



PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Bridge Bearing

We, SILENT CHANNEL PRODUCTS LIMITED, a British Company, of Ferrars Road, Huntingdon, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to bridge bearings, and more particularly to bridge bearings made up of laminated rubber and metal.

The purpose of a bridge bearing is to prevent forces being transmitted between a bridge beam and its piers or abutments due to slight longitudinal movements of the bridge caused, for example, by expansion. A laminated bridge bearing has its upper lamination fixed to the bridge and its lower lamination fixed to the pier or abutment and flexes under the shear stresses imposed by movement of the bridge, the forces involved being ascertainable and relatively small.

An object of the invention is to facilitate the manufacture of bridge bearings and with this object in view the invention provides a bridge bearing made up of a plurality of elements each comprising a metal plate and a layer of rubber, at least one of such elements having the layer of rubber sandwiched between two metal plates, the elements being stacked with adjacent metal plates of contiguous elements mechanically keyed together.

One embodiment of the invention and certain variants thereof will now be described by way of example with reference to the accompanying drawings, in which:—

Figure 1 is an exploded sectional view of a bridge bearing according to the invention,

Figure 2 is a view similar to Figure 1 but showing the bearing assembled in final position,

Figure 3 is a sectional view showing upper and lower elements of the Figure 1 bearing and one intermediate element, the section being taken on the line III—III in Figure 4;

Figure 4 is a plan view of one of the elements shown in Figure 3;

Figure 5 is a further sectional view showing the elements of Figure 3 in assembled condition, and

Figures 6 and 7 are partial sectional views showing variant forms of bearing element.

Referring to the drawings the bearing of Figures 1 to 4 is made up of upper and lower elements 1, 2 and two intermediate elements 3. Upper and lower elements 1, 2 consist of a flat steel plate 4 having a layer 5 of rubber vulcanized thereto on one face, the rubber layer overlapping the plate. The intermediate elements 3 each consist of a pair of flat steel plates 6 having an overlapping rubber layer 7 sandwiched between and vulcanized to them. The elements 1, 2, 3 are stacked in alignment with their steel plates 4, 6 in contact. The elements 1, 2, 3 have each a pair of larger holes 8 which are aligned in the stack; the holes in the steel plates 4, 6 are larger than those in the rubber 5, 7 so as to receive keying rings 9. Each steel plate 4, 6 is formed with six smaller holes 10 (Figure 3) which are aligned in the stack to receive keying discs 11. In assembled condition of the bearing each pair of adjacent metal plates 4, 6 is keyed by two rings 9 and six discs 11 which resist the shear stresses which may act between the plates in service. It will be noted that all the plates 4, 6 are identical. It will be understood that the number of larger and smaller holes may vary according to the size (in plan) of the bearing.

The various elements 1, 2, 3 of the bridge bearing are preferably bonded by adhesive. A main reason for this is to provide a single unit which is convenient to transport. The adhesive helps to resist the shear stresses between the elements but is not absolutely necessary for this.

As shown in Figures 1 and 2, the bearing is placed between a beam, shown at B, and

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5 a pier, shown at P. Dowels D rigid with the beam and pier respectively locate in the holes 8 and penetrate into the upper and lower keying rings 9; the upper and lower pairs of adjacent steel plates 4, 6 and 6, 4 are thus held rigid with the beam B and pier P respectively, while longitudinal and rotational movements of the bridge are absorbed by flexure of the rubber layers 7 of the intermediate elements 3.

10 As shown in Figure 5, a bearing may comprise a single intermediate element 3: here there is only one rubber layer 7 to absorb the movement of the bridge. However, in many instances more than two intermediate elements may be needed, and it will be understood that the invention contemplates that as many such elements as are required for a given application may be assembled in the stack. One advantage of the invention is that only a limited number of easily manufactured different elements are required to provide a range of bridge bearings capable of use in a wide variety of different applications.

25 The bearing described with reference to Figures 1 to 4 can be varied in different ways. For example, keying methods may vary according to the requirements of shear stress transmission. In some instances either the rings 9 or the discs 11 can be dispensed with.

30 It may be preferred to dispense with both discs and rings and key the metal plates together by deforming them, as illustrated in Figure 6.

35 Figure 7 shows, somewhat enlarged, a pair of mating grooves 20 formed in adjacent surfaces of the rubber layers where they are in contact beyond the steel plates. In assembly of the elements adhesive runs into the grooves and forms a locating head which helps to key the elements together. The thickness of the metal plates and rubber may be varied to suit specific requirements.

40 **WHAT WE CLAIM IS:—**

45 1. A bridge bearing made up of a plurality of elements each comprising a metal plate and a layer of rubber, at least one of such elements having the layer of rubber sandwiched between

two metal plates, the elements being stacked with adjacent metal plates of contiguous elements mechanically keyed together.

2. A bridge bearing as claimed in claim 1, wherein the layer of rubber overlaps the or each metal plate and is recessed to receive such plate or plates.

3. A bridge bearing as claimed in claim 1 or claim 2, wherein the elements are keyed together by discs each received in aligned holes in the adjacent metal plates.

4. A bridge bearing as claimed in any of claims 1 to 3, wherein the elements are keyed together by rings each received in aligned holes in the adjacent plates.

5. A bridge bearing as claimed in claim 1 or claim 2, wherein the elements are keyed together by deformation of adjacent metal plates.

6. A bridge bearing as claimed in any of the preceding claims, wherein at least the top and bottom elements of the stack have holes to receive pegs on the bridge beam and the pier or abutment, the pegs in operation holding top and bottom elements against lateral movement.

7. A bridge bearing as claimed in claim 6, wherein the top and bottom elements of the stack each have a metal plate at the inner side only thereof.

8. A bridge bearing as claimed in claim 7 as dependent on claim 4, wherein the rings are located coaxially with the peg-receiving holes so that in operation the pegs extend into and locate the rings which key the metal plate of the top or bottom element to the next adjacent element.

9. The bridge bearing herein described with reference to Figures 1 to 4 of the accompanying drawings, or as described with reference to such figures as modified by Figure 5, Figure 6 or Figure 7.

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vantage of the invention is that only a limited
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of mating grooves 20 formed in adjacent sur-
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WHAT WE CLAIM IS:—

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of elements each comprising a metal plate and
a layer of rubber, at least one of such elements
having the layer of rubber sandwiched between

two metal plates, the elements being stacked
with adjacent metal plates of contiguous ele- 50
ments mechanically keyed together.

2. A bridge bearing as claimed in claim 1,
wherein the layer of rubber overlaps the or
each metal plate and is recessed to receive such
plate or plates. 55

3. A bridge bearing as claimed in claim 1
or claim 2, wherein the elements are keyed
together by discs each received in aligned holes
in the adjacent metal plates.

4. A bridge bearing as claimed in any of
claims 1 to 3, wherein the elements are keyed
together by rings each received in aligned holes
in the adjacent plates. 60

5. A bridge bearing as claimed in claim 1
or claim 2, wherein the elements are keyed
together by deformation of adjacent metal
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6. A bridge bearing as claimed in any of
the preceding claims, wherein at least the top
and bottom elements of the stack have holes
to receive pegs on the bridge beam and the
pier or abutment, the pegs in operation holding
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7. A bridge bearing as claimed in claim 6, 75
wherein the top and bottom elements of the
stack each have a metal plate at the inner
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8. A bridge bearing as claimed in claim 7
as dependent on claim 4, wherein the rings
are located coaxially with the peg-receiving
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