Jan. 15, 1957 J. R. SNYDER 2,777,641

REHABILITATION OF ENLARGED SPIKE HOLES IN RAIL FASTENINGS

Filed Oct. 24, 1951 2 Sheets-Sheet 1

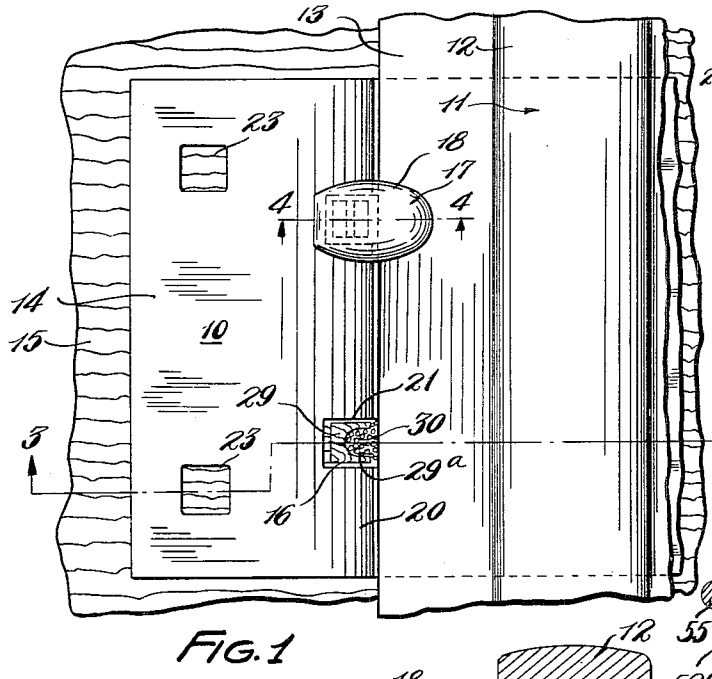


FIG. 1

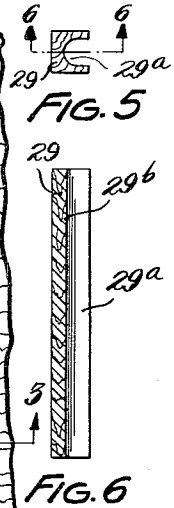


FIG. 5

FIG. 6

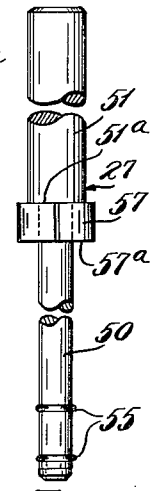


FIG. 7

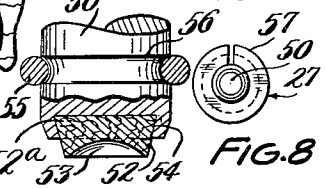


FIG. 8

FIG. 9

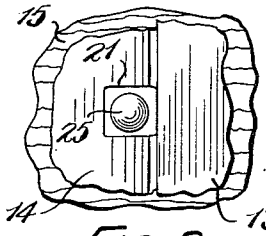


FIG. 2

FIG. 3

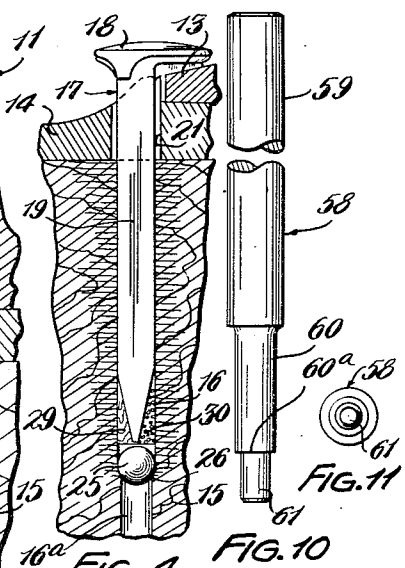


FIG. 4

FIG. 10

FIG. 11

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REHABILITATION OF ENLARGED SPIKE HOLES IN RAIL FASTENINGS

Filed Oct. 24, 1951 2 Sheets-Sheet 2

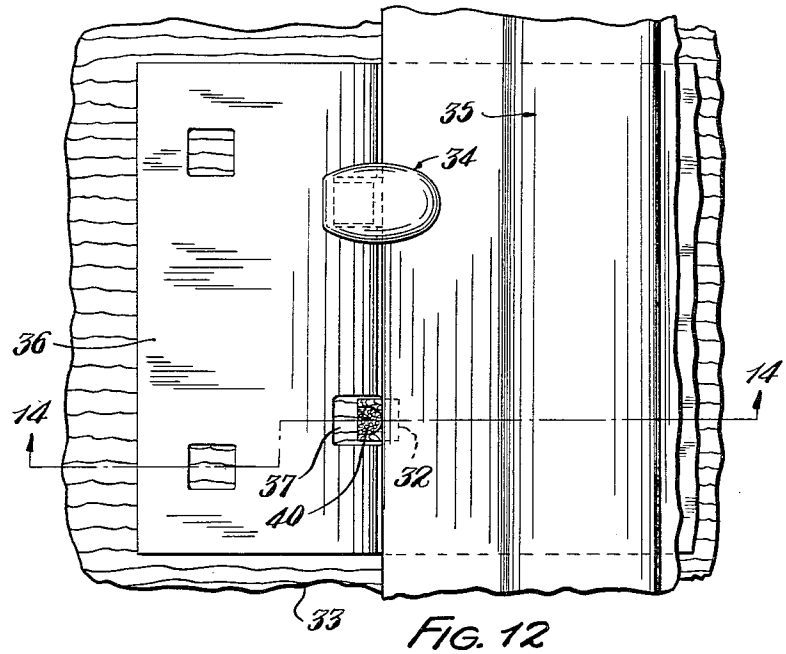


FIG. 12

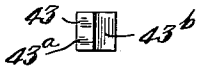


FIG. 16

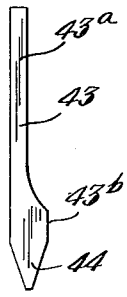


FIG. 15



FIG. 17

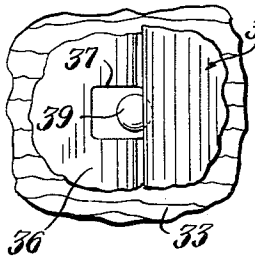


FIG. 13

FIG. 14

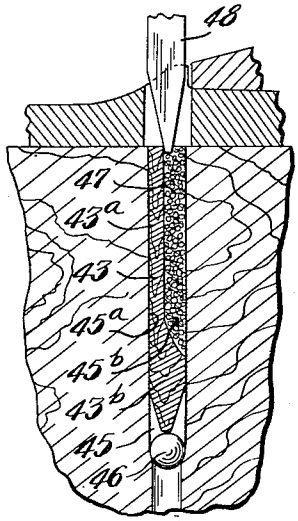


FIG. 18

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United States Patent Office

2,777,641

Patented Jan. 15, 1957

2,777,641

REHABILITATION OF ENLARGED SPIKE HOLES IN RAIL FASTENINGS

Jacob Rush Snyder, Cleveland, Ohio

Application October 24, 1951, Serial No. 252,958

15 Claims. (Cl. 238—366)

This invention relates to metal-to-wood fastenings, such as rail fastenings, and more particularly to the rehabilitation of enlarged spike holes in wood members or railway ties.

The present invention is further concerned with fastenings of the kind in which a filler member and a wood-hardening treating material are used in a spike hole which extends entirely through the wood member or tie and, as one of its objects, provides a novel method and means for sealing the lower portion of the spike hole in a manner to retain the treating material therein and permit pressurization of the treating material into the wood tie and filler member, preferably by the driving of the spike into the spike hole.

Another object is to provide a novel method and means for sealing the spike hole in the wood member of a fastening of the character mentioned in which a substantially spherical rigid element, such as a glass ball, is advanced into the spike hole and seated therein to form a substantially fluid-tight closure at a point spaced a substantial distance from the upper end of the spike hole.

A further object is to provide a novel fastening and method of the character mentioned employing a filler member and a closure ball for retaining the treating material in the spike hole, and in which the filler member is of a cross-sectional shape to only partially fill the spike hole.

Still another object is to provide a novel fastening of the kind referred to employing a closure ball and a filler member, and in which the filler member or a portion thereof forms a wedge strip along one side of an enlarged spike hole being rehabilitated.

As an additional object, this invention provides a novel driving tool for seating a closure ball in the spike hole of a wood member, and, also provides a novel driving tool for advancing a grooved or hollow filler member in such a spike hole.

Other objects and advantages of the invention will be apparent in the accompanying drawings and in the following detailed description.

The rehabilitation of spike holes by the use of a filler member and a wood-hardening glue therein is also disclosed and claimed in copending application Serial No. 164,744 filed May 27, 1950, now Patent No. 2,690,878 granted October 5, 1954. Rail fastenings of the kind employing a wood-hardening glue and in which a closure member is used in the spike hole at a point spaced from its outer end to permit pressurization of the glue therein, are disclosed but not claimed in Patent No. 2,690,876 granted October 5, 1954, on my copending application Serial No. 47,653 filed September 3, 1948.

In the accompanying sheets of drawings:

Fig. 1 is a plan view showing a rail fastening embodying the present invention;

Fig. 2 is a fragmentary plan view corresponding with a portion of Fig. 1 and showing one of the spike holes after the introduction of the closure ball, but prior to the insertion of the filler member;

Fig. 3 is a transverse vertical section of the rail fastening, taken substantially on section line 3—3 of Fig. 1 and showing both the initial and fully driven positions for the spikes;

Fig. 4 is a partial transverse vertical section taken through the fastening substantially as indicated by section line 4—4 of Fig. 1 and showing one of the spikes in its fully driven condition in one of the rehabilitated spike holes;

Fig. 5 is an end view of a filler member used in the spike hole of the novel fastening;

Fig. 6 is a longitudinal section taken through such filler member on section line 6—6 of Fig. 5;

Fig. 7 is a side elevation showing a driving tool for use in seating the closure ball in the spike hole;

Fig. 8 is an end view of the driving tool as seen from the lower end thereof;

Fig. 9 is a fragmentary elevational view, on a larger scale and with portions in section, further illustrating the ball-engaging end of the driving tool of Fig. 7;

Fig. 10 is a side elevation showing a driving tool for use in driving the hollow or grooved filler member into a spike hole;

Fig. 11 is an end view of the lower end of the driving tool of Fig. 10;

Fig. 12 is a plan view similar to Fig. 1, but showing a modified form of rail fastening;

Fig. 13 is a fragmentary plan view corresponding with a portion of Fig. 11 and showing one of the spike holes after the introduction of the closure ball, but prior to the insertion of the filler member;

Fig. 14 is a transverse vertical section through the modified rail fastening taken substantially on section line 14—14 of Fig. 12 and showing the initial and fully driven positions for the spikes;

Fig. 15 is a side elevation showing a spike hole filler member of a different form;

Figs. 16 and 17 are end views of the upper and lower ends, respectively, of the filler member of Fig. 15; and

Fig. 18 is a partial vertical section similar to Figs. 3 and 14, but showing a fastening being made by the use of the modified filler member of Fig. 15.

As one example of the rehabilitation of an enlarged spike hole by the present invention, Figs. 1 to 4 inclusive show a rail fastening **10** in which a conventional railway rail **11** having a head **12** and a base flange **13** rests on tie plate **14** which is supported by a wood railway tie **15**. The tie **15** has a pair of used and somewhat laterally enlarged spike holes **16** extending thereinto crosswise of the grain of the tie and which are being rehabilitated by the present invention as is explained in detail hereinafter.

Each of the spike holes **16** is one from which a conventional cut spike, such as the spike **17** having a head **18** and a plain stem **19** of a substantially square cross-sectional shape, has been withdrawn. The upper portion of the spike hole **16** from which the stem **19** has been withdrawn is of a corresponding substantially square cross-sectional shape. The lower portion **16a** of the spike hole is a substantially cylindrical portion and represents the remaining portion of a conventional bore which had been previously formed in the tie **15**. This conventional cylindrical bore extended entirely through the tie and is the preformed bore into which the spike **17** was initially driven.

The tie plate **14** is here shown as being a conventional metal tie plate having an upstanding shoulder **20** extending thereacross for gauging cooperation with the longitudinal edge of the base flange **13** of the rail **11**. The tie plate **14** also has a pair of openings **21** therein which overlie the pair of the spike holes **16** of the wood tie **15** and accommodate a pair of the cut spikes **17** which are driven into the tie through such tie plate openings.

The heads 18 of the spikes 17 overhang the base flange 13 of the rail 11 for retaining the rail in place, and hence, these spikes are frequently referred to as line spikes. Additionally, the tie plate 14 is here shown as having a second pair of openings 23 through which similar cut spikes (not shown) can be driven into the wood tie 15 for holding the tie plate 14 thereagainst and which spikes, when used, are referred to as tie plate hold down spikes. The method and means of the present invention is equally applicable to the rehabilitation of spike holes into which such tie plate hold down spikes are to be driven.

In the rehabilitation of one of the enlarged spike holes 16 according to the present invention, a rigid sealing member or closure 25 of a substantially spherical shape is introduced into the spike hole through the open upper end thereof and is advanced therein to a position of seating engagement with the wood of the tie surrounding the spike hole to form a substantially fluid-tight closure for the lower portion of the spike hole. The point of seating engagement of the spherical closure member or ball 25 is indicated at 26 and is located a substantial distance from the upper end of the spike hole 16 and immediately below the lower end of the square upper portion of this spike hole. The closure member 25 is advanced into the spike hole 16 for a distance such that it will be located a somewhat greater distance from the upper end of the spike hole than the distance which the stem 19 of the spike 17 will extend into such spike hole. In other words, the seated position of the closure member 25 in the spike hole 16 should be a sufficient distance from the upper end of the spike hole such that when the spike 17 is driven into the hole, its lower end will not strike the closure member.

The closure member 25 can be introduced into the spike hole 16 by simply dropping the same thereinto or by advancing the closure member downwardly into the spike hole by means of a driving tool 27 which is shown in Fig. 7 and will be presently described. When the spike hole is not obstructed by frayed wood or wood splinters the closure member 25 will usually drop freely by gravity to the bottom of the square upper portion of the spike hole. In cases where the hole is partially obstructed by frayed wood or splinters, the closure member must be advanced into the hole by the driving tool 27 and, in so doing, the closure member produces a desired smoothing action on the wood and thus clears the spike hole into which it has been driven. In thus seating the closure member 25 in the spike hole 16, it is engaged against or forced part-way into the upper end of the remaining portion of the original cylindrical through bore 16a of the tie, such as to form a substantially fluid-tight annular seal with the wood of the tie at the location of the seating engagement 26.

The closure member 25 is a rigid substantially spherical member or ball as mentioned above and can be made of glass, metal, plastic or any other suitable material. Closure members for this purpose which are made of glass, for example glass marbles, have been found to be very economical and satisfactory for use in the rehabilitation of the spike holes of these metal-to-wood fastenings.

After the closure member 25 has been thus introduced into the spike hole 16 and seated therein to form a fluid-tight closure for the lower portion of the spike hole, a filler member 29 made of a fibrous material is introduced into the spike hole from the upper end thereof to partially fill the same. This filler member 29 is here shown as being in the form of a wood peg having a longitudinal grain and which is of a length to extend into the spike hole 16 for a distance corresponding substantially with the length or depth of the square upper portion of the spike hole, that is to say, for a distance such that the lower end of the peg will be located at or adjacent the closure member 25.

The filler member 29 is of a generally square cross-

sectional shape and is of a size to correspond substantially with the plan dimensions of the square upper portion of the spike hole 16. This filler member has a longitudinal groove or channel recess 29a therein which imparts to the filler member a hollow channel-like cross-sectional shape such that when the filler member has been introduced into the spike hole, as shown in Figs. 1 and 3, it only partially fills the spike hole and the channel recess 29a defines a longitudinal passage in such spike hole.

The passage formed by the longitudinal groove 29a extends along one side wall of the spike hole and exposes the cross grain of the portion of the wood tie 15 which defines this side wall of the spike hole. The back or web portion 29b of the filler member 29 extends along the opposite side wall of the spike hole and forms a filler strip therealong for wedging cooperation with the stem 19 of the spike 17 when the latter is driven into the rehabilitated spike hole.

In the case of the spike hole 16 shown in Figs. 1 and 3, the enlargement of the spike hole has been a lateral enlargement in a direction away from the rail 12 as is usually the case in rail fastenings of this character and which lateral enlargement has resulted from the outward thrust transmitted to the spike by the spreading action exerted on the rails of the track by trains passing thereover. In the rehabilitation of such a laterally outwardly enlarged spike hole, the filler member 29 is driven into the spike hole 16 with the web portion 29b of the filler member located along the side of the spike hole which is remote from the rail 12. When the spike 17 is driven into the spike hole 16, the web portion 29b of the filler member will then form a wedge strip which will take up the space resulting from the enlargement of the spike hole and will wedge the spike laterally inwardly toward the rail 12 such that the spike will occupy substantially the position which it had before the lateral enlargement of the spike hole occurred.

After the filler member 29 has been introduced into the spike hole 16 and prior to the driving of the spike 17 thereinto, a quantity of treating material 30 is introduced into the passage of the spike hole which is formed by the channel recess 29a of the filler member. This treating material is a wood-hardening material and is also a cold-setting water-insoluble glue. In addition to its wood-hardening property, the treating material also forms an adhesive bond between the filler member and the wood tie, and also between the spike 17 and the wood of the filler member and tie.

As such treating material, the present invention contemplates the use of a thermosetting, or potentially thermosetting, synthetic resin glue such as resorcinol formaldehyde, urea formaldehyde, melamine formaldehyde or any one of various other such synethic resin materials which are thermosetting or potentially thermosetting in character. The treating material is introduced into the spike hole in an initially fluid condition and thereafter assumes a set condition at ordinary temperatures. This invention also contemplates that various mixtures of the above-mentioned synthetic resin materials could be used or mixtures of one or more of those materials with formaldehyde or with a vinyl resin or various other materials.

After the treating material 30, which for convenience can be referred to herein as a wood-hardening glue, has been introduced into the passage 29a of the spike hole 16, the spike 17 is driven into such passage. The fluid-tight seal formed by the closure member 25 retains the glue in the spike hole 16, such that during the driving of the spike thereinto the glue will be pressurized in the spike hole between the spike and the closure member 25 and will be forced into the wood of the filler member 29 and into the portions of the wood of the tie 15 immediately surrounding the spike hole. This pressurization of the

glue in the spike hole, thus causes the filler member 29 and the surrounding portions of the wood tie 15 to be impregnated with the glue. It is obvious, of course, that the spike must have a sufficiently tight engagement with the spike hole to prevent the escape of glue and cause the pressurization thereof when the spike is driven into the hole.

During the driving of the spike 17 into the spike hole 16, the filler member 29 will become more or less splintered or broken but will be sufficiently distributed along the stem of the spike, such that the spike will have a tight fit in the rehabilitated spike hole and when the glue becomes set it will harden the wood of the surrounding tie portions as well as the wood of the filler member and will thus cause the surrounding tie portions to be so strengthened and reinforced that it will not be subject to lateral enlargement as the result of thrust transmitted to the spike from the rail and will also enable the spike to remain tight in the spike hole. Additionally, the glue will form an adhesive bond between the spike 17 and the wood of the tie and filler member, as mentioned above. The spike will, therefore, have a good, or even an increased, holding power in the wood tie 15 such that it will not readily work loose during passage of trains over the track and leakage of brine, rain or corrosive liquid into the spike hole around the spike will be substantially prevented.

Figs. 12, 13 and 14 of the drawings show another form of a rail fastening in which worn spike holes 32 of a wood tie 33 are being rehabilitated by the present invention. Each of the spike holes 32 is a laterally enlarged spike hole from which a cut spike such as the spike 34 has been withdrawn. The rail 35 is a replacement rail of a heavier weight which has been substituted for a worn rail of a lighter weight. Because of the use of a replacement rail of a heavier weight, a tie plate 36 having pairs of more widely spaced openings 37 therein is being used in this fastening. The wider spacing of the pairs of openings 37 of the tie plate 36 results in the situation shown in Figs. 12 and 14 in which the portion 36^a of the tie plate overhangs the worn spike holes 32.

Prior to the replacement tie plate 36 being placed on the tie 33, the closure member 39 and the filler member 40 are introduced into each of the spike holes 32 in the same manner and for the same purposes as has been described in detail above in connection with the rehabilitation of the spike holes 16. In this case, however, the filler member 40 is introduced into the spike hole 32 with the web portion 40^a thereof extending along the side of the spike hole which is nearest the rail 35. When the tie plate 36 is placed on the tie 33, the tie plate portion 36^a will then overlie and cover the upper end of the strip portion of the filler member 40 as shown in Fig. 14. The longitudinal passage formed in the spike hole by the channel recess 40^b of the filler member 40 will extend along the side wall of the spike hole which is remote from the rail 35 and will expose the cross grain of the wood of this portion of the tie. The upper end of this passage of the spike hole will be exposed and accessible through the tie plate opening 37.

Prior to the driving of the spike 34 into the passage of the spike hole 32, a quantity of wood-hardening glue 41 of the kind mentioned above is introduced into the spike hole through the tie plate opening and during the driving of the spike, this glue will be pressurized in the spike hole and between the spike and the closure member 39 and will be forced into the wood of the filler member 40 and into the portions of the tie surrounding the spike hole.

When the spike 34 has been fully driven into the spike hole 32, it will extend along the wedge strip 40^a of the filler member and will have a tight engagement in the rehabilitated spike hole. The wood-hardening assumes a set condition after the spike has been driven and hardens the wood of the surrounding portions of the tie and the wood of the filler member such that the spike will have increased holding power in the rehabilitated spike hole. The glue also forms an adhesive bond between the tie and the wood of the filler member as well as an adhesive bond between the spike and the wood of the tie and the wood of the filler member.

Fig. 15 of the drawings shows a filler member 43 of a somewhat different form and which comprises an upper substantially flat stem portion 43^a of a substantially rectangular cross-sectional shape and a lower enlarged portion 43^b of a substantially square cross-sectional shape. The enlarged lower portion 43^b preferably also has a wedge-shaped point 44 on the lower end thereof.

Fig. 18 shows the filler member 43 being used in a worn and laterally enlarged spike hole 45 for the rehabilitation thereof. During the driving of the filler member 43 into the spike hole 45, the enlarged portion 43^b forms a combined plug and guide portion which substantially fits the square portion of the spike hole in which it is located and also serves as a positioning means by which the flat upper stem portion 43^a of the filler member will be located and held in adjacent relation to a side wall 45^a of the spike hole. The flat upper stem portion 43^a forms a wedge strip extending along the side wall 45^a and only partially fills the spike hole 45, leaving a longitudinal passage 45^b along the opposite side wall which exposes the cross grain of the wood of this portion of the tie.

Prior to the driving of the filler member 43 into the spike hole 45, a closure member 46 in the form of the above described rigid spherical member or ball is introduced into the spike hole in the same manner and for the same purpose as has been previously described herein. After the filler member 43 has been introduced into the spike hole 45, a quantity of wood-hardening glue 47 of the kind described above is introduced into the passage 45^b of the spike hole and is more or less confined in the portion of the spike hole which is located above the plug portion 43^b of the filler member. A spike 48 is driven into the spike hole 45 and into the passage 45^b thereof and pressurizes the wood-hardening glue 47 therein. During such driving of the spike 48, the closure member 46 prevents the escape of the glue from the spike hole such that the glue will be pressurized into the wood of the filler member and into the portions of the tie surrounding the spike hole.

Although the use of a closure ball in a through spike hole of a wood tie has been described above as applied particularly to worn or used spike holes, the present invention also contemplates the use of such a closure ball in substantially the same manner and for the same purpose in unused spike holes, such as in the preformed through spike holes of new wood ties. In such unused spike holes, a filler member or peg is usually not needed and can be omitted.

Reverting now to the driving tool 27 for advancing and seating the closure members 25, 39, and 46 in the spike holes 16, 32 and 45, it will be seen from Figs. 7, 8 and 9 that this tool comprises a stem 50 connected and carried by a handle 51. The stem 50 is a cylindrical stem of a size to freely enter the spike hole. At its lower end, the stem 50 is provided with a socket member 52 for engagement with the closure member or ball. The socket member 52 is made of a softer and more yieldable material than the material of the stem 50 and the handle 51, as for example, leather, hard rubber, soft metal or other suitable material.

As shown in the drawings, the socket member 52 is provided with a socket 53 having a substantially spherical concave shape to correspond with and substantially fit the spherical shape of the closure member. The socket member 52 can be connected with the stem 50 by having a relatively enlarged base portion 52^a engaging in an undercut recess 54 of the lower end of the stem.

The socket member 52 can be aligned with the closure member so that its engagement therewith will occur

substantially on the axis of the spike hole. For this purpose, the stem 50 is provided with one or more guide rings 55 adjacent its lower end and which are mounted on the stem by the engagement of these rings in corresponding annular grooves 56 of the stem.

The lower end of the handle portion 51 of the driving tool 27 has a shoulder 51a thereon which provides a stop for engagement with the tie plate 14 and limits the extent to which the stem 50 can move into the spike hole and, hence, limits the distance which the closure member can be advanced into the spike hole. For example, when the tool 27 is used to seat the closure member 25 in the spike hole 16, the shoulder 51a will engage the upstanding shoulder 20 of the tie plate 14 and will thereby establish the maximum distance which the closure member can be advanced into the spike hole.

When the tool 27 is to be used for advancing a closure member into a spike hole which is located below one of the tie plate openings 23, a shorter effective length is desired for the stem 50 of the tool. This shorter effective length for the driving tool 27 is also desirable when the tie plate 14 does not have the upstanding shoulder 20 thereon. To adapt the driving tool 27 for such use where a relatively shorter stem portion 50 is desired, an adaptor ring or sleeve 57 is mounted on the stem adjacent the shoulder 51a so as to form a locating shoulder or stop 57a at a relatively lower point on the tool. The adaptor 57 can be in the form of a split ring made of metal, plastic or any other suitable material and which will be sufficiently resilient in character to permit the ring to be slid onto the stem portion 50 in telescoping relation thereto and to be retained on the stem portion by its frictional grip thereon.

Figs. 10 and 11 show a driving tool 58 for use in advancing the filler members 29, 40 and 43 into the spike holes. The driving tool 58 comprises an upper handle portion 59 and a stem portion 60 depending from such handling portion and provided at its lower end with a locating pin 61. At the junction of the locating pin 61 with the stem portion 60, the latter is provided with a shoulder 60a which is engageable with the upper end of the filler member for applying the thrust or driving force thereto. In the case of the filler members 29 and 41, the locating pin 61 engages in the upper end of the longitudinal groove or channel recess and in the case of the filler member 43 the locating pin lies against the adjacent face of the reduced upper stem portion of this filler member.

During the use of the driving tools 27 and 58, the handle portion is manually grasped for positioning the tool relative to the closure member or relative to the wood filler member, and a driving force is applied to the upper end of the handle by means of a hammer or a pressure applying device.

Although the driving tools 27 and 58 can usually be used to advantage, their use is not mandatory in carrying out the present invention. Instead of advancing the closure ball into a used spike hole by means of the tool 27 it can if desired, be advanced and seated in the spike hole by means of the filler member or peg. In some cases the closure ball will drop freely into a worn and enlarged spike hole and will engage the tapered portion usually found in such used spike holes and resulting from the tapered inner end of the cut spike. The seating of the closure ball to form the fluid-tight seal can then be accomplished either by the use of the tool 27, or preferably, by the driving of the filler member or peg into the spike hole.

The above described filler members 29, 40 and 43 have been referred to as being made of wood and having a longitudinal grain, but it should be understood that these members could also be in the form of molded filler members made of wood meal, saw dust, or wood flour and a suitable binder such as a synthetic resin of the kind mentioned herein.

In all of the different embodiments of the invention illustrated in the drawings, the form of the filler member is such that it only partially fills the spike hole, thus decreasing the transverse dimension thereof to an open remaining axial passage of a reduced cross-sectional size. The use of a filler member, which reduces in cross-sectional size, but does not fill, the spike hole insures the presence of the axial passage of reduced cross-sectional size for receiving the initially fluid glue and as a passage into which the metal spike can be driven with a resulting tight engagement between the spike and the wood and with minimum likelihood of causing splitting of the tie.

From the foregoing description and the accompanying drawings, it will now be readily understood that this invention provides a novel method and means for rehabilitating enlarged fastening holes in wood members and is especially useful in rehabilitating enlarged spike holes of wood railway ties. It will now also be understood that this invention provides a novel method and an improved metal-to-wood fastening in which a substantially spherical rigid closure member is employed in a spike hole and is seated in engagement with the wood surrounding such hole to form a substantially fluid-tight closure for retaining a treating material or wood-hardening glue in the spike hole. Additionally, it will be seen that this invention provides a novel method and fastening in which a filler member is employed in such a spike hole in combination with the substantially spherical closure member and the wood-hardening glue.

Although the rehabilitation of enlarged spike holes as contemplated by the present invention has been illustrated and described herein to a somewhat detailed extent, it will be understood, of course, that the invention is not to be regarded as being limited correspondingly in scope but includes all changes and modifications coming within the terms of the claims hereof.

Having thus described my invention, I claim:

1. In a method of making metal-to-wood rail fastenings of the kind employing wood-hardening glue in a preformed fastening hole extending through a wood member, the step of advancing a substantially spherical rigid element in said hole and seating said element against the wood defining the sides of the hole such that the seated element forms a substantially fluid-tight closure for said hole at a point spaced a substantial distance from the outer end of said hole.

2. In a method of making metal-to-wood rail fastenings the steps of, introducing a substantially rigid ball element into a preformed spike hole which extends through a wood tie or the like, seating said ball element against the wood of the tie so as to close said hole at a point spaced a substantial distance from the upper end of said hole, introducing a settable wood-hardening glue in fluid form into said hole from said outer end, and then driving a metal spike into said hole from said upper end, said spike having a sufficiently tight fit in said hole to prevent the escape of glue sufficiently to pressurize said glue in said hole between the spike and said ball element for forcing some of said glue into the wood surrounding said spike hole.

3. In a method of making metal-to-wood rail fastenings the steps of, introducing a substantially rigid ball element into a preformed spike hole which extends through a wood tie or the like, seating said ball element against the wood of the tie so as to close said hole at a point spaced a substantial distance from the upper end of said hole, introducing a filler member into said spike hole from said upper end to extend longitudinally in said hole and occupy a portion only of the space thereof so as to leave an open remaining axial passage of a reduced cross-sectional size, introducing a settable wood-hardening glue in fluid form into said axial passage from said upper end, and then driving a metal spike into said hole from said upper end, said spike having a sufficiently tight fit in said hole to prevent the escape of glue sufficiently to pressurize said glue in said passage between the spike and said ball ele-

ment for forcing some of said glue into the wood surrounding the spike hole.

4. In a method of rehabilitating enlarged spike holes extending through wood members such as railway ties the steps of, introducing a substantially spherical rigid ball element into such a spike hole from the upper end thereof, seating said ball element against the wood of said tie to form a substantially fluid-tight closure for said hole at a point spaced a substantial distance from said upper end, introducing a hollow filler member of fibrous material into said spike hole axially thereof from said upper end to partially fill the hole and define therein an open remaining axial passage of a reduced cross-sectional size, introducing a settable wood-hardening glue in fluid form into said passage, and driving a metal spike into said hole from said upper end, said spike having a sufficiently tight fit in said hole to prevent the escape of glue sufficiently to pressurize said glue in said axial passage between said spike and said ball element for forcing some of said glue into said filler member and into the wood surrounding the spike hole.

5. In a rail fastening or the like, a wood tie having a preformed spike hole extending therethrough, a metal spike driven into said hole from the outer end thereof, the portion of the tie surrounding said hole being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said hole in a fluid but settable condition and being pressurized into said tie portion by the driving of said spike into said hole, and a substantially spherical rigid ball element in said hole and seating against the wood to form a substantially fluid-tight closure for said hole at a point spaced from said outer end such as to permit the pressurization of said glue in said hole by the driving of said spike, said spike having a sufficiently tight fit with said hole to cause said pressurization.

6. In a rail fastening or the like, a wood tie having a preformed spike hole extending therethrough, a metal spike driven into said hole from the outer end thereof, the portion of the tie surrounding said hole being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said hole in a fluid but settable condition and being pressurized into said tie portion by the driving of said spike into said hole, and a substantially spherical rigid glass ball in said hole and seating against the wood and forming a substantially fluid-tight closure for said hole at a point spaced from said outer end such as to permit pressurization of said glue in said hole by the driving of said spike, said spike having a sufficiently tight fit in said hole to cause said pressurization.

7. In a rail fastening or the like, a wood tie having a preformed spike hole extending therethrough, a filler member extending axially in said hole and decreasing the transverse dimension thereof to an open remaining axial passage of a reduced cross-sectional size, a metal spike driven into said hole, said filler member and the portion of the tie surrounding said hole being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said hole in an initially fluid but settable condition and being pressurized into said filler member and tie portion by the driving of said spike into said hole, and a substantially spherical rigid ball element in said hole inwardly of said filler member and seating against the wood to form a substantially fluid-tight closure for said hole to permit pressurization of said glue therein by the driving of said spike, said spike having a sufficiently tight fit in said hole to cause pressurization of said glue upon the driving of said spike into said hole.

8. A rail fastening or the like as defined in claim 7 in which said substantially spherical rigid ball element is a glass ball.

9. In a rail fastening or the like, a wood tie having a preformed bore extending therethrough and the upper portion of which bore constitutes a laterally enlarged spike hole portion, a filler member extending axially in said spike hole portion and decreasing the transverse dimension thereof to an open remaining axial passage of a reduced cross-sectional size, a metal spike driven into said spike hole portion, said filler member and the portion of the tie surrounding said spike hole portion being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said passage in an initially fluid but settable condition and being pressurized into said filler member and surrounding tie portion by the driving of said spike into said spike hole portion, said spike having a sufficiently tight engagement with said hole portion to cause pressurization of said glue when the spike is driven into the hole portion, and a substantially spherical rigid ball element in said bore and seated against the wood of the tie so as to form a substantially fluid-tight closure in said bore adjacent the lower end of said spike hole portion and against which closure the initially fluid glue is pressurized by the driving of said spike.

10. In a rail fastening or the like, a wood tie having a preformed bore extending therethrough and the upper portion of which bore constitutes a laterally enlarged spike hole portion, a channeled fibrous filler member extending axially in said spike hole portion and decreasing the transverse dimension thereof to an open remaining axial passage of a reduced cross-sectional size, a metal spike driven into said passage, said filler member and the portion of the tie surrounding said spike hole portion being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said passage in an initially fluid but settable condition and being pressurized into said filler member and surrounding tie portion by the driving of said spike into said passage and spike hole portion, said spike having a sufficiently tight-fitting engagement with said hole portion to cause the pressurization of said glue, and a substantially spherical rigid glass ball in said bore and seated against the wood of the tie so as to form a substantially fluid-tight closure in said bore adjacent the lower end of said spike hole portion and against which closure the initially fluid glue is pressurized by the driving of said spike.

11. In a rail fastening or the like, a wood tie having a preformed bore extending therethrough transversely of the grain of the wood and the upper portion of which bore constitutes a laterally enlarged spike hole portion, a wood filler peg extending axially in said spike hole portion and having a longitudinal channel recess defining an open remaining axial passage of reduced cross-sectional size in said spike hole portion and exposing the cross grain of the portion of the tie surrounding said spike hole portion, a metal spike having a plain stem driven into said passage, said stem being wedged laterally against the exposed cross grain of the surrounding tie portion by said peg, said surrounding tie portion and said peg being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said passage in an initially fluid but settable condition and being pressurized into said peg and surrounding tie portion by the driving of said spike into said passage and spike hole portion, said spike having a sufficiently tight engagement with said spike hole portion to cause the pressurization of said glue, and a substantially spherical rigid ball in said bore and seated against the wood of the tie so as to form a substantially fluid-tight closure in said bore adjacent the lower end of said spike hole portion and against which closure the initially fluid glue is pressurized by the driving of said spike.

12. In a rail fastening or the like, a wood tie having a preformed bore extending therethrough transversely of the grain of the wood and the upper portion of which bore constitutes a laterally enlarged spike hole portion, a wood filler peg in said spike hole portion and comprising integrally connected plug and strip portions of which said plug portion is of a size and shape to substantially fill

a lower section of said spike hole portion and said strip portion extends along one side of said spike hole portion and decreases the size thereof to an open remaining longitudinal passage of reduced cross-sectional size extending along and exposing the cross grain of the surrounding tie portion, said surrounding tie portion and said peg being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said passage in an initially fluid but settable condition and being pressurized into said peg and surrounding tie portion by the driving of a spike into said passage and spike hole portion, and a substantially spherical rigid ball in said bore and seated against the wood of the tie so as to form a substantially fluid-tight closure in said bore adjacent the lower end of said spike hole portion and against which closure the initially fluid glue is pressurized by the driving of said spike.

13. In a rail fastening of the character described, a wood tie having a preformed spike hole extending therethrough, a tie plate on said tie and having an opening overlying and exposing the upper end of said spike hole, a rail resting on said tie plate, a wood filler peg of a channel shaped cross-section extending longitudinally in said spike hole, said peg being disposed in said hole with the channel recess of the peg facing away from said rail and defining a longitudinal passage of reduced cross-sectional size in said spike hole along the side of the latter which is remote from said rail, a fastening spike driven into said passage through said opening, said peg and surrounding tie portions being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said passage in an initially fluid but settable condition and being pressurized into said peg and surrounding tie portions by the driving of said spike into said passage of the spike hole, said spike having a sufficiently tight-fitting engagement with said peg and with the portions of the ties surrounding said spike hole to cause pressurization of the glue upon the driving of the spike, and a substantially spherical rigid ball in said spike hole and seated against the wood of the tie so as to form a substantially fluid-tight closure in said spike hole at a point inwardly of said peg and against which closure the initially fluid glue is pressurized by the driving of said spike.

14. In a rail fastening of the character described, a wood tie having a preformed spike hole extending therethrough, a wood filler peg of a channel shaped cross-section extending longitudinally in said spike hole and including a web portion adjacent the bottom of the channel recess, a tie plate on said tie and having an opening therein, a rail resting on said tie plate, said peg being disposed in said hole with the channel recess of the peg facing away from the rail and defining a longitudinal passage of reduced cross-sectional size in the spike hole along the side of the latter which is remote from said rail, said tie plate being disposed on said tie with a portion thereof substantially covering the upper end of the web portion of said peg and with said opening exposing the upper end of said passage, a fastening spike driven into said passage through said opening, said peg and surrounding tie portions being impregnated with and hardened by a wood-hardening glue, said glue being initially contained in said passage in an initially fluid but settable condition and being pressurized into said peg and surrounding tie portions by the driving of said spike into said passage of the spike hole, said spike having a sufficiently tight-fitting engagement with said peg and with the portions of the tie surrounding said spike hole to cause pressurization of the glue upon driving of the spike into said spike hole, and a substantially spherical rigid ball in said spike hole and seated against the wood of the tie so as to form a substantially fluid-tight closure in said spike hole at a point inwardly of said peg and against which closure the initially fluid glue is pressurized by the driving of said spike.

15. A method of making metal-to-wood fastenings as defined in claim 3, in which the seating of said ball element against the wood of the tie at such inwardly spaced point is accomplished by the driving of said filler member into the spike hole.

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