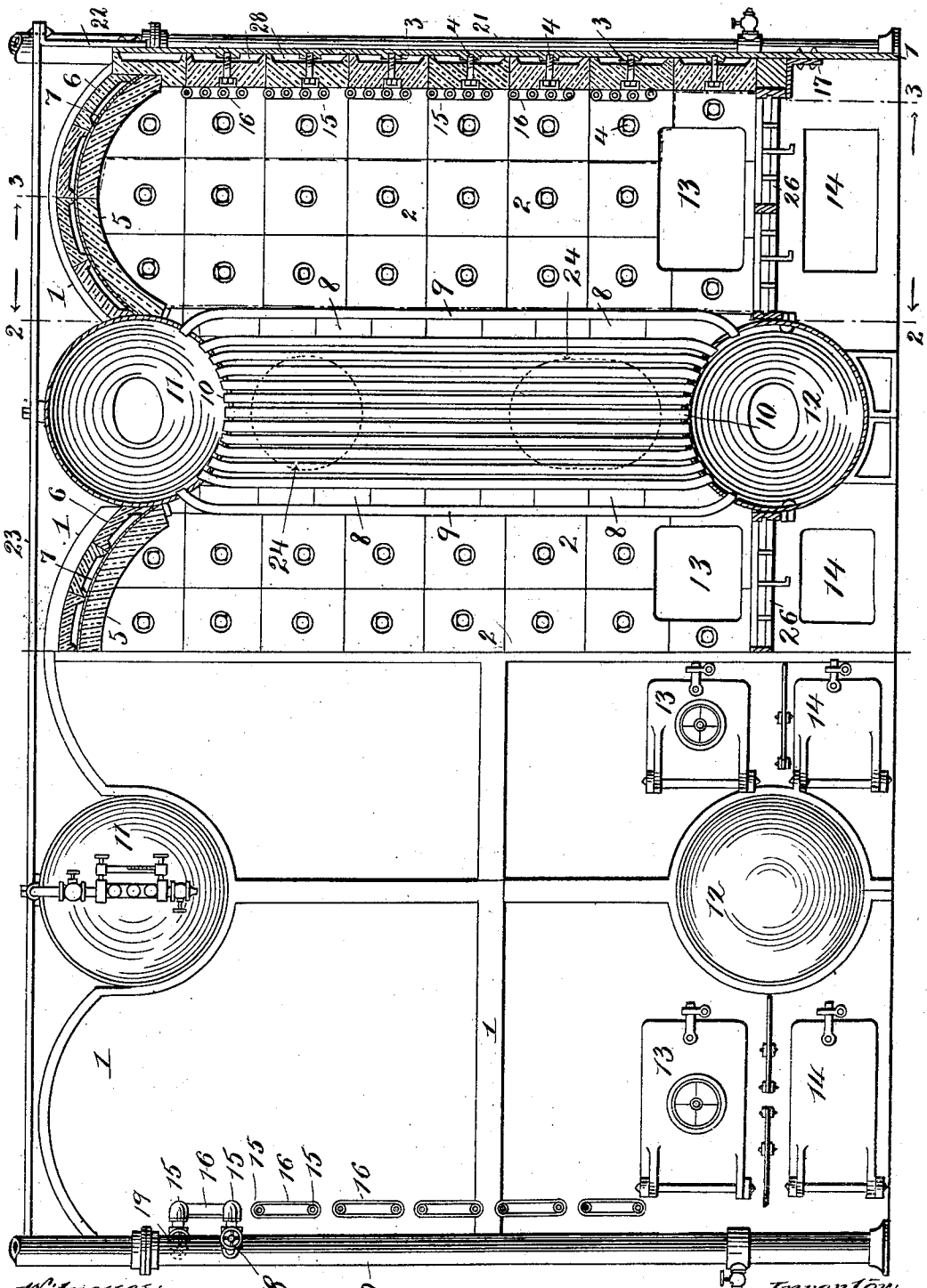
No. 732,725. PATENTED JULY 7, 1903.

E. F. EDGAR.

STEAM BOILER.

APPLICATION FILED DEC. 12, 1902.

NO MODEL. 4 SHEETS—SHEET 1.



Witnesses:
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W. J. Ludwig.

Inventor:
Ellis F. Edgar.

Fig. 1.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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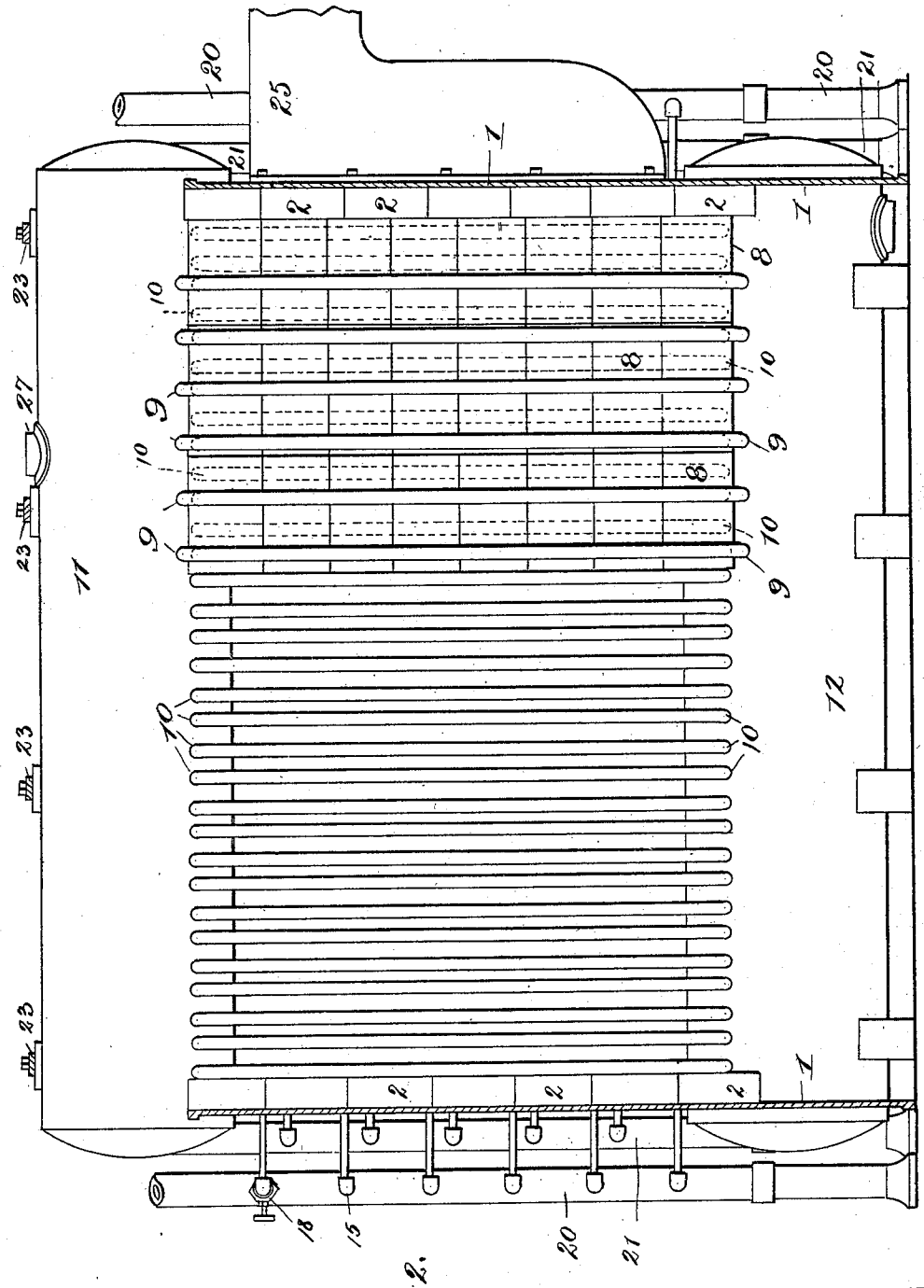


Fig. 2.

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NO MODEL, 4 SHEETS—SHEET 3.

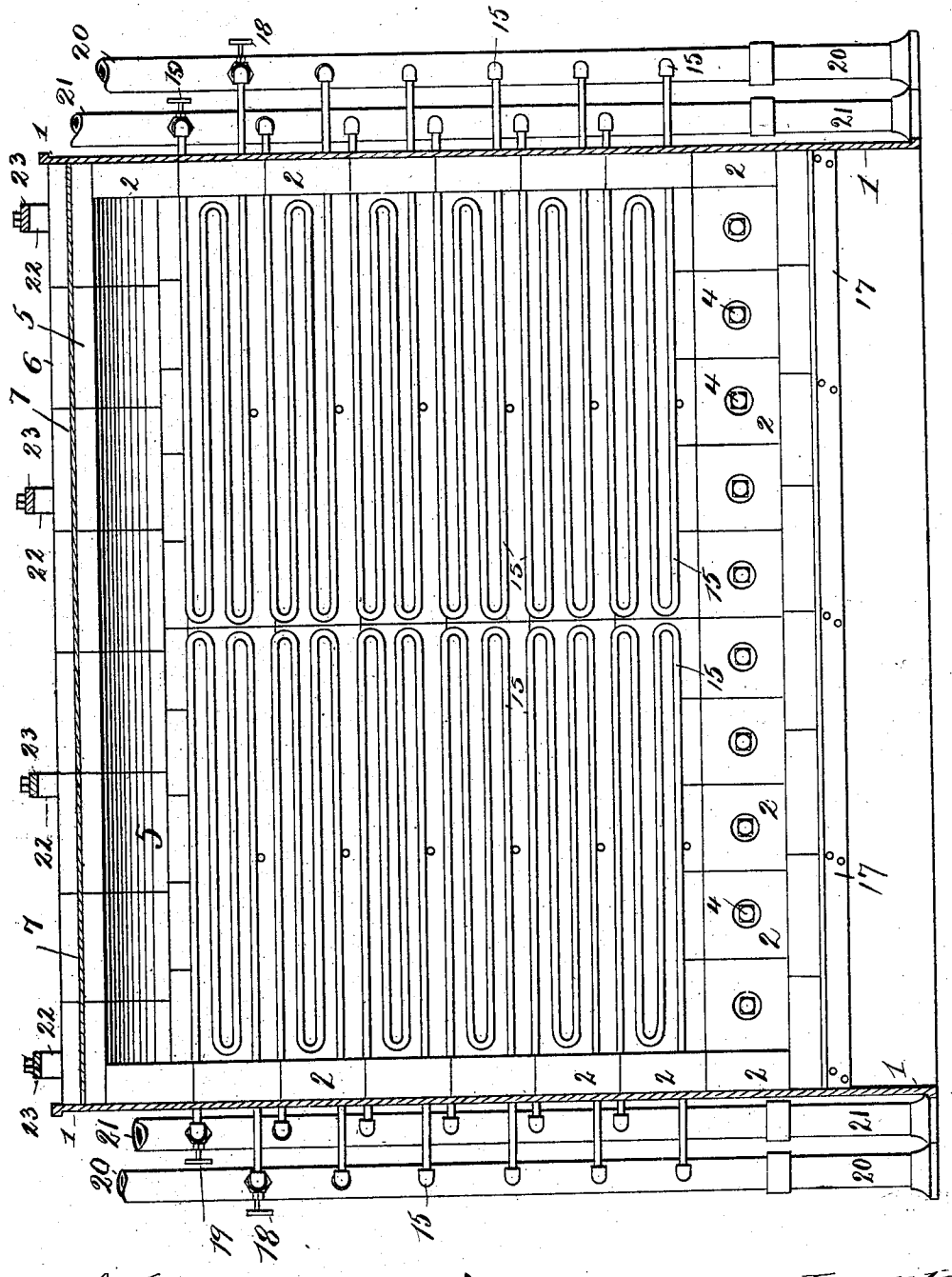


Fig. 3.

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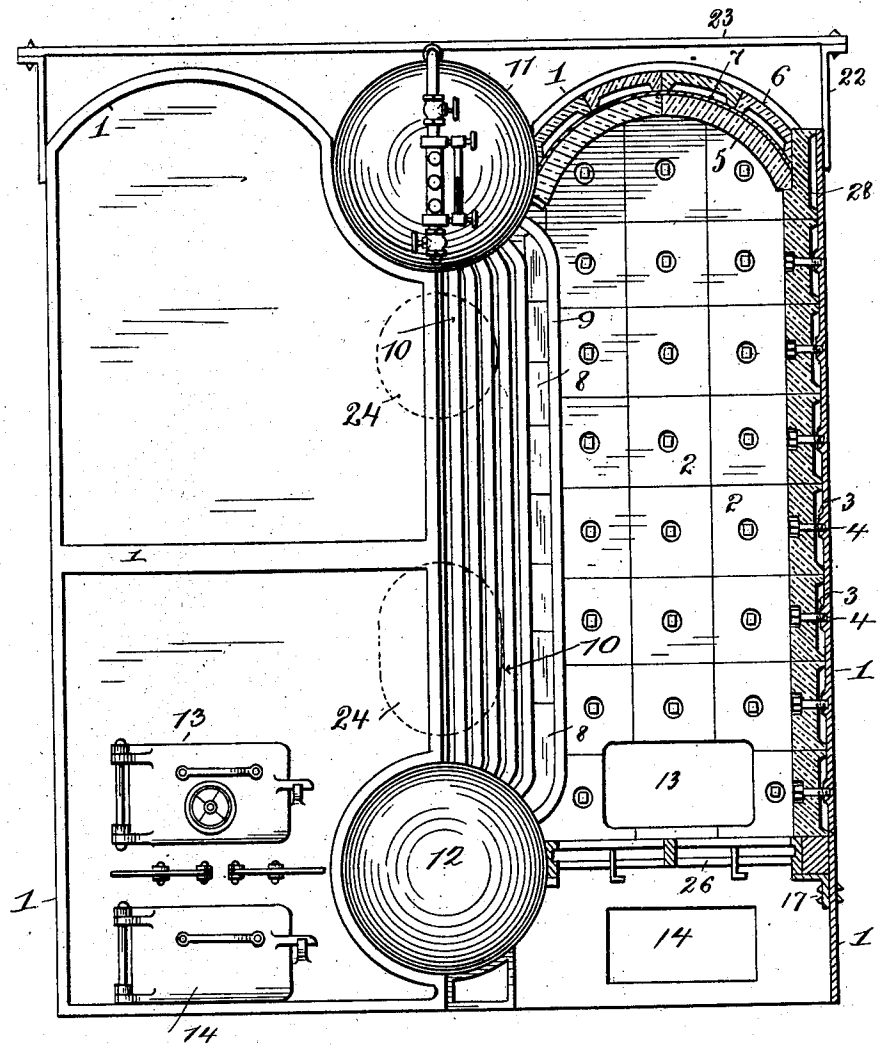


Fig. 4.

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No. 732,725. Patented July 7, 1903.

UNITED STATES PATENT OFFICE.

ELLIS F. EDGAR, OF WOODBRIDGE, NEW JERSEY.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 732,725, dated July 7, 1903.

Application filed December 12, 1902. Serial No. 134,883. (No model.)

To all whom it may concern:

Be it known that I, ELLIS F. EDGAR, a citizen of the United States, and a resident of Woodbridge, in the county of Middlesex and State of New Jersey, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification.

Figure 1 is a front elevation, part in full and part in section. Fig. 2 is a side elevation view of the boiler-section at section-line 2 2 in Fig. 1. Fig. 3 is a side elevation view of superheater and inside of outside casing at section-line 3 3 in Fig. 1. Fig. 4 is a front elevation, part in full and part in section, of a one-section boiler.

I had in view several objects in inventing this boiler—namely, a large furnace-well surrounded with fire-clay bricks, whereby a high furnace temperature might be obtained, a furnace on each side of each boiler-section, whereby a high evaporation per square foot of heating-surface can be secured and easy access for cleaning or repairing the tubes, and an opportunity of getting a large amount of heating-surface in my superheated loops and easy access for cleaning the same, and by their location across the furnace from the boiler-section they are subject to a high temperature, whereby a higher degree of superheat can be obtained, and easy to be removed in case of accident and replaced by a new one without stopping the operation of any of the others, as each loop is slipped through an independent thimble and connected up separately.

This boiler is especially adapted for marine work, owing to its high rate of evaporation and ease of replacing water-tubes and superheating-loops and a long furnace, if desired, that can be fired at both ends, which is valuable in marine work, and by such construction a very high horse-power efficiency can be obtained per cubic area.

1 represents cast-iron forming outside of casing; 2, fire-clay bricks forming inside of casing; 3, cast-iron boss; 4, anchor-bolt; 5, brick arch; 6, platting forming top of brick arch; 7, asbestos-felt between brick arch and platting; 8, brick wall running from lower drum to upper drum and extending from draft-exit end of section part way to the opposite end of section, a side elevation view shown in Fig. 2; 9, water-tubes for holding brick wall 8 in position; 10, water-tubes connecting upper and lower drums and forming heating-surface of the boiler; 11, upper drum; 12, lower drum; 13, furnace-doors; 14, ash-pit doors; 15, four-legged superheating-loops; 16, thimble through outside casing for reception of the superheating-loops; 17, bracket riveted to cast-iron casing 1 for supporting fire-clay-brick lining 2; 18, valves at end of lower leg of superheating-loops; 19, valves at end of upper leg of superheating-loops; 20, receiving-pipes; 21, discharge-pipes; 22, arms riveted to upper end of cast-iron casing 1 for supporting ends of tie-bars 23; 23, tie-bars connecting upper drums of boiler-sections and outside casings; 24, draft-exits; 25, smoke-flue; 26, grate; 27, steam-exit; 28, dead-air space in outside casing.

In a marine boiler I would always construct with a cast-iron casing lined with fire-clay-brick lining, substantially as shown, and usually of two or more boiler-sections; but where there is only one boiler-section the brick arch would always extend from the outside casing to the upper drum, substantially as shown, and where there are two or more sections the furnaces between the sections would be covered by a brick arch supported between the upper drums, substantially as shown, and the furnaces between the outside casing and the section would be covered by a brick arch extending from the outside casing to the upper drum, substantially as shown. In a land-boiler I would in many cases build the outside casing without the cast-iron, building it of ordinary fire-bricks. For re-tubing or thoroughly cleaning the tubes of the boiler-sections one can readily see the advantage of the large furnace on each side of the boiler-section, as one can enter through the furnace-door to accomplish this work without removing any casings, and this in steamship-work is very important, as space is so valuable, and the space that otherwise would have to be allowed for to do this work could be utilized by the boiler, which means less boiler-space for a given amount of horse-power. For working at the tubes that lie between the walls 8 these walls can be removed in a short time, as they are made in slabs of such a size that can be readily slipped out and in between tubes 9

and 10. The only tubes that are in line of draft are the tubes that lie between walls 8. The rest of the tubes are exposed to the direct radiation of the heat from the furnaces on each side of the section, and by their close proximity to the intense heat of the furnace a very high rate of evaporation is obtained, thereby giving a much higher total evaporation to all the heating-surface than has been obtained before with a much less loss by high temperature of escaping gases. The usual place to locate a superheater has been in line of draft, where insufficient heat is obtained unless by a great loss up the stack, where in this construction I not only have ample opportunity for plenty of heating-surface, also a high temperature without any loss up stack, and easy to get at for cleaning. In most cases I would fire these furnaces from each end; but in small boilers, especially in one section, they can be made to fire from one end, and there is another advantage there, as in wishing to fire from only one end either end will do.

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

1. In a vertical water-tube boiler one oblong section composed of one drum above another, connected by water-tubes, a furnace on each side of said oblong section and half or more than half of said water-tubes being exposed to the direct radiation of the heat from the furnaces, and out of line of draft, said furnaces extending the height of said section to above the tube-sheet of the upper drum, substantially as shown and described and for the purpose set forth.

2. In a vertical water-tube boiler one or more oblong sections composed of one drum above another, connected by water-tubes, a furnace on each side of each oblong section, each outside oblong section having an outside casing parallel with it, on the opposite side of the furnace from said oblong section, as set forth.

3. In a vertical water-tube boiler one oblong section composed of one drum above another connected by water-tubes, a furnace on each side of said oblong section, an outside casing on each side of said oblong section, parallel with said oblong section, on the opposite side of the furnaces from said oblong section another outside casing extending across the end of said oblong section and furnaces and connecting the outside casings that are parallel with said oblong section, a draft-exit through the casing at the end of said oblong section, and two walls one on each side of said oblong section extending from the casing containing the draft-exit at the end of said oblong section about half the length or less of said oblong section as set forth.

4. In a vertical water-tube boiler one or more oblong sections composed of one drum above another connected by water-tubes, a furnace on each side of each oblong section, each outside oblong section having an outside casing parallel with it, on the opposite side of the furnace from said oblong section, another outside casing extending across the end of said oblong section or sections and furnaces, and connecting the aforesaid outside casings that are parallel with said oblong section, a draft-exit through the casing at the end of each oblong section, and two walls, one on each side of each oblong section extending from the casing containing the draft-exit at the end of said oblong section or sections about half the length or less of said oblong section or sections, as set forth.

5. In a vertical water-tube boiler one or more oblong sections composed of one drum above another connected by water-tubes, a furnace on each side of each section, a draft-exit at the end of each section, a wall on each side of each section extending from the lower drum to the upper drum and from the draft-exit end half the length or less of said section, substantially as shown and described and for the purpose set forth.

Signed at New York, in the county of New York and State of New York, this 11th day of December, A. D. 1902.

ELLIS F. EDGAR.

Witnesses:
C. B. GLICK,
W. G. FRANZ.