Jan. 17, 1956 H. W. FAUS 2,730,968

MEANS FOR PROTECTING LADING IN CARS

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Fig. 1.

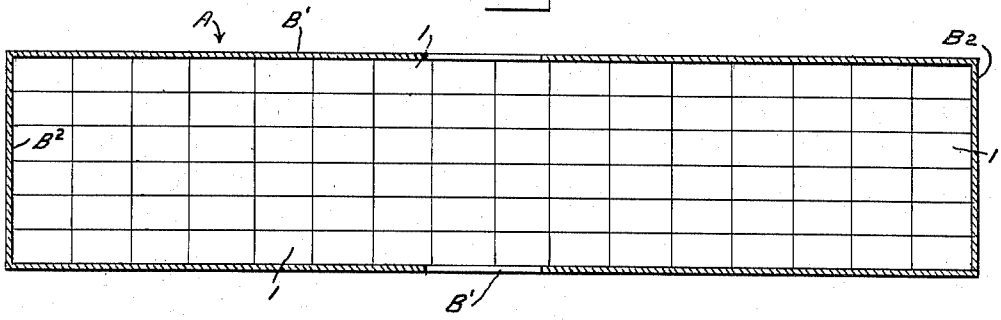

Fig. 2.

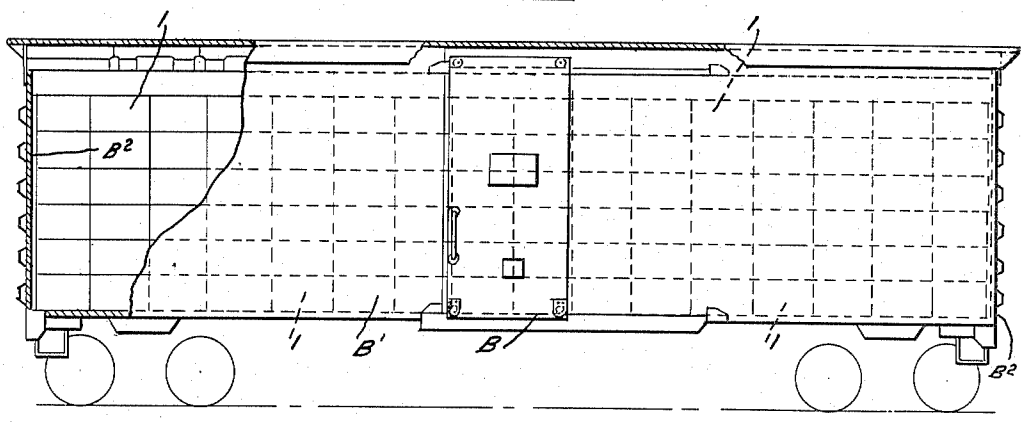

Fig. 3.

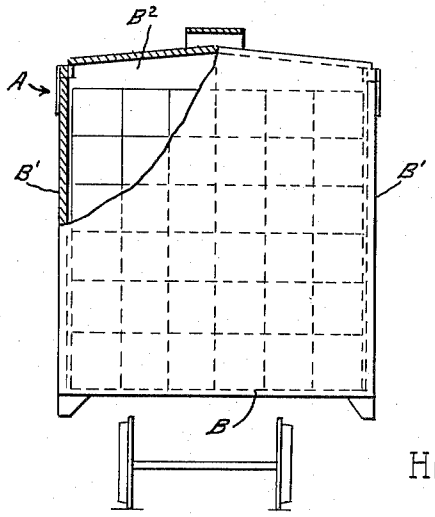

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Fig. 4.

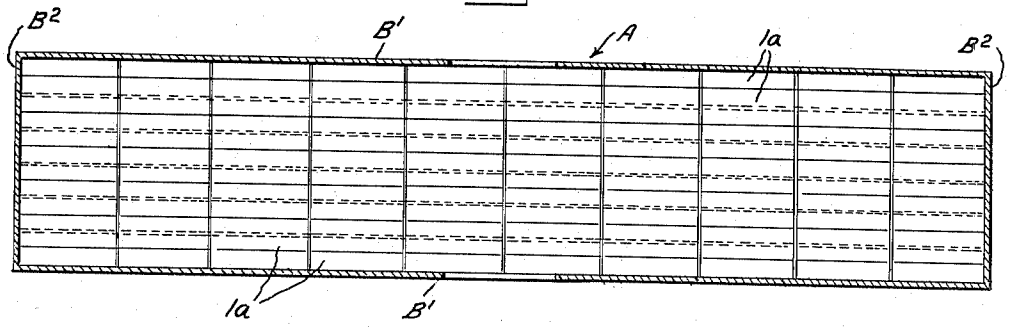

Fig. 5.

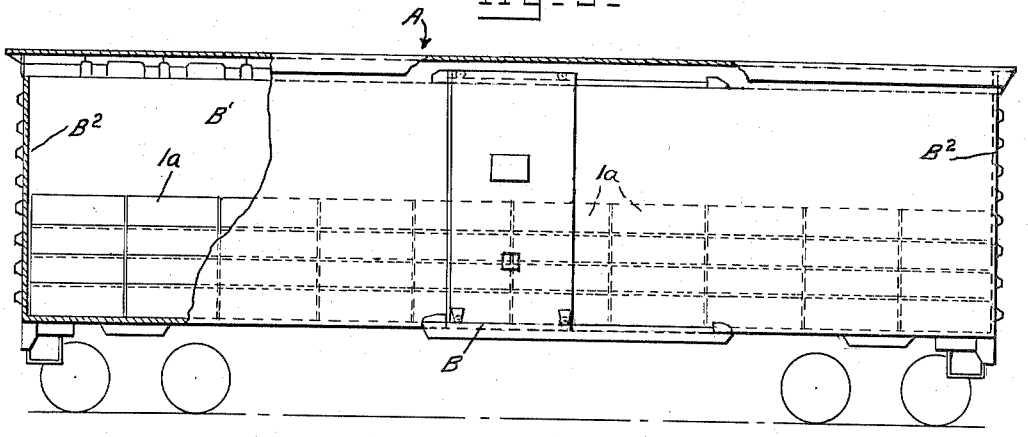

Fig. 6.

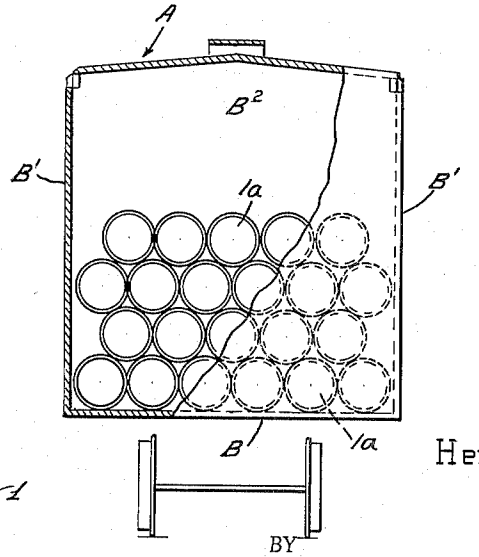

Fig. 7.

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MEANS FOR PROTECTING LADING IN CARS

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1 Claim. (Cl. 105—369)

This invention relates to a method of and means for protecting lading from damage while in course of shipment in transportation vehicles, particularly railway freight cars.

In shipping more or less fragile articles in freight cars, it is common practice either to anchor such articles, or containers in which they are enclosed, securely to the floor or other parts of the car structure, or to pack them tightly in the car, relying solely on the compressive strength of the articles or containers to protect them against damage by excessive forces of acceleration or deceleration. While such cars are primarily protected by some type of cushioning devices between couplers and car structure, these are not always sufficient to protect lading being transported from damage.

When articles or containers are anchored or braced securely against any movement whatsoever, all of the forces of acceleration or deceleration to which the car body is subjected are transmitted without diminution to the articles or containers, with no chance for dissipation of the kinetic energy involved except by breakage of articles or containers.

When articles or containers are packed tightly in the car, there is likewise no opportunity for dissipation of energy. As a result of this, the weight of the entire mass of lading, when the car is subjected to impact, is thrown against the end of the car, or against intermediate anchors or braces, with a crushing blow.

The purpose of the present invention is to make it possible to place the lading in the car somewhat loosely, allowing each unit of lading some freedom of movement, and to provide friction means to restrain this movement while at the same time permitting enough movement so that each individual unit of lading, moving against friction, will dissipate energy. By making it possible for each unit of lading to dissipate its own portion of the total energy, much more energy can be dissipated without any destructive concentration of force than if no such provision is made.

Thus, if 1,000 ordinary cartons of bottled liquids, weighing, say, 50 lbs. per carton, are packed tightly in a freight car, the total weight of this mass of lading would be 50,000 lbs. If the movement of the car body is suddenly accelerated or decelerated, each individual carton will tend to slide toward one end of the car. The forces exerted by all of the cartons will be cumulative, there being no force to oppose this tendency, and, therefore, the end rows of cartons will be subjected to the pressure of the entire weight of 50,000 lbs.

If, however, each carton is covered with a frictional coating, and the movement of this carton is resisted by the friction of this coating against the floor and/or the sides of the car, including tops and bottoms or other surfaces of adjacent cartons, a very slight movement will suffice to dissipate the kinetic energy in each carton, acting separately, and no destructive forces will be permitted to accumulate.

As an answer to any possible objection that no provision is made for restoring units of lading to their original positions after each blow, it may be pointed out that freight cars in normal operation are not usually subjected to successive impacts always coming from the same direction. Stated in railroad terminology, a run-in of slack is usually followed by a run-out of slack, and every time this occurs the lading will tend to move alternately in opposite directions and thus be re-positioned each time to take the maximum possible advantage of the friction here provided. This may not give infallible protection against every kind of lading damage under all conceivable conditions, but tests have shown that it will minimize and prevent much of the damage that now occurs to many kinds of fragile lading.

In the drawings hereto attached:

Figs. 1, 2 and 3 are, respectively, a sectional plan view, a sectional side elevation and a sectional end elevation of a freight car showing the same filled with lading units of rectangular or oblong rectangular form, which may be boxes or cartons containing goods, and in which the car and units have friction surfaces in sliding engagement.

Figs. 4, 5 and 6 are similar views showing the car filled to a certain level with lading units of cylindrical or circular type, such as sewer or other fragile pipes, the car and pipes having friction surfaces in sliding engagement.

Fig. 7 is a sectional perspective view of a portion of a wall of a carton provided with my motion-permitting, energy-dissipating coating.

In the drawings, A represents a freight car body, B its bottom wall and B′ and B^2 its side and end walls, and 1 in Figs. 1, 2 and 3, inclusive, and 1^a in Figs. 3, 4 and 5, inclusive, respectively represent lading articles or units more or less loosely disposed or packed in the car for shipment to allow a certain degree of relative motion, at least forwardly and rearwardly of the car, between the car and units, and between the respective units, the car floor and side wall and opposed surfaces of the units each having a friction coating applied thereto in accordance with my invention.

In carrying my invention into practice, I provide a coating of such composition that it will, when applied by spray or otherwise in a liquid state, harden and produce a surface having a coefficient of static friction within the range of 1.00 to 2.00 and coefficient of kinetic friction within the range of 0.75 to 1.50 when in contact with another surface, such as a normally smooth wooden car floor, car wall or other surface, preferably but not necessarily covered with a coating of the same character. The utmost in protection will, of course, be afforded if all surfaces that come in sliding contact with each other are covered with this coating, although in most cases the coating of only one of two opposing surfaces will give adequate protection.

A coating *a*, as shown in Figure 7, having these and other properties of importance and advantage may be made in accordance with the following formula:

Reclaimed rubber	lbs.	253.00
Sulfonic acid plasticizer	lbs.	7.60
Limed resin	lbs.	126.00
Hydrogenated rosin	lbs.	126.00
Lime	lbs.	50.00
Ethyl alcohol	gallons	3.75
Hi-test gasoline	do	97.00

In preparing the composition for use the reclaimed rubber, mixed with the lime, is broken down in a mill, the mixture allowed to rest overnight and milled again, sheet-thin from the mill; the alcohol and gasoline are put into a dough mixer or churn and the rosins added and these ingredients agitated until the rosins are dissolved; and finally, to the solution thus prepared, the rubber-lime mixture is added and the mass mixed thoroughly in the mixer

until a composition of uniform consistency is obtained. As a thinner, hi-test gasoline may be used when required to provide a coating composition of the right consistency for application to the surfaces to be coated.

In practice, the floor (and preferably also the upright walls) of the body of the freight car coated with the composition, as are also the surfaces of the lading units which are intended to lie in contact with such car surfaces or with each other when disposed in the car for shipment. The composition may be applied to such surfaces by brushing, spraying or in any other suitable manner and allowed to dry. When dried the composition provides a coating in the form of a film of required thickness having the frictional coefficients specified and which is permanently smooth, slightly elastic, strongly adherent to the surface, and tough enough to withstand rough handling and is proof against cracking or disintegration over any intended service period, and also which, while having the property of tending to slightly cohere to a similarly coated surface in rubbing contact therewith, will not stick thereto, or interfere with a sliding frictional contact between the surfaces sufficient to preclude the coated lading articles or units from sliding for dissipation of energy under a force tending to displace the article or unit from its normal position.

The coating may be applied directly to one or more surfaces of an article or unit to be shipped, such as boxes, cartons or other containers 1, as shown in Figs. 1, 2, 3 and 7, in which one or more articles are packed, or to fragile sewer or other pipes 1a, as shown in Figs. 4, 5 and 6, or to units formed of articles bound or bundled together, so long as the unit, in whatever form it may be, is provided with a surface coating of the character described sufficient for contact with another uncoated surface or similarly coated surface to perform the energy dissipating function described. Fig. 7 shows in sectional perspective, a wall portion of a cardboard carton provided with a friction coating *a* in the form of a film formed by spraying the coating solution in a suitable liquid state on the wall and allowing the deposited coating to solidify and harden, in which condition it will adhere to the wall but will be non-adhesive, i. e., free from stickiness or tackiness and of sufficient glacial smoothness to have the sliding and frictional qualities specified. I do not limit myself in this regard, nor to the use of the particular composition described, except when expressly set forth in the claim, as other compositions might be used, as equivalents, within the spirit and scope of the appended claim, so long as the stated frictional coefficients of the coating are preserved.

Having thus described my invention, I claim:

In combination, a railroad freight car or other like vehicle of transportation, and units of lading stacked on and in sliding contact with the floor of the vehicle and each other, said floor and units having their contacting surfaces coated with a friction substance solidified thereon from a liquid state and of such composition as to produce a coefficient of static friction within the range of 1. to 2.00 and a coefficient of kinetic friction within the range of 0.75 to 1.50, thereby causing each of said units to offer substantial resistance to displacement when the vehicle while in transit is subjected to impacts, and at the same time permitting each unit to slide with consequent harmless dissipation of energy through friction when the force tending to displace the unit is great enough to produce damage if said unit were not free to move.

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