April 16, 1957 R. E. RUSSELL 2,788,751

BRIDGE FOR PIGGYBACK FLAT CARS

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FIG. 1.

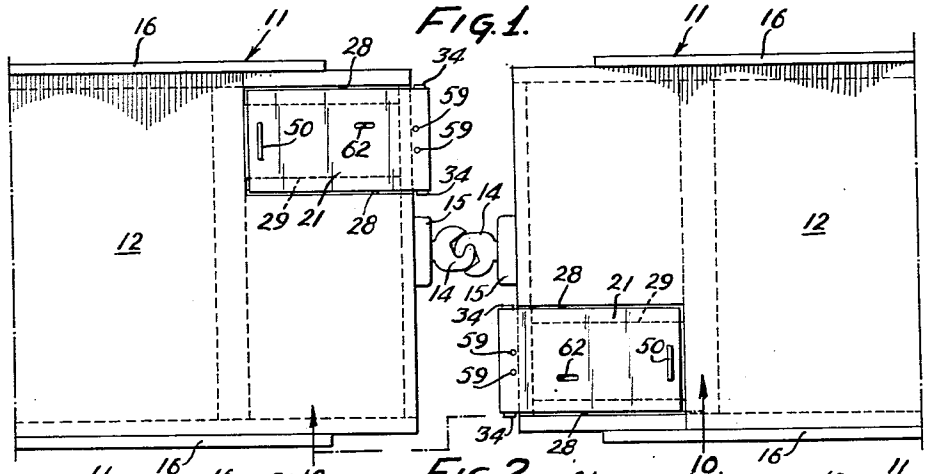


FIG. 2.

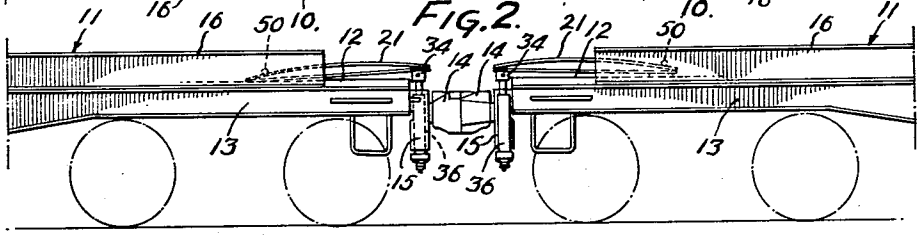


FIG. 3.

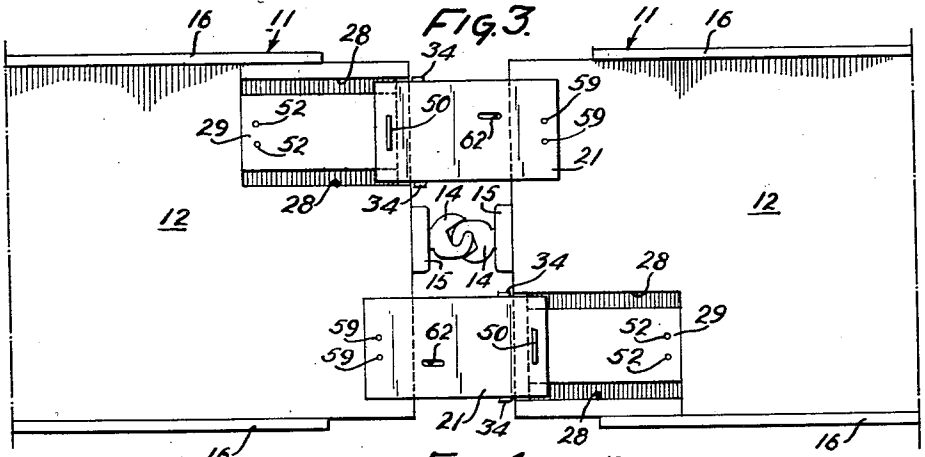
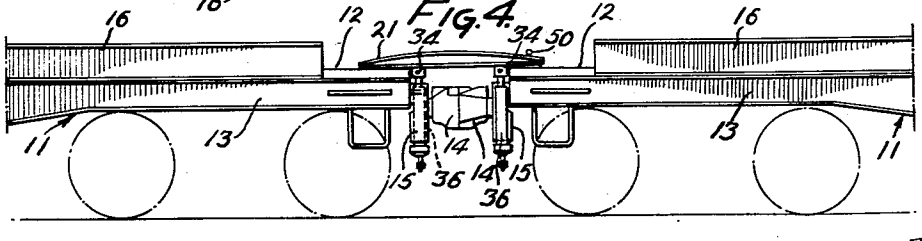


FIG. 4.



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FIG. 5.

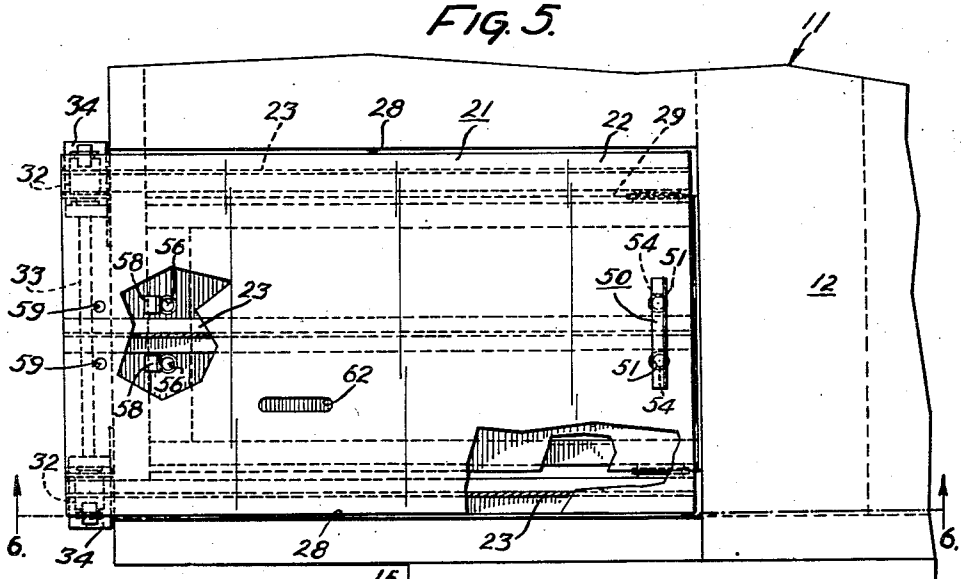


FIG. 6.

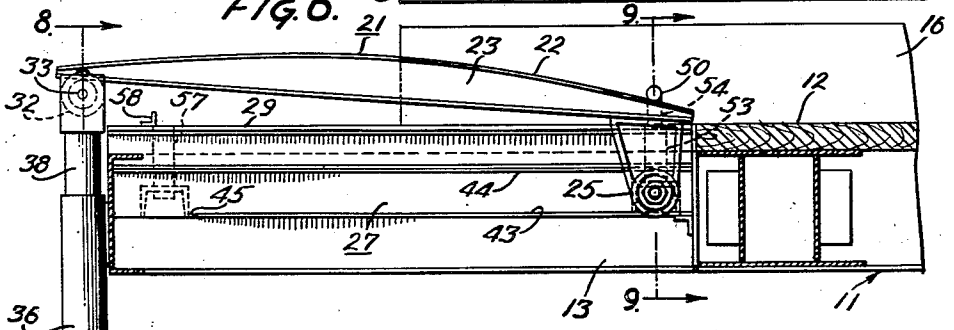
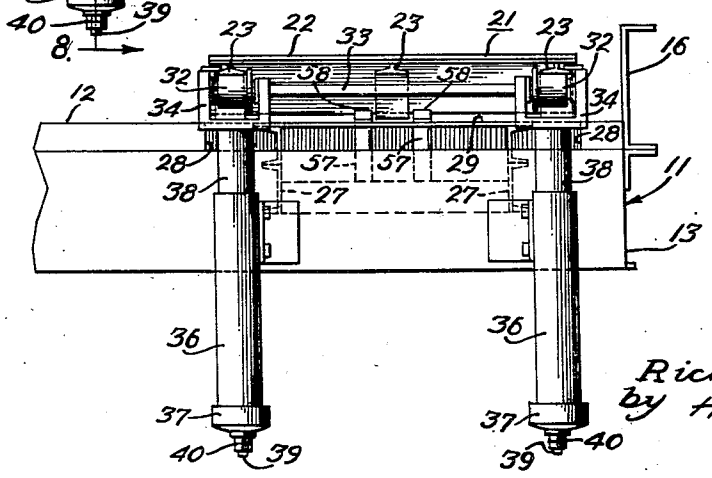


FIG. 7.



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FIG. 8.

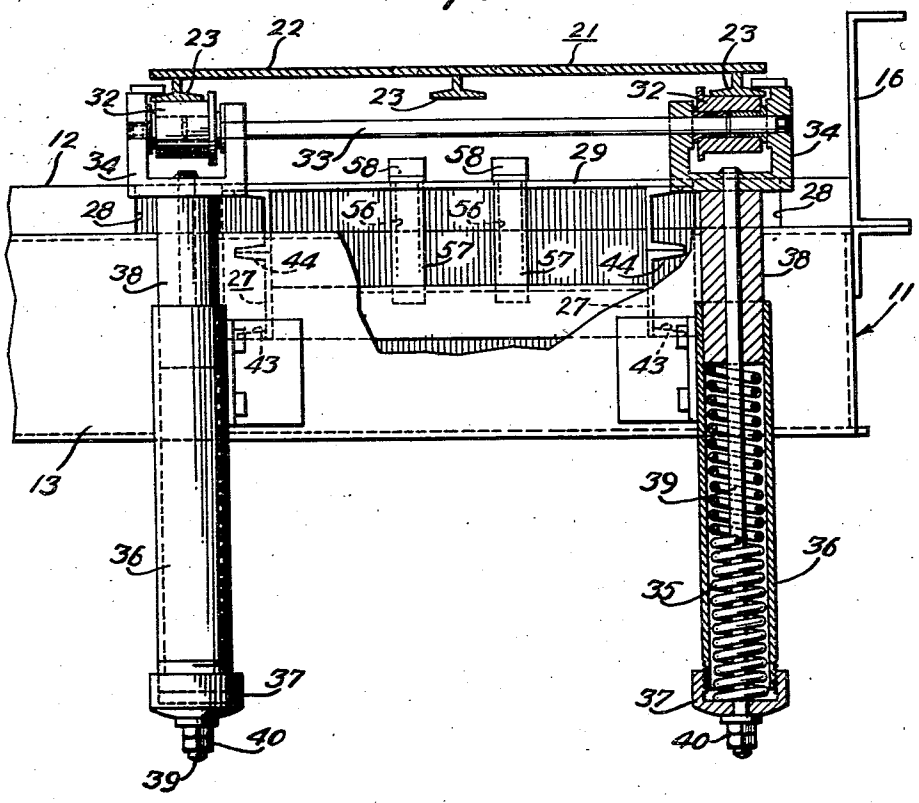
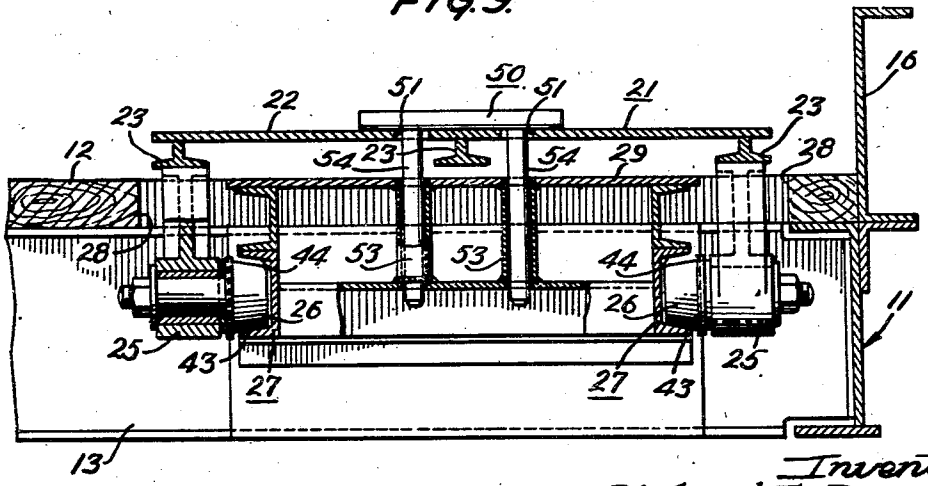


FIG. 9.



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BRIDGE FOR PIGGYBACK FLAT CARS

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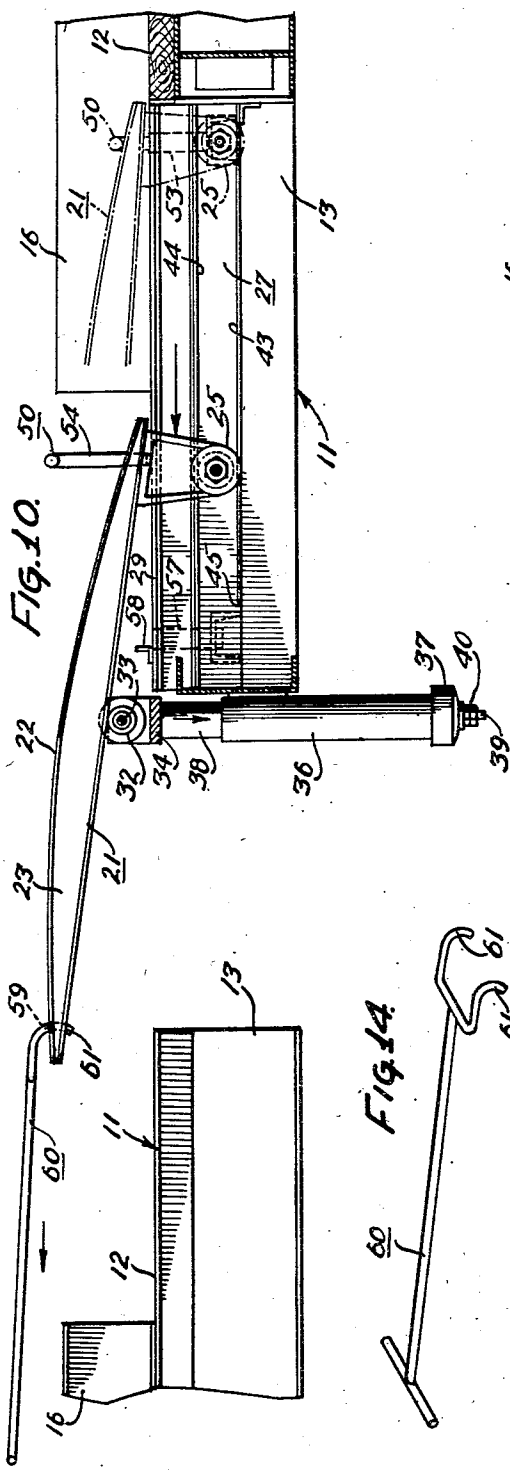


FIG. 10.

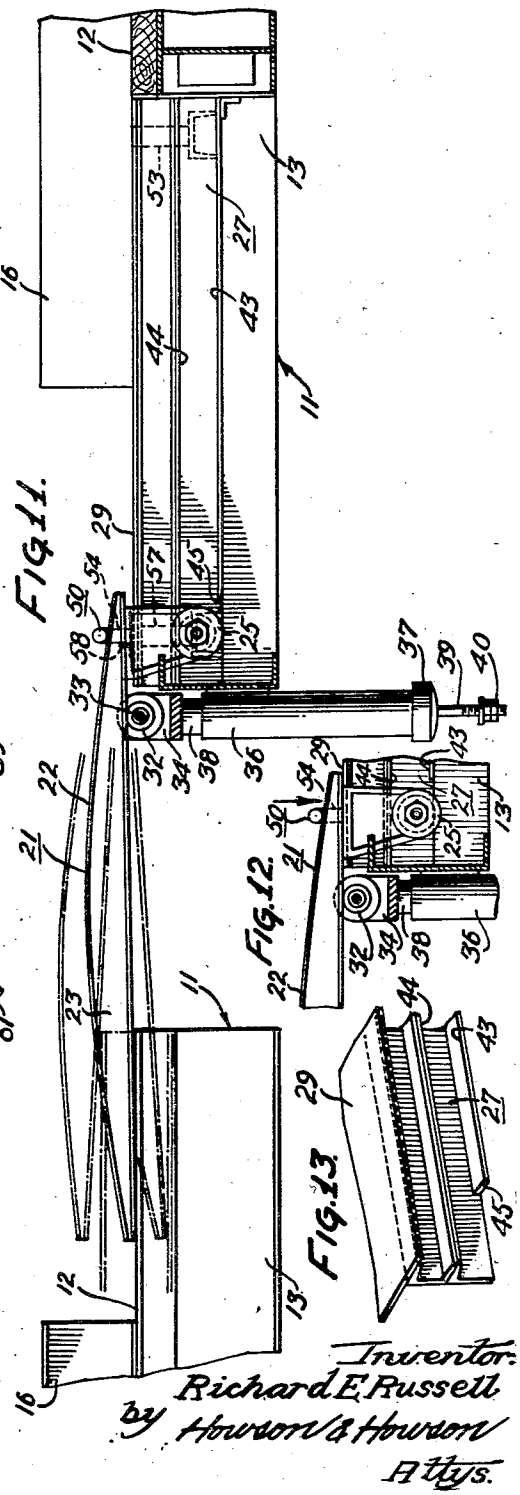


FIG. 11.

FIG. 12.

FIG. 14.

FIG. 13.

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BRIDGE FOR PIGGYBACK FLAT CARS

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Application January 10, 1956, Serial No. 558,281

15 Claims. (Cl. 105—458)

The present invention relates to railroad flat cars and more particularly to an improved bridge construction for spanning between adjacent flat cars employed for transporting by rail, highway vehicles such as truck trailers and the like. The flat cars designed for this purpose are commonly referred to as piggyback flat cars.

The conventional method of loading piggyback flat cars consists of first arranging a series of piggyback flat cars on a siding, and driving each truck trailer endwise over the series of flat cars to its desired position. A bridge is provided between adjacent flat cars and conventionally comprises a pair of steel plates each pivoted to one of the flat cars and swingable between a horizontal position spanning the space between the cars and a vertical position for transport. To withstand the weight of the trucks and trailers traveling over the bridges, the plates must be of heavy construction, and in addition, means must be provided to retain the plates upright during travel, usually in the form of struts. The struts must also be of heavy construction because of the impacts occasioned in the normal operation of the railroad train. All of these factors make the manipulation of the bridges quite cumbersome and there is substantial possibility for injury to the workmen when handling the equipment. It frequently occurs that the adjacent piggyback flat cars do not have the same bed height and problems are encountered when handling the bridges of cars having different bed heights.

With the foregoing in mind, a primary object of the present invention is to provide a bridge for piggyback flat cars which is capable of one-man operation without substantial danger of injury to the worker.

Another object of the present invention is to provide a bridge which lays flat in transit to eliminate the possibility inherent in a conventional bridge of its catapulting from the upright position.

A further object of the present invention is to provide a bridge which automatically compensates for variation in car heights without adversely affecting the rigidity of the bridge structure.

Still another object of the present invention is to provide a bridge construction in which the weight of the vehicles crossing the bridge is transmitted directly to the piggyback flat car bed independently of the operating parts of the bridge.

A still further object of the present invention is to provide a bridge assembly which is adapted to be mounted on any standard flat car.

The invention also contemplates a bridge construction which is of highly economical manufacture and is fully effective in operation and use.

All of the objects, and the various features and details of the construction and operation of the invention are more fully set forth hereinafter with reference to the accompanying drawings in which:

Fig. 1 is a fragmentary plan view of two adjacent piggyback flat cars embodying a bridge constructed in accordance with the present invention and shown in position for transit;

Fig. 2 is a side elevation of the cars shown in Fig. 1;

Fig. 3 is a view similar to Fig. 1 showing the bridges in position for loading the piggyback flat cars;

Fig. 4 is a side elevational view of the flat cars shown in Fig. 3;

Fig. 5 is an enlarged plan view of the novel bridge with fragments broken away to illustrate the construction;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5;

Fig. 7 is an end elevation as seen from the left of Fig. 5;

Fig. 8 is a section taken on the line 8—8 of Fig. 6;

Fig. 9 is a section taken on the line 9—9 of Fig. 6;

Fig. 10 is a section taken on the line 10—10 of Fig. 1; and, showing the operation of the bridge from the transit position to the loading position;

Fig. 11 is a view similar to Fig. 10 showing the bridge in loading position;

Fig. 12 is a fragmentary view similar to Fig. 11 showing a detail of construction of the bridge operating parts;

Fig. 13 is a fragmentary perspective view of the forward end of the track mounting the bridge; and

Fig. 14 is a perspective view of a tool employed in manipulating the bridge from the transit to the loading position.

Referring to the drawings, the present invention is adapted be be applied to piggyback flat cars having a bed 12 mounted on a sub-structure 13. The sub-structure 13 is provided with a coupler 14 at each end thereof mounted on the sub-structure 13 by a mounting plate 15. The bed 12 is provided with upwardly projecting side members 16, 16 to which the trailers are adapted to be anchored by suitable guy cables (not shown).

The present invention provides a bridge 21 which is slidably mounted on the sub-structure of a piggyback flat car for movement between a transit position and a loading position. In the transit position, the bridge overlies the bed of the flat car, and in the loading position, the bridge rests at one end on the bed of the adjacent flat car and at the other end on the bed of the flat car on which it is mounted, to thereby span the gap between adjacent flat cars. As shown in Figs. 1 and 3, each flat car 11 has two bridges 21 mounted thereon. The bridges are mounted at diagonally opposite corners so that when the bridges are in loading position, the bridges provide two track-ways between each pair of adjacent cars, one track-way comprising a bridge mounted on one of the cars and resting on the other, and the other track-way comprising a bridge mounted on the other car and resting on the one car.

In accordance with the invention, the bridge 21 comprises a bridge platform 22 which is arched, as shown in Figs. 2, 4, and 6, and reinforced by underlying inverted T channels 23. The under surface of the channels 23 provide a flat rail, and vertical rigidity is provided by the vertical web of the channel. The inner extremity of the platform 22 is provided with depending journal blocks 25, 25 which rotatably mount wheels 26, 26 thereon (see Fig. 9). The wheels 26, 26 are freely rotatable to roll on tracks 27, 27 which are integrally mounted on the sub-structure 13 of the flat car. As shown, the platform 22 is mounted above the bed 12 of the flat car, and the tracks 27, 27 are mounted below the bed. The journal blocks 25, 25 project through slots 28, 28 disposed longitudinally of the flat car as shown in Fig. 3. A bed plate 29 is mounted contiguous with the bed 12 intermediate the slots 28, 28. Thus, the inner extremity of the bridge platform 22 is slidably supported on the sub-structure 13 by the wheels 26, 26 and the tracks 27, 27.

In accordance with the invention, a second support for

the bridge platform 22 is provided adjacent the end of the flat car. The support takes the form of a pair of spring-loaded rollers 32, 32 which are biased upwardly against the rails formed by the under surface of the channel reinforcing members 23, 23. The rollers 32, 32 are rotatably mounted on a shaft 33, which is supported at each end by a yoke 34. The yokes 34, 34 are biased upwardly by springs 35 mounted in spring cylinders 36 and compressed between a spring cap 37 and a spring piston 38 slidably mounted in the cylinder 36. The yoke 34 is mounted on the piston 38, and the piston is retained in the cylinder 36 by a spring shaft 39 passing through a central aperture in the spring cap 37. Stop nuts are provided at 40 to adjust the compression of the spring 35 and insure a level disposition of the shaft 33 mounting the rollers 32, 32. The springs 35, 35 are sufficiently strong to support the weight of the bridge platform 22 during its travel between the transit and loading positions thereof.

In the operation of the bridge, when the bridge is in the transit position, the wheel 26 is supported on the bottom flange 43 of the track 27, and the channel 23 is supported on the roller 32. As the platform is extended to the load position, the roller 32 supports a greater proportion of the weight of the platform until the center of gravity of the platform passes over the rollers 32. At this point, the wheel 26 floats from the bottom flange 43 of the track 27 to the top flange 44 and the bridge platform 22 is supported cantilever fashion over the bed 12 of the adjacent car. When the bridge is fully extended, its weight is sufficient to compress the springs 35, 35 to allow the free end of the platform 22 to engage the bed 12 of the adjacent flat car. As shown in Fig. 11, there may be a substantial variation in height between adjacent flat cars without adversely affecting the engagement of the platform with the beds.

Means is provided in the loading position of the platform to support the platform substantially independently of the wheels 26 and the rollers 32 as a load is applied to the platform. To this end, the lower flange 43 of the track 27 is cut away adjacent the end of the flat car as indicated at 45. Thus, when the platform is in its loading position, for example, as shown in Figs. 11 and 12, there is no track flange underlying the wheel 26. Thus, when a load is applied to the platform, the weight compresses the spring 35 and the wheel 26 is free to travel below the level of the track 43 until the lower surface reinforcing channels 23 rest upon the bed of the flat car. Therefore, when the trailers are traveling over the platform, the platform is supported directly by the reinforcing channels 23, 23 upon the beds of the two adjacent flat cars, and the wheels 26 and the rollers 32 are not subjected to substantial stresses which might tend to distort them and adversely affect the operation of the bridge.

Means is provided to lock the platform in each of the transit and loading positions. To this end, the lock-in pin 50 is mounted for vertical sliding movement adjacent the inner terminal end of the platform 22 in apertures 51, 51 (see Fig. 9). The bed plate 29 is provided with apertures 52, 52 registering with the apertures 51, 51 in the transit position of the bridge, the sub-structure 13 of the car being provided with means 53, 53 providing cylindrical bores for receiving the legs 54, 54 of the lock-in pin 50. The bed plate 29 is also provided with apertures 56, 56 which register with the apertures 51, 51 in the extended or loading position of the platform 22, and similar means is provided at 57, 57 in the sub-structure to define cylindrical bores for receiving the legs 54, 54 of the lock-in pin 50 when the bridge is in its extended position.

Means is provided to automatically lock the bridge in extended position. To effect this automatic action, a pair of lock trips 58, 58 are mounted to project above the bed plate 29 outwardly adjacent the apertures 56, 56. Thus, in the operation of the bridge, the lock-in pin 50 is displaced out of the bores 53, 53 and the platform is extended on the track towards its loading position. As the platform is advanced, the lock-in pin 50 is allowed to bear on the surface of the bed plate 29 and slide therealong. When the platform reaches its extended position, the legs 54, 54 of the lock-in pin 50 engage the lock trips 58, 58 to stop the advance of the platform and allow the legs 54, 54 to fall into the bores 57, 57 through the apertures 56, 56.

To facilitate manipulation of the bridge, the platform 22 is provided with a pair of spaced apertures 59, 59 adjacent the free extremity thereof. A tool 60 (see Fig. 14) having fingers 61, 61 operable to engage in the apertures 59, 59 is used to draw the bridge from the transit to the loading position, as shown in Fig. 10. Hand holds 62 are also provided in the platform 22 to assist in mounting the car from the side.

Thus, the present invention provides a bridge assembly for piggyback flat cars which may be mounted on any conventional flat car by simply cutting away the bed of the flat car along the grooves 28, 28, mounting the bed plate 29 and tracks 27 on the sub-structure 13 of the flat car along with the spring cylinders 36. The bridge is easily manipulated between the loading and transit positions, and danger of catapulting of the platform is eliminated by the locking means.

While a particular embodiment of the present invention has been herein illustrated and described, it is not intended to limit the invention to such disclosure, but changes and modifications may be made therein and thereto within the scope of the following claims.

I claim:

1. A piggyback flat car comprising a flat bed, means defining at least one longitudinal groove in said bed inwardly adjacent one end thereof, a sliding bridge platform overlying said longitudinal groove, track means mounted below said groove, bearing block means mounted on said platform and extending through said groove, first support means on said bearing block means engaging said track means to slidably support the bridge platform thereon, second support means mounted adjacent the end of said bed and underlying said bridge platform, and means resiliently mounting said second support means to bias the same upwardly and vertically support said bridge platform, whereby said bridge platform is slidable between a position overlying the groove and a loading position extending outwardly beyond said bed for engagement with a second flat car disposed adjacent to said bed in spaced relation to one end thereof.

2. A piggyback flat car comprising a flat bed, means defining at least one longitudinal groove in said bed inwardly adjacent one end thereof, a sliding bridge platform overlying said longitudinal groove, track means mounted below said groove, bearing block means mounted on said platform and extending through said groove, wheel means mounted on said bearing block means and engaging said track means to slidably support the bridge platform thereon, support means mounted adjacent the end of said bed and underlying said bridge platform, and means resiliently mounting said support means to bias the same upwardly and vertically support said bridge platform, whereby said bridge platform is slidable between a position overlying the groove and a loading position extending outwardly beyond said bed for engagement with a second flat car disposed adjacent to said bed in spaced relation to one end thereof.

3. A piggyback flat car comprising a flat bed, means defining at least one longitudinal groove in said bed inwardly adjacent one end thereof, a sliding bridge platform overlying said longitudinal groove, track means mounted below said groove, bearing block means mounted on said platform and extending through said groove, support means on said bearing block means engaging said track means to slidably support the bridge thereon, roller means mounted adjacent the end of said bed and underlying said

bridge platform, and means resiliently mounting said roller means to bias the same upwardly and vertically support said bridge platform, whereby said bridge platform is slidable between a position overlying the groove and a loading position extending outwardly beyond said bed for engagement with a second flat car disposed adjacent to said bed in spaced relation to one end thereof.

4. A piggyback flat car comprising a flat bed, means defining at least one longitudinal groove in said bed inwardly adjacent one end thereof, a sliding bridge platform overlying said longitudinal groove, track means mounted below said groove, bearing block means mounted on said platform and extending through said groove, wheel means mounted on said bearing block means and engaging said track means to slidably support the bridge thereon, roller means mounted outwardly adjacent the end of said bed and underlying said bridge platform, and spring means resiliently mounting said roller means to bias the same upwardly and vertically support said bridge platform, whereby said bridge platform is slidable between a position overlying the groove and a loading position extending outwardly beyond said bed for engagement with a second flat car disposed adjacent to said bed in spaced relation to one end thereof.

5. A piggyback flat car comprising a flat bed, means defining longitudinal grooves in said bed inwardly adjacent diagonally opposite corners thereof, a sliding bridge platform overlying said longitudinal groove at each of said diagonally opposite corners, track means mounted below said grooves, bearing block means mounted on each platform and extending through said groove, wheel means mounted on said bearing block means and engaging said track means to slidably support the bridge platform thereon, roller means mounted outwardly adjacent the end of said bed and underlying said bridge platform, and spring means resiliently mounting said roller means to bias the same upwardly and vertically support said bridge platform, whereby said bridge platform is slidable between a position overlying the groove and a loading position extending outwardly beyond said bed for engagement with a second flat car disposed adjacent to said bed in spaced relation to one end thereof.

6. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising a platform overlying said one end of said flat car bed, first support means on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the first support means and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform extends outwardly beyond the end of said flat car, a second support means mounted adjacent the end of said flat car underlying said platform, and means resiliently biasing said second support means upwardly into engagement with said platform to provide a second sliding support therefor.

7. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising a platform overlying said one end of said flat car bed, wheels rotatably mounted on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the wheels and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, said track means comprising vertically spaced upper and lower flanges between which said wheel travels, support means mounted adjacent the end of said flat car underlying said platform, and means resiliently biasing said support means upwardly into engagement with said platform to provide a second sliding support therefor.

8. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising an arched platform overlying said one end of said flat car bed, wheels rotatably mounted on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the wheels and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, said track means comprising vertically spaced upper and lower flanges between which said wheel travels, said lower flange terminating short of the end of the flat car to afford displacement of said wheel below the level of said lower flange in the loading position of said platform, support means mounted adjacent the end of said flat car and underlying said platform, and means resiliently biasing said support means upwardly into engagement with said platform to provide a second support therefor.

9. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising a platform overlying said one end of said flat car bed, support means on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the support means and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, a roller rotatably mounted on the flat car adjacent the end thereof and underlying said platform, and means resiliently biasing said roller upwardly into engagement with said platform to provide a second sliding support therefor.

10. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising an arched platform overlying said one end of said flat car bed, support means on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the support means and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, a roller rotatably mounted adjacent the end of said flat car and underlying said platform, and means biasing said roller upwardly into engagement with said platform, comprising a shaft rotatably mounting said roller, a yoke supporting said shaft, and spring means compressed between said yoke and said flat car sub-structure to bias the yoke upwardly and provide a resilient second sliding support for said platform.

11. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising an arched platform overlying said one end of said flat car bed, support means on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the support means and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, a roller rotatably mounted adjacent the end of said flat car and underlying said platform, and means biasing said roller upwardly into engagement with said platform to provide a resilient second sliding support for said platform, said platform in-

cluding means defining a flat rail for travel on said roller.

12. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising an arched platform overlying said one end of said flat car bed, wheels rotatably mounted on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the wheels and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, said track means comprising vertically spaced upper and lower flanges between which said wheel travels, said lower flange terminating short of the end of the flat car to afford displacement of said wheel below the level of said lower flange in the loading position of said platform, a roller rotatably mounted adjacent the end of said flat car and underlying said platform, and means biasing said roller upwardly into engagement with said platform comprising a shaft rotatably mounting said roller, a yoke supporting said shaft, and spring means compressed between said yoke and said flat car sub-structure to bias the yoke upwardly and provide a resilient second sliding support for said platform, said platform including means defining a flat rail for travel on said roller.

13. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising an arched platform overlying said one end of said flat car bed, wheels rotatably mounted on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the wheels and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, a roller rotatably mounted adjacent the end of said flat car and underlying said platform, means biasing said roller upwardly into engagement with said platform comprising a shaft rotatably mounting said roller, a yoke supporting said shaft, and spring means compressed between said yoke and said flat car sub-structure to bias the yoke upwardly and provide a resilient second sliding support for said platform, said platform including means defining a flat rail for travel on said roller, and locking means for locking said platform in each of the loading and transit positions comprising a lock-in pin having depending legs mounted for vertical sliding movement in said platform, and means

mounted in said sub-structure defining bores for receiving said legs in the transit position of said platform, and a second means mounted in said sub-structure defining bores for receiving said legs in the loading position of said platform.

14. For a piggyback flat car having a bed and a supporting sub-structure therefor, a bridge construction at one end of said flat car comprising an arched platform overlying said one end of said flat car bed, wheels rotatably mounted on said platform at the inner end thereof and disposed below the bed of said flat car, track means mounting the wheels and thereby said platform for sliding movement longitudinally of said flat car to position said platform selectively between a transit position wherein said platform overlies the end of said flat car bed and a loading position wherein said platform projects outwardly beyond the end of said flat car, said track means comprising vertically spaced upper and lower flanges between which said wheel travels, said lower flange terminating short of the end of the flat car to afford displacement of said wheel below the level of said lower flange in the loading position of said platform, a roller rotatably mounted adjacent the end of said flat car and underlying said platform, means biasing said roller upwardly into engagement with said platform comprising a shaft rotatably mounting said roller, a yoke supporting said shaft, and spring means compressed between said yoke and said flat car sub-structure to bias the yoke upwardly and provide a resilient second sliding support for said platform, said platform including means defining a flat rail for travel on said roller, and locking means for locking said platform in each of the loading and transit positions comprising a lock-in pin having depending legs mounted for vertical sliding movement in said platform, and a first means mounted in said sub-structure defining bores for receiving said legs in the transit position of said platform, and a second means mounted in said sub-structure defining bores for receiving said legs in the loading position of said platform.

15. Apparatus according to claim 14 wherein the legs of said lock-in pin are adapted to slide on the bed intermediate said first and second means defining bores for receiving said legs, and including stop means projecting upwardly from said bed outwardly adjacent said second means to engage said legs and direct the same into the bore defined by said second means.

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