

April 26, 1932.

R. D. WAGNER
NAIL SPIKE

1,855,329

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Fig. 2.

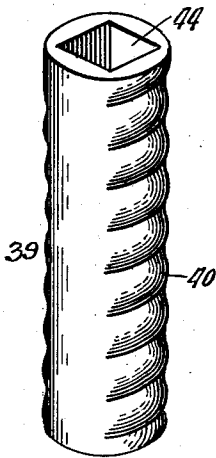


Fig. 1

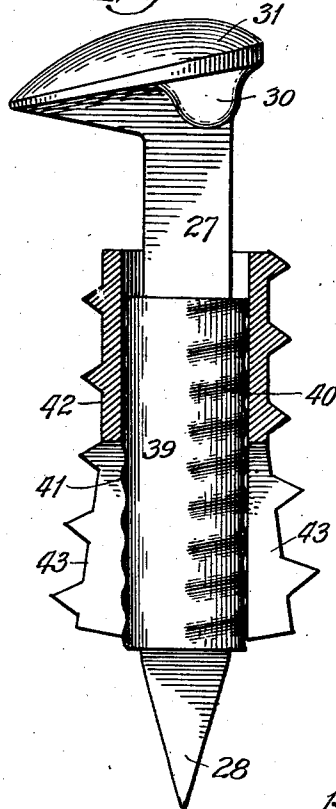


Fig. 3

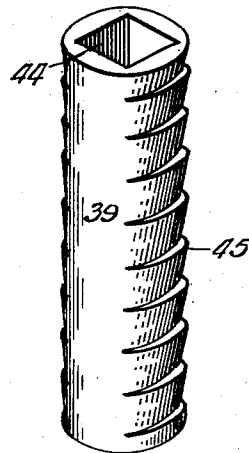


Fig. 4

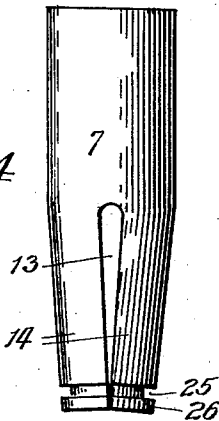


Fig. 5

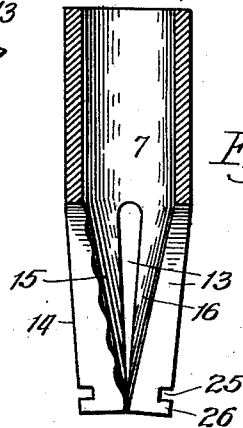


Fig. 6

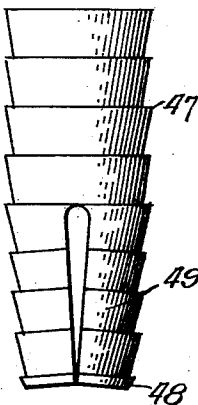


Fig. 7

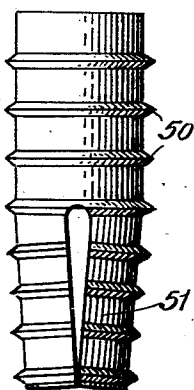


Fig. 8

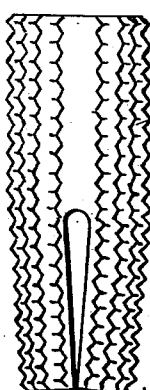


Fig. 9

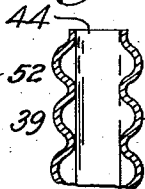
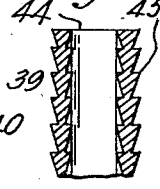


Fig. 10



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UNITED STATES PATENT OFFICE

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NAIL SPIKE

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The present invention relates to spike devices for holding railroad, railway and like rails to ties, sleepers, and like supports.

When using spikes driven into a tie, either wholly or partly of wood or the like, the fibers of the wood are more or less injured by reason of the spike cutting or breaking the fibers. The spike, therefore, cannot be held securely and firmly in place but will readily work itself loose and permit rail spreading. Also, the fibers surrounding the spike are subject to rapid decay resulting in a loss in the holding power of the fibers. Moreover, inasmuch as wood fibers are not uniform, the driving of the spike is not always in a straight or vertical line, correction, by canting, often being necessary during the driving of the spike. Drilling preparatory holes for the spike might avoid some of the disadvantages but not all of them, particularly as regards the holding power of the wood. Moreover, spikes of square cross-section are not practical in drilled or round holes, and the making of holes of square cross-section is not practical. It is highly important that the spike be held positively and firmly in place. The use of screw spikes has the disadvantage of consuming more time to apply than the driving of a nail spike or cut spike. It also tears the fibers where there is no prepared hole for it, and if the latter be provided, there is still the reduced holding power, the spike easily tearing out the holding fibers of the wood. The screw spike is not much superior to the nail or cut spike. Furthermore, the screw spike has the objection of turning and working its way out of place and consequently permitting the rails to spread.

The use of an expansible socket has the advantage of having greater holding power and providing for the use of spikes which may be firmly held in the socket without the disadvantages mentioned above. In devices using expansible sockets and spikes with interlocking teeth or serrations so inclined as to permit the driving of the spike into the socket but remaining permanently locked after being so driven in, the locking of the teeth prevents any withdrawal of the spike from the

socket, should it be desired to replace a spike by a new one.

Among the objects of the present invention are to provide a spike device which will avoid the objections and disadvantages heretofore encountered; which will enable the use of a spike having a substantially smooth surface provided with undulated portions, preferably on opposite sides thereof and also preferably near the point thereof, the undulations cooperating with similar surface portions in the socket for the purpose of firmly and securely holding the spike in place yet permitting the driving of the spike into place and the withdrawing of it under proper applied force; which will enable the use of a socket having expanding portions, such as tongues formed between slots or slits provided in an end of the socket, a pair of diametrically opposed tongues being preferably formed with undulated internal surfaces and also preferably having the internal surfaces of the tongues, alternating therewith, with smooth surfaces, so that a spike may be driven into place with the undulated surface portion of the spike and socket registering, and for permitting, in the case of the use of a spike of circular cross-section, the turning of the spike about its longitudinal axis to disengage the undulations and present them opposite the smooth surface portions to the end of facilitating the withdrawing of the spike, as by means of a claw bar or spike puller; which will provide for the use of a socket preferably provided with means, such as external projections, grooves and ridges, screw threads and similar means capable of projecting a substantial distance into the material of the tie, combined with internal undulated surface portions preferably on expansible parts of the socket, cooperating with like surface portions on the spike, whereby the spike is firmly held in place and incapable of working loose or out of the socket; which will permit the use of a round nose or blunt ended spike, the end of the spike having only such taper as may be necessary to expand the expansible portions of the socket; which will permit the use of spikes of square or polygonal cross-sections with

sockets of circular cross-sections, preferably with a bushing capable of receiving and holding the spike firmly and rigidly, and of being driven into the socket as would a spike of circular cross-section, the interior surface of the bushing being preferably smooth and having portions thereof formed with grooves and ridges or undulations to cooperate with similar interior surface portions of the socket; which may have a spike having claw bar engaging ears, preferably near and underneath the head of the spike and also preferably on both sides of the shank of the spike; which will have a spike having a head provided with a laterally projecting portion preferably inclined and tapered and extending toward and bearing upon a base flange of the rail; which will permit the use of a bushing and a spike therein having cooperating irregular surface portions for holding the spike firmly in the bushing; and, which will have other advantages, capabilities and objects, as will later appear and are inherently possessed by the invention.

In the drawings showing a few illustrative embodiments of the invention:

Fig. 1 is a view, partly in elevation and partly in section, of an assembly having a bushing for receiving a square spike and fitting in a socket; Fig. 2 is a perspective view of one form of bushing; Fig. 3 is a perspective view of another form of bushing; Fig. 4 is a view, in elevation, of a socket having a smooth exterior; Fig. 5 is a longitudinal sectional view of the same; and, Figs. 6, 7 and 8 are perspective views of sockets having incised or serrated, ribbed or ridged, and toothed exteriors. Figures 9 and 10 are detail sectional views of the bushings illustrated in Figures 2 and 3 respectively.

Referring more particularly to the drawings, Fig. 1 illustrates a form of device used with a rail having a base flange resting on a tie-plate supported upon a tie, the latter being preferably of wood or the like, although it is to be understood that the invention is applicable to other kinds of ties, such as concrete having wood or like inserts for receiving the spike device, or such other material as may have, preferably, some shock absorbing qualities and yet durable and strong. Each end of the plate is suitably provided with a hole for the passage of the shank of a spike.

The ties are provided with holes, preferably made by drilling. These holes are made preparatory to the receiving of a socket, in which the spike is driven.

In some cases it may be desired to use sockets having a round hole but with square or cut spikes. In such cases the invention includes mechanism such as that shown in Figs. 1, 2 and 3 of the drawings. The socket is of generally cylindrical form provided with an internal bore for the reception of the bush-

ing. Upon the exterior surface of the socket is provided or formed a thread or threads of a substantial altitude so that the thread or threads may enter a substantial distance into the material of the tie. At the upper end, the socket may be provided with any suitable means, such as wrench sockets or the like, for engagement therewith of a suitable tool by which the socket may be threaded or screwed into place in the tie.

The lower end of the socket is provided with a number of slots or slits so as to provide between the slots a number of tongues or 43, these tongues serving as expanding members of the sockets when the spike and bushing or the bushings are driven into place therein. As shown, there may be two or four tongues, the interior surfaces of preferably two of the opposite tongues of the four tongues, being formed with undulations or the like for the purpose hereinafter described, the other tongues having smooth interior surfaces, as surface 16 in Fig. 5.

It will be noted that the thread or threads increase in altitude toward the lower end of the socket so that the threads near the lower end of the socket, may project at a greater distance within the material of the tie than the thread or threads at the upper end of the socket. Prior to inserting the socket in the bore or drilled hole in the tie, the tongues may be contracted as shown for example in Figs. 4 and 5, so that the socket will be tapered to facilitate the entry of the socket in the hole when screwing the same in place. The tongues will then be expanded when the spike or spike and bushing are driven in place. In this particular form of device a bushing 39 is provided to fit within the socket and to receive the spike. Such bushing is of generally cylindrical form having a smooth surface except for diametrically opposite portions thereof being formed with undulations, or corrugations 40 or the like constructed and arranged to cooperate and register with similar undulated or corrugated portions 41 formed in parts of the interior surface of the socket 42. These corrugations or undulations 40 may be formed on diametrically opposite surface portions of the sleeve and similarly of the interior surface of the socket 42. They may also extend, on the interior of the surface, above the inner surfaces of the expansible tongue portions 43 of the socket, as clearly shown in Fig. 1 of the drawings. The exterior of the bushing is substantially cylindrical as is also the bore of the socket. Within the bushing is a square bore 44 of a shape and size to receive the square shank of the spike 27, the interior surface of the bore or passage 44 and the exterior surface of the spike 27 may be formed with irregular portions or formations such as corrugations, undulations, ribs or grooves and ridges, as desired, so that the spike may

be normally locked and held securely to the bushing. The bushing in turn will be held securely by the registration of the corrugated surface portions of it and of the socket. To remove the bushing and spike, the same, as a unit, may be given a quarter turn to disengage the registering corrugations, undulations and the like, of the bushing and the socket, and then drawing the same out of the socket. At the upper end of the spike is provided a head 31 which extends or projects laterally with an inclined and tapered portion 22, somewhat in the form of a beak to project over and contact or bear upon the base flange of the rail. Beneath the head and at opposite sides of the shank 27 is provided a pair of ears 30, preferably formed integral with the spike, of such a shape as to cooperate with the curves and forked ends of a claw bar or spike puller, the ears 30 being of utility to lock with the spike so that the bar may withdraw or pull the spike or the spike and bushing from the socket without the end of the bar slipping or otherwise escaping from the spike before the spike or spike and bushing are fully withdrawn.

The lower end of this socket may be provided with grooves and flanges 25 and 26 as in the form shown in Figs. 4 and 5 of the drawings and for the same purpose.

The surface portions 40 of the bushing 39 may be varied and made in the form shown in Fig. 3 of the drawings, such being in the nature of the teeth or serrations 45. When using this type of bushing the inner surface portions of the socket may also be similarly formed, but with the teeth extending in opposite directions so that as the bushing is driven into the socket the teeth may interlock permanently with the socket, the bushing being removable from the socket only through the lower end of the socket if such be required or desired. The socket 42 is, in other respects, the same as those previously described and is inserted in the tie in the same manner and performs the same functions.

In the particular construction shown in Figs. 1, 2 and 3, after the socket has been located in place in a tie, the bushing may be inserted therein and driven into the socket by any suitable means to the desired depth. The undulations 40 will engage and register with the undulations 41 so as to hold the bushing in place. The lower end of the bushing, as the bushing is driven in place, will laterally force the tongues 43 so as to expand the same and force the threads thereof and the tongues into the material of the tie. The spike is then driven into the passage 44 of the bushing by a suitable hammer or sledge until the projecting end of the head 31 engages firmly with the base flange of the rail. Should it be desired to remove the spike, a claw bar or spike puller may be engaged

with the spike by way of the ears 30 and upon the proper application of force the spike may be withdrawn, the undulations 40 and 41 being of such a form as to permit this, yet preventing the removal of the spike under the normal pressures and forces imposed upon the spike by the rail.

Should it be desired to remove the bushing, a wrench member may be used so that the squared end thereof may fit into the passage 44 and the cylindrical portion 46 of said member fitting into the upper end of the cylindrical bore of the socket and when the member 35 is given a quarter turn the undulations 40 or 45 may be disengaged from the undulations 41 and presented opposite the smooth interior surface portions of the socket. A suitable tool, such as a hook, may be used to extract the bushing.

When, however, the spike is in place and it is desirable to remove it and the bushing as a unit, the spike and bushing may both be turned a quarter turn, by a socket wrench engaging with the squared head of the spike, it being understood that the spike has, in this case, a square head 38. With the spike still in the bushing the claw bar or spike puller may then be operated to draw or pull upon the spike and by reason of the latter being in locked engagement with the bushing, both the spike and the bushing will be withdrawn as a unit. The same operation may be applied to the form of bushing shown in Fig. 3, the quarter rotation of the bushing effecting a disengagement of the teeth 45 with the interior teeth of the socket. It will thus be apparent that this bushing may also be withdrawn from the socket in the same way as the bushing shown in Fig. 2.

In some cases it will not be necessary to provide the socket members with external projections as where the same are used in a tie of substantially hard substance or material and where the socket, when inserted into the tie, is forced therein with considerable pressure, the pressure between it and the material in the tie being sufficient to permanently or substantially permanently hold the socket in place. Such sockets, omitting external projections, are shown in Figs. 4 and 5 in vertical elevation and longitudinal section respectively. The sockets may also have grooves 25 and flanges 26 for cooperation with a suitable contracting tool as the form previously described.

In certain materials used for ties it may be found convenient or desirable to form the outer surface of the sockets with other surface formations than that previously described. In Fig. 6 is shown a socket having a series of circular teeth or serrations 47 so formed and arranged that the socket may be readily driven into place in the tie and securely held therein. The lower end of this socket may be provided with a flange 48

which may be engaged by the ends of a pair of contracting pincers for contracting the tongue portions 49 of the socket. The internal formation of this socket may be the same as that described above in respect to the other forms shown.

In Fig. 7 is shown a similar socket having a number of substantially circular ribs or ridges 50 which may project into the material of the tie. This particular form of socket would be of advantage in ties having material of the nature of cement, concrete and the like, where the material is poured and sets about the ribs 50. In such event it would be desirable to have the spike driven in place so as to expand the tongue portions 51 of this socket so that the same will be in proper form or divergent condition when the material hardens about the socket.

Fig. 8 shows a socket of similar construction with the exception that the exterior surface of the socket is provided with a plurality of teeth or projections 52 which may serve the same purpose as the ridges 50 of the socket shown in Fig. 7.

From the above it will be apparent that the spikes intended to hold the rail in place cannot be removed without the intervention of the human being operating with suitable means such as a wrench and a claw bar. The undulated surface portions are such that they normally remain locked to prevent the loosening of the spike under the normal conditions imposed upon the spike by the rail, yet, when absolutely necessary, the spike may be withdrawn without the breaking or otherwise injuring the corrugated or undulated surface portions of the spike and socket. The surface portions are so related, however, that the extracting of the spike may be facilitated upon suitable rotation of the spike or spike bushing in the socket as described. By such construction spreading of the rail is insured against.

While I have herein described and upon the drawings shown a few embodiments of the invention, it is to be understood that the invention is not limited to the particular details, arrangements of parts and constructions shown and described but that it comprehends other constructions, arrangements of parts and elements without departing from the spirit of the invention.

Having thus described my invention, I claim:

1. A rail spike device comprising a socket having means for securing it in a tie and having expansible portions at an end thereof, a spike bushing capable of being forced into the socket from the outer end thereof and causing an expanding of said expansible portions, and capable of receiving thereafter a spike.

2. A rail spike device comprising a socket having means for securing it in a tie and

having expansible portions at an end thereof, a spike bushing capable of being forced into the socket from the outer end thereof and causing an expanding of said expansible portions, and capable of receiving thereafter a spike, said socket and bushing having cooperating grooved and ridged surfaces whereby the bushing may be firmly held in said socket.

3. A rail spike device comprising a socket having means for securing it in a tie and having expansible portions, a spike bushing capable of being forced into the socket from the outer end thereof and causing an expanding of said expansible portions, and capable of receiving thereafter a spike, said socket having interior corrugated surface portions and said bushing having exterior corrugated surface portions cooperating with the corrugated surface portions of the socket for firmly holding the bushing in the socket.

4. A rail spike device comprising a socket having means for securing it in a tie and having expansible portions, a spike bushing capable of being forced into the socket from the outer end thereof and causing an expanding of said expansible portions, a spike forced into said bushing after the expansion of said socket by said bushing, said socket and bushing having cooperating irregular surface portions for holding the bushing firmly in the socket, and said bushing and spike having cooperating irregular surface portions for holding the spike firmly in the bushing.

5. A rail spike device comprising a hollow socket having a substantially cylindrical hole and expansible portions, means for securing the socket in a tie, a bushing fitting into said socket and having a passage polygonal in cross-section, a spike fitting in said passage, and means on the surfaces of said socket and bushing and said bushing and spike for holding the same firmly in place.

6. In a rail spike device, a bushing for a spike of non-circular cross-section and capable of fitting in a socket of substantially circular cross-section, said bushing having part of its surface formed with grooves and ridges capable of cooperating with the socket for firmly holding the bushing therein.

7. A bushing for rail spikes, comprising a substantially tubular body having a bore of substantially square cross-section, a major part of the exterior surface of said bushing being smooth and a part of said exterior surface being corrugated.

8. A spike for rails comprising a shank provided with an enlarged head portion at one end having an overhanging laterally projected portion for engagement with the base flange of a rail, and ears depending from the underside of said head and extending downwardly on opposite sides of said shank.

9. A spike for rails comprising a shank

provided with an enlarged head portion at one end, said head being inclined with respect to the shank and having an overhanging laterally projected tapered lip portion for engagement with the base flange of a rail, and ears depending from the underside of said head and extending downwardly on opposite sides of said shank.

In witness whereof, I hereunto subscribe my name to this specification.

RAOUL D. WAGNER.

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