No. 731,525. PATENTED JUNE 23, 1903.

E. A. TRAPP.

TRANSPORTATION CAR.

APPLICATION FILED OCT. 1, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

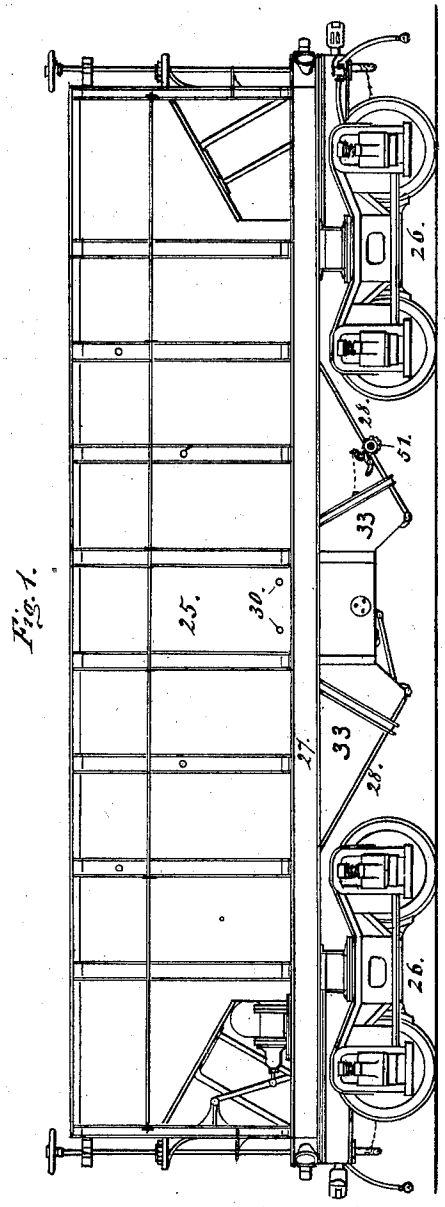


Fig. 1.

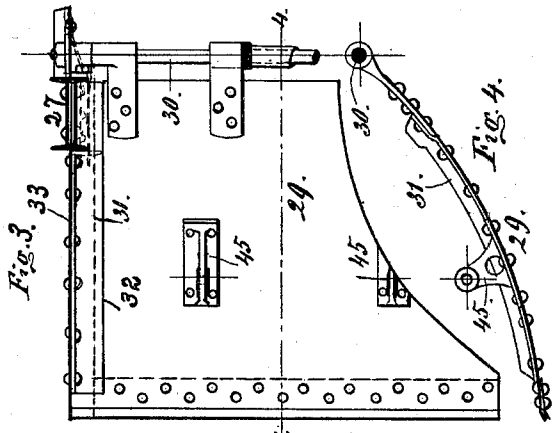


Fig. 3.

Fig. 4.

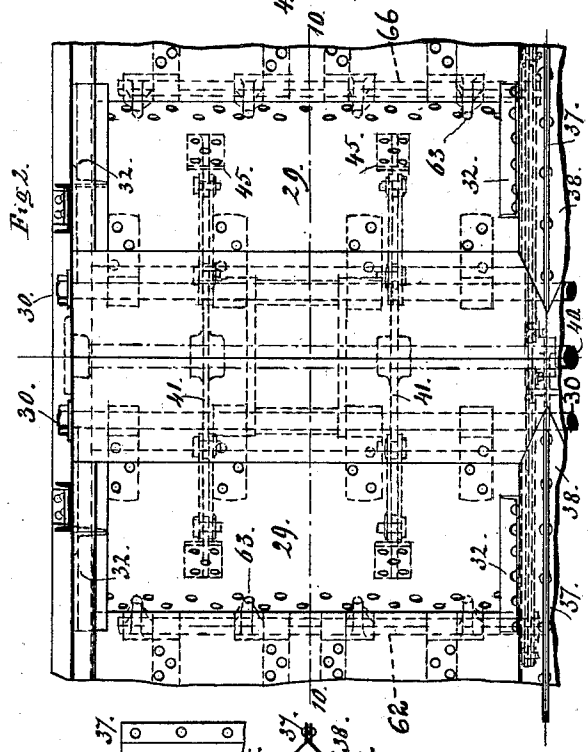


Fig. 2.

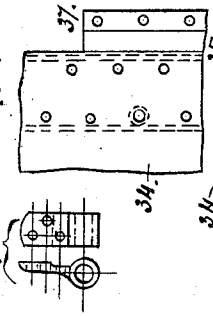


Fig. 6.



Fig. 5.

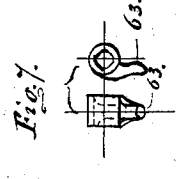


Fig. 7.

Fig. 8.

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No. 731,525. PATENTED JUNE 23, 1903.

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TRANSPORTATION CAR.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 9.

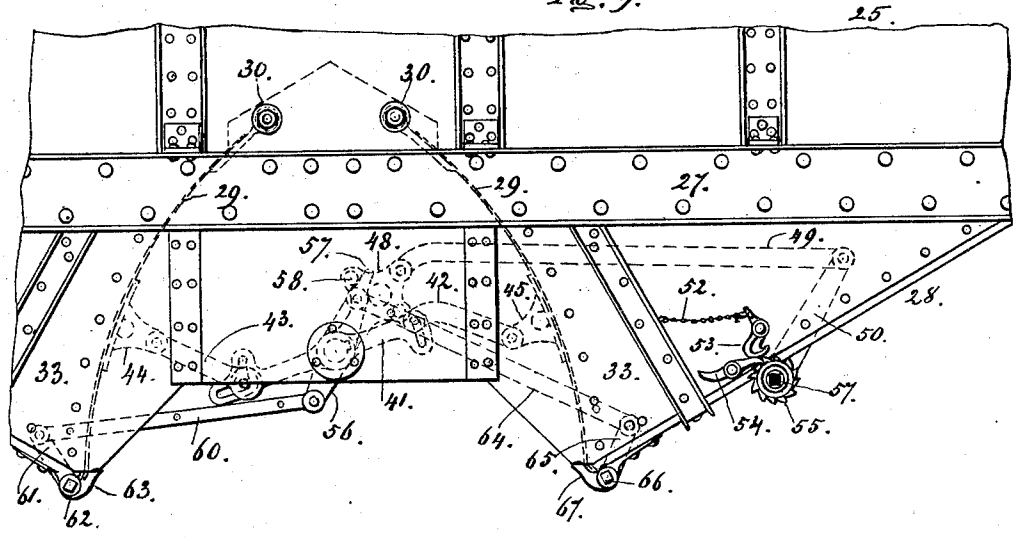


Fig. 10.

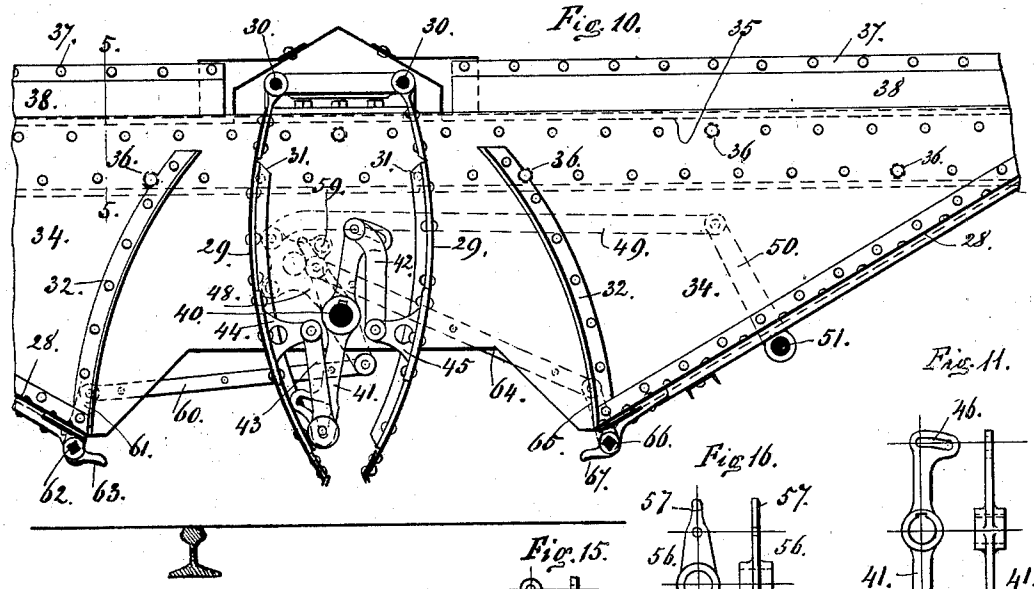


Fig. 11.

Fig. 16.

Fig. 15.

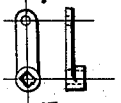


Fig. 14.

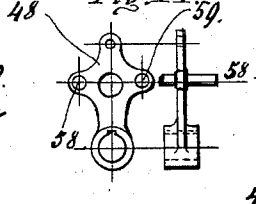


Fig. 13.

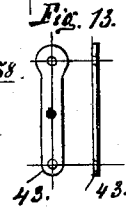
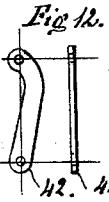


Fig. 12.



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No. 731,525. Patented June 23, 1903.

UNITED STATES PATENT OFFICE.

EDWARD A. TRAPP, OF NEW YORK, N. Y.

TRANSPORTATION-CAR.

SPECIFICATION forming part of Letters Patent No. 731,525, dated June 23, 1903.

Application filed October 1, 1902. Serial No. 125,461. (No model.)

To all whom it may concern:

Be it known that I, EDWARD A. TRAPP, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Transportation-Cars, of which the following is a specification.

The invention relates to improvements in transportation-cars, and particularly to improvements in the class of cars employed for the transportation of coal, ore, and other materials.

The object of the invention is to produce a car of great strength and durability and having the requisite carrying capacity; and the invention pertains more especially to certain improvements in the character of cars shown and described in Letters Patent of the United States No. 615,373, granted to me December 6, 1898; and it consists in a novel construction of that portion of the car along the central part of and below the floor-line thereof, the novel features of the invention embracing the exit-doors from the car, the means for operating said doors, and the construction and relation of the plates which depend below the floor-line adjacent to but at each side of the center thereof, together with the draw or center beams to which said plates are secured.

The nature and objects of the invention will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of a car constructed in accordance with and embodying the invention. Fig. 2 is a detached top view, partly broken away, of one longitudinal half of the central portion of same. Fig. 3 is a detached top view, partly broken away, of one of the exit-doors from the car. Fig. 4 is a sectional view of same on the dotted line 4 4 of Fig. 3. Fig. 5 is a detached vertical section through the draw or center beams of the car and the plates secured thereto and depending at each side of the center of the car below the floor-line, this section being on the dotted line 5 5 of Fig. 10. Fig. 6 is a side elevation of same. Fig. 7 denotes, in edge and elevation, one of the latches for holding the exit-doors in their closed position. Fig. 8 illustrates one of the supports for the rods which carry the latches represented in Fig. 7. Fig. 9 is an enlarged detached side elevation, partly broken away, of the central portion of the car represented in Fig. 1 on a smaller scale. Fig. 10 is a vertical longitudinal section of the same, the section being taken on about the line 10 10 of Fig. 2; and Fig. 10 illustrates the exit-doors in their open position, while Fig. 9 shows said doors in their closed position. Fig. 11 presents edge and side elevations of a double-ended lever constituting part of the door-closing mechanism. Fig. 12 presents edge and side elevations of one of the links which connect one end of the lever shown in Fig. 11 with one of the exit-doors. Fig. 13 presents edge and side elevations of the link which connects the other end of the lever shown in Fig. 11 with the other exit-door. Fig. 14 presents edge and side elevations of one of the levers connected with the door-closing mechanism. Fig. 15 presents edge and side elevations of one of the crank-arms mounted on the shafts carrying the door-locking latches and connected by rods with the ends of the lever shown in Fig. 16, and Fig. 16 presents edge and side elevations of a double-ended lever whose movement is communicated to the door-locking latches.

In the drawings, 25 denotes the body of the car, and 26 the usual trucks therefor. The car-body 25, especially above the lower chords or beams 27, is substantially identical in construction and outline with the car-body shown in my aforesaid Letters Patent dated December 6, 1898, and therefore requires no special description herein.

The present car, like the car of the aforesaid patent, is provided with the downwardly-converging or inclined floor-sections 28, leading to the exit-openings for the coal or other material carried, and for the purpose of closing the said exit-openings I provide the hinged doors 29 29, which are arched or curved, as clearly illustrated, and hung from the transverse parallel rods 30, there being four of the doors 29, or two at one side of the longitudinal center of the car and two at the other side of the longitudinal center of the car. The doors 29 are formed from sheet metal and are provided with angle-iron edge strips 31, secured thereto for the purpose of strengthening and stiff-

ening the doors, and the said doors 29 may be otherwise strengthened, as may be desired. The rods 30 extend transversely across the entire car, and hence the one pair of rods 30 serve for the four doors 29.

Within the compartments formed at each side of the central portion of the car below the lower chords 27 will be secured angle-iron bars 32, (shown in Fig. 10,) against which the doors 29 will impinge when said doors are in their closed position, and the transverse flanges of which bars 32 will extend over the edges of the doors 29 and prevent the wedging of coal or other material between the edges of the doors 29 and the adjacent portions of the car structure. The angle-iron bars 32 are curved to conform to the arch shape of the doors 29, and said bars are riveted to the inner side of the adjoining plates 33, extending from and below the side chords or beams 27, and to the inner faces or sides of the adjoining plates 34, which are suspended below the floor-line of the car and at the opposite sides of the center of the car from the draw or center beams 35, the spaces between the plates 33 34 at each side of the center of the car constituting compartments of about the width of the doors 29 and leading directly to the exit-openings normally closed by said doors. One of the outer side plates 33 is shown in Fig. 9, and one of the inner corresponding plates 34 is shown in Fig. 10, wherein the draw or center beams 35 are represented by dotted lines, being hidden by the upper portion of the plate 34.

The draw or center beams 35 comprise a pair of channel-beams whose flanges face each other and to whose outer web portions the plates 34 are riveted, as shown in Fig. 5, the said beams 35 being properly separated by spacing tubes or pieces 36 and extending the entire length of the car-body, as is the case with the central draw-beams shown in the aforesaid patent dated December 6, 1898. The plates 34, secured to the sides of the draw-beams 35, extend upwardly at their upper edges above said beams 35, and the upper edges of the said plates 34 are brought together and riveted, as denoted at 37, whereby a cone-shaped metal structure (numbered 38) is formed above the upper edges of the beams 35, which structure possesses two functions, one being to prevent the settling of coal or other material upon the said beams 35 and the other being to materially strengthen the car-body, the upper portions of the plates 34 constituting, in effect, a longitudinal truss which will impart rigidity to the car-body and combine with the draw-beams 35 in increasing the capability of the car to withstand the severe strains to which cars of this class are subjected. In the aforesaid Letters Patent dated December 6, 1898, are shown inner plates depending at the opposite sides of the center of the car from the draw or center beams, and in said patent a conical roof is provided over the center beams; but in the present instance the depending center plates 34 are themselves carried upward along the outer sides of the beams 35 and have their edges brought together and riveted above said beams, and in the construction presented in this application I attain superior results and improve the character of the car.

The doors 29 of the curve or arch form swing between the outer depending plates 33 and the inner or center depending plates 34, and the doors of arch form constitute a part of my present invention, the arching of the doors 29 enabling the accomplishment of two very important results, the first being that by reason of the arch shape of the doors the latter when closed are enabled to withstand enormous strain without bulging, bending, or breaking, and the second being that when the doors 29 are in their open position (shown in Fig. 10) their lower portions converge and create exit-openings of a maximum capacity, whereby the packing of the material carried about the exits from the car is entirely avoided, even though said material should be coal or ore in large lumps. The form of the exit-doors 29 therefore insures the longevity of the cars and assures the ready exit of the coal or other material therefrom. When the doors 29 are in their open position and the material is being discharged from the cars, the said material, owing to the form of the doors, will not injure the latter and has not the same facility for pounding said doors as it has with the straight inclined doors shown in the aforesaid patent of December 6, 1898.

In accordance with part of my present invention I provide novel means for closing the doors 29 and locking said doors in their closed position, and the details of these means are more clearly illustrated in Figs. 7 and 8 and 10 to 16, inclusive. Centrally between the doors 29 a transverse shaft 40 extends across the car-body below the chords 27 thereof, and upon this shaft 40, intermediate each pair of the doors 29, is secured a pair of double-ended levers 41. (Shown in Figs. 10 and 11.) The levers 41 are rigid on the shaft 40 and are connected by links 42 43 with the doors 29, as shown in Fig. 10, the outer end of the links 43 being pivotally secured to brackets 44, carried by one of the doors 29, and the outer end of the links 42 being pivotally secured to brackets 45, secured to the other door 29. The other ends of the links 42 43 carry pins, which are free in the slots 46 47, respectively, at the ends of the levers 41, the said pins and slots permitting at the proper time a sufficient amount of free play to prevent during the operation of the doors 29 the parts from becoming bent, strained, or broken. The levers 41 and links 42 43 are moved or turned to close the doors 29 from the motion imparted to them by the transverse shaft 40, and upon the turning of the shaft 40 in one direction the levers 41 and links 42 43 will effect the simultaneous closing of the doors 29 connected with them,

while upon the turning of the said shaft 40 in a reverse direction the said levers 41 and links 42 43 will fold together into the position in which they are shown in Fig. 10 and permit the doors 29 to have a simultaneous opening movement. The means for actuating the transverse shaft 40 in a direction for closing the doors 29 comprise a lever 48, Fig. 14, keyed centrally upon the said shaft 40 intermediate the two depending center plates 34, a connecting-rod 49, pivotally secured to the upper end of said lever 48 and extending longitudinally of the car between the said plates 34, a crank-arm 50, pivotally secured to the outer end of the connecting-rod 49, and a shaft 51, carrying the said crank-arm 50, and the turning of which shaft operates to throw the crank-arm 50 in one direction or the other. The doors 29 are shown in their closed position in Fig. 9, and when it is desired that the doors shall open the attendant will simply unloosen the chain 52, Fig. 9, turn the eccentric dog 53 to the left, and elevate the point of the pawl 54 from the teeth of the ratchet-wheel 55, secured on said shaft 51, thereby releasing the shaft 51 and permitting the weight of the coal or other material pressing against the doors 29 to drive said doors to their open position. The closing of the doors 29 will be accomplished by the turning of the shaft 51 in a reverse direction, so as to throw the crank-arm 50 outward toward the right, and thereby through the connecting-rod 49 and lever 48 turning the transverse shaft 40 to set the levers 41 and links 42 43 into motion.

In addition to providing the doors with the means for closing them I also provide means operable from the lever 48 for locking the doors in their closed position, and in carrying out this part of my invention I mount on a central portion of the transverse shaft 40 two double-ended levers 56, Fig. 16, which are free on said shaft and have upwardly-extending ends or arms 57. The two levers 56 are exactly alike and each is close to the lever 48, the latter being between the two levers 56 and the upper ends or arms 57 of the levers 56 being free between pins 58 59, projecting from opposite faces of the said lever 48, it being the purpose that during the oscillatory motion of the lever 48 the said pins 58 59 shall alternately strike the arms 57 of the levers 56 and move the latter. The levers 56 are double-ended and their lower ends connected by pivoted rods 60 with cranks 61, secured upon the shafts 62, carrying the latches 63 for locking one alined pair of the doors 29 in closed position. The upper portion of the levers 56 are, by means of rods 64, connected with crank-arms 65, carried by the shafts 66, upon which are secured the latches 67 for locking the other alined pair of doors 29 in closed position. During the closing of the doors 29 to the position in which they are shown in Fig. 9 the pin 58 of the lever 48 will engage the upper ends of the levers 56 and turn said levers to the position shown in Fig. 9, thereby driving the rods 60 64 outwardly and turning the latches 63 67 upwardly against the lower edge of the then closed doors 29. When the pawl 54 is released from the ratchet-wheel 55, the weight of the coal or other material against the doors 29 will drive them to their open position, and during the opening of the doors 29 the levers 41 will turn the shaft 40, and thus cause the lever 48 to move toward the left from the position in which it is shown in Fig. 9, and during this movement of the said lever 48 its pin 59 will engage the upper ends of the levers 56 and turn said levers toward the left from the position shown in Fig. 9, thereby causing said levers 56 to draw on the rods 60 64 and turn the shafts 62 66 in a direction to lower the latches 63 67 downwardly, as shown in Fig. 10, to their extreme lower position. When the pawl 54 is released, the doors 29, pressing against the latches 63 67, will open them sufficiently for the doors to pass them. The operation of the latches 63 67 is effected by the action of the pins 58 59, carried by the lever 48, on the levers 56, the latter, through the rods 60 and 64, serving upon the closing of the doors 29 to turn the latches 63 67 upwardly to the position shown in Fig. 9, and upon the opening of the doors to turn said latches 63 67 downwardly to the position in which they are shown in Fig. 10. The upper end of the levers 56 is free between the pins 58 59 of the lever 48, so that during the opening and closing of the doors 29 the shaft 40 and lever 48, with the parts connected therewith, may have a limited movement before the levers 56 are set in motion, and this feature is desirable during the opening of the doors 29, because at such time the space between the pins 58 59 of the lever 48 will permit of a limited movement of the crank-arm 50, connecting-rod 49, and lever 48 before the pin 59 strikes the levers 56. In the absence of this limited movement of the parts manually operable from the shaft 51 before the lever 56 is acted upon the doors 29 would be so instantly forced open as soon as the shaft 51 is released that injury to the attendant engaged in manipulating the shaft 51 and pawl 54 might result. During the closing of the doors 29 the latches 63 67 turn partly upward at first, and then after the doors 29 pass them they have their final closing movement against the lower edges of said doors, this final movement of said latches being caused by the contact of the pin 58 of lever 48 against the levers 56. I employ two of the levers 56 because the shafts 62 66 for the latches preferably do not extend entirely across the car, there being at one side of the transverse center of the car two shafts 62 in line with each other, having on their inner or adjacent ends the crank-arms 61, connected by the rods 60 to the levers 56, and there being at the other side of the transverse center of the car two shafts 66

in line with each other, having on their inner or adjacent ends the crank-arms 65, connected by the rods 64 with the levers 56.

I desire to call attention to the fact that when the doors 29 are in their closed position the levers 41 and links 42 43 are not on their dead-center or on a horizontal line intermediate the said doors, and I regard this feature of the construction as important, because in the construction of cars having doors to be closed by levers if the levers are allowed to attain a position on their dead-centers for holding the doors closed they will soon cease to be effective, because the rapid wear between the adjoining parts of the levers will soon prevent the latter from being enabled to fully and firmly close the doors, the result being that there will be a leakage around the edges of the doors, which not only results in waste, but in the dropping of the coal or other material along the track and into the switches thereof, causing considerable inconvenience and some danger. In addition, unless the levers are enabled to positively and firmly close the doors and hold them closed the doors will be subjected to rattling, with the resulting noise and wear on the parts. In accordance with my invention the lever 41 and links 42 43 force the doors 29 to their closed position without said levers and links attaining a true horizontal position, and the said lever and links are when the doors are closed locked in stationary position by means of the pawl 54 and ratchet 55.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The car having a compartment for holding coal or other material and provided with an exit-opening therefrom, combined with the door for closing said opening, means hinging said door at one edge, means for locking said door at its opposite edge in closed position, and lever mechanism for closing said door and operating said locking means, said door being of arched form with the convexity of the arch facing said compartment to receive the strain of the load, and said hinging and locking means at opposite edges of the door serving to resist such strain; substantially as set forth.

2. The car having the downwardly-inclined floor-section leading to the exit-opening, combined with the hinged door for said opening, the metal strips 32 against which the edges of the door may pass when the latter is closed, and means for locking the door in its closed position, said door being hinged at its upper end and being curved or arched; substantially as set forth.

3. The car having the downwardly-converging floor-sections leading to exit-openings, and the hinged doors for said openings, said doors being hinged at their upper ends and being arched or curved, the convexity of the arch facing inwardly toward the compartments of the car, combined with lever mechanism connected with said doors for closing the same; substantially as set forth.

4. The car having the downwardly-converging floor-sections leading to exit-openings, and the curved or arched doors for said openings, said doors being hinged at their upper ends and adapted to swing toward each other when opened, combined with lever mechanism connected with said doors for closing the same, latches for holding said doors in their closed position, and lever mechanism for operating said latches; substantially as set forth.

5. The car having the downwardly-converging floor-sections leading to exit-openings, and the curved or arched doors for said openings, said doors being hinged at their upper ends and adapted to swing toward each other when opened, combined with lever mechanism connected with said doors for closing the same, latches for locking said doors in their closed position, and means connected with said lever mechanism for moving said latches to their locking position when said doors are closed and for moving said latches to their open position preparatory to the opening of said doors; substantially as set forth.

6. The car having the downwardly-converging floor-sections leading to exit-openings, and the hinged doors for said openings, said doors being hinged at their upper ends and adapted to swing toward each other when opened, combined with the transverse shaft 40 intermediate said doors, the lever and links connecting said doors and shaft for enabling the closing of said doors from said shaft, the lever 48 on said shaft, means for actuating said lever 48 to rotate said shaft, pins 58, 59, carried by said lever 48, the lever 56 free on said shaft and having one end freely disposed between said pins, the locking-latches, the shafts carrying the same, the crank-arms connected with said shafts, and the rods connecting said crank-arms with opposite ends of said lever 56; substantially as set forth.

7. The car having exit-openings, the arched doors for said openings and hinged at one end, and means for engaging the other end of said doors, when the latter are closed, for locking the doors in their closed position, the convexity of the doors facing inwardly, and said hinges and locking means serving to resist the strain of the load against said doors, combined with lever mechanism for operating said doors and said locking means; substantially as set forth.

8. The car having the downwardly-converging floor-sections leading to exit-openings, and the doors for said openings, said doors being hinged at their upper ends and adapted to swing toward each other when opened, combined with lever mechanism connected with said doors for closing the same, latches for locking said doors in their closed position, and means connected with said lever

mechanism for moving said latches to their locking position when said doors are closed and for moving said latches to their open position preparatory to the opening of said doors; substantially as set forth.

9. The car having the lower chords or beams 27, the draw-beams 35, the downwardly-extending floor-sections, the plates 33 extending downwardly from said chords, and the integral plates 34 covering the outer sides of the said draw-beams 35 and securely riveted thereto, and thence extending upwardly above the said beams 35 and inwardly toward each other over the said beams, the upper edges of said plates above said beams 35 being riveted together and forming a trussed reinforcement of the beams 35 as well as a cover for said beams; substantially as set forth.

10. The car having the exit-openings, and the doors for said openings, combined with the double-ended lever and links connected with said doors for closing the same, the lever mechanism for actuating said lever and links to force said doors to their closed position, the pawl and ratchet for locking said lever mechanism and through it said lever and links in stationary position, and latches for fastening the free edges of the doors when the latter are in their closed position; substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 30th day of September, A. D. 1902.

EDWARD A. TRAPP.

Witnesses:
CHAS. C. GILL,
ANNA V. BRODERICK.