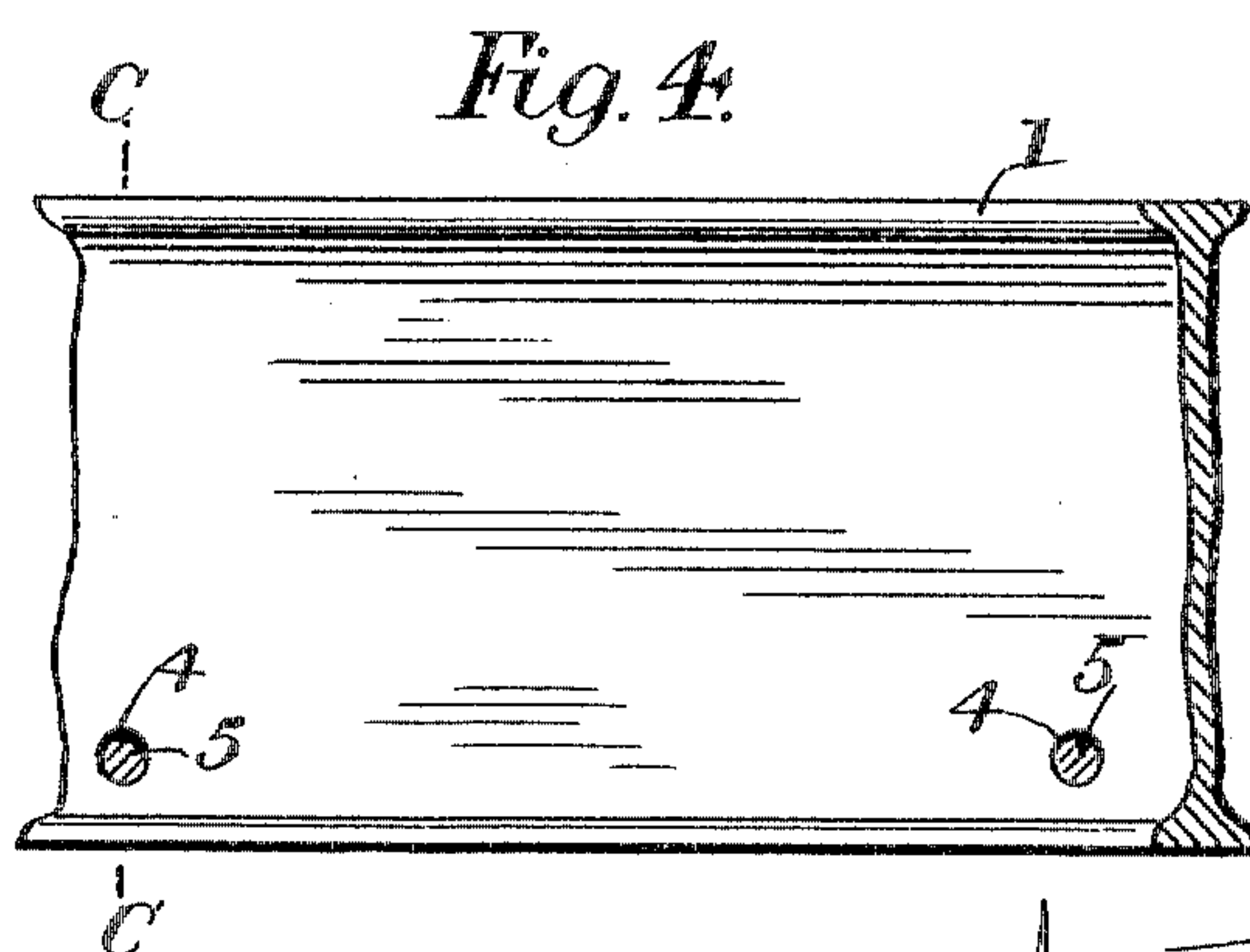
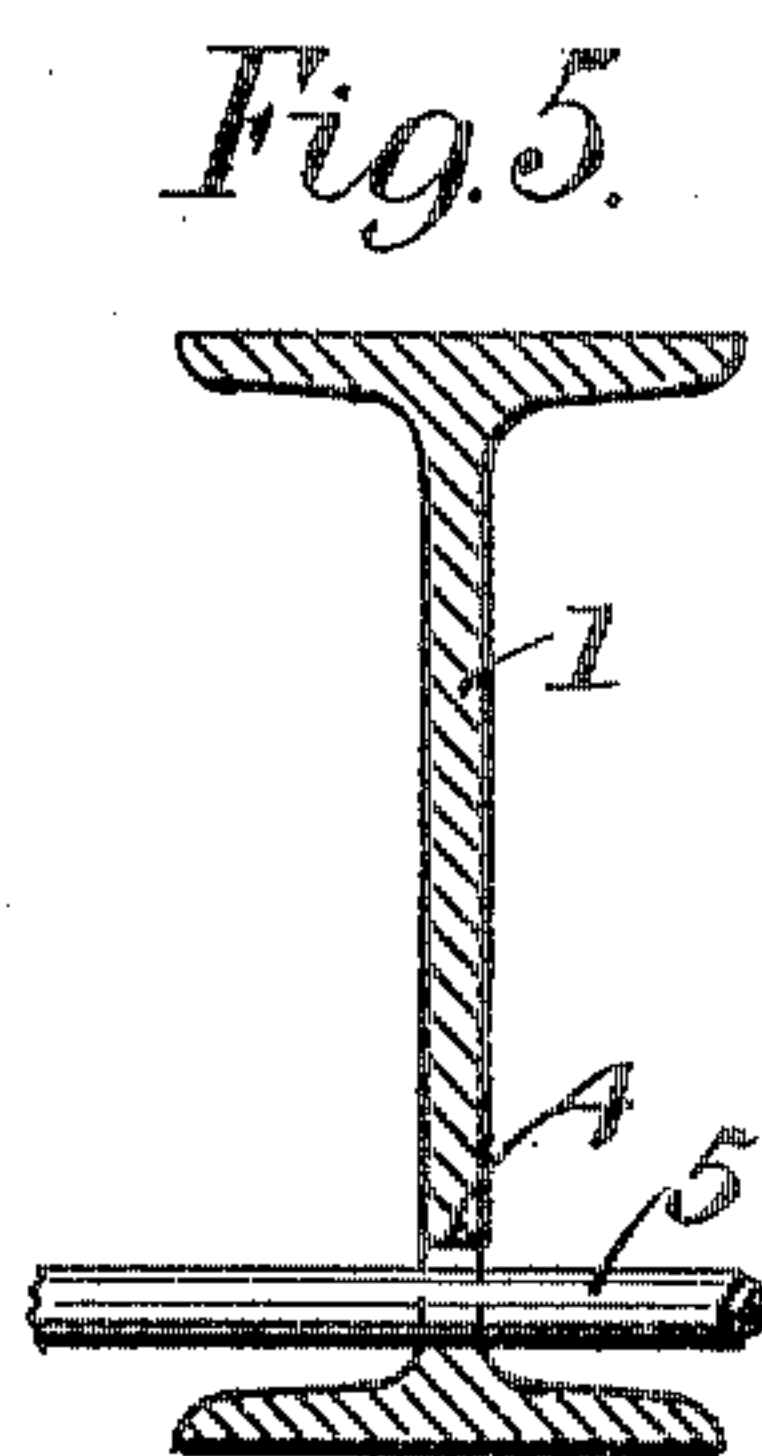
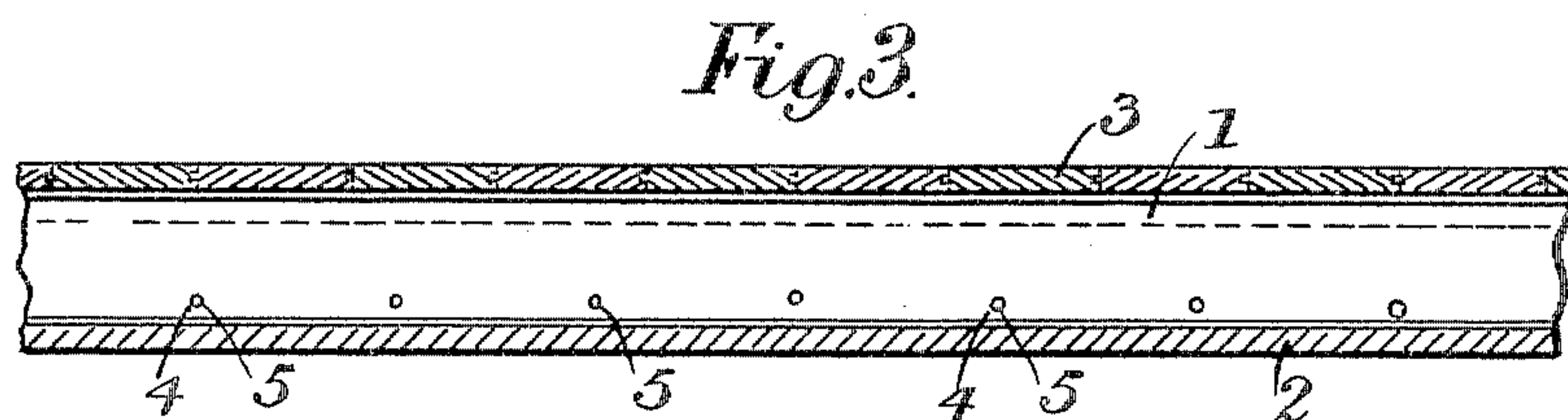
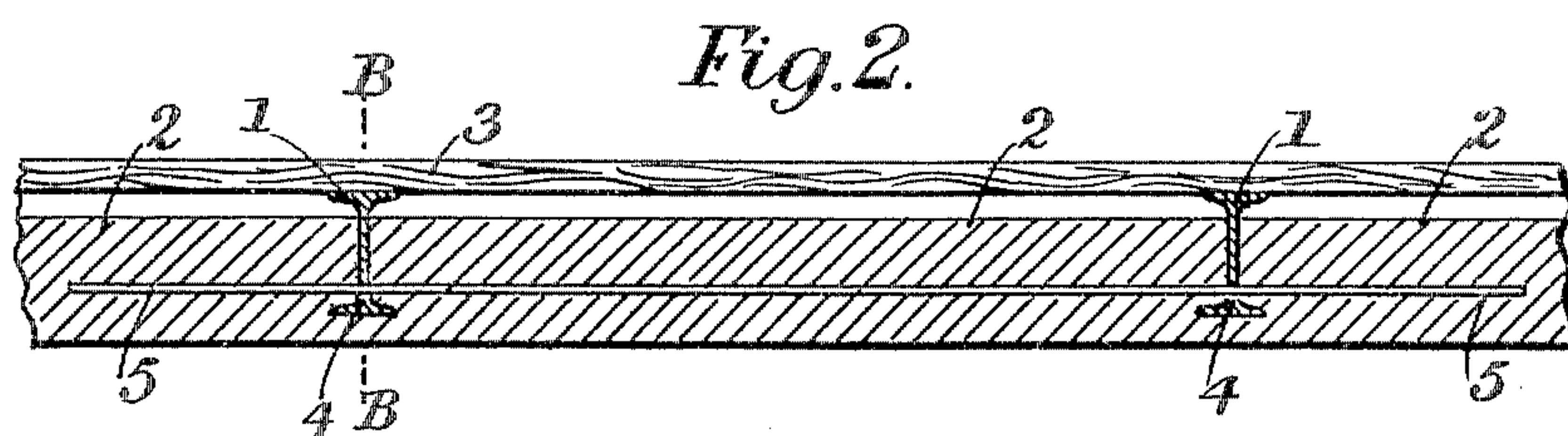
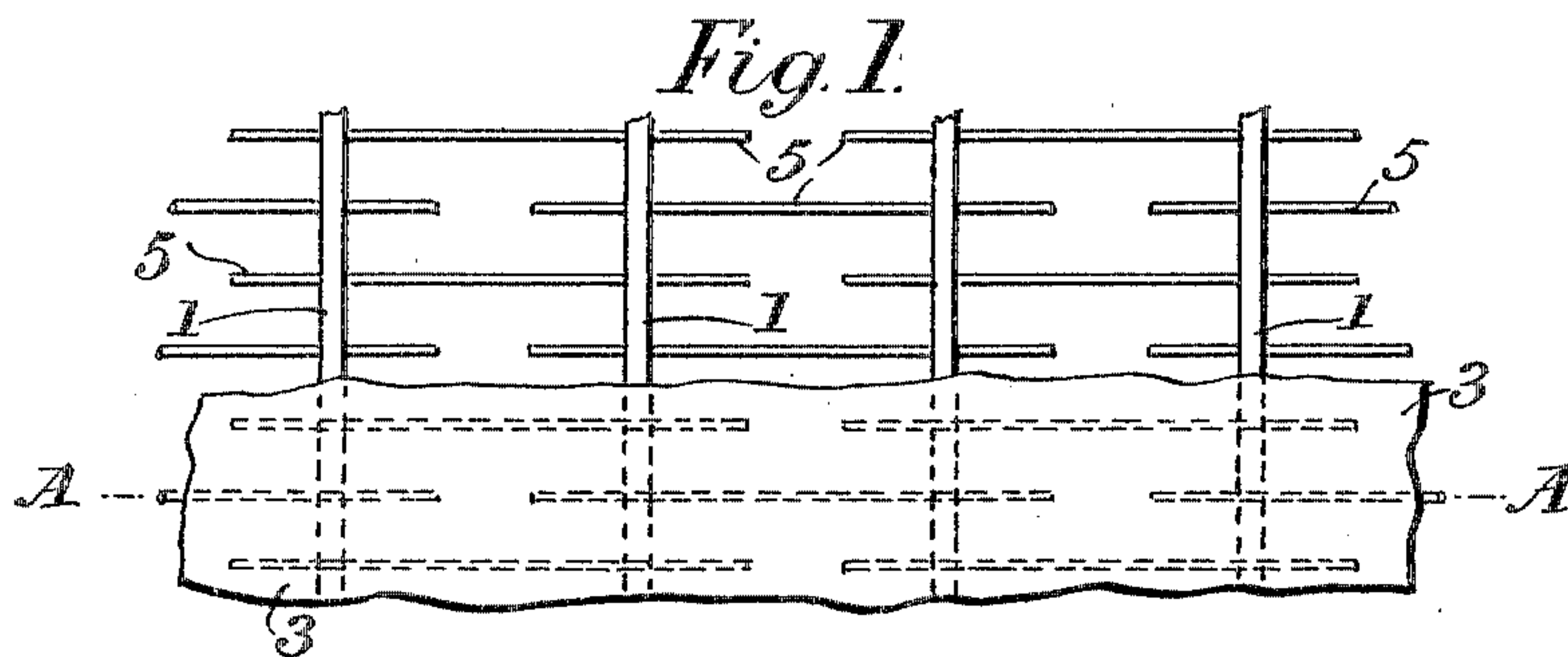


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APPLICATION FILED JAN. 12, 1904.

3 SHEETS—SHEET 1.

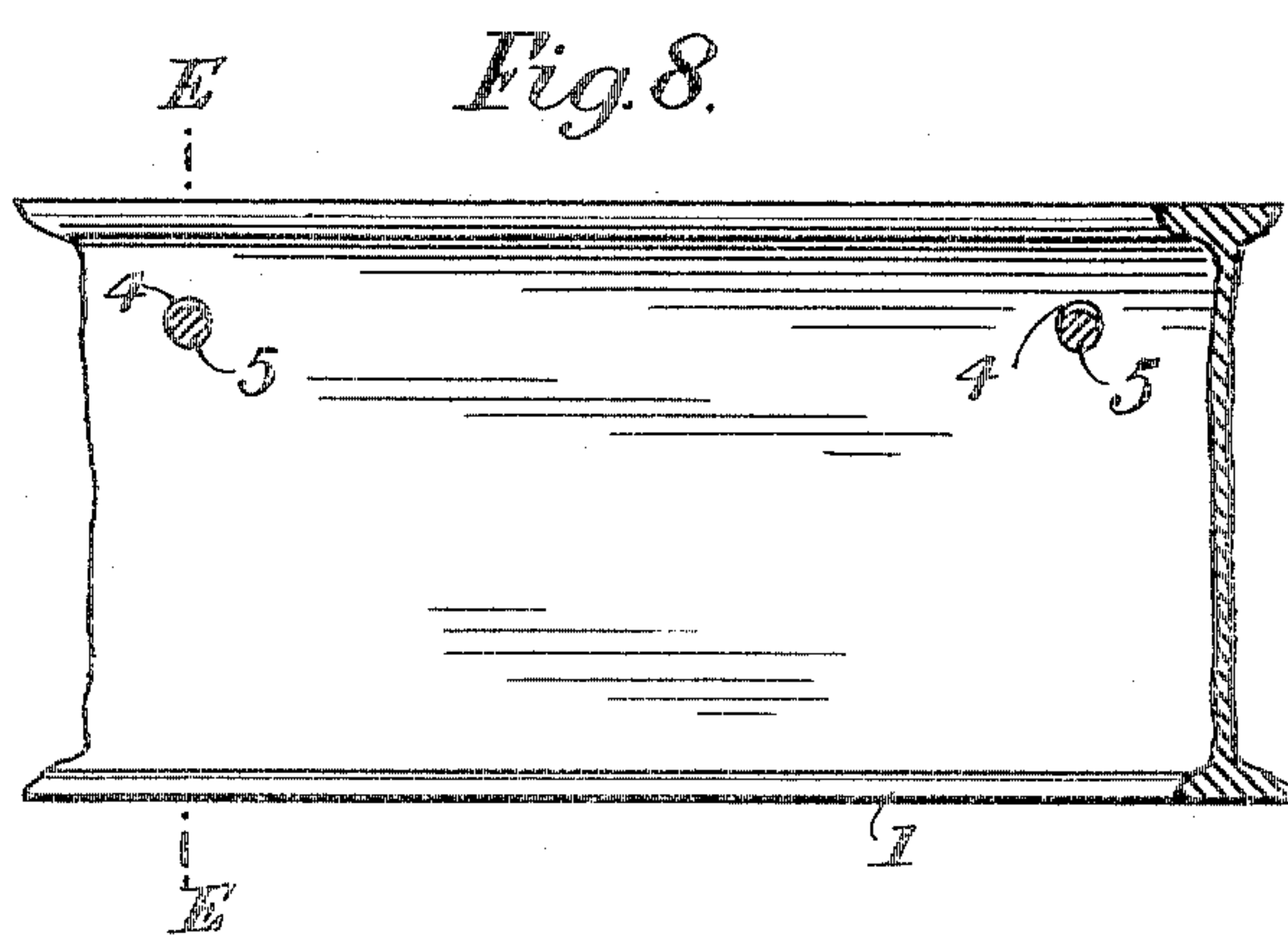
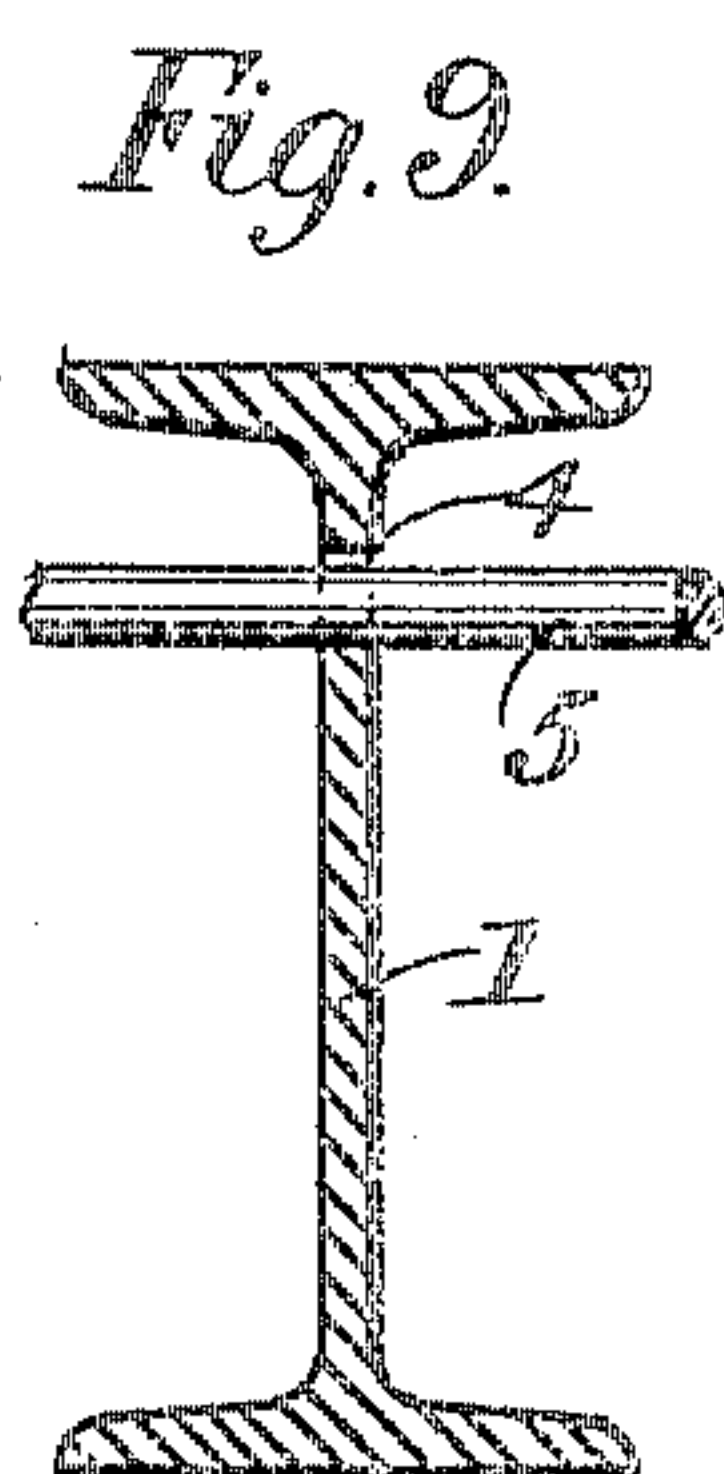
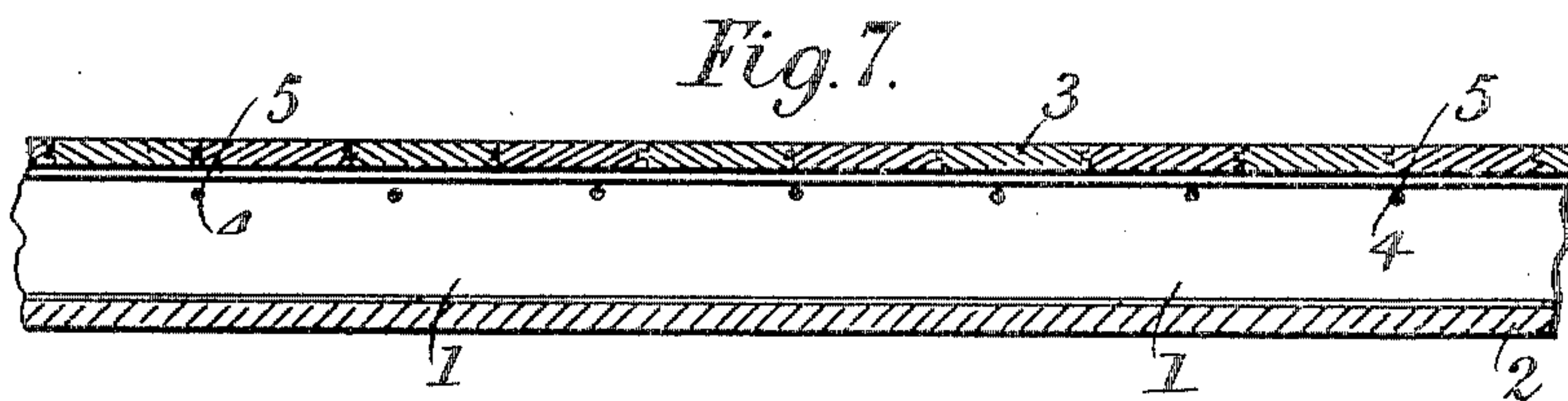
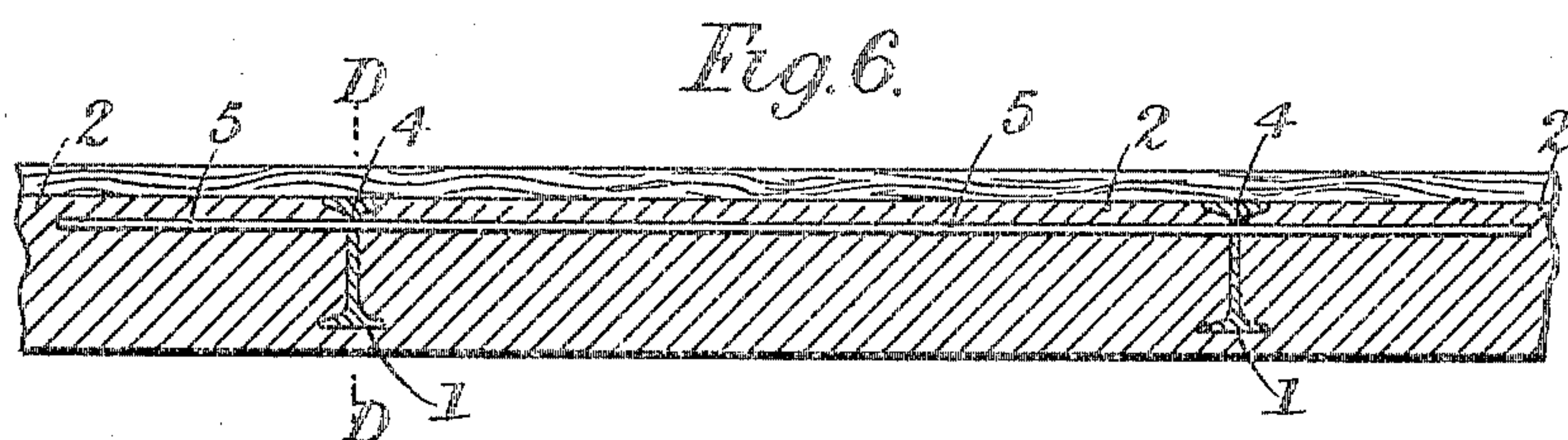


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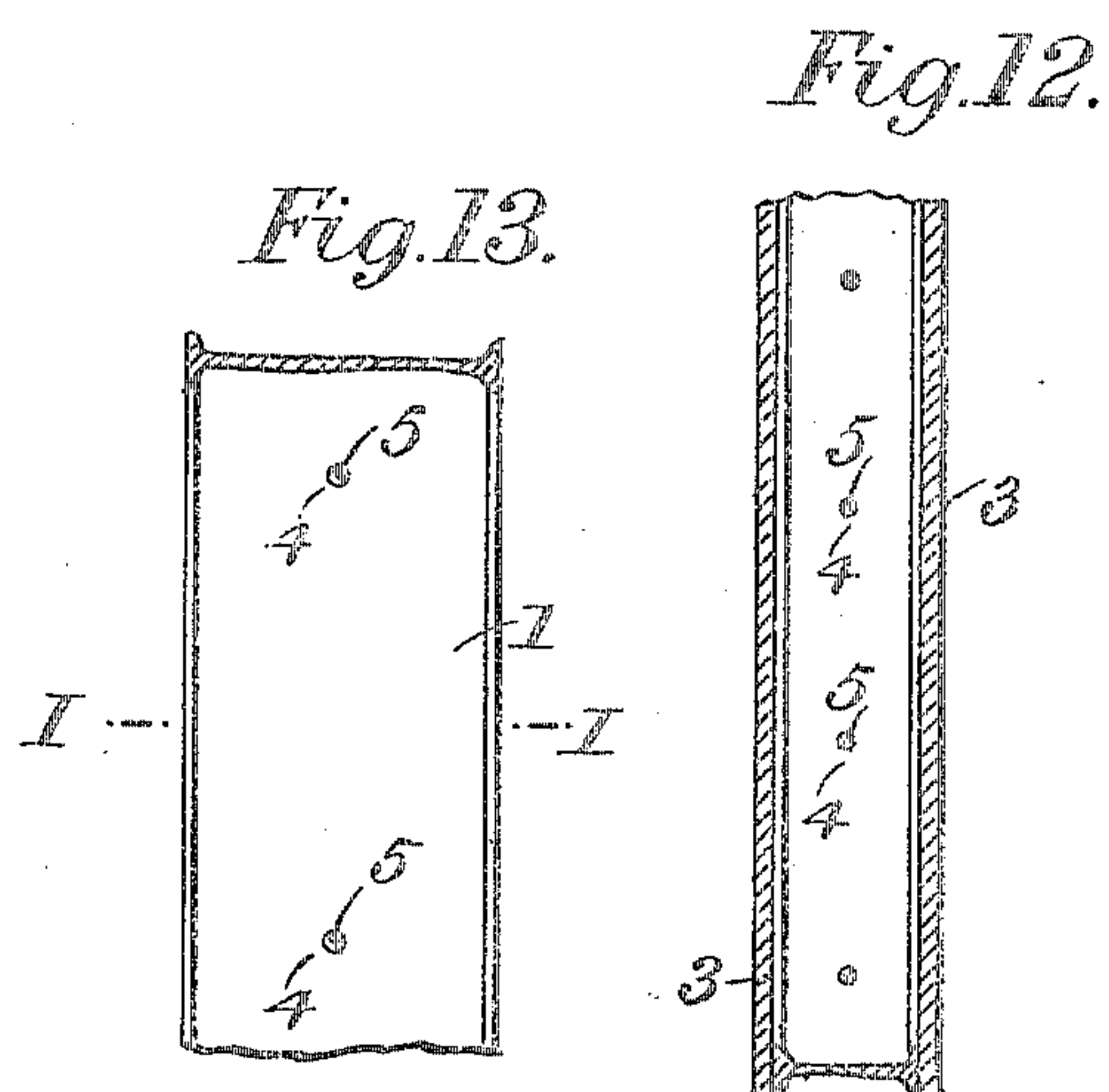
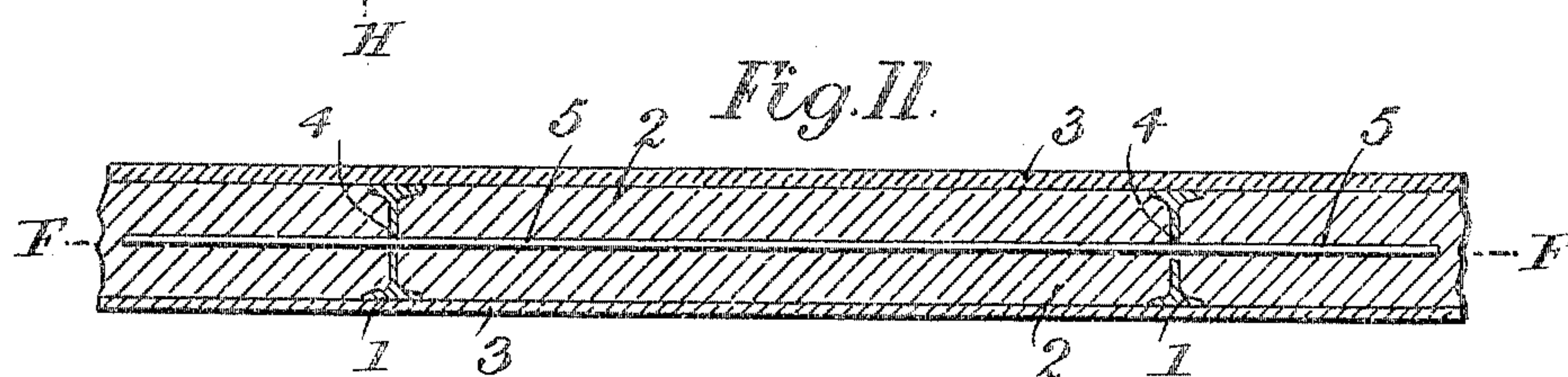
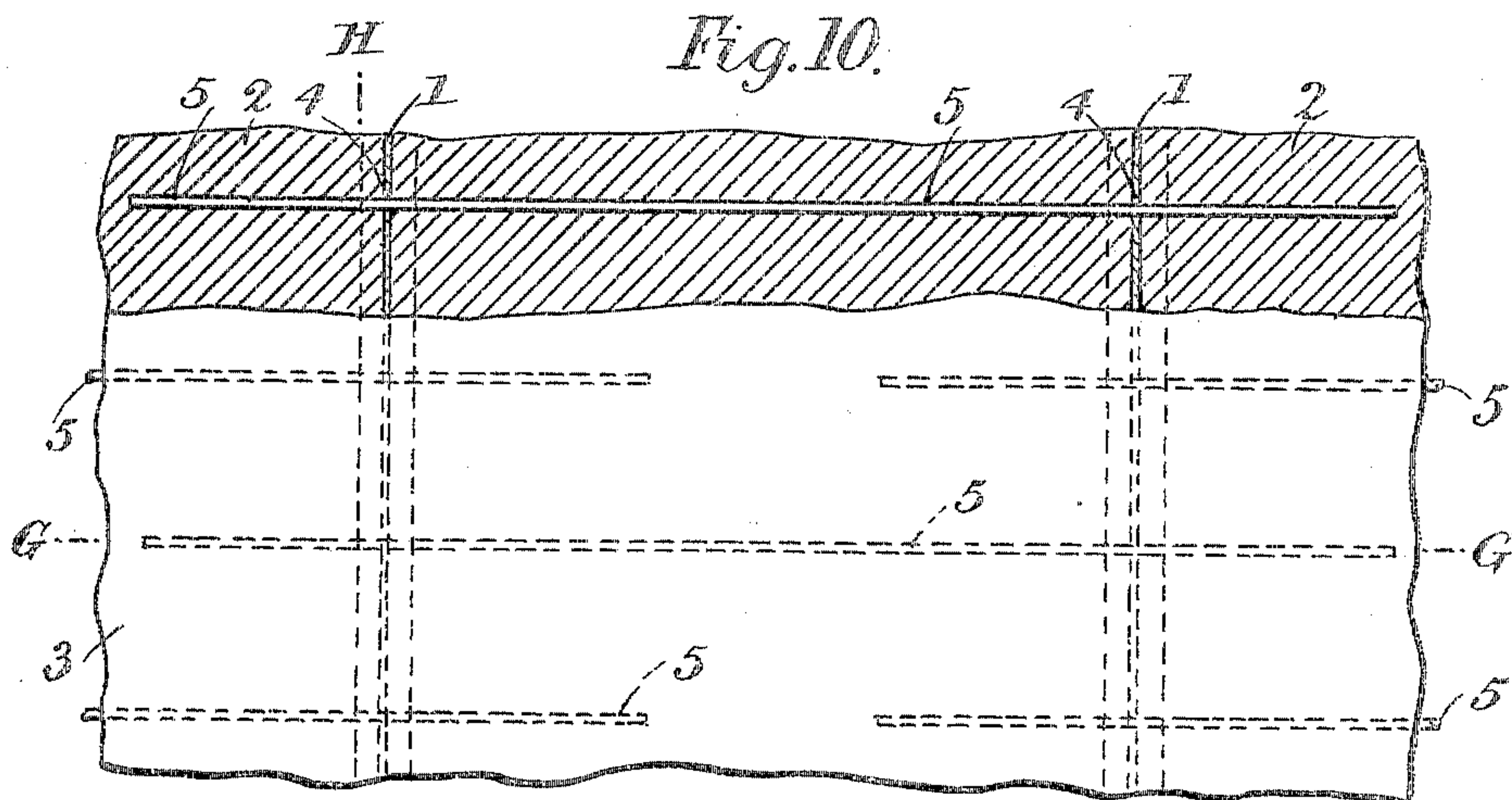
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*1904*  
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APPLICATION FILED JAN. 12, 1904.

3 SHEETS—SHEET 3.



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# UNITED STATES PATENT OFFICE.

ERNEST HOMAN, OF LONDON, ENGLAND.

## FIREPROOF FLOOR, &c.

SPECIFICATION forming part of Letters Patent No. 793,789, dated July 4, 1905.

Application filed January 12, 1904. Serial No. 188,676.

*To all whom it may concern:*

Be it known that I, ERNEST HOMAN, engineer, a subject of the King of Great Britain, residing at 17 Gracechurch street, in the city of London, England, have invented certain new and useful Improvements in or Connected with Fireproof Floors, Ceilings, Partitions, or the Like, of which the following is a specification, reference being had to the drawings hereunto annexed and to the reference-numerals marked thereon—that is to say—

In structures of that class which are known as "steel-and-concrete fireproof floors" the girders are sometimes tied together in pairs by means of bolts and nuts, which pass through holes in the girders and are embedded in the concrete; but this method of construction is necessarily expensive, added to which it does not afford an efficient tie to the concrete.

Now the primary objects of the present invention are to enable the bolts and nuts to be dispensed with, thereby cheapening the structure both as regards material and labor and to provide a more efficient tie for the concrete than heretofore.

In the accompanying drawings, Figure 1 is a plan, with part broken away, of a portion of a fireproof floor constructed according to the present invention. Fig. 2 is a vertical section taken on the line A A of Fig. 1. Fig. 3 is a vertical section taken on the line B B of Fig. 2. Fig. 4 is a side elevation of part of one of the girders, separately showing more particularly the arrangement of the tie-rods in connection therewith. Fig. 5 is a transverse section taken on the line C C of Fig. 4. Fig. 6 is a similar view to Fig. 2, illustrating a modification in the position of the tie-rods. Fig. 7 is a vertical section taken on the line D D of Fig. 6. Fig. 8 is a side elevation of part of one of the girders, separately illustrating more particularly the arrangement of the tie-rods in connection therewith. Fig. 9 is a transverse section taken on the line E E of Fig. 8. Fig. 10 is a sectional elevation of a partition constructed according to the present invention, the section being taken on the line F F of Fig. 11. Fig. 11 is a horizontal section taken on the line G G of Fig. 10. Fig. 12 is a vertical section taken on the line H H of

Fig. 10. Fig. 13 is an elevation of part of an upright, illustrating more particularly the arrangement of the tie-rods in connection therewith; and Fig. 14 is a horizontal section taken on the line I I of Fig. 13.

In the several figures like parts are indicated by similar reference-numerals, and Figs. 2, 3, 6, 7, and 10 to 12 are drawn to an increased scale, Figs. 13 and 14 are drawn to a further increased scale, and Figs. 4, 5, 8, and 9 are drawn to a still further increased scale with respect to Fig. 1.

Referring to Figs. 1 to 5, 1 represents the girders, 2 represents the concrete filling, and 3 represents the flooring. The webs of the girders 1 are near to the bottom flanges thereof, provided with holes 4 therethrough, and through each set of corresponding holes 4 in two adjacent girders 1 is passed a tie bar or rod 5, of iron or steel, of round or other suitable section. The tie bars or rods 5 are of such length that at their ends they project considerably beyond the webs of the girders into the adjacent bays or spaces between the girders, and they are so arranged that they pass through a group of every two adjacent girders alternately, as shown at Fig. 1, or the tie-rods might be of a length to pass through groups of three or more girders, although the arrangement above described is the preferred one. The elevation of the tie-rods 5 with relation to the usual centering employed to support the plastic concrete is so arranged that a space is always left between the former and the latter, into which the concrete 2 flows or is deposited so that it completely envelops the tie bars or rods 5. The tie bars or rods 5 by reason of the absence of bolts and nuts can be placed in position with great rapidity by any unskilled person, and therefore at comparatively little cost for labor. The concrete 2 firmly adheres to the tie bars or rods 5 throughout their entire length, thereby efficiently tying together the girders 1, while the ends of said bars 5 projecting beyond the webs of the girders 1 serve to materially strengthen the concrete 2 of the structure and more particularly that of the adjacent bays.

In the example given at Figs. 6 to 9 the con-



struction is similar to that hereinbefore shown and described with respect to Figs. 1 to 5, with the exception that the holes 4 in the webs of the girders 1 are formed near to the upper flanges thereof, and the concrete 2 is carried up to the flooring 3 of the building, so as to embrace the tie bars or rods 5.

In the example given at Figs. 10 to 14 is shown a partition constructed according to the present invention. In this case the usual uprights 1 are provided with holes 4 and the tie bars or rods 5 are passed through said holes 4 and are constructed and arranged in a similar manner to those shown and described with respect to Figs. 1 to 5, and temporary boarding having been applied to the exterior of the structure in the usual way the concrete 2 is then filled in around said tie-bars, and after the concrete has set the temporary boarding is removed and the partition finished off with plaster 3 or otherwise.

By the means hereinbefore described the girders, or in the case of partitions the uprights, are efficiently tied together, the concrete structure is largely strengthened, and by reason of the simple character of the tie-bars and the facility with which they can be placed in position the cost of constructing steel and concrete fireproof floors and partitions is materially reduced.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In a fireproof structure, the combination of a series of beams spaced from one another, each of the beams having a series of holes therein; a series of tie-rods passing loosely through said holes, adjacent tie-rods passing through different sets of beams and having their ends protruding outside of the beams; and a filling-mortar embracing the tie-rods and the beams.

2. In a fireproof structure, the combination of a series of beams spaced from one another, each of the beams having a series of holes therein; a series of tie-rods passing loosely through the holes of alternate groups of adjacent beams and having their ends protruding outside of the beams; and a filling-mortar embracing the tie-rods and the beams.

3. In a fireproof structure, the combination of a series of parallel beams, each of the beams having a series of holes therein; a series of tie-rods passing loosely through said holes, adja-

cent tie-rods passing through different sets of beams and having their ends protruding outside of the beams; and a filling-mortar embracing the tie-rods and the beams.

4. In a fireproof structure, the combination of a series of parallel beams, each of the beams having a series of holes therein; a series of tie-rods passing loosely through the holes of alternate groups of adjacent beams and having their ends protruding outside of the beams; and a filling-mortar embracing the tie-rods and the beams.

5. In a fireproof structure, the combination of a series of parallel beams, each of the beams having a series of holes therein; a series of parallel tie-rods passing loosely through the holes of alternate groups of adjacent beams and having their ends protruding outside of the beams; and a filling-mortar embracing the tie-rods and the beams.

6. In a fireproof structure, a series of girders or the like arranged parallel to one another, holes formed in the webs of said girders at suitable intervals, a series of tie-rods passed loosely through the holes said tie-rods being of a length to extend across a group of several adjacent girders and by their ends project beyond the same into the adjacent bays and alternately arranged across every group of girders and a filling of concrete embracing the tie-rods and the girders substantially as herein shown and described and for the purpose stated.

7. In a fireproof structure, the combination of a series of beams spaced from one another, each beam having holes therein, a series of tie-rods passing loosely through the holes of said beams and projecting into and terminating in the space between the beams, adjacent tie-rods passing through different sets of beams, and a filling-mortar embracing the tie-rods and the beams.

8. In a fireproof structure, the combination of a series of beams having holes therein, a series of tie-rods passing loosely through the holes of alternate groups of adjacent beams and terminating between the beams, and a filling-mortar in which the beams and the tie-rods are embedded, the tie-rods projecting outside of the beams a distance sufficient to have their free ends tied by the filling-mortar.

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Witnesses:

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A. NUTTING.