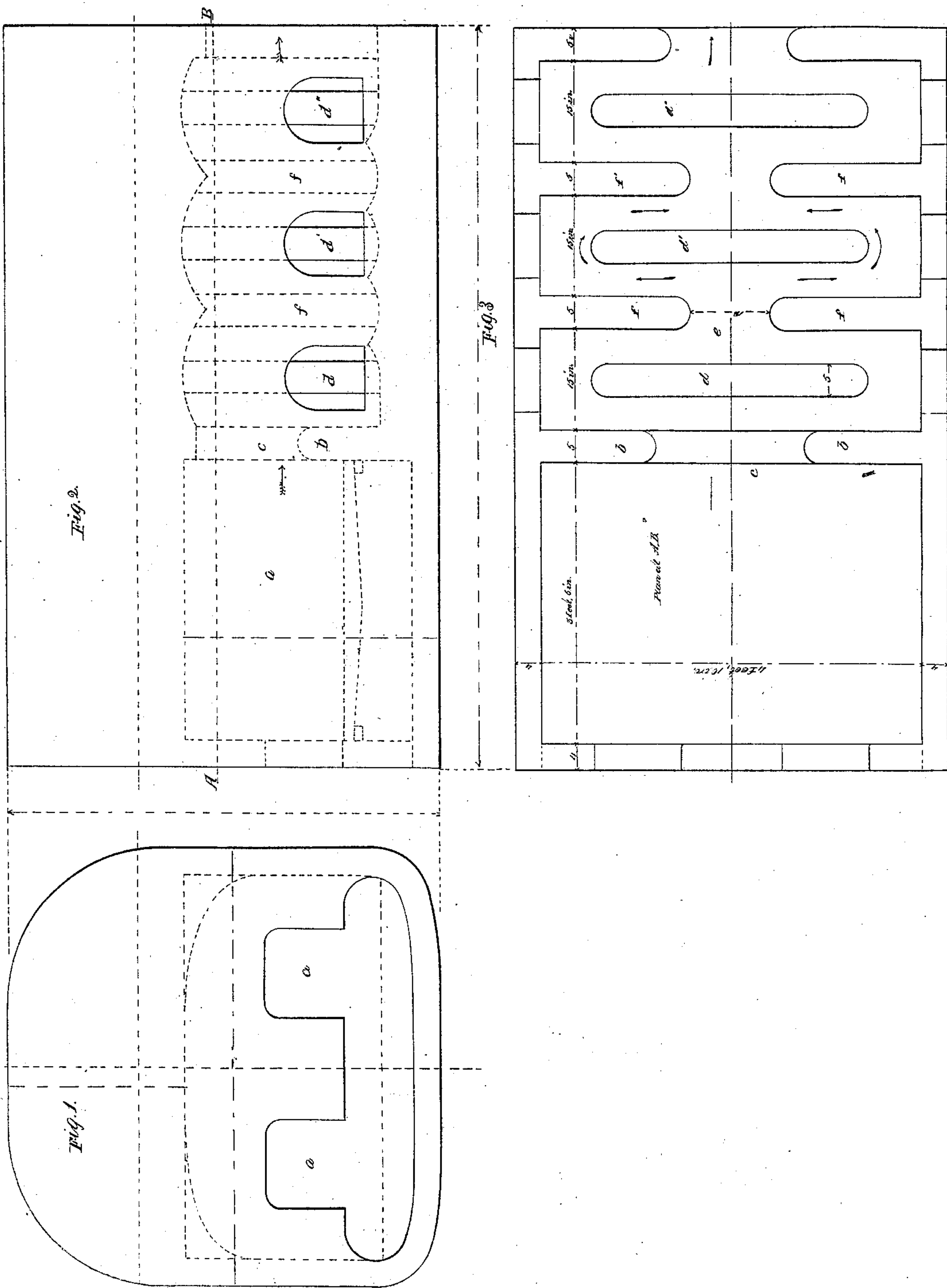


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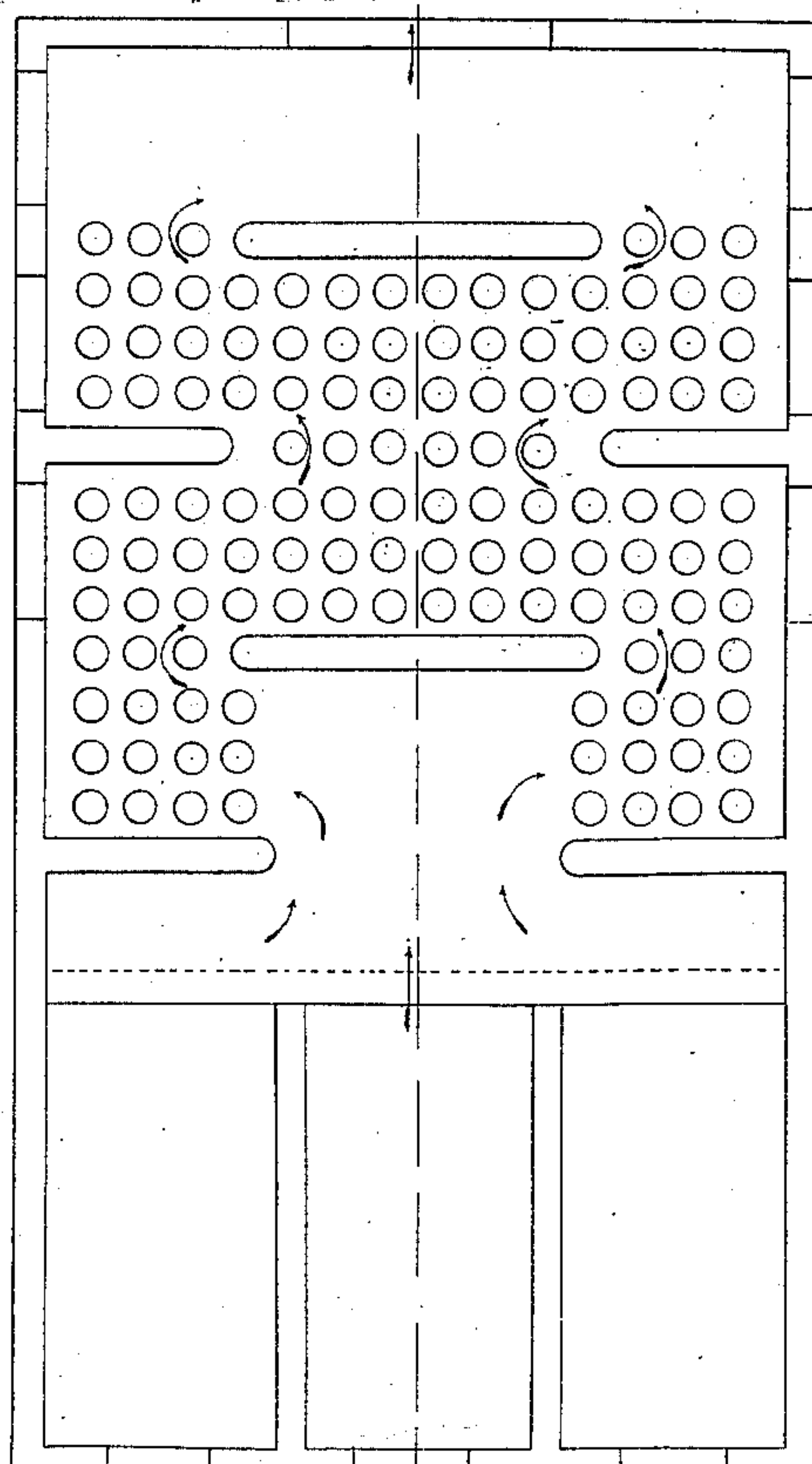
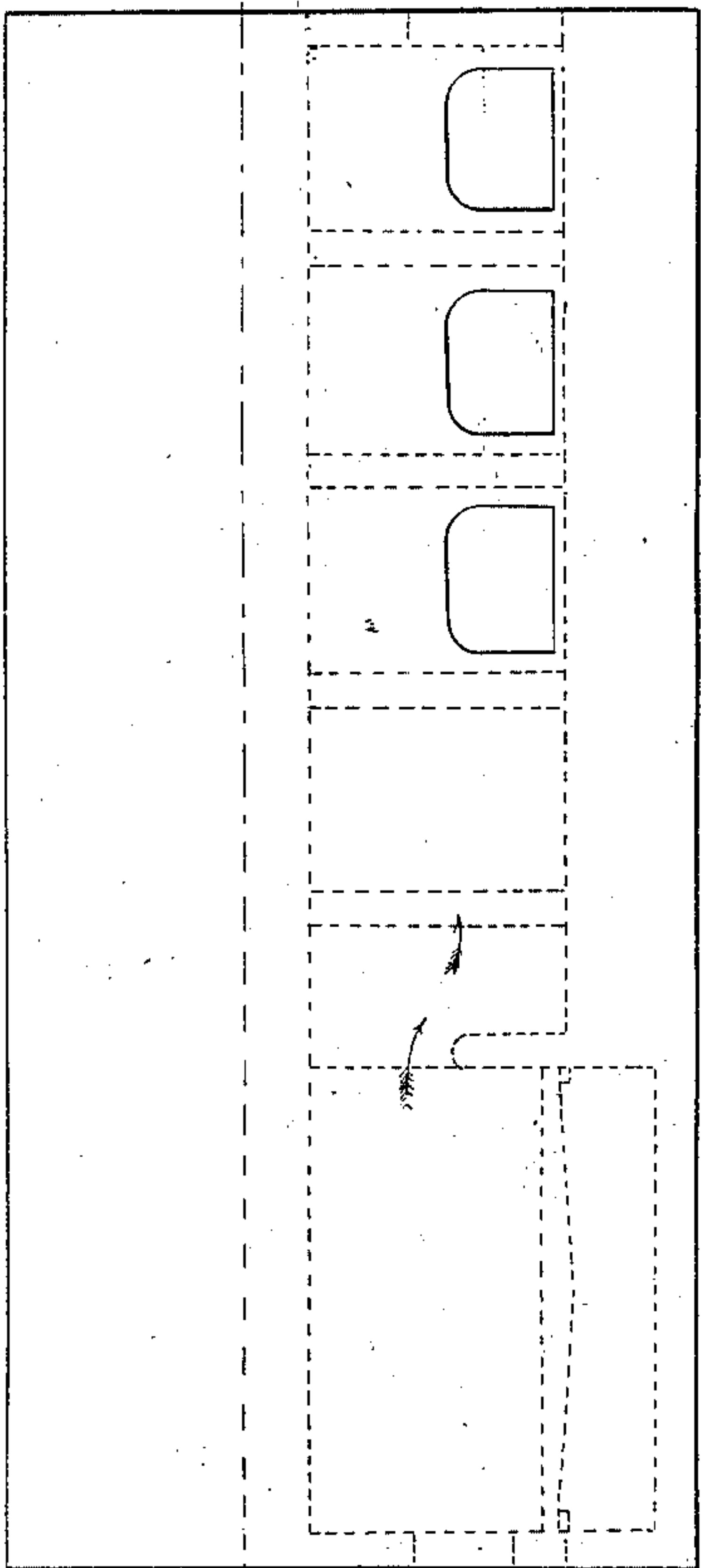
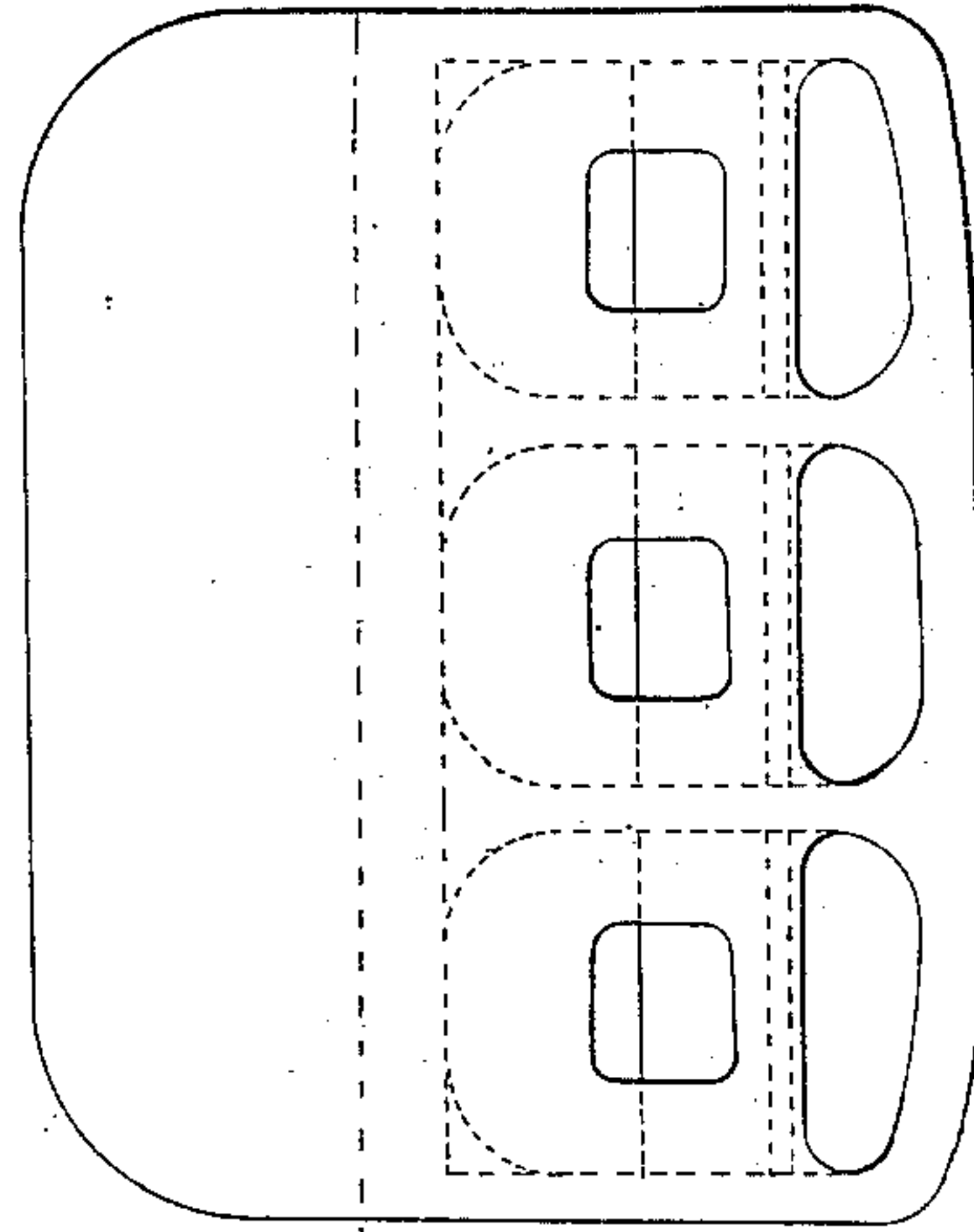


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Patented Apr. 17, 1849



UNITED STATES PATENT OFFICE.

R. F. LOPER, OF PHILADELPHIA, PENNSYLVANIA.

ARRANGEMENT OF FLUES IN MARINE BOILERS.

Specification of Letters Patent No. 6,367, dated April 17, 1849.

To all whom it may concern:

Be it known that I, R. F. LOPER, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented
5 certain new and useful Improvements in Steam-Boilers; and I declare that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the usual manner of
10 making, modifying, and using the same.

The object of my invention is so to construct a boiler as to cause the products of combustion from the furnace or furnaces to
15 divide into two parts and again commingle alternately through a series of labyrinth flues, against the sides of which they are caused to impinge many times in the course of their passage through the boiler, their
20 construction is substantially as follows:

The outer case is formed similar to the ordinary wagon-top boiler, in one end of which is placed the furnace (*a*,) constructed in the usual manner. Just in rear of said
25 furnace there is a water table (*b*,) forming a partition from the bottom to the top of said furnace, through the center of the breadth of this partition and near its top, there is an opening (*c*,) of sufficient capacity for the furnace flue. Directly in
30 the rear of this aperture a second water-table (*d*,) is placed parallel with that above named, with a space (*e*,) all around its sides for flueway. Behind this water table (*d*,)
35 are two others (*f*, *f*,) of half its capacity each, the sides of which are connected with the shell of the boiler, and with a space (*e*,)

between them. Behind these water tables there is another central one (*d'*,) constructed and placed similar to the one before described, and lettered (*d*,). This is succeeded by two other side water tables (*f'*, *f'*,), and the series can be continued through any number deemed desirable. All these water tables open into the main boiler, above and below. The effect of this arrangement is to concentrate the heat passing from the furnace, and cause it to impinge upon the center water table (*d*,) where it divides, and passing around the ends of said table, the divided currents are brought together, causing the gases to commingle, and be more perfectly consumed, and thus produce a great saving of fuel, as they pass between the tables (*f*, *f*,) against the second center water table, where the same evolution is performed as that just above described; and this is performed through all the series of the labyrinth flues. A modification of this boiler is shown in Plate 2,—in which there is a series of tubes placed in the flues.

Having thus fully described my improvements, what I claim therein as new, and for which I desire to secure Letters Patent, is—

Constructing the boiler substantially in the manner above described, by the employment of a series of central and side water tables forming a flue, in which the gases are alternately divided, and commingled in the manner and for the purpose set forth.

R. F. LOPER.

Witnesses:

WM. GREENOUGH,
THOMAS ADAMS.