

No. 719,501.

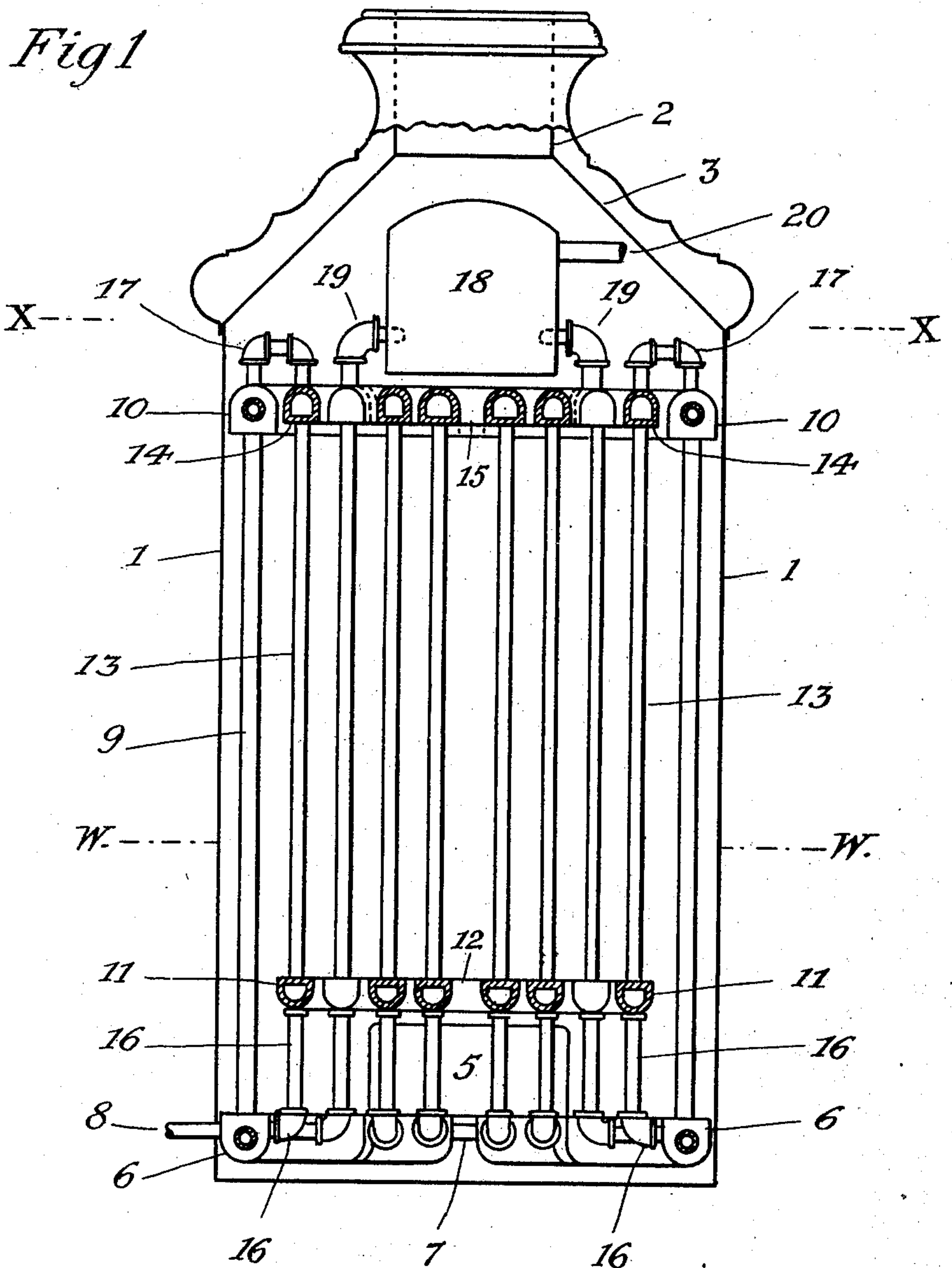
PATENTED FEB. 3, 1903.

H. E. PENNEY.
STEAM GENERATOR.

APPLICATION FILED AUG. 14, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses.
Thos. Lagaard.
H. A. Bowman.

Inventor
Herbert E. Penney
By *P. H. Gunkel*
his Attorney

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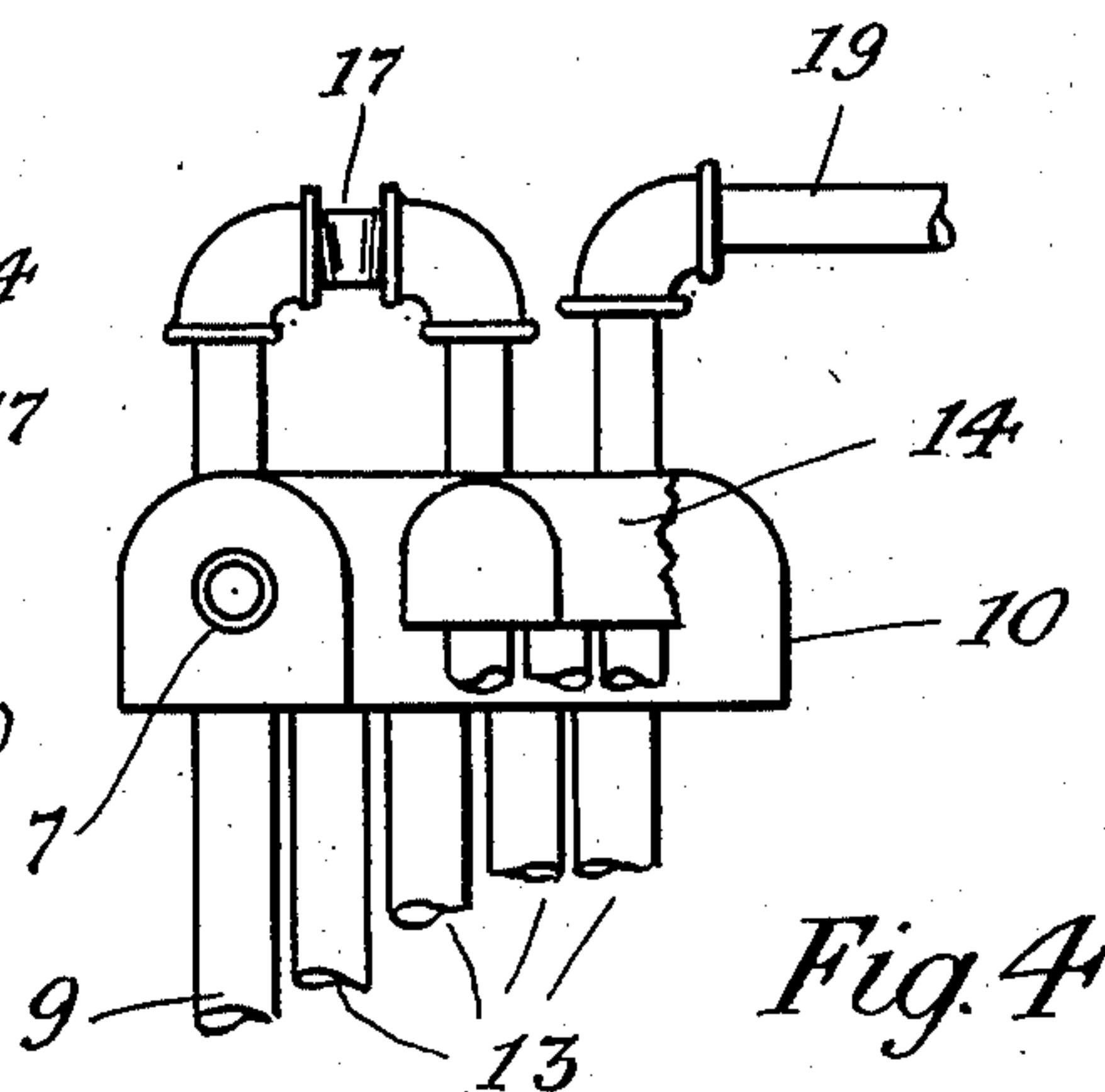
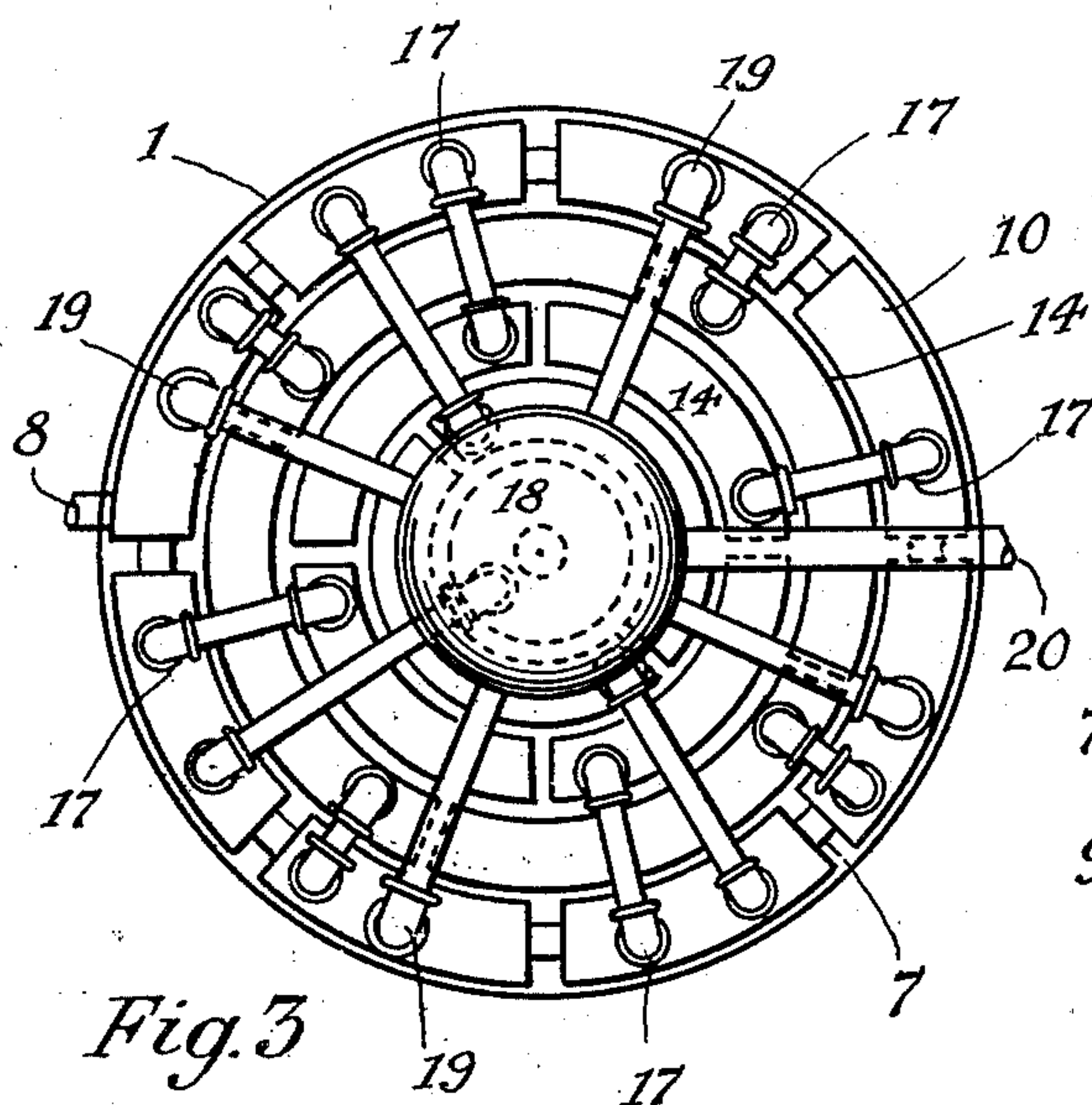
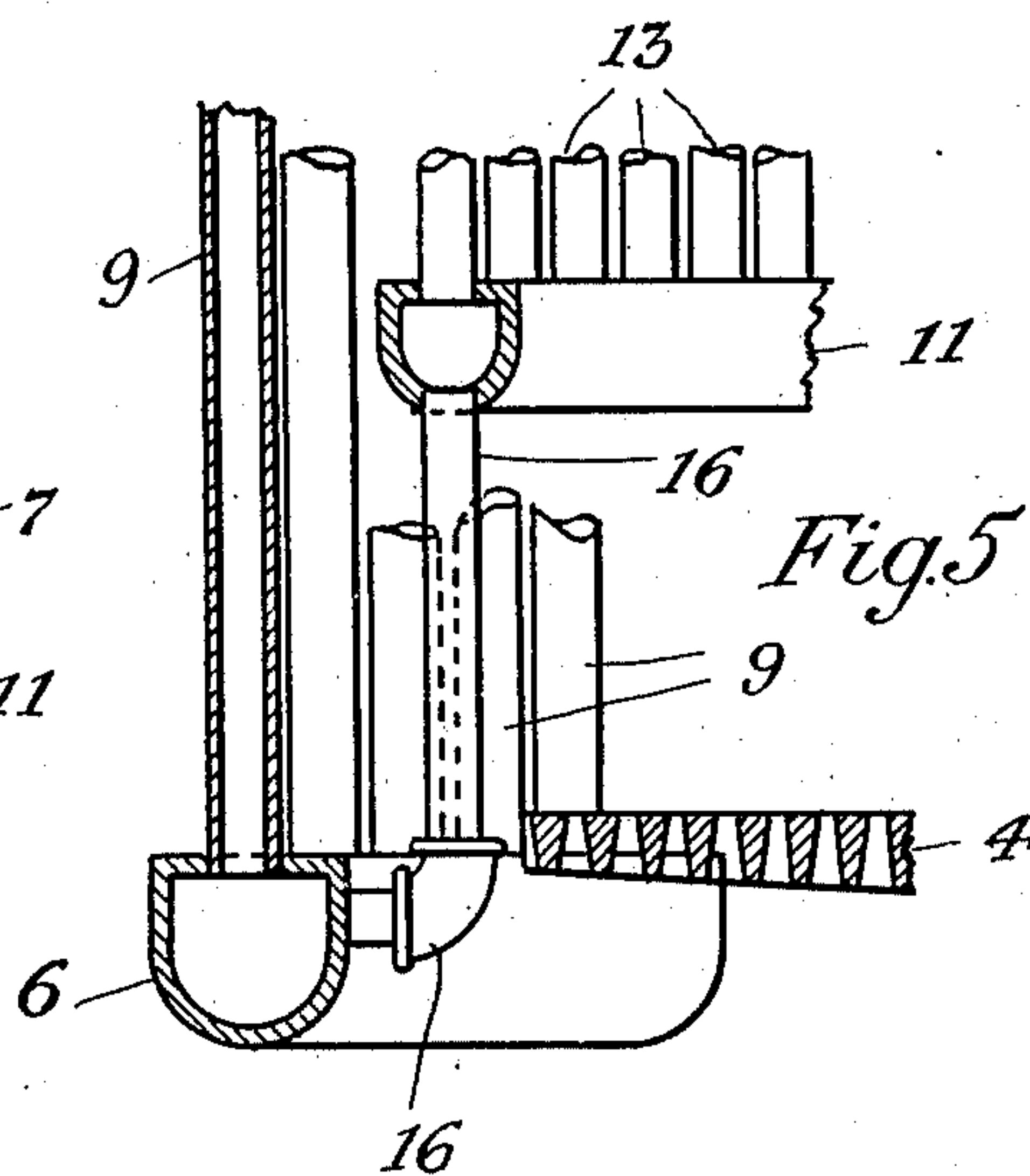
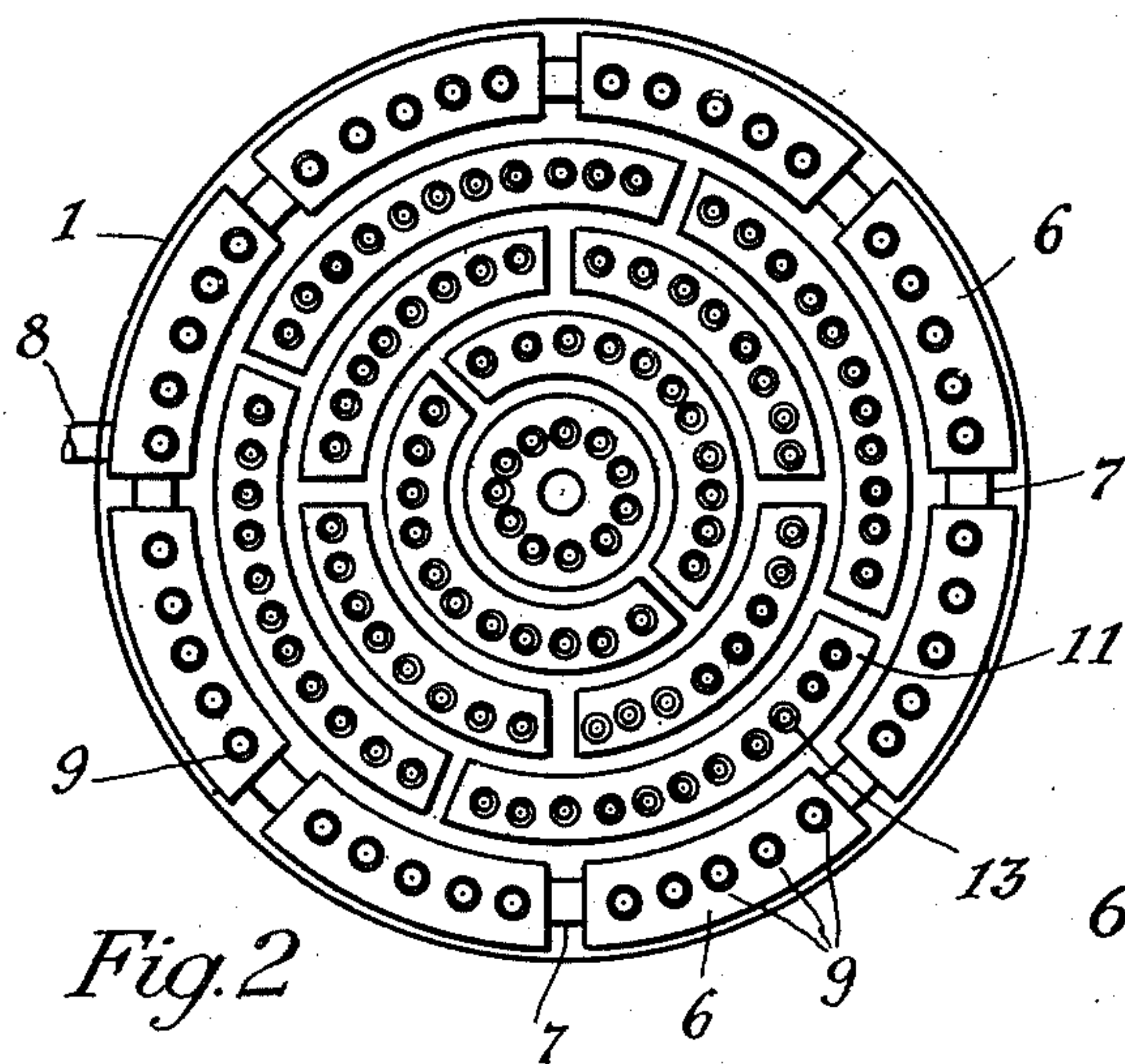
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Witnesses

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H. A. Bowman

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By *C. H. Gunkel*

his Attorney.

UNITED STATES PATENT OFFICE.

HERBERT E. PENNEY, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO W. S. NOTT COMPANY, OF MINNEAPOLIS, MINNESOTA, A CORPORATION.

STEAM-GENERATOR.

SPECIFICATION forming part of Letters Patent No. 719,501, dated February 3, 1903.

Application filed August 14, 1902. Serial No. 119,656. (No model.)

To all whom it may concern:

Be it known that I, HERBERT E. PENNEY, a citizen of the United States, residing at Minneapolis, county of Hennepin, and State of Minnesota, have invented certain new and useful Improvements in Steam-Generators, of which the following is a specification.

My invention relates to vertical steam-generators or steam-boilers of the sectional water-tube type.

The objects of the invention are to dispense with one of the usual vertical shells and substitute for the water-leg a series of horizontal headers and upright tubes in circular arrangement and fill the combustion-chamber with concentric tube-sections, and thereby produce an efficient steam-generator. The headers are sectional and, together with the tubes, are arranged in manifolds or tube-sections that are separately removable.

My improvements are illustrated in the accompanying drawings, in which—

Figure 1 is a vertical sectional view of a steam-generator embodying my improvements. Fig. 2 is a horizontal section of the same on the line *ww* of Fig. 1. Fig. 3 is a top view on the plane of the line *xx* of Fig. 1, and Figs. 4 and 5 are enlarged detail views of the upper and lower headers and their pipe connections.

In the drawings, 1 designates an inclosing shell; 2, the smoke-stack; 3, the hood over the top of the generator; 4, the fire-grate, and 5 the fire-door. These features may be of any usual or suitable construction.

In the lower portion of the shell, at or near the level of the grate, is a water-drum, composed of a series of horizontal segmental headers or sections 6, connected together in a circle by short coupling-pipes 7 and providing the water-space of the generator. A supply-pipe 8 is connected to one of the headers 6 at any desired point. To the top of the headers of the water-drum is connected a series of vertical pipes 9, that connect with the under sides of a series of upper headers 10, which preferably correspond in form and arrangement with the lower headers 6 and which constitute what may be termed a "steam-ring,"

and the pipes 9 are for the return of water from the steam-ring to the water-drum. The pipes 9 may be placed as close together as desired to prevent the escape of any great amount of heat from the combustion-chamber within their circle.

Over the fire-box are arranged series of concentric segmental headers 11 and at the center a hollow header-ring 12, to which are connected vertical water-tubes 13, which in turn communicate with corresponding headers 14 and a similar central ring 15, placed at the top of the boiler, within the steam-ring. The headers of these series are not in communication with other headers of the same series; but each header is independent, except in respect to the tubes 13, that connect corresponding headers above and below to constitute a manifold or tube section.

Each lower header is connected by a coupling-pipe 16 to a water-drum section, and each upper header is provided with a suitable removable bent-pipe connection 17, adapting it to discharge into the steam-ring. The pipe connections 16 and 17 may be of any usual or suitable construction adapted to be conveniently disconnected to permit the removal of a tube-section.

A steam-drum 18 of any desirable form (shown in the drawings as a short upright cylinder) is arranged centrally over the series of manifolds. The sections or headers 10 of the steam-ring are connected with the lower portion of the steam-drum by pipes 19, and a steam-discharge pipe 20 is connected to its upper portion. This construction enables any section of the water-drum and steam-ring to be readily removed by disconnecting its coupling-pipes 7, 16, 17, and 19, and so, too, the interior tube-sections are made separately removable by disconnection of their couplings 16 and 17.

In operation water is supplied from the water-drum to the lower headers of the tube-sections, and when steam is generated it rises through the tubes to the upper headers of the tube-sections and, together with whatever water it may carry over, discharges downward into the headers of the steam-ring, the steam

passing off through the pipes 19 to the drum and the water flowing directly downward through the return-pipes 9.

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

1. In a steam-generator, the combination with an inclosing shell, a water-drum composed of segmental sections, a steam-ring composed of corresponding sections, a series of return-pipes connecting such drum and ring sections, of interior series of independent tube-sections the lower headers of which communicate with the water-drum and the upper ends of which communicate with the steam-ring, a steam-drum, and connections between it and the steam-ring, substantially as set forth.

2. In a steam-generator, the combination with a cylindrical inclosing shell, of a water-drum and steam-ring composed of corresponding detachable communicating sections of segmental form, a circularly-arranged series of vertical return-pipes connecting said drum and ring sections, interior concentric series of tube-sections composed of upper and lower independent headers and vertical connecting water-tubes, and detachable connections between such tube-sections and the water-drum and steam-ring, substantially as set forth.

3. In a steam-generator, the combination with a cylindrical inclosing shell, of a water-drum and a steam-ring each consisting of communicating segmental headers, a circular series of vertical return-pipes connecting them, interior concentric series of tube-sections composed of upper and lower independent headers and vertical connecting water-tubes, detachable connections between the lower ends of the tube-sections and the water-drum and between their upper ends and the steam-ring,

a centrally-located steam-drum above the tube-sections, and pipes connecting such drum with the steam-ring, substantially as set forth.

4. In a steam-generator, the combination with a cylindrical inclosing shell, of a water-drum and a steam-ring each consisting of communicating segmental headers, a circular series of vertical return-pipes connecting them, the water-drum and return-pipes serving to water-jacket the fire-box, interior concentric series of tube-sections arranged over the fire-box and consisting of upper and lower independent headers and vertical connecting water-tubes, and detachable connections between such tube-sections and the water-drum and steam-ring, substantially as set forth.

5. In a steam-generator, the combination with a cylindrical inclosing shell, of a water-drum and a steam-ring each consisting of communicating segmental headers, a circular series of vertical return-pipes connecting them, the water-drum and return-pipes serving to water-jacket the fire-box, interior concentric series of tube-sections arranged with their lower ends immediately above the fire-box and their upper ends about on the plane of the steam-ring, and consisting of upper and lower independent headers and vertical connecting water-tubes, and detachable connections between such tube-sections and the water-drum and steam-ring, substantially as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 7th day of August, 1902.

HERBERT E. PENNEY.

Witnesses:

P. H. GUNCKEL,
H. A. BOWMAN.