

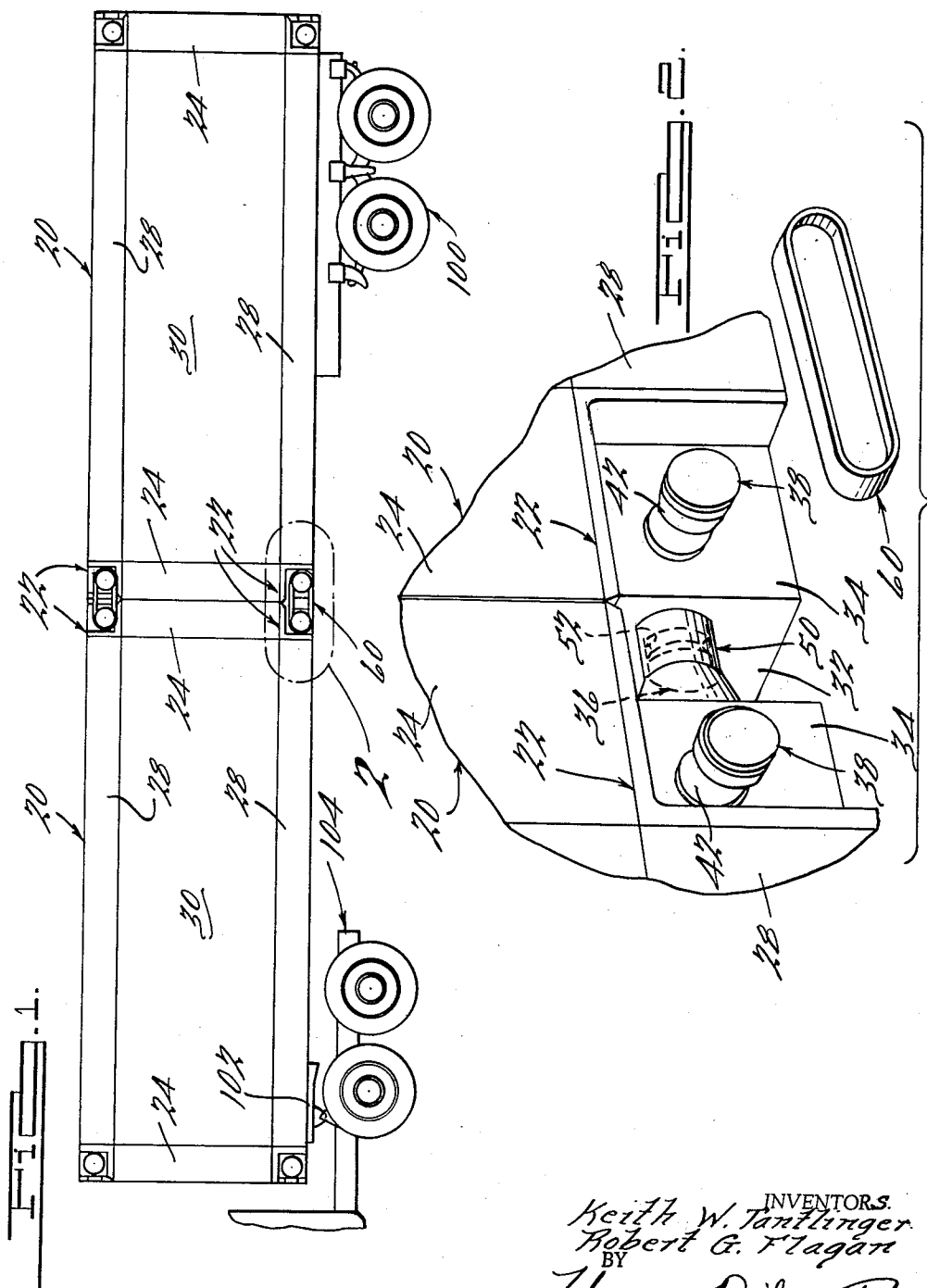
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K. W. TANTLINGER ETAL

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SHIPPING APPARATUS

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INVENTORS.
Keith W. Tantlinger
Robert G. Flagan
BY
Harness, Dickey & Paine
ATTORNEYS.

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SHIPPING APPARATUS

Keith W. Tantlinger, Grosse Pointe Shores, and Robert G. Flagan, Grosse Pointe Park, Mich., assignors to Fruehauf Corporation, a corporation of Michigan
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This invention relates generally to shipping apparatus and more particularly to a pin system for coupling, handling and securing load-supporting shipping apparatus.

The herein disclosed pin system for coupling shipping apparatus is described primarily in an environment wherein it has particular utility, namely, when incorporated into a corner construction for shipping containers. It is to be understood, however, that the invention can be applied in other modes to other forms of shipping apparatus employed for the support of freight and bulk commodities during shipment.

There are many advantages to shipping freight or other goods in containers of modular dimensions. Such modular containers implement the transfer of goods in that standardized handling equipment can be utilized for loading and unloading the containers, the containers are relatively easily spotted and stacked on a vehicle or ship, and the containers are relatively easily separable for consignment to different destinations.

The present invention presents a material step forward in shipping art in that it presents a solution to many of the problems encountered in integrating the many types of shipping containers into a common modular system.

For example, to maximize the utility of a shipping container, the container must be completely interchangeable between rail, highway, marine and air carriers. Such interchangeability is effected, in accordance with the present invention, by standardization of several critical features of the container. The number of such standardized features is minimized to maximize design flexibility of the various container configurations required for refrigerated, dry, liquid, and bulk cargoes. Further, the provision of a minimum number of standard features reduces the possibility of encroachment of the load space within the container.

Preferably, shipping containers are transportable either singly or in multiple coupled configuration, on detachable wheel bogies, on platform trailers, on skeleton chassis trucks, or on rail cars. Such containers must also be transportable by ship, wherein they are often stacked, for example, six high, in complementary cells. Also, because such containers are often stacked on the deck of a ship or on loading platforms, they should be readily attachable to the deck of the ship or platform and should be sufficiently rigid to obviate the need for athwartship lashing wires or the like.

Since the containers must fit the vertical guides or ways provided at the corners of conventional ship storage cells, the containers must bear a direct relationship to the size of such storage cells. Accordingly, it is contemplated that various combinations of fractional size containers be coupled together to make a container assembly that will fit properly in such a storage cell. Also, to maximize transportation economy, such containers should be joinable to form an assembly similar in dimension to the size of a standard railway car or highway trailer.

The foregoing requirements for shipping containers are preferably fulfilled without requiring depending or protruding coupling structures that interfere with movement of the containers on rollers, on factory assembly lines, on shipping docks and within the cells of cargo-carrying ships.

The present invention is founded on the concept of using pins, in unique orientation, to effect coupling of a

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container to other containers, to supporting structures, and to handling devices. This pin system is preferably incorporated into a corner construction wherein the pins are positioned and supported in such a manner that they do not extend beyond the cubic dimension of the container, nor extend into or otherwise encroach upon load space.

In a constructed embodiment, cylindrical fastening pins extend laterally and longitudinally outwardly from lateral and longitudinal recesses, respectively, in the corner members of the container, for the acceptance of novel coupling and retaining devices. The pins extend into contiguous relation to the planes of the side and end walls of the container, thereby eliminating the problems, inherent in container constructions heretofore known and used, stemming from the use of coupling devices that protrude beyond the cubic dimension of the container. Further, the pins can be positioned with respect to each other without regard for manufacturing accuracy of the container itself, rendering original manufacture and repair less costly.

To effect coupling of, for example, one container to another container, novel sleeves are telescoped over axially aligned ones of the abutting pins on juxtaposed containers to accept lateral shear loads therebetween. A loop-type tie extends about spaced parallel ones of the pins to accept tensile loads between the containers. Compressive loads are accepted directly by the abutting axially aligned pins. The same loop ties can be used to tie or couple containers side by side, stacked, as well as end to end, plus various combinations of these three ways of tying.

In accordance with one feature of the present invention, a pair of containers, when coupled together by the aforementioned sleeves and loops, comprises a structural unit capable of supporting the loads normally contained within the containers without requiring external structural support even when the assembly is supported at only the outboard ends thereof. This condition obtains when, for example, a pair of containers are coupled in end-to-end relationship and are supported by a fifth wheel of a tractor at one end of the assembly and by a wheel bogie at the other end of the assembly.

Accordingly, one object of the present invention is an improved shipping apparatus.

Another object of the invention is a pin system for coupling shipping apparatus.

Another object is a corner construction for shipping apparatus that facilitates the use of a pin system for coupling two or more units of shipping apparatus into a substantially rigid structural unit without encroaching upon load area.

Another object is a shipping apparatus that is compatible with conventional transportation facilities.

Other objects and advantages of the present invention will be apparent in the following detailed description, claim and drawings wherein:

FIG. 1 is a side elevational view of a pair of the shipping containers, coupled in end-to-end relation and operatively associated with a tractor and load-supporting wheel bogie;

FIG. 2 is a perspective view of the structure within the circle 2 of FIG. 1 with the coupling ring removed from the spaced parallel pins.

Referring now to FIGURE 1 of the drawings, a shipping container 20 is provided with corner members 22, in accordance with the present invention, at each of the corners thereof. The corner members 22 are connected by relatively strong vertical frame members 24 and by longitudinal frame members 29. Suitable wall panels 30 may extend between the aforementioned frame members 24 and 28 to substantially enclose the container 20. Because the corner members 22 are similar in construction,

only one corner member 22 will be discussed in detail hereinafter.

Referring now to FIG. 2 of the drawings, each corner member 22 comprises, for example, a steel casting having a longitudinally recessed laterally extending face 32 and a laterally recessed longitudinally extending face 34 to which are secured, as by welding, a pair of longitudinally and laterally extending cylindrical pins 36 and 38, respectively. To insure accurate positioning and alignment of the pins 36 and 38, the corner members 22 are preferably assembled with the frame members 24 and 28 without the pins, after which the pins are accurately located with respect to one another as by suitable jigs or fixtures (not shown) and secured to the corner members as by welding. It is to be noted that welding of the pins 36 and 38 to the corner members 22 can be accomplished from the exterior of the container 20, thus facilitating the aforementioned method of construction.

The pins 36 and 38 may be provided with suitable annular grooves 42, respectively, to facilitate retention of a suitable coupling device, as will be described.

Lateral shear forces between two containers 20, coupled in end-to-end relation as shown in FIG. 1, are accepted by a coupling sleeve 50 that is telescopically received about the longitudinally extending, axially aligned and abutting pins 36 on adjacent ones of the corners 22. The coupling sleeve 50 has a central bore 52 of substantially the same diameter as the pins 36 so as to accept the pins 36 with a slide fit. Longitudinal compressive loads between the containers 20, coupled as shown in FIG. 1, are accepted directly by the aligned and abutted pins 36.

Tensile forces tending to separate the containers, coupled as shown in FIG. 1, are accepted by a coupling loop or tie 60 adapted to extend about spaced parallel ones of the pins 38. The coupling tie 60 is more particularly described in Patent No. 3,086,673 assigned to assignee of the present invention. Alternately, an automatic coupling means, more particularly described in application Serial No. 132,619 filed August 21, 1961, and assigned to the assignee of the present invention, may be provided to couple spaced parallel ones of the pins 38.

Because the faces 32 and 34 on the corner members 22 are recessed, the pins 36 and 38 extend therefrom, respectively, sufficiently far to facilitate coupling of, for example, the sleeve 50 to aligned ones of the pins 36 and the coupling tie 60 to spaced ones of the pins 38, yet do not extend materially beyond the plane of the end and side walls of the container 20. For example, the pins 36 and 38 extend preferably approximately $\frac{1}{8}$ inch beyond the plane of the end and side walls, respectively, of the container 20 so that when a pair of the containers 20 are coupled in end-to-end or side-by-side relationship, compressive loads are transmitted directly between the aligned and abutting pins to preclude scuffing or rubbing of the juxtaposed walls of the container 20.

Thus, it should be apparent that the normally related pins 36 and 38 on the corner members 22 accept and transfer all of the forces acting on the shipping container 20 without protruding outwardly of the generally rectangular cubic configuration of the container. This is accomplished by recessing the faces 32 and 34 on each corner member.

As seen in FIG. 2 of the drawings, a pair of corner members 22 are shown in juxtaposed relationship with

the coupling sleeve 50 telescopically disposed about aligned ones of the pins 36 and the pins 38 in condition for acceptance of the coupling tie 60. The tie 60 is simply inserted over the spaced parallel pins 38. The tie 60 may have suitable detent means (not shown) engageable in the recesses 42 in the pins 38 to retain the tie 60 thereon, the detent means being fully disclosed in Patent No. 3,086,673 and assigned to the assignee of the present invention.

From the foregoing description, it should be apparent that all the forces transferable between a single shipping container and its supporting structure or between coupled shipping containers, are transmitted through the longitudinally and laterally extending pins on the corner members thereof. Because the pins do not extend outwardly of the cubic dimension of the shipping container, due to the recessed end faces on the corner members, the shipping containers are rendered practicable for use with conventional transportation facilities.

It is to be understood that the specific construction of the improved pin system and corner construction for shipping apparatus herein disclosed and described is presented for the purpose of explanation and illustration and is not intended to indicate limits of the invention, the scope of which is defined by the following claim.

What is claimed is:

In a shipping apparatus comprising a pair of juxtaposed containers having spaced vertically extending generally planar side walls and spaced vertically extending generally planar end walls at opposite ends thereof defining cubicles of generally rectangular horizontal cross section, respectively, an improved means for coupling the containers to one another to form a structural unit comprising a plurality of corner members on said containers, respectively, at the junctions of said side and end walls, each of said corner members comprising a face recessed with respect to the associated side wall of the container and communicating with the associated end wall thereof, the face on said corner member lying in a plane spaced laterally inwardly from the plane of the associated side wall and extending generally parallel thereto, a coupling pin on said corner member extending generally normally to the face thereof, for the acceptance of loads acting on the container in a plane generally parallel to the plane of the associated side wall, said pin being of a length substantially equal to the spacing of the face of said corner member from the plane of the associated side wall thereby to extend into substantially contiguous relation to the plane of the side wall so as to be within the generally rectangular horizontal cross section defined by the side and end walls of the container, and means engaged with the pins on juxtaposed ones of the corner members for transferring loads between the containers.

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