

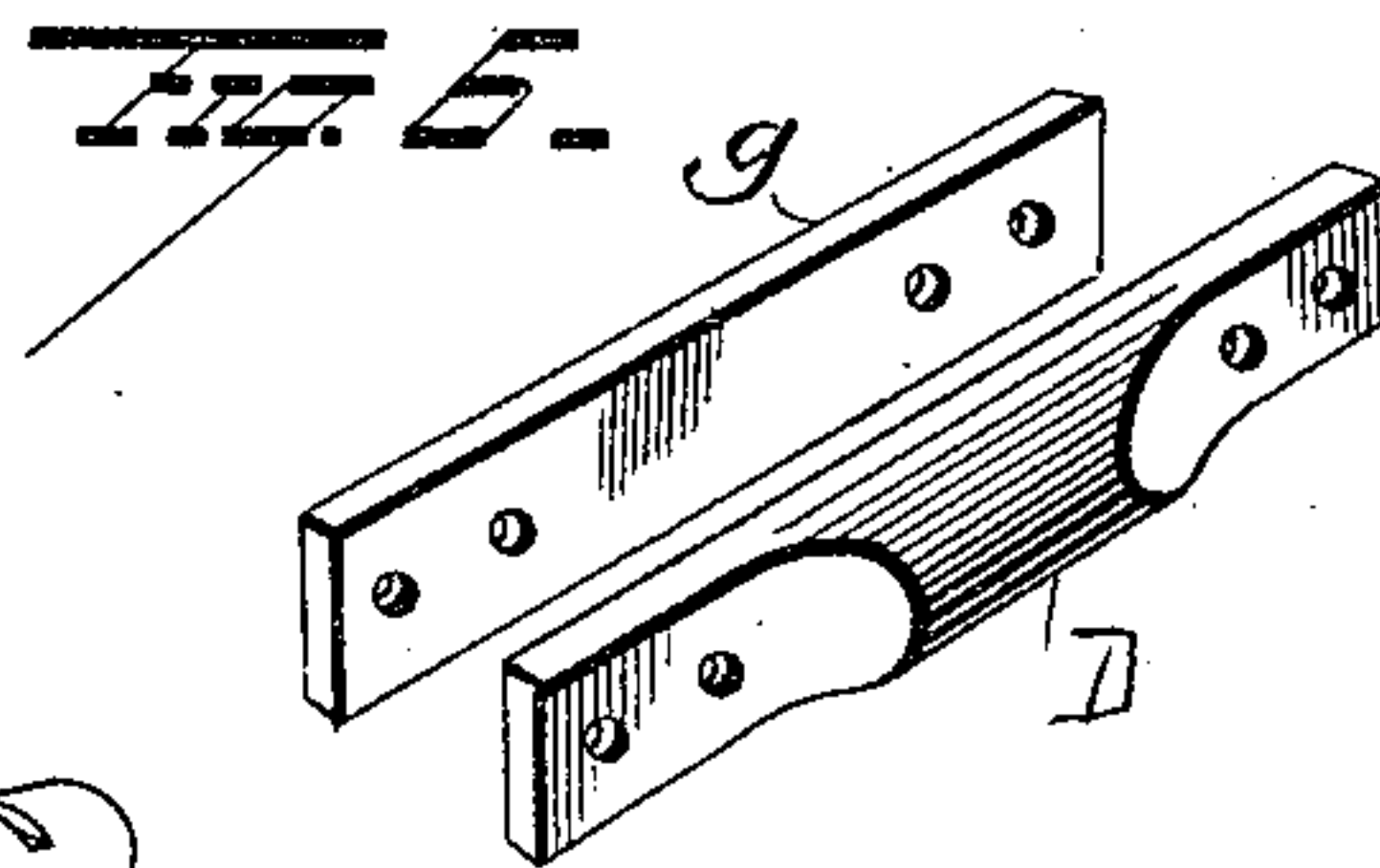
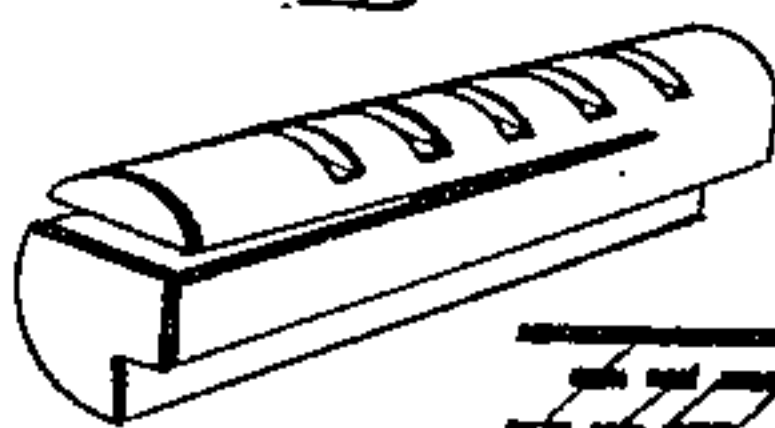
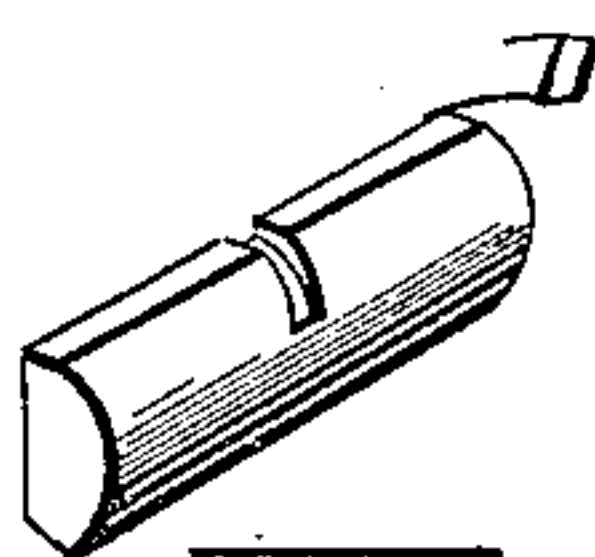
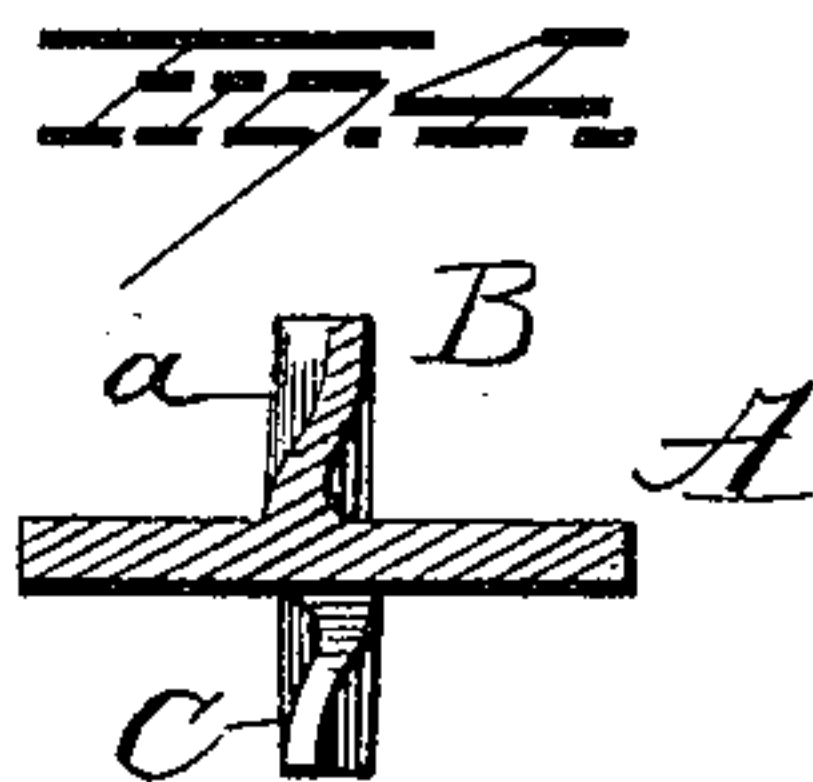
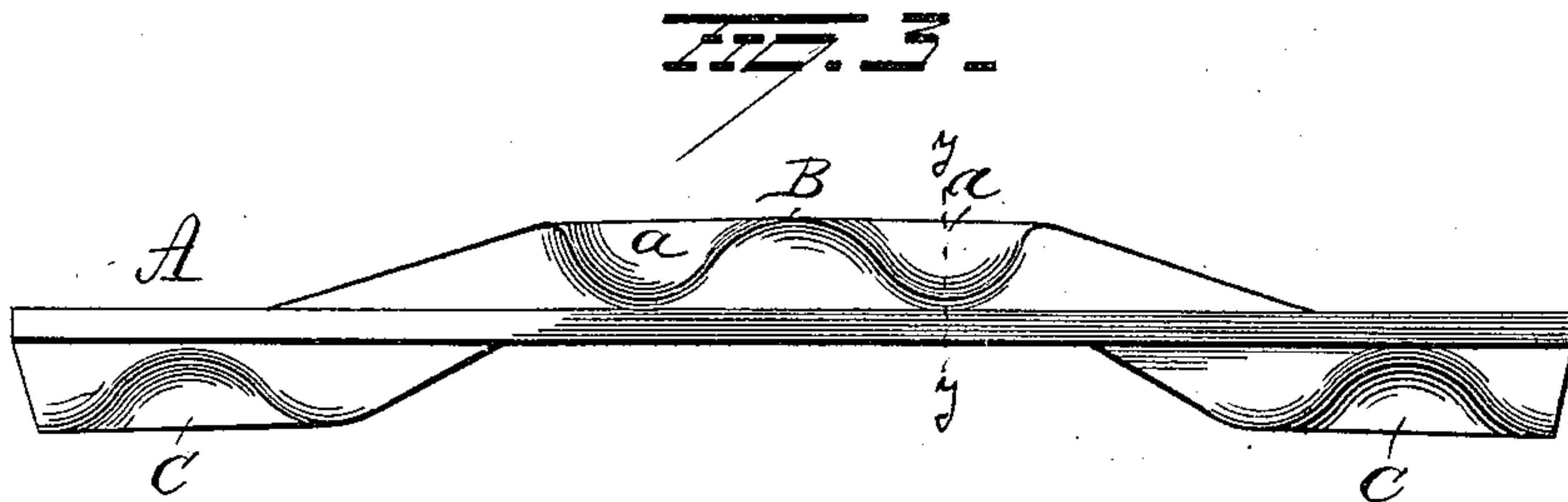
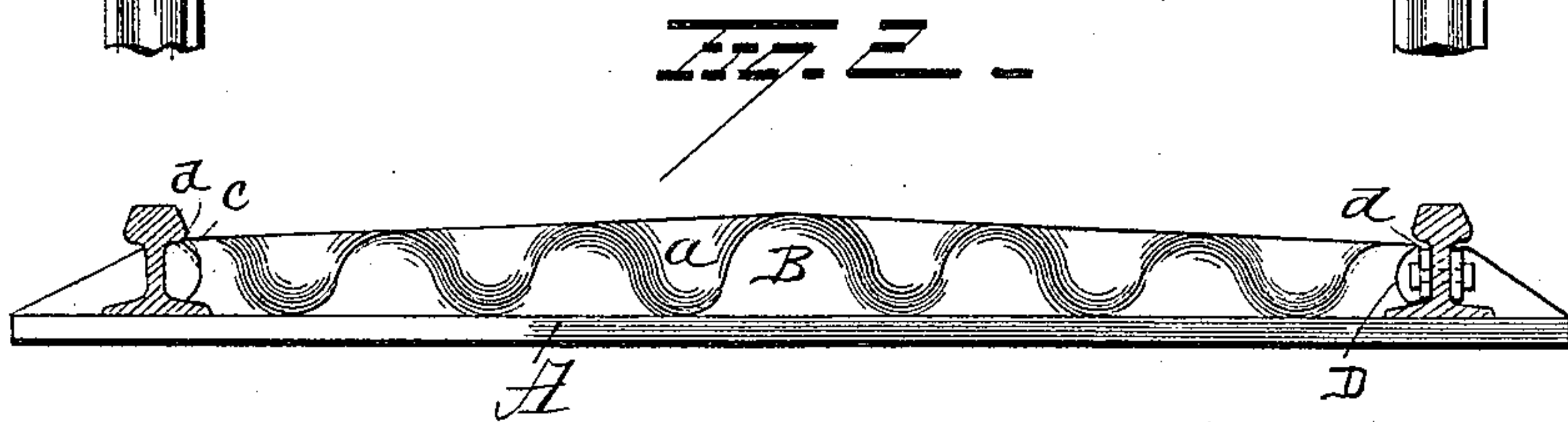
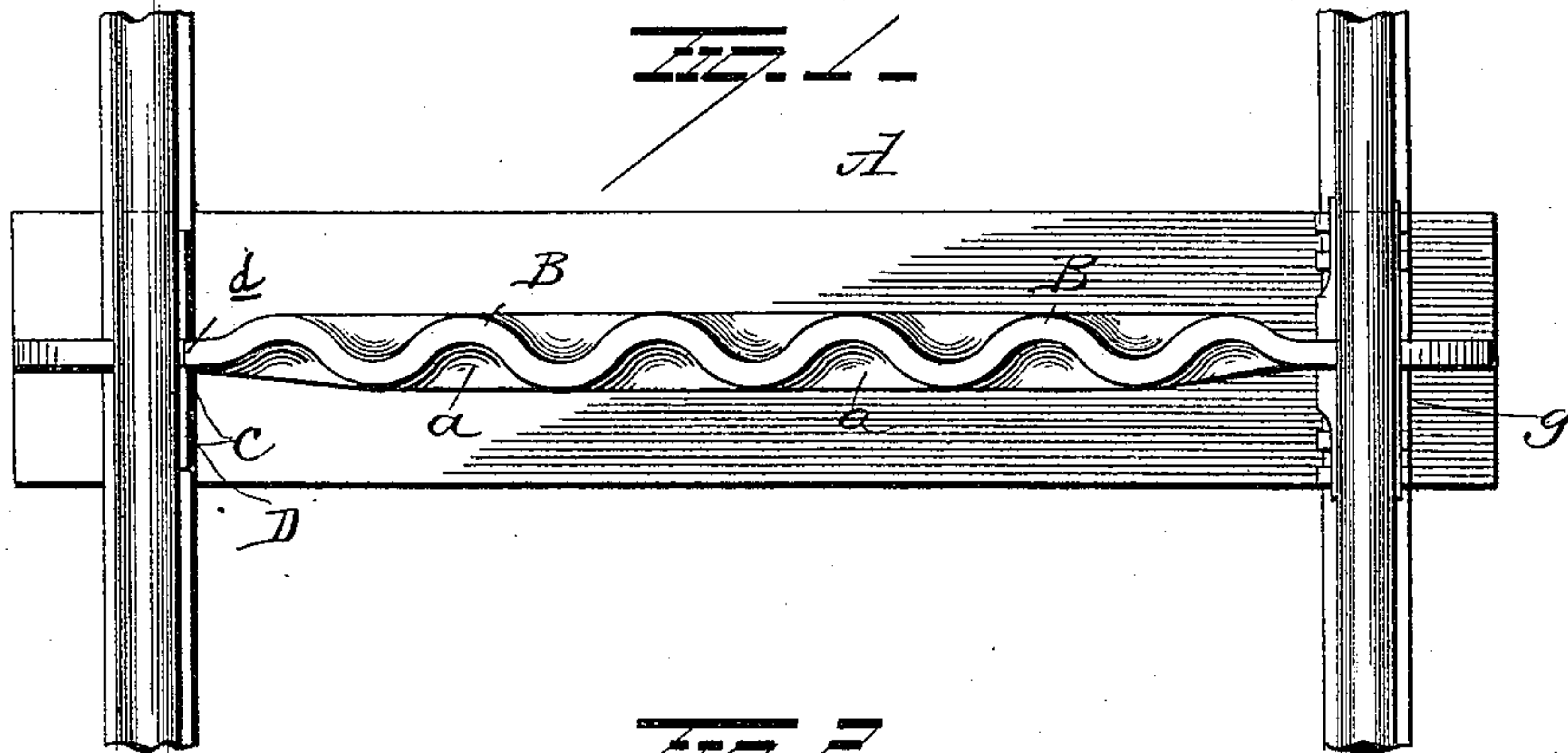
(No Model.)

2 Sheets—Sheet 1.

L. L. FROST.  
RAILROAD TIE.

No. 451,120.

Patented Apr. 28, 1891.



Witnesses  
*E. H. Houghton*  
*L. J. Downing*

Inventor  
*L. L. Frost*  
By his Attorney  
*H. A. Seymour*

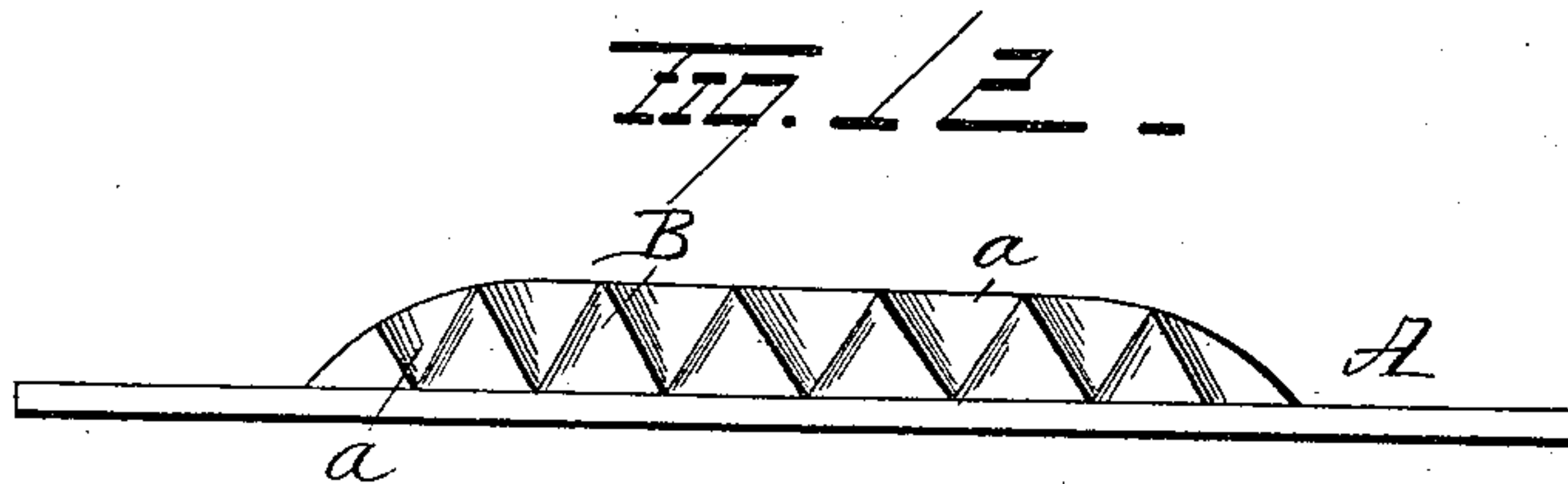
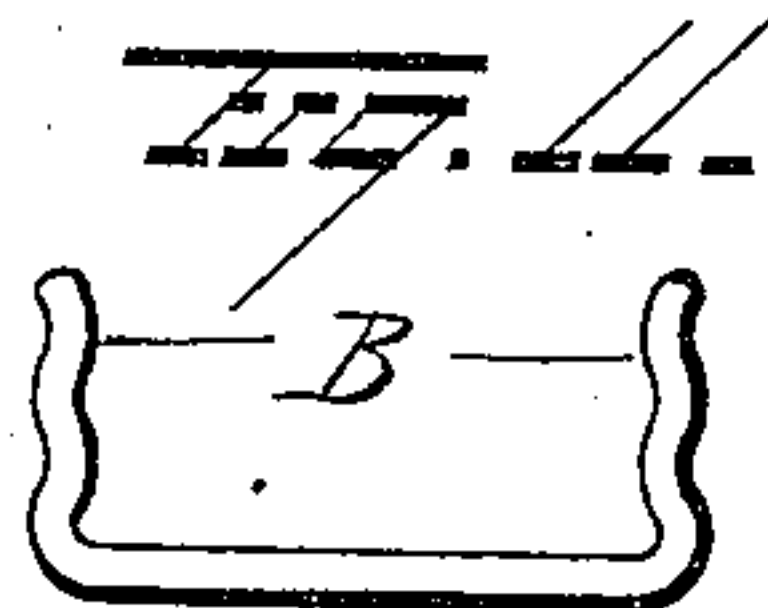
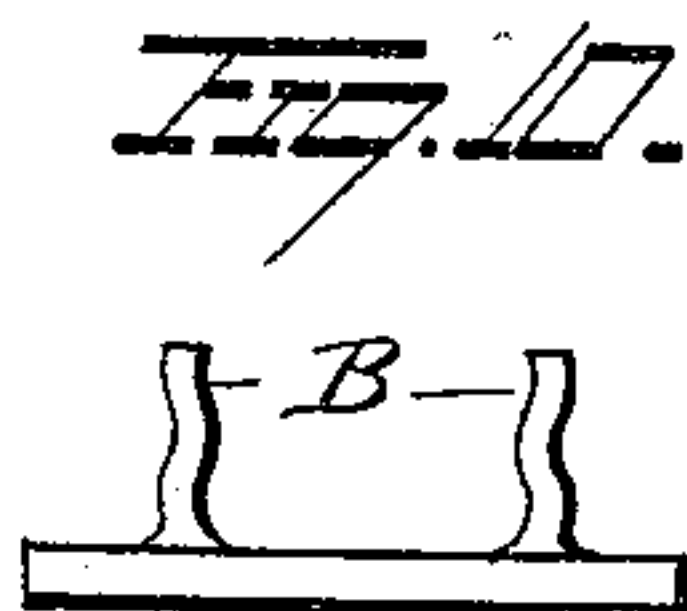
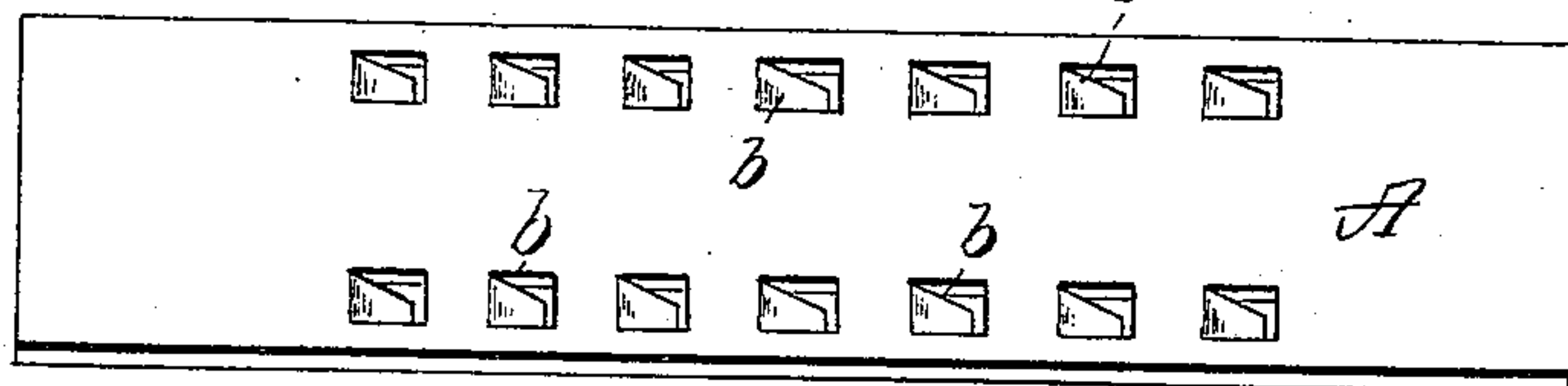
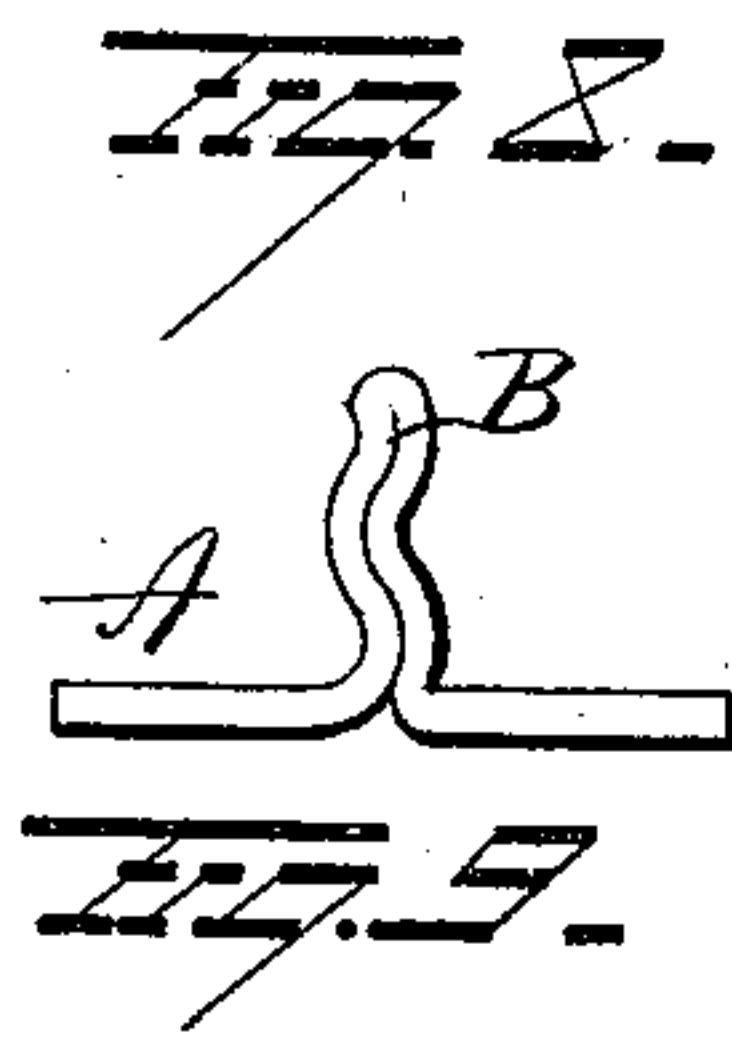
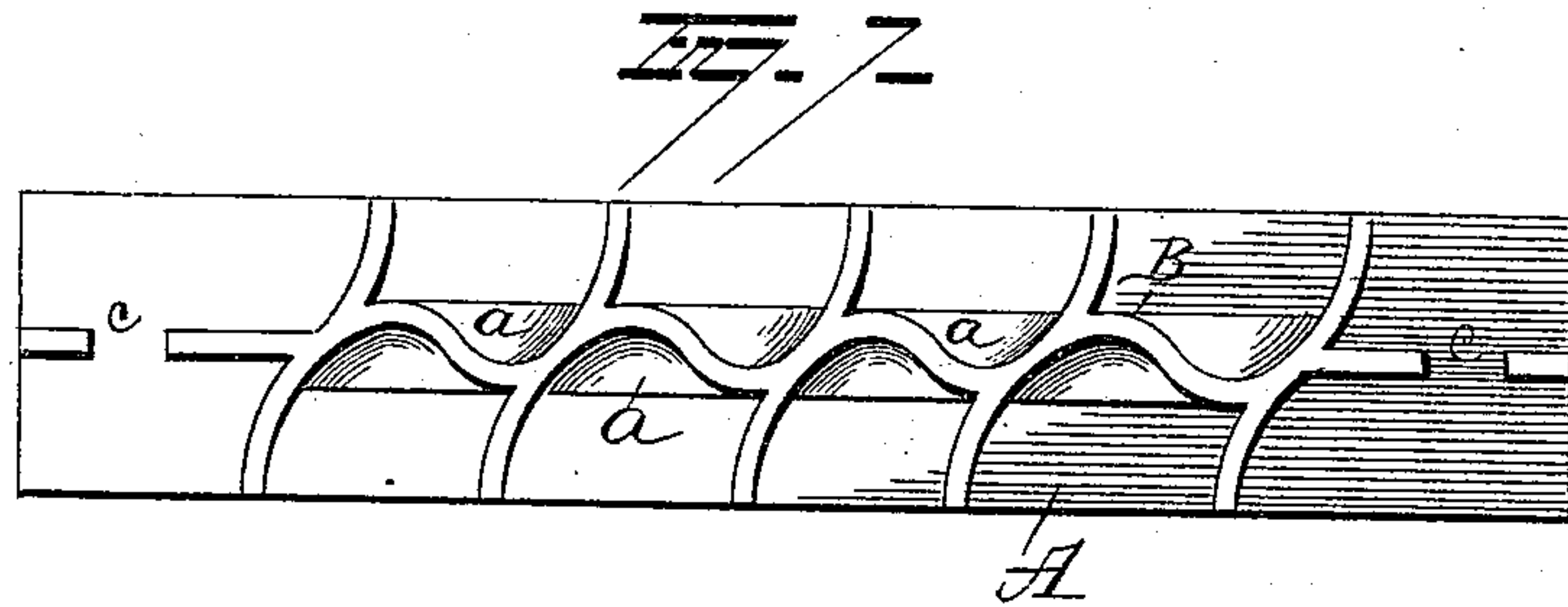
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2 Sheets—Sheet 2.

L. L. FROST.  
RAILROAD TIE.

No. 451,120.

Patented Apr. 28, 1891.



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# UNITED STATES PATENT OFFICE.

LEONARD L. FROST, OF BARADA, NEBRASKA.

## RAILROAD-TIE.

SPECIFICATION forming part of Letters Patent No. 451,120, dated April 28, 1891.

Application filed June 30, 1890. Serial No. 357,258. (No model.)

*To all whom it may concern:*

Be it known that I, LEONARD L. FROST, a citizen of Barada, in the county of Richardson and State of Nebraska, have invented certain new and useful Improvements in Railroad-Ties; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in metallic railway-ties, and has for its object to so construct a tie that it shall be capable of withstanding strain where such strain is the greatest.

A further object is to construct a railroad-tie in such manner that it shall be capable of sustaining strain and at the same time possess a due amount of elasticity.

A further object is to so construct a railroad-tie that it shall be substantial and be secured against lateral displacement.

A further object is to provide a flanged railroad-tie with means for securing the rails thereto.

With these objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as hereinafter set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is an elevation of my improved tie. Fig. 2 is a side elevation. Fig. 3 is a view showing the flanges on both faces of the tie. Fig. 4 is a section on the line  $y y$  of Fig. 3. Figs. 5, 6, and 6<sup>a</sup> are views illustrating the construction of the keys for securing the rails to the tie. Fig. 7 is a plan view of the tie, showing a central rib provided with corrugations, and radial corrugations in the top face of the tie. Figs. 8, 9, 10, 11, and 12 are views illustrating modifications.

A represents a metallic railroad-tie having a central flange B on the top face thereof, said flange extending from end to end of the tie, as shown in Fig. 1. The flange or rib B is made deepest at the center and gradually diminishes in depth to the opposite ends of the tie, whereby the tie is strengthened or re-enforced at the center, where the greatest portion of the strain must be sustained.

In each face of the flange or rib B a series

of corrugations or recesses  $a$  are made, the corrugations in one face alternating with those of the other. These corrugations may be made in any desired number, size, and form, and each series extends from end to end of the rib B. Said corrugations or recesses may extend but part of the depth of the flange, or they may extend the full depth thereto, or if desired they may be extended laterally across the face of the tie, as shown in Fig. 7.

By providing the rib or flange B with corrugations or recesses, as above described, the tie will lose none of its firmness and strength, but will overcome undue rigidity of the tie and secure the desired amount of elasticity necessary for a railroad-tie.

Instead of forming one rib B running through the center of the tie from end to end thereof, two such ribs may be provided at opposite sides of the longitudinal axis thereof, as shown in Fig. 10, or the material composing the tie may be turned up at its longitudinal edges to produce the corrugated ribs, as shown in Fig. 11. If desired, the corrugated rib or flange B may be terminated at points near the end of the tie, as shown in Fig. 12, instead of extending it entirely to the extremities, as above described.

When the ties are to be placed in position for a curved track or on a grade, it is preferable to produce corrugated flanges on both faces thereof to prevent lateral movement of the tie. A convenient mode of doing this is illustrated in Figs. 3 and 4, in which the top rib B is made to terminate at points somewhat removed from the ends of the tie, and ribs C on the under face of the tie made to extend from points at opposite sides of the center of the tie to the ends thereof. In lieu of producing the corrugated ribs C on the under face of the tie, said tie may (when made of sheet metal) be cut to produce a series of flanges  $b$ , Fig. 9, which may be bent downwardly and adapted to enter the ground. When the tie is not made of sheet metal, these flanges may be made integral with the under face of the tie. The tie may, if desired, be made of sheet metal, the flange B being bent, as shown in Fig. 8, and corrugated, as above described.

In order to provide seats for the rails, the flange B will be provided with notches  $c$ , one



wall of which is made to conform to the contour of the web and flange of the rail, while the other wall is made curved for the reception of a key D, the upper extremity of the curved wall terminating in a shoulder *d* immediately beneath the tread of the rail. The key D is made wedge-shaped and is adapted to conform to the contour of the web and flange of the rail on one side and be wedged into the space between the web and flange of the rail and the curved wall of the slot or notch in the flange B, a groove being made in said wedge or key to receive the shoulder *d*. When it is desired to unite two rails, the key D is made larger, as shown in Fig. 6, and provided with perforations for the accommodation of securing-bolts which pass through said key and through the web of the rail, said bolts also passing through a fish-plate *g* on the opposite side of the web of the rail. The wedge may be made by doubling a piece of metal properly to fit the inside of the rail and curved wall of the notch in the rib or flange B, with a groove or grooves formed in the upper side to interlock with shoulder *d*, thereby forming a wedge with sufficient elasticity to lock itself as the shoulder reaches the groove in the upper side of said wedge when driven up.

I do not wish to be understood as limiting myself to the exact details of construction herein set forth, as such details may be to some extent varied without limiting the scope of my invention.

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

1. A railroad-tie having a corrugated flange on its upper face, the said flange being higher at the center than at its ends, substantially as set forth.

2. A railroad-tie having a rib or flange on its

upper face and a series of corrugated ribs on its lower face.

3. A railroad-tie having a rib or flange on its upper face and corrugated ribs on its lower face, the said lower ribs being located near the ends of the tie.

4. A railroad-tie having a corrugated rib or flange on its upper face and a series of flanges on its lower face, substantially as set forth.

5. A sheet-metal railroad-tie doubled on itself to produce a corrugated flange or rib on its upper face, substantially as set forth.

6. The combination, with a railroad-tie, of a corrugated rib or flange on the top face thereof, said flange being notched to produce seats for the rails, each of said notches having one wall to conform to the flange and web of the rail and the other wall curved, and a wedge-shaped key adapted to enter the notch at the curved side thereof, substantially as set forth.

7. The combination, with a railroad-tie, of a flange on the top thereof, said flange being provided with notches to receive the rails, one wall of each notch conforming to the web or flange of the rail and the other wall made curved and producing a shoulder at the top thereof, a key inserted in the notch at the curved side thereof and provided with perforations, a plate in the notch on the other side of the web of the rail, and bolts passing through said plate, web, and wedge, substantially as set forth.

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

LEONARD L. FROST.

Witnesses:

G. W. MARSH,  
JOHN W. HAAS.