

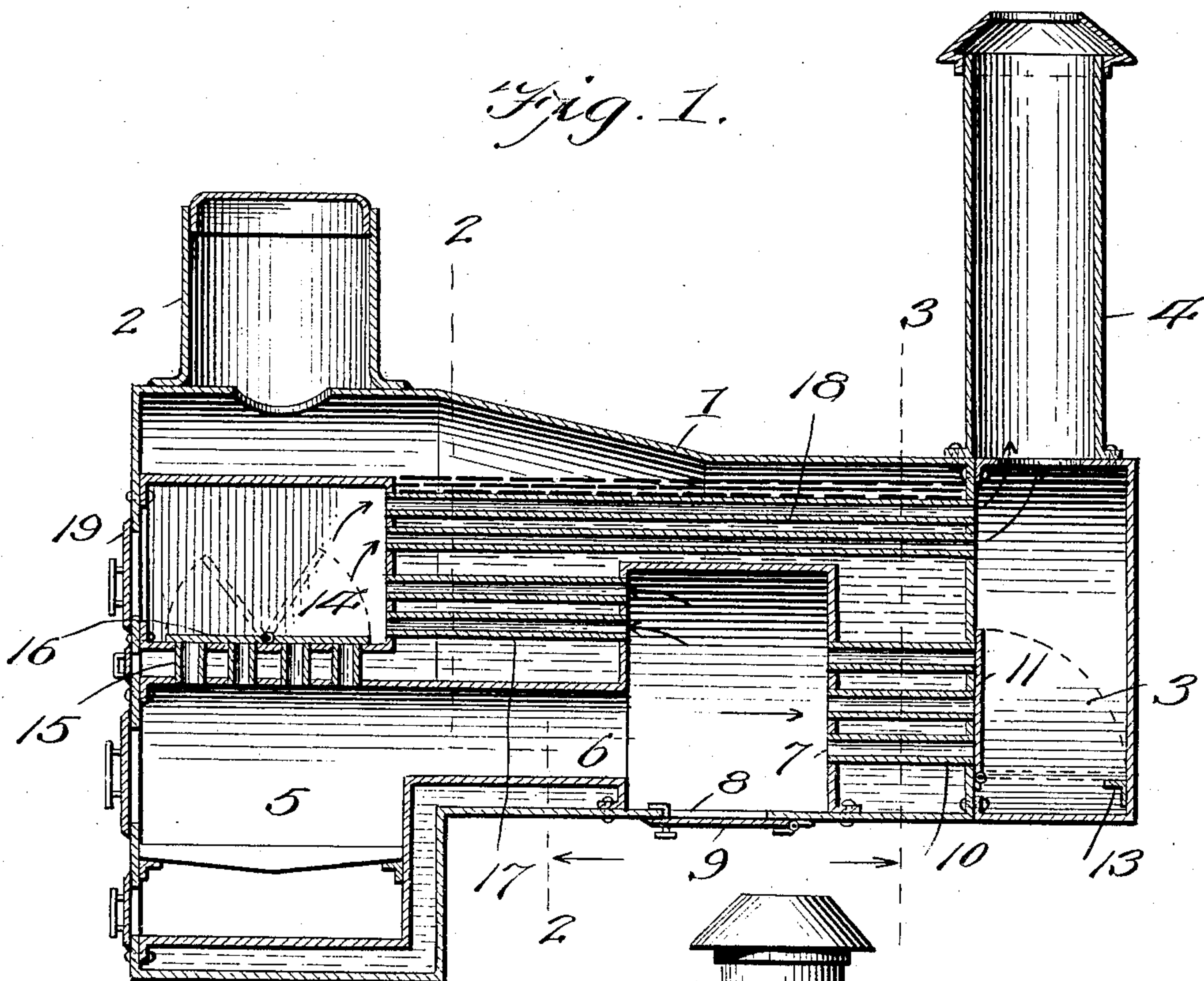
No. 766,016.

PATENTED JULY 26, 1904.

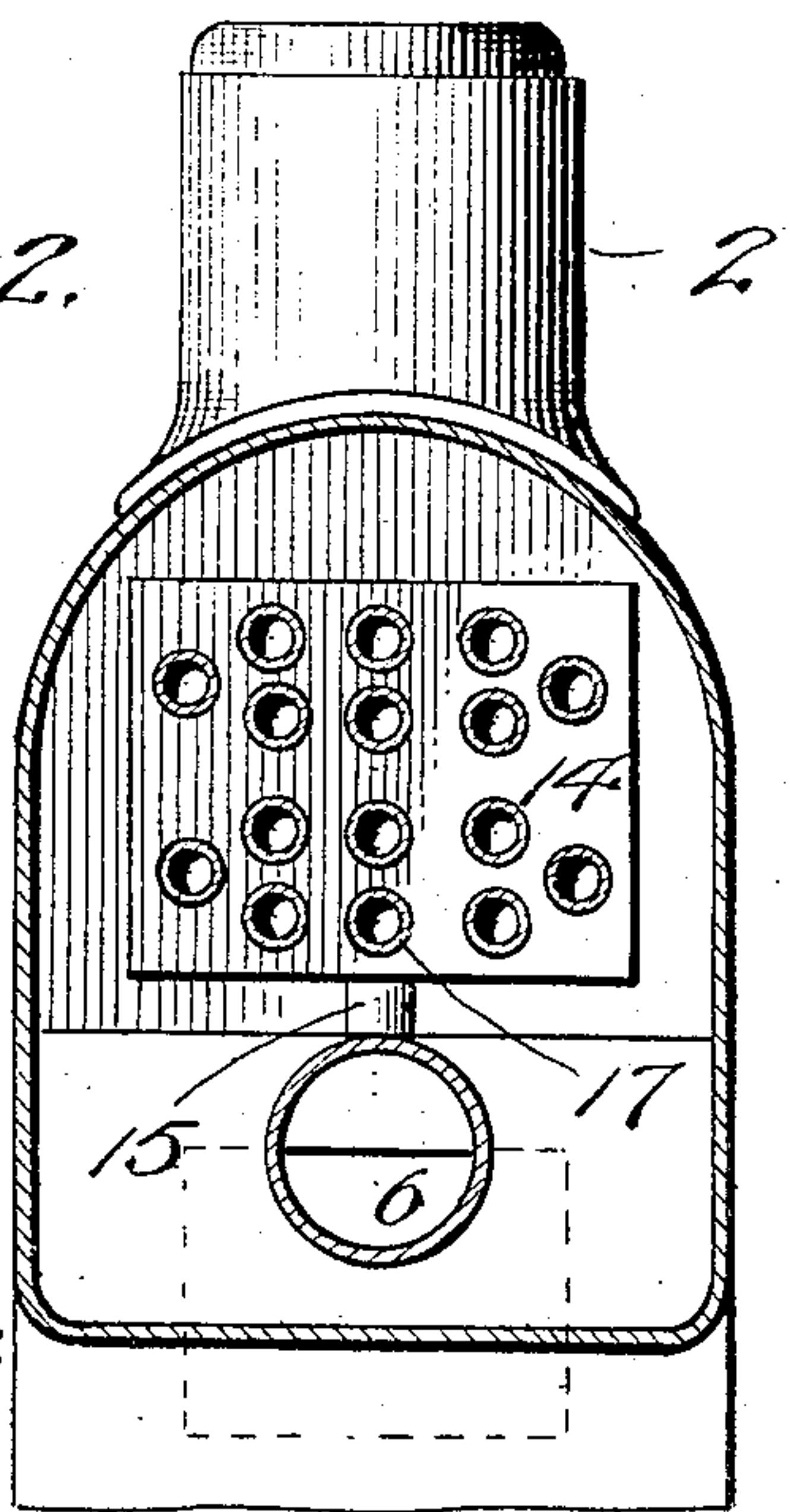
C. BIOLY.  
TUBULAR BOILER.

APPLICATION FILED JUNE 27, 1903. RENEWED JUNE 9, 1904.

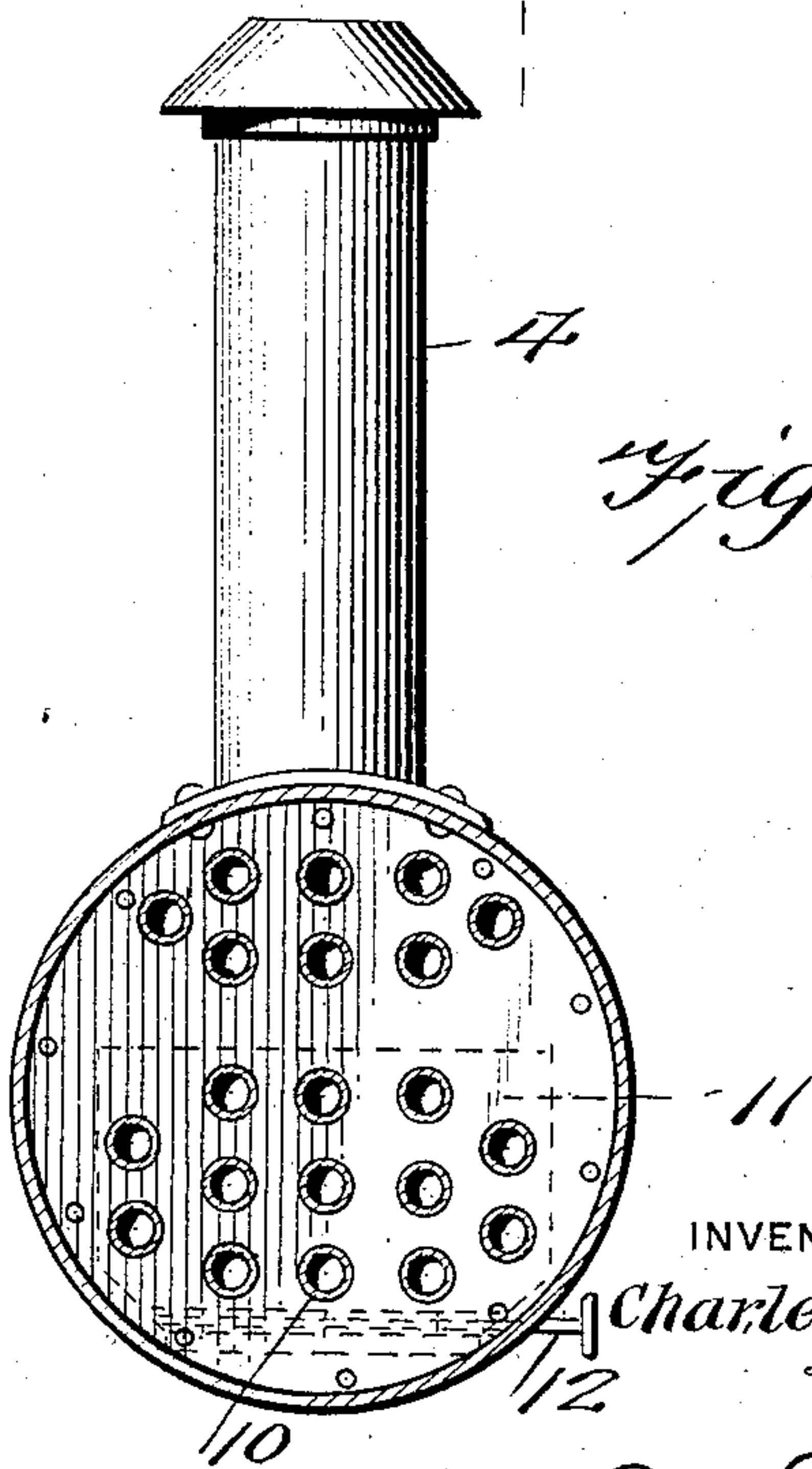
NO MODEL.



*Fig. 2.*



*Fig. 3.*



WITNESSES  
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# UNITED STATES PATENT OFFICE.

CHARLEY BIOLY, OF BEAVER, WISCONSIN, ASSIGNOR OF THREE-FOURTHS  
TO HENRY A. TAGATZ, OF BEAVER, WISCONSIN.

## TUBULAR BOILER.

SPECIFICATION forming part of Letters Patent No. 766,016, dated July 26, 1904.

Application filed June 27, 1903. Renewed June 9, 1904. Serial No. 211,808. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLEY BIOLY, a citizen of the United States, residing at Beaver, in the county of Marinette and State of Wisconsin, have invented new and useful Improvements in Tubular Boilers, of which the following is a specification.

My invention relates to new and useful improvements in tubular boilers; and its object is to provide a device of this character having a novel arrangement of flues by means of which the products of combustion may be directed into a desired number of the tubes of the boiler.

The invention consists in arranging heat-boxes within the boiler and communicating with the fire-box, and each of these boxes opens into tubes of the boiler and is provided with dampers for closing communication with said tubes. By properly manipulating the dampers the products of combustion may be directed from the fire-box through all of the tubes of the boiler, so as to utilize the maximum quantity of heat in the production of steam.

The invention also consists in the further novel construction and combination of parts hereinafter more fully described and claimed, and illustrated in the accompanying drawings, showing the preferred form of my invention, and in which—

Figure 1 is a longitudinal section through a boiler constructed in accordance with my invention. Fig. 2 is a section on line 2 2, Fig. 1; and Fig. 3 is a section on line 3 3, Fig. 1. Referring to the figures by numerals of reference, 1 is a boiler-casing of any suitable form having a dome 2 communicating therewith. A smoke-box 3 occupies one end of the casing and communicates with a stack 4 or other suitable outlet for products of combustion. A fire-box 5 is arranged within the casing and has a forwardly-extending passage 6 communicating therewith and opening into a heat-box 7, which is arranged within a casing and has an outlet 8, normally closed by means of a suitable door 9. Flues 10 extend from the heat-box to the smoke-box, and their forward ends are adapted to be closed by means of a damper 11, which is hinged within the smoke-

box and is mounted upon a revoluble rod 12, which extends from the casing and is adapted to be rotated in any suitable manner. A supporting-cleat 13 is arranged within the smoke-box for the purpose of holding the damper in a horizontal position after the same has been removed from the flues 10.

A heat-box 14 is arranged within the casing at a point above the fire-box 5 and communicates with said fire-box through short flues 15, which are adapted to be closed by means of dampers 16. These dampers are hinged, as shown, and are adapted to be raised from position over the flues so as to permit the products of combustion to pass from the fire-box into the heat-box 14. A series of flues 17 connects the two heat-boxes 7 and 14, and one series of flues 18 extends from the heat-box 14 to the smoke-box 3. A door 19 is arranged at the front end of the heat-box 14 to permit access to be had thereto for the purposes of cleaning or repairing the same.

The water within the boiler surrounds the two heat-boxes, as well as the fire-box 5, and contacts within the inner wall of the smoke-box 3. When fuel is burned within the fire-box 5, the products of combustion will naturally pass through the passage 6 into the heat-box 7, and if the damper 11 is removed from the tubes 10 said products will pass through said tubes directly into the smoke-box 3 and thence to stack 4. After the fire within the box 5 has been well started the damper 11 is moved into position over the flues 10, and the products of combustion will then pass from passage 6 into heat-box 7 and back through the tubes 17 to the box 14 and thence through the tubes 18 to the smoke-box. I have indicated the course of the products of combustion by arrows. It will thus be seen that the hot gases are brought into contact with the maximum number of tubes, and therefore the heating-surface presented to the water within the boiler is materially increased. If desired, the dampers 16 may be opened, so as to permit some of the products of combustion to pass directly into the heat-box 14. By means of the boiler herein described steam may be quickly generated and a very small percent-



age of the heat is wasted. The heat-boxes 7 in addition to their use for distributing the products to the various tubes are also useful in heating the water within the boiler in view of the fact that they present extensive surfaces thereto, which are heated by the products coming in contact therewith. By providing the short flues which serve to connect the heat-box 7 directly with the smoke-box 3 the fire within the box 5 may be quickly started, as a strong draft is thus produced. As before stated, however, subsequent to the starting of the fire the damper 11 can be moved in closing position and the products thus directed back and forth within the flues, so as to quickly convert the water into steam.

In the foregoing description I have shown the preferred form of my invention; but I do not limit myself thereto, as I am aware that modifications may be made therein without departing from the spirit or sacrificing any of the advantages thereof, and I therefore reserve the right to make such changes as fairly fall within the scope of my invention.

Having thus described the invention, what is claimed as new is—

1. The combination with a boiler having a fire-box therein, and a passage extending therefrom; of a heat-box within the boiler and

communicating with said passage, a heat-box within the boiler and communicating with the upper portion of the fire-box, flues connecting the heat-boxes, a smoke-box, flues connecting the heat-boxes with the smoke-box.

2. The combination with a boiler having a fire-box therein, and a passage extending from said fire-box; of a heat-box communicating with said passage, a smoke-box, flues connecting said heat and smoke boxes, a damper adapted to close said flues, a heat-box above and communicating with the fire-box, a damper therein for closing communication with the fire-box, flues connecting said heat-box with the smoke-box, and flues connecting the heat-boxes.

3. In a boiler, the combination with a fire-box; of heat-boxes communicating therewith, independent series of flues opening into the heat-boxes, a smoke-box, and dampers arranged within the flues whereby products of combustion may be directed from the fire-box through desired series of flues.

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

CHARLEY BIOLY.

Witnesses:

G. W. DE LUDE,  
H. J. TAGATZ.