

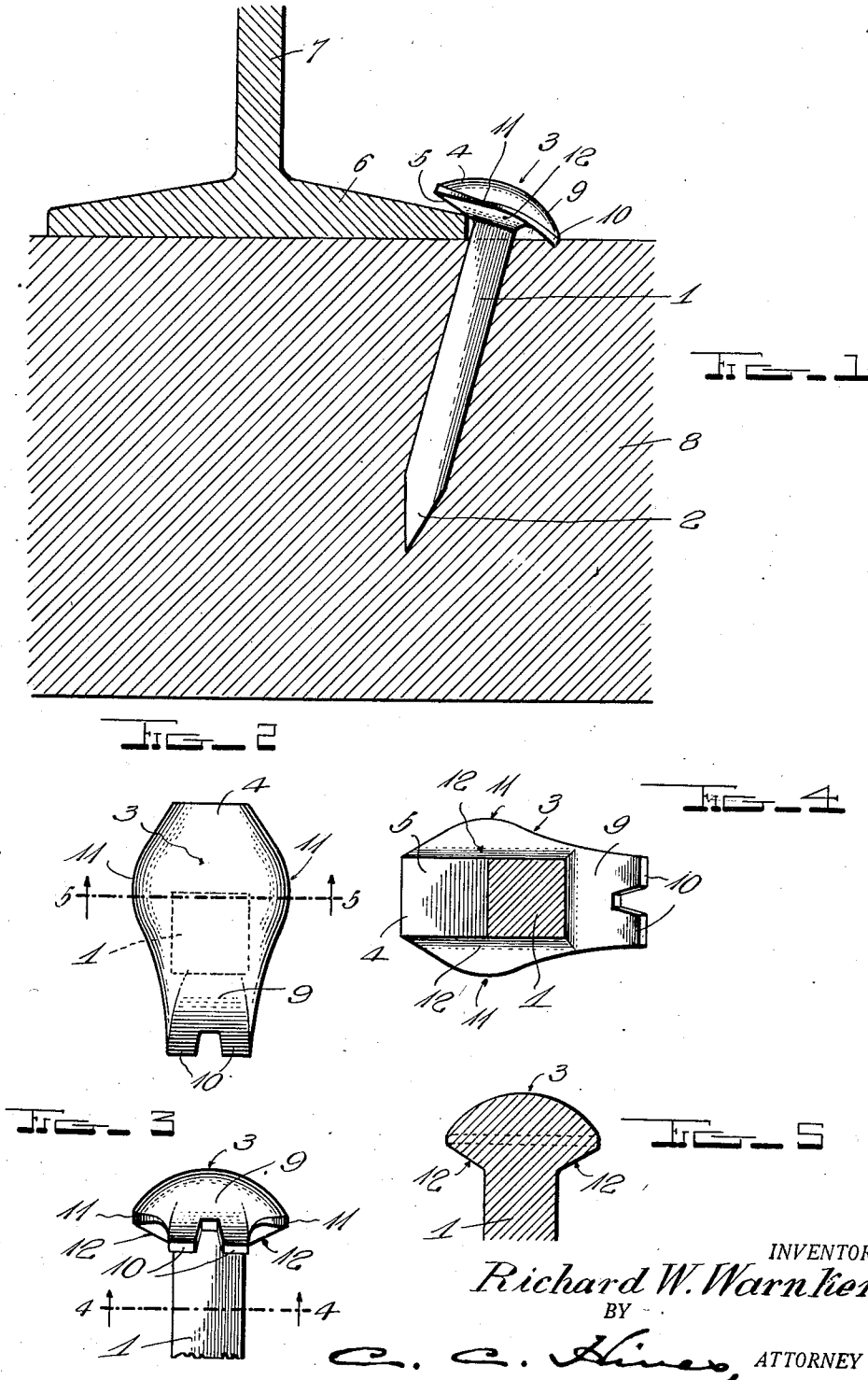
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RAILROAD SPIKE

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## UNITED STATES PATENT OFFICE

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## RAILROAD SPIKE

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This invention relates to railroad spikes for fastening rails to ties, and has for its objects, first, to provide a spike adapted to be driven into a tie at an angle to the vertical and to have its head engage the rail and tie in such manner that a resistance to a pulling out movement or lateral play causing loosening of the spike will be instituted to prevent such displacements of the spike and loosening of the spike and rail under relative vertical movements of the tie and rail, while a bracing action will be instituted under horizontal pressure of the rail to prevent lateral movement or spreading of the rail and enlargement of the spike hole or splitting of the tie incident to such pressure upon the spike; second, to provide a spike having a driving and bracing head of novel form and construction giving greater strength to the head and resistance to its fracture under sledge blows, while adapting it to perform bracing functions to prevent spike and rail displacements; third, to provide a head having, in addition to its rail engaging flange, lateral shoulders, and a bracing wing or flange to bear upon the tie, said bracing wing or flange being of such form as to provide for the ready engagement of the claws of a claw bar or like tool with the lateral shoulders in order to permit easy extraction of the spike when desired; and, fourth, to provide a spike of increased general strength and having the qualifications stated while being at the same time adapted for commercial manufacture at a cost not exceeding that of an ordinary spike.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a side elevation of a railway spike embodying my invention, showing the same applied to a tie and rail, the tie and rail appearing in section.

Figure 2 is a top plan view of the spike.

Figure 3 is a rear elevation of the same.

Figure 4 is a horizontal section on line 4—4 of Figure 3, looking toward the spike head.

Figure 5 is a vertical transverse section on line 5—5 of Figure 2.

In carrying my invention into practice, I provide a spike comprising a shank 1 provided with a pointed lower end 2 and having at its opposite end a head 3. The shank 1 may be of square or other rectangular form in cross-section in accordance with customary practice.

The head 3 is formed with a forwardly extending flange or projection 4 having an inclined bottom face 5 to engage the base flange 6 of a rail 7 seated upon the tie 8 into which the spike shank is driven. The head 3 is also provided with a rearwardly projecting brace flange or wing 9 centrally divided or forked at its free end or extremity to provide bearing prongs 10. The flange or wing 9 projects beyond the side of the spike shank diametrically opposite that side of the shank from which the flange 4 projects, and the free ends of the prongs of said flange or wing 9 are adapted to engage the upper face of the tie 8 to brace the spike and sustain it firmly against displacement under strains or stresses falling upon the rail. The head 3 is further provided with opposite, laterally extending shoulders 11 projecting some distance beyond and overhanging the sides of the shank and disposed at right angles to the sides beyond which the flanges 4 and 9 respectively project.

The spike head 3, constructed as above described, and including the portions 4, 9 and 11, provides a spike head of much greater area than a spike head of ordinary construction, and which is accordingly much stronger and much less liable to fracture under blows of a driving sledge or hammer. This spike head is preferably both longitudinally and transversely arched, giving it maximum depth or thickness in the line of the shank, and then diminishing in depth toward its margins, so that a head of the construction described, of maximum strength to withstand the driving blows, and which is at the same time not of excessive depth, will be produced. The upper surface of the bracing wing 4 constitutes a continuation of the upper surface of the head in the line of the longitudinal arch,

and said wing curves downwardly and rearwardly so that its engaging edge or prongs 10 lie at an angle to and below the plane of the deepest portion of the inclined rail engaging surface 5.

This spike is designed in practice to be driven into the tie 8 at an angle of about 15° to the vertical, so that it will extend at an angle to the vertical plane of its point of entrance into the tie and at an angle to and beneath the rail flange 6 engaged by the surface 5. When the spike is so driven into the tie, the lowest point of the inclined surface 5 of the flange 4 will engage the lateral edge of the upper surface of the flange 6 of the rail 7, the remainder of the surface 5 being spaced from and extending at an angle to the upper face of the flange 6. This arrangement of the spike will also cause the spike head to lie at such an angle that the bearing edges or prongs 10 of the bracing wing 9 will bear upon or be slightly embedded into the upper surface of the tie 8. By this inclined arrangement of the spike shank, and the engagement of its flanges 4 and 9 with the rail flange 6 and upper surface of the tie, any strains falling upon the surface 5 of the flange 4, incidental to relative vertical movements of and between the rail 7 and tie 8, will be exerted at an angle to the plane of the shank 1 and at such an angle as to force the head end of the shank in an outward lateral direction instead of in a straight upward vertical direction. As a result, the wing 9 will be pressed with force against the surface of the tie and act, in addition to the resistance to outward movement of the shank 1 as a brace, to hold the spike against displacement in any direction. This bracing action of the wing 9 upon the face of the tie also occurs under stresses or strains produced by horizontal lateral movement of the rail 7, whereby the resistance of the spike to such movement of the rail is increased. The inclination of the shank of the spike also establishes a resistance to upward movement of the spike under any stresses or strains falling upon the rail 7. By this means the gradual pulling up or extraction of the spike from the tie is prevented, and loosening of the rail due to elevation of the spike head above the base flange of the rail prevented. Also lateral working of the spike in its hole in the tie 8, due to outward pressure of the flange 6 of the rail 7, is prevented, so that enlargement of the spike hole in the tie and resultant loosening of the spike can not occur. My invention thus provides a spike which in the first place can not be directly pulled upward and gradually extracted by movements of the tie and rail, owing to its inclination, and which, by reason of such inclination and the construction and operation of its bracing wing, will prevent both vertical and lateral movements of the spike due to any rail movements, as a result

of which loosening of the spike or rail can not occur and spreading and other rail displacements will be prevented.

As shown, the flanges 4 and 9 of the rail head are tapered respectively toward their free ends, making the spike head of maximum width at its center, giving a wide area of driving surface to receive the blows of a sledge or hammer, without making the head of undesirably large size. This shape of the head also enables the shoulders 11 to be made comparatively wide for the effective bearing engagement against them of the claws of a claw bar or like tool, whereby the spike may be extracted from the tie when desired. The bottom or claw engaging faces 12 of these shoulders 11 are preferably beveled or inclined at an upward and outward angle, as shown, in order that such surfaces may lie a sufficient distance above the surface of the tie to permit of the ready insertion of the claws of the claw bar thereunder for the extracting operation. The wing 9 is so tapered that its side edges lie substantially in the plane of the sides of the shank 1 and are laterally beveled off, as shown, the construction thus being such that the wing 9 may be received in the space between the claws of the claw bar, allowing the claws to slide along the edges of the wing and into engagement with the surfaces 12 of the shoulders 11, so that the extracting tool may be positively engaged with the head and the spike extracted, whenever desired, with a minimum amount of time, trouble and effort. The purpose of bifurcating the wing 9 so as to provide short fork arms 10 to bear upon the tie is to provide tie engaging surfaces having the effect of engaging spurs, which will be spaced apart so that their pressure will be spread, i. e., not centralized, as a result of which any tendency of the tie to split under pressure along a line in which it is weakened by the spike hole will be prevented.

The advantage of my improved spike will be evident from the foregoing description. The spike by reason of its angular placement resists, as a result of this placement, any tendency to upward movement and extraction due to any rail movements. By reason of this angular placement and the action of the bracing wing 9, all lateral pressures of the rail upon the spike head are sustained, so that sidewise deflection of the rail will be prevented. This bracing action furthermore prevents any lateral motion of the spike tending to cause enlargement of the spike hole allowing water to enter and causing the tie to rot. In addition to these several advantages, the construction provides a spike which may be easily and conveniently extracted when desired. Owing also to the fact that the placement of the spike and bracing action of the bracing wing relieves the spike of considerable strain, the spike shank may be made

of less diameter or shorter than usual, without sacrifice of structure, and with a resultant economy of material in its manufacture.

Having thus fully described my invention, I claim:

5 A railway spike having a shank and a flange engaging head, said shank designed to be driven into a tie at a downward and inward angle to the rail flange engaged by the head,  
10 and said head having a flange to bear upon the rail and a flange to bear upon the tie, and laterally extending shoulders of less depth than the head and of maximum width substantially in line with the face of the shank  
15 beyond which the rail engaging flange projects, the said tie engaging flange having its upper and lower faces arched downwardly and rearwardly and of gradually decreasing thickness to its outer edge and having its side  
20 edges continuous with the side edges of the shoulders, the outer end of said flange having a central inwardly constricted notch cut therein to divide the end into a pair of relatively broad prongs lying on opposite sides of  
25 the longitudinal center of the head and arranged to bear with their ends upon the tie when the head is forced outward by lateral pressure from the rail, the tie engaging flange having its upper surface lying below the horizontal plane of the bottom faces of the  
30 shoulders and the width of the head progressively diminishing between the point of maximum width of the shoulders and the sides of the said tie engaging flange.

35 In testimony whereof I affix my signature.

RICHARD W. WARNKEN.

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