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(54) Improved pan for railway line double-block sleepers

(57) The rubber Pan (6) has an asymmetry that varies the rigidities on the sides directly in proportion to the stresses applied by the concrete block (4) due to the wheel-rail interaction. The asymmetrical variation can be achieved by decreasing the number of interspaces (8) between the ridges (7).

The pan subject of the invention is applicable to double-block sleepers without a spacing bar in order to prevent pitching of the concrete block (4) and therefore gage widening of rails.

FIG. 2

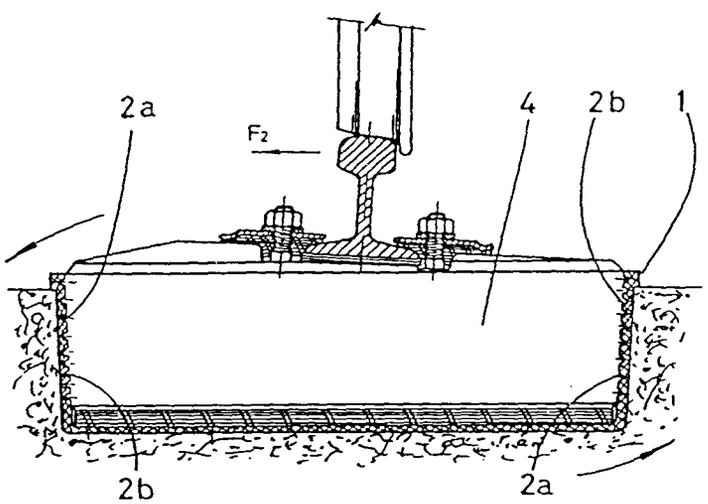

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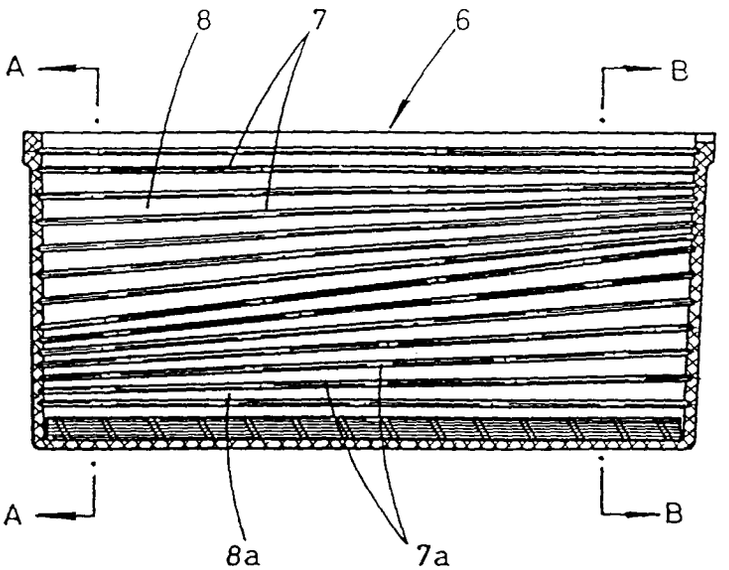
FIG. 3



Description

OBJECT

The present Patent application relates to an improved pan for railway line double-block sleepers which, in addition to the function for which it was designed, affords a number of advantages discussed hereinafter, and others that are inherent in its organisation and construction.

BACKGROUND OF THE INVENTION

The use of STEDEF type lines without ballast is known since the year 1963, based upon the principle of mounting a sleeper comprising two concrete blocks with a modified base in which a rubber pan is housed including symmetrical ridges on its sides, and having a foam mattress on the bottom end to prevent transmission of vibrations. This double-block sleeper is provided with a steel spacing bar which is primarily designed to maintain the gage upon mounting, and further to absorb the lateral stresses originating in the wheel-rail interaction.

The reason why such stresses need to be absorbed is to avoid gage widenings of the rails and thereby prevent derailment from occurring; the presence of the current spacing bar is, however, in practice a hindrance which makes it difficult for people to walk between the rails in the line, which circumstance poses a major problem when passengers must be evacuated due to a breakdown or otherwise, for they must walk between the rails and risk being injured by the spacing bars that form an integral part of current double-block sleepers.

The elimination of spacing bars in order to solve the foregoing problem is not currently possible, since a force acting sideways on the running rail, originating when the train is running, particularly at a bend, generates a turning torque that is transferred to the concrete block, compressing the rubber ridges on one side of the pan and decompressing the ridges on the opposite side of said pan, the very elastic nature of the ridges causing them to yield, which results in very dangerous gage widenings.

Now, therefore, no double-block sleeper without a spacing bar is known in the current state of the art which suitably reacts to the overturning torque derived from the lateral stresses caused by a train running upon the sleeper, which results in the gage widenings of the rails.

SUMMARY OF THE INVENTION

The proposer of the present patent application has devised improvements for rubber pans of the kind located at the modified base of a double-block sleeper, with which a wholly different performance is achieved with regard to the turning torque resulting from the lateral stresses referred to in the above section, whereby the spacing bar can be removed without risking derailment.

The improvements lie in configuring an asymmetrical pan with its side walls having a variable rigidity that lies in a greater rubber mass at areas that are placed under a greater compression due to the lateral stresses under a passing train.

Now, therefore, the asymmetrical pan subject of the present invention, has varying rigidities on its sides, directly in proportion to the stresses applied by the concrete block due to the wheel-rail interaction.

The improved pan, in accordance with the present Patent application, provides the advantages described above as well as others that will follow easily from the embodiment described hereinafter in detail for an easy understanding of the features set out above, concurrently giving a number of details and attaching to the present specification, to such end, some drawings showing a practical example of the object of the present invention that is meant to illustrate and not to limit its scope.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Figures 1 and 2 are embodiments of the current state of the art, and respectively illustrate the performance of a double-block sleeper with a spacing bar and the performance of the block of a sleeper of the same kind, albeit without a spacing bar, when a train is running thereon.

Figure 3 is a longitudinal section of an asymmetrical pan in accordance with the object of the invention.

Figures 4 and 5 show two cross sections along A-A and B-B, in accordance with the preceding figure.

Figures 6 and 7 are sections equivalent to the above of an asymmetrical pan in accordance with the invention, made in accordance with an alternative embodiment, which figures respectively illustrate the outer front and inner front of the pan.

DESCRIPTION OF AN EMBODIMENT OF THE INVENTION

With reference to the drawings, the pan subject of the invention is of the kind comprising a rubber part, generally designated -1-, as shown in figures 1 and 2, provided with symmetrical ridges -2- and having a foam mattress -3- located on the lower inner base, which pan is designed to be housed in the modified base of a sleeper comprising two concrete blocks -4- connected by means of a steel spacing bar -5- and which is designed to avoid the transmission of vibrations.

As noted hereinabove, the spacing bar -5- is designed to maintain the gage upon mounting and absorb the lateral stresses F_3 resulting from the wheel-rail interaction, to avoid gage widenings of the rails and prevent derailments. If the spacing bar -5- is removed, for the reasons aforesaid, and the sleeper is made as illustrated in figure 2, the force F_2, when acting upon the running rail, generates a turning torque that is trans-

ferred to the block -4-, compressing the rubber ridges -2a- and decompressing the ridges -2b- which, because of their very elastic nature, yield generating very dangerous gage widenings.

The invention lies particularly in improvements made in rubber pans of this kind, and is based upon varying the rigidities of the rubber side walls asymmetrically, as shown in figures 3 to 7, which illustrate the object of the invention.

In said figures, the pan subject of the invention is designated -6- to distinguish it from the conventional pan -1- aforesaid. This pan -6- is provided with an asymmetry on the structure of its sides. As shown in figures 3 to 5, the ridges designated -7- have less interspaces -8- and there is therefore a far greater resistance to expansion of the rubber due to compression, thereby lowering the chances of the block -4- pitching. The ridges designated -7a-, however, have a larger number of interspaces -8a-, for they are subjected to a discharge of lateral compression.

Figures 6 and 7 illustrate an alternative embodiment of the pan subject of the invention, in which the asymmetrical variation of the rigidities on the side walls is achieved through other means, such as by forming circular embossments -9- of large diameter at areas placed under a greater compression, and embossments -10- of lesser diameter on the surfaces subjected to a discharge of the side compression.

Claims

1. An improved pan for railway line double-block sleepers, being of the kind comprising a single rubber body, with ridges on the side walls and a foam mattress on the bottom end, designed to be housed in the modified base of a double-block sleeper without a spacing bar, essentially **characterised** by having an asymmetry on its sides, affecting the top and bottom area thereof, which provides varying rigidities in such areas, directly in proportion to the stresses applied by the concrete block due to the wheel-rail interaction, in order to avoid pitching thereof and gage widening of the rails.

2. An improved pan for railway line double-block sleepers, as in claim 1, **characterised** because the asymmetry of the sides is configured by the presence of ridges (7) provided with less interspaces (8) than the interspaces (8a) existing between the ridges (7a).

3. An improved pan for railway line double-block sleepers, as in claim 1, **characterised** because the asymmetry of the sides is configured by the presence of embossments (9) having a greater surface area than second embossments (10), between which interspaces of greater surface area are provided.

FIG.1

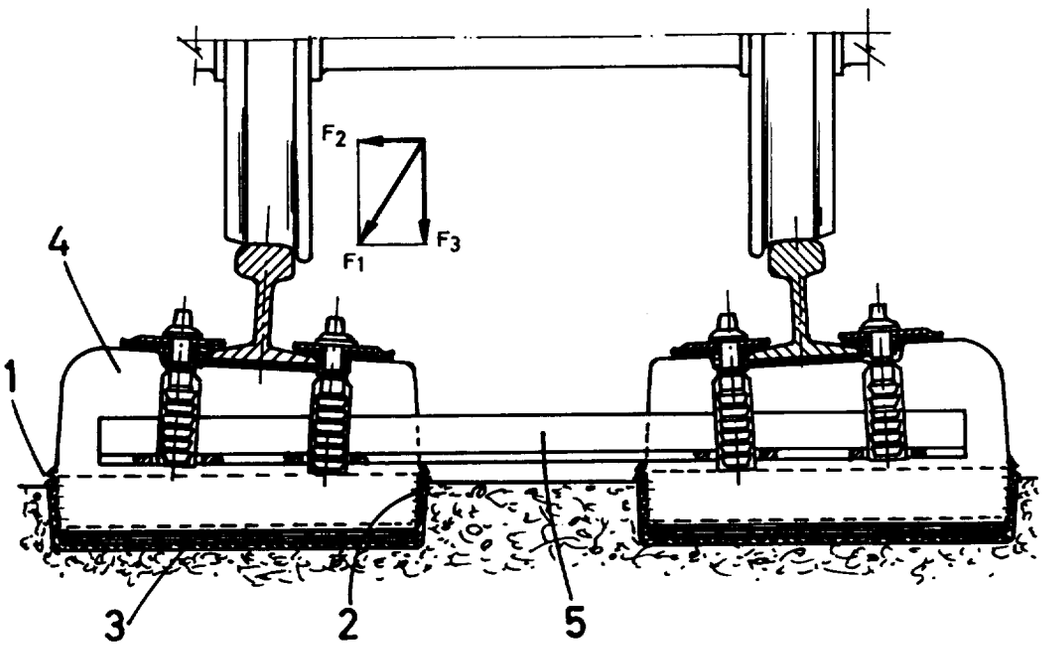


FIG. 2

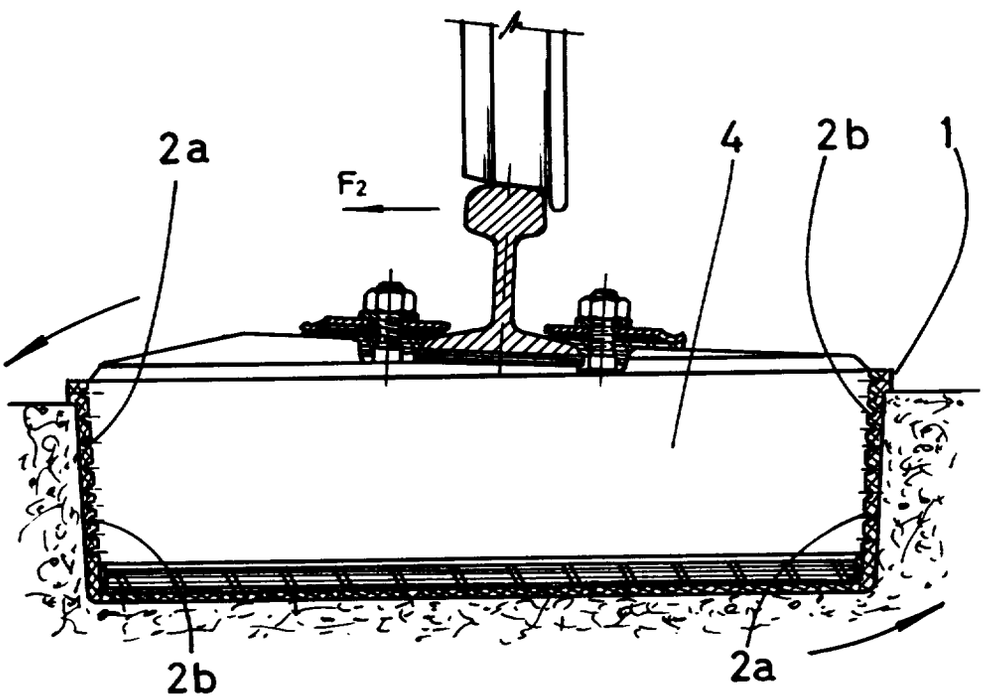


FIG. 3

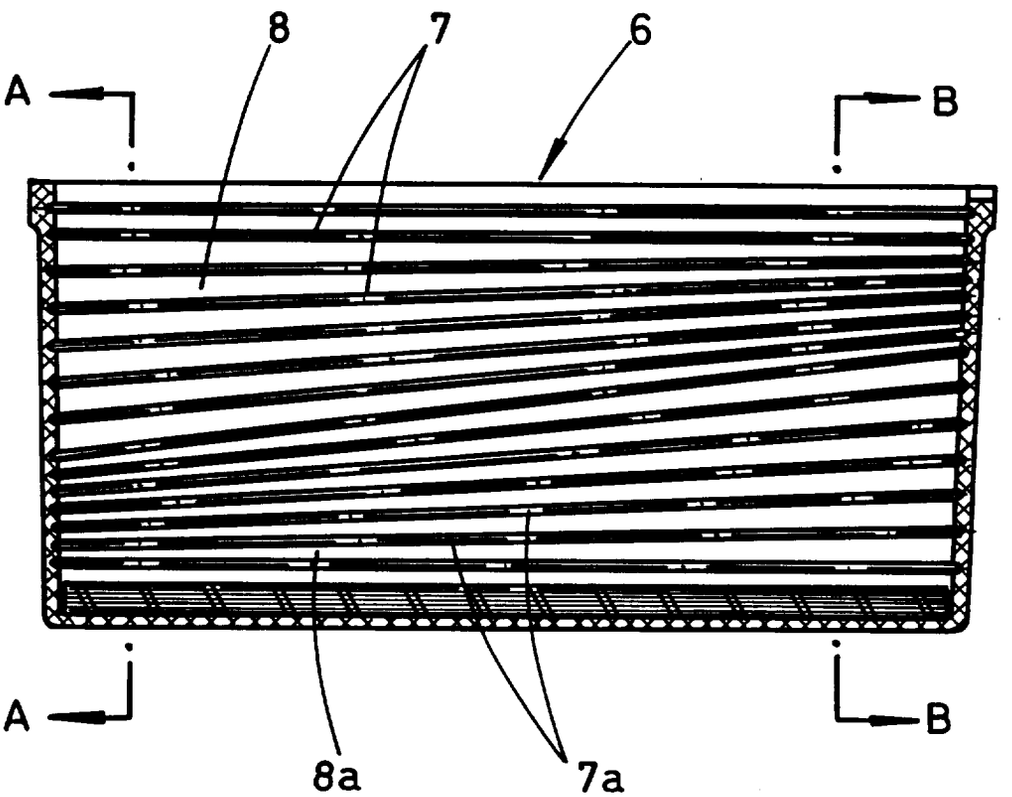


FIG. 4
SECTION A-A

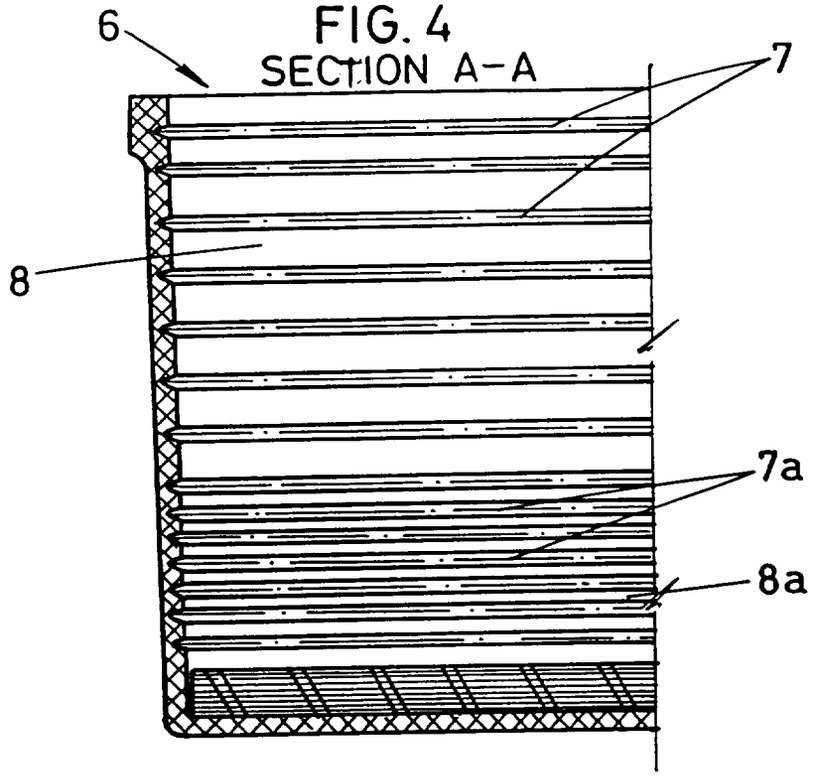


FIG. 5
SECTION B-B

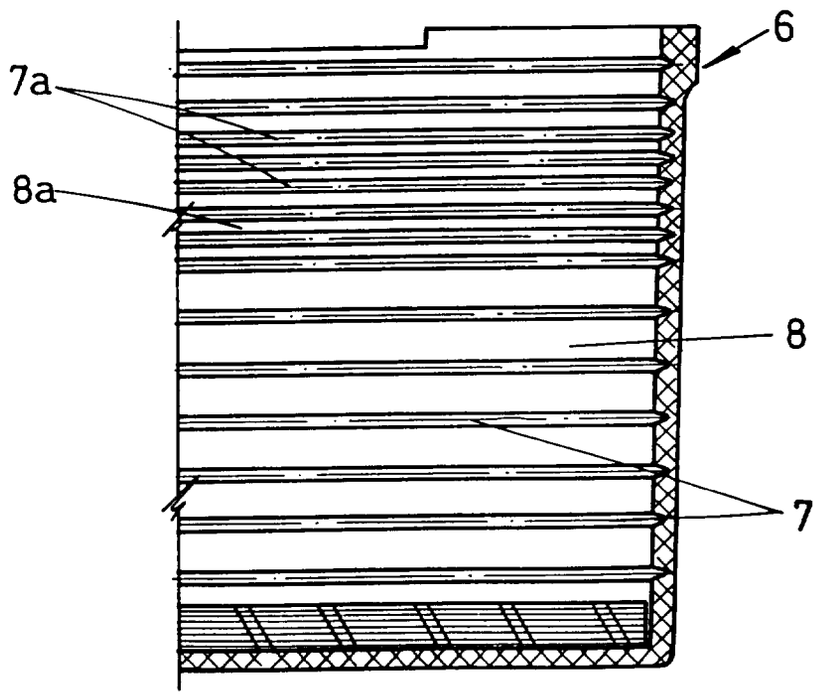


FIG. 6

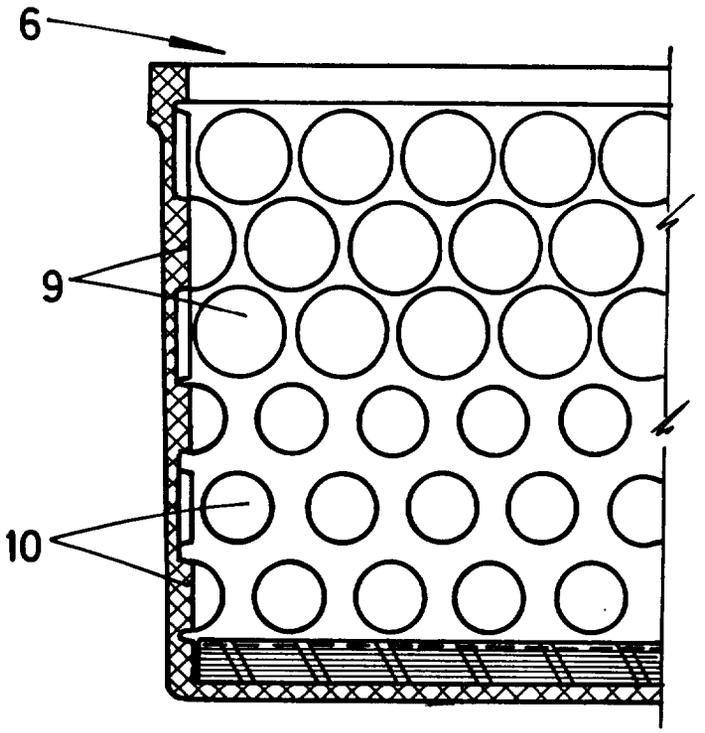


FIG. 7