Jan. 9, 1962 L. E. ANDERSON, SR 3,015,913

ADJUSTABLE MOUNTING FOR A CENTRIFUGAL GRIT BLASTING MACHINE

Filed June 10, 1960 2 Sheets-Sheet 1

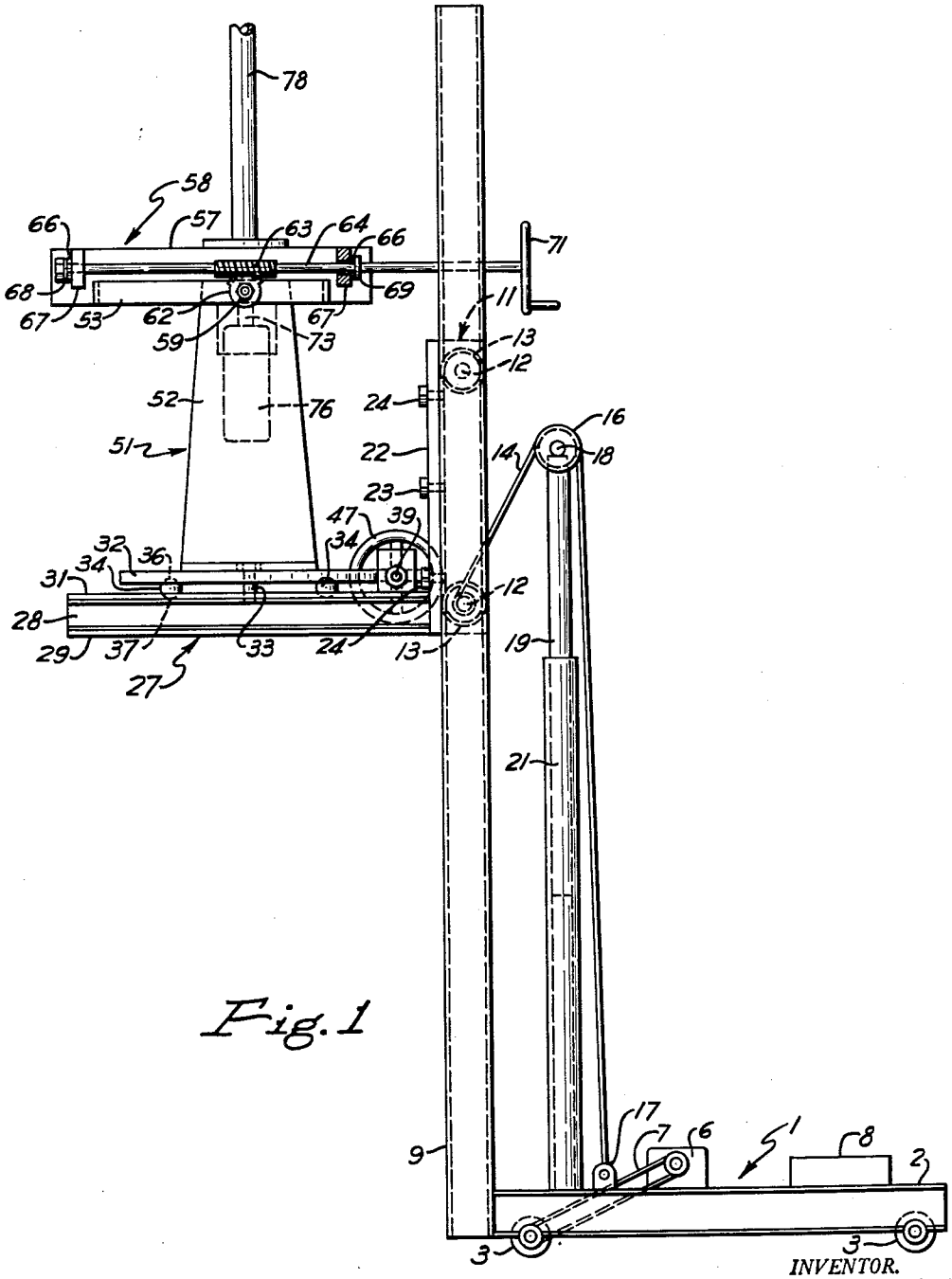


Fig. 1

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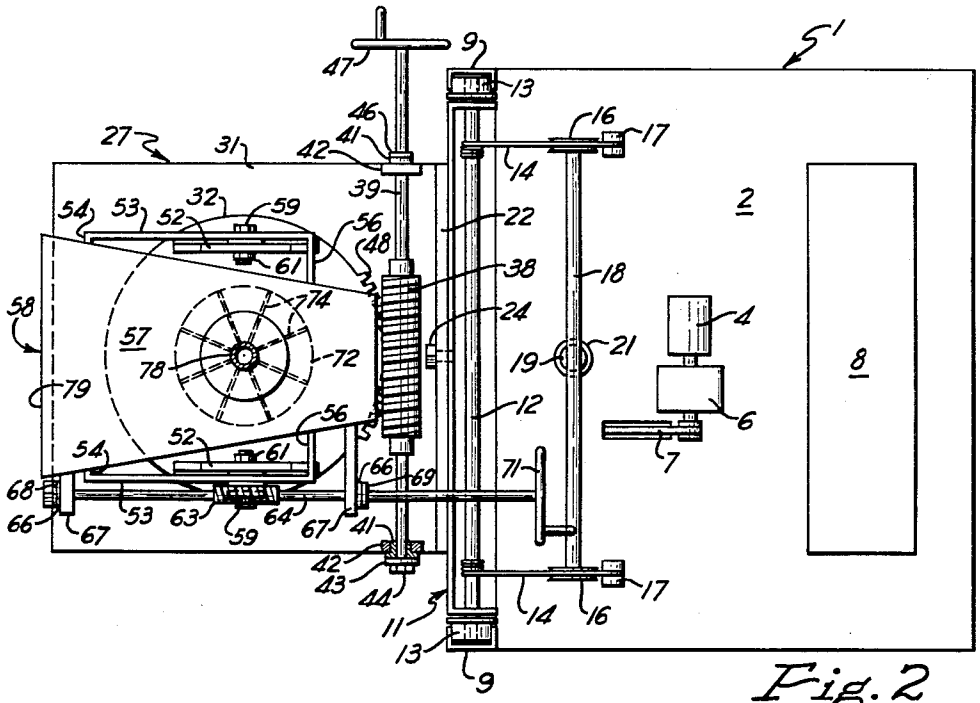


Fig. 2

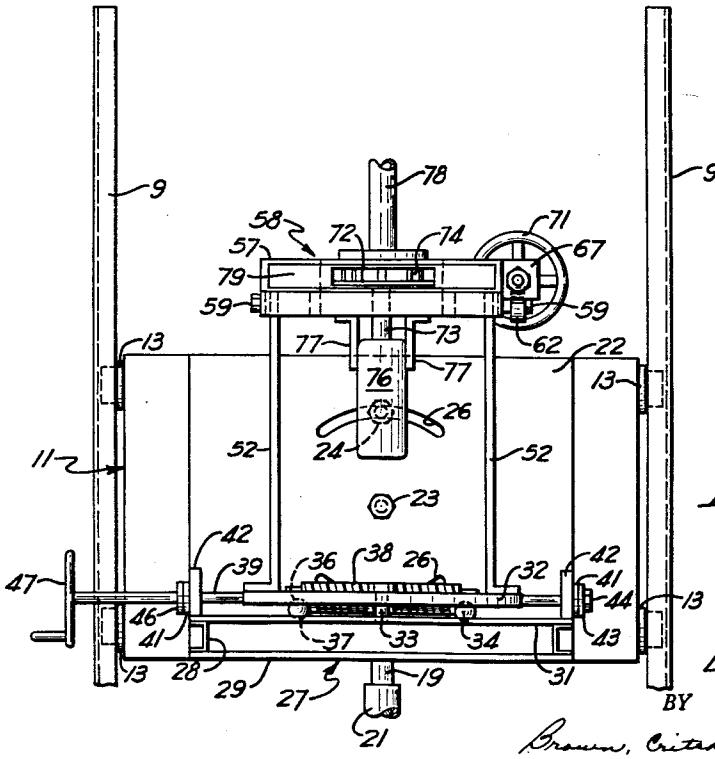


Fig. 3

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ADJUSTABLE MOUNTING FOR A CENTRIFUGAL GRIT BLASTING MACHINE

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9 Claims. (Cl. 51—9)

This invention relates to an adjustable mounting for a centrifugal grit blasting machine of the type used to clean and polish metal objects with a high velocity stream of steel grit or shot abrasive. More particularly, this invention relates to an adjustable mounting for such a machine that may be supported on the basic structure of a fork lift truck.

Two general methods are currently used in discharging steel shot or grit abrasive against metal objects for cleaning and polishing them. One is by means of compressed air entraining the abrasive, which is discharged from a nozzle attached to a flexible hose. While this method permits manual direction of the nozzle to obtain the most efficient application of abrasive, the average cleaning rate of air blasted shot on steel plates and sheets is only about 0.125 sq. ft. per minute per horsepower. The second method of discharging abrasive shot or grit is by means of a centrifugal grit blasting machine, which has a rapidly rotating wheel provided with paddles or the like mounted inside a casing with a restricted opening. The average cleaning rate obtained with a centrifugal grit blasting machine is about 1.5 sq. ft. per minute per horsepower, or about twelves times that obtained with the air blast method. However, the centrifugal grit blasting machine is a relatively heavy and awkward piece of equipment and is generally mounted on a fixed support with the objects to be cleaned passing before it on a conveyor. As a result, the blast pattern is not always the most effective one for a given application.

It is among the objects of this invention to provide an adjustable mounting for a centrifugal grit blasting machine that will permit the abrasive stream discharged therefrom to be directed at any desired angle against the object to be cleaned or polished, that will maintain the machine in a given position until it is adjusted to a new position, and that may be supported on the framework of a fork lift truck for added mobility.

Other objects of the invention will be apparent from the following description of a preferred embodiment in connection with the accompanying drawings, in which

FIG. 1 is a side elevation, partly in section, of a grit blasting machine supported on the adjustable mounting of this invention and, in turn, supported on the framework of a fork lift truck;

FIG. 2 is a plan view, partly in section, of the adjustable mounting shown in FIG. 1; and

FIG. 3 is a front elevation of the adjustable mounting shown in FIG. 1.

In accordance with this invention, the adjustable mounting for a centrifugal grit blasting machine is adapted to be supported on a wheeled carriage having upright frame members secured thereto, such as the platform and the upright frame members of a fork lift truck. An elevator member is slidably mounted for vertical movement on the upright frame members in place of the usual fork, and means are provided for raising and lowering the elevator member. A vertically disposed back plate is adjustably and pivotally mounted on the elevator member for rotation about an axis normal to the back plate. A normally horizontal base plate is rigidly mounted on the back plate and extends forwardly therefrom. A supporting pedestal is adjustably and rotatably mounted on the base plate for rotation about an axis normal to the base plate. A mounting frame, on which the grit blasting machine is directly supported, is pivotally mounted on the pedestal for rotation about a transverse axis parallel to and spaced above the base plate. Separate means are provided for continuously adjusting the pedestal and the mounting frame about their respective axes.

Referring to the drawings, a fork lift truck 1 is provided with the usual platform 2 and wheels 3. The latter are driven by a motor 4 through a gear reduction device 6 and a belt 7. A counterweight 8 is provided at the rear end of the truck, while on the front end are mounted two vertically extending parallel frame members, preferably in the form of inwardly facing channels 9. An elevator member 11, which may be in the form of a channel-shaped plate, is provided with transverse top and bottom shafts 12, on the ends of which are secured flanged guide rollers 13. The latter are received within the opposed channels 9, so that the elevator member will be free to move up and down between those channels. Flexible cables 14, secured at one end to the bottom shaft 12 of the elevator member, pass over sheaves 16 and are secured at the other end to anchor points 17 on the platform of the truck. The sheaves 16 are rotatably mounted on a shaft 18, which is secured at its midpoint to the upper end of a hydraulic piston 19 slidably received in a cylinder 21 mounted on the platform of the truck. A motor-driven hydraulic pump (not shown) permits the piston 19 to be raised and lowered relative to cylinder 21, thereby raising and lowering the elevator member.

On the front face of elevator member 11 is rotatably mounted a back plate 22 by means of a pivot bolt 23 passing through both plates. Locking bolts 24, mounted on the elevator member 11, pass through arcuate slots 26 on the back plate and provide means for locking the latter in various angular positions relative to the elevator member. A base plate 27 is welded or otherwise rigidly secured to the bottom of the back plate and extends forwardly therefrom and at right angles thereto. As shown in the drawings, base plate 27 includes side channel members 28 to which are secured a bottom plate 29 and a top plate 31. A worm wheel 32 is rotatably mounted on a pivot bolt 33 on the upper side of the top plate 31 and rests on a plurality of balls 34, which roll in grooves 36 and 37 on the under surface of the worm wheel and the top of the base plate, respectively, and serve as a thrust bearing. The worm wheel 32 is rotated about its axis by means of a worm gear 38 mounted on a shaft 39, which is rotatably supported in bushings 41 mounted on bearing supports 42 secured to the base plate (see FIG. 2). Endwise movement of shaft 39 is prevented by a washer 43 (held by a nut 44 threaded on the end of the shaft) engaging one of the bushings 41 and a fixed collar 46 engaging the other bushing 41. A hand wheel 47 mounted at one end of the shaft permits turning the worm gear to continuously adjust the angular disposition of the worm wheel 32 about its axis. Since it is not necessary to rotate the worm wheel a complete revolution, it need be provided with teeth 48 only about a portion of its periphery.

A supporting pedestal 51 is rigidly secured to the top of the worm wheel 32. In the drawings, the pedestal is shown in the form of two upstanding tapered plates 52 welded at their bottom edges to the top of the worm wheel. The upper ends of these plates pivotally support a mounting frame in the form of two angled bars 53 with inturned legs 54 and 56 of unequal length, which are secured to the tapered casing 57 of a grit blasting machine 58. The mounting frame members 53 are pivotally attached to the upper ends of the plates 52 by means of bolts 59 and nuts 61, which define a transverse axis parallel to the base plate 27. A worm wheel 62, having teeth around part of its periphery, is secured to one of

the uprights 52 of the pedestal member, as by keying, and is coaxial with said transverse axis. This worm wheel is engaged by a worm gear 63 mounted on a shaft 64, which is rotatably supported in bushings 66 mounted in bearing supports 67 secured to the casing 57 of the grit blasting machine. Endwise movement of shaft 64 is prevented by a nut-held washer 68 and a fixed collar 69, in the same manner as previously described in connection with worm gear 38 and its shaft 39. A crank 71 is attached to one end of shaft 64 for turning the worm gear 63 to adjust the angular position of the mounting frame about its axis rotation.

The grit blasting machine 58 does not form part of this invention, but includes a wheel 72 rotatably mounted inside the casing 57 on a shaft 73 and provided with upstanding vanes 74, the wheel being adapted to be rapidly rotated by an electric motor 76 suspended by straps 77 below the mounting frame. A flexible hose 78 is secured to the top of the casing and projects therethrough in substantially coaxial relation to the wheel 72. Through this hose, steel shot or grit abrasive is introduced into the machine and is blasted by the rapidly rotating wheel through the opening 79 at the front of the machine.

It is among the features of this invention that the grit blasting machine can be supported in any desired angular position with reference to objects to be cleaned or polished, which are generally passed in front of the machine on a conveyor (not shown). The blast pattern produced by the machine is a relatively narrow band proportioned to the length and width of the opening 79 in the front of the machine, the absolute dimensions of the pattern depending upon the distance of the object to be cleaned from the blasting machine. The angular disposition of this pattern, and the angle of incidence of the abrasive stream on the object to be cleaned, can be varied within desired limits by rotating the pedestal on the base plate, by changing the angular disposition of the mounting frame on the pedestal, or, when the occasion requires it, by changing the angle of the back plate relative to the elevator member, or by various combinations of these adjustments, depending on the size and shape of the object, projections from its surface that must be cleaned on four sides, etc. In addition, the use of the adjustable mounting in combination with the basic framework of a fork lift truck gives mobility to the machine and permits its height from the floor to be adjusted as required by the exigencies of the work.

According to the provisions of the patent statues, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. An adjustable mounting for a centifugal grit blasting machine, comprising a wheeled carriage, upright frame members secured to the carriage, an elevator member slidably mounted for vertical movement on the frame members, a vertically disposed back plate rotatably mounted on the elevator member for rotation about an axis normal to the back plate, a normally horizontal base plate rigidly mounted on the back plate, a pedestal rotatably mounted on the base plate for rotation about an axis normal to the base plate, a mounting frame for supporting the grit blasting machine pivotally mounted on the pedestal member directly above the base plate for rotation about an axis parallel to the intersection of the planes

of the base and back plates, and separate means for raising and lowering the elevator member and for rotating the pedestal member about its vertical axis and for rotating the mounting frame about its axis.

2. Apparatus according to claim 1, in which the means for rotating the pedestal member about its axis include a worm wheel secured to the pedestal member and a worm gear rotatably supported on the base plate and engaging the worm wheel, and means for manually rotating the worm gear.

3. Apparatus according to claim 1, in which the means for rotating the mounting frame about its axis includes a worm wheel secured to the pedestal member and a worm gear rotatably supported on the mounting frame and engaging the worm wheel and means for manually rotating the worm gear.

4. Apparatus according to claim 1, in which the upright frame members are in the form of parallel inwardly facing channel members and the elevator member is in the form of a channel plate having a plurality of shafts projecting beyond the sides of the plate and rollers rotatably mounted on the ends of the shafts, the rollers being received within the channel members.

5. Apparatus according to claim 1, in which the mounting frame is disposed substantially symmetrically relative to its pivotal axis.

6. Apparatus according to claim 1, in which the pedestal is a hollow member having itstop spaced substantially above the base plate to provide mounting space within the pedestal for driving means for the grit blasting machine.

7. Apparatus according to claim 1, in which the pivotal axis of the mounting frame intersects the rotational axis of the pedestal.

8. An adjustable mounting for a centrifugal grit blasting machine, comprising a wheeled carriage, upright frame members secured to the carriage, an elevator member slidably mounted for vertical movement on the frame members, a vertically disposed back plate rotatably mounted on the elevator member for rotation about an axis normal to the back plate, a normally horizontal base plate rigidly mounted on the back plate, a hollow pedestal of substantial height rotatably mounted on the base plate for rotation about an axis normal to the base plate, a mounting frame for supporting the grit blasting machine pivotally mounted on top of the pedestal member directly above the base plate for rotation about an axis parallel to the intersection of the planes of the base and back plates and intersecting the axis of the pedestal, and separate means for raising and lowering the elevator member and for rotating the pedestal member about its normally vertical axis and for rotating the mounting frame about its normally horizontal axis.

9. Apparatus according to claim 8, in which the back plate is provided with an arcuate slot spaced from the axis of the plate, and means passing through said slot and secured to the elevator member for locking the back plate against rotation relative to the elevator member.

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