

June 27, 1950

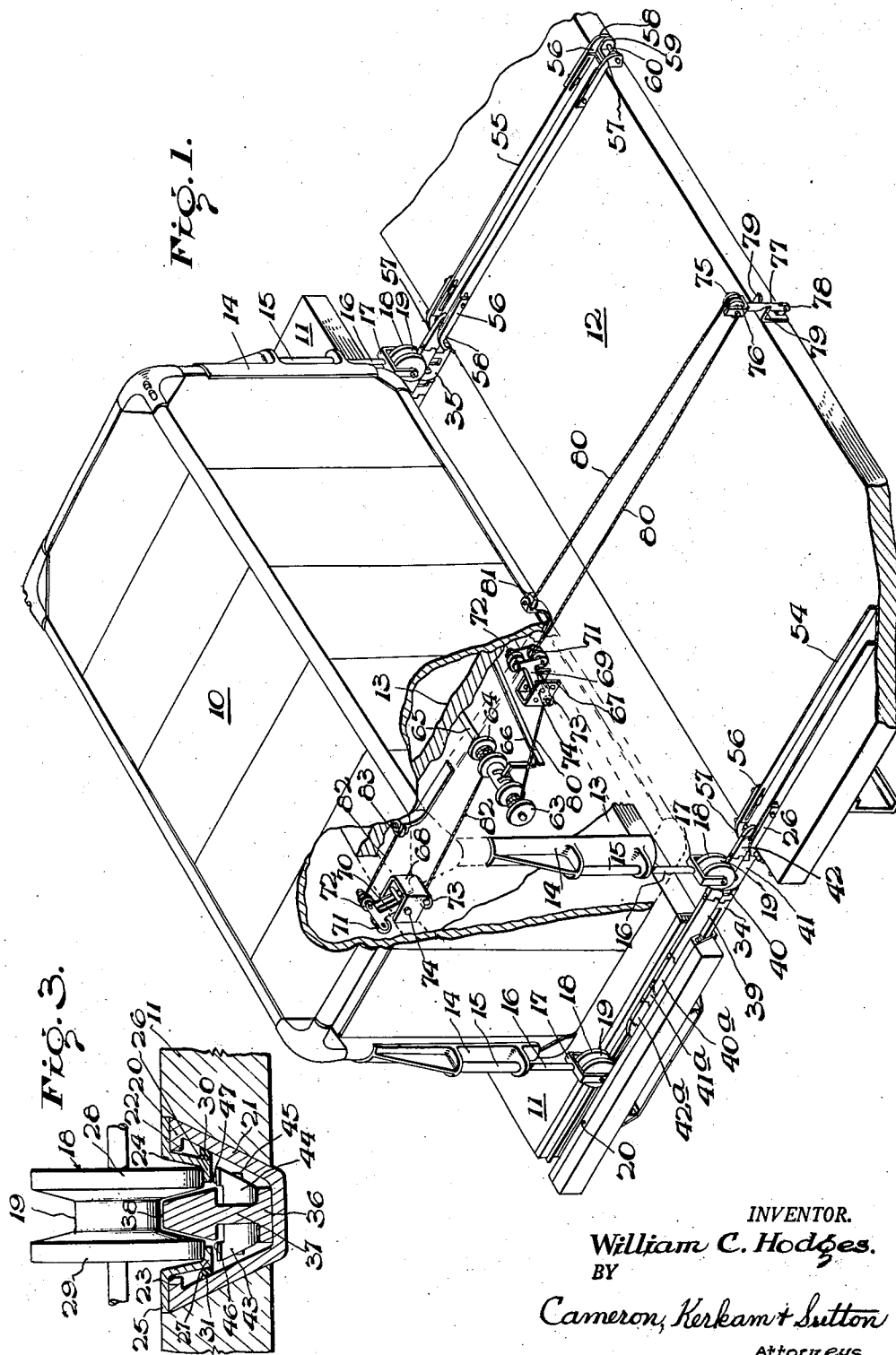
W. C. HODGES

2,512,798

TRANSFER MECHANISM

Filed March 29, 1948

3 Sheets-Sheet 1



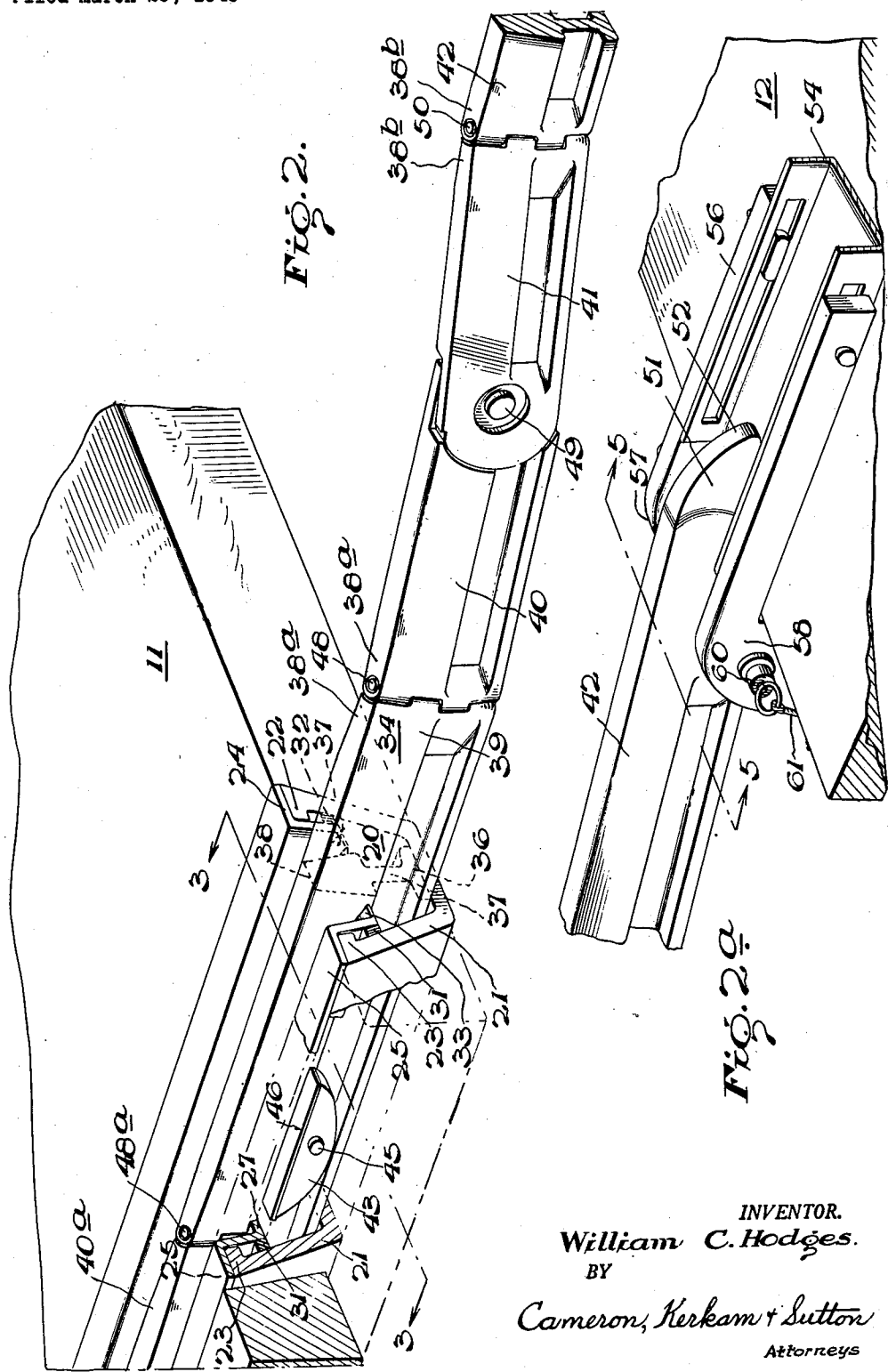
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3 Sheets-Sheet 2



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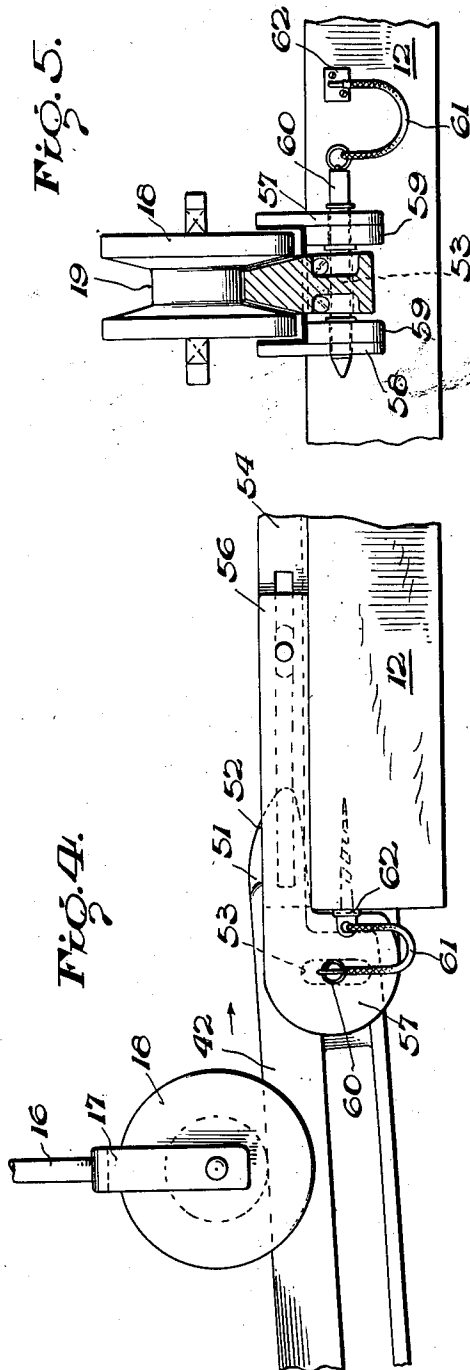
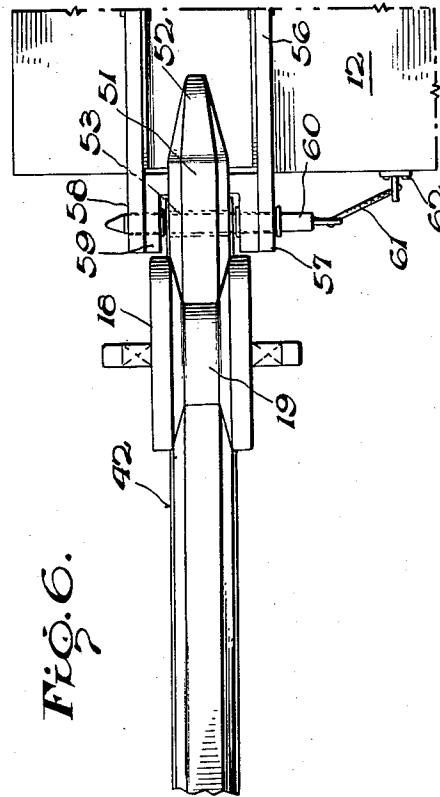
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UNITED STATES PATENT OFFICE

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TRANSFER MECHANISM

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This invention relates to transfer mechanisms and more particularly to such mechanisms for the transfer of containers from one means of support or transportation to another.

More particularly this invention relates to transfer mechanisms in which one supporting means or means for transportation is connected to another by bridging elements and the container is moved over the bridging elements by draft mechanism carried by one of the transportation means.

Heretofore various transfer mechanisms of this general type have been proposed as exemplified by the several patents to Benjamin F. Fitch and to Ragnar A. Norbom including Patents No. 2,304,115, Ragnar A. Norbom, December 8, 1942, and No. 2,127,480, Benjamin F. Fitch, August 16, 1938. As representative of other patents relating to this general subject attention is called to Patents No. 1,830,740, Leech et al., November 3, 1931, and No. 2,004,095, Hawkins et al., June 11, 1935. In all of these patents bridging elements are used to connect the two supporting or transportation means and various mechanical means are employed to move the container from one means to the other over the bridging elements. All of these devices are subject to criticism for one reason or another. In some the mechanical structure employed is complicated, too costly, and difficult to maintain and use. In others careful alignment of the two transportation means is required before the bridging elements can be employed with resulting loss of time and efficiency of operation. In others complete control of the container during movement is obtained only by the use of heavy skids and guides requiring excessive power to effect the transfer of the container.

By the present invention I have overcome the difficulties inherent in these prior devices and have provided a simple, inexpensive and readily usable transfer mechanism requiring a minimum of power to move the container from one supporting or transportation means to the other. These desirable advantages are obtained by providing the container with wheeled jacks at each corner to raise the container before transfer for complete support upon the wheels and transverse guides on each supporting or transportation means to engage and guide the wheels. Articulated bridging elements connect corresponding guides and are engaged by the wheels to guide the wheels during movement over the bridging elements. The bridging elements are slidably mounted in the transverse guides of one of the supporting or transportation means to be carried

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therein when not in use. Articulation of the bridging elements and the sliding support provided in the transverse guides of one of the supporting or transportation means permits the two supporting or transportation means to be at different elevations and out of alignment during transfer of the container without impairing the efficiency of my invention. A simple cable and drum device is mounted on one of the supporting or transportation means to move the container from one supporting or transportation means to the other.

It is accordingly an object of my invention to provide a novel transfer mechanism in which articulated bridging elements are employed to connect the two supporting or transportation means.

Another object is to provide such mechanism in which the two supporting or transportation means are provided with transverse guides and corresponding guides of each supporting or transportation means are connected by an articulated bridging element.

Another object is to provide such mechanism in which the container to be transferred is provided with wheeled lifting jacks, the wheels of which carry the weight of the container during transfer and are guided during movement by transverse guides on each supporting or transportation means which guides are correspondingly connected by articulated bridging elements.

Another object is to provide such mechanism in which the wheels of the jacks are peripherally grooved to engage the articulated bridging elements during movement of the container and are provided with adequate peripheral surface so that they may roll over level supporting surfaces or level ground.

Another object is to provide such mechanism in which the articulated bridging elements are slidably mounted within the transverse guides of one of the supporting or transportation means to be carried in retracted position therein when not in use.

Another object is to provide such mechanism in which the bridging elements are formed of a plurality of elements articulated together by horizontally and vertically disposed pivots so that the space between the supporting or transportation means may be bridged when such means are at different elevations and otherwise out of alignment.

Another object is to provide such mechanism in which the wheels of the jacks are raised from the bridging elements when positioned in the

guides of the supporting or transportation means carrying the bridging elements so that such elements may be freely withdrawn from or retracted into such guides.

Another object is to provide such mechanism in which simple mechanical means such as a simple cable and drum powered by one of the supporting or transportation means is utilized to move the container during transfer.

Another object is to provide such mechanism which will permit the supporting or transportation means to be used for other cargoes when not in use with cargo carrying containers.

Another object is to provide such mechanism which requires minimum reconstruction of or structural changes or additions to known supporting or transportation means.

Another object is to provide such mechanism which is relatively inexpensive to manufacture and install; which is simple and efficient in operation; and which may be used with any known type of supporting or transportation means.

Other and further objects of my invention will appear from the following description.

My invention is capable of various mechanical embodiments and can be used with any known types of supports or transportation. One embodiment of my invention is shown in the accompanying drawings and is described hereinafter as applied to known means of transportation, say a trailer of a trailer truck and a railroad flat car, to illustrate my invention. This illustrative embodiment of my invention should in no way be construed as defining or limiting the same and reference should be had to the appended claims for this purpose.

In the several drawings, in which like reference characters designate like parts:

Fig. 1 is a view of one embodiment of my invention as applied to a flat trailer of a trailer truck and to a railroad flat car showing the container being transferred from the trailer to car with a part of both the container and the trailer cut away to show the cable and drum mechanism for moving the container;

Fig. 2 is an enlarged detail of Fig. 1 showing an articulated bridging element in extended position mounted in a guide on the trailer;

Fig. 2a is a continuation of Fig. 2 showing the means for attaching the bridging element to the guide on the flat car;

Fig. 3 is a cross sectional view of the embodiment of Fig. 1 on the line 3—3 of Fig. 2;

Fig. 4 is a side view of that part of the embodiment of Fig. 1 seen in Fig. 2a;

Fig. 5 is a cross sectional elevation on the line 5—5 of Fig. 2a; and

Fig. 6 is a view from above of that part of the embodiment of Fig. 1 as seen in Fig. 2a.

Referring to the drawings, a suitable container of any desired size, and preferably of such size that two can be transported on a standard railroad flat car, is generally indicated at 10. A flat trailer of a trailer truck for transporting container 10 is partially and generally indicated at 11 and a part of a suitable railroad flat car is indicated at 12. Container 10 rests upon its bottom 13 upon trailer 11 or car 12 when in transportation and may be secured thereto by any suitable means not here shown. Container 10 is raised for transfer from the trailer to the car or vice versa by wheeled jacks generally indicated at 14 and suitably and dismountably secured one at each corner of container 10. The exact construction of jacks 14 forms no part of this in-

vention and jacks 14 may be actuated by suitable mechanical or hydraulic means here shown as hydraulic including a cylinder 15 and piston 16. Piston 16 carries wheel fork 17 at its lower end and peripherally grooved wheel 18 is rotatably mounted therein, the peripheral groove being indicated at 19.

Wheels 18 ride in and are aligned by a pair of parallel guides on trailer 11 generally indicated at 20 which guides may be let transversely into the deck of trailer 11 or may be supported on the surface thereof. As best seen in Figs. 2 and 3 guides 20 include a hollow channel member 21 suitably secured in the deck of trailer 11 and having a truncated V-shaped cross section provided with inturned parallel and oppositely disposed shoulders 22 and 23 at the open end of the V. Tracks 24 and 25 of generally S-shaped cross section are suitably secured to and are carried by shoulders 22 and 23 respectively. Inner and inturned surfaces 26 and 27 of tracks 24 and 25 respectively are engaged by treads 28 and 29 respectively of wheels 18. Tracks 24 and 25 are supported and spaced within channel 21 by spacers 30 and 31 respectively. The ends of surfaces 26 and 27 may be provided with ramps 32 and 33 respectively for purposes which will more fully appear hereinafter.

Bridging elements, generally indicated at 34 and 35 (Fig. 1), are slidably mounted in guides 20 and may be of any suitable cross sectional shape here shown as having a base 36, web 37 and a truncated wheel engaging surface 38 shaped to fit the peripheral grooves 19 of wheels 18. The overall height of bridging elements 34 and 35 from the underside of base 36 to the top of surface 38 is such that when wheels 18 ride upon surfaces 26 and 27 peripheral grooves 19 of wheels 18 will not bear upon surfaces 38 and there will be a suitable clearance therebetween. Each bridging element 34 and 35 is made up of a plurality of articulated elements including a center element 39 and elements 40, 41 and 42 articulated thereto on one end and elements 40a, 41a and 42a articulated thereto on the other end for the particular purpose. Element 39 is never completely withdrawn from guides 20 and is provided on each side with pressure shoes 43 and 44 pivotally mounted on web 37 at 45. Shoes 43 and 44 are provided with elongated bearing surfaces 46 and 47 respectively engaging the undersides of surfaces 27 and 26 respectively to keep element 39 in position within guide 20. Element 39 is pivoted to element 40 by vertically disposed pivot 48 and to element 40a by pivot 48a; element 40 is pivoted to element 41 by horizontally disposed pivot 49; and element 41 is pivoted to element 42 by vertically disposed pivot 50. Elements 41a and 42a are similarly pivoted. Element 42 is provided with an extending finger 51 to engage the surface of car 12 and finger 51 is cut away at 52 to form a ramp for reasons which will more fully appear hereinafter. Element 42 is vertically slotted at 53 (Fig. 4). Element 42a has a similar finger and slot (not shown). With this construction the articulated bridging elements may be withdrawn from either side of trailer 11.

Truncated wheel engaging surface 38 may be reduced in width adjacent the vertical pivots 48, 48a and 50 as at 38a and 38b to prevent binding of the wheels at these pivots when there is considerable angularity between the bridging elements.

Car 12 is provided with a pair of transversely extending channel shaped guide rails 54 and 55

which extend parallel to each other and which are suitably spaced apart to receive wheels 18 on opposite ends of container 10. Guides 54 and 55 are suitably secured to car 12 as by extensible end elements 56 which have downwardly turned flanges 57 and 58 which embrace a bracket 59 secured to the side of car 12, the assembly being secured together by pin 60. Pin 60 may be readily removed and may be retained against loss by a cord or chain 61 secured to car 12 at 62.

Trailer 11 is provided with a conventional pair of winding drums 63 and 64 driven by conventional drive shaft 65 and controlled by operating lever 66, all in known manner. U-shaped brackets 67 and 68 are let into and are secured in opposite edges of the deck of trailer 11. T-shaped pulley arms 69 and 70 are pivoted in brackets 67 and 68 respectively and each rotatably supports a pair of sheaves 71 and 72. Rollers 73 are rotatably mounted at the inner and lower edges of brackets 67 and 68. Stop pins 74 may be used to limit the movement of arms 69 and 70. Dead head pulley 75 carried by angles 76 and arm 77 may be pivoted at 78 to one edge of car 12 and arm 77 may be supported against lateral movement when in raised position by horns 79. Drum 63 carries cable 80 which passes over roller 73 in bracket 67; then over sheave 71 on arm 69; around dead head pulley 75; and then back across car 12 to container 10 where it is secured adjacent the bottom thereof by a suitable connection 81. Drum 64 carries cable 82 wound oppositely to cable 80 on drum 63. Cable 82 passes over roller 73 in bracket 68; then over sheave 72; and is then suitably secured at 83 to container 10 adjacent its bottom on the opposite side from connection 81.

With this embodiment of my invention organized as above described assume that container 10 is resting upon trailer 11 and it is desired to transfer container 10 to flat car 12. Trailer 11 is then positioned beside car 12 but it is not necessary that the two be at the same level or that guides 20 are aligned with guides 54 and 55. Jacks 14 are then attached to the corners of container 10 and wheels 18 are extended into guides 20. Cables 80 and 82 are rigged as described above and attached to container 10 at 81 and 83 respectively. Bridging elements 34 and 35 are now withdrawn from guides 20, no pressure being exerted on these elements by wheels 18 at this time, and the several articulated elements 39, 40, 41 and 42 are moved about their respective pivots until fingers 51 can rest upon the deck of car 12 within channels 54 and 55. Pins 60 are then inserted through flanges 57 and 58, bracket 59 and slot 53 to lock bridging elements 34 and 35 to car 12. Elements 39 of the bridging elements are retained in guides 20 by pressure shoes 43 and 44 and are free to slide therein if movement of either the trailer or the car takes place when the container is moved.

Jacks 14 may now be actuated to raise container 10 off of trailer 11 to support its entire weight on wheels 18. Drums 63 and 64 are now energized, drum 63 being rotated to take in cable 80 and drum 64, being oppositely wound, unreels cable 82 thus providing complete control of container 10 during movement. Winding up of cable 80 moves container 10 on wheels 18 toward car 12 and wheels 18 and the movement of container 10 are guided and controlled by guides 20. As the nearest pair of wheels 18 reach the end of guides 20 they roll down ramps 32 and 33 and onto bridging elements 34 and 35, grooves 19 of wheels 18 receiving surface 38 of elements 39.

Part of the weight of container 10 is now supported by the bridging elements. Further movement of container 10 toward car 12 is guided by the engagement of wheels 18 with the bridging elements until the nearest pair of wheels 18 rides down ramps 32 formed on the ends of fingers 51 and into guide channels 54 and 55 which guide movement of wheels 18 and container 10 across car 12. Movement of container 10 is continued until the rear wheels 18 thereof have passed down ramps 32 and 33, across bridging elements 34 and 35 and down off ramps 52 into channels 54 and 55 and until container 10 is centered on car 12. Jacks 14 are then actuated to lower container 10 so that its bottom 13 rests upon car 12. Jacks 14 may then be removed or may be left on container 10 as is desired.

When container 10 is to be moved from car 12 to trailer 11, trailer 11 is positioned beside car 12, it not being necessary to position trailer 11 exactly either longitudinally or in elevation. Bridging elements 34 and 35 are extended and the several elements thereof are moved on their pivots until fingers 51 rest on car 12 within channels 54 and 55 and pins 60 are inserted. Jacks 14 are then actuated to raise container 10 from car 12 and cables 80 and 82 are rigged as above described. Drums 63 and 64 are now energized so that drum 64 winds in cable 82 and drum 63 unwinds cable 80 thus affording complete control of the movement of container 10. Container 10 is then moved on wheels 18 toward trailer 11, channels 54 and 55 directing the movement of wheels 18. As the first pair of wheels 18 reach fingers 51 they engage and ride up ramps 52 onto bridging elements 34 and 35 where track surfaces 38 are engaged by grooves 19 to guide wheels 18 and container 10 in movement across the bridging elements. As the first pair of wheels reach trailer 11 they enter and ride up ramps 32 and 33 of surfaces 27 and 28 thus relieving the bridging elements of the weight carried by these wheels. Movement of container 10 is continued until all wheels 18 have crossed the bridging elements and container 10 is centered on trailer 11 with all wheels 18 carried by surfaces 26 and 27 with no weight being exerted on the bridging elements. Jacks 14 are now actuated to lower container 10 onto trailer 11. Cables 80 and 82 may now be unrove and pins 60 are withdrawn to permit bridging elements 34 and 35 to be slid into guides 20 into retracted position. Trailer 11 is now ready to transport container 10.

As noted above any suitable type of supporting or transportation means may be used with this invention. The container 10 may be moved from one truck to another; from one railroad flat car to another; from an aeroplane to a truck or from a truck to an aeroplane; from a truck or railroad car to a barge or vice versa; and so on through all combinations of means for transporting the container. The container may also be moved from the ground to any suitable transporting means or from platforms, floors or any other suitable support for the container to such transporting means. Further it is not critical to this invention which transportation means carries drums 63 and 64 and this power may even be supplied from a source separate from either transportation means.

It will now be apparent that the present invention provides novel mechanisms for the transfer of containers from one means of support or transportation to another, which employs articulated bridging elements to connect

the supporting or transportation means; which employs transverse guides on each supporting or transportation means; in which the container is provided with wheels to engage in the transverse guides and to engage the bridging elements during movement of the container; in which the wheels of the container are preferably carried by removable jacks and are peripherally grooved to engage the articulated bridging elements; in which the articulated bridging elements are slidably mounted in the transverse guides of one of the supporting or transportation means to be carried in retracted position therein when not in use; in which the bridging elements are formed of a plurality of elements articulated together by horizontal and vertically disposed pivots to bridge the space between the supporting or transportation means when such means are at different elevations or otherwise out of alignment; in which the wheels supporting the container do not engage the bridging elements when positioned in the guides of the supporting or transportation means carrying the bridging elements so that such elements may be freely withdrawn from or retracted into such guides; in which simple means such as cable and drum means are utilized to move the container during transfer; which requires a minimum of reconstruction, structural changes or additions to known supporting or transportation means; which permits use of supporting or transportation means with other cargoes; and which is relatively inexpensive to manufacture and install; which is simple and efficient in operation and which may be used with any known types of supporting or transportation means.

Changes to or modifications of the above described illustrative embodiment of my invention may now be suggested to those skilled in the art without departing from my inventive concept. As an example, this invention may be readily adapted to transfer the container when the transportation means are arranged in end-to-end relationship with each other or with the supporting means rather than in side-by-side relationship as above described. Reference should therefore be had to the appended claims to determine the scope of this invention.

What is claimed is:

1. In a transfer mechanism as described including two supporting means and a wheeled container to be transferred from one supporting means to the other, wheel guides carried by one of the supporting means and articulated bridging elements comprising a plurality of elements united by alternate horizontal and vertical pivots for bridging the space between the supporting means slidably mounted in said guides.

2. A mechanism as described in claim 1 in which each of said wheel guides includes a channel member having a truncated V-shaped cross section and a pair of spaced parallel wheel engaging surfaces supported within said channel member, the articulated bridging element extending upwardly between said wheel engaging surfaces.

3. A mechanism as described in claim 1 in which each of said wheel guides includes a channel member, a pair of spaced parallel wheel engaging surfaces supported within said channel member and ramps formed at the ends of said wheel engaging surfaces, the articulated bridging element extending upwardly between said wheel engaging surfaces.

4. A mechanism as described in claim 1 in

which each of said wheel guides includes a channel member, a pair of spaced parallel wheel engaging surfaces supported within said channel member, the articulated bridging element extending upwardly between said wheel engaging surfaces and pressure elements pivoted to said articulated bridging element and engaging the under surfaces of said wheel engaging surfaces.

5. A mechanism as described in claim 1 in which each of said articulated bridging elements includes a plurality of relatively short elements pivoted to each other about pivots which are alternately vertically and horizontally disposed.

6. A mechanism as described in claim 1 in which each of said articulated bridging elements includes a plurality of relatively short elements pivoted to each other about vertically and horizontally disposed pivots and a finger formed on the end of one of said short elements to engage and rest upon the other of the supporting means.

7. A mechanism as described in claim 1 in which each of said articulated bridging elements includes a finger formed on the end thereof to engage and rest upon the other of the supporting means and a ramp formed on the end of said finger.

8. A mechanism as described in claim 1 in which each of said articulated bridging elements includes a base slidably mounted in said wheel guides, a truncated wheel engaging rail and a vertically disposed web connecting said base and said rail.

9. A mechanism as described in claim 1 in which each of said wheel guides includes a channel member and a pair of spaced parallel wheel engaging surfaces supported within said channel member, and in which each of said articulated bridging elements includes a base slidably mounted in said channel member, a truncated wheel engaging rail and a vertically disposed web connecting said base and said rail, said truncated rail extending upwardly between said wheel engaging surfaces and pressure elements pivoted to said web and engaging the under surfaces of said wheel engaging surfaces.

10. A mechanism as described in claim 1 in which each of said articulated bridging elements includes a plurality of relatively short elements pivoted to each other about vertically and horizontally disposed pivots, each of said relatively short elements having a base for sliding engagement within said wheel guides, a wheel engaging rail, and a vertically disposed web joining said base and said rail.

11. In a transfer mechanism as described including two supporting means and a container supported during transfer by peripherally grooved wheels, channel wheel guides recessed into one of the supporting means, spaced parallel wheel supporting surfaces carried within each of said channels, and articulated bridging elements to be received in the peripheral grooves of the wheels slidably mounted in said channels between said surfaces to bridge the space between the supporting means.

12. A mechanism as described in claim 11 in which said supporting surfaces and said articulated bridging elements are constructed and arranged so that said articulated bridging elements are not engaged by the wheels when the wheels bear upon said supporting surfaces.

13. A mechanism as described in claim 11 including ramps formed in the ends of said supporting surfaces whereby the peripherally

grooved wheels are lowered to engage said articulated bridging elements.

14. A transfer mechanism as described comprising supporting means, a container carried by said supporting means, wheels supporting said container during transfer, channel wheel guides recessed in said supporting means receiving said wheels, articulated bridging elements slidably mounted beneath said wheels in said channels, a second supporting means, means for securing one end of each of said articulated bridging elements to said second supporting means, channel wheel guides on said second supporting means and drum and cable means for moving said container across said bridging elements onto said second supporting means.

15. A transfer mechanism as described comprising transportation means, a container carried by said transportation means, wheels supporting said container during transfer, channel wheel guides recessed in said transportation means receiving said wheels, spaced parallel surfaces carried in said channels supporting said wheels, articulated bridging elements slidably mounted beneath said wheels in said channels between said surfaces, container supporting means, means for securing one end of each of said articulated bridging elements to said supporting means, and mechanical means for moving said container across said bridging elements onto said supporting means.

16. A mechanism for connecting two container supporting devices to transfer a wheeled container including wheel guides recessed into one of the supporting devices, and articulated bridging elements alternately joined by horizontal and vertical pivots for connecting the two supporting devices slidably mounted in said guides.

17. A mechanism as described in claim 16 in which each of said wheel guides includes a chan-

nel member and a pair of spaced parallel wheel engaging surfaces supported within said channel member, the articulated bridging element extending upwardly between said wheel engaging surfaces.

18. A mechanism as described in claim 16 in which each of said wheel guides includes a channel member, a pair of spaced parallel wheel engaging surfaces supported within said channel member, the articulated bridging element extending upwardly between said wheel engaging surfaces, and pressure elements pivoted to said articulated bridging element and engaging the under surfaces of said wheel engaging surfaces.

19. A mechanism as described in claim 16 in which each of said articulated bridging elements includes a plurality of relatively short elements pivoted to each other about pivots which are alternately vertically and horizontally disposed.

20. A mechanism as described in claim 16 in which each of said articulated bridging elements includes a base slidably mounted in said wheel guides, a truncated wheel engaging rail, and a vertically disposed web connecting said base and said rail.

WILLIAM C. HODGES.

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