J. W. COOPER.

METALLIC RAILWAY TIE AND SUPPORT THEREFOR.

APPLICATION FILED JUNE 30, 1909. RENEWED JUNE 17, 1910.

981,980. Patented Jan. 17, 1911.

3 SHEETS—SHEET 1.

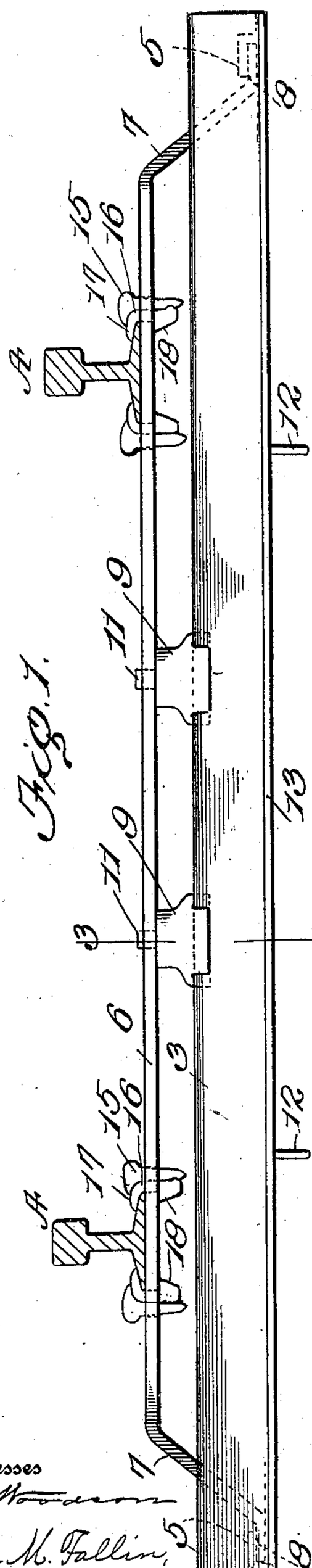

Fig. 1.

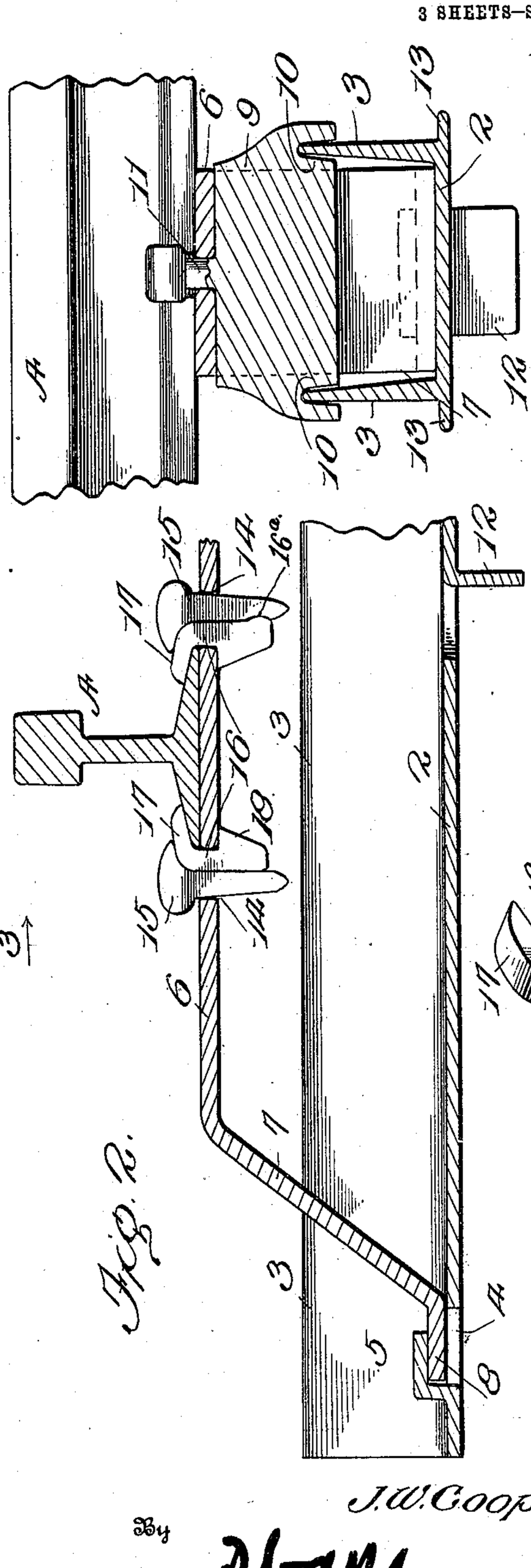

Fig. 3.

Fig. 2.

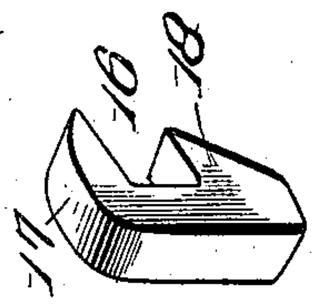

Fig. 4.

Witnesses

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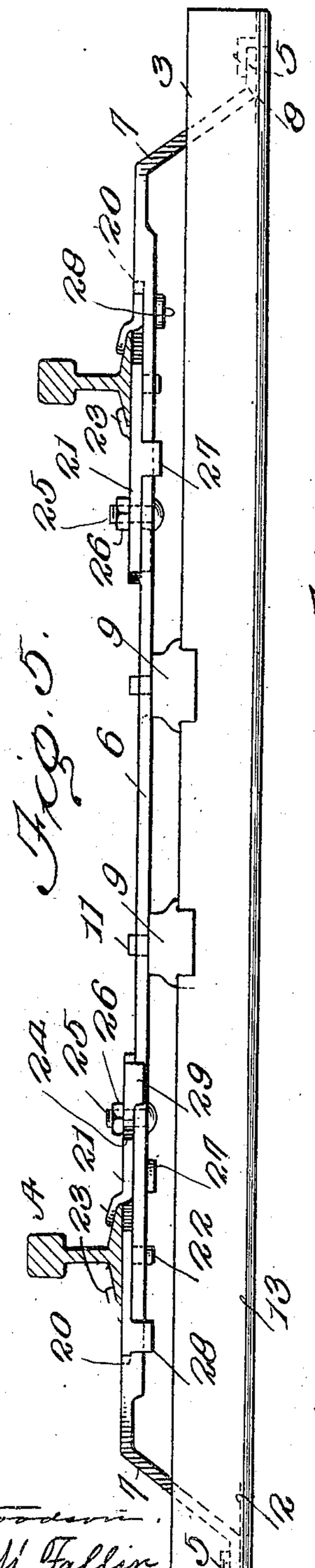

Fig. 5.

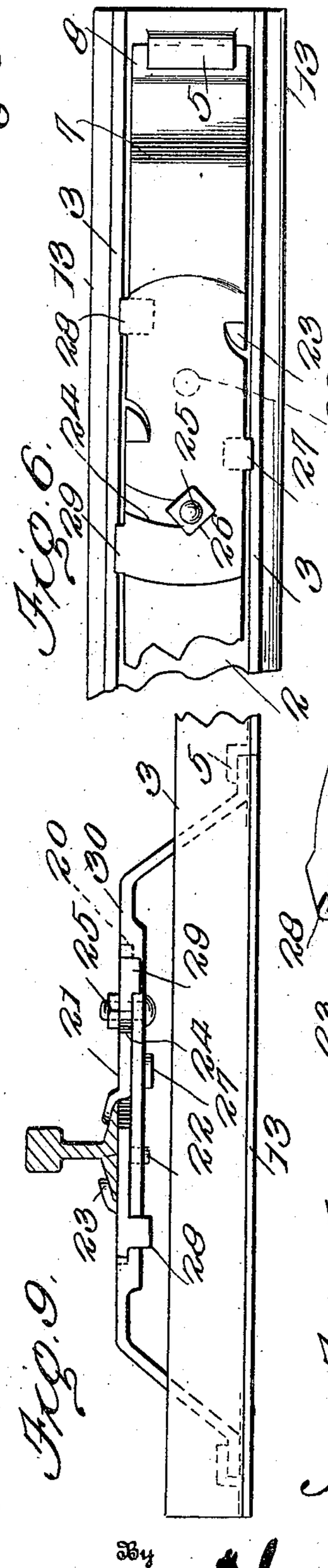

Fig. 6.

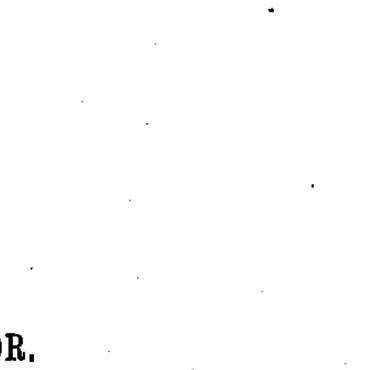

Fig. 8.

Fig. 4.

Fig. 9.

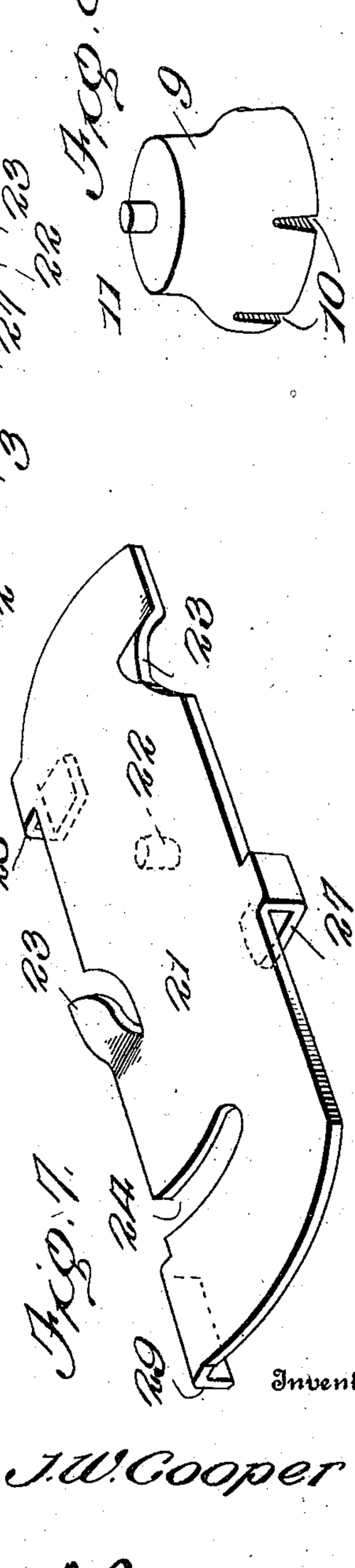

Fig. 7.

Witnesses

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3 SHEETS—SHEET 3.

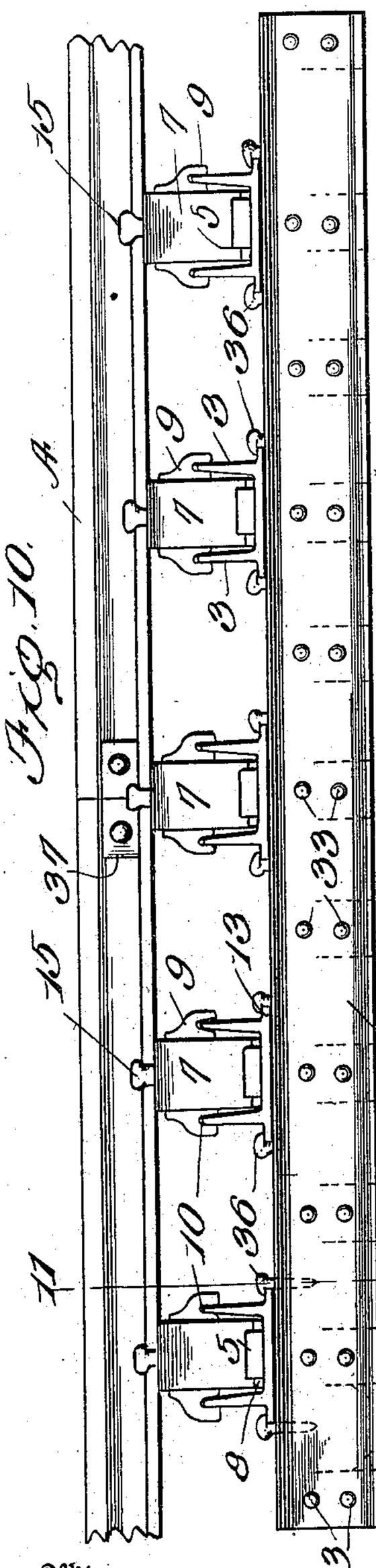

Fig. 10.

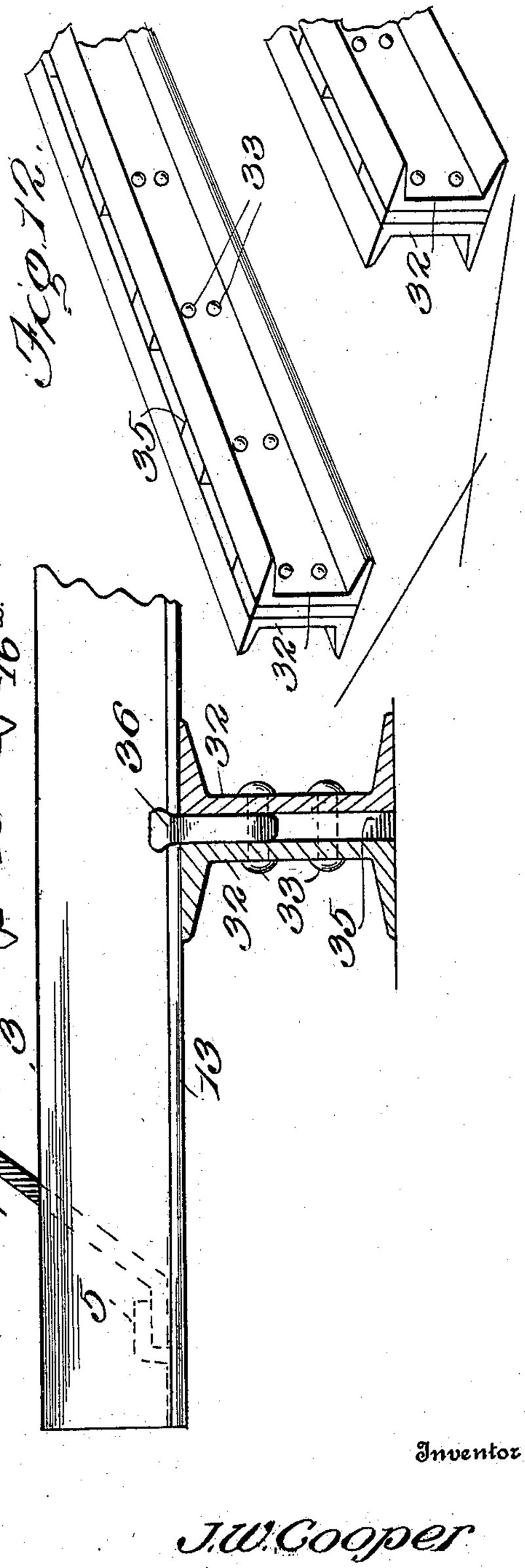

Fig. 12.

Fig. 11.

Witnesses
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UNITED STATES PATENT OFFICE.

JOHN W. COOPER, OF BUFFALO, NEW YORK.

METALLIC RAILWAY-TIE AND SUPPORT THEREFOR.

981,980. Specification of Letters Patent. **Patented Jan. 17, 1911.**

Application filed June 30, 1909, Serial No. 505,154. Renewed June 17, 1910. Serial No. 567,481.

To all whom it may concern:

Be it known that I, JOHN W. COOPER, citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Metallic Railway-Ties and Supports Therefor, of which the following is a specification.

My invention relates to metallic railway ties and supports therefor, and particularly to an all-steel tie and a supporting base for a plurality of such ties extending along in line with and beneath the rail and acting not only as a support for the tie, but as a support for the joint of the rail, preventing any deflection thereof.

One very vital objection which has been made to metallic railway ties is that such a tie is unyielding and rigid, and hence that the rails are supported too rigidly and do not give as the train passes over them. A rigid support for a rail, such as given by metallic ties embedded in ballast, or a tie composed of steel and concrete causes "chattering" which quickly wears away the surface of the rail and makes the trains run roughly. The support for the rails should be sufficiently yielding so that the rail will yield to a slight degree, as the train passes thereover.

The main object of my invention is to obtain this end by providing, in connection with a steel tie, a yielding bridge or support upon which the rail is directly carried and which gives the requisite flexibility to the rail support.

Another object is to secure a very simple and yet very strong support for the tie and rail, particularly at the joints, this support extending beneath a plurality of ties and being embedded in the road ballast, and being so arranged as to extend beneath the joint of the rail, and so properly support the same without the necessity of using the present fish plates or cradles for the ends of the rail.

In the drawings, I have shown three forms of my invention, and therein: Figure 1 is a side elevation of one form of my improved tie; Fig. 2 is a fragmentary longitudinal section thereof; Fig. 3 is a transverse section on the line 3—3 of Fig. 1; Fig. 4 is a perspective detail of a rail clip; Fig. 5 is a side elevation of a tie provided with another means of engaging the rail; Fig. 6 is a top plan view of the rail engaging means, the rail being omitted; Fig. 7 is a perspective view of the rail engaging plate; Fig. 8 is a perspective view of one of the intermediate blocks; Fig. 9 is a side elevation of one-half of a tie, and the bridge plate forming the support for one rail; Fig. 10 is an end view of a series of ties with a tie and rail support; Fig. 11 is an enlarged section on the line 11—11 of Fig. 10; and, Fig. 12 is a perspective view of the tie support.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to Figs. 1 to 4 which show the simplest form of my invention, 2 designates a base plate having on each side the upwardly extending side flanges 3. The base plate and side flanges thus form a channel bar, the open side of which is upward. The extremities of the base plate 2 are cut away as at 4 and the cut away portion is upwardly and inwardly turned to form overhanging tongues 5 at each end of the channel bar, which act to support the bridge plate 6. This bridge plate extends from one end of the tie to the other, as shown in Fig. 1, and acts as the direct support of the rails. The ends of the bridge plate are downwardly turned as at 7 and then outwardly bent as at 8 so as to be inserted beneath the tongues 5, whereby the bridge plate will be held in rigid relation to the tie and prevent it from any longitudinal movement therealong. Where a long bridge plate is used, extending practically the length of the base plate 2, I prefer to support the middle of the bridge plate by means of the blocks 9. These blocks 9, as shown in Fig. 3, are formed with the lateral channels 10 on their under side adjacent to the margins of the blocks, into which channels the upwardly extending edges of the side flanges 3 are received, whereby the blocks are prevented from any lateral movement. Each of the blocks is provided with an upwardly projecting stud bolt 11 which passes through a perforation in the bridge plate 6 and is held to the bridge plate by means of a nut. Thus, the middle of the bridge plate is supported from any undue yielding. While I have shown two of these intermediate supports or blocks 2, I do not wish to be limited to this number, as I may use one or more, as desired. The under side of the base plate 2 is provided with the downwardly extending flanges 12.

These may be formed in any desired manner, but preferably they are cut out of the plate 2 in the form of tongues, and then bent downwardly. These downwardly extending flanges being embedded in the ballast of the track, prevent the tie as a whole from shifting laterally. It will also be seen from Fig. 3 that the base plate 2 extends outward on each side beyond the upwardly projecting flanges 3, thus forming the marginal flanges 13. The ballast of the road bed covering these marginal flanges, the tie will be held down and prevented from any lifting.

While I have devised a number of means whereby the rail may be held to the bridge plate, I show, in Fig. 2, a very simple device to that end. The bridge plate is provided with oblong perforations 14 located on each side of the base flange of the rail A. These openings 14 are of sufficient length to admit within them the shank of a spike 15 and the shank of a U-shaped clip 16. This clip has the projecting upper flange 17 and the inwardly projecting lower flange 18. The under side of the upper flange is adapted to fit against the upper inclined face of the base flange of the rail, while the lower flange 18, on its upper face, is adapted to fit against the under face of the bridge plate 6. It is to be understood of course that the perforations 14 are only as wide as the thickness of the clip 16 and the spike 15, and that each perforation is slightly less in length than the width of the clip 16 and spike 15. Therefore when the spike is driven inward into the opening 14 in the steel bridge plate, it will force the clip 8 over upon the rail and beneath the bridge plate and will hold it firmly in this position against all chance of movement. The clip is held in its place by simply driving the spike into the hole behind the straight face of the clip. Thus, the clip is driven up on the base flange of the rail and engages under the bottom of the steel bridge plate, the spike forcing it into place with such strength that the rail is perfectly and solidly held. It will be obvious that by making the perforation 14 slightly smaller than the thickness of the spike and slightly less than the combined width of the clip and spike, the spike may be driven in so tightly as to render it incapable of being withdrawn except by considerable manual exertion. The head of the spike in this construction projects inwardly over the clip so that the clip is absolutely prevented from any movement which would tend to withdraw it from engagement with the rail. The lower end of the spike is preferably made with a recess on its inside face, and the lower portion of the clip 16 is made with a protuberance 16ª which projects into this recess in the spike so that when the spike and clip are in place, the spike is locked to the clip and prevented from lifting. In forcing the clip and spike into place the spike will yield sufficiently to permit it to slip over the protuberance 16ª until this protuberance slips into place in the recess. The clip 16 is preferably longitudinally extended so as to present a relatively long contacting face in engagement with the face of the spike, thus forming a guide and support for the spike.

In Fig. 5 I have shown a like form of tie to that above described, consisting of the base plate 2, the side flanges 3, the upwardly and inwardly projecting tongues 5, the bridge plate 6 having the downwardly turned ends which engage beneath the tongues, and the intermediate blocks 9. The base plate is also provided with the downwardly projecting flanges 12, all for the purpose heretofore described. The only difference between the construction now to be described and that heretofore described resides in the manner in which the rails are clamped upon the bridge plate. The extremities of the bridge plate are formed with the thickened transverse shoulders 20. Mounted inward of these shoulders, on each end of the bridge plate, are the clamping plates 21. One of these plates is shown in Fig. 7. The plate has projecting from it the downwardly extending pivot stud 22 which is adapted tc pass through a perforation in the plate 6 so that the clamping plate 21 is pivotally supported upon the upper face of the plate 6. On opposite side edges of the plate 21 there are provided the upwardly and inwardly projecting tongues 23 which are adapted to engage over opposite edges of the base flange of the rail A. These tongues are cut out of the body of the plate 21 and are arranged on diametrically opposite sides of the pivot stud 22 so that as the plate turns upon its pivot in one direction, the tongues will move out of engagement with the base flange of the rail, but when the plate is turned in the other direction, the tongues will engage said base flange. One end of the plate 21 is provided with the arcuate slot 24 through which passes a bolt 25 which extends down through the bridge plate 6 and is there provided with a head. The bolt is of course formed with a nut 26, whereby the plate 21 may be clamped at any desired position and rigidly held set in position to hold the rail down upon the bridge plate 6. Opposite edges of the plate 21 are provided with the downwardly and inwardly projecting clips 27 and 28 which, when the plate 21 is set parallel to the bridge plate 6, extend beneath either edge of the bridge plate and thus hold the plate 21 to the bridge plate 6 so that the plate 21 cannot be shifted. The outer extremity of the plate 21 is also provided with the downwardly projecting flange 29 which extends down over the edge of the bridge plate 6 and prevents any rota-

tion of the plate 21. In order to disengage the clamping plate 21 from the rail, it is only necessary to unscrew the nut 26 sufficiently to permit the plate 21 to be raised so that the flange 29 may escape the plate 6. The plate 21 may be then turned upon its pivot, whereupon the lugs 27 and 28 will release the bridge plate 6 and the tongues 23 will release the flange of the rail, so that the rail can be taken off. The abutment or shoulder 20, in conjunction with the flange 29, will act to hold the plate 21 from accidental rotation, even though the bolt 25 should break or the pivot 22 should give way. The outside abutment and the lateral flange give security to the plate, and the rail will not leave its original position, even if the bolt or nut and pivot were to all give out, or for any reason these were not screwed tightly.

In Fig. 9 I have shown the same construction as shown in the figure just described, except that in place of a bridge plate being used which extends the entire length of the channel bar, I provide a separate bridge plate 30, beneath each of the rails. In this case, the base plate 2 is provided at its opposite ends with the inwardly turned tongues 5, as before described, but the intermediate portion of the base plate 2 is also provided with the outwardly projecting tongues 5′. Thus two pairs of tongues are provided, between each of which the individual bridge plate 30 is supported. The rail is clamped upon the bridge plate 30 in the same manner as that previously described, and the same reference numerals are used, to designate the various parts.

As a means for supporting the ties heretofore described, and giving a rigid foundation to these ties and particularly supporting the rails at its joints, I provide the construction shown in Figs. 10, 11 and 12. This tie support is preferably located immediately beneath each rail of the track and crosses the ties transversely. The support comprises the two opposed channel beams 32 which are held to each other by bolts or rivets 33 which pass through the beams and are headed at each end. The beams 32 are spaced apart by means of metal or composition blocks 35 which are located between the lower margins of the beams. The space between the beams is sufficient to permit the insertion of a spike 36, these spikes being driven down into this space and wedged therein so that they cannot be removed accidentally. The heads of the spikes of course project over the flanges 13 of the base plates 2. The tie is constructed in the manner heretofore described, and the same reference characters are used to designate the various parts thereof. This form of beam or support for a plurality of ties, is very simple and forms one of the strongest and best supports for the joints of the rails. I have shown this support as long enough to extend beneath five ties, or a distance of about ten feet, but of course I do not wish to be limited to this, as the support may be made of any length, and may indeed be of the same length as a rail and be therefore arranged so as to break joints with the rails above. So strong is the support, and so rigidly does it bear the rails A that it is only necessary to use a small fish plate 37 at the rail joints attached to the rails by two bolts. The support formed of the opposed channel bars 32 may be spiked down upon any suitable sub-structure, or it may be embedded in the ballast of the road bed. It will be seen that these channel bars being embedded in the road bed, and the ties also to a considerable extent embedded, the rail will be supported in a very secure manner, while at the same time the requisite degree of elasticity is secured for the rail by means of the resilient bridge plate or plates 6 or 30.

The rail clip as described and shown in the drawings, is a fastening which makes it impossible for the tie and rail to separate. The tie cannot be depressed without taking the rail with it, nor can the rail be elevated or thrown out of position while in engagement with the tie. This rail fastening is simple and inexpensive, and while adding greatly to the safety of the rail, provides for a use of the regular railroad spike, without material change.

The construction of a sub-structure for railroads in accordance with this invention, eliminates all danger of spreading of the rails and pulling of the spikes, while at the same time providing for the resiliency which is necessary in railroad road beds.

Having thus described the invention, what I claim is:

1. A metallic railroad tie including a base, a resilient rail-supporting plate extending longitudinally of the base but spaced from the same and having downwardly extending ends engaged with the base, and supports resting upon the base and supporting the rail support intermediate of its ends.

2. A metallic railroad tie including a base plate having upwardly turned side flanges, said base plate being provided with a pair of inwardly turned tongues, and a resilient rail-supporting plate extending longitudinally of the base plate and having downwardly extending ends engaging beneath said tongue.

3. A metallic railroad tie including a base plate having upwardly projecting side flanges, and a pair of inwardly projecting tongues, and a resilient rail-supporting plate extending longitudinally of the base plate and having downwardly extending ends engaging with said tongues, and intermediate supporting blocks resting upon the upwardly

extending side flanges of the base plate and supporting the intermediate portion of the rail-supporting plate.

4. A metallic railroad tie including a base plate having upwardly extending side flanges and an opposed pair of inwardly extending tongues, a rail-supporting plate having downwardly extending ends engaged beneath said tongues, and supporting blocks arranged intermediate of the ends of the rail-supporting plate, said blocks having opposed recesses on their margins, into which the edges of the upwardly extending side flanges are received.

5. A metallic railroad tie including a base plate having upwardly extending side flanges and stops at the ends of the base plate, a resilient rail-supporting plate extending longitudinally of the base plate and having downwardly extending ends engaged with said stops, and supporting blocks arranged midway between the ends of the rail-supporting plate, said blocks each having an upwardly projecting stud on its upper face extending through the rail-supporting plate, and on its lower face being provided with opposed parallel recesses into which the edges of the upwardly projecting side flanges are received.

6. A metallic railroad tie including a base plate having upwardly projecting side flanges, said base plate being cut out to form downwardly projecting tongues and also having cut-out portions forming upwardly and inwardly projecting tongues on the upper face of the base plate, a resilient rail-supporting plate extending longitudinally of the base plate and having downwardly extending ends engaging with said upwardly and inwardly extending tongues, and means on the supporting plate for holding the rail thereto.

7. A railroad tie including a base plate, upwardly extending side flanges on the base plate located inwardly of the outer edges of the base plate, downwardly extending flanges on the lower face of the base plate, inwardly and upwardly extending tongues on the upper face of the base plate at the ends thereof, between said flanges, and a resilient rail-supporting plate extending longitudinally of the base plate and having downwardly extending ends with outwardly bent terminations detachably engaging with said tongues.

8. The combination with a plurality of metallic railroad ties, each consisting of a base plate having upwardly turned side flanges and a resilient rail-supporting plate mounted on said base plate but spaced from the same, of a tie support consisting of two opposed channel beams spaced from each other, and metal blocks engaging with the said ties and extending into the space between the beams and jammed therein.

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

JOHN W. COOPER. [L. S.]

Witnesses:

CHARLES H. COOPER,

WELBURNE S. COOPER.