

[54] **DOOR HANGING DEVICE**

3,643,935 2/1972 Bell..... 214/1 SW X

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[57] **ABSTRACT**

[52] U.S. Cl..... **214/1 D; 214/1 Q; 214/650**

A door handling apparatus that is adapted to hold a heavy door or similar object in a plurality of positions whereby the door may be worked on while supported on the apparatus. The apparatus includes a substantially vertical main frame mounted on a rollingly supported base. A rotatable door carriage is slidably mounted on the frame so that the door may be universally positioned to perform operations on the door and also to assist in hanging of the door. The apparatus also includes a wheel lock to prevent the door holding apparatus from moving while work is being done on the door.

[51] Int. Cl.²..... **B25B 1/22**

[58] Field of Search..... 214/1 Q, 1 QA, 1 R, 672, 214/1 QF, 1 D, 1 H, 1 SW, 1 S, 650, 651, 652; 52/749, 745

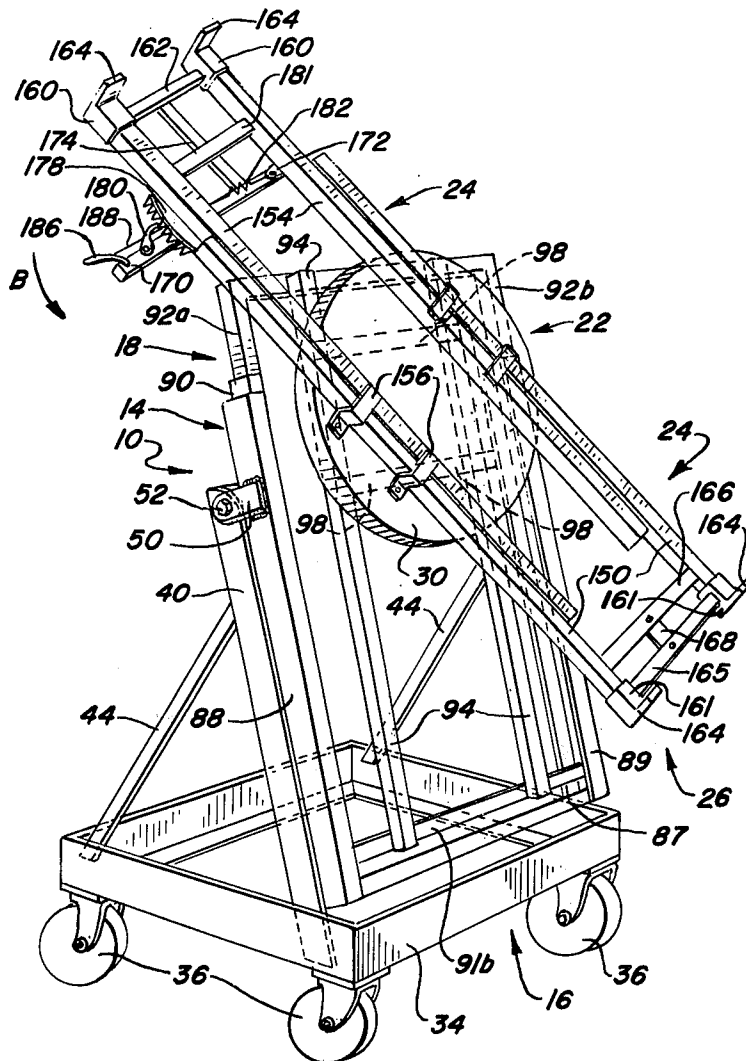
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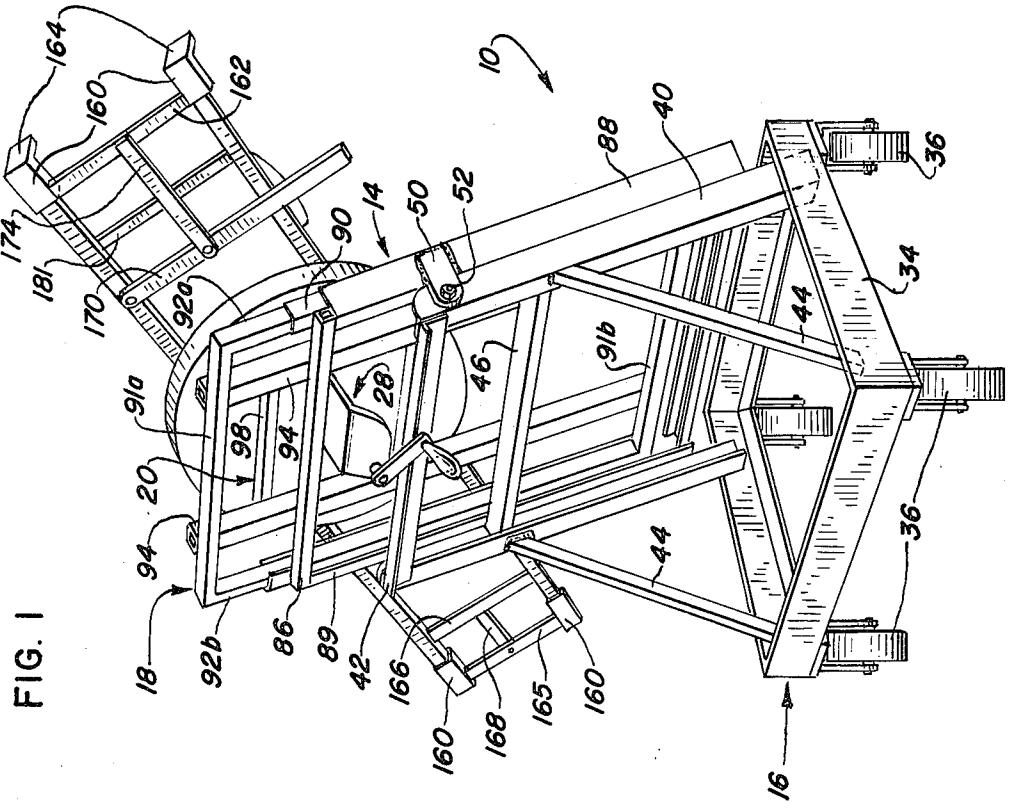
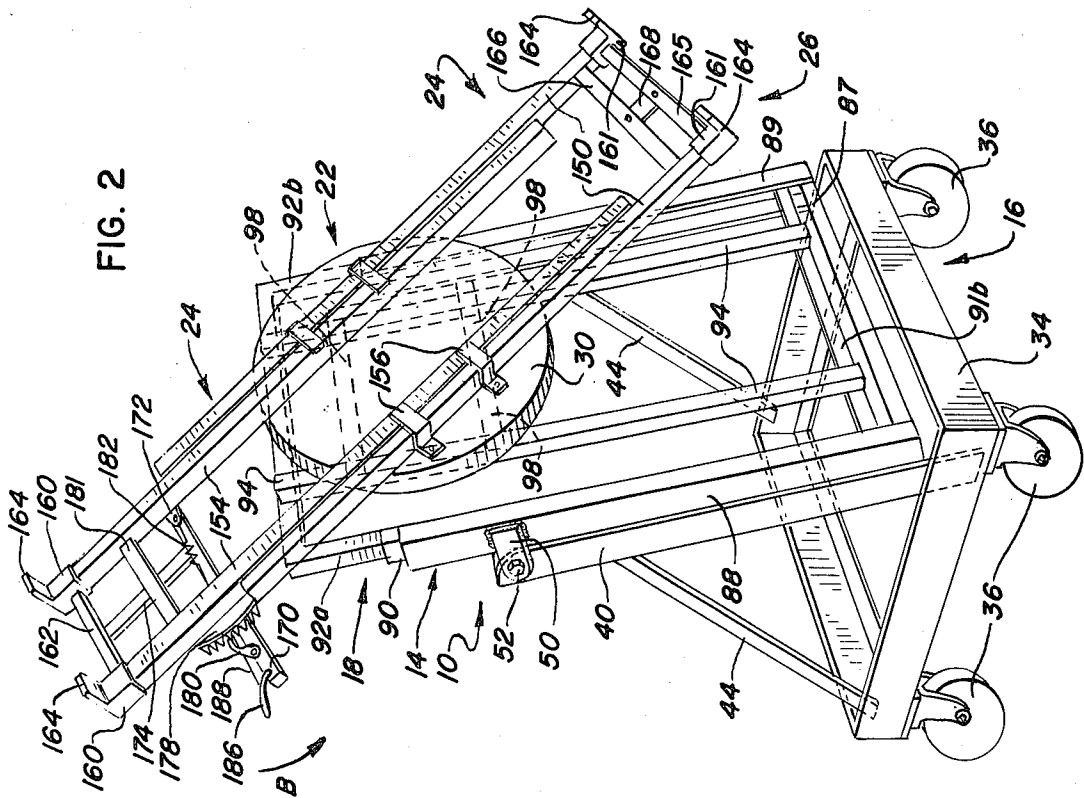
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8 Claims, 6 Drawing Figures





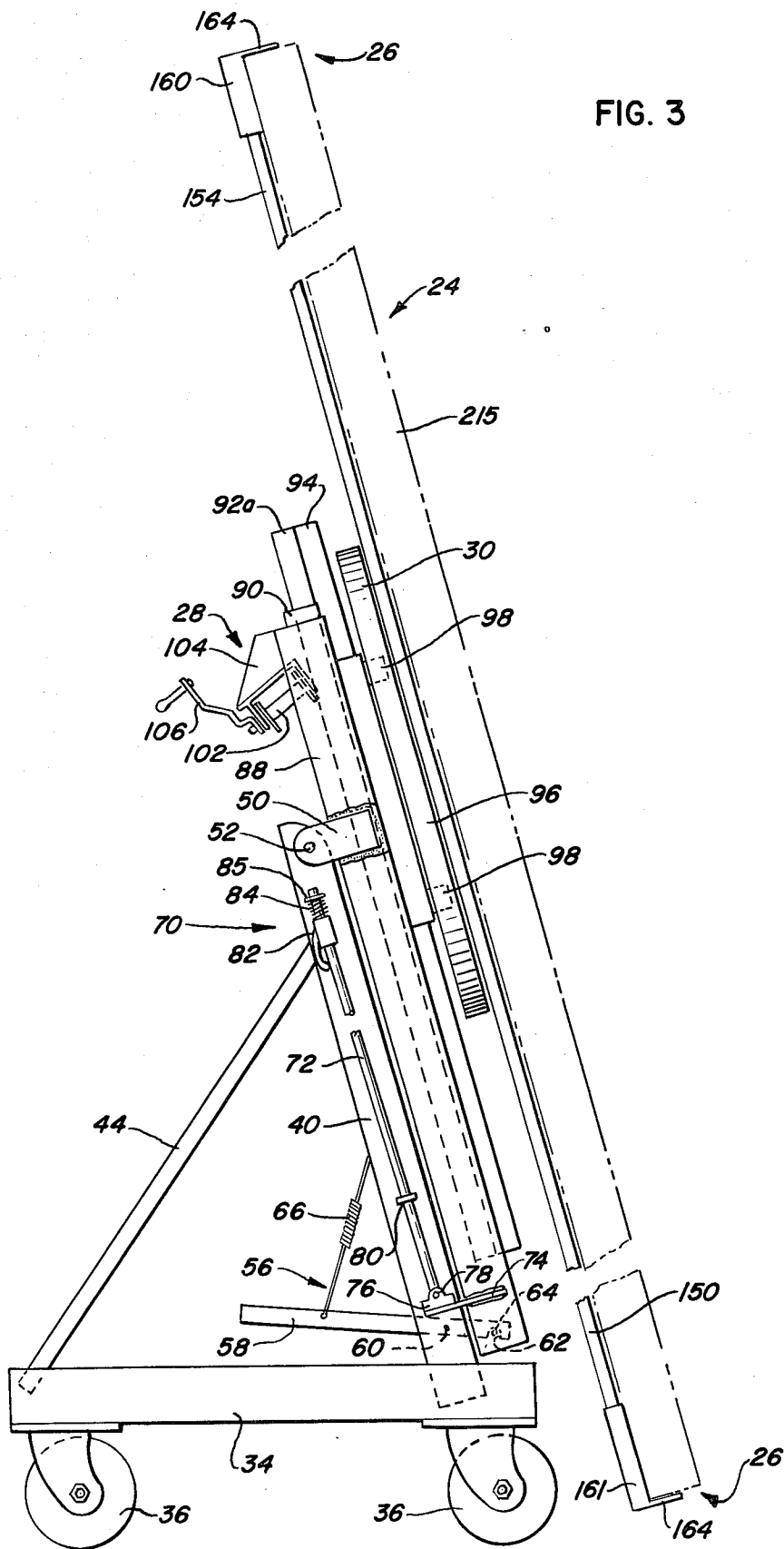


FIG. 4

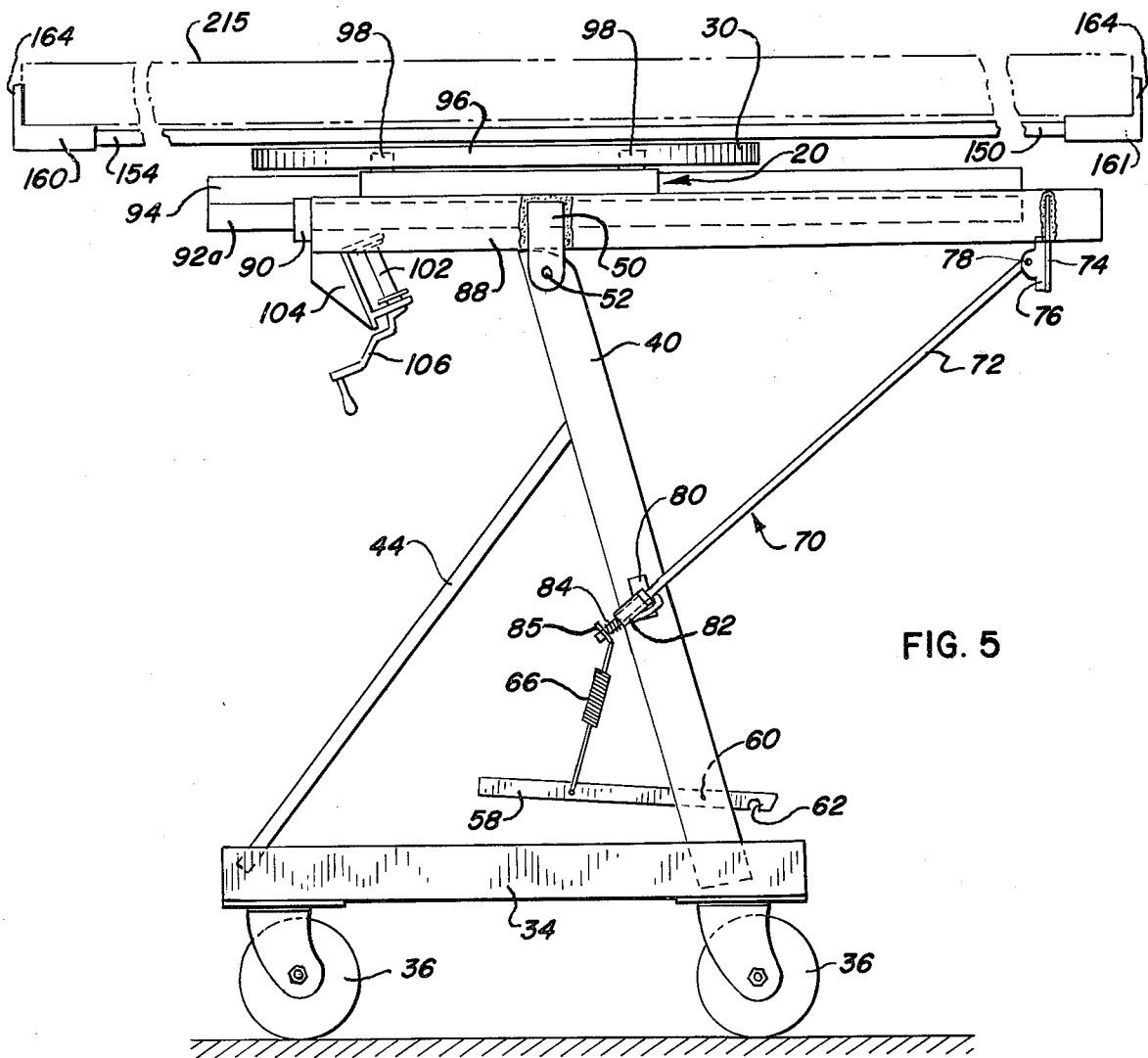
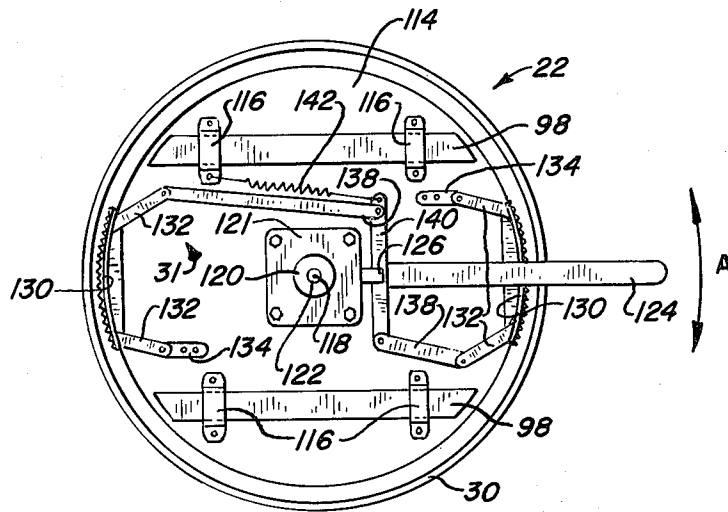


FIG. 5

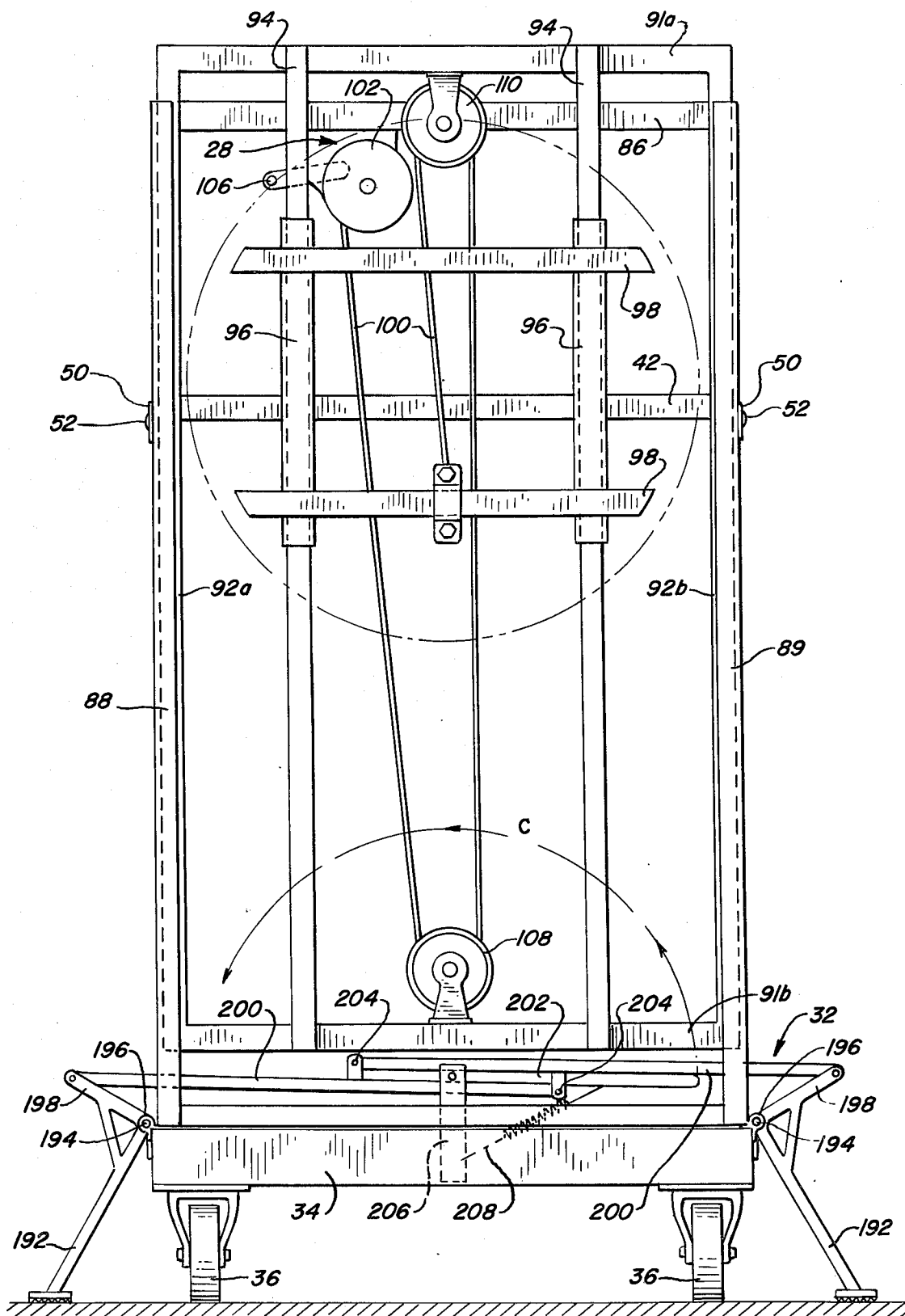


FIG. 6

DOOR HANGING DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to door handling devices and in particular those which support a door in a plurality of positions so as to enable the user to hang the door within a door jamb.

2. Brief Description of the Prior Art

In the past, various types of carts and trucks have been used in moving heavy doors from place to place on a job site but they have been found to require several men in order to move a heavy door to a desired destination. Also, if such prior art carts or trucks are used for transporting a door, the door has to be lifted therefrom and supported by other means in a horizontal position if work is to be performed thereon. The previous devices have also been unable to grasp a door in such a manner that it could be rotated while the door is in a generally vertical position.

The present invention overcomes these operational disadvantages found in prior equipment of the type described, in that it permits one man to move a heavy door from place to place, rotate the door while in a vertical orientation and also swing the door into a horizontal orientation to permit work to be performed thereon.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a new and improved door handling apparatus as described above and including means to rotate the door while in the vertical or horizontal orientation. The door handling apparatus includes a base assembly, a substantially vertical first frame pivotally mounted on the base assembly capable of moving the door from a vertical to a horizontal orientation, and door holding means mounted on said first vertical frame capable of holding a door for reciprocal and rotational movement with respect to said first movable frame.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a generally rear, perspective view of the door handling apparatus of the present invention;

FIG. 2 is a generally front, perspective view of the door handling apparatus similar to that shown in FIG. 1;

FIG. 3 is an elevational view of the door handling apparatus shown holding a door in a relative vertical position;

FIG. 4 is a fragmented view showing the brake assembly of the present invention;

FIG. 5 is another elevational view of the door handling apparatus shown holding a door in the relative horizontal position; and

FIG. 6 is a front elevational view showing the door handling apparatus with the brake assembly removed.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIGS. 1 and 2 of the drawings, the overall assembly of the door handling apparatus, generally designated 10, includes a main frame, generally designated 14, which is pivotally mounted on a base assembly, generally designated 16, normally at an angle of approximately 15° with the vertical. A carriage support frame, generally designated 18, is slidably mounted in the main frame 14 and a carriage, generally designated

20, is slidably mounted on the carriage support frame 18 for up and down movement with respect thereto. A brake assembly, generally designated 22 (FIG. 4), is rotatably mounted on the carriage 20. A pair of parallel spaced apart telescoping arms, generally designated 24 (FIGS. 2 and 3) are mounted on the brake assembly 22 for rotation therewith. The arms 24 have grasping means, generally designated 26, on the ends thereof for grasping a door. The door handling apparatus also includes a winch, generally designated 28 (FIGS. 1 and 3) mounted on the main frame 14 for sliding the carriage support frame 18 and the carriage 20 up and down with respect thereto.

Looking at FIG. 4, the brake assembly 22 includes a brake drum 30 and clamping means, generally designated 31, associated with the brake drum 30 for preventing rotation of the brake drum 30. Ground engageable stop means, generally designated 32 (FIG. 6), are provided to prevent the door holding apparatus 10 from moving while work is being done on the door.

Looking at FIGS. 1 and 2, the base assembly 16 includes a generally square horizontal base frame 34 having four pivotally mounted, ground engaging coasters 36, one at each corner of the base frame 34, for rollingly supporting the apparatus 10 on a floor or other surface. The base assembly 16 includes two support members 40 secured to the base frame 34 and extending upwardly from the two righthand corners at generally an angle of 15° from the vertical as shown in FIG. 3. A horizontal member 42 (FIG. 1) is secured to the top of each member 40 to add rigidity to the base assembly 16. Looking at FIG. 3, two additional members 44 extend upwardly from the lefthand corners of the base frame 34 and are secured to the members 40 near their uppermost ends. An additional cross bar 46 (FIG. 1) connects the uppermost ends of the members 44 for added rigidity.

The main frame 14 is mounted to the members 40 by means of a tab 50 secured on each side of the main frame 14 and pivotally connected to the support members 40 by a pin 52. A latch, generally designated 56 (FIGS. 3 and 5) is provided to lock the main frame 14 in its generally vertical position.

More particularly, the latch 56 includes a bar 58 which is pivotally mounted on a supported member 40 by a pin 60 (FIGS. 3 and 5). The bar 58 includes an elongated notch 62 which engages a stud 64 on the main frame 14 thereby locking the main frame in its generally vertical position. A spring 66 biases the bar 58 to hold the notch 62 into engagement with the stud 64.

When it is desired to support a door in a generally flat horizontal position, the main frame 14 is rotated about the pins 52 after the bar 58 is manually depressed to disengage it from the stud 64. The main frame 14 is then free to rotate upwardly about the pins 52 to a horizontal position (FIG. 5).

Stop means, generally designated 70 (FIGS. 3 and 5), is provided on the main frame 14 to hold the main frame 14 in a horizontal position, as shown in FIG. 5. More particularly, the stop means 70 includes a shaft 72 which is pivotally connected to the main frame 14. The pivotal connection includes a plate 74, secured to the main frame 14, having a tab 76 with a pin 78 there-through. The rod 72 slidably engages a ring 80 which is pivotally mounted on the support member 40. A latch 82 is provided on the shaft 72 and is secured near one end to a shaft 84 which is secured to a flange 85 at the

end of the shaft 72. Thus, as the main frame 14 is rotated about the pins 52, the shaft 72 will slide outwardly through the ring 80 until the latch 82 engages the ring. The spring 84 provides a damper for the stop means 70 as the frame 14 reaches the horizontal position. In this manner, the latch 82 holds the main frame 14 in the horizontal position.

The main frame 14 is pivotally supported by the base assembly and is capable of rotating approximately 90° with respect thereto. More particularly, referring to FIGS. 1, 2, 3 and 5, the main frame 14 is generally rectangular in shape having upper and lower spaced apart horizontal members 86 and 87 connected to the spaced apart vertical members 88 and 89. The carriage support frame 18 is supported for movement in two vertical channels 90 (FIGS. 1, 2 and 3) which are secured to the inside of vertical side members 88 and 89 in sliding engagement therewith.

The carriage support frame 18 is rectangular in shape and includes upper and lower spaced apart horizontal members 91a and 91b connected to two spaced apart vertical members 92a and 92b. Two vertically spaced apart parallel slide rails 94 are secured between the upper and lower members 91a and 91b.

The carriage 20 is rectangular in shape and includes two vertically spaced apart sleeves 96, which slidably receive the rails 94, connected to two spaced apart horizontal brake mounting bars 98. By this arrangement, carriage 20 is capable of up and down movement along carriage support frame 18.

Looking at FIGS. 1, 3, 5 and 6, the winch 28 is mounted on the main frame 14 and connected by a cable 100 to the carriage support frame 18 and the carriage 20 to form a block and tackle type of assembly for raising the carriage support frame 18 and the carriage 20. More particularly, referring to FIGS. 3 and 6, the winch 28 includes a cable spool 102 which is mounted on a winch support 104 secured to the upper member 86 of main frame 14. A crank 106 is secured to the spool 102 to facilitate manual rotation of the spool. The cable 100 extends downwardly through a pulley 108 secured to the lower member 91b of the carriage support frame 18 then upwardly through a second pulley 110 secured to the upper member 91a of the carriage support frame 18 and is finally secured to the bottom brake mounting bar 98 in the middle thereof. As the crank 106 of the winch 28 is rotated, the cable 100 will cause both the carriage 20 and the carriage support frame 18 to move upwardly relative to the main frame 14.

The brake assembly 22 is mounted on the brake support bars 98 as shown in FIG. 4. More particularly, the brake assembly 22 includes a disc 114 which is secured to the support bars 98 by clamps 116 bolted to the disc 114. The brake drum 30 includes a threaded support shaft 118 in the center thereof extending through a hole in the brake plate 114. The shaft 118 is supported in a roller bearing 120 enclosed in a bearing spindle 121 secured to the brake plate 114. A lock nut 122 on the end of the threaded shaft 118 holds the shaft within the bearing 120. A brake release arm 124 is pivotally mounted on the bearing spindle 121 by tab 126. Two brake shoes 130 are provided, one on either side of the brake plate 114 for engagement with the drum 30. Each brake shoe 130 is connected to two short links 132. One of the short links 132 of each brake shoe 130 is pivotally connected to a support link 134 which is mounted to the brake plate 114. The other short link

132 is pivotally connected to a connecting link 138 which is pivotally connected to a cross bar 140 secured to the release arm 124 on either ends thereof. Therefore, as the brake release arm 124 is rotated in the direction of arrow A in FIG. 4, both of the brake shoes 130 will be moved out of engagement with the brake drum 30. As the release arm 124 is released a spring 142 connected to the cross bar 140 and the brake plate 114 will rotate the release arm 124 in the direction opposite that of arrow A and cause the brake shoes 130 to again engage the brake drum 30.

The parallel spaced apart telescoping arms 24 are secured to the exposed side of the brake drum 30 as seen in FIGS. 1, 2 and 3. More particularly, each telescoping arm 24 includes two arms of square tubing as seen in FIG. 2. Two outer arms 150 extend generally downwardly from the brake drum 30 and two other arms 154 extend generally upwardly from the brake drum 30. The grasping means 26 on the ends of the members 150 and 154, to be described later, has a limit of travel of approximately 6 to 8 inches.

The pairs of movable arms 150 and 154 are secured to the brake drum 30 in a manner to allow them to be easily telescoped so that the door handling apparatus can handle materials having a lengthwise dimension which varies from approximately 4 to 10 feet. The arms 150 and 154 are secured to the brake drum 30 by four U-clamps 156 which are bolted to the brake drum 30. The clamps 160 may be loosened by loosening the bolts in order to allow the members 150 and 154 to slide relative to one another to adjust their length and therefore move the grasping means 26 on the end thereof within the desired range of the work material.

The grasping means 26 includes a pair of movable square tubular members 160 slidably fitting over the arms 154 and a pair of non-movable square tubular members 161 slidably fitting over the arms 150. The members 160 are connected by a cross bar 162. Each of the tubular members 160 and 161 includes a plate 164 welded perpendicularly to the end thereof for grasping the door.

The second pair of non-movable members 161 are located on the lower arms 150 and are connected by a bottom cross bar 165. The lower cross bar 165 is secured to a second cross bar 166 between the arms 150 by a connecting link 168 which prevents relative movement of the clamp plates 164 and the arms 150. However, the upper members 160 are movable to grasp the work pieces.

A crank arm 170 is pivotally connected to one of the arms 154 by a tab 172. A connecting link 174 is pivotally connected between the top cross bar 162 and the crank arm 170.

The arm 154 opposite the arm with the tab 172 includes an arcuate ratchet 178 and the crank arm 170 includes a pivotally mounted claw foot 180 (FIGS. 1 and 2) which will engage the ratchet 178. A spring 182 keeps the claw foot 180 normally in contact with the ratchet 178 so that as the arm 170 is pulled downward in the direction of arrow B (FIG. 2), the clamping plates 164 will move downwardly to grasp the work piece between the upper and lower plates 164.

A claw foot release handle 186 is pivotally mounted on the arm 170 and connected to the claw foot 180 by a shaft 188. Thus, to release the work piece from the apparatus, the release handle 186 is depressed against the arm 170 which releases the claw foot 180 from the ratchet 178 and the arm 170 can be rotated upwardly

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in the direction opposite arrow B (FIG. 2) to move the top and bottom grasping plates 164 away from one another. An additional cross bar 181 is secured between the members 154 for added rigidity.

The ground engageable stop means 32 is, for simplicity, shown only in FIG. 6. The stop means 32 permits selective locking of the device to prevent it from rolling while performing one of various operations on a work piece. More particularly, the ground engageable stop means 32 includes two pairs of legs 192 which are connected to a shaft 194 on either side of the base frame 34. The shaft 194 is pivotally mounted in journals 196 provided on the base frame 34.

Each shaft contains an arm 198 formed at right angles with one of the legs which is pivotally connected to a folding link 200. The folding links 200 are both pivotally connected to a locking arm 202 by pins 204. The locking arm 202 is pivotally supported in a stud 206 which is mounted on the base frame 34 approximately at the midpoint of one of the sides. A spring 208 connects the locking arm 202 to the base frame 34 such that the arm will remain in either the locked or unlocked position.

As shown in FIG. 6, the ground engageable stop means 32 is in the locked position and the feet 210 are in engagement with the ground or other supporting surface so that the apparatus 10 cannot be rolled. To unlock the device, the locking arm 202 is rotated approximately 180° in the direction as shown by arrow C in FIG. 6. This rotation causes the legs 192 to be moved up out of contact with the supporting surface. The device is then supported only by the casters 36 and can be rolled around while carrying a work piece or for storage.

The door handling apparatus is designed to facilitate the handling of heavy work pieces and in particular heavy wooden doors. The device is constructed of steel or other suitable material so that it can withstand the forces created when supporting a work piece, such as a door 215 as shown in phantom in FIGS. 3 and 5.

The apparatus can be used as a work bench or table as shown in FIG. 5 for mounting hinges, door knobs, and other items where it is desirable to have the door in a horizontal position. The apparatus is also capable of holding a door in a generally vertical position as shown in FIG. 3 for hanging a door in a door jamb. The grasping means 26 are rotatably mounted so that a work piece or door can be rotated relative to a supporting surface to make it easier for a workman or team of men to finish the sides and top or bottom of the door.

The foregoing detailed description has been given for clearness of understanding only and no unnecessary limitations should be understood therefrom as some modifications will be obvious to those skilled in the art.

I claim:

1. A sheet holding device comprising:

a base;

a substantially vertical frame pivotally mounted on the base, said frame being movable between a gen-

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erally vertical position and a generally horizontal position;

a movable second vertical frame slidably mounted on said first vertical frame for generally vertical reciprocal movement with respect thereto;

carriage means mounted on said second movable frame for generally vertical reciprocal movement with respect thereto;

rotatable means mounted on said carriage means for rotational movement with respect to said carriage means; and

grasping means mounted on said rotatable means, said grasping means being capable of retaining a sheet therein when the sheet is in any relative position.

2. The device of claim 1 including a pair of spaced apart telescoping arms releasably mounted on said rotatable means, said telescoping arms mounting said grasping means whereby said telescoping arms are movable to permit adjustments for widely varying lengths of sheet.

3. The device of claim 2 wherein the grasping means includes a sheet engaging member slidably mounted on the upper end of each of said telescoping arms, pawl means connected to said slidable members, and ratchet means mounted on one of said telescoping arms engageable with said pawl means to maintain said sheet engaging member in engagement with said sheet to facilitate quick locking of a sheet onto said device.

4. The device of claim 3 wherein the grasping means includes a second sheet engaging member slidably mounted on the lower end of each of said telescoping arms, said first and second sheet engaging members being connected together by an arm pivotally connected to said telescoping arm to permit a degree of misalignment when grasping a sheet, the opposite ends of which may be out of square.

5. The device of claim 1 including a cable and spool assembly mounted on said first frame to facilitate movement of said second vertical frame and said carriage with respect to said first vertical frame.

6. The device of claim 1 including a tilt lock means mounted on said base and biased to prevent movement of said first vertical frame, said tilt lock means being selectively disengageable with said first vertical frame to permit movement of said first vertical frame.

7. The device of claim 1 wherein said rotatable means includes releaseable brake means carried by said carriage and operable to releaseably secure said rotatable means in any desired angular orientation with respect to said carriage.

8. The device of claim 7 wherein said releaseable brake means includes a drum rotatably mounted on the carriage, a pair of brake shoes pivotally mounted on said carriage, a manually actuatable brake arm connected to said shoes, and biasing means connected to said brake arm for maintaining said shoes in engagement with said drum to prevent rotation thereof and to permit rotation of said drum upon release of said brake shoes by manual actuation of said brake arm.

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