

(No Model.)

2 Sheets—Sheet 1.

B. P. EMERY.
BOILER.

No. 605,410.

Patented June 7, 1898.

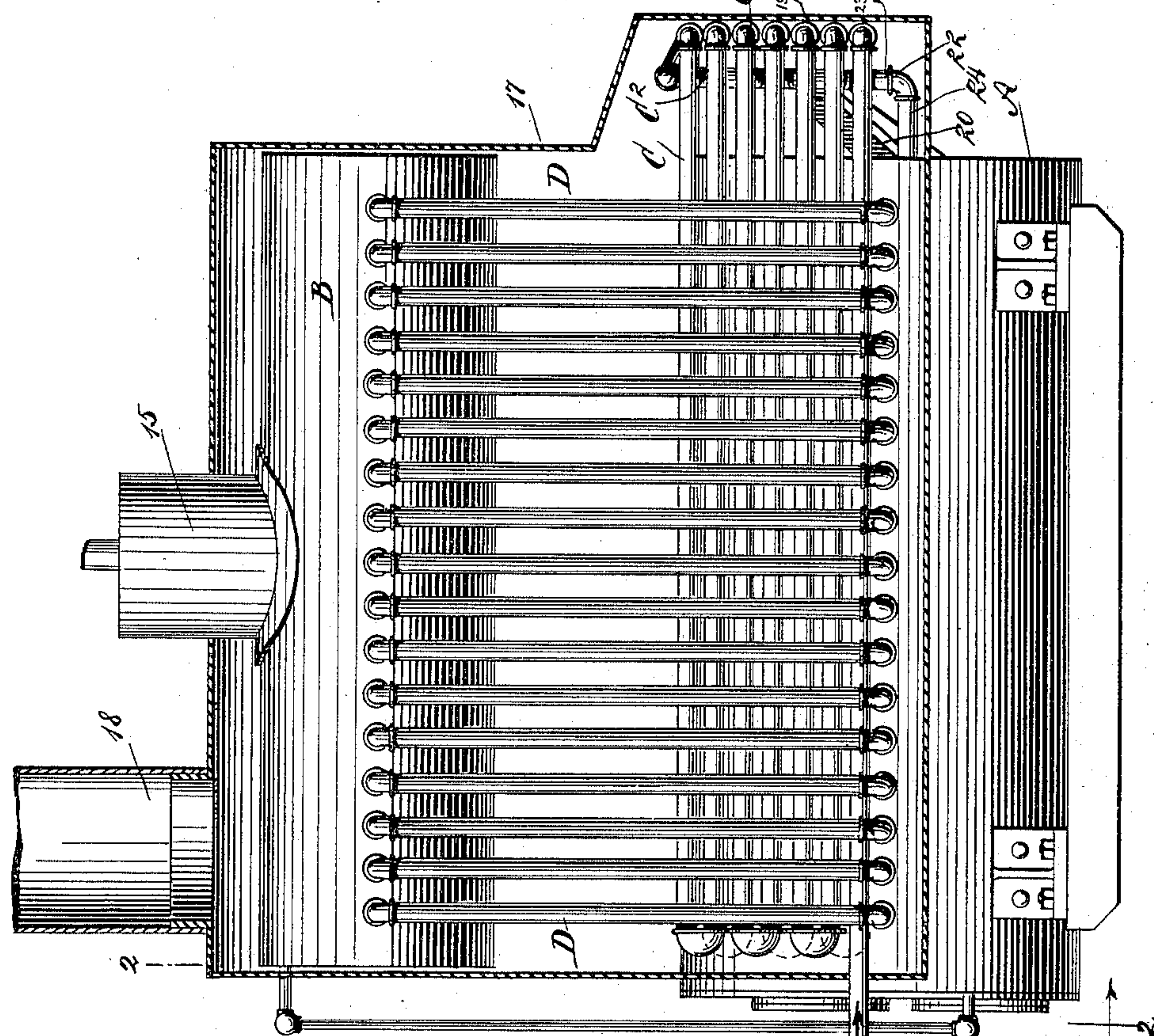


Fig. 1

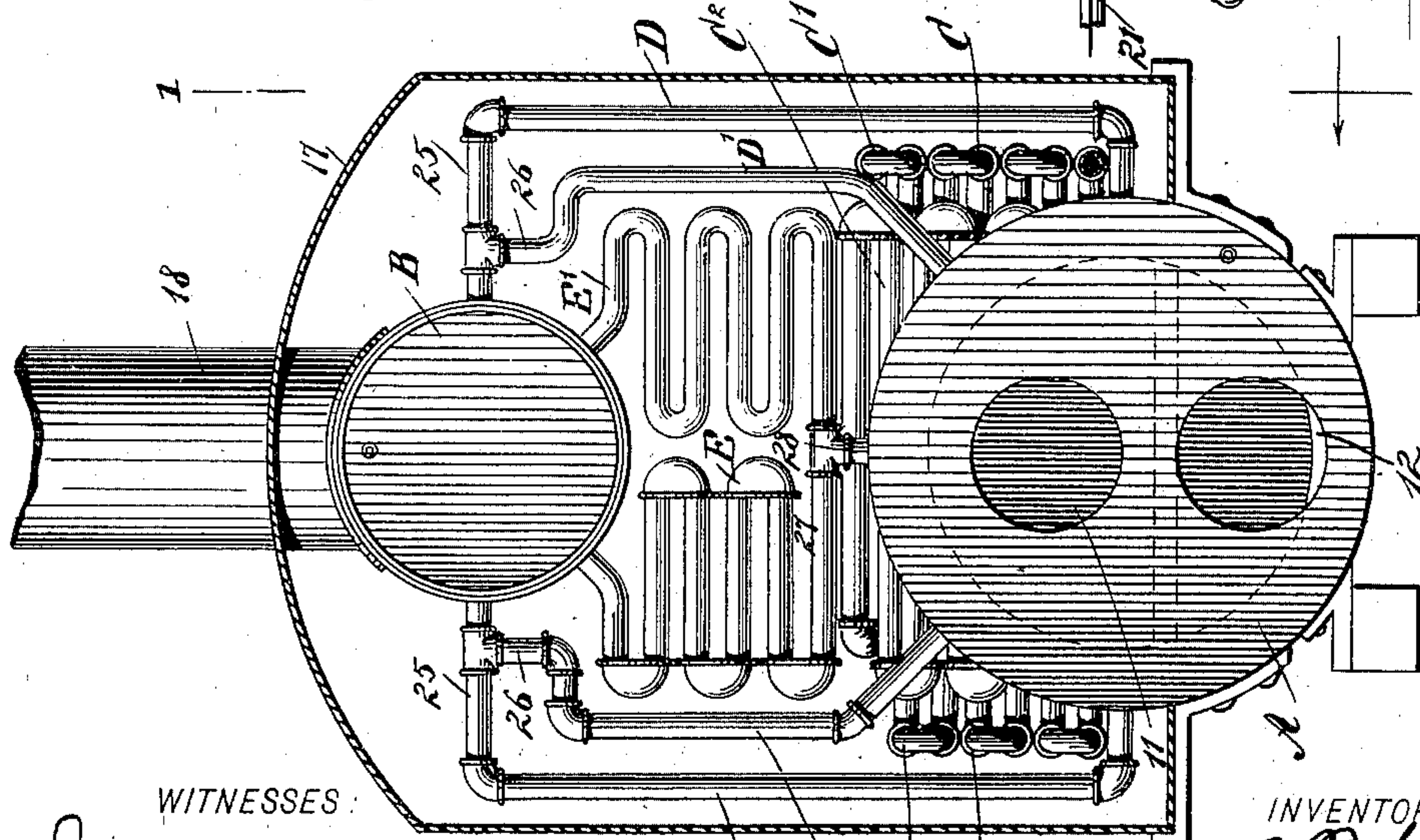


Fig. 2

WITNESSES:

Johnatberg
J. H. K. Ker

INVENTOR

B. P. Emery

BY

Murray

ATTORNEYS.

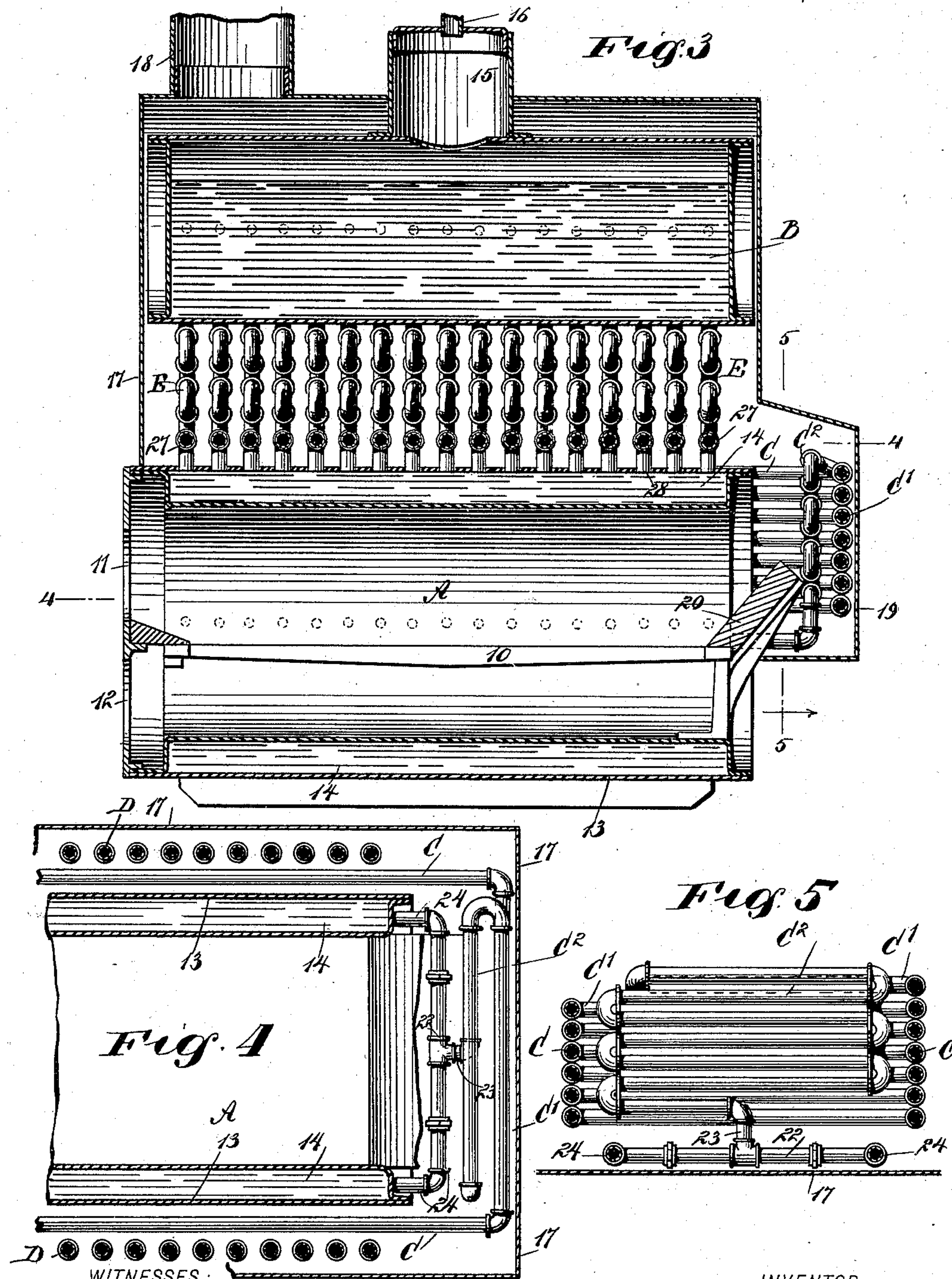
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WITNESSES:

John A. Schuyler
John A. Schuyler

INVENTOR

B. P. Emery

BY

Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

BENJAMIN PERKINS EMERY, OF KENNEBUNK, MAINE.

BOILER.

SPECIFICATION forming part of Letters Patent No. 605,410, dated June 7, 1898.

Application filed January 22, 1898. Serial No. 667,569. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN PERKINS EMERY, of Kennebunk, in the county of York and State of Maine, have invented a new and useful Improvement in Boilers, of which the following is a full, clear, and exact description.

My invention relates to an improvement in boilers; and the object of the invention is to construct a boiler which will be safe, simple, durable, and economic, and which will also be a rapid generator of steam and be adapted for land or for marine use.

A further object of the invention is to so construct the boiler that repairs may be expeditiously, conveniently, and cheaply made thereon by any good mechanic.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

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

Figure 1 is a longitudinal section through the boiler, taken substantially on the line 1 1 of Fig. 2. Fig. 2 is a transverse section through the boiler, taken substantially on the line 2 2 of Fig. 1. Fig. 3 is a central vertical longitudinal section through the boiler. Fig. 4 is a horizontal section on the line 4 4 of Fig. 3, and Fig. 5 is a vertical section on the line 5 5 of Fig. 3.

The fire-box A is cylindrical and is provided with a suitable grate 10 and a fire-opening 11 and an ash-pit opening 12 at the front. The fire-box is further provided with a jacket 13, and the jacket extends from end to end around the fire-box, providing a water-chamber or circular water-leg 14. The boiler B is supported above the fire-box, as shown in Figs. 1 and 3, and the boiler is provided with a suitable steam-dome 15, having a steam-supply pipe 16. A casing 17 extends partially around the fire-box and entirely around the boiler, the steam-dome of the boiler being carried up through the top of the casing, and the said casing is provided with a flue 18. At the rear of the fire-box the casing is provided with an extension 19, as shown particularly in Fig. 3, and a bridge 20 is carried up-

ward and outward from the rear of the grate 10 into the extension 19 of the casing.

A coil of pipe C, which is adapted to receive the feed-water, is located at each side of the fire-box within the casing, the coils being horizontally arranged, and the side coils C are connected within the extension 19 of the casing by an end coil C', and between the rear end of the fire-box and the end coil C' a secondary coil C² is formed, which is connected at one of its ends with the upper pipe in the end coil C', the lower end of the secondary coil being attached to a T 22, through the medium of a suitable coupling 23, and the said T 22 is connected with the water-leg 14 at each side of the fire-box, as shown in Fig. 4, the connecting-pipes being designated as 24.

The lower pipe 21 of one of the side coils is connected with a source of water-supply, and the water is admitted to said coil in the manner indicated by the arrow in Fig. 1. The feed-water upon entering the coil connected with the source of water-supply passes through the lower pipe of that coil; flows through the lower pipe of the back pipe C', and through the lower coil of the pipe C at the opposite side of the fire-pot before the water rises to the second pipe in a coil. In this manner it will be observed that the water makes practically a circuit of the fire-box before passing from one set of horizontal pipes to another set. The pipes forming the side coils are of greater number on one side than on the other, as shown in Fig. 5—as, for example, six pipes will constitute one side coil and seven pipes the opposing side coil. After the water has passed through the pipes of the side and back coils the water enters the upper portion of the secondary coil C² and is then fed into the chamber or water-leg 14, surrounding the fire-box.

The arrangement of the circulating-tubes is best shown in Fig. 2, and these tubes are arranged in vertical series, the tubes of a series being in the same plane. Each series of circulating-tubes consists of upright or stand pipes D, which connect with the water-leg 14 at the horizontal center thereof, one at each side, the pipes D being carried upward and connected by horizontal pipes 25 with each side of the central portion of the boiler. Secondary stand-pipes D' connect with the upper

portion of the water-leg 14 at each side of the center and are connected, as shown at 26 in Fig. 2, with the horizontal pipes 25. Two coils E and E' are located between the secondary stand-pipes D', the upper ends of which coils connect with the bottom portion of the boiler, one at each side. The two coils are connected at their lower ends by a pipe 27, and the connecting-pipe in its turn is connected with the water-leg 14 at the top of the boiler by means of a branch connecting-pipe 28.

The return portions of the coils may be and preferably are in the form of fittings, as are likewise the return portions or bends of all the pipes, so that any tube may be quickly, economically, and readily repaired; but if it is desired the number of fittings may be reduced or the return portions of the coils may be formed by simply bending the pipes in the usual way. The entire boiler is of very simple character, and the circulation may be said to be perfect, as well as the feed.

It will be observed that the feed-pipes extend almost entirely around the fire-box and that the rear coils of the feed-pipes and the secondary coil are in the path of the products of combustion, since the said products of combustion pass upward around the boiler to the flue. The products of combustion also freely pass through and around the circulating-pipes D and D' and E and E'.

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

1. A boiler having a cylindrical fire-box, a water-jacket encircling the fire-box, a casing inclosing the upper portion of the fire-box and extending upward above the same, a bridge at the rear end of the fire-box and leading into an extension at the rear of the casing, a

coil of pipe extending around the fire-box and into the said extension of the casing so as to pass rearward of the fire-box, the coil of pipe communicating with the water-jacket, a boiler proper located in the upper portion of the casing and having a steam-dome projected through the casing, upright or stand pipes running from the water-jacket of the fire-box to, and communicating with the boiler proper, the said upright or stand pipes being divided into two sets located respectively at each side of the boiler proper and fire-box, secondary stand-pipes communicating with the upper portion of the water-jacket and extending upwardly to, and having communication with the boiler proper, and two additional coils of pipes located between the secondary stand-pipes and extending between the fire-box and the boiler proper and communicating with the latter and with the water-jacket.

2. A boiler, having a fire-box, a water-jacket surrounding the same, a casing inclosing the upper portion of the fire-box, a boiler proper located in the upper portion of the casing, a coil of pipe extending around the sides of the fire-box and around the rear end thereof, and communicating with the water-jacket, stand-pipes located at each side of the fire-box, and extending upwardly to, and communicating with the boiler proper, the stand-pipes also communicating with the water-jacket, and coils of pipes located between the boiler proper and the fire-box and also between the stand-pipes, the said coils of pipes communicating with the water-jacket and with the boiler proper.

BENJAMIN PERKINS EMERY.

Witnesses:

BURLEIGH S. EMERY,
EUGENE A. GOODWIN.