

[54] **CORNER CLIP AND BALE LIFTING METHOD**

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Related U.S. Application Data

[63] Continuation of Ser. No. 836,281, June 25, 1969, abandoned.
 [52] U.S. Cl.294/74, 294/67 DA, 294/67 EA, 24/115
 [51] Int. Cl.B66c 1/12
 [58] Field of Search294/74, 75, 78, 67 DA, 67 EA; 24/16, 115; 280/179.1; 105/369; 224/508

References Cited

UNITED STATES PATENTS

2,676,835 4/1954 McKinney294/74

3,203,726 8/1965 Smith.....294/74
 3,378,889 4/1968 Dunderdale24/16

FOREIGN PATENTS OR APPLICATIONS

1,139,447 7/1957 France.....294/74

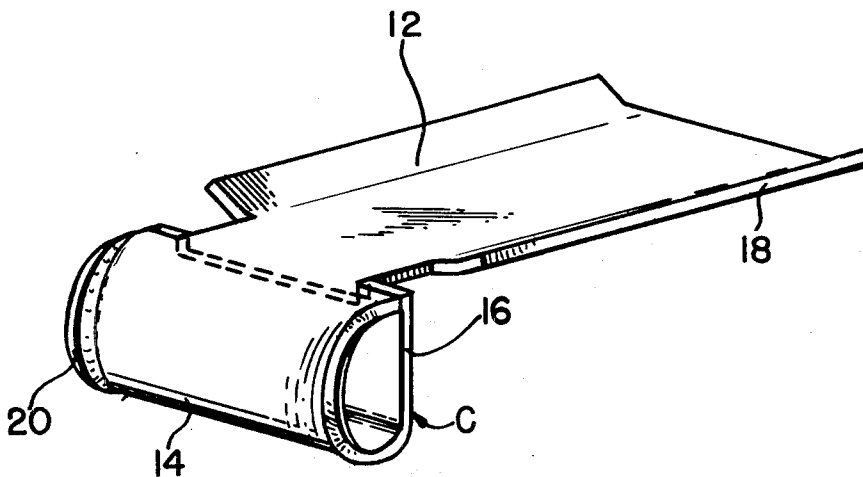
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[57]

ABSTRACT

A corner clip is formed of a single strip of metal into a horizontal leg which fits beneath the top run of a strap, a vertical leg, and a loop which fits beneath the side run of a strap. The loop and horizontal leg have lateral upturned ends for confining the strap in the clip. In the method the strap is spaced from the side of the bale of the loop of the clip and the lifting force is applied at each corner at an angle of substantially 45°.

5 Claims, 6 Drawing Figures



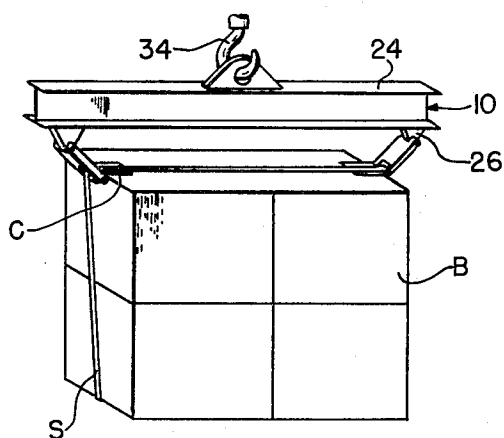


FIG-1

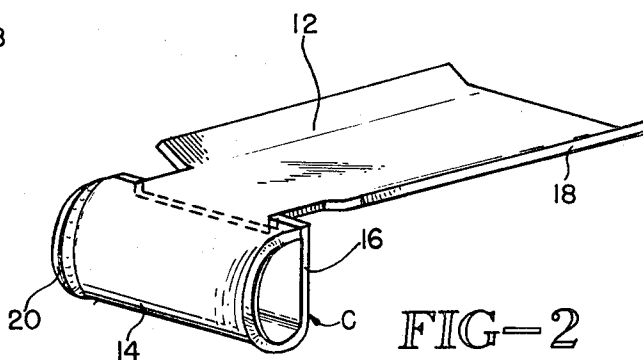


FIG-2

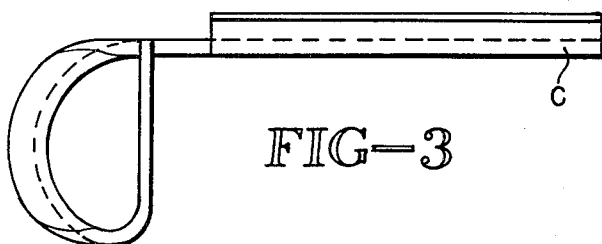


FIG-3

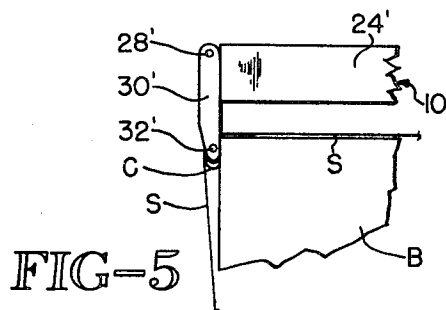


FIG-5

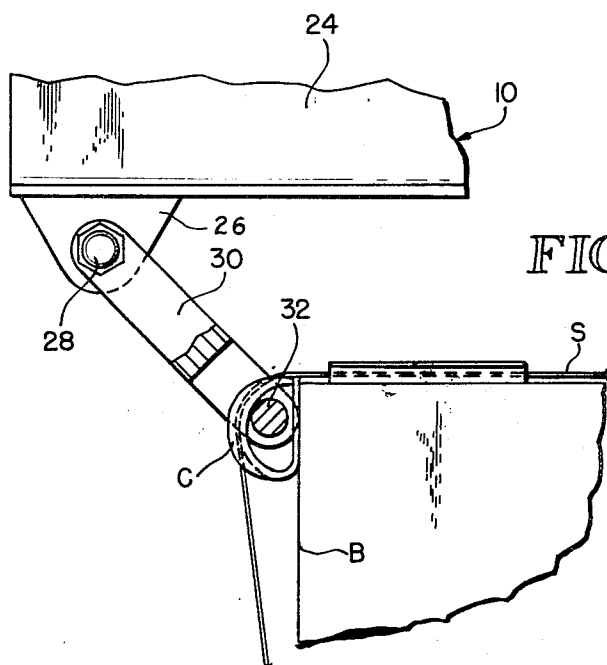


FIG-4

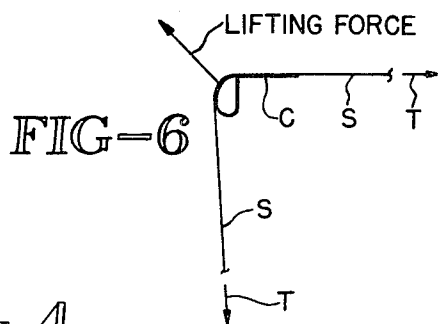


FIG-6

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CORNER CLIP AND BALE LIFTING METHOD

This is a continuation of application Ser. No. 836,281, filed June 25, 1969, and now abandoned.

BACKGROUND OF THE INVENTION**1. Field of the Invention**

This invention relates to apparatus and methods for handling cargo, and more particularly to the raising of loosely compacted cargo, such as pulp bales that cannot withstand high compressive forces, by lifting the straps of the cargo.

2. Description of the Prior Art

It has been customary in the past to raise strapped loads by positioning lifting arms either directly beneath the top strap of the load or beneath a supplementary basket strap secured to the top strap of the load. In some cases hoisting elements, such as shown in Smith U.S. Pat. No. 3,203,726, are interposed beneath the corner of the corner of the strap to prevent the strap from biting into the corner of the load. In all of the above, however, the lifting force applied to the strap is applied in such a manner that there exists in the top strap a tension force which must be resisted by the internal structure of the cargo. If the load is a pulp bale or similar cargo that cannot resist high compressive forces, the tension force in the top strap tends to crush the cargo. A second problem is that hoisting elements, when used, are caused to tilt or rotate thereby changing the geometry of the strap at the upper corners of the cargo and imposing on the top strap a tension force which exceeds the normal tension force of one-half the weight of the load. Obviously if the strap must be designed to carry more than is necessary then heavier and more expensive straps are required thus increasing the overall cost of transporting the cargo. Another disadvantage occurring from the use of prior art hoisting elements is that the lifting force has heretofore been applied through the hoisting elements which then pull on the strap. This requires that the hoisting elements be of extremely heavy-duty materials so as to withstand the tension loading applied to lift the cargo.

SUMMARY OF THE INVENTION

This invention pertains to a corner clip for use particularly with cargo not capable of withstanding high compressive loads but also usable with other types of cargo. The corner clip is provided with loop means which spaces the strap from the cargo so that lifting means may be inserted through the loop and thus beneath the strap for lifting the load. Lifting forces are applied to the strap rather than to the corner clip with the corner clip acting to space the strap from the cargo and as a bearing for the lifting means. The invention also pertains to a method of lifting strapped loads, particularly compressible loads such as pulp bales, by spacing the strap from the corners of the bales and then applying a lifting force to the strap outside of the vertical confines of the cargo and in an outward direction. Preferably the direction is at a 45° angle with respect to the horizontal. In this manner the geometry of the strap at the corner remains substantially unchanged during the lifting operation. Furthermore, tension forces within the top strap are transmitted to the lifting means rather than to the cargo and thus the tension loading in the top strap is kept to a minimum.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric of a bale being lifted by a method embodying the principles of the invention.

FIG. 2 is an isometric of a corner clip made according to the invention.

FIG. 3 is a side elevation of the corner clip.

FIG. 4 is an enlarged fragmentary elevation, with parts broken away for clarity, illustrating the use of a lifting link with the corner clip.

FIG. 5 is a fragmentary elevation of a modified form of lifting link in use with the corner clip.

FIG. 6 is a schematic diagram showing of FIG. 2 the forces acting on the strap and the direction of the lifting force acting on the clip.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As best shown in FIGS. 1, 4, and 6 the method of lifting a strapped load or cargo, such as a pulp bale B girded by a strap S, employs means, such as a corner clip C, which spaces the strap from the bale adjacent the top corners of the bale. After spacing the strap a lifting force is applied at each corner in an outward direction and outside of the vertical confines of the bale by a lifting mechanism 10. In the preferred form, this lifting force is applied at a 45° angle with respect to the horizontal, as shown in FIG. 6. The tension forces T within the top strap are transmitted to and reacted by the lifting mechanism 10 rather than by the bale. The geometry of the strap remains substantially unchanged at the upper corners of the bale resulting in tension forces T no greater than the minimum required to lift the bale B.

The corner clip C, which functions in the customary manner of distributing the strap pressure over a larger surface of the bale B, also serves in the instant invention to space the strap from the bale. Preferably the clip is formed from a single flat piece of metal and includes a horizontal leg 12, a loop 14 and a vertical leg 16. The lateral ends of the horizontal leg are upturned as at 18 and the lateral ends of the loop are outwardly turned as at 20 to retain the strap S on the corner clip.

One form of lifting mechanism shown in FIGS. 1 and 4 includes a beam 24 having longitudinally spaced ears 26. An upper pivot bolt 28 is secured to a pair of links 30 and is pivotally mounted in the ear 26. A lower pivot pin 32 that is quickly removable from the links 30 is passed through the loop 14. As the beam 24 is raised by a hoist 34 or the like the links 30 will tend to straighten and swing outward thus applying the lifting force in an outward direction at a substantially 45° angle.

In the embodiment shown in FIG. 5 the lifting mechanism 10' includes a beam 24' having upper pivot bolts 28' secured thereto. Sets of lifting links 30' are pivotally connected to the upper pivot bolts and lower pivot bolts 32' that are easily detachable are passed through the loops of the clip C. In this embodiment the links 30' are restrained from rotating inwardly over the bale B by the beam 24' so that the tension force in the top strap is again transmitted to and reacted by the beam rather than by the bale.

While the preferred embodiments of the invention have been illustrated and described, various changes and modifications may be made by one skilled in the art without departing from the invention. For example various types of strap, such as, round, oval, flat, rope etc, may be used. Accordingly, the appended claims are intended to cover all modifications and variations which fall within their scope.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A corner clip for transferring a lifting force from a load lifting device to a strap girding a load, which clip is adapted to extend around a corner of the load and along two sides thereof beneath the strap and to substantially space said strap from the load adjacent said corner comprising a first leg for extending from a corner of said load along one side thereof, said first leg having a load engaging surface and a strap engaging surface, a second leg rigidly secured to said first leg and extending substantially normal thereto for engagement with a second side of said load, said second leg having a load engaging surface joining the load engaging surface of said first leg, and a lifting member rigidly secured to said second leg and extending outwardly therefrom away from the load engaging surface thereof to form a closed loop with said second leg to receive the load lifting device, said lifting member having an outer surface for engagement with said strap to space said strap from said second leg and an inner surface engageable by said lifting device.

2. The corner clip defined by claim 1 wherein the outer surface of said lifting member and the strap engaging surface of said first leg form a continuous strap engaging surface around the corner of said load.

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3. The corner clip defined by claim 1 wherein said first leg includes a substantially flat central portion joining said lifting member outer surface and wherein said lifting member outer surface and said first leg include outturned lateral edges.

4. The corner clip defined by claim 1 wherein said first and second legs and said lifting member are integral.

5. The corner clip of claim 1 wherein said first and second legs and said endless closed loop are integral, with said first leg having a cutout portion for receiving one end of said second leg.

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