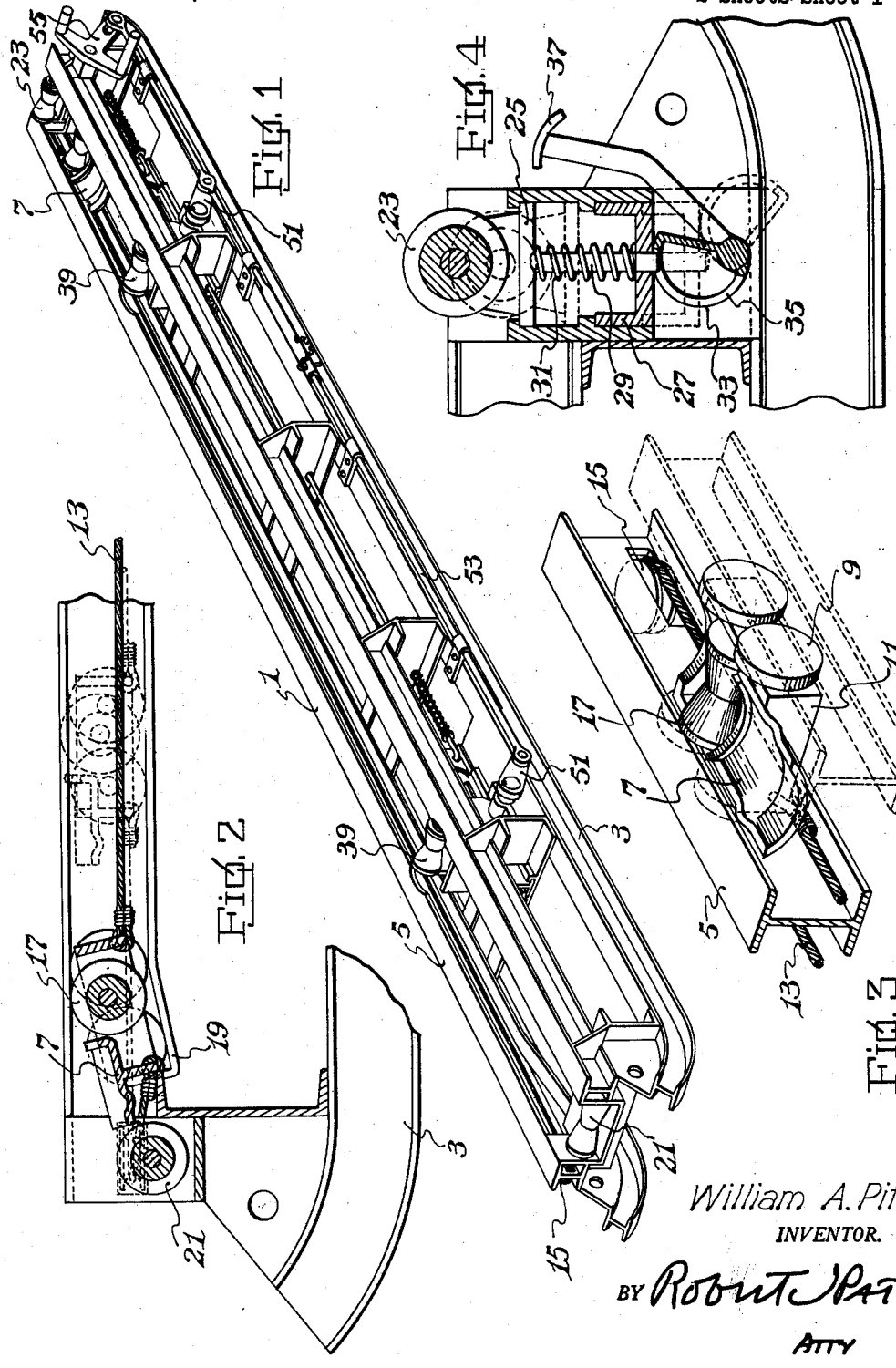
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APPARATUS FOR HANDLING ELONGATED ARTICLES

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APPARATUS FOR HANDLING ELONGATED ARTICLES

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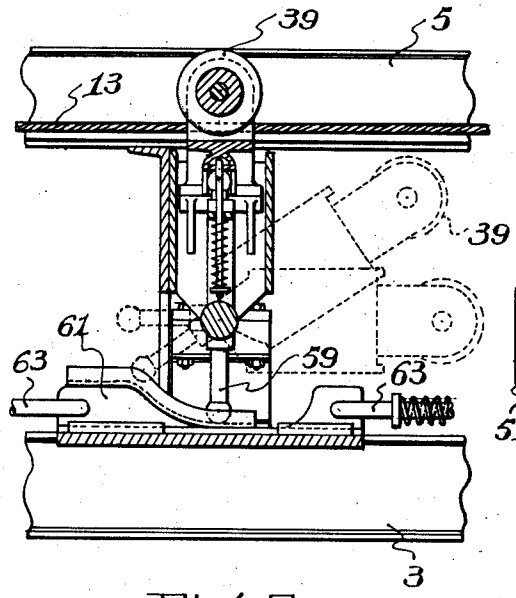


Fig. 5

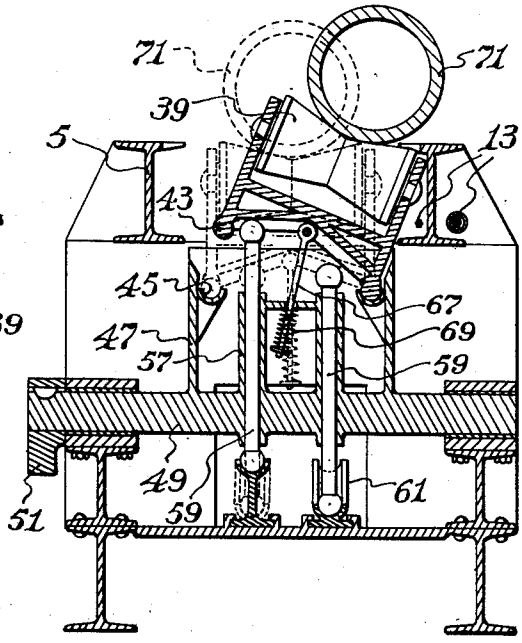


Fig. 6

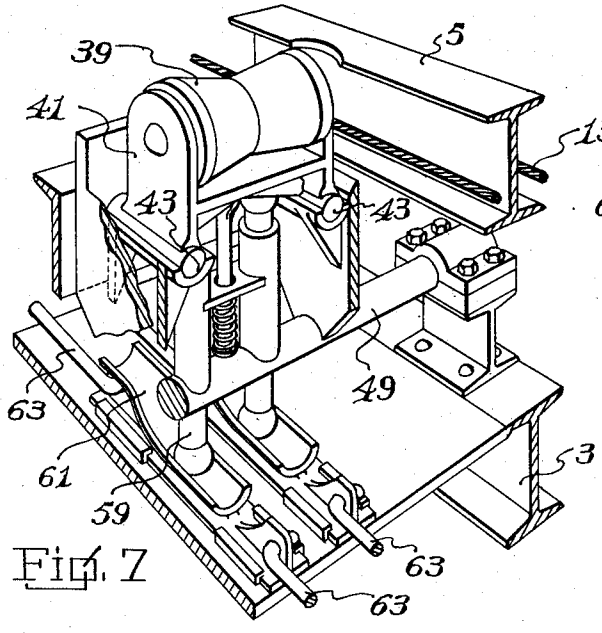


Fig. 7

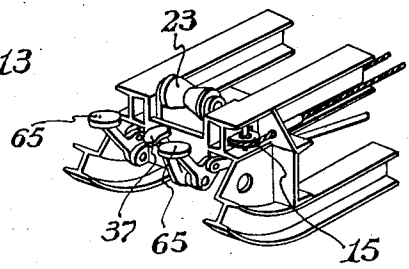


Fig. X

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APPARATUS FOR HANDLING ELONGATED ARTICLES

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3 Claims. (Cl. 214—1)

The present invention relates to apparatus for handling elongated articles, and more particularly to such apparatus for aiding in the transfer of such articles from horizontal to vertical positions and vice versa. The present invention is useful in various environments, and has particular utility in gas and oil well drilling and servicing operations, in which it is necessary to move elongated articles such as lengths of casing or tubing or sucker rods to and from rig elevators and pipe racks and in connection with small rotary drilling units for handling drill pipe or the like.

It is an object of the present invention to provide apparatus for handling elongated articles, in which the articles may be received from an elevator and placed on racks or removed from racks and placed on an elevator with the aid of only a single workman.

Another object of the present invention is the provision of such apparatus which protects the articles from dirt and abrasive wear during handling.

Still another object of the present invention is the provision of such apparatus which need not be power driven but which is powered by movement of the article itself.

A still further object of the present invention is the provision of such apparatus which prevents damage to the articles from falling.

Finally, it is the object of the present invention to provide such apparatus which will be relatively simple and inexpensive to manufacture, easy to operate, maintain and repair, and rugged and durable in use.

Other objects and advantages of the present invention will become apparent from a consideration of the following description, taken in connection with the accompanying drawings, in which:

FIGURE 1 is a perspective view of apparatus according to the present invention;

FIGURE 2 is an enlarged elevational view of one end of the device;

FIGURE 3 is an enlarged fragmentary perspective view of a portion of the device showing the dolly;

FIGURE 4 is an enlarged fragmentary side cross-sectional view of one end of the device showing the cushioning roller;

FIGURE 5 is an enlarged fragmentary side cross-sectional view showing the operation of the retractable rollers;

FIGURE 6 is an enlarged cross-sectional view showing the operation of the laterally swinging rollers;

FIGURE 7 is an enlarged fragmentary perspective view showing the structure of FIGURES 5 and 6; and

FIGURE 8 is a fragmentary perspective view of that end of the device which carries the cushioning roller and the control pedals.

Referring now to the drawings in greater detail, there is shown apparatus for handling elongated articles, comprising an elongated frame **1** adapted to rest on the ground on skids **3**. Frame **1** includes a pair of parallel horizontal I-beams **5** extending lengthwise thereof along its upper portion. A dolly **7** is supported at either side on pairs of wheels **9** which ride on the lower inner flanges of I-beams **5**. Dolly **7** includes a support **11** for one end of an article to be handled. A cable **13** dead ends at both ends on dolly **7** to provide an endless flexible member for moving dolly **7** back and forth along the flanges of I-beams **5**. Cable **13** is reeved about sheaves **15** mounted for rotation about vertical axes and one disposed

at each end of one of I-beams **5**. Thus, dolly **7** may be drawn back and forth lengthwise of frame **1** and carries a central roller **17** mounted for rotation about a horizontal axis for supporting an article to be handled. A depressed portion **19** of the lower inner flanges of I-beams **5** at one end thereof provides a stop for dolly **7**.

At the same end of frame **1** as depressed portion **19** is a roller **21** with which the article may have rolling contact, mounted for rotation about a horizontal axis.. A similar roller **23** is disposed at the other end of frame **1** but is mounted in an entirely different manner. Roller **23** is journaled for rotation about a horizontal axis on a vertically slidable support **25** which in turn is supported on a vertically slidable subframe **27** by means of a vertical rod **29** unitary with support **25** and slidably received in an opening through subframe **27** and continuously upwardly urged by means of a coil compression spring **31** disposed between support **25** and subframe **27**. A rocker cam **33** is mounted for vertical swinging movement about a horizontal axis on frame **1** and has a cam face which spirals outward counter-clockwise from that axis as seen in FIGURE 4. Cam **33** has a slot **35** therethrough for the reception of the lower end of rod **29**, so that the lower surface of subframe **27** may have sliding contact with the cam face of rocker cam **33**. A foot pedal **37** serves to turn cam **33** and hence to move roller **23** up or down as desired.

Further article supporting means are provided by rollers **39**, each supported for rotation about a generally horizontal axis on mountings **41**. A plurality of rollers **39** is provided spaced apart lengthwise of frame **1**. The lower edges of mountings **41** are rounded to provide pivot edges **43** disposed for pivotal movement in pivot seats **45** on brackets **47**. The axis of pivotal movement between edges **43** and seats **45** is about a pair of parallel pivotal axes disposed in a common horizontal plane, these pivotal axes extending parallel to the length of frame **1**. Each bracket **47** is mounted on a rock shaft **49** for vertical swinging movement about a horizontal axis perpendicular to the length of frame **1**. A crank arm **51** is secured to and projects laterally from each rock shaft **49**, and an operating rod **53** interconnects the free ends of crank arms **51** with an end of an arm of a bell crank **55** disposed at the same end of frame **1** as pedal **37**.

Mounted on each bracket **47** is a pair of vertical sleeves **57** within each of which is disposed for vertical sliding movement a rod **59** projecting beyond the associated sleeve **57** at each end thereof. A cam **61** underlies each rod **59**, the lower end of the rod riding on the cam. Each cam **61** has an inclined upper cam face and is mounted in appropriate slideways for longitudinal sliding movement lengthwise of frame **1**. To this end, a cam rod **63** is attached to each cam **61**; and cam control pedals **65** are provided for moving cams **61** lengthwise of frame **1** by means of cam rods **63**. It should especially be noted that one rod **59** is disposed adjacent and contacts the underside of each side of each bracket **47**. A rod **67** is pivotally mounted on the underside of each bracket **47** and extends through an opening in a web between the two associated sleeves **57**. A coil compression spring **69** acts between the outer end of the rod and the underside of that web continuously to draw rod **67** downward to maintain the associated bracket **47** on seats **45** or the upper ends of rods **59**, as the case may be.

The operation of the device is as follows:

With rollers **39** in the dotted line position shown in FIGURE 5 and roller **23** in the full line position of FIGURE 4 and dolly **7** in the position of FIGURE 1, an elongated article **71** such as a length of pipe as seen in FIGURE 6 is lowered in vertical position and its lower end guided onto support **11** of dolly **7**. As the article is further lowered, it pushes dolly **7** lengthwise along

frame 1 to the left as seen in FIGURE 1. Rollers 39 are depressed and do not interfere with this movement. Then, when dolly 7 reaches the opposite end of frame 1, it is positively stopped and the retailing end of article 71 is dropped and falls on raised roller 23, which acts as a bumper and resiliently absorbs the shock of the fall.

Rollers 39 are then raised to the full line position shown in FIGURE 5 by manipulation of crank 55, which moves operating rod 53 to swing crank arms 51 to turn rock shafts 49 to raise rollers 39 about the axes of those rock shafts, into a position in which they are higher than roller 17 of dolly 7 and roller 21. Roller 23 is then lowered by depressing foot pedal 37 from the position shown in FIGURE 4 to the dotted line position shown therein, so that roller 23 is then lower than rollers 39. In this position, article 71 rests solely on rollers 39.

To remove the article from rollers 39 and to cause it to roll sideways onto an adjacent pipe rack or the like (not shown), it is necessary only to actuate a selected pedal 65 to raise the corresponding ends of rollers 39. Actuation of a pedal 65 moves the associated cam rod 63 to actuate the cams 61 on one side of the device, so as to raise rods 59 to lift one pivot edge 43 from its associated seat 45, the other seat 45 on the other side of the machine providing a pivotal seat for its associated pivot edge 43, which remains in contact with that seat. This movement provides for vertical swinging movement of mountings 41 and rollers 39 about either of a pair of spaced parallel horizontal axes so as to enable discharge to either side of the device as desired, the vertical swinging movement imparted the mountings 41 and rollers 39 causes these elements not only to pivot about horizontal axes but also to have a component of vertical movement so that the article is caused to roll off rollers 39 and onto an adjacent side frame without interference. The importance of making the rollers concave, that is, of general hourglass configuration, will therefore be apparent.

To use this device for the reverse operation, that is, to aid in removing articles from a rack such as a pipe rack and feeding them one by one to an elevator or the like, dolly 7 is left at the end of the device as shown in FIGURE 2 and rollers 39 again lowered by manipulation of bell crank 55 and roller 23 raised by manipulation of foot pedal 37, so that the article is initially supported on dolly 7 and roller 23. As the article is raised by its end adjacent roller 23, however, dolly 7 is pulled toward that end of frame 1 by the supported end of the article until dolly 7 has reached that end of the frame and the trailing end of the article has parted from dolly 7. Thereafter, the operation may be repeated for receiving another vertically disposed article being lowered onto dolly 7.

Of course, the same operation can be repeated for, say, racking a number of articles, by drawing dolly 7 toward the same end of the device as roller 23, by manipulation of cable 13. Also, the reverse operation of unracking and feeding articles can be repeatedly performed.

From a consideration of the foregoing, it will be obvious that all of the initially recited objects of the present invention have been achieved.

It is to be understood that the appended claims are to be accorded a range of equivalents commensurate in scope with the advance made over the prior art.

What is claimed is:

1. Apparatus for handling elongated articles, comprising an elongated frame, a cradle for supporting an elongated article on and lengthwise of the frame, and means for rocking said cradle selectively about either of a pair of parallel, laterally spaced-apart axes extending lengthwise of said elongated frame, said means comprising a pair of upwardly open, concavely rounded seats extending parallel to each other lengthwise of the frame and one disposed adjacent either side of the frame, the cradle having a pair of complementarily rounded, downwardly extending pivot portions that rest in the seats, each pivot portion turning in its seat about an axis parallel to the length of the frame, said means including means for selectively swinging the cradle about one said axis up and to one side of the frame to discharge an elongated article to said one side of the frame, and means for selectively swinging the cradle about the other said axis up and to the other side of the frame to discharge an elongated article to said other side of the frame.

2. Apparatus as claimed in claim 1, and a rotatable horizontal shaft perpendicular to the length of the frame, the seats being carried by the shaft, and means for rotating the shaft thereby to swing the cradle bodily vertically between raised and lowered positions.

3. Apparatus as claimed in claim 2, and a pair of parallel rods extending through and slidable relative to the shaft and engageable with the crade one adjacent each said pivot portion, and means for independently selectively moving each rod through the shaft toward the cradle thereby selectively to swing the cradle up and to either side of the frame.

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