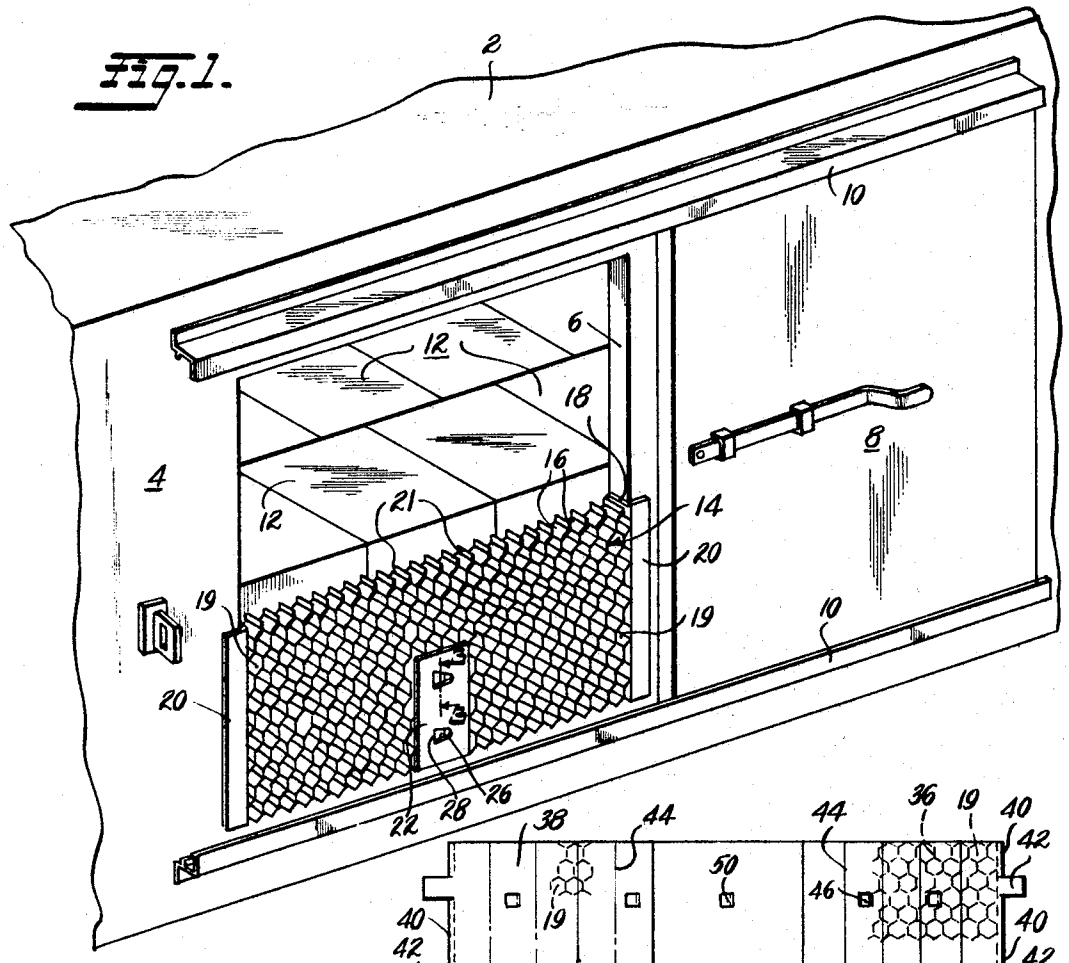
June 25, 1968 R. J. KAUFFMAN 3,389,665

DOORWAY VOID FILLER

Filed July 6, 1966

Fig. 1.



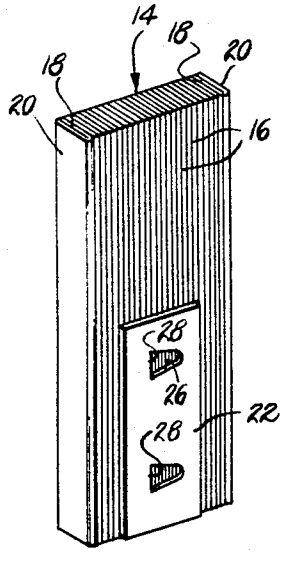


Fig. 2.

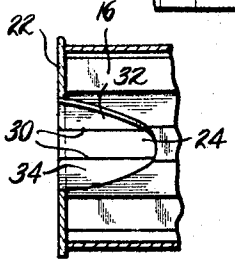


Fig. 3.

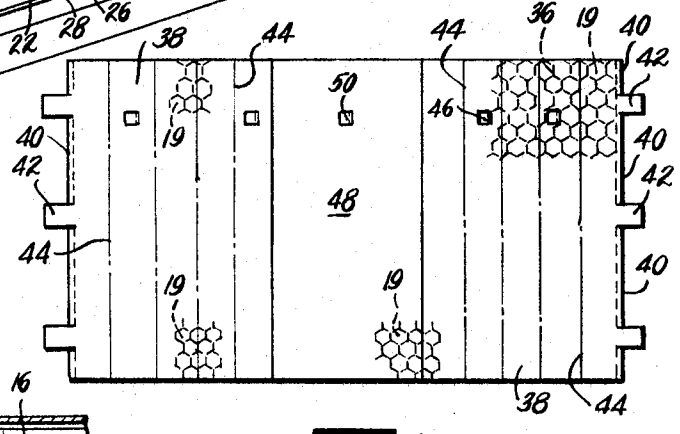


Fig. 4.

INVENTOR.
ROBERT J. KAUFFMAN
BY
Bacon & Thomas
ATTORNEYS

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3,389,665

DOORWAY VOID FILLER

Robert J. Kauffman, Plymouth, Mich., assignor to Narad, Inc., Wayne, Mich.

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9 Claims. (Cl. 105—369)

ABSTRACT OF THE DISCLOSURE

An expandable honeycomb structure formed of strips of corrugated paper board and positioned in a freight container doorway to fill the void between an outer door and articles of freight stacked in the container. Tab means on opposite sides of the honeycomb are fastened to the edges of the doorway and an upstanding support holds intermediate cells of the honeycomb against vertical sagging.

This invention relates to means for filling void spaces between articles packed in a mobile freight container and the door or other surface thereof to prevent shifting of the articles into that space.

By way of example, the description herein will refer to a railway freightcar as the mobile freight container although it is to be understood that the invention is applicable to other containers wherein similar problems exist.

When a railway freightcar is packed with items of freight, such as loose or palletized bagged items, cartons of products and/or drums thereof, the articles are normally packed as tightly as possible in the car, from side wall to side wall, and great care is exercised to tighten the load to prevent shifting of the containers. However, the walls of a freightcar are of substantial thickness, usually in the order of about five inches, and the conventional doors for the door openings slide along the outside of the car. Thus, when the freight items are packed in the car and even though they extend from side wall to side wall, they do not normally extend into the doorway opening, and when the car door is closed, a five inch space exists between those articles adjacent the doorway and the inner face of the car door. During transit the articles can thus shift into the void in the doorway and this loosens at least a part of the load and can cause damage to the articles of freight.

The present invention comprises a honeycomb structure adapted to be placed in and fill that void in the doorway, for example, after the articles of freight are loaded, so that when the freightcar door is closed, the articles cannot shift into the doorway opening. The device comprises a honeycomb structure formed of sheet material that can be normally stored or shipped in a collapsed condition and then expanded to whatever size is necessary to fill the doorway. The structure is arranged with the sheet material of the honeycomb cells extending in a direction from the inner face of the door to the articles of freight, in which position the device exhibits great strength and stability.

Throughout the description, reference to a honeycomb structure or a honeycomb slab will refer to the well-known arrangement wherein a plurality of sheets or strips of foldable material are assembled to form a stack with the adjacent sheets or strips secured to each other at spaced and staggered positions so that expansion of the stack will result in the formation of a multiplicity of open-ended cells defined by the sheet material and to cellular structures comprising normally straight strips of sheet material arranged edgewise in crossing relation to define rectangular cells, the strips being notched with their notches interengaging, in well known manner. Such honeycomb structures are well known in many arts and a further detailed description thereof is not deemed necessary. A preferred

form of the present invention comprises such a honeycomb structure having suitable tabs secured to the edges thereof whereby the structure may be placed in a door opening and expanded to completely span the same whereupon the tabs may be secured to the walls adjacent the door opening to hold the device in position.

It is, therefore, a principal object of this invention to provide an inexpensive, easily installed and disposable doorway void filler achieving the objects suggested above.

Another object of the invention is to provide such a device having great flexibility as to size whereby it may be adapted to doorways of any width or height.

Still another object of the invention is to provide a device as set forth which is collapsible when not in use to occupy a minimum of space for storage or shipment.

Further objects and advantages will become apparent to those skilled in the art as the description proceeds with reference to the accompanying drawings wherein:

FIG. 1 is a schematic perspective view of a portion of a railway freightcar illustrating the manner of using the invention;

FIG. 2 is a perspective view of a filler device in collapsed form;

FIG. 3 is an enlarged fragmentary sectional view taken on the line 3—3 of FIG. 1; and

FIG. 4 is a plan view of a modified form of the invention.

Referring first to FIG. 1, numeral **2** represents a railway freightcar, commonly referred to as a "boxcar" having side walls **4** (only one of which is shown), a doorway **6** through at least one side wall and a slidable door **8** guided by tracks **10** for movement from the open position shown to a position overlying and closing the doorway **6**. Numeral **12** indicates generally a group of freight articles packed in the interior of the car **2**. Normally the articles are packed in the car as tightly as possible and are arranged to extend from side wall to side wall of the car. Those articles engaging the side walls themselves are held thereby against lateral shifting movement but those articles opposite the doorway **6** have no such support and often shift laterally into the void defined by the doorway **6**. This void exists because the sidewalls **4** are of substantial thickness and the door **8** is outside the side walls. Thus, the articles **12** often shift into the void of the doorway, thus loosening the entire load and permitting the shifting articles to move laterally under the shocks of transportation, which often causes damage to the product.

As shown in example of FIG. 1, the invention comprises an expandable honeycomb slab structure **14** formed of a multiplicity of strips **16** of suitable sheet material secured together in an obvious and well known manner whereby the slab may be expanded laterally to fill the void of the doorway **6**. The sheets or strips **16** are of such width as to completely fill the doorway void and so that the sheet material thereof extends from the articles **12** to the inner face of the door **8** when the latter is closed. The sheets or strips **16** may be of any suitable sheet material but are preferably of such inexpensive material as double-faced corrugated fiberboard or various combinations of linerboard of different weights, for example, 17# kraft and 26# corrugated medium, plastic, wood, kraft paper, thin metal, etc.

Tab structures comprising first tabs **18** are secured to the end strips of the honeycomb slab **14** and are provided with further tabs **20** foldably joined thereto which may be folded to overlie the face of the side wall **4** adjacent the door opening **6**. The tabs **20** are secured to the side wall **4** by any suitable means such as tacks, staples, nails, pressure sensitive adhesives or the like. The tabs **20** are, of course sufficiently thin so as not to interfere with movement of the door **8** between its open and closed positions. The first tabs **18** may, if desired, be secured

to a strip **16** at only one or two of the cells **19** to permit unrestricted expansion of the structure. An upstanding support member **22** is employed in the example shown, particularly where the doorway **6** is of a substantial width. The support member **22** comprises a sheet of stiff material, such as double-faced corrugated paperboard and is positioned to lie flat against the ends of the cells of the honeycomb structure. Tabs **24** (see FIG. 3) are struck inwardly from the sheet **22** and extend into cells of the honeycomb structure and those tabs are preferably adhesively secured to the strips **16** defining one side of the cell into which the tab extends. The tabs are struck from the sheet **22** and leave an opening **26** therein but are not severed from the sheet along the entire edge **28**. Thus, the tabs are foldably joined to the support sheet **22**. However, the upper and lower portions of the tabs are slit along the edge **28** down to fold lines **30** shown in FIG. 3 whereby the upper portions **34** of the tabs are foldable relative to the center portion along the fold lines **30**. Thus, the tabs **24** may be adhesively secured throughout the entire area to a strip **16** when the latter is in flat condition and the tab will then fold to accommodate itself to the shape of the honeycomb cell when the structure is expanded. Preferably, the end tab structures **18** and **20** and the support structure **22** are initially secured to the honeycomb structure at the time of fabrication and the elements define a unitary device shown in collapsed form in FIG. 2. As is obvious, the collapsed package of FIG. 2 is of relatively small dimensions and is thus easily stored or shipped in a minimum of space. When a freight-car has been loaded, as illustrated, the device of FIG. 2 is merely positioned in the doorway and the tabs **20**, shown folded against the sides of the stack, are swung or folded outwardly and moved apart to expand the honeycomb structure from the collapsed condition of FIG. 2, and until the tabs **18** are brought into engagement with the side of the door openings **6**. Obviously, the dimensions of the door opening are not critical since the width thereof will merely determine the extent to which the honeycomb structure is expanded. After being thus expanded, the tabs **20** are secured to the side walls of the car and the prepositioned support structure **22** will automatically assume a position intermediate the sides of the doorway, as shown.

The support structure **22** may, if desired, be of a length to extend the full height of the honeycomb filler and the tabs **24** thereof extending into the cells support the midportion of the honeycomb structure against vertical collapse or sagging under the influence of gravity or other forces. In the event the honeycomb structure is used to fill the void of a narrow doorway, the support device **22** may be eliminated.

Other forms of support means may be employed in place of member **22**. For example, the upper ears **21** of the honeycomb structure may be perforated to accommodate a horizontal rod which in turn may be supported by the sides of the doorway or by being suspended from the top of the doorway. Also, the honeycomb structure can be supported by cords or the like engaging in the openings in ears **21** and secured to the top or sides of the doorway.

While the example illustrated shows the honeycomb structure as being expanded from side to side, obviously it could be first secured to or suspended from the top of the doorway or at a transverse beam in the doorway and then expanded downwardly to the car floor.

As a further obvious alternative, the honeycomb structure could be of such size that it reaches only about halfway across the doorway and two such structures used. They would meet at the center of the doorway and suitable tab means at their meeting edges would serve not only to secure the two structures together but would also serve as a vertical support. One advantage of such an arrangement would be that the devices could be mounted at the sides of the doorway, in collapsed condition, before loading the car even with its mounting tabs against the inner face of the car side wall.

Clearly, the structure described will be effective to prevent lateral shifting of the articles **12** during transit. Furthermore, when the car reaches its destination and the door **8** is opened, the structure serves to retain loose articles **12** in the car and to prevent damage thereto from external sources.

FIG. 4 illustrates a further embodiment wherein a honeycomb cell structure **36** may be identical to any of those already described. The end tabs **16**, **20** of FIG. 1, however, are replaced by facing sheets. A facing sheet **38** has tabs **40** folded from one edge thereof against the sides of the honeycomb structure and secured thereto to function in the same manner as the tabs **18** of FIG. 1. Intermediate the tabs **40** further tabs **42** are formed and adapted to be folded to extend in the direction shown in FIG. 4. The facing sheet **38** is provided with parallel score or fold lines **44** whereby it may be folded upon itself to occupy relatively small space. The facing sheets **44** and the tabs **42** may be folded to lie flat against a face of the collapsed honeycomb structure **36**, when the latter is collapsed, and thus the entire package occupies a relatively small space. When expanded to fill a doorway, the support sheets **44** are unfolded and arranged to lie against the ends of the cells to distribute pressure throughout the honeycomb structure and assist in preventing collapse of the latter. The tabs **42** are unfolded to lie against the face of the car side wall and can be secured thereto to function in the manner already described in connection with tabs **20** of FIG. 1. The sheets **44** may also be provided with precut tabs **46** adapted to be folded inwardly when the structure is expanded to project into a cell of the honeycomb structure and function as a support in the manner of the support **22** previously described.

The facing sheets **38** may be of standard width, the total width thereof being approximately equal to the width of the narrowest doorway normally encountered. For doors of greater width, a further cover sheet **48** is used and which may be cut to the desired width at the time of installation. It is merely placed against the face of the honeycomb structure between the sheets **38** and one or more tabs **50**, similar to tabs **46**, are pushed inwardly into the cells of the honeycomb structure. Thus, the entire honeycomb slab is faced with continuous sheet material offering further support, distributing pressure over a great number of cells, and securely supporting the entire structure against sag.

The cover sheets described with reference to FIG. 4 may be used on either or both sides of the honeycomb structure.

It will be obvious that a single cover sheet may be used and secured to the expanded honeycomb structure before being positioned in the doorway. In this way the cover sheet may be placed on the inside of the filler and serve to retain grain or other granular material in the car. In such case a cover sheet may be secured to both faces of the honeycomb structure, if desired. Also, the inner cover sheet may have a bottom flange lying on the floor of the car so that the weight of grain or the like thereon will hold the structure against bulging outwardly.

The foregoing disclosures describe devices achieving the objectives of the invention and provide an inexpensive filler, capable of being shipped to the point of use in collapsed condition and disposable by burning or the like, after use.

While a limited number of embodiments of the invention are shown and described herein, it is to be understood that other embodiments are contemplated within the scope of the appended claims.

I claim:

1. The combination comprising: a freight container having side walls of appreciable thickness; a plurality of discrete articles of freight in said container and arranged therein to extend substantially from side wall to side wall

therein; a door opening through at least one of said side walls; a movable door closing said opening and having its inner face spaced from said articles; an expandable honeycomb structure of sheet material in the space between said articles and said door, the sheet material of said honeycomb structure extending substantially from said door to said articles to prevent movement of said articles into said space, said honeycomb structure extending across said doorway from one margin thereof to the opposite margin, and holding means secured to at least one edge of said honeycomb structure and releasably secured to said side wall adjacent said door opening to hold said structure in place in said opening.

2. The combination defined in claim 1 wherein said holding means comprises first tabs of sheet material secured to the edges of said structure and second tabs of said material foldably joined to said first tabs, said second tabs overlying a face of said side wall adjacent said opening and being removably secured thereto.

3. The combination defined in claim 1 including upstanding support means between the side edges of said door opening, said support means engaging and supporting said honeycomb structure against vertical sagging in a region between said side edges.

4. The combination defined in claim wherein said support means comprises a length of stiff sheet material lying against a face of said honeycomb structure and having tabs extending laterally from a face thereof and engaging within cells of said honeycomb structure.

5. The combination defined in claim 3 wherein said support means comprises a sheet of stiff material overlying a face of said structure and having one side edge secured to a side edge of said structure, said sheet having upstanding parallel fold lines; said sheet having tabs extending past said structure and overlying a face of said side wall adjacent said opening and being removably secured thereto.

6. An expandable honeycomb structure comprising: a stack of strips of sheet material, the strips of said stack being secured to adjacent strips at spaced and staggered positions whereby said stack may be expanded to define a honeycomb slab; a first tab of relatively stiff sheet material secured to the outer face of each outer strip of said stack; a second tab of said relatively stiff sheet material foldable joined to an edge of said first tab and folded to lie flat against said stack but being foldable to extend outwardly therefrom.

7. An expandable honeycomb structure as defined in claim 6 wherein said tabs comprise elongated strips extending substantially the full length of said stack.

8. An expandable honeycomb structure as defined in claim 6 wherein said second tab comprises a sheet of said relatively stiff material extending substantially the length of said stack and being folded upon itself along fold lines extending lengthwise of said stack; and a further tab foldably joined to said second tab and folded to lie adjacent said first tab but being foldable outwardly from said stack.

9. An expandable honeycomb structure as defined in claim 6 including a support member of relatively stiff sheet material overlying the edges of strips of said stack and having at least one tab extending laterally therefrom and between adjacent strips of said stack.

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DRAYTON E. HOFFMAN, *Primary Examiner.*