

No. 663,588.

Patented Dec. 11, 1900.

J. E. SLACK.
WATER TUBE BOILER.

(Application filed Mar. 12, 1900.)

(No Model.)

4 Sheets—Sheet 1.

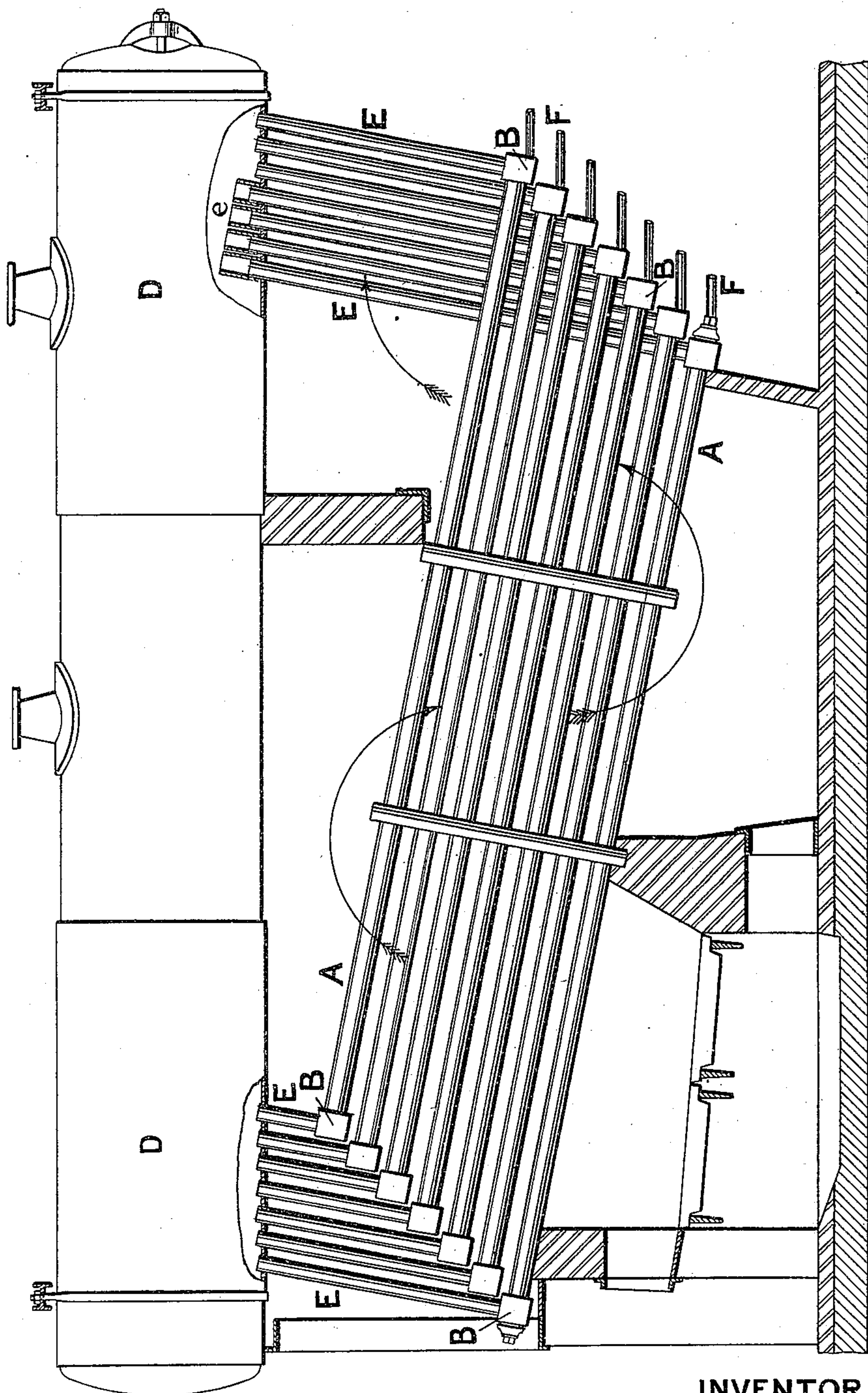


FIG. 1.

WITNESSES.

Joseph Bates.
Alfred Davies.

INVENTOR.

J. E. Slack.
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No. 663,588.

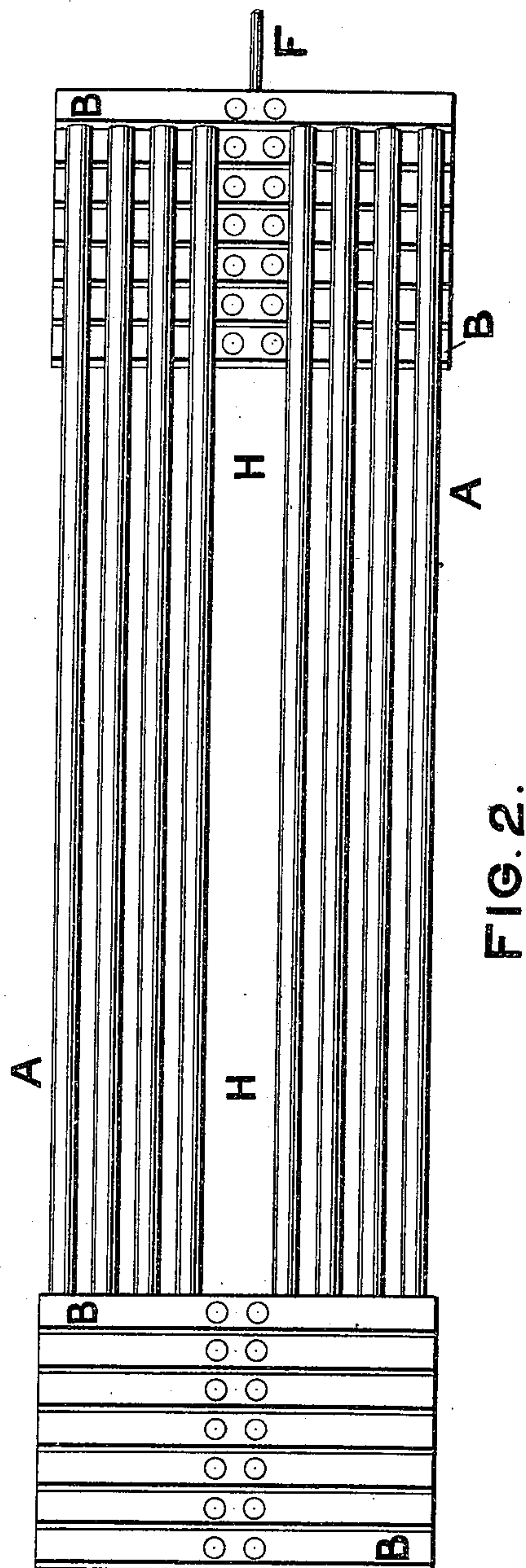
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WITNESSESS.

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4 Sheets—Sheet 3.

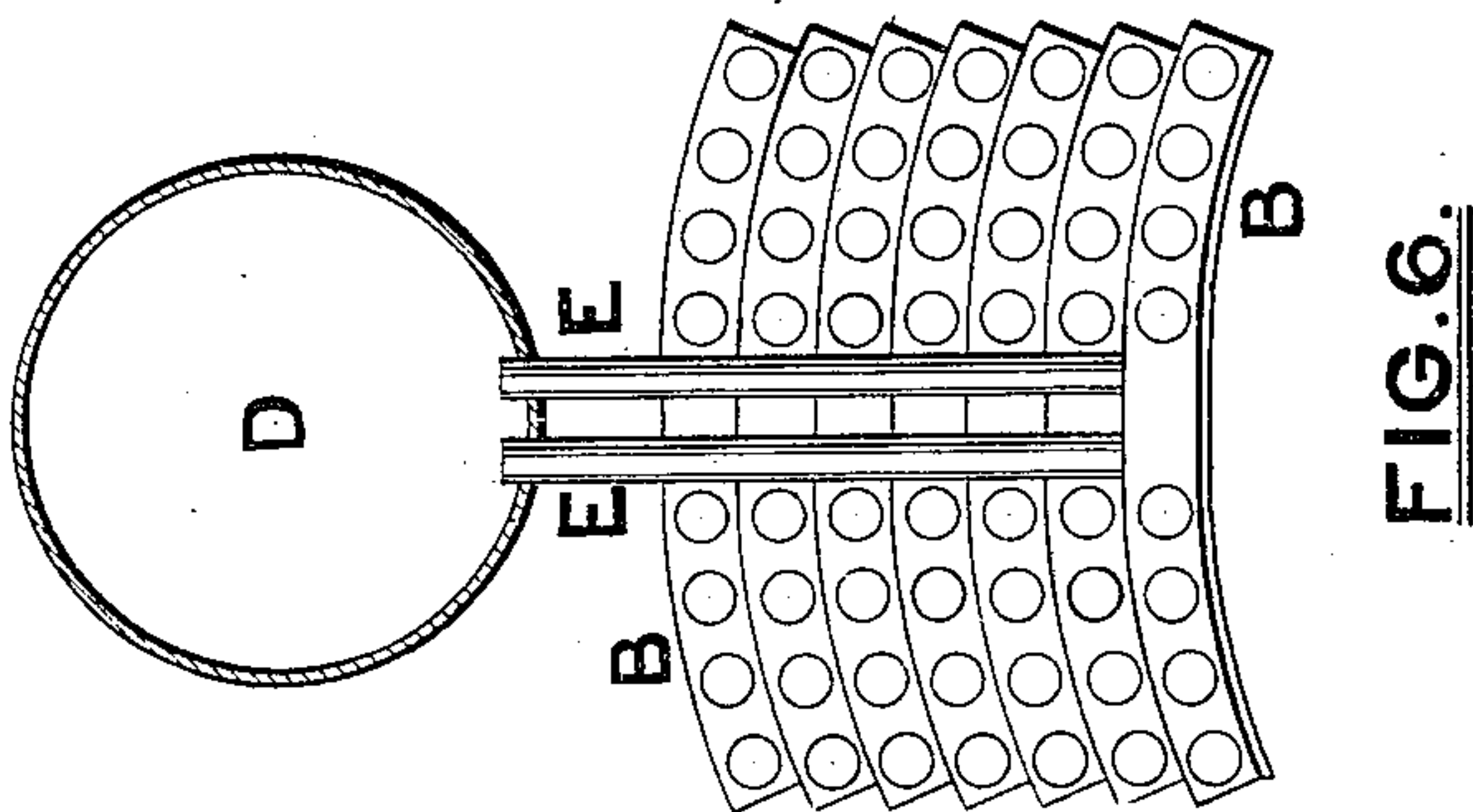


FIG. 6.

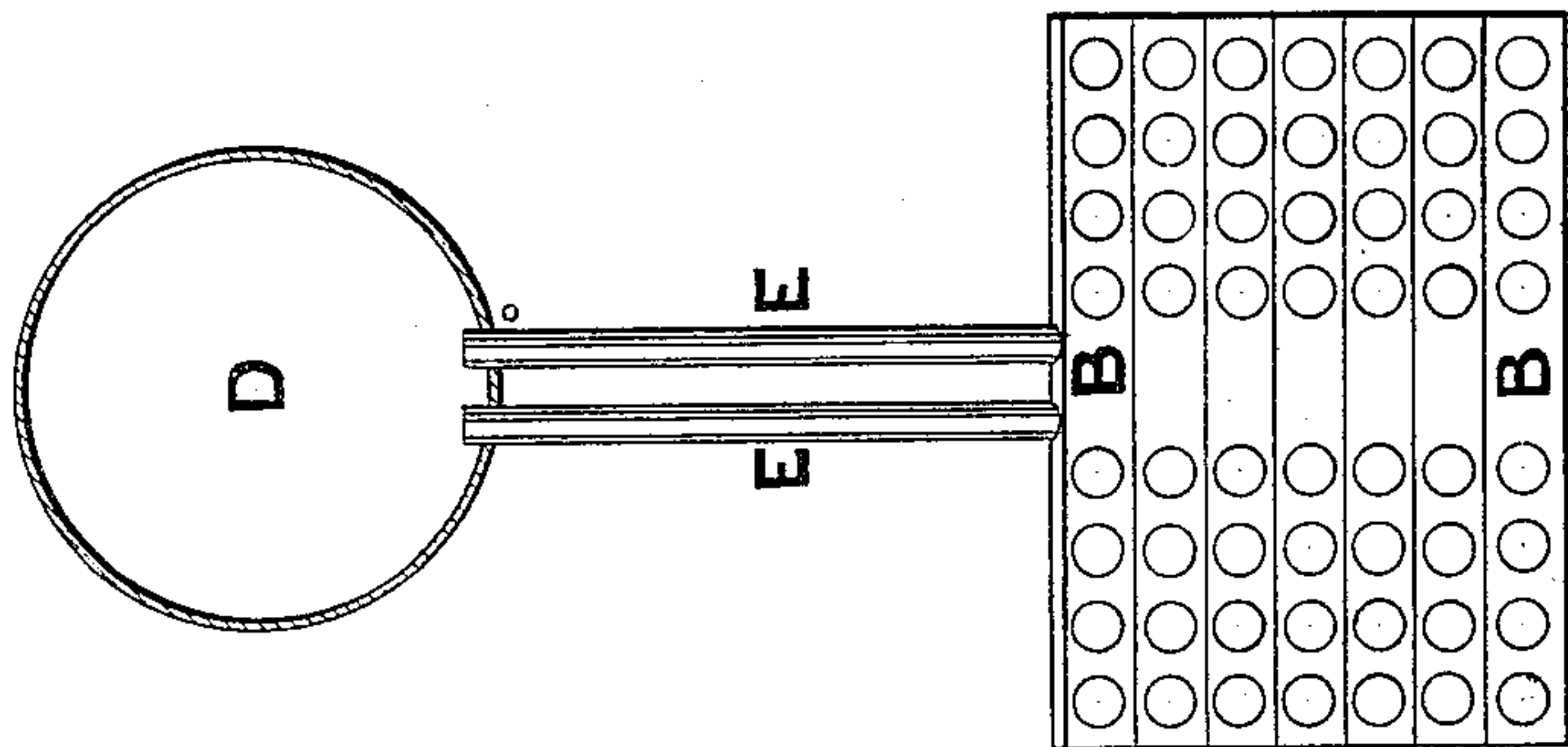


FIG. 4.

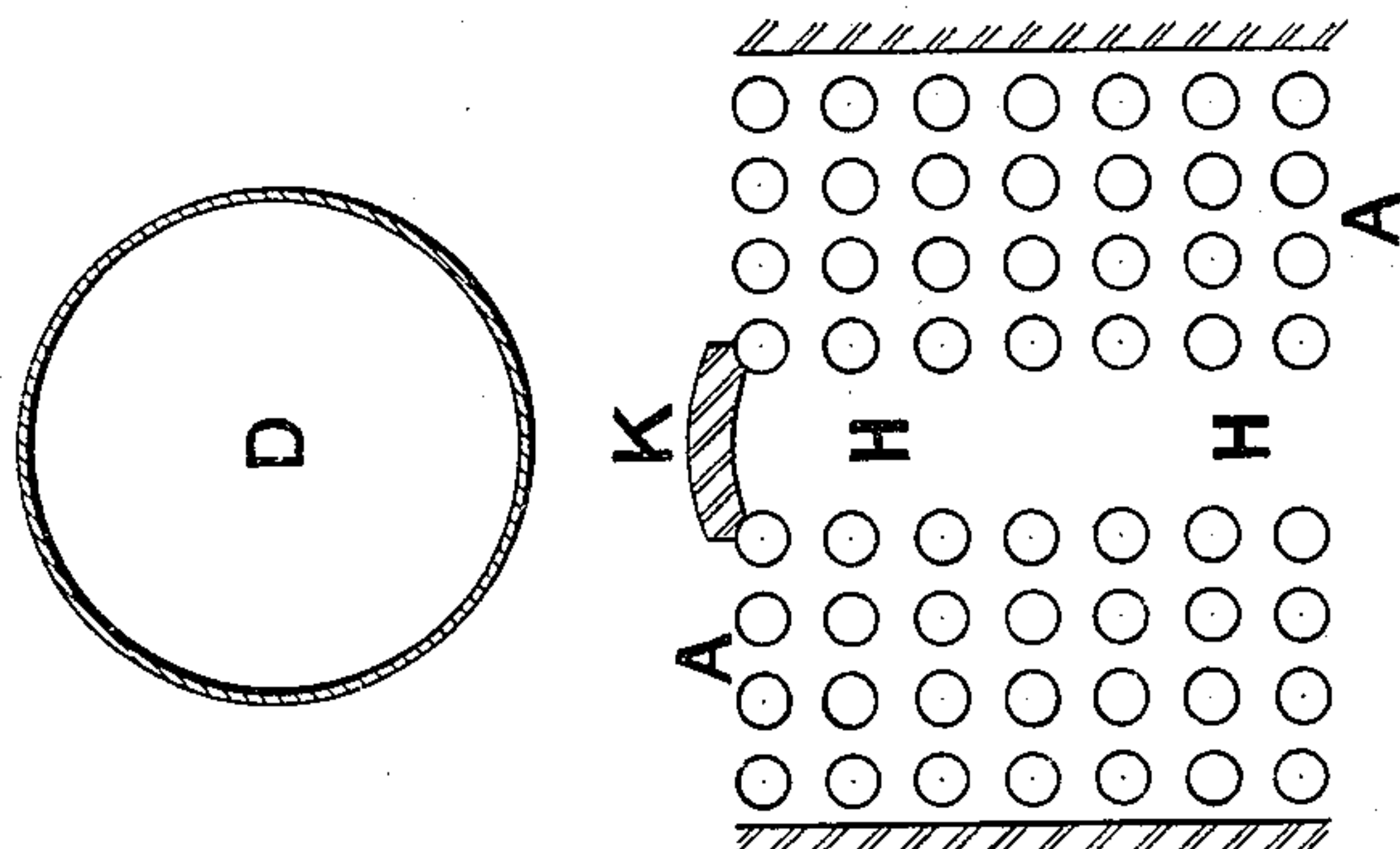


FIG. 5.

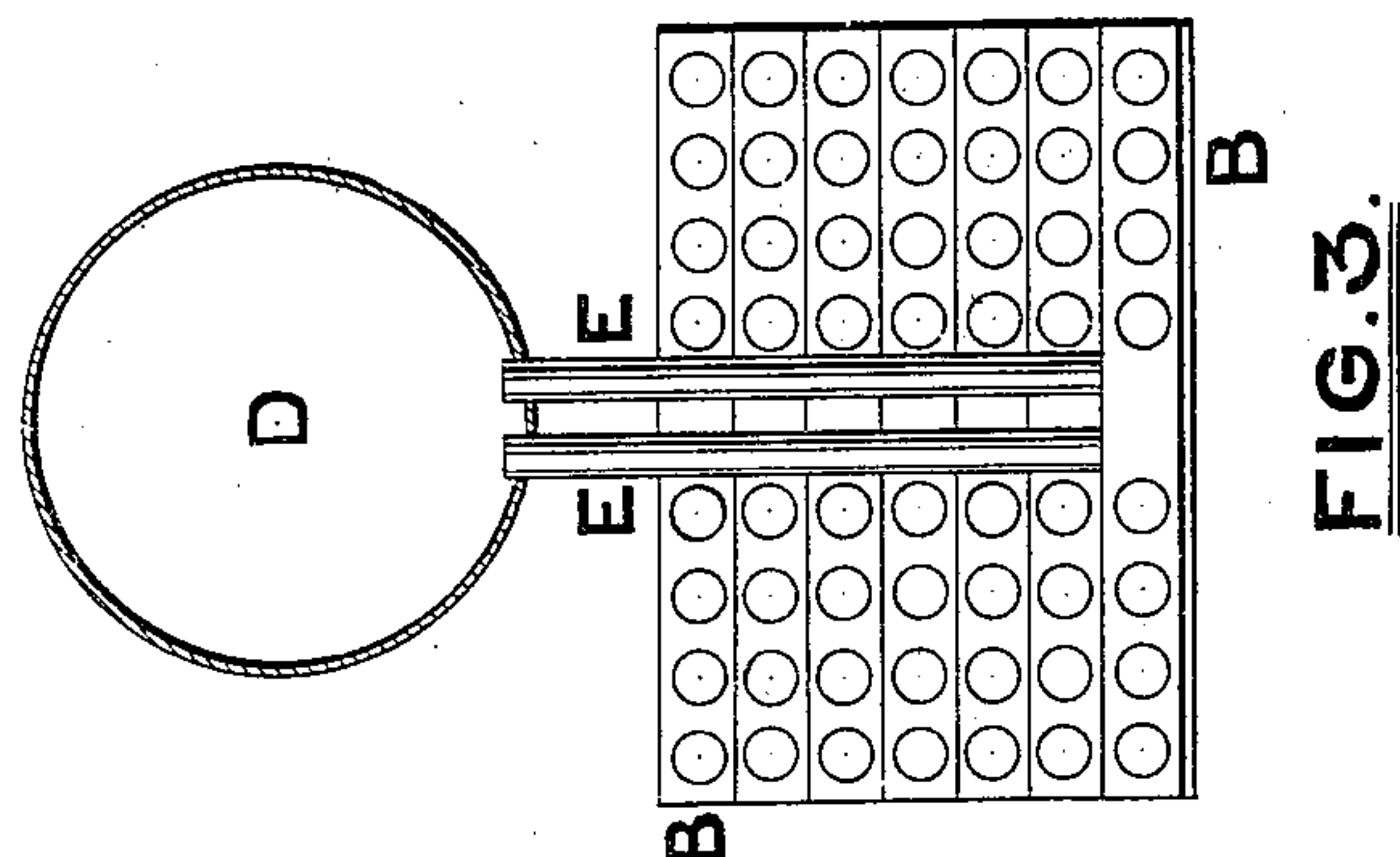


FIG. 3.

WITNESSES.

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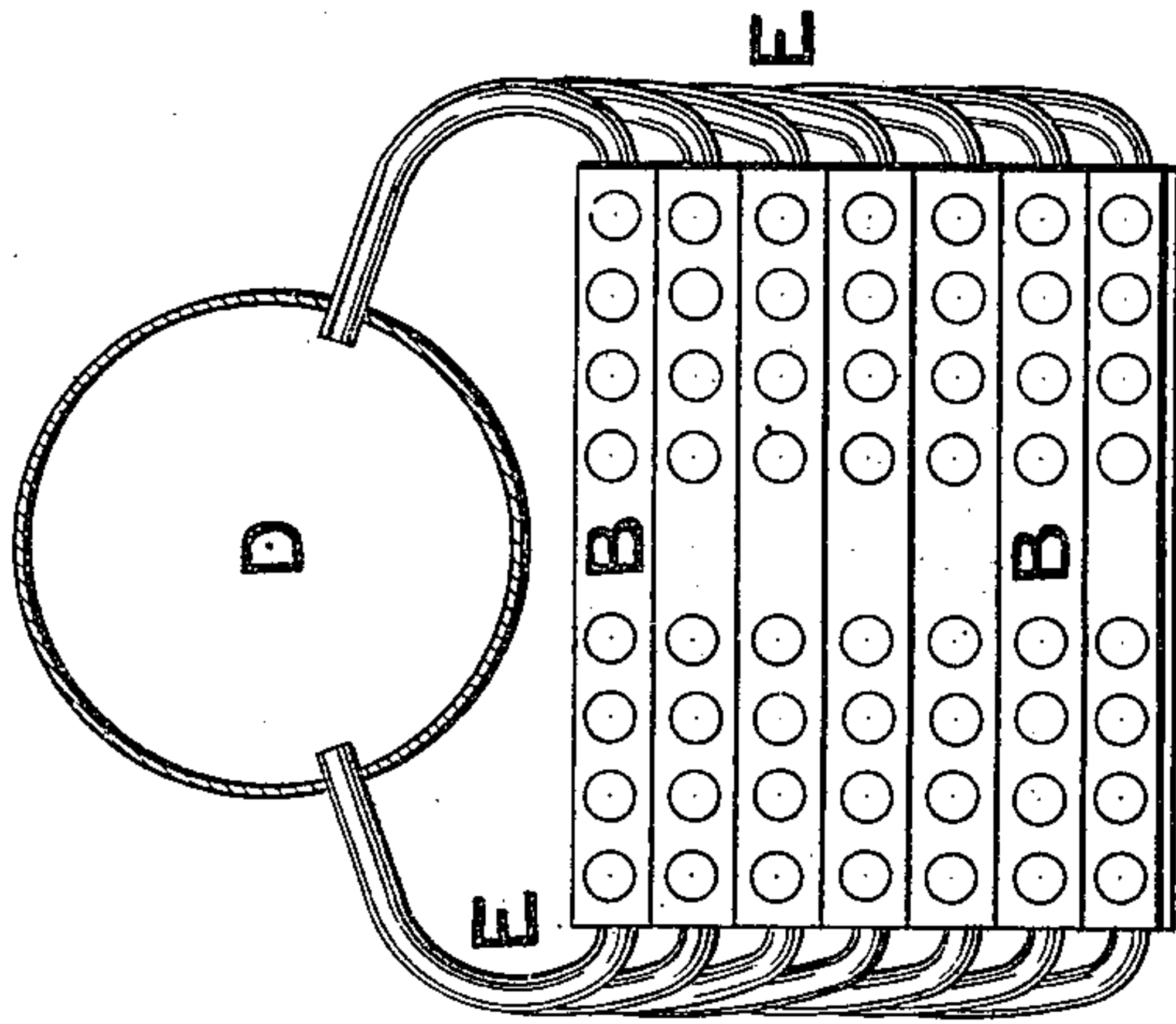


FIG. 8.

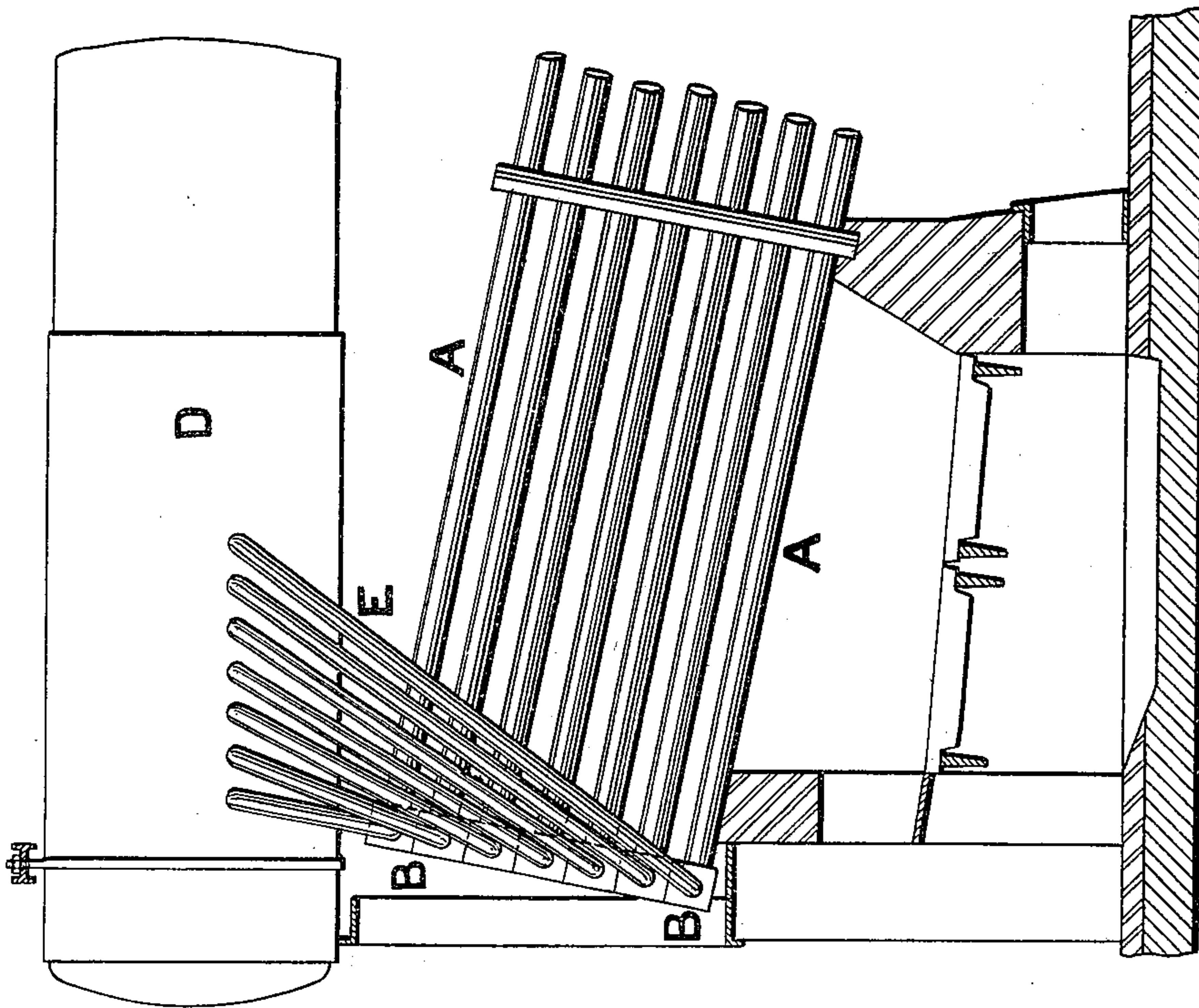


FIG. 7.

WITNESSES.
Joseph Prates.
Alfred Davies.

INVENTOR
J. Edward Slack
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UNITED STATES PATENT OFFICE.

JOHN EDWARD SLACK, OF MANCHESTER, ENGLAND, ASSIGNOR OF TWO-THIRDS TO HAMMERSLEY HEENAN, OF SAME PLACE.

WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 663,588, dated December 11, 1900.

Application filed March 12, 1900. Serial No. 8,396. (No model.)

To all whom it may concern:

Be it known that I, JOHN EDWARD SLACK, a British subject, and a resident of Manchester, in the county of Lancaster, England, (postal address, Chester road, Manchester, in the county of Lancaster, England,) have invented certain new and useful Improvements in Water-Tube Steam-Generators, of which the following is a specification.

10 This invention is designed to provide for the better supply of water to the lower water-tubes of tubulous boilers. As at present generally constructed the tubes in vertical rows are connected by vertical or upright headers, (which may be somewhat inclined,) such
15 headers being all supplied with water by a single tube at the upper end, so that the water as it flows or circulates reaches and feeds the upper and cooler tubes first, often leaving the lower tubes, which are in the hottest part of the furnace, with an insufficient supply of water, causing them to be burned or damaged. This invention effectually prevents any such damage occurring.

25 This invention consists, essentially, in constructing the boiler with each set or section of tubes, taken horizontally, connected at their end to a horizontal header and such horizontal headers each separately connected by one, two, or more (preferably vertical) tubes with the steam and water drum. Thus the bottom row of tubes, which receives the hottest flame and gases, and each successive horizontal row of water-tubes have their water-supply direct
35 from the steam and water drum.

The invention will be fully described with reference to the accompanying drawings.

40 Figure 1 is a side elevation of the boiler, parts of furnace being in section; Fig. 2, a plan of same, upright tubes E removed; Fig. 3, an end elevation from front; Fig. 4, an end elevation from back; Fig. 5, a transverse section; Fig. 6, an end elevation of a modification; Fig. 7, a side elevation of another modification; Fig. 8, an end elevation of Fig. 7.

45 The water-tubes A are placed in a series of horizontal rows, and the ends of the tubes forming each horizontal row are connected to or inserted in a horizontal header B, the ends of the tubes A being expanded or otherwise secured therein. Each of the headers B at

both ends of each horizontal set of tubes A is separately connected with the steam and water drum D by one, two, or more (preferably two) upright tubes E, slightly inclined to the vertical, but at right angles to the tubes A, which are set at an inclination of about thirty degrees.

The upright tubes E connect each horizontal set of water-tubes A direct with the drum D.

The headers B are preferably arranged or set in steps, one in advance of the other, (see Fig. 1,) to permit of the upright tubes E passing in a straight line to the drum D. Where, however, it is desirable to have the headers B all in the same plane, the tubes E, connecting them with the steam and water drum D, are brought in at the ends, as in Figs. 7 and 8, each horizontal set of tubes A, as before, being separate and separately connected with the steam and water drum D, as shown in Fig. 6. The headers B may be arched instead of flat. The connecting-tubes E are attached to the drum D and to the headers B in any ordinary or suitable way.

The tubes E, connected with the header B of the lower set of horizontal tubes A, are provided with a projecting end *e* to project into the interior of the drum D, so that any sediment in the drum D will not flow into the lower and hotter tubes. Each horizontal header is provided with a blow-off cock or tube F, so that there is a separate blow-off for each set of horizontal tubes A. By this arrangement of tubes a better form of furnace is obtained, as a chamber H is formed between the tubes A, covered by a plate or bridge K, which provides a combustion-chamber in which more complete combustion takes place and from which the gases spread among the tubes. A.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. A water-tube boiler comprising in its construction a number of sections or sets of tubes approximately horizontal each horizontal set connected to a horizontal header at both ends and each horizontal header separately connected with the steam and water drum substantially as described.

2. In a water-tube boiler constructed with

a number of sections or sets of tubes the combination with each set of tubes A of a horizontal header B at both ends and upright tubes E attached thereto connecting each
5 header B and set of tubes A separately and direct with the steam and water drum D.

3. In a water-tube boiler the combination with the steam and water drum D and a number of sets of tubes A of the horizontal header
10 B placed at both ends and a number of up-

right tubes E connecting the headers separately with the drum.

In witness whereof I have hereunto signed my name, in the presence of two subscribing witnesses, this 28th day of February, 1900. '5

J. EDWARD SLACK.

Witnesses:

J. OWDEN O'BRIEN,
HARRY BARNFATHER.