**Title:** CONNECTING SEAL ASSEMBLY FOR RAILWAY CARRIAGES

**Abstract:** The object of this invention is to provide a connecting seal assembly for railway carriages. This connecting seal assembly consists of a first connecting seal (10), which is made of hard rubber and coupled to two railway carriages (2, 2'), and a pathway bottom for allowing trainmen and passengers to walk along the connecting seal assembly (1) when they move from a carriage to another carriage. A second connecting seal (20), made of soft rubber to have a bellows shape, is integrated with the edges of the first connecting seal (10) and connected at its ends to the facing ends of the two carriages (2, 2'). The connecting seal assembly has an integrated structure with a predetermined thickness, and is easily produced and installed on the carriages, in addition to effectively intercepting noises and preventing introduction of atmospheric air into the seal assembly.
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CONNECTING SEAL ASSEMBLY FOR RAILWAY CARRIAGES

Technical Field

The present invention relates, in general, to a connecting seal assembly for railway carriages, and more particularly to a connecting seal assembly for railway carriages which constitutes a connecting corridor positioned between two railway carriages and which is comprised of an integral rubber structure having a certain thickness or more to facilitate its manufacturing and installing processes.

Background Art

As well known to those skilled in the art, a railway train is comprised of a plurality of carriage parts and adapted to travel on rails. A connecting corridor positioned between the carriage parts is adapted to enable railway carriages to travel on curved rails without trouble, and is provided with a gangway allowing passengers and trainmen to pass therethrough. The connecting corridor comprises a bottom plate for allowing passengers and trainmen to walk therealong and to cross it, and a seal covering defining a tunnel space to allow passengers and trainmen to pass therethrough.

Such a known connecting corridor for railway carriages will now be described in detail.

A bottom plate constituting the connecting corridor is integrally joined to or separately manufactured and then connected to a mechanical structure connecting railway carriages. Moreover, since the bottom plate is mostly made of a rigid iron plate, the bottom plate may generate intensive metal frictional noise due to its vibration. Accordingly, such metal frictional noise generated from the bottom plates is transmitted to passenger rooms during opening and closing of doors of the rooms, thereby making passengers and trainmen uncomfortable and thus hindering a comfortable journey.

The covering, which is one of components constituting the connecting
corridor covers is comprised of a bellows-type shroud made from synthetic resin material and a bottom plate such that the covering and the bottom plate define a gangway therebetween, so as to shut out rain and snow. However, since the covering is manufactured separately from the bottom plate, it is not preferable in terms of manufacturing and installation cost. Furthermore, since the covering is very thin with a thickness of about 0.8 mm, it is impossible to consider insulation from noise.

Disclosure of the Invention

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a connecting seal assembly for railway carriages for allowing passengers and trainmen to pass therethrough, which is intended to constitute a connecting corridor and is comprised of an integral rubber structure having a thickness equal to or larger than a certain value to facilitate its manufacturing and installation.

In order to accomplish the above object, the present invention provides a connecting seal assembly for railway carriages, which defines a gangway allowing trainmen and passengers to pass therethrough, comprising: a first connecting seal coupled between the two railway carriages to serve as a bottom plate of the gangway allowing trainmen and passengers to walk therealong, and made of hard rubber material; and a second connecting seal integrally connected at its lateral ends to side edges of the first connecting seal and integrally connected at its longitudinal ends to the railway carriages, the second connecting seal being of a bellows type shape and made of soft rubber material.

Brief Description of the Drawings

The above and other objects, features and advantages of the present invention will be more clearly understood from the following detailed description
taken in conjunction with the accompanying drawings, in which:

Fig. 1 is a side elevation view of a connecting seal assembly for railway carriages according to the present invention, which is installed on railway carriages and is partly shown in cross section;

Fig. 2 is a left side view of the connecting seal assembly of Fig. 1, in which a left railway carriage in Fig. 1 is removed;

Fig. 3 is an enlarged cross-sectional view of oval portion “A” of Fig. 1;

Fig. 4 is a cross-sectional view taken along line B-B in Fig. 2; and

Fig. 5 is a cross-sectional view of another embodiment of the present invention.

Best Mode for Carrying Out the Invention

This invention will be described in further detail by way of example with reference to the accompanying drawings.

Fig. 1 is a side elevation view of a connecting seal assembly for railway carriages according to the present invention, which is installed on railway carriages and is partly shown in cross section, Fig. 2 is a left side view of the connecting seal assembly of Fig. 1, in which a left railway carriage in Fig. 1 is removed, Fig. 3 is an enlarged cross-sectional view of oval portion “A” of Fig. 1, and Fig. 4 is a cross-sectional view taken along line B-B in Fig. 2.

The connecting seal assembly 1 according to the present invention is installed between two railway carriages 2 and 2’. The railway carriages 2 and 2’ are connected to each other by means of a known connecting mechanism 4 such that the railway carriages 2 and 2’ can be rotated relative to each other.

The connecting seal assembly 1 comprises a first connecting seal 10 serving as a bottom plate of a gangway for allowing trainmen and passengers to walk therealong, and a second connecting seal 20 integrally formed to the first connecting seal 10 to define a gangway allowing trainmen and passengers to pass therethrough and to insulate the gangway from exterior noise.

The first and second connecting seals 10 and 20 are preferably made of
rubber material and are adapted to have a thickness of 8 mm or more so as to meet various requirements of the connecting seals. However, the first and second connecting seals 10 and 20 are not limited to these materials and thicknesses, and may be made of other materials and may have other thicknesses.

Furthermore, it is preferable that the connecting seal assembly 1 is internally provided with reinforcing material (not shown) to improve its rigidity and durability.

The first and second connecting seals 10 and 20 are described hereinafter in detail.

As shown in Fig. 4, the first connecting seal 10 is designed to have a mechanical flexural strength and durability sufficient to endure a certain weight in order to serve as a bottom plate enabling trainmen and passengers to walk thereon. To this end, it is preferable that the first connecting seal 10 is made of rigid material, or is laterally provided at its lower surface with a plurality of ribs 11 so as to increase its strength.

Opposite longitudinal ends of the first connecting seal 10 are preferably extended to lower surfaces of step boards 3 and 3' coupled to the railway carriages 2 and 2'. At this point, it is preferable that the remaining upper surface of the first connecting seal 10, excepting portions beneath the step boards 3 and 3', is adapted to flush with upper surfaces of the step boards 3 and 3' so as not to obstruct walking passengers. In other words, the upper surfaces of opposite ends of the first connecting seal 10 are preferably positioned to be lower than the remaining middle upper surface thereof, thereby obtaining lower stepped portions.

In addition, it is preferable that a clearance between the lower surface of each of the step boards 3 and 3' and the corresponding upper surface of the lower stepped portion of the first connecting seal 10 is set to be 5 mm or less without contact therebetiveen, in order to minimize transmission of noise and heat therethrough.

That is, although it is very efficient in terms of insulation of noise and heat when the lower surface of each of the step boards 3 and 3' and the corresponding upper surface of the lower stepped portion of the first connecting
seal 10 are in contact with each other, vibration of the railway carriages is directly transmitted to the first connecting seal 10 through the step boards 3 and 3', thereby causing the first connecting seal 10, which is more weak than the step boards 3 and 3', to be deformed or broken. Hence, the direct contact between the first connecting seal 10 and the step boards 3 and 3' is not desirable in terms of durability.

The first connecting seal 10 is further provided at its opposite ends with integral extensions 12, which are corrugated. The corrugated extensions 12 are joined at outer ends thereof to the railway carriages 2 and 2' by means of bolts 13 etc.. Alternatively, the corrugated extensions 12 may be joined to the railway carriages 2 and 2' via brackets 14. The connected portions, in which the corrugated extensions are jointed to the railway carriages 2 and 2', must be airtight.

The corrugated extensions 12 are manufactured to have elasticity, flexibility and retractility superior to other portions of the first connecting seal 10, so that the corrugated extension 12 can be deformed and restored during travelling on curved rails.

The second connecting seal 20 is integrally formed to the first connecting seal 10 to afford a safe gangway allowing trainmen and passengers to pass therethrough, and is adapted to have strength enough to carry the first connecting seal 10 on which weight of passing trainmen and passengers is loaded. The second connecting seal 20 is generally comprised of side plates upwardly extended from side edges of the first connecting seal 10 and a top plate integrally formed to the upper ends of the side plates and connecting the side plates.

The second connecting seal 20 is shaped into a bellow to be longitudinally stretched and retracted, thereby achieving a desired degree of elasticity, flexibility and retractility. Accordingly, the second connecting seal 20 can be deformed and restored according to linearity of rails while the railway carriages 2 and 2' travel on curved rails.

Moreover, the second connecting seal 20 is integrally provided at its longitudinal opposite ends with extensions 22. The extensions 22 are adapted to
have corrugated shapes and are coupled at ends thereof to the facing railway carriages 2 and 2' by means of bolts 23 etc. The corrugated extensions 22 may alternatively be coupled to the railway carriages 2 and 2' via brackets 24. The connected portions, in which the corrugated extensions 22 are coupled to the railway carriages 2 and 2', must be airtight.

Accordingly, thanks to the corrugated extensions 12 and 22 of the first and second connecting seals 10 and 20, the connecting seal assembly according to the present invention can afford perfect insulation from the outside.

The outwardly protruded ridge portions of the second connecting seal 20 are preferably engaged with the ribs 11 of the first connecting seal 20.

Fig. 5 is a cross-sectional view of another embodiment of the present invention, which corresponds to a left portion of Fig. 4.

It will be appreciated that this embodiment is substantially identical to the above embodiment, with only its step boards 3A being different from those of the above embodiment.

A first connecting seal 10A of the connecting seal assembly according to this embodiment is provided with internal reinforcing cords such as tire cords made of rayon, nylon, polyester and so on, which are embedded therein, and is integrally provided at its longitudinal opposite ends with extensions 12A, which have excellent elasticity, flexibility and retractility. The extensions 12A are shaped to have corrugations, and are coupled at their ends to ends of brackets 14A by means of bolts 13 etc. The corrugated extensions 12A are of course coupled to the brackets 14A to retain airtight connection therebetween.

Each of the brackets 14A is hingedly coupled at its middle portions to railway carriages by means of a pin 15 laterally fitted thereto, and is attached at its upper end with a step board 3A by means of bolts 14B.

The step boards 3A are preferably shaped to cover upper surfaces of the opposite ends of the first connecting seal 10A, and are preferably embossed at upper surfaces thereof to prevent slippage.

Although the step boards 3A may be made of iron material, it is more preferable that the step boards 3A are made of the same hard rubber material as
that of the first connecting seal 10A.

Functions of the above connecting seal assembly according to the present invention will now be described.

Since the connecting seal assembly 1 according to the present invention comprises a first connecting seal 10 serving as a bottom plate of a gangway for allowing trainmen and passengers to walk therealong, and a second connecting seal 20 integrally formed to the first connecting seal 10 to define a safe gangway allowing trainmen and passengers to pass therethrough, its manufacturing process is relatively simple and a process of installing the connecting seal assembly to railway carriages 2 and 2' is also simply and quickly fulfilled. In other words, the connecting seal assembly of the present invention can reduce manufacturing and installation costs by reduction of the number of processes required for manufacturing and installation, thereby having advantages from an economic standpoint. That is, an operation of installing the connecting seal assembly 1 to railway carriages 2 and 2' can be simply fulfilled because the connecting seal assembly 1 comprised of first and second connecting seal parts, which are integrally formed to each other, is directly coupled to railway carriages 2 and 2' by bolts etc..

Moreover, since the first and second connecting seals 10 and 20 are made of rubber material to have a thickness of 8 mm or more, their rigidity, thermal insulating efficiency and sound insulating efficiency are superior to a conventional one made of synthetic resin and having a relatively thin thickness of 0.8 mm.

In addition, since the first connecting seal 10 is not made of iron material, there is no noise due to friction between the first connecting seal 10 and the step boards 3 and 3' of the railway carriages 2 and 2', thereby affording comfortable and quiet passenger rooms. Of course, the first connecting seal 10 must have proper hardness and abrasion resistance to have a prolonged service life.

Furthermore, since the inside of the connecting seal assembly 1 is perfectly insulated from the outside of the assembly by the corrugated extensions 12 and 22 of the first and second connecting seals 10 and 20, it is possible to prevent introduction of external noise and air thereinto.
Although the connecting seal assembly 1 according to the present invention comprises a first connecting seal 10 serving as a bottom plate of a gangway for allowing trainmen and passengers to walk therealong, and a second connecting seal 20 integrally formed to the first connecting seal 10 to define a safe gangway allowing trainmen and passengers to pass therethrough, the connecting seal assembly 1 can be deformed and restored while maintaining airtight connection between railway carriages during travel on curved rails. The reason why the connecting seal assembly can maintain airtight connection is that the extensions 12 and 22 of the first and second connecting seals 10 and 20 are corrugated resulting in appropriate elasticity, flexibility and retractility.

Industrial Applicability

As described above, the present invention provides a connecting seal assembly comprising a first connecting seal serving as a bottom plate of a gangway for allowing trainmen and passengers to walk therealong, and a second connecting seal integrally formed to the first connecting seal to define a safe gangway allowing trainmen and passengers to pass therethrough. Therefore, its manufacturing and installing processes can be very simply fulfilled.

Furthermore, since the connecting seal assembly is made of relatively thick rubber material, the connecting seal assembly has excellent rigidity, thermal insulating efficiency and sound insulating efficiency.

In addition, since the connecting seal assembly according to the present invention is perfectly insulated from the outside of the assembly by the corrugated extensions of the first and second connecting seals, and does not have a noise source therein, it is possible to prevent introduction of external noise and air thereinto, thereby affording comfortable and quiet passenger rooms.
Claims

1. A connecting seal assembly for railway carriages, which defines a gangway allowing trainmen and passengers to pass therethrough, comprising:
   a first connecting seal coupled between the two railway carriages to serve as a bottom plate of the gangway allowing trainmen and passengers to walk therealong, and made of hard rubber material; and
   a second connecting seal integrally connected at its lateral ends to side edges of the first connecting seal and integrally connected at its longitudinal ends to the railway carriages, the second connecting seal being of a bellows type shape and made of soft rubber material.

2. The connecting seal assembly as set forth in claim 1, in which the first connecting seal is sealingly coupled to the railway carriages by means of flexible extended portions integrally formed to the first connecting seal, and the second connecting seal is sealingly coupled to the railway carriages by means of flexible extended portions integrally formed to the second connecting seal.

3. The connecting seal assembly as set forth in claim 1 or 2, in which the first connecting seal is extended at its longitudinal opposite ends such that the opposite ends are positioned under step boards of the railway carriages.

4. The connecting seal assembly as set forth in claim 1, in which each of the railway carriages is hingedly attached with a bracket by means of a pin laterally fitted thereto, and the bracket is connected at one end to the flexible extended portion integrally formed to the first connecting seal, and is connected at its other end to a step board, the step board being coupled to any one of the railway carriages and covering one end of the first connecting seal.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
   IPC7 B61D 17/20
   According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
   Minimum documentation searched (classification system followed by classification symbols)
   IPC7 B61D17/20, B61D17/22
   Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
   Korean Utility Models and applications for Utility Models since 1973
   Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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<td>KR 95-3938 Y1 (Jae-Kwan, CHOI) 18 May 1995 (18.05.95)</td>
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