May 6, 1969 PER-ERIK OLSON ET AL 3,442,222

METHOD OF LAYING RAILROAD TRACKS ON CONCRETE BASES

Filed April 24, 1967 Sheet 1 of 2

Fig. 1

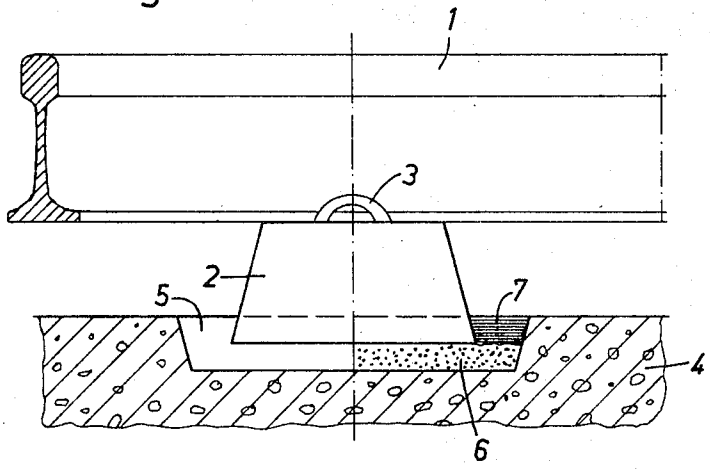
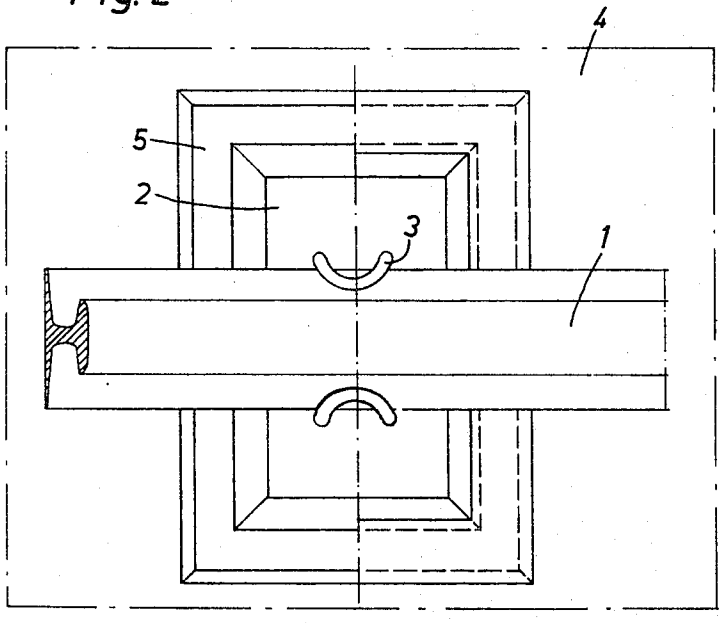


Fig. 2



METHOD OF LAYING RAILROAD TRACKS ON CONCRETE BASES

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Fig. 3

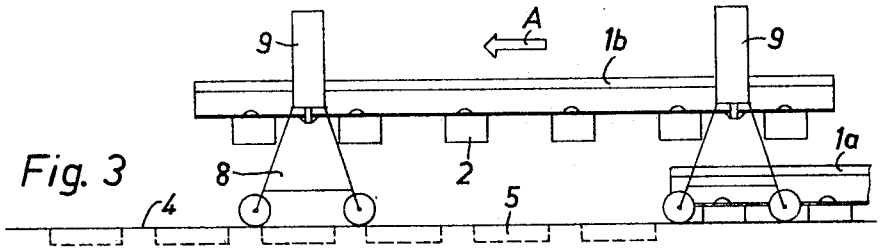


Fig. 4

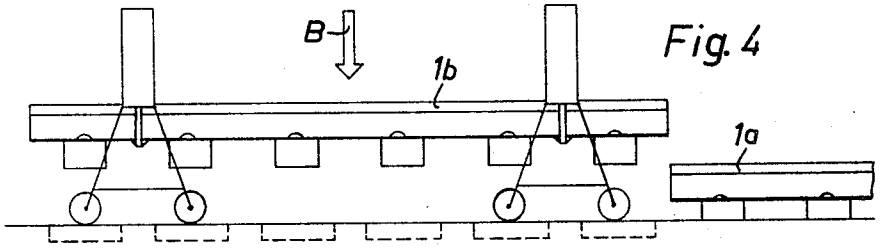


Fig. 5

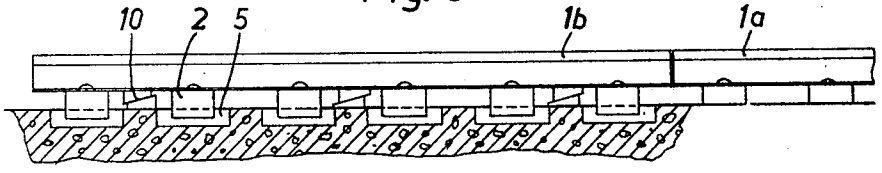
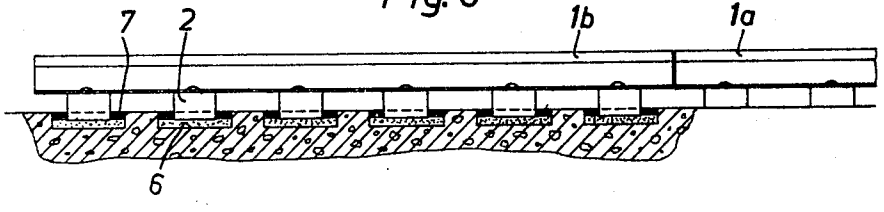


Fig. 6



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3,442,222

METHOD OF LAYING RAILROAD TRACKS ON CONCRETE BASES

Per-Erik Olson, Nasbypark, near Stockholm, Nils Lunden, Stockholm, and Sigwid Ribbing, Bromma, near Stockholm, Sweden, assignors to Swedish Rail System AB-S.R.S. Solna, near Stockholm, Sweden

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Int. Cl. E01b 29/02
U.S. Cl. 104—3 5 Claims

ABSTRACT OF THE DISCLOSURE

A concrete base for railroad tracks is moulded with recesses for sleeper blocks, said recesses being made deeper and wider than corresponding with the sleeper blocks. A rail with attached sleeper blocks is brought substantially to its proper final position with respect to the recesses and is adjusted in said position by means of temporary supports. Sand is placed and packed in the recesses, under and around the sleeper blocks, and then these blocks are joined to the concrete base by pouring concrete or other suitable material round the sleeper blocks within the recesses for closing the same. Finally the temporary supports are removed.

The invention refers to a method of laying railroad tracks on concrete bases.

When building subways, originally the same technic was utilized for the track as in connection with openly disposed railroads. Thus, a ballast of macadam as well as sleepers were used, the rails being fastened to the sleepers in any approved manner. However, during the last decades a successive change to other methods has occured, the object of which is to spare space, especially in connection with the building of tunnels (subways) and to come down to low heights of construction. The intention also was to create such constructions in which one can avoid the work of packing and adjusting, usually recurring in macadam tracks. In the first place one has tried to replace the macadam-ballast by concrete bases in which wooden sleepers directly have been inserted. But this technic has proved to be disadvantageous especially when substituting new rails and when the sleepers and the rail fasteners are to be renewed. Therefore, one has tried to eliminate the sleepers entirely and to fasten the rails directly on the concrete base by different means. However, in this connection a particular difficulty did arise inasmuch as there are very limited possibilities of adjusting the position of the rails, and therefore an expensive precision technic was necessary for the moulding of the concrete base and for the application of devices on the concrete base, suitable for mounting the rail fasteners, in order to secure the exactness required for a high standard of the track. Besides, when the rails are moulded directly in the concrete, the level of noise will be unfavourably high, as the vibrations of the track will propagate through the concrete structure and buildings. Substantially the same disadvantages will arise if the track is laid on the concrete base by means of separate concrete sleeper blocks individual for each rail.

The object of the invention is to provide such a method of laying the railroad tracks on concrete bases that the position of the rail easily can be adjusted both at the first laying and at re-adjustment operations, at the same time as shock-absorbing and noise-absorbing between the track and the concrete base are rendered possible.

In the method according to the invention, also separate

sleeper blocks for each rail are used, at first such sleeper blocks being in well-known manner attached to the rails by means of rail fasteners—one series of sleeper blocks under each rail—and then each rail with the attached sleeper blocks being disposed in the desired position on the concrete base. The essential characterizing novel features of the invention according to a preferred embodiment are as follows. The concrete base is moulded with recesses for the sleeper blocks, which recesses are made deeper and wider than corresponding with the sleeper blocks at the desired final position of the rail. When the rail with the attached sleeper blocks has been advanced to the desired location above the concrete base, the rail is adjusted to the proper final position in relation to the concrete base by means of temporary supports. Sand is placed and packed in the recesses, under and around the sleeper blocks, and then these blocks are joined to the concrete base by pouring concrete or other material around the sleeper blocks within the recesses while closing the same. On account of this moulding the sand is enclosed within a certain volume, and the friction joint of sand between the concrete base and the sleeper blocks is stabilized. For re-adjustment of the position of the rail—also in connection with an exchange of the rails—the concrete or other moulded material by means of which the sleeper blocks have been secured to the concrete base, can easily be removed and the position of the sleeper blocks in the recesses can be adjusted by placing new sand in the recesses or possibly removing some sand already present, and then the sleeper blocks are again attached to the concrete base by pouring concrete or other material around the blocks.

The invention refers also to sleeper blocks suitable for carrying out the method according to the invention, and an embodiment of a sleeper block according to the invention is characterized in that it is made with smaller dimensions than normal so as to form, when placed in a recess in the concrete base, a sufficient space with the wall of the recess for allowing sand to be packed in said space.

The invention will be better understood as described by way of example in the following specification and in conjunction with the accompanying drawings, in which:

FIG. 1 is a side view of a portion of a rail together with a sleeper block, attached to the same, and a cross-section through the adjacent portion of the concrete base with a recess;

FIG. 2 is a plan corresponding to the side view of FIG. 1;

FIGS. 3, 4, 5 and 6 illustrate different stages of the method according to the invention.

In FIGS. 1 and 2, the reference numeral **1** indicates the rail, **2** is a sleeper block, **3** a rail fastener of any type, by means of which the rail is attached to the sleeper block (the type of rail fastener being no feature of the present invention), **4** the concrete base, **5** the recess provided in said base, **6** the sand and **7** the concrete or other material which is moulded around the sleeper block for fixing the same to the concrete base. In the left-hand section of FIGS. 1 and 2, the recess is shown without the sand **6** and without the material **7**. The sleeper blocks **2** can be made of concrete, based on standard cement, but preferably they are made of concrete containing a plastic based on ejoxy resin or other synthetic resin. The blocks have relatively small dimensions, for instance a length of about 30 centimeters, a width of about 20 centimeters and a height of about 12 centimeters. The sand should be rather course. For the joint **7**, preferably concrete is used, for instance an electrically insulating concrete containing synthetic resin.

The method according to the invention will be best

understood from the following description with reference to FIGS. 3, 4, 5 and 6, in which 1*a* indicates a track portion already laid out, and 1*b* indicates a further rail which is to be laid down in connection with the foregoing rail.

Attached to the rail 1*b* is a series of sleeper blocks 2, and in the concrete base 1 a series of corresponding recesses 5 are moulded with a corresponding spacing. The rail 1*b* is advanced by means of two carriages 8, in which they are suspended by suitable means, such as hydraulic jacks 9. FIG. 3 illustrates how the rail 1*b* is advanced in the direction of the arrow A. The advancing is performed until the sleeper blocks 2 are directly above a respective recess 5. This position appears from FIG. 4, which also illustrates that the rail 1*b* has started its lowering movement in the direction of the arrow B. According to FIG. 5 the rail 1*b* has been lowered entirely so as to be aligned with the rail 1*a*. The position of the rail 1*b* is adjusted by means of temporary supports 10, which can be wedges, for example. Now, the recesses 5 are filled with coarse sand 6 which is packed approximately to the level of the undersides of the sleeper blocks 2, as shown in FIG. 6 (compare also FIG. 3). Then, concrete 7 is poured into the recesses around the sleeper blocks, as also appearing from FIG. 6 (compare FIG. 1). Finally, the temporary supports 10 are removed.

The method according to the invention does not only afford a good solution of the problem of providing for a simple adjustment of the exact final position of the rail as well as absorbing noises and shocks in connection with railroads on concrete bases, but has also the advantage that the concrete base need not be made with especially great exactness. Moreover, the sleeper blocks, which are comparatively small, can be manufactured in factories from a high class material at moderate price and with very great precision and strength.

In re-adjustment operations it is rather easy to remove the comparatively thin layer of concrete 7. Then the track is adjusted to the proper final position and is again fixed by pouring new concrete 7 around the sleeper blocks in the recesses. This system is of current interest especially in connection with the building of high level railroads on bridges of prestressed concrete, where after the shrinkage, ageing and creeping, a re-adjustment of the track is necessarily required. Also sinking or slanting in bearing constructions can be compensated for, to a certain extent, by utilization of the method according to the invention.

The invention is not limited to the embodiment described above, modifications being possible within the scope of the appendent claims.

I claim:

1. A method of laying railroad tracks on concrete bases while using separate sleeper blocks for each rail, and at first attaching such sleeper blocks to the rails by means of rail fasteners—one series of sleeper blocks under each rail—and then disposing each rail with the attached sleeper blocks in desired position on the concrete base, characterized by moulding the concrete base with recesses for the sleeper blocks of greater depth and width than corresponding to the sleeper blocks at desired position of the rail, adjusting the rail with the attached sleeper blocks to proper position with respect to the concrete base by means of temporary supports, placing and packing sand in the recesses under the sleeper blocks and around the same, and moulding material in the recesses around the sleeper blocks for closing the recesses and fixing the sleeper blocks to the concrete base, the

sand being enclosed in the recess so as to form a stabilized friction joint between the sleeper block and the concrete base.

2. A method of re-adjusting the position of a rail laid out according to the method claimed in claim 1, characterized by removing the moulded material, by means of which the sleeper blocks have been fixed to the concrete base, adjusting the position of the sleeper blocks in the recesses by placing new sand in the recesses or removing some of the sand already present, again packing the sand and again moulding material around the sleeper blocks for closing the recesses and fixing the sleeper blocks to the concrete base, also in this event the sand being enclosed in the recess so as to form a stabilized friction joint between the sleeper block and the concrete base.

3. A method of laying a railroad rail on a base comprising the steps of:

providing at least one upwardly opening recess in said base;

attaching at least one sleeper block to said rail;

positioning said rail and the block over the base with said rail disposed in substantially its final position and with said block disposed within the recess and in spaced relationship to the walls defining the recess; and thereafter,

emplacing a quantity of a particular supportive material within the recess and under and around the block while maintaining the rail in its final position.

4. A method as set forth in claim 3 wherein is included the step of sealing the recess with an initially fluid mouldable substance disposed around the block and over the material.

5. A method of laying a railroad rail comprising the steps of:

providing an elongated, concrete base having a plurality of recesses spaced therealong;

attaching a plurality of sleeper blocks to the rail, said blocks being spaced along the rail in respective positions corresponding to the positions of the recesses, each block being of a size to be received within its corresponding recess in spaced relationship to the walls defining the recess;

positioning the rail with the blocks thereon over the base in a predetermined position with the blocks disposed within their corresponding recesses and in spaced relationship to said walls; and

emplacing a quantity of particulate supportive material in each recess and under and around the block therein whereby the position of the rail is maintained irrespective of fluctuations in the dimensions of said base or of said recesses.

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ARTHUR L. LAPOINT, *Primary Examiner.*

R. A. BERTSCH, *Assistant Examiner.*

U.S. Cl. X.R.

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U.S. DEPARTMENT OF COMMERCE

PATENT OFFICE

Washington, D.C. 20231

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,442,222 May 6, 1969

Per-Erik Olson et al.

It is certified that error appears in the above identified patent and that said Letters Patent are hereby corrected as shown below:

In the heading to the printed specification, line 9, "May 6, 1966" should read -- May 4, 1966 --.

Signed and sealed this 8th day of December 1970.

(SEAL)
Attest:

Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents