Nov. 21, 1939. G. K. BRADFIELD ET AL 2,180,504

METAL FLOOR CONSTRUCTION

Filed Jan. 9, 1937

Fig. 1.

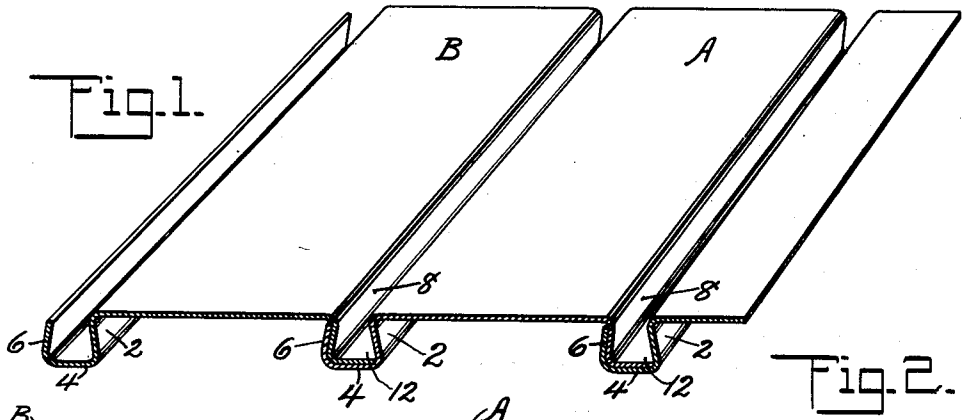


Fig. 2.

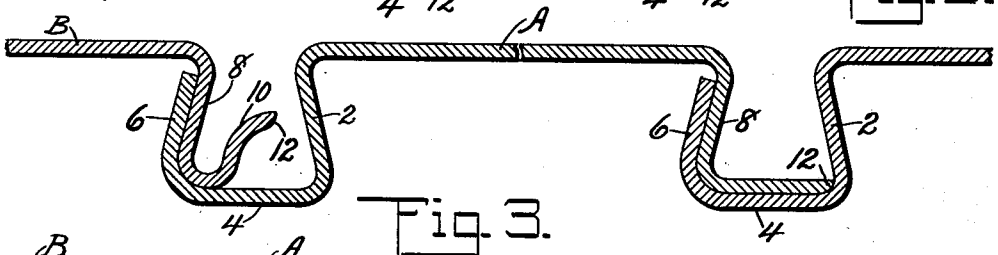


Fig. 3.

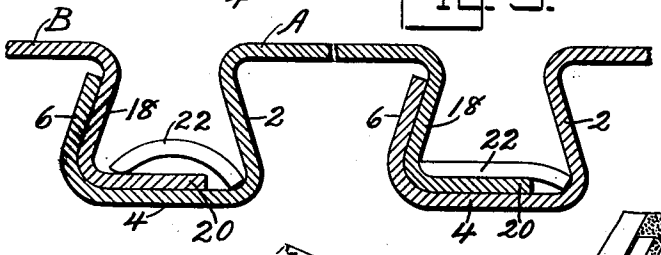


Fig. 4.

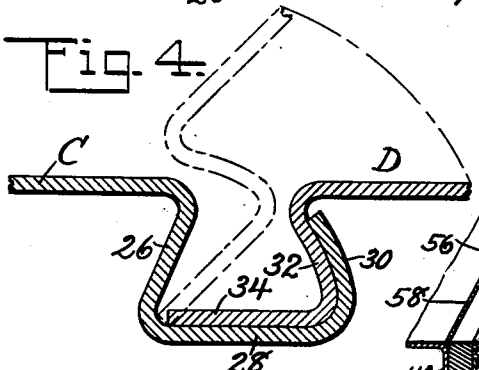


Fig. 5.

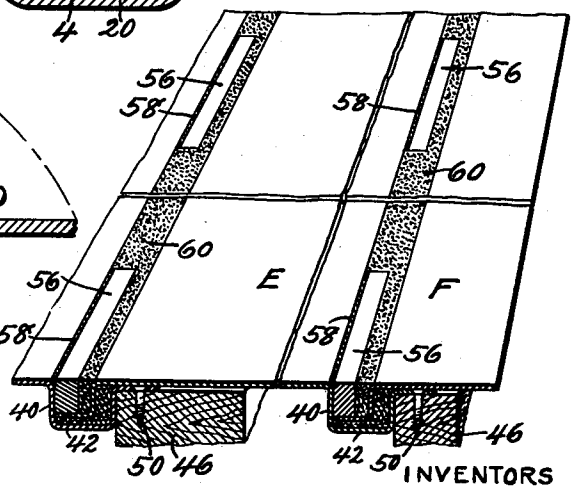
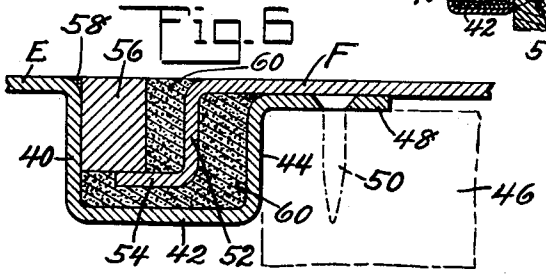


Fig. 6



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METAL FLOOR CONSTRUCTION

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8 Claims. (Cl. 189—34)

This invention relates to floor construction in general and in particular to metallic floors for railway cars especially of the refrigerator type wherein a water-proof construction is necessary.

Previous floor constructions for refrigerator cars have been with water-proof paper and treated floor boards, but such floors are objectionable since a certain amount of moisture is absorbed and the floor retains odors from the lading which may taint subsequent lading. Since a metallic floor, if used, must be protected against the various slightly corrosive substances, such as salt water, it is necessary that the flooring be made of either special steels or of galvanized material. In rail car construction it has proven practically impossible to form a satisfactory metal floor of galvanized or special steels without in some manner breaking the protective coating and permitting corrosion of the metal at these points. It is an object, therefore, of the invention to provide a floor in which sections may be interlocked without in any way affecting the metal surface.

Another object of the invention is the provision of a metallic floor formed of unbroken interlocked sections so joined as to provide an expansion joint therebetween.

A further object of the invention is to provide a metallic floor formed of sections which may be lowered vertically into position and interlocked with each other.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawing, in which:

Figure 1 is a perspective view of a portion of the floor in assembled position;

Fig. 2 is an enlarged view in section showing at the left hand portion the joint as it appears with the sections first engaged and at the right the sections as interlocked;

Fig. 3 is a sectional view similar to Fig. 2 but showing the use of the separate member to interlock the floor sections;

Fig. 4 is a sectional view disclosing a further modification of a floor joint;

Fig. 5 is a perspective view similar to Figure 1 but showing a still further modification of the floor construction, and

Fig. 6 is an enlarged sectional view showing the joint construction used in Fig. 5.

Referring now to the drawing in detail and first to Figures 1 and 2, it is seen that the floor is made up of a plurality of interlocking sections. In refrigerator car construction it is preferable that the floor be made in as few pieces as possible and it has been found that the minimum number of sections that can be handled is two on either side of the doorway which necessitates a single joint substantially on the center line of the car. When using such large sheets of metal it is impossible to assemble the sheets other than by lowering one section vertically into engagement with the other section while maintaining the main body portion of the sheets substantially parallel. To this end one section A is provided with a main body portion formed along one edge with an upwardly open channel having inner side wall 2, web 4 and outer side wall 6. The side walls 2 and 6 of this channel are inclined upwardly toward each other, thus forming a throat or opening of less width than the web portion 4. This construction provides what may be considered an inverted keystone or an upwardly facing channel with a restricted throat or opening. The other section B is provided with a main substantially plane body portion and has one edge formed with an angular section with the vertical leg 8 forming an acute angle with the under surface of the section and having inclination substantially the same as that of the channel side 6. The outwardly directed leg of the angle is for assembly purposes bent upwardly and outwardly as at 10, thus forming a U-shaped member in order that the distance between tip 12 and the outer surface of leg 8 is substantially the same as the throat or opening of the channel. In assembling these sections in the car section A is first placed in position and securely fastened by means, such as screws (not shown), inserted through the web 4 into the supporting stringers, then section B is placed substantially parallel to section A and then is lowered vertically into position and shifted horizontally a slight distance in order that inclined leg 8 and channel flange 6 will engage. With the sections in this position a bar or other tool may be used to drive leg 10 downwardly into engagement with web 4 in which position tip 12 will engage upwardly inclined channel wall 2 as shown in Fig. 2. The joint is now preferably filled with some water-proof and slightly resilient material, such as asphalt, thus forming a water-proof flexible joint without any break or scar being necessary in the metal surface. The slight resiliency necessary for the horizontal movement of the main portions of the sections will be taken care of by the metal through flexing of the parallel walls 6 and 8.

While this construction has been described with reference to merely two sections, it is obvious that more than two sections may be used in which case

one edge of each section will be formed with the restricted channel, while the other edge is formed with the deformed angle which is clearly shown in Figure 1.

Referring now to Fig. 3 it is seen that section A is provided with a substantially plane main body portion formed with an upwardly restricted channel, the same as previously described, and accordingly the same reference numerals have been used, while section B also is provided with a substantially plan main body portion and is formed with a deformed angle edge having downwardly inclined leg 18 which is subsequently parallel to the upwardly inclined flange 6 of the channel. The outwardly directed leg or flange 20 of section B is substantially parallel with the web 4 of the channel and of such length that it may vertically enter the restricted throat or opening of the channel while maintaining the main body portions of sections A and B substantially parallel. After the sections are assembled a separate curved strip 22 is dropped into the channel with the curved portion upward and a bar or other tool used to drive the curved strip downward to substantial parallelism with web 4 and flange 20, thus securely wedging the sections together as shown in the right hand portion of Fig. 3. This joint like the one previously described may then be filled with some resilient water-proof material. In this form as in the form of Figures 1 and 2 the necessary resiliency permitting horizontal movement of the main portions of the sections is obtained through the flexing of the walls 2, 6 and 18.

The modified joint construction shown in Fig. 4 is suitable where narrower sections, or sections of relatively short length are joined together. In this form floor section C is formed along one edge with an upwardly facing channel of restricted opening, which channel is formed by plane flange 26, web 28 and outer flange 30. This outer flange 30 is curved concentric with the point substantially coinciding with the meeting point of flange 26 and web 28. Mating floor section D is formed along one edge with an angular portion having a downwardly directed leg 32, curved on an arc substantially identical with that on which flange 30 is curved and with a forwardly directed leg 34 substantially parallel with the body portion of the section. The leg or flange 34 is of such a length as to permit the oblique entrance of the angular portion of the section into the restricted channel followed by rotation from the dot and dash position to the full line position. After assembly this joint, like those previously described, is intended to be filled with some water-proof elastic material.

In the modification shown by Figs. 5 and 6 floor section E is provided with a substantially plane main body portion formed along one edge with downwardly directed portion 40 forming inner flange of a channel, the bottom being formed by web portion 42, while the other flange is formed by vertically directed flange 44 adapted to rest against the side of floor supporting stringer 46. In order to secure this section to the stringer an outwardly directed flange 48 is provided on the vertical flange 44 and this outwardly directed flange is provided with openings to receive screws or other securing means 50. The flange 48 has its upward surface substantially in alignment with the under surface of the main portion of the floor section in order that it may support the floor section F in substantial alignment with the mating floor section E. The floor section F is also provided with a substantially plane main body portion formed at one of its edges with a right angle flange having vertical leg 52 and substantially horizontal leg 54 disposed perpendicular and substantially parallel respectively to the main portion of the section. After the sections have been placed in their proper position upon the stringers short bars 56 are welded, soldered or otherwise secured as at 58 to the inner flange 40 of the floor section. These bars are of such a depth and width as to engage the flange or horizontal leg 54 of the adjoining section in order to retain this section in its proper position while permitting a slight sliding movement thereof. The joint may then be filled with asphalt or other water-proof substance 60 which will effectively seal the joint yet permit relative movement of the floor sections. When applied to refrigerator cars it is preferable that a single joint located at the center line of the car be used.

It will be obvious that with each of these joints (except that shown by Fig. 4) the mating sections may be lowered vertically into position while maintaining the main body portions of each section substantially parallel after which a securing operation is necessary to interlock the sections. It is also obvious that with each of these joints the surface of the plate will not be injured whether the surface be galvanized or a polished surface of some stainless alloy.

While the floor construction has been described more or less in detail, it is apparent that slight changes may be made and such changes are contemplated as fall within the scope of the following claims.

What is claimed is:

1. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a substantially plane main body portion formed along at least one edge with an upwardly opening channel shaped portion, a second metal section having a substantially plane main body portion formed along at least one edge with an angular shaped portion having an outwardly directed flange, said flange being of such a width and form as to permit substantially vertical entrance thereof into the channel while maintaining said main body portions substantially parallel and said flanges undeformed, and means engaging a wall of said channel and said flange for locking said first and second metal sections together for relative horizontal movement of said main body portions.

2. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a main body portion formed along at least one edge with an upwardly opening channel shaped portion, a second metal section having a main body portion formed along at least one edge with an angular shaped portion having an outwardly directed flange, said flange being of such a width and form as to permit substantially vertical entrance thereof into the channel while maintaining said flange undeformed, and a curved metal strip insertable within the channel, said strip when flattened engaging said channel and flange for locking said first and second metal sections together for relative horizontal movement of said main body portions.

3. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a substantially plane main body portion formed along at

least one edge with an upwardly opening channel shaped portion, a second metal section having a substantially plane main body portion formed along at least one edge with an angular shaped portion having an outwardly directed flange, said flange being of such a width and form as to permit substantially vertical entrance thereof into the channel while maintaining said body portions substantially parallel and said flanges undeformed, and metallic means secured to said channel and engageable with said flange to lock said first and second metal sections together for relative horizontal movement.

4. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a substantially plane main body portion formed along at least one edge with an upwardly opening channel shaped portion having a restricted throat opening, a second metal section having a substantially plane main body portion formed along at least one edge with an angular shaped portion having an outwardly directed flange, said flange being of less width than the throat opening to permit substantially vertical entrance of the flange through the channel throat while maintaining said body portions substantially parallel and said flanges undeformed, and means retaining said first and second sections together for relative horizontal movement of said main body portions.

5. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a substantially plane main body portion provided along at least one edge therewith with an upwardly opening channel shaped portion formed by a web substantially parallel to the plane of said main body portion and by upwardly directed side walls, one of which walls is connected to the main body portion, a second metal section having a substantially plane main body portion provided along at least one edge with an angular shaped portion having an outwardly directed flange connected to the main body portion by a wall substantially parallel to the plane of one of said side walls, said flange being of such a width and form as to normally permit substantially vertical entrance thereof into the channel while maintaining said main body portions substantially parallel and said flanges undeformed, and elastic material filling said channel substantially flush with the upper surface of the sections.

6. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a substantially plane main body portion provided along at least one edge thereof with an upwardly opening channel shaped portion formed by a web substantially parallel to the plane of said main body portion and by upwardly directed side walls, one of which is connected to the main body portion, a second metal section having a substantially plane main body portion formed along at least one edge with an angular shaped portion having an outwardly directed flange connected to the section by an inclined wall substantially parallel to the plane of one of said side walls, said flange being of such a width and form as to normally permit substantially vertical entrance thereof into the channel while maintaining said main body portions substantially parallel and said flanges undeformed, and means locking said first and second metal sections together for relative horizontal movement of the main body portions thereof.

7. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section having a main substantially flat body portion and provided along at least one edge thereof with an upwardly opening channel shaped portion, said channel shaped portion being formed by a web substantially parallel to the plane of said section and by upwardly convergent side walls, one of which is connected to the flat body portion, a second metal section having a main substantially flat body portion formed along at least one edge with an angular shaped portion having an outwardly directed flange connected to the flat body portion by an inclined wall substantially parallel to one of said convergent side walls, said flange being of such a width and form as to permit substantially vertical entrance thereof into the channel with said flange undeformed, and means locking said first and second metal sections together for relative horizontal movement of the main portions thereof.

8. A metal floor construction formed of a plurality of interengaging metal sections and comprising, a first metal section formed along at least one edge with an upwardly opening channel shaped portion having a web substantially parallel to the plane of said section and connected thereto by convergent side walls, a second metal section formed along at least one edge with an angularly shaped portion having an outwardly and upwardly directed flange connected to the section by an inclined wall substantially parallel to one of said side walls, said upwardly directed flange being of such width as to permit substantially vertical entrance thereof into the upwardly opening channel portion, and said flange being deformable into a position parallel to said web thereby locking said first and second metal sections together.

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