LIFTING HOOK FOR BOUND PACKAGES

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ABSTRACT

This is an eye hook having a handle on the back side of the shank for the manual engagement and disengagement of the point of the hook under a tensioned binding extending across the top of a bound package. The lifting portion of the hook presents a broad and curved lifting surface to support the binding without producing a sharp bend in the binding. The lifting surface is hardened and polished to avoid damage to the binding. A nose projects from the shank into close proximity with the point of the hook overhanging the binding and preventing accidental disengagement of the binding from the hook when lifting tension is relaxed.

9 Claims, 5 Drawing Figures
LIFTING HOOK FOR BOUND PACKAGES

BACKGROUND OF THE INVENTION

The invention relates to a manually engageable and disengageable lifting hook for lifting a bound package by its binding.

Conventional lifting hooks are unsuitable in various respects for the present purpose. They are difficult to engage and disengage quickly from the binding on the package. They are subject to accidental disengagement when the lifting tension is relaxed. They damage and weaken the binding on the package. Because of these deficiencies, conventional lifting hooks have been generally unsatisfactory.

It has heretofore been proposed to provide various types of accessory devices on the binding or to form a loose basket handle from an extra length of the binding on top of the package for lifting the package. Such expedients, however, have not been well received by the trade for reasons of safety, additional expense and the necessity to provide special lifting equipment.

Objects of the present invention are, therefore, to provide an improved lifting hook, to provide a lifting hook for a bound package which does not damage the binding material, to provide a lifting hook which does not require accessory devices or a loose basket handle on the binding, to provide a lifting hook having a broad, curved hardened and polished surface to support a conventional binding without creating a sharp bend in the binding, to provide a lifting hook having a manipulating handle for the quick and easy engagement and disengagement from the binding on a bound package, to provide a lifting hook which does not become accidentally disengaged from the binding when the lifting tension is relaxed, and to provide a lifting hook which is safe for the workman involved.

SUMMARY OF THE INVENTION

The present lifting hook has a broad flat shank with a lifting eye in its upper end. Projecting from the back of the shank is an elongated handle providing leverage for forcing the point of the hook under a tensioned binding on the top of a bound package and for disengaging the hook from the binding. The lifting surface of the hook is broad and curved to provide a wide area of support for the binding without creating a sharp bend in the binding. The lifting surface is hardened and polished to avoid damage to the binding material. A retaining nose projects from the shank into close proximity with the point of the hook to prevent accidental disengagement of the hook from the binding when lifting tension is relaxed.

The invention will be better understood and additional objects and advantages will become apparent from the following description of the preferred embodiment illustrated in the accompanying drawings. Various changes may be made, however, in the details of construction and arrangement of parts and certain features may be used without others. All such modifications within the scope of the appended claims are included in the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a lifting hook embodying the invention, in operative position;

FIG. 2 is a side elevation view illustrating the operation of engaging the point of the hook under a tensioned binding on top of a package;

FIG. 3 is a view similar to FIG. 2 showing the hook in lifting position;

FIG. 4 is a view on the line 4—4 in FIG. 3; and FIG. 5 is an elevation view showing the complete apparatus for lifting a unitized package.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The hook 10 has a broad flat shank 11 with a lifting eye 12 in its upper end. Welded on the back of shank 11 is an elongated handle 13. On the lower end of shank 11 is a hook portion 15 having a broad supporting surface 16 which is curved both longitudinally and transversely of the hook. The point 17 is rounded transversely and of tapered wedge shape in thickness. The hook terminates in a thin and rounded end or point 17.

Overhanging the supporting surface 16 is a nose member 20 projecting forward from the front side of shank 11 and having a downturned end 21 approaching in close proximity to the end of point 17 of the hook. Nose member 20 is equidistant from opposite sides of the hook, in the mid plane of hook portion 15.

The preferred embodiment herein illustrated is designed for lifting a unit package P weighing approximately 4,000 pounds and encompassed by a binding 25 which comprises a plurality of round wires. However, the present hook is also adapted to lift a unit package having other types of bindings such as, for example, metal straps. As shown in FIG. 5, each unit package P comprises a plurality of bundles B each having its own bindings 26.

By way of example, in the present instance the bundles B are bales of paper pulp individually wrapped in sheets of paper, making a somewhat resilient unit package P wherein the binding 25 is tensioned sufficiently to indent itself to some extent into the surface of the package as indicated by the indentation at 27 in FIG. 2. This condition presents a problem in engaging the hook under the binding 25 and in disengaging the hook, with facility and safety.

In order to handle the type of unit package described above, the present hook 10 incorporates a number of unique features and relationships which are subject to variation depending on the nature of the unit package P and the type of binding 25 which may be involved in any particular instance. In the present embodiment, for example, the shank portion 11 and hook portion 15 are made from a single flat bar of steel approximately 11 inches long, 3 inches wide and ½ inch thick. The 3 inch width dimension is indicated at W in FIG. 4. The curved supporting surface 16 and thin rounded end 17 are formed by grinding operations on one end of the steel bar, followed by buffing. The transverse curvature of surface 16 is preferably a circular arc having approximately a 34 inch radius as viewed in FIG. 4.

The hook portion 15 is formed by bending it in an approximately semi-circular arc having a center at point 30 in FIG. 3 and an inside radius of approximately 1½ inches as indicated at R. This produces an inside diameter D of approximately 2½ inches which is considerably less than the 3 inch width dimension W of supporting surface 16 in FIG. 4. A further grinding operation rounds and smooths the contours of point 17, and eye 12 is drilled.
Following the structural operations and buffing as described above, the hook is given a heat treatment to provide an extremely hard surface and it is then shot blasted to remove scale. Then the nose member 20 is welded in position on shank 11 just above center point 30. For the present purpose with the particular type of unit package P and binding 25 herein illustrated by way of example, the downturned end 21 of nose element 20 extends below the point 17 of the hook a distance of approximately § inch and provides a gap of approximately § inch at 31 between nose part 21 and hook point 17. In a final welding operation the pipe handle 13 is welded on the back of shank 11.

As thus described, the parts are dimensioned and proportioned so that when the hook is loaded as shown in FIG. 3, the shank 11 inclines at an angle of approximately 23° from the vertical, placing point 30 on the vertical line 32 between eye 12 and the center of the load on surface 16. Preferably, handle 13 is inclined downward approximately a corresponding angle of 23° from a perpendicular position on shank 11 whereby the handle is horizontal when the hook is under lifting tension.

The foregoing dimensions may be scaled up or down to make larger or smaller hooks while maintaining the described relationships. Obviously in any case the gap 31 must be dimensioned to freely admit the binding 25.

FIG. 2 shows how the hook is engaged under binding 25. Point 17 extends approximately parallel with shank 11 whereby when shank 11 is placed in horizontal position, point 17 may be projected into the depression 27 and forced under binding 25, the gap 31 being only slightly greater than the thickness of the binding. Then by pressing down on handle 13 and rotating the hook counterclockwise as indicated by arrow 35, the hook is placed approximately in its lifting position shown in FIG. 3. In such position the nose member 20 acts as a keeper to prevent accidental disengagement of the hook from the binding when the parts are not under lifting tension.

The hook is disengaged from binding 25 by reversing the operations just described. After lifting tension has been relaxed, handle 13 is raised from its FIG. 3 position to rotate the hook clockwise to its FIG. 2 position whereupon the point of the hook may be readily moved out from under binding 25.

FIG. 5 shows a complete apparatus for lifting a single unitized package P. The eye 12 of each hook 10 is supported by a shackle 40 on a swivel 41. Swivel 41 is supported by a pin 42 on a collar 43 on one end of an adjustable length spreader bar 45. Shackle 40 and swivel 41 form a short, flexible linkage for hook 10.

Spreader bar 45 comprises outer and inner telescoping tubular members 46 and 47. Length adjustment is effected by a pin 48 received in holes in tube 46 and inserted in selected diametral holes spaced apart longitudinally in tube 47. Pin 48 is secured by a nut 49, the nut and the head of the pin being equipped with rings as shown for quick adjustment without tools.

Thus, one of the collars 43 is mounted on the outer end of tube 46 and the other collar 43 is mounted on the outer end of tube 47. Collars 43 are confined between end flanges 51 and another pair of collars 52 clamped in fixed positions on the tubes 46 and 47, respectively. Shackles 53 on the collars 52 provide connection with a pair of wire ropes 54 which are suspended from a lifting ring 55.

In preparing to pick up the unitized package P in FIG. 5, the spreader bar 45 is lowered to a position slightly above the top of the package and oriented parallel with the portion of binding 25 extending across the top of the package. Binding 25 is in a vertical plane through the center of gravity of the package whereby the package is in balance and stable equilibrium when lifted by the binding. The length of the spreader bar is adjusted by means 48, 49 to approximately the width of package P, placing the lifting collars 43 adjacent the sides of the package. Then, when the hooks 10 are engaged with binding 25 and the ring 55 is lifted, the hooks 10 will draw the binding 25 upward away from the top of the package.

As the package is lifted away from its underneath support, the flexible linkages 40, 41 assume inclined positions with the collars 43 tending to pull the hooks outward toward the sides of the package while the uplifted portion of binding 25 tends to move the hooks away from the sides of the package. The linkages 40, 41 are relatively short in relation to the width of package P whereby the hooks 10 are restrained from assuming positions on the binding 25 very far from the sides of the package.

The horizontal components of the forces acting on hooks 10 become balanced and stabilize the hooks in the approximate positions shown. This causes the binding 25 to bend in a gradual curve over the curved supporting surface 16 on the hooks without introducing a sharp bend at any point in the binding. The extremely hard and smoothly polished condition of supporting surfaces 16 allows the hooks to freely seek and assume the equilibrium positions just described whereby lifting of the package is accomplished in a safe and stable manner without damage to the binding.

In practice, the present suspension system is expanded to lift simultaneously a plurality of the unit packages P. For this purpose a plurality of lifting rings 55 are connected by shackles at intervals along an upper spreader bar, not shown, extending transversely above spreader bar 45 and other spreader bars parallel with the spreader bar 45, each lifting a similar unit package P. In this way, either two, three or four unit packages P may be lifted and handled in a single operation.

The several packages are disposed close together in side by side relation thereby stabilizing each other during the lift. The improved hooks 10 provide for quick and safe engagement and disengagement with the binding 25 on each unit package.

I claim:

1. A lifting hook for engagement under a tensioned binding on a package comprising a shank portion having a lifting connection in one end thereof, a hook portion on the other end of said shank portion disposed in a plane through said shank portion and terminating in a point of tapered thickness, a nose member projecting from the hook side of said shank in said plane of the hook and having an end portion spaced a short distance inside said point to provide a narrow gap for the admission of said binding so that said point may be wedged between said tensioned binding and the package to hook the binding while said plane of the hook is oriented at right angles to the direction of the binding, and a handle rigidly mounted on said shank portion for applying thrust to said point, said hook portion having a broad, transversely curved binding supporting surface for lifting the package, said hook portion being curved
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away from said shank portion in an arc of approximately 180°, the width of said binding supporting surface exceeding the diameter of said arc.

2. A hook as defined in claim 1, said handle comprising a straight bar connected at one end with said shank.

3. A hook as defined in claim 2, said handle being inclined away from said lifting connection at an angle in excess of 90° relative to said shank.

4. A hook as defined in claim 1, said binding supporting surface being hardened and polished by heat treatment and buffing.

5. A hook as defined in claim 1, said shank and hook portions being formed from a flat metal bar.

6. A hook as defined in claim 1, said lifting connection being in such position on said shank as to cause the center of said arc of the hook to lie on a vertical line through said lifting connection when the hook is loaded.

7. A hook as defined in claim 1 including a short, flexible linkage connected to said lifting connection, a second similar hook and flexible linkage, an adjustable length spreader bar connected at its ends to said linkages, a lifting ring, and a pair of wire ropes each connected at one end with said lifting ring, the opposite ends of said ropes being connected with the ends of said spreader bar.

8. A hook as defined in claim 1, said handle being mounted on the opposite side of said shank portion.

9. A lifting hook for bound packages comprising a shank portion and a hook portion formed from a flat metal bar, said hook portion curving away from the lower end of said shank portion in an arc of approximately 180° and terminating in a wedging point of tapered thickness, said hook portion having a broad, transversely curved binding supporting surface of greater width than the diameter of said arc, a nose member extending from one side of said shank portion in the plane of said hook portion approximately on the diameter of said arc and terminating a short distance inside the point of said hook portion leaving a narrow gap for the engagement and disengagement of a binding on a package, and a straight handle projecting rigidly from the opposite side of said shank portion for effecting said engagement and disengagement of the binding.

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