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BALE UNLOADING CLAMP DEVICE

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2 Sheets-Sheet 1

FIG. 1

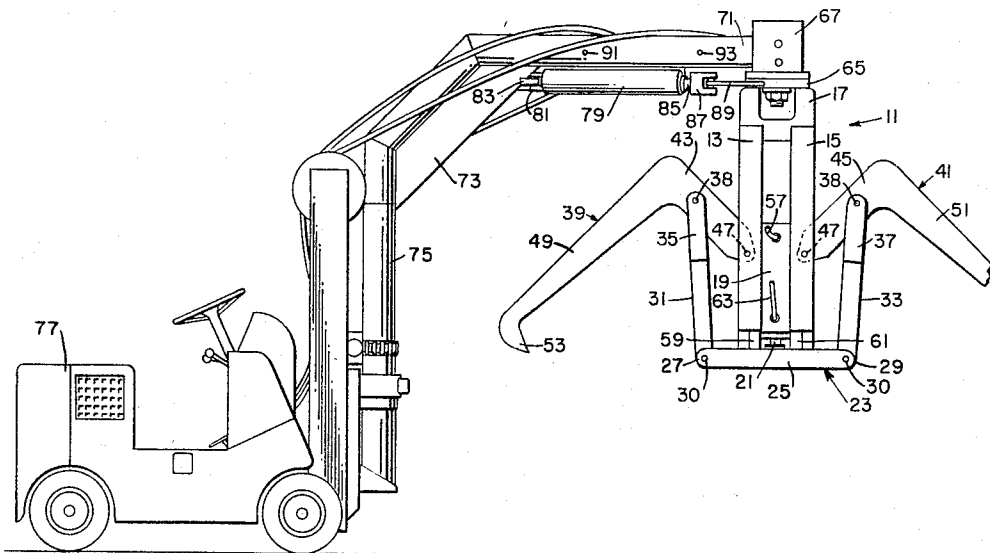


FIG. 2

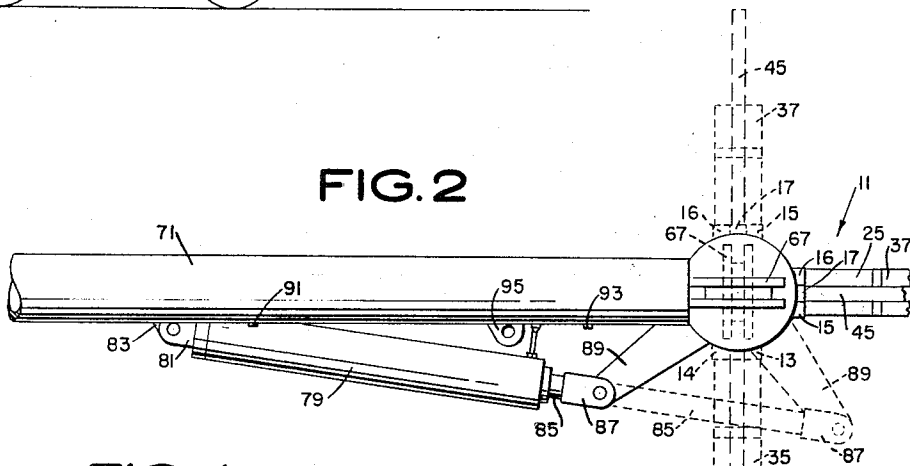
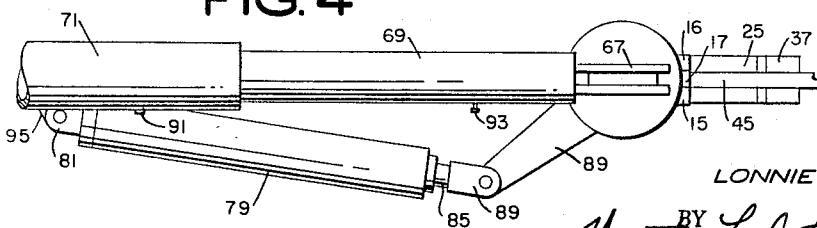


FIG. 4



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BALE UNLOADING CLAMP DEVICE
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ABSTRACT OF THE DISCLOSURE

A material handling apparatus for mounting upon fork lift and similar type warehouse trucks, which includes a telescoping boom, material engaging tongs suspended from the boom, and motive means for operating the tongs to engage and release material to be handled.

This invention relates to new and useful improvements in clamping devices, and more particularly to clamping devices adapted for use with conventional material handling machines for loading, unloading and transferring baled objects, such as cotton, fibre, synthetic materials and the like.

There have been heretofore numerous devices provided for handling baled products, but these prior devices have required the use of two or more operators and were further restricted in design to perform a singular function. These prior devices have been additionally limited in scope and operation because of their dependence upon more than one operator. The novelty of the present invention is further enhanced by its adaptability for use with existing material handling devices.

The principal object of the present invention is to provide bale clamping means adapted for use with conventional material handling devices.

Another object of the present invention is to provide clamping means for the transporting of baled materials such as cotton or the like.

A further object of the present invention is to provide hydraulic means for the operation of bale clamping devices.

Another object of the present invention is to provide a bale clamping device for breaking out a unit of baled material from a stack for purposes of inspection and identification.

A further object of the present invention is to provide a bale clamping device suspended from an adjustable boom for use in loading and unloading baled materials.

Another object of the present invention is to provide a bale clamping device employing hydraulic means for the raising and lowering of cotton bales; and

A further object of the present invention is to generally improve the design, construction and efficiency of bale clamping devices.

The means by which the foregoing and other objects of the present invention are accomplished and the manner of their accomplishment will be readily understood from the following specification upon reference to the drawings, in which:

FIG. 1 is a side elevational view of the bale clamping device of the present invention suspended from a boom carried by a conventional material handling truck, with the clamp in open position.

FIG. 2 is an enlarged fragmentary top plan view of the device described in FIG. 1 with the device rotated approximately 90 degrees indicated in dotted lines.

FIG. 3 is an enlarged front elevational view of the device of FIG. 2 with parts broken away for purposes of clarity.

FIG. 4 is an enlarged fragmentary side elevational view of the bale clamping device with the clamps indicated in clamping condition.

Referring now to the drawings in which the various

parts are indicated by numerals, the present invention comprises a bale clamp 11, provided with a plurality of substantially parallel, vertically disposed frame members 13, 14, 15, 16, commonly interconnected at their upper termini by a substantially U-shaped connector 17. The bale clamp 11 is further provided with hydraulic means 19 substantially vertically maintained within the frame members 13, 14, 15, 16, and centrally rigidly secured therebetween. The hydraulic means 19 is provided with a downwardly extending reciprocable piston 21 drivingly attached at its lower end to a bar 23, in substantial perpendicularity with the piston 21. The bar 23 carried by the piston 21 comprises a center section 25 and a pair of opposite ends 27, 29, the ends 27, 29 each being further provided with a pin 30 projecting through the bar ends for the pivotal mounting thereon of a pair of substantially upright toggle arms 31, 33, pins 30 projecting through the lower ends of the respective toggle arms.

Formed in the upper ends of the toggle arms 31, 33 and integrally attached thereto are a pair of bifurcated members 35, 37, provided with pins 38 upon which are swingably mounted the angularly defined tongs 39, 41. It will be seen, upon reference to the drawings, and more particularly to FIGS. 1 and 3 of the drawings, that the shorter arm portion 43 of the tong 39 is pivotally mounted between the frames 13, 14, and the arm 45 of the tong 41 is similarly pivotally mounted between the frame members 15, 16. The tongs 39, 41 are pivotally secured within the frame members 13, 14 and 15, 16 by the pins 47. The tongs 39, 41 further comprise a pair of substantially convergent downwardly extending legs 49, 51 provided at their distal free ends with inwardly disposed claws 53, 55, somewhat below the bar 23.

It will be noted upon reference to FIG. 5 of the drawings that as the hydraulic means 19 are activated by the introduction therein of a suitable hydraulic fluid through the pipe 57 into the upper end of the hydraulic means 19 to propel the piston 21 in a downwardly direction, the bar 23 attached to and carried by the piston 21 is driven downwardly away from the frame members 13, 14, 15, 16. The toggle arms 31, 33 linkingly interconnected between the bar 23 and the tongs 39, 41, and urged downwardly by the bar 23 and the piston 21, moves the tongs 39, 41 pivotally about the pins 47 in such manner to bring the respective claws 53, 55 in a depending substantially arcuate path toward the vertical axis of the frame members 13, 14, 15, 16, thus engaging the claws 53, 55 with a bale B of cotton or like material. To maintain the arcuate path of the tongs 39, 41 in a substantially planar condition, the bale clamp 11 is further provided with a pair of vertical guide struts 59, 61 attached to the bar 23 and interposed in substantial slidable parallel relation within the frame members 13, 14, 15, 16.

When the piston 21 is retracted in the hydraulic means 19 by the interjection of hydraulic fluid into the hydraulic means 19 through the line 63 lifting the bar 23, the guide struts 59, 61 and the toggle arms 31, 33 upwardly toward the frame members 13, 14, 15, 16, the tongs 39, 41 are urged into an outward arcuate manner to release the bale B.

The top of the U-shaped connector 17 of the bale clamp 11 is rigidly attached to the under surface of a rotatable disc 65 subjacent a similar fixed disc carried by a bracket 67 which is secured to the outer end of a boom 69. The boom 69 is slidably contained within a slightly larger substantially cylindrical horizontally disposed boom 71, connected to an angular brace 73 integrally attached to and supported by a vertical column 75 to further complete a gibbet-like structure mounted upon suitable conventional carrier means such as a material handling truck 77.

The device of the present invention further comprises an hydraulic cylinder 79 provided with a clevis 81 hingedly attached by suitable pin means to a tab 83 affixed to the depending skirt of the angular brace 73. A piston 85 is encased within the hydraulic cylinder 79 and extends outwardly therefrom somewhat, into rigid attachment with a clevis 87 pivotally connected with a lever 89 securely joined to the rotatable disc 65 as by welding or similar means.

It will thus be seen upon reference to the drawings that when hydraulic fluid is introduced into the rearmost portion of the hydraulic cylinder 79 the piston 83 is driven outwardly therefrom urging the lever 87 forwardly to rotate the disc 65 and the attached bale clamp 11 in a substantially counter-clockwise direction to facilitate the positioning of a bale of cotton or like material carried by the tongs 39, 41 of the bale clamp 11. Conversely, when it is desired to rotate the bale in a clockwise direction, hydraulic fluid is introduced into the forward end of the hydraulic cylinder 79 retracting the piston 85 inwardly therein to rotate, through the connecting clevis 87, the lever 89, the disc 65, and the attached bale clamp 11.

When it is desired to load or unload baled material from a platform or truck bed of a length greater than the distance between the central axis of the bale clamp 11 and the upright column 75 the slidable boom 69 may be projected outwardly through the enveloping cylindrical boom 71 by disconnecting the clevis 81 from the tab 83 and removing the lock pins 91, 93 from the boom 71. The slidable boom 69, substantially coextensive in length with the enveloping cylindrical boom 71 may be extended outwardly away from the boom 71 a predetermined distance and anchored in position by replacing the lock pin 91 in the hole vacated by the pin 93 and attaching the clevis 81 to the tab 95, the tab 95 in axial alinement with the tab 83 spaced forwardly away therefrom and rigidly secured to the outer circumferential surface of the cylindrical boom 71.

The bale clamp 11, the booms 69, 71, the brace member 73 and the upright column 75 may be rotatably positioned by conventional hydraulically driven gear means attached to the upright column 75.

I claim:

1. Means for handling material in warehouses and the like comprising mobile truck means, material engaging means mounted to said truck means, hydraulic motive means powered from said truck means connected to said engaging means, in which said engaging means comprises
 - (A) boom means carried by and extending from said truck means,
 - (B) a framework fixed at its upper end to said boom means substantially at the distal end of said boom means and depending therebelow
 - (1) said framework comprising a rigid structure of upright members,
 - (C) a pair of tong members, each said tong member comprising
 - (1) a short arm section pivoted to said framework below the upper end thereof,
 - (2) a long arm section angularly joined to the outer end of said short arm section and extending from the joint with said short arm section,
 - (3) said long arm section having at its end remote from said joint an inturned claw for engaging material to be handled,

- (D) a tong operating system comprising
 - (1) a hydraulic cylinder and piston
 - (a) supported within said framework,
 - (b) including an extending piston rod,
 - (c) operatively connected to said hydraulic motive means for reciprocating movement of said rod relative to said framework,
 - (2) a cross bar
 - (a) rigidly fixed to the end of said rod and reciprocable therewith,
 - (b) extending oppositely from said rod in perpendicular relation to said rod,
 - (c) the outer ends of said bar extending laterally outwardly beyond said framework,
 - (3) a pair of parallel guide struts slidably supported in said framework, said guide struts being
 - (a) disposed substantially parallel to said rod and
 - (b) rigidly connected at their lower ends to said bar inwardly from the outer ends of said bar,
 - (c) maintaining said bar stably relative to said rod,
 - (4) a pair of links, forming with said bar, tong-moving toggle means, each said link being
 - (a) pivoted to an outer end of said bar outwardly from said framework,
 - (b) extending angularly away from said bar to said tong members,
 - (c) pivoted to the short arm sections respectively of said tong members adjacent said joints between said short arm sections and said long arm sections between said joints and said framework,
 - (5) whereby upon shift of said bar under operation of said hydraulic cylinder and piston said links are effective to urge rotational movement of said tong members about their pivotal connection to said framework toward and away from material engaging condition.

2. Means in accordance with claim 1, in which said framework is rotatably connected to said boom.

3. Means in accordance with claim 2, in which hydraulically powered means are mounted on said boom and coupled to said framework for controlling and effecting rotation of said framework.

4. Means in accordance with claim 1, in which said boom means comprises telescoping extensible and retractible means and power means for shifting the position of said boom means to effect location of said framework and the means supported thereby.

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