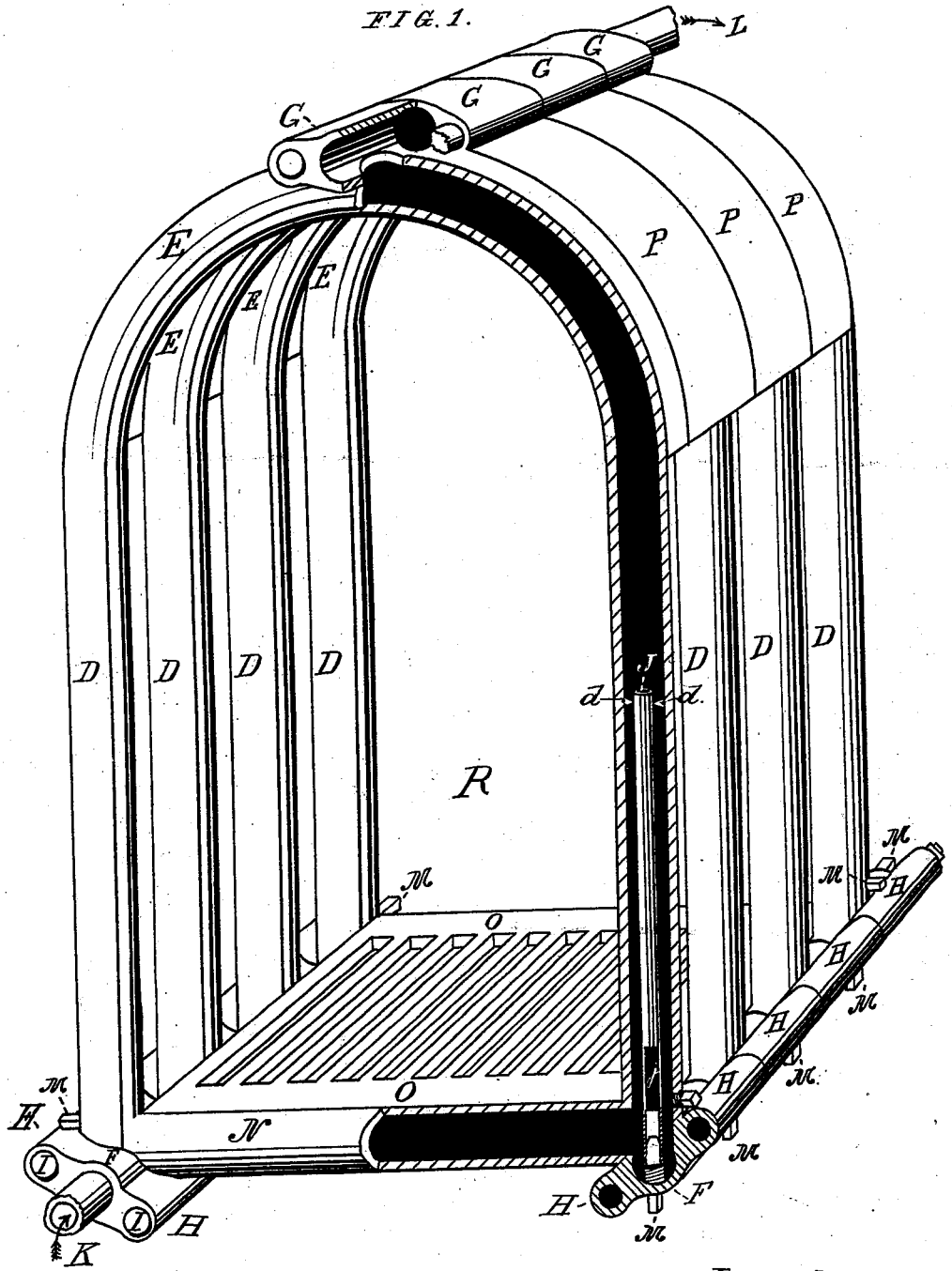
2 Sheets—Sheet 1.

G. MARSHALL, T. IBBOTSON & J. BAILEY.

Sectional Steam-Generator.

No. 210,135. Patented Nov. 19, 1878.

FIG. 1.



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2 Sheets—Sheet 2.

G. MARSHALL, T. IBBOTSON & J. BAILEY.

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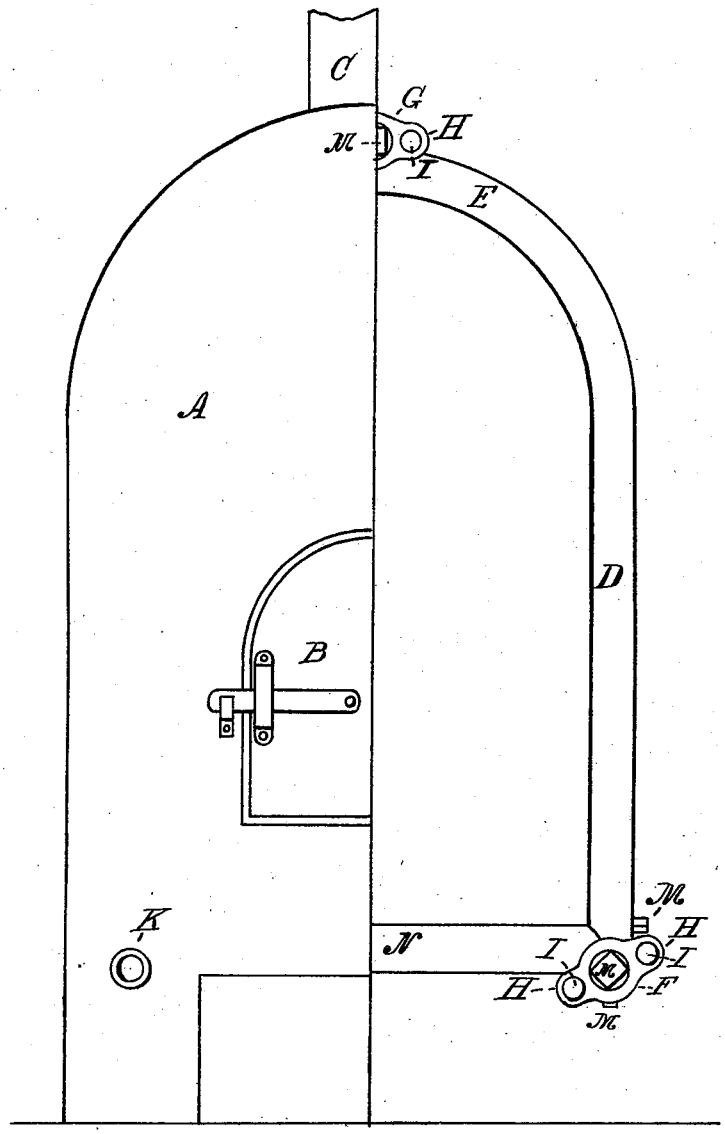
FIG. 2.



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UNITED STATES PATENT OFFICE.

GEORGE MARSHALL, THOMAS IBBOTSON, AND JOHN BAILEY, OF BELLEVILLE, ILLINOIS.

IMPROVEMENT IN SECTIONAL STEAM-GENERATORS.

Specification forming part of Letters Patent No. **210,135**, dated November 19, 1878; application filed April 20, 1878.

To all whom it may concern:

Be it known that we, GEORGE MARSHALL, THOMAS IBBOTSON, and JOHN BAILEY, all of Belleville, in the county of St. Clair and State of Illinois, have invented a certain new and useful Improvement in Sectional Steam-Generators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

Our improvement relates to that class of boilers for heating water and generating of steam which are constructed of cast sections.

Our improvement consists, first, in the construction of the separate sections, each of the central sections consisting of a pipe in form of an inverted U, or with angular bends at top, and with open-ended horizontal portions at bottom, extending transversely to the rest of the pipe, and serving to connect the sections together at bottom. The sections are also similarly connected at the apex.

Our improvement also consists in combining with the cast sections, as described, a circulating-pipe, placed concentrically in the lower part of each vertical leg of the section, said pipe being open at top, and having lateral openings near the bottom for the outward flow of water, which enters at top.

Our improvement also consists in combining with the described sections (which are placed centrally in the boiler) end sections, having their lower ends connected by a horizontal pipe. In line with the pipes are screw-plugs, to allow the introduction of an instrument in the cleaning out of the boiler. The plug-orifices supply a means for the support of the cores in casting and for their removal.

In the drawings, Figure 1 is a perspective view of the boiler proper, with half the front section broken away to show the interior. Fig. 2 is a front elevation of the boiler, showing half the boiler-casing.

A is the casing. This may be of metal, brick, or other material. B is the fire-door, and C the chimney. The boiler consists of end sections and central sections, differing in this, that the end sections have a horizontal pipe connecting the lower ends together and the central sections have no such connecting-pipe. D D are the vertical portions of the sections, connected at top by an arched or straight crown-pipe, E, of the same size as the parts D. The bore of pipe D D E may be of any suitable size. We have made it four inches in diameter. The sections have at each foot and at the crown transverse open-ended pipes. Those at the foot are marked F and that at the crown G. These connecting pipes or orifices are faced off where they connect with those of the adjoining section, so as to make a steam-tight joint with lead or a gasket. Beside the parts F and G are perforated lugs H, through which pass stay-bolts I, by which all the sections are held together, the bolts extending from end to end of the boiler.

J is a circulating-pipe, placed axially in each the vertical parts D of each section, and extending down into the part F. These pipes are open at top to allow the inflow of water, and have openings *j* in the sides, at the lower ends, to allow the outflow of the cooler water to take the place of the hotter water flowing up through the annular space between the pipes D and J. The pipes J are held in position at top by teats *d*, cast upon the inside of pipes D, and at the lower end they are held in place by the screw-plugs M, which enter the lower ends. These screw-plugs, like the others shown, give means for the introduction of an instrument in cleaning the horizontal and vertical pipes.

K are feed-water pipes communicating with pipes F. L is the steam-pipe communicating with pipe G. N are horizontal pipes, found only in the end sections at front and back of the boiler. These pipes form a communication between the feet of these sections from F to F.

The fire-grate O may be at the same height as the pipes N and F, or the grate may be above or below this elevation. We prefer to put it somewhat above the center of these pipes, to cause a more regular circulation of the water through all the pipes of the boiler, as there would be a reservoir for the cooler water entering through the feed-pipe and returned through the pipes J that would supply the upper current in the pipes D.

P P are flanges cast upon the sides of parts E, and meeting to form a crown-sheet to the

fire-space R, said crown deflecting the products of combustion and causing them to escape between the pipes D and at the ends of the boiler before they reach the chimney.

We claim as our invention—

1. The cast sections having vertical legs D D, crown-pipe E, and transverse pipes F F and G, communicating from section to section in the boiler.

2. The combination, in a boiler, of the sections having the parts D E F G, and the end sections having in addition the horizontal pipe or portion N.

3. The combination, with the cast sections D D E, of the stay-bolts I, passing through lugs H cast upon the sections.

4. The combination of the sections D D E, axial pipes J, and plugs M, forming the support of the pipes J, and made removable for the purpose of cleaning out the pipes D, substantially as set forth.

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Witnesses:
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