

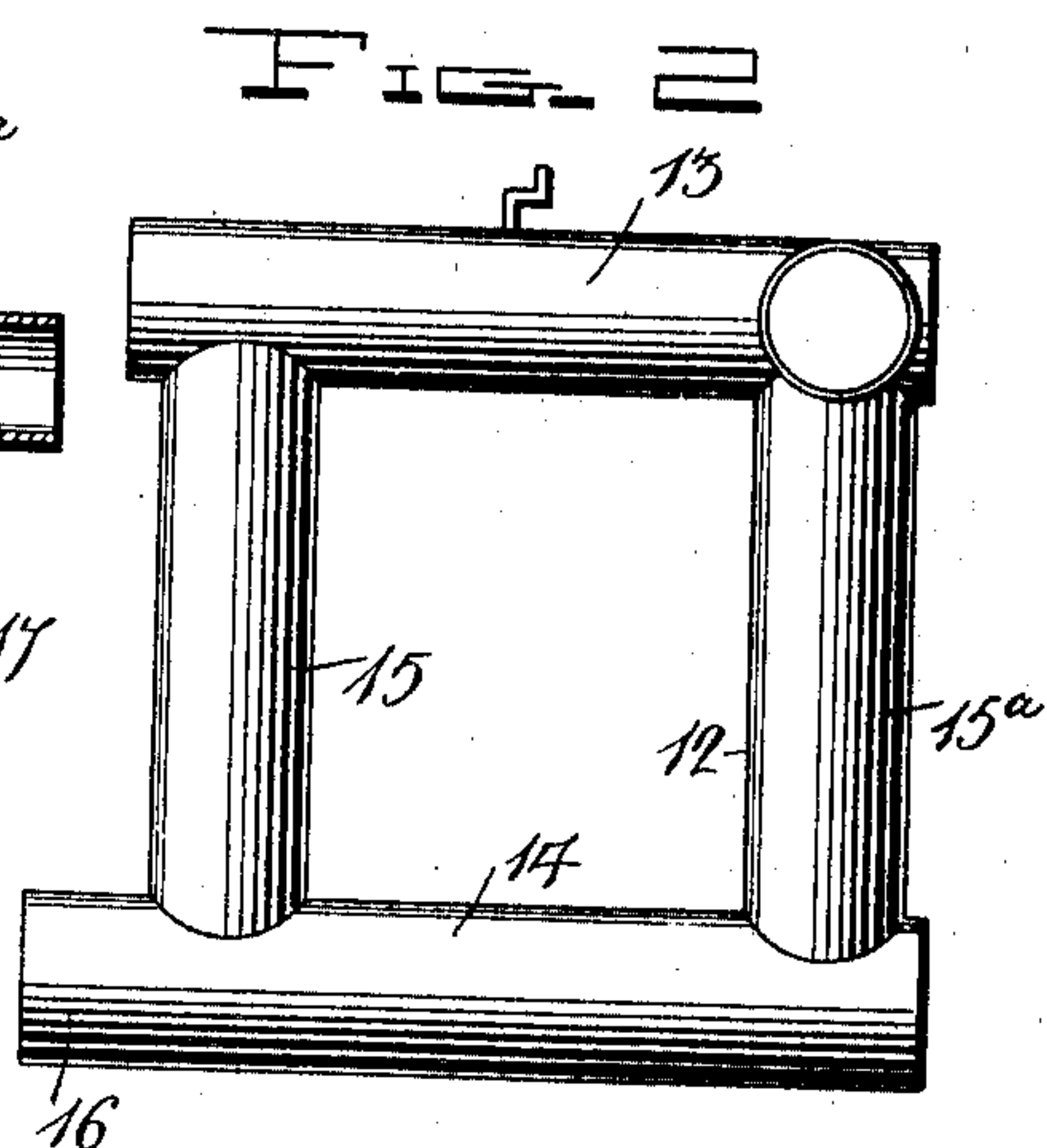
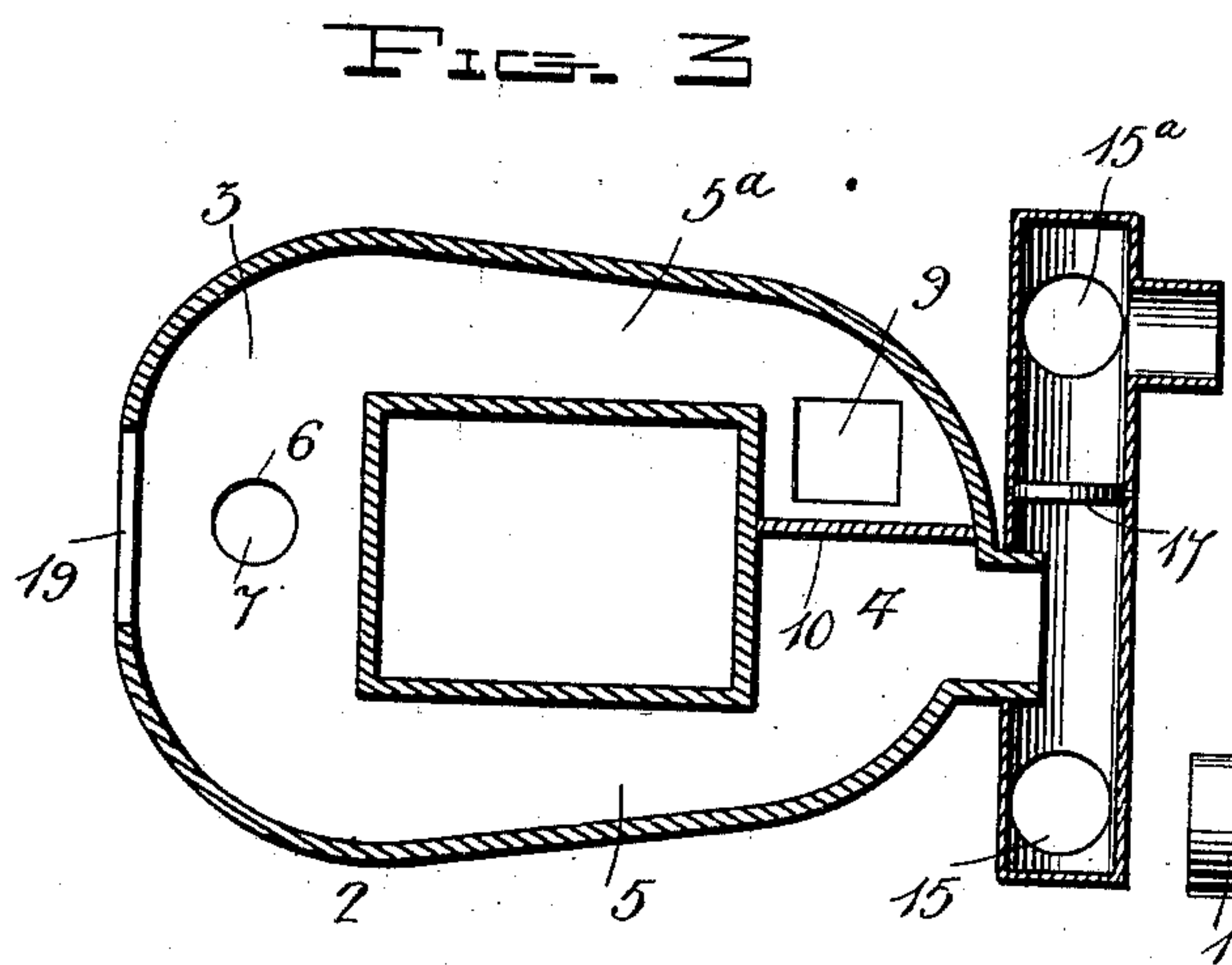
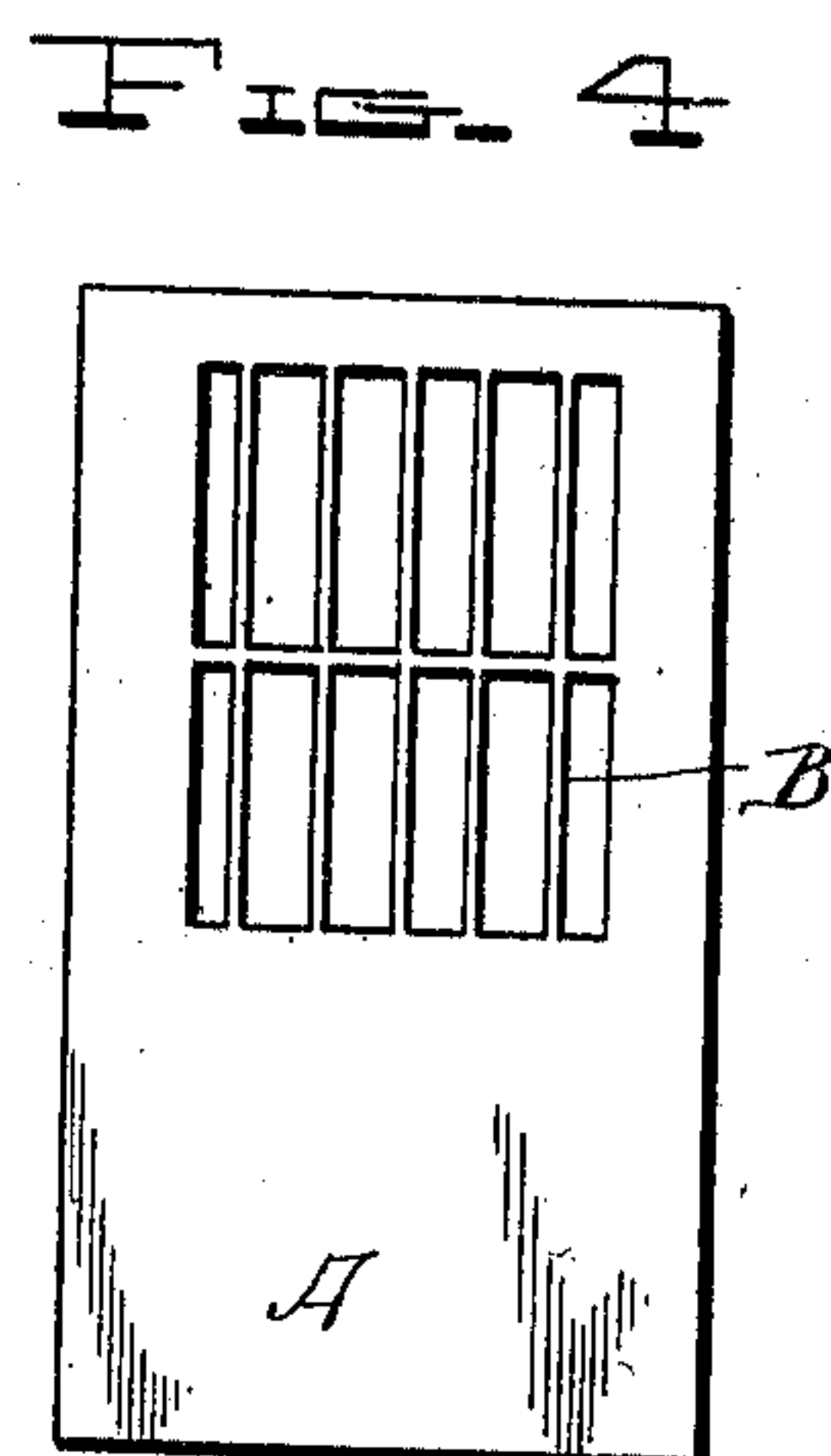
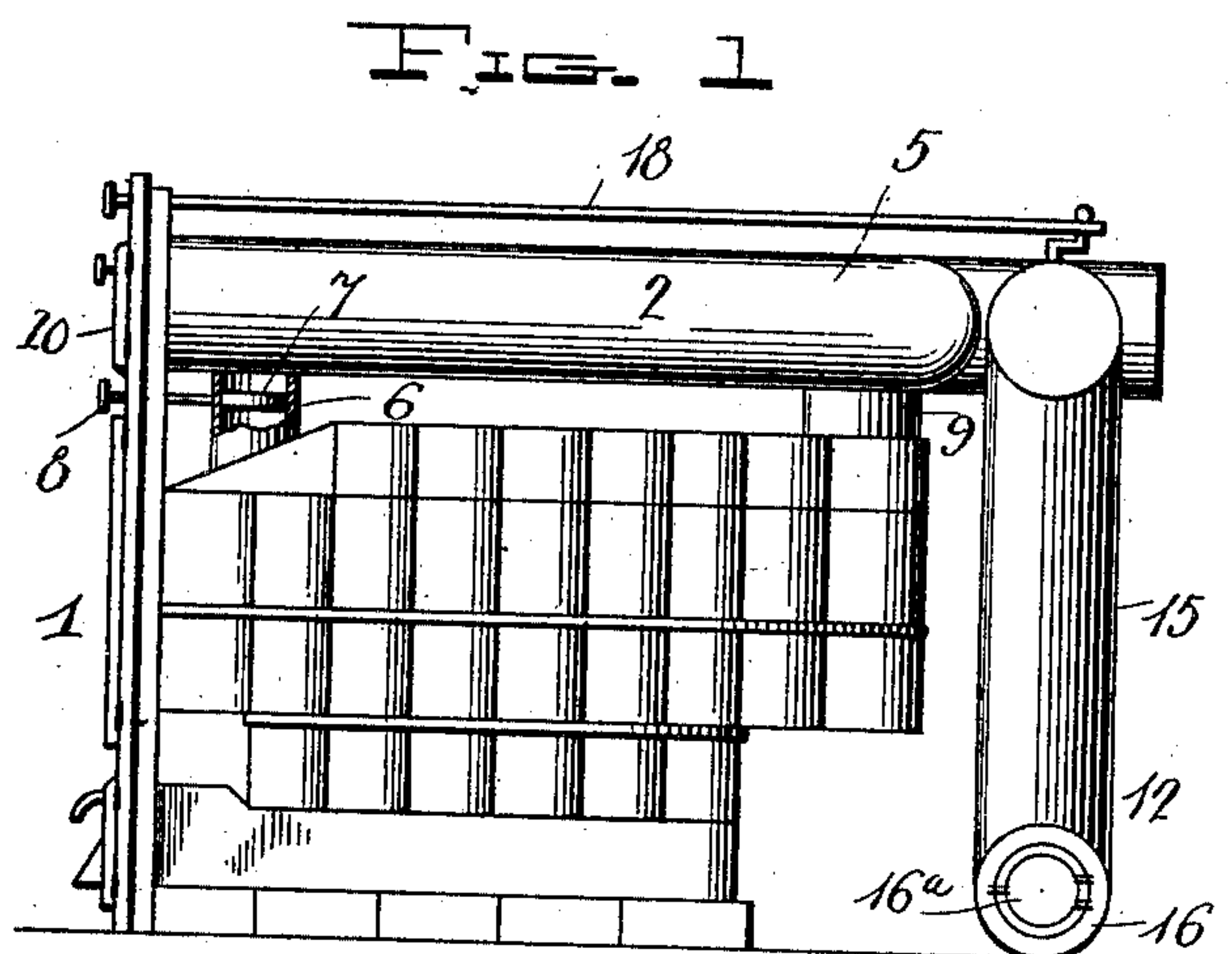
No. 718,980.

PATENTED JAN. 27, 1903.

W. H. CHAPPELL.  
HOT AIR FURNACE.

APPLICATION FILED OCT. 30, 1902.

NO MODEL.



Witnesses  
*J. H. Brown*  
*E. J. Wilson*

Inventor  
*William H. Chappell,*  
By *A. B. Wilson & Co.*  
Attorneys



# UNITED STATES PATENT OFFICE.

WILLIAM HENRY CHAPPELL, OF MORENCI, MICHIGAN.

## HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 718,980, dated January 27, 1903.

Application filed October 30, 1902. Serial No. 129,452. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HENRY CHAPPELL, a citizen of the United States, residing at Morenci, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to hot-air furnaces, and has for its object to improve the construction of furnaces now in use by increasing the heating and radiating capacity of the same without increasing the consumption of fuel.

Another object is to provide a more perfect arrangement for controlling the draft and circulation of heat and products of combustion and to produce a furnace which will be simple in construction, durable in use, and comparatively inexpensive of production.

With these and other objects in view the invention consists in the construction and arrangement of the parts, which will be hereinafter more fully described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of a furnace, showing the application of the invention, parts being broken away for clearer illustration. Fig. 2 is a rear view of the same. Fig. 3 is a horizontal section through the horizontal radiator and upper end of vertical radiator, and Fig. 4 is a detail plan view of a wood-burning grate.

In the drawings, 1 denotes a furnace, and 2 a horizontal radiator arranged above the furnace-body and consisting of the front and rear smoke-boxes 3 and 4, connected by the parallel flues 5 and 5<sup>a</sup>. The front smoke-box 3 is above and in direct communication with the furnace fire-box through a short neck or connection 6, in which is located a cut-off damper 7, controlled by a handle or lever 8, projecting through the front plate of the furnace.

The rear smoke-box 4 is in communication with the rear end of the furnace through the usual smoke-outlet 9. The smoke-box 4 is divided by a partition 10, thereby cutting off

communication between the flues 5 and 5<sup>a</sup> at this end of the radiator. The part of the box 4 at the end of the flue 5 is in communication with the upper end of a vertical radiator 12.

The radiator 12 consists of the upper and lower drums 13 and 14, connected by the parallel perpendicular flues 15 and 15<sup>a</sup>. The drum 14 is provided on one of its ends with an extension 16, which is adapted to project through the brickwork of the furnace and is provided with a door 16<sup>a</sup> for cleaning out the radiator 12.

The drum 13 is provided with a cut-off or damper 17, which is located therein between the flues 15 and 15<sup>a</sup>. The end of said drum 13 adjacent to the upper end of the flue 15 is in communication with the box 4 of the radiator 2, while the opposite end of the said drum adjacent to the upper end of flue 15<sup>a</sup> opens into the chimney.

The stem of the damper 17 has connected thereto an operating-rod 18, which projects forwardly and through the front plate of the furnace and is provided with a handle for operating the same. The forward end of the box 3 of the radiator 2 has formed therein an opening 19, which registers with a similar opening formed in the front plate of the furnace and is closed by a door 20. This opening is for the purpose of cleaning out the radiator 2.

In Fig. 4 of the drawings I have shown a supplemental grate A, which is used in connection with the furnace when wood is used for fuel. This grate is of an area conforming to the fire-box and consists of a plate having a front grated portion B, which properly restricts the draft for this class of fuel.

In operation by closing the damper 7 above the fire-box the smoke and products of combustion are caused to pass to the back of the furnace, then upwardly through the outlet 9 into the box 4, thence forwardly through the flue 5<sup>a</sup> to the box 3 and then back through flue 5 to the other side of box 4, and from there it passes into the drum 13 of the radiator 12, from which it may be allowed to pass directly to the chimney or upon closing the damper 17 it will be caused to pass downwardly through flue 15 into and through the lower drum 14, thence upwardly through flue 15<sup>a</sup> and out to the chimney, thus passing



through and heating a long and circuitous system of flues, which will radiate a great amount of heat that would otherwise have passed directly out with the smoke.

5 Should a direct draft be desired, as when "coaling" the furnace or for any other purpose, the damper 7 in the outlet immediately above the fire-box is opened, as is also the damper 17. The course of the smoke, &c.,  
10 will now be directly through the flue 5 into the drum 13 and through the same out into the chimney.

By the use of proper grates and proper regulation of the air-supply this furnace can be  
15 use to burn either hard or soft coal or wood, as desired.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and advantages  
20 of my invention will be readily apparent, it is thought, without requiring a more extended explanation.

Various changes in the form, proportion, and the minor details of construction may be  
25 resorted to without departing from the principle or sacrificing any of the advantages of my invention.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

In a furnace, the combination with a fire-box, of a horizontal radiator provided with passages in communication at their front ends with the front of the fire-box and closed against communication with each other at  
35 their rear ends, one of said passages having an outlet at its rear end and the other being in communication at its rear end with the rear of the fire-box, and a vertical radiator consisting of upper and lower horizontal drums and  
40 vertical pipes connecting them at their ends, the upper drum communicating with the chimney on one side of its center and with the outlet of the horizontal radiator on the opposite side of its center, and a controlling-damper be-  
45 tween the connection from the horizontal radiator and the chimney connection, substantially as set forth.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.  
50

WILLIAM HENRY CHAPPELL.

Witnesses:

GEORGE H. CHAPPELL,  
OLIVE E. HANNA.