil lying between said steam and water drums, and a mud-drum connected with said feed-heating coil and connected with said steam and water drums, sub-
25 stantially as shown and described.

3. The combination, with two steam and

water drums, of two manifolds lying under said drums, respectively, and connected therewith, coils of pipe alternately connecting each manifold with the opposite steam and
30 water drum, a steam-drum connected with the steam-spaces of said steam and water drums, and a superheating-coil connected with said steam-drum, substantially as shown and described.

35 4. The combination, with two steam and water drums, each connected with a manifold lying beneath said drum, of coils of pipe alternately connecting said manifolds with the opposite steam and water drum, a grate ly-
40 ing between said manifolds, a feed-heating coil lying between said drums and connected therewith, a steam-drum between said steam and water drums connected with the steam-spaces thereof, and a superheating-coil above
45 the feed-coil and connected with said steam-drum, substantially as shown and described.

FREDERICK J. ROBINSON.

Witnesses:

CHARLES L. COFFIN,
GERTRUDE H. ANDERSON.