

July 30, 1940.

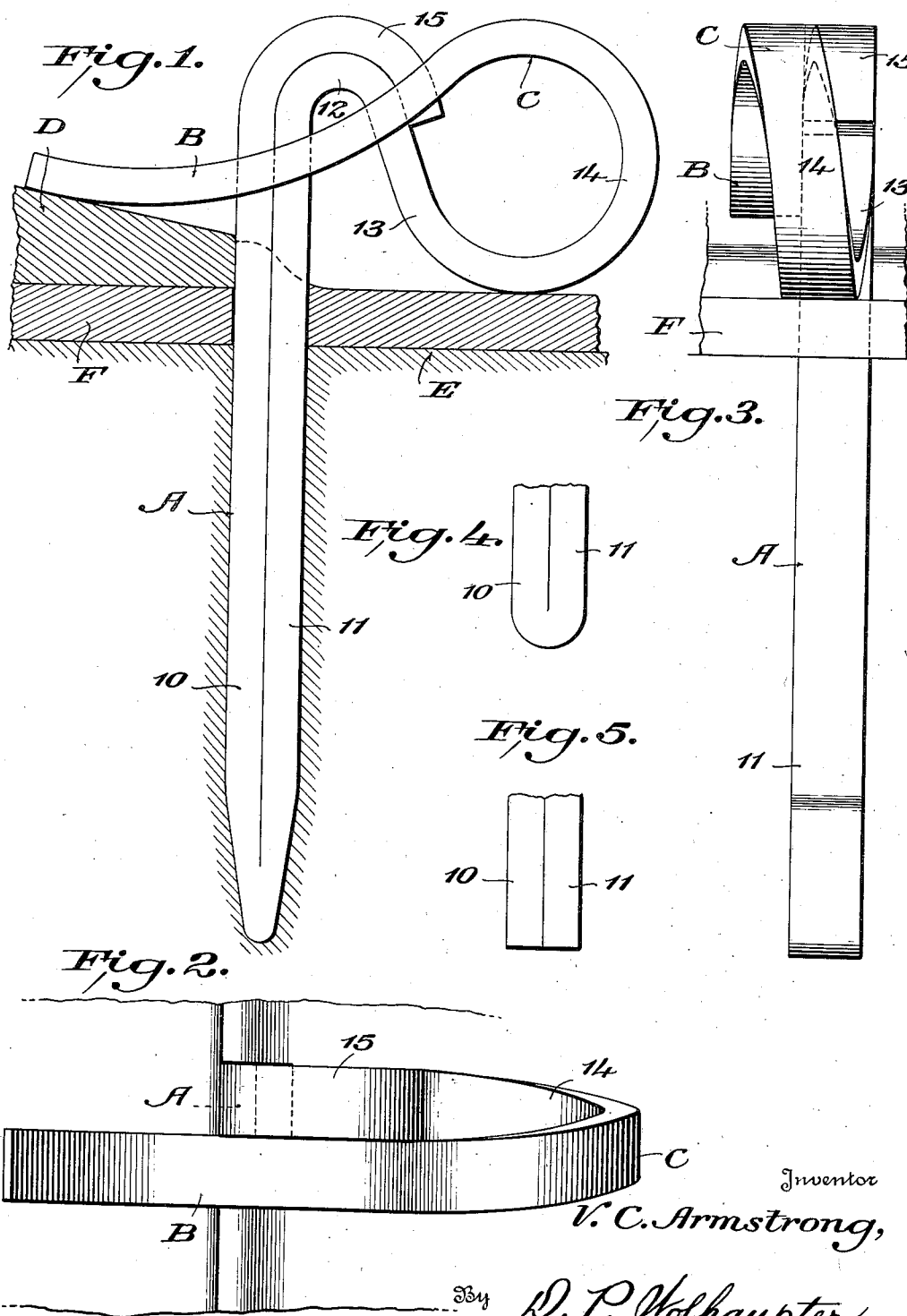
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2,209,552

SPIKE

Filed April 25, 1939

5 Sheets-Sheet 1



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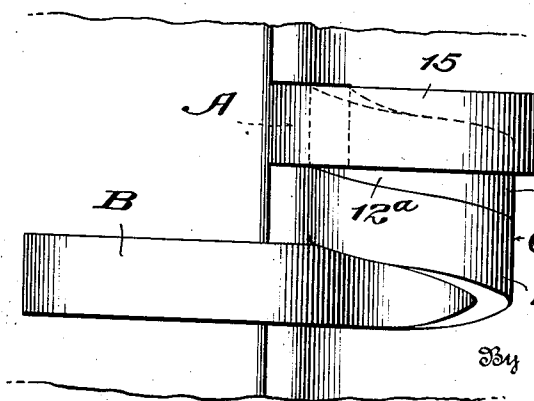
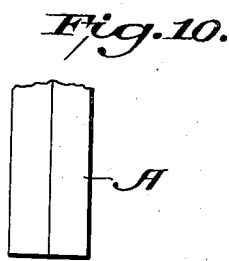
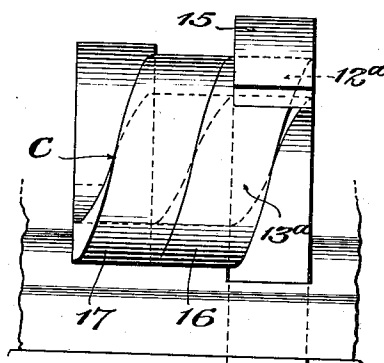
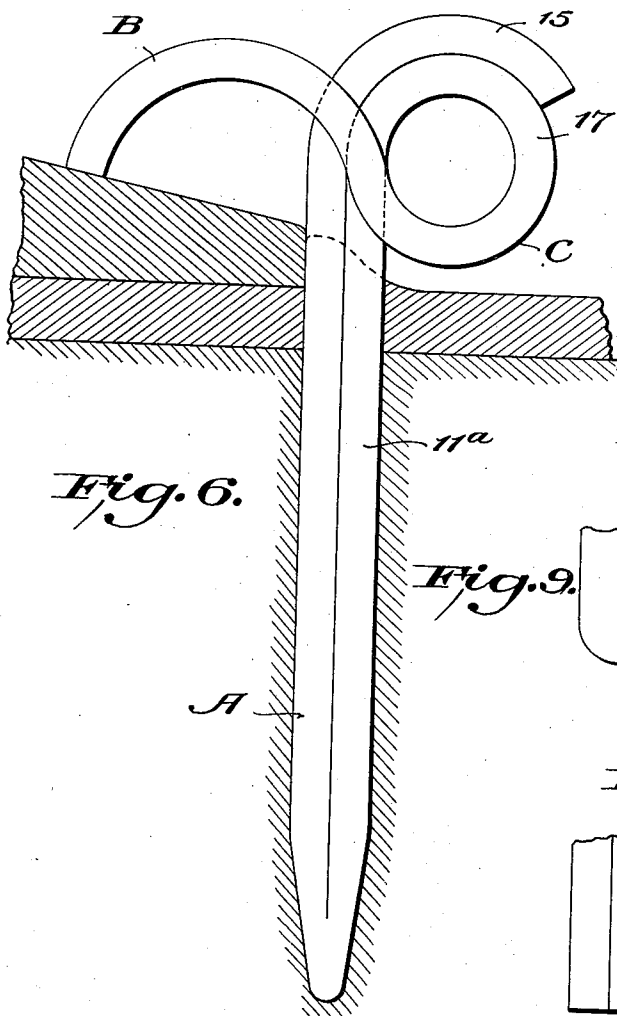
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5 Sheets-Sheet 2



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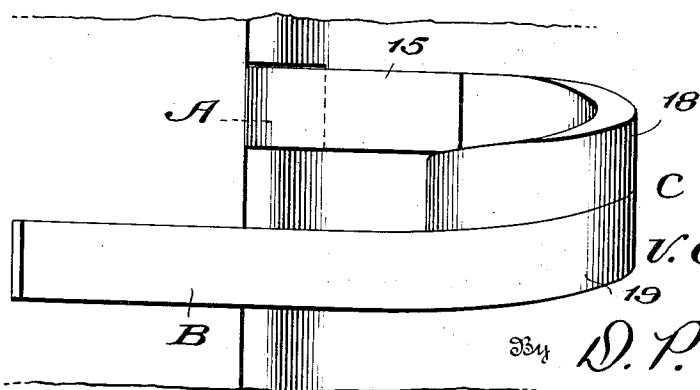
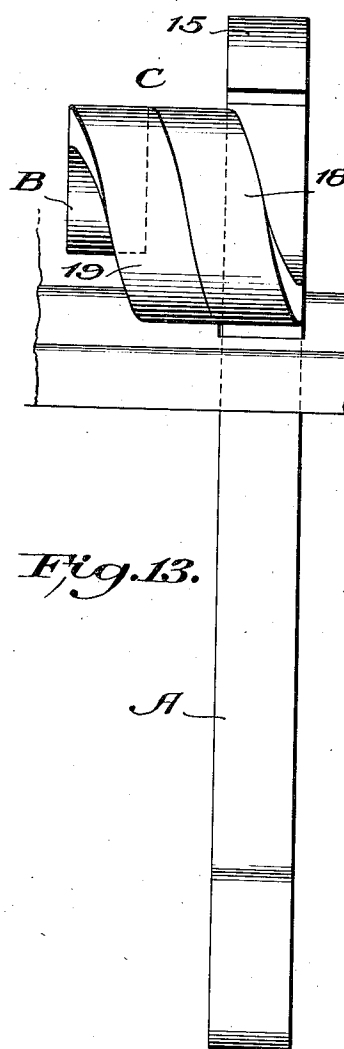
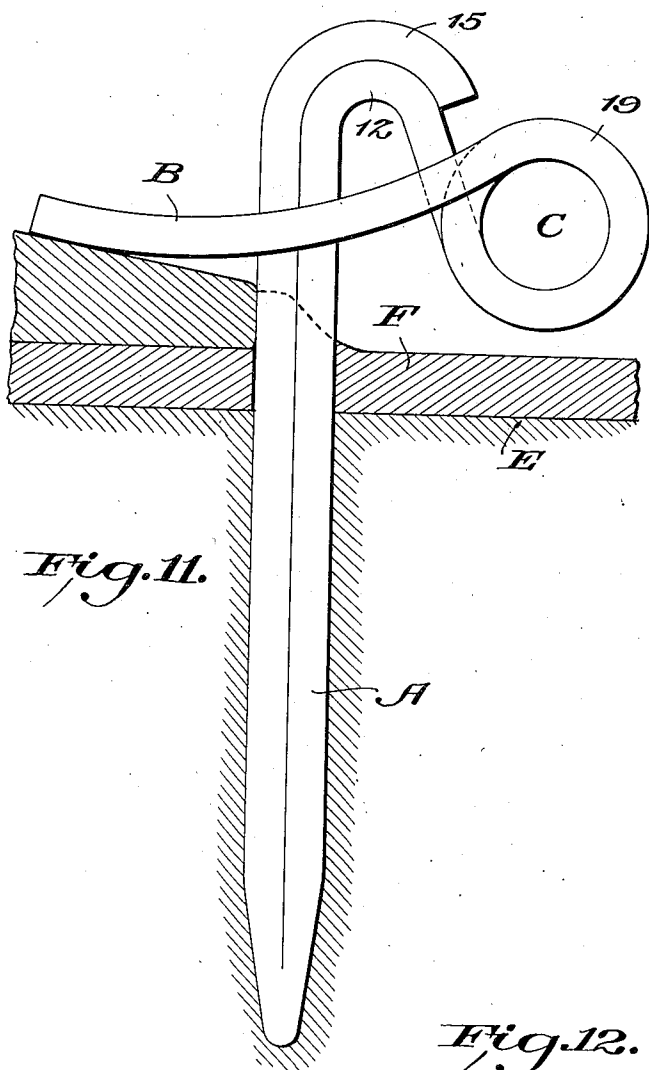
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5 Sheets-Sheet 3



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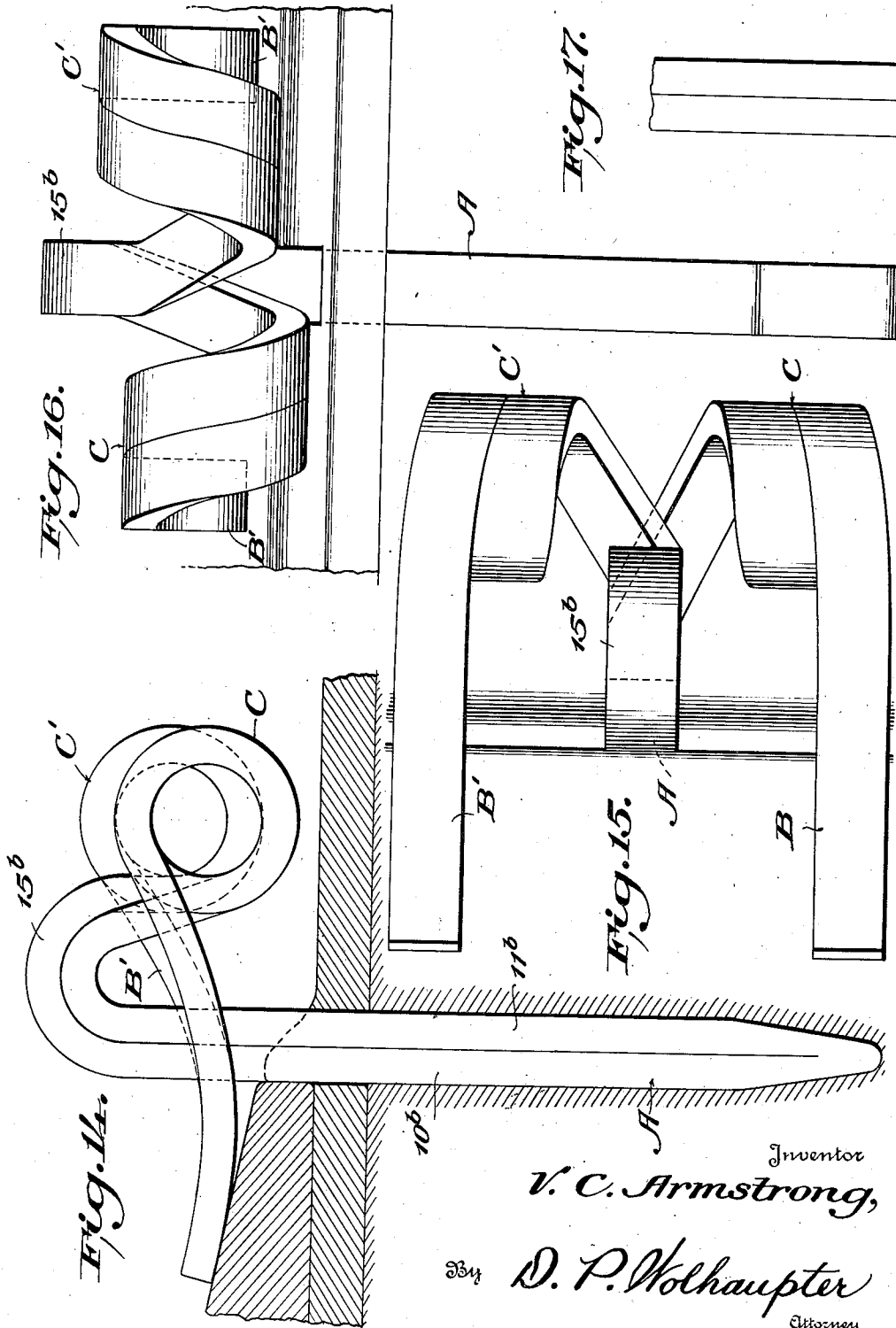
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5 Sheets—Sheet 4



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5 Sheets-Sheet 5

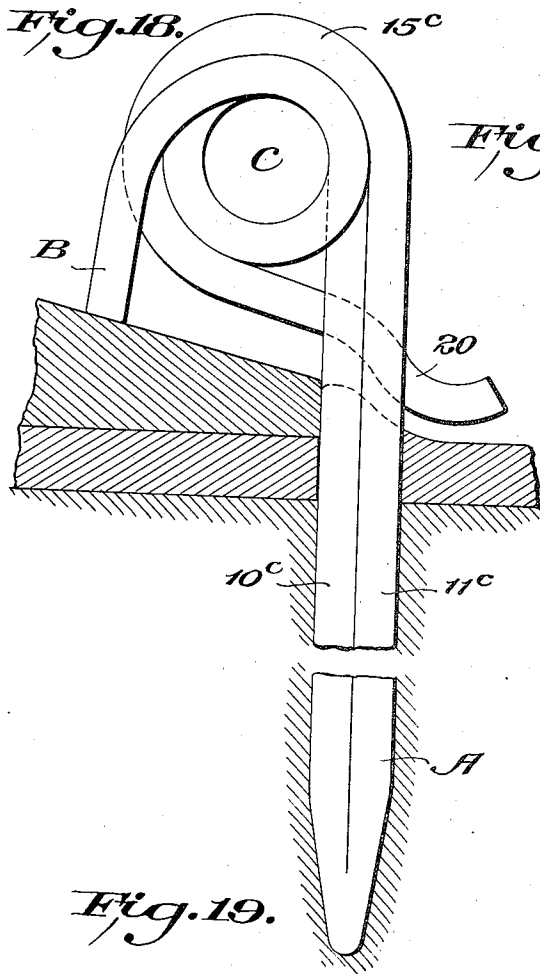


Fig. 20.

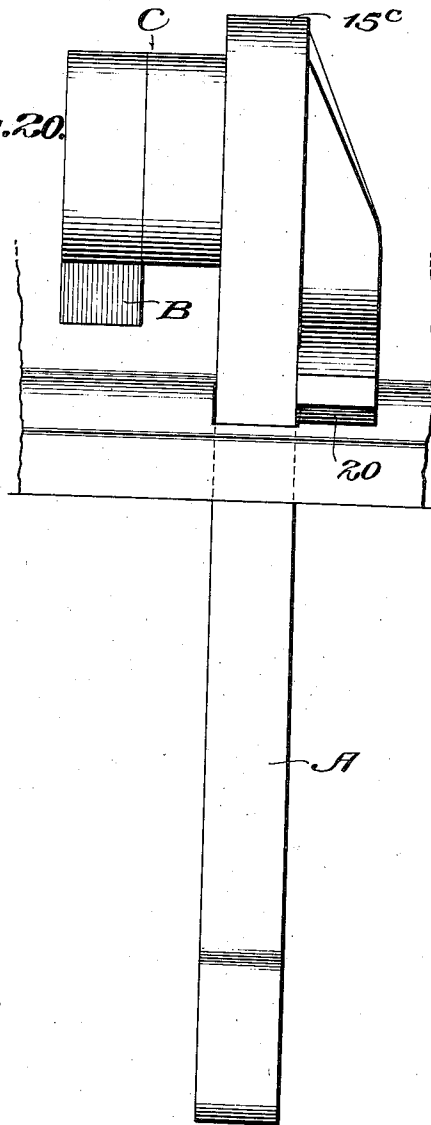
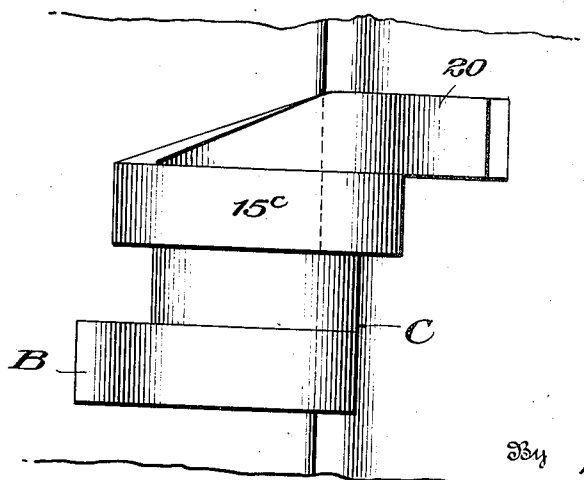


Fig. 19.



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UNITED STATES PATENT OFFICE

2,209,552

SPIKE

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13 Claims. (Cl. 238—349)

This invention relates to a novel spike of the so-called "elastic" or resilient type particularly intended for use to yieldingly but firmly hold railway rails, either directly upon cross ties or upon abrasion plates interposed between the ties and the rails, and permitting the rail wave motion of the rail to freely pass over the tie without the undesirable "pumping" of the latter in the road bed.

10 A general object of the invention is to provide a spike of the type referred to having a strong, stiff shank to effectively resist bending during and after driving and to possess the required rail holding power, and further having a rail flange engaging and holding arm which, instead of being so inherently rigid and so rigidly connected with the shank as to require the tie to move vertically as a unit with the rail, with said consequent tie pumping action, is either so inherently resilient, or so resiliently connected with the shank, or both, so inherently resilient and so resiliently connected with the shank, as effectively to hold the rail and yet permit the same to move vertically relative to the tie for the purpose indicated.

A special object of the invention is to provide a practical, efficient spike of the character stated embodying a construction such that it may be manufactured readily and easily at low cost.

30 Another special object of the invention is to provide a spike of the type mentioned including a head portion which is exposed to be struck for driving of the spike and which is practically rigid with the shank, so that the spike may be driven with practically the same facility as an ordinary spike.

40 Another special object of the invention is to provide a spike of the character mentioned embodying a portion disposed outwardly of the shank that may contact with the upper face of a tie, or tie plate, to prevent excessive driving of the spike and to support the spike against being canted outwardly from its operative position.

45 With the foregoing and other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in a spike embodying the novel combination and arrangement of features as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

50 In the accompanying drawings, which are illustrative of different practical forms of the improved spike and wherein like characters of ref-

erence denote corresponding parts in related views:

Figure 1 is a sectional view through a portion of a tie, tie plate and rail, illustrating one practical form of the present spike operatively associated therewith.

Figure 2 is a top plan view of the construction shown in Fig. 1.

Figure 3 is a front elevation of the construction shown in Fig. 1.

Figures 4 and 5 are detail views illustrating variations of the construction shown in Fig. 1.

Figures 6 to 10 are views similar to Figures 1 to 5, respectively, illustrating another practical form of the present spike.

Figures 11 to 13 are views similar to Figures 1 to 3, respectively, illustrating another practical form of the present spike.

Figures 14 to 17 are views similar to Figures 1 to 3, respectively, illustrating another practical form of the present spike; and

Figures 18 to 20 are views similar to Figures 1 to 3, respectively, illustrating still another practical form of the invention.

Referring to the drawings in detail, it will be observed that, according to all forms of the invention, the present spike includes a shank A and a rail flange overlying, engaging and holding arm B joined with the shank through a resilient loop formation C. In a spike of this type designed for the particular purpose, it is required that the shank A have not less than a certain minimum cross sectional area in order to possess sufficient strength and stiffness effectively to resist bending forces imposed thereon during and after driving and to have required holding power. In the case of a spike of the type mentioned designed for rail holding purposes, it has been found that, if the spike is formed throughout from stock material corresponding in cross sectional area to the required cross sectional area of the shank, and if such stock material is bent to form the loop C and the arm B, the arm and loop are so stiff as not to permit vertical movement of the rail D relative to the tie E, but to require the tie to move vertically as a unit with the rail. The result is that, under the wave motion imparted to the rails by the passage of rolling stock thereover, the ties are caused to partake of an undesirable "pumping" action in the road bed. According to the present invention, for a strong, stiff shank A of any given cross section, the stock comprising the arm B and the loop C is of materially lesser cross section. Thus, while the shank of the present spike is strong and stiff,

the arm, while sufficiently stiffly joined with the shank to effectively hold the rail, nevertheless is sufficiently resilient to permit the rail to move vertically relative to the tie. Undesirable "pumping" of the tie in the road bed thereby is avoided.

In order that the present spike may be manufactured practically and economically, it is formed from stock bar material which, in cross sectional area, may be one half the cross sectional area of the shank of the spike. The bar stock used preferably is of rectangular shape in cross section and preferably is twice as wide as it is thick. Thus, if a piece of the bar stock is doubled upon itself, or if two pieces of the bar stock are disposed in side to side relationship, the resulting cross section is rectangular.

In accordance with the invention, the shank of the present spike is composed of two layers or plies of the bar stock from which the spike is formed and a portion of either or both of the plies is suitably bent to provide the arm B and the loop C through which said arm is joined with the shank. Thus, the arm B has far greater resiliency than would be the case if the bar stock used equaled in cross sectional area the cross sectional area of the shank.

Of course, the bar stock used might be of other than rectangular cross section and might have a width more or less than twice its thickness, but since a shank of square cross section is desirable, the bar stock used preferably is twice as wide as thick so that two layers or plies of the bar afford a square cross section.

According to the form of the invention illustrated in Figures 1 to 3 of the drawings, a bar of stock material, spring steel for example, of rectangular cross section and having a width twice its thickness, is bent at an intermediate point upon itself to provide the two-ply shank A of rectangular cross section composed of the inner and outer plies 10 and 11, respectively.

The shank A may be of any suitable length and at its lower or entering end may be tapered to provide an entering point, as illustrated in Fig. 1, or may be left blunt as illustrated in Fig. 4. In either case, the outer ply 11, at the upper end of the shank, is bent first outwardly, as indicated at 12, then downwardly, as indicated at 13, then outwardly, upwardly and inwardly, as indicated at 14, to provide the resilient loop C, and then is extended inwardly across and at one side of the shank A a suitable distance beyond the inner face of said shank to provide the rail flange overlying, engaging and holding arm B.

The inner ply 10 may be terminated in any suitable manner at the top of the shank A. Preferably, however, said ply 10, at the top of the shank, is bent outwardly into overlying relationship to the outwardly bent top portion 12 of the outer ply 11, as indicated at 15, to provide a strong, stiff, two-ply driving head. Appropriately, the top of this driving head may be disposed above, or not lower than, the top of the loop C, to reduce the likelihood of striking said loop with a maul during driving of the spike.

Obviously, instead of the spike being formed from a single length of bar stock, the inner and outer plies of its shank A may be comprised by separate bar sections, as indicated in Fig. 5. In that case, the bar sections may be loose or separable relative to each other, or they may be welded or otherwise suitably connected together.

Preferably the bottom of the loop C is disposed to permit optional contact with the top face of

the tie plate F, or with the top face of the tie E, depending upon whether a tie plate is or is not used, either before or after engagement of the arm B with the top face of the flange of the rail D, thereby to support the upper end portion of the shank A against undesirable outward canting and to intensify the holding power of the arm B should that be desirable.

According to the form of the invention illustrated in Figs. 6 to 10 of the drawings, the construction is generally the same as the construction illustrated in Figs. 1 to 5, except that the loop C is formed to be contracted by upward movement of the arm B, rather than expanded by upward movement of such arm, as is the case according to the Figs. 1 to 5 construction. In other words, according to the Figs. 6 to 10 form of the invention, the outer ply 11^a of the shank A is bent first outwardly, as indicated at 12^a, and then downwardly as indicated at 13^a, as in the case of the outer ply 11 of the Figs. 1 to 5 form of the invention, but instead of being then extended outwardly, upwardly and inwardly to provide the loop C in accordance with the Figs. 1 to 3 showing, is directed inwardly and upwardly into a coil 16 and again is similarly coiled, as indicated at 17, and finally is extended inwardly across the shank A to provide the arm B. See Fig. 8. The loop C thus comprises two coils, but it may comprise only a single coil or more than two coils, depending upon the amount of resiliency desired. For any single loop, the arm of the Figs. 6 to 10 form of the invention is less resilient than the arm of the Figs. 1 to 5 form of the invention, assuming loops of the same size, because more force is required to contract than to expand the loop.

As the Figs. 6 to 10 form of the invention is, or may be, the same in other respects as illustrated in Figs. 1 to 5, or as described in connection with Figs. 1 to 5, it is deemed unnecessary to repeat in connection with Figs. 6 to 10 what has been stated in connection with Figs. 1 to 5.

According to the form of the invention illustrated in Figs. 11 to 13, the construction is the same as the Figs. 1 to 5 construction, except that the loop C, instead of comprising only a single coil of large diameter as in the Figs. 1 to 5 construction, comprises two side by side coils 18 and 19, respectively, of somewhat smaller diameter. The tops of these coils are disposed well below the driving head of the spike and their bottoms are disposed to permit optional contact with the top of the tie plate F, or with the top of the tie E, as the case may be, only after tightening of the spike following its initial application with the arm B contacting with the upper face of the rail flange. In other respects the Figs. 11 to 13 form of the invention is, or may be, the same as illustrated, or as described in connection with, Figs. 1 to 5.

According to the form of the invention illustrated in Figs. 14 to 16, the construction is the same as illustrated in Figs. 11 to 13, except that the inner ply 10^b of the shank A, after being bent, as indicated at 15^b, into overlying relationship to the outwardly directed portion of the outer ply 11^b at the top of the shank to provide the two-ply driving head, is coiled and extended in the same manner as the outer ply of the Figs. 11 to 13 construction to provide a second resilient loop C' and a second rail flange overlying, engaging and holding arm B'. As shown, the loop C and its arm B are disposed at one side of the shank A and the loop C' and its arm B' are dis-

posed at the opposite side of said shank. In other respects the Figs. 14 to 16 form of the invention is, or may be, the same as illustrated, or as described, in connection with the other forms of the invention.

Figure 17 illustrates, as in the cases of Figs. 5 and 10, that the spike may be comprised by two separate sections instead of by a single length of bar stock bent upon itself.

According to the form of the invention illustrated in Figs. 18 to 20, the loop C is disposed at the inner side of the shank A instead of at the outer side of said shank as in the previously illustrated and described forms of the invention. At the top of the shank A the inner ply 10° of said shank is coiled inwardly one or more times to provide the loop C and finally is extended downwardly to provide the arm B. On the other hand, the outer ply 11°, at the top of the shank is bent into overlying relationship to the initially inwardly bent portion of the inner ply, as indicated at 15°, to provide a two-ply driving head, and then is extended downwardly and outwardly across the shank in the form of an arm 20 for permissible contact with the top face of the tie, or tie plate, as the case may be, to limit driving of the spike.

Obviously, according to all forms of the invention, the two-ply shank A is strong and stiff while the arm, or arms, B is, or are, much more resilient than would be the case if the spike were formed from bar stock having the same cross sectional area as the shank.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will, of course, be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and scope of the appended claims.

I claim:

1. A rail spike comprising a stiff two-ply shank, at least one of said plies, at the upper end of the shank, being first bent upon itself to provide a resilient loop, and being then extended from said loop in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop, the other ply, at the upper end of the shank, being bent into overlying relationship to an upper end portion of the first mentioned ply to provide a two-ply driving head.

2. A rail spike comprising a shank composed of inner and outer plies of material, at least one of said plies, at the upper end of the shank, being first bent upon itself to provide a resilient loop, and being then extended from said loop in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop, the other ply, at the upper end of the shank, being bent into overlying relationship to an upper end portion of the first mentioned ply to provide a two-ply driving head.

3. A rail spike comprising a shank composed of inner and outer plies of material, the outer ply, at the upper end of the shank, being first bent outwardly and downwardly and then upon itself to provide a resilient loop, and then being extended inwardly from said loop across the side of said shank in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop, the inner ply, at the upper end of the

shank, being bent into overlying relationship to an upper end portion of the outer ply to provide a two-ply driving head.

4. A rail spike comprising a shank composed of inner and outer plies of material, the outer ply, at the upper end of the shank, being first bent outwardly and downwardly and then upwardly and inwardly upon itself to provide a resilient loop, and then being extended inwardly from the top portion of said loop across the side of said shank in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of said shank by said loop.

5. A rail spike comprising a shank composed of inner and outer plies of material, the outer ply, at the upper end of the shank, being first bent outwardly and downwardly and then upwardly and inwardly upon itself to provide a resilient loop, and then being extended inwardly from the top portion of said loop across the side of said shank in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of said shank by said loop, the inner ply, at the upper end of the shank, being bent into overlying relationship to an upper end portion of the outer ply to provide a two-ply driving head.

6. A rail spike comprising a shank composed of inner and outer plies of material, each of said plies, at the upper end of the shank, being first bent upon itself to provide a resilient loop, and being then extended from said loop in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by its related loop, one of said plies being disposed in overlying relationship to the other ply at the upper end of the shank to provide a two-ply driving head.

7. A rail spike comprising a shank composed of inner and outer plies of material, each of said plies, at the upper end of the shank, being first bent upon itself to provide a resilient loop, and being then extended from said loop in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by its related loop, said arms extending inwardly across opposite sides of said shank, respectively, one of said plies being disposed in overlying relationship to the other ply at the upper end of the shank to provide a two-ply driving head.

8. A rail spike comprising a shank composed of inner and outer plies of material, the inner ply, at the upper end of the shank, being first coiled inwardly to provide a resilient loop, and being then extended from said loop in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop.

9. A rail spike comprising a shank composed of inner and outer plies of material, the inner ply, at the upper end of the shank, being first coiled inwardly to provide a resilient loop, and being then extended from said loop in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop, the outer ply, at the upper end of the shank, being bent into overlying relationship to an upper end portion of the inner ply to provide a two-ply driving head.

10. A rail spike comprising a shank composed of inner and outer plies of material, the inner ply, at the upper end of the shank, being first coiled inwardly to provide a resilient loop, and being then extended from said loop in the form

- of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop, the outer ply, at the upper end of the shank, being first bent into over-
 5 lying relationship to an upper end portion of the inner ply to provide a two-ply driving head and being then extended outwardly across the shank in the form of an arm to engage the upper face of a tie or tie plate to limit driving of the spike.
- 10 11. A rail spike comprising a shank composed of inner and outer plies of material, the inner ply, at the upper end of the shank, being first bent outwardly and downwardly and being then coiled outwardly, upwardly and inwardly to provide a resilient loop, and being then extended in-
 15 wardly across the shank in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop.
- 20 12. A rail spike comprising a shank composed of inner and outer plies of material, the inner ply, at the upper end of the shank, being first bent outwardly and downwardly and being then coiled outwardly, upwardly and inwardly to provide a resilient loop, and being then extended inwardly across the shank in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by said loop, the inner ply, at the upper end of the shank, being bent into overlying relationship to the outwardly bent portion of the outer ply at the upper end of the shank to provide a two-ply driving head.
- 10 13. A rail spike comprising a two-ply shank, at least one of said plies at the upper end of the shank being bent upon itself to provide an open resilient loop and then extended from said loop, at one side of the vertical plane of the
 15 shank, in the form of a rail flange overlying, engaging and holding arm resiliently connected with the upper end of the shank by the said loop, and the other ply being disposed in overlying relationship to an upper end portion of the first
 20 mentioned ply to provide a two-ply driving head.

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