

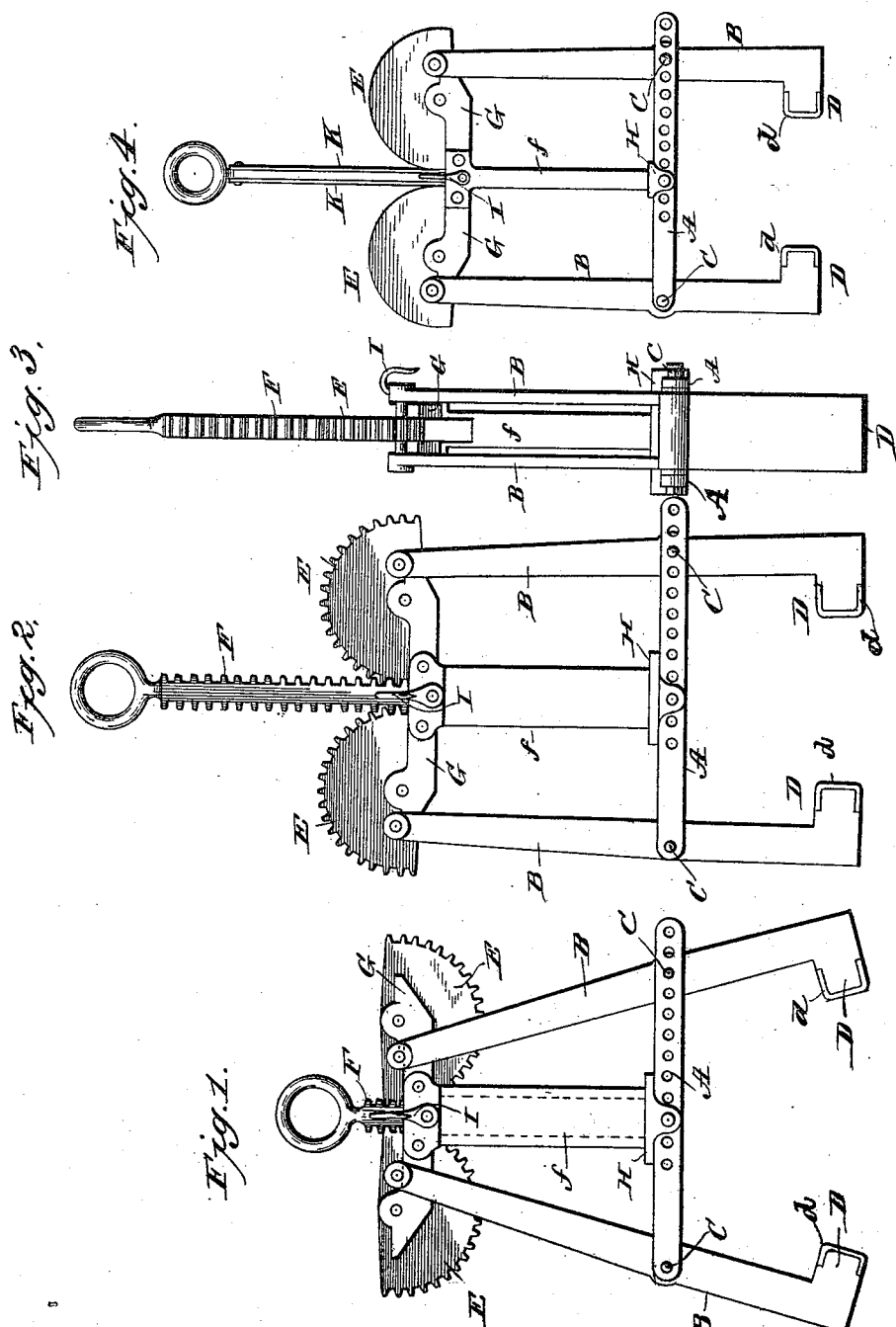
(No Model.)

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GRAPPLE AND GRAPPLE OPERATING MECHANISM.

No. 451,090.

Patented Apr. 28, 1891.



WITNESSES:

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CHARLES F. WALTER, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO ROBERT C. NEAL, HENRY M. KELLY, AND J. W. COVERT, ALL OF SAME PLACE.

GRAPPLE AND GRAPPLE-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 451,090, dated April 28, 1891.

Application filed December 13, 1890. Serial No. 374,592. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. WALTER, of Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Grapples and Grapple-Operating Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the letters of reference marked thereon.

This invention relates to improvements in grapples such as are employed to grasp and elevate substances, as blocks of stone, boxes, hay, or, in fact, any material at all, the configuration of the ends of the grasping arms or levers being changed to suit the material being operated upon. For instance, to adapt the device for elevating hay the arms should be long, slender, and pointed, while to adapt it for use in dredging the ends of the arms should form co-operating parts of a receptacle which will hold semi-liquid substances.

The object of the invention is to provide an operating mechanism in which the weight of the article being lifted will, through wedging mechanism, serve to move the grasping ends of the arms inward with great power, preventing all possibility of the article escaping, which mechanism shall be simple and strong.

The invention consists, broadly stated, in a grappling mechanism having pivoted grappling-arms, a movable lifting member, and pivoted wedging members interposed between the grappling-arms and lifting member.

Further, the invention consists in certain novel details of construction and combinations and arrangements of parts to be hereinafter described, and pointed out particularly in the claims at the end of this specification.

Referring to the accompanying drawings, Figure 1 is a side elevation of a simple grapple constructed in accordance with the present invention. Fig. 2 is a similar view with the parts in the position they occupy when lifting. Fig. 3 is an end elevation. Fig. 4 is a side elevation of a modified form, showing a different manner of connecting the lifting-bar with the cams or wedging members.

Similar letters of reference in the several figures indicate the same parts.

The letter A indicates the part I term the "main frame," which in the form shown consists of nothing more than a couple of straight bars of iron or similar material having means at each end for holding the pivots of the grappling-arms B. These arms are pivoted at the proper point intermediate the ends or bolts C, passing through apertures in the frame, as shown. The lower ends of the arms are properly shaped to engage the article or material to be operated upon in the device shown. Relatively broad knobs D are provided, so as to grasp and hold an article tightly without injuring the same, and to prevent any possibility of the same slipping the knobs are covered with a slightly-yielding material, such as leather, (shown at *d*). At the upper ends the arms are provided with the devices for wedging them apart, and thereby closing the lower ends to grasp the article. These devices consist, essentially, of a cam-shaped member pivoted to the upper end of one of the arms and a vertically-movable member for turning the same to force the arms apart, as will now appear.

E E indicate the cams formed by flat segments, preferably provided with peripheral teeth, and pivoted to the ends of the arms on eccentric centers, so that as they are rotated inward and upward by the rack-bar F, working between them and having the suspension-ring at the top, they necessarily force the arms apart, and the weight of the article being lifted determines the degree of pressure with which it shall be grasped.

To hold the cam-segments together with their gear-teeth in engagement with the rack-bar, as well as to provide a guide for the latter, a frame G connects the centers of the segments, which of course always maintain the same distance apart, and depending from this frame is a guide *f*, held against lateral movement by the guide H, mounted on the main frame.

A hook or suspension device such as I may be secured to either of the frames, from which to support the grapple when it is desired to hold the arms open, and by well-known trip-

ping devices the connection may be released and the strain brought to bear on the rack-bar, so as to close the arms from a distance, as at the base of a derrick from which the

grapple is suspended.

The capacity of the arms may be regulated by adjusting the point of connection with the main frame, and for this purpose a series of holes are shown in said frame, in any one of which the pivot may be placed. A similar arrangement is also provided for changing the position of the guide H, as might be necessary where but one arm is adjusted.

Many modifications of the construction herein shown may be made without departing from the scope of the invention. For instance, as shown in Fig. 4, instead of employing a rack-bar, flexible connections are made between the bar and cam-segments, such connections, as shown, consisting of thin metal strips K, connected at the outer ends to the outer portion of the segments and at the inner ends to the central suspension-piece.

Stops for limiting the movement of the cam-segments and arms may be formed by projections interposed in the path of any of the movable parts. Preferably, however, the frame G is extended at the ends and engages the pivots connecting the segments and arms when at either extreme of its movement, as shown in Figs. 1 and 2.

Having thus described my invention, what I claim as new is—

1. In a grapple, the combination, with a pivoted grappling-arm and the cam pivoted thereto, of the suspension device co-operating with the cam to turn the same and move the arm, and a co-operating grappling-arm, substantially as described.

2. In a grapple, the combination, with the pivoted grappling-arms, of the co-operating cams pivoted thereto, and the suspension-bar working between the cams and co-operating therewith to move the arms, substantially as described.

3. In a grapple, the combination, with the pivoted grappling-arms, of the co-operating cams pivoted thereto, the frame uniting said cams, and the suspension device co-operating with the cams to turn the same and move the arms, substantially as described.

4. In a grapple, the combination, with the pivoted grappling-arms, of the co-operating cams pivoted thereto, the frame uniting said cams, and the suspension-bar working through said frame and between the cams and co-operating with the latter to turn the same and move the arms, substantially as described.

5. In a grapple, the combination, with the pivoted grappling-arms, of the co-operating

cam-segments pivotally mounted on said arms on eccentric centers, the frame connecting said cam-segments by pivots passing through the true centers of the circle on which they are formed, and the suspension-bar working through said frame and co-operating with the cam-segments to turn the same, substantially as described.

6. In a grapple, the combination, with the pivoted grappling-arms, of the co-operating cam-segments pivoted thereto, the frame uniting said segments, the guide on said frame, and the suspension-bar co-operating with the segments and held by said guide, substantially as described.

7. In a grapple, the combination, with the pivoted grappling-arms, of the co-operating cam-segments pivoted thereto, the frame uniting said segments, the guide on said frame, the suspension-bar co-operating with the segments and held by said guide, and the suspension-hook on the frame, substantially as described.

8. In a grapple, the combination, with the pivoted grappling-arms, the co-operating cam-segments pivoted thereto, having gear-teeth thereon, and the frame uniting said segments, of the rack-bar working between and co-operating with the teeth on said segments, substantially as described.

9. In a grapple, the combination, with the pivoted grappling-arms, the co-operating cam-segments pivoted thereon, and the frame having the extended ends forming stops, of the suspension-bar working between and co-operating with the segments to move the same, substantially as described.

10. In a grapple, the combination, with the main frame and grappling-arms pivoted thereon, one of said arms being mounted on an adjustable pivot, and the cams pivoted on the upper ends of said arms, of the frame uniting the cams and the suspension-bar working between the cams, substantially as described.

11. In a grapple, the combination, with the main frame and grappling-arms pivoted thereon, one of said arms being mounted on an adjustable pivot, the cams pivoted on the upper ends of the arms, the frame uniting said cams, and the guide *f*, depending from said frame, of the adjustable guide H for holding the guide *f* against lateral movement and the suspension-bar working between the cams and through said guides, substantially as described.

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Witnesses:

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