(No Model.)

# H. GREER.

## RAILROAD SPIKE.

No. 267,420. Patented Nov. 14, 1882.

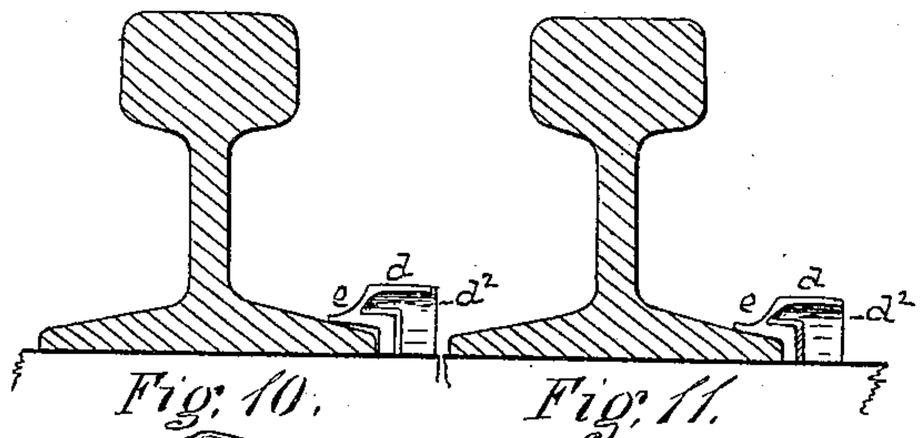


Fig: 10.

Fig: 11.

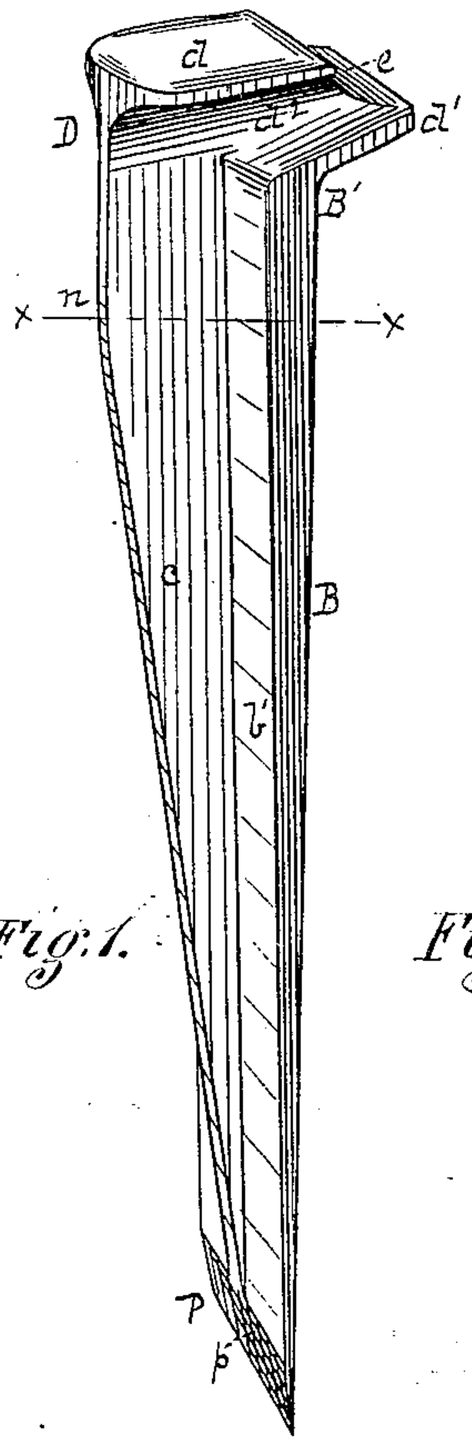


Fig: 1.

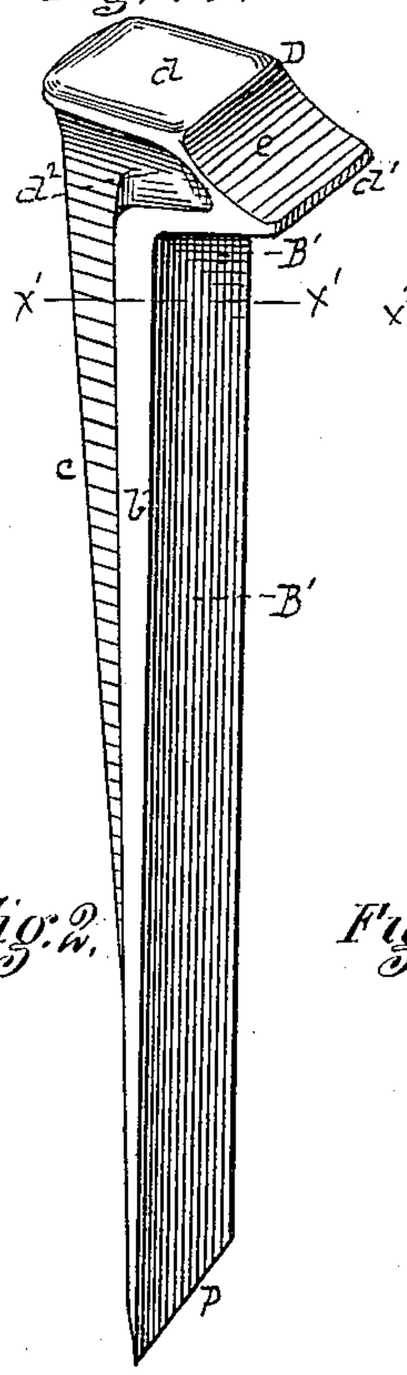


Fig: 2.

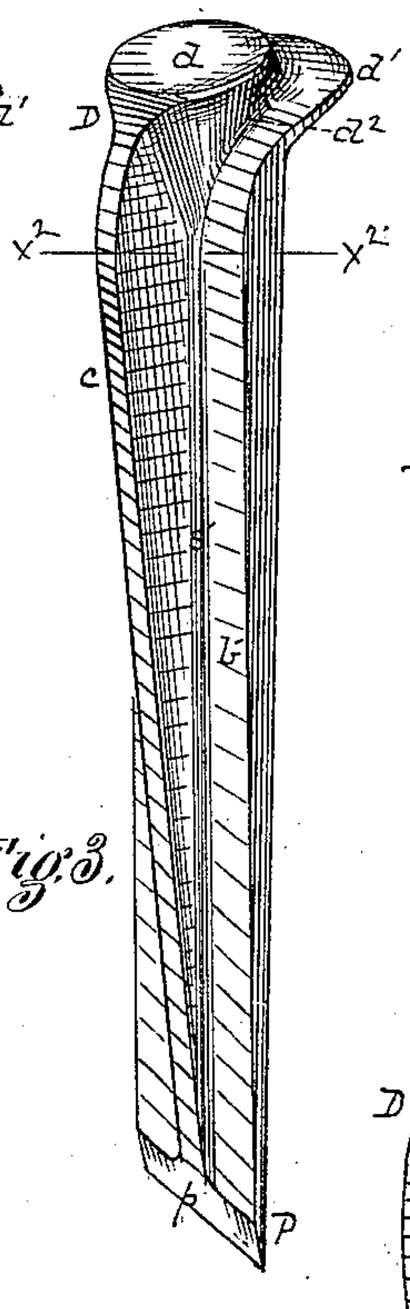


Fig: 3.

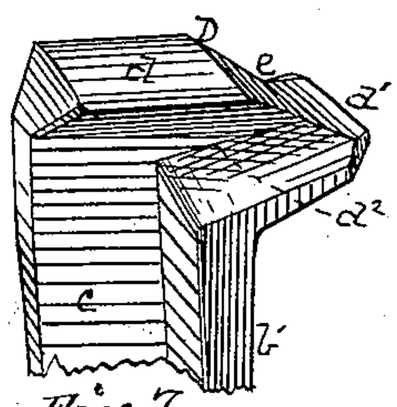


Fig: 7.

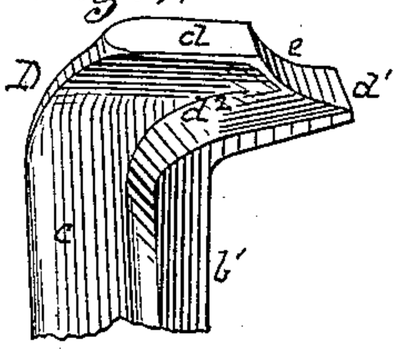


Fig: 8.

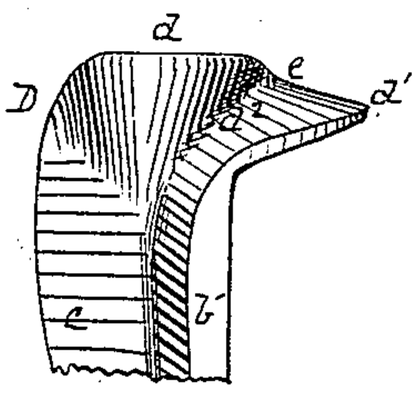


Fig: 9.

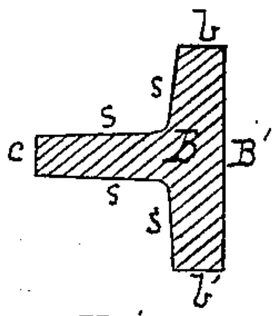


Fig: 4.

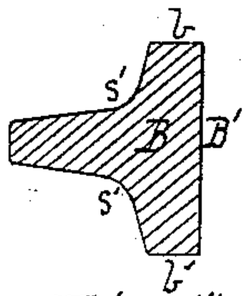


Fig: 5.

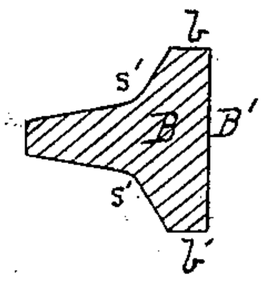


Fig: 6.

Witnesses.
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R. H. Whiddeney

Inventor Howard Greer,
By Attorney George W. Chinsly

# UNITED STATES PATENT OFFICE.

HOWARD GREER, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO GEORGE H. CHRISTY, TRUSTEE, OF SEWICKLEY, PENNSYLVANIA.

## RAILROAD-SPIKE.

SPECIFICATION forming part of Letters Patent No. 267,420, dated November 14, 1882.

Application filed March 3, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, HOWARD GREER, of Chicago, county of Cook, State of Illinois, have invented or discovered a new and useful Improvement in Railroad-Spikes; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figures 1, 2, and 3 are perspective views of railroad-spikes of slightly different forms, but each containing more or less completely the features of invention hereinafter described and claimed. Figs. 4, 5, and 6 are sectional views of Figs. 1 to 3, respectively, in the planes of the lines $x\ x$, $x'\ x'$, and $x^2\ x^2$. Figs. 7 and 8 are perspective views of spike-heads, further illustrative of my present invention; and Fig. 9 is a detached view of the spike-head of Fig. 3.

The ordinary railroad-spike heretofore employed—namely, with a square shank, a lap-head, and a wedge-point—has, when in use, so little holding-power that the railroad companies are generally compelled to adhere to the exclusive use of hard-wood ties. The form of the spike is such that when driven into wood it breaks or disintegrates the fiber or grain of the wood immediately around it to a greater or less extent, depending somewhat on the kind or quality of wood employed; and such broken pieces or grains of wood fiber, resembling in some respects coarse sawdust, operate apparently somewhat as a cushioning material around or along the body of the spike, and also, on account of their broken and disintegrated condition, they have a yielding tendency under the heavy strain employed, as a result of which the otherwise strong hold of the wood on the spike-body or shank is materially lessened. This evil is less in hard than in soft woods, and hence the necessity in using hard-wood ties. There has for a long time been a call for a spike of such form that when driven into soft wood it would have a holding-power sufficient for the purposes desired, so that, as hard wood has become scarce and costly, the softer woods can be resorted to. The present spike is devised with this particular end in view.

Referring first to Figs. 1 and 4, the body or shank B of the spike is of T form in cross-section, the flanges $b\ b'$, which form the head of the T, being on the bearing side of the spike, or on the side which in driving comes next the rail-flange. The third flange or rib, $c$, extends up and down the back side of the shank, and tapers in depth from at or about the wood-line—say at $n$—to or nearly to the point P. The side ribs, $b\ b'$, taper in thickness through about the same range. The point P is made chisel-shaped or beveled, as at $p$, on its back side, and this point, after being shaped somewhat roughly by machinery or in the casting operation, is subjected to a finishing operation by grinding or forging, so as to give a sharp edge and a finless point, whereby to insure a free and easy entry of the spike into the wood when being driven, and, what is of still more importance, to avoid so far as possible the breakage of the fiber of the wood by the entrance of the spike. The taper forms described give the best wedge-like action, whereby to displace and push back the wood which lies in the path of the spike with the least possible breakage of the grain or fiber so displaced, and still retaining the desired amount or degree of holding-power, or, rather, so increasing the latter that even in soft wood the holding-power will be as great or greater than the holding-power of the ordinary spike in hard wood; and, still further, while doing all this I make the ribs $b\ b'$ comparatively thin and broad, and thus, and by the use of the back rib, so dispose the metal of the spike that, while less in weight than the ordinary spike, it will be equally strong or stronger. And in order to increase the holding-power of the adjacent angular faces $s\ s$ of the ribs, I so incline or shape them that each two adjacent meeting faces shall make an obtuse angle with each other, as in Fig. 4; and, what I believe to be a still further improvement, I add a fillet, $s'$, along up and down the meeting faces, or in the angle formed by the meeting planes of the faces, as better illustrated in Figs. 3, 5, and 6.

The spike-head D, Fig. 1, is double, by which I mean that the table or striking-head $d$, which receives the blow in driving, is separated from the lip $d'$, which overlaps the edge of the rail-flange, by a groove, $d^2$, one on each side, of suitable size and depth to receive the claws

of a draw-bar, but still leaving sufficient metal between the bottoms of each two opposite grooves to secure proper strength at that point; and it is one peculiarity of these grooves that they extend forward or inward toward the point of the lip *d'* far enough so that the points of the claws of the draw-bar may engage the under side of the upper head, *d*, at or near or forward of the central line of the greatest resistance found in the drawing of the spike.

Heretofore, in all the railroad-spikes I have any knowledge of, the claw-bar could take a bite or grip on the under side of the head only at a point considerably back of such line of greatest resistance. The result then was that the spike was almost always bent considerably backward in drawing, and had to be straightened (generally after heating) before it could be used again. Extending the grooves forward as described enables the spikes to be drawn vertically upward in a direct line and usually without being much, if at all, bent, assuming the work to be done with care.

As another part of this invention, I make the upper side of the lip *d'* with a hollow concave or recess, *e*. The utility of this will be seen by reference to Figs. 10 and 11. When a spike of the ordinary form of side head is driven down, the outer end of the lip usually engages the upper side of the rail-flange, as in Fig. 10, and clamps the rail tightly down. The tendency of the rail to lift under the various strains to which it is subject produces not only a considerable wear at that point, but also an upward strain, which, acting on the spike at the outer end of the lip, acts as on the end of a bent lever to lift the spike, and the effective lifting force of such strain increases with the distance of such bearing-point from the spike-body. Now, the concave or recess *e* leaves the outer end of the lip free to bend or spring a little, so that the final blow given to the spike shall bring it down, as in Fig. 11, with its lower face conformed to the shape of the upper side of the rail-flange. Thus the lifting-strain and wearing effect of the rail is distributed from the point of the lip along to or nearly to its base, and the bent-lever action above referred to is practically eliminated. The occasion for this feature of improvement arises from the fact that there is no uniformity in the angle of the slope or bevel of the upper outer edge of the rail-flange, as between the different patterns of rails used by different roads. Hence the desirability of a spike, the side head of which may conform to the irregularities met with.

The several features of improvement thus far described are illustrated in slightly modified forms in the other figures, and are designated or identified by the same letters, so that the description need not be repeated as to each. The taper of the ribs may begin from just beneath the spike-heads, as in Figs. 1, 7, and 8, instead of from at or near the wood-line; and other modifications may be made without any substantial departure from the scope of the present invention.

One of the advantages appertaining to this form of spike is that I get a broad lateral bearing-face, B', of the spike against the edge of the rail-flange, and I further improve the spike by carrying out the lips *d'* of the full width or approximately of the full width of this bearing-face B', as best illustrated in Fig. 2, but also shown more or less perfectly in other figures. The advantages of this will be readily understood by track-layers.

In order to increase the holding-power of a spike, I also scale the same; but this will be included in another application to be filed in due time.

In those spikes wherein a side head is desired—that is, with the lip *d'* projecting over one or the other of the side ribs, *b* or *b'*—a broad bearing-face should be added immediately under the base of the lip, which in use will come against the rail-flange. In like manner the head may project over the back flange, *c*, and have a like broad bearing-face immediately beneath the base of the lip. Spikes of these modified forms are sometimes required for special uses, and in all the forms of spikes shown this broad bearing-face is important, since the use of steel rails has led to a reduction in the thickness of the rail-flange, whereby its frictional wear or cutting effect on the spike is considerably increased as compared with the old iron rail.

Some of the several features of improvement herein described may be employed, if desired, without the necessary use of certain others—as, for example, the double head with the intermediate grooves may be used on the ordinary spike; or one or more of the improvements shown, described as appertaining to the spike-shank, may be used with some advantage even with the old and well-known form of head, and all such modifications are hereby included herein.

As a further element of utility in the use of a chisel-pointed spike, it may be stated that with the ordinary wedge-pointed spike it has in driving to be started at an angle, or inclined outward, and in driving its direction of motion is changed, so that when driven down it will stand vertical, or nearly so. This is necessary in order to make it bear tightly against or hug the edge of the rail-flange. This circuitous driving operation causes the spike-point to enter the wood in a curved path, so that the wood fibers around the spike-shank, after it is driven down, are so much the more disintegrated or broken. The chisel-pointed spike, on the other hand, may be driven directly down straight into the tie, as the tendency of the bevel of the chisel-point, particularly in connection with the slope or incline of the back edge of the back rib, *c*, will be to hold or press the spike at all times over against the rail-flange and cause it to hug the latter tightly. Hence the hugging action of the spike on the

edge of the rail-flange will be secured without necessarily extending or spreading out the area of breakage of the wood fiber in the driving of the spike.

These spikes may be made by casting, rolling, or forging, or by a combination of the two latter operations in any of the ways known to the art. Specially-constructed machinery for the purpose will form the subject-matter of one or more applications hereafter to be filed, if thought advisable.

I use the terms "chisel-point" and "chisel-pointed" herein as distinguishing my improved spike from the wedge-pointed spike commonly in use, and shown in numerous patents.

As regards the taper in the back rib, *c*, of the spike, it is important that such taper should extend, as described, entirely through or along so much or approximately so much of its length as enters the wood when in use, or, in other words, from at or near the wood-line to at or near the spike-point, since only thus can the wood fiber be displaced without being considerably crushed and broken back of or away from the spike-hole. Where the bevel or taper is at all abrupt, as when made short, a considerable breaking or crushing effect necessarily follows, and the best holding-power of the spike is consequently to a corresponding extent lost.

For the purpose of illustrating other features of improvement, I have shown some of the features of the present invention in Patent No. 258,052, granted to me May 16, 1882, the present case being the one referred to in the specification of said patent.

I claim herein as my invention—

1. In a railroad-spike, the grooves $d^2$, extending along the opposite sides of the head to a point at or near or beyond the vertical line of greatest resistance in the drawing operation, substantially as and for the purposes set forth.

2. A notch, concave, or recess, *e*, made in the upper face of the projecting part of a side or lap-headed railroad-spike, substantially as set forth.

3. A railroad-spike having a back rib, *c*, which tapers from at or near the wood-line to at or near the spike-point, substantially as set forth.

4. The side ribs, *b b'*, of a railroad-spike, tapering in thickness from at or near the wood-line to at or near the spike-point, substantially as set forth.

5. A chisel-pointed railroad-spike substantially of the form shown and described.

6. A railroad-spike having the chisel-point shown and a tapering back rib, substantially as set forth.

7. A railroad-spike having a double head, tapering ribs, and a chisel-point, substantially as set forth.

In testimony whereof I have hereunto set my hand.

HOWARD GREER.

Witnesses:

FRANK J. LOESCH,

JACOB GREMBY, Jr.