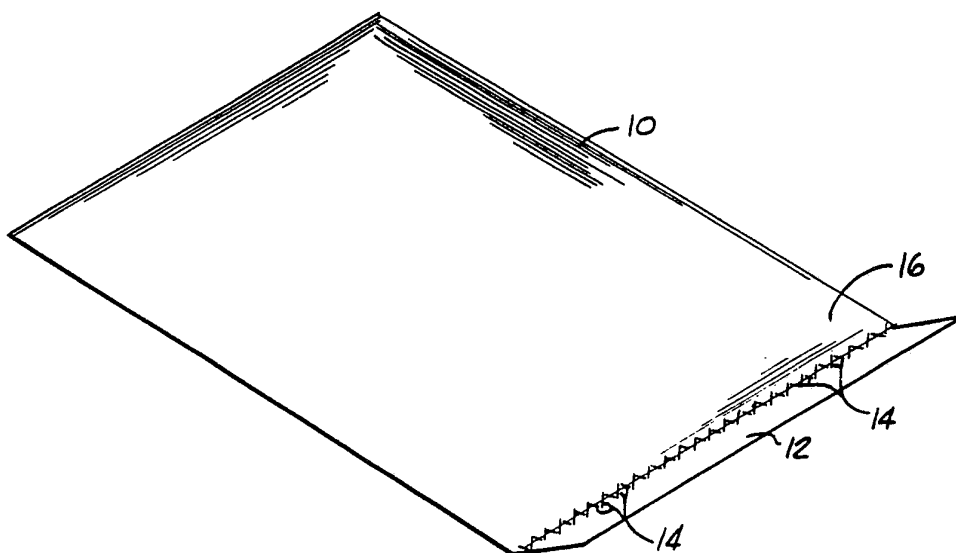




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<p>(54) Title: SLIP SHEET HAVING PERMANENTLY BENT TAB AND METHOD FOR MAKING SAME</p>		



(57) Abstract

The invention is concerned with slip sheets (10) for use in conjunction with fork lift trucks. The slip sheet (10) of the invention has a permanently bent or elevated end or side tab (12) to allow easy access by a fork lift grabber bar to secure the tab (12) of the sheet (10). The bent tab (12) is formed by pressing indentations (14) in a sheet (10) and angled with respect to the edge of the sheet.

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SLIP SHEET HAVING PERMANENTLY BENT TAB AND METHOD FOR
MAKING SAME

The present invention relates to a slip
sheet having a permanently bent tab. The invention is
also concerned with a method of making such a slip
sheet and takes advantage of the memory qualities of
5 extruded polyolefin resins.

According to the present invention there is
provided a slip sheet for pulling a load positioned
thereon onto the fork arms of a lift truck,
10 characterized by a thin sheet of deformable plastic
material having at least one substantially straight
edge, said sheet having a series of indentation formed
therein, said indentations defining the boundary of a
tab which is located inwardly adjacent to said edge,
15 and said indentations being angled with respect to
said edge, with the angle of each indentation being
supplementary to the angle of each adjacent
indentation.

According to a further aspect of the
20 invention there is provided a method of forming a
permanently bent tab in a margin of a sheet of plastic
material, characterized by pressing a series of
discrete indentations into said sheet along a border
between said tab and the remainder of said sheet, said
25 indentations being angled with respect to the edge of
said sheet.

According to a still further aspect of the
invention there is provided a device for supporting a
load, characterized by a sheet of deformable plastic

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material having a flat main support portion, a flap portion connected to said flat main support portion by an elongated transverse hinge portion, said flap portion being outwardly inclined relative to said main support portion; and said hinge portion comprising a uniform continuous pattern of equal size and equally spaced indentations formed in said plastic material.

In order that the invention may be more clearly understood and readily carried into effect, reference will now be made to the accompanying drawings, in which

FIG. 1 is a top view of a slip sheet embodying the features of the present invention.

FIG. 2 is a perspective view of the slip sheet of FIG. 1.

FIG. 3 is a sectional view taken along the line 3-3 in FIG. 1.

FIG. 4 is a plan view of another embodiment of the invention.

FIG. 5 is a plan view of yet another embodiment of the invention.

FIG. 6 is a detail view, at an enlarged scale, of a portion of FIG. 1.

FIG. 7 is a detail view, at an enlarged scale, of a portion of FIG. 3.

FIG. 8 is a detail view, at an enlarged scale, of a portion of FIG. 5.

Referring now to the drawings, a slip sheet is used in conjunction with fork lift trucks, whereas a load of boxes, barrels, bags, etc., is carried by a platen (a thin sheet of steel or the like) attached to the fork lift truck, which can slide underneath the slip sheet and its load by means of pulling the slip sheet by its extending tab 12 with a grabber bar which is fixed to an upright backstop that is moveable front to back of the platen area usually by means of hydraulics or electronics to relocate

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loads of all shapes and sizes.

One of the problems that may occur when the fork lift driver attempts to attach the grabber bar to the slip sheet tab is, that the tab may be resting flat on the floor or surface from which the load is to be pulled onto the platen, making the tab hard to secure. Also, problems may occur when loads are double stacked and the tab of the slip sheet has bent downward. Either of these conditions can result in the lift truck driver not being able to secure a firm hold on the tab of the slip sheet or grabbing the tab in a manner causing it to fold and wrinkle in the grip of the grabber bar. It is very important that the tab of the slip sheet rest evenly across the length of the grabber bar.

The unique functional feature that I have added to the plastic slip sheet are indented patterns designed to make the tab or tabs of the plastic slip sheet remain at a ready upward angle to achieve smooth effective fork lift handling and to reduce damage to the slip sheet.

Unlike a crease or shallow groove which will allow the extending tab to be manually positioned at an upward angle, the feature described herein and illustrated in the attached drawings (Fig's. 1-5) causes the tab of the slip sheet to angle upward automatically and remain at an upward angle when this or a similar pattern is indented into the surface of the finished plastic sheet.

For best results patterns should be used in conjunction with polyolefin resins with a tensile strength range of 3,000 PSI to 4,500 PSI and a vicat softening point of 260°F. Finished sheet thickness range is 20 to 100 mils.

The design comprises a pattern of alternating angled or otherwise shaped lines indented into the plastic slip sheet surface between

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the load area 16 and the tab area 12 or areas. These indentations are pressed into the plastic slip sheet in a manner that causes the plastic to stretch downward (Fig. 3) wherever a line is placed. As the plastic is pulled downward the edge of the plastic sheet (or tab) automatically raises to a useful permanent upward angle (Fig. 2).

The angle θ , length l , shape, and depth d of the indented lines depends on the thickness of the plastic sheet, how wide the tab of the sheet is to be, and the amount of tab angle desired.

The indentations of the pattern are not quite connecting to one another (Fig. 1), nor do they extend completely to the edge of the sheet itself. The reason for this is that when the plastic is pulled downward in the indented line areas these indented areas become weaker than the other areas of the sheet that are not indented. Leaving a small space between these lines adds to the strength of the slip sheet tab.

For shipping purposes, plastic slip sheets are usually stacked and banded in quantities of between 300 and 1,000 depending on sheet thickness. When sheets are stacked in this manner the tendency is for the sheet to lay completely flat because of the weight accumulation of the sheets themselves. When a single sheet is removed from the stack of sheets to be put into use, the tab area of a sheet with the patterned indentation will slowly raise into a ready position.

Even if the tabs of this sheet are pressed out of position between loads of material in box cars or truck trailers, the tab will return to a functional position when the stress of the neighboring load is removed.

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C L A I M S

1. A slip sheet for pulling a load positioned thereon onto the fork arms of a lift truck, characterized by a thin sheet of deformable plastic material having at least one substantially straight edge, said sheet having a series of indentations formed therein, said indentations defining the boundary of a tab which is located inwardly adjacent to said edge, and said indentations being angled with respect to said edge, with the angle of each indentation being supplementary to the angle of each adjacent indentation.
2. Apparatus according to claim 1, characterized in that said indentations have first predetermined lengths and are separated from each other by second predetermined lengths, said first predetermined lengths being substantially larger than said second predetermined lengths.
3. Apparatus according to claim 1, characterized in that the angle between said indentations and said edge is a specific value which provides a desired amount of non-linearity between said sheet and said tab.
4. A method of forming a permanently bent tab in a margin of a sheet of plastic material, characterized by pressing a series of discrete indentations into said sheet along a border between said tab and the remainder of said sheet, said indentations being angled with respect to the edge of said sheet.
5. A method according to claim 4, characterized by the further step of forming said indentations such that the angle of each indentation is supplementary to the angle of each adjacent indentation.
6. A device for supporting a load, characterized by a sheet of deformable plastic material having a flat main support portion, a flap portion connected to said flat main support portion by an elongated transverse hinge portion, said flap portion being outwardly inclined relative to said main support portion; and said hinge portion comprising a uniform continuous pattern of equal size and equally spaced

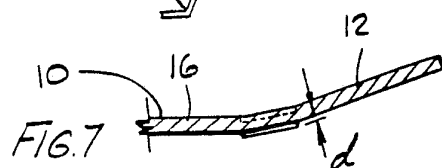
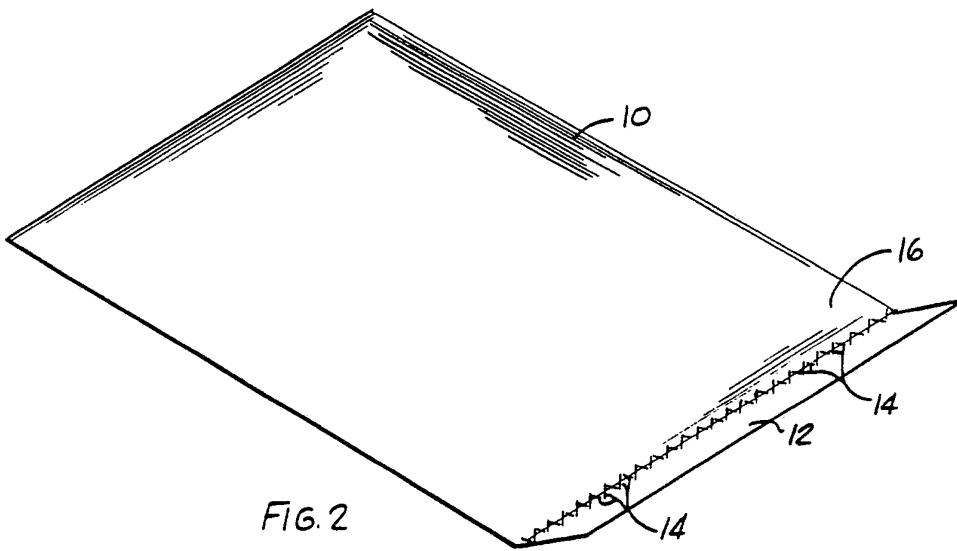
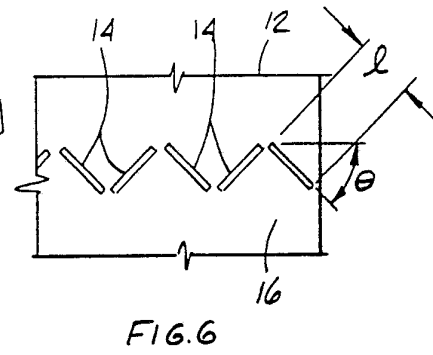
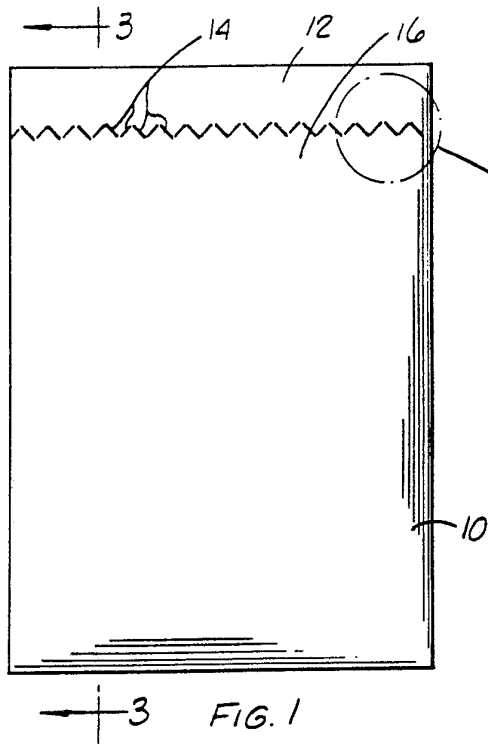
- 6 -

indentations formed in said plastic material.

7. A device according to claim 6, characterized in that said indentations have triangular-shape flat unformed sheet portions therebetween.

8. A device according to claim 7, characterized in that said indentations are elongated and adjacent ones of said indentations are oppositely equally inclined relative to the longitudinal axis of said hinge portion.

9. A device according to claim 8, characterized in that said indentations have equal lengths and said indentations have a first pair of closely laterally spaced end portions and a second pair of widely laterally spaced end portions.



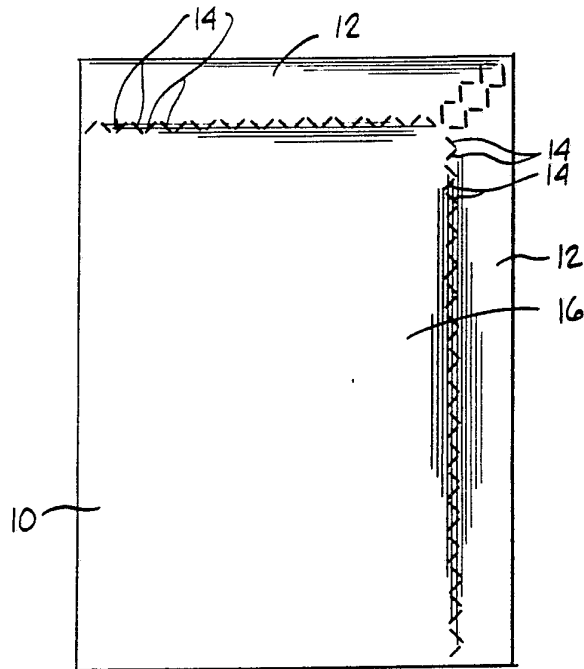


FIG. 4

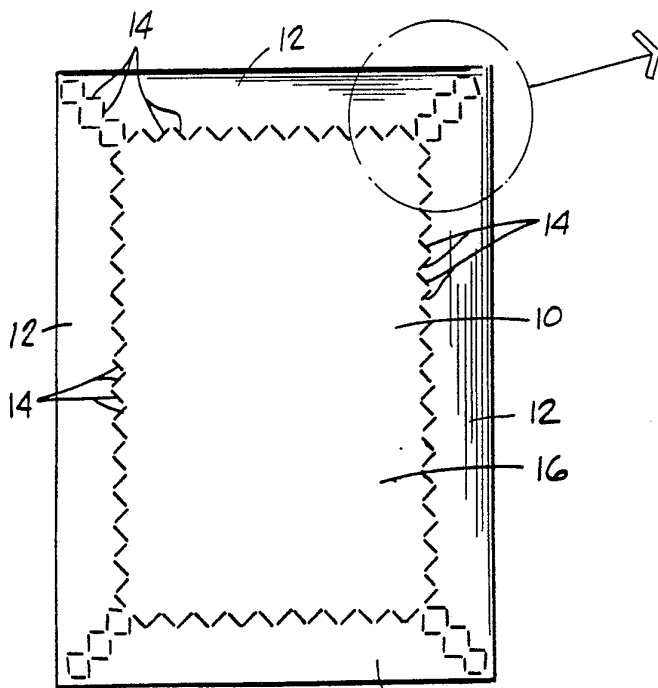


FIG. 5

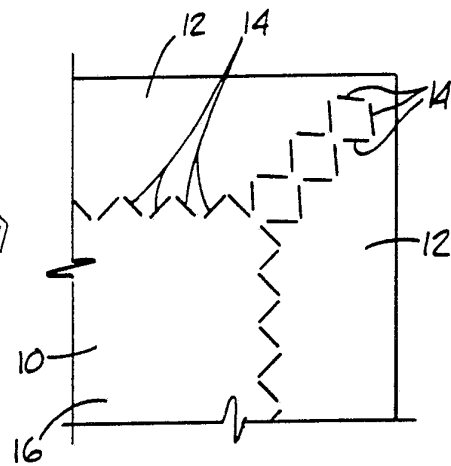


FIG. 6

INTERNATIONAL SEARCH REPORT

International Application No. PCT/US 88/02100

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
IPC (4): B65D 19/24; B29C 59/02		
U.S. Cl. 108/51.3; 264/293		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
US	108/51.3, 51.1, 901, 902; 264/293, 339; 29/419R	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US, E, 29,192 (ANDERSON ET AL.) 26 April 1977, see the entire document.	6
A	US, A, 2,302,137 (NEUMAN) 17 November 1942, see the entire document.	
A	US, A, 2,955,324 (MORGAN) 11 October 1960, see the entire document.	
X	US, A, 3,274,047 (SLOAN) 20 September 1966, see the entire document.	4 5
X	US, A, 3,900,500 (OLIVER ET AL.) 19 August 1975, see the entire document.	4, 5
X	US, A, 4,042,127 (BROSSIA) 16 August 1977, see the entire document.	6
X	US, A, 4,130,623 (WALTER) 19 December 1978, see the entire document.	4, 5
A	US, A, 4,405,673 (FRIDLEY ET AL.) 20 September 1983, see the entire document.	
Y	US, A, 4,409,277 (MICHEL) 11 October 1983, see the entire document.	4
A	US, A, 4,507,348 (NAGATA ET AL.) 26 March 1985, see the entire document.	
A	US, A, 4,507,546 (BATELKA) 18 February 1986, see the entire document.	
A	US, A, 4,649,007 (BONIS ET AL.) 10 March 1987, see the entire document.	
<p>* Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search		Date of Mailing of this International Search Report
14 September 1988		24 OCT 1988
International Searching Authority		Signature of Authorized Officer
ISA/US		Jose Chen

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document with indication, where appropriate, of the relevant passages	Relevant to Claim No
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X	GB, A, 1,586,512 (WEDGE-MATHIASSEN) 10 March 1981, see the entire document.	4,5
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