

Oct. 27, 1959

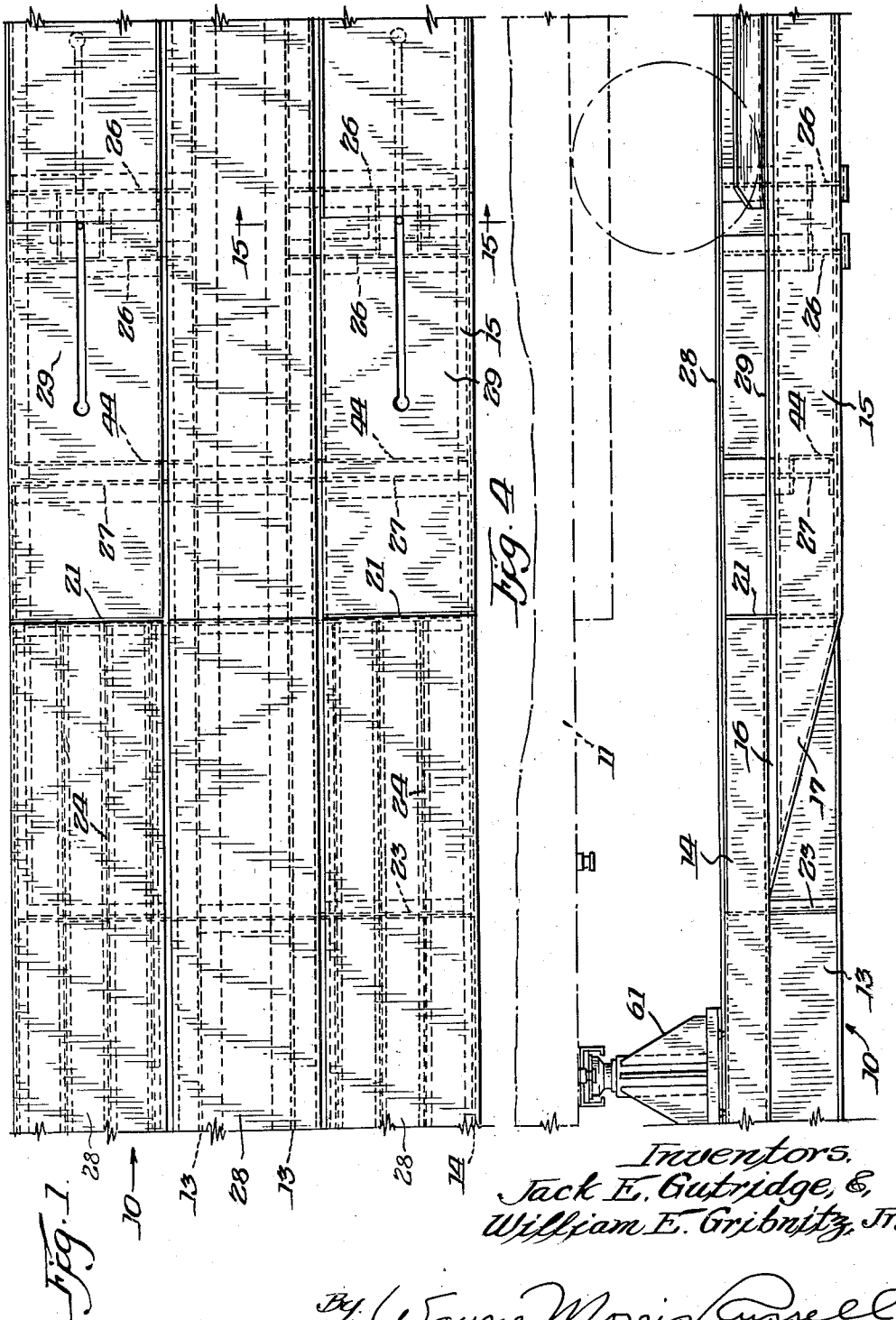
J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 1



Oct. 27, 1959

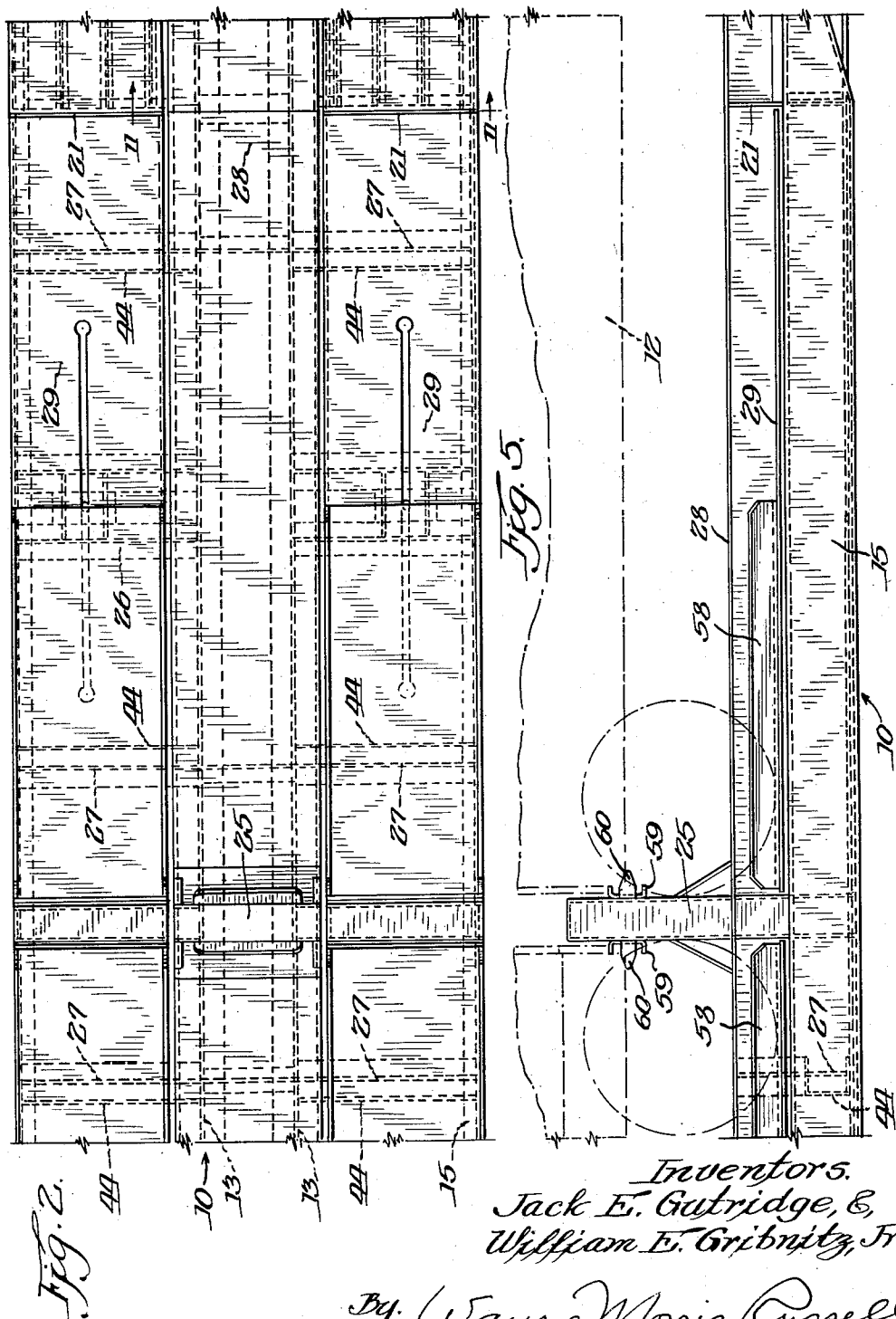
J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 2



Inventors.
Jack E. Gutridge, &
William E. Gribnitz, Jr.

By Wayne Morris Russell.
Atty.

Oct. 27, 1959

J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 3

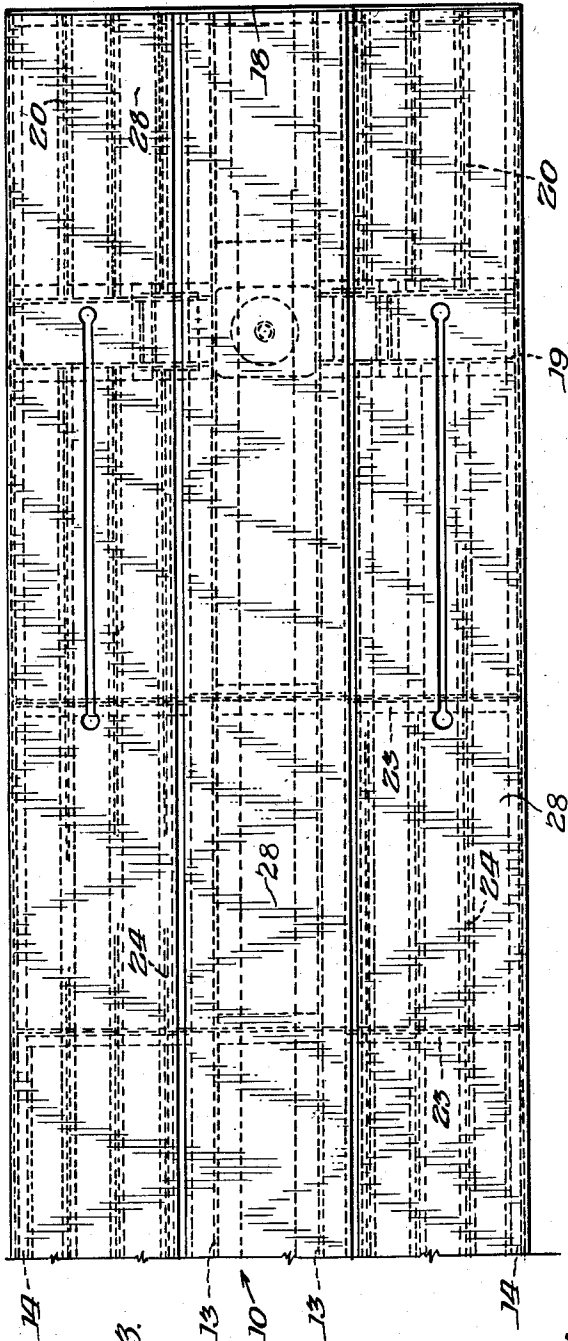
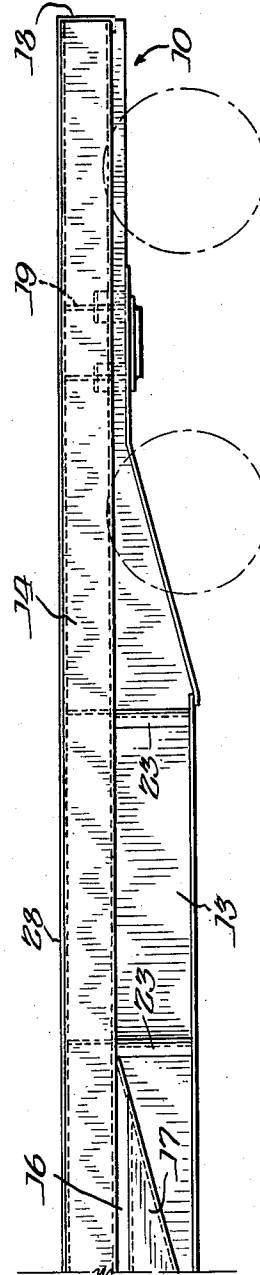


Fig. 3.

Fig. 6.



Inventors.
Jack E. Gutridge, &
William E. Gribnitz, Jr.

By Wayne Morris Russell.
Att'y.

Oct. 27, 1959

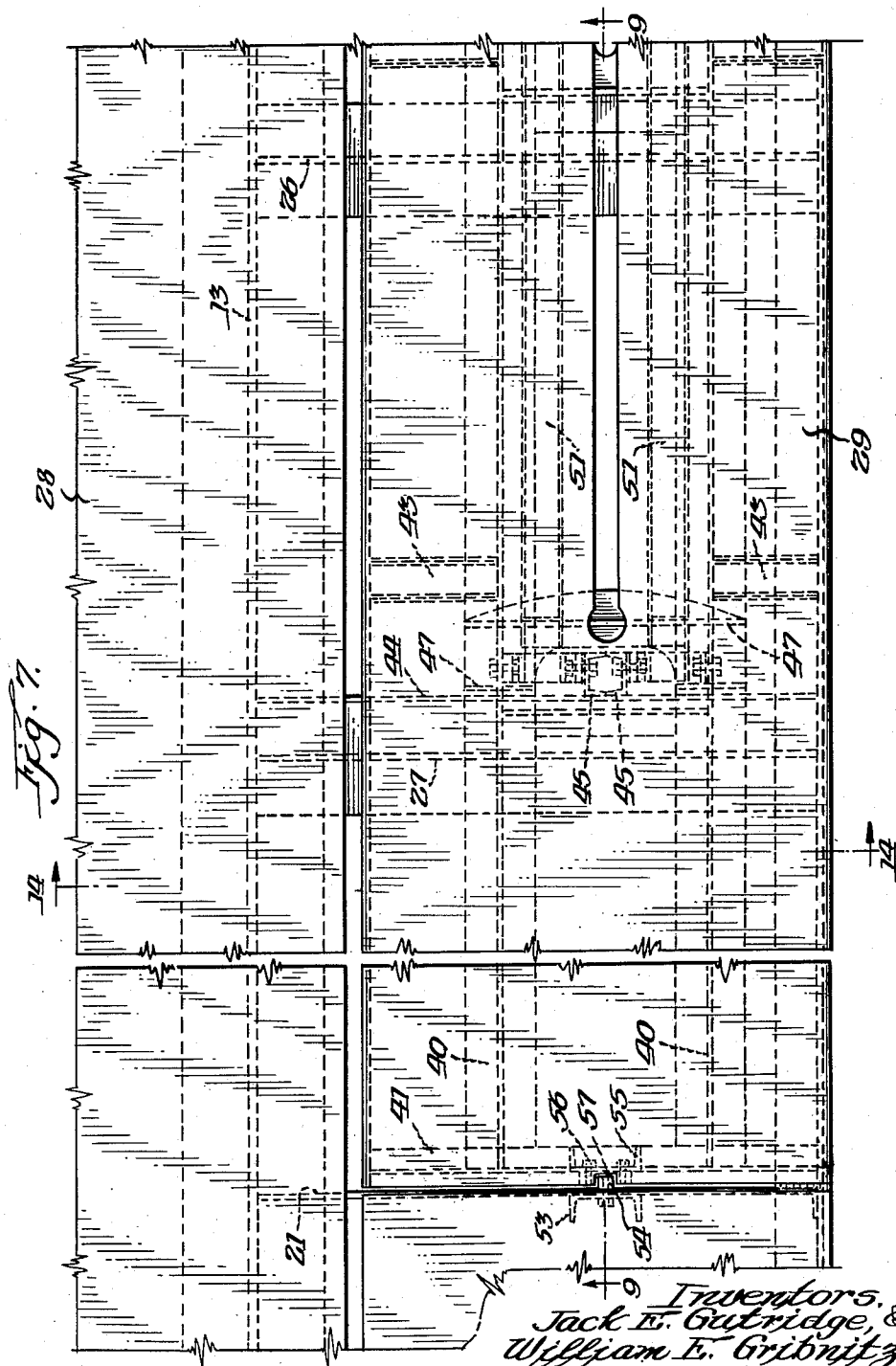
J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 4



Inventors.
Jack E. Gutridge, &
William E. Gribnitz, Jr.

By Wayne Morris Russell.
Atty.

Oct. 27, 1959

J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 5

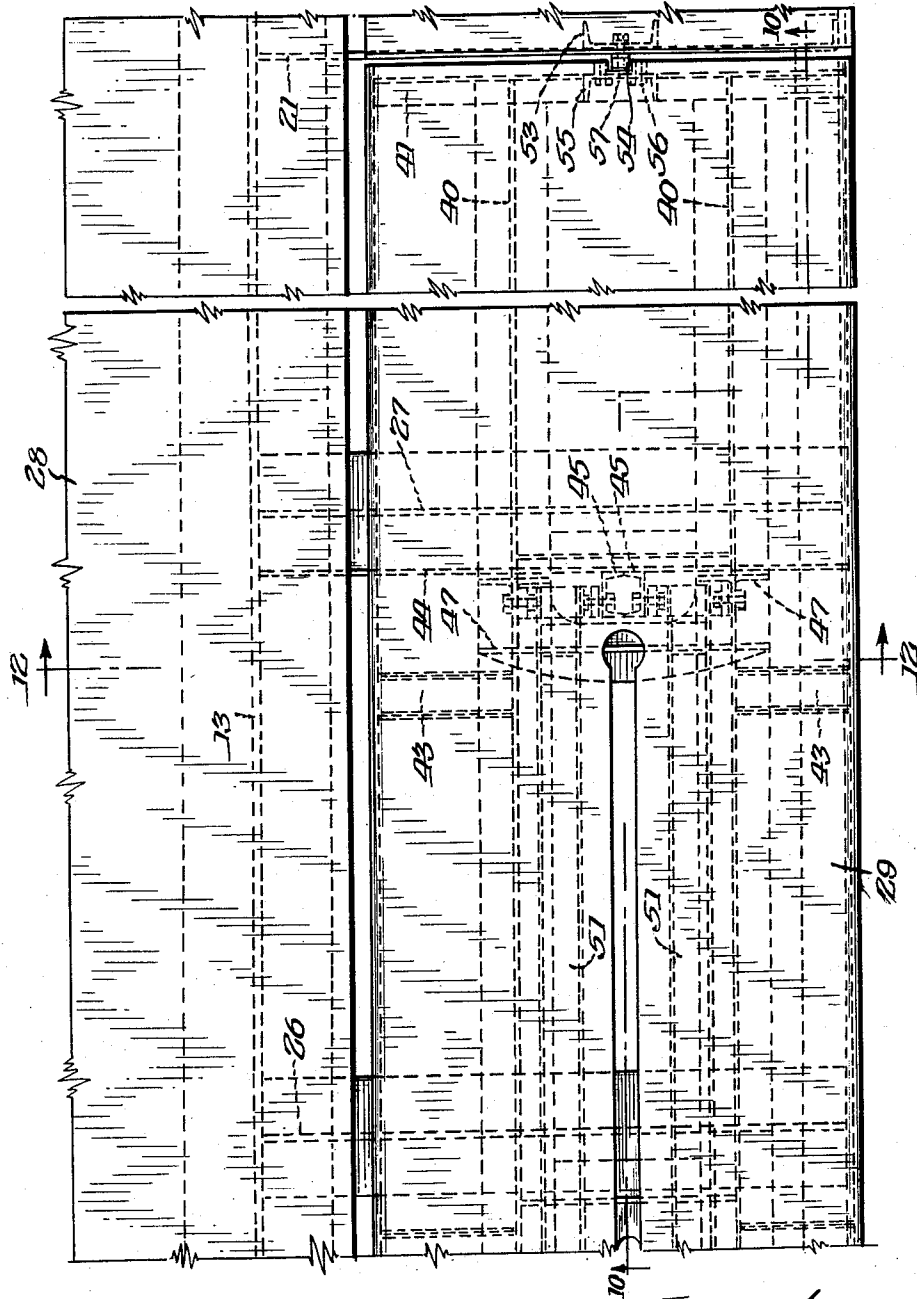


Fig. 8.

Inventors.

Jack E. Gutridge, &
William E. Gribnitz, Jr.

By Wayne Morris Russell.
Att'y.

Oct. 27, 1959

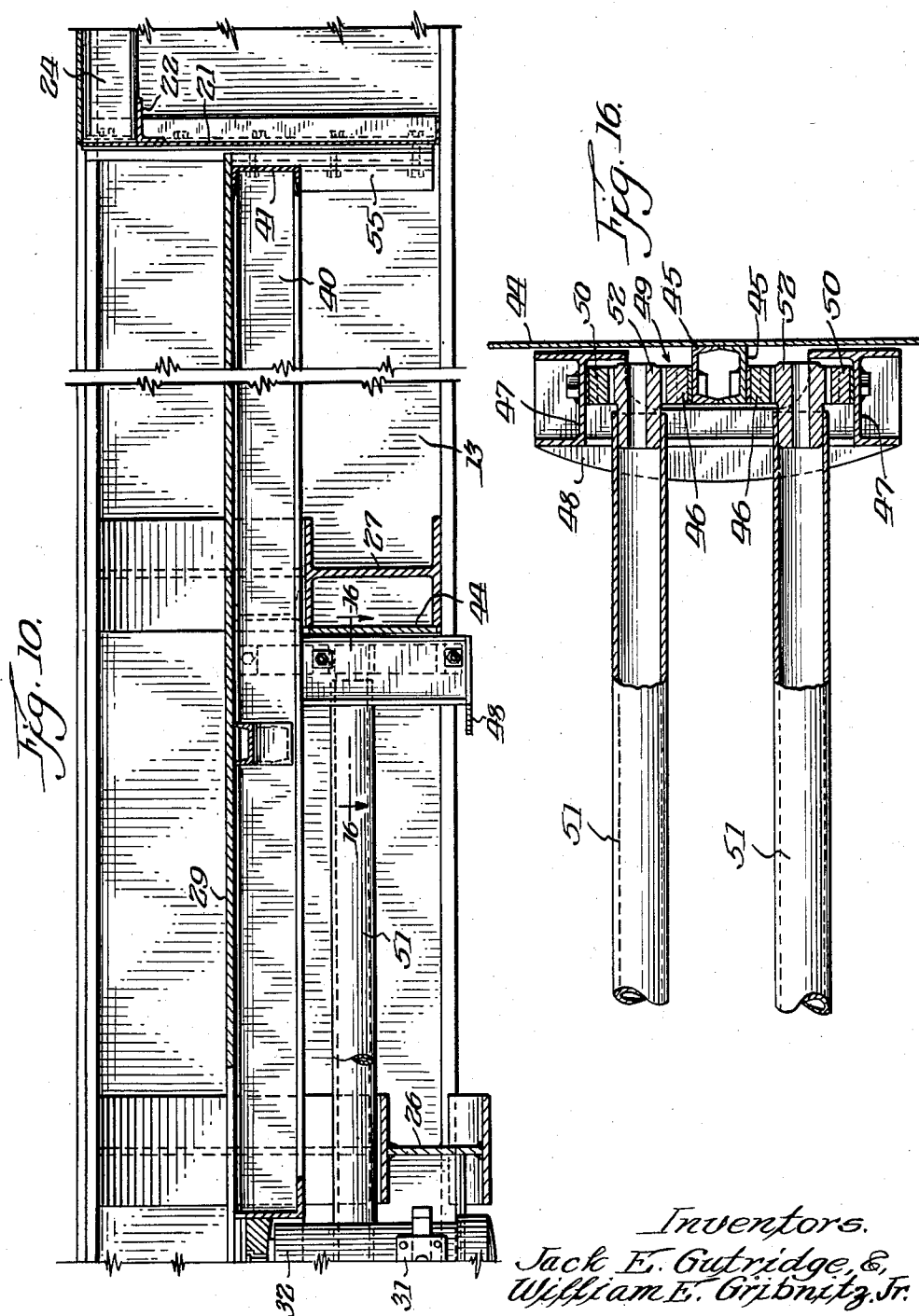
J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 7



Inventors.
Jack E. Gutridge, &
William E. Gribnitz, Jr.

By Wayne Morris Russell.
Atty.

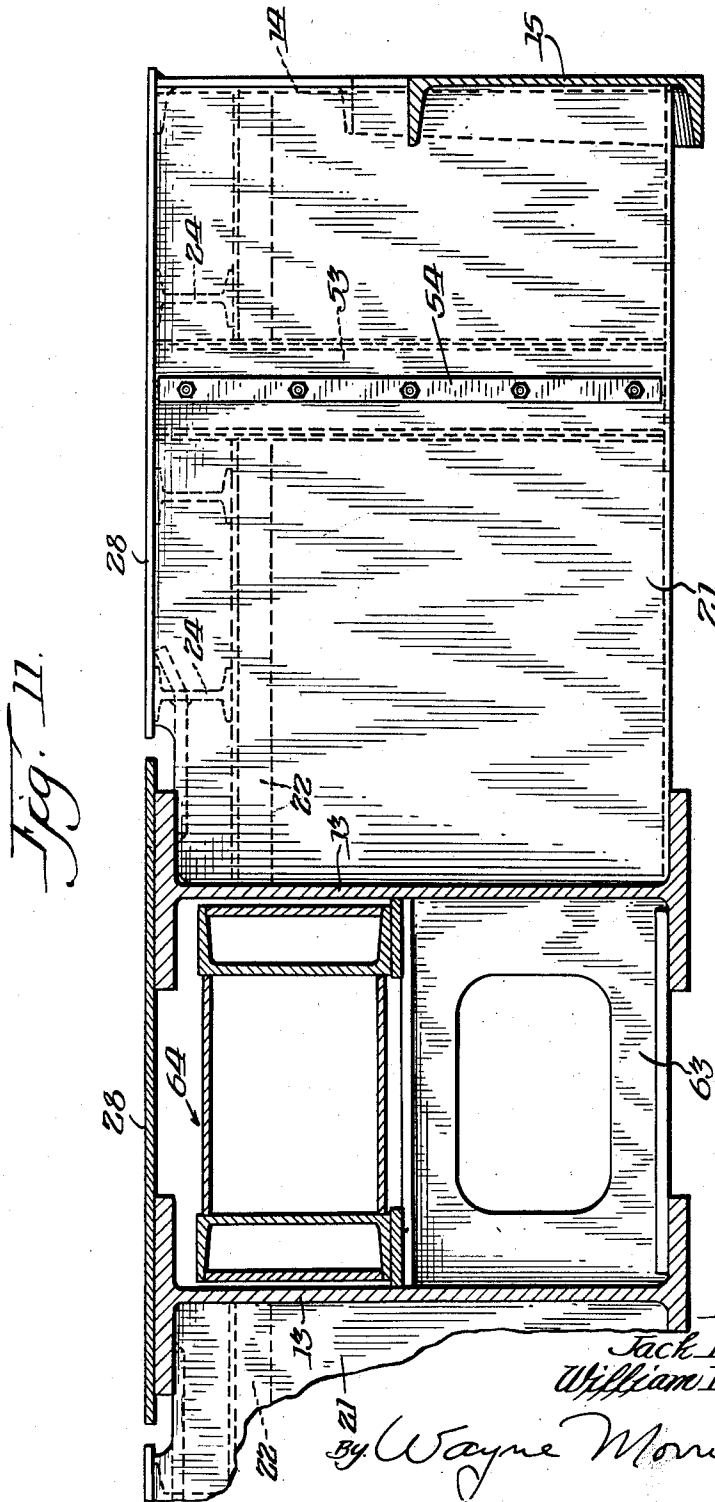
Oct. 27, 1959

J. E. GUTRIDGE ET AL
ELEVATOR FREIGHT CAR

2,910,015

Filed April 23, 1954

10 Sheets-Sheet 8



Inventors.

Jack E. Gutridge, &
William E. Gribnitz, Jr.

21
By: Wayne Morris Russell
Atty.

Oct. 27, 1959

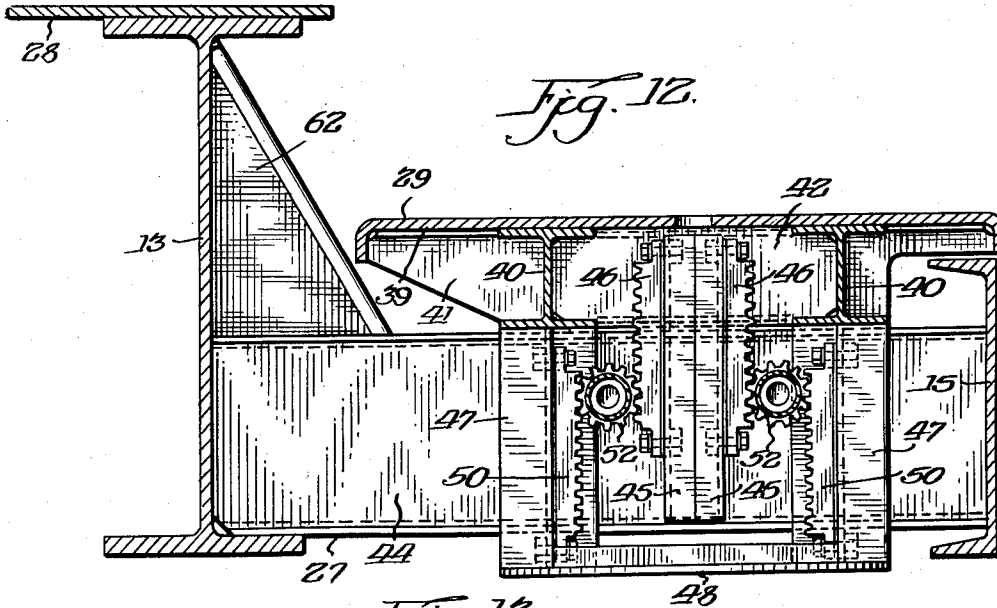
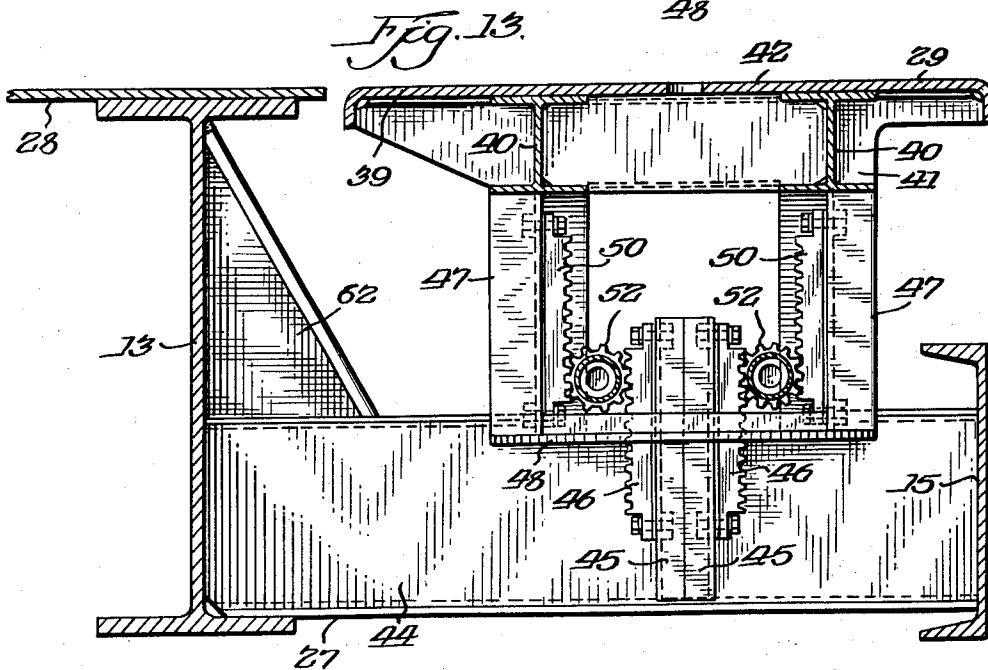
J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 9



Inventors.

*Jack E. Gutridge, &
William E. Gribnitz, Jr.*

*By Wayne Morris Russell.
Att'y.*

Oct. 27, 1959

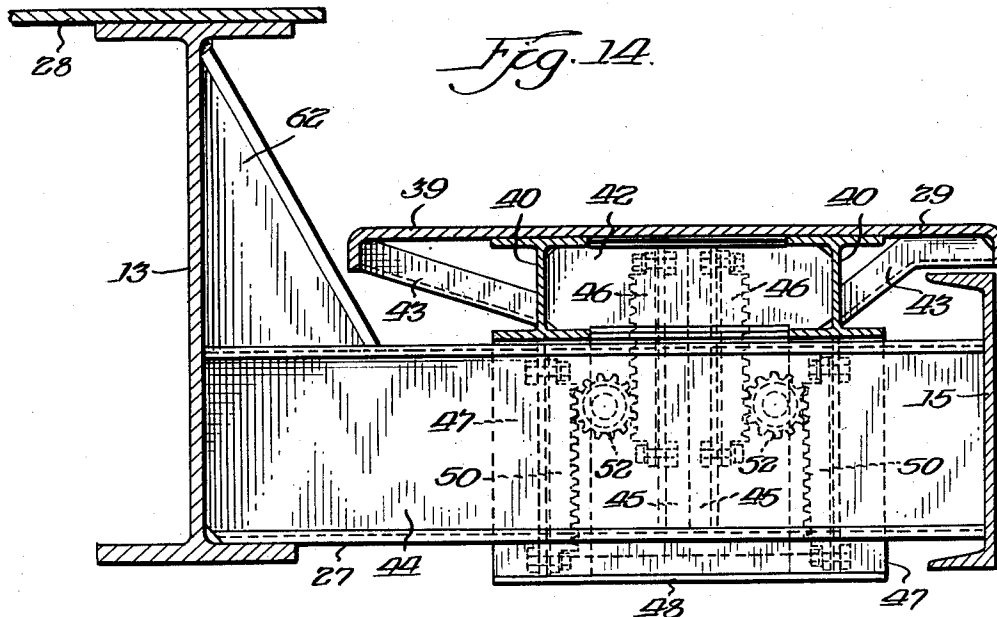
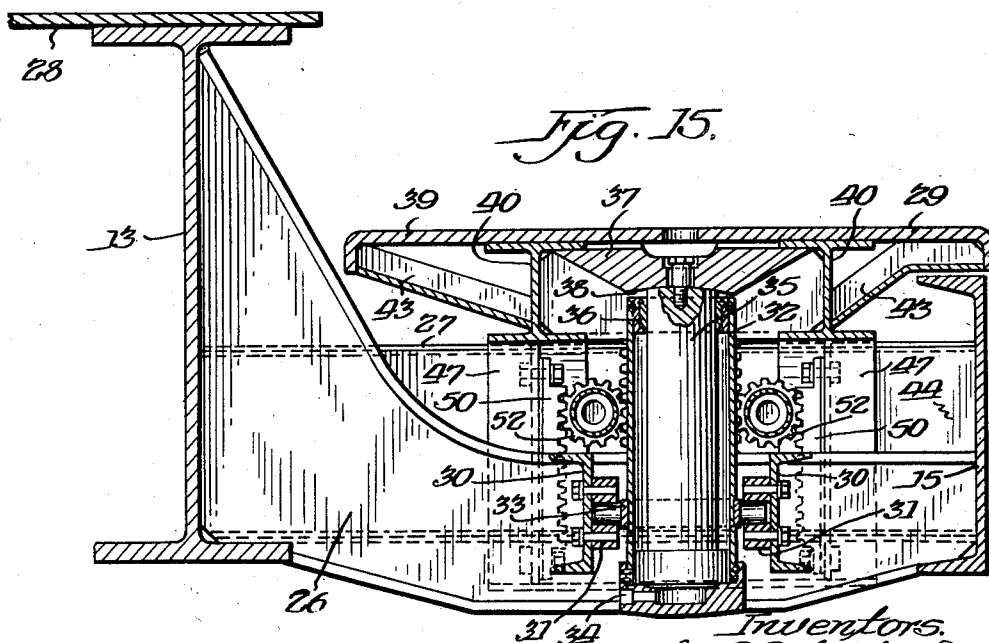
J. E. GUTRIDGE ET AL

2,910,015

ELEVATOR FREIGHT CAR

Filed April 23, 1954

10 Sheets-Sheet 10



Inventors,
Jack E. Gutridge &
William E. Gribnitz, Jr.

By Wayne Morris Russell.
Atty.

1

2,910,015

ELEVATOR FREIGHT CAR

Jack E. Gutridge, Munster, Ind., and William E. Gribnitz, Jr., Chicago, Ill., assignors to Pullman Incorporated, Chicago, Ill., a corporation of Delaware

Application April 23, 1954, Serial No. 425,136

1 Claim. (Cl. 105—368)

This invention relates to elevator type freight cars for carrying vehicles, such as truck trailers, and is primarily concerned with mechanism for the elevators:

Some truck trailers have a height so great that when loaded on a railway freight car they will not clear railroad underpasses, so that provision must be made for clearance between the trailer and the underpass. This is accomplished by providing the floor and underframe of the car with elevators which may be lowered from a position flush with the floor of the car. The rear wheels of the trailer are located on the elevators and the front end of the trailer rests upon a vertically adjustable stand mounted on the floor of the car so that the trailer is lowered relative to the car and the necessary clearance established so that the trailer will clear railroad underpasses.

The invention proposes an elevator type flat car for carrying truck trailers. The car has a well in its floor and underframe in which a platform is horizontally disposed. A cylinder is positioned in the well and is pivotally connected to the car with a piston disposed in the cylinder and connected to the center of the platform. Means are provided between each end of the platform and the center of the platform, comprised of a pair of vertically disposed racks positioned in the well and secured to the car and another pair of vertically disposed racks depending from and secured to the platform. A pair of horizontally disposed tubes are positioned in the well and a gear wheel is fixedly secured on each end of each tube meshing with one of the racks on the car and one of the racks on the platform. The racks and gear wheels and tubes together prevent rotational movement of the platform about a horizontal axis extending transversely of the car. Interengaging means are provided on each end of the platform and on the adjacent bounding wall of the well to prevent rotational movement of the platform about a horizontal axis extending longitudinally of the car.

The invention further proposes an underframe for a railway freight car adapted to carry truck trailers. The underframe comprises a center sill positioned longitudinally of the car and extending the full length of the car. Each side sill is comprised of a pair of end sections and a center section, with the end sections on the same level as the center sill and the center section below the level of the end sections. A cross member having the same depth as the center sill is positioned between each side sill end section and the side sill center section and extends from the side sill to the center sill. Other cross members extend between the side sill end sections and the center sill and these cross members are disposed below the center sill. Stringers on the same level as the center sill extend between each of the first-named cross members and the adjacent bolster and are disposed upon the second-named cross members. A plurality of horizontally disposed beams having a depth not greater than

2

the side sill center section extend between the center section and the center sill.

The principal object of the invention is to provide an improved type of mechanism for the elevators of an elevator type freight car.

Another object of the invention is to provide means for maintaining an elevator in a horizontal position during loading or unloading or during transportation of a truck trailer.

Another object of the invention is to provide means for preventing rotational or tilting movement of the elevator about a horizontal axis extending transversely of the car.

Another object of the invention is to provide means for preventing rotational or tilting movement of the elevator about a horizontal axis extending longitudinally of the car.

A further object of the invention is to provide an elevator of novel construction.

An important object of the invention is to provide an underframe of novel construction for a car adapted to carry truck trailers.

The foregoing and other objects of the invention are attained by the construction and arrangement illustrated in the accompanying drawings, wherein:

Figs. 1, 2 and 3 are complementary plan views of the major portion of a railway flat car for carrying truck trailers;

Figs. 4, 5 and 6 are complementary side elevational views of the car shown in Figs. 1 to 3, with two truck trailers being shown loaded on the car;

Figs. 7 and 8 are complementary plan views of one of the elevators and the adjacent portion of the car;

Figs. 9 and 10 are longitudinal sectional views through the elevator and the adjacent portion of the car taken on the lines 9—9 and 10—10 of Figs. 7 and 8 respectively.

Fig. 11 is a cross sectional view taken on the line 11—11 of Fig. 2;

Fig. 12 is a cross sectional view taken on the line 12—12 of Fig. 8;

Fig. 13 is a view similar to Fig. 12, but with the elevator shown in a position flush with the floor of the car;

Fig. 14 is a cross sectional view taken on the line 14—14 of Fig. 7;

Fig. 15 is a cross sectional view taken on the line 15—15 of Fig. 1;

Fig. 16 is a sectional view taken on the line 16—16 of Fig. 10; and

Fig. 17 is a bottom view of one of the elevators showing its construction.

In the drawings, 10 generally designates a railway flat car adapted to carry two truck trailers 11 and 12. The underframe has a fish belly type center sill made up of a pair of spaced I-beams 13 extending full length of the car. Each side sill consists of two end sections 14 and a dropped center section 15 and all three sections are of channel form. A spacer 16 is disposed under each end section 14 of the side sill adjacent the center section 15 and is welded to the respective end section, and a gusset 17 extends between the respective end of the center section and the adjacent spacer and is welded to the center section and the spacer. The underframe has the usual end sills 18, double web bolsters 19, and I-shaped stringers 20 extending between and welded to the end sill and the adjacent web of the bolster. A substantially rectangular plate 21 having the same depth as the center sill I-beams 13 is positioned between each side sill end section 14 and the center section 15 and extends from the side sill to the adjacent center sill I-beam 13 and is welded to the end section and the center section and the beam.

A horizontally disposed support or angle 22 is welded to each plate 21. Cross members 23 are arranged in spaced relation between the plates 21 and the bolsters 19 and each cross member consists of a vertical plate and an angle welded to the plate along its top edge and an angle welded to the plate along its bottom edge.

Each cross member has its top edge horizontal and spaced below the tops of the center sill I-beam 13. Each cross member 23 extends between the side sill end section 14 and the adjacent center sill I-beam 13 and rests upon the outer flange of the beam and the lower flange of the end section and is welded to the beam and the end section. A plurality of I-shaped stringers 24 have their tops on the same level as the tops of the center sill I-beams 13 and extend between each plate 21 and the adjacent web of the adjacent bolster 19. The stringers are disposed upon the horizontal flange of the angles 22 and upon the cross members 23 and are welded to the plates and angles and cross members and to the adjacent web of the bolster. The tops of the end sections 14 are on the same level as the tops of the center sill I-beams 13 and the top of the center section is disposed below the level of the tops of the end sections and the center section has a depth less than the depth of the center sill I-beams. A holding device 25 is positioned midway between the plates 21 and extends across the width of the car and is fixedly secured to the underframe. Midway between the holding device 25 and the plates 21 on the left side of the holding device as viewed in the drawings, a pair of beams 26 I-shaped in cross section extend between the center section 15 of the side sill and the adjacent center sill I-beam 13. The beams 26 are disposed upon the lower flange of the center side sill section 15 and upon the lower outer flange of the adjacent center sill I-beam 13 and are welded to the center section and the center sill I-beam. Between the beams 26 and the plates 21, a horizontally disposed I-shaped beam 27 extends from the center section 15 to the adjacent center sill I-beam 13 and is disposed upon the lower outer flange of the center sill I-beam and is welded to the center section and the center sill I-beam. Other beams 26 and 27 are disposed opposite and aligned with the beams just discussed and secured in a similar manner. Midway between the holding device 25 and the plates 21 on the right side of the holding device, still other beams 26 and 27 are disposed similarly to the beams 26 and 27 on the left side of the holding device. All of the beams 26 and 27 have a depth not greater than, and as illustrated in the drawings a depth less than, the depth of the center section 15 of the side sill. A plurality of metal floor sheets 28, more specifically seven floor sheets, are used for the flooring of the car. Since the holding device 25 extends across the car, four wells are defined by plates 21, side sill center sections 15, holding device 25, and center sill 13.

A platform 29 is positioned in each well and is adapted for vertical movement between a position flush with the floor of the car and a position below the floor of the car. Three longitudinally aligned floor sheets 28 are positioned on the I-beams 13 with two of these floor sheets extending from the end sills to the adjacent platforms 29 while the third floor sheet occupies the space between the platforms. Two other floor sheets 28 extend from the adjacent platforms 29 to the adjacent end sill and two more floor sheets extend from the adjacent platforms to the other end sill. The floor sheets 28 on the I-beams 13 are spaced from the platforms 29 and from the other floor sheets to provide a pair of longitudinally extending slots on opposite sides of the beams extending full length of the car to accommodate various forms of hold down devices. All of the floor sheets 28 are secured to their adjacent parts of the underframe by welding. In each well a pair of parallel channels 30 extend between and are welded to the pair of beams 26. An apertured block 31 is bolted to each channel 30. A vertically disposed cylinder

32 is positioned in the well and a ring 33 extends around the cylinder adjacent its lower end and is welded to the cylinder. The ring 33 has opposing studs which project into the apertures in the blocks 31 thus pivotally connecting the lower end of the cylinder to the car. The cylinder 32 has an opening 34 in its lower end in communication with the interior of the cylinder and a source of fluid under pressure is adapted to be connected to the opening. A piston 35 is disposed in the cylinder 32 with its upper end projecting above the upper end of the cylinder through the sealing means 36. The upper end of the piston 35 is rounded and a bearing 37 having a spherical recess 38 in its lower face is positioned on the upper end of the piston. A bolt loosely extends through the bearing and is in threaded engagement with a threaded opening in the upper end of the piston. The platform 29 is comprised of an inverted U-shaped plate 39 consisting of a base and a pair of flanges integral with the base. A pair of spaced parallel I-shaped beams 40 extend longitudinally of and are welded to the base of the plate. A channel 41 is positioned horizontally at each end of the plate 39 with the ends of the beams 40 welded thereto and extends transversely of the plate and is welded to the base of the plate, the end positions of the channels 41 outwardly of the beams 40 being cut away as best shown in Figs. 12 and 13 for clearance. Spaced horizontal braces 42 extend between the beams 40 and are welded to the beams and the plate 39, and spaced diagonal braces 43 extend between each beam 40 and the adjacent flange on the plate 39 and are welded to the respective beams and flange. The bearing 37 is disposed at the center of the platform 29 and is welded to the upper inner flanges of the beams 40.

Means are provided between each end of the platform 29 and the center of the platform for maintaining the platform in a horizontal position. A vertically disposed plate 44 is positioned at each beam 27 and has the same depth as the beam and extends from the center section 15 of the side sill to the adjacent center sill I-beam 13 and is welded to the beam 27 and the beam 13. A pair of vertically disposed channels 45 have their flanges welded to each other so as to form a box section and this box section is welded to the plate 44. The channels 45 extend from the bottom of the adjacent beam 27 to a location slightly above the center section 15 of the side sill. A pair of vertically disposed racks 46 are bolted to the webs of the channels 45 to secure the racks to the car. A pair of vertically disposed I-beams 47 are disposed opposite the racks 46 and the upper ends of these beams are welded to the beams 40 on the platform 29 and a plate 48 having an opening 49 through which the channels 45 and the racks 46 can pass is welded to the lower ends of the beams. Another pair of vertically disposed racks 50 arranged in opposition to the racks 46 are bolted to the webs of the I-beams 47 being thus secured to the platform 29. A pair of horizontally disposed members or tubes 51 are longitudinally positioned in each of the wells on opposite sides of the cylinder 32 and a gear wheel 52 is fixedly secured on each end of each tube. Each gear wheel 52 is adapted to mesh with the adjacent one of the racks 46 on the car and the adjacent one of the racks 50 on the platform 29. The racks 46 and 50 and gear wheels 52 and tubes 51 prevent rotational or tilting movement of the platform 29 about a horizontal axis extending transversely of the car and if this rotational movement could take place it would be at the pivot point of the cylinder 32 at the ring 33 or between the upper end of the piston 35 and the bearing 37 or both.

A vertically disposed channel 53 is disposed on one face of the plate 21 and a vertically disposed rib 54 is disposed on the other face of the plate and both the channel and the rib extend from the bottom of the plate to the door of the car and bolts extend through the rib and the plate and the channel thus securing the rib and the channel to the car. Another vertically disposed channel

5

55 has its upper end welded to the channel 41 at the end of the platform and gussets are welded to the channel 55 and the beams 40 on the platform 29. A vertically disposed bar 56 has a vertically extending guideway 57 therein and the bar is bolted to the channel 41 and the channel 55. The rib 54 and the bar 56 form an interengaging means on the end of the platform 29 and on the adjacent bounding wall of the well to prevent rotational or tilting movement of the platform about a horizontal axis extending longitudinally of the car, which movement would tend to be about the upper end of the piston 35 and the bearing 37. This interengaging means is provided at each end of each platform 29. A single set of controls and a single pump, which are not shown but may be of any suitable type, are used for all four platforms 29. Actuation of the controls in one direction will raise or lower the two platforms 29 under one trailer at the same time and actuation of the controls in the opposite direction will raise or lower the other two platforms under the other trailer at the same time.

To load a trailer 11 on the flat car, the platforms 29 are disposed in a position flush with the floor of the car and a turntable 58 is pivotally mounted at its center on one of the platforms. A lift truck backs the trailer 11 diagonally onto the car so that the rear wheels on one side of the trailer roll onto the turntable 58. The lift truck then swings the front end of the trailer 11 onto the car so that the rear wheels at one side of the trailer pivot with the turntable 58 while the rear wheels at the other side of the trailer roll on the floor of the car. After the trailer 11 is on the car the lift truck then backs it longitudinally of the car until the rear end of the trailer is close to the holding device 25. The platforms 29 are then lowered resulting in the lowering of the rear end of the trailer 11. Lowering of the platforms 29 is continued until a channel 59 on the rear end of the trailer 11 is opposite the projections 60 on the holding device 25. The lift truck then backs the trailer 11 onto the projections 60 on the holding device 25. A fifth wheel stand 61 is mounted on the floor of the car and is slidable longitudinally of the car and is vertically adjustable. The stand 61 is slid until it is under the fifth wheel pin of the trailer 11 and then it is adjusted vertically so that the trailer will be level during its transportation on the car. Then the lift truck lowers the front edge of the trailer 11 onto the stand 61 to complete the loading of the trailer on the car. To unload the trailer 11 from the car the front end of the trailer is lifted off the fifth wheel stand 61 by a lift truck and the lift truck then pulls the trailer forward so that the channels 59 on the trailer are moved off the projections 60 on the holding device 25. The two platforms 29 under the trailer 11 are then raised to a position flush with the floor of the car. The lift truck then swings the front end of the trailer 11 off the car with the rear wheels at one side of the trailer pivoting with the turntable 58 and the rear wheels at the other side of the trailer rolling on the floor of the car. The lift truck then pulls the rear end of the trailer 11 off the car. The trailer 12 is loaded on and unloaded from the car in a similar manner.

The distance from the rear end of a trailer to its rear wheels varies with different trailers, therefore the rear wheels of a trailer will not be bearing upon the center of the platforms 29 and there will be a movement about the center of the platform when the trailer wheels are located at one end of the platform as shown in Fig. 5. It would be possible to support each platform by a plurality of piston and cylinder assemblies; however, this would mean that a greater amount of liquid would have to be carried under the car and such a large number of controls would be required that raising and lowering of the platforms would be a tedious and time-consuming operation and there might not be enough space under the car in which to store the liquid and carry the controls since the amount of available space is limited by brakes, trucks, and

6

other equipment. To solve this problem, applicant has provided a single piston and cylinder assembly at the center of each platform and a single set of controls and a single pump for all four platforms, which means that the car will have to carry only a small amount of liquid for all of the cylinders and the liquid can be stored in, and the pump and controls can be disposed in, a small amount of space under the car. When the trailer is loaded on the car its rear wheels will not be at the center of the platforms and will cause a downward force to be exerted on one side of the center of the platform. This force will be transmitted to the racks 50 depending from the platform 29 between the center and one end of the platform and this will tend to cause the gear wheels 52 to turn and the torque on the gear wheels will be transmitted to the tubes 51. The tubes 51 are elastic and will twist and this twist will be transmitted to the gear wheels at the opposite ends of the tubes and the gear wheels will urge the adjacent end of the platform 29 downwardly. In other words, a downward force on one side of the center of the platform 29 will be transmitted through the tubes 51 and cause a downward pull to be exerted on the platform on the other side of its center.

For the reason that the rear wheels of the trailer will not be on the exact center laterally of the platform 29 the wheels will cause a force to be exerted on the platform about its longitudinal axis or about an axis extending longitudinally of the car. The ribs 54 on the ends of the platform 29 sliding in the guideways 57 of the bars 56 on the car will prevent any rotational or tilting movement of the platform 29 about an axis extending longitudinally of the car. It is important that the platforms 29 be kept in a horizontal plane, since tilting movement of the platform would cause unnecessary forces to be exerted on the projections 60 of the holding device 25 and upon the fifth wheel stand 61 and forces upon the fifth wheel stand might cause the fifth wheel pin on the trailer to be detached from the trailer. The U-shaped plate 39, I-beams 40, channels 41, braces 42, and braces 43 together form a platform 29 of great strength which will support the largest of truck trailers whether they be loaded or unloaded.

The underframe construction provides four wells, and when the platforms 29 are in their lowermost positions the beams 40 on the platform rest upon the beams 27 of the underframe and when in this position the platform is spaced from the beams 26 of the underframe. The beams 27 are reinforced by the gussets 62 which are welded to the adjacent center sill I-beam 13 and the respective one of the beams 27. The beams 26 extend between the upper and lower outer flanges of the adjacent center sill I-beam 13 and they decrease in depth for a short distance and under the platform 29 and on to the center section 15 of the side sill they are of substantially constant depth.

A plurality of spaced vertical tie plates 63 extend between and are welded to the I-beams 13 (Fig. 11). The center sill I-beams 13, cross members 23, stringers 24, rectangular-shaped plates 21, beams 26, and beams 27 all cooperate together to provide an underframe of great strength particularly adapted to carry truck trailers. The underframe may be of the type having a stationary center sill, in which case the I-beams 13 will function as the stationary center sill. The underframe may instead be of the type having a sliding center sill, in which case a sliding center sill 64 would be inserted between I-beams 13 and would slide upon the vertical tie plates 63, as shown in Fig. 11.

From the foregoing, it will be seen that there has been provided means for preventing rotational or tilting movement of the elevator about a horizontal axis extending transversely of the car or about a horizontal axis extending longitudinally of the car, as well as an elevator of novel construction and an underframe of novel construction particularly adapted to carry trailers.

What is claimed is:

In a railway car, an underframe and a floor provided with a well, a vertically disposed cylinder positioned in the well and having its lower end connected to the car, a piston disposed in the cylinder, a horizontally disposed platform positioned longitudinally of the car in the well and secured at its center to the upper end of the piston and movable between a position flush with the floor and a position below the floor, means for supplying fluid under pressure to the cylinder to raise and lower the piston whereby the platform may be moved between the position flush with the floor and the position below the floor, means between each end of the platform and the center of the platform comprising a first pair of vertically disposed rack structures disposed back to back in the well and secured to the car and a pair of vertically disposed racks depending from and secured to the platform disposed in opposed relation to the respective rack structures, a pair of horizontally disposed shafts positioned in the well extending longitudinally of the car on opposite sides of the cylinder and between each of said rack structures and the respectively opposed rack, a gear wheel fixedly secured on each end of each shaft adapted to mesh with

the adjacent one of the racks on the car and the adjacent one of the racks on the platform whereby to prevent rotational movement of the platform about a horizontal axis extending transversely of the car, and interengaging vertical guide means on each end of the platform and on the adjacent bounding wall of the well to prevent rotational movement of the platform about a horizontal axis extending longitudinally of the car.

References Cited in the file of this patent

UNITED STATES PATENTS

93,995	Huntington	Aug. 24, 1869
1,350,087	Trapp	Aug. 17, 1920
2,047,503	Wilson et al.	July 14, 1936
2,121,181	Bayerl	June 21, 1938
2,246,543	Smith	June 24, 1941
2,489,024	Gaynor	Nov. 22, 1949
2,585,126	Holland	Feb. 12, 1952
2,605,064	Davis	July 29, 1952

FOREIGN PATENTS

671,064	Germany	Jan. 30, 1939
---------	---------	---------------