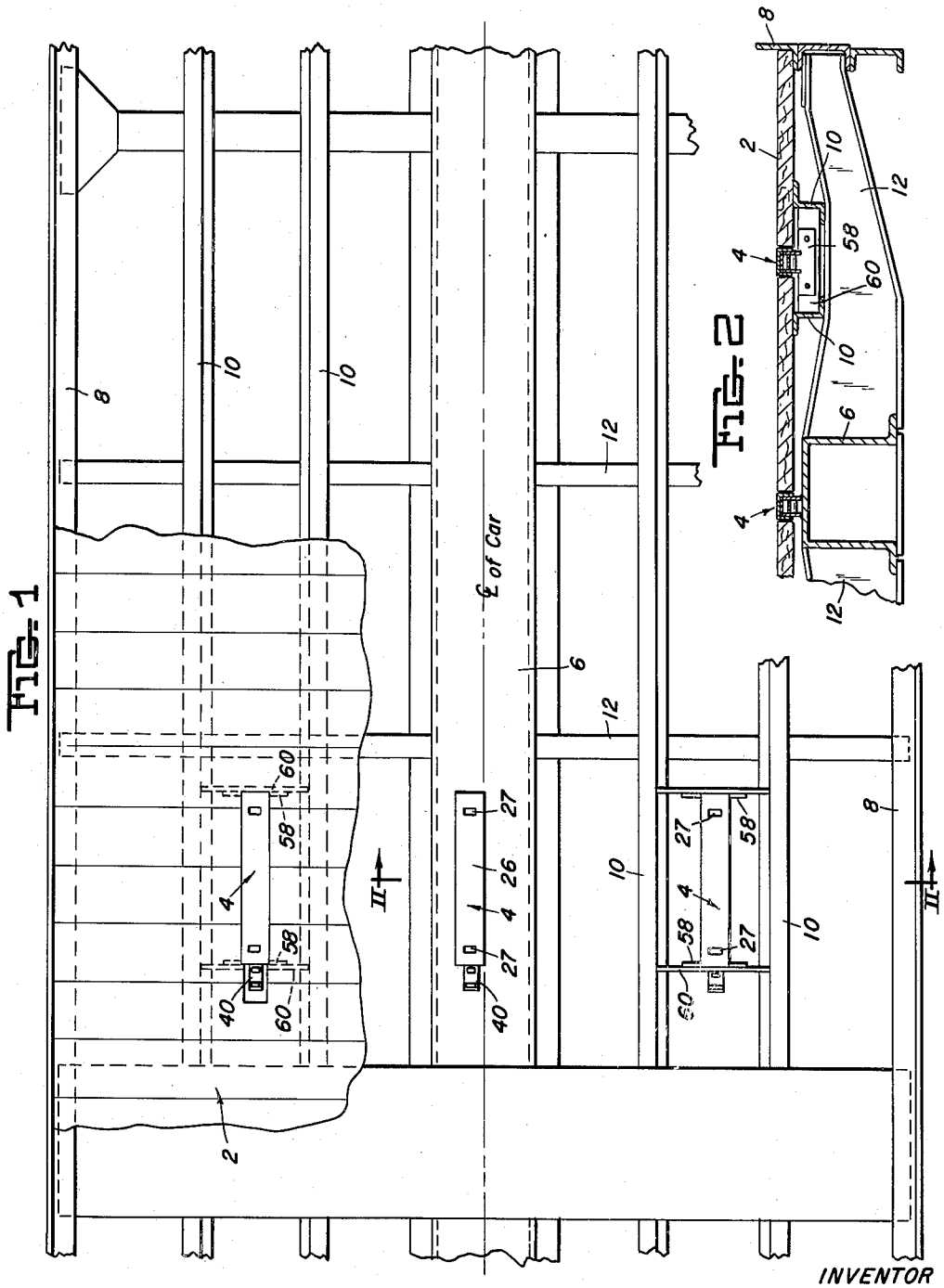
March 21, 1961 W. G. NICHOL 2,975,730

LOAD RETARDING DEVICE

Filed Nov. 3, 1959 3 Sheets-Sheet 1



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Filed Nov. 3, 1959 3 Sheets-Sheet 2

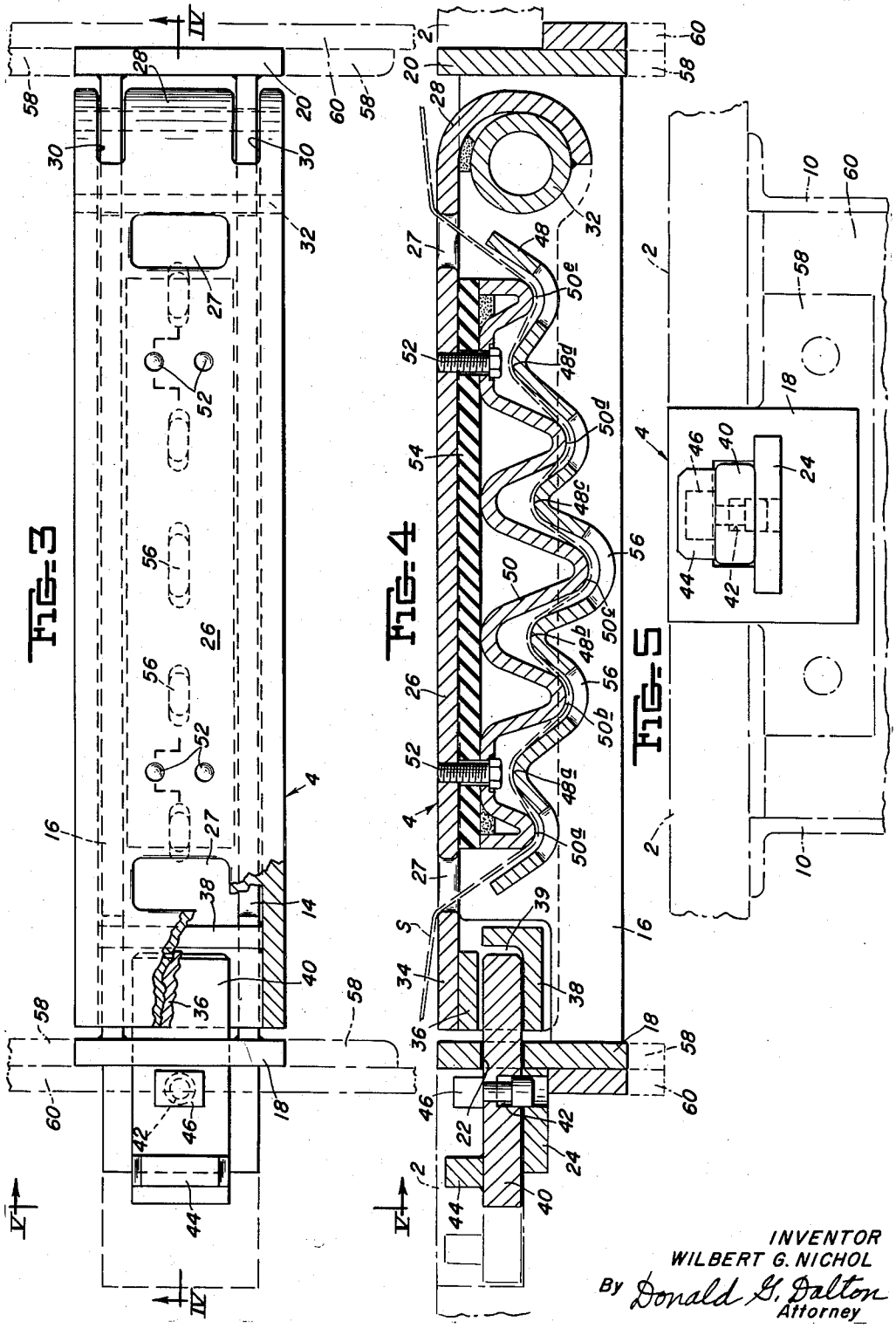


Fig-3

Fig-4

Fig-5

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Filed Nov. 3, 1959 3 Sheets-Sheet 3

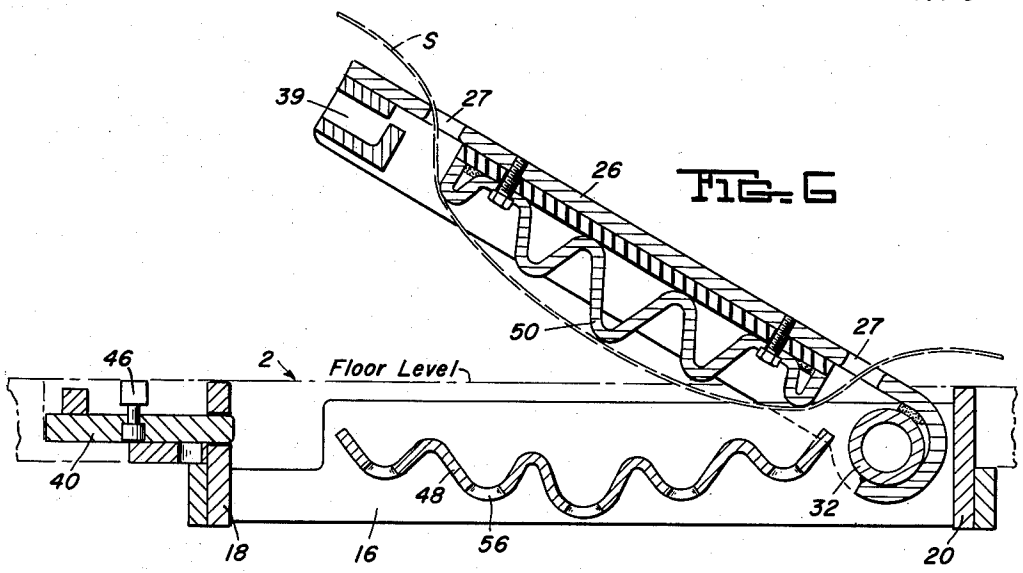


FIG. 6

FIG. 7

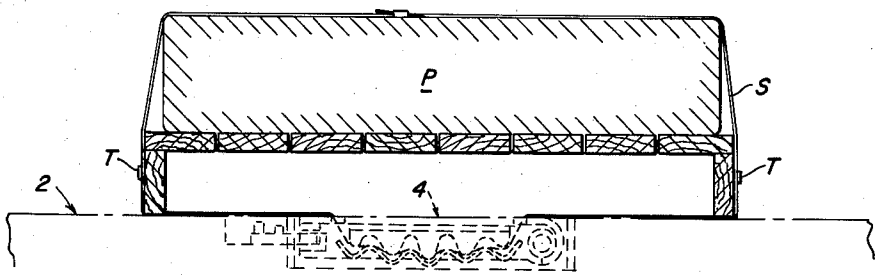
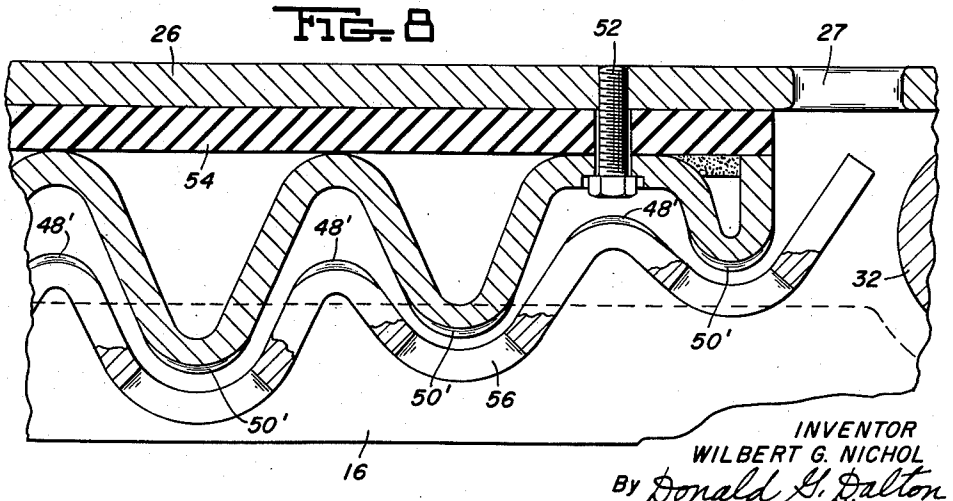


FIG. 8



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LOAD RETARDING DEVICE

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4 Claims. (Cl. 105—369)

The present invention relates generally to the handling of heavy materials in transit and more particularly to the bracing of flat-band-secured package units of heavy material in railway cars or other vehicle carriers.

In shipping steel or other heavy material in coil or flat sheet form the material is usually placed on wooden pallets or skids and secured thereon with flat lading-strapping to form a package unit. The palletized or skidded package units are loaded into railway boxcars, gondolas or other carrier vehicles by means of lift fork tractors, crane hoists or the like. After the package unit has been loaded in the carrier vehicle it may be rigidly braced by means of wood blocking or similar means. Frequently, if the material in the package unit is heavy, no bracing is applied. In such cases the weight of the package is relied upon to create sufficient friction between the pallet or skid runners and the floor of the vehicle to restrain movement of the load unit during transit. If the package unit is made up of material which may be easily damaged, such as thin gauge tin plate, it may be loaded in the carrier vehicle in a manner to create a controlled-movement load. This latter loading arrangement minimizes the possibility of damage to the material caused by package units forcibly contacting the ends of the carrier vehicle or each other during transit. As is well known in the art, the term "controlled-movement load" designates a load arranged in a carrier vehicle in a manner wherein a limited amount of movement of the load is permitted as contrasted with either a rigidly braced load or a free moving, unrestrained load. If the package units are rigidly braced the impacts that are encountered during transit movements, such as in the "humping" of freight cars, or flat switching movements involved in making up freight trains, often cause the rigid bracing to loosen or break so that the load unit becomes free of restraint and shifts back and forth freely in the car thereby causing damage to the material from forcible end wall contact or forcible contact with other package units. Such shifting also frequently causes the package units to block the car doorway so that it interferes with unloading operations.

Prior to my invention, to make up a controlled-movement load in carrier vehicle, it was usual practice to affix one or more lengths of flat band to the floor of the vehicle by means of strap-movement retarder devices and then wrap the strapping around the package unit.

The retarder devices, sometimes referred to as "mechanical brakemen," were usually in the form of flat slotted plates which were nailed to the floor of the carrier after the strapping was threaded through the plate. Such retarder plates served to provide a load "braking" effect through the deformation of the flat lading-strapping and a certain amount of friction exerted on the flat strapping between the nailed plate and the floor of the vehicle as the load or package unit moved back and forth under alternating impacts during transit. When the carrier vehicle reached its destination and was unloaded the retarder plates were pried up from the floor. Thus the

plates were restricted to a single use and had to be threaded with lading strapping and nailed to the floor of the car each time they were used.

Up to the time of my invention this type of load retarding plate was widely and effectively used for shipment of products such as heavy packages of tin plate in sheet or coil form. Although the use of such flat retarder plates substantially reduced impact damage, certain disadvantages were inherent in their use. Among such disadvantages were the following:

(*a*) Installing the number of single-use retarder plates necessary for each carload of product required considerable time and labor which increased the shipping costs.

(*b*) Carrier vehicle floors had to be in excellent condition to provide positive anchorage for the plates.

(*c*) Extremely high speed impacts sometimes resulted in sections of vehicle floor boards being pulled out along with the retarder.

(*d*) Removal of the retarder plates from the vehicle floor after unloading was difficult and laborious and ultimately resulted in excessive floor damage.

It is, accordingly, the primary object of my invention to substantially eliminate the above-listed and other disadvantages by providing a load retarding device which can be permanently installed in the floor of a carrier vehicle and be used repeatedly for controlled-movement loads.

It is another object of the invention to provide a device of the character indicated generally in the form of an elongated box adapted to be recessed in the floor of a carrier vehicle and having a slotted top and means in its interior defining a wave-like or tortuous passageway in which lading strapping can be inserted and then looped around a package unit.

It is a further object of the invention to provide a device of the character set forth in the above object in which the slotted top is hinged so that the device can be opened to facilitate the insertion of strapping therein.

It is another object of the invention to provide a device of the character indicated in which the elements forming the tortuous passageway provide spaced bearing surfaces located in different planes in the passageway for engaging and deforming the lading strapping to retard its movement.

Corollary to the above object it is a further object of the invention to provide a device of the character indicated in which the bearing surfaces are shaped to deform the lading strapping in both the longitudinal and transverse direction to retard its movement.

It is a further object of the invention to provide a load retarding device of the character described having resilient means incorporated therein which is yieldable under pressure of the lading strapping to prevent severance of the strapping when it is under load tension caused by severe impact shock.

These and other objects will become more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a partial plan view of the understructure of a railroad car having the load retarder of the invention installed therein;

Figure 2 is a sectional view taken along the line II—II of Figure 1;

Figure 3 is a plan view with a portion cut away for clarity of the load retarder of the invention;

Figure 4 is a longitudinal sectional view taken along the line IV—IV of Figure 3;

Figure 5 is an end view taken along the line V—V of Figure 3;

Figure 6 is a longitudinal sectional view showing the load retarder of the invention in open position;

Figure 7 is an elevational view with the load retarder

illustrated in broken lines showing a load unit arranged according to the invention; and

Figure 8 is a longitudinal sectional view partly in elevation of a modification of the load retarder of the invention.

Referring more particularly to the drawings reference numeral 2 designates the floor of a railway boxcar having load retarding devices of the invention, designated generally by reference numeral 4, installed in openings therein. With the exception of the load retarder 4 of the invention, which will be described in detail hereinafter, the boxcar is conventional in structure having the usual understructure consisting of a center sill 6, side sills 8 and intermediate stringers 10 extending longitudinally and cross bearers 12 extending transversely of the car.

As viewed in Figure 1, the load retarding devices 4 of the invention are positioned extending longitudinally of the car and may be disposed in spaced alignment transversely thereof.

The retarding device 4 includes a box frame member having spaced side walls 14 and 16 and end walls 18 and 20. The end wall 18 is formed with an opening 22 therethrough and a support bracket 24 projecting from its outer face immediately below opening 22 for a purpose which will become apparent hereinafter.

A cover plate 26 is hinged to the side walls 14 and 16 and extends over the top of the box frame formed by the side walls 14 and 16 and end walls 18 and 20. The cover plate is provided with a pair of spaced transverse slots 27, one adjacent each end thereof.

The cover plate is generally channel shape in form having downturned sides which fit over the side walls 14 and 16. One end 28 of the cover plate is rounded and provided with spaced slots 30 and carries a transverse shaft 32 welded or otherwise rigidly affixed thereto. The ends of the shaft 32 are journaled in the side walls 14 and 16 to form a hinge connection for the cover plate so that it can be pivoted upwardly away from the boxed frame.

The opposite end 34 of the cover plate is provided with a top guide plate 36 and bottom support angle 38 extending thereacross in spaced parallel relation to form a receptacle 39, which communicates with the opening 22 in the end wall 18 when the cover plate is in closed position, as best shown in Figure 4.

The cover plate is locked in closed position by means of a key 40 which is in the shape of a flat elongated plate having a hole 42 therethrough and a lug 44 projecting from the upper surface thereof adjacent one end. The key 40 is dimensioned to fit slidably through the opening 22 and into the receptacle 39 to lock the cover in closed position as shown in Figures 3 and 4. The bracket plate 24 which projects from the outer surface of the end wall 18 supports the key 40 and is provided with a hole for receiving a locking pin 46 which is inserted in the hole 42 in the key to maintain the latter in locking position.

An elongated bottom plate 48 having a wave-like configuration when viewed in elevation, is welded or otherwise rigidly fastened along its edges to the side walls 14 and 16. The end portions of the plate 48 extend angularly and upwardly toward the slots 27 in the cover plate 26.

An elongated intermediate plate 50 is attached loosely to the underside of the cover plate 26 by means of metal screws 52 and extends longitudinally along the bottom of the cover plate between the slots 27 above the bottom plate 48. The intermediate plate has a wave-like configuration when viewed in elevation mating with the configuration of the bottom plate so that the plates are in nesting relation and define a tortuous passageway therebetween.

Resilient means in the form of a cushion 54 made of rubber, neoprene or similarly compressible material, is disposed between the intermediate plate 50 and the cover plate 26. The cushion 54 constantly urges the middle plate away from the top plate for a purpose which will become apparent.

The bottom plate 48 may be provided with spaced longitudinal slots 56 therethrough to render the device self-cleaning.

The retarder device of the invention is installed in an opening in the car floor which is slightly longer than the box frame of the device. The retarder device is secured to the underframe of the car below the opening in the car floor by welding the bottom edges of the side walls 14 and 16 and end walls 18 and 20 to the upper surface of the center sill 6, as best shown in Figures 1 and 2. Where the retarder device is to be located in a position remote from the center sill, an enlarged flange 58 is provided on the bottoms of the end walls 18 and 20 for bolting or welding to a pair of spaced tie plates 60 welded between adjacent longitudinal stringers 10 of the underframe. The box frame of the retarder device is so dimensioned that the cover plate 26 is flush with the floor of the car when the installed device is closed.

In operation, the pin 46 is lifted from the key 40 and the key is shifted away from the end wall 18 to free the end 34 of the cover plate 26 so that it may be pivoted clockwise, as viewed in Figure 6, to open the retarder device. A pre-cut length of flat metal lading strapping S is then inserted in the opened load retarder with its ends lying on the floor of the car adjacent either end of the load retarder. The cover plate 26 is then pivoted to closed position, the key 40 is shifted so that it enters the receptacle 39 in the end of the cover plate and the pin 46 is inserted to lock the key in position and secure the cover plate in closed position. A load unit P, which for purposes of demonstration, consists of a package of steel sheets mounted on a pallet, is then loaded in the car with the pallet straddling the retarder device 4, as best shown in Figure 7. Then the length of strapping is tensioned around the load unit in a vertical loop sealed with conventional tools and tacked to the pallet as at T.

Although I have shown the use of three retarder devices spaced transversely of the car in Figures 1 and 2, it will be noted that more or less than three retarder devices arranged as desired may be used.

After the load unit P has been thus secured, the car is ready for travel. When impact forces are encountered during travel the load unit will respond by moving only a limited distance, movement of the unit being retarded by the action of the bearing surfaces in the tortuous passageway formed between the intermediate and bottom plates of the retarder device on the strapping inserted therein. When the load unit moves under impact the strapping S is deformed as it moves through the tortuous path defined between the intermediate plate 50 and the bottom plate 48. As the load unit moves the strapping S is tensioned as shown in Figure 4 and bears against the intermediate plate 50 at the bearing surfaces formed on the bottom of the plate by the wave-like configuration as at 50*a*, 50*b*, 50*c*, 50*d* and 50*e*, and against the bottom plate 48 at the bearing surfaces 48*a*, 48*b*, 48*c* and 48*d*, formed by the wave-like configuration of the bottom plate. It will be noted that the bearing surfaces of the intermediate and bottom plates lie in different horizontal planes. This arrangement causes deformation of the strapping S in the longitudinal direction so that its movement is positively retarded.

When a flat steel strapping band is thus deformed by drawing it through the retarder of the invention, a carefully controlled and positively shaped deformation is achieved which results in an optimum braking or movement-retarding effect. As the strapping moves back and forth under alternate impacts a relatively uniform braking action is obtained.

Cushion 54 functions as a built-in shock absorber and prevents strapping breakage under severe impact shock. Cushion 54 compresses under pressure from the intermediate plate 50 when the strapping is under load tension.

It will be understood that the configuration of the intermediate and bottom plates may be varied by varying the configurations so that a greater or less number of bearing surfaces are provided on each of the plates. However, it is preferable that the intermediate plate be designed with at least two spaced bearing surfaces and the bottom plate with at least one bearing surface mating with the two bearing surfaces on the intermediate plate. In order to bring about optimum braking effect it is also important that the bearing surfaces on the intermediate and bottom plates lie in different horizontal planes.

Figure 8 illustrates a modification of my invention characterized by the bearing surfaces on the intermediate plate having a concave contour 50' and by the mating bearing surfaces on the bottom plate having a convex contour as at 48'. The concave and convex bearing surfaces cooperate to deform the strapping S in the transverse direction as it moves through the retarder. Thus, with mating concave and convex bearing surfaces, the strapping S is engaged and deformed in both the longitudinal and transverse directions and, consequently, is subjected to a higher degree of braking action. It will be understood that only some of the bearing surfaces on the intermediate and bottom plates may be provided with concave and convex bearing surfaces as described above, if desired.

If desired, more than one length of strapping may be inserted in the retarder device of the invention to secure relatively heavy load units. The multiple lengths of strapping may be inserted in the retarder device one above the other and then be tensioned around the load unit and sealed in the customary manner.

While two embodiments of my invention have been shown and described, it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. In apparatus for checking the movement of a metal strapping-encircled load, the combination which comprises a load-bearing surface, an elongated box frame member having spaced end walls and sidewalls mounted in recessed relation in said load-bearing surface, a cover plate disposed on the top of said member, said cover plate having a pair of aligned slots therethrough spaced longitudinally therealong for receiving said metal strapping, a bottom plate in said frame member spaced below said cover plate, said bottom plate having a wave-like configuration along its length, said bottom plate extending between points adjacent opposite ends of said frame member, said slots being disposed between said points, an elongated intermediate plate having a wave-like configuration along its length attached to and extending longitudinally along the underside of said cover plate between said slots, the waves in the wave-like configuration of said bottom plate and said intermediate plate extending transversely of said box frame member, said intermediate plate being spaced above said bottom plate, said intermediate plate and said bottom plate being disposed in substantially nesting relation and defining therebetween a tortuous passageway for said strapping, and spaced bearing surfaces on said intermediate plate and on said bottom plate for frictionally engaging and deforming said strapping to retard but not prevent its movement through said passageway.

2. A load retarding device as defined by claim 1 including means pivotally connecting said cover plate by one end to said sidewalls, and latch means disposed in said frame member for locking said cover plate on said frame member.

3. A load retarding device as defined by claim 1 in which said bottom plate is provided with at least one slot therethrough for the passage of matter whereby said load retarding device is rendered self-cleaning.

4. A load retarding device adapted to be installed in the floor of a load-carrying vehicle for retarding the movement of a metal strapping-encircled load over said floor which comprises an elongated box frame member having spaced end walls and sidewalls, a cover plate disposed on the top of said member, said cover plate having a pair of aligned slots therethrough spaced longitudinally therealong for receiving said strapping, a bottom plate in said frame member spaced below said cover plate, said bottom plate having a wave-like configuration along its length, said bottom plate extending between points adjacent opposite ends of said frame member, said slots being disposed between said points, an elongated intermediate plate having a wave-like configuration along its length attached to and extending longitudinally along the underside of said cover plate between said slots, the waves in the wave-like configuration of said bottom plate and said intermediate plate extending transversely of said box frame member, said intermediate plate being spaced above said bottom plate, means loosely attaching said intermediate plate to said cover plate for movement toward and away from said cover plate, resilient means interposed between said cover plate and said intermediate plate whereby said intermediate plate is constantly urged away from said cover plate, said intermediate and bottom plates being disposed in substantially nesting relation and defining therebetween a tortuous passageway for said strapping, and spaced bearing surfaces on said intermediate and bottom plates for frictionally engaging and deforming said strapping to retard its movement through said passageway.

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