No. 752,753. PATENTED FEB. 23, 1904.

# A. M. BOWMAN.

## RAILWAY TIE.

APPLICATION FILED APR. 27, 1903.

NO MODEL.

Fig. 1.

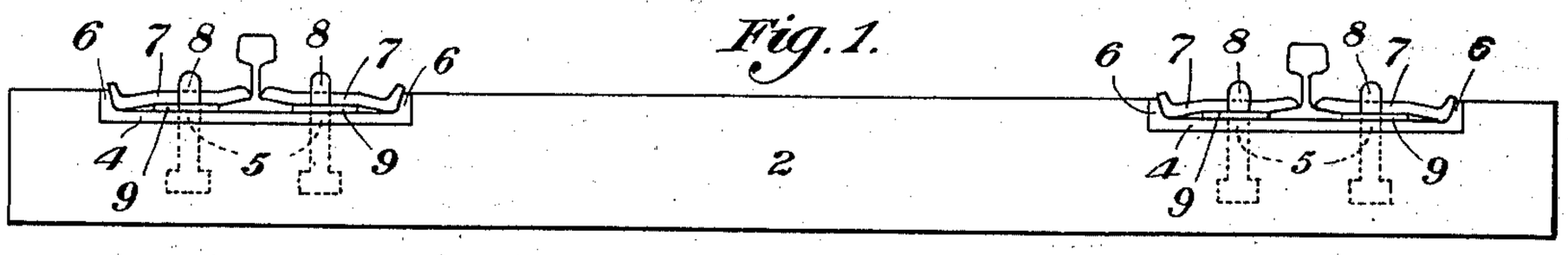



Fig. 2.

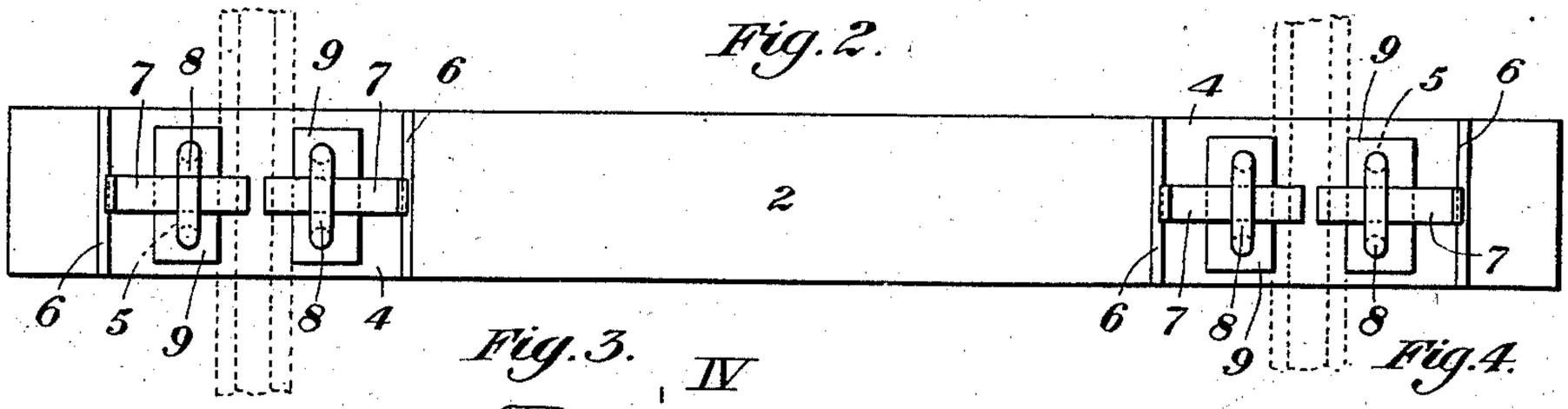



Fig. 3.

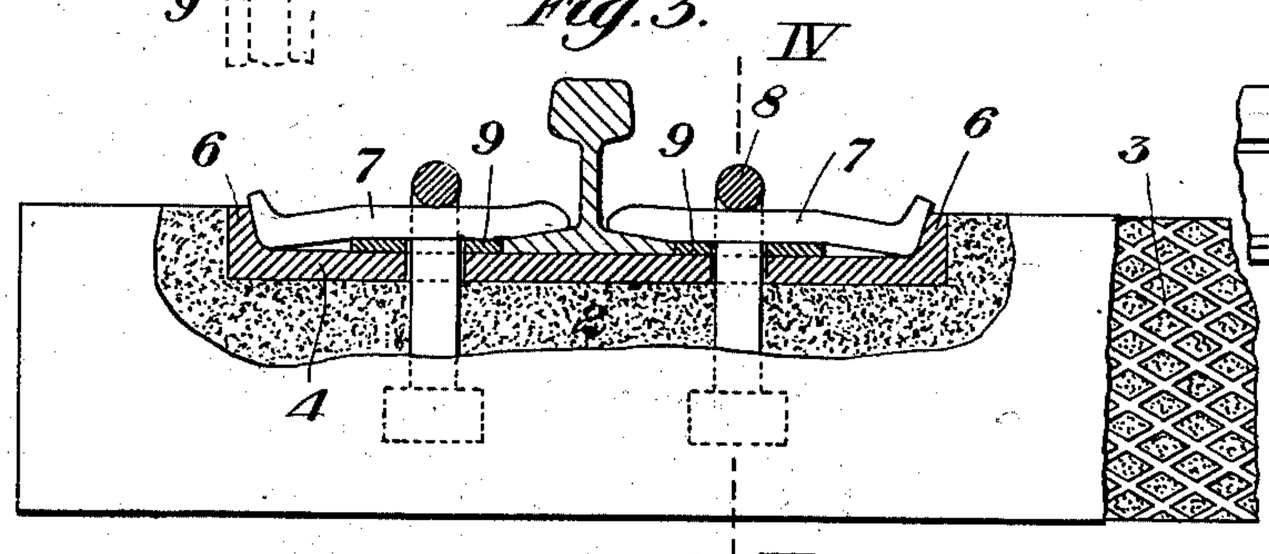



Fig. 4.

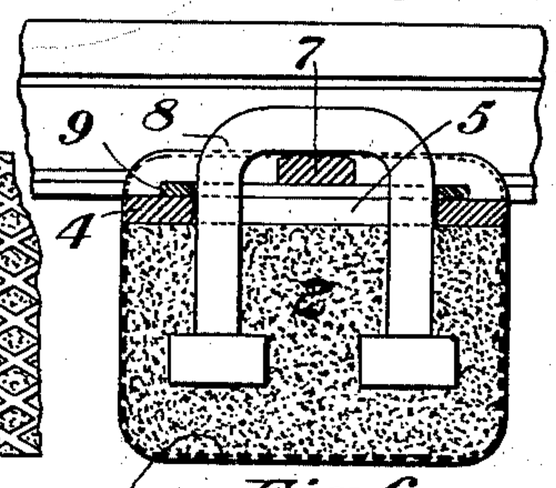



Fig. 5.

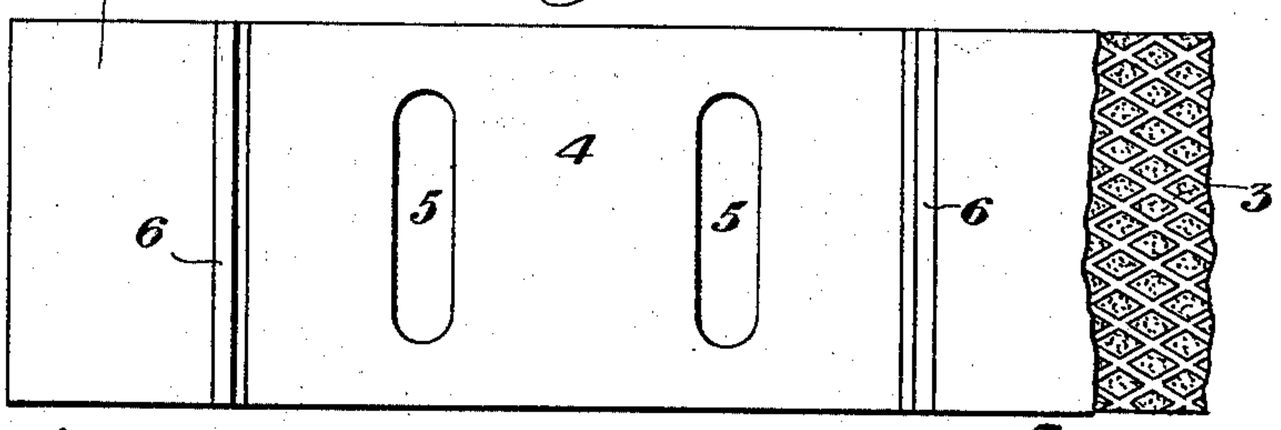



Fig. 6.

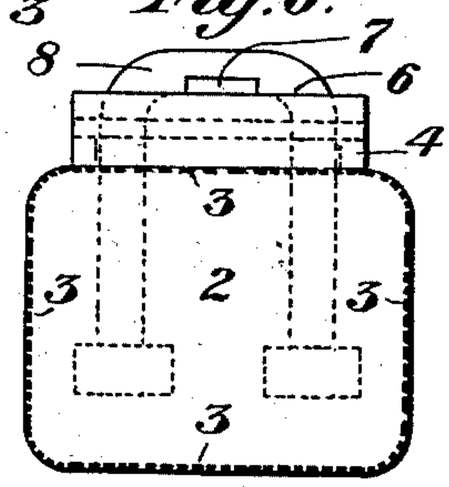



Fig. 7.

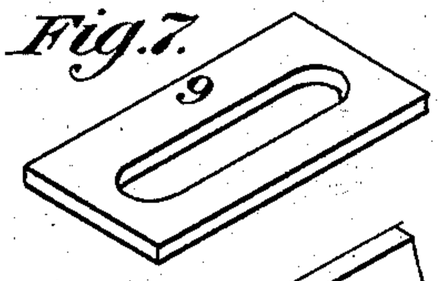



Fig. 8.

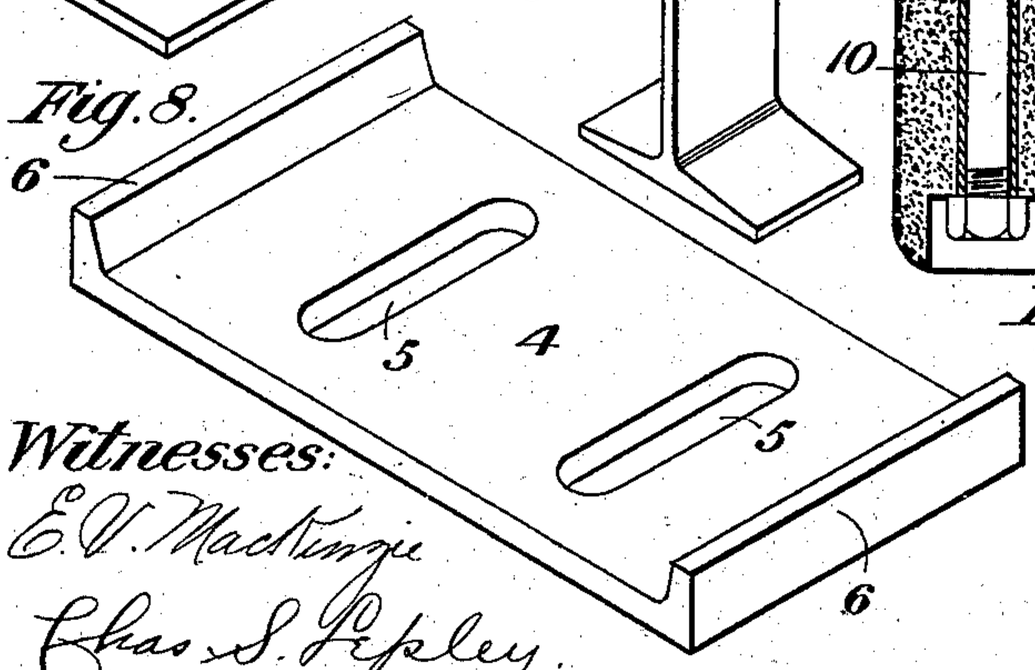



Fig. 9.



Fig. 10.

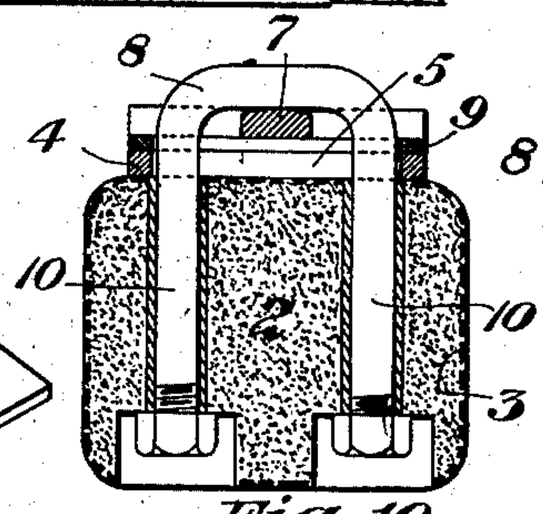
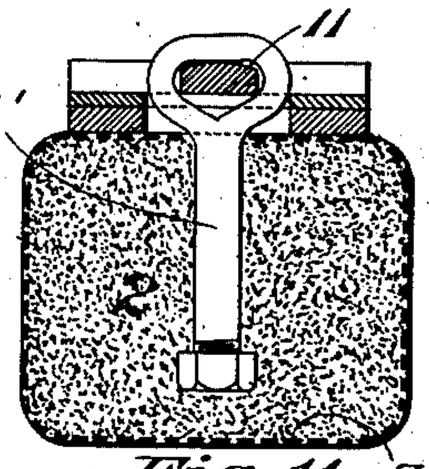



Fig. 11.

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No. 752,753. Patented February 23, 1904.

# UNITED STATES PATENT OFFICE.

ARTHUR M. BOWMAN, OF BELLEVUE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO CHARLES M. CLARKE, OF PITTSBURG, PENNSYLVANIA.

## RAILWAY-TIE.

SPECIFICATION forming part of Letters Patent No. 752,753, dated February 23, 1904.

Application filed April 27, 1903. Serial No. 154,384. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR M. BOWMAN, a citizen of the United States, residing at Bellevue, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Railway-Ties, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in side elevation of my improved tie, showing the rails in place. Fig. 2 is a plan view of the tie. Fig. 3 is an enlarged view of one end of the tie and rail bearing and fastening device, partly in section. Fig. 4 is a cross-sectional view on the line IV IV of Fig. 3. Fig. 5 is a plan view of Fig. 3, the rail-key and key-plate having been removed. Fig. 6 is an end view of the tie, showing the bearing-plate resting on the upper surface. Fig. 7 is a detail perspective view of the key-bearing plate. Fig. 8 is a similar view of the rail-bearing plate. Fig. 9 is a detail view of one form of key-holding anchor. Fig. 10 is a cross-sectional view showing the tie provided with protecting-coverings for the key-holding anchors. Fig. 11 is similar view showing a further modified form of holding-anchor screwed into a nut embedded in the tie.

My invention relates to composite railway-ties; and it consists of a tie made of cement, concrete, or other similar substance having an inclosing sheathing or reinforcing surrounding shell, preferably slightly embedded in the material of the tie, extending approximately throughout its length and adapted to confine and protect and to firmly hold the entire mass of the structure in one integral piece.

It is well known that concrete structures or bodies acquire great strength and capacity to resist strains of different kinds, and I have utilized these qualities and features with a view to providing a solid and durable tie, with means for providing rail-bearings and holding elements at a minimum of cost.

Referring to the drawings, 2 is a body of concrete or similar material adapted to harden and set to any desired form in a suitable molding device, with which is incorporated a metallic sheath 3, of expanded metal, wire-netting, or any other suitable material which is adapted to the purpose and having the required confining strength. The sheathing is designed to surround the main body of the tie, as shown, from one end to the other, a thin outer coating of the concrete covering the sheathing along the sides, top, and bottom to protect it from moisture. It may, however, be entirely on the outside, if desired, and I do not desire to be limited to the exact construction or arrangement shown, as it is evident that the sheathing or any equivalent bonding, tying, or anchoring holder for the concrete may be utilized which will serve to bind it in one solid body and effectually prevent fracture or chipping of the concrete in handling or tamping the railroad-ballast around or under it.

In making the tie the sheathing is first placed in a suitable mold closely adjacent to its inside face and the concrete is filled in, emerging through the openings in the sheathing, providing a bonding hold between the concrete and the sheathing, and abutting against the inner surface of the mold, pressure being exerted by any suitable tamping or compressing means.

Various means may be incorporated with the tie for providing bearings for the rails and for securing them in place, and I have shown a plate 4, which is either partly embedded in the concrete at each end on the upper side of the tie or which may merely rest on the top surface, as shown in Fig. 6. The plate is provided with openings 5 for the holding-bolts and at each end with upwardly-extending flanges 6, providing end bearings for the securing-keys 7. The holding anchors or staples 8 are embedded in the concrete, either in the operation of manufacture or separately, being of inverted-U form or otherwise suitably formed to give a good binding or anchoring hold. These holding-anchors may be of varying forms, as shown in the various details views, and I do not desire to be limited to any special or particular construction, as it is evident that various forms or means for securing the rail in position may be used with good results—as, for instance, a holding-anchor having a hook-terminal.

With the form of construction shown in the principal figures of the drawings I prefer to use under-supporting key-plates 9, adapted to fit over the holding-staples upon the plate 4 and to bear against the edges of the rail-flanges. An advantage of these plates is that they may be made in varying widths to suit varying dimensions of rails, thus permitting of a standard dimension between the holding-staples, which is of advantage in making the ties of uniform sizes and types. The plates also give good bearing for the holding-keys.

If desired, the holding means may be in the form of bolts passed through the tie and held by nuts, as in Figs. 10 and 11, in which case I prefer to provide armored openings by using hollow sections 10, as of pipe, thus permitting of easy removal or renewal of the holding-bolts. If desired, however, a single bolt 8′, provided with an upper key-eye 11, may be secured by a nut embedded in the tie, as in Fig. 11, thus permitting the bolt to be screwed out and renewed. The anchors may be of the form shown in Fig. 9 or of modifications of such general type. The upper end of the bolts may also be provided with nuts and any suitable clamping devices adapted to engage the flanges of the rail.

Various other changes or modifications may be made in the details of construction or in the shape, design, proportions, or other features of the invention by the skilled mechanic without departing from it; but all such are to be considered as within the scope of the following claims.

What I claim is—

1. A railway-tie consisting of a body portion of concrete or cement, and a reinforcing surrounding sheathing incorporated therewith immediately under the surface of the tie, substantially as set forth.

2. A railway-tie consisting of a body portion of concrete or cement, and a reinforcing surrounding sheathing of flexible metal incorporated therewith immediately under the surface of the tie, substantially as set forth.

3. A railway-tie consisting of a body portion of concrete or cement, and a reinforcing surrounding sheathing of flexible metal having open spaces throughout its body portion, incorporated therewith immediately under the surface of the tie, substantially as set forth.

4. A railway-tie consisting of a body portion of concrete or cement and a reinforcing surrounding sheathing incorporated therewith immediately under the surface of the tie, with bearing members for the rails, substantially as set forth.

5. A railway-tie consisting of a body portion of concrete or cement and a reinforcing surrounding sheathing incorporated therewith immediately under the surface of the tie, and holding devices for the rails incorporated with the tie, substantially as set forth.

6. A railway-tie consisting of a body portion of concrete or cement having a reinforcing surrounding sheathing, rail-bearing plates, and rail-holding anchoring devices embedded in the body portion of the tie and provided with upwardly-projecting terminal openings, substantially as set forth.

7. A railway-tie consisting of a body portion of concrete or cement having a reinforcing surrounding sheathing, rail-bearing plates, and rail-holding anchoring devices embedded in the body portion of the tie, projecting upwardly through said plates, and rail-holding devices incorporated with the plates and the anchoring devices, substantially as set forth.

8. A railway-tie formed of concrete or cement provided with anchoring devices embedded in the body of the tie, and having upwardly-projecting looped portions extending above the tie, substantially as set forth.

9. A railway-tie formed of concrete or cement provided with anchoring devices embedded in the body of the tie and having upwardly-projecting looped portions, with rail-bearing plates provided with clearance-openings therefor, substantially as set forth.

10. A railway-tie formed of concrete or cement provided with anchoring devices embedded in the body of the tie and having upwardly-projecting looped portions, with rail-bearing plates provided with clearance-openings therefor and retaining-flanges, and rail-holding devices incorporated with said elements, substantially as set forth.

11. A railway-tie formed of concrete or cement provided with anchoring devices embedded in the body of the tie and having upwardly-projecting looped portions, with rail-bearing plates provided with clearance-openings therefor, and rail-holding keys and under-bearing key-plates incorporated with said devices, substantially as set forth.

12. A railway-tie formed of concrete or cement provided with anchoring devices having enlarged heads embedded in the body portion of the tie, and upwardly-projecting holding extremities provided with openings extending beyond the upper surface of the tie, substantially as set forth.

13. The combination with a railway-tie of the character described, of anchoring devices consisting of inverted-**U**-shaped elements embedded in the body portion of the tie, and having their closed retaining portions projecting upwardly above the same, substantially as set forth.

14. The combination with a railway-tie of the character described, of anchoring-bolts provided with securing-nuts embedded in the body portion of the tie, and having upwardly-projecting key-holding terminal eyes, substantially as set forth.

15. The combination with a railway-tie of the character described, of anchoring devices having upwardly-extending looped terminals embedded in the tie, surrounding protecting-

armors therefor, and means for holding said anchoring devices in place, substantially as set forth.

16. A railway-tie consisting of a solid continuous body of concrete or cement, a flexible reinforcing metallic sheathing incorporated therewith, superimposed rail-bearing devices, and means embedded in the cement for securing the rails to the tie, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ARTHUR M. BOWMAN.

Witnesses:

JAS. J. MCAFEE,

C. M. CLARKE.