April 9, 1940. J. E. MONTGOMERY ET AL 2,196,470

LOADING SPACER FOR SHEET STEEL AND CONCENTRATED LOADS

Filed Sept. 2, 1937 2 Sheets-Sheet 1

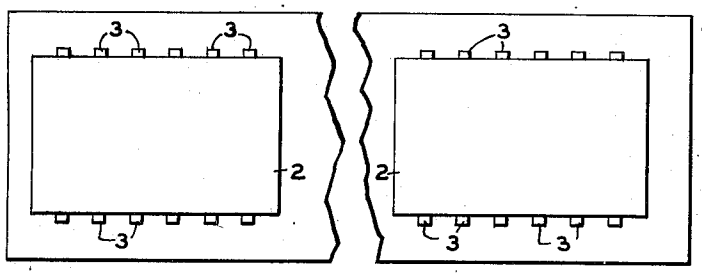


Fig.1

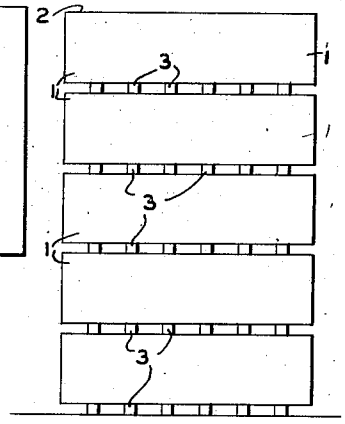


Fig.2

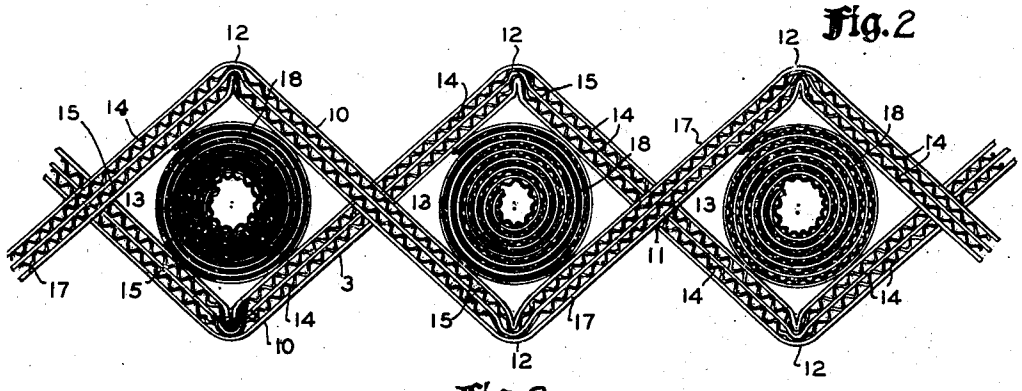


Fig.3

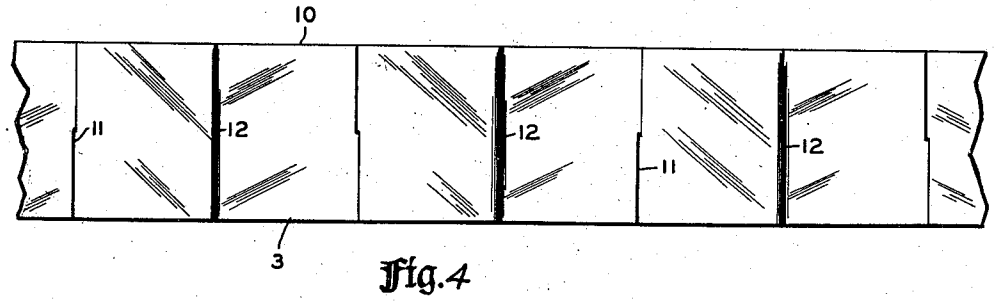


Fig.4

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LOADING SPACER FOR SHEET STEEL AND CONCENTRATED LOADS

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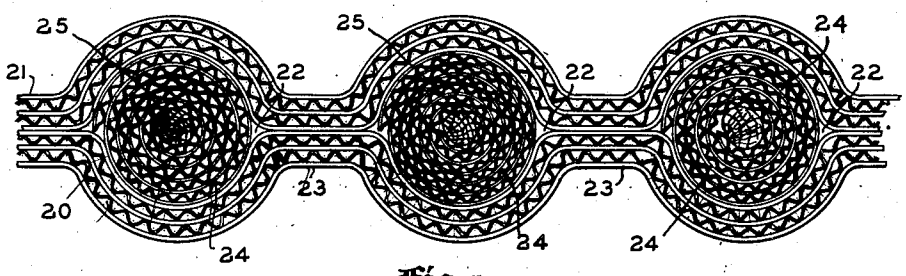


Fig. 5

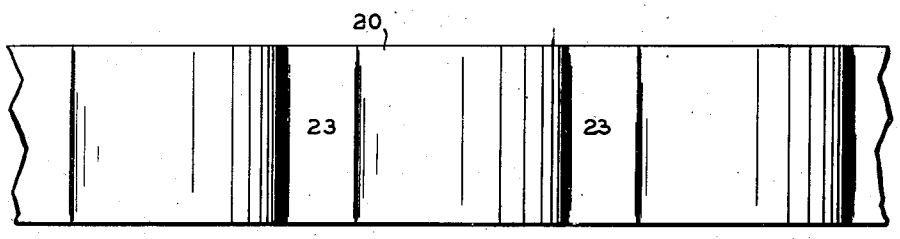


Fig. 6

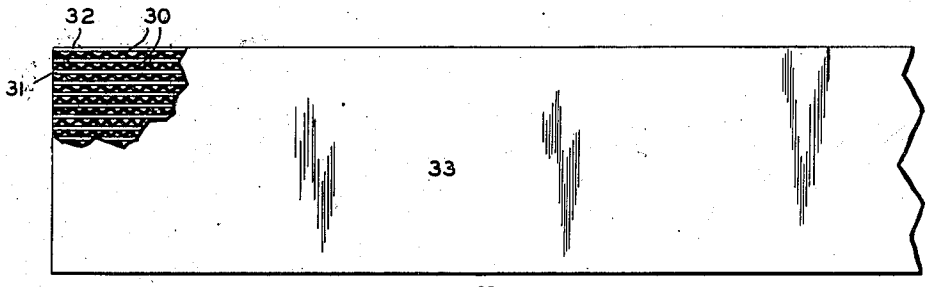


Fig. 7

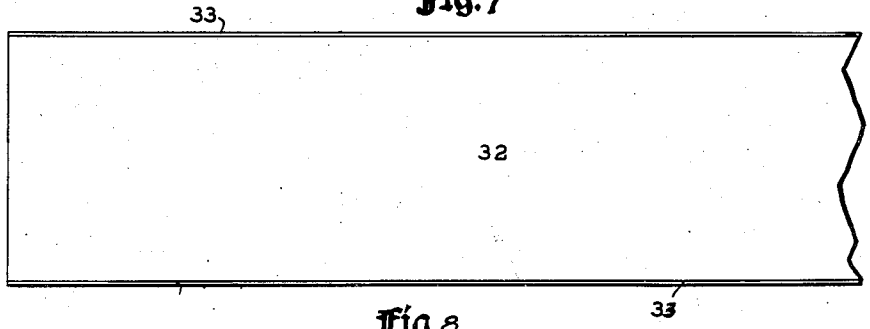


Fig. 8

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Patented Apr. 9, 1940 2,196,470

UNITED STATES PATENT OFFICE

2,196,470

LOADING SPACER FOR SHEET STEEL AND CONCENTRATED LOADS

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Application September 2, 1937, Serial No. 162,154

3 Claims. (Cl. 214—6)

This invention relates to stringers or spacers used in connection with loading and storing of heavy compact loads and particularly lifts of steel sheets and plates and the like.

For the purposes of illustration, the present invention is described in connection with the loading of sheet steel for shipment in railway cars, trucks, and the like, the uses and advantages of the invention in connection with other products being readily apparent therefrom.

In the loading and shipping of sheet steel, the customary practice is to pile the sheets, face to face, in lifts which weigh several tons each, these lifts often being individually wrapped in suitable paper for protection from the elements. The lifts are then piled in stacks, each stack usually comprising about three to five lifts. Stacks may vary from five to fifty tons in weight, depending upon the length of car and size of sheets. In order to facilitate unloading of the steel at the destination, the lifts of each stack must be spaced one above the other so that suitable hooks or clamps can be engaged with the under surface of each lift readily for removing the lifts from the stack.

In the prior practice suitable spacers or stringers are used for this purpose, these stringers being of a fair quality wood cut to suitable lengths and cross section for the particular shipment, the cross section being about three inches high by four inches wide on the average, but the size depends upon the spacing of the particular lifts necessitated by the unloading equipment which is subsequently to remove the lifts. Usually about six spacers or stringers are placed between each pair of adjacent lifts, the stringers being arranged parallel with respect to each other and evenly distributed along the length of the associated lifts.

The wooden spacers heretofore used are not only expensive, due to their original cost, but also increase the weight of the shipment, thus adding materially to the total freight charge. Furthermore, at the destination, the wooden spacers are of no particular use, and, due to their weight do not warrant return to the shipper for subsequent re-use as stringers.

Again, in loading the steel on railway cars, trucks and the like, considerable time is required for distributing the spacers along the loading ramps or tracks. The weight is so great that a man cannot readily carry a sufficient number to facilitate shipping, and so the spacers are distributed, usually by a locomotive crane or from a separate car near the site of final use.

Such spacers, likewise, are apt to become coated with particles of grit and the like, which only partially embed therein under load, and, as the steel is slid or deposited thereon, the grit tends to scratch and mar the surface of the finished sheet.

One of the principal objects of the present invention is to provide a new and improved spacer for the purpose described and which, as compared to the prior spacers, is lighter in weight and less expensive in cost per lineal foot and per ton of steel supported, which accommodates itself more readily to slight irregularities in car flooring and thus distributes the load more uniformly and in which the salvage value is a very large percentage of the original cost.

Other objects and advantages will become apparent from the following specification wherein reference is made to the drawings, in which

Fig. 1 is a diagrammatic plan view of a portion of a box car floor showing the manner of loading the stacks of steel sheet or plate thereon;

Fig. 2 is a diagrammatic elevation of one of the stacks of steel illustrated in Fig. 1;

Fig. 3 is a top plan view of one form of spacer embodying the principles of the present invention;

Fig. 4 is a side elevation of the spacer illustrated in Fig. 3;

Figs. 5 and 6 are a plan view and side elevation, respectively, of a modified form of the spacer illustrated in Fig. 3; and

Figs. 7 and 8 are a plan view and side elevation, respectively, of a preferred embodiment of a spacer of the present invention.

Referring first to Figs. 1 to 4 of the drawings, the lifts of steel sheets or plates, indicated generally at 1, are arranged in stacks 2, the number of stack to the average car varying with the size and length of the material. Beneath the lower lift of each stack and resting on the floor of the car are a number of spacers or stringers 3 of the present invention. Usually the spacers are positioned three to four feet apart so as to distribute the load of the stack as uniformly as possible on the floor. Likewise, similar spacers 3 are provided and correspondingly arranged between the lifts for separating the lifts from each other. The spacers between all of the lifts extend generally parallel to each other, and corresponding spacers of the respective rows are aligned vertically with respect to each other so as to directly transfer the weight to the car floor.

Spacers embodying the principles of the present invention are illustrated in Figs. 3 and 4 and comprise strips of corrugated paper 10 which are oppositely notched, as indicated at 11, and bent oppositely to each other as indicated at 12, so as to interfit and form a chain of square diamond-shaped enclosures 13, arranged with their diagonals in a common plane, as illustrated in Figs. 3 and 4 and connected at their adjacent corners. The corrugated paper strips are positioned with the corrugations 14 disposed vertically. Each strip of corrugated paper preferably comprises two sets of corrugations 14 arranged side by side and spaced by an inside liner 15 and covered with outside liners 17. The corrugations are secured by glue or in the usual manner to the layers 15 and 17.

Other strips of similar corrugated paper are rolled tightly about axes parallel to the corrugations so as to provide fillers 18 which fit snugly within diamond-shaped enclosures 13, respectively, with the corrugations of the fillers extending parallel to the corrugations of the strips 10. If desired, the fillers 18 may be glued lightly in place in the enclosures 13. The upper and lower ends of the fillers 18 and strips 10 may be sealed by suitable waxed or gummed paper both to hold the structure together during handling and to assist in excluding water from the same. The spacers are disposed between the lifts of steel with the corrugations extending vertically.

Spacers made in accordance with Figs. 3 and 4 and equal in number and size to and arranged in the same manner as wooden spacers, can support forty-five tons of steel. The particular spacers described, which are substantially three inches high and four inches in major width, are arranged six spacers per lift on the average. The weight of the spacers is one-seventh of that of the weight of equal size wooden spacers. The paper used is preferably of virgin wood pulp. Although paper of other ingredients might be used with equal success, virgin pulp is preferred, due to its uniform strength and the fact that it has a salvage or reclamation price of about forty per cent or more of its original cost, whereas the solid wooden spacers have little or no salvage value. Due to the light weight of the spacer per lineal foot, a single workman can transport and distribute manually enough of the spacers to provide for shipment of a very large order.

Referring next to Figs. 5 and 6, a spacer of the same general character is illustrated and comprises two strips 20 and 21 of double corrugated paper or box board, these strips being preformed so that when placed together they define a chain of circular enclosures, as indicated at 22, with neck portions 23 therebetween. The strips 20 and 21 are secured together at the neck portions by gluing or in any suitable manner and fillers 24 are inserted in the enclosures 22. This embodiment has the advantage of simplicity in construction in that it does not require any cutting of the box board strips 20 and 21 but the mere forming portion thereof. In this instance, the corrugations are disposed vertically and, if desired, suitable gummed paper may be placed over the top and bottom so as to render the same more nearly moisture-proof. In addition, in order to prevent any partial collapse of the fillers 24, wood plugs 25 are pressed or driven into the central openings in the fillers 24 after the fillers are installed in the enclosures 22, thus pressing and compacting the convolutions of the spirally wound fillers 24 tightly together.

Referring next to Figs. 7 and 8, there is illustrated a spacer of rectangular cross section which is formed merely by juxtaposing a plurality of layers of corrugations 30 with suitable inner and outer liners 31 and 32 between adjacent corrugations. Such a structure may be built up during the manufacture of the corrugated paper or may be provided by gluing together the outer liners of separate strips of box board. The layers are all arranged with the corrugations parallel to each other and extending vertically, with the result that the section built up conforms substantially to the ordinary wooden spacer in contour. The top and bottom of the spacer is sealed to exclude moisture by a suitable coating such as a sheet of paper 33 which may be firmly glued thereto.

Both of these coverings are preferably of waterproofed material and corresponding waterproofed coverings may be placed on the side walls of the spacer. A structure such as illustrated in Fig. 8, when tested for its loading capacity, is found to be capable of sustaining sixty tons of steel when the spacers are placed in a manner customarily employed in connection with the prior wooden structures. If desired, the material forming the spacers may be directly waterproofed, though waterproofing of the outer coating is preferred as the pockets defined by the corrugations might be apt to catch and hold the water even though they are waterproofed so as not to absorb moisture. This would greatly increase the weight of the structure.

Instead of paper coverings for weatherproofing, the entire structure may be sprayed or coated with glue or some material capable of excluding water entirely.

In comparison with wooden spacers, it has been found that not only is the original price of the present spacers twenty to thirty per cent less than the price of wood spacers, but also that the salvage value is forty to forty-three per cent of the original price. Further, one ton of spacers made in accordance with the present invention provides many times the number of spacers of a given length and cross section that is provided by a ton of the wooden spacers, yet each spacer has weight-supporting capacity sufficient for the purposes intended. Due to the large bulk and low unit weight of the spacers, the same can readily be stored and accumulated by the shipper and disposed of at a high percentage of the original cost, thus additionally reducing the cost of spacers per ton of steel as compared to wooden spacers. Again, the freight cost per car or truck is very materially reduced, the weight of the spacers per car being from about one-seventh to one-third of the weight of the wooden spacers customarily employed.

Another decided advantage resulting from the use of the spacer described resides in the fact that any grit or foreign material thereon, when subjected to the weight of the superimposed steel, readily embeds in the paper and does not scratch or otherwise injure the steel itself. The vertical dimension of the spacer is determined to some extent by the loading and unloading equipment used but in order to change the shape and reduce the amount of material required for a particular spacer, where surrounding circumstances would permit of a reduction in the space of the lifts, the shorter the vertical dimension the stronger the spacer, this added strength being due to the tendency of the corrugations to shear

loose from each other if the height is so great a portion of the width as to cause diagonal distortion. As explained heretofore, the vertical dimensions are preferably about three inches as compared to the width of four inches.

Having thus described our invention, we claim:

1. The arrangement of metal sheets stacked in tier-lifts with spacer blocks between the lifts, characterized in that each of the blocks comprises corrugated paper sheets secured together with the corrugations extending vertically and so interrelated as to form a multiplicity of vertical voids in each block.

2. The arrangement according to claim 1, wherein the voids of the block are closed by sheet material secured to a horizontal face of the block.

3. In the arrangement of metal sheets stacked in tier-lifts with elongated stringers extending in spaced relationship to each other between the tiers, the improvement wherein the stringers comprise interconnected corrugated boxboard strips with the voids provided by the corrugations extending vertically, the horizontal overall width of the individual stringers being greater than their height.

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