

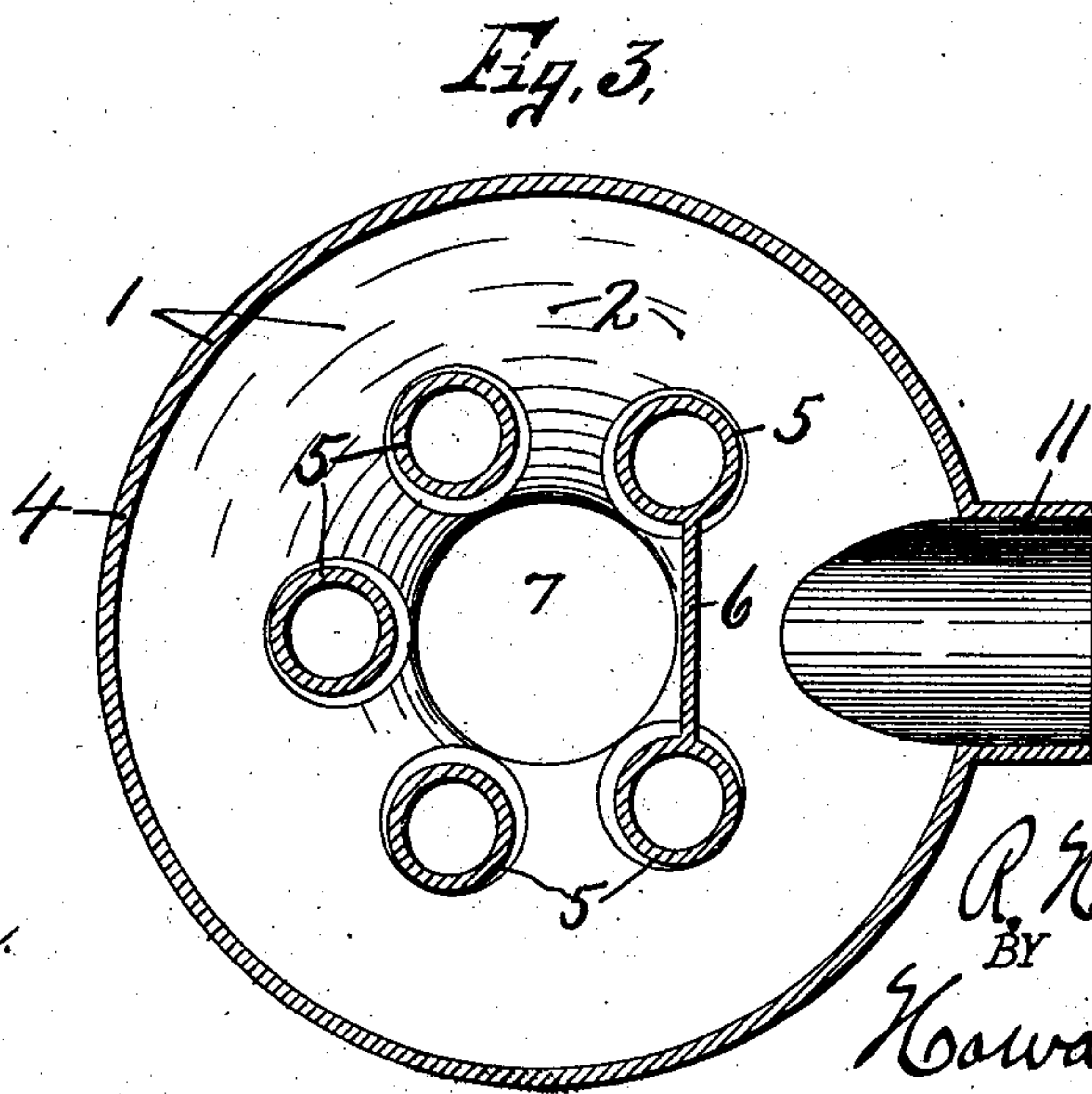
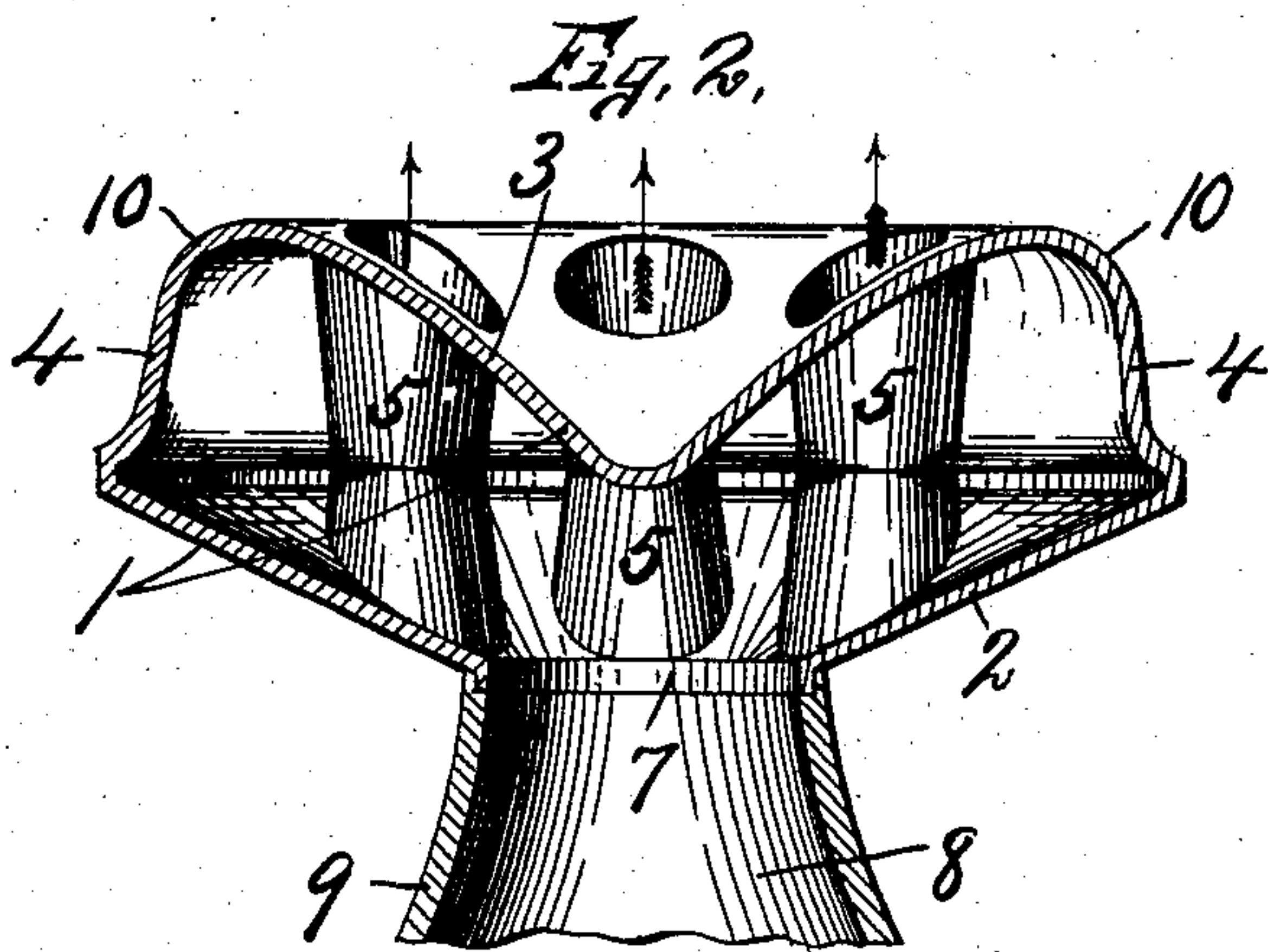
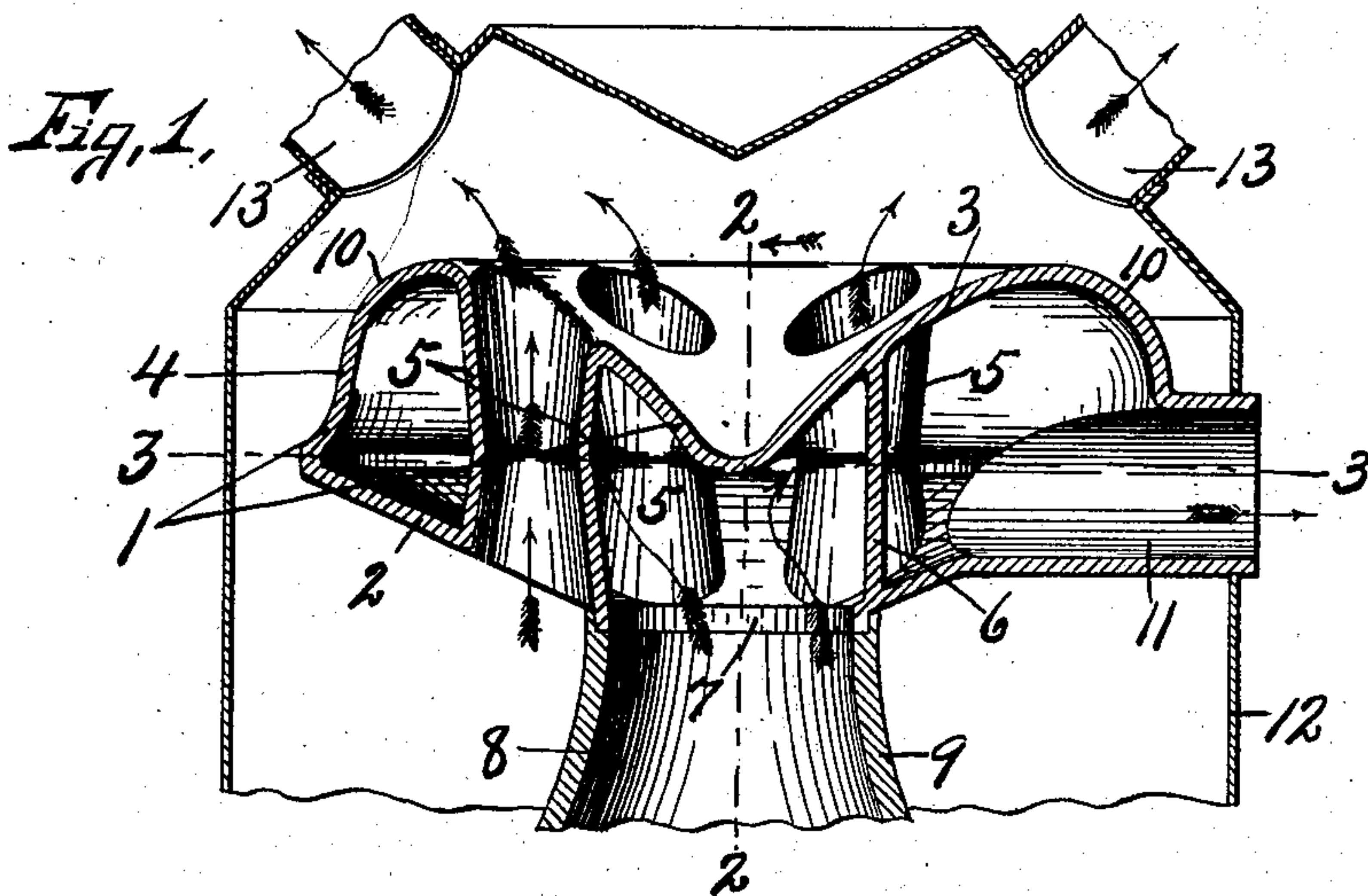
No. 747,904.

PATENTED DEC. 22, 1903.

R. H. BRADLEY.
HOT AIR HEATER.

APPLICATION FILED FEB. 14, 1903.

NO MODEL.



WITNESSES:
W. J. Brewer.
W. C. Chase

INVENTOR.
R. H. Bradley
BY
Howard P. Davidson
ATTORNEY.

UNITED STATES PATENT OFFICE.

ROYAL H. BRADLEY, OF SYRACUSE, NEW YORK, ASSIGNOR TO KELSEY HEATING COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

HOT-AIR HEATER.

SPECIFICATION forming part of Letters Patent No. 747,904, dated December 22, 1903.

Application filed February 14, 1903. Serial No. 143,312. (No model.)

To all whom it may concern:

Be it known that I, ROYAL H. BRADLEY, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in Hot-Air Heaters, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to improvements in hot-air heaters or furnaces, and refers more particularly to the heat-radiating section therefor.

The object of my present invention is to produce a hollow cast-iron or similar section which is adapted to receive the products of combustion from a combustion-chamber and in which the lower and upper walls are so arranged as to deflect any soot or ashes which may tend to accumulate thereupon back into the combustion-chamber, the said shell or section being provided with vertical air-flues extending through its lower and upper walls outside of the combustion-chamber, through which the air may readily pass from beneath the section into a suitable receiving-chamber above the section, from which the heated air may be conveyed to any desired locality, the air-flues being arranged so that the products of combustion entirely surround the portions extending through the interior of the section.

Another object is to provide a baffle-plate which forms an integral part of the section and is located between the outlet and combustion-chamber to prevent the direct passage of the products of combustion to said outlet, and thereby cause said products to travel in tortuous paths around the portions of the air-flues which are interposed between the upper and lower walls of the section.

Referring to the drawings, Figure 1 is a transverse vertical sectional view through the upper portion of a heater, showing particularly my improved heating-section. Figs. 2 and 3 are sectional views taken, respectively, on lines 2-2 and 3-3, Fig. 1.

Similar reference characters indicate corresponding parts in all the views.

In carrying out the objects of this invention I provide a cast-iron shell or heating-section 1, with lower and upper walls 2 and

3 and side walls 4, said section being substantially circular in top plan, and its upper and lower walls are connected by air-feeding flues 5 and a baffle-plate 6.

The lower wall 2 is constructed in the form of an inverted cone somewhat flat and truncated at its lower end, said lower end or apex being provided with a central opening 7, which communicates with the combustion-chamber 8 of a heater 9. It will thus be seen that the bottom wall flares outwardly and upwardly from the opening 7, the object of this being to cause the soot or ashes which may tend to accumulate on the bottom wall to precipitate or gravitate back into the combustion-chamber 8, thus maintaining a substantially clean surface, and thereby increasing the efficiency of the heating-section. It is well known that soot and similar accumulations upon the surface of a radiator-section of this character form a coating of heat-refractory substance which nullifies the purposes of the heating-section—that is, it prevents the heating of the walls of the section, and therefore prevents the section from performing its heat-radiating function for heating the surrounding air—and by sloping the bottom wall downwardly and inwardly toward the opening 7 this accumulation is almost entirely obviated. Another purpose of inclining this bottom wall upwardly from the inlet-opening is to permit the heated products of combustion to expand gradually and to thereby impinge against the bottom wall after leaving the combustion-chamber 8, so that the bottom wall forms an efficient radiating-body. In like manner the upper wall is also dished or depressed at the center, the apex being directly over the center of the opening 7, so that the products of combustion are deflected laterally in all directions against the inner face of the upper wall. By this construction a greater radiating-surface is produced, and in order that the greatest degree of efficiency may be attained the outer edges of the upper wall are curved downwardly at 10 at their junctions with the side walls 4, so that the products of combustion which are deflected upwardly along the inner faces of the top wall are in turn deflected downwardly by the curved portions 10 against

the side walls 4, thus heating the section throughout its entire surface. Another feature or object of this construction of the upper and side walls is that the products of combustion are deflected with considerable force laterally along the inner surfaces of the upper and side walls and then downwardly against the bottom wall, which establishes a strong current of hot air impinging against the bottom wall and operating to loosen and convey any accumulated soot or ashes back into the opening 7.

A smoke-flue 11 is provided in one of the side walls of the section 1 and forms an outlet for the products of combustion after passing through the interior of the heater-section 1, the baffle-plate 6 being interposed between the inner end of the flue 11 and the adjacent side of the opening 7, said baffle-plate being disposed in a substantially vertical position between the upper and lower walls 2 and 3 and also between two of the air-flues 5, which are located at opposite sides of the outlet-opening 11, as best seen in Figs. 1 and 3.

The flues 5 extend through the interior of the section 1 and continue through the lower and upper walls 2 and 3, said flues being preferably arranged concentrically around the opening 7 and connect the space surrounding the upper end of the heater 9 with the space above the section 1, thereby forming air-channels through which the air passes and is heated, or rather superheated, during its transit through the flues, said heater-section 1 and heater 9 being usually inclosed in a jacket 12, which is provided with air-outlets 13, adapted to be connected to distribute-pipes not necessary to further illustrate or describe.

The air-flues 5 are preferably contracted or of less diameter midway between their opposite ends, the lower ends tapering upwardly and the upper ends tapering downwardly,

the object of this being to retard the passage of air through the flues, so that it may become heated to a greater degree than would be the case if the flues were of the same diameter from top to bottom.

In the operation of my invention the products of combustion pass upwardly through the opening 7 and are reflected backwardly by reason of the interposition of the baffle-plate 6 between the passage 7 and smoke-flue 11, thereby causing the air to circulate around all the flues before passing out through the outlet 11, and it is evident that by this construction the section 1 is heated to a maximum degree with a minimum quantity of fuel and that the air which surrounds and passes through the section is therefore similarly heated to a high degree before passing through the distributing-pipes 13.

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

In combination with the combustion-chamber of a heater, a hollow heater-section having lower and upper walls, the central portion of each being depressed and the lower wall being provided with a central opening communicating with the combustion-chamber, air-flues arranged concentrically around the opening and extending through the upper and lower walls of the section, said section having a smoke-outlet and a baffle-plate connecting the adjacent walls of two of the air-flues, said baffle-plate being located between the inner end of the smoke-outlet and the adjacent side of the opening in the bottom wall.

In witness whereof I have hereunto set my hand this 12th day of February, 1903.

ROYAL H. BRADLEY.

Witnesses:

H. E. CHASE,

MILDRED M. NOTT.