United States Patent

[11] **3,547,049**

[72] Inventor **Frank H. Sanders**
8860 Fontainebleau Terrace, Cincinnati, Ohio 45231

[21] Appl. No. **678,270**
[22] Filed **Oct. 26, 1967**
[45] Patented **Dec. 15, 1970**

[54] **CONVERTIBLE RAILROAD CAR**
2 Claims, 9 Drawing Figs.

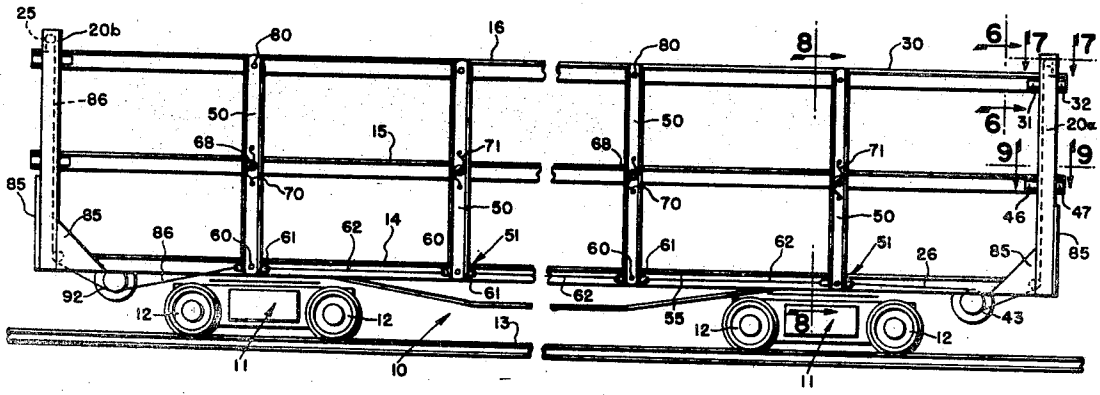
[52] **U.S. Cl.** **105/368,** 105/370
[51] **Int. Cl.** **B61d 3/02,** B65j 1/22
[50] **Field of Search** 105/368, 370, 371; 296/1A, 10, 24

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Primary Examiner—Drayton E. Hoffman
Attorney—Burton Perlman

ABSTRACT: The novel railroad car here provided may be used first to support goods such as automobiles upon a plurality of decks disposed at different levels, and alternatively with decks lowered to provide a single cargo surface. The plurality of decks raise straight up from collapsed position to raised position, and return straight down, and means are provided to stabilize the decks against untoward motion when they are in the raised position.



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SHEET 1 OF 5

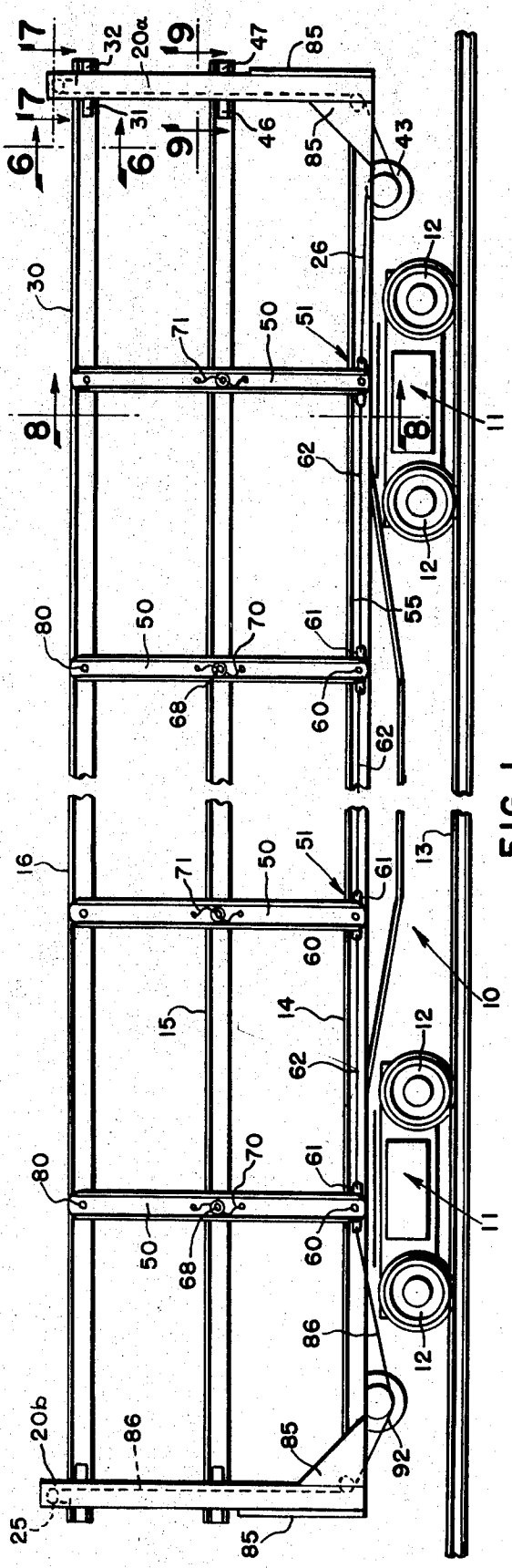


FIG. 1

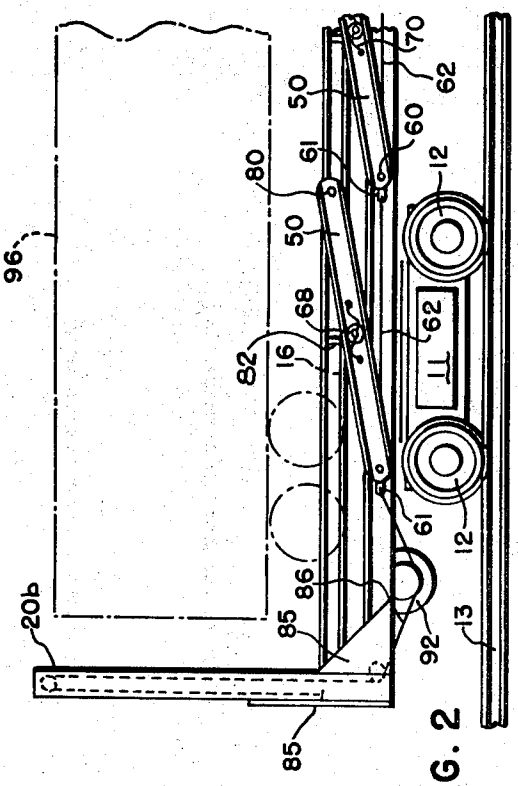


FIG. 2

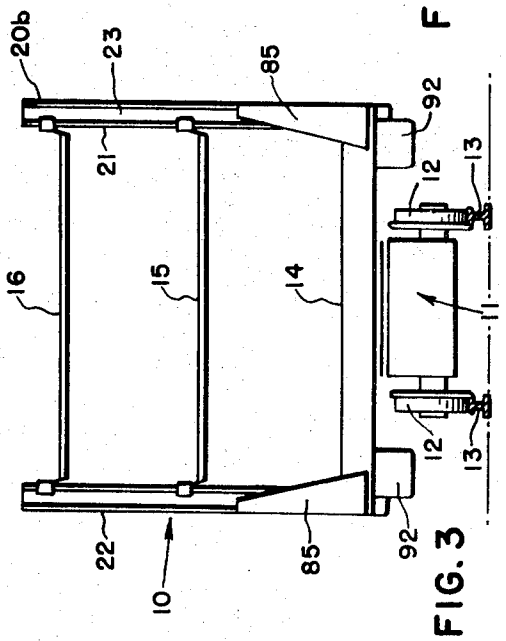


FIG. 3

INVENTOR.
FRANK H. SANDERS

BY
Burton Perlman

ATTORNEY

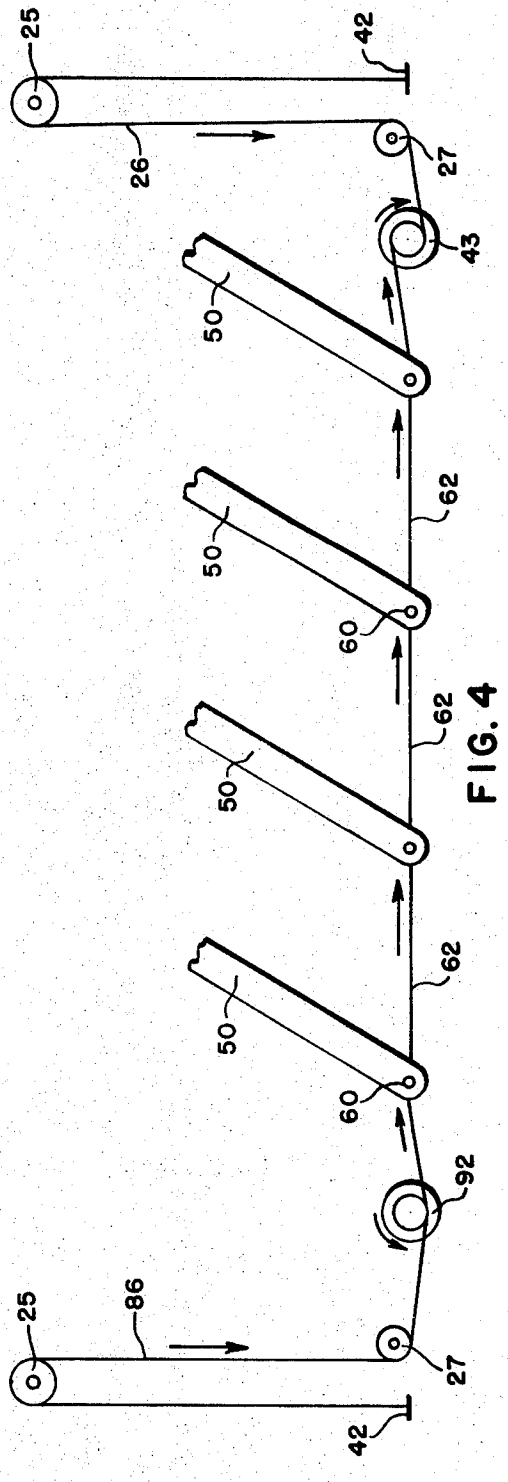


FIG. 4

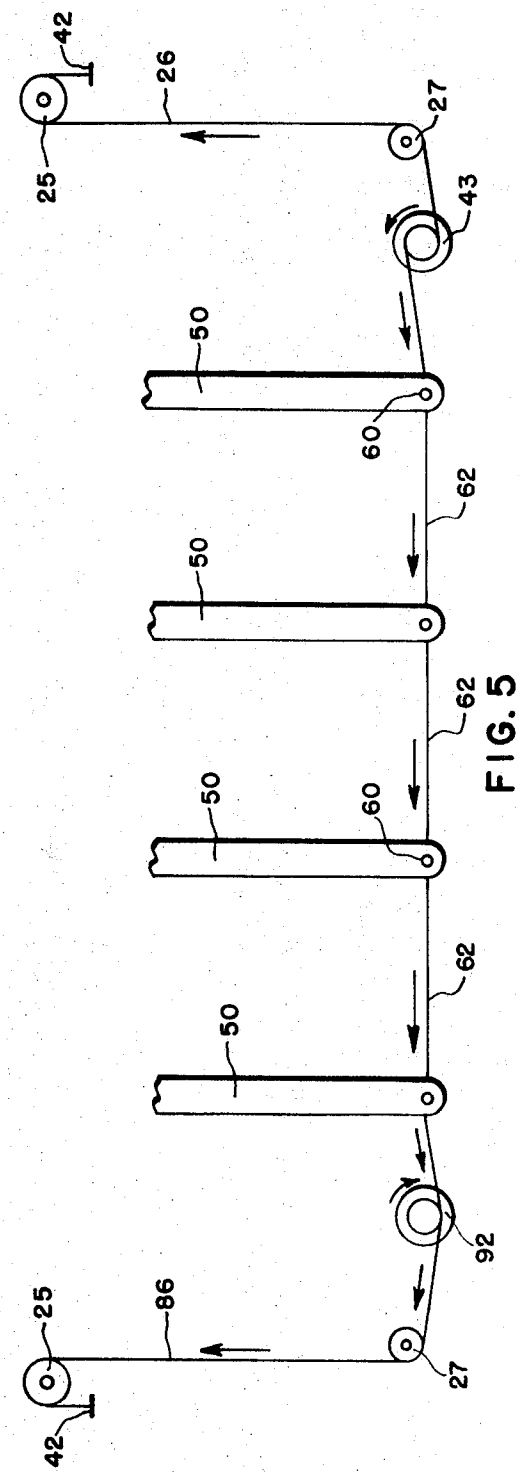


FIG. 5

INVENTOR.
FRANK H. SANDERS
BY
Burton Perlman
ATTORNEY

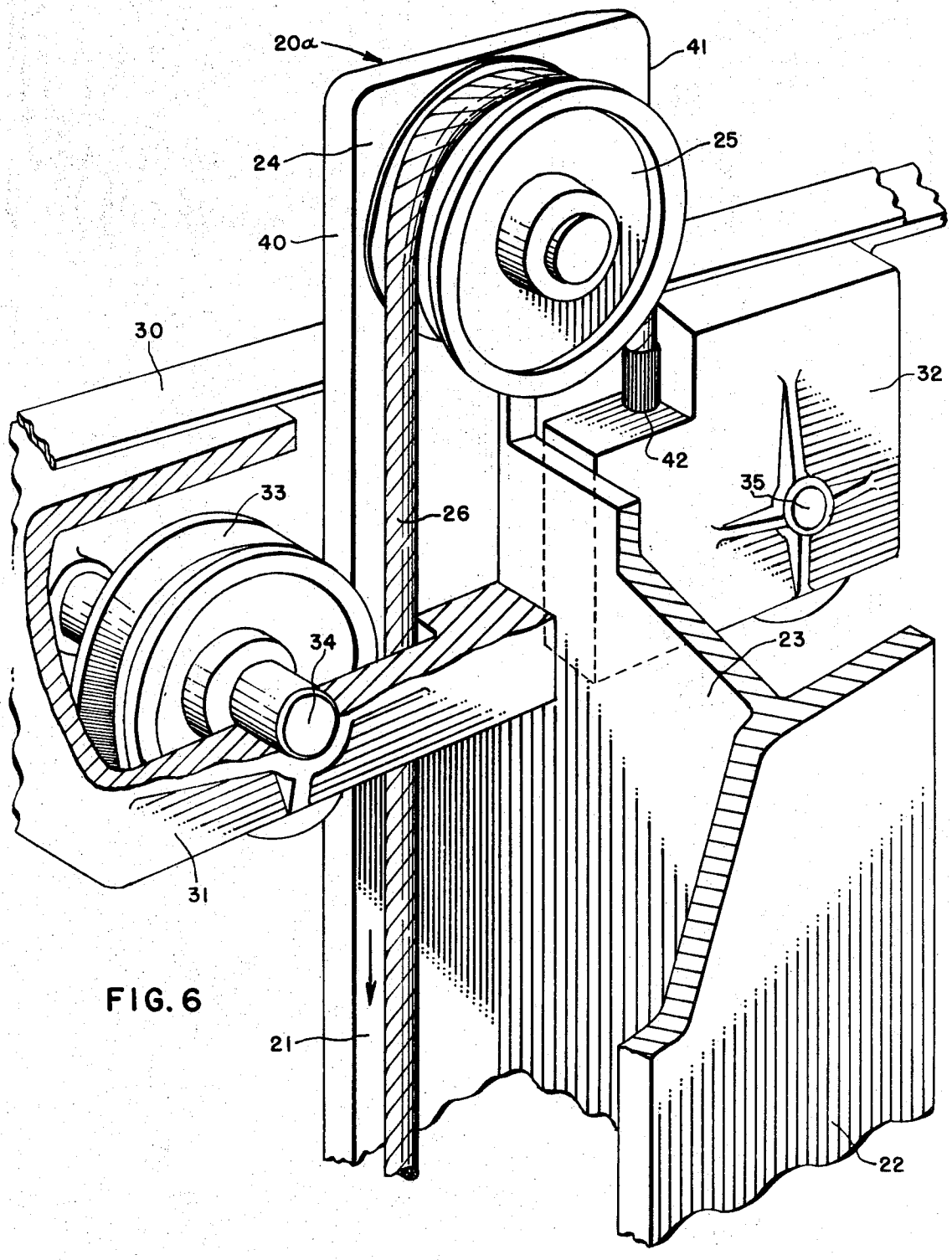


FIG. 6

INVENTOR.
FRANK H. SANDERS
BY
Burton Perlman
ATTORNEY

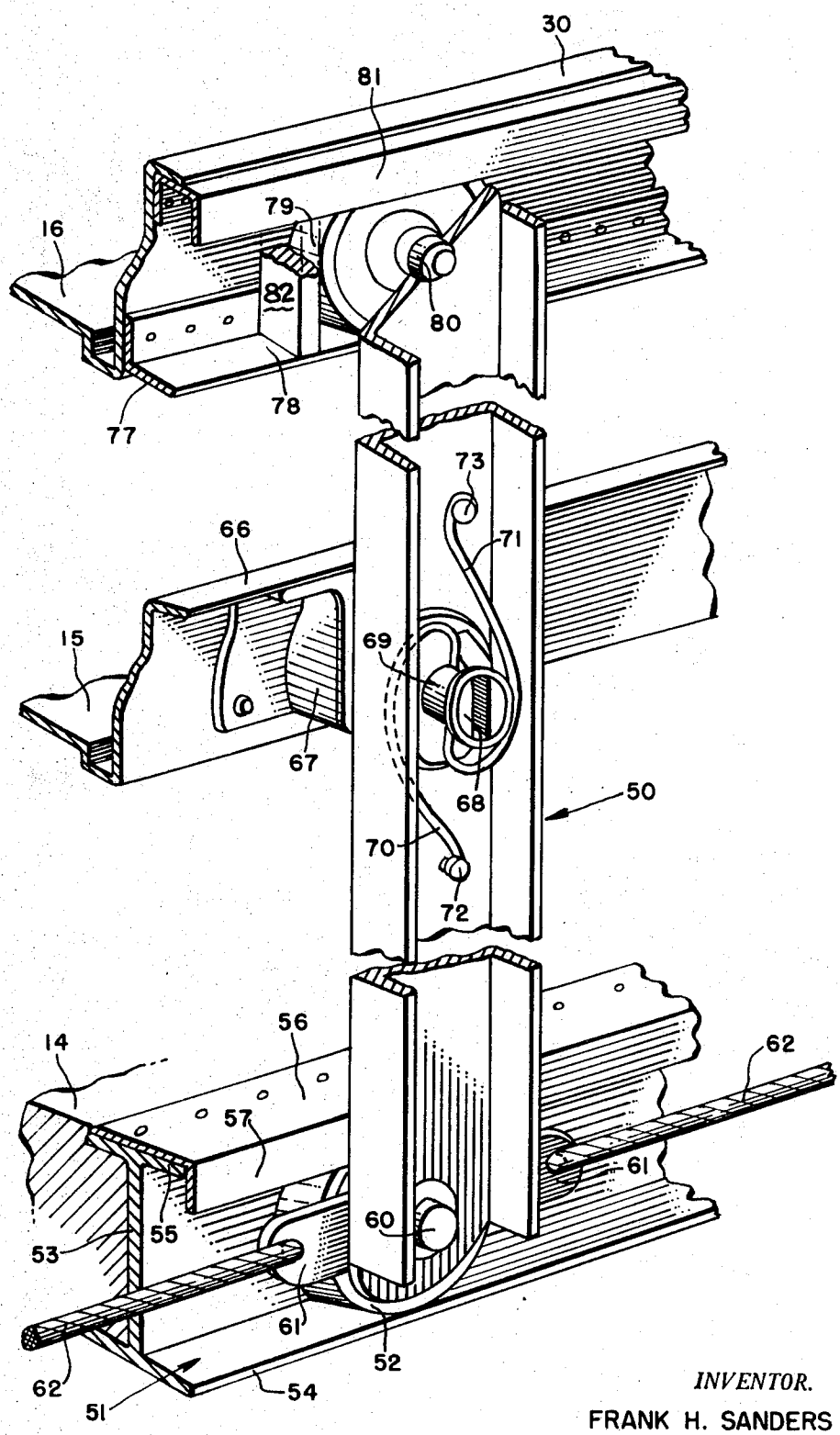


FIG. 8

INVENTOR.
FRANK H. SANDERS
BY
Burton Perlman
ATTORNEY

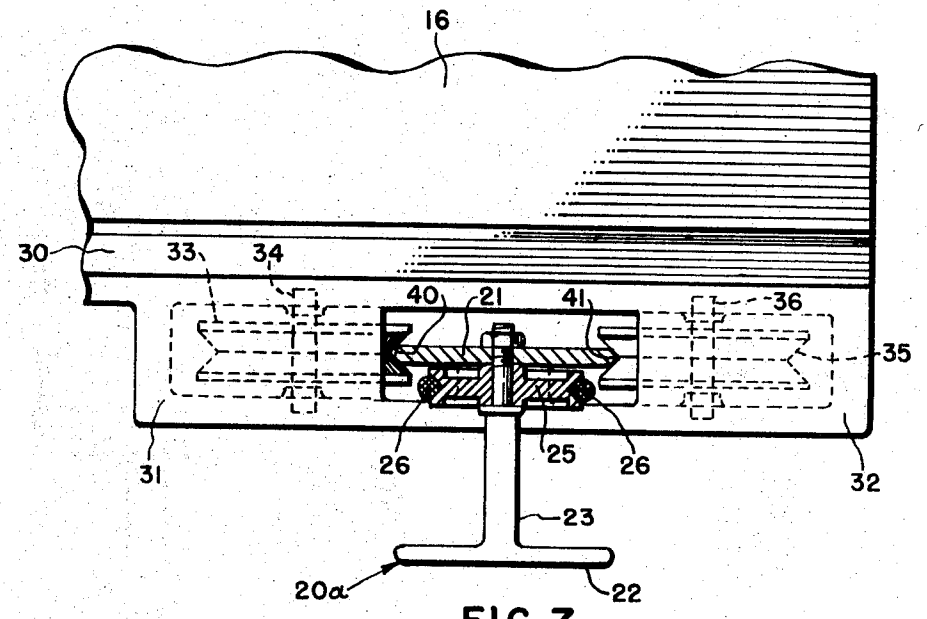


FIG. 7

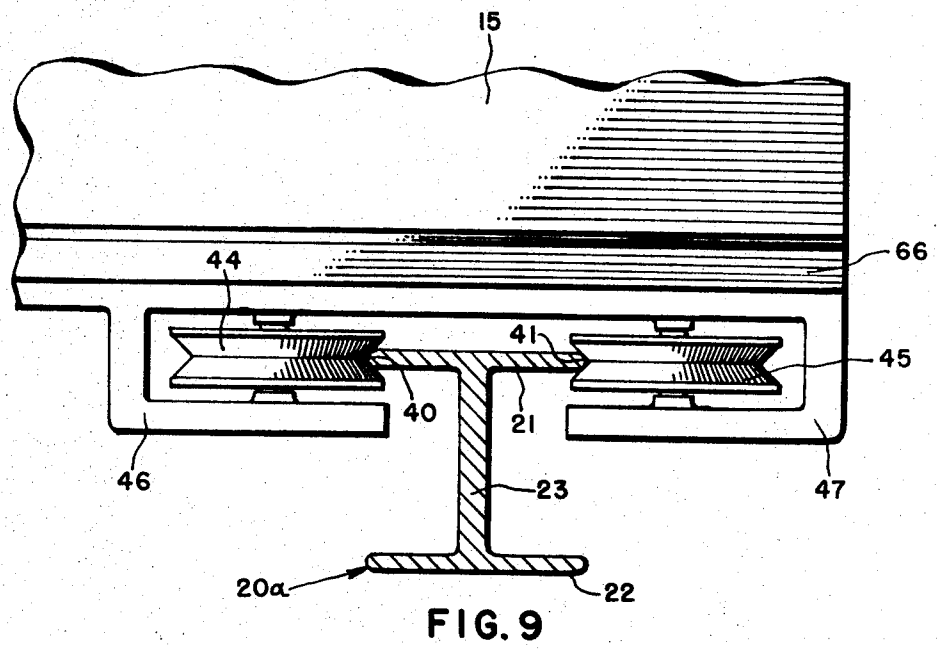


FIG. 9

INVENTOR.
FRANK H. SANDERS
BY
Burton Perlman
ATTORNEY

CONVERTIBLE RAILROAD CAR

This invention relates to a railroad car for carrying freight, and more particularly to such a car which may be loaded at a plurality of levels when so desired, yet which may alternatively be used with only a single cargo-carrying level.

It has now become conventional to transport automobiles by railroad from the place of manufacture of the automobiles to points where they are removed from the railroad carriers equipment for distribution to dealers and customers for the cars. Presently flat bed railroad cars are employed for this purpose, such cars being modified by having a superstructure built thereon comprising several decks upon which automobiles may be carried. A substantial number of automobiles may be carried on a single railroad car because of the employment of such a superstructure, and relatively efficient use of the railroad car is thus possible.

It is generally found, however, that the just described automobile-carrying railroad car is empty on its return trip from the distribution point, and thereby a substantial element of wastefulness enters the cargo-carrying operation of the railroad. The reason for the wastefulness is that the superstructure for carrying automobiles at several levels is a rigid permanent emplacement on the railroad car, and such superstructure does not lend itself to the carrying of cargo other than automobiles.

Accordingly, it is the primary object of this invention to provide a railroad car having a superstructure which provides several levels for carrying automobiles or other cargo, but which superstructure may be lowered to a second position in which a railroad car having all the utility of an ordinary railroad flat car is at hand.

It is a further object herein to provide a railroad car which while having a superstructure which may be disposed either in an elevated or lowered position, will when in the elevated position offer a firm and solid base upon which cargo such as automobiles may be carried.

Still another object herein is to provide a novel convertible railroad car in which the superstructure may readily be moved from raised to lowered position and vice versa in simple fashion.

How these and many other objects are to be implemented will become clear through a consideration of the accompanying drawings wherein:

FIG. 1 shows a side view of my novel railroad car with decks in erected condition;

FIG. 2 shows a side view of the same railroad car with the decks in lowered condition;

FIG. 3 is an end view of my novel railroad car looking at the left end of such car as represented in FIG. 1, decks being in erected condition;

FIG. 4 is a schematic view representing relationship of parts involved in deck movement and directions of movement when decks are being moved from lowered to elevated position;

FIG. 5 is a schematic view similar to FIG. 4 except that the movement represented is that when decks are being moved from elevated to lowered position;

FIG. 6 is a view in perspective showing elements related to corner posts involved with raising and lowering of decks, such perspective view being in the direction of 6–6 in FIG. 1;

FIG. 7 is a section of corner post taken at 7–7 in FIG. 1;

FIG. 8 is a perspective view of the detail of a supporting column, the view being taken in the direction of 8–8 in FIG. 1; and

FIG. 9 is a section of corner post taken at 9–9 in FIG. 1.

In the drawings the number 10 generally refers to the railroad car depicted. Such car has conventional truck assemblies 11 carrying wheels 12 which support the car upon the railroad tracks 13. The floor 14 of the car 10 surmounts truck assemblies 11. When in erected position (see FIG. 1) the embodiment of the present inventive railroad car illustrated in the drawings has three levels. Car floor 14 is the first level; middeck 15 is the second level; top deck 16 is the third level.

The decks when in the erected position as seen in FIG. 1 may carry cargo, for example, automobiles, on all three levels. Alternatively, the decks may be in lowered position as shown in FIG. 2 and when in such position the three decks are nested and cargo other than automobiles may be carried upon the flat bed thus presented. For example, the car may then be used to transport trailer trucks.

At each corner of the railroad car 10, is a fixed post having an I-beam cross section. One such post 20*a* may be seen at the right of FIG. 1, and a description of post 20*a* will be understood to apply to all four such posts since they are identical in construction. Post 20*a* has inner flange 21, outer flange 22 and web 23 between such flanges. The top deck 16 and middeck 15 each is interrelated at each of its four corners with one of the fixed posts, and one purpose of such interrelationship is to provide stability of the decks when they are in elevated position. In addition, the decks and fixed posts are interrelated so that the fixed posts may provide a guide for the decks as they are raised into erected position. The manner of interrelationship may best be understood from FIGS. 6, 7, and 9.

Web 23 of post 20*a* is cut down to permit the mounting of a pulley 25 on surface 24 of inner flange 21 near the top of the post 20*a*. Cable 26 passes over pulley 25. Top deck 16 has a horizontal surface 30 along the edge thereof, and housings 31 and 32 are secured to the top deck beneath said horizontal surface on either side of inner flange 21 on fixed post 20*a*. A wheel 33 is mounted within housing 31 upon a shaft 34, and a wheel 35 upon shaft 36 is mounted on the other side of inner flange 21, within housing 32. Wheels 33 and 35 are in contact with side surfaces 40 and 41 respectively on inner flange 21, side surfaces 40 and 41 providing tracks up and down which wheels 33 and 35 may run. One end 42 of cable 26 is anchored in housing 32. When a downward force in the direction of the arrow as indicated in FIG. 6 is exerted, it is apparent that an initial upward force upon the top deck 16 will be exerted. The means by which force is exerted upon cable 26 is, in the case of post 20*a*, winch 43.

Just a pair of wheels running along inner flange 21 of post 20*a* were provided for purposes of stabilizing the top deck during the process of raising such deck, as well as when such deck is in elevated position, so middeck 15 has a pair of wheels 44 and 45 within housings 46 and 47 respectively, such housings being mounted upon middeck 15 itself. The wheels 44 and 45 are in contact with side surfaces 40 and 41 respectively whereby such wheels run along such side surfaces and such side surfaces through their contact with wheels 44 and 45 stabilize the middeck when it is in elevated position.

As has been heretofore indicated winch 43 operating upon cable 26 (cable 26 passing not only over pulley 25, but also about a second pulley 27 before reaching winch 43) can cause the exertion of an initial or starting upward force upon top deck 16. The principal upward force, however, is exerted both upon top deck 16 and middeck 15 by means of supporting columns 50. As may be understood from FIG. 4 the same rotation of winch 43 which may be used to exert an initial upward force upon top deck 16, can also be used to exert a force causing supporting columns 50 to move to a vertical position as seen in FIG. 1, from the horizontal position seen in FIG. 2.

The details of the relationship of columns 50 to the decks may best be seen in FIG. 8, and it will be understood that the illustration for the column 50 in FIG. 8 applies as well to all such columns all of which are identified by numeral 50 in the drawings. Fastened to the side of the railroad car alongside the floor 14 or first level of the car is track assembly 51 within which roller 52 is confined and may move. Such track assembly 51 consists of I-beam 53; lower outer flange 54 and upper outer flange 55. A separate bent strip 56 is secured as by welding or riveting through the top of I-beam 53 in such fashion that depending skirt portion 57 thereof serves to provide a confined track for roller 52. Stub shaft 60, upon which roller 52 is rotatably mounted, is secured at the bottom of column 50 in such manner that column 50 may pivot about

such stub shaft 60 from vertical to horizontal position. Stub shaft 60 also passes through and supports a horizontal bar 61 therein, horizontal bar 61 serving as the means to transmit a lateral force to the bottom of column 50 and roller 52. Cable portions 62 interconnect the horizontal bars 61 mounted upon each column 50.

Middeck 15 has a horizontal flange portion 66 and a bearing 67 is secured at the side of middeck 15 and beneath flange 66. The function of the bearing 67 is to receive shaft 68 therein, shaft 68 also being secured within column 50, passing interiorly of collar 69. Springs 70 and 71 each are secured at one end in collar 69, the outer end of spring 70 being pinned to column 50 at 72, and spring 71 being similarly pinned at 73. Springs 70 and 71 are loaded as column 50 moves to the vertical position, the effect of loading such springs being to urge column 50 to return to horizontal position.

Top deck 16 has horizontal flange 30 and an L-shaped bar 77 attached to the side of top deck 16. Horizontal portion 78 of bar 77 provides a track upon which roller 79 may roll. Shaft 80 upon which roller 79 is mounted, itself is mounted upon column 50 in such manner that column 50 may pivot thereabout. A U-shaped bar 81 is mounted on the underside of flange 76 and provides confining means to keep roller 79 on horizontal portion 78 and bar 77. Stop plate 82 vertically secured between bars 77 and 81 provides a limit to movement of roller 79 when the decks are raised.

As has been indicated, decks 15 and 16 may be moved downwardly to lowered position, in effect providing a flat bed railroad car, or alternatively may be in the raised position. Reference has already been made to a force exerted at each corner of the decks to be raised by means of cables upon which a winch may pull. Thus, a post identical with the construction heretofore described for post 20*a* is fixed in position at each corner of the railroad car, reinforcing plates 85 serving to maintain such posts in position. Post 20*b* identical with post 20*a*, may be seen at the left in FIG. 1. In the case of post 20*b* force may be exerted on cable 86 to help raise top deck 16, and second winch 92 mounted on the underside of car 10 is the means for exerting such force.

When it is desired to move decks 15 and 16 from lowered position (as in FIG. 2) to raised position (as in FIG. 1) not only are forces exerted upon cables 26 and 86 (as well as cables at the other two corners which are not shown), but in addition a force, to the right in FIG. 4, is exerted upon horizontal bars 61 by means of winch 43. Because bar 61 is mounted upon column 50, the force to the right in FIG. 1 will pull the bottom of column 20 to the right, and because horizontal bars of columns 50 are fastened together by cable portions 62, the bottoms of all such columns are pulled to the right. The effect of the exertion of this force will be to cause such decks to be raised because decks 15 and 16 are pivoted to columns 50 at midpoint and top respectively, and the assumption of verticality of columns 50 will necessarily result in a raising of such decks.

Winch 92 plays an important role in the procedure for lowering decks 15 and 16 to the lowered position shown in FIG. 2, from the elevated position shown in FIG. 1. The way in which this is done is for winch 92 to exert a force upon horizontal bar 61 at the bottom of supporting column 50 to the left in FIG. 2. Such force exerted at the bottom of one post 50 will be transmitted to all posts 50 through cable portions 62. In addition to causing lowering by a force exerted at the bottom of post 50, it will be remembered that springs 70 and 71 were loaded during the process of raising decks 15 and 16 to elevated position, and the effect of such loading is to cause such springs to urge supporting columns 50 to return to lowered position.

Precipitous movement of decks 15 and 16 to lower position is prevented by reason of the necessity that cable 26, controlled by winch 43 in post 20*a*, and cable 86, controlled by winch 92 in post 20*b* must be paid out to allow deck 16 to move downwardly, and this downward movement of deck 16 may be controlled by the rate at which rotation of the winches is permitted to occur. Because columns 50 are integrated with middeck 15 as well as to deck 16, a restraint upon the rate of descent of top deck applies a like restraint upon the rate of descent of middeck 15.

When top and middecks have been moved to lowered position, the car may be regarded as a flat car for purposes of cargo carrying, and, for example, a truck trailer 96 as seen in FIG. 2 may be carried thereon.

Reference has heretofore been made to winch 43 at the right in FIG. 1, and winch 92 at the left in FIG. 1. It will be understood that there is a winch corresponding to each of these winches mounted upon the same shaft but on the opposite side of railroad car 10. Because such opposite winches are identical with those shown, they have been omitted from the drawings. By proper application of cables to winches 43 and 92, the operations of raising and lowering the decks 15 and 16 may be carried out, it being understood that the corresponding winches on the far side of the car are correspondingly loaded so that their rotation assists raising or lowering of the decks in the very same manner that rotation of winches 43 and 92 does. It will be further understood that the winches shown in the drawings may be manually rotated as by the employment of a crank.

Referring to FIG. 4, the operation of the winches and the forces which are thereby created are schematically depicted during the process of raising top deck 16 from its lowered position. During this procedure winch 43 is rotated clockwise. In doing so, the winch 43 operates to take in cable 26. In the structure here depicted this has the effect of giving an initial lift to the top deck 16, whereafter cable 26 may go slack. At the same time such clockwise operation of winch 43 will take in, or pull, cable segments 62 to the right, and thereby the bottoms of supporting columns 50 to the right. Winch 92 may meanwhile be rotated counter clockwise, and as may be seen, such rotation causes the taking in of cable 86 to give an initial lift to top deck 16 after which cable 86 need play no further role in lifting. Counterclockwise rotation of winch 92 also pays out cable segments 62 to permit support columns 50 to rise.

In FIG. 5 the events which occur during the lowering of top deck 16 from its raised position is depicted. During this sequence, winch 43 is rotated counterclockwise, thereby paying out cable 26 and also paying out cable segments 62, to permit cable portions 62, and the bottoms of supporting columns 50, to move to the left. At the same time winch 92 is rotated clockwise, thereby paying out cable 86, the result of which is to exert a force to the left pulling upon the bottoms of supporting columns 50 to induce them to move to a horizontal disposition. While two independent winches are indicated in the drawings, it will be understood that both may be simultaneously operated by a single control by conventional means. For example, a pair of worm gears could extend to either end of the car from a central position, a rotatable gear being mounted on the railroad car at such central position, in engagement with both worm gears, each worm gear at either end of the car engaging a circular gear rotatable with each winch.

While I have described a specific embodiment of my invention, it is apparent that changes and modifications may be made therein without departing from the spirit of my invention.

I claim:

1. A convertible railroad freight car comprising:

a railroad car undercarriage having truck and wheel means surmounted by a car floor; and

collapsible superstructure means supported upon said undercarriage, said superstructure means comprising:

a plurality of cargo carrying decks including a topmost deck, and an intermediate deck, said decks being capable of being disposed in a first position in which they are suspended and spaced above said car floor, in which first position said decks may each independently carry cargo, said decks also being capable of being disposed in a second position in which said decks are in

close proximity to each other so that only said topmost deck can provide a cargo carrying surface;

a plurality of columns spaced longitudinally along each side of said car pivotably mounted upon said intermediate deck to provide releasable support means for said decks when they are in said first position;

roll means rotatably mounted on said column;

track means in said topmost deck and on said car floor, said roll means being confined within said track means and being capable of rolling movement therein as said decks are moved from said first to said second position;

means for moving said decks between said first and second positions, said moving means causing said columns to move from a substantially horizontal disposition to a substantially vertical disposition as said decks are moved from said second to said first position; and

stabilizing means in said car interengaged with said decks, to provide stability to said decks when in said first position.

2. A convertible railroad freight car comprising:

a railroad car undercarriage having truck and wheel means surmounted by a car floor; and

collapsible superstructure means supported upon said undercarriage, said superstructure means comprising:

a plurality of cargo-carrying decks including a topmost deck, said decks being capable of being disposed in a first position in which they are suspended and spaced above said car floor, in which first position said decks may each independently carry cargo, said decks also being capable of being disposed in a second position in which said decks are in close proximity to each other so that only said topmost deck can provide a cargo carrying surface;

a plurality of columns spaced longitudinally along each side of said car in rotary engagement with each of said decks, said columns moving from substantially horizontal to substantially vertical disposition as said decks move from second to first position, and means for moving said columns between substantially horizontal and substantially vertical disposition, said means for moving said columns being capable of simultaneously exerting a lifting force upon one of said decks;

fixed post means extending upwardly from said car floor; and

post-engaging means mounted on said decks, and being in engagement with said fixed post means whereby movement of said decks in their own planes is minimized.