July 21, 1936. B. F. FITCH 2,047,955

RAILWAY CAR

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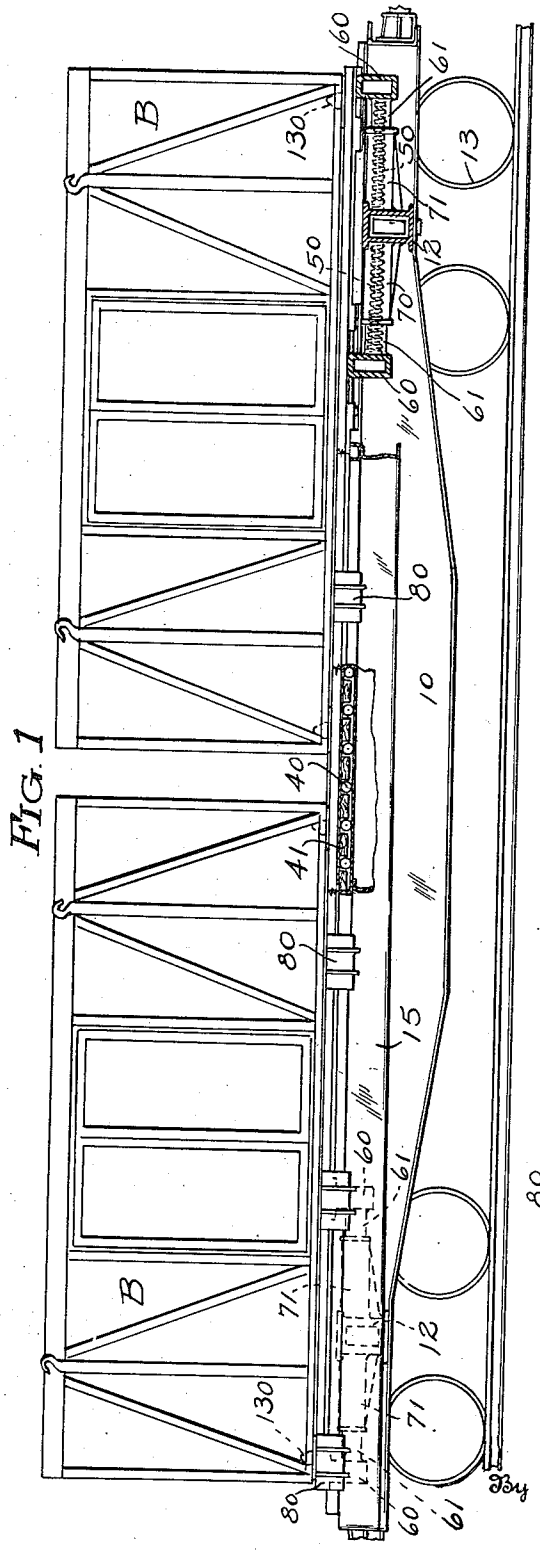


FIG. 1

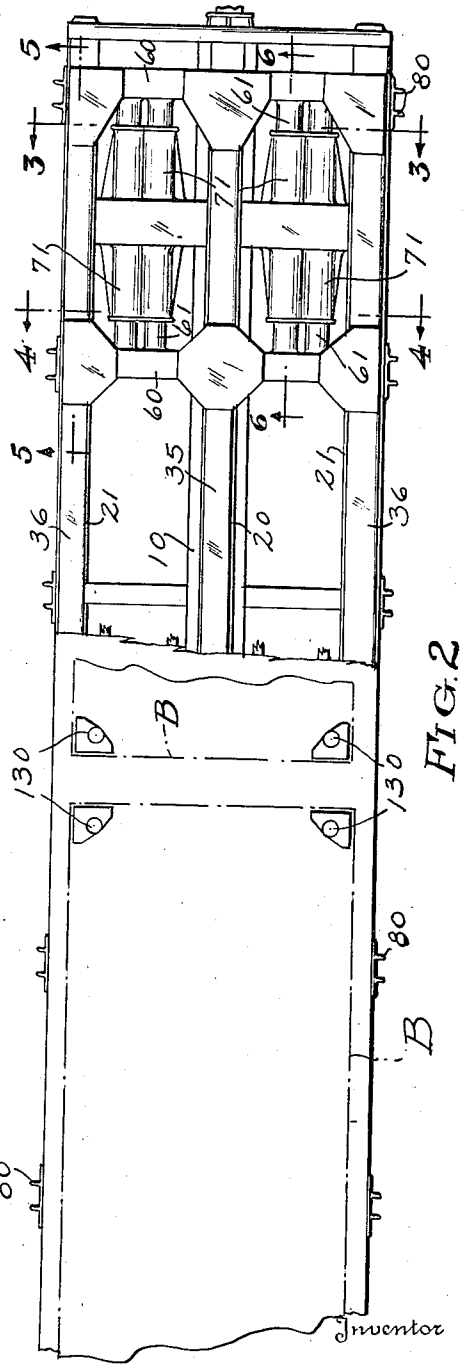


FIG. 2

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RAILWAY CAR

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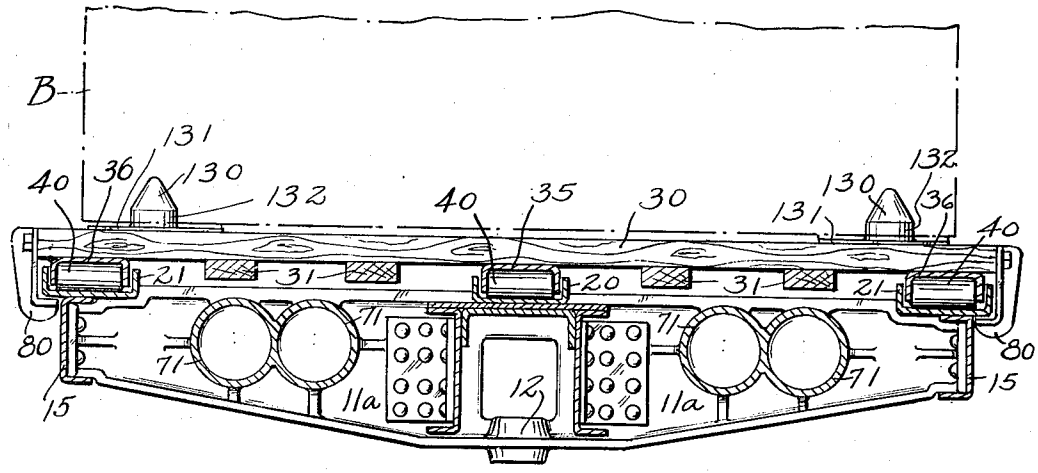



FIG. 3

FIG 4

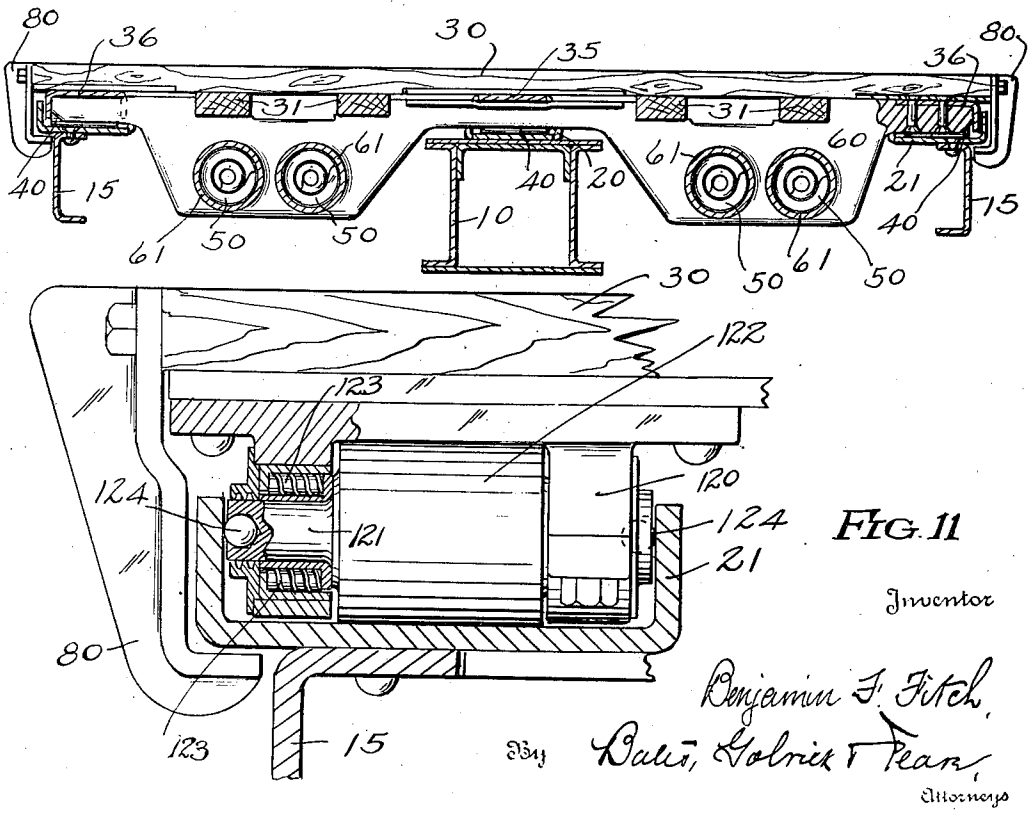



FIG. 11

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RAILWAY CAR

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FIG. 5

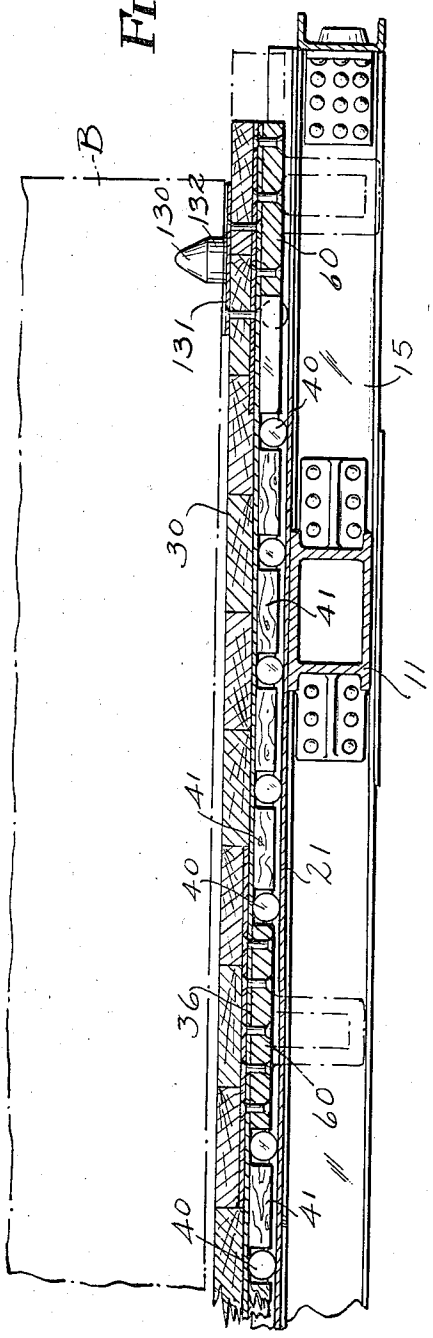
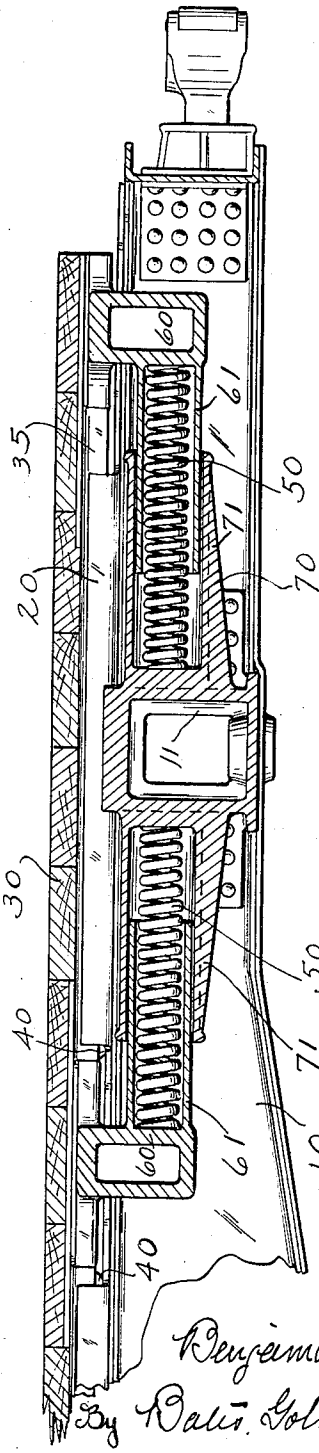



FIG. 6




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RAILWAY CAR

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FIG. 7

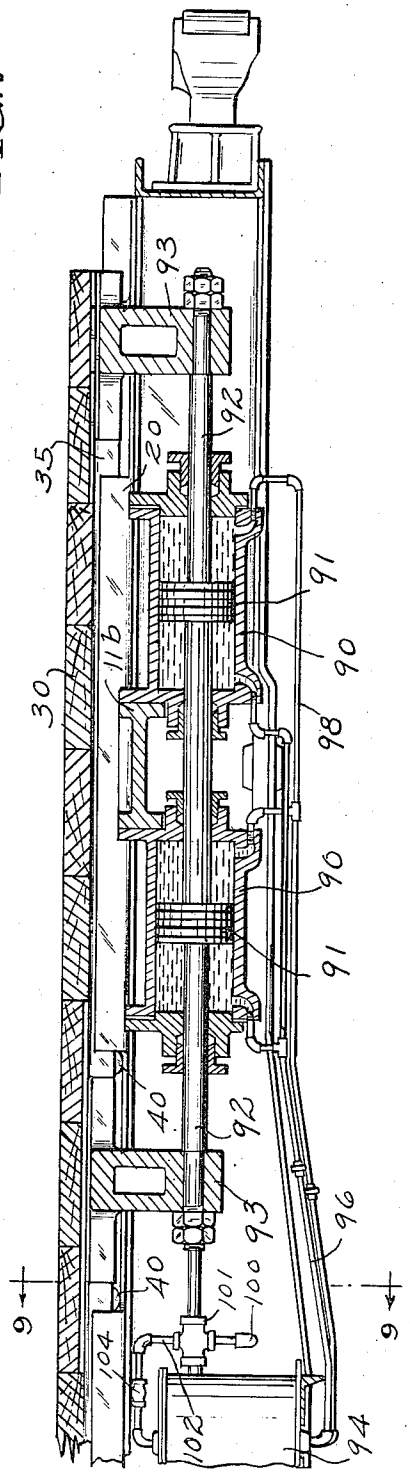
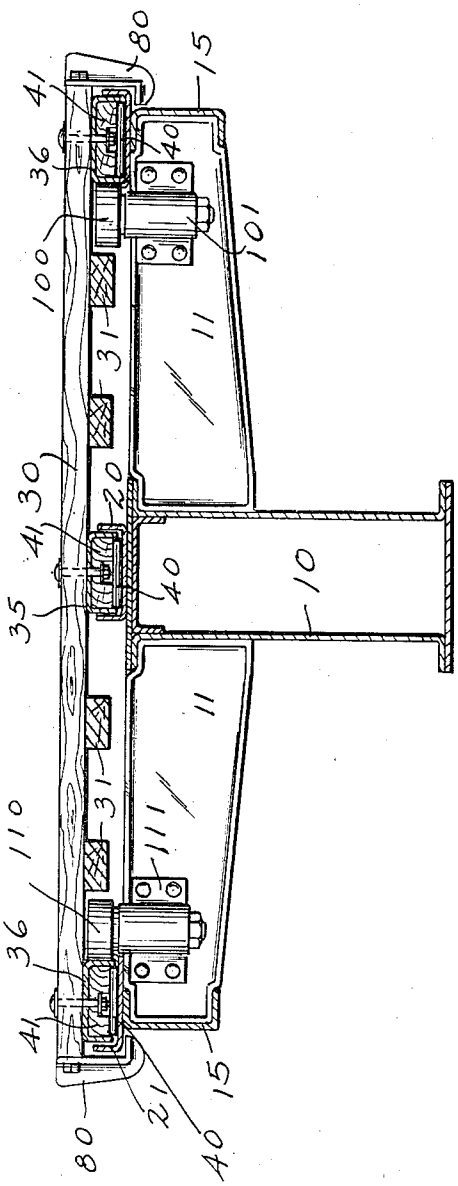



FIG. 10




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RAILWAY CAR

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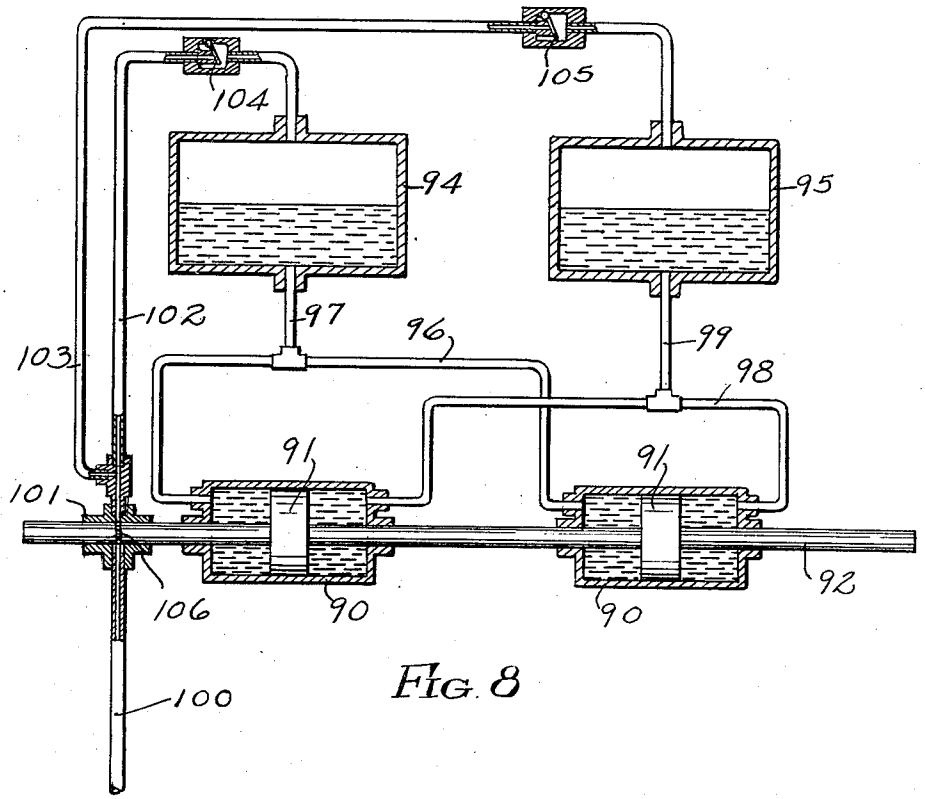



FIG. 8

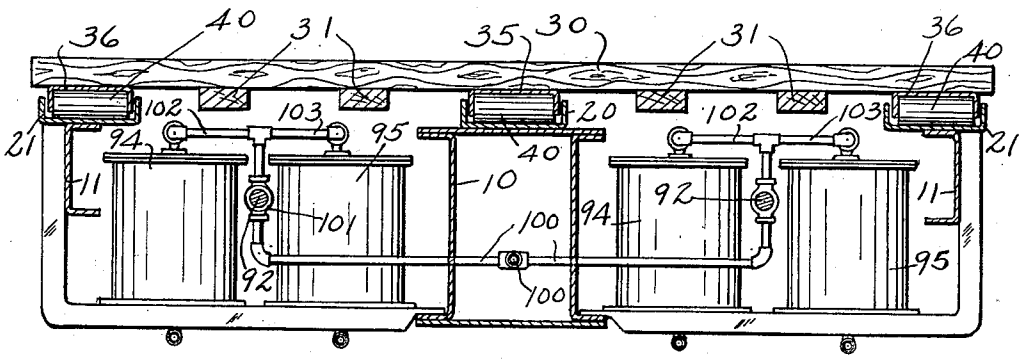



FIG. 9

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2,047,955

# UNITED STATES PATENT OFFICE

2,047,955

## RAILWAY CAR

Benjamin F. Fitch, Greenwich, Conn., assignor to Motor Terminals Company, New York, N. Y., a corporation of Delaware

Application December 31, 1932, Serial No. 649,703

6 Claims. (Cl. 105—392.5)

The object of this invention is to provide a railway flat car so arranged that the load carried thereby will not be subjected to troublesome shocks due to jerks in starting and stopping the train. To this end I have provided a car floor yieldingly mounted on the car sub-structure in such manner that the sub-structure may move longitudinally a short distance independently of the floor, suitable spring means being provided to yieldingly resist the independent movement and centralize the floor in the car frame.

The load carried by the floor may comprise passengers or freight. In the former instance, the shiftable floor carries walls, roof and interior equipment, as seats or berths. In the case of freight there may be merely walls and roof, but I prefer to carry the freight in demountable automobile bodies, and I then provide the shiftable floor with fixed positioning projections adapted to engage sockets in the base frame of the demountable body.

With the equipment last mentioned, the demountable bodies may be lifted by a suitable crane and deposited on the floor over the projections, the same as if the floor were a rigid part of the car. Then in starting or stopping or otherwise jerking the train, the whole floor with its load, will lag behind the sudden movement of the under-frame for a short distance, and then move relatively to the frame to assume normal position thereon. Thus a gradual change of speed is delivered to the body, preventing jar to the contents.

In carrying out the invention I provide a rigid sub-frame connected to the trucks in the ordinary manner and having longitudinal trackways, and I provide a suitably braced and supported car floor, which overlies such sub-frame, and between the floor and sub-frame I provide rollers operating on a longitudinal trackway, enabling the floor to roll in either direction on the sub-frame. Beneath the floor, and suitably carried by the sub-frame, I provide cushioning means connected with the floor, which thus yieldingly counteracts the independent movement of the floor.

My invention comprises the above outlined feature of a yielding car floor and also the more specific embodiments thereof illustrated in the drawings hereof and hereinafter more fully described.

In the drawings, Fig. 1 is a side elevation of a railway car equipped with my invention and supporting two demountable bodies, arranged tandem; Fig. 2 is a plan of a portion of such car with part of the flooring broken away; Figs. 3 and 4 are cross-sections of the car as indicated by the lines 3—3 and 4—4 in Fig. 2; Figs. 5 and 6 are longitudinal sections as indicated by the lines 5—5 and 6—6 on Fig. 2; Fig. 7 is a longitudinal section of a portion of the car adjacent the end, having a modified form of yielding resister against independent movement of the floor; Fig. 8 is a diagrammatic view illustrating the operation of this modified form; Fig. 9 is a cross-section on the line 9—9 in Fig. 7; Fig. 10 is a cross-section of the car having a modified form of guiding means for the longitudinally shiftable floor; Fig. 11 is a detail in transverse section of a modified form of supporting roller.

As shown in Figs. 1 to 6, "10" indicates a conventional car sub-frame, comprising a longitudinal central beam having laterally extending cross-beams or outriggers 11, carrying longitudinal beams 15 at their outer ends. The central structure may be a box girder, as indicated in Fig. 4 and the out-riggers, for instance, pressed metal frames secured to the sides of the central girder, as shown in Fig. 10. The edge beams 15 may be channels, suitably braced. Near the ends of the car the central box girder carries the usual journal box 12 for the king-pin of the trucks of which the wheels are indicated at 13. This sub-frame and its connection with the trucks, however, may be of any desired form.

As shown in the drawings, the sub-frame carries a plurality of longitudinally positioned upwardly facing trackways. Three of these are shown, comprising an upwardly facing channel 20, mounted on top of the central box girder and upwardly facing channels 21 adjacent each edge of the frame. If the outriggers of the sub-frame have longitudinal beams at their ends as illustrated by the channel beams 15, as is the usual construction, the horizontal track channels 21 may rest on the upper flanges of the channels 15, as well as on the frame cross-beams, as illustrated in Figs. 3 and 4.

The car floor 30 comprises a suitable platform which, as hereinafter explained, has a roller engagement with the sub-frame trackings. As shown in Fig. 3, the floor has an upper layer of wood and under stringers 31. This floor carries on its underside downwardly facing channel beams 35 and 36, which extend within the flanges of the channel beams 20 and 21 respectively. The overlapping flanges of the two sets of channel beams provide lateral guides, preventing independent transverse movement of the floor and provide also space for the rollers supporting the

floor. These rollers may be hardened steel cylindrical members 40, suitably spaced apart, as for instance, by wooden blocks 41 between them, carried by the floor channels 35 and 36, as shown in Fig. 5.

It will be seen that the floor is adapted to roll on the sub-frame, lengthwise thereof in either direction, but cannot have independent lateral movement.

I yieldingly limit the longitudinal movement of the floor, relative to the sub-frame, and I provide for its automatic return to neutral position, and thus blows to the frame are only gradually transmitted to the floor. To effect this action I may provide horizontal compression springs on the underside of the floor between abutments carried by the floor and abutments secured to the sub-frame.

As shown in Figs. 4 and 6, the floor abutments 60 are made by means of a suitable cross-beam secured to the underside of the floor, shown as a hollow casting carrying guiding tubular extensions 61 to house the springs 50. I have shown four tubular extensions in Fig. 4, two on each side of the car, to carry four longitudinal compression springs. Tubular extensions with the projecting ends of the springs extend into tubular housings 71, carried by the abutment member on the base-frame.

I have shown the frame abutment as comprising a cross-beam 11*a*, which is located at the king-pin bearing, but any other location may be employed, if desired. As shown, the different pairs of compression springs bear at their inner ends against the opposite sides of the cross-frame 11*a* and at their outer ends against the two depending cross-beams 60 of the floor.

It will be seen that the construction described provides an effective yielding retarder, preventing longitudinal movement of the floor with reference to the sub-frame, except in case of shock in which case the frame may move relative to the floor a short distance, and then the floor, by reason of the reaction of the springs gradually returns to normal position. This eliminates or very materially reduces the shock to the load carried by the floor.

To hold the floor down on the sub-frame, I prefer to provide the edges of the floor with downwardly projecting inwardly extending brackets in the form of hooks 80, which have their lower portions extending beneath the projecting portions of the floor frame channels 21.

In place of using the metal springs to yieldingly resist the movement of the floor, I may employ a fluid yielding device as illustrated in Figs. 7, 8 and 9. For instance, one of the cross-girders, as the king-pin girder 11*b*, may carry on its opposite sides longitudinal cylinders 90 in which operate pistons 91, the rods 92 of which are connected to abutments 93, depending from the floor-frame. Such pistons may operate against compressed air in the cylinders, supplied thereto through suitable piping with a proper valve. I prefer, however, to employ liquid in the cylinders communicating with tanks to which compressed air is supplied. Fig. 8 illustrates by way of example a system of piping which may be employed in connection with such cylinder-and-tank embodiment. It is to be understood that that embodiment is duplicated on each side of the longitudinal axis.

In Figs. 7 and 8, a pipe 96 leads from the left-hand end of the two cylinders 90 to a common pipe 97 which communicates with the tank 94. Similarly a pipe 98 leads from the right-hand end of the two cylinders 90 to a common pipe 99, communicating with the tank 95. The cylinders, the pipes described, and the lower part of the tanks are filled with some non-compressible liquid, as glycerine or oil. A supply pipe 100 from the compressed air system of the car leads through a valve casing 101 to a pair of pipes 102 and 103, which lead through check valves 104 and 105 to the tanks 94 and 95, respectively. The piston rod 92 extends through the valve casing 101 and has about it a groove or other passageway 106, which enables free communication between the pipe 100 and the two pipes 102 and 103 when the pistons are in their neutral or central position, but closes such passageway in any other position.

With the piping system described, when a jar is given to the car frame, for instance, a bumping impact against the end of the car frame shown in Fig. 7, the cylinders carried by that frame will be moved in the left-hand direction, thus forcing some of the liquid in the right-hand portion of the cylinders through the pipes 98 and 99 into the tank 95 against the pressure of air in the upper portion of that tank. At the same time the pressure is reduced in the tank 94 by reason of the withdrawal of some of the liquid therein to the left-hand portion of the cylinders. Then, following the bumping impact, the increased pressure in the tank 95 reacts on the liquid therein and forces back the pistons 91 to normal position. In the case of a tugging blow similar increase in pressure would take place in the tank 94, with a reduction in the tank 95. The check valves 104 and 105 prevent the increase of pressure in either tank from passing over via the pipes 102 and 103 to the other tank.

The air pressure in the top portion of the two tanks is accordingly normally constant and, if desired, may be at about 75 pounds per square inch, being supplied by the air brake system of the train. The provision for normal open connection to the air brake system is to provide for leakage of compressed air. In the absence of leakage there will be no additional air supplied to either tank, for before the normal pressure is reduced in either of them by the piston-and-cylinder operation the piston rod will have shut off the connection from the main pipe 100. However, when the pistons return to their neutral position, the open connection to the train air pipe allows the restoration of pressure in the two tanks 94 and 95, equal to the pressure in the train pipe.

It will be seen that the embodiment illustrated in Figs. 7, 8 and 9, and above described, produces a fluid spring pressure, retarding independent movement between the floor and frame in either direction and restoring the displacement in a similar manner to that already described in connection with the steel compression springs of Fig. 6.

In place of relying entirely on the overlapping flanges of the upwardly facing frame channels and the downwardly facing floor channels to provide the lateral guide, I may provide rollers on vertical axes carried by the sub-frame and bearing against the longitudinal member of the floor frame. Such rollers are indicated at 110 in Fig. 10, and are mounted on studs journalled in brackets 111, secured to the cross-members of the under frame, the rollers bearing at their

outermost peripheries against the inner edges of the downwardly facing channels 36 of the floor frame. When such rollers are employed, the inner flange of the channels 21 are omitted at the rollers.

I have spoken of hardened steel rollers 40, loosely occupying the channels and spaced by blocks 41, carried by the floor channels. In place of this, however, I may employ rollers journalled in either the sub-frame or floor frame and coacting with the other frame. Thus, I have shown in Fig. 11 the floor frame 30 carrying brackets 120 in which are journalled gudgeons 121 on the ends of rollers 122. Each gudgeon has a supporting roller bearing engagement with the bracket as shown at 123, and a thrust ball bearing 124 engaging the flanges of the frame channels 21. This makes an anti-friction arrangement and may be employed, if desired, but is more expensive than the loose rollers and spacing blocks 41, heretofore described.

The nature of the structure carried by the floor depends on the use to which the car is to be put. It may comprise walls, etc. to make a box-car, or passenger coach, but my construction is especially designed for use with demountable automobile bodies shown at B in Fig. 1 and indicated by the lines designated B in other figures. To hold such demountable bodies in definite position on the floor, I provide the floor with upstanding projections 130, adapted to enter sockets in the base of the body.

The floor projections may be of the form shown, described and claimed in my Patent No. 1,814,304, granted July 14, 1931, to my assignee, Motor Terminals Company. As there shown, a base plate 131, adapted to be rigidly secured to the car floor, carries a projection which extends upwardly first as a cylinder 132 and then as a cone. There are at least four of these projections for each demountable body positioned at the four corners of a theoretic rectangle of smaller dimensions than the body. The projections may thus readily engage sockets of a complementary shape to the projection carried within the floor frame of the body, as described in the patent referred to.

It will be seen that when the projections on the floor frame are employed and the demountable body lowered into position on the floor, the body is rigidly anchored to the floor against shifting in any direction, while the floor has a limited and yieldingly restricted longitudinal movement with reference to the underframe, but automatically returns to neutral position. Accordingly, the package freight within the demountable body is relieved of the jar resulting from the buffing and tugging strains in the operation of the train. This greatly reduces the liability of damage to the freight in transit, and overcomes the necessity for bracing the individual packages, and is a great protection in case of an abnormally severe blow to the car.

I claim:

1. The combination of a running frame having trackways in the form of upwardly facing longitudinal channels, a floor frame having downwardly facing longitudinal channels, the flanges of the running frame and floor frame channels overlapping each other, and relatively travelling rollers within the space defined by said cooperating channels and having rolling contact with each of them.

2. The combination of a vehicle frame, a floor frame above it, trackways on the upper side of the vehicle frame and the underside of the floor frame respectively, said trackways being provided with overlapping vertical flanges preventing lateral shifting in either direction of the floor frame relative to the vehicle frame, and rollers between the trackways of the vehicle frame and the trackways of the floor frame having rolling contact with both of them.

3. The combination of a vehicle frame having a set of upwardly facing channels, a floor frame having a set of downwardly facing channels, the flanges of which overlap those of the upwardly facing channels, travelling rollers relative to both frames in the space defined by said coacting channels, distance blocks between the rollers, and means for yieldingly resisting independent movement of the vehicle frame and floor.

4. The combination of a vehicle frame having longitudinal upwardly facing channels adjacent its side edges, a floor frame having downwardly facing longitudinal channels adjacent its side edges, the flanges of the channels of one of said frames extending between the flanges of the corresponding channels of the other frame, and relatively traveling rollers rolling in the longitudinal space bounded by the webs of each cooperating pair of channels and the inside flanges of said pair.

5. The combination of a car underframe, a floor frame above it, longitudinal trackways on the two frames, one above the other, rollers between said trackways, traveling relative to both of them, a vertical flange on the trackway on one of the frames, and a lateral guiding roller carried by the other frame and coacting with said vertical flange.

6. The combination of a running frame, a floor mounted thereon to partake of an independent longitudinal movement, a cylinder and piston, one carried by the running frame and the other by the floor and arranged on a horizontal axis, a tank with which such cylinder communicates, and liquid in the tank, the cylinder and the communicating connection, and means for supplying air under pressure to the liquid in the tank.

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