

W. J. STOOP.  
INSULATED METALLIC CROSS TIE.  
APPLICATION FILED DEC. 19, 1907.

924,400.

Patented June 8, 1909.  
2 SHEETS—SHEET 1.

FIG. 1

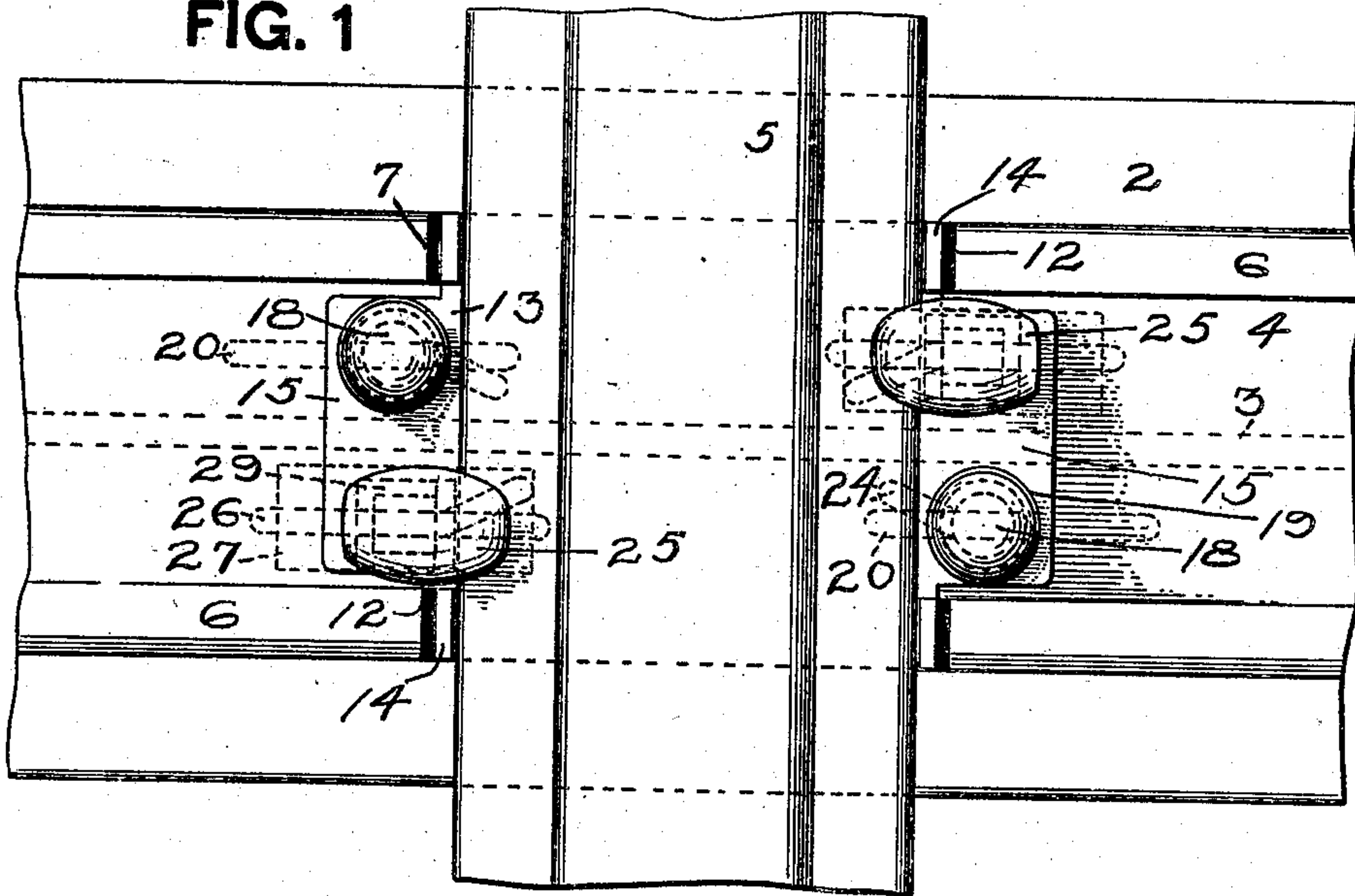
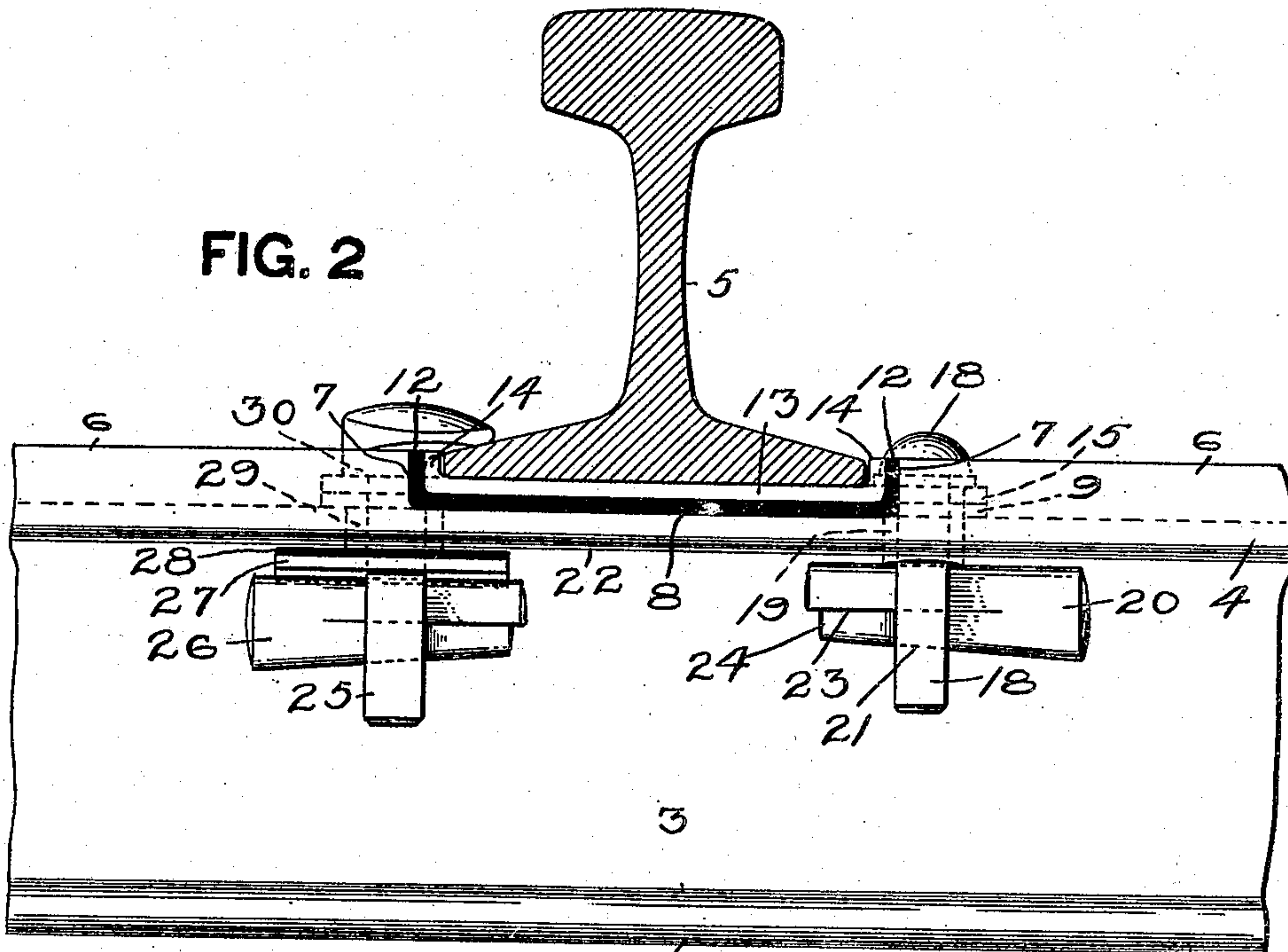


FIG. 2



WITNESSES.

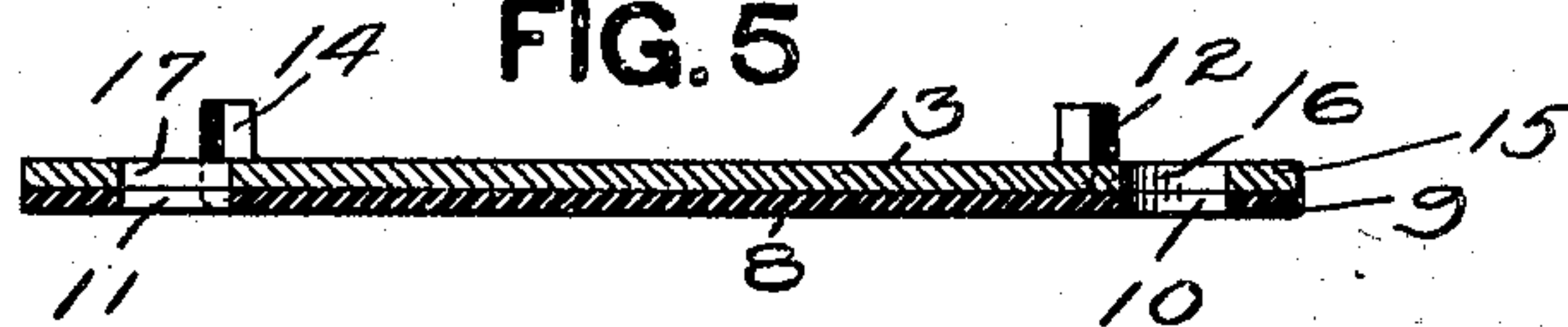
M. G. Keller.  
Alberta Richard

INVENTOR.

Wm J Stoop.  
By Geo Verbit  
att

**924,400.**

FIG. 3



**INVENTOR.**

Wm J. Stook,  
By Geo. Nesbit atty



# UNITED STATES PATENT OFFICE.

WILLIAM J. STOOP, OF PITTSBURG, PENNSYLVANIA.

## INSULATED METALLIC CROSS-TIE.

No. 924,400.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed December 19, 1907. Serial No. 407,167.

*To all whom it may concern:*

Be it known that I, WILLIAM J. STOOP, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Insulated Metallic Cross-Ties, of which the following is a specification.

This invention relates to an insulated metallic cross-tie, and while many of its novel features are adapted for use with metallic ties generally, the invention is designed primarily for insulating the particular form of tie and rail fastening shown and described herein but claimed in an application filed concurrently herewith, Serial No. 407,166.

One object of the invention is to so construct and arrange the bearing and insulating plates that they may be readily and conveniently removed and replaced. And a further purpose is to so arrange said plates as to cooperate with the rail fastenings without interfering with the manipulation of the latter.

Still another object is to adapt the bearing and insulating plates to the improved cross-tie, whereby the lateral thrust of the rails is transmitted to the tie flanges even though said parts are insulated from each other, this without exposing the rail fastenings to such thrust, thereby relieving the fastenings of destructive shearing strains.

In the accompanying drawings, Figure 1 is a top plan view of portions of a tie and rail equipped with the improvements, and Fig. 2 is a side elevation of the tie with the rail shown in section. Fig. 3 is a cross sectional view of the tie and fastenings, the rail being shown in elevation. Figs. 4 and 5 are detail views of the insulating and bearing plates.

The metallic cross-tie here shown, and the one to which the invention is preferably applied, is of modified I-beam form, 2 designating the flanged base thereof, 3 the web, and 4 the top portion which supports the insulated rails 5 of a railway track. The tie is rolled or otherwise formed with the laterally separated upward flanges 6 on the longitudinal edges of its top face, and these flanges are interrupted to receive the base of the rail, the extremities 7 forming thrust-receiving abutments for the opposite sides of the rail base.

8 is the insulating plate, formed preferably of vulcanized fiber, which fits the top surface of the tie at the flange interruptions and

extends into the latter, thus covering the tie from one edge to the other in the line of the rail. The opposite ends of the insulating plate are extended at 9 to fit between flanges 6, and each of these extensions is preferably formed with a circular bolt passage 10 and a square bolt passage 11. The extremities of those portions of the insulating plate extending into the interruptions of flanges 6 are turned upward at 12 to bear against the flange extremities or abutments 7.

The metallic bearing plate 13 has the same outline as the insulating plate upon which it rests, only that the opposite side portions are enough shorter than the corresponding parts of the insulating plate to fit between the upturned portions 12 of the latter, the bearing plate having similar upward lugs engaging parts 12, with lugs 14 spaced apart at each side to receive the base of a rail. The end extensions 15 of the bearing plate have the circular and square bolt passages 16 and 17 which register with corresponding passages 10 and 11 of the insulating plate.

The bearing and insulating plates are secured to top portion 4 of the tie by headed bolts 18 extending through openings 10 and 16 and through bolt passages in top 4, said openings and passages being enough larger than the bolt to admit the sleeve-like insulating washer 19, thus completely insulating the bolt from the metallic bearing plate. The preferred securing means for the bolt consists of the tapered key 20 extending through slot 21 of the bolt, the slot being of such length that its upper end is above the under face 22 of top portion 4 of the tie, so that when the key is driven in it has a wedging action between said under face and the lower end of the bolt slot and tightly holds the bolt. The smaller end of the key is slit horizontally at 23, and after being inserted the portion 24 beneath the slit is bent laterally.

Each of the hook-bolts 25 which hold down the rail extends through the plate openings 11, 17 and through square passages in top 4 with a locking key 26 like key 20 entered in the slot thereof. The upper edge of the key bears against the plate-like metallic washer 27, while interposed between the latter and the under face 22 of part 4 is the insulating washer 28. An insulating washer 29 sur-



rounds the bolt within the passage through top portion 4, and this with insulating plate 8 above and insulating washer 28 below, holds the bolt out of contact with the metal of the tie.

Each of the hook bolts is preferably shouldered at 30 to bear on the top surface of plate 13, the shoulder being preferably formed on three sides of the bolt, the side without a shoulder being next to the rail base. With the upper end of the bolt slot extending into the plane of washer 27, the key has a wedging action and draws shoulder 30 into tight engagement with the bearing plate. In practice, it is not desirable to have the hook bolt bear downward so tightly on the rail base as to endanger the fastening by the expansion and contraction of the rail. Therefore, shoulder 30 is so spaced from the bolt head as to cause the latter to merely engage the rail base without exerting undue pressure thereon. In fact, the construction may be such as to afford a very slight clearance between the hook and the rail.

All of the lateral thrust of the rail is imparted to and resisted by the top flanges 6, thus completely protecting the hook bolts, leaving to them the one function of holding down the rail. The depth of flanges 6 is preferably equal to the combined thickness of the insulating and bearing plates and the edge of the rail base. Angle plates 30 may be secured to the opposite faces of web 3 to form wings which project laterally into the ballast and prevent the tie from "walking" therein.

I claim:—

1. The combination of a metallic tie, a metallic bearing plate, an insulating plate between the tie and bearing plate, plate fastening devices extending through the plates and the upper portion of the tie, insulation separating said devices from the bearing plate, holding means for the lower ends of said devices, rail fastening devices engaging the bearing plate and extending through the plates and the top portion of the tie, holding means at the lower ends of the rail fastening devices, and insulation separating the rail fastening devices and their holding means from the tie.

2. The combination of a metallic tie, a bearing plate, an insulating plate interposed between the tie and bearing plate, securing devices for the plates extending there-through and through the top portion of the tie, and rail fastening devices also extending through both plates and through the top portion of the tie and secured to the latter.

3. The combination of a metallic tie, a bearing plate, an insulating plate interposed between the tie and bearing plate, plate fastening devices extending through both plates and through the top portion of the tie with securing means for said devices engaging the

under face of said top portion, and rail fastening devices extending through both plates and through the top portion of the tie and secured at the under face of the latter.

4. The combination of a metallic tie, a metallic bearing plate, an insulating plate between the tie and the bearing plate, plate fastening devices headed at their upper ends and extending downwardly through both plates and through the top portion of the tie with detachable holding means for said devices at the under face of the top portion of the tie, and rail fastening hook-bolts extending downwardly through both plates and through the top portion of the tie with holding means for the bolts at the under face of said top portion.

5. The combination of a metallic tie, a bearing plate, an insulating plate interposed between the tie and bearing plate, a rail fastening device extending through the upper portion of the tie, holding means for the fastening device beneath said top portion, and insulation interposed between the holding means and the top portion of the tie.

6. The combination of a metallic tie, a bearing plate insulated from the tie, a rail fastening device having a slotted shank extending through the top portion of the tie, a washer for the shank, an insulating plate between the washer and the under face of the top portion of the tie, and a key in the slot of the fastener shank and bearing upwardly against said washer.

7. The combination of a metallic tie having flanges on its top surface separated to admit and form abutments for opposite sides of a rail base, an insulating plate on the top face of the tie at said interruptions and extending between the flanges with raised insulation separating the tie flanges from the rail base, a bearing plate on top of the insulating plate, and securing means.

8. The combination of a metallic tie having laterally separated longitudinal flanges on its top face, the flanges interrupted to receive a rail, an insulating plate on top of the tie and extending into said interruptions with extensions at either end of the plate lying between the laterally separated flanges, a bearing plate on top of the insulating plate, and fastening devices extending through the insulating and bearing plates for fastening the plates to the tie.

9. The combination of a metallic tie having laterally separated longitudinal flanges raised from its top surface, the flanges being interrupted to admit a rail base, an insulating plate fitting the top of the tie at said interruptions and extending into the latter, the insulating plate having raised portions in line with the tie flanges, a bearing plate on top and of substantially the same outline as the insulating plate, the bearing plate having raised lugs in line with the tie flanges and the



raised portions of the insulating plates for transmitting the lateral thrust of the rail to the tie flanges, and securing means.

5 10. The combination of a metallic tie having laterally separated longitudinal flanges raised from its top surface, the flanges being interrupted to admit a rail base, an insulating plate fitting the top face of the tie at the interruptions and extending into the latter, 10 the plate having extensions at either end lying between the laterally separated flanges, the plate having raised portions in line with and engaging the flanges, a bearing plate on top of and of substantially the same outline 15 as the insulating plate with raised lugs on the bearing plate in line with the raised portions of the insulating plate and with the tie flanges, and fastening devices for the plates passing through the end extensions of the 20 latter.

23 11. The combination of a metallic tie having laterally separated longitudinal flanges on its top face, the flanges being interrupted to pass a rail base, an insulating plate fitting the top surface of the tie at said interruptions and extending into the latter, the plate having raised portions in line with the flanges and also having extended end portions lying between the flanges, a bearing plate of sub-

stantially the same outline as the insulating 30 plate with raised lugs in line with the raised portions of the insulating plate and with the tie flanges, headed bolts extending downwardly through both plates and through the top portion of the tie and secured at the under 35 face of the latter, and rail securing hook-bolts extending downwardly through the end extensions of both plates and through the top portion of the tie with means beneath the 40 latter for securing the bolts.

12. As an article of manufacture, an insulating plate for metallic ties formed with separated raised portions at opposite sides thereof and with end portions extended beyond the raised portions with apertures in the end 45 portions.

13. As an article of manufacture, a metallic bearing plate for insulated cross ties formed with separated raised portions at the opposite sides thereof and with end portions 50 extended beyond the raised portions with apertures in the said end portions.

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

WILLIAM J. STOOP.

Witnesses:

JOE NESBIT,  
ALEX. S. MABON.