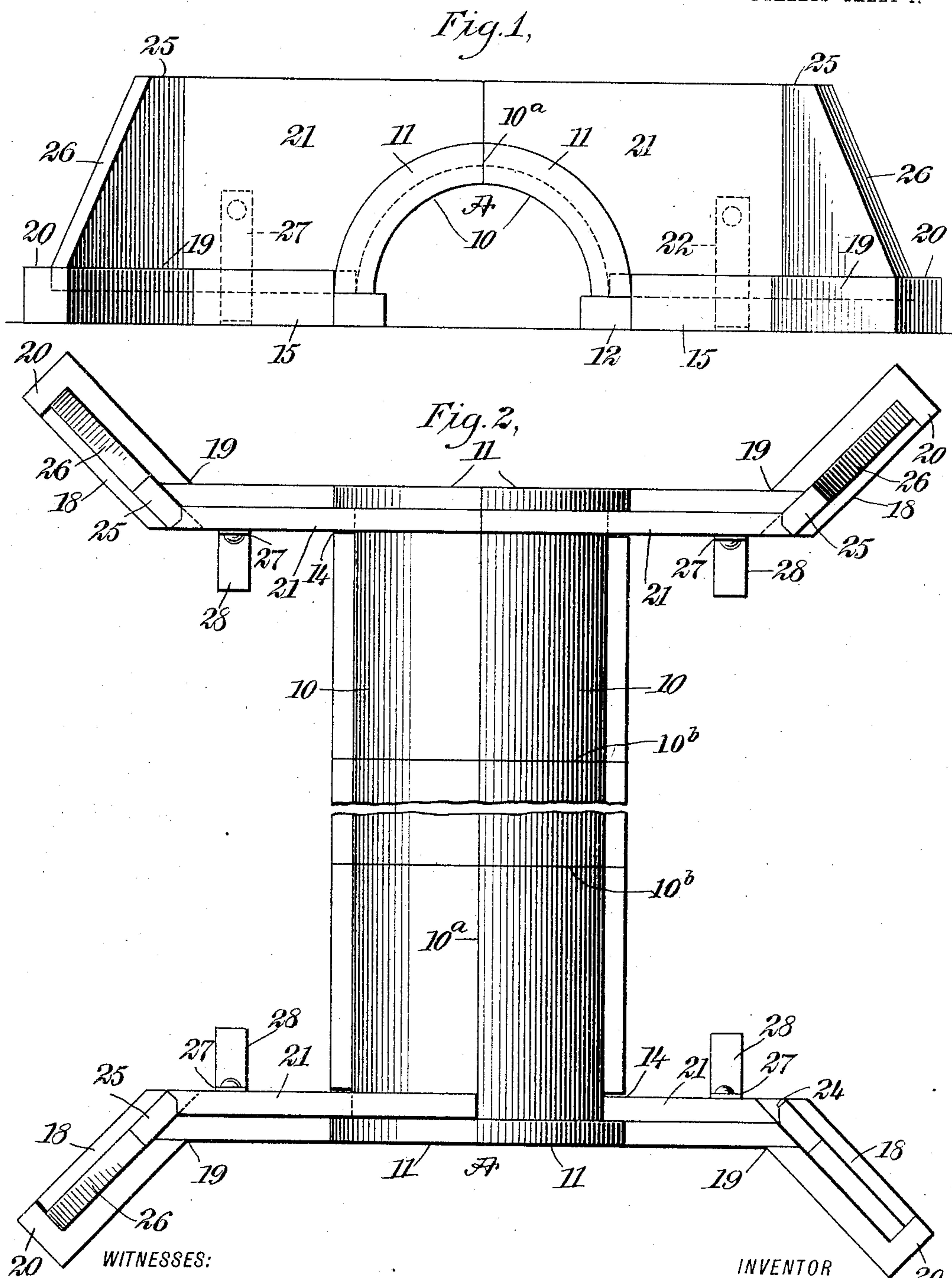


No. 786,059.

PATENTED MAR. 28, 1905.

J. SIMPSON.
SUBWAY STRUCTURE.
APPLICATION FILED AUG. 28, 1904.

2 SHEETS—SHEET 1.



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J. SIMPSON.
SUBWAY STRUCTURE.
APPLICATION FILED AUG. 26, 1904.

2 SHEETS—SHEET 2.

Fig. 3,

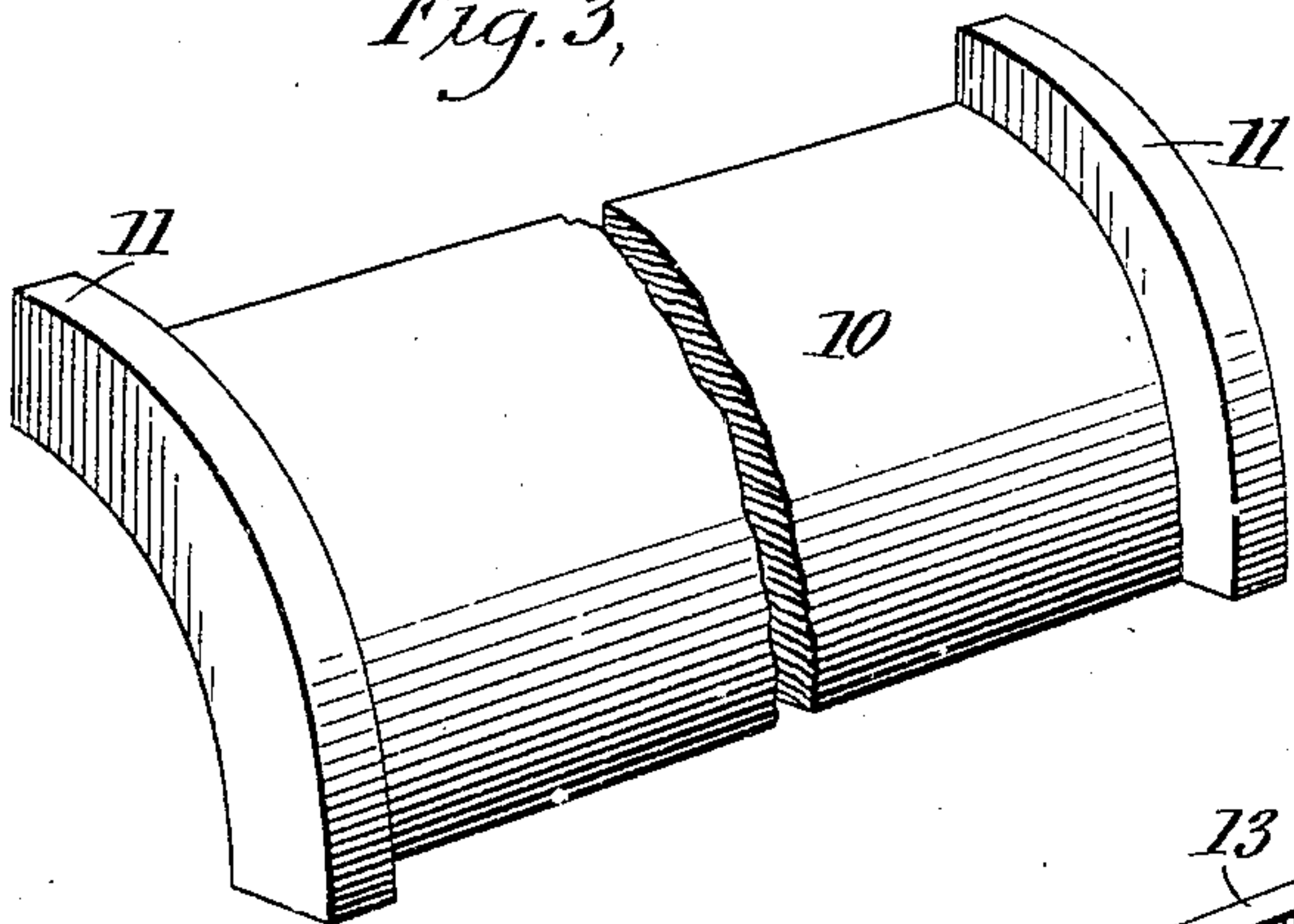


Fig. 4,

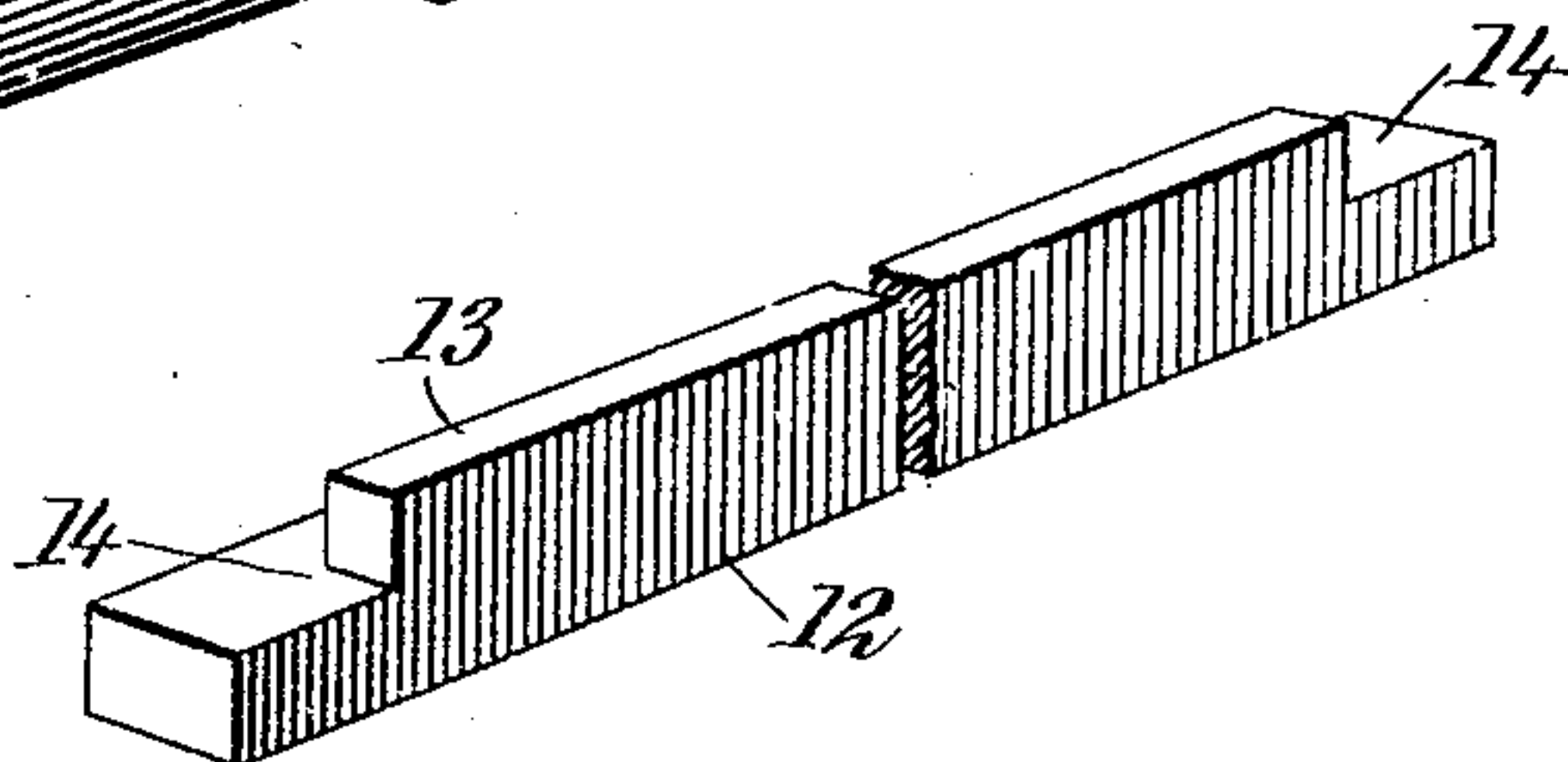


Fig. 5,

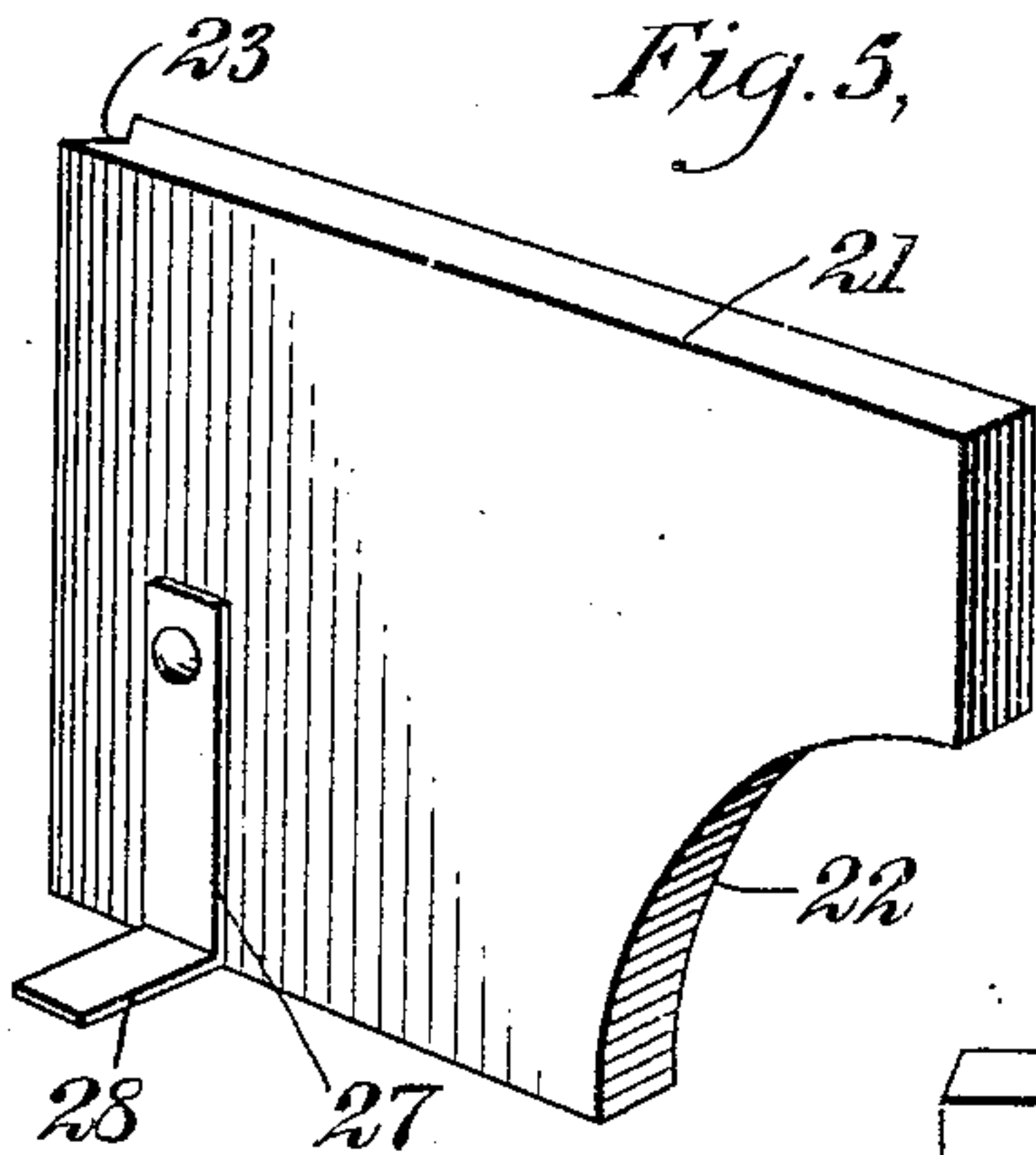


Fig. 7,

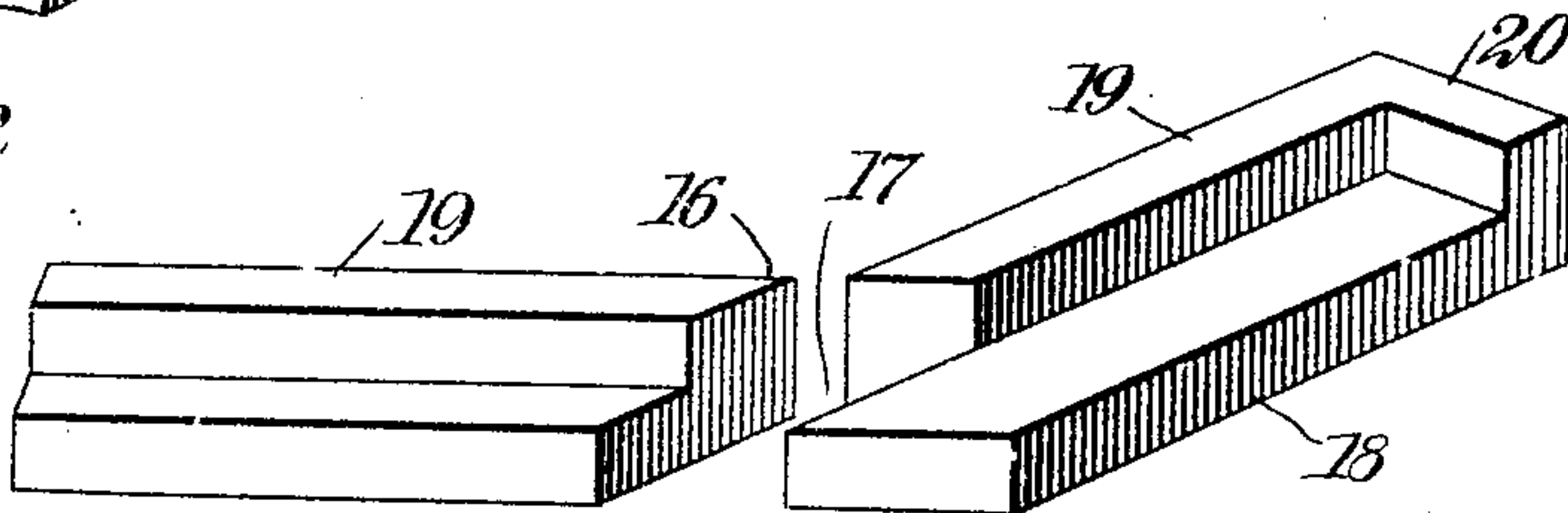


Fig. 6,

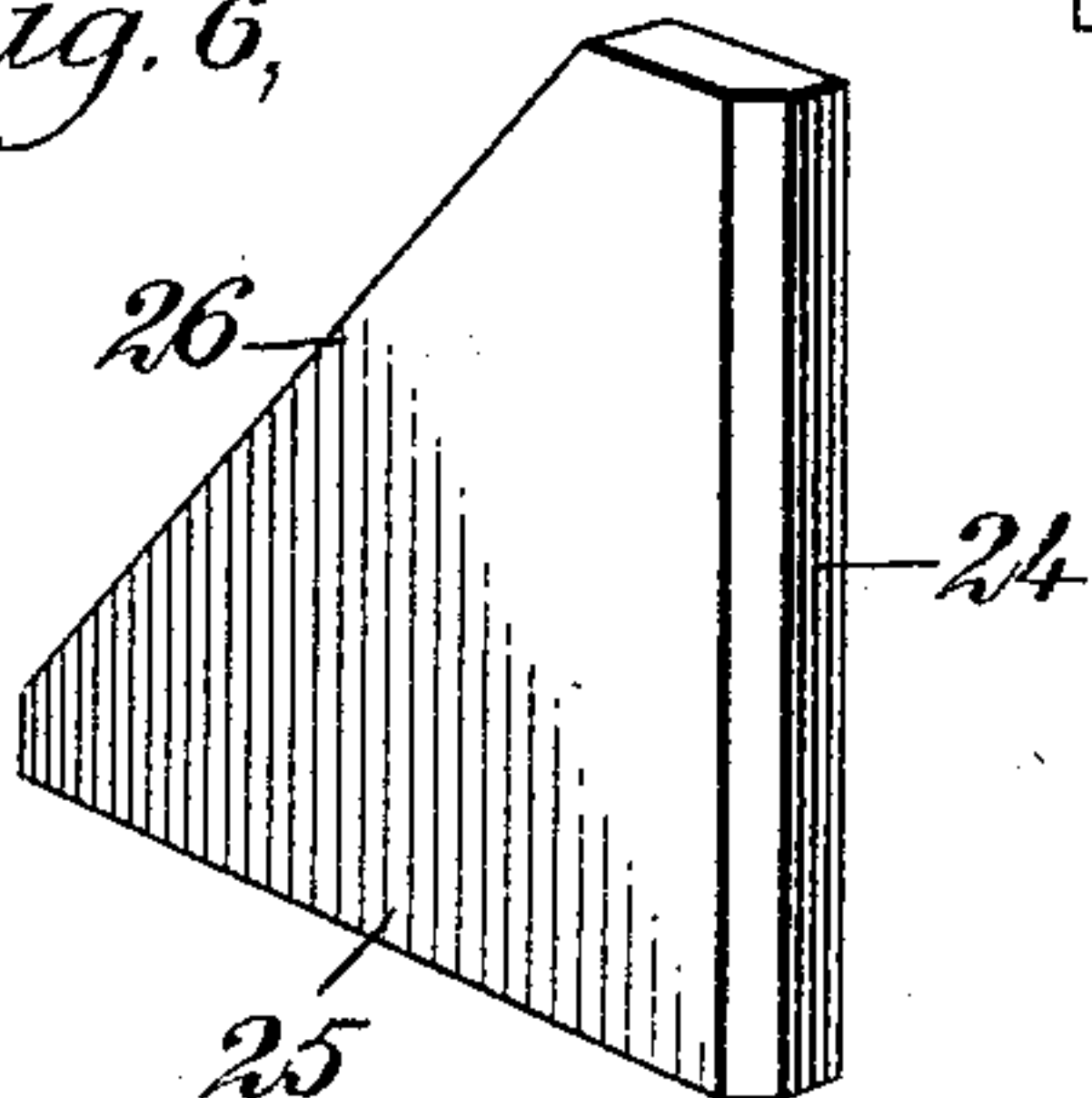
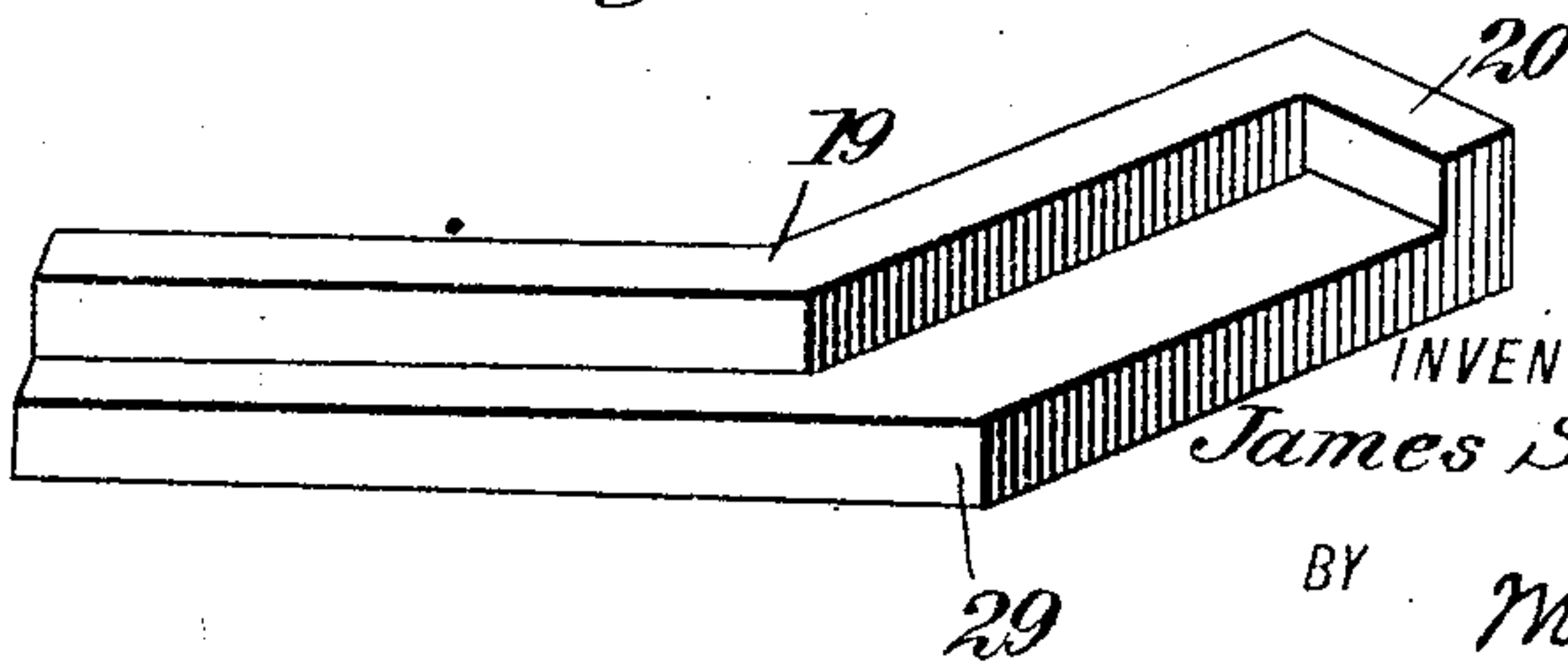


Fig. 8,



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TO WILLIAM H. MALLORY, OF VEEDERSBURG, INDIANA.

SUBWAY STRUCTURE.

SPECIFICATION forming part of Letters Patent No. 786,059, dated March 28, 1905.

Application filed August 26, 1904. Serial No. 222,239.

To all whom it may concern:

Be it known that I, JAMES SIMPSON, a citizen of the United States, and a resident of Veedersburg, in the county of Fountain and State of Indiana, have invented a new and Improved Subway Structure, of which the following is a full, clear, and exact description.

My invention relates to such subway structures as culverts and the like. Its principal objects are to provide organization of this character which will be strong and may be readily erected.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is an end elevation of one embodiment of my invention, showing the parts assembled. Fig. 2 is a broken top plan view thereof. Fig. 3 is a broken perspective view of one of the arch-sections. Fig. 4 is a similar view of one of the arch-sills. Fig. 5 shows in perspective one of the main wings. Fig. 6 is a similar view of one of the extension-wings. Fig. 7 shows in perspective the wing-sills separated from one another, and Fig. 8 illustrates these last-named elements formed in one piece.

A designates the arch member of my improved structure, which is preferably formed in longitudinal sections 10, here shown as two in number, they being of cylindrical shell form and each having an extension of substantially ninety degrees. When erected, they meet along a central longitudinal line 10^a. The sections may also be divided transversely at 10^b, and each of the end portions is shown as provided at its outer end with a wall or abutment 11. The arch-sections rest at their lower edges upon opposite sills 12 12, which may be divided into portions corresponding in length to the arch members and are preferably provided with upwardly-extending side walls or abutments 13, with which the arch-sections may contact to prevent lateral movement. These abutments extend for but a portion of the length of the sills, there being spaces 14 left at each end, into which the extremities of the arch-abutments 11 project.

At each side and at each end of the arch member is a main wing-sill 15, lying in substantially the same plane as the main sills and at right angles thereto. These wing-sills have inclined ends 16, which are adapted to enter recesses 17 of similar form in the ends of extension wing-sills 18. Each of the wing-sill members is shown as having an outer side wall or abutment 19, and the sills 18 also have end abutments 20. The wing-sills when laid assume the position clearly shown in Fig. 2 of the drawings, the angles of the extensions being conveniently about one hundred and thirty-five degrees with the wing-sills. Resting upon the main wing-sills, with their inner and lower corners projecting into the spaces 14, are main wing-walls 21, which are curved at 22 to conform to the contour of the arch-sections and which contact along the adjacent outer surface with the abutments 13 of these sections. In the outer end of each of these walls 21 is shown an angular groove or recess 23, with which may coact the angular end 24 of an extension wing-wall 25, which rests upon the sill 18, the groove and projection being maintained against separation by the contact of the end of this wall with the companion abutment 20. The outer edges of the extension-walls are conveniently inclined at 26. Attached to the inner face of each of the main wing-walls is shown a brace or retaining member 27, at the lower end of which is a foot 28, projecting at substantially right angles and which may be anchored to any suitable member fixed within the embankment surrounding the structure.

As illustrated in Fig. 8, the wing-sills are formed in one piece 29, they being otherwise as previously described. This is particularly adapted for light work, in which the members would not be rendered unduly cumbersome. Obviously the wing-wall might be made in the same manner, if desired.

The various elements of my improved subway structure are preferably molded in concrete, being ready to assemble at the time the ground is broken for erection, this greatly facilitating progress, which is of much importance in connection with work upon rail-

roads and highways. After the earth has been removed, as is necessary, the sills are laid in their proper relation to one another and the arches and wing-walls placed thereon, as is shown in Figs. 1 and 2. The braces, which are preferably of steel or other suitable metal, are then secured to their anchors, and the earth is filled in over the structure. It will be seen that the sill-abutments take the outward or separating thrust between the elements and that these same abutments upon the arches prevent displacement between the wing-walls and the arch member, said wing-walls being further secured by their braces and by the coöperation between the grooves and projections in their adjacent ends. The sectional arrangement not only renders the transportation of the elements and erection easier, but also permits some movement under such strains as those arising from the heaving of the ground by frost, this preventing the structure from cracking. The inclination of the extension wing-walls directs water from each side toward the arch and prevents it from getting back of the walls and washing out the embankment.

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

1. A structure comprising an arch member, a main wing-sill projecting therefrom, an extension wing-sill lying at an angle to the

main wing-sill, and main and extension wing-walls resting upon the sills.

2. A structure comprising an arch member, a main wing-sill projecting therefrom, an extension wing-sill lying at an angle to the main wing-sill, one of said sills having a recess into which the other extends, and main and extension wing-walls resting upon the sills.

3. A structure comprising an arch member, a main wing-sill projecting therefrom, an extension wing-sill lying at an angle to the main wing-sill, and main and extension wing-walls resting upon the sills, one of said wing-walls having a recess into which the other extends.

4. A structure comprising an arch member, a main wing-sill projecting therefrom, an extension wing-sill lying at an angle to the main wing-sill, main and extension wing-walls resting upon the sills, and braces lying along the inner side of the main wing-wall and projecting substantially at right angles therefrom.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES SIMPSON.

Witnesses:

AUSTIN V. HITCH,
WILLIAM C. BRANDENBURG.