

(No Model.)

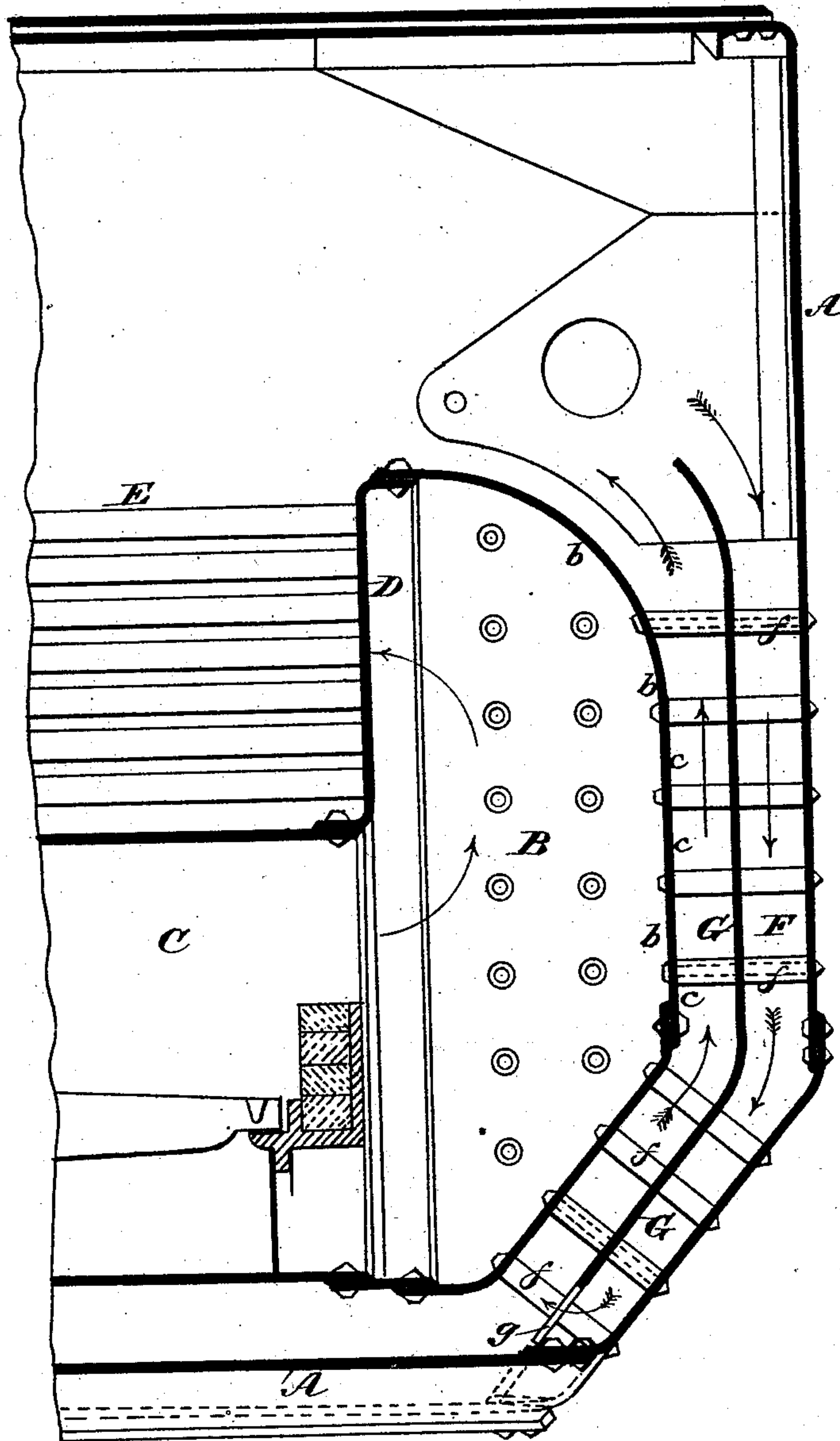
2 Sheets—Sheet 1.

G. B. WHITING.
SEPARATING DIAPHRAGM.

No. 258,835.

Patented May 30, 1882.

Fig. 1.



Witnesses:

Richard J. Evans.
W. J. Moore

Inventor:

G. B. Whiting

(No Model.)

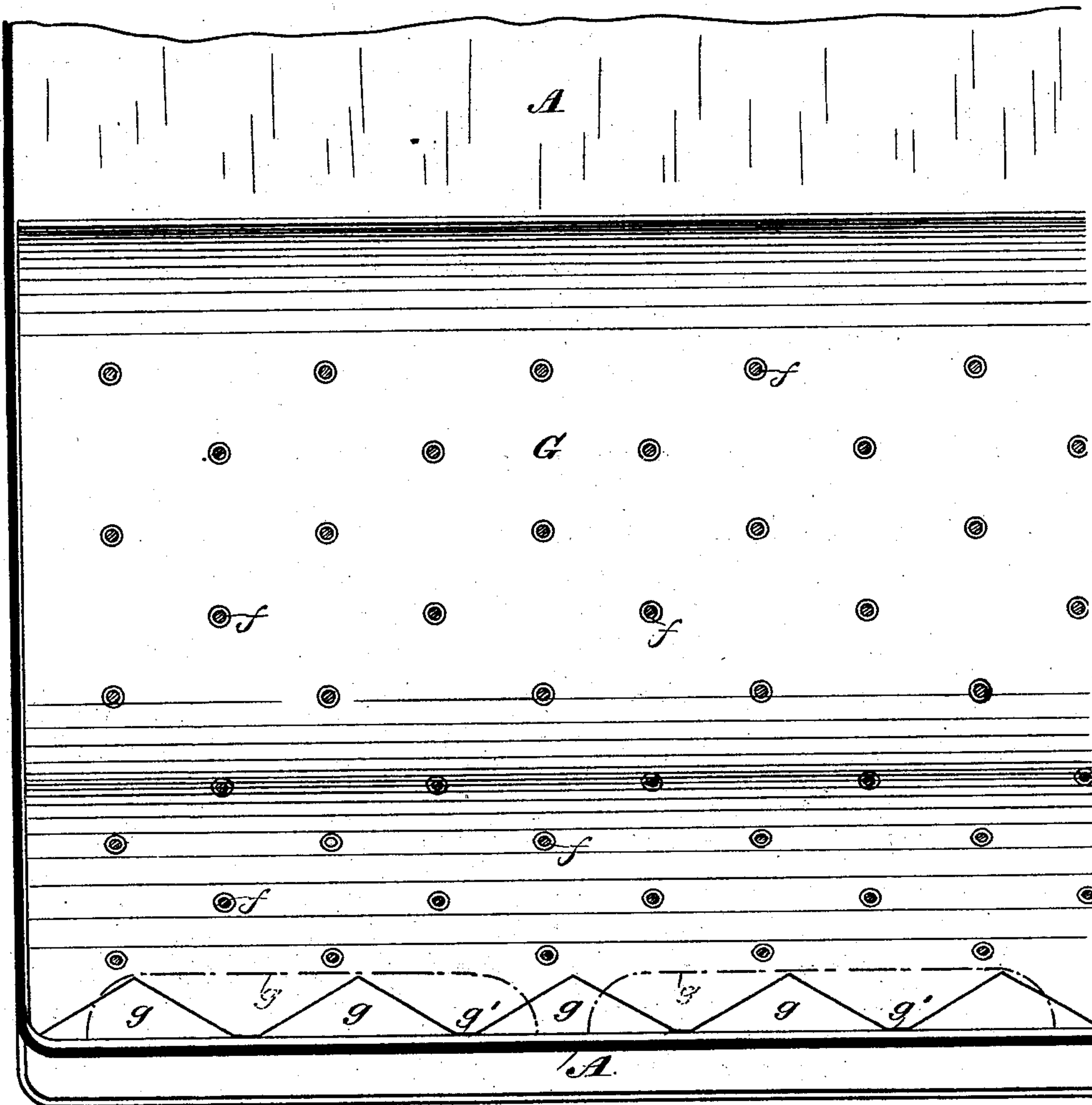
2 Sheets—Sheet 2.

G. B. WHITING.
SEPARATING DIAPHRAGM.

No. 258,835.

Patented May 30, 1882.

Fig. 2.



WITNESSES

Lewis H. Johnson.
Alex. H. Betz.

INVENTOR

George B. Whiting
By J. C. Brecht
his Attorney

UNITED STATES PATENT OFFICE.

GEORGE B. WHITING, OF WASHINGTON, DISTRICT OF COLUMBIA.

SEPARATING-DIAPHRAGM.

SPECIFICATION forming part of Letters Patent No. 258,835, dated May 30, 1882.

Application filed March 18, 1881. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. WHITING, a citizen of Washington, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Separating-Diaphragms; 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 letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to separating-diaphragms or circulating-plates for marine steam-boilers, and the object is to improve the circulation of the water and secure positive continuous currents in opposite direction, and this by controlling the action of the water while the boiler or boilers are in operation. I arrange in the back-water connection of the marine boiler a separating-diaphragm with free passages underneath, and connecting with the water-bottom space, whereby a better circulation is obtained and steam is more rapidly generated, while the forming of scale is prevented, which, as is well known to engineers, is more rapidly formed there than at any other part of the boiler, and it is caused by eddies produced by the conflicting currents or the absence of currents altogether. These accumulations result frequently in great and expensive damages to the boilers by displacing the water. Different methods have been suggested to overcome this serious trouble, more or less expensive in their character, and without entirely satisfactory results.

The invention consists in arranging a separating-diaphragm or circulating-plate in the water-space of the back connection of the boiler of the form and in the manner as will be more fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical section of the back connection of the boiler with the separating-diaphragm in position. Fig. 2 is a cross-section on line *x x* of Fig. 1, looking toward the diaphragm, showing the serrations or openings.

In the drawings, A represents the shell of the boiler, in which B is the back connection;

C, part of the furnace; and D, the rear tube-sheet, to which the tubes E are secured. In the back-water connection F is arranged the separating-diaphragm or circulating-plate G, and secured by the stay-bolts *f* or in any other suitable manner. The upper and lower parts of said diaphragm are curved or bent over toward the front of the boiler, and the lower part is provided with a number of openings or serrations, *g*, so that the water can freely pass from one side to the other of the diaphragm. The diaphragm G is supported, in addition to the stay-bolts, by the lower edge of the said diaphragm, which rests upon the lower boiler-sheet by means of the points *g'* of the serrations or openings, as better shown in Fig. 2. By thus supporting the diaphragm its weight is taken off from the stay-bolts and leakage prevented.

In operation the most intense heat from the furnace strikes the back-connection sheets *b b b*, the steam here generated flowing upward along its water side *c c*, producing an upward current, which is more or less impeded by the downward tendency of the water remote from the heated plate causing irregular currents and eddies, and necessarily the deposition of matter held in suspension until the water is more or less displaced and the plates overheated or permanently injured. The plates are not only injured, but the proper circulation of the water is interfered with and foaming or priming ensues, with all of its dangers and annoyances. The introducing of the separating-diaphragm obviates all this trouble, insures a clean and clear back-water space, with a perfect circulation of water, not only in that part of the boiler, but throughout all its parts. Two water-spaces are formed, and the steam generated and flowing up along the water side *c c c* of the plate *b b* has no interruptions or check by downward currents, but has a free and unobstructed passage up the heated-water and steam spaces toward the steam-room above, until it reaches the curved edge of the diaphragm, when it is deflected away from the downward currents of cooler water which descends between the diaphragm and the rear sheet of the boiler-shell, as indicated by the arrows, causing a continuous current while the boiler is in operation.

I am aware that circulating-plates have been

arranged in the water-legs of the furnace and other parts of the boiler, and also that a circulating-plate has been placed in the back connection of the boiler, as shown in English Patent No. 1,716 of 1869. I am also aware that
5 separate circulating pipes or tubes are old, as shown in English Patent No. 3,405 of 1873; and also that an upright boiler with an annular circulating-plate in the water-legs of
10 the fire-box, is old, as shown in English Patent No. 1,315 of 1873; also, that circulating-plates are shown in Patents No. 144,778, No. 155,093, and No. 89,258; but none of these are constructed as in my case, and do not ac-
15 complish the object sought to be patented. I am also aware of the English Patent No. 1,674 of 1869, in which a diaphragm is shown in the back connection; but in this said diaphragm is also curved backward and will not accomplish
20 the purpose sought to be covered by my inven-

tion. I therefore disclaim such circulating-plate, broadly; but,

Having thus described my invention, what I claim is—

In a marine boiler provided with a back-water space, F, and having also a water-bottom, a diaphragm, G, constructed as described, inserted midway between the front and rear sheets of the back-water space, with free passages underneath, and connecting with the water-bottom space for the purpose of promoting
25 circulation, in the manner and for the purposes set forth.

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

GEO. B. WHITING.

Witnesses:

RICHARD J. EVANS,
W. S. MOORE.