Dec. 21, 1943. M. F. SCHMITZ 2,337,278

RAILWAY CAR FLOOR CONSTRUCTION

Filed June 1, 1942 2 Sheets-Sheet 1

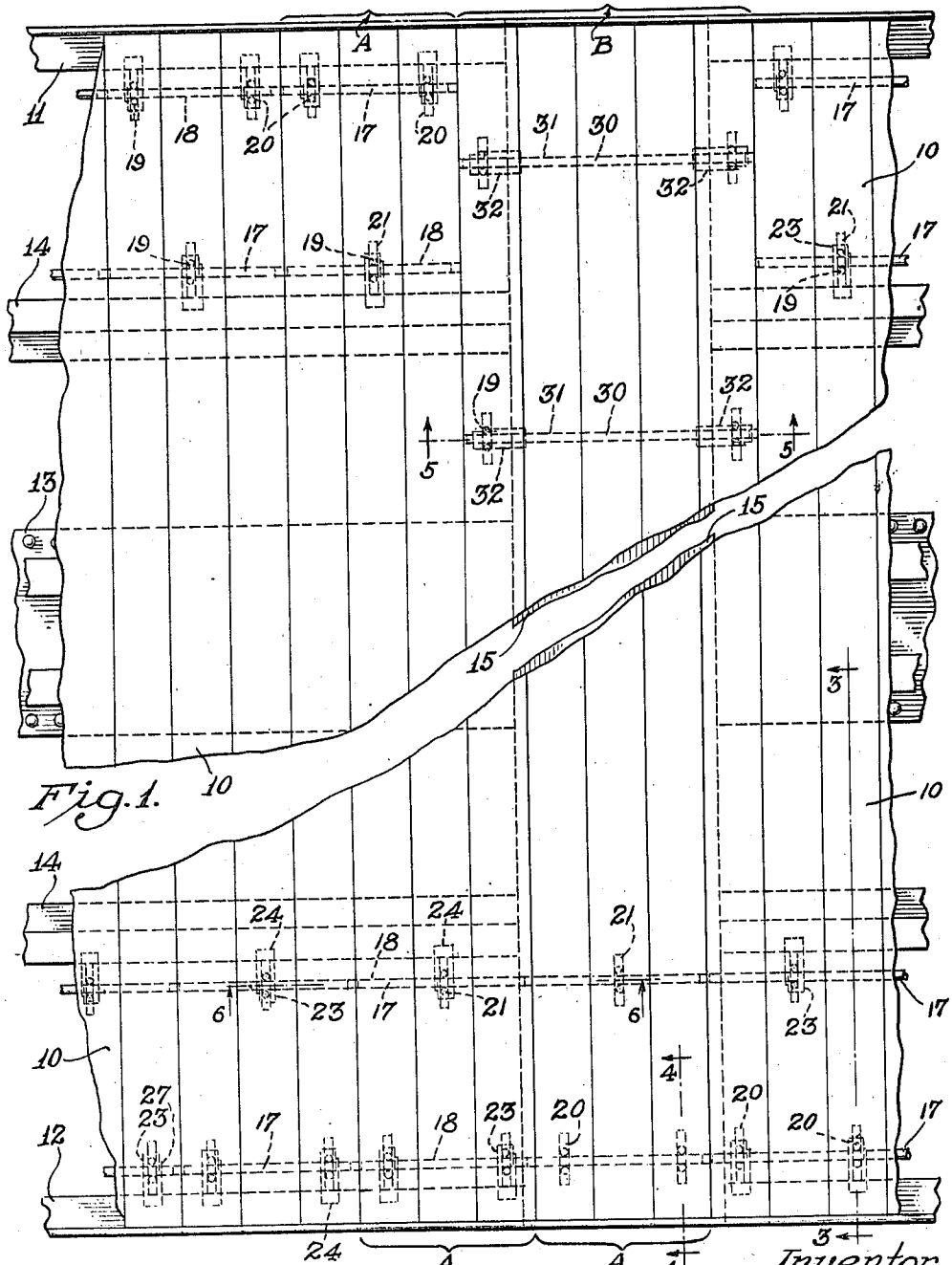


Fig. 1.

Fig. 2.

Inventor
Michael F. Schmitz
By
McCaleb, Wendt & Dickinson
Attorneys.

Dec. 21, 1943. M. F. SCHMITZ 2,337,278

RAILWAY CAR FLOOR CONSTRUCTION

Filed June 1, 1942 2 Sheets-Sheet 2

Fig. 3.

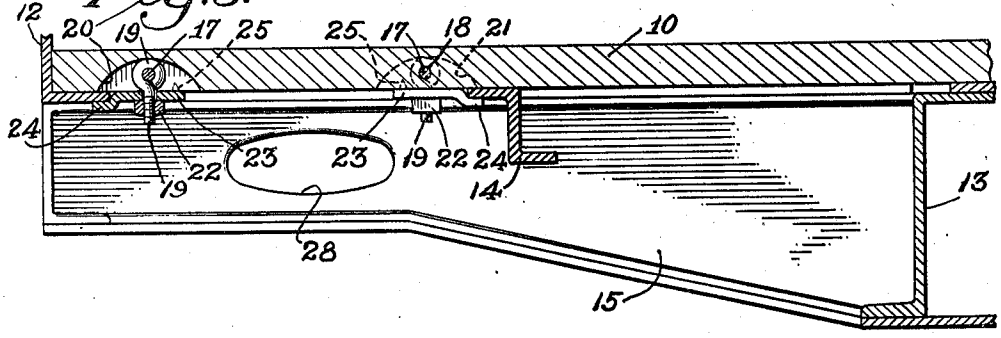


Fig. 4.

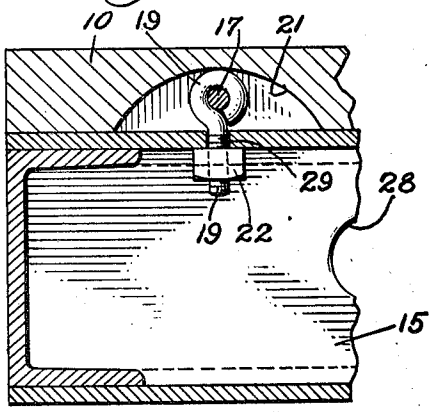


Fig. 7.

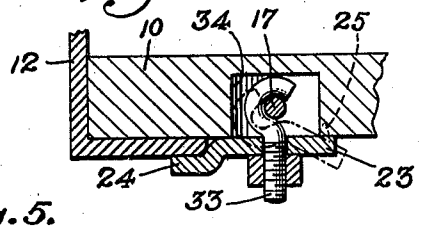


Fig. 5.

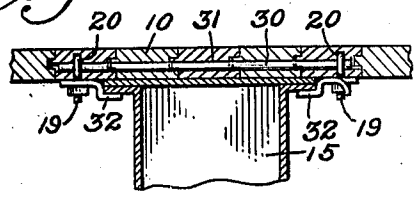


Fig. 6.

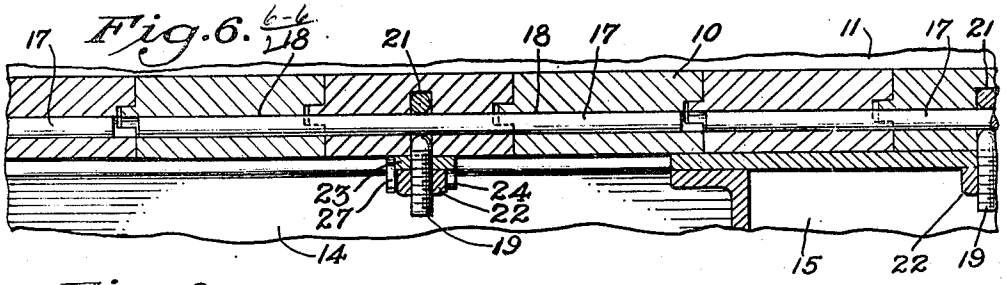
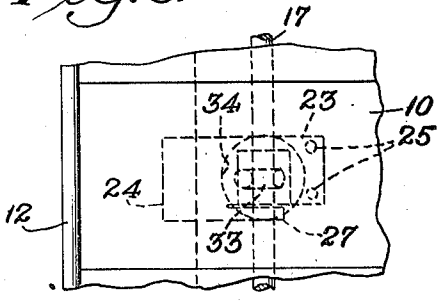


Fig. 8.



Inventor
Michael F. Schmitz
BY
McCaleb, Wendt & Dickinson
Attorneys.

Patented Dec. 21, 1943 2,337,278

UNITED STATES PATENT OFFICE

2,337,278

RAILWAY CAR FLOOR CONSTRUCTION

Michael F. Schmitz, Lemont, Ill.

Application June 1, 1942, Serial No. 445,322

3 Claims. (Cl. 20—8)

This invention relates to floor construction and is more particularly concerned with improvements in heavy duty floors such as are used in railway cars and are made up of relatively heavy floor boards laid across and secured in place upon the underframe of the car.

An important object of my invention is to eliminate, in a floor of this type, the use of ordinary headed bolts which project above the upper surface of the floor or have the heads countersunk in such surface, and to provide for attachment of the floor boards to the supporting framework in such manner that the top surfaces of the floor boards and a substantial subjacent portion of the floor boards remains unapertured and free of any metal parts that might interfere with the shaving or sanding of the floor to a uniform and smooth surface.

In some, if not all, railway cars, an even, smooth floor surface is highly desirable if not requisite, but with prior constructions it has been necessary to contend with the bolt heads which presented an ever-present danger of damage to the floor shaver or sander. It has often been necessary to place a top surfacing or sole of light-weight flooring nailed down over the main floor board in order to eliminate such danger. By my invention, however, the complete elimination of any metal parts at or adjacent the top surface of the floor board eliminates all danger of damage to the shaver or sander and without resorting to such expedients as a superposed sole or other precautions.

Another important object of my invention is to improve and simplify the attachment of the floor board over the body bolsters of a railway car. The body bolsters are generally of a width equal to three or four floor board widths, with the floor boards lying thereon longitudinally. Quite a problem is presented in securing the floor board down upon a bolster, because the bolsters are of relatively massive box-like construction, and considerable difficulty is experienced in gaining access to the threaded ends of the floor-board-securing bolts that project down through holes drilled through the top plate of the bolster. One common expedient to minimize the number of floor board bolts through the bolster, has been to inlay transverse hold-down strips across the floor boards overlying the bolster and thus hold down three or four floor boards by means of a pair of bolts extending down through the end portions of each of the inlaid hold-down strips instead of requiring the usual number of bolts to hold down the individual boards. This is a fairly costly operation calling for the services of a carpenter working with a hammer and chisel to route out a transverse groove across the boards to receive the inlaid hold-down strip. My invention eliminates such inlaying expedient and like complexities and provides for the effective holding down of the floor boards which overlie the bolster in a novel manner which effects substantial savings in the cost of installation.

Another object of the invention is to provide a heavy-duty floor structure in which the floor boards are connected together in multi-board sections which require less bolting to the supporting framework and provide a more uniform floor surface.

A further object is to provide a novel unit-connected heavy duty floor board structure especially adapted for railway car or like floors, which is readily adapted for direct bolting to the supporting framework or which may be attached by means of floor clips.

Still another object of the invention is to effect important saving in the cost of materials used in attaching the floor boards to the supporting framework, by the use of simpler and less expensive materials to reduce substantially the number of more expensive attachment parts heretofore required.

Another object is to improve the hold upon the floor boards and increase the strength and endurance of the floor by completely eliminating certain disadvantages resulting from the use of ordinary bolts which have a tendency to pull down into or through the floor boards and develop looseness between the floor boards and the supporting frame under the strain of railway car floor movement due to weaving stresses and the like.

Other objects and advantages of my invention will appear more fully from the following description and from the accompanying drawings, in which similar characters of reference indicate similar parts throughout the several views.

Figure 1 is a fragmentary top plan view of a railway car floor embodying the features of my invention;

Fig. 2 is a fragmentary top plan view of a railway car floor showing a slightly modified arrangement embodying the invention;

Fig. 3 is an enlarged vertical sectional view taken substantially along line 3—3 of Fig. 2;

Fig. 4 is an enlarged vertical sectional view taken substantially along line 4—4 of Fig. 2;

Fig. 5 is a transverse vertical sectional view taken substantially along line 5—5 of Fig. 1;

Fig. 6 is a transverse vertical sectional view taken substantially along line 6—6 of Fig. 2;

Fig. 7 is a fragmentary vertical sectional view of a slightly modified form of the invention; and

Fig. 8 is a top plan view of the modification shown in Fig. 7.

My invention is particularly adapted for use in railway car floors such as shown fragmentarily in Figs. 1 and 2 wherein relatively heavy floor boards 10, having a conventional tongue and groove interfit, are supported by the metallic underframe structure of the car. Such floor boards may be of about 2⅜ inches thickness, 5⅜ inches width, and 9-foot length, are laid across the width of the car, and generally provide the only flooring for box cars, stock cars, and flat cars.

In the drawings, features of a box car underframe structure are shown more or less schematically, based on the Association of American Railroads standard specifications. Included are side sills 11 and 12, a center sill 13, intermediate floor sills 14, and a body bolster 15. Fig. 1 may be considered as showing one side of the car floor, and Fig. 2 the opposite side of the floor. Except for a different manner of securing in place the floor boards 10 which overlie the bolster 15, the details of construction shown in Figs. 1 and 2 are practically alike.

According to my invention, instead of securing each of the floor boards individually to the car underframe, the floor boards 10 are secured thereto in multi-board units A, the size of which is dictated by convenience in handling. In the present instance, these units are shown in Fig. 1 (except over the bolster 15) and in Fig. 2 as comprising three floor boards cooperating in edge-to-edge interengagement and endwise alignment and connected together by right-angularly transverse metal rods 17 which are received within aligned relatively closely fitting bores 18 in the floor boards. The bores 18 are drilled parallel to and intermediate the top and bottom faces of the boards, but preferably somewhat closer to the botttom than the top faces. By preference, there are four of the connecting rods 17 for each of the floor board units A, one of the rods being located adjacent each of the respective ends of the units and the other two rods being located adjacent the transverse areas of the board units which rest upon the intermediate sills. By preference, the rods 17 are cut to length from standard ½" steel rod stock.

Each of the end rods 17 of the board unit A is engaged by a pair of standard, preferably ½" eye bolts 19, one of which bolts is located within a downwardly opening, centered longitudinal slot 20 intersecting the rod bore 18 in each of the outermost floor boards 10 of the unit and the slots 20 are preferably wide enough to admit free swinging movement of the eyebolt 19 about the axis of the associated rod 17.

Each of the intermediate connecting rods 17 is engaged by a single one of the eyebolts 19 received within a longitudinally extending slot 21 formed centrally within the center board, intersecting the rod bore 18 and opening through the bottom face of the board.

In order to preserve the greatest possible solid thickness of board between the inner walls of the slots 20 and 21 and the top faces of the boards 10, the slots should be as shallow as practicable consistent with free accommodation of the eye heads of the bolts 19. As shown, the depth of the slots 20 and 21 is conditioned by the diameter of the eye heads of the bolts 19, being such as to receive the heads entirely within the lower face plane of the boards, so as to avoid interference with the drawing up of supporting or floor clip surfaces into tight, flush abutment against the areas of the lower faces of the floor boards, surrounding the slots. This arrangement leaves substantially the entire threaded shanks of the bolts 19 depending clear of the lower board faces to receive nuts 22. Thereby floor clips 23 can be secured tightly in place against the floor boards in such a manner as to attach the flooring to the side sills 11 and 12 and the intermediate sills 14. The floor clips 23 are preferably of the type covered by MacLean Re. Patents 21,792 and 2,030,216, and each includes an apertured body to receive the bolt shank and to be secured against the floor board. An offset sill-engaging portion 24, integral with the board-engaging portion of the clip, engages under the horizontal flange of the side or intermediate sill and draws the floor board down tight against the top of the flange. Prongs 25, on the body of the clip, penetrate the floor board surface and hold the clip against rotation about the axis of the bolt shank. Integral bendable tongues 27 at the sides of the clips are engageable with the respective nuts 22 to hold the latter against accidental loosening rotation.

While in the present instance the location of the board-connecting rods 17 and the bolts 19 has been predetermined to clear the respective edges of the side and intermediate sills sufficiently to accommodate the floor clips 23, it will be clear that merely by shifting the location of the connecting rods and bolts to overlying or centered position relative to the engaged surfaces of the sills, the bolt shanks may be received in appropriately located bolt holes drilled through the sills. However, the use of the floor clips 23 affords greater adaptability in construction and is not bound by the relatively close tolerances demanded by direct bolting to the sills.

Another advantage of the use of the floor clips 23 is that after the practically inevitable shrinkage of the floor boards following a period of use, the boards can be jacked tight to take up slack and receive filler strips or take-up boards, without requiring the redrilling of bolt holes.

It may be noted that as a result of connecting the floor boards into the units A, a substantial number of bolts and floor clips is saved, as compared with a floor structure in which the floor boards are individually secured to the underframe structure. In a three-board unit A, as shown in Figs. 1 and 2, only six bolts and clips will quite securely attach the floor board unit in place, as compared to the nine bolts and clips which would be required to secure the three floor boards in place individually were they not tied together by such means as the rods 17. For the conventional individually secured board arrangements, each board is supplied with a bolt and a clip for securing each opposite end to the underlying side sill, and each board has at least one bolt and clip for securement to a selected one of the intermediate sills 14.

By my invention, however, only two clips per board are used, merely the outer boards of the units A being secured adjacent their ends to the side sills, and only the intermediate boards being secured to the intermediate sills, while the connecting rods 17 are relied upon for positively holding down those portions of the floor boards, such as the ends of the intermediate floor boards and the intermediate portions of the outer floor

boards, which are not directly secured to the sills. In fact, this arrangement provides a stronger and more positive securement of the floor boards, especially at the intermediate portions thereof where in the conventional construction no attachment to an intermediate stringer would ordinarily be made, but where according to the present invention the intermediate connecting rods 17 provide indirect though nevertheless positive and sturdy attachment to the intermediate sills for the outer boards of the floor board unit A as well as the intermediate board.

Another distinct advantage of the reduction in number of bolts and clips resides in the saving in cost of material. In a three-board section A, this accrues from the substitution of the four connecting rods 17 for three of the bolts 19 or their equivalent and three of the clips 23. The rods 17 are a relatively inexpensive stock item and are utilized without any processing other than simply cutting them to the proper lengths. On the other hand, the bolts and clips which the rods replace require a substantial number of manufacturing operations in their production, and with regard to the floor clips, especially, require a higher grade and thus more expensive material.

My improved floor construction has very important advantages for securing in place the floor boards 10 which directly overlie the body bolsters 15 of the car underframe. The use of floor clips for securing these boards in place is, of course, precluded by the broad top plate of the bolster which extends longitudinally under the full widths of the boards. Therefore, even in floor constructions where the clips 23 have been used for the remaining boards of the floor, the bolster-covering floor boards have had to be bolted directly to the top plate of the bolster. This is a difficult matter, however, because of the box construction of the bolster and the cramped working space within which the nuts 22 of the bolts must be tightened inside of the bolster by access through necessarily relatively small side hand-holes 28 (Figs. 3 and 4). For this reason some car builders have adopted the practice of inlaying transverse board strips across the boards overlying the bolster and then bolting down the ends of such strips. In this way they reduce the number of bolts that must be worked through the bolster because of the elimination of any bolts to hold down the boards which are traversed by the intermediate portions of the hold-down inlay strips.

By the use of my invention, also, the number of bolts that must be worked through the bolster is kept at a minimum, but there is no need for the costly expedient of inlaying wooden strips across the boards. In addition, the top surfaces of the board are kept entirely free and clear of bolt heads or other metal parts or countersunk holes.

As shown in Fig. 2, the preferred three-board unit arrangement is adhered to even over the bolster 15, with the threaded shanks of the bolts 19 extending down through bolt holes 29 in the top plate of the bolster and the nuts 22 screwed on in the usual way by access through the openings 28 in the sides of the bolster (Fig. 4).

Where conditions will permit, I prefer to avoid entirely the necessity for bolting through the top plate of the bolster, but employ floor clips engaging the side wings or flanges at the top of the bolster or the adjacent sill flanges. Such an arrangement is shown in Figs. 1 and 5 and comprises herein a unit of floor boards of sufficient width to extend sidewise beyond the top edges of the bolster. In this instance the bolster is of a slightly greater width than the combined width of three of the floor boards 10. Therefore a floor board unit B composed of five floor boards is used, connected together by means of rods 30 extending through alined transverse bores 31 in the floor boards, and located at points which lie between the side sills and the intermediate sills and between the side sills and the center sill, respectively. Thus, the bolts 19 need engage the rods 30 only in the outermost two boards of the unit and will entirely clear all parts of the underframe. Floor clips 32 secured in place by these bolts can then engage the top side wings or flanges of the bolster. Such top flanges may be of substantially greater thickness than the sill flanges and for this purpose the clips 32 will, of course, have to be formed with a substantially increased offset between the board-engaging and flange-engaging portions thereof. Alternatively, the connecting rods 30 may be positioned adjacent the side sills and the intermediate sills, respectively, similarly as the tie rods 17 of the remaining board unit A, so that the clips 23 can be used to engage the side sills and intermediate sills. In either event, the result is that the bolster units B are secured firmly in place without direct bolting through the bolster.

In assembling the eye bolts 19 with either of the floor board units A or B, it is necessary, of course, to locate the bolt eyes within the slots 20 or 21, as the case may be, and thereafter push the respectively associated rods 17 into place through the eyes. This may be done most conveniently at the time that the board units are assembled. However, even though the slots 20 and 21 may be long enough to receive the bolt shanks therein when swung down for stacking the board units, there may be occasions where the bolt shank may offer disadvantageous protuberances in handling the units prior to or during installation. Moreover, should the bolts stick within the slots 20 and 21 and not swing down freely into attaching position when the units are being installed, the workmen may suffer some delay in prying them out. These are, of course, only relatively very minor drawbacks, but they are overcome by the modified form of construction shown in Figs. 7 and 8 where the use of a slightly modified hook bolt 33 is shown to replace the eye bolt already described. By preference the hooked head of the bolt 33 is formed similarly as the eye bolt 19 but with the free end of the head loop shortened to a point approximately in line with the side of the shank. This provides a sufficient hook for adequate rod engagement and is probably every bit as strong as the eye head of the bolt 19 but saves rod stock and affords the advantage that the bolt 33 may be hooked in place on the rods 17 (or 30, as the case may be) after the board unit has been located in place upon the underframe and as an incident to securing the board unit in place by means of the floor clips 23 or 32.

Instead of a slot for receiving the hook bolt 33, I prefer to utilize a round bore 34 (round, because that is easier to make by a simple drilling operation). The bore 34 should be as shallow as practicable and has its side wall spaced from one side of the rod 17 (preferably the side nearest the edge of the frame member to be engaged) just

far enough so that the hooked head of the bolt can clear through the space between the bore wall and the connecting rod when the bolt is tilted over to the extreme limit permitted by the mouth of the bore, as shown in dot-dash outline in Fig. 7, and is moved up into the bore with a hooking motion onto the connecting rod. The only way the bolt can then be disengaged from the rod is by a reversal of the hooking motion which requires the bolt to be swung over to the extreme limit to which position it is not likely to swing accidentally. Thus, even though the hook bolts **33** may be placed in advance of attaching the floor clips **23** or **32** and the floor unit is subjected to considerable jostling while the bolts are hanging down therefrom, there will be little, if any, likelihood of the bolts accidentally dropping off. After the clips **23** or **32** are secured in place, the bolts **33** will, of course, be held positively against any possibility of accidental dislodgement and will hold the floor board unit securely in place.

From the foregoing it will be evident that my invention affords substantial advantages over prior heavy duty floor constructions because the top surface and a substantial thickness of the floor boards below the top surface are maintained free from bolt heads or other metal prominences that might prove damaging to or interfere with the operation of a scraper or sander for smoothing the floor. A railway car in which, by the use of my invention, the floor surface is completely free from any exposed metal in or on the surface, is thus adapted for the shipment of many classes of commodities such as explosives, which, for the sake of safety, must not be shipped in any car where the floor has metal, such as bolt heads, exposed. The result is also a floor surface which is entirely free from bolt holes, bolt hole fillers, inlays, or the like.

Since the floor boards of the multi-board units are tied together by the straight connecting rods, a better surface alignment is maintained than where each board is individually secured to the underframe. The better distribution of pulling force through the medium of the transverse connecting rods secures a firmer and less yieldable hold upon the floor boards than with individual bolts, the board-engaging area of the heads of which is necessarily quite limited. There is also a substantial saving in material cost through the use of inexpensive standard rod stock to replace a substantial number of fabricated parts. Moreover, a very substantial improvement and saving in labor and material is attained by this invention in securing the floor boards to wide coextensive underframe members such as the bolsters of a railway car.

While the invention is susceptible of various modifications, and alternative constructions, I have shown in the drawings, and have herein described in detail certain preferred embodiments, but it is to be understood that I do not thereby intend to limit the invention to the specific forms disclosed, but intend to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. In a floor construction, a supporting framework; a plurality of floor boards cooperating in edge-to-edge relation to constitute a plurality of board units; each of said boards having formed therein a plurality of spaced apart straight horizontal transverse bores lying substantially away from the upper and lower faces of the board; the transverse bores of each board being aligned with corresponding bores of the other boards of the same unit; certain boards of each unit being provided in their lower faces with blind openings which intersect and extend upwardly slightly above the transverse bores of such boards; bolts having rod embracing heads lying within said blind openings and shanks depending from said openings; devices cooperating with the shanks of said bolts for attaching the latter to the frame at appropriate points; and rods occupying, and being longitudinally movable in, the aligned transverse bores of the boards of each unit and embraced by the heads of the bolts associated with that unit; the rods, bolts and the devices which cooperate with the bolt shanks as aforesaid constituting the board unit fastening instrumentalities; and each of said rods being of substantially uniform thickness from end to end, bridging all the joints between the boards of the unit with which it is associated, and having a length less than the width of the board unit with which it is associated; whereby the boards of any unit may be jacked tightly together, in situ, to take up board shrinkage without necessarily disassociating the unit from any of its fastening instrumentalities.

2. A floor construction as defined in claim 1 wherein the rod embracing heads of the bolts are eyes receiving and turnable upon the rods, and the blind openings are elongated transversely of the boards sufficiently to receive the bolts entirely within the boards.

3. A floor construction as defined in claim 1 wherein the rod embracing heads of the bolts are hooks, and the blind openings are so proportioned relatively to the hooks that the latter only can be disengaged from the rods when the bolts are swung away from their normal depending positions.

MICHAEL F. SCHMITZ.