Dec. 28, 1965 W. H. BOGAR ET AL 3,225,706

BEAM RACKS FOR RAILROAD CARS

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FIG. 1

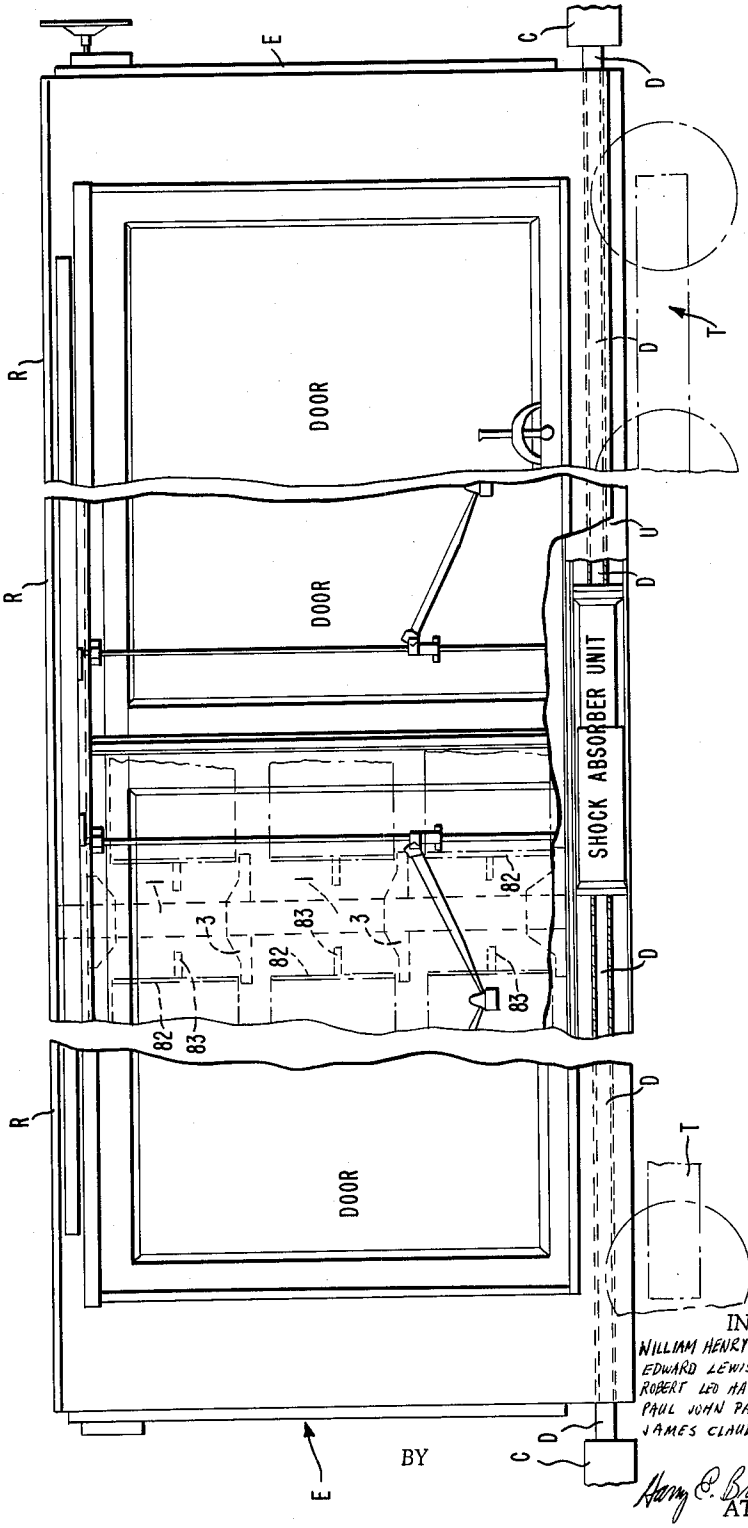

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FIG. 2

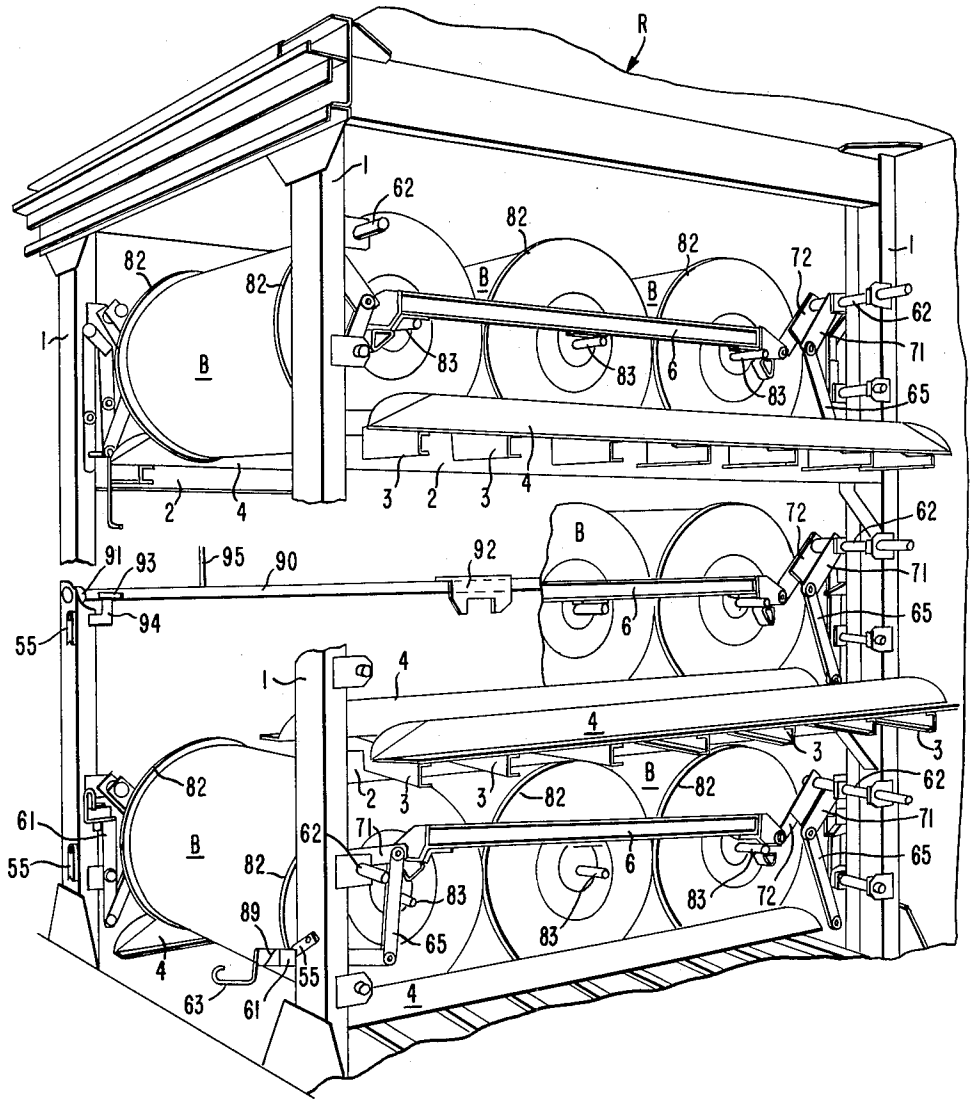

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FIG. 3

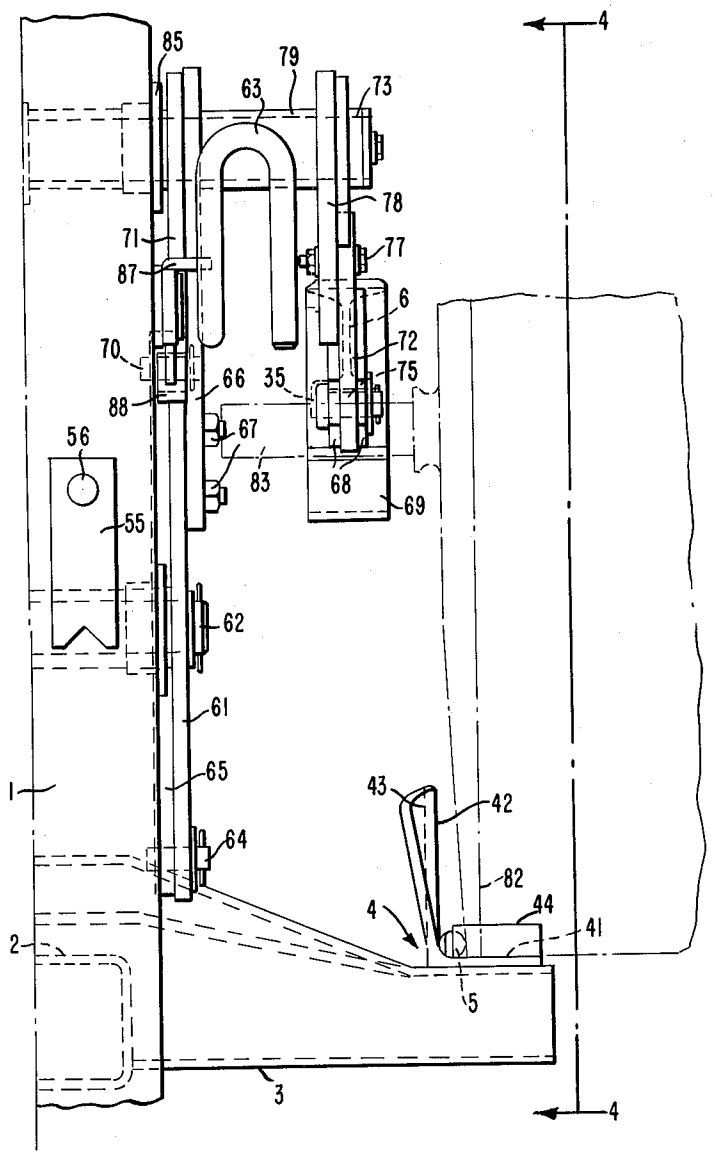

FIG. 5

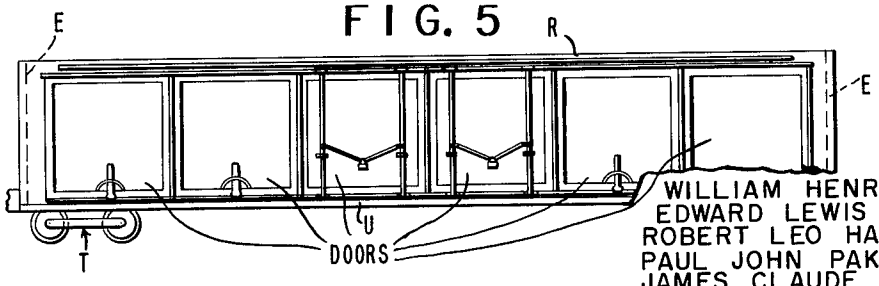

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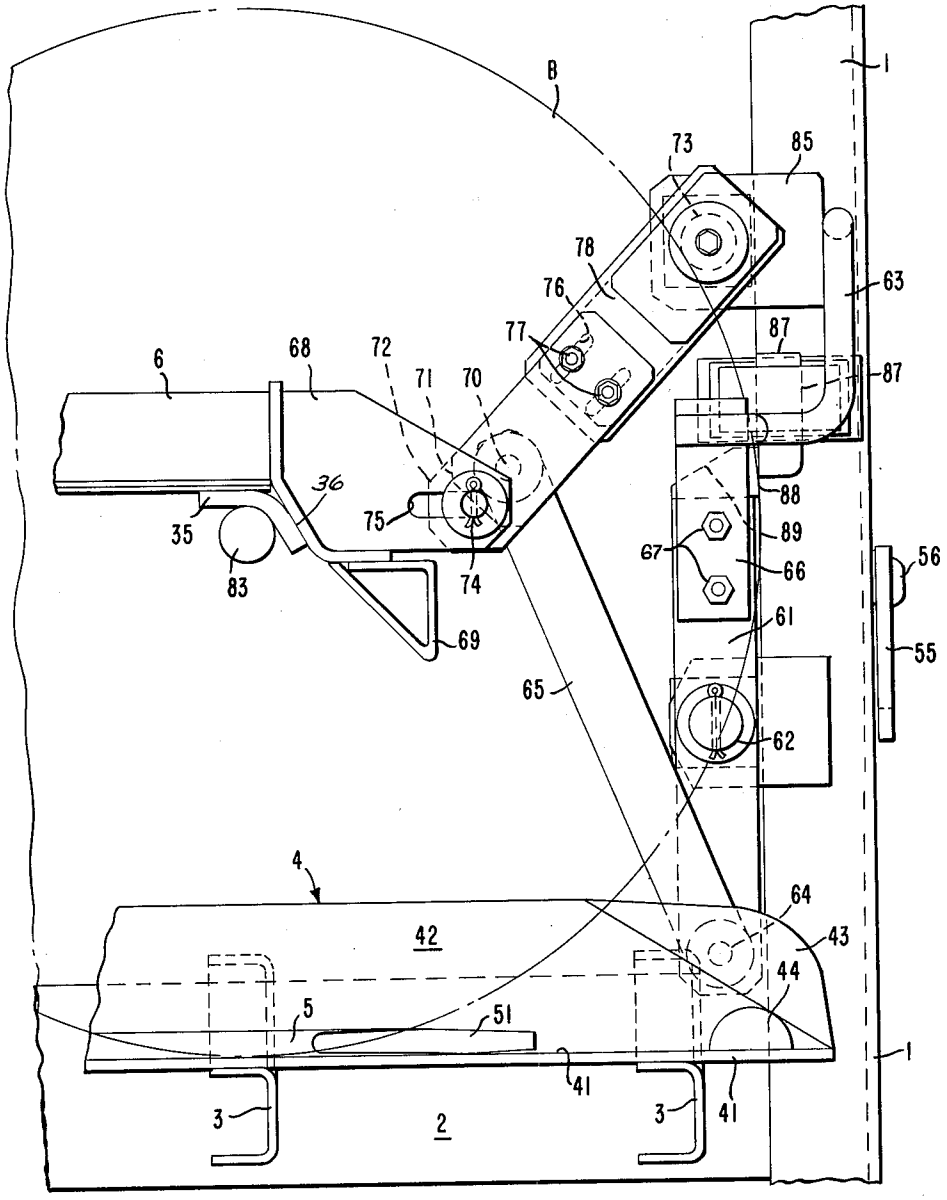
FIG. 4



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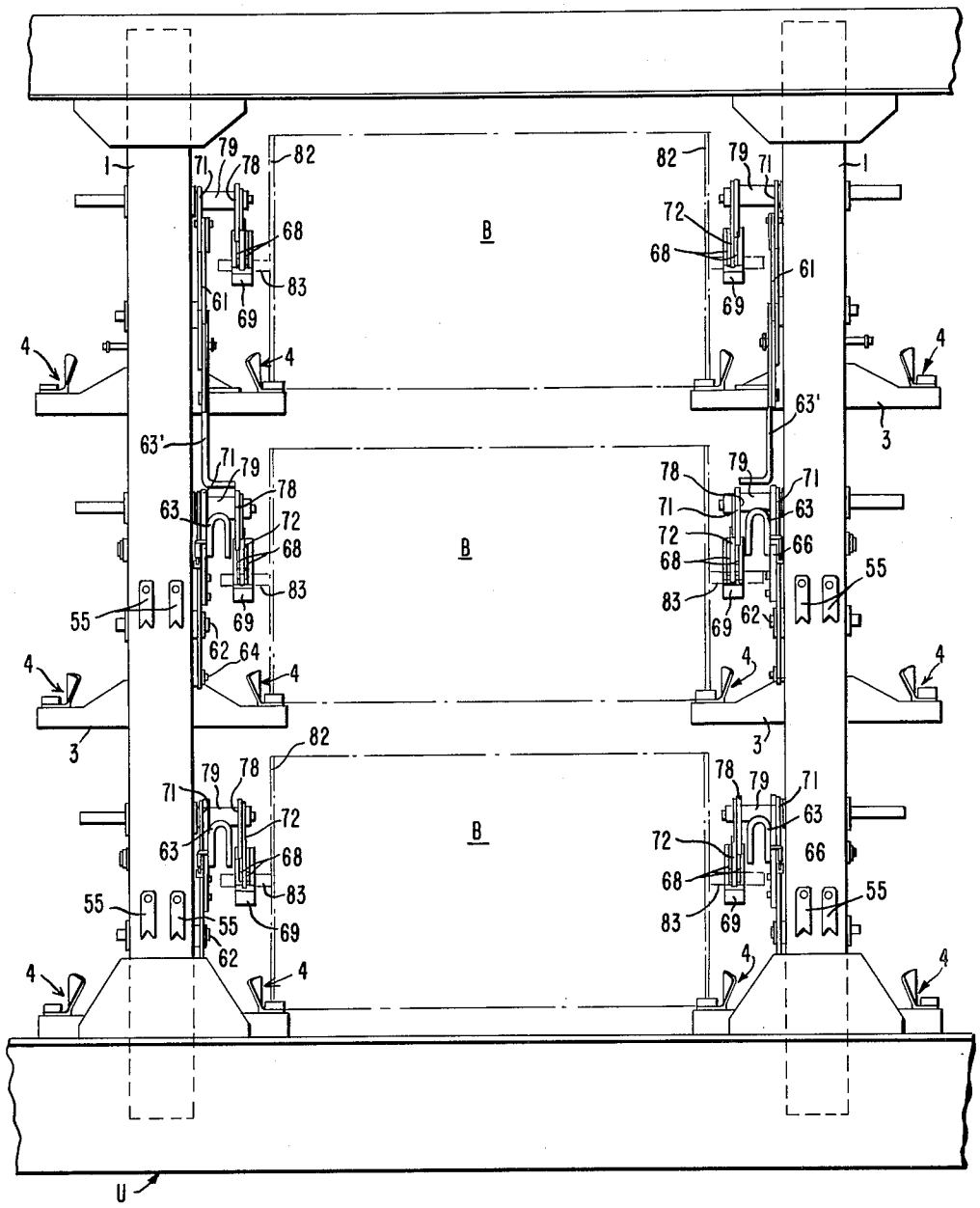

FIG. 6

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BEAM RACKS FOR RAILROAD CARS

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8 Claims. (Cl. 105—367)

This invention relates generally to the structure of vehicles for transporting freight. More specifically, the invention involves in combination with railway freight car construction an improved rack or frame structure useful in loading and transporting large heavy spool-like objects such as yarn beams, reels for film and fabrics, and reels for cables and the like.

The invention is of special significance in the loading, unloading, and transportation of the type of heavy beams upon which nylon, rayon, or other yarns are wound for shipment, it being very important that such beams be expeditiously loaded in the vehicle and secured against movement relative to each other and relative to the vehicle during travel of the vehicle in order to prevent damage to the yarn or to the beams. Such beams, when fully loaded with yarn, weigh between 1,000 and 2,000 pounds and great care must be taken in loading and during travel to prevent the impacts and minimize forces incidental to loading and travel which would damage the beams and the yarn.

It is an object of this invention to provide an improved frame structure in a freight vehicle for supporting and securing beams in traveling positions, and for permitting rapid and easy loading and unloading of the beams from the vehicle.

It is another object of the invention to provide an improved supporting frame structure for beams which structure is especially adapted to cooperate with a freight car construction of the type having the side portions of the enclosed freight space entirely formed by door members, and further having a single slidable drawbar assembly connected to the main body of the car through a shock absorber mechanism, this cooperation making possible maximum utilization of available freight car space with the greatest possible ease of loading and unloading.

It is another object of the invention to provide in conjunction with the freight car shock absorber features and "all-door side" construction mentioned in the preceding paragraph, an improved rack structure of sufficient strength to support and secure beams in position during travel of the car, while permitting safe efficient loading and unloading of individual beams from any longitudinal position along the length of the car and from either side of the car or both sides simultaneously as desired.

It is another object to provide an improved frame structure for the transport and handling of beams in a railroad freight car, which structure, through reasonably light and simple in construction, is effective and reliable to support and secure the beams during transportation without damage.

It is another object of this invention to provide a frame structure, or rack arrangement, for supporting beams, in a freight car which permits direct lateral unloading from either side and from any position along the length of the car and which permits beams to be moved in the frame structure by rolling when not secured in traveling condition.

It is another object of the invention to provide a frame structure which supports and maintains beams in a freight car in an attitude which prevents impacts or acceleration in the line of normal car travel from producing a tendency in the stored beams to move by rolling action.

Other objects and advantages will appear from a consideration of the following specification and claims when taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a side elevational view of a railway freight car provided with the improved frame structure of this invention. Certain structural parts have been broken away to simplify and clarify the showing. A portion of the frame structure with the beams supported thereon is shown with broken lines. The slidable drawbar and associated shock absorber device is also generally shown in this figure.

FIGURE 2 is a partial perspective view of the railway car and frame construction taken at one of the beam carrying positions along the length of the car. Certain parts have been broken away to show the arrangement of parts more clearly.

FIGURE 3 is an enlarged partial side elevational view of part of one of the vertical support members and one of the rail elements carried thereby. The position of one end of a beam positioned on the rail element is indicated in broken lines. The means for securing the beams in position against lateral and vertical movement is also shown in this figure.

FIGURE 4 is an enlarged end view of the partial structure shown in FIGURE 3 looking lengthwise of the car as indicated at line 4—4 of FIGURE 3.

FIGURE 5 is a general large scale side elevational view of the railroad car construction embodying features of the invention illustrating primarily the "all-door" side wall construction of the car.

FIGURE 6 is an enlarged view of the vertical support members, rail elements, and cooperating structure defining the beam carrying and securing frame structure of the invention at one longitudinally spaced position along the car showing the arrangement of parts in considerable detail.

The improved frame structure of this invention has special significance in combination with a general type of railway freight car construction in which the car is provided with, as shown in FIGURES 1 and 5 a main body unit U supported by wheeled trucks T and having as the body unit a housing enclosing the freight carrying space. The housing of this type car comprises two opposed end walls E, a roof R and opposed side walls which are entirely formed by movable door members as shown. In addition, this type car is provided with a slidabe drawbar assembly extending longitudinally through the body unit U and provided at its ends with usual coupling devices. A shock absorber unit cooperates with the drawbar assembly and the main body unit U to cushion longitudinal impacts and forces transmitted to the main body unit by the drawbar assembly. These features of the railway freight car construction preferably used in conjunction with the improved frame structure of this invention, are known to those skilled in the railway rolling stock art, and for this reason the specific details of the "all door" side construction, the slidable drawbar assembly, and shock absorber mechanism are not disclosed.

The objects of freight for which the frame structure of this invention is primarily intended are the large heavy spool-like objects known in the art as beams or reels. These beams are designated by the reference letter B and shown at various places in the drawings. The beams are conventional structures or articles and are generally described as having a central elongated shaft structure and two axially spaced opposed annular rim elements carried by or mounted on the shaft structure. In the drawings the ends of the central shaft structures are indicated by

reference numeral 83 and the annular rim elements by reference numeral 82.

The improved frame structure of the invention is preferably permanently fixed to the general freight car structure. This frame structure is sufficiently rigid and strong, in conjunction with the slidable drawbar and shock absorber mechanisms, that beams are satisfactorily supported and secured in position against the impacts and forces encountered by the car during travel and loading-unloading operations. As seen in the drawings this combination of features makes possible a frame structure which is relatively simple, light, and compact which permits maximum utilization of the car freight carrying space.

As shown in the drawings the frame structure comprises a plurality of vertical support members 1 suitably secured to the car structure at longitudinally spaced positions in the car. Laterally opposed vertical support members 1 are interconnected by cross-bar members 2 which extend transversely of the car and are positioned substantially horizontally as best shown in FIGURES 2, 3, and 4. Rigidly supported on each cross-bar member 2 are a plurality of shortened longitudinally extending rib members 3 each parallel and spaced laterally from the other rib member on a given cross-bar member. Sets of laterally extending elongated rail members 4 are rigidly supported on the rib members 3 on each cross-bar member 2. Each set of spaced parallel rail members 4 forms a substantially horizontal transverse guideway in the frame structure for receiving and supporting the annular rim elements of beams to be carried. Preferably the elongated rail members are formed with an L-shaped transverse cross section as best seen in FIGURES 3 and 4. The horizontal laterally extending surface of the rail member provides support in the vertical direction for rim elements of beams positioned in the frame structure. An elongated guiding and positioning element 5 is secured in the rail member in position adjacent and substantially parallel to the horizontal laterally extending surface of the rail member. This element 5 is preferably provided with a rounded transverse cross section which in cooperation with the element 5 on the opposed rail element of each set forms a downwardly converging abutment structure which engages and wedges the rim elements of a beam downwardly into position on the horizontal surfaces of the rail members. This abutment structure also provides positive restraint against axial movement of the beams in a longitudinal direction relative to the car structure. The extremities of elongated elements 5 are provided with tapered surfaces 51 to assist in guiding the beam rim elements as the beams are loaded at the outer ends of the lateral guideways. At least one of the elongated elements 5 forming a portion of a guideway is removably secured to its rail member so that elongated elements 5 of differing sizes may be substituted to accommodate beams with varying distances between the beam rim elements.

A transversely extending elongated bar element 6 is movably mounted adjacent each rail member 4 in the frame structure. Bar elements 6 are pivotally mounted at each extremity to the vertical support members 1 by swingable link elements each formed of slidable adjustable parts 72 and 78 which are attached to each other by means elongated holes 76 and bolts 77. As best shown in FIGURES 3 and 4, part 78 is rigidly connected to a hub or sleeve element 79 which is rotatably mounted on a pin or shaft 73 secured in vertical member 1. A part 71 is also rigidly connected to sleeve element 79 substantially parallel to part 78 at a position axially spaced from part 78 along the shaft 73. Part 71 is pivotally connected to one end of a manually operated lever 61 by means of link 65 and pins 70 and 64. Lever 61 is provided with a handgrip 63 by which the bar element 6 is moved, one end at a time, between a first position in which the bar element 6 engages elongated shaft structures 83 of beams B supported in the adjacent rail member to exert a downward force thereon sufficient to secure the beams against vertical and lateral movement on the rail members forming the transverse guideway, and a second position in which the bar element is spaced out of engagement with the shaft structures 83 to permit lateral and vertical movement of the beams for loading and unloading. The operation of manually actuated lever 61 is believed to be clearly illustrated in FIGURES 2, 3, 4, the lever being shown in the middle guideway in FIGURE 2 in a position in which one end of the bar element 6 is held out of engagement with the beam shaft structures 83. Pivoted elements 55 are movably mounted on vertical support members 1 to engage and hold the levers 61 in position in which the bar element 6 is maintained in the second position mentioned previously.

Each guideway is provided with a releasable latch device for holding beams near the car longitudinal centerline from lateral movement toward the sides of the car. These latch devices comprise an elongated transversely extending shaft 90 rotatably mounted in sockets 91 fixed in vertical support members 1, a latch element 92 having a notch for engagement with the shaft structure 83 of a beam in central portion of the guideway, the latch element and shaft being pivotally movable into and out of engagement with beam shaft structure by actuation of a handle 95 fastened to the shaft 90 for manual operation. A limit stop 93 on shaft 90 cooperates with a fixed abutment 94 mounted on vertical support element 1 to position element 92 in operative position for engaging the beam shaft structures 83 to prevent laterally rolling movement of the latched beam on the rail members 4 forming the guideway.

As will be seen in FIGURES 3 and 4 the rail members 4 are each provided at their extremities with flared portions or tapered surfaces 43 to facilitate loading of beams into the guideways. Also, members 4 are provided at their extremities with elements 44 which serves as detents or stop abutments providing some resistance to rolling movement of beam rim elements into and out of the guideway defined by the rail members.

It will be noted from the drawings, especially FIGURE 4, that bar elements 6 are provided with cam or wedge surfaces 36 which force the beam shaft structures 83 and beams laterally inward on the rail member as the bar is moved downwardly. These surfaces 36 also serve to hold the beams against lateral movement when secured in their traveling positions in the guideways. If desired additional elements 69 may be mounted on bar elements 6 to extend the cam or wedge surfaces 36. Bar element 6 is provided at its beam shaft engaging positions with resilient pad elements 35 formed of suitable material such as rubber or neoprene and secured to the bar structure.

Referring to FIGURES 3 and 4 catch element 87 is shown supported on member 1 adjacent the upper end of handgrip operated lever 61 for releasably maintaining the lever and its bar element in position of engagement with the beam shaft structures. Element 87 is vertically slidably mounted for engagement with cam surface 89 of element 88 which is rigidly connected to lever 61. Upon moving the upper end of lever 61 in toward member 1 the catch element 87 is cammed upwardly by cam surface 89 out of the way of element 88 and drops by gravity in holding position behind element 88. The catch element is manually lifted out of engagement with element 88 when it is desired to actuate lever 61 and its bar element 6.

The operation of the disclosed structure or apparatus is believed to be clear from the drawings and above descripition. It will be obvious that loading or unloading can be accomplished from either or both sides of the car and frame structure simultaneously, and can be accomplished directly at any of the longitudinally spaced beam guideway positions along the car.

For loading, the bar elements 6 are positioned as shown in the bottom row of guideways of FIGURE 2 by actua-

tion of handgrips **63** and held in position by engagement of lever **61** with elements **55**. Then the beams are loaded by rolling into position on the rail members forming each guideway. Latch **92** will automatically engage the central beam, being cammed upwardly out of the way by the beam shaft structure and then dropping down by gravity into latching engagement with the shaft structure. The beams in a guideway are secured in traveling position by upward movement of the handgrips **63** and latched in secured traveling position by latch elements **87**. Unloading is accomplished equally simply and effectively.

It will be noted that the transverse bar element operating linkage of the uppermost guideway is slightly modified for easier manipulation because of its more elevated position. The pivoted lever **61** being provided with an extended handgrip element **63'**.

It is believed clear that a significantly improved beam supporting and securing frame structure for freight vehicles has been provided. The frame structure of this invention cooperates with the particular freight car construction, for which it was designed, to perform its function in a manner not contemplated or possible by previous structures of this type. The frame structure makes possible maximum utilization of available freight space and also makes possible direct lateral unloading of individual small groups of beams at any position along the length of the car. This means that mixed loads with different parts bound for different destinations can easily be carried and expeditiously handled.

Furthermore, simultaneous loading and/or unloading can go on at a plurality of positions along the length of a given car. The novel structure of the invention is believed to be not only highly useful, but is a very significant improvement in this art.

In accordance with the patent statutes a preferred embodiment of the invention has been described in detail. Many modifications and variations within the spirit of the invention will occur to those skilled in this art and all such are considered to fall with the scope of the appended claims.

What is claimed is:

1. In combination with a railroad freight car having a longitudinal dimension generally corresponding to the direction of travel of the car, a given width and a given height, said freight car comprising a main body unit supported on wheeled trucks, a slidable drawbar assembly extending longitudinally through said body unit and provided with car coupling devices, a shock absorber mechanism cooperating with said drawbar assembly and the main body unit to cushion longitudinal impacts and forces transmitted to the main body unit by the drawbar assembly, said car further comprising a housing secured on said main body unit and enclosing a space for freight, said housing comprising opposed end walls, a longitudinally extending roof structure, and opposed longitudinally extending side walls, said side walls formed by a plurality of movable door members constructed and arranged to permit direct lateral access into the space for freight from either side at any longitudinal position along the car length; an improved frame structure mounted in housing structure for handling and supporting a plurality of beams, of the type comprising a central elongated shaft structure and two axially spaced opposed annular rim elements carried by said shaft structure, said frame structure also adapted to secure the beams against movement relative to the car and each other during movement of the car, said frame structure constructed and arranged to support and secure said plurality of beams in a plurality of groups at longitudinally spaced positions along the car, the beams of each group having their axes parallel to each other and substantially parallel to the longitudinal dimension of the car and the direction of car travel, the beams of each group being supported by substantially flat rail members of said frame structure in aligned rows extending vertically and laterally across the width of the car at each longitudinally spaced position for direct lateral loading and unloading of individual beams from the car from either side and both sides thereof at each of said longitudinally spaced positions, said improved frame structure comprising a plurality of vertical support members mounted at longitudinally spaced locations in said housing, a plurality of sets of vertically spaced superimposed substantially horizontal parallel rail members mounted on said vertical support members and extending laterally across the width of the car at each of said longitudinally spaced positions to form a series of vertically aligned horizontal guideways extending across the width of said car between said side walls of the housing, each guideway constructed and arranged to engage and support for rolling engagement therewith a plurality of parallel laterally aligned beams with the beam axes substantially parallel to the length of the car and its direction of travel of the car, said frame structure provided with abutment means positioned to cooperate with said beams to prevent axial movement of the beams longitudinally of the car, said frame structure further provided with releasable means adjacent each guideway for engagement with the shaft structure of beams supported on said guideway to positively secure such beams in position on said guideway and prevent vertical and lateral movement of such beams with respect to the guideway.

2. The improved frame structure of claim **1** in which each rail member of said plurality of sets of rail members comprises a horizontal surface for engagement with the periphery of one of said annular rim elements of one of said beams, and said abutment means comprises an element mounted on each rail member and provided with a first surface extending along said rail member adjacent said horizontal surface for engagement with a side portion of one of said beam annular rim elements positioned on said horizontal surface to prevent axial movement of said beam longitudinally of the frame structure and said car.

3. The improved frame structure of claim **2** in which said releasable means comprises a movable elongated transverse bar element mounted in said frame structure and positioned adjacent each guideway for movement between a first position in which said bar element engages the elongated shaft structure of beams supported in the guideway to exert a downward force thereon sufficient to secure the beams against vertical and lateral movement on said guideway, and a second position in which said bar element is spaced out of engagement with the shaft structures of beams on the adjacent guideway to permit lateral movement of the beams and unloading, said releasable means comprising a drive means for moving said bar element between its first and second positions.

4. The improved frame structure of claim **3** in which said bar element is provided with wedge means for engaging the shaft structures of the outermost beams in each guideway and urging said beams inwardly toward the longitudinal centerline of the car when said bar element is in its first position, each bar element independently pivotally mounted adjacent each end thereof and independently engaged with the drive means for independent movement of each end of said bar element between said first and said second positions.

5. The improved frame structure of claim **4** in which said releasable means further comprises a releasable latch device mounted in the frame structure adjacent each guideway for engagement with the shaft structure of a beam supported on the central portion of the guideway to prevent lateral movement of such beam on the guideway when said bar element is in its second position, and means for pivotally releasing said latch device from engagement with a beam supported on the central portion of the guideway.

6. The improved frame structure of claim **5** in which said abutment means element is further provided with a second surface extending along said rail member, said second surface of the abutment means on the corresponding rail member forming each guideway being oppositely

tapered to guide the annular rim elements of beams on said guideway downwardly into engagement with the horizontal surface of said rail members and into close fitting relationship with the first surfaces of each abutment means element on the rail members.

7. The improved frame structure of claim 6 in which each rail member is provided with laterally outwardly diverging guide surfaces at its lateral extremities which cooperate with similar opposed guide surfaces of the other corresponding rail member forming each guideway to control the movement of beams during loading and unloading on the guideways.

8. The improved frame structure of claim 7 which comprises fastening means for permanently securing said frame structure in said housing and on said car body unit.

References Cited by the Examiner

UNITED STATES PATENTS

1,400,140	12/1921	Callery	105—378
2,144,081	1/1939	Porte	105—368.5 X
2,762,514	9/1956	McGinn	211—13
2,828,023	3/1958	Berra et al.	211—13
3,003,436	10/1961	Peterson	105—454
3,009,426	11/1961	Nampa	105—367

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