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GAS CYLINDER CLEANING APPARATUS

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2 Sheets-Sheet 1

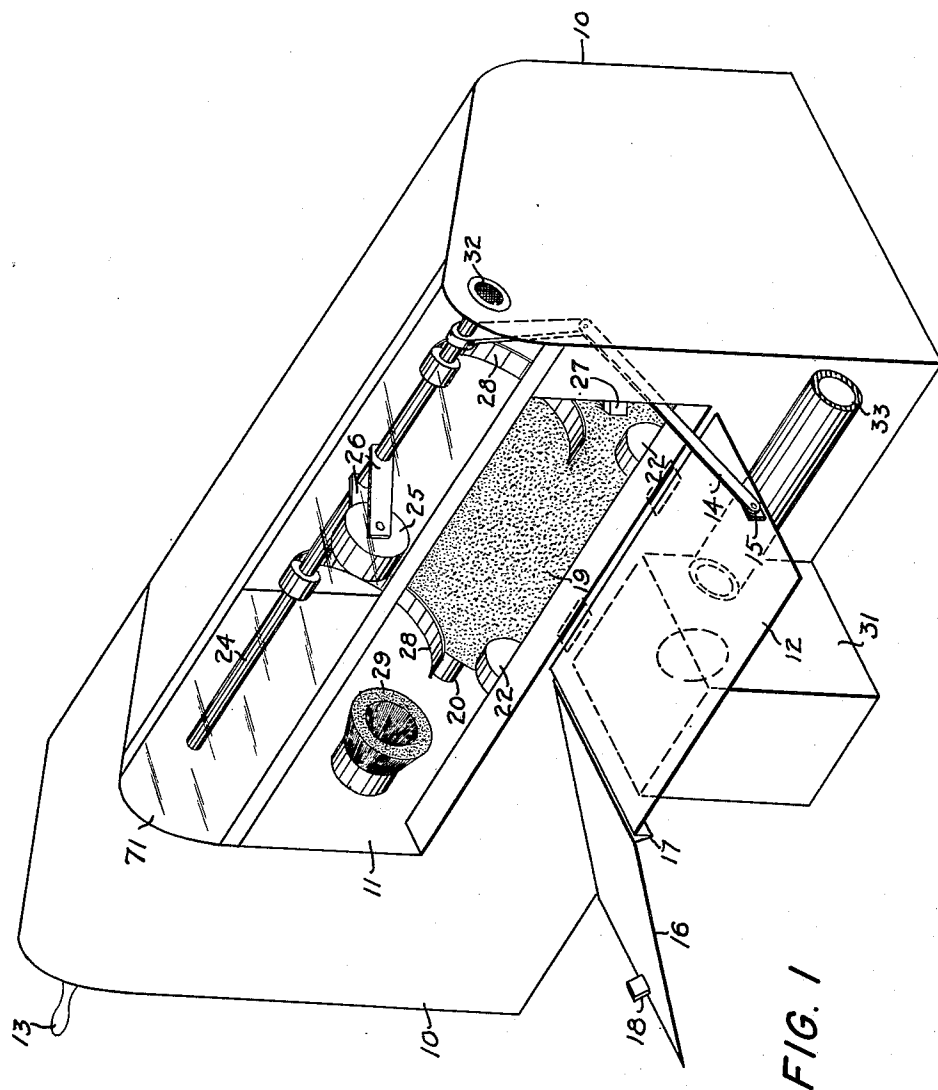


FIG. 1

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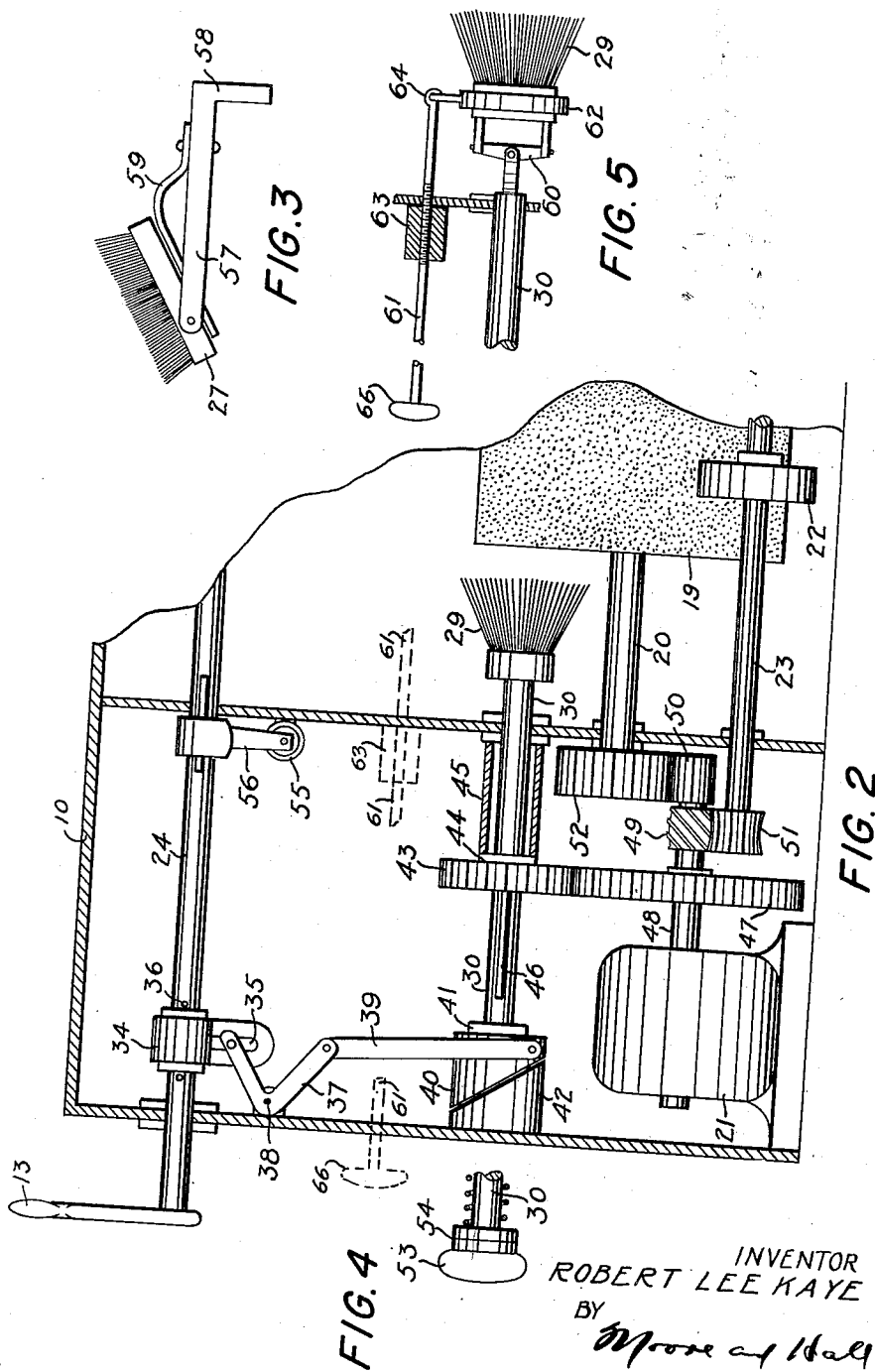
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GAS CYLINDER CLEANING APPARATUS

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6 Claims. (Cl. 15-56)

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The present invention concerns the cleaning and refinishing of gas cylinders.

It is an object of the invention to provide a gas cylinder cleaner and buffer which removes all paint and foreign material from a metallic gas cylinder and dresses the entire surface down to clean metal ready for spraying or refinishing of any kind.

It is an object of the invention to provide a single machine which will receive a gas cylinder, clean the cylindrical surface, the inset bottom and the curved shoulder and top all in a single operation and deliver the finished cylinder ready for painting or the like.

In the drawings like numbers refer to like parts.

Fig. 1 is a perspective view of one form of the invention.

Fig. 2 is a fragmentary section showing the drive and control in the left side of Fig. 1.

Fig. 3 is a detail of the shoulder brush.

Fig. 4 is a fragmentary view of one form of control means.

Fig. 5 is a fragmentary detail of an alternate form of the bottom brush mounting.

One form of the device, which is presented as illustrative of the invention and not as limiting, has a body member 10 comprising a base, frame and housing. A side receiving opening 11 is provided by hinged door 12 which also serves as a receiving shelf. Door 12 is connected to control lever 13 by rod 14 pivoted at 15 to door 12. One half 16 of door 12 is hinged at 17 and forms an inclined ramp having a loading stirrup or stop 18. The hinge 17 may be supplied with latches (not shown) whereby portion 16 may be releasably held in the main plane of door 12. Door 12 and portion 16 close opening 11 when lever 13 is thrown clockwise into washing position under the action of rod 14.

Within body member 10 is a rotary body brush 19 mounted on shaft 20 driven by a motor 21 and suitable gearing under a removable gear cover. In front of body brush 19 are traction drive wheels 22 mounted on a shaft 23 driven from motor 21. An upper shaft 24 which is rotatably mounted on body member 10 is connected to and controlled by loading lever 13. Shaft 24 carries hold down wheel 25 rotatably mounted on outstanding arms 26 and set an angle or skewed to bring a gas cylinder to be cleaned toward fixed shoulder brush 27 which also works on various types of cylinder tops. Shaft 24 also carries outwardly and downwardly extending spring expeller arms 28.

Rotary bottom brush 29 is mounted on shaft 55

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30 which is reciprocally mounted on housing 10. Brush 29 is cup shaped and is formed to clean the recessed bottoms of gas cylinders. Brush 29 is reciprocally adjustable so that it can be employed as desired, both as to the amount of scrubbing force required and to permit intermittent use. In normal operation brush 29 is used to buff the cylinder bottoms only one fifth as much as body brush 19 is used on an equivalent body area.

An exhaust blower 31 is provided with air through housing air intake 32 and a blower discharge pipe 33 and serves to dry the cleaned cylinders quickly by removing the humid atmosphere and employing the stored heat in the cleaned cylinder to help evaporate the water. The convection action of the blower of course greatly accelerates the evaporation.

Loading and unloading lever 13 when pressed counter clockwise depresses wheel 25 and forces a cylinder being cleaned against brushes 19 and 27. This action allows for brush wear and permits special action where needed to clean difficult cylinders.

Shaft 24 is longitudinally movable a small amount under manual translation of lever 13 to cause brush 29 to reciprocate longitudinally while rotating. Lost motion arm 34 is slotted as at 35 and rotatably mounted on shaft 24, but carried with shaft 24 in translation by pins 36. Bell crank 37 is pivoted at 38 to frame 10 and connected by link 39 to cam member 40. Shaft 30 is seated in cam member 40. Shaft 30 is seated in cam member 40 by means of thrust bearing 41 and moved to the right carrying brush 29 against the bottom of a cylinder by the relative rotation of cam members 40 and 42. Gear 43 is mounted on bearing 44 mounted on support 45 and slidably engages shaft 30 by means of feather key 46. Gear 43 mates with gear 47 on shaft 48 of motor 21. Shaft 48 carries worm 49 and pinion 50 which mate with worm wheel 51 and gear 52 respectively. Worm wheel 51 is keyed to shaft 23 and turns large body brush 19.

Where desired linkage 34-42 inc. may be replaced by knob 53 connected to shaft 30 extended by thrust bearing 54. Control lever 13 is biased clockwise to closed position by spring 55 anchored to frame 10 and connected to lever 56 which is keyed to shaft 24.

Shoulder brush 27 is pivoted between fork members 57 which have their handle portion 58 mounted on the inside of frame 10 to receive the upper end of a cylinder to be cleaned. Spring 59 holds brush 27 yielding in position. Where it is desired to have brush 29 operate

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at an angle of thirty to forty-five degrees to the axis of a cylinder the end of shaft 30 may be provided with a universal joint 60 which carries brush 29. The desired angle of application of brush 29 to bottom of a cylinder may be obtained by adjusting rod 61, which is pivotally connected to ball bearing race way 62 through a handle 66. Support 63 is threaded to receive rod 61 and allow angular adjustment of brush 29 by means of ball joint 64.

To minimize the danger of fire all brushes are of nonferrous material and inclined ramp 16 is provided with a rubber cushion. The hinge 17 is at the longitudinal center of gravity of the normal cylinder so that ramp 16 is easily raised when a cylinder is in place. The hinge 17 may be made self latching for ease of operation.

An intake 32 is preferably connected to a duct providing outside air and discharge pipe 33 is filtered or run out doors to make the device explosion proof. It is to be noted that the clean air from intake 32 flows across Plexiglas cover 71 and keeps it free of fog and dust.

The operation of the device is as follows: As cylinder to be cleaned is rolled onto inclined ramp portion 16 with its bottom resting against loading stirrup 18 and tilted until hinge 17 latches. The cylinder is then rolled off receiving shelf 12 and through opening 11 until it rests against body brush 19 and deflects spring expeller arms 28. The cylinder then rests upon traction drive wheels 22 and body brush 19. Arm 13 is now rotated clockwise, moving expeller arms 28 back and causing hold down wheel 25 to bear upon the upper outer wall portion of the cylinder being cleaned, both holding it in place and forcing it against brushes 19 and 27. Rod 14 closes door 12 and motor 21 rotates shafts 20 and 23 in the same direction, turning the surface of the cylinder against the movement of brush 19 and enhancing its cleaning action.

Hot caustic solution within housing 10 is sprayed on the cylinder. Brush 19 removes all paint and the like from the cylinder body while brush 27 cleans the cylinder shoulder and top. Both brushes have a burnishing action. The cylinder being cleaned is normally allowed to rotate five times for a complete cleaning operation. During one of these rotations adjustable rotary bottom brush 29 is advanced and cleans the bottom of the cylinder.

After about four revolutions the caustic spray is turned off and exhaust blower 31 circulates air around the rotating cylinder. After the fifth revolution the cylinder is usually clean and dry. Lever 13 is then rotated counterclockwise, opening door 12. Hold down wheel 25 is released and expeller arms 28 roll the cylinder over drive wheels 22 and onto shelf 12. The cylinder is then tilted with ramp 16 and rests against loading stirrup 18. It is then rolled off onto a rack of cleaned cylinders. The next cylinder is then rolled onto ramp 16 and the process repeated.

Brush 29 is rotated at about five hundred r. p. m. and is highly adjustable in its differential mounting. The functions of control lever 13 deserve special attention. Once a cylinder is in place lever 13 closes door 12 when pulled down with spring 55. If lever 13 is pressed down more roller 25 presses the cylinder against body brush 19 increasing its action and against drive rollers 22 insuring increased traction. At the same time the skewed axis of roller 25 causes it to exert a longitudinal force on the cylinder and causes it to roll against shoulder brush 27 which adjusts

itself in its fork mounting 57 under the action of spring 59.

Before forcing the cylinder against brush 27 by the action of skewed roller 25 it is usually preferred to pull control lever 13 out rotating bell crank 37 and cam member 40 counterclockwise. This action forces brush 29 against the bottom of the cylinder to be cleaned. Where the construction of Fig. 4 is employed rod 61 is adjusted so that the brush 29 acts at the desired angle by rotating rod 61 in threaded support member 63.

Where the more simple construction of handle 53 is used to replace kinematic arrangement 34-42 inclusive, thrust bearing 54 permits handle 53 to be held and forced against the end of rotating shaft 30. In this manner brush 29 may be applied to the bottom of a cylinder being cleaned.

I claim:

1. In a device for cleaning, drying and polishing heavy gas cylinders, a housing, a door for said housing, a ramp hinged to said door, a cylinder holding means on said ramp, a drive means mounted on said housing, a loading and unloading control means connected to said housing for controlling the loading and unloading of the cylinders to be cleaned into and out of said housing, a main body brush mounted on a shaft connected to said drive means, drive wheels mounted on said housing adjacent said body brush substantially parallel to said body brush and connected to said drive means, a shoulder brush mounted on said housing adjacent one end of said body brush, hold down means controlled by said control means and acting to maintain a cylinder in cleaning position and force it against both said body brush and said shoulder brush, a bottom brush mounted on said housing and driven by said drive means, ejector arms controlled by said control means, said bottom brush being reciprocally movable in response to said control means.

2. In a device for cleaning, drying and polishing heavy gas cylinders, a housing, a loading shelf, a door adjacent said shelf on said housing, a drive means mounted on said housing, operating control means mounted on said housing, a main body brush mounted on a shaft connected to said drive means, cylinder rotating means mounted on said housing adjacent to and in operative relation with said body brush, said cylinder rotating means being driven by said drive means, a shoulder brush means mounted on said housing adjacent one end of said body brush, hold down means controlled by said control means and acting to maintain a cylinder in cleaning position and in further response to said control means to force a cylinder being cleaned against said body brush and said shoulder brush, ejector means actuated by said control means and synchronized with said hold down means to eject a finished cylinder from said housing.

3. In a device for cleaning drying and polishing heavy gas cylinders, a housing, a body brush, a bottom brush and a shoulder brush all positioned within said housing and a single control means movable in translation and rotation and operatively coupled to each of said brushes to bring each of said brushes into operation upon a gas cylinder to be cleaned and control the action thereof on said cylinder ejecting means mounted within said housing and actuated by said control means to eject a finished cylinder from cleaning position within said housing.

4. The combination set forth in claim 3, said

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control means comprising a shaft having a skewed roller mounted to act on a cylinder to be cleaned, depress the cylinder and move it longitudinally.

5. The combination set forth in claim 4, said shaft having a linkage connecting it to said bottom brush whereby translation of said shaft forces said bottom brush against the bottom of a cylinder to be cleaned.

6. The combination set forth in claim 3, said control means comprising a shaft, a skewed roller mounted on said shaft, said roller being applied to a gas cylinder being cleaned; upon rotation of

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said shaft, an auxiliary brush shaft, a linkage connecting said shafts whereby translation of said first shaft causes translation of said auxiliary brush shaft.

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