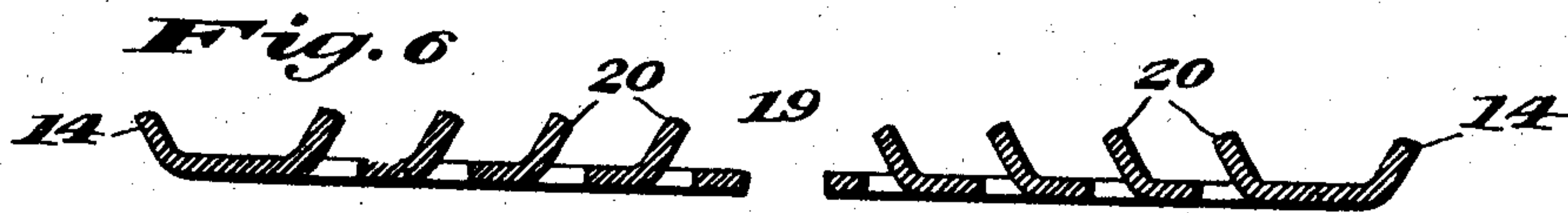
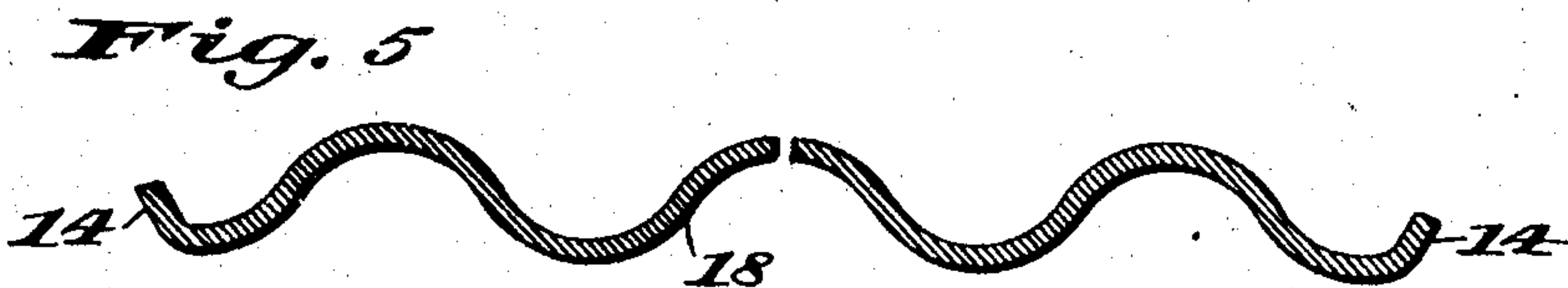
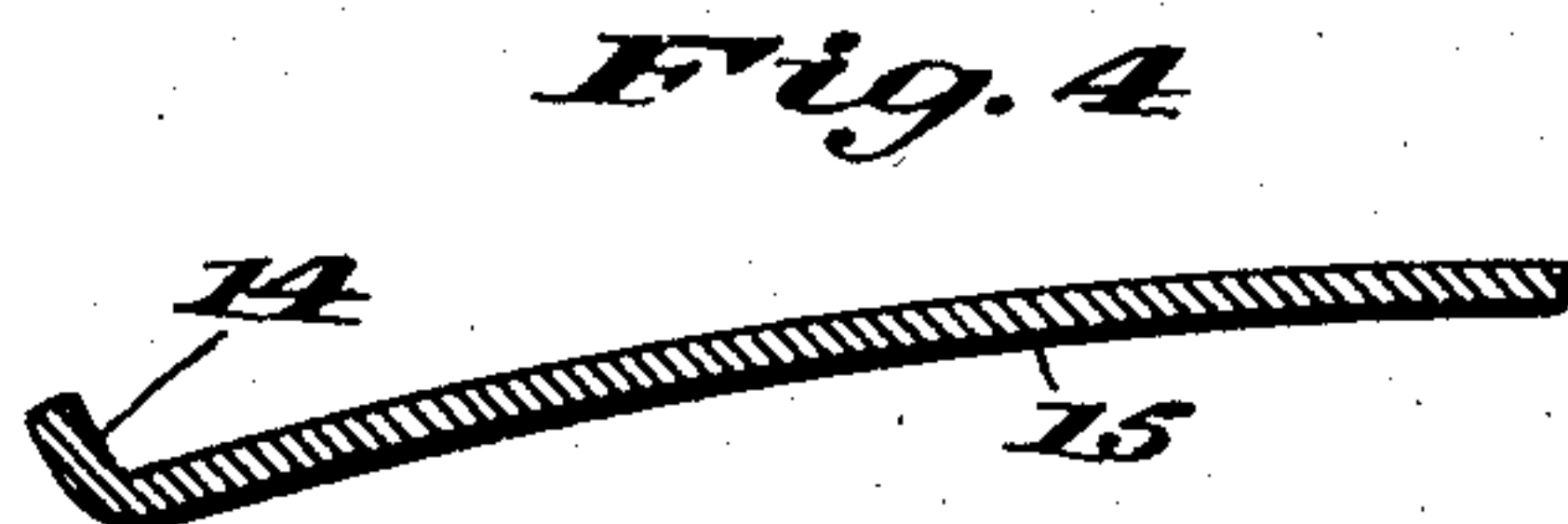
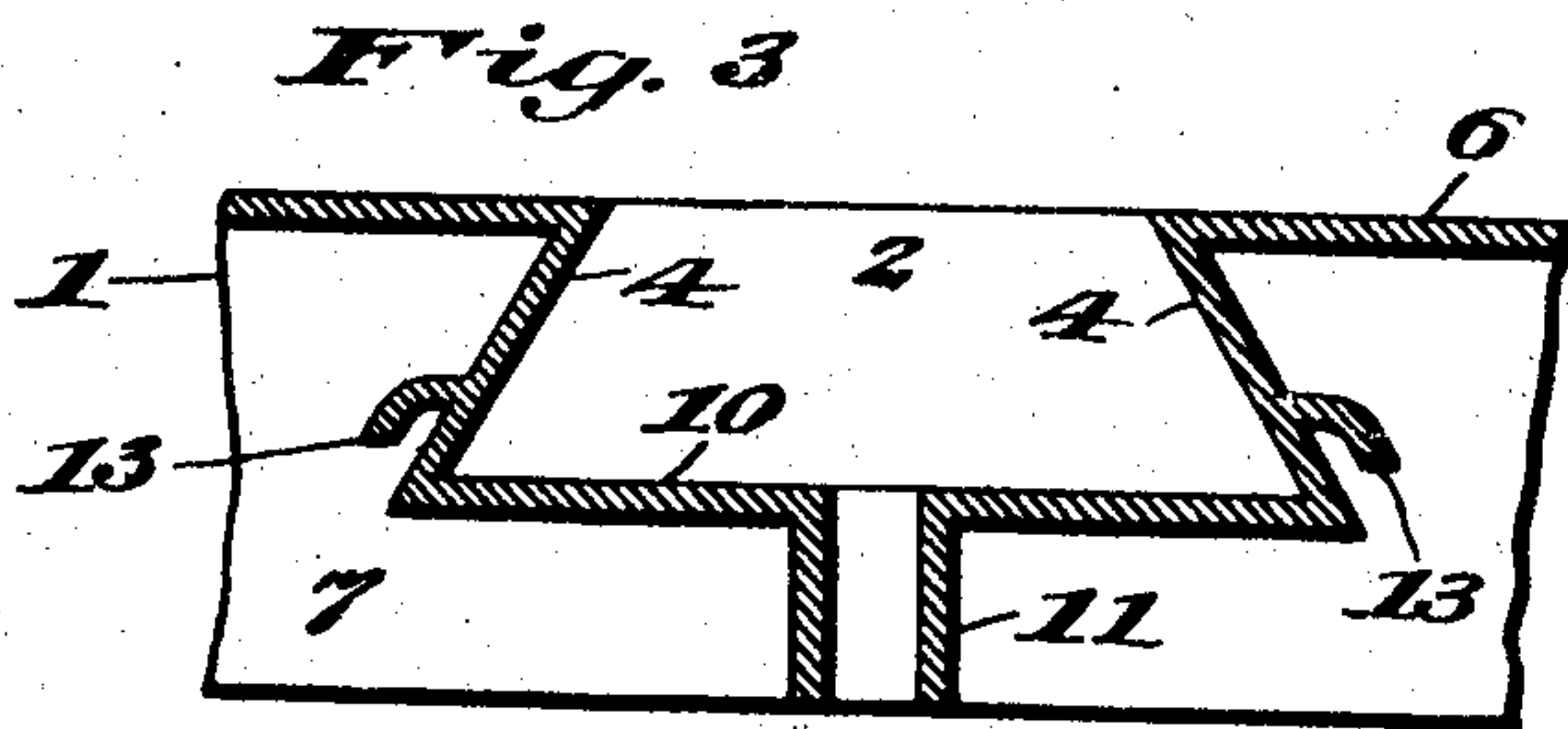
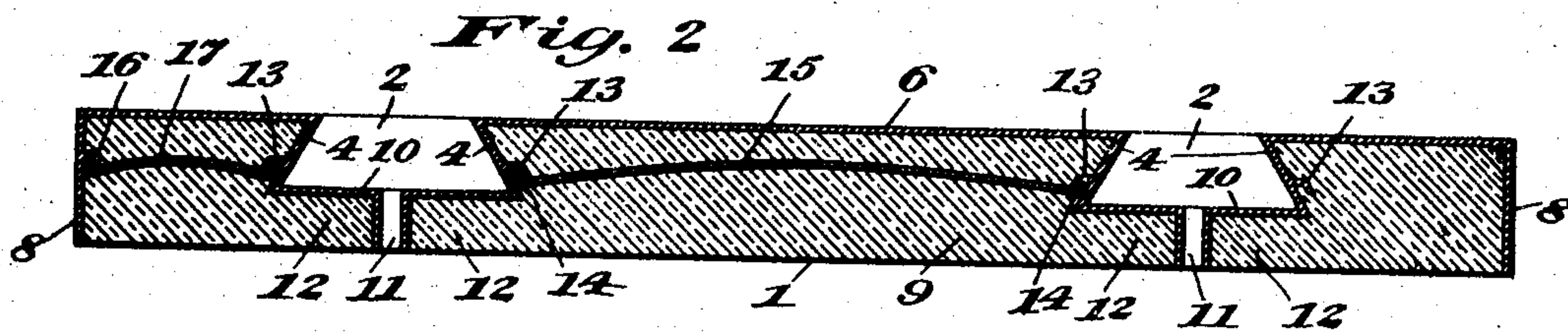
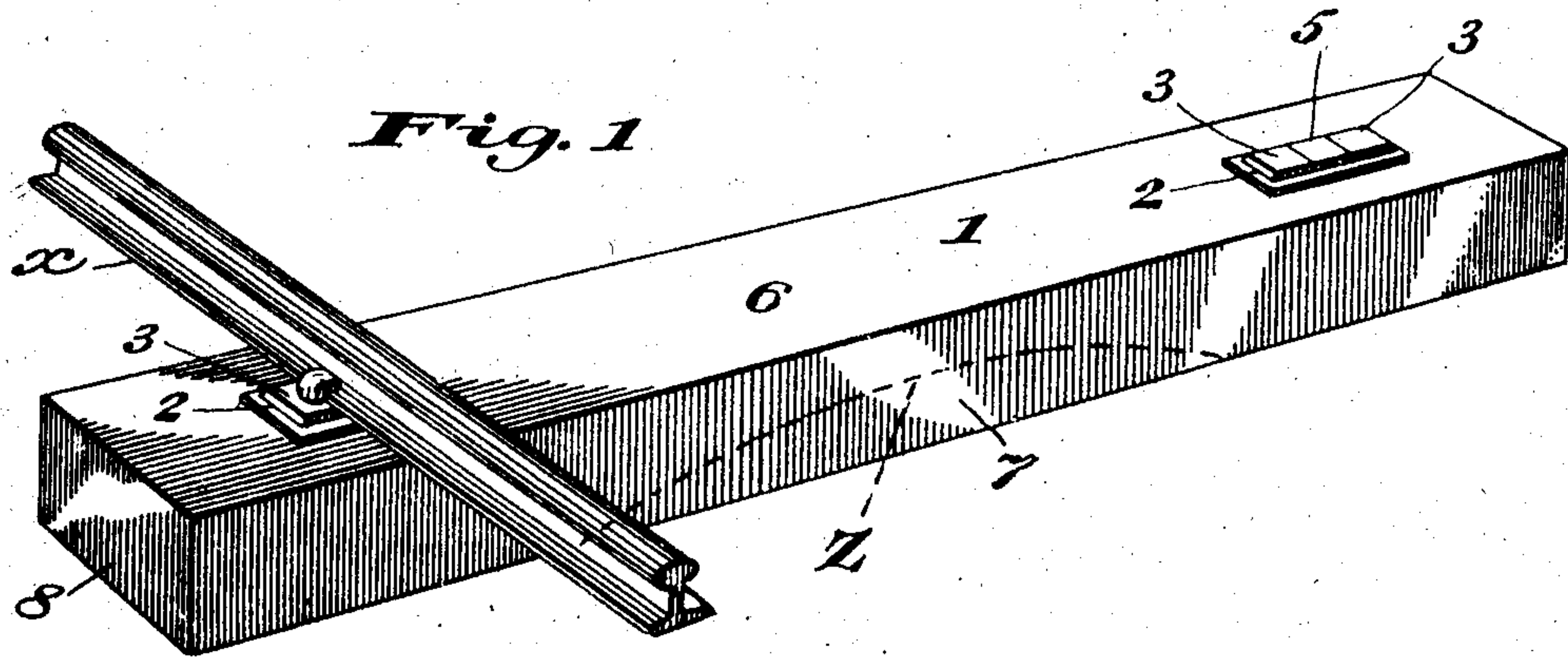


No. 780,755.

PATENTED JAN. 24, 1905.

E. S. KEEFER.  
RAILWAY CROSS TIE.  
APPLICATION FILED SEPT. 27, 1904.



**Witnesses**  
William Schuchardt  
M. C. Demman

**Inventor**  
Edward S. Keefer,  
By John Elias Jones,  
Attorney.



# UNITED STATES PATENT OFFICE.

EDWARD S. KEEFER, OF CINCINNATI, OHIO.

## RAILWAY CROSS-TIE.

SPECIFICATION forming part of Letters Patent No. 780,755, dated January 24, 1905.

Application filed September 27, 1904. Serial No. 226,249.

*To all whom it may concern:*

Be it known that I, EDWARD S. KEEFER, a citizen of the United States of America, and a resident of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Railway Cross-Ties, of which the following is a specification.

This invention relates to certain improvements in railway-ties, and more particularly in that class of such devices wherein concrete is employed for forming the body portion of the tie; and the object of the invention is to provide a device of this character having improved means of a simple and inexpensive nature for so bracing and strengthening the concrete body portion of the tie as to prevent disintegration thereof due to the pounding and jarring caused by the passage of trains along the track wherein the improved tie is used.

The invention consists in certain novel features of the construction, combination, and arrangement of the several parts of the improved railway-tie whereby certain important advantages are attained and the device is made simpler, cheaper, and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In the accompanying drawings, which serve to illustrate my invention, Figure 1 is a perspective view showing a railway-tie constructed according to my invention; and Fig. 2 is a section taken lengthwise through the improved tie, omitting the rail-supporting blocks. Fig. 3 is an enlarged section taken through the portion of the shell or casing of the tie at the point of location of the rail-attaching means. Fig. 4 is a partial view showing one end portion of the bracing means provided for strengthening the concrete body portion of the tie. Fig. 5 is a partial section, broken at center, showing a modified form of said bracing means; and Fig. 6 is a view similar to Fig. 5, but showing still another modified form of said bracing means.

In the views, 1 indicates the tie as a whole, and 2 2 indicate sockets or seats provided near

opposite ends of the upper part of said tie for the reception of rail-attaching means, which may be of the character shown and claimed in my pending patent application, Serial No. 218,847, filed July 30, 1904, although I do not desire to be understood as limiting myself in this particular, since other forms of rail-attaching means may also be employed. As shown, however, the rail-attaching means comprises wooden blocks 3 3, having beveled end surfaces for engagement upon oppositely-beveled and undercut surfaces produced at the end walls of the sockets or seats 2 2 and held in position by means of a locking-block 5 driven between them. The rail  $x$  is held by means of spikes driven into the blocks 3 3, and the beveled end surfaces of the socket or seat are indicated at 4 4 on the drawings. Lag-screws or the like may also be used.

As shown on the drawings, the improved railway-tie 1 is constructed with a metallic casing or shell, having a continuous closed top 6 unbroken except at the points of location of the seats or sockets 2 2 and also provided with unbroken and continuous sides 7 and ends 8, the bottom of said shell or casing being, however, open, so that when the shell or casing is laid in inverted position with its open bottom uppermost the concrete mass may be poured in at the bottom to fill the interior of the shell or casing, as seen at 9. The seats or sockets 2 2 have metallic walls, which are herein shown as integral with the metallic shell or casing of the tie, and the concrete body portion 9 fills the interior of the shell or casing and surrounds those portions of the walls of the seats or sockets which depend within the shell, so as to afford a very solid and strong construction. On hardening the concrete body portion 9 adheres firmly to the shell or casing and to the walls of the seats or sockets 2, so that said body portion is not liable to be readily cracked and separated from the shell.

The seats or sockets 2 2 are provided with bottom walls 10, elevated above the bottom of the improved tie, so that a layer of concrete is afforded beneath each seat or socket, as shown at 12 in the drawings, which layer is, however, of less thickness and strength than



the thicker concrete portions of the tie, and at the bottom of each seat or socket 2 is a centrally-arranged and downwardly-directed tubular extension 11, integrally produced upon the bottom wall 10, the bore of said extension serving for the introduction of a tool at the bottom of the tie for engagement upon the locking-block, so that the same may be driven from its position between the spike-receiving blocks 3 3 to permit removal and replacement thereof. The oppositely-inclined end walls 4 4 of the respective seats or sockets 2 2 are provided upon their outer surfaces with hook-like projections 13 13, which are directed downwardly and are adapted for engagement over the upwardly-bent end portions 14 of a central reinforce or brace, which is indicated at 15 on the drawings and may be produced from a sheet of metal arched upwardly at its central portion. The reinforce or brace 15 will be embedded in the concrete body portion 9 of the tie in the process of manufacture thereof, and said brace or reinforce will operate in the finished tie to strengthen the same so that cracking and disintegration of the concrete substance will be avoided, the brace or reinforce acting to tie the portions whereat the seats or sockets 2 2 are located to each other by reason of the engagement of its end portions 14 beneath the hooks 13 on the end walls of the seats or sockets. If desired, also the end walls 8 8 of the shell or casing may be provided with hooks 16, similar to and alined with the hooks 13 on the ends of the seats or sockets, and auxiliary end braces or reinforcers 17 of arched or other form may be engaged with said hooks and with the hooks 13 on the outer walls of the seats or sockets, as seen at the left in Fig. 2, to strengthen the end portions of the improved tie. The braces or reinforcers thus arranged and the tubular extensions 11 will operate also to support the upper part of the concrete body portion 9, so as to lessen the downward pressure exerted thereby and which would otherwise tend to loosen the layer 12 of concrete from beneath the seats or sockets, especially when acting in conjunction with the pounding and jarring of trains, which is of course exerted directly above the seats 2.

From the above description of my invention it will be evident that the improved railway-tie is of an extremely simple and inexpensive nature and is especially well adapted for use by reason of its great strength and solidity and also of the bracing and strengthening means comprising the shell and braces or reinforcers extended between and engaged with the end walls of the seats for the rail-attaching devices, which strengthening means insures against disintegration of the concrete body portion and consequent spreading of the rails, and it will also be obvious from the above description of my improvements that the de-

vice is susceptible of some modification without material departure from the principles and spirit of the invention, and for this reason I do not wish to be understood as limiting myself to the precise form and arrangement of the several parts of the device herein set forth in carrying out my invention in practice. For example, in Fig. 5 I have shown a modified form of the brace or reinforce for tying together the seats or sockets 2 2 of the tie, which consists in a piece or strip of sheet metal 18 of serpentine or wavy form in longitudinal cross-section and having upturned end portions 14 for engagement beneath the hooks 13 on the end walls of the seats or sockets. Also in Fig. 6 I have shown a modified form of brace or reinforce consisting of a strip or piece 19 of metal, the end portions of which are upbent, as shown at 14, for engagement with the hooks 13 and the central portion of which is serrated, as shown at 20, for better engagement with the concrete body portion 9 of the tie wherein it is to be embedded. Also in Fig. 1 I have shown a rectangular tie as to shape; but I do not wish to be understood as limiting myself to this precise form. For instance, the top surface could be concaved centrally to allow for drainage or the bottom could be centrally cupped or hollowed out, as shown by the dotted curved line Z, said Fig. 1, so as to prevent the tie from becoming what is commonly termed "center-bound" and to reduce the weight of the tie and corresponding cost of production. Also the metallic shell or casing may be cast, wrought, or pressed in one or more pieces or parts to assume the required form.

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

1. A railway-tie comprising a metallic shell open at its bottom and filled with concrete and having sockets produced at its ends to receive rail-attaching devices.

2. A railway-tie comprising a metallic shell open at its bottom, a concrete body portion within said shell, and sockets produced on the shell adjacent to the ends thereof and extended down within the concrete body portion to receive rail-attaching devices.

3. A railway-tie comprising a metallic shell open at its bottom and having, adjacent to opposite ends, internal portions wherein are produced sockets to receive rail-attaching devices.

4. A railway-tie comprising a concrete body portion, casings at the opposite ends thereof and embedded in said body portion to receive rail-attaching devices and a brace or reinforce extended within the body portion between said casings and having at its ends means for engagement therewith.

5. A railway-tie comprising a concrete body portion, casings at the opposite ends thereof and embedded in said body portion to receive rail-attaching devices and a brace or reinforce



embedded in the concrete body portion between said casings and having a central upwardly-arched portion and ends adapted for engagement with the end walls of the casings.

5 6. A railway-tie comprising a concrete body portion, casings at the opposite ends thereof and embedded in said body portion to receive rail-attaching means and having on their end walls hook-like projections and a brace or re-  
10 inforce embedded in said concrete body portion between the casings and having upturned end portions engaged with the hook-like projections on the end walls of the casings.

15 7. A railway-tie comprising a concrete body portion, casings at the opposite ends thereof and embedded in said body portion and downwardly-directed tubular extensions centrally produced upon the bottoms of the casings with bores leading from the under side of the tie to  
20 the bottom of the casings.

8. A railway-tie comprising a metallic shell open at its bottom and having at opposite ends

internal casings wherein are produced seats to receive rail-attaching devices, hook-like projections upon adjacent ends of said casings, a 25 brace the ends of which are engaged with the hook-like projections on the ends of the casings and the central portion whereof is extended between the casings and a concrete body portion filling the interior of the shell 30 around said casings and wherein said brace is embedded.

9. A railway-tie comprising a metallic shell open at its bottom and filled with concrete, the latter forming the body portion of the tie and 35 having its bottom centrally arched or concaved, the longitudinal sides of the said metallic shell conforming thereto.

Signed at Cincinnati, Ohio, this 20th day of September, 1904.

EDWARD S. KEEFER.

Witnesses:

WILLIAM SCHUCHARDT,  
JOHN ELIAS JONES.