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Beam rotation device and system

Abstract

The beam rotation device described herein has a base support with a first vertical jaw arm, a second vertical jaw arm, and a support arm. The second vertical jaw arm may be pivotally coupled to the device so as to go from a first, closed position to a second, opened position to receive a steel beam (e.g., I-beam). Once the steel beam is placed within the device, the support arm may hold the beam stationary to allow a worker to weld or perform other tasks. It will be appreciated that multiple beam rotation devices may be coupled together and work in tandem to receive and rotate a beam. The beam rotation device creates a safer working environment than the rotators found in the art by having a pivotable second vertical jaw arm that may open to receive a beam and a support arm to hold the beam during fabrication.

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS (1) This application claims the benefit of U.S. Provisional Application Ser. No. 63/208,628, filed Jun. 9, 2021, which is incorporated herein by reference.

TECHNICAL FIELD

(1) The present disclosure relates to an apparatus to assist a user in fabricating steel beams. More particularly, the present disclosure relates to a beam rotation device and system that rotates steel beams so as to assist in fabrication.

BACKGROUND

(2) Steel beams, such as I-beams, were introduced into the construction industry in the late 1800s. It was not long after that people realized the strength and durability of steel beams. These steel beams would end up revolutionizing the construction industry. Even though steel beams are prevalent throughout the construction industry, they are difficult to manufacture and transport. For example, fabricating and moving steel beams is difficult due to their size and weight. In addition, the size and weight of the steel beam also introduces many hazardous working conditions that can lead to injury.

(3) To address the obstacles of working with steel beams, individuals have created structural beam rotators that help remove hazardous working conditions and assist workers in fabricating the beams. However, these structural beam rotators are not without their flaws. Many of the rotators include arms with a narrow opening to receive the steel beams. Often, these openings are too narrow and do not open or extend outward, thereby creating additional hazards while trying to insert a beam into the structural beam rotator. In addition, many of the structural beam rotators have a chain to hold and rotate a steel beam, which makes welding difficult due to the beam being capable of moving while working on it.

(4) Accordingly, there is a need for a beam rotator that allows easy access between arms for a steel beam and that can hold the beam stationary while welding or performing other labors. The present invention seeks to solve these and other problems.

SUMMARY OF EXAMPLE EMBODIMENTS

(5) In one embodiment, a beam rotation device comprises a first base plate and a second base plate coupled to a base support frame, which may comprise a first support panel and a second support panel. Coupled to the first support panel and the second support panel is a first vertical jaw arm. On an opposite side, a second vertical jaw arm may be coupled to the first and second support panels. The second vertical jaw arm may be pivotally coupled to the base support and the second base plate. Accordingly, the second vertical jaw arm may pivot outward away from the first vertical jaw arm so as to increase the width of a throat area (i.e., space between the first and second vertical jaw arm) to ease entrance of a steel beam. A housing comprises a linear actuator coupled to a support arm bracket. Extending from the support arm bracket is a support arm. The support arm is moveable up and down on a y-axis via the linear actuator to hold a steel beam. The beam may also be cradled on a chain that extends between the first vertical jaw arm and the second vertical jaw arm.

(6) In one embodiment, a beam rotation system comprises two or more beam rotation devices coupled to each other.

(7) In one embodiment, a remote control communicates with, and sends signals to, a beam rotation device and/or a beam rotation system.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) FIG. **1** illustrates a front, right side perspective view of a beam rotation device;

(2) FIG. **2** illustrates a rear, right side perspective view of a beam rotation device;

(3) FIG. **3** illustrates a top elevation view of a beam rotation device;

(4) FIG. **4** illustrates a front elevation view of a beam rotation device with a second vertical jaw arm in an extended position;

(5) FIG. **5**A illustrates a front elevation view of a beam rotation device with front panels removed therefrom;
(6) FIG. **5**B illustrates a rear perspective view of a beam rotation device with rear panels removed therefrom;
(7) FIG. **5**C illustrates a detailed, side view of the interior components of a housing and first vertical jaw arm;
(8) FIG. **6** illustrates a front elevation view of a support arm with a steel beam proximal thereto;
(9) FIG. **7** illustrates a front elevation view of a support arm with a steel beam resting thereon;
(10) FIG. **8** illustrates a front, top perspective view of a beam rotation system with a steel beam placed therein;
(11) FIG. **9** illustrates a remote control for a beam rotation device and/or a beam rotation system;
(12) FIG. **10** illustrates a diagram of an alarm system of a beam rotation device; and
(13) FIG. **11** illustrates a diagram of an alarm system of a beam rotation device.

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS

(14) The following descriptions depict only example embodiments and are not to be considered limiting in scope. Any reference herein to “the invention” is not intended to restrict or limit the invention to exact features or steps of any one or more of the exemplary embodiments disclosed in the present specification. References to “one embodiment,” “an embodiment,” “various embodiments,” and the like, may indicate that the embodiment(s) so described may include a particular feature, structure, or characteristic, but not every embodiment necessarily includes the particular feature, structure, or characteristic. Further, repeated use of the phrase “in one embodiment,” or “in an embodiment,” do not necessarily refer to the same embodiment, although they may.

(15) Reference to the drawings is done throughout the disclosure using various numbers. The numbers used are for the convenience of the drafter only and the absence of numbers in an apparent sequence should not be considered limiting and does not imply that additional parts of that particular embodiment exist. Numbering patterns from one embodiment to the other need not imply that each embodiment has similar parts, although it may.

(16) Accordingly, the particular arrangements disclosed are meant to be illustrative only and not limiting as to the scope of the invention, which is to be given the full breadth of the appended claims and any and all equivalents thereof. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation. Unless otherwise expressly defined herein, such terms are intended to be given their broad, ordinary, and customary meaning not inconsistent with that applicable in the relevant industry and without restriction to any specific embodiment hereinafter described. As used herein, the article “a” is intended to include one or more items. When used herein to join a list of items, the term “or” denotes at least one of the items, but does not exclude a plurality of items of the list. For exemplary methods or processes, the sequence and/or arrangement of steps described herein are illustrative and not restrictive.

(17) It should be understood that the steps of any such processes or methods are not limited to being carried out in any particular sequence, arrangement, or with any particular graphics or interface. Indeed, the steps of the disclosed processes or methods generally may be carried out in various different sequences and arrangements while still falling within the scope of the present invention.

(18) The term “coupled” may mean that two or more elements are in direct physical contact. However, “coupled” may also mean that two or more elements are not in direct contact with each other, but yet still cooperate or interact with each other.

(19) The terms “comprising,” “including,” “having,” and the like, as used with respect to embodiments, are synonymous, and are generally intended as “open” terms (e.g., the term “including” should be interpreted as “including, but not limited to,” the term “having” should be interpreted as “having at least,” the term “includes” should be interpreted as “includes, but is not

limited to," etc.).
(20) As previously described, there is a need for a beam rotator that allows easy access between arms for a steel beam and that can hold the beam stationary while welding or performing other labors. The present invention seeks to solve these and other problems.
(21) The beam rotation device described herein comprises a base support with a first vertical jaw arm, a second vertical jaw arm, and a support arm. The second vertical jaw arm may be pivotally coupled to the device so as to go from a first, closed position to a second, opened position to receive a steel beam (e.g., I-beam). Once the steel beam is placed within the device, the support arm may hold the beam stationary to allow a worker to weld or perform other tasks. It will be appreciated that multiple beam rotation devices may be coupled together and work in tandem to receive and rotate a beam. The beam rotation device creates a safer working environment than the rotators found in the art by having a pivotable second vertical jaw arm that may open to receive a beam and a support arm to hold the beam during fabrication.
(22) In one embodiment, as shown in FIGS. **1-7**, a beam rotation device **100** comprises a first base plate **102**A and a second base plate **102**B coupled to a base support frame **104**, which may comprise a first support panel **106**A and a second support panel **106**B. The first support panel **106**A and second support panel **106**B are coupled to a first vertical jaw arm **108**A. It will be appreciated that the first vertical jaw arm **108**A may comprise one or more panels **107**A, **107**B forming the exterior walls of the vertical jaw arm **108**A and enclosing its contents, as will be discussed later herein.
(23) A second vertical jaw arm **108**B is coupled to the first and second support panels **106**A, **106**B, at an opposite end from the first vertical jaw arm **108**A, and may be coupled to the second base plate **102**B. The second vertical jaw arm **108**B may comprise a plurality of panels **109**A-C forming the exterior walls and enclosing its contents. In some embodiments, the second vertical jaw arm **108**B may be pivotally coupled to the base support frame **104** and the second base plate **102**B, such as by using a hinge pin **105**. For example, the hinge pin **105** may pass through the first support panel **106**A, through the first panel **109**A, through the second panel **109**B, and through the second support panel **106**B. This allows the second vertical jaw arm **108**B to pivot on the hinge pin **105**, creating a fulcrum, as shown in FIG. **4** where the second vertical jaw arm **108** is pivoted outwardly, creating a wider throat **111** for receiving or removing a beam.
(24) Referring to FIG. **5**, the pivoting of the second vertical jaw arm **108**B may be controlled using one or more linear actuators **113**A-B (e.g., piston and cylinder). The linear actuators **113**A-B may be of any known type in the art, such as hydraulic, electric, screw driven, etc. The linear actuators **113**A-B may be coupled, at a first end, to the base support frame **104** using a locking pin **115**A, with the opposite end coupled to the second vertical jaw arm **108**B, such as by using locking pin **115**B through the panels **109**A-B. For example, to pivot the second vertical jaw arm **108**B outwardly, a user would extend the linear actuators **113**A-B, which causes the second vertical jaw arm **108**B to pivot on the hinge pin **105**, thereby widening the throat **111** (i.e., the space between the first and second vertical jaw arm **108**A, **108**B). Once a beam is placed in the throat **111** (on chain **124**), the linear actuator **113**A-B is retracted, thereby retracting the second vertical jaw arm **108**B and closing the throat **111**. Accordingly, by the second vertical jaw arm **108**B pivoting outwardly and creating a wider throat **111**, the beam rotation device **100** solves the problem of the industry by allowing easier insertion and removal of beams.
(25) Further, a housing **114** may extend vertically and be coupled to the first base plate **102**A adjacent the first vertical jaw arm **108**A. The housing **114** may comprise a linear actuator **116** (which may be hydraulic, as illustrated, but may also be electric or other known actuator) coupled to a support arm bracket **118**, such as by locking pin **115**C. The support arm bracket **118** is coupled to a support arm **122**, such as by locking pin **115**D. The support arm **122** extends horizontally from the first vertical jaw arm **108**A towards the second vertical jaw arm **108**B. The support arm **122** is moveable up and down on a y-axis via the linear actuator **116**. In other words, the support arm

bracket **118** is slidably coupled to a jack stand **119**. Accordingly, when welding or work needs to be performed on a beam, a user may raise the support arm **122** via the linear actuator **116**, support arm bracket **118**, and jack stand **119**, until the support arm **122** contacts and supports the beam that is resting on the chain **124**. With the beam supported by the support arm **122**, the beam is less likely to move, allowing a worker to complete work faster and safer. This is a significant improvement over the prior art that relies on chains alone. Relying on chains alone allows the beam to sway; in contrast, the support arm **122** disclosed herein prevents swaying. A second linear actuator **117** (FIG. **5**C) may provide stabilization and additional support when raising the support arm **122** via the support arm bracket **118** and the jack stand **119**.

(26) When rotation of the beam is necessary, the support arm **122** may be lowered, allowing the beam to be cradled on chain **124**. The chain **124** may then be actuated, which rotates the beam as a result. More particularly, the chain **124** may be continuous and run through the beam rotation device **100**. A motor **120** rotates a first sprocket **126**A using a motor chain **125**, which drives a second sprocket **126**B engaged with the chain **124**. Chain **124** then proceeds around a third sprocket **126**C and around the subsequent sprockets **126**D-I until returning to the second sprocket **126**B. Accordingly, when the motor **120** is actuated, the chain **124** travels throughout the beam rotation device **100**. As a result, a beam resting on the chain **124** in the throat **111** is rotated by the chain **124** when it is actuated. To ensure proper tension on the chain **124**, the beam rotation device **100** may comprise a tension motor **130**. Sprocket **126**D may be coupled to a linear actuator **131**. This allows a user the ability to easily remove and replace the chain **124** when needed. A hydraulic motor **133** coupled to a hydraulic pump **135** may be used when using hydraulics to drive the various linear actuators (e.g., **116**, **117**, **131**, **113**A, **113**B, etc.).

(27) In some embodiments, the support arm **122** may be flush or level with the base support frame **104** when in its lowest position, depending upon the configuration of the support arm bracket **118**. In addition, as shown in FIGS. **6-7**, the beam rotation device **100** may comprise sensors that sense when a beam is near the support arm **122** (e.g., infrared sensor) and on the support arm **122** (e.g., resistance sensor). For example, an infrared sensor may be secured to the support arm **122** to detect when the beam is within a predetermined distance **123** (e.g., two inches) of the support arm **122** while raising. Once the beam is detected, the speed of the support arm **122** may be reduced. A second infrared sensor may be secured to the bottom of the support arm **122** to detect objects in its path or the ground. Further, the support arm **122** may stop when the sensors sense a sudden increase in weight, such as by using sensors that detect the resistance/pressure of the hydraulics, thereby detecting an increase in weight, indicating contact with the beam. By using sensors, the beam rotation device **100** enhances workplace safety and efficiency in steel fabrication shops where steel beams are being fabricated.

(28) Multiple emergency stop buttons **132**A-D may be located on the housing **114**, first vertical jaw arm **108**A, and/or second vertical jaw arm **108**B. In one embodiment, the beam rotation device **100** may comprise four emergency stops, with one near each corner of the device **100**. If any one of the emergency stop buttons **132**A-D are depressed, the entire beam rotation device **100** will stop immediately. In addition, if there is more than one beam rotation device **100**, depressing a single emergency stop button **132**A-D will cease function of all beam rotation devices. This may be accomplished using wired or wireless communication protocols, such as Bluetooth® or similar. In some embodiments, the emergency stop buttons **132**A-D have indicator lights. For example, in one embodiment, if the light color is green, the emergency stop buttons **132**A-D have not been depressed. If the light is red, the target emergency stop button has been depressed. If the lights are off, then the target emergency stop button is not active, but one or more emergency stops have been depressed. In some embodiments, when one of the emergency stop buttons **132**A-D is depressed or connection is lost between beam rotation devices, an audible alarm (e.g., a chirping sound) will be heard, for example, once every two seconds.

(29) The beam rotation device **100** may further comprise a power switch **134** that turns power on

and off to the device **100** and acts as a lockout point. In some embodiments, the power switch **134** is located on the second vertical jaw arm **108**B. However, it will be appreciated that the power switch **134** may be located anywhere on the beam rotation device **100**, such as the first vertical jaw arm **108**A or hydraulic **114**. A keypad **136** may be positioned on the first vertical jaw arm **108**A or at any other location on the device **100**. The keypad **136** may control the beam rotation device **100**. The keypad **136** may comprise a plurality of buttons **138**, such as beam rotation buttons that control the movement direction of the chain **124**, chain in and out buttons that increase or decrease slack of the chain **124**, up and down buttons for raising and lowering the support arm **122**, and open and close buttons for extending or retracting the second vertical jaw arm **108**B.

(30) In addition, the beam rotation device **100** may comprise a power cord connection **140** that couples to a power supply and a communication link connection **142** that allows one or more beam rotation devices to be communicatively connected to each other via a communication cable. For instance, multiple beam rotation devices **100** may have synchronized movements with both the second vertical jaw arms **108**B and chain rotation so as to allow a steel beam **144** to rotate evenly from one end to the other. While communication cables are discussed, beam rotation devices **100** may communicate wirelessly via, for example, Bluetooth, Wi-Fi, a radio bridge, or other wireless communication technology.

(31) At times, the beam rotation device **100** may need to be moved. Accordingly, a user may transport the beam rotation device **100** via lift pockets **110**A-D on a first upper surface **112**A of the first vertical jaw arm **108**A and on a second upper surface **112**B of the second vertical jaw arm **108**B. In particular, the lift pockets **110**A-D may receive the arms of a forklift. While lift pockets **110**A-D are shown, it could be envisioned that chains, cables, or other types of lifting components could be used to transport the beam rotation device **100**.

(32) Referring to FIG. **8**, multiple beam rotation devices **100**A, **100**B may electronically connect to each other and work in sync with each other to rotate a single beam **144**. Accordingly, a beam rotation system **200** comprises a first beam rotation device **100**A and a second beam rotation device **100**B receiving a single beam **144**. While two beam rotation devices **100**A-B are shown, it will be appreciated that more than two may be used to accommodate longer beams. In some embodiments, after the beam rotation devices **100**A-B are connected to the power supply, they may begin by initiating and updating their memory with any current connections to other beam rotation devices, both wired and wireless. Once connected, each beam rotation device **100**A-B may constantly communicate its status with each other. For example, in one embodiment, the beam rotation devices **100**A-B may communicate with each other 20 times a second, although this timing is not required and more or less communication may work.

(33) To remove a beam rotation device **100**A-B from the beam rotation system **200**, a user may, if a wired connection, disconnect the communication cable from the device being removed and re-initialize the remaining beam rotation devices as a new set. If a wireless connection, may use a user interface to navigate to wireless connections and click to disconnect. When a beam rotation device **100**A-B is disconnected from the beam rotation system **200**, the remaining beam rotation devices are capable of immediately activating an emergency stop mode to prevent injury to a user. In some embodiments, reconnecting the beam rotation device **100**A-B to the beam rotation system **200** deactivates the emergency stop mode.

(34) FIG. **9** illustrates a remote control **146** that may be used to control a single beam rotation device **100** or to control the beam rotation system **200**. It will be appreciated, as discussed above, that each beam rotation device **100** may be controlled by their own keypad **136**. The remote control **146** may communicate with the beam rotation device **100** or system **200** wirelessly through Bluetooth®, Wi-Fi, infrared, etc. In addition, the remote control **146** may comprise a stop button **148** that may function the same as the emergency stop buttons **132**A-D on each of the beam rotation devices **100**. In some embodiments, the stop button **148** functions when the remote **146** is powered on and connected to the device **100** or system **200**. The remote control **146** may comprise

a switch **150** that controls the whether the beam rotation device **100** or system **200** is on or off and the speed. The remote control **146** may have four speed settings which are percentages of the maximum speed: 25%, 50%, 75%, and 100%. In some embodiments, these speed settings control the maximum speed value of the buttons. For example, if the speed setting is set to 25%, the motion of the device **100** or system **200** is limited to 25% speed across all moving systems (e.g., speed of chain **124**, speed of support arm **122**, etc.). The remote control **146** may comprise a set of status indicator lights **152** that notify a user of power and speed. The set of indicator lights **152** may comprise a status light **154**. In one embodiment, when the switch **150** is turned on, the status light **154** may light up as a green light for two seconds and then slowly flash.

(35) A first rotate button **156**A may rotate a beam counterclockwise via the chain **124** while a second rotate button **156**B may rotate the beam clockwise via the chain **124**. In addition, a first chain slack button **158**A may increase the amount of slack in the chain **124**. A second chain slack button **158**B may decrease slack in the chain **124**. Other buttons on the remote control **146** may include a first support arm button **160**A that raises the support arm **122** and a second support arm button **160**B to lower the support arm **122**. A first jaw button **162**A may open the second vertical jaw arm **108**B and a second jaw button **162**B may close the second vertical jaw arm **108**B. It will be appreciated that the above-described buttons are not limited to a certain order or orientation. Further, the remote control **146**, in some embodiments, may have as few as one button or may have a plurality of buttons. In some embodiments, the remote control **146** may be in the form of a mobile application, which a user may operate from a smart device, such as a smartphone or tablet.

(36) In some embodiments, on both keypad **136** and remote controls **146**, buttons must be held depressed for the duration of motion. In some embodiments, if there are conflicting commands from multiple sources, the first command locks out all conflicting commands until the button sending the first command is released. In some embodiments, the buttons on the remote control **146** are proportional, meaning the harder/farther the button is pressed, the faster the speed of motion. Further, in a beam rotation system **200**, a single remote control **146** controls each beam rotation device **100**A-B simultaneously.

(37) Referring to FIG. **10**, a first alarm system **300** may assist and add protection for a user while the beam rotation devices **100**A-B are in motion. At step **302**, the beam rotation system **200** ("Beam Champ") is initialized. After greater than 20 seconds of any keypad inactivity at step **304** and greater than 20 seconds of inactivity of wireless remote **146** or keypad **136** control, the system is ready for use. In step **308** initiating a function may be actuated on either the remote **146** or keypad **136**. At step **310**, all pre-motion alarms sound for two seconds. It will be appreciated that step **310** may have alarms, in some embodiments, that are shorter or longer. At step **312**, all in-motion alarms sound through the duration of motion (e.g., an alarm sounds when the beam is rotated, vertical jaw arm opened, etc.). After step **312**, if more than 20 seconds have elapsed since a command was received by the system, the system may return to steps **304** or **306**. If less than 20 seconds have elapsed since a command was received when a new command is received, then the system proceeds to step **314** or **320**. If a keypad button is pressed in **316** or the remote is used in **322**, only the in-motion alarms sound in **318**.

(38) In some embodiments, as shown in FIG. **11**, the pre-motion alarms may vary depending upon the source of the command (e.g., keypad **136** vs. remote **146**). For example, in the safety system **400** and at step **402**, the beam rotation system **200** ("Beam Champ") is initialized. After greater than 20 seconds of any keypad inactivity at step **404** and greater than 20 seconds of inactivity of wireless remote **146** or keypad **136**, the system is ready for use. In step **408** initiating a function may be actuated on either the remote **146** or keypad **136**. At step **410**, all pre-motion alarms sound for two seconds. At step **412**, all in-motion alarms sound through the duration of motion (e.g., an alarm sounds when the beam is rotated, vertical jaw arm opened, etc.). After step **412**, if more than 20 seconds have elapsed since a command was received by the system, the system may return to steps **404** or **406**. If less than 20 seconds have elapsed since a command was received when a new

command is received, then the system proceeds to step **414** or **420**. If a keypad **136** button is pressed in **416**, the in-motion alarm sounds. On the other hand, if the remote **146** is used in **422**, a pre-motion alarm sounds at **424** and then the in-motion alarms sound in **418**.
(39) Therefore, as appreciated from the foregoing disclosure, the beam rotation device **100** and system **200** solve the problems in the art by having an expandable throat **111** to receive and remove beams, by having a support arm **122** to keep the beams stable while work is performed, and by having a safety system in place while using the system, among others.
(40) It will also be appreciated that systems and methods according to certain embodiments of the present disclosure may include, incorporate, or otherwise comprise properties or features (e.g., components, members, elements, parts, and/or portions) described in other embodiments. Accordingly, the various features of certain embodiments can be compatible with, combined with, included in, and/or incorporated into other embodiments of the present disclosure. Thus, disclosure of certain features relative to a specific embodiment of the present disclosure should not be construed as limiting application or inclusion of said features to the specific embodiment unless so stated. Rather, it will be appreciated that other embodiments can also include said features, members, elements, parts, and/or portions without necessarily departing from the scope of the present disclosure.
(41) Moreover, unless a feature is described as requiring another feature in combination therewith, any feature herein may be combined with any other feature of a same or different embodiment disclosed herein. Furthermore, various well-known aspects of illustrative systems, methods, apparatus, and the like are not described herein in particular detail in order to avoid obscuring aspects of the example embodiments. Such aspects are, however, also contemplated herein.
(42) Exemplary embodiments are described above. No element, act, or instruction used in this description should be construed as important, necessary, critical, or essential unless explicitly described as such. Although only a few of the exemplary embodiments have been described in detail herein, those skilled in the art will readily appreciate that many modifications are possible in these exemplary embodiments without materially departing from the novel teachings and advantages herein. Accordingly, all such modifications are intended to be included within the scope of this invention.

Claims

1. A beam rotation device, comprising: a base support frame; a first vertical jaw arm extending from a first side of the base support frame; a second vertical jaw arm pivotally coupled to a second side of the base support frame via one or more linear actuators and a hinge pin; a chain passing from the first vertical jaw arm to the second vertical jaw arm, a throat formed between the first vertical jaw arm and the second vertical jaw arm; and a support arm moveable on a y-axis, the support arm configured to contact and support a beam placed in the throat wherein the chain is configured to pass through the beam rotation device via a plurality of sprockets and wherein at least one sprocket is coupled to a linear actuator, wherein when the linear actuator is in a retracted position, the chain may be removed from the beam rotation device.
2. The beam rotation device of claim 1, wherein the support arm is coupled to a support arm bracket, the support arm bracket slidably coupled to a jack stand, the support arm bracket moveable on the jack stand via one or more linear actuators.
3. The beam rotation device of claim 1, further comprising a motor to actuate at least one sprocket and thereby the chain.
4. The beam rotation device of claim 1, further comprising a plurality of emergency stop buttons.
5. The beam rotation device of claim 1, wherein the first vertical jaw arm and second vertical jaw arm comprise lift pockets for receiving arms of a forklift.
6. The beam rotation device of claim 1, further comprising a motor and pump for actuating the

linear actuators.

7. The beam rotation device of claim 1, further comprising a keypad and a remote control.

8. The beam rotation device of claim 1, further comprising an audible alarm during motion of the beam rotation device.

9. A beam rotation device, comprising: a base support frame; a first vertical jaw arm extending from a first side of the base support frame; a second vertical jaw arm pivotally coupled to a second side of the base support frame via a hinge pin; at least one linear actuator coupled to the base support frame and the second vertical jaw arm, the linear actuator configured to control the pivot position of the second vertical jaw arm; a chain passing from the first vertical jaw arm to the second vertical jaw arm, through the base support frame, and returning to the first vertical jaw arm; a throat formed between the first vertical jaw arm and the second vertical jaw arm, the chain suspended in the throat; a housing coupled to the first vertical jaw arm, the housing comprising a jack stand; a support bracket slidable on the jack stand, a support arm extending horizontally from the support bracket and crossing the throat area from the first vertical jaw arm toward the second vertical jaw arm; and a linear actuator coupled to the support bracket, the linear actuator configured to control the height of the support bracket and support arm coupled thereto.

10. The beam rotation device of claim 9, further comprising a motor to actuate the chain in a desired direction.

11. The beam rotation device of claim 9, further comprising a plurality of emergency stop buttons.

12. The beam rotation device of claim 9, wherein the first vertical jaw arm and second vertical jaw arm comprise lift pockets for receiving arms of a forklift.

13. The beam rotation device of claim 9, further comprising a motor and pump for actuating the linear actuators.

14. The beam rotation device of claim 9, further comprising a keypad and a remote control.

15. The beam rotation device of claim 9, further comprising an audible alarm during motion of the beam rotation device.

16. A beam rotation device, comprising: a base support frame; a first vertical jaw arm extending from a first side of the base support frame; a second vertical jaw arm pivotally coupled to a second side of the base support frame via one or more linear actuators and a hinge pin; a chain passing from the first vertical jaw arm to the second vertical jaw arm, a throat formed between the first vertical jaw arm and the second vertical jaw arm; a support arm moveable on a y-axis, the support arm configured to contact and support a beam placed in the throat; and a plurality of emergency stop buttons.

17. A beam rotation device, comprising: a base support frame; a first vertical jaw arm extending from a first side of the base support frame; a second vertical jaw arm pivotally coupled to a second side of the base support frame via one or more linear actuators and a hinge pin; a chain passing from the first vertical jaw arm to the second vertical jaw arm, a throat formed between the first vertical jaw arm and the second vertical jaw arm; a support arm moveable on a y-axis, the support arm configured to contact and support a beam placed in the throat; and wherein the first vertical jaw arm and second vertical jaw arm comprise lift pockets for receiving arms of a forklift.

18. A beam rotation device, comprising: a base support frame; a first vertical jaw arm extending from a first side of the base support frame; a second vertical jaw arm pivotally coupled to a second side of the base support frame via one or more linear actuators and a hinge pin; a chain passing from the first vertical jaw arm to the second vertical jaw arm, a throat formed between the first vertical jaw arm and the second vertical jaw arm; a support arm moveable on a y-axis, the support arm configured to contact and support a beam placed in the throat; and a motor and pump for actuating the one or more linear actuators.

19. A beam rotation device, comprising: a base support frame; a first vertical jaw arm extending from a first side of the base support frame; a second vertical jaw arm pivotally coupled to a second side of the base support frame via one or more linear actuators and a hinge pin; a chain passing

from the first vertical jaw arm to the second vertical jaw arm, a throat formed between the first vertical jaw arm and the second vertical jaw arm; a support arm moveable on a y-axis, the support arm configured to contact and support a beam placed in the throat; and an audible alarm during motion of the beam rotation device.