

No. 765,062.

PATENTED JULY 12, 1904.

G. H. BARRUS.
STEAM BOILER.

APPLICATION FILED OCT. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

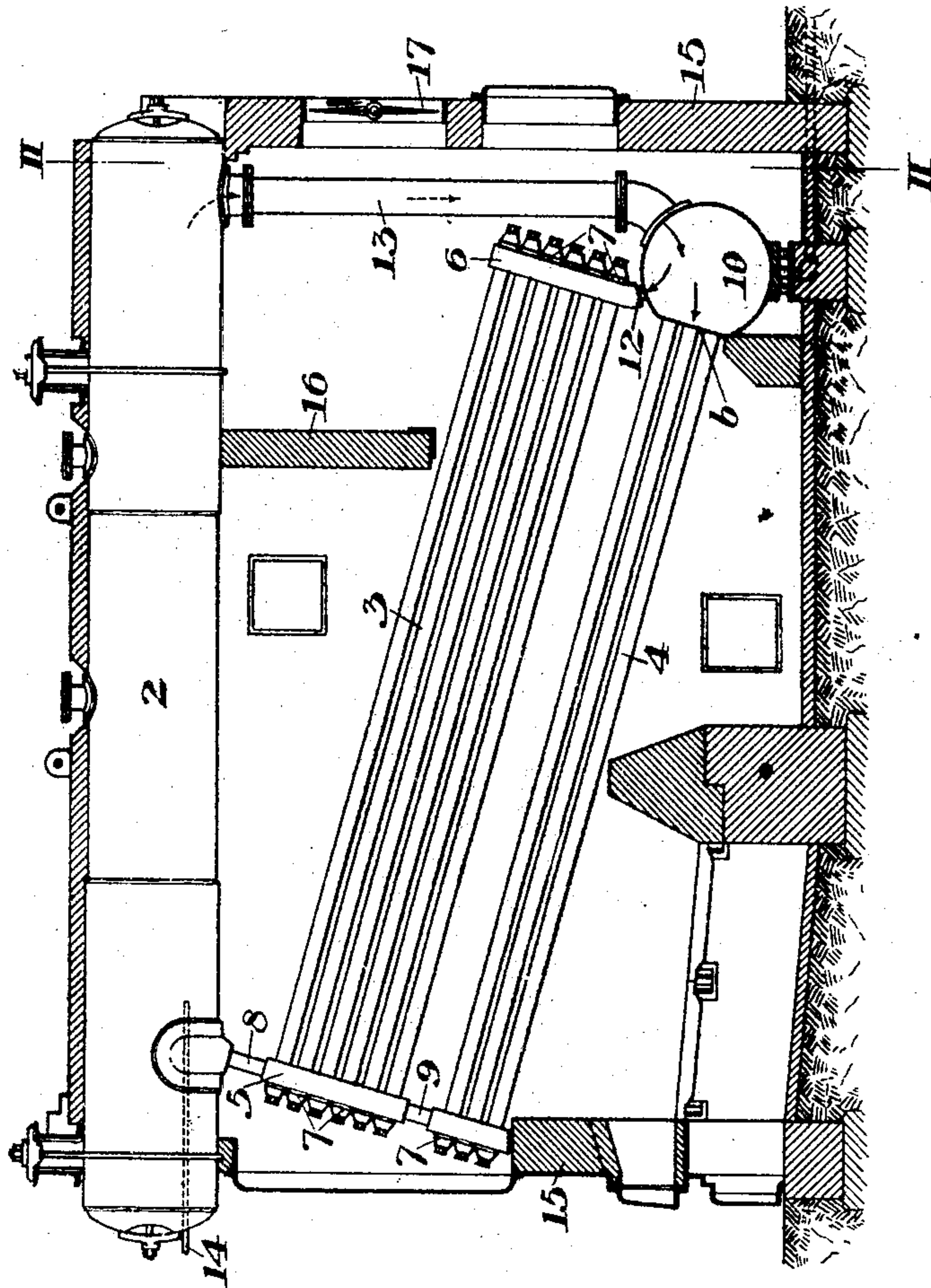
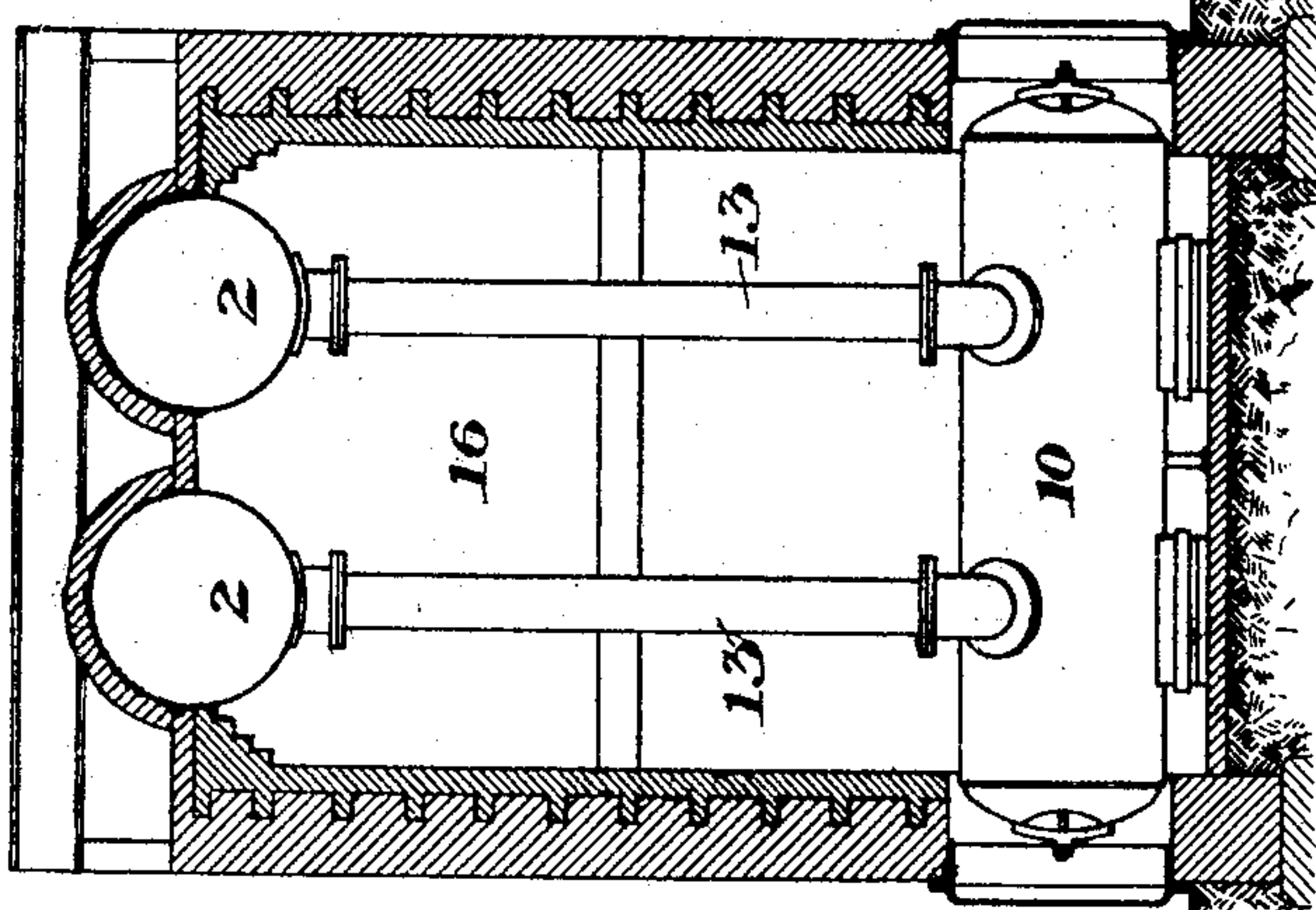


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5.

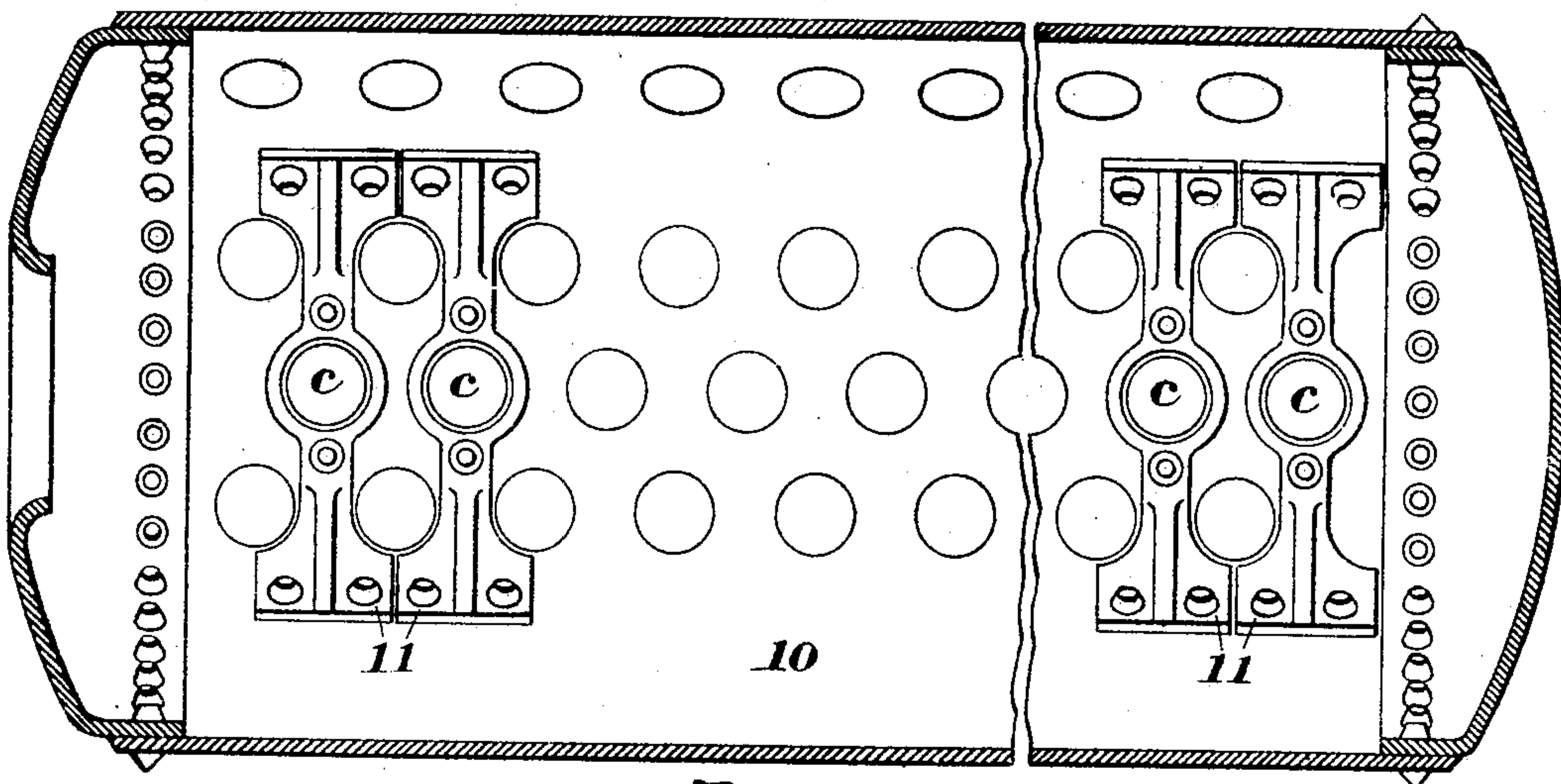


Fig. 3.

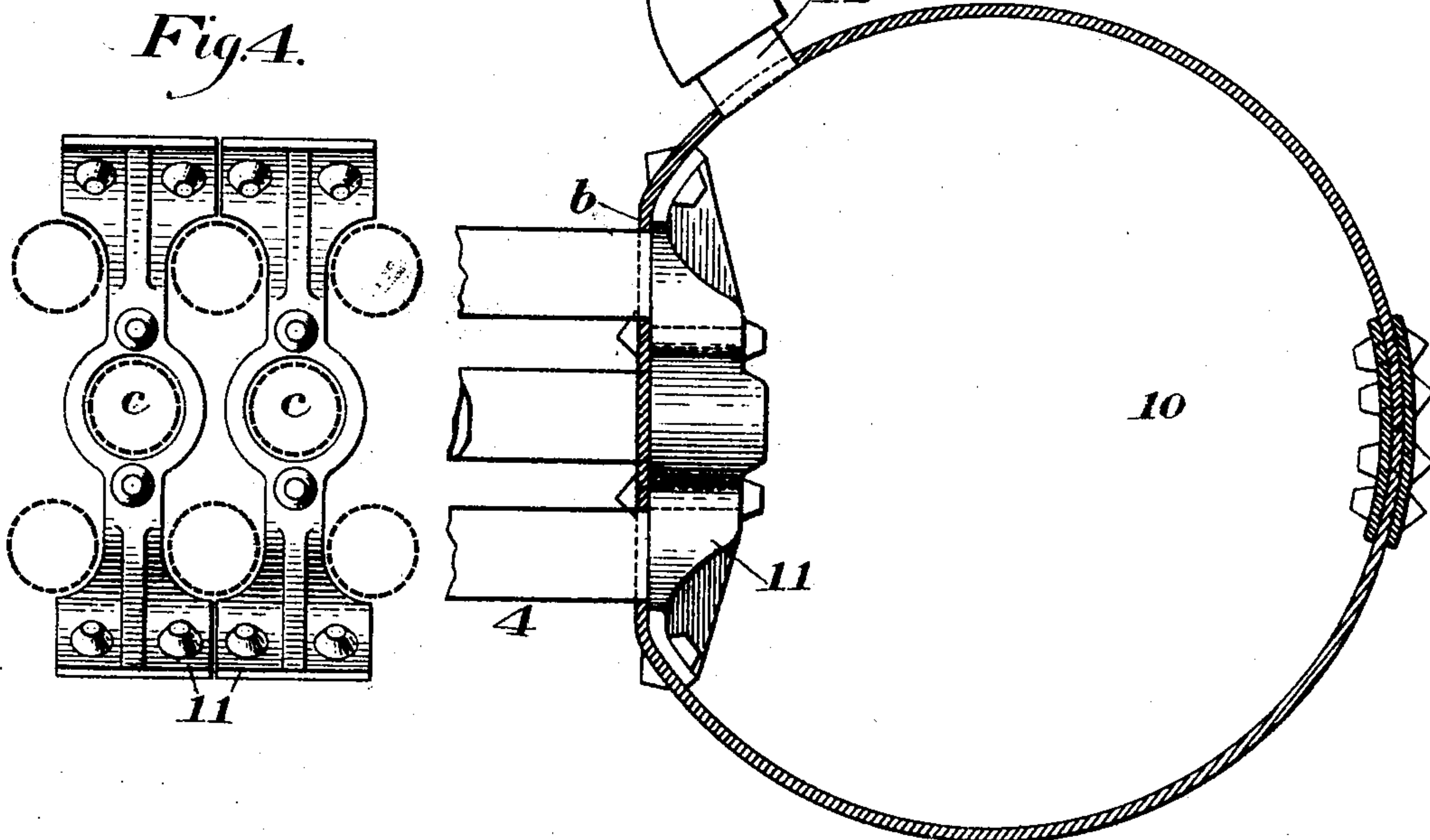
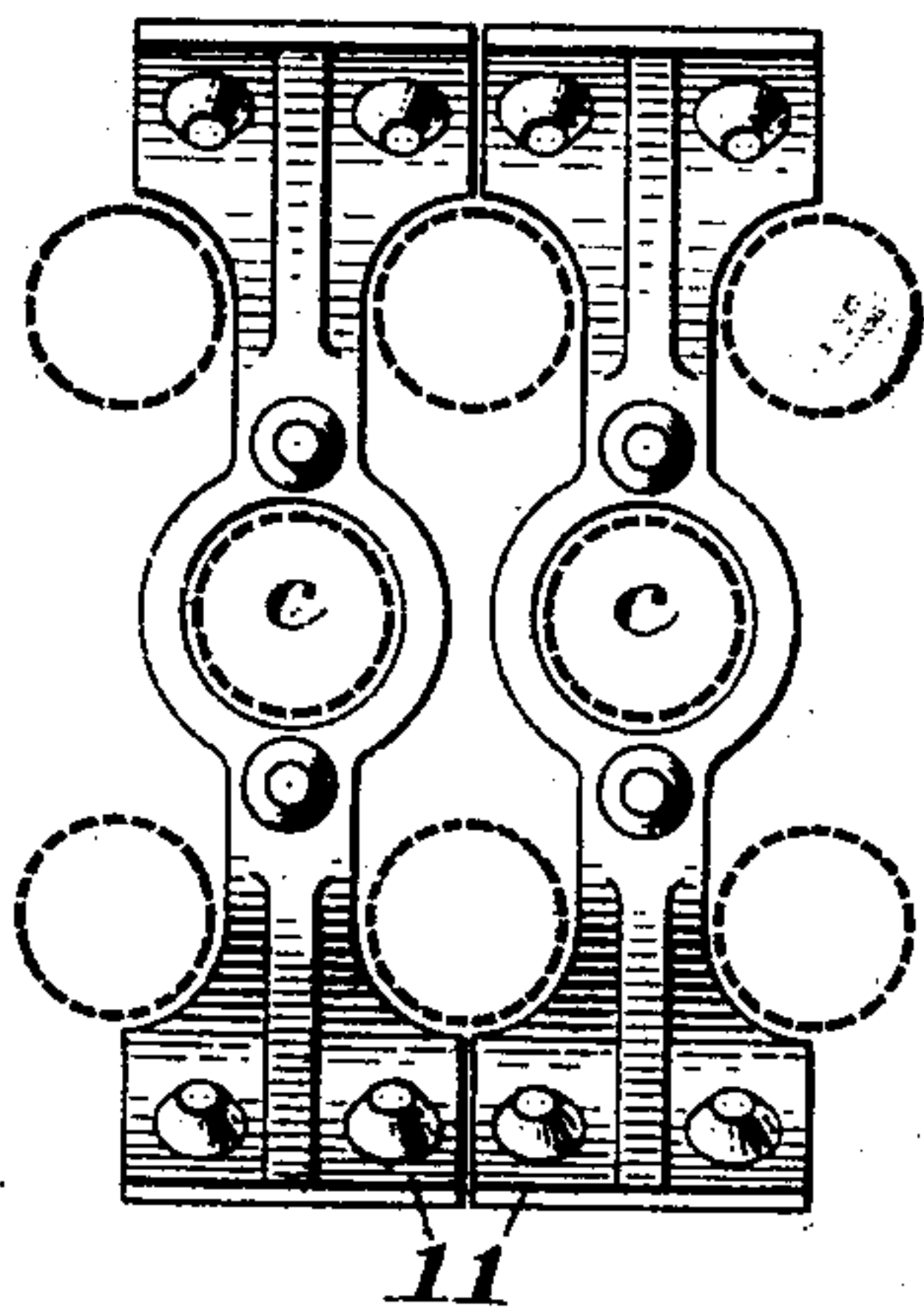


Fig. 4.



WITNESSES

L. A. [Signature]
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UNITED STATES PATENT OFFICE.

GEORGE H. BARRUS, OF BROOKLINE, MASSACHUSETTS.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 765,062, dated July 12, 1904.

Application filed October 19, 1903. Serial No. 177,577. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. BARRUS, of Brookline, Norfolk county, Massachusetts, have invented a new and useful Steam-Boiler, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 shows in vertical section a steam-boiler constructed in accordance with my invention. Fig. 2 is a rear elevation, the boiler-setting being shown in vertical section on the line II II of Fig. 1. Fig. 3 is a transverse section of the settling-drum, showing the devices by which it is braced. Fig. 4 is an elevation of the crown-bars or braces of the settling-drum, and Fig. 5 is an axial section of the settling-drum.

The object of my invention is to improve the construction of steam-boilers, and to provide means to prevent the deposits in the tubes, which have heretofore constituted an objection to the use of the class of water-tube boilers having rectangular banks of inclined and relatively staggered tubes connected by headers to an upper longitudinal drum or drums.

The invention is illustrated in the accompanying drawings, in which—

2 2 are the upper longitudinal steam and water drums. I show two of these drums in the drawings; but one or more may be employed, if desired.

3 4 are the banks of water-tubes, the tubes being inclined somewhat to the horizontal and being relatively staggered in position. The upper bank of tubes 3 has at its ends connecting headers 5 6, provided with covered hand-holes 7 opposite the respective tubes. The headers at the front end of the bank are connected to the drum 2 by nipples 8, and the headers of the two banks are connected together by nipples 9. The tubes of the lower bank 4 are expanded into a settling-chamber or mud-drum 10, which extends transversely of the boiler and is of general cylindrical form, flattened, however, on the front side *b*, so as to present a flat surface for the attachment of the tubes. To strengthen the drum against the weakness which would result from the

flattening of the side, I provide it on its interior with bracing crown-bars 11, which are riveted to the flat side *b* and are formed with holes *c*, which are in line with the ends of the tubes and are of equal or preferably somewhat larger diameter than the tubes, so as to present no obstruction to the free passage of water through and from the drum and allow the introduction of a tube-expander. The drum 10 is connected to the headers at the rear of the upper bank of tubes by a series of pipes or nipples 12 and is connected with the rear end of the upper drums 2 by pipes 13, attached to the drum 10 at places opposite to the flat side *b* and of suitable diameter to accommodate the entire circulation of water from the upper drums. The drum 10 is thereby so located and connected as to provide for the free passage of the entire water circulation before the water enters the tubes of the boiler, and it is of sufficiently large diameter to retard greatly the velocity of the water in the drum, so as to cause within it such quiescence of the water as will insure the precipitation of the impurities. For this purpose a drum nine feet in length and thirty-six inches in diameter for a two-hundred-and-fifty-horse-power boiler will suffice. It must not be materially smaller than this and may be made of greater capacity.

The upper drums have feed-water pipes 14, and the boiler is inclosed in a setting comprising front and end walls and side walls 15, baffle-walls 16, and a stack-flue 17.

In the operation of the boiler feed-water is admitted to the upper drums from the feed-pipe 14, and thence circulating in the direction of the arrows in Fig. 1 all of it passes down through the pipes 13 into the settling-drum 10. The water has been heated to its full temperature of evaporation by the time it reaches this drum, and as its velocity is greatly retarded in the drum the solid matter is deposited in the latter, and the purified water thence flows into the lower bank of tubes 4 and through the headers 6 into the upper bank of tubes 3. The water thence passes forward through these banks of tubes and through the headers at the front ends into the steam and water drums. By the use of

the settling-chamber I am thus enabled to remove the solid matter from the boiler before it reaches the tubes of the boiler. I thus preserve these tubes from serious incrustation, 5 render unnecessary the frequent cleaning of the tubes, and greatly enhance the efficiency and durability of the apparatus.

I claim—

1. A water-tube boiler having a plurality 10 of banks of parallel inclined and relatively staggered tubes, one or more cylindrical steam and water drums above the tubes, headers connecting the tubes at the front ends and themselves connected with the steam and water 15 drums, a transverse substantially cylindrical settling-drum below the steam and water drums and at the lower ends of the tubes, said settling-drum having a flattened side with braces applied thereto and connected at said 20 side with the lower bank of tubes, and headers at the rear end of the other bank or banks of tubes connecting said tubes and themselves connected with the settling-drum, said settling-drum constituting the sole water con-

nection between the steam and water drums 25 and the rear portion of the bank of tubes, whereby the whole body of water in circulation including the feed-water passes through the settling-chamber before reaching the tubes, and said settling-drum being of sufficient capacity to retard greatly the velocity 30 of the water passing therethrough, and to precipitate the impurities contained in the water; substantially as described.

2. A water-tube boiler having a substantially cylindrical settling-drum, one side of 35 which is flattened to serve as a tube-head, and bracing crown-bars riveted to the interior of the flattened side of the drum and having perforations in line with the tube-openings thereof and of equal or greater diameter; substantially as described. 40

In testimony whereof I have hereunto set my hand.

GEORGE H. BARRUS.

Witnesses:

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