Aug. 22, 1944. M. H. BROWN, JR 2,356,376

TRACK SPIKE

Filed April 24, 1942

Fig. 1

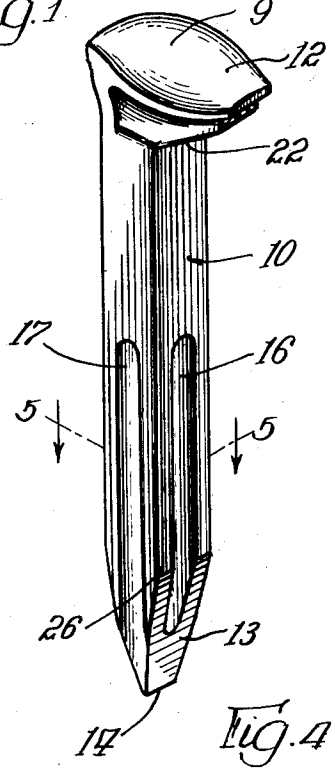


Fig. 2

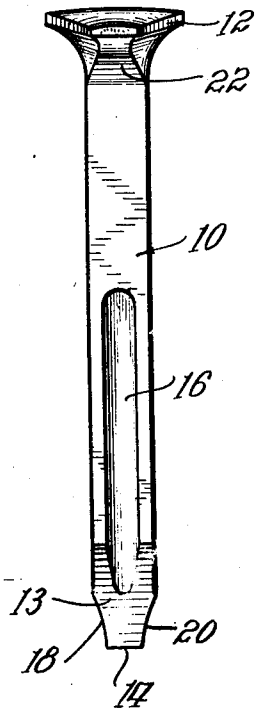


Fig. 3

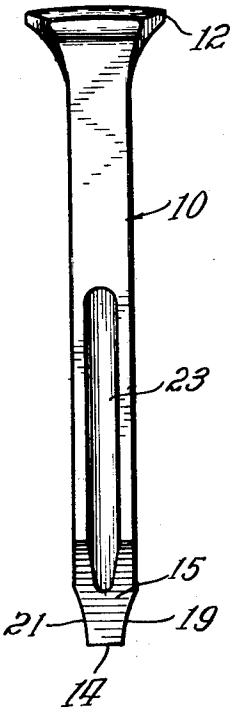


Fig. 4

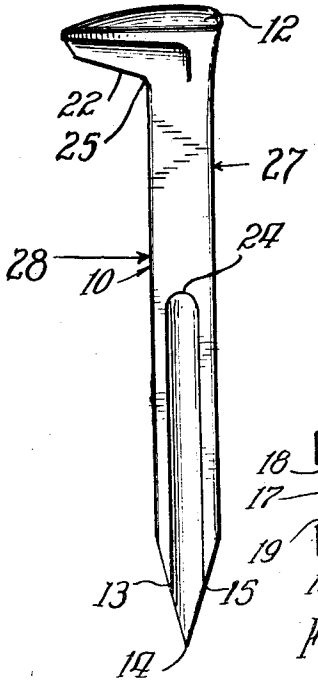
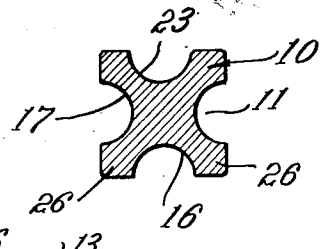


Fig. 5



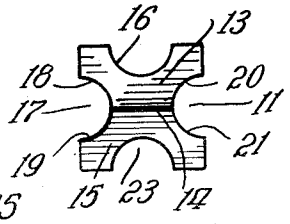


Fig. 6

INVENTOR.
Maurice H. Brown Jr.,
BY
Atty.

Patented Aug. 22, 1944

2,356,376

UNITED STATES PATENT OFFICE

2,356,376

TRACK SPIKE

Maurice H. Brown, Jr., Anaconda, Mont.

Application April 24, 1942, Serial No. 440,317

2 Claims. (Cl. 85—19)

This invention relates to spikes and more particularly to track spikes for holding rails to the ordinary railroad tie wherein the wood grain is generally speaking running parallel to the length of the tie, which is at right angles to the rail.

The design of the track spike standard on American railroads today has survived many alleged improvements primarily because the original spike was designed by men living during an age when the average man had far more knowledge of wood and its properties than has the average man today. Many spikes, alleged to be improvements over the standard spike, have failed to receive commercial approval because their design was defective in failing to meet certain problems presented by the wood into which the spike was to be driven.

An improved track spike must possess all of the merits of the present standard track spike and it is therefore necessary to understand the principles governing the design of the present standard track spike. Its first principle of design may be described thus: the entering edge of the spike must sever the wood fibers and spread them parallel to the grain for the full width of the shank of the spike. The entering edge of the standard track spike is therefore a chisel edge extending across the entire width of one end of the spike shank and positioned at right angles to an off-center head at the other end of the shank. This principle of design accomplishes two important things. Firstly, the average tie has the grain running lengthwise and inasmuch as the tie is placed at right angles to the base of the rail, a spike having such a chisel edge will enter the wood so as to cut the grain. The action of the standard spike chisel edge is exactly the opposite of the action of the ordinary wedge used in splitting wood. Secondly, the chisel edge is formed by two like sloping surfaces which upset the wood or push the wood equally in two opposite directions in order to make room for the shank of the spike. The displaced wood, therefore, is always moved parallel to the grain and whatever splitting action is developed arises from the packing of the wood fibers into an unusually small space adjacent those two sides of the spike shank which are intercepted by the tapered surfaces forming the chisel edge.

The second important principle underlying the standard rail spike is this: the cross section of the spike is to be determined by the strength necessary to resist shearing by the edges of the hole in the tie plate through which the spike customarily is mounted.

The standard spike possesses one conspicuous short-coming: it is not difficult to withdraw from the wood. Track crews are continuously tapping down spikes which the repeated rise and fall of the track under rail equipment have loosened. This defect is attributed partly to the fact that a track spike is not driven at the center of the tie but to one side. Standard ties are six to eight inches wide and the standard spike has a shank one-half to five-eighths of an inch wide. Consequently the spike is driven at a point one and one-half to two inches from the side of the tie and, despite the transverse chisel edge's function, may develop under traffic conditions a so-called spike split, which with growth loosens the grip of the tie on the shank of the spike. Spike splitting of ties is due to the large displacement of wood necessary to make room for the standard track spike.

The primary object of this invention is to provide a track spike which conforms to the principles of design of the standard rail spike and which at the same time possesses superior holding power and is less likely to cause tie splitting along spike lines. Applicant has discovered that the extent to which wood is upset in a tie in order to make room for a standard spike not only exceeds what is necessary to obtain good holding power, but is actually detrimental to holding power. Elaborating on this, in a standard track spike the thickness of the shank is five-eighths (or nine-sixteenths) of an inch and the cutting edge is exactly across the center of the entering end of the spike shank. It follows that each tapering surface forming the chisel edge will move the wood outwardly by five-sixteenths (or nine thirty-seconds) of an inch. In so doing, particularly in the hard woods, it will so crush the fibers that there will be a certain amount of pulverizing and in any event the alteration of the fibers which are displaced and which engage the shank of the track spike will not improve the purchase between the wood and the spike shank but in many instances impair it.

The first specific object of this invention is to reduce the maximum displacement of any wood in the tie from five-sixteenths (or nine thirty-seconds) of an inch to approximately five thirty-seconds (or nine sixty-fourths) of an inch. The applicant accomplishes this end by means of placing a flute centrally of each wall of the spike shank and parallel to its length, each flute being open ended at the entering edge. In cross section, the flutes are semi-circular and are generated on a radius approximating one-quarter the

width of the spike shank. The size of the flutes and their configuration are critical.

The second specific object of this invention is to increase the area of engagement between the steel shank and the wood, which because of applicant's relationship of flute size to the cross sectional area of the spike will find themselves in engagement with wood fibers that have not been so greatly displaced as to have their relationship with the main portion of the tie seriously altered.

Another specific object of this invention is to terminate these flutes at a point sufficiently below the head so that the full cross sectional area of the spike shank will be available for engaging the square hole in the steel tie plate and will penetrate the upper surfaces of the wood to establish a water seal above the flutes. Additionally the flutes are terminated in such a fashion that their top edges will tend to shear the wood and pack the wood down into the upper part of the flutes or grooves. Where the spike actually enters the wood after being driven, therefore, the top edge of each flute is below the surface of the tie and this has the advantage of impairing the penetration of water down the shank of the spike into the grooves. One cause responsible for loosening spikes in ties is believed to be the penetration of water down all sides of the shank without any means of the water getting out other than through some form of evaporation. Freezing of the water therefore has a detrimental effect upon the purchase of the spike upon the wood fiber. In applicant's spike the packing of the wood fibers at the top of each flute impairs the ability of the water to get further down into the flute. Applicant's flutes terminate not less than one and one-half inches below the off-set head and in the case of special spikes wherein an exceptionally long portion of the shank will project above the tie when the spike has been fully driven, as for example spikes to be used at joint bars, applicant's flutes will be terminated sufficiently far down the shank that their tops will be substantially below the surface of the wood.

Applicant's spike additionally has the ability to resist twisting during driving superior to such ability of the standard spike. Also applicant's spike readily follows a pre-bored hole.

One of the most important attributes of the standard track spike lies in its ease of manufacture. While applicant's spike has a shank which is not as simple as the shank of a standard track spike it nonetheless lends itself readily to a simple forging operation.

These and such other objects as may hereinafter appear are obtained in the embodiment of the invention shown in the accompanying drawing, wherein:

Figure 1 is a perspective view of applicant's new and improved track spike;

Figure 2 is a front view;

Figure 3 is a rear view;

Figure 4 is a side view showing the spike as positioned against the base of a rail in the hole of a rail plate and in the wood fiber;

Figure 5 is a view in section taken on the line 5—5 of Figure 1; and

Figure 6 is a view illustrating the entering end of applicant's spike.

Continuing to refer to the drawing and particularly to Figure 1, the numeral 10 identifies generally a spike shank having a conventional head 9 with nose 12 and throat 22. The spike 10 is substantially square in cross section, see Figure 5, and has centrally of its end a chisel edge 14 formed by two intersecting beveled surfaces 13 and 15. The chisel edge 14 is dispcsed at approximately right angles to the axes of the nose and the spike shank. The reason for this is that the nose 12 having a throat 22 with a flat under side, see Figures 2 and 4, is intended to engage the top edge of the base of a rail while the chisel edge cuts the wood fibers at right angles to the length of the tie.

Applicant provides open ended grooves or flutes 17, 16, 11 and 23 in each flat wall of the shank of the spike. The grooves 16 and 23, which are disposed in those walls of the shank which are at substantially right angles to the axis of the nose 12, intersect the two beveled surfaces 13 and 15 which taper to the chisel edge 14. The grooves 11 and 17 disposed in the other two side walls of the shank of the spike cut off the outer portions of the chisel edge 14, as may be seen in Figures 2 and 3.

It will be observed that the chisel edge 14 is less than the width of the shank of the spike and consequently cannot cut the fibers of the tie throughout the entire width of the spike so as to prevent a spreading action by the spike. Additional cutting, however, is supplied by the chisel edges 18, 20, 19 and 21, see Figure 6. Continuing to refer to Figure 6, it will be appreciated that when applicant's spike is driven into the wood, any wood in alignment with the beveled surfaces 13 and 15 will be spread by the chisel edge 14 or will enter the grooves 17 and 11. Moreover, as the cutting edge 14 spreads the wood, the beveled surfaces 13 and 15 will permit a certain portion thereof to pass into the open ended grooves 16 and 23. It is evident, therefore, that the chisel edges 18, 20, 19 and 21 are the means for cutting all of the wood fibers for the entire width of the spike as is done by the standard spike in use today. It is further evident that applicant's positioning the chisel edges adjacent the grooves 11 and 17 results in the two bevel surfaces 13 and 15 spreading all upset wood fibers in just two directions as in the standard spike, while nevertheless permitting a portion of the upset wood fibers to enter the grooves 16 and 23 to provide additional holding power for the spike. Study of Figure 6 will show that applicant's spike will displace a given particle of wood by a distance of not more than about one-quarter of the thickness of the spike. This is to be contrasted with the displacement of the standard spike which causes displacement that may approximate one-half the thickness of the spike.

It will also be understood that applicant's invention can be adapted for use on a spike wherein the nose has been turned ninety degrees with respect to the spike shank. In this type of spike, the axis of the nose is parallel to the chisel edge and is designed for the specific purpose of being driven in wood having the grain running parallel to the rail length. Thus, in some forms of bridge construction, the rails may be spiked to long ties or timbers extending parallel to the rail.

As for the point at which the upper ends of the flutes terminate, for example 24 in Figure 4, in actual practice it is a full two inches below the point 25 where the throat 22 meets the shank of the spike. The actual distance shown in the drawings is somewhat less than two inches because the spikes are not drawn to full scale. A spike having a shank width of nine-sixteenths of an inch is

usually five and one-half inches long, that is from the point 25 to the cutting edge 14, and a spike having a five-eighths of an inch thickness is usually six inches long measured in the same way. The thickness of tie plates may vary, so that when a spike is driven the bottom of the plate or the top of the tie will be at some point such as 27. Moreover there is a standard track spike for use at rail joints to grip not the base of the rail but the base of the joint bar. This results in a substantially greater portion of the shank extending above the bottom of the tie plate or the top of the tie, which point might be close to 28 in Figure 4. The spike shown in Figure 4 is designed for use with tie plates only and applicant preferably terminates the top 24 of a groove at a point which will be approximately one inch below the top of the tie, that is 27, when the spike has been driven. The upper end of each groove is concave and the edges sharp so that instead of spreading the wood outwardly it tends to shear the wood and pack the wood in the upper end of the flute or groove. This packing provides an effective water seal at the top of each groove. As a result the surface of the grooves which engages the wood remains dry so as to preserve the original holding power of the spike.

It will be appreciated that in adapting applicant's invention to a special spike such as that to be used with joint bars, the top of the groove will terminate at a point substantially lower than the point illustrated in Figure 4. In such spikes, however, the actual length of the groove will be about the same because such spikes ordinarily have longer shanks.

By referring to Figures 5 and 6, it will be observed that the flutes 11, 18, 17 and 23 are generated by arcs of circles having a radius of approximately one-quarter the thickness of the spike. The lands 26, are therefore all of equal strength and the chisel or entering edge 14, see Figure 6, has a substantial breadth. This substantial breadth has a steadying effect, in conjunction with the beveled surfaces 13 and 15, at the commencement of the driving of one of applicant's spikes.

The size of the flutes is important. Referring to either Figure 5 or Figure 6 it will be noted that the flutes are generated on a radius of one-quarter the thickness of the shank of the spike. The beneficial effect of upsetting most of the wood by not to exceed one-quarter the thickness of the spike results from the actual size of the radius employed and from the fact that the grooves are semi-circular in cross section. The terminology employed in the claims to describe the parts of a spike varies in accordance with variations of usage in the trade. The head 12 of a track spike is frequently called a hook head or an off-set head and the grooves 16 may be defined as flutes.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A track spike comprising a shank, a hook head disposed at one end of said shank, a chisel edge disposed at the other end of said shank, and grooves extending lengthwise of said shank, said grooves being open ended adjacently to the chisel edge and terminating in closed ends approximately midway the spike length, the edges of said closed ends being fairly sharp, whereby the closed ends of the grooves will perform a shearing and fiber packing function during the latter stages of the spike's being driven into wood.

2. A track spike comprising a shank having four side walls disposed to give a substantially square cross section, a hook head disposed on one end of said shank, a chisel edge at the other end of said shank, and a groove commencing about half way down each wall of said shank and extending centrally lengthwise of each of said walls and each groove intercepting the chisel edge so as to form open ended grooves, said grooves being in cross section semi-circular with a radius approximating one-quarter the width dimension of one of the shank walls, the upper ends of each of said grooves having edges which are fairly sharp, whereby these upper ends will perform a shearing and fiber packing function during the latter stages of the spike being driven into wood.

MAURICE H. BROWN, JR.