

(No Model.)

J. RILEY.
BASIC HEARTH STEEL MAKING FURNACE.

No. 464,229.

Patented Dec. 1, 1891.

Fig. 1.

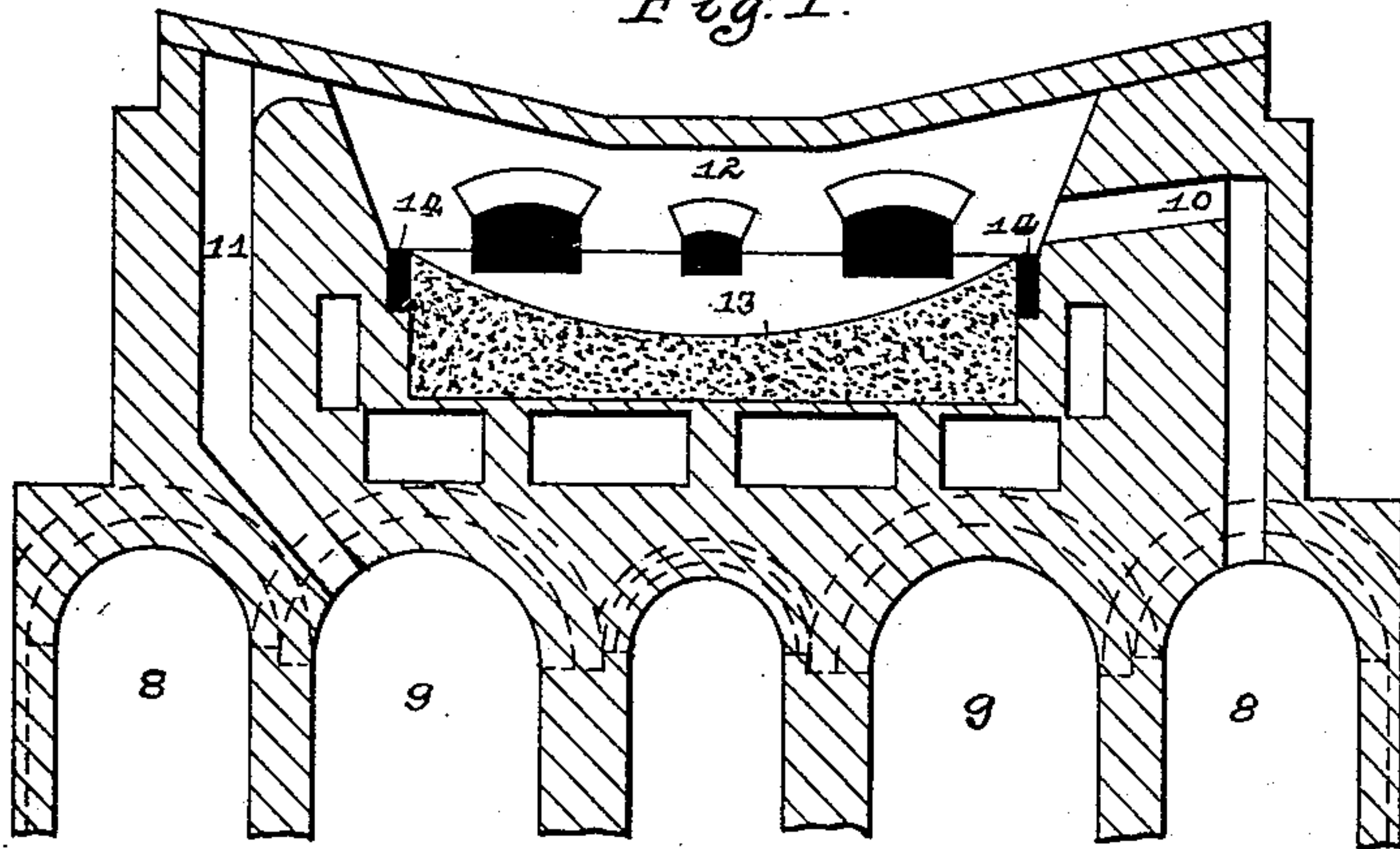


Fig. 2.

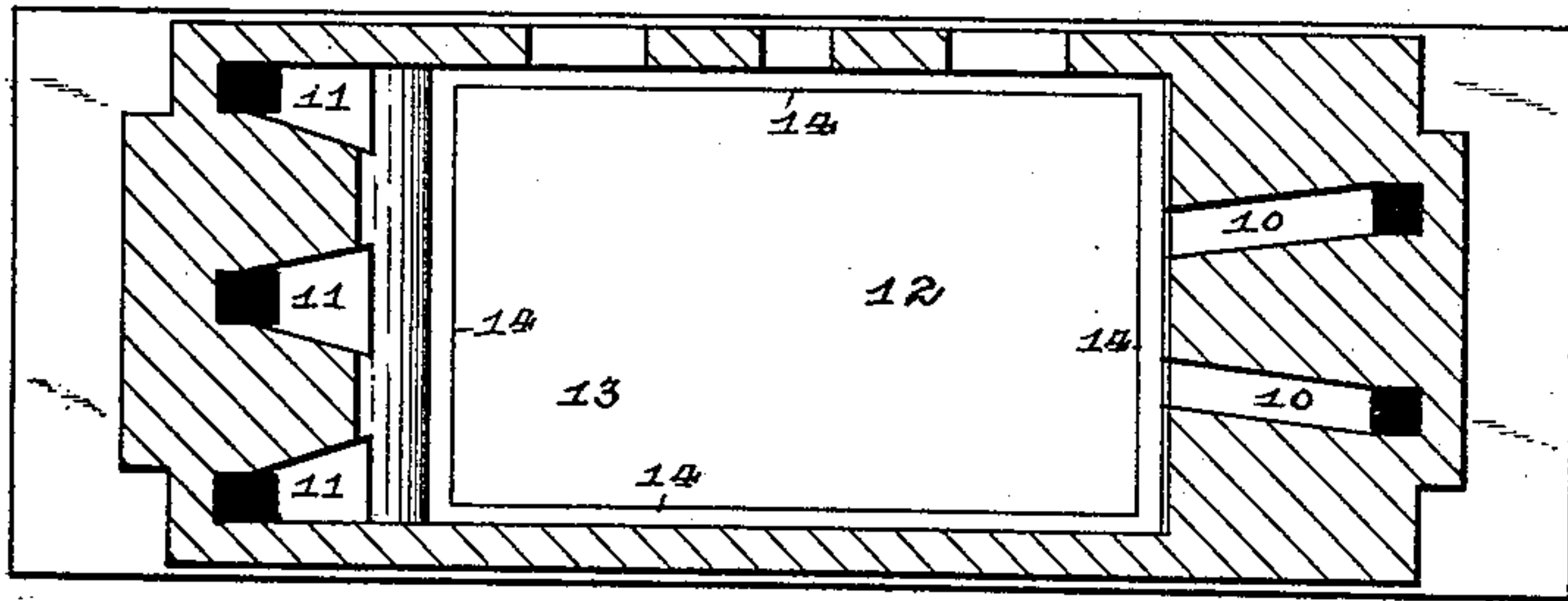
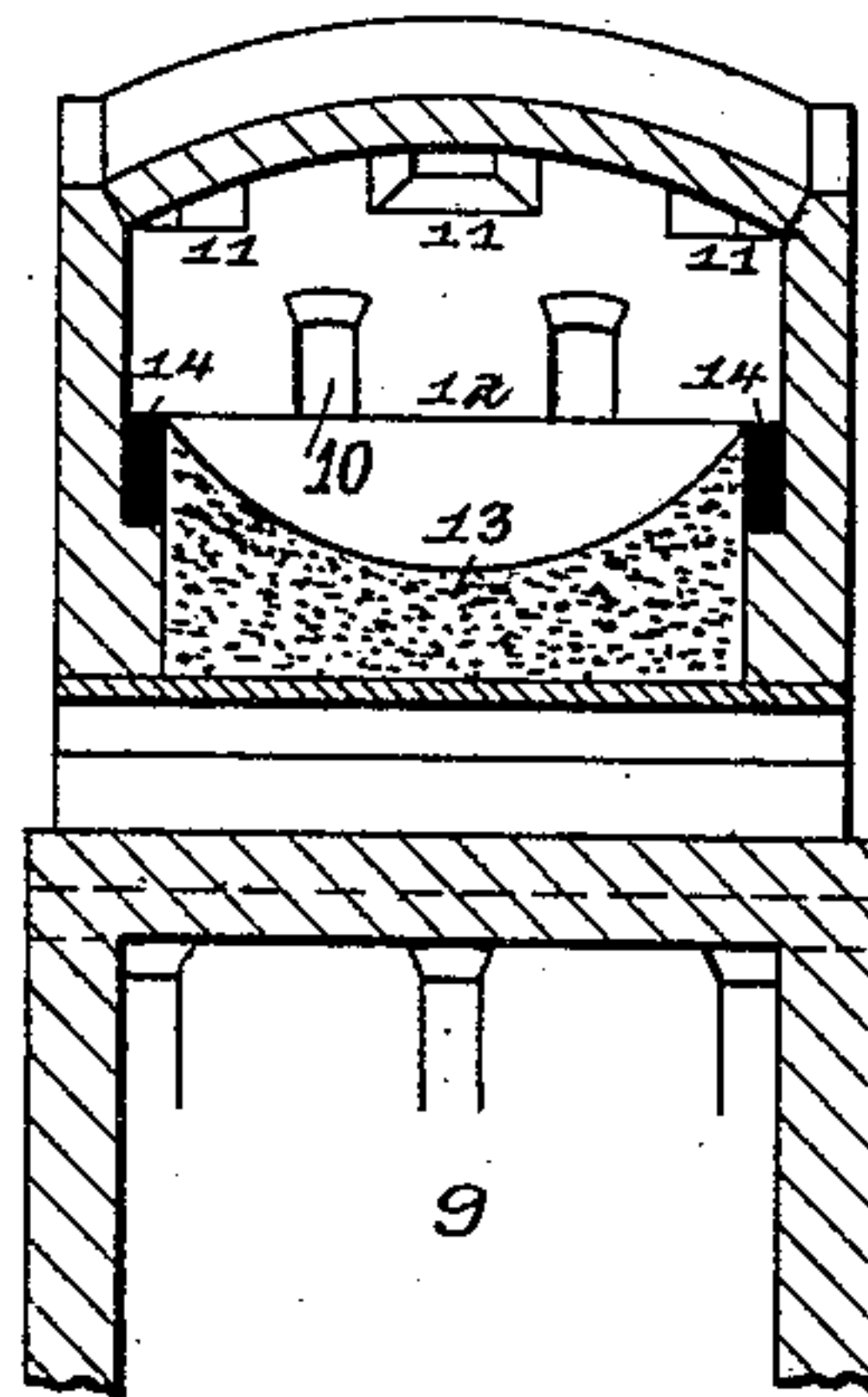


Fig. 3.

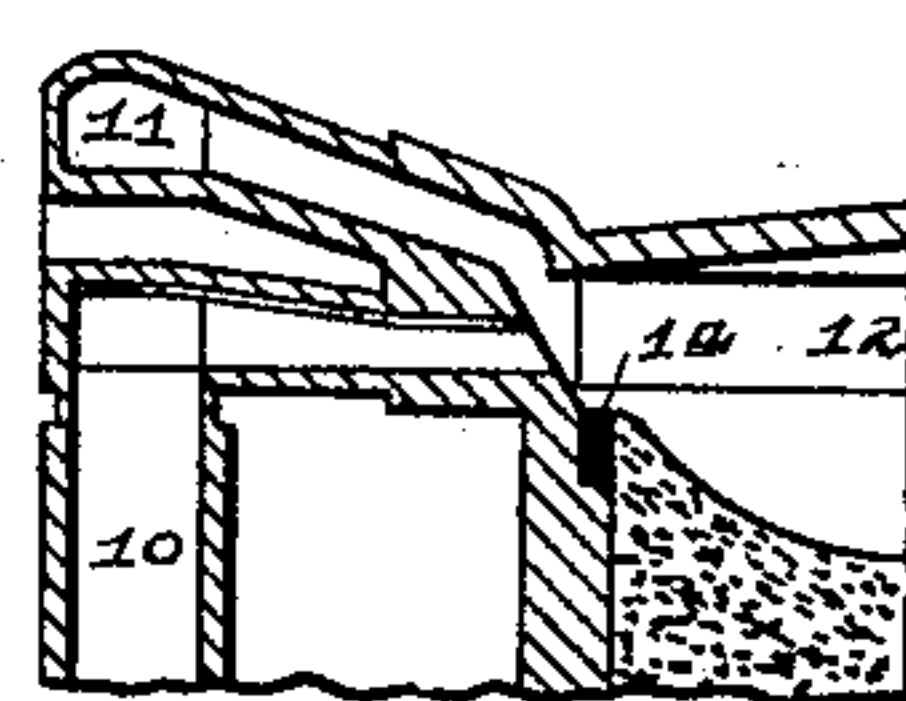


Fig. 6.

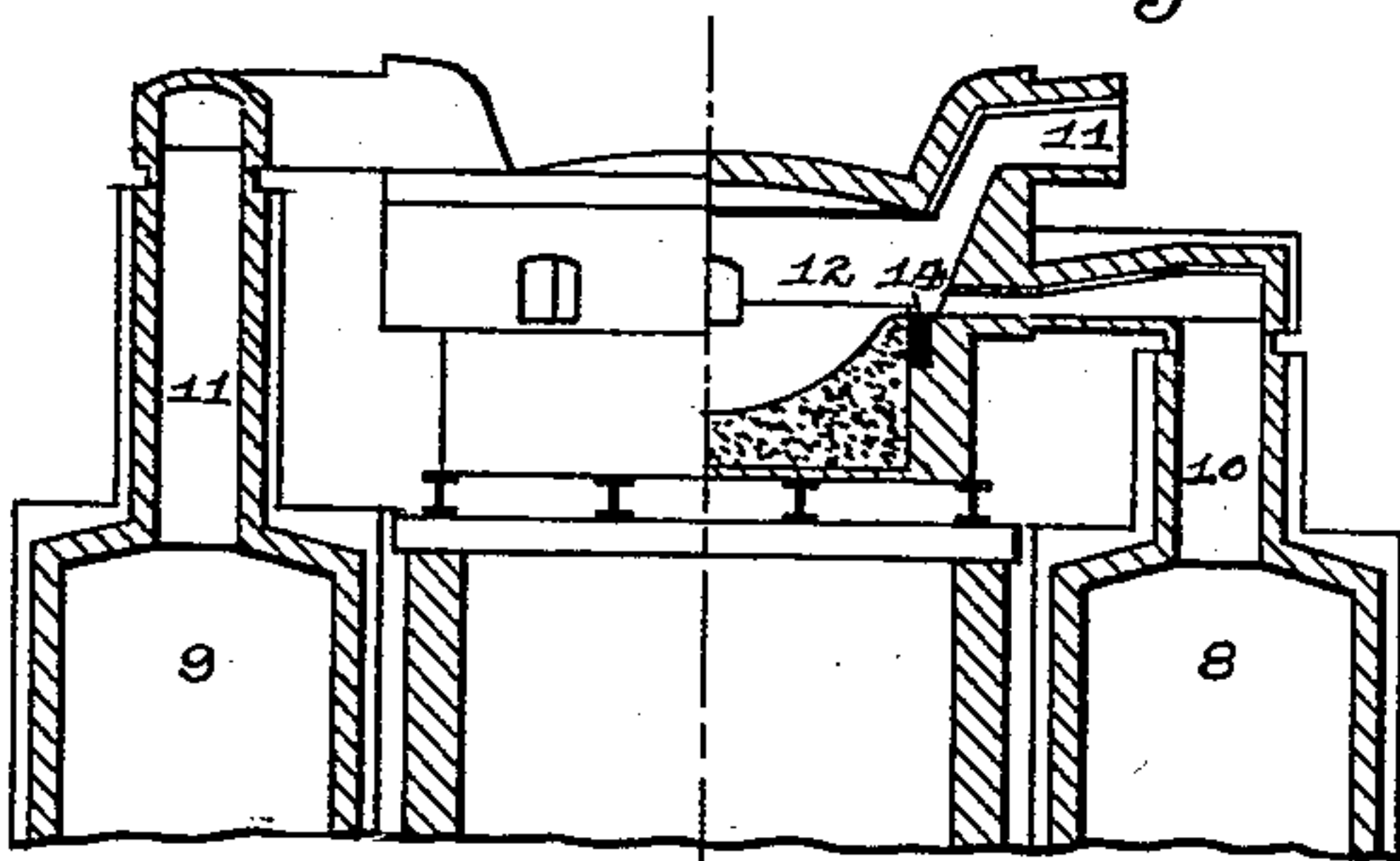


Fig. 4.

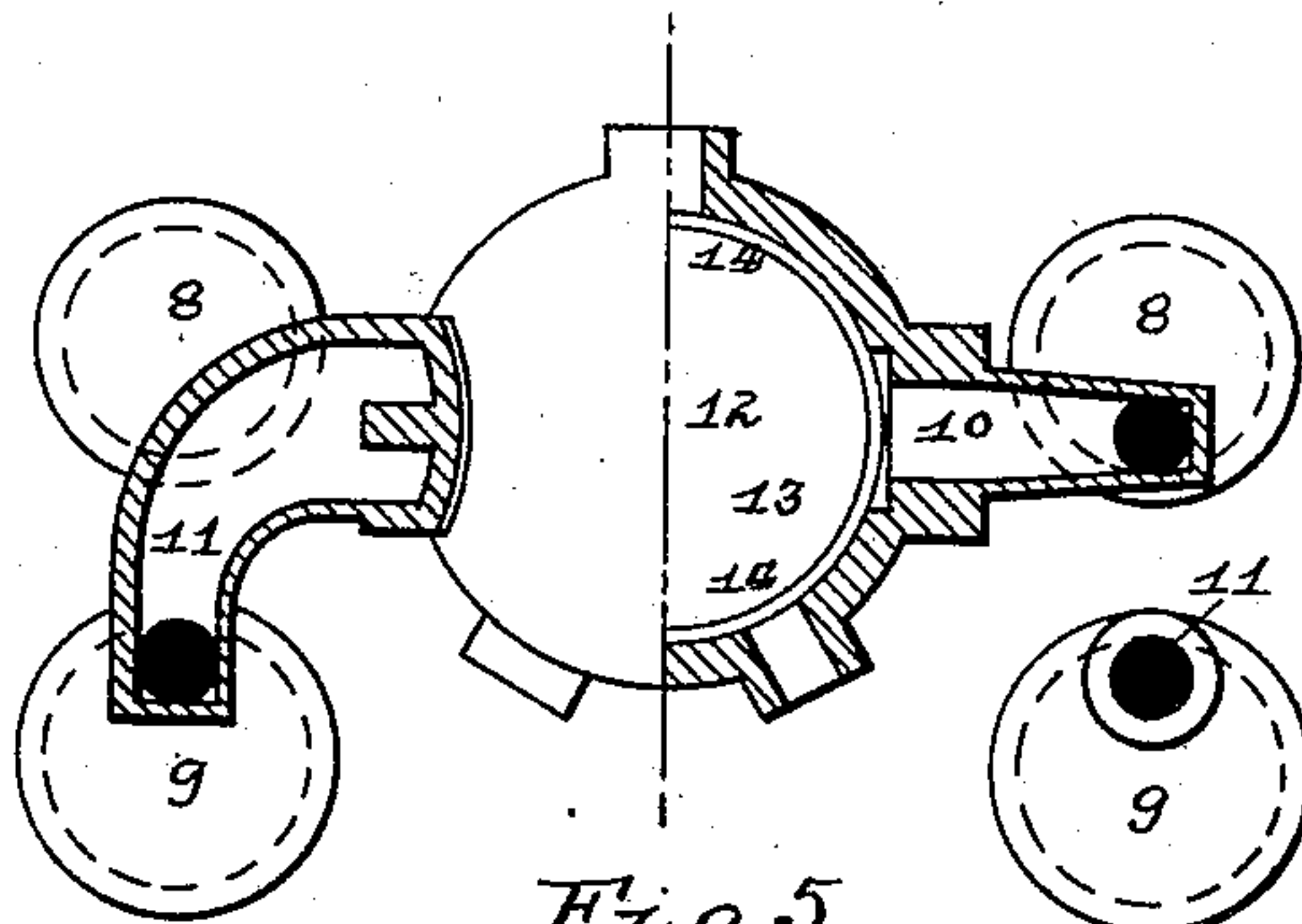
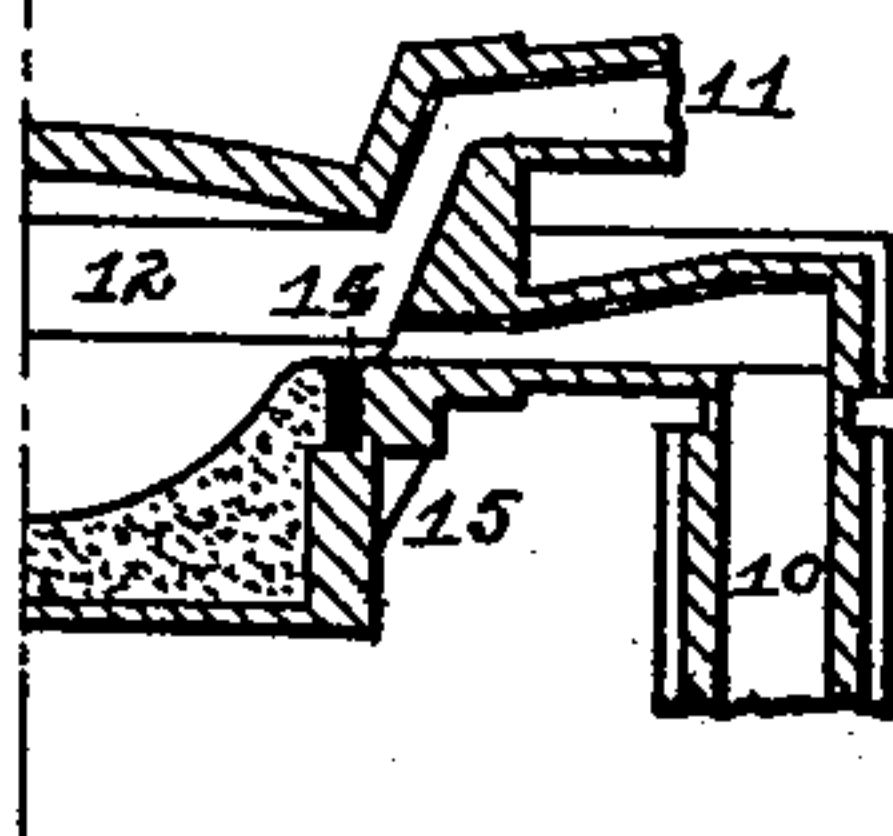


Fig. 5.

Fig. 7.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES RILEY, OF GLASGOW, SCOTLAND.

BASIC-HEARTH STEEL-MAKING FURNACE.

SPECIFICATION forming part of Letters Patent No. 464,229, dated December 1, 1891.

Application filed January 2, 1889. Serial No. 295,261. (No model.) Patented in England February 27, 1888, No. 2,896.

To all whom it may concern:

Be it known that I, JAMES RILEY, of Glasgow, in the county of Lanark, Scotland, have invented a new and useful Improvement in Basic-Hearth Steel-Making Furnaces, (for which I have received Letters Patent in Great Britain, No. 2,896, dated February 27, 1888;) and I do hereby declare the following to be a full, clear, and exact description thereof.

My said invention has for its object to improve the construction and increase the durability of steel-making furnaces of the kind for working what is known as the "basic" process of making steel.

The walls and other structural parts of steel-making furnaces being built with fire-bricks consisting principally of silica, and the hearth, bed, or lining consisting principally of dolomite or other basic material, the two tend to react upon each other at their junction or contact-surfaces, when subjected to great heat, the result being the formation of a fused slag and injury of the structure, as well as imperfection in the steel-making operation. It has been attempted to avoid the injurious action referred to by interposing between the basic hearth, bed, or lining and the parts of the furnace-walls adjoining the hearth, and the internal surfaces of which are subjected to the heat, a layer of a neutral substance or composition; but such layer has been made a part of the walls or has been placed so as to sustain more or less of the weight of the upper part of the walls and roof, and it has in practice given way through the crushing action of such weight, thereby causing collapse of the furnace. By my invention I interpose between the boundary of the basic hearth, bed, or lining and the walls of the furnace or reverberatory chamber a vertical barrier of a neutral substance or composition, such neutral barrier (in the form of a wall surrounding the hearth within the inner face of the side walls and having its upper face exposed) having no part of the side-walls nor any weight resting on it and being therefore not liable to displacement or crushing.

In order that my said invention and the manner of performing the same may be properly understood, I hereunto append a sheet of explanatory drawings representing furnaces as constructed with my improvements.

Figures 1 and 2 of the drawings are transverse vertical sections, at right angles to each other, of a regenerative steel-making furnace, of the "Siemens" type; and Fig. 3 is a corresponding horizontal section. Figs. 4 and 5 are vertical and horizontal sectional views of a regenerative steel-making furnace of the "Batho" type; and Figs. 6 and 7 are vertical sections of portions of furnaces, showing slight modifications in the precise placing of the neutral barrier relatively to the other parts.

In the drawings the same reference-numerals are used to mark the same or like parts wherever they are repeated.

The general construction of the furnaces with their regenerative chambers (marked 8 and 9) and connecting flues or passages (marked 10 and 11) being well known, it is unnecessary to minutely describe them in the present specification.

In the furnace shown in Figs. 1, 2, and 3 the reverberatory chamber (marked 12) is of an oblong rectangular form in horizontal section, while in the furnace shown in Figs. 4 and 5 it is of a circular form, or it may be of an oval form, as it frequently is in that type of furnace. A hearth, bed, or lining (marked 13) is formed in each reverberatory chamber 12 of dolomite or other basic material or compound in the usual way; but instead of this hearth having its upper edge or boundary as large as the interior of the reverberatory chamber at that part it is made smaller, and there is interposed all round it a barrier or inner wall (marked 14) built or composed of a neutral material or compound, such as chrome iron ore or magnesite, or a suitable compound thereof, or of other materials. This neutral barrier (which is made black in the vertical sections, Figs. 1, 2, 4, 6, and 7) is in the form of a low vertical wall and has its top surface by preference horizontal, as shown, but which may be slightly inclined with the top peripheral edge or boundary level, or nearly so, with the basic hearth 13. This neutral barrier extends in the form of a wall surrounding the hearth and within the inner face of the side wall and having its upper face exposed, and as a result of this it does not bear any of the weight of the walls of the furnace, while at the same time the basic material of the hearth must necessarily extend over such

neutral wall or barrier before it can reach the silicious side walls, and as such vertical neutral wall or barrier can be made of considerable depth it will still act to prevent contact
5 of the hearth with the side walls, even though the hearth wear down to a considerable extent. The top of the neutral barrier 14 may be level, or nearly so, with the bottoms of the gas-ports 10, as shown in Figs. 1 to 5 and 7,
10 or it may be a little lower, as shown in Fig. 6.

In Figs. 1 to 6 the parts of the furnace-walls below the neutral barrier 14 are shown as thicker than the upper parts to the extent of the thickness of the neutral barrier; but,
15 if preferred, the walls may be constructed as shown at 15 in Fig. 7, the upper parts resting

on plates forming part of the iron or steel casing of the furnace and strengthened by bracket-pieces.

I claim—

A basic-hearth steel-melting furnace having a hearth, side walls, and a barrier of neutral material in the form of a wall surrounding the hearth within the inner face of the side walls and having its upper face exposed,
25 substantially as and for the purposes set forth.

In testimony whereof I, the said JAMES RILEY, have hereunto set my hand.

JAMES RILEY.

Witnesses:

WILLIAM CLARK,
WILLIAM MAXWELL.