

May 12, 1931.

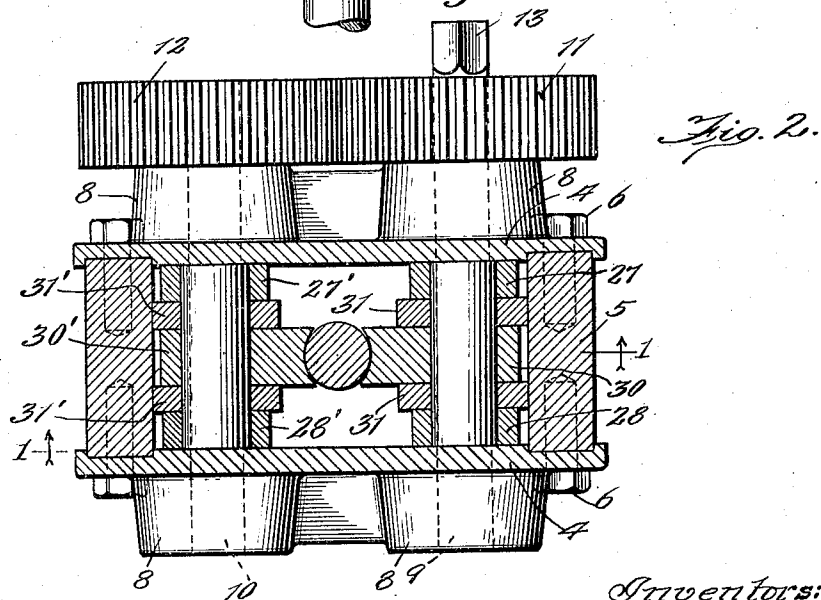
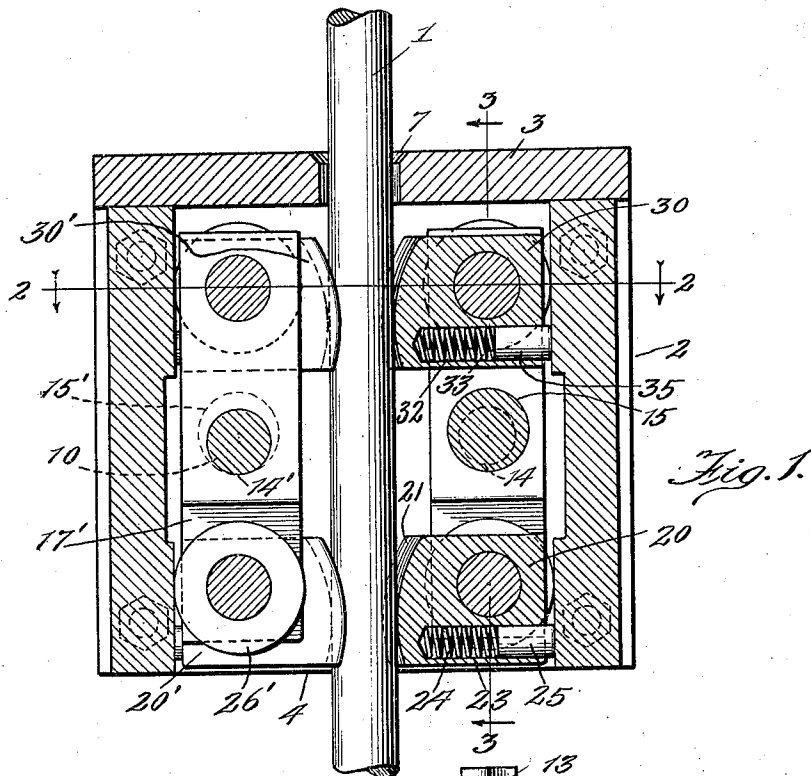
G. T. BURRELL ET AL

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CLIMBING OR LIFTING JACK

Filed Jan. 29, 1927

3 Sheets-Sheet 1



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May 12, 1931.

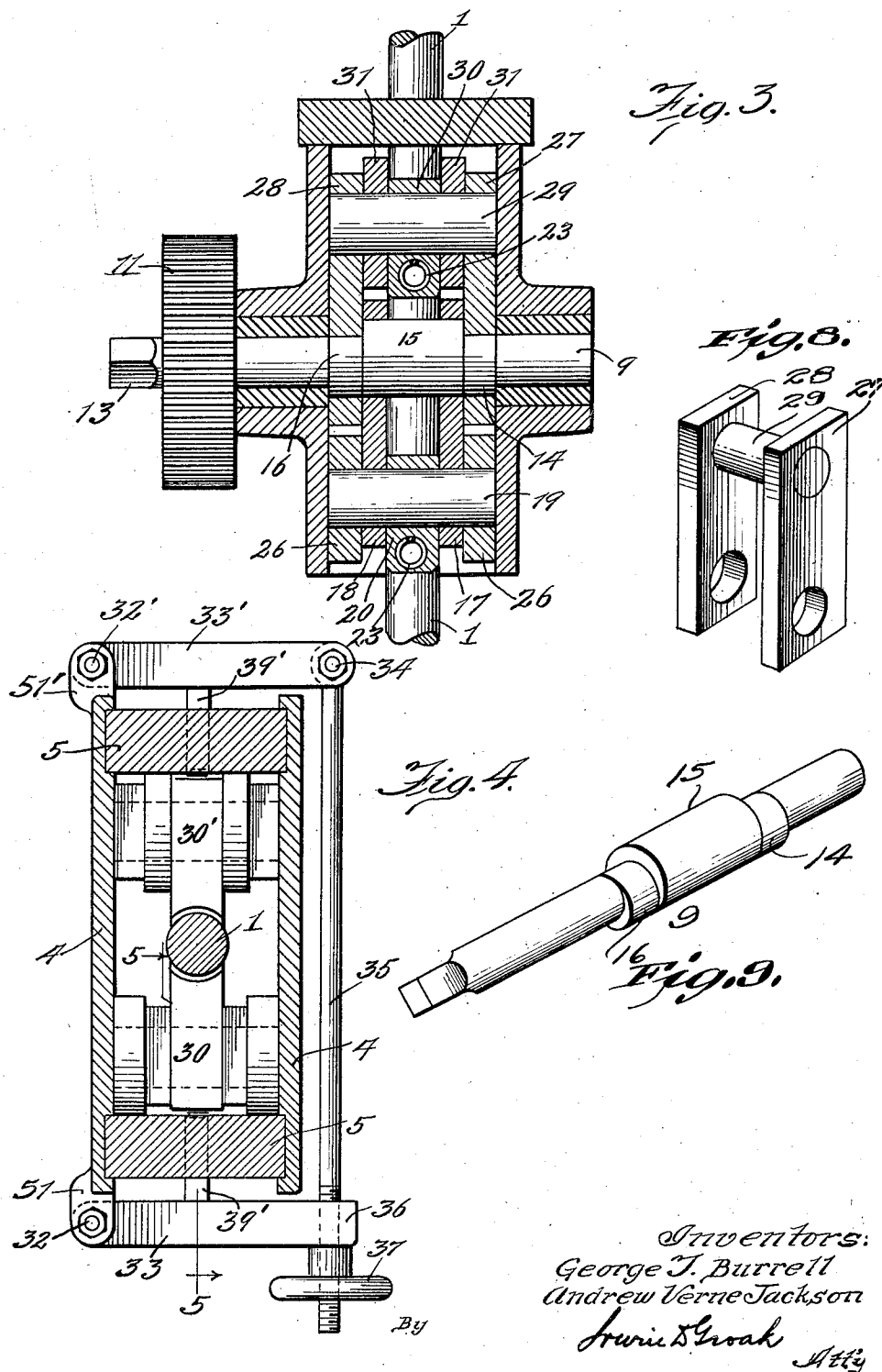
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CLIMBING OR LIFTING JACK

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3 Sheets-Sheet 2



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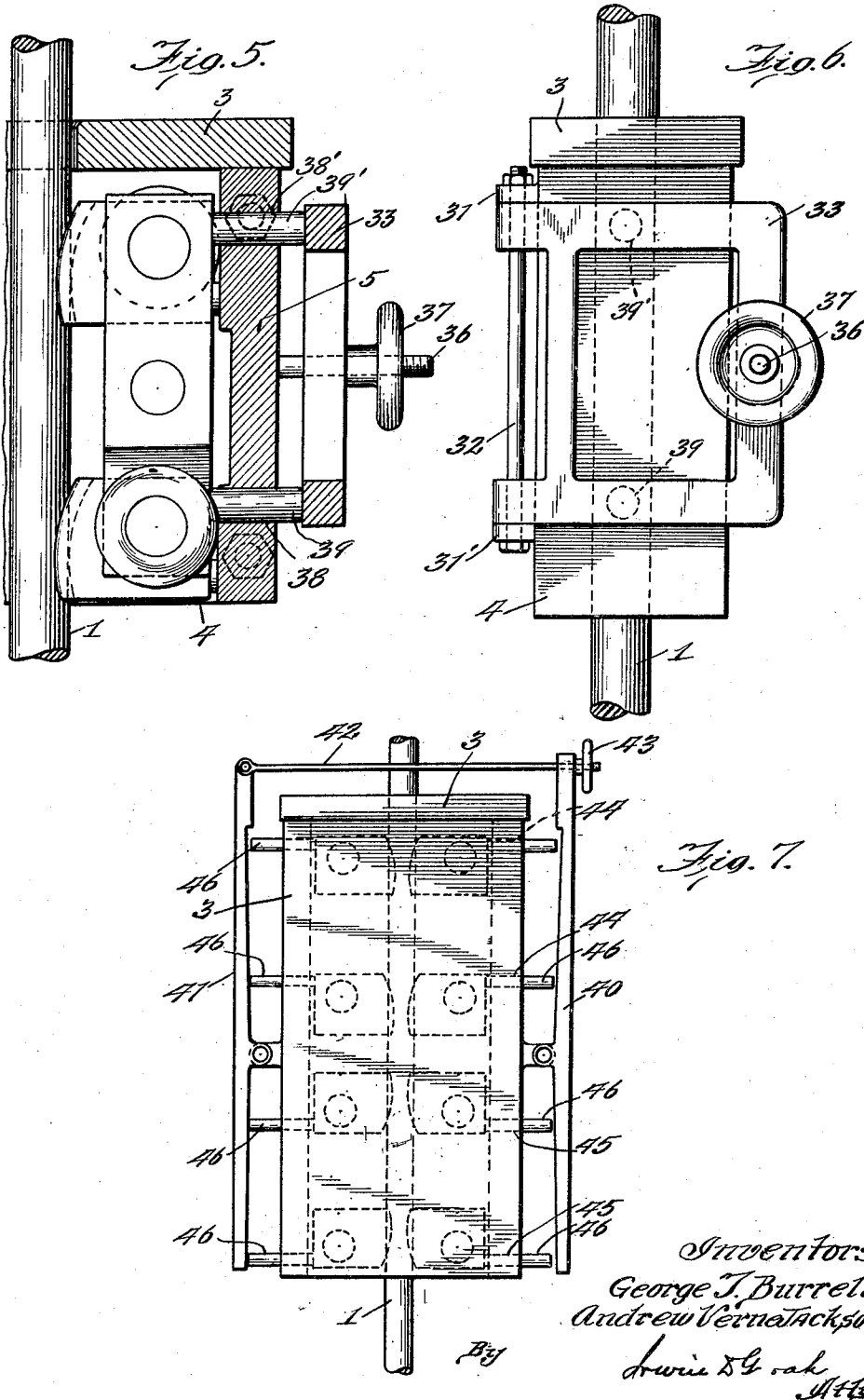
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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CLIMBING OR LIFTING JACK

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This invention relates to lifting or climbing mechanisms, and designs to provide an improved mechanism which is simple in construction and may be conveniently operated on an object upon which it is to elevate itself.

The object of this invention is to provide a device of the character described which will by the application of power thereto elevate itself on any object upon which it is mounted.

10 A further object of this invention is to provide a device of the character described which when mounted upon an object will elevate itself on said object by a step by step action, upon the application of power thereto.

15 A still further object of this invention is to provide a device of the character described having a casing and means mounted in said casing adapted to move relatively to said casing for climbing or elevating said casing on any object upon which it may be mounted.

20 A still further object of this invention is to provide a device of the character described having means for gripping the object which it is climbing when moved in one direction and to slide over said object when moved in the opposite direction.

A still further object of this invention is to provide a device of the character described having means for alternately gripping and releasing the object which it is climbing whereby it may elevate itself upon said object by the application of power.

35 A still further object of this invention is to provide a device of the character described having means for alternately gripping and releasing the object which it is climbing and a releasing means for holding said gripping means in inoperative position.

40 A still further object of this invention is to provide a device of the character described having means for gripping the object which it is climbing when moved in one direction and to slide over said object when moved in the opposite direction, and means for permitting

said last mentioned means to slide over said object when moved in any direction.

A still further object of this invention is to provide a device of the character described having a casing wherein all of the operating mechanism of said device may be supported and housed.

With the foregoing and other objects in view, which will appear as the description proceeds, this invention consists in the construction, arrangement and combination of parts of my mechanism whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in the appended claims, and illustrated in the accompanying drawings, in which;

Fig. 1 is a vertical sectional view taken on the line 1—1 of Fig. 2;

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 is a plan sectional view of the device with a releasing means mounted thereon;

Fig. 5 is a sectional view taken on line 5—5 of Fig. 4;

Fig. 6 is a side elevational view of the device shown in Fig. 4;

Fig. 7 is a view of a modification;

Fig. 8 is a view in perspective of a pair of links mounted on the shaft; and

Fig. 9 is a view in perspective of the main drive shaft.

Referring to the drawings 1 represents a rod, pipe, or post upon which the device is to be mounted for elevating itself. The climbing or lifting mechanism may be enclosed in a casing 2 having a top cover 3, front and rear walls 4, and side walls 5, fastened by bolts 6, or other suitable means to said front and rear walls 4. An opening 7 is provided in the top cover 3 through which is adapted to pass the rod or post 1. Arranged on said front and rear walls 4 and formed integral therewith are projections or bosses 8 in which

are journaled for rotation shafts 9 and 10, said shafts being parallel to each other and passing through said front and rear walls 4. Gears 11 and 12 are rigidly secured on one of the ends of each of said shafts 9 and 10 respectively and are arranged to mesh with each other at all times so that they may rotate at the same time and at the same rate of speed. One of the shafts, as the shaft 9 for example, is adapted to project beyond the gear 11, the projecting extremity of the shaft being squared as at 13 to receive a suitable crank arm (not shown) or the like for the purpose of turning said shafts.

Arranged on each of said shafts 9 and 10 and formed integral therewith or rigidly secured thereto are cam portions 14, 15 and 16, and 14', 15' and 16', respectively, the portions 14 and 16 and 14', 16' being identical in size while the intermediate cam portions 15 and 15' are a little larger. Since the structure mounted on each of the shafts 9 and 10 is exactly the same only that mounted on one shaft will be described. The cam portion 15 is adapted to be received in openings provided in the upper ends of link members 17 and 18, the lower ends of which link members are provided with openings for receiving a stub shaft, 19, upon which is pivotally mounted a lower jaw 20, said jaw being substantially rectangular in shape, and the front face 21 of which is curved as shown in Fig. 1 of the drawings. A recess 23 is provided in the lower portion of said jaw and is adapted to receive a spiral spring 24, which spring is held in said recess by means of a member or block 25, one end of which is adapted to bear against one end of said spring and the other end of which is adapted to bear against a portion of the wall 5. By means of this spring, the jaw 20 is kept in constant contact with the rod or post 1. The link members 17 and 18 are spaced from the front and rear walls 4, by means of spacing blocks or washers 26, which washers are adapted to distribute the thrust or load pressures to the casing 2.

The cam portions 14 and 16 of each shaft are adapted to be received in openings provided in the lower portions of link members 27 and 28, the upper portions of which link members are provided with openings for receiving a stub shaft 29 similar to the stub shaft 19 and upon which is mounted an upper jaw 30 similar to the lower jaw 20. The link members 27 and 28 are spaced from said jaw 30 by means of spacing blocks or washers 31. A recess 32 similar to the recess 23 has a spiral spring 33 and a block or member 35 therein, one end of said block bearing against one end of said spring and the other end of said block bearing against a portion of the wall 5. The jaws 20 and 30 are thus pivotally mounted in the upper and lower link members respectively which in turn are mounted on the shaft 9, and in a similar man-

ner the jaw 20' is mounted in links 17' and 18' and the jaw 30' in links 27' and 28' which in turn are mounted on the shaft 10, so that the two upper jaws and the two lower jaws move together and will cooperate to grip the rod or post.

The cam portions 14, 15 and 16, 14', 15' and 16' are so arranged that upon the rotation of the shafts 9 and 10 the link members 17 and 18, 17' and 18' will move in one direction while the link members 27 and 28, and 27' and 28' will move in a reverse direction carrying with them their respective jaws, which jaws because of the shape of their front faces 21 will grip said rod or post 1 when moved in one direction and slide over the same when moved in the opposite direction. As shown in the illustration in the accompanying drawings said jaws will grip the rod when moved downwardly but will pass over the same when moved upwardly. Thus it will be seen that when the shafts 9 and 10 are rotated by the application of power to the shaft 9 the lower jaws will first grip the rod or post while the upper jaws are moved upward, and in further rotation of said shafts the upper jaws will grip said rod while the lower jaws are moved upward. The device will thus elevate itself upon the rod by a step by step action.

The entire mechanism is enclosed in the casing 2 in such a way that excessive pressures or stresses are taken through this casing to an upper surface which forms a contact point with any object which may be placed on top of the mechanism or attached thereto, which it is desired to elevate or move on said rod or post.

In Figs. 4, 5 and 6, the invention is illustrated with a form of releasing means embodied therein, whereby the jaws may be moved out of operative engagement with the post or rod, 1. In the construction shown in the figures, one of the walls, as the wall, 4, for example, is provided with a pair of upper and lower lugs, 51 and 51', at each of its sides. A bolt or rod, 32, is positioned in one pair of lugs, and a bolt or rod, 32' is positioned in the other pair of lugs. Mounted on the rod, 32 and adapted to pivot thereon, is a rectangular frame, 33, said frame being arranged in a plane substantially parallel to the end wall 5, and the front portion of which frame extends beyond the casing 2. A rectangular frame 33' similar to the frame 33, is hingedly mounted on the rod or bolt 32' and is positioned adjacent to and in a plane substantially parallel to the other end wall 5 of the casing. The front portion of said frame 33' is adapted to extend to a point beyond the casing, and has pivoted therein as shown at 34, one end of an adjusting rod, 35, the other end of which adjusting rod is adapted to pass through a slot or opening, 36 provided in the front portion of the frame 33. The free end of the adjusting rod 35 is screw

threaded for receiving a nut 37 or other suitable means for adjusting the distance between the front portions of the frame 33 and 33'.

Openings 38 and 38' are provided in the end walls 5 of the casing at points just above the stub shafts upon which are mounted the jaws, and in these openings 38 and 38' are positioned for sliding movement, pins, 39 and 39', said pins being just long enough to make slight contact between a portion of the jaw and one end of the pin and a portion of the rectangular frame and the opposite end of the pin, when said releasing means is in inoperative position. Thus when it is desired to release the jaws from operative engagement with the rod or post, the nut, 37 may be rotated in a clockwise direction thereby moving the frames 33 and 33' towards each other and forcing the pins 39 and 39' to bear against the upper portion of their corresponding jaws, forcing the latter out of engagement with the rod or post against the action of the springs mounted in the jaws for keeping the latter in contact with the post.

In the modification employed in Fig. 7, the device comprises a set of upper and lower jaws mounted in the upper portion of a casing for elevating the device and a set of upper and lower jaws mounted in the lower portion of the casing for lowering the device. The front faces of the jaws in each set are so shaped as to adapt them for their respective functions. The construction of the lifting or climbing mechanism is exactly the same as that illustrated in Figs. 1, 2, 3.

In the construction illustrated in Fig. 7, a releasing means is employed which will release either one of the sets of operating jaws from operative engagement with the rod or post which it is climbing, or upon which it is being lowered. In this construction, the releasing means comprises a pair of arms, 40, and 41, pivoted intermediate their ends to a portion of the casing between the two sets of operating jaws. To one end of the arm 41, is pivotally connected an adjusting rod 42, the free end of which adjusting rod is adapted to pass through an opening or slot provided in the corresponding end of the arm 40. The free end of the adjusting rod 42 is screw threaded and has mounted thereon an adjusting nut 43 for adjusting the distance between the upper ends of the arms 40 and 41. In a manner similar to that employed in the illustration shown in Figs. 4, 5 and 6, openings 44 are provided in the walls of the casing at points just below the stub shafts upon which the lower set of jaws are mounted. Pins 46 are loosely mounted in said openings. When the nut 43 is rotated in a clockwise direction the upper portions of the arms 40 and 41 will bear against the pins 46 and force the same against a portion of their respective jaws to move the latter out of operative engagement with the rod or post.

At the same time the lower portions of the arms 40 and 41 will move out of contact with said pins allowing said jaws to operatively engage said rod or post because of the action of the spiral springs mounted in said jaws. By rotating said nut 43 in the opposite direction the lower set of jaws will be released and the upper set will be moved to operative position. Thus with the device illustrated in Fig. 7 one set of jaws may be employed for elevating the device and the other set of jaws may be employed for lowering the same.

It is thought that the operation of this climbing or elevating mechanism will be fully understood from the foregoing description from which it is evident that the device may be mounted on a rod, a post or a cable and upon the operation of the crank arm the jaws will operate to alternately grip and release the object which the device is climbing, and upon the cessation of operation of the crank arm will hold the device in any position to which it may have been elevated.

This invention is not to be understood as restricted to the details shown and described, since they may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what we claim as new and desire to secure by Letters Patent is:

1. A device of the character described, comprising a casing mounted for movement on a fixed object, a shaft journaled in said casing, upper and lower yokes mounted on said shaft, jaws mounted in said yokes, said jaws being in contact with said object, and being adapted for gripping said object when moved in one direction and for sliding over said object when moved in the opposite direction and cam portions provided on said shaft whereby the rotation of said shaft causes a sliding movement of said jaws, in directions opposite to each other.

2. A device of the character described, comprising a casing mounted for movement on a fixed object, a shaft, journaled in said casing, upper and lower pivotally mounted jaws operatively connected with said shaft, means on said shaft for causing sliding movement of said jaws in directions opposite to each other, said jaws being adapted for gripping said object when moved in one direction but to slide over said object when moved in a reverse direction.

3. A device of the character described, comprising a casing mounted for movement on a fixed object, a shaft journaled in said casing, cam portions provided on said shaft, links mounted on said cam portions, said cam portions causing a reciprocation of said links upon the rotation of said shaft, jaws pivoted in said links, said jaws being adapted to grip said object when moved in one direc-

tion and to slide over said object when moved in a reverse direction, and means for rotating the said shaft.

4. A device of the character described comprising a casing a shaft journaled in said casing having cam portions provided thereon, links having circular openings for receiving said cam portions mounted on said shaft, said cam portions causing a reciprocation of said links upon the rotation of said shaft, and jaws pivotally mounted in said links adapted to grip the object which it is climbing when moved in one direction but to slide over said object when moved in a reverse direction.

5. A device of the character described comprising a housing, a shaft journaled in said housing, yokes mounted on said shaft, and means for causing a reciprocation of said yokes relatively to said housing upon rotation of said shaft, said means comprising cams provided on said shaft and received in openings provided therefor in said yokes, and gripping jaws carried by said yokes.

6. A device of the character described comprising a casing, a shaft journaled in said casing, yokes connected to said shaft, jaws connected to said yokes, said jaws having means for gripping the object which the device is climbing when moved in one direction but to slide over said object when moved in the reverse direction, and cam portions provided on said shaft and received in openings in said yokes, whereby rotation of said shaft will cause a reciprocating movement of said yokes.

7. A device of the character described comprising a casing, a shaft journaled in said casing, cam portions arranged on said shaft, yokes connected to said cam portions, said cam portions causing a reciprocation of said yokes upon the rotation of the shaft, and jaws carried by said yokes, said jaws being adapted for gripping an object which the device is climbing when moved in one direction and for sliding over said object when moved in the opposite direction.

8. A device of the character described comprising a casing adapted for climbing a fixed object, a shaft journaled in said casing, a pair of yokes mounted on said shaft, means on said shaft for imparting reciprocating movement to said yokes upon rotation of said shaft, and jaws pivotally mounted in said yokes, said jaws being adapted for gripping said object when moved in one direction and for sliding over said object when moved in the opposite direction.

9. A device of the character described comprising a casing, a shaft journaled in said casing, yokes mounted on said shaft, and means on said shaft for imparting sliding movement to said yokes in directions opposite to each other upon rotation of said shaft, said means comprising cam portions

formed integral with said shaft and of different sizes in diameter.

10. A device of the character described comprising a casing, a shaft journaled in said casing, jaws mounted in said casing, and means whereby rotation of said shaft causes a sliding movement of said jaws, said means comprising cam portions formed integral with said shaft and of different sizes in diameter.

11. A device of the character described comprising a casing, a shaft journaled in said casing, jaws mounted in said casing, and means whereby the rotation of said shaft causes a sliding movement of said jaws in directions opposite to each other, said means comprising cam portions formed integral with said shaft and of different sizes in diameter.

12. A device of the character described comprising a casing, a shaft journaled in said casing, links mounted on said shaft, jaws mounted in said links, and means whereby rotation of said shaft causes a sliding movement of said links, said means comprising cam portions formed integral with said shaft and of different sizes in diameter.

13. A device of the character described comprising a casing, a shaft journaled in said casing, upper and lower link members mounted on said shaft, jaws pivotally mounted in said link members, and means whereby the rotation of said shaft causes a sliding movement of said links in directions opposite to each other, said means comprising cam portions formed integral with said shaft and of different sizes in diameter.

14. A device of the character described comprising a casing, a shaft journaled in said casing, cam portions provided on said shaft and formed integral therewith, links connected to said cam portions, said cam portions being of different size diameters for causing a reciprocating movement of the parts connected thereto upon rotation of the shaft and jaws pivoted in said links, said jaws being adapted for gripping the object which it is climbing when moved in one direction but to slide over said object when moved in a reverse direction.

15. A device of the character described comprising a casing, a shaft journaled in said casing, cam portions on said shaft, upper and lower yokes connected to said cam portions, said cam portions being of different size diameters for causing a reciprocating movement of the parts connected thereto upon rotation of the shaft and jaws pivoted in said yokes, the front faces of said jaws being so shaped that they will grip the object which the device is climbing when moved in one direction but will slide over said object when moved in a reverse direction.

16. A device of the character described comprising a casing mounted on a fixed ob-

ject and means mounted in said casing for alternately gripping and releasing said object, said means comprising oppositely disposed upper and lower pivotally mounted jaws adapted for gripping said object when moved in one direction and to slide over said object when moved in the opposite direction, reciprocating yokes in which said jaws are pivotally mounted, cam portions carried by said casing connected to said yokes for reciprocating the same upon the rotation of said cam portions, and means for rotating said cam portions.

17. A device of the character described comprising a casing mounted on a fixed object, means mounted in said casing for alternate up and down movement relative to said casing, said means comprising oppositely disposed upper and lower pivotally mounted jaws adapted for gripping said object when moved in one direction and to slide over said object when moved in the opposite direction, reciprocating yokes in which said jaws are pivotally mounted, cam portions carried by said casing connected to said yokes for reciprocating the same upon the rotation of said cam portions, and means for rotating said cam portions.

18. A device of the character described comprising a casing mounted on a fixed object, a shaft journaled in said casing, and means mounted on said shaft for alternate up and down movement upon the rotation of said shaft, said means comprising oppositely disposed upper and lower pivotally mounted jaws adapted for gripping said object when moved in one direction and to slide over said object when moved in the opposite direction, reciprocating yokes in which said jaws are pivotally mounted, cam portions carried by said casing connected to said yokes for reciprocating the same upon the rotation of said cam portions, and means for rotating said cam portions.

19. A device of the character described, means mounted on a fixed object for alternately gripping and releasing said object, said means comprising oppositely disposed upper and lower pivotally mounted jaws adapted for gripping said object when moved in one direction and to slide over said object when moved in the opposite direction, reciprocating yokes in which said jaws are pivotally mounted, cam portions carried by said casing connected to said yokes for reciprocating the same upon the rotation of said cam portions, and means for rotating said cam portions.

20. A device of the character described comprising a casing mounted on a fixed object, a shaft journaled in said casing, upper and lower yokes mounted on said shaft, means on said shaft for causing alternate up and down movement of said yokes upon rotation of said shaft, oppositely disposed piv-

otally mounted jaws provided in said yokes, said jaws being adapted for gripping said object when moved in one direction and to slide over said object when moved in the opposite direction, and means for causing a rotation of said shaft.

21. A device of the character described comprising a casing mounted on a fixed object, means slidably mounted in said casing for alternate up and down movement relative to said casing, and means mounted in said first mentioned means for gripping said object when moved in one direction and for releasing said object when moved in a reverse direction, said means comprising oppositely disposed upper and lower pivotally mounted jaws adapted for gripping said object when moved in one direction and to slide over said object when moved in the opposite direction, cam portions carried by said casing for causing a reciprocating movement of said jaws, and means for rotating said cam portions.

22. A device of the character described comprising a casing mounted on a fixed object for sliding movement thereon, said casing having jaws pivotally mounted therein adapted to grip said object when moved in one direction and to slide over said object when moved in a reverse direction, cam portions provided in said casing for causing reciprocating movement of said jaws, means for normally holding said jaws in contacting engagement with said fixed object, and means for releasing the said jaws from contacting engagement with said fixed object.

23. A device of the character described comprising a casing mounted on a fixed object, means mounted in said casing and adapted to normally permit movement of said casing in one direction only, said means comprising pivotally mounted jaws having spring means associated therewith for normally holding said jaws in contacting engagement with said fixed object.

24. A device of the character described comprising a casing mounted on a fixed object, a plurality of shafts mounted in said casing, yokes mounted on said shafts, means formed on said shafts for causing alternate up and down movement of said yokes upon the rotation of said shafts, means in said yokes for normally engaging said object, said means comprising pivotally mounted jaws adapted to grip said object when moved in one direction and to slide over said object when moved in the opposite direction, and a releasing means for disengaging said last mentioned means from said object.

25. A device of the character described comprising a casing mounted on a fixed object, means mounted in said casing for elevating the same on said object, said means comprising jaws adapted to grip said object when said jaws are moved downwardly with

with respect to said casing and to slide over said object when said jaws are moved upwardly with respect to said casing, means for causing alternate up and down movement of said jaws, a second means mounted in said casing for lowering the same on said object, said second means comprising jaws adapted to slide over said object when said jaws are moved downwardly with respect to said casing and to grip said object when said jaws are moved upwardly with respect to said casing, and a releasing means for holding either the first or second means in inoperative position.

26. A device of the character described comprising a casing mounted on a fixed object, means for elevating said casing on said object, said means comprising jaws adapted to grip said object when said jaws are moved downwardly and to slide over said object when said jaws are moved upwardly, a second means for lowering said casing on said object, said second means comprising jaws adapted to grip said object when said jaws are moved upwardly and to slide over said object when said jaws are moved downwardly, means for causing alternate up and down movement of said jaws, and a releasing means mounted on said casing intermediate said first and second means for holding either of said means in an inoperative position.

27. A device of the character described comprising a casing having a pair of shafts mounted therein, links carried by said shafts, clamping jaws operatively connected to said links, said jaws being pivotally mounted and adapted to alternately grip and release a fixed object, and separate means for causing the clamping jaws to release the object at all times.

28. A device of the character described comprising a casing mounted on a fixed object, pairs of clamping jaws pivotally mounted in said casing, shafts mounted in said casing, cams mounted on said shafts, links having circular openings at one end to receive said cams, and connected at their other ends to said clamping jaws, and spring means for urging said jaws into engagement with said fixed object.

29. A device of the character described comprising a casing, pairs of clamping jaws, shafts mounted in said casing, cam portions provided on said shafts, and links having circular openings at one end to receive said cam portions and at their other ends connected to said clamping jaws, said clamping jaws adapted to be operated simultaneously upon the rotation of said shafts for alternately gripping and releasing a fixed object, and separate means for rendering the said clamping jaws inoperative.

30. A device of the character described comprising a casing, shafts mounted in said

casing, pairs of clamping jaws, cams formed integrally with said shafts, links having circular openings at one end to receive said cams, and having stub shafts at their other ends for carrying said jaws, each pair of jaws being adapted to grip a fixed object when moved in one direction and to slide over said object when moved in the opposite direction, and means for imparting reciprocating motion to said jaws.

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