Sept. 16, 1969 SOICHIRO SHIMIZU 3,466,987

EXPANSIBLE AND CONTRACTIBLE CONNECTING DEVICE FOR THE ROAD

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FIG. 1

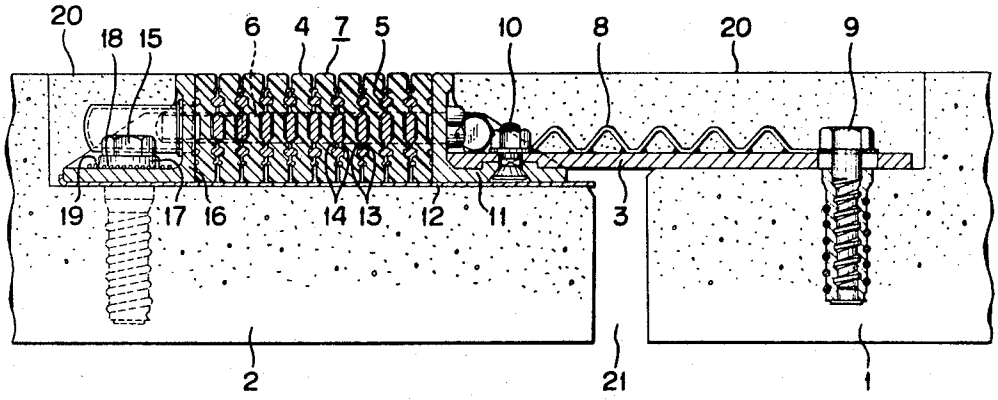


FIG. 2

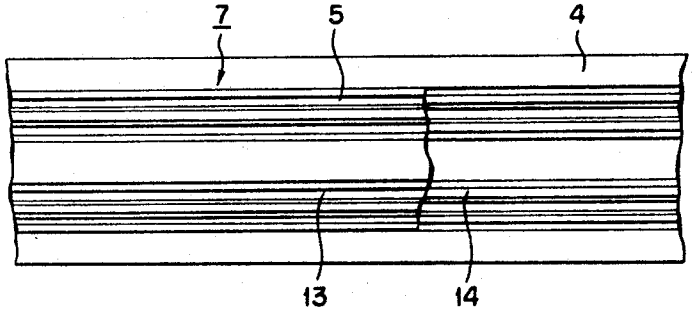
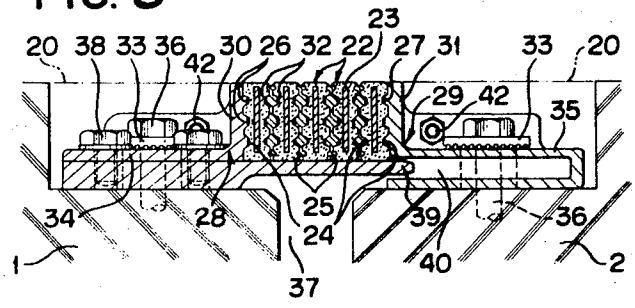


FIG. 3



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FIG. 4

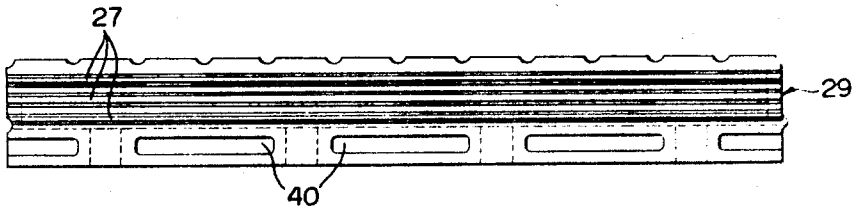
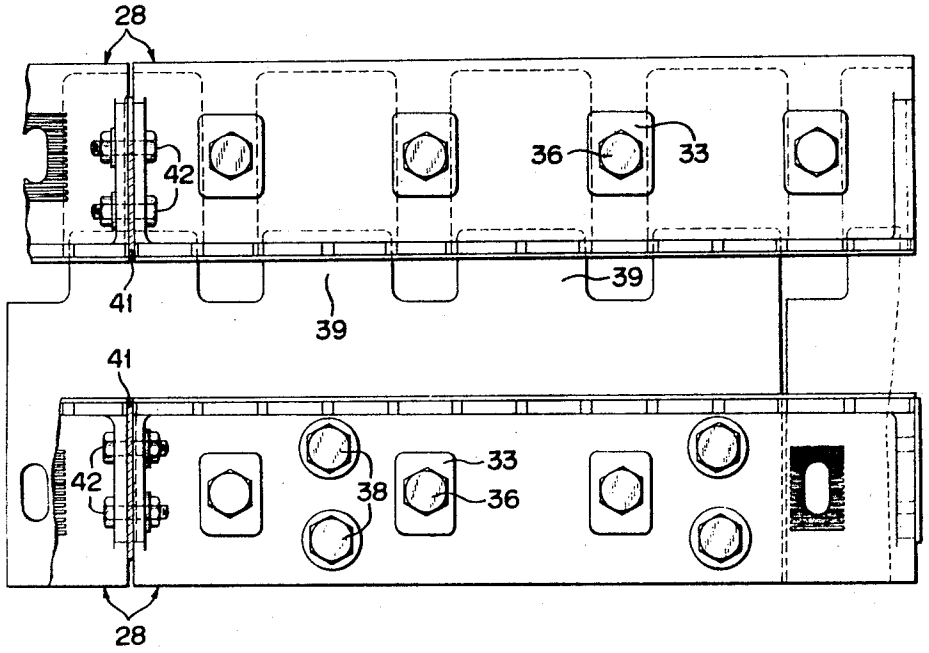


FIG. 5



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EXPANSIBLE AND CONTRACTIBLE CONNECTING DEVICE FOR THE ROAD

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U.S. Cl. 94—18 2 Claims

ABSTRACT OF THE DISCLOSURE

An expansion joint construction to bridge the gap between adjacent road blocks having elastic packing and stiffening frames.

This invention relates to a novel expansible and contractible connecting device for an overhead road.

This invention offers an expansible and contractible connecting device for the road, wherein a plate for covering the space of the expansion joint portion and for supporting the load spans between the end parts of the road blocks. One side portion of the plate is fixed to the road block on one side of the space and besides an expansion and contraction joint includes a plurality of band like rubber packings and stiffening plates are alternately built up in a lateral direction and at the same time the packings are pierced with a supporting bolt. The other side portion of the plate is put on the upper surface of the road block on the other side of the space. Thus, one portion of the said joint is in contact with one side of the said securing plate and the other side of the expansion joint is fixed to the road block.

Thus, instead of providing an expansion and contraction joint having bandlike elastic packings over the upper part of the space of the joint portion, it is possible to support the heavy load of wheels passing over the expansion and contraction joint because the band-like rubber packings are fitted flush with the upper surface of the road block. The fitting work is extremely simple as compared with the trying to fit the unexpansible joint that is merely interposed between the end faces of the road blocks securing plates are provided between the band-like packings adjoining each other, the car load can directly and firmly be supported by the securing plates. As the securing plate and the band-like rubber packing are mutually fixed at the dented and projected position, they are immobile relative to each other thus maintaining a flat upper load beaming surface extending over their full length.

Furthermore, this invention offers an expansible and contractible connecting device for the road, wherein plural elastic packings are arranged in a row and fixed in a compressed state between the vertical portions of supporting frames fitted to the end portions of opposed road blocks. The side face of the vertical portion securing plates and the elastic packing are dented in such a manner that they will not move each up and down. In addition one end portion of the plate supporting the lower face of each elastic packing is fixed to the road block of one side of the space and the extreme end portion is formed in the shape of the teeth of a comb. This toothed end is inserted within a slit also with the shape of the teeth of a comb provided on the lower portion of the supporting frame.

In this device, the elastic packing is fixed to the vertical portions of the supporting frames at the dented and projected positions without requiring any compress bolt for piercing the elastic packing and the vertical portion of the supporting frame. In case a compress bolt projects into the middle part of the dented step portion of the road block and the supporting frame, if the space between that bolt and the upper face of the pavement material is small, the pavement material is sometimes cracked by the car load. But in the case of this invention, as the bolt does not project into the middle part of the dented portion, any possible crack of the pavement material can be prevented since one end part of the plate supporting the elastic packing is fixed to the road block or one side and the other end part with the shape of the teeth of a comb is inserted within the teeth of a comb shaped slit in the supporting frame fixed to the road block of the other side. Thus movement by friction may freely be made and therefore the effect is obtained that both supporting frames can easily and securely be connected while at the same time preventing relative movement up and down.

Appended drawings show two embodiments of this invention.

FIG. 1 is a vertical section front view of the first embodiment,

FIG. 2 is a side view of the load supporting plate and the band-like rubber packing, showing a partial section, taken out of FIG. 1,

FIG. 3 is a vertical section side view of the second embodiment,

FIG. 4 is a front view of the supporting frame having the slit with the shape of the teeth of a comb, and

FIG. 5 is plan of the main part from which the elastic packing and the securing plate are taken off.

First, in FIG. 1 and FIG. 2, **1** and **2** indicate the opposed road blocks. There is also shown the connecting plate **3** for covering the space of the expansion and contraction joint portion and for supporting the load and spanning between the ends of these road blocks **1** and **2** one side of the said plate **3** is fixed to the road block **1** of one side. The expansion and contraction joint **7** includes plural band shaped rubber like elastic packings **4** and a plurality of alternating intermixed securing plates **5** made of hard materials built up in a lateral direction and affixed together at their dented and projected positions where they are pierced by the supporting bolt **6**. The plate **3** is placed on the upper face of the road block **2** on one side of the joint. The plate **3** on the other side of the said joint **7** is in contact with the road block **1**. The metal plate **3** is held secure by a corrugated anchor reinforcement **8**. In FIG. 1, **9** is a bolt affixing one side of the plate **3** to the road block **1**, **10** is a bolt for affixing the other side of the plate **3** to the frame **11** of the one side which comprises expansion and contraction joint **7**. **12** is a slide guide plate made of nylon or other hard synthetic resin or stainless steel affixed to the upper face of the step portion of the road block **2** at the lower part of the expansion and contraction joint **7** in order that the frame **11**, the elastic packing **4** and the securing plate **5** may smoothly move by friction and **13** is a groove provided on the side of the securing plate **5** and the rim **14** on the side of the elastic packing **4** fits into this groove **13**. **15** is a bolt for affixing the frame **16** which constitutes the other side portion of the expansion and contraction joint **7** to the road block **2**, and **17** is a toothed gauge block for adjusting and fixing the position of the frame **16** and the tooth **18** of the said gauge block **17** in engagement with the rack **19** provided on the horizontal portion of the frame **16**. **20** is a pavement material pounded on the upper part of the plate **3** and on the upper part of the step portion of the road blocks **1**, **2**, at the same height as that of the road surface and **21** is a space formed between the end faces of the road blocks **1**, **2**.

Next, in the second embodiment of FIGS. 3 to 5, **22** is a rubber-like packing make of elastic materials in

which a hard plate **23** such as a nylon plate or a metal plate or the like is inserted for stiffening, **24** is a groove provided on the both sides of the elastic packing **22** extending in a longitudinal direction. **25** is a securing plate made of hard materials such as nylon or metal interposed between the elastic packings **22**. **26** and **27** are the ribs provided within the vertical portions **30**, **31** of the supporting frames **28**, **29** and **32** is a rib provided on the both sides of the securing plate **25**. These ribs **26**, **27**, **32** are fitted within the groove **24** of the elastic packing **22** to prevent any upward movement of the packing. **33** is an adjustable clip having a tooth secured to the rack shaped tooth provided on the lateral portions **34**, **35** of the supporting frames **28**, **29**. **36** is a bolt by which the lateral portions **34** and **35** are affixed to the step portion of the road blocks **1**, **2**, and **39** is a metal plate for supporting the packing between the vertical portions **30** and **31**. The block **1** is affixed to the lateral portion **34** by the bolt **38**. The end portion of this plate **34** is formed in shape of the teeth of a comb and the teeth shaped portion **39** is inserted into the comb teeth shaped slit **40** provided at the lateral portion **35** opposed supporting frame. **41** (FIG. 4) is a rubber like elastic plate interposed between the end faces of the supporting frames adjacent to the said plate in a longitudinal direction. **42** is a bolt connecting those supporting frames and **20** is a pavement material of synthetic resin or mortar to fill in the void formed by the dented step portion of road block and the supporting frame.

While FIG. 3 shows the elastic packings were mutually affixed at their dented and projected portions by the securing plate but the elastic packings may also be affixed directly at the dented and projected portions without using the securing plate **25**.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. An expansion joint construction for a roadway comprising first and second separated road bases, a first angle frame member having a horizontal portion and a vertical portion extending upwardly therefrom, first securing means for securing said horizontal portion of said first angle frame member to said first base, a second angle frame member having a horizontal portion and a vertical portion extending upwardly therefrom opposite to the vertical portion of said first angle member, second securing means securing said second angle member horizontal portion to said second base, a plurality of alternately arranged and interengaged resilient packing members and securing plates held between the vertical portions of said first and second angle members, a plurality of ribs in said first and second angle members, a plurality of ribs in said securing plates and upwardly extending vertical portions of said first and said second angle frame members, a plurality of grooves in said resilient members engaging said ribs to hold said securing plates and said resilient members in a fixed position with respect to the upwardly extending vertical portions of said first and said second angle frame members, said first securing means including means to position at least one of said angle frame members in a predetermined lateral position on said first road base, the opposite end faces of said road bases being cut away to expose slab portions and vertical walls, and a slide plate on the exposed slab portion of said first road base, said first and said second angle frame members supported on said slide plate, said second securing means including a converting plate to anchor the other of said angle frame members to said second road base, the elastic packing being compressed between said angle frame members.

2. An expansion joint construction as defined in claim **1**, wherein the vertical portions of said first and said second angle frame members terminate at the upper surface level of said road bases, said cut away portion of said road bases being filled with concrete between the vertical portions of said angle frame members and the vertical walls of the cut away portions.

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U.S. Cl. X.R.

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