

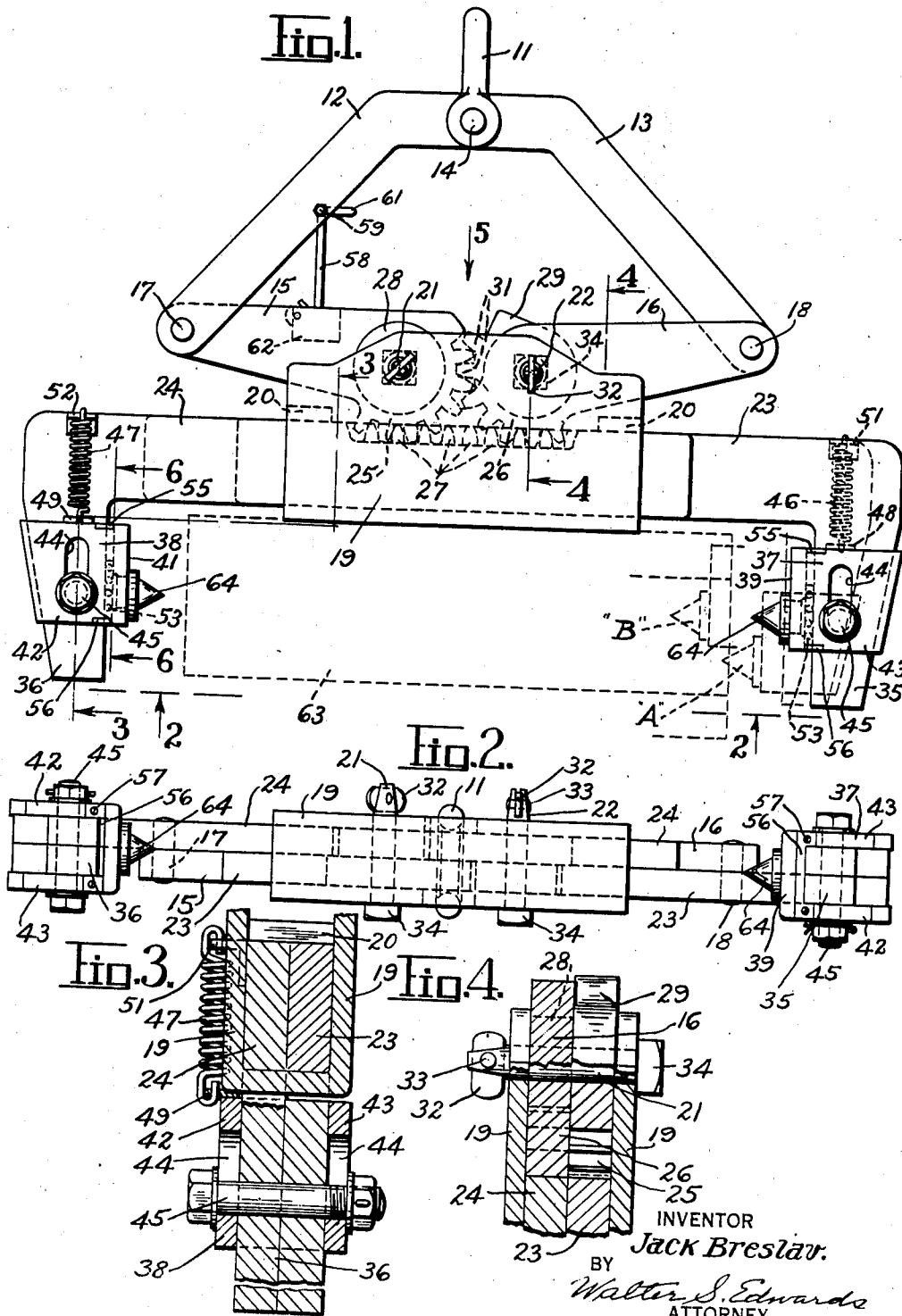
Dec. 21, 1943.

J. BRESLAV
STOCK LIFTING GRAB

2,337,178

Filed Nov. 17, 1942

2 Sheets-Sheet 1



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FIG. 5.

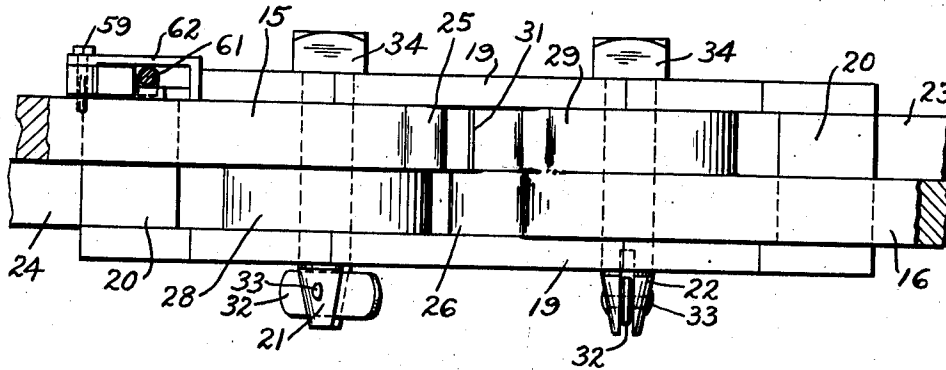


FIG. 6.

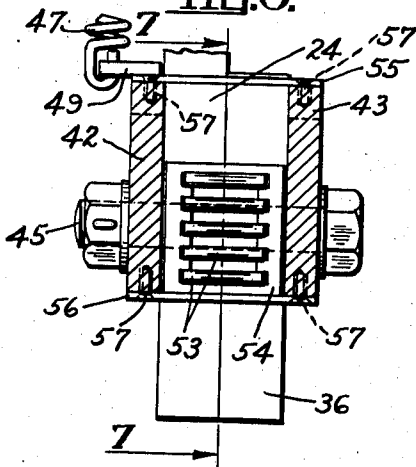


FIG. 7.

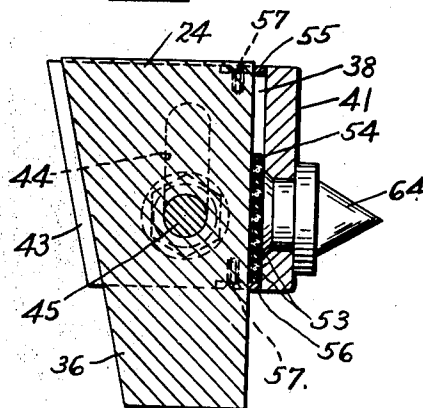


FIG. 8.

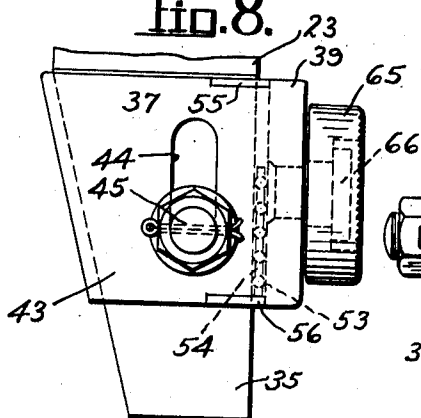
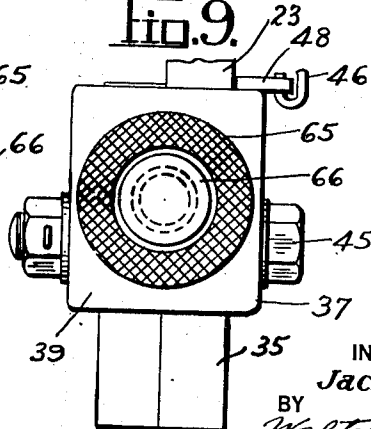


FIG. 9.



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STOCK LIFTING GRAB

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16 Claims. (Cl. 294—86)

This invention relates to stock lifting grabs and more particularly to improvement in lifting grabs of the sliding-bar type, whereby jaws supported thereby may be moved toward and away from each other to engage and grip stock disposed therebetween.

In using stock lifting grabs of this type, it is often desirable to rotate the stock about its axis, extending from one grab jaw to the other, so as to be able to position the stock as required at the place to which the stock is transferred by the crane, from which the grab is suspended. One object of this invention, therefore, is to provide in a stock lifting grab mechanism whereby the stock after being gripped and raised may be rotated into the position desired.

In stock lifting grabs of the above type the jaw holding bars are often actuated by swinging arms which are operably connected to the bars through the meshing of the gear teeth of gear segments formed on the arms, with the teeth of gear racks, formed on the bars. In such forms of grabs it is desirable that provision be made to vary the maximum amount of opening, or closing, allowed the jaws, and therefore another object of this invention is to provide improved means for so doing.

Still another object of this invention is to provide in stock lifting grabs, wherein rotation of the stock after it is raised is provided for by the features of this invention, stock engaging jaws arranged to move relatively to depending extensions of the sliding bars.

A further object of this invention is to provide means in a stock lifting grab having movable stock engaging jaws, means to reduce friction between them and the bar extensions to a minimum.

A still further object of this invention is to provide an improved stock lifting grab which will be relatively simple in construction, inexpensive to manufacture, readily manipulated, compact, and very efficient and durable in use.

With these and other objects in view, which will appear as the description proceeds, there have been illustrated in the accompanying drawings forms of grabs in which the features and principles of this invention may be conveniently embodied in practice, it being understood that various changes may be made within the scope of what is claimed, without departing from the spirit of the invention.

In the drawings:

Figure 1 is a side view of a stock lifting grab embodying the features and principles of this invention;

Figure 2 is an underside view of the same looking in the direction of arrows 2—2 in Figure 1;

Figure 3 is an enlarged broken sectional view taken on the line 3—3 of Figure 1;

Figure 4 is an enlarged broken sectional view taken on the line 4—4 of Figure 1;

Figure 5 is an enlarged top plan view of the sliding bars and their housing and looking in the direction of arrow 5 of Figure 1;

Figure 6 is an enlarged sectional view taken on the line 6—6 of Figure 1;

Figure 7 is a sectional view taken on the line 7—7 of Figure 6;

Figure 8 is a side view of a modified form of stock engaging jaw; and

Figure 9 is an end view of the same.

Referring to the drawings wherein like reference numerals designate like parts throughout the several views the numeral 11, Figure 1, denotes a shackle by which the stock lifting grab, illustrated in the drawings, may be connected to a hoist, or crane, to be moved thereby to transfer stock from one location to another. The juxtaposed ends of oppositely directed arms 12 and 13 are pivoted together and to the shackle 11 by a pivot pin 14. The other ends of the arms 12 and 13 are respectively pivoted to the outer ends of arms 15 and 16 by pivot pins 17 and 18, respectively. The arms 15 and 16 extend toward each other and are pivoted to a bar supporting housing 19 by removable pivot pins 21 and 22, respectively. The housing 19 is U-shaped in cross-section and is of sufficient length to properly support juxtaposed jaw holding bars 23 and 24 which are slidable lengthwise in this housing. Cross bars 20 extend across the housing at its top to reinforce it and to assist in guiding the bars 23 and 24 and prevent them tilting upwardly.

The inner and adjacent ends of the arms 15 and 16 have gear segments 25 and 26, respectively formed thereon, which are adapted to mesh with gear rack teeth 27 formed in the upper edge of each of the bars 23 and 24, respectively. The arm 15 is spaced from one side of the housing 19 by a spacing disc 28 so that the teeth of the gear segment 25 will not engage the rack teeth 27 on the bar 24, and the arm 16 is spaced from the other side of the housing 19 by a space block 29 so that the teeth on the gear segment 26 will not mesh with the rack teeth 27 on the bar 23. In this instance, the space block 29 has two teeth 31 formed thereon which are positioned to mesh with the teeth on the gear segment 25 so that both arms 15 and 16 will be controlled to move

in unison, and that the bars 23 and 24 will slide in the housing 19 an equal amount in opposite directions.

The pivot pins 21 and 22, as above stated are removable, and this provision is for the purpose of being able to readily remove the gear segments 25 and 26 out of mesh with the rack teeth 27 on the bars 15 and 16, in order to vary the maximum amount of jaw members carried by the bars may be opened, or closed. By removing the gear segments the bars 15 and 16 may be slid along in the housing 19 to position the jaw members for gripping various lengths of stock. The pins 21 and 22 are each provided with a key 32 which is pivoted by a pin 33 to an end of the respective pivot pin 21 and 22 and assumes a cross-wise position to releasably lock the pivot pin in assembled position, a head 34 being provided on the other end of each pivot pin 21 and 22. By rotating the key 32 on its pivot to align it with the pivot pin 21, or 22, the respective pivot pin is easily removed.

The bars 23 and 24 are provided with legs 35 and 36, respectively, which legs depend from the outer ends thereof. In this instance the legs 35 and 36 are reinforced by having a block welded thereto to provide the desired bearing width for the respective stock gripping jaws 37 and 38, respectively. The jaws 37 and 38 are U-shaped in cross-section and straddle the respective thickened legs 35 and 36 with their base portions 39 and 41, respectively, facing each other. The arm portions 42 and 43 of each jaw 37 and 38 are provided with elongated slots 44 through which pins 45, herein shown as bolts, project to secure the jaws 37 and 38 to the legs 35 and 36, respectively. Springs 46 and 47 secured at their lower ends to lugs 48 and 49 attached, as by welding, to the jaws 37 and 38, respectively, bias these jaws upwardly upon the legs 35 and 36. The upper ends of the springs 46 and 47 are secured to lugs 51 and 52 which are attached, as by welding, to the bars 23 and 24, respectively.

A plurality of anti-friction rollers 53, loosely held in a rack 54, Figures 6 and 7, are disposed between the inner surface of the base portions 39 and 41, of the jaws 37 and 38, and the adjacent surface of the legs 35 and 36, respectively, to reduce friction therebetween to a minimum. The rollers 53 of each set are adapted to be engaged by the aforesaid opposing surfaces and maintain the rack 54 out of engagement with these surfaces. The racks 54 with the rollers 53 are free to travel both up and down along the aforesaid surfaces an amount substantially equal to the amount of movement of the jaws 37 and 38, permitted by the elongated slots 44. The racks 54 are prevented from movement out between the aforesaid surfaces by cross-bars 55 and 56, secured at the top and bottom of each jaw by screws 57.

The grab illustrated, is shown provided with a fully automatic form of means for releasably locking the jaws 37 and 38 in open position. This means is similar in every respect to that shown in the applicant's copending application Serial No. 461,343, filed Oct. 8, 1942, and includes a swingable catch member 58 pivoted to the arm 12, at 59, and having an offset counterweight portion 61. The catch member 58 enters a casing 62 and is acted upon therein by suitable means (not shown) to lock the arm 12 to the arm 15 in the position shown in Figure 1 and then, by proper manipulation of the hoist, from which the grab

is hung, to release these arms to permit the jaws 37 and 38 to close against stock 63 (see dotted lines in Figure 1) to grip the same therebetween.

The form of grab illustrated in Figures 1-7, inclusive, is provided with pointed stock engaging members 64, one of which is secured to and protrudes from the base portion of each jaw 37 and 38. Being in opposed relation these pointed members 64 will slightly dig into the stock 63, to be raised, and act as centers, about which the stock may be rotated after being raised from its support. The form of stock engaging members shown in Figures 8 and 9 may be provided in place of the pointed members 64 as desired. In this form, members 65, having their stock engaging surfaces serrated to provide a good grip on the stock, are rotatably mounted to the base portions 39 and 41, of the jaws 37 and 38, respectively, by being secured thereto upon headed studs 66 fastened to and protruding from the jaws 37 and 38. By being rotatably mounted on the studs 66 the members 65, and the stock 63 gripped therebetween, rotate together, when the stock is raised from its support.

Operation

The grab of this invention, and which is constructed as above described, is particularly efficient in use for raising stock which is required to be rotated, either before placing it on a support to which it has been transferred, or back upon the support from which it is raised. After actuating the grab by raising it to swing the arms 15 and 16 upwardly, and through the gear segments 25 and 26 to cause the jaws 37 and 38 to grip the stock therebetween, the jaws 37 and 38 ride downwardly into the position "A" shown in Figure 1 before the stock 63 is raised from its support. This results in the formation of a space between the stock and the housing 19 sufficient to allow rotation of the stock, especially if it be rectangular in cross-section. When the stock is again placed upon a support and the grab is lowered to spread the jaws 37 and 38 the springs 46 and 47 act on the jaws 37 and 38 to again raise them into their initial position, as shown in Figure 1.

By removing the pins 21 and 22 and adjusting the gear segments in respect to the rack teeth 27 on the bars 23 and 24, the initial position of the jaws 37 and 38 may be varied. For instance these jaws may be set closer together to an initial position as indicated by dotted lines "B" in Figure 1.

The provision of the timing gear segment 29, which is set in position before securing it, as by welding, to the arm 16, insures that the arms 15 and 16 will move in unison and thereby move the jaws 37 and 38 uniformly toward each other. The provision of freely movable rollers between the jaws and the legs of the jaw closing arms prevents binding at this point and insures freedom of movement and ease in operation.

While there has been described above preferred forms in which the features and principles of this invention are embodied, it will be understood that the same may be embodied in other specific forms without departing from the spirit and essential attributes thereof, and it is therefore desired that the present embodiments be considered in all respects as illustrative and not restrictive, reference being had to the claims rather than to the foregoing description to indicate the scope of the present invention.

Having thus fully disclosed the invention, what

is claimed as new and for which it is desired to secure Letters Patent, is:

1. In a stock lifting grab, opposing jaw members arranged to move toward and away from opposite side of stock to be lifted, means to support said jaw members, means to actuate said supporting means to move said jaws toward and away from each other, means on said jaw members to engage the stock to be lifted and forming a pivot about which the stock may be rotated when engaged and raised from its support, and means to connect said jaw members to the supporting means for sliding movement thereon in the direction of movement of the stock from its support.

2. In a stock lifting grab, opposing jaw members arranged to move toward and away from opposite sides of stock to be lifted, means to support said jaw members, means to actuate said supporting means to move said jaws toward and away from each other, means on said jaw members to engage the stock to be lifted and forming a pivot about which the stock may be rotated when engaged and raised from its support, means to connect said jaw members to the supporting means for sliding movement thereon in the direction of movement of the stock from its support, and anti-friction rollers disposed between the jaw members and the supports therefor in position to have the thrust, of the engagement of the pivot means upon the stock, imposed thereon.

3. In a stock lifting grab, opposing jaw members arranged to move toward and away from opposite sides of stock to be lifted, means to support said jaw members, means to actuate said supporting means to move said jaws toward and away from each other, said jaw members being adapted to engage the stock to be lifted, means to connect said jaw members to the supporting means for sliding movement thereon in the direction of movement of the stock from its support, and anti-friction means disposed between the jaw members and the supports therefor in position to have the thrust, of the engagement of the jaw members upon the stock, imposed thereon.

4. In a stock lifting grab, opposing jaw members arranged to move toward and away from opposite sides of stock to be lifted, means to support said jaw members, means to actuate said supporting means to move said jaws toward and away from each other, said jaw members being adapted to engage the stock to be lifted, means to connect said jaw members to the supporting means for sliding movement thereon in the direction of movement of the stock from its support, a plurality of rollers disposed between the jaw members and the supports therefor in position to have the thrust, of the engagement of the jaw members upon the stock, imposed thereon, and a rack in which the rollers are loosely carried, said rack with the rollers being freely slidable between the jaw members and the supports.

5. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw on its outer end, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack formed on the inner end of each bar and arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, and a second gear segment on one of the arms adapted to cooperate with the gear segment on the other arm to insure movement of the arms in unison.

6. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw on its outer end, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack formed on the inner end of each bar and arranged to cooperate with the gear segment on an arm to be actuated when the arm is swung, and a second gear segment on one of the arms adapted to cooperate with the gear segment on the other arm to insure movement of the arms in unison, said arms being separately and removably pivoted to a support, whereby the arms may be readily removed to adjust the cooperating action between the gear segments and the respective gear racks on the bars, to vary the opening and closing movement of the jaws.

7. In a stock lifting grab, opposing jaw members arranged to move toward and away from opposite sides of stock to be lifted, means to support said jaw members, means to actuate said supporting means to move said jaws toward and away from each other, said jaw members being adapted to engage the stock to be lifted, means to connect said jaw members to the supporting means for sliding movement thereon in the direction of movement of the stock from its support, a plurality of rollers disposed between the jaw members and the supports therefor in position to have the thrust, of the engagement of the jaw members upon the stock, imposed thereon, and a rack in which the rollers are loosely carried, said rack with the rollers being freely slidable between the jaw members and the supports, and means to bias the jaw members in the direction the stock is to be lifted.

8. In a stock lifting grab having oppositely slidable juxtaposed bars each having a stock engaging jaw slidably mounted thereon, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, means to actuate said arms, and means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated when engaged and raised from its support.

9. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, means to actuate said arms, means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, and means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support.

10. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, means to actuate said arms means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support, and spring means to bias the jaws in the direction the stock is to be lifted.

11. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, means to actuate said arm, means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support, springed means to bias the jaws in the direction the stock is to be lifted, and a set of anti-friction rollers disposed between each of the jaws and each of the slidable bars in position to have the thrust, of the engagement of the jaws upon the stock, imposed thereon.

12. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, means to actuate said arms, means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support, a set of anti-friction rollers disposed between each of the jaws and each of the slidable bars in position to have the thrust, of the engagement of the jaws upon the stock, imposed thereon, a rack in which set of rollers is loosely carried, said rack with the rollers being freely slidable between the jaws and the bars.

13. In a stock lifting grab having oppositely slidable juxtaposed bars each having a stock engaging jaw slidably mounted thereon, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, a second gear segment on one of the arms adapted to cooperate with the gear segment on the other arm to insure movement of the arms in unison, means to actuate said arms, and means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated.

14. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when

the arm is swung, a second gear segment on one of the arms adapted to cooperate with the gear segment on the other arm to insure movement of the arms in unison, means to actuate said arms, means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, and means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support, and spring means to bias the jaws in the direction the stock is to be lifted.

15. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, a second gear segment on one of the arms adapted to cooperate with the gear segment on the other arm to insure movement of the arms in unison, means to actuate said arms, and means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support, and a set of anti-friction rollers disposed between each of the jaws and each of the slidable bars in position to have the thrust of the engagement of the jaws upon the stock imposed thereon.

16. In a stock lifting grab having oppositely slidable juxtaposed bars each carrying a stock engaging jaw, a swingable arm for actuating each slidable bar, a gear segment on each arm, a gear rack on each bar arranged to cooperate with the gear segment on an arm, to be actuated when the arm is swung, a second gear segment on one of the arms adapted to cooperate with the gear segment on the other arm to insure movement of the arms in unison, means to actuate said arms, means on said jaws to engage the stock to be lifted and forming a pivot about which the stock may be rotated, means to connect one of said jaws to each of the slidable bars for sliding movement thereon in the direction of movement of the stock from its support, spring means to bias the jaws in the direction the stock is to be lifted, a set of anti-friction rollers disposed between each of the jaws and each of the slidable bars in position to have the thrust, of the engagement of the jaws upon the stock, imposed thereon, a rack in which set of rollers is loosely carried, said rack with the rollers being freely slidable between the jaws and the bars.

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