

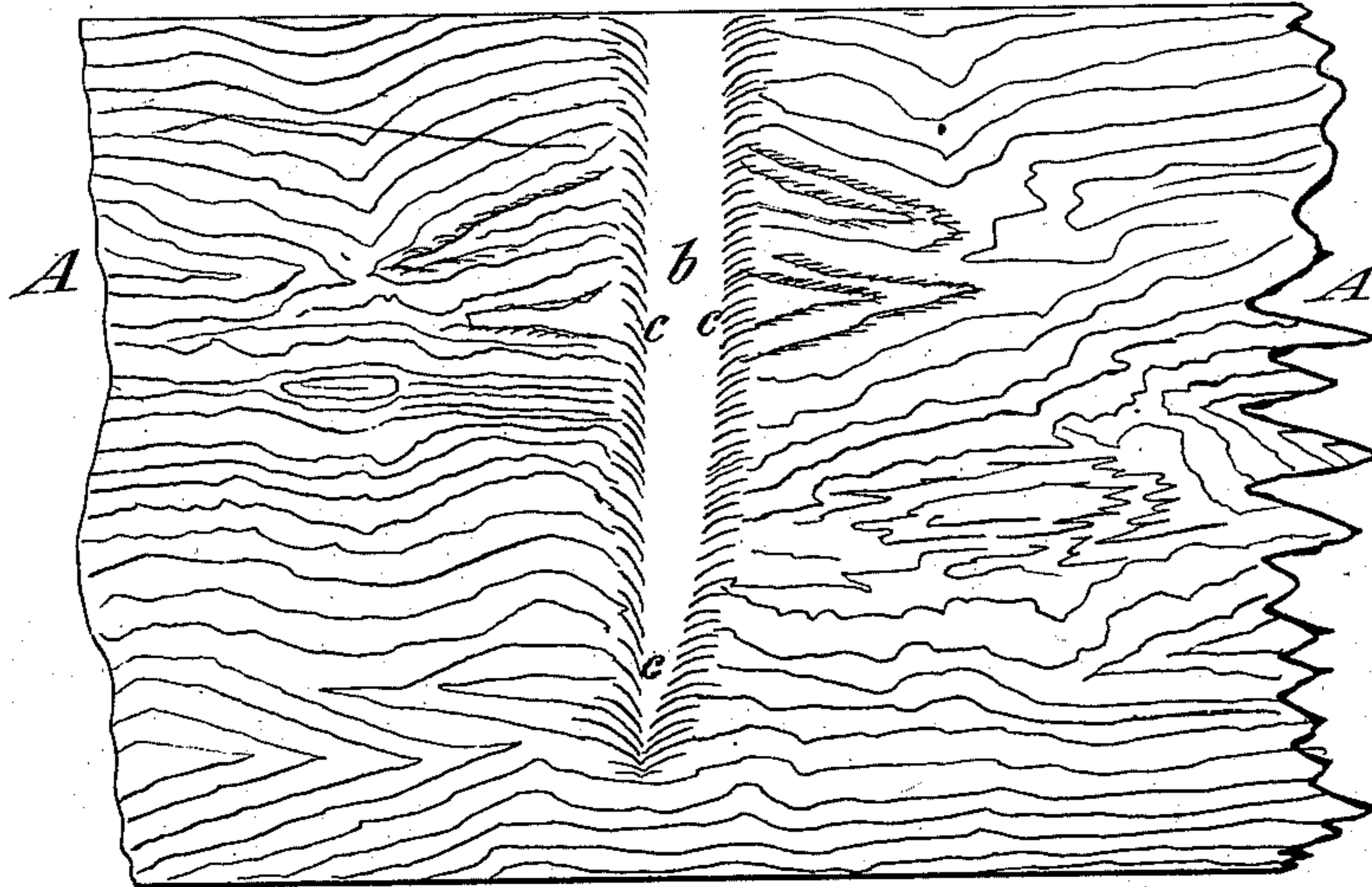
(No Model.)

P. H. DUDLEY.  
PRESERVING RAILWAY TIES.

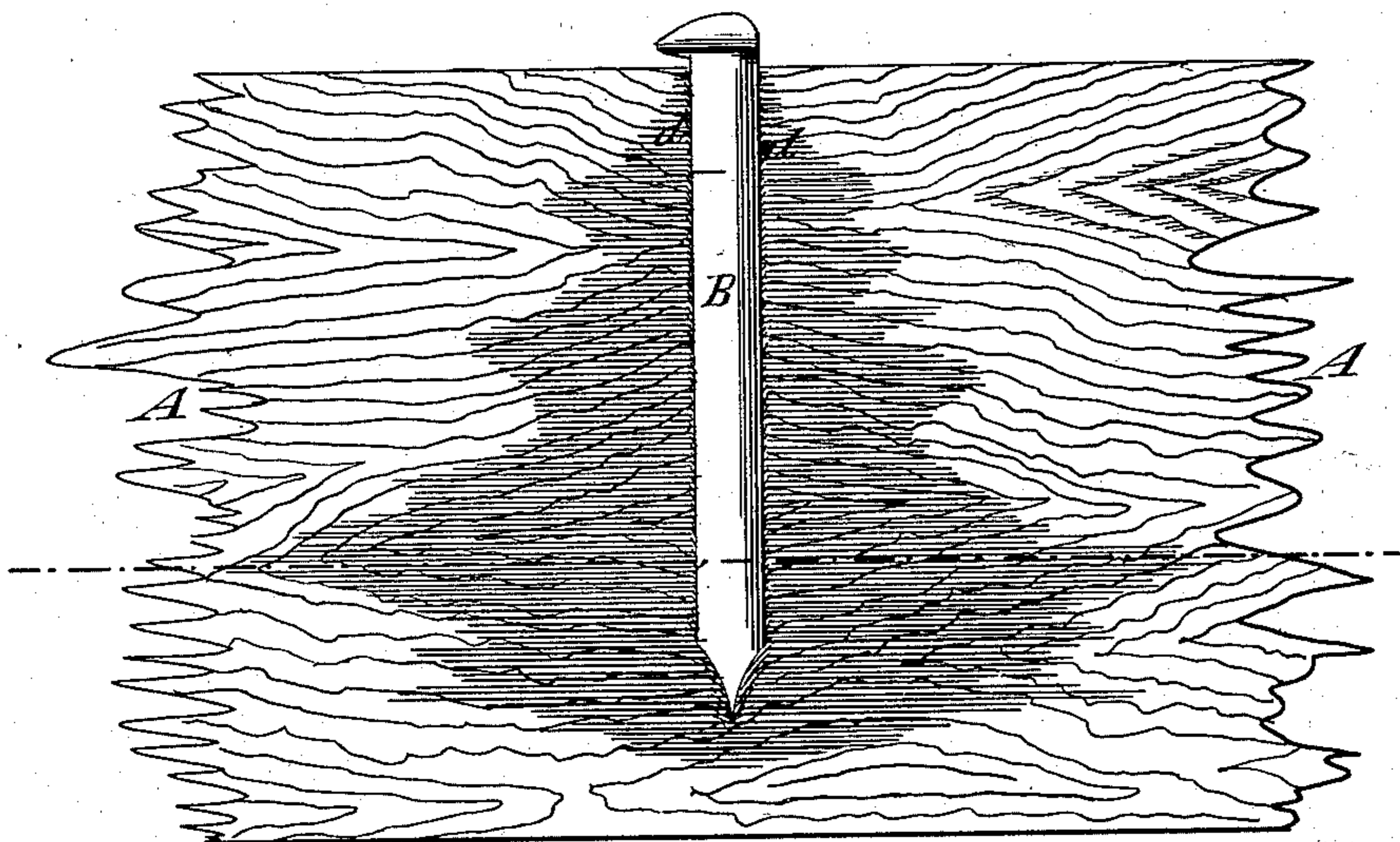
No. 406,566.

Patented July 9, 1889.

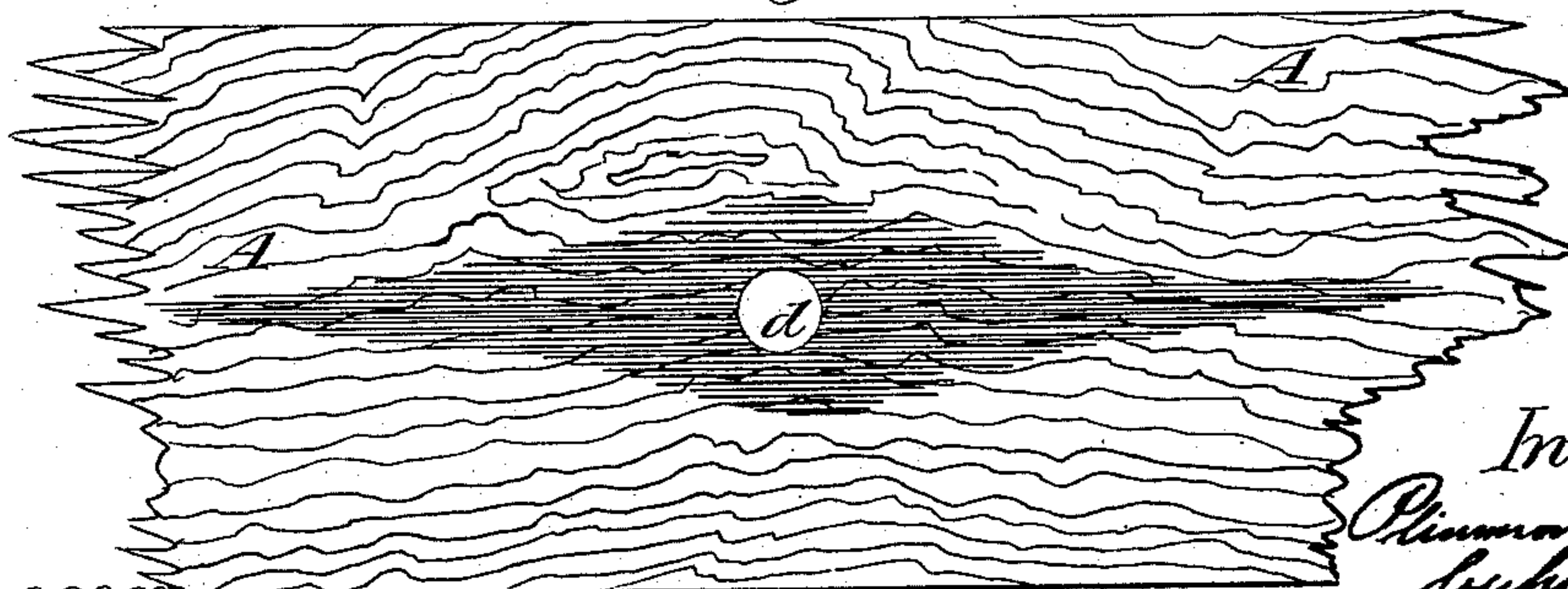
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses.  
Emil Hertov.  
O. Sundgren

Inventor.  
Plimmon H. Dudley  
by his attys  
Brown & Hall

# UNITED STATES PATENT OFFICE.

PLIMMON H. DUDLEY, OF NEW YORK, N. Y.

## PRESERVING RAILWAY-TIES.

SPECIFICATION forming part of Letters Patent No. 406,566, dated July 9, 1889.

Application filed December 23, 1886. Serial No. 222,375. (No model.)

*To all whom it may concern:*

Be it known that I, PLIMMON H. DUDLEY, of the city and county of New York, in the State of New York, have invented a new and useful  
5 Improvement in the Art of Preserving Railway-Ties and other Spiked and Bolted Timbers, of which the following is a specification.

In most species of wood used for railway-ties incipient decay starts first in the injured  
10 wood fibers penetrated by the spike, which, according to the nature of the wood, may be due to either of two causes or both combined: first, by the cell contents of the wood uniting with the iron of the spike, forming compounds  
15 which permit fermentations to take place in the changed contents of the wood more readily than take place in the natural or unchanged compounds of the woods, and, second, by the admission of moisture and spores  
20 of fungi to the injured wood fibers, whose cell contents do not unite with the iron of the spike, and which by their germination and resulting growth induce fermentation and decay.

25 As soon as decay starts around the spike it extends in all directions, but most rapidly in the longitudinal direction of the fibers, and soon extends under the rails. The wood fibers are first softened and then rendered brittle  
30 by the changes taking place, which lessens the adhesion of the spikes, and the rails become loose, and mechanical abrasion of the fibers and layers of wood takes place on the passage of trains. The more extensive the area of  
35 infected wood the more rapid the abrasion and cutting into the ties by the rails, and in many woods this cutting of the ties becomes so extensive that the ties have to be renewed on this account while their ends and centers are  
40 still sound.

From extended investigations and experiments on many railways it has been found that methods which prevent the decay of the wood around the spikes extend the service of  
45 the ties from one-half to three times the ordinary life of ties which are untreated, the gain depending somewhat upon the kind of wood and amount of traffic. The methods of preserving ties at present in use are, however,  
50 so complicated and expensive that, although successful for accomplishing the purpose in

the hands of experts, they have not been successful in the hands of ordinary labor, and the advantage secured has not been sufficient to warrant the cost.

55 The object of my invention is to provide a method of preserving ties and other spiked and bolted timbers which is so simple and inexpensive that it may be successfully used in the hands of ordinary track-layers, and which  
60 will leave the tie or timber, after the spike is driven, with the wood which has a bearing along the length of the spike, penetrated for a comparatively long distance by the preservative compound.

65 The first step in a cheap and effective method is to prevent the great injury to the wood caused by the driving of ordinary spikes, which crushes and breaks the fibers of the wood, and by separating the layers facilitates  
70 the entrance of water and spores to the injured wood. This injury to the wood is so great that an ordinary tie will not bear more than a second spiking before it is injured so much from the spike that a further spiking is  
75 of little service.

The marked injury to the wood may be obviated by boring holes for the spikes, which extend transversely across the grain, and the adhesion of the spike will also be materially  
80 increased. I have found that while the adhesion in white oak of the ordinary five and one-half inch spike nine-sixteenths of an inch square is from four thousand to four thousand  
85 five hundred pounds, the adhesion of the same spike when driven into a half-inch bored hole is from six thousand to six thousand six hundred pounds.

The wood may be preserved from decay by applying thereto through the bored holes  
90 paint or other preservative compounds or substances, and a convenient and simple way of accomplishing this is to fill or partly fill the hole with the preservative compound and then drive thereinto a spike having its body  
95 of such substantially round or circular transverse section as will cause it to tightly fill the hole, and by preventing the escape of the compound will force the latter into the pores of the wood as the spike is driven in. A spike  
100 which may advantageously be used for this purpose is shown and described in my pend-

ing application for Letters Patent, Serial No. 222,374, filed of even date herewith.

In the accompanying drawings, Figure 1 represents a sectional view of a portion of a tie into which a spike of the ordinary form has been driven in the ordinary way. Fig. 2 is a similar section showing a spike driven into the wood and illustrating the effect of my treatment of the wood, and Fig. 3 is a transverse section showing the extent to which preservative substance has penetrated the wood.

Similar letters of reference designate corresponding parts in the several figures.

A designates the wood of a tie, and *b*, Fig. 1, shows the hole into which an ordinary spike has been driven without first boring a hole for its reception. By such driving the fibers of the wood are greatly mutilated and injured and their layers are separated, as shown at *c*. Such injury to the wood may be greatly lessened by first boring a hole *d*, (see Fig. 2,) and then driving thereinto a spike B but little larger than the hole.

The spike B has a substantially circular or round body, as shown and described in my aforesaid application, and fills the hole into which it is driven.

After boring the hole *d* I supply to the wood around the hole a preservative substance or compound of any suitable or well-known character, which has the effect of preventing decay.

The preservative fluid or substance may, by pressure applied to it, be forced into the pores or cells of the wood around the hole *d*, and will extend therefrom in all directions, but chiefly lengthwise of the fibers, as shown by the darker lines extending from the hole *d* in Figs. 2 and 3.

A very effective and yet simple way of applying the necessary pressure to the preservative fluid or substance is to first fill or partly fill the hole *d*, and then drive the spike B directly thereinto. If the spike fits the hole snugly, it will prevent the fluid from escaping at the mouth of the hole, and the continued driving in of the spike will gradually displace the fluid and cause it to penetrate the wood. The moisture and spores entering around the spike will then have but little effect in producing decay.

I prefer to tin or galvanize the spikes or bolts or to provide them with some other protecting coating which will prevent the formation of compounds of iron—such as sesquioxide—and, inasmuch as the tannic acid of the wood cannot combine with such compounds, the discoloration of the wood will be prevented and decay thereof will be retarded.

I am aware of Patent No. 108,659, granted October 25, 1870, to E. Webb, and do not desire to include in my invention the method of preserving wood therein described. According to that patent a hole is bored lengthwise

in a stick and plugged at the end, thereby forming a permanent chamber for containing a supply of preservative compound. A hole is also bored transversely into the chamber for filling it with preservative compound and is closed by a screw-plug. When this invention is used for railway-ties, no holes are bored for the spikes, which are driven in the usual way.

I am also aware that in Haldane's Workshop Receipts, Second Series, 1883, paragraph 29, page 464, it is described that in preserving posts and other timbers a hole is bored lengthwise parallel with the grain, and after being filled with preservative compound is plugged up with a long taper wedge, which will give pressure to force the preservative into the pores of the wood. I do not seek to include anything above described as old in my invention. My first step is to bore a hole for the spike transverse to the length of the grain, and which will cut through the pores of the wood and expose their ends, so that when the hole is filled with preservative compound and pressure applied, as by driving the spike, the preservative throughout the length of the hole will enter readily into the exposed cut ends of the pores and impregnate the wood for a comparatively long distance. The preservative compound will readily enter and penetrate wood when applied with pressure to the ends of the grain and pores, and will enter but very little if applied with even great pressure to wood transversely to the length of the pores or grain. By first boring a hole for the spike transversely to the length of the grain, I expose the ends of the pores through the depth of the hole, and then by introducing the preservative compound by pressure through this hole I enable it to readily penetrate the wood through the cut and exposed ends of the pores. I am not aware that ever before my invention had a tie or other timber been bored with a hole transverse to the length of the pores and grain, the hole then filled with preservative compound, and the spike or bolt finally driven in, filling the hole.

What I claim as my invention, and desire to secure by Letters Patent, is—

The improvement in the art of preserving railway-ties and other spiked and bolted timbers, consisting in first boring a hole in the wood transverse to the length of the pores and grain and which exposes the ends of the pores, in then applying a preservative compound in the hole, where it has access to the exposed ends of the pores, and in finally driving a spike or bolt to substantially fill the hole and force the preservative compound into the wood upon all sides, substantially as herein described.

P. H. DUDLEY.

Witnesses:

C. HALL,  
FRED HAYNES.