

Oct. 7, 1930.

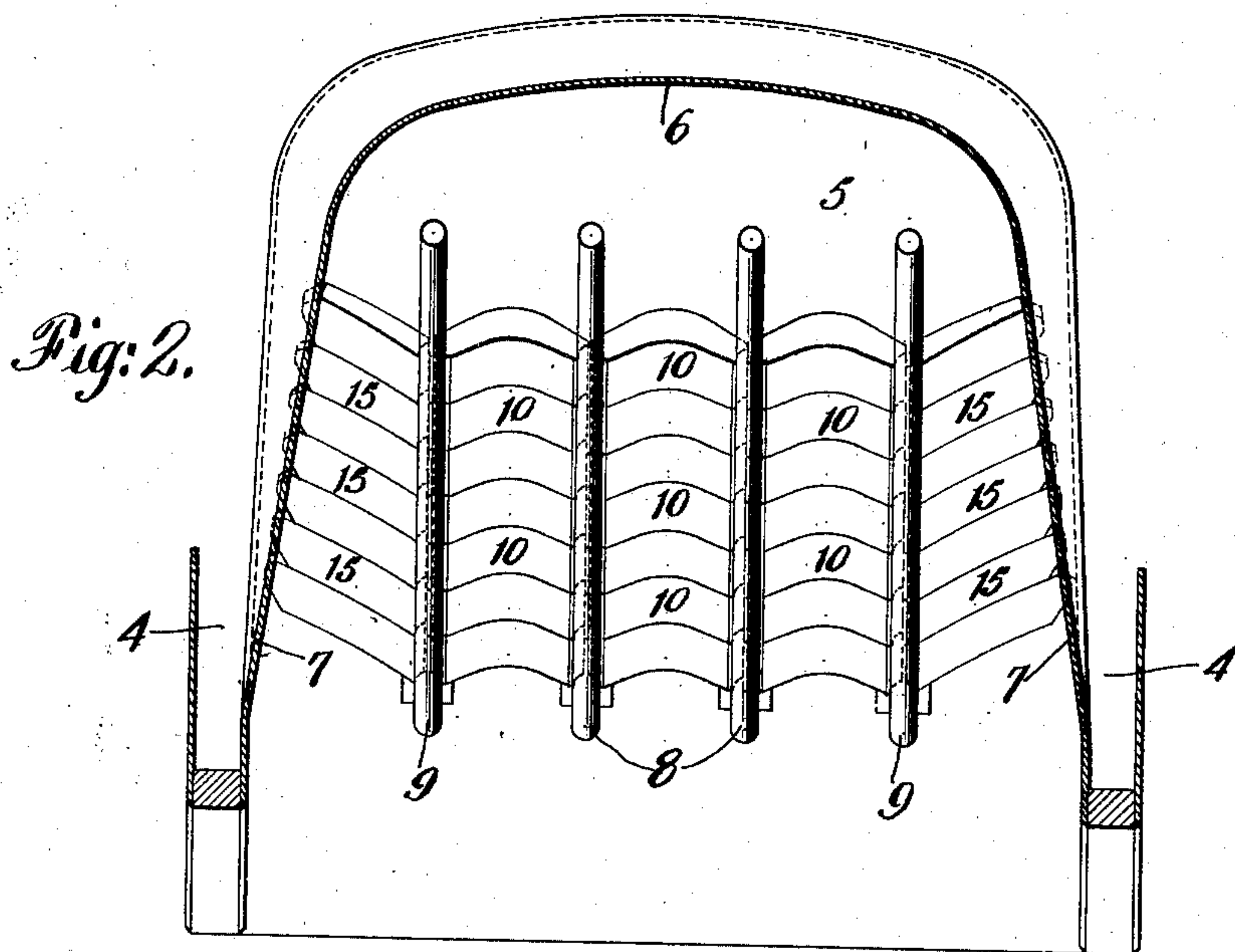
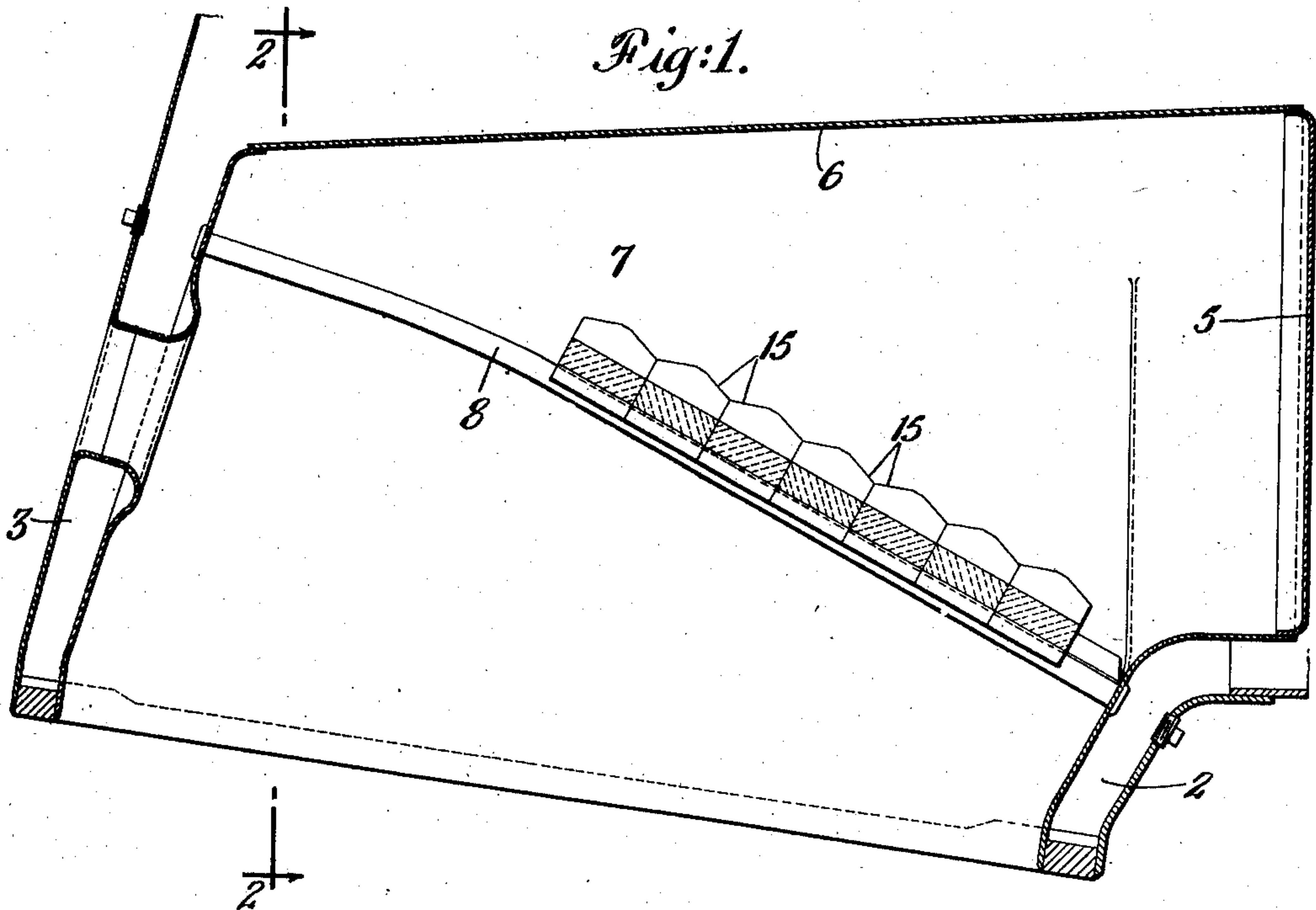
A. H. WILLETT

1,777,818

REFRACTORY ARCH AND ARCH BRICK.

Filed Nov. 16, 1926

2 Sheets-Sheet 1



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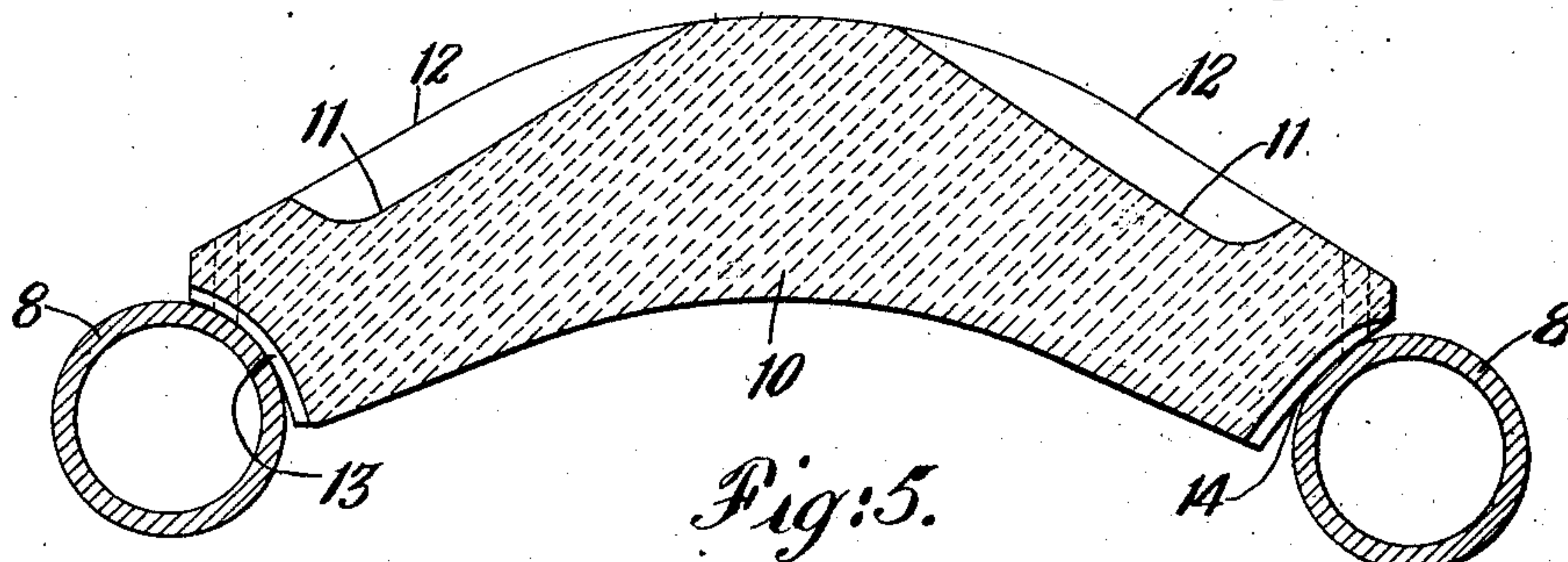
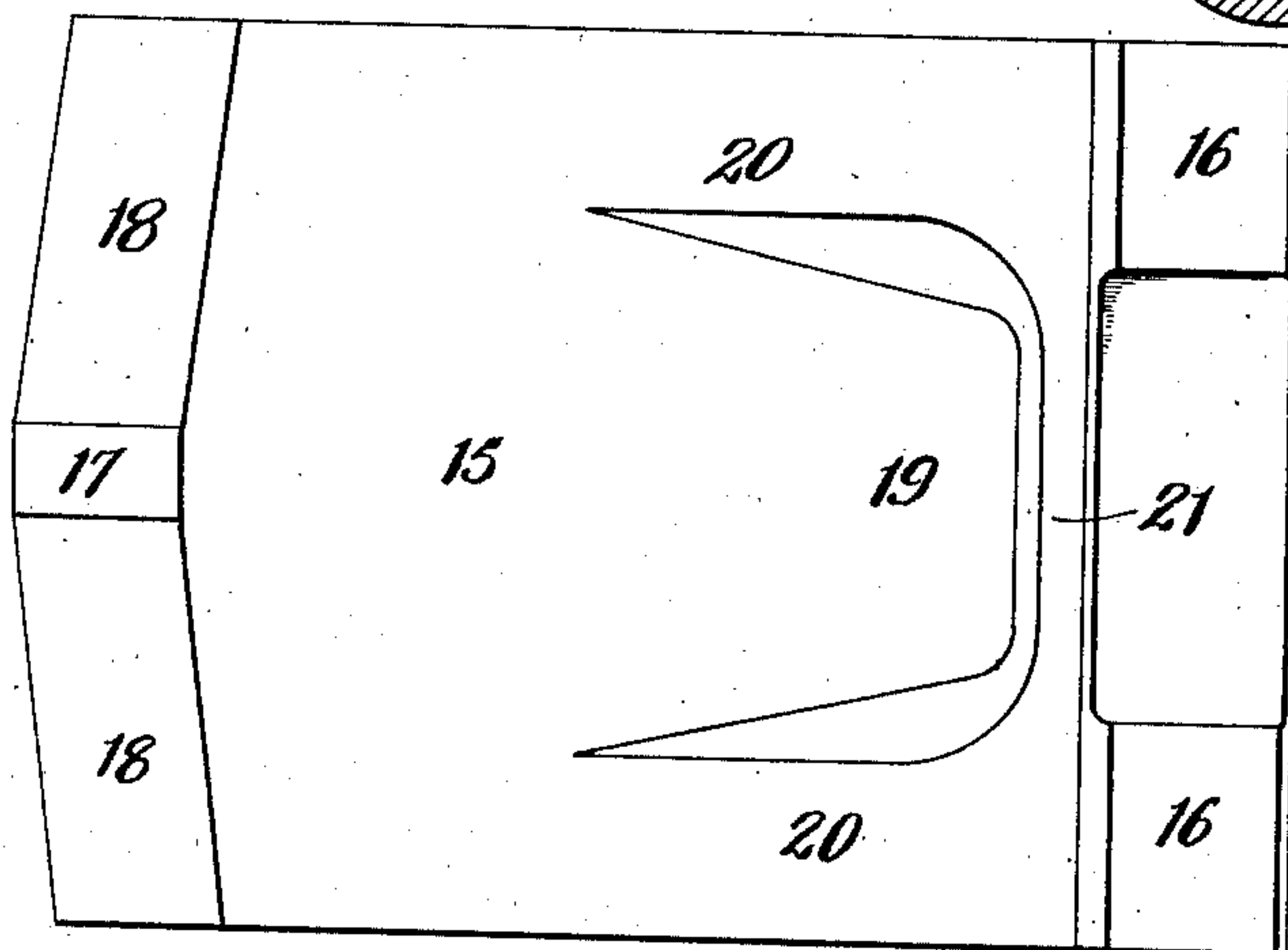
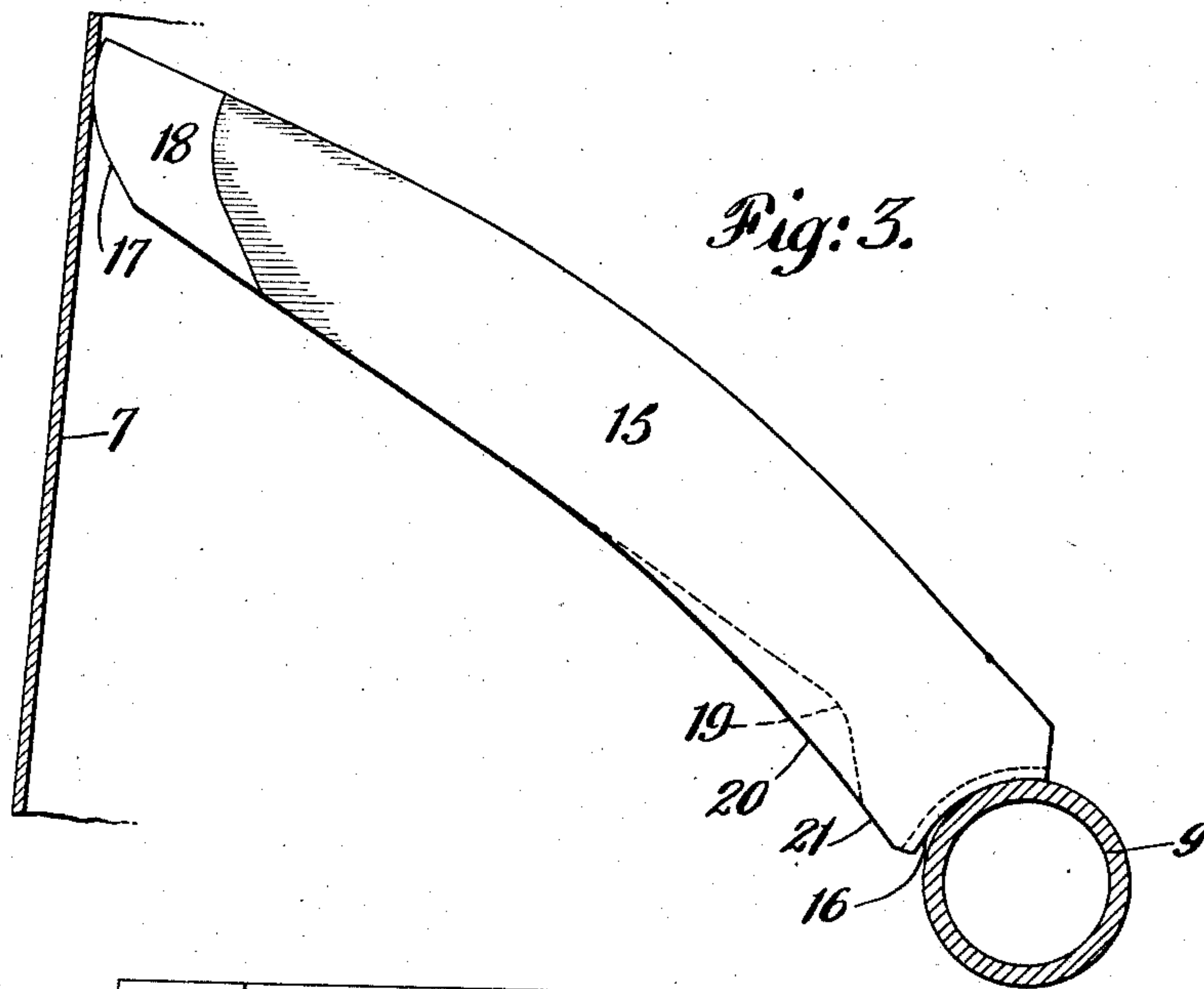
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REFRACTORY ARCH AND ARCH BRICK

Filed Nov. 16, 1926

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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REFRACTORY ARCH AND ARCH BRICK

Application filed November 16, 1926. Serial No. 148,695.

This invention relates to refractory arches and arch brick, and particularly to locomotive arch brick construction, and has, as one of its primary objects, the strengthening of the arch and the brick thereof.

Another object of the invention is to minimize arch brick breakage and cracking, and to reduce the likelihood of bricks falling into the fire even when cracked.

How the foregoing, together with such other advantages as are incident to the invention, or which may occur to those skilled in the art, are obtained, will appear from the following description of the preferred embodiment of my invention, reference being had to the accompanying drawings, wherein

Fig. 1 is a vertical longitudinal section through a locomotive firebox and arch embodying my improvements;

Fig. 2 is a section taken on the line 2—2 of Fig. 1;

Fig. 3 is a side elevation of my improved side brick in position between an arch tube and a side sheet of the firebox;

Fig. 4 is a bottom plan view of the brick; and

Fig. 5 is a cross section of one of the middle brick employed in the arch, and the tubes on which it rests.

Referring first to Figs. 1 and 2, it will be seen that the firebox illustrated has the usual front and rear water legs 2 and 3, side water legs 4, tube sheet 5, crown sheet 6, side sheets 7, and middle and side arch tubes 8 and 9. Between the tubes 8, 8, and 8, 9, I employ courses of upwardly curved or arched brick 10, such as the brick illustrated in Fig. 5, having its greatest thickness at the center of its span where the greatest stress and erosion occur, with depressions 11, 11 at either side of its crown and strengthening ribs 12, 12, and provided at the ends with tube-engaging portions 13, 14, the latter of which permits the brick to adapt itself to variations in the spacing between tubes.

Referring now more particularly to Figs. 3 and 4, wherein I have shown my improved side brick 15, it will be seen that I have provided a brick of upwardly bowed or curved contour having two tube engaging surfaces

16, 16 at one end, the other end having a curved surface 17 for sliding engagement with the side sheet 7 of the firebox, and a backward rake or slope 18, 18 from the bearing portion 17 on either side thereof. I may provide the brick with a cavity or depression 19 on its under side to retard the flow of the gases and products of combustion, and to lighten the brick. I am enabled to do this, as well as to make the brick body of relatively thin contour throughout, by virtue of the curve of the brick, which is such as to provide ample strength even as against the stresses set up when the brick-end shifts or slides on the side sheet 7 upon changes caused by temperature variations or "weaving" between the tube 9 and the side sheet.

It will be evident that the tendency of the brick, even if split or cracked, to fall into the fire, is greatly minimized by its upwardly sprung or curved shape, which, when the brick is in position (as shown in Figs. 1 to 3) maintains all portions of it in compression with the thrust thereof upon the tube 9. The brick, as regards strength and stability, is, in effect, an upwardly bowed triangle or letter "A," with its feet 16, 16, resting on the tube, its apex 17 resting on the side sheet, and its legs formed of the thicker rib-like portions 20, 20, the cross rib 21 providing added strength.

An arch constructed as shown in Figs. 1 and 2, with courses of arched middle brick and my curved side or wing brick in a course at each side of the firebox, provides proper baffling and retardation of the gases, accommodation for shifting of parts due to temperature and other changes, comparative freedom from cracked or broken brick, minimization of the displacement or dropping of cracked bricks, increased freedom from arch repairs, and decreased cost of replacement when repairs are made.

What I claim is:—

1. A locomotive arch side-brick comprising a body arched upwardly from end to end, with its lower end thicker than its upper end and having a pair of laterally-spaced-apart tube engaging sockets on the lower end face, the upper end being tapered off

to the tip on its under face midway of the brick sides to provide a sloping surface for sliding engagement with a side sheet and being cut back laterally on each side of said surface.

5 2. A locomotive arch side-brick comprising a body arched upwardly from end to end, with its lower end thicker than its upper end and having a pair of laterally-spaced-
10 apart tube engaging sockets on the lower end face, the upper end being tapered off to the tip on its under face midway of the brick sides to provide a sloping surface for sliding engagement with a side sheet and being cut
15 back laterally on each side of said surface, said body having a depression midway of its sides on its under face, providing thrust-carrying ribs extending lengthwise at each side on the under face and a transverse rib extending from socket to socket.
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3. In combination with a firebox side sheet and a substantially longitudinally extending water-circulation member, a refractory arch including a side arch-brick sloping steeply
25 upward from said member to said sheet, said brick having a runner-like surface on the under face at the upper end midway of the sides slidably engaging said sheet, and a pair of laterally-spaced-apart sockets in its
30 lower end face rotatively engaging said member, the body of the brick being arched upwardly from end to end, substantially uniformly, to carry the weight thrust, endwise of the brick, downwardly to said member.
35 In testimony whereof, I have hereunto signed my name.

ALFRED H. WILLETT.

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