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A. J. FITZGERALD

2,682,326

PREFABRICATED GRILL STRUCTURE

Filed June 13, 1950

2 Sheets-Sheet 1

Fig. 1.

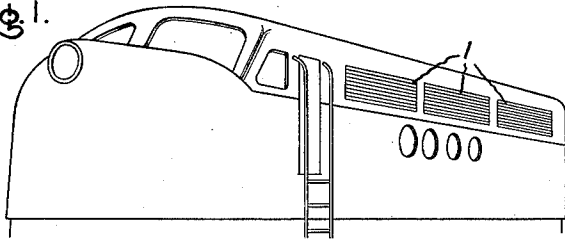


Fig. 2.

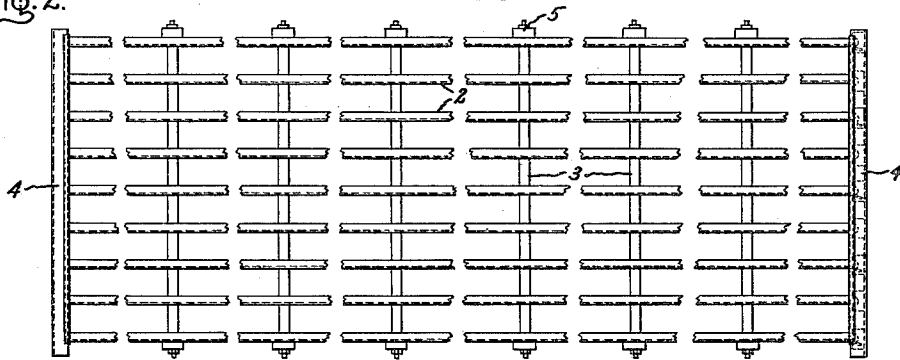
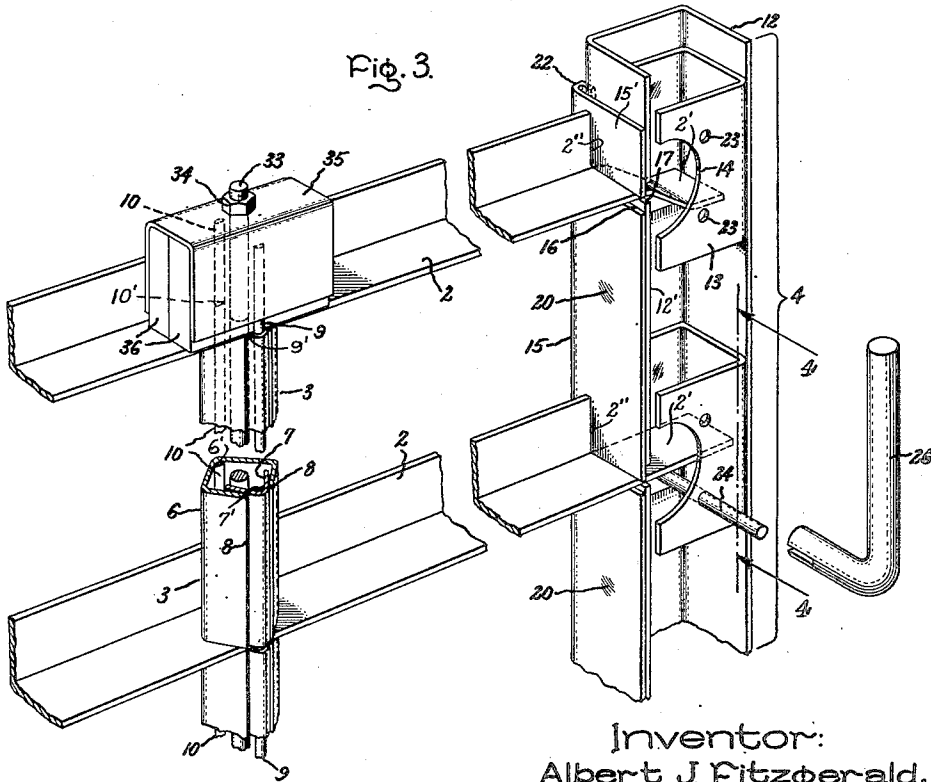


Fig. 3.



Inventor:  
Albert J. Fitzgerald,  
by *Mertow & Mann*  
His Attorney.

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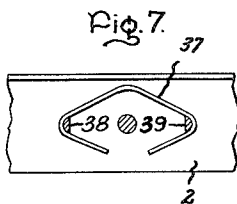
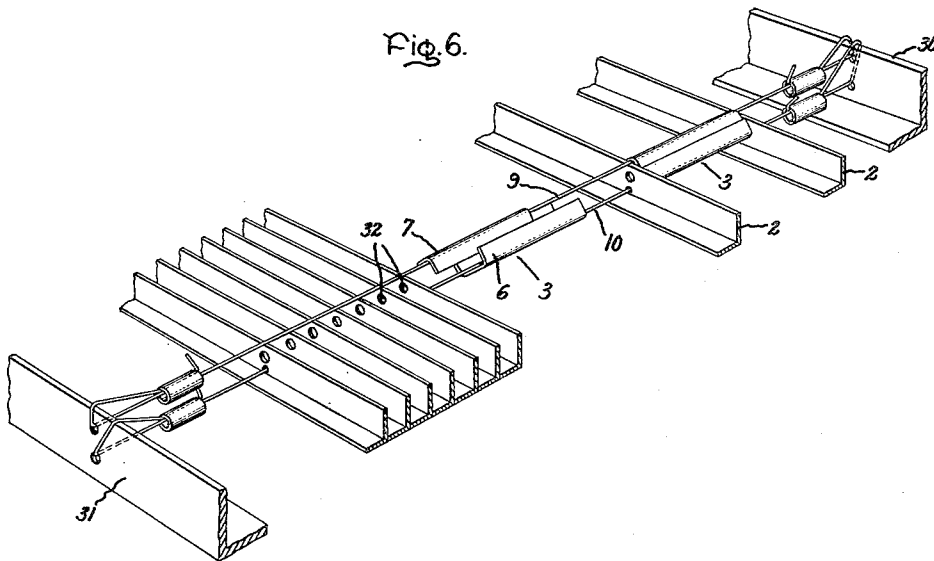
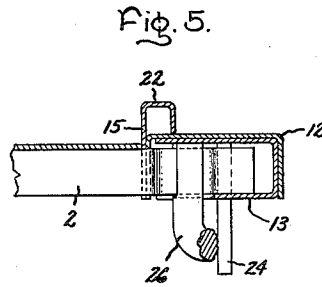
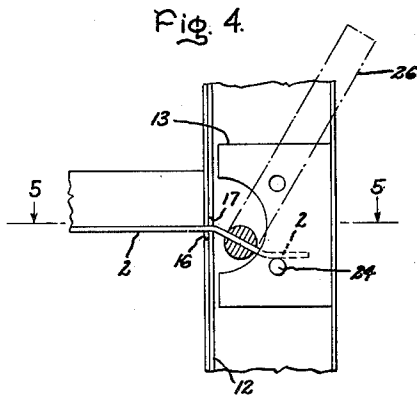
A. J. FITZGERALD

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PREFABRICATED GRILL STRUCTURE

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Inventor:  
Albert J. Fitzgerald  
by *Merlon D. Morse*  
His Attorney.

# UNITED STATES PATENT OFFICE

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## PREFABRICATED GRILL STRUCTURE

Albert J. Fitzgerald, Syracuse, N. Y., assignor to  
General Electric Company, a corporation of  
New York

Application June 13, 1950, Serial No. 167,816

7 Claims. (Cl. 189-82)

1

My invention relates to prefabricated structures. It has to do with certain improvements in prefabricated structures of the type described and claimed in my co-pending application Serial No. 702,823, filed October 11, 1946, now Patent No. 2,639,012, patented May 19, 1953, entitled Structural Member which is assigned to the assignee of my present application.

In the prefabrication of structures, such as grills for use in the side walls of enclosed structures such as locomotives, and other vehicles and buildings, one of the problems presented is to produce desired appearance with minimum weight and cost of materials and with assurance against noise and rattles generated in the structure due to any vibrational stresses that the prefabricated structure may be subject to. At the same time the structure must possess the strength and rigidity required in the area in which it is to be used.

In my above referred to application are disclosed certain forms of such structures which have served satisfactorily in many locomotives.

An object of my present application is to provide certain improvements therein whereby certain advantages are obtained as to appearance, cost of materials and assembly, and assurance against generation of undesired noise due to vibration.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims. My invention itself, however, together with further objects and advantages thereof, may best be understood with reference to the following description taken in connection with the accompanying drawings in which Fig. 1 is a perspective view of one type of railroad locomotive in which a grille structure embodying the present invention may be utilized; Fig. 2 is a plan view of a grille work constructed in accordance with the invention; Fig. 3 is a perspective view, drawn to an enlarged scale, of portions of the structure shown in Fig. 2; Fig. 4 is a cross-sectional view taken along line 4-4 of Fig. 3, but illustrating a different stage of assembly for certain of the elements of Fig. 3; Fig. 5 is a cross-sectional view taken along line 5-5 of Fig. 4; Fig. 6 illustrates one method which may be employed to assemble a grille embodying the invention; and Fig. 7 is a cross-sectional view of a modification of the grille shown in Fig. 3.

Fig. 1 represents a locomotive in which a grill, constructed in accordance with my invention is utilized at the areas 1. These areas may be open to permit ventilation through the grill, or they may be closed, the grill being used, in that

2

case, solely to improve the appearance of the locomotive.

Fig. 2 represents a grill utilizing my present invention. It comprises a plurality of longitudinal members 2 which may be of L or other suitable shape, spacer devices 3 between the longitudinal members, end assemblies 4, and transverse members, presently to be more fully indicated, which project through the spacer devices 3 and terminate at units 5.

Fig. 3 shows in greater detail the structure of Fig. 2. The longitudinal members 2, which preferably are of stainless steel, are shown as of L form. These longitudinal members are held in fixed, coextensive relation with respect to each other by spacer devices 3 each of which comprises two preformed members 6 and 7 preferably of resilient sheet metal, such as stainless steel. The member 7 is of V shape and the member 6 is similarly of V shape, with the extremities or extensions 8 of the V bent inward to embrace the member 7 within the member 6. Transverse members 9 and 10, which may be wires of the character utilized in the invention of my former application, extend transversely of the longitudinal members 2 and within the spacer devices 3. The inner apex 6' of member 6 engages the transverse member 10 and the inner apex 7' of member 7 engages the transverse member 9.

In the form of the invention illustrated the transverse member 10 extends through apertures 10' in the longitudinal members 2 whereas the transverse member 9 extends past and bears on the edge 9' of each longitudinal member 2. The distance between these transverse members 9 and 10 thus is fixed in a plane intercepting the points of engagement defined by edge 9' and opening 10'. The legs 8 of member 6 are resiliently biased toward one another and engage the non-parallel sections of the outer surface of V-shaped member 7. This provides a cam-type action which biases members 6 and 7 in direction transverse to the bias of legs 8, and the inner apices 6' and 7' of the spacer members 6 and 7 are biased in engagement with transverse wires 9 and 10. The spacing between inner apices 6' and 7' of the spacer members, in the sections thereof intermediate longitudinal members 2, is smaller than the aforementioned distance plus the thickness of wires 9 and 10. As a result, the spacer members cause flexing of the transverse members so that the transverse members are held firmly against the longitudinal members 2 at the points of contact thereby to prevent vibration of the longitudinal members. That is, since the spacing between the points of

engagement of the transverse wires 9 and 10 with the longitudinal members 2 is different from any arithmetic combination of the spacing of inner apices 6' and 7' and the thickness of wires 9 and 10, the spacer devices tend to draw the members 9 and 10 together against the members 2, thereby stressing the arms of the V-shaped members 6 and 7. This holds the transverse members against the members 2 at the points of contact and prevents any vibration at those points.

It will be seen from the righthand portion of Fig. 3 that the horizontal portion 2' of each of the longitudinal members 2 extends at the ends thereof into the end assembly 4 and the vertical portions 2'' abut against the outer wall 15' of the end assembly.

These end assemblies comprise a channel member 12 having within them, and spot welded thereto, sheet metal brackets 13 with semi-circular cut-away portions at 14, there being one bracket for each longitudinal member 2. These parts also preferably are of stainless steel. These end assemblies 4 also comprise an additional stainless steel member 15 arranged in adjacent broadside relation with the near side wall 12' of the channel member 12. Horizontal portion of each longitudinal member 2 extends through a slot 16 in the member 15 and through a slot 17 in the member 12.

To reduce cost in the materials used, it is desired that the members 2 be as thin as possible. Since these members must project through the side wall of the end assembly, the slots 16 and 17 are required and these slots should be as small as is practical. However, to cut slots of a dimension of the thickness of the thin longitudinal members 2 is difficult and expensive resulting in breakage of dies and tools and high cost in labor. Therefore it is preferred to cut slots of larger dimensions but to use two slots one in the additional member 15 as indicated at 16 and the other in the side wall of the channel member 12 itself as indicated at 17. These slots are displaced with respect to each other as shown thereby to produce a resultant slot having a dimension equal to the thickness of the member 2. In this way a narrow slot is obtained without the use of dies, or punches, of the small dimension of the members 2.

The member 15 may be spot welded as indicated at 20 to the side wall of the channel member 12. Its back edge as shown in Fig. 3, which is at the front of the grill, may be crimped over as shown at 22 for improved appearance.

The bracket 13 is provided with apertures 23 spaced at a suitable distance from slot 17 and at either side thereof. In the assembly of the apparatus a rod such as is shown at 24 may be inserted through one of these apertures and a wrench such as is indicated at 26 may then be applied to the end of the member 2 within the channel member to bend the end of the member 2 within the channel member downward against the rod 24, thereby to produce a double bend as illustrated by the upper member 2 in Fig. 3, one bend being at the slot 17 and the other being near the member 24. After this bend has been produced the member 24 may be removed and the bend adjacent the slot 17 prevents any withdrawal of the end member or any vibration between the end assembly and the longitudinal members 2.

How this bend is produced is better illustrated in Fig. 4 where corresponding reference numerals are applied to corresponding parts. It will be

seen that the wrench 26 is applied to the member 2 between the slot 17 and the member 24. The engagement of the member 2 with the member 24, and the resultant strain in the member 2 producing a bend directly against the slot 17 thereby holding the member 2 in stress against the channel member 12 in the slot 17.

This is further illustrated in Fig. 5 which shows the wrench 26 in engagement with member 2 within the channel 12. This figure is a section on the line 5-5 of Fig. 4 and better illustrates the bracket 13.

The operation of the member 24 may better be understood when it is considered that during the first part of the turn of the wrench 26, only one bend is produced that being near the wall of the channel member. Such a bend does not produce adequate stresses against the slot. However, as soon as the member 2 engages the surface of pin 24 a stress is set up in member 2 tending to cause a bend between the wrench and the pin. Resistance of the member 2 to bending at this point additionally stresses member 2 between the wrench and the side wall of the channel. This stress produces additional bending in member 2 directly against the side wall of the slot. This additional bend having been produced the pin 24 and wrench 26 may be removed and the member 2 remains stressed against the slot and thus prevents any generation of noise due to vibration between the parts at that point.

A further important advantage of having the end of member 2 within bracket 13 project substantially parallel to its original direction resides in the additional resistance to any tendency of the end assembly to rotate out of place. It will be observed that if the end of member 2 were bent directly against the inner side wall of the channel there would be little resistance to such rotation, but with member 2 projecting well across the channel in engagement at both edges with the bracket any rotation of the end assembly is prevented.

Fig. 6 illustrates the manner of assembly of the grill in accord with my invention. Members 30 and 31 are rigid fixed side-rails of the machine employed. Transverse members 9 and 10 of Fig. 3 are shown tightly stretched between these side-rails 30 and 31, the transverse members 10 extending through apertures in the longitudinal members 2 and the transverse member 9 extending adjacent the upper edge thereof. These longitudinal members are supported on suitable bed rails, not shown, extending between the side rails 30 and 31.

In the assembly of the grill the operator first positions the upper longitudinal member 2 against suitably positioned stops, not shown. He then inserts the spacer device 3, drives it home against the member 2 with a suitable hammer, brings into place the next longitudinal member 2, drives it home against the first spacer device, and then positions the next spacer device 3 in the same way, and so on until all longitudinal members are in proper position.

The spacer members 3 are fitted together as illustrated in the central portion of Fig. 6. Two adjacent longitudinal members 2 may be positioned on the machine apart by a distance in excess of twice the length of the spacer device, or twice the distance of the normal space between the longitudinal members in the grill. The member 6 is then brought into engagement with the transverse member 10 and member 7 is brought into engagement with transverse

5

member 9, the two members 6 and 7 being end to end. The transverse members 9 and 10 are then pressed together to allow the member 7 to be inserted into the end of member 6. The two members are then driven home against the upper member 2 and the next member 2 is brought against the opposite ends thereof.

After the longitudinal members have been assembled, the transverse members 9 and 10 may be cut at a distance of an inch or an inch and a half beyond the outer longitudinal members. A transverse tie rod may then be inserted through apertures 32 in the different longitudinal members between the transverse members. This rod is shown at 33 in Fig. 3. This rod may be provided with suitable holding means such as a thread and nut 34 at the ends thereof to place it under tension. In order firmly to hold the outer members 2 and to bind the ends of the transverse members 9 and 10 the channel sections 35 are provided one for each rod. These channel sections embrace within them a block, or a pair of blocks 36, of suitable material, such as wood, which bear against the outer surfaces of the outer member 2. The members 9 and 10 are received in suitable grooves in these blocks and are held in such grooves by the adjacent side-walls of the channel member 35. By tightening the nut 34 the channel member causes the block to bear against the outer surface of the outer member 2 placing the rod under a certain amount of tension.

The intermediate longitudinal members are adequately held in place by stresses between the transverse members 9 and 10 and the members 6 and 7 of the spacer devices 3 but it is desirable that these additional holding means comprising the tie rods 33, channel sections 35 and blocks 36 be provided principally to secure the outer of the longitudinal members against vibration.

When these longitudinal members have thus been secured in their parallel relation the end assembly 4, the parts of which have previously been assembled and spot welded together, may be applied to the ends of the longitudinal members. This is done by bringing the open face of the channel member 12 against the ends of the members 2 so that the ends of the members 2 enter the semi-circular cut-away openings 14. The members 2 are then inserted edgewise into the slots in the sidewall of the channel member and the channel member brought by a rotating motion into place as shown in Fig. 3. The near surface of brackets 13 hold the members 2 in the channel and prevents edgewise movement out of the slots.

The member 24 may then be inserted and the wrench 26 applied as has been previously explained to produce the double bend in the end of the members 2 to hold the end assembly in place.

It has been found in the assembly of large numbers of such grills that it is adequate if only alternate members 2 are bent by use of the wrench 26 in the member 24. No welding of the end assemblies to members 2 is required.

In Fig. 7 I have shown a modification in which the transverse members 9 and 10 are replaced by transverse members 38 and 39 both of which project through apertures in the members 2 along the center line of member 2. The spacer member may comprise a member 37 having the general shape of the member 6 in the spacer device of Fig. 3. This member 37 is of such dimensions that it stresses the transverse members 38 and

6

39 causing them to bear against the apertures in the members 2 and thereby securely holding the members 2 against vibration.

While I have shown certain specific embodiments of my invention, it will, of course, be understood that different modifications may be made and I intend by the appended claims to cover all such modifications as come within the true spirit and scope of my invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. The combination, in a prefabricated grill structure, of a plurality of longitudinal members, a pair of holding members extending transversely of said longitudinal members, spacer devices between said longitudinal members, said spacer devices comprising a pair of cooperating portions, one of said portions including non-parallel diverging surfaces and the other of said portions including spaced converging extensions resiliently biased relative to one another and engaging the outer surfaces of said one portion in locking relationship, one of said portions embraced about one of said transverse holding members and the other of said portions embraced about the other of said transverse holding members, said transverse holding members being spaced apart by said longitudinal members to cause said portions to be in resilient engagement one with the other.

2. The combination, in a prefabricated grill structure, of a plurality of longitudinal members, a pair of holding members extending transversely of said longitudinal members, spacer devices between said longitudinal members, each of said spacer devices comprising a pair of resilient sheet metal members, one of said sheet metal members including a pair of non-parallel diverging surfaces and the other of said sheet metal members including a pair of spaced converging extensions resiliently biased relative to one another, and engaging the outer surfaces of said one portion in locking relationship, one of said sheet metal members embraced about one of said transverse holding members and the other of said sheet metal members embraced about the other of said transverse holding members, said transverse holding members being spaced apart by said longitudinal members to cause said sheet metal members to be in resilient engagement one with the other, and said sheet metal members having edges at right angles to said transverse holding members engaging said longitudinal members and holding them apart.

3. The combination, in a prefabricated grill structure of a plurality of longitudinal members, a pair of holding members extending transversely of said longitudinal members, spacer devices between said longitudinal members, each of said spacer devices comprising a pair of resilient sheet metal members, one of said sheet metal members including a pair of non-parallel diverging surfaces and the other of said sheet metal members including a pair of spaced converging extensions resiliently biased relatively to one another and engaging the outer surfaces of said one portion in locking relationship, one of said sheet metal members embraced about one of said transverse holding members and the other of said sheet metal members embraced about the other of said transverse holding members, said transverse holding members being spaced apart by said longitudinal members to cause said sheet metal members to be in resilient engagement one with the other, and a tensioned rod extending through

said longitudinal members within said spacer devices and drawing said longitudinal members against said spacer devices.

4. The combination, in a prefabricated grill structure of a plurality of longitudinal members, a pair of holding members extending transversely of said longitudinal members, spacer devices between said longitudinal members, each of said spacer devices comprising a pair of resilient sheet metal members, one of said sheet metal members including a pair of non-parallel diverging surfaces and the other of said sheet metal members including a pair of spaced converging extensions resiliently biased relative to one another and engaging the outer surfaces of said one portion in locking relationship, one of said sheet metal members embraced about one of said transverse holding members and the other of said sheet metal members embraced about the other of said transverse holding members, said transverse holding members being spaced apart by said longitudinal members to cause said sheet metal members to be in resilient engagement one with the other, and a tensioned rod extending through said longitudinal members within said spacer device, said rod being provided with a channel member embracing a block of cushion material, said rod extending through said block and the bottom of said channel and bearing said block against the outer surface of the outer longitudinal member, said transverse holding members being held in place between the sidewalls of said channel section and said block.

5. The combination, in a prefabricated grill structure, of a plurality of longitudinal members, a pair of holding members extending transversely of said longitudinal members with portions of said longitudinal members therebetween, and a spacer between said longitudinal members comprising a first piece of resilient sheet material formed in the shape of the letter V with the extremities of the V curved inward toward one another, said spacer further comprising a second piece of sheet material formed in the shape of the letter V, said extremities of said first piece being in engagement with the non-parallel portions of the outer surface of said second piece and each of said transverse holding members being disposed at the inner apex of one of said first and second pieces, said transverse holding members being spaced apart by said longitudinal members causing resilient engagement of said first piece with said second piece whereby said transverse holding members are biased against said longitudinal members at the points of contact therewith.

6. The combination, in a prefabricated grill structure, of a plurality of longitudinal members, a pair of holding members extending transversely of said longitudinal members with portions of said longitudinal members therebetween, and a spacer between said longitudinal members comprising a first piece of resilient sheet material formed in the shape of the letter V with the extremities of the V curved inward toward one another, said spacer further comprising a second

piece of sheet material formed in the shape of the letter V, said extremities of said first piece being in engagement with the non-parallel portions of the outer surface of said second piece and each of said transverse holding members being disposed at the inner apex of one of said first and second pieces, said transverse holding members being spaced apart by said longitudinal members causing resilient engagement of said first piece with said second piece whereby said transverse holding members are biased against said longitudinal members at the points of contact therewith, and a tensioned rod extending through said longitudinal members within selected ones of said spacer devices, said rod being provided with a channel member embracing a block of cushion material, said rod extending through said block and the bottom of said channel member and bearing said block against the outer surface of the outer longitudinal member, said transverse holding members being held in place between the sidewalls of said channel section and said block.

7. The combination, in a prefabricated grill structure, of a plurality of parallel longitudinal members, tie rods extending through said members at right angles thereto, spacer devices to hold said longitudinal members apart, and means cooperating with said spacer devices to prevent vibration of said longitudinal members, said means comprising a pair of resilient transverse members extending transversely of said longitudinal members at either side of a respective one of said tie rods, and said spacer devices individually including a pair of portions each comprising a resilient sheet bent in the form of a letter V with the extremities of one of the V portions turned inward and in engagement with the outer surface of the other V portion, each of said pair of resilient transverse members being in engagement with the inner surface of the apex of one of said V portions, said transverse members being spaced apart by said longitudinal members causing resilient engagement of one of said V-shaped portions with the other of said V-shaped portions thereby to bind said transverse members firmly against said longitudinal members.

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