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W. BÄSELER ET AL
SLEEPER FOR RAIL TRACKS

2,257,833

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2 Sheets-Sheet 1

Fig. 1.

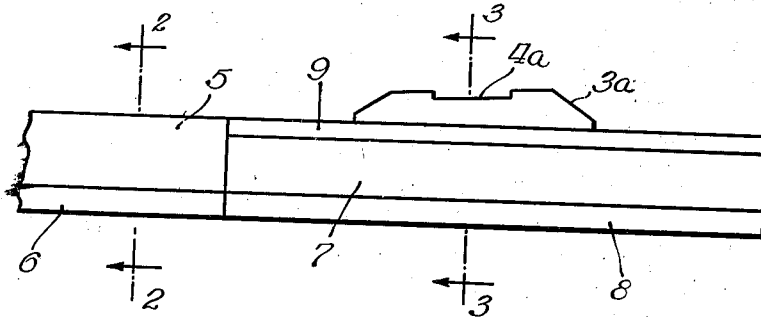


Fig. 2.

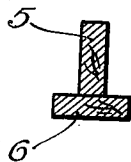


Fig. 3.

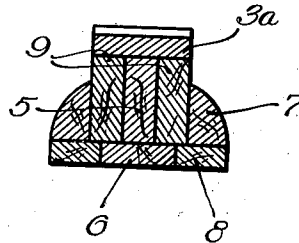
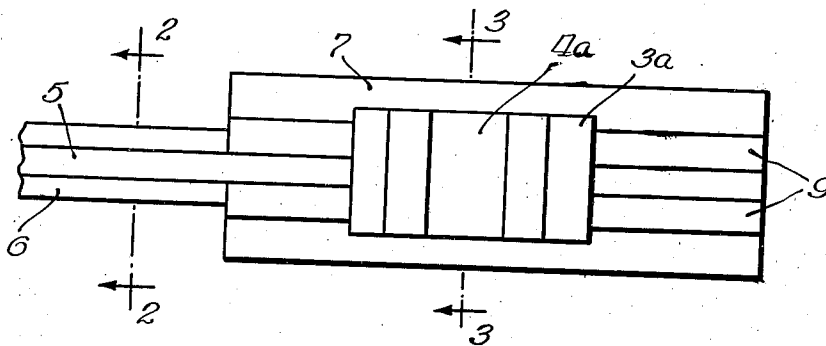


Fig. 4.



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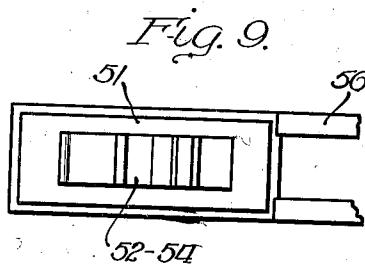
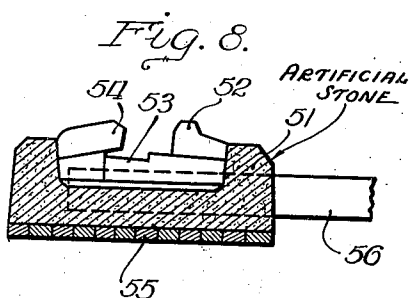
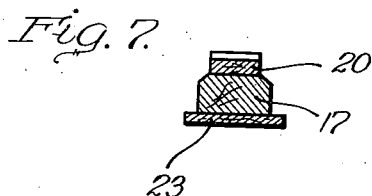
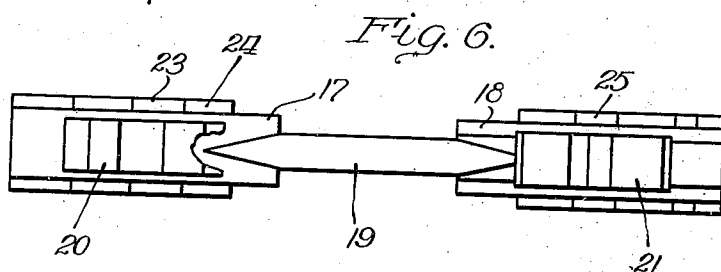
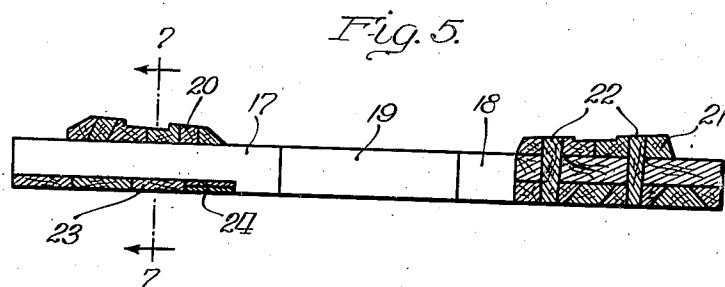
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UNITED STATES PATENT OFFICE

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SLEEPER FOR RAIL TRACKS

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Dietrich, Munich, GermanyApplication April 26, 1938, Serial No. 204,340
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4 Claims. (Cl. 238—83)

This invention relates to sleepers for rail tracks and especially for railway tracks.

Supports for rail tracks and especially railway sleepers, still consist chiefly of wood, in nearly all countries. In contrast to iron sleepers, those of wood are elastic and resilient. They function gently and silently, without special aids, provide a sufficiently firm union between rail and sleeper and, when impregnated, have a considerable working life at moderate cost.

However the wooden sleeper is not yet of the shape which is best adapted to utilise each fibre, as far as possible, for absorbing, dealing with and transmitting the forces to the ballast, especially in view of the increased requirements imposed, in respect of the lateral rigidity of the track frame, by the long-rail track now desired to be attained. This is due to the fact that by the long-established method, the wooden sleeper can be produced, from the tree trunk, only in the usual form of prismatic baulks. It is known, however, that, even in the case of the simple cross sleeper, the prismatic form—that is, one of uniform cross section through the whole length—is not the most favourable, either from the technical or from the economic point of view. What variations in detail are desired, depends on the special objects aimed at in the structure of the permanent way in each case. Nevertheless it is nearly always advantageous that, for example, the midway portion of the cross sleeper should present a smaller bearing surface than that in the zone of the rails, under which the greatest pressures occur and have to be absorbed. For many reasons, a variable moment of inertia—for example, smaller in the middle portion—is advisable, as is also reinforcement in the vicinity of the bearing surface of the rails, and, if possible, stays for engaging in the ballast and artificially enlarged frontal surfaces for absorbing lateral pressures in the track. Where the material of the sleeper, such as iron or concrete, enables such forms to be produced, shapes differing from the prismatic are aimed at and employed.

Even if one were to be contented with the prismatic form, the baulk (that is to say, a slab in which there are no re-entrant corners or concave boundaries on the whole cross section, but only salient corners and convex boundaries) is by no means adapted to meet all requirements. The baulk comes from the trunk, in the shape of a rectangle, or trapezoid, sometimes even with partly untrimmed surfaces, and is needlessly massive. For a given final weight of timber, an

approximately T-section, with a stout basal slab, a superimposed web (not too narrow) and suitable reinforcement of the portion supporting the rail, would furnish a larger bearing surface and an adequate moment of resistance. At the same time, the projecting flanges of the base member would be loaded with overlying heavy ballast, which would be highly desirable. Such modified shapes could, however, in the case of wood, be produced from the solid baulk only by sawing and milling, and, owing to the amount of wood, in the rough state, used, and the additional working would be uneconomical. Moreover, such more or less cut-out blocks would easily split. The ideal wooden sleeper should combine the properties of a body which is not prismatic and not in baulk form, whilst, according to circumstances, either the non-prismatic or the modified form, may be preferable to such a degree that the other becomes almost, or quite, negligible. In all cases, the form selected must be capable of being produced cheaply from rough timber, must be durable and must be adapted to the static conditions. These modern standpoints are specially applicable when the object in view is to produce sleepers which comply with modern requirements in respect of tracks which are proof against distortion and therefore provide or include angular rigidity in the connection between rail and sleeper, or already a completely interlocked frame or grid in the supporting system.

The careful utilisation and improvement of the raw material becomes increasingly important with the progressive technical development aimed at economy in the use of materials, on the one hand, and, the scarcity of raw materials on the other, and must also receive greater attention than heretofore in the case of a mass-production article, such as the wooden sleeper. The foregoing aims in respect of improved shape must be accomplished with the same, or even smaller, consumption of raw material. Weaker, inferior and also older and waste timber, especially well preserved portions of used sleepers must contribute to the structure or the body of the new sleeper. Where practicable and desirable, still cheaper and still more diverse substances, such as stone, artificial stone, including, for example concrete, asbestos cement, ferro-concrete, wood-wool cement blocks, straw-fibre blocks, which economise material must be capable of being combined with the wood.

All the aforesaid aims can be achieved only by a suitable combination of wooden and other structural members. This combination must

not be effected, as in the existing methods, substantially by screws, dowelpins, nails, hooks, clamps, brackets, bows and bolts, because these, besides entailing a disproportionate consumption of metal, further weaken the already weak wooden members employed, since they sever the fibres, which are important for support, and since, in the course of time, they work loose, admit water and lead to a gradual loosening and destruction of the entire structure. On the contrary, the entire unit must be a combined solid structure, which, though capable of resilient functioning, is otherwise unalterable. At present this result can be obtained, in various ways, by means of novel kinds of glue. The term "glue" used herein is intended to include any agent for cementing together the surfaces of two members by the interposition of an adhesive layer. Nowadays, such glues are absolutely proof against weather and bacteria, and can secure wood to wood, wood to stone, wood to iron and so forth. The adhesive can also consist of regular thick or thin films composed of the known horny substances, abundantly furnished by the plastics industry. It can also be used in association with fillings of the most diversified types, fabrics, papers, wire netting, inlays, hardening substances, fibres and diluents. An auxiliary connection may be established, in addition, by means of screws, dowel pins and the like, provided that the main connection is established by surface adhesion alone. When one of these possibilities is utilised, the invention is not affected if, or for any reasons of simplicity or adaptation to existing conditions, the sleeper has the external form of a baulk prism. For example, it may be suitably advantageous, as will hereinafter be described, to construct a new sleeper by cementing together the well preserved middle portions of two old ones.

At the same time, it may be advantageous to bond together different types of wood (hard, soft and tough) in which case the special properties of the woods come into operation in their position. For example, a sleeper of soft wood may be made equivalent to one of hard wood by cementing it between two hardwood plates. At points of special stressing, such as the bearing surface for the rails, hardened wood, artificial resin permeated with cellulose, and the like, or also metal fittings, may be employed and superimposed or embedded. At the same time, the structural members specially exposed to wear at these places, may be provided with a metallic sheath, which affords good assistance in diverting the forces applied to the rail. When iron underlays or plates are also desirable, they are pressed, in a specially suitable and economical shape, from sheet metal, and are slipped over the filler, of wood or stony wood, with insertion of a cementing composition or adhesive. For additional security, in difficult cases, they may also be secured by penetrative fastening agents, such as nails, pins, screws and the like.

The cementing operation may be so conducted that the special stresses (including those due to weather) to which the sleeper is exposed and which tend to lead to the sleeper splitting, can be absorbed by laying the fibres of the connected plates crosswise, so that splitting is precluded.

In place of the existing type of bolted double sleeper, a unitary built-up member cross-grain cemented in the form of a large slab can be produced, without using any iron. Wooden

chairs, for supporting the rails can be cemented on to ferro-concrete sleepers, or cemented into recesses in the concrete member. The existing excessively heavy ferro-concrete sleeper, of low resilience, can be replaced by two single concrete members cemented together, by means of one or two incorporated, cemented wooden bars, to form a complete sleeper. The wooden, or woodlike plates, or structural members supporting the rails may be combined, for example by using the wooden bars, serving as spacing members, to form a grid which is surrounded by the concrete member.

The foregoing and other features of the invention will become apparent from the following description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a partial elevation of a sleeper built up from sawn timber, only one end of the complete sleeper being shown;

Fig. 2 is a cross section on line 2—2 in Fig. 1;

Fig. 3 is a cross section on line 3—3 in Fig. 1;

Fig. 4 is a partial plan view of the sleeper shown in Fig. 1;

Figs. 5 and 6 are an elevational and a top plan view, respectively, of another embodiment of the invention;

Fig. 7 is a section along the line 7—7 of Fig. 5; and

Figs. 8 and 9 represent a partial elevational and a top plan view, respectively, of still another embodiment.

Referring now to Figs. 1, 2, 3 and 4, the main body of the sleeper is composed of timbers 5 and 6 glued or cemented together to form a compound structure of inverted T cross section. At the rail seatings the sleeper is reinforced by flat members 8 on the flange and by flat members 9 on the web of the inverted T structure, together with the quarter rounds such as 7. The actual rail seatings are formed by chairs such as 3a having recesses 4a for receiving the rails.

The entire assembly is well bonded together and the relative arrangement of the several wooden slabs or parts should be such that flanks with approximately equal degrees of shrinkage should be in mutual contact in order to prevent the combination from warping. The rail chair 3a may also be composed of several individual parts glued or cemented together, as is particularly indicated in Fig. 5.

In Figs. 5 and 6, short usable portions 17 and 18 of old sleepers, are combined, by means of the web 19, to form a sleeper equivalent to the new type. In order to make the parts stronger, they are cemented to wooden members such as 25, or laminated wooden members 24 with transversely disposed fibres. As can be seen from Fig. 7, the laminated members 23 project laterally beyond the main timber 17 in order to distribute the load, over a larger area of ballast. The rail chair 20, or 21, preferably consists for example, of bonded prisms with correctly disposed fibres. Any bolt holes present in the old timber are filled up with cemented dowel pins 22, which, in passing through the assembly, contribute to its security.

Sleepers making use of artificial stone can be designed as shown in Figs. 8 and 9. These figures show artificial stone blocks such as 51 having axial recesses to receive the cemented spacing timbers 56. The rail chairs may be composed of improved pieces 52, 53, 54 of wood with addition of fabrics impregnated with artificial resin, and can, for example, be

inserted in the artificial stone blocks such as 51. The embodiment comprising the block 51 shows an arrangement for carrying light rails at road cross-overs, while in the case of double-headed rails the chair will be suitably modified. The timbers 56 serve as spacing members. A raft 55, Fig. 8, composed of bars, may be employed as a resilient intermediate layer between block and ballast.

Other structural forms can also be deduced from the examples and measures specified.

We claim:

1. As an article of manufacture, a compound cross tie or sleeper for rail tracks fabricated of a plurality of separate parts fitted together to form an elongated member and arranged to distribute over a large surface the stresses imposed thereupon when the tie is subjected to use, said parts being secured together solely at their contact surfaces by an adhesive and formed at the ends of the tie with relatively massive structures which increase the ballast contact area at the rail seatings, certain of said contact surfaces extending in horizontal planes of substantial area longitudinally of said tie, whereby shearing stresses due to loading will be distributed throughout said planes, wherein a plurality of said separate parts consist of timber pieces, and wherein some of said timber pieces are positioned with respect to other timber pieces so that the fibers of the first said timber pieces

cross with respect to the fibers of said other timber pieces so as to increase the shearing strength of the tie structure.

2. The cross tie defined in claim 1, wherein the middle portion of the structure is of non-prismatic form and appreciably smaller in cross sectional area than the end portions, together with rail seatings disposed at each end of the tie, said seatings being secured in place by adhesive at the contact surface with the ends of said tie.

3. The cross tie defined in claim 1, wherein the middle portion of the structure is of non-prismatic form and appreciably smaller in cross sectional area than the end portions, together with rail seatings disposed at each end of the tie, comprising a plurality of assembled parts secured together by adhesive at the contact surfaces thereof and being secured in place by adhesive at the contact surfaces with said tie.

4. The tie structure defined in claim 1, wherein timber parts are combined with parts made of other material to form the massive structures at each end of the tie, and wherein the middle portion of the tie consists of timber parts forming a substantially smaller cross sectional area than said end structures.

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