

UNITED STATES PATENT OFFICE.

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RAILROAD-TIE.

988,282.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, RAYMOND G. OSBORNE, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles, State of California, have invented new and useful Improvements in Railroad-Ties, of which the following is a specification.

This invention relates to a railroad tie composed in the main of cementitious material with or without metallic reinforcement. As the metallic reinforcement does not enter into the present invention, I will describe my tie as being composed completely of cementitious material.

The object of this invention is to provide a concrete tie which will afford the desired resiliency of support for the rails in addition to possessing the normal qualities of a concrete tie.

Considered broadly, my invention consists of a cementitious body portion of comparatively small resiliency and of cementitious rail supporting portions of comparatively great resiliency. I have discovered a combination of cementitious materials which not only fulfil these but also other conditions, such as adaptability for receiving spikes without deterioration of the material, the consequent loosening of the spikes, ease of manufacture, repair and change on the road bed, and general durability under extreme weather conditions. These advantages, and others to be hereinafter set forth, will be better understood from consideration of the following specification in connection with the accompanying drawings, in which:

Figure 1 is a perspective view illustrating my improved tie and showing its use. Fig. 2 is a plan view of a modified form. Fig. 3 is a section taken on line 3—3 of Fig. 2.

In the drawings 5 designates the body portion of my tie of general prismatic configuration and having dimensions somewhat in accordance with the dimensions now prevalent for ties of other materials, or being larger if conditions are such as to demand a heavier tie. This body portion is preferably constructed of ordinary cementitious material composed of a cement, such as "Portland cement," binder with a filling of rock or mineral substance, such as crushed rock, sand, cinders or any other equivalent material. The different ingredients may be used in proportions to suit varying conditions; the one salient characteristic of the body portion so made is this, that it is of

comparatively little resiliency and great strength, affording an admirable permanent base for a track but not being suitable for the direct support of the rails on account of its unyielding nature. I have provided a special yielding and supporting support for the rails, capable of receiving driven spikes without cracking or deteriorating in any way. The body portion of the tie may consequently be made of inexpensive and easily obtainable materials. To prevent the friable materials of the body portion from being broken by the impact transmitted to them, I have provided that reinforces may be placed as illustrated at 6. These reinforces may be designed to suit conditions.

Near each end of the body portion a transverse groove is preferably cut in the upper portion of the tie clear from side to side. In this groove a plug 7 is poured in plastic state to subsequently harden, these plugs becoming the rail supporting portions of the tie. It will be understood, however, that the rail supporting portions or members may be placed on top of the body portion and be secured in other manners. It is not necessary that they should be sunk in the tie, although this is contemplated as a practical form. Metallic plates 8 may be placed on the upper surface of the rail supporting portions, and the rails, as illustrated at 9, are held on the plates by spikes 10, spikes 10 being driven directly into plugs 7.

In Fig. 2 I have shown a modified form of plug in which a projecting portion 11 prevents the movement of the plugs in a direction longitudinal of the rail, and in Fig. 3 I have shown a construction which provides for a relatively shallow plug 7^a by having pockets 12 in body portion 5^a, which pockets are filled by extensions of the plug. The spikes project into these pockets. I may provide holes 13 for the entry of spikes, the holes being of such size that the spikes must be forced in sufficiently to be held tightly. Liquid cement capable of hardening may be first inserted into these holes, which cement may be similar to the material forming the rail supporting portions. This, however, is an alternate provision, the material of the plugs being of such a nature as to admit the spike being driven into it without previous preparation.

The material of the plugs is preferably composed of a woody or other resilient and yielding material, such as saw dust or wood

chips, used as a filler, in combination with a cement binder which will unite the filler. For all practical purposes I have found that magnesium cement is well suited to this use.

I use a mixture of more or less finely divided wood and cement in varying proportions, a larger proportion of wood making a more resilient and yielding material and a larger proportion of cement having the opposite effect. Such material, say equal parts of wood and cement, possesses a large amount of resiliency and yielding qualities—in fact, being similar to wood in many of its properties. It will receive driven spikes without breaking in any manner and will hold them very tightly.

I am aware that ties have heretofore been made with a cementitious body and plugs of wood or asphalt; but my invention has many advantages over both of these old forms, in fact, it possesses practically all of the advantages of both forms without their disadvantages. As over the wooden plugs it possesses the advantages of general non-deterioration when exposed to the elements, no grain along which it will split, no admission of moisture around the spike and consequent loosening and decomposition of the spike, greater strength, better elasticity, together with the property of being plastic and capable of being poured into place. In this connection it may be mentioned that the rail supporting plugs of my tie may be easily replaced without removing the tie from beneath the rails, or disturbing the road bed, the old plugs being picked out, the new plugs poured in while the material is in a plastic state and then allowed to set.

Practically, the plugs are formed in the following manner, although I do not wish to limit myself to this method of procedure. The materials are supplied in the form of, say, sawdust, a solution of magnesium chlorid (about 5% of calcium fluorid may be added) in water, and magnesium oxid in powdered form. A mixture, in proper proportions, of the sawdust and oxid is first made; the solution is then added and the whole thoroughly mixed. The body of the tie is first formed of concrete, leaving space for the rail supporting material. Then while still in a plastic state the rail supporting mixture is poured into the tie, filling the rail supporting portion. After having thoroughly set, the plate is forced in over the plug and under the rail. The spikes may then be driven.

As over the asphalt plugs the following advantages may be cited; non-changeability under pressure and temperature (asphalt will change its form, volume and consistency under pressure at any temperature, becoming more plastic the higher the temperature), better resiliency, ability to receive spikes without splitting or breaking, no de-

terioration when exposed to water. Further, asphalt requires a rather high temperature to bring to plastic pouring condition, thus requiring fire and special tools for handling. As over both materials, wood and asphalt, it may be said that my material possesses greater compressive strength and greater durability. Its characteristics may be varied within certain degrees so as to obtain the precise qualities needed, these qualities varying from those of wood on one hand to those of a cementitious material on the other hand.

The magnesium cement which I consider preferable for use in making the rail supports possesses in its pure state these qualities: It is waterproof, fire proof and weather proof and is very elastic as compared to cements in general use. This cement protects with these qualities any neutral materials which may be bedded therein; just as steel (forming reinforced concrete) is protected from the elements when properly embedded in concrete.

Having described my invention, I claim:

1. A rail tie, comprising a body portion of cementitious material of relatively little resiliency, and a rail supporting portion upon the body portion composed of cementitious material of relatively great resiliency.

2. A rail tie, comprising a body portion of cementitious material of relatively little resiliency, and a rail supporting portion upon the body portion composed of cementitious material of relatively great resiliency and extending transversely clear across the body portion.

3. A rail tie, comprising a body portion of cementitious material containing a cement binder and a filling of rocky substance, and a rail supporting portion composed of cementitious material containing a cement binder and a filling of vegetable material.

4. A rail tie, comprising a body portion of cementitious material containing a cement binder and a filling of rocky substance, and a rail supporting portion composed of cementitious material containing a cement binder and a filling of wood material.

5. A rail tie, comprising a body portion of cementitious material containing a cement binder and a filling of rocky substance, and a rail supporting portion composed of cementitious material containing a cement binder and a filling of finely divided wood.

6. A rail tie, comprising a body portion of cementitious material containing a cement binder and a filling of hard substance, and a rail supporting portion composed of cementitious material containing a cement binder and a filling of resilient material.

7. A rail tie, comprising a body portion of cementitious material containing a cement binder and a filling of hard substance, and a rail supporting portion composed of cemen-

titious material containing a cement binder and a filling of soft material.

5 8. A rail tie, comprising a body portion comprised of cement binder and a rocky filler, and rail supporting portions composed of magnesium oxy-chlorid cement and a woody filler.

In witness that I claim the foregoing I have hereunto subscribed my name this 9th day of January 1911.

RAYMOND G. OSBORNE.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
