



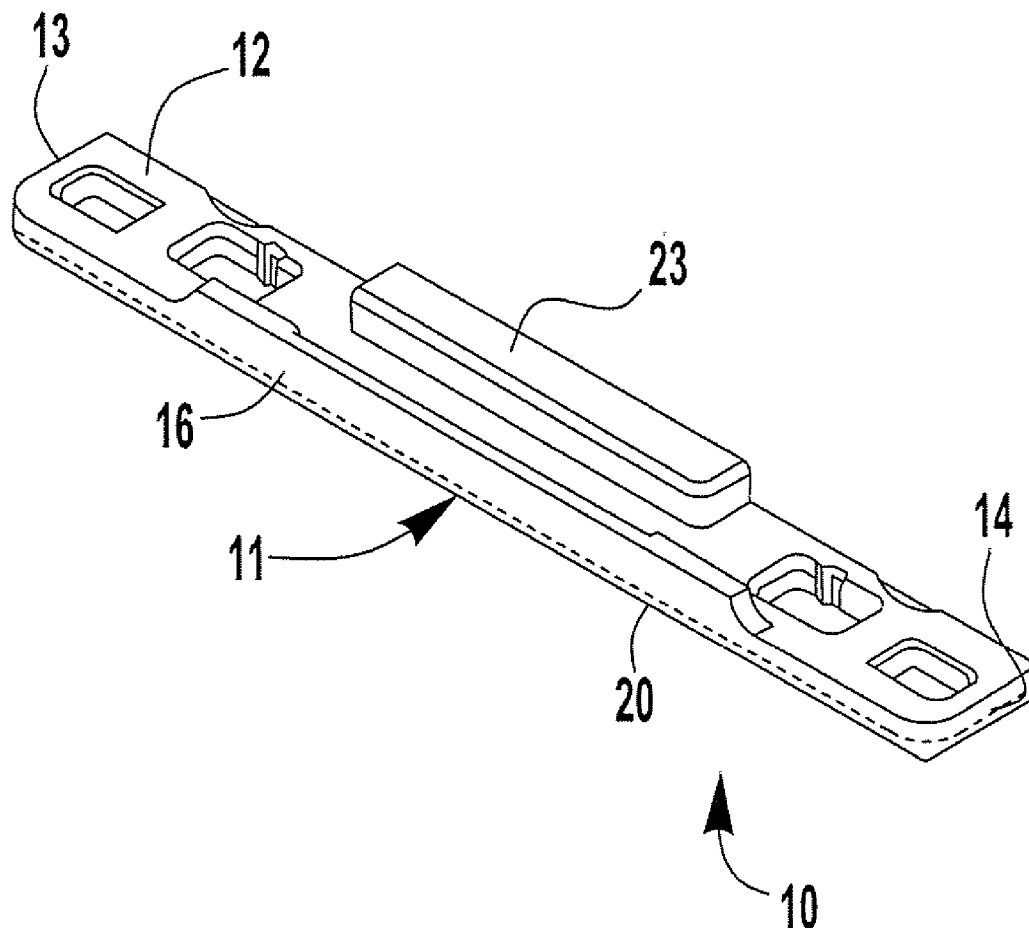
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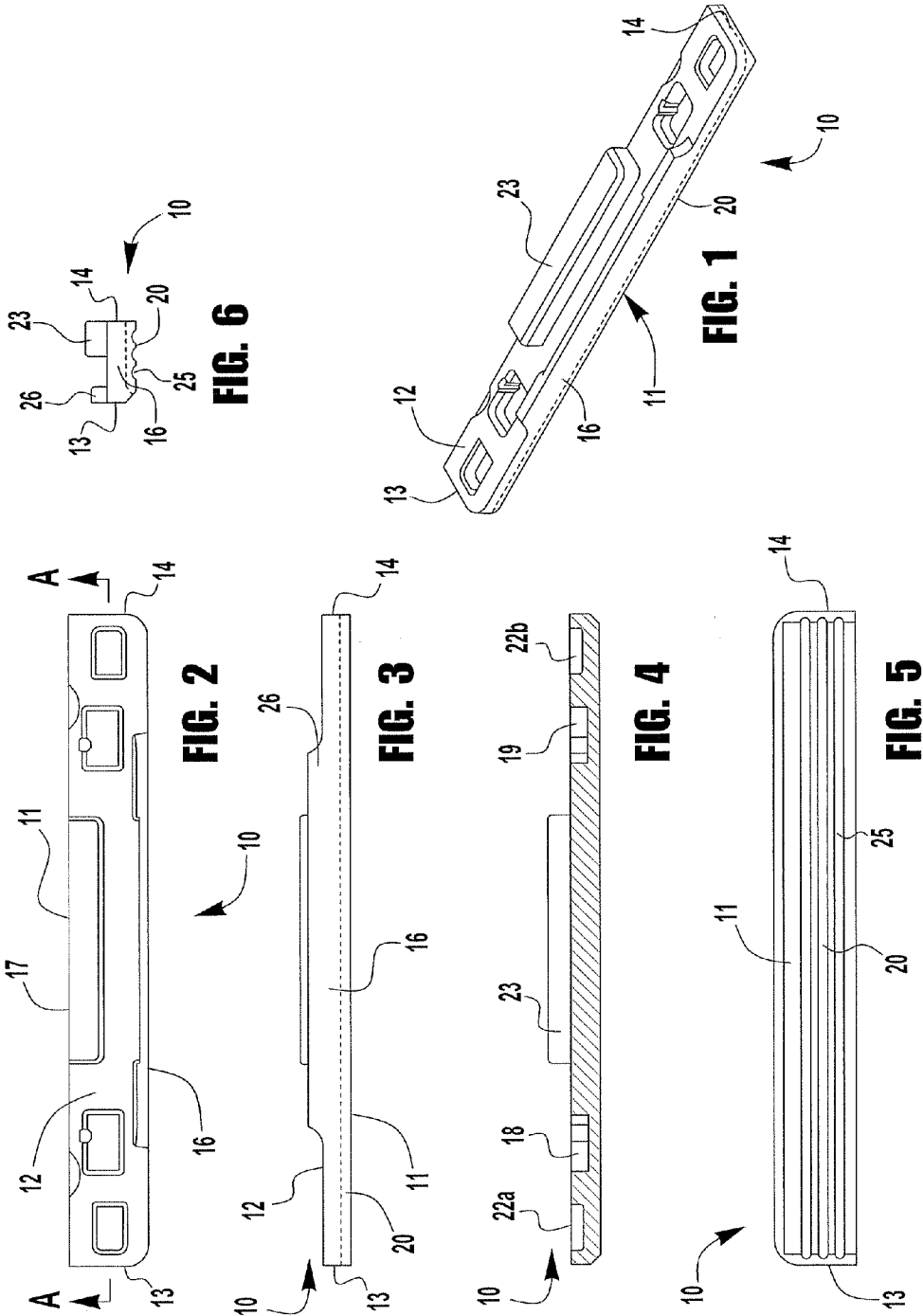
(19) **United States**(12) **Patent Application Publication**
Brubaker et al.(10) **Pub. No.: US 2007/0131147 A1**(43) **Pub. Date: Jun. 14, 2007**(54) **PACKAGE HANDLING SYSTEM****Publication Classification**(76) Inventors: **Tom Brubaker**, Perkasio, PA (US);
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PITTSBURGH, PA 15222 (US)(57) **ABSTRACT**

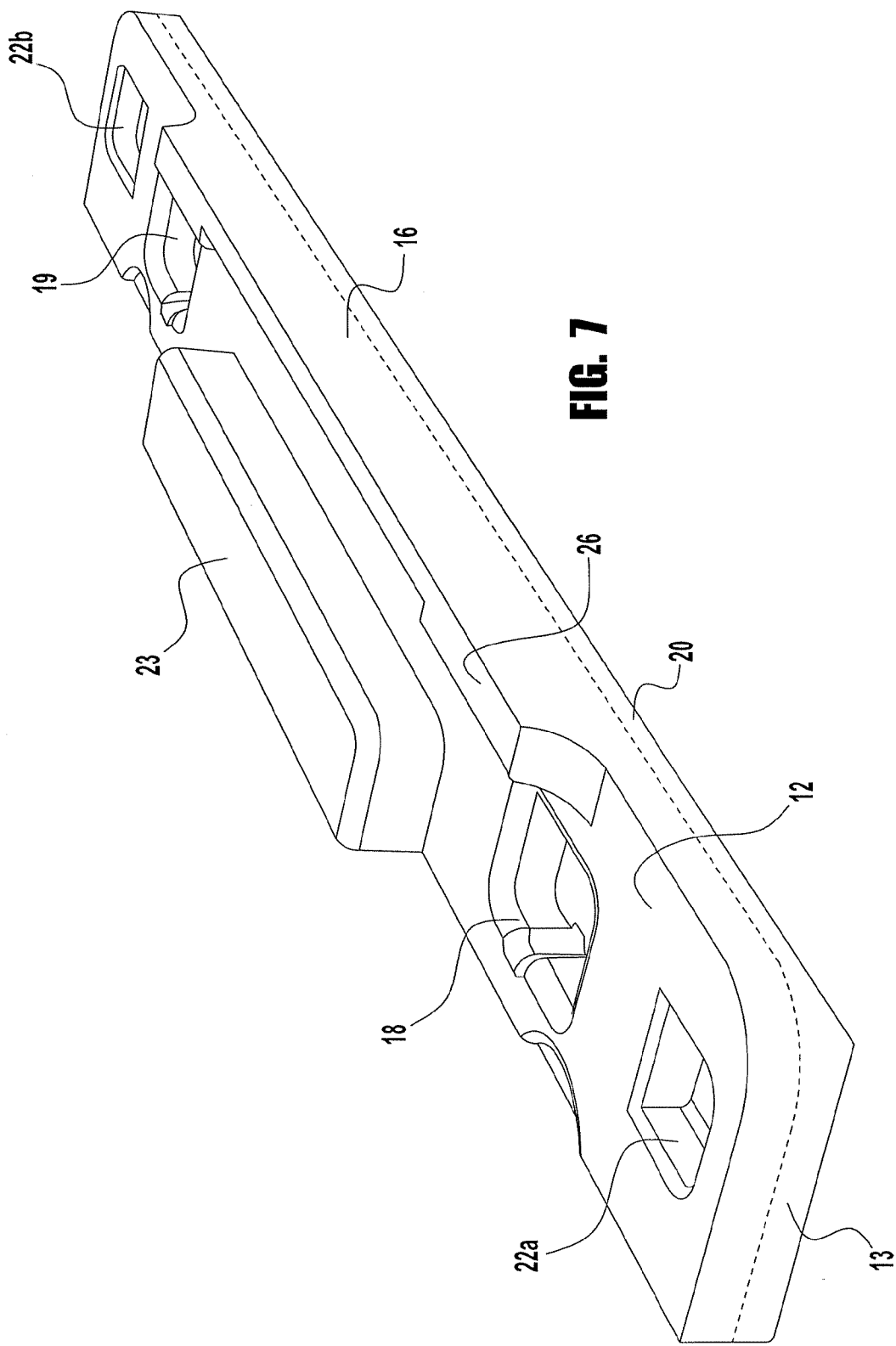
A package handling system for handling and transporting a load comprises two spaced apart skid runners molded from an expandable polystyrene or other polyolefin expanded bead, and a high impact polystyrene film. Each runner has a first surface designed to contact a load supporting surface and second surface contoured to accommodate a specific load, and a polystyrene skid applied coextensive with the first side. Optionally, the length of the first side has a plurality of grooves. The system can be used in combination with corner post supports and/or one or more top pieces. A method of packaging a load is also disclosed.

(21) Appl. No.: **11/566,754**(22) Filed: **Dec. 5, 2006****Related U.S. Application Data**

(60) Provisional application No. 60/748,865, filed on Dec. 9, 2005.







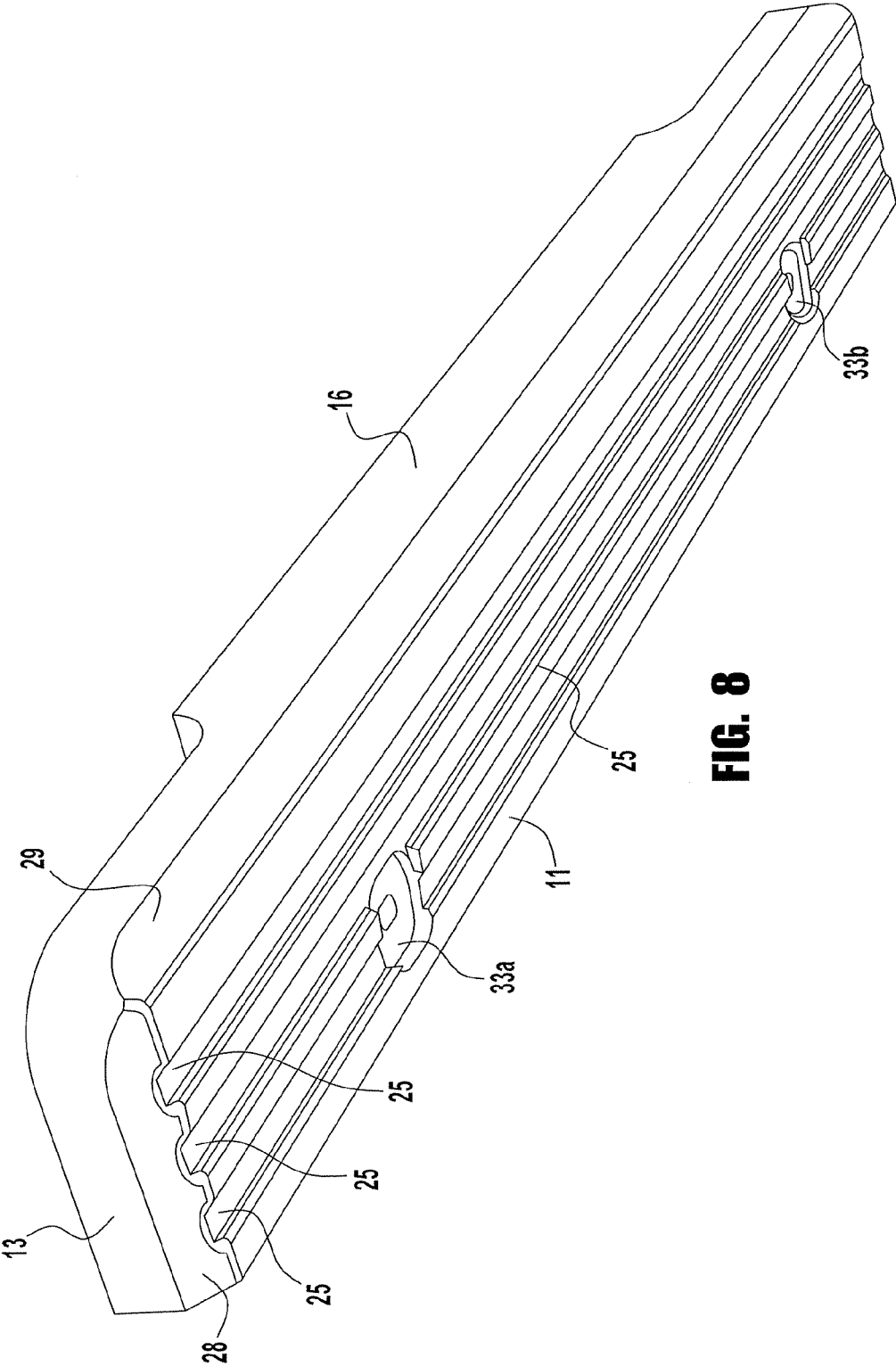


FIG. 8

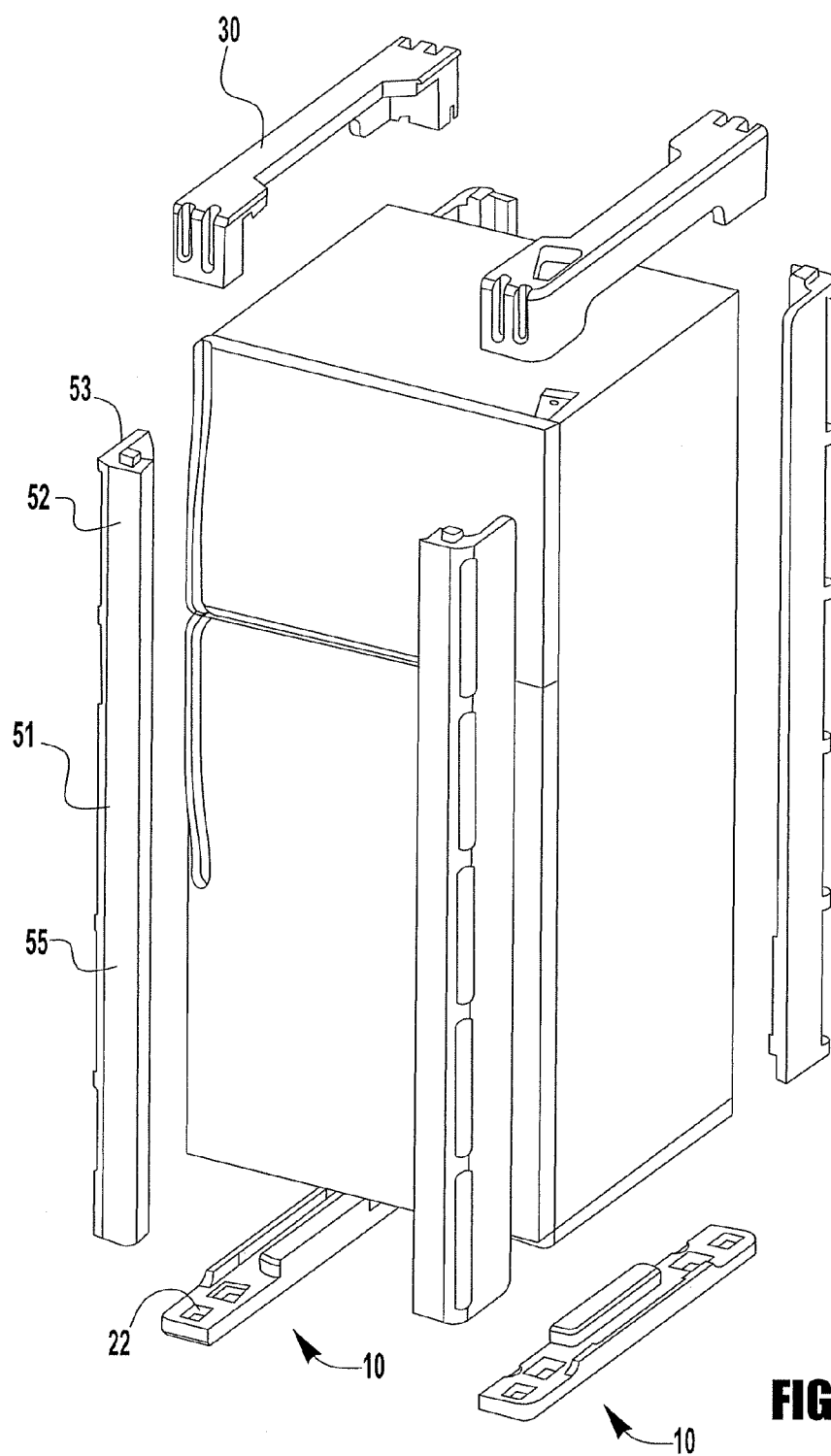


FIG. 9

PACKAGE HANDLING SYSTEM

REFERENCE TO RELATED APPLICATION

[0001] This application claims priority of U.S. Provisional Application Ser. No. 60/748,865, filed on Dec. 9, 2005, the entire contents of which are incorporated by reference.

FIELD OF THE INVENTION

[0002] The present invention relates to a package handling system and, in particular, to a package handling system comprising of an expanded polystyrene molded shape having a polystyrene sheet formed and applied to the contours of the molded shape, such as on at least bearing portions or the surfaces having contact with support surfaces such as a floor.

BACKGROUND OF THE INVENTION

[0003] Package handling systems comprising of skid runners are known in the art. Skid runners are used to support loads and as spacers to protect the loads. They facilitate handling the loads for transportation using common handling equipment such as fork lifts and hand trucks. Skids can be made in many shapes to support various types of load configurations and weights. For example, U.S. Pat. No. 4,317,515 shows a skid runner made from laminated paper to support sheets of wall board, lumber and the like. U.S. Pat. No. 4,050,664 discloses a skid runner formed from kraft paper conduit and includes integrated strapping means for stabilizing loads on the runners.

[0004] Skid runners have been made from many different types of material. The most common material is wood where the runner is integrated into a pallet for transporting various products. Metal such as steel channels has been used to support heavy loads for transportation and storage. These runners can also be designed to be integrated into rack storage systems and to act as part of the rack system itself. Various shipping containers have been fabricated from aluminum or steel or plastics such as polyethylene or polypropylene with integrated skid runners. Most tend to be cumbersome and heavy, adding bulk and weight to the system thereby increasing cost.

[0005] Traditionally, skids have been designed to support their intended loads using two or more skids that would extend the length of the loads and have a height that enables the tongs of a fork lift, or other lifting apparatus, to extend between the skids. In many applications, pallets are used instead of containers to handle large loads of individual items. These loads can vary from stacks of beer cases to individual appliances or machines. Typically, loads of cases or products are stacked on a pallet in a palletizer and then wrapped with a thin film wrapping material instead of using a traditional container or cardboard shipping box. Large loads are also shipped on pallets which are wrapped in a film in lieu of a shipping carton. In both of these examples, it is not unusual to include cardboard edges at the corners of the stacked cases prior to wrapping to stabilize the loads so that multiple pallets of products can be stacked for shipping or warehousing.

[0006] Notwithstanding these advances in package handling systems and methods, none of the prior systems or methods provide for a convenient, light weight and inex-

pensive system useable with stackable and/or heavy loads. Thus, there is a need for a packaging system that facilitates stackable loads, is inexpensive to produce and is light in weight to reduce shipping charges. In addition, it would be highly desirable to have a packaging system that is customizable for the various product shapes to be packaged, shipped and stored plus be of a material that can absorb shock typically encountered in shipping environments.

SUMMARY OF THE INVENTION

[0007] Generally, the present invention comprises a packaging system for a load such as a container, for example, a cardboard box or an appliance such as a refrigerator, stove, washer or the like designed to overcome the prior shortcomings. Thus, it is an object of the invention to provide a lightweight, customizable skid runner for use with packaging and a method of packaging a load that does not require or obviates the requirement for package handling palletization. An objective of the runner absorbs shock typically encountered in shipping environments. It is a further object in an example of the invention to provide a novel skid runner that can include integrated corner posts or novel corner posts for packaging, particularly posts having ends that include at least one portion that interlocks into a skid runner. In another embodiment, it is an object of the invention to provide a packaging system that includes an integrated skid runner and corner posts that increase safe stacking and handling of appliances and like products.

[0008] One embodiment of the invention comprises at least two spaced apart skid runners having a polystyrene skin applied to at least portions of each of the runners for supporting the load. Each of the skid runners is preferably made from an expandable polymeric moldable material, and more preferably shape molded from expanded polystyrene to have at least first and second surfaces. The first surface in this embodiment is substantially coextensive with the length and width of the skid runner for contact with a supporting surface for the load such as a warehouse floor, truck or another packaging system. The second surface, on the other hand, can be configured to support a load. For example, the second surface can be specially designed to engage mating parts of a load to be packaged such as the support feet or legs of an appliance.

[0009] A polystyrene film is laminated, fused or bonded substantially coextensive with the first surface. The film is preferably a high impact polystyrene film. The unique combination of applying the film to the expanded polystyrene material provides enhanced wear and durability characteristics plus substantially increases the tensile and flexural strength of the skid runner without adding excess weight.

[0010] In preferred embodiments of the invention, the film is bonded to the expanded bead skid runner in the molding process so as to be an integral component of the skid runner.

[0011] In an embodiment of the invention, the packaging system comprises a plurality of spaced apart skid runners. At least one of the runners is located at a supporting position of a load, such as along an edge extending generally from corner to corner. The runner has a first surface for contact with a supporting surface for the package handling system, such as warehouse floor, transport vehicle or vessel or another packaging system. A second surface is provided for

contacting the load at a supporting position on the load. Each of these skid runners is preferably molded from, but not limited to, expandable polystyrene and includes polystyrene film fused or laminated substantially coextensively to the first surface. Typically, in this embodiment, there are three, or possibly four, skid runners. In an example using three runners, the runners are positioned in parallel substantially in parallel with one another, the third skid runner being generally centered between the other two. In an example with four skid runners, each runner is configured to be located at a respective corner of the load. In some applications this may comprise an extension of the supporting leg of an appliance such as refrigerator. In this embodiment the size and weight of the skid runners is almost immaterial to the size and weight of the load, thus reducing the shipping charges of the load compared to containers or palletized loads. In addition, the expanded polystyrene skid runners of the present invention provide substantially enhanced impact resistance to the load from dropping by a careless forklift driver, for example.

[0012] The skid runners further have a pair of outer sides between the first and second surfaces. The outer sides include at least a portion of the polystyrene film laminated or fused thereto at least adjacent to an intersection with the first surface. In a preferred embodiment of the invention, the polystyrene film is laminated or fused to associated expanded polystyrene part during the molding process to provide a cohesive coextensive bond with the associated part.

[0013] Other advantages of the present invention will become apparent from a perusal of the following detailed description of presently preferred embodiments taken together with the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is an isometric view of a skid runner according to an embodiment of the present invention.

[0015] FIG. 2 is a plan view of a skid runner according to an embodiment of the present invention.

[0016] FIG. 3 is an elevation view of the skid runner shown in FIG. 1.

[0017] FIG. 4 is a sectional elevation of the skid runner along line A-A shown in FIG. 2.

[0018] FIG. 5 is a bottom view of the skid runner according to an embodiment of the present invention.

[0019] FIG. 6 is an end view of the skid runner according to an embodiment of the present invention.

[0020] FIG. 7 is an isometric view generally showing surface 12 of the skid runner according to an embodiment of the present invention.

[0021] FIG. 8 is an isometric view generally showing surface 11 of the skid runner according to an embodiment of the present invention.

[0022] FIG. 9 shows an embodiment of the present invention in combination with corner post supports and a carrying load.

PRESENTLY PREFERRED EMBODIMENTS OF THE INVENTION

[0023] With reference to FIGS. 1-6, a skid runner 10 is shown molded from expandable polystyrene having a den-

sity of, but not limited to, from about 1.5 to about 3.5 pounds per cubic foot. The overall weight of skid 10 is from about 2.60 to about 5.30 ounces. Generally, the weight and density vary depending upon the load weight design required, and the shock absorbency desired. For a small but fairly heavy load, the load contacting surface area of the skid will be relatively small and have a density high enough to support the weight of the load. The greater the density the greater the skid weight. The size of the runner will vary to accommodate the size and shape of the load it is to support. Size will also affect the weight. Skid 10 includes a first surface 11 designed to contact a load supporting surface, and a second surface 12 configured to accommodate portions of a load, as shown in FIGS. 1 and 2. Skid 10 includes ends 13 and 14 and a pair of outer sides 16 and 17 positioned between first and second surfaces 16 and 17. Film 20 covers first surface 11 and portions of sides 16 and 17, as illustrated for example in FIGS. 1 and 3. Film 20 is a high impact polystyrene film that is fused substantially coextensive with first surface 11 during the molding process. Preferably the polystyrene film 20 is laminated or fused to the first surface after molding of the expanded skid 10 but when it is still in the mold. The load supporting surface includes any surface on which the skids may be used such as a warehouse floor, transport vehicle or vessel or like. The second surface 12 of skid 10 is uniquely configured to custom fit the specific load contact surfaces as needed for support. As can be seen from the above data, the weight of the skids imparts little weight to the package, provides an economical and impact resistant skid for transporting loads such as appliances safely.

[0024] The height of ends 13 and 14 and sides 16 and 17 can be made to accommodate the height necessary for the tongs of a forklift if required for the application. Common edges between first surface 11 and ends 13, 14 and side surface 16, as an option, can be chamfered to accommodate and ease transition over various surfaces. Chamfered ends and side surfaces can ease conveyor roller transaction such as rollers on a conveyor line. In an example, chamfered edge 28 is provided along one of ends 13 or 14, or both ends 13, 14. Sides 16, 17 can also be chamfered, providing chamfered side 29 shown, for an example, in FIG. 8. The height of chamfered edge 28 and side 29 is generally the same. The chamfer height typically is a variable that is determined by the specific application and need.

[0025] In an embodiment, a generally central portion along side 16 extends opposite surface 11 creating sidewall 26 that protrudes from surface 12 as illustrated in FIG. 3. Sidewall 26 provides further support and protection from side force impact to the load. Sidewall 26 can be designed to accommodate the dimensions of the specific load contacting surfaces.

[0026] Additionally, as shown for example in FIG. 4, skid 10 can have specific openings such as 22a and 22b that can be used to incorporate other packaging components such as a corner post 51. Locations such as indents or openings 18 and 19 on second surface 12 of skid 10 can be made to accommodate specific or recurring loads. Openings 18 and 19 give clearance for wheels of a load for example.

[0027] In an embodiment, skid runner 10 has a plurality of grooves 25 provided on first surface 11 as shown in FIGS. 5 and 6. Grooves 25 provide a ribbed texture to first surface 11 that increases flexural strength. Grooves 25 generally

extend the length of surface 11 from end 13 to end 14, or to a position just inward thereof. Film 20 contours the form of the grooves 25 along surface 11. In this way, grooves 25 reduce contact with the load supporting surface area and reduce friction thereby minimizing the effort required to slide loads across supporting surfaces such as a floor or truck bed. Generally grooves 25 are each of a similar shape and located equidistant to one another parallel or substantially parallel along first surface 11. Shape and position of grooves 25 can vary from application to application. The width of the grooves 25 is minimized, as measured from side 16 to side 17, if greater contact with the load supporting surface area is desired, for instance to increase stiffness and decrease friction. If increased skid flex is desired, such as to adsorb more shock, the width of grooves 25 could be increased in size or even eliminated. The grooves 25 also enhance the flexural strength of the invention.

[0028] Optionally, second surface 12 has a projecting support 23 specially molded to adapt or configure the second surface to engage the load bearing members of the load, such as the legs of an appliance, e.g. a refrigerator, washing machine or like legs, by fitting between portions of inner faces of those legs. In an example shown in FIG. 7, a product bearing area 23 extends opposite surface 11 from a central portion of surface 12. Bearing area 23 in combination with side 17 measures about 2.0 to 3.0 from first surface 11, or, preferably, about 2.4 to 2.6 inches high, and, more preferably, about 2.52 inches in height. Bearing area 23 has a length that is generally one-third the length of the skid. Bearing area 23 or similar configuration, is typically used with second surface 12 as the main load bearing surfaces. The ability to custom mold the second surface 12 of skid 10 by use of bearing area 23 and sidewall 26, for example, to accommodate specific loads provides a cost efficient system for placing a skid to the load at the point of manufacture and retaining the skid to the final destination.

[0029] In an example of the invention as shown in FIG. 8, first surface 11 also has one or more recesses 33a and 33b also referred to as mechanical attachment locations. Recesses 33 provide an indent to grooves 25. Regardless of whether grooves 25 are used, recesses 33 have the general form of a circle, square or rectangle, and enable mechanical attachment of skid runners to the product being supported.

[0030] An illustration of a typical application of an embodiment of the present invention is shown in FIG. 9. FIG. 9 shows a combination of two runners 10 supporting a refrigerator load in combination with corner post supports 51 and top pieces 30. In this embodiment of the packaging system, skid runner 10 is optionally used in combination with vertical corner post supports 51 as illustrated in FIG. 9. Corner post supports 51 are located along each corner or edge of the load, such as an appliance, coextensively with the height thereof. A male feature on post support 51 removeably engages with corresponding locking feature 22. Optionally, expanded polystyrene corner posts 51 can be used with skid runners 10 and top pads 30 to form a complete protective system for a typical load as shown in FIG. 9. In this embodiment of the packaging system, corner post 51 locks into skid runner 10 and top pad 30. A conventional stretch wrap or other material of exterior containment can be applied to complete the packaging system.

[0031] The invention also provides a method of packaging a load. First, expanded polystyrene is molded to form at least two elongated generally rectangular skid runners. Each of the runners has first and second surfaces and at least two side walls and two ends. Next, during the molding process, a polystyrene film is bonded substantially coextensive with the first surface and portions of the sides and ends that are adjacent to an intersection with the first surface. The film becomes an integral part of the final molded skid. At least two skids are placed in the supporting position of a load, generally the bottom part, on the second surfaces of are skid. Optionally, one or more corner post supports and/or one or more top pieces are positioned in the skid, as in the former case, or adjoined by contouring to the corners or edges of the load. Optionally, the combined skids and load are wrapped with plastic, paper, tape or other packaging material for further protection.

[0032] While the presently preferred embodiment of the invention has been shown and described in particularity, the invention maybe otherwise embodied within the scope of the appended claims.

What is claimed is:

1. A package handling system for a load comprising at least two spaced apart skid runners for supporting a load to be carried by said skid runners, each of said skid runners being comprised of an expanded polystyrene molded to have at least a first and second surface, said first surface being substantially coextensive the length and width of said skid runner for contact with a supporting surface, said second surface being configured to support said load, and a polystyrene film laminated substantially coextensive with said first surface.

2. A package handling system as set forth in claim 1 wherein at least one of said runners is located at least at a supporting position of said load.

3. A packaging handling system as set forth in claim 1 wherein said system includes a third skid runner positioned between and substantially parallel with said at least two spaced apart skid runners.

4. A package handling system as set forth in claim 1 wherein said skid runners have at least a pair of sides and ends positioned between said first and second surfaces and wherein at least a portion of said sides and ends includes said polystyrene film bonded thereto at least adjacent to an intersection with said first surface.

5. A packaging handling system as set forth in claim 1 wherein said first surface comprises a plurality of grooves.

6. A packaging handling system as set forth in claim 4 wherein said first surface comprises a chamfered edge extending along one end or both of said pair of ends.

7. A package handling system as set forth in claim 4 wherein said first surfaces comprises a chamfered edge extending along one side or both of said pair of sides.

8. A package handling system as set forth in claim 4 further comprising a side wall generally aligned with and extending from one of said sides and protruding from said second surface.

9. A package handling system as set forth in claim 4 wherein said second surface further comprises at least one bearing area generally aligned with and extending along one of said sides and being positioned between said ends.

10. A package handling system as set forth in claim 1 wherein said second surface further includes one or more

openings or indents having the general shape of a square, circle or rectangle suitable to accommodate protruding contact surfaces on said load.

11. A package handling system as set forth in claim 1 wherein said skid runners are spaced apart a distance less than the relative dimension of said load to be supported on said second surface.

12. A package handling system as set forth in claim 1 wherein said skid runners comprise of an expanded polystyrene having a density of from about 1.25 to 3.5 pounds per cubic foot.

13. A package handling system as set forth in claim 1 wherein said polystyrene film is a high impact film and is located over at least said first surface.

14. A package handling system as set forth in claim 13 wherein said high impact film is located by lamination.

15. A package handling system as set forth in claim 14 wherein said lamination is prepared substantially simultaneously with molding said skid runner.

16. A package handling system as set forth in claim 4 wherein said polystyrene film is located over at least a portion of said sides and ends.

17. A packaging system for a load comprising a plurality of spaced apart expanded polystyrene skid runners, each of said skid runners comprising a first surface for contact with a load supporting surface and second surface for contacting support of said load, each of said skid runners having a polystyrene film substantially coextensively bonded to said first surface, and a plurality of corner supports configured to

support a corner of said load, each of said corner supports extending at least from an outer edge of said second surface to a point adjacent the extent of said load.

18. A packaging system for a load as set forth in claim 17 wherein said system further includes one or more top pieces each said top piece being removably attached to an end of said corner support.

19. A method of packaging a load, said method comprising the steps of:

a. molding expanded polystyrene to form at least two elongated generally rectangular skid runners, each of said runners having first and second surfaces and at least two side walls and two ends;

b. bonding a polystyrene film substantially coextensive with said first surface and a portion of said sides and ends adjacent to an intersection with said first surface; and

c. placing the supporting position of said load on said second surfaces of said at least two skids runners.

20. A method of packaging a load, further comprising the step of:

d. positioning a first end of each of at least two corner posts into one of said at least two skid runners, and positioning each second end of each of at least two corner posts into opposite ends of a top piece.

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