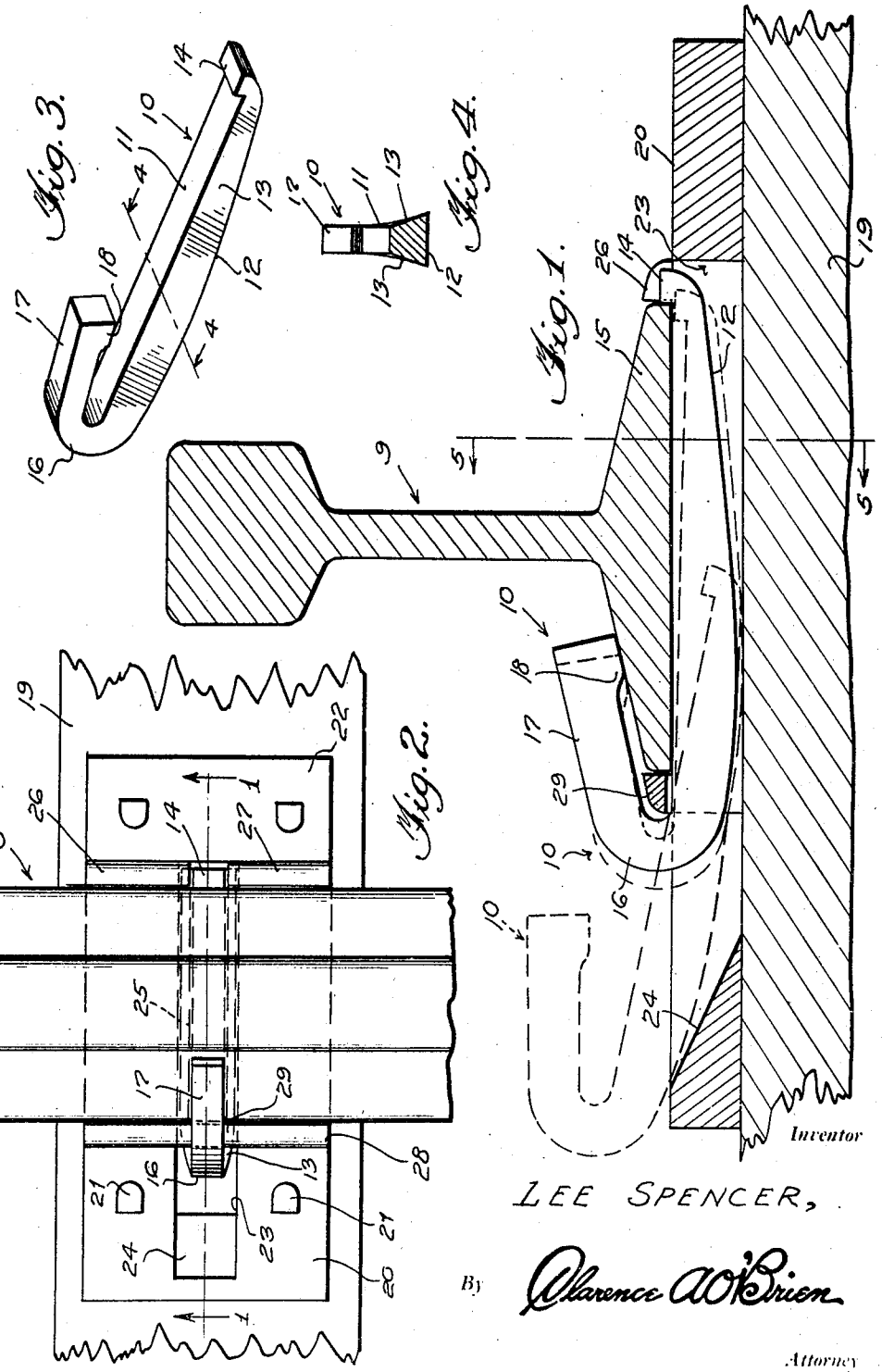
Oct. 20, 1942. L. SPENCER 2,299,354

RAIL FASTENER

Filed Dec. 17, 1941 2 Sheets-Sheet 1



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RAIL FASTENER

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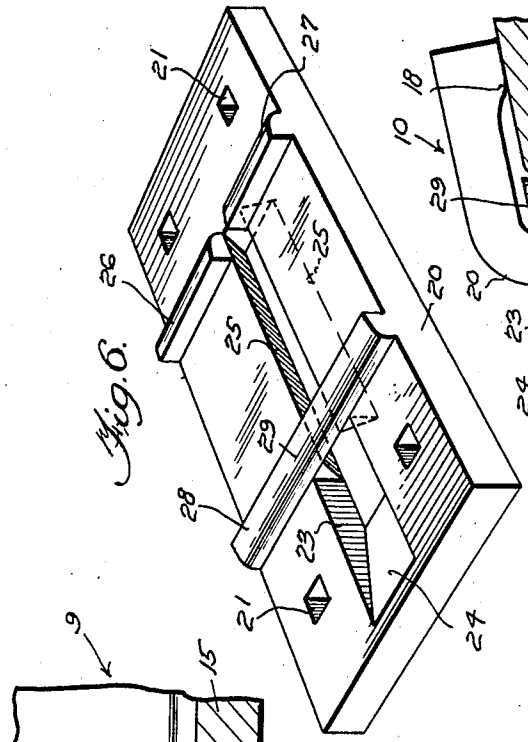


Fig. 6.

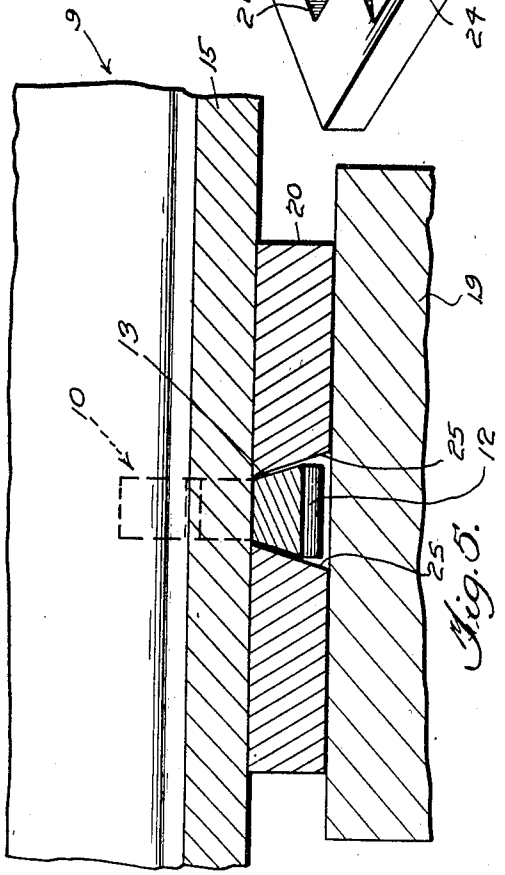


Fig. 5.

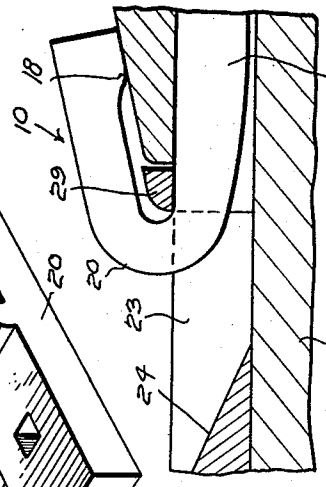


Fig. 8.

Fig. 7.

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RAIL FASTENER

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Application December 17, 1941, Serial No. 423,379

8 Claims. (Cl. 238—343)

This invention relates to the art of rail fasteners in general, having more specific reference to what is believed to be an innovation in this line of endeavor, the adaptation thereof being aptly suited to achieve desired results with requisite certainty and expediency.

In order that the nature of the invention may be best understood and satisfactorily contrasted with present day methods and commonly utilized fasteners, I feel disposed, at the outset, to direct attention to existing conditions, whereby to permit the reader to better understand and appreciate the points of novelty, structurally and functionally, which characterize the hereinafter described contribution to the art.

At points of very heavy traffic coupled with sharp curvature, rails require frequent renewal, either by transposing the rail from one side to the other to equalize curve wear or are replaced out of face, and in any case with track as it is now constructed requiring considerable labor expense to release the rail, and generally under the conditions noted there are at least two spikes to pull or bolts to loosen. Where spikes are used, the spike holes require plugging before the rail is replaced, and the spikes redriven, and it is a well known fact that ties have shorter service life under these conditions than the average, this resulting from a condition known as spike-killing, and is a direct result of this pulling and driving of the rail holding spikes. This operation so breaks the wood fibers surrounding the spike that in time the spike can no longer perform the purpose for which it is intended, that is, to hold the rail in the proper position.

Upon close examination of the ties removed, it will be revealed that, except for the small area under the rail base, the tie or timber is in a state of good preservation and would render many more years of service, and even those ties that are removed because of decay will show that this decay started from this same area and from the same abuse. This destruction of the wood fiber around the spike allows easy entrance of water and the elements to the center and untreated portion of the tie; and in nearly every case this condition is still further aggravated by plate cutting or mechanical wear. If the figures released by experts—that about 45 per cent of the ties removed were taken out for spike-killing and nearly the same amount for mechanical wear, plate cutting, checking, etc.—are accepted as general, there is a field of great savings if these two items be reduced or eliminated.

The common track spike, one of the earliest rail fastenings used and still the most common, has certain advantages over all the above devices. Cheapness and ease of application first of all, and the one great advantage that after a certain period of time it will raise away from contact with the rail base and allow the rail a certain freedom of movement vertically, or, stated in another way, an allowance for the fact that in all track there exists a certain amount of wave motion of the rail which if confined by the rail holding spike or other device will cause the track to pump or churn. Along with its good points, the spike has several bad faults, one of them being that it requires removal in order to release the rail; another, as the shank is generally in contact with the rail base there is a certain amount of this motion transmitted to the spike causing it to work upward out of the tie and requiring repeated hitting down into place, this, too, breaking the wood fibers and constituting another cause of spike-killing and indirectly, decay.

Having in mind the foregoing relevant factors and circumstances, and after due deliberation and study, I have evolved and produced an improved assemblage characterized by an appropriate foundation, generally a wooden tie with a more or less conventional tie plate fastened thereon, the base flange of the rail resting on the tie plate, there being a key carried by said base flange, and said plate having a keyway to accommodate the coacting portion of the key. Using a tie plate of sufficient area such as will not sink into the tie under a load, and properly anchoring this plate on the tie by full throated spikes so that shifting of the plate is prevented, and using my improved rail retainer or fastener to hold the rail, and by thus eliminating spike-killing and the aforementioned factors, and incorporating the good points of the conventional track spike, while at the same time discarding the faults of said track spike, I have thus perfected what is believed to be a new and novel rail fastener.

There are many other features and advantages to be touched upon, but these will be included in the concluding portion of the description whereby to enable the reader to better comprehend the claims predicated thereon.

In the accompanying drawings wherein like numerals are employed to designate like parts throughout the views:

Figure 1 is an enlarged fragmentary view showing a portion of a wooden rail tie, the specially designed rail plate superimposed thereon, the

conventional rail, and the novel fastener in operative position in full lines and in other progressive positions in dotted lines, the section being taken on the plane of the line 1—1 of Figure 2.

Figure 2 is a top plan view of the arrangement depicted in Figure 1, the view being on a smaller scale and showing the assemblage with parts in full operative position.

Figure 3 is a perspective view of the specially designed detachable key, that is, the retention element or part which is adapted to embrace and be carried by the base flange of the rail.

Figure 4 is a cross-section on the plane of the line 4—4 of Figure 3.

Figure 5 is a vertical section on the plane of the line 5—5 of Figure 1, said view serving to emphasize the "daylight" spacing between the plate and the key and utilized for achieving a wave motion feature hereinafter described.

Figure 6 is a detail perspective view of the preferred embodiment of the rail or tie plate perfected in accordance with the principles of the present invention.

Figure 7 is a view like Figure 1 disclosing a modification.

Figure 8 is a fragmentary detail view showing the arrangement utilized when the parts are in metal-to-metal contact such as is the case when the wave motion feature is eliminated.

Reference being had to the illustrative drawings, and as before stated, the arrangement comprises broadly a base or foundation characterized by a wooden tie and a tie plate thereon, and a rail, the rail being provided with a key and there being coacting retention or interlocking features between the plate and key, whereby to anchor and thus fasten the rail on the foundation.

The rail is denoted by the numeral 9 and is conventional. The relatively movable retention or fastener element is broadly a key 10 and this is preferably a detachable part, the opposite ends thereof being releasably connected with the base flange of the rail and the intermediate or shank portion constituting the retention key. The shank, which is longitudinally elongated, is denoted by the numeral 11. It is tapered from left to right, that is, reduced in vertical dimension, on a slight curve, as indicated at 12. It is preferably dovetailed in cross-sectional form, the longitudinal side faces or edges 13 being denoted as beveled. It will be understood, however, that any type of retention shoulders or "keying elements" will serve the purpose. At the relatively reduced righthand end there is an upstanding lug 14 which functions as a detent, this being adapted to snap up and around the adjacent longitudinal edge of the base flange 15 of the rail. At the opposite end is a return bend 16 defining an overhanging limb or reach arm 17 slightly thickened at its free or terminal end, as at 18, to contact and rest upon the top side of the adjacent half of the base flange 15, as brought out to advantage in Figure 1 of the drawings. Thus, we have visualized the rail and the detachable key 10 carried thereby.

The conventional wooden tie is denoted by the numeral 19. The metal tie or rail plate, which is seated and fastened thereon, is denoted by the numeral 20. This part 20 is shown to advantage in Figure 6 and preferably comprises a somewhat conventional rectangular plate provided with openings or apertures 21 to accommodate the spikes or equivalent fasteners 22. In practice this plate is routed out to provide a longitudinally elongated somewhat centralized slot 23. One end of 23 is slightly wide and is beveled as at 24 to pilot the shank portion of the key 10 into the slot. The opposite end portion is narrower and the opposite longitudinal edges are undercut as at 25 to provide suitable retention shoulders. Thus, the meeting faces of the shank and slot are corresponding in shape to coincide. It is not necessary that the keyway portion of the slot and the key be dovetailed in cross-section. In other words, any other cross-sectional shape may be utilized as long as the retention shoulders on the key underlie and properly coact with the undercut shoulders forming the opposite longitudinal side walls of the slot or keyway. At one end of the slot we find lugs or coacting ribs 26 and 27 serving as upstanding abutments for the adjacent edge of the base flange of the rail. At the opposite end portion of the slot there is a similar transverse abutment or rib 28 whose central portion 29 bridges the underlying keyway or slot.

In practice the shank of the keying unit is slipped under the base flange of the rail and the detent rises slightly and snaps into position, as brought out to advantage in the progressive dotted and full line showings in Figure 1. The return bend and limb at the left hand end constitute a hook which effectively embraces the adjacent or intermediate portion 29 of the abutment 28. As brought out in the drawings, particularly Figures 1 and 5, there is sufficient space between the parts to provide the necessary play or "daylight' to accomplish the aforementioned wave motion and to at the same time obtain the equally desirable interlocking effect. I desire to emphasize the so-called key and keyway assembly wherein the retention shoulders or faces are spaced slightly from each other. The degree of spacing is of course variable, but in any event, sufficient space between the parts is provided for in order to allow the desired play.

Now in Figure 8 the parts are designated by the same numerals already utilized to avoid needless repetition. The only point to be made here is that in Figure 8 there is metal-to-metal contact between the coacting or interlocking surfaces of the key and keyway and the hook on the key and the bridging portion 29 of the abutment 28. This tight fit or rigid arrangement is utilized in such instances where experts have deemed it advisable to utilize rigid anchorage as distinguished from the wave motion principle of anchorage.

Reference being had now to Fig. 7 of the drawings, everything is the same here as already described, except that the left hand abutment on the top of the tie plate 20 is in two parts. In other words, the companion parts are denoted by the numerals 30. That is to say, there is no portion of the abutment actually bridging the slot or keyway. It is not necessary in all instances to use the bridging feature depicted in Figures 5, 6 and 8. It has been found sufficient in certain circumstances to simply rely on the interlocking result attainable by the coaction of the undercut retention shoulders in the keyway and the coacting retention faces on the shank portion of the key. Some prefer this arrangement over that represented with particularity in Figure 1. However, the principle is basically the same.

It is within the purview of the invention to

employ any appropriate design of tie plate construction so long as the same is characterized by a body having a slot constituting a keyway and transversely disposed parallel ribs or equivalent parts serving as abutments between which the base flange of the rail is placed for proper retention in place. No rail holding spikes are needed. This means that there are no rail holding spikes to pull to relay or change out a rail. The tie plate may be attached by bolts, spikes or lag screws or the like. It is evident, too, that wave motion of the rail is allowed or restricted and is held within and controlled within limits considered advisable at the time of manufacture. By making the tie plate and the tie act as one unit and the rail and the rail clip or key as another unit, these two units either flexibly or rigidly interlock the parts in desired relation to each other with the result that there is very limited wear and no adjustment and virtually a minimum of expense to maintain. It is evident, too, that the rail will be held precisely as laid in the first instance. We require only a spike maul to drive the key 10 into place or to remove it. The use of a punch against the detent 14 and the maul permits easy removal. The keying unit can be slipped into place by hand, as shown to the left in dotted lines in Figure 1.

It is evident, too, that the creeping is prevented in both directions. What is more, there is nothing new for trackmen to learn, as they are already familiar with the principal parts, that is, tie, tie plate, and an anti-creeper which is very much the same in design as that used for the key unit in Figure 3 of the drawings.

As regards the so-called "foundation" hereinbefore broadly referred to, it is understood that it is within the purview of this invention to employ a hollow metal tie, the upper plate of which (not shown) would be properly slotted or constructed to correspond to the tie plate shown in Figure 6. Since the fundamental principle would be the same, it has been thought unnecessary to further encumber the drawings to depict this within the range of the invention modification.

Changes in shape, size and rearrangement of parts such as come within the spirit of the invention or the scope of the subjoined claims may be resorted to in actual practice, as is understood.

In conclusion, it is to be noted that this application is a continuation in part of co-pending application Serial No. 349,175 which matured into Patent 2,276,799, said application having been filed August 1, 1940, and the patent having issued March 17, 1942.

I claim:

1. In a structure of the class described, a tie, a tie-plate on said tie, said tie-plate having a slot and being provided with parallel upstanding abutment shoulders, there being shoulders at one end of the slot and another shoulder at the intermediate portion of the slot, a portion of the latter shoulder spanning said slot, that portion of the slot between the respective shoulders having its longitudinal edges undercut to provide retention shoulders, and a detachable key member comprising a shank fitting in said slot, the longitudinal edges of the shank being shaped to coact with the retention shoulders, one end of the shank having an upstanding detent, the opposite end being formed with a hook, the hook embracing that portion of the abutment shoulder which spans the slot.

2. In a structural assemblage of the class described, a rail foundation having a portion thereof provided with a slot, a rail flange abutment with which one edge of the rail flange is engageable, said abutment having its intermediate portion spanning the slot to provide a retaining element, and a detachable key member adapted to be connected to and carried by the base flange of a conventional rail, said key member comprising a shank fitting slidably and removably in said slot, one end of the shank having an upstanding detent to engage the base flange of said rail, the opposite end being formed into a hook to embrace the opposite edge of the base flange of the rail, the crotch portion of said hook being adapted to embrace said retaining element.

3. In a structural assemblage of the class described, a rail foundation having a portion thereof provided with a slot, upstanding abutments on said foundation at opposite end portions of the slot, said abutments being adapted to accommodate and receive the conventional rail flange therebetween, the opposite longitudinal edges of the slot being undercut to provide key receiving and retention shoulders, a one-piece unitary rail carried detachable key including a shank underlying the base flange of the rail, the shank having an integral upstanding detent at one end releasably engageable with an adjacent edge of the base flange and a hook at the opposite end also releasably engageable with the base flange, the shank being of cross-sectional shape corresponding to the cross-sectional shape of the slot.

4. In a wave motion rail, tie and interconnecting assemblage of the class described, a rail tie construction provided with a horizontally disposed longitudinally elongated slot having its opposed side edges formed to provide undercut retention shoulders, a rail, said rail being removably seated upon the tie construction and bridging the slot, and a detachable key member comprising a shank fitting in said slot, the opposite longitudinal edges of the shank being shaped to underlie and releasably coact with the aforesaid retention shoulders to limit relative vertical movement, one end of the shank having a relatively short integral upstanding detent engaging an adjacent edge portion of the base flange of the rail, the other end of said shank being provided with a hook embracing the other edge portion of said base flange, the terminal bill portion of the hook resting releasably on an adjacent top surface of said base flange.

5. In a structural assemblage of the class described, a rail foundation having a portion thereof provided with a slot, rail flange abutment means with which one edge of the rail flange is engageable, said abutment means having a portion overlying said slot to provide a retaining element, and a detachable key member adapted to be connected to and carried by the base flange of the conventional rail, said key member comprising a shank fitting slidably and removably in said slot after the rail is in a position bridging the slot, one end of the shank having an upturned end forming a detent to releasably snap over and engage the adjacent edge of the base flange of said rail, the opposite end being formed into a hook to embrace the opposite edge of the base flange of the rail, the crotch portion of said hook being adapted to embrace said retaining element.

6. As a new article of manufacture and as a component part of a rail and the assemblage of the class described, a one-piece rail base flange anchoring key comprising a longitudinally elongated shank vertically tapering toward one end

and terminating in an upturned relatively short vertical lug constituting a detent, the opposite longitudinal side surfaces of said shank being downwardly diverging to form retention shoulders, the opposite end of said shank being fashioned into a return bend constituting a rail flange embracing hook, the bill portion of the hook overlying the shank in vertically spaced relation.

7. As a new article of manufacture and as a component part of an assemblage of the class described, a rail plate of general rectangular form, said plate having a central longitudinally extending slot and opposed longitudinal edge portions of said slot being undercut to provide key retention shoulders, a pair of upstanding aligned abutment elements on the top face of the plate at one end portion of the slot, a third upstanding abutment element also on the top of the plate and located at a point intermediate the ends of the slot, the central portion of said last-named abutment element spanning the underlying portion of the slot in the manner and for the purposes described.

8. A rail base structure having a horizontally elongated slot adapted to function as a key-way, a conventional rail having its bottom flange seated on said base structure and bridging the key-way, a one-piece rail fastening key removably fitting in said key-way, said key embodying a shank extending beneath and crosswise of the bottom flange, and said shank having integral end members at its opposite ends releasably and frictionally connected with the opposite longitudinal edge portions of said bottom flange, and coacting portions between the slotted base structure and said shank for limiting relative vertical movement of the key to said base structure.

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