United States Patent [19]

Dalglish

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[54] **ROLL LIFTER**

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[52] **U.S. Cl.**.....**214/652,** 214/1 Q, 214/653, 214/658, 214/DIG. 4

[51] **Int. Cl.**.....**B66c 1/54**

[58] **Field of Search**.....214/653, 658, 651, 214/652, DIG. 4, DIG. 3, DIG. 1, 620, 750, 147 R, 1 Q

[56] **References Cited**

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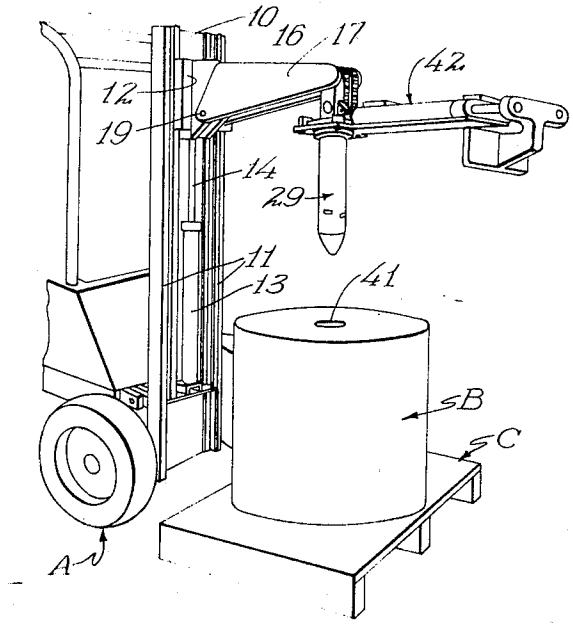
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Assistant Examiner—George F. Abraham
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[57] **ABSTRACT**

Apparatus to lift a roll of material or other object having a central opening comprising a probe designed to engage the inside walls of the center aperture of the roll which probe is pivotally mounted on an articulated bracket. The probe is held in position by a chain passing over the articulated bracket. As the bracket is pivoted upwards the probe is caused to pivot downward into a vertical position. In another embodiment a hydraulically actuated clamp is incorporated onto the probe so as to grasp the roll from the outside in conjunction with the internally grasping probe.

10 Claims, 4 Drawing Figures



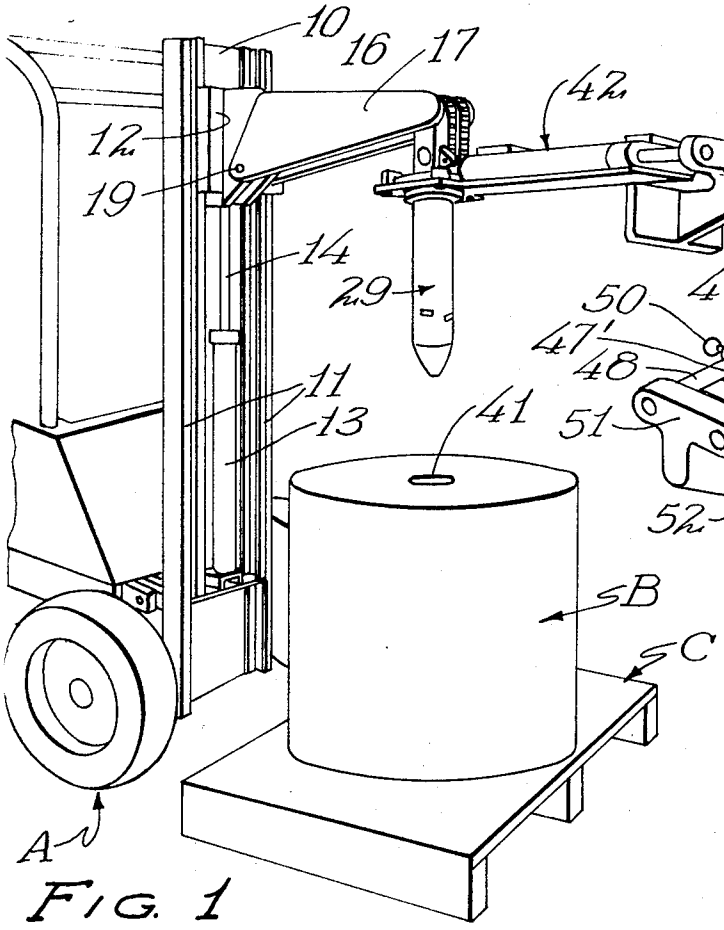


FIG. 1

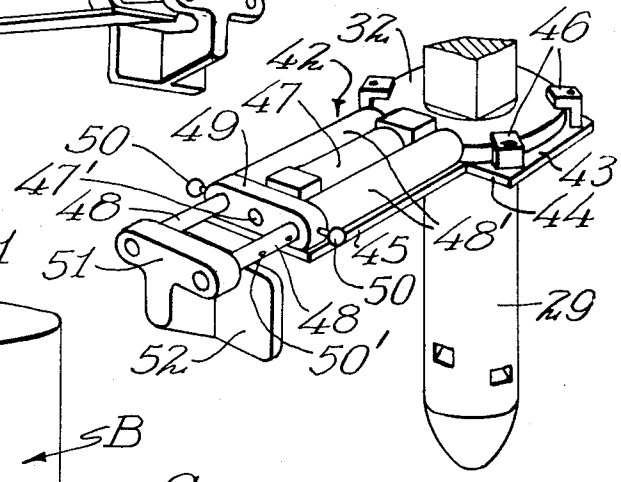


FIG. 4

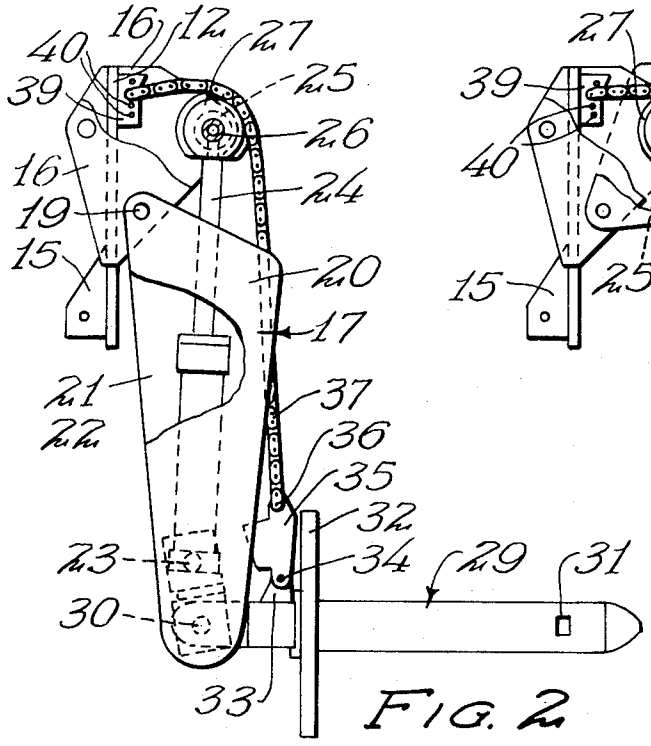


FIG. 2

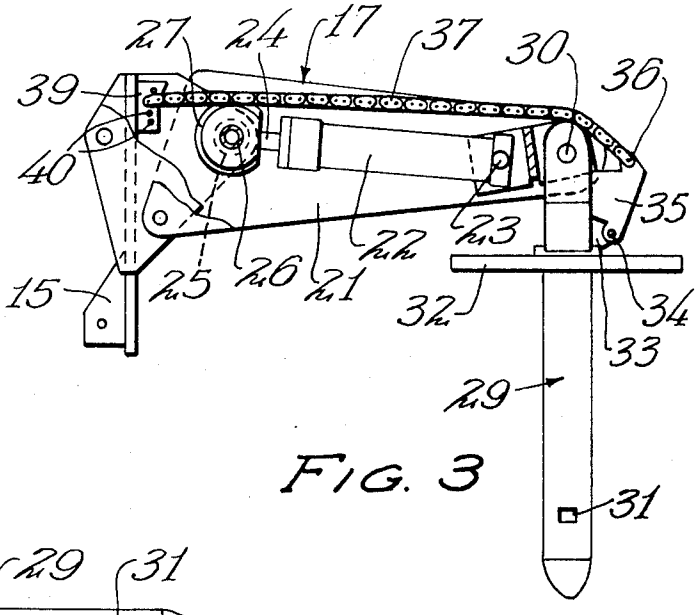


FIG. 3

ROLL LIFTER

BACKGROUND OF THE INVENTION

The present invention is an improvement relating to center lifters designed to handle rolls of paper, paperboard, foil, plastic, coils of wire or cable or other such materials by engaging the rolls from the center thereof. Rolls of paper and the like should be stored with their axes in a vertical position in order to prevent the heavy rolls from getting out of round which happens when they are rested upon their periphery for any length of time. Also, in a vertical position there is no tendency for the roll to move in any direction and the flat ends of the roll permit several rolls to be stacked thus conserving space. One prior art approach for handling the rolls and lifting them into and out of the vertical position involves a center probe which is inserted into the center aperture of the roll. Expansible jaws in the probe operate to grasp the inside walls of the aperture of the roll providing a firm grip thereon. For an example of such a probe reference should be had to U.S. Pat. No. 3,423,120 relating to "Center Lifts" issued Jan. 21, 1969 to the present inventor.

Although center lift probes of this type work well, providing an excellent means for handling rolls of material, spools of material, or the like, a need has been felt in the art for a compact mechanism employing such a center probe lift which can engage and lift the roll in either a horizontal or vertical position. My invention accomplishes this objective.

SUMMARY OF THE INVENTION

Briefly, the present invention contemplates mounting a center lift probe pivotally on a member which is in turn designed to pivot on a bracket which bracket may be connected to any suitable lifting device. The member is pivotal from a generally vertical position to a generally horizontal position. The member is pivoted relative to the bracket by means of a hydraulic cylinder. A chain extends from the bracket over the pivot point of the hydraulic cylinder and down to the center lift probe so as to hold the probe in a horizontal position in said generally vertical position of the member. When the member is pivoted up into said generally horizontal position the chain length is such as to allow the probe to pivot downward into a vertical position. In this way the probe can be inserted into either horizontal or vertical rolls. Since a device of this sort can handle rolls of any diameter, another problem has arisen in the prior art in that the larger rolls, when formed of paper or sheet material, have a tendency to telescope or release the outer layers of such material one by one when the roll is held from the center in a vertical position. To avoid this difficulty the instant invention may be provided with a hydraulically actuated clamp extending out to one side of the probe which is adjustable so as to engage the outside edge of a variety of sizes of rolls and get a better grip on the roll. At the same time the clamp prevents any telescoping action. It may therefore be seen that it is an object of my invention to provide an improved and compact roll lifting device for rolls of sheet material, spools of wire or cable, as well as for tubing or any other object having an aperture into which the center probe may be inserted. Further objects and advantages will become apparent upon consideration of the following description and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic perspective view showing how the present invention may be used on a small lift truck. This embodiment is shown only by way of example since the present invention may be used in cooperation with any mechanism designed to lift it up and down.

FIG. 2 is a partially cut-away side view of just the articulated linkage between the lifting mechanism and the probe showing the probe in a horizontal position.

FIG. 3 is another partially cut-away side view of the apparatus of FIG. 2 but showing this articulated member in the horizontal position with the probe extending vertically downward.

FIG. 4 is a perspective view of a hydraulic clamp adapted to be used in conjunction with the center lift probe of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. 1 of the drawings indicates an industrial lift truck A of the type often used with lift forks to move pallets of material from one place to another. The forward end of the truck A is provided with a vertical mast **10** including forwardly directed slides **11** which support a vertically slideable bracket **12.** The bracket **12** is interengaged with the mast **10** in any suitable manner and is moved vertically of the mast by means of a cylinder **13** including a piston (not illustrated) which is connected to a piston rod **14** pivoted to the bracket **12** to raise and lower the same. A lug **15** projects downwardly from the bracket **12** to which the piston rod **14** may be secured.

As indicated in the drawings, the bracket **12** includes a pair of spaced plates **16** which extend forwardly from the bracket in spaced parallel relation. An arm which is indicated in general by the numeral **17** is pivotally connected by the pivot **19** between the bracket plates **16.** The arm **17** includes generally triangular side plates **20** and **21.** The plates **20** and **21** are held in spaced parallel relation by any suitable means.

A cylinder **22** has one end pivotally connected at **23** to the arm **17,** the axis of the pivot **23** extending normally to the surfaces of the arm sides **20** and **21.** A piston in the cylinder **22** is connected to a piston rod **24** provided at its extremity to a bearing **25** encircling a shaft **26** extending normally to the surfaces of the bracket plates **16.** The bearing **25** supports a sprocket or pulley or bearing block **27** also encircling the shaft **26** for a purpose which will be described.

A center lift element **29** is pivotally connected at **30** to the sides **20** and **21** of the arm **17** on an axis parallel to the axes of the pivots **23** and **26.** The center lift element **29** is provided with jaws **31** which are engageable with the inner surface of the hollow roll or with the inner surface of a core extending through the roll. A flange **32** encircles the center lift member **29** on a plane normal to the axis of the lift.

One or more ears **33** are provided on the center lift **29** near the pivoted end thereof. The ear or ears **33** is connected at **34** to a stabilizing link **35** which, in turn, is connected at **36** to a chain **37.** The chain **37** extends over the bearing block **27** and is dead ended at a bracket plate **39** which is between the bracket side plates **16.** The bracket plate **39** is provided with a plurality of apertures **40** extending therethrough and to which the end of the chain may be anchored. The an-

chorage of the chain to one or another of the apertures 40 provides a slight adjustment in the length of the chain. As will be seen from a comparison of FIGS. 2 and 3 of the drawings, when the piston rod 24 in the cylinder 23 is fully extended, the arm 17 is in a substantially vertical position with the pivot 30 of the center lift element 29 almost directly below the axis of the pivot shaft 26, and the center lift element extending horizontally. However, as the piston rod 24 is contracted into the cylinder 22, the chain 37 straightens out to a considerable extent, allowing the center lift element 29 to swing down into a vertical position. In this position, the stabilizing link 35 engages the surface of the upper end of the center lift element, holding this element in vertical position.

Thus it will be seen that as the arm 17 is swung from a vertical position to a horizontal position, the center lift element simultaneously swings from a horizontal position to a vertical position. Similarly, when the arm 17 swings from the position shown in FIG. 3 to the position shown in FIG. 2, the center lift element is moved from the vertical position to a horizontal position. Thus it will be seen that once the center lift element 29 is engaged in the center opening 41 of the roll B and engaged with the walls of this center opening, the roll B may be carried with its axis vertical or horizontal, and may be positioned on a suitable support such as the pallet C either resting upon its side or with its axis vertical as illustrated.

As is perhaps best illustrated in FIG. 4 of the drawings, a clamping means which is indicated in general by the numeral 42 may be attached to the center lift flange 32. The clamping unit 42 is provided with a mounting plate 43 including an end portion 44 and the radially extending arm 45 extending therefrom. The plate portion 44 is attached to the flange 32 by clamps such as 46 or other suitable means.

The plate 45 supports a cylinder 47 including a piston rod 47 connected to a transverse connecting member 49. The movement of the member 49 is guided by a pair of guide rods 48 slideably supported by bearings 48' mounted on the plate 45 on opposite sides of cylinder 47'. The guide rods support a connecting member 51 of a clamp 52. The cross member 51 is adjustably connected to the guide rods 48 by spring actuated pins 50 on the bearings 48' and engageable into spaced apertures 50' in the guide rods 48. The clamp 52 may have a flat inner surface opposing the center lift member 29 or it may be concave in horizontal section so as to fit against the roll B. The clamp 52 may clamp a portion of the roll B between the clamp and the center lift element 29 so as to prevent any chance of telescoping the various layers of the roll.

As will be seen, the center lift may engage the roll in a vertical or horizontal position, may carry it in either position, and may deposit it in either position. If desired during transportion, the roll may be clamped by the clamp 52.

In accordance with the Patent Office Statutes, I have described the principles of construction and operation of my ROLL LIFTER, and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that changes may be made within the scope of the following claims without departing from the spirit of my invention

I claim:

1. An apparatus for engaging and lifting rolls of material in either a vertical or horizontal position comprising:

a vertical lifting means;

bracket means adapted to be lifted by said vertical lifting means;

an arm pivoted at a first end on said bracket means;

a hydraulic cylinder between said bracket means and the second end of said arm;

a probe with means therein adapted to engage the inside walls of the center of the roll of material, said probe pivoted at the second end of said arm;

a flexible connecting means extending from said bracket means over a guide bearing to said probe so as to hold said probe in a horizontal position when said arm is pivoted downward and in a downward position when said arm is pivoted to a horizontal position.

2. The apparatus of claim 1 in which said guide bearing comprises a generally round bearing block pivoted about the point at which said hydraulic cylinder is mounted to said bracket means.

3. The apparatus of claim 2 in which said connecting means comprises a chain connected between an adjustment block on the bracket means and a bracket on said probe.

4. The apparatus of claim 1 including a hydraulically actuated clamp mounted and extending out from the probe to engage the outside of said roll of material in conjunction with said probe engaging the center of the roll.

5. The apparatus of claim 3 including a hydraulically actuated clamp mounted and extending out from the probe to engage the outside of said roll of material in conjunction with said probe engaging the center of the roll.

6. The apparatus of claim 5 in which said arm comprises a pair of members, said hydraulic cylinder being mounted between said pair of members and said chain passing generally between said pair of members.

7. The structure of claim 1 and in which the hydraulic cylinder is connected to said bracket means and to said second end of said arm on parallel axes, and said first end of said arm is pivoted on said bracket on an axis parallel to said parallel axes.

8. The structure of claim 7 and in which the axis connecting said first end of said arm is connected to said bracket at a point substantially below the axis connecting said cylinder to said bracket.

9. The structure of claim 8 and in which said axis connecting said cylinder to said bracket is farther from said vertical lifting means than said axis connecting said first end of said arm to said bracket.

10. The structure of claim 1 and including a stabilizing link pivotally connecting said flexible connecting means to said probe, said stabilizing link engaging the upper end of said probe when said arm is pivoted to a horizontal position.

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