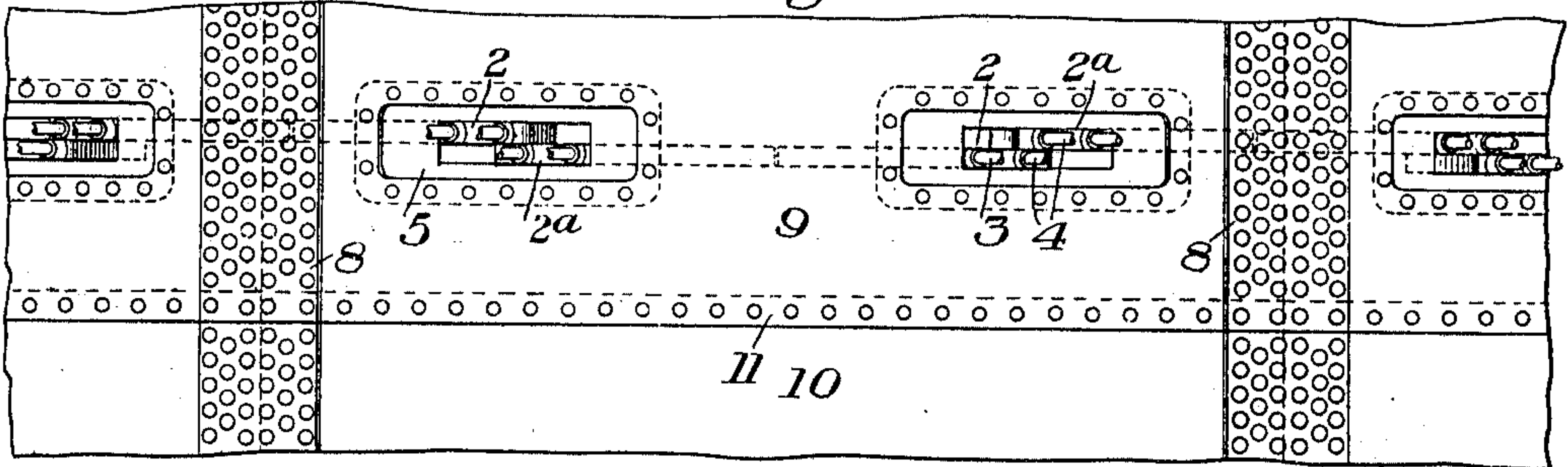
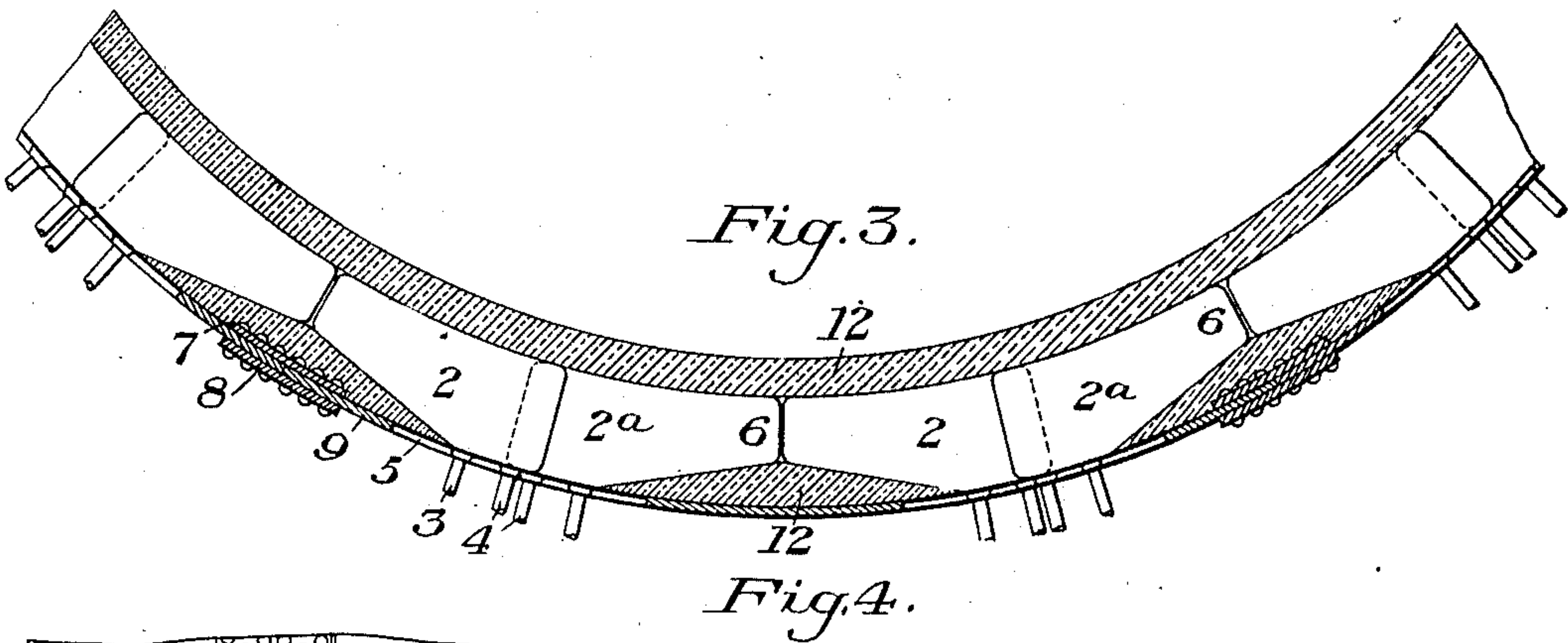
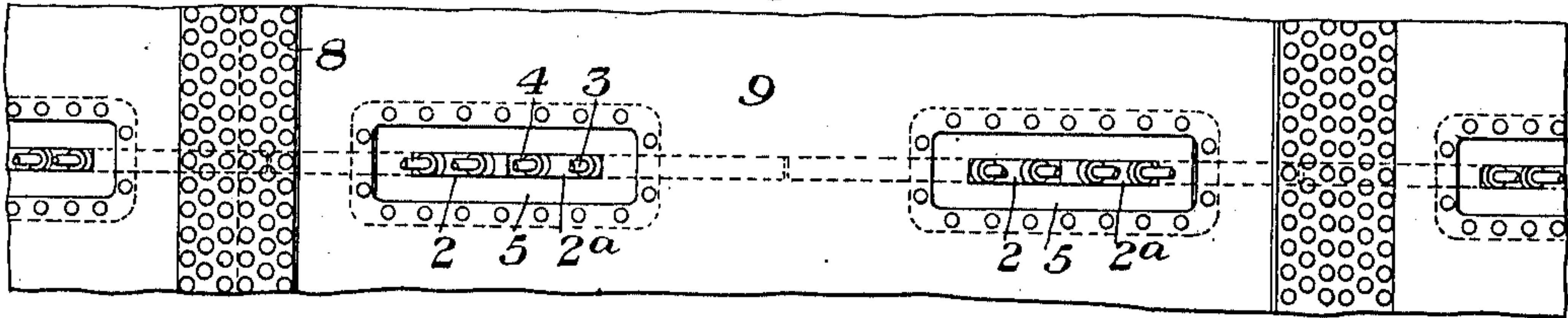
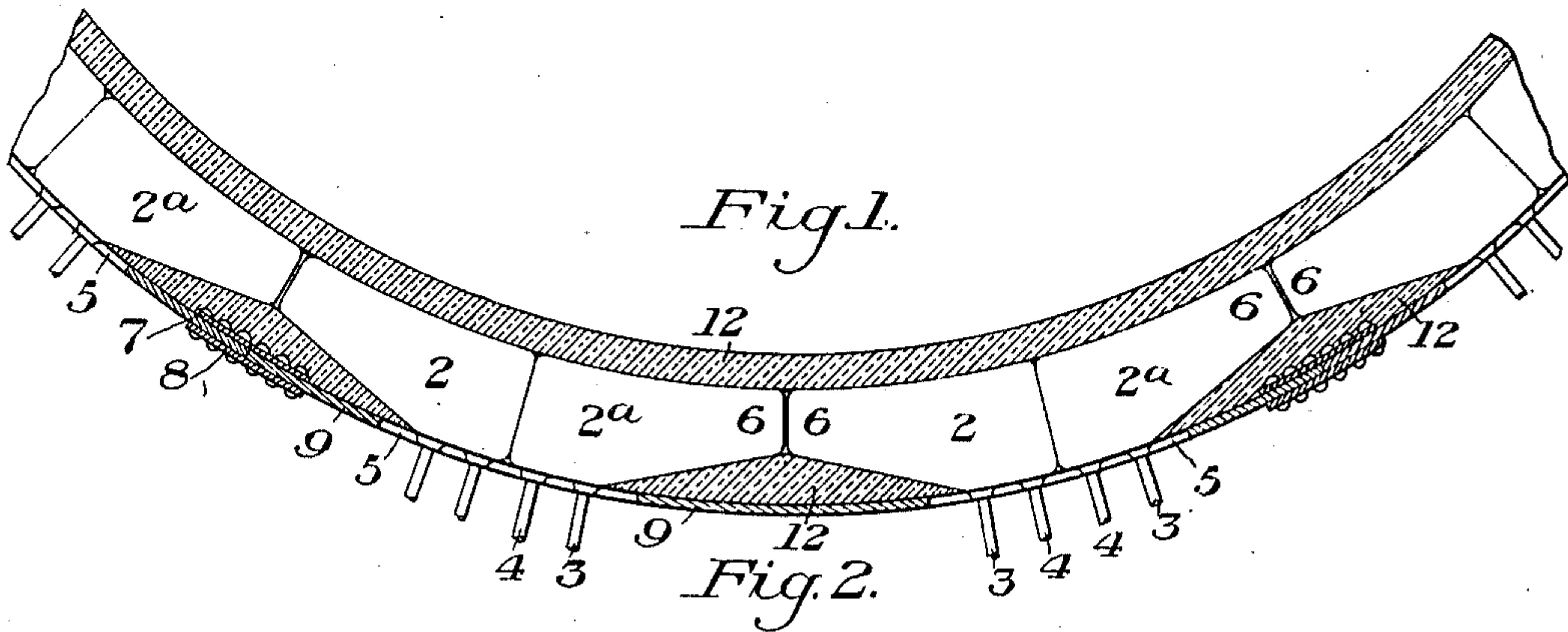


J. KENNEDY.
BLAST FURNACE COOLING APPARATUS.
APPLICATION FILED JULY 21, 1910.

970,376.

Patented Sept. 13, 1910.



WITNESSES

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JULIAN KENNEDY, OF PITTSBURG, PENNSYLVANIA.

BLAST-FURNACE-COOLING APPARATUS.

970,376.

Specification of Letters Patent. Patented Sept. 13, 1910.

Application filed July 21, 1910. Serial No. 573,136.

To all whom it may concern:

Be it known that I, JULIAN KENNEDY, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Blast-Furnace-Cooling Apparatus, 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 is a partial horizontal section of a blast furnace wall, showing my improved arrangement of cooling plates; Fig. 2 is a partial front elevation of the same; Fig. 3 is a view similar to Fig. 1, showing the arrangement at a higher level; and Fig. 4 is a front elevation of the arrangement of Fig. 3.

My invention relates to the cooling of blast furnace walls, and is designed to provide an improved system therefor, which will allow ready insertion and removal of the cooling plates, and will more efficiently protect the walls than with the arrangements heretofore used.

In the use of ordinary cooling plates above the bosh of the blast furnace, the plates of each row are spaced apart and are staggered in one row relative to the plates in the next row. My invention is designed to provide a substantially complete ring of cooling plates at each cooling level, if desired, and to provide laterally separated openings in the furnace rings through which the plates, constituting the coolers may be introduced. I thus provide a series of rows of plates which may form a substantially continuous cooling ring at each level, while the plates may be inserted and removed through separated openings.

In the drawings, referring to Figs. 1 and 2, 2 and 2^a represent hollow cooling plates, each of which may be provided with the usual inlet and outlet pipes 3 and 4 for the circulating fluid. The cooling fluid may be directed through the plates in any desirable way by baffles or otherwise. The plates are arranged in pairs, one pair to each opening 5 in the blast furnace ring making up a part of the shell. Each opening 5 is of less length in a horizontal direction than the combined length of the two plates inserted there-through. Each plate is slid in and moved sidewise so that its end is between two of the cooler plate openings, the plates thus forming substantially an entire cooling ring. To aid in this insertion, the outer portions of

the plate more remote from the shell opening may be reduced in width, as shown at 6. This, however, may or may not be done as desired.

The blast furnace varies in diameter in different portions thereof above the bosh, and the same plates can be used in successively higher rows by overlapping the ends of the plates and placing the alternate plates at alternately different levels in the same row, as shown in Figs. 3 and 4. In the form shown, the wider inner ends of the plates are overlapped, but their outer ends may be overlapped, so that one plate of each pair overlies the end of one plate of the next pair, instead of overlapping the plates of each pair in front of the opening, as shown. Of course, where the difference in diameter is too great, a different length of plate must be used, but the same plates may be used for several of the rows differing in diameter as the blast furnace contracts upwardly.

I have shown the ring plates as butted together and secured by inside and outside butt springs 7 and 8, but any suitable arrangement of rings may be used. I have also shown the plates 9 of one ring overlapping the plates 10 of the next ring, as shown at 11, the overlapping portions being riveted together.

12 represents refractory portions of the blast furnace wall.

The advantages of my invention will be obvious to those skilled in the art. The plate system is simple, and is easily applied and removed, the shell of the furnace is not materially weakened, and at the same time a very effective cooling system is obtained.

Variations may be made in the form and arrangement of the shell, the plates, the openings, etc., without departing from my invention.

I claim:

1. In a blast furnace, a shell opening, and a cooler plate movable through the opening and extending laterally beyond the end of the opening, substantially as described.

2. In a blast furnace, a shell having an opening, and a plurality of plates inserted through the opening and extending laterally beyond the ends of the opening, substantially as described.

3. In a blast furnace, a shell having an opening, and a plurality of plates inserted through the opening and extending laterally

beyond the ends of the opening, the combined length of the plates being greater than the length of the opening, substantially as described.

5 4. In a blast furnace, a shell having a series of openings in a horizontal row, and plates inserted through said openings and extending laterally of the openings to give a substantially complete cooling ring, sub-
10 stantially as described.

15 5. In a blast furnace, a shell having a horizontal series of openings, and plates removable through said openings and extending at least partially through the space between the openings inside of the shell, substantially as described.

6. In a blast furnace, a shell having an opening, and a plurality of plates removable through said opening, and arranged at different levels.

20 7. A blast furnace having a horizontal series of openings, and plates insertible through said openings and extending laterally between the openings, said plates being arranged at different levels and overlapping
25 each other, substantially as described.

In testimony whereof, I have hereunto set my hand.

JULIAN KENNEDY.

Witnesses:

L. McKITTRICK,
C. P. BYRNES.