

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets

(11)

Publication number:

0 072 248
A2

(12)

EUROPEAN PATENT APPLICATION

(21)

Application number: 82304217.1

(51)

Int. Cl.³: B 24 C 3/06, B 24 C 7/00

(22)

Date of filing: 10.08.82

(30)

Priority: 11.08.81 AU 169/81

(71)

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Date of publication of application: 16.02.83
Bulletin 83/7

(72)

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(84)

Designated Contracting States: **BE CH DE FR GB LI NL**
SE

(74)

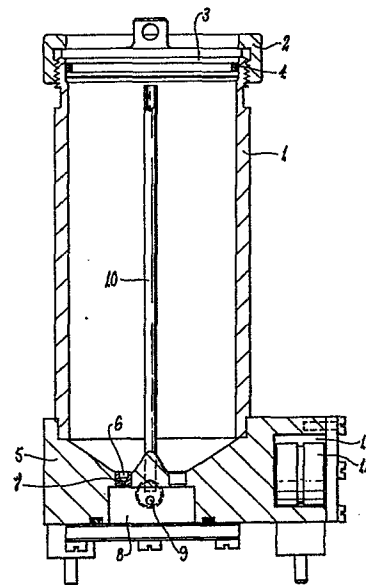
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Portable grit blaster.

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Grit blasting apparatus including a storage vessel (1) for containing a body of grit, a base (5) of said vessel against which said grit body rests, passage means connectable to a source of pressurized gas and being operable to direct a stream of said gas along a path adjacent said base, outlet means (9) in said base through which said grit can be discharged under gravity into said gas path, gas operated vibrator means (11, 12) connected to said vessel and being operable to vibrate said vessel to promote said discharge, and means for connecting a source of pressurized gas to said vibrator means.



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This invention relates to grit blasting apparatus of the kind which is used in surface treatment or preparation, for example before painting, welding or applying an adhesive to the surface. The invention is particularly designed for use with
5 grit blasting apparatus in which the grit is not recycled although it is not limited thereto.

In the past one known non-recyclable grit blasting apparatus has included a storage vessel for grit, the grit being arranged to be fed to a gas supply line by electrically
10 vibrating the grit storage vessel. This arrangement necessitates connection of the apparatus with a source of pressurized gas as well as an electrical power supply and also the apparatus has been relatively bulky.

It is an object of the present invention to provide a
15 simplified grit blasting apparatus that does not require electrical power to operate and can be made more compact.

The grit blasting apparatus according to the present invention includes

a storage vessel for containing a body of grit,
20 a base of said vessel against which said grit body rests,

passage means connectable to a source of pressurized gas and being operable to direct a stream of said gas along a path adjacent said base,

25 outlet means in said base through which said grit can be discharged under gravity into said gas path,

gas operated vibrator means connected to said vessel and being operable to vibrate said vessel to promote said discharge

30 and means for connecting a source of pressurized gas to said vibrator means.

The storage vessel may be of any suitable size and shape. For example the vessel may be a cylinder having its axis generally vertical and having a removable cap allowing replenish-
35 ment of the supply of grit in the vessel. The cap is preferably a gas-tight seal with the vessel. For example the cap may be arranged to be screw threaded to the outer surface of the vessel and be provided with a plug which fits within the walls of the cylindrical vessel. The plug may be provided with a resilient
40 O-ring around its periphery so as to form a seal within the inner

surface of the vessel.

In a preferred form the base of the storage vessel is in the form of a block, said base block having a conical recess in its upper surface providing a funnel for directing the grit towards said outlet means. The base of the conical recess is preferably provided with at least one output hole for passing the grit. The output hole may be arranged to receive an insert providing the output orifice, the output orifice in the insert being of a predetermined diameter. The insert may be a press fit within the hole in the base of the conical recess. This enables ready replacement of the insert if the output orifice becomes worn by the action of the grit and also to allow replacement of the insert for different grit sizes.

Preferably the passage means includes a mixing chamber in the base block beneath the output orifice and communicating therewith, said mixing chamber further including a pressurized gas inlet and gas outlet located on opposite sides of the chamber.

To assist falling of the grit into the mixing chamber, there is preferably provided means enabling the gas pressure in the storage vessel above the stored grit to be equal with the gas pressure in the mixing chamber. For this purpose there is preferably provided a pressure equalizing tube extending from the mixing chamber through the main body of the storage vessel and opening at its upper end within the storage vessel just below the cap thereof.

The gas operated vibrator means associated with the vessel preferably includes a rotary vibrator member which is driven by pressurized gas. The vibrator may be associated with the vessel, however preferably the vibrator is arranged to vibrate the base block.

In the preferred embodiment the rotary vibrator member comprises a vibrator block mounted within a vibrator chamber provided in the base block. The vibrator block is of smaller dimensions than the vibrator chamber so that the block can rock or vibrate within the chamber and thereby transmit the force of the vibration to the base block itself. For example the vibrator block may be a generally cylindrical metal block having a groove around the outside, the vibrator chamber also being cylindrical of larger diameter and slightly larger length than the block.

The cylindrical vibrator block and chamber may be arranged with their axes generally horizontal.

5 The means for connecting a source of gas preferably includes a gas conduit connected to the pressurised gas inlet located to one side of the vertical centre plane of the chamber say through the upper wall of the chamber, and the gas outlet is located to the other side of the vertical centre plane also through the upper wall of the chamber. With this arrangement, the pressurized vibrator gas tends to travel
10 around the cylindrical vibrator block, promoted by the groove in the surface of the block, and since the block is free to move within the chamber, the block will rock violently within the chamber producing vibration of the base block.

15 It will be appreciated that other methods of producing vibration and operated by pressurized gas are possible. For example there may be provided a vibrator block rotatably mounted on an axle fixed to the base block and eccentrically weighted, the arrangement being such that the flow of pressurized gas causes the block to rotate on the axle, the
20 eccentric weighting causing vibration in the block through the axle. As a further alternative, the vessel may be resiliently mounted in association with a diaphragm, compression waves of relatively high frequency being produced in a gas line to a chamber closed by the diaphragm, thereby vibrating the
25 diaphragm and hence the vessel.

The pressurized vibrator gas may be any suitable gas such as compressed air. The compressed air after passing through the vibrator chamber may be exhausted to atmosphere, through a pneumatic silencer if desired.

30 The grit blasting apparatus of the present invention is preferably adapted to be supplied from an external source of clean dry propellant gas. The propellant gas supply may be a compressor or alternatively the gas may be supplied from a cylinder of pressurized gas. The propellant gas may be the same
35 as the vibrator gas. For some applications it is desirable to use a relatively inert propellant gas and accordingly the propellant gas may be dry nitrogen supplied from a cylinder.

The propellant gas may be arranged to pass through a pressure relief valve, a master on/off valve and an adjustable
40 pressure regulator, as will be readily appreciated in the art.

The pressure relief valve may be adjustable enabling presetting of the pressure at which the valve will open to relieve excess pressure in the propellant gas lines. Also, the pressure of propellant gas may be monitored by means of a pressure gauge which has a tapping into the propellant gas supply line downstream of the valves but upstream of the mixing chamber. After passing through the mixing chamber where the grit is entrained in the gas stream, the propellant gas is generally led through a flexible hose to a hand held nozzle.

The vibrator gas supply may be passed through a similar arrangement of adjustable pressure relief and on/off valves and pressure regulator as the propellant gas. Also a pressure gauge may be provided for monitoring the pressure of the vibrator gas.

It may be possible to provide a single gas source for suitable applications of the apparatus, i.e. the one gas source supplying both the vibrator and propellant gases. For example a single source may have a divided outlet for the propellant and vibrator gases. Alternatively the gas may be passed through the valves and past the pressure gauge and thence to the vibrator chamber. After leaving the vibrator chamber the gas may be passed into the mixing chamber and thence to the hose and nozzle.

Except for the gas supply and outlet hose and nozzle, the apparatus of the present invention may be included in a suitable housing enabling a compact apparatus to be provided. The housing may be provided with suitable manually operable controls for starting and stopping the respective gas flows, adjusting the pressure regulators and for initial presetting of the pressure at which the relief valves operate. The pressure gauges may be also mounted on the housing enabling ready monitoring of the pressure.

In use of the preferred embodiment of the present invention as described above the nitrogen and air supplies are connected to the apparatus and the nitrogen and air on/off valves are opened. The opening of the master on/off air valve causes air to flow through the vibrator chamber around the vibrator block thereby causing the block to rock in the chamber and transmit the vibration to the base block. The storage vessel is thereby vibrated to promote falling of grit through the

orifice(s) in the base block. As the grit falls through the orifice(s) the nitrogen flowing through the mixing chamber entrains the grit and then passes out through the hose and nozzle. Variation of the vibrator gas flow pressure enables vibration control so that the grit feed may be adjusted to the required rate. Adjustment of the propellant gas flow pressure controls the force of the blast so that materials of differing hardness can be treated.

An embodiment of a grit storage vessel and vibrator means according to the present invention is shown in Figure 1 of the accompanying drawings and Figure 2 shows a schematic diagram of a pneumatic circuit for the apparatus. However, it will be appreciated that the present invention is not limited to the specific arrangements shown in the accompanying drawings.

The grit blasting apparatus of Figure 1 comprises a storage vessel 1 for containing a body of grit. The storage vessel is cylindrical and has a cap 2 providing a gas tight seal with the vessel. The cap is screw threaded and is provided with a plug 3 and resilient O-ring 4 to supply a gas-tight seal. The cylindrical storage vessel 1 is mounted on a base block 5. The base block has a conical recess in its upper surfaces at the base of which is an output hole 6 adapted to receive an insert 7 providing an output orifice. The output orifice communicates with a mixing chamber 8 into which the grit is fed. The mixing chamber is provided with a pressurised gas inlet (not shown) and gas outlet 9. The grit blasting apparatus further includes a pressure equalising tube 10 extending from the mixing chamber 8 to just below the cap of the storage vessel 1.

The grit blasting apparatus further comprises a vibrator chamber 11 and vibrator block 12 in the base block. The vibrator chamber and block are adapted to vibrate the storage vessel by means of pressurised gas passing around the vibrator block thereby causing the block to rock in the chamber and transmit the vibration to the base block 5.

As illustrated in Figure 2, the grit blasting apparatus may be provided with a suitable series of gas controls. Nitrogen and air supplies are connected to the grit blasting apparatus and vibrator respectively. The controls include master on/off valves 13, the respective opening of which cause air to flow

to the vibrator chamber and causes nitrogen to flow to the mixing chamber wherein the grit is entrained in the gas flow. The controls further include pressure relief valves 14 which may be preset to open once a critical pressure is reached.

5 The controls further include pressure regulators 15 and gauges 16 mounted downstream of the regulators.

Finally it is to be understood that various alterations modifications and/or additions may be made to the construction and arrangement of parts as herein described
10 without departing from the spirit and scope of the present invention.

15

CLAIMS

1. Grit blasting apparatus including
 a storage vessel for containing a body of grit,
 a base of said vessel against which said grit body
5 rests,
 passage means connectable to a source of pressurized
 gas and being operable to direct a stream of said gas along a
 path adjacent said base,
 outlet means in said base through which said grit can
10 be discharged under gravity into said gas path,
 gas operated vibrator means connected to said vessel
 and being operable to vibrate said vessel to promote said
 discharge
 and means for connecting a source of pressurized gas
15 to said vibrator means.
2. Grit blasting apparatus as claimed in Claim 1 wherein
 the grit storage vessel includes a cylinder having its axis
 generally vertical and a cap providing a gas-tight seal with the
 vessel.
- 20 3. Grit blasting apparatus as claimed in Claim 2 wherein
 said base is in the form of a block, said base block having a
 conical recess in its upper surface providing a funnel for
 directing the grit towards said outlet means.
- 25 4. Grit blasting apparatus as claimed in Claim 3 wherein
 said outlet means includes at least one output hole in the base
 of the conical recess, said output hole being adapted to
 receive an insert providing an output orifice.
- 30 5. Grit blasting apparatus as claimed in Claim 4 wherein
 said passage means includes a mixing chamber in the base block
 beneath the output orifice and communicating therewith, said
 mixing chamber further including a pressurized gas inlet and gas
 outlet located on opposite sides of the chamber.
- 35 6. Grit blasting apparatus as claimed in Claim 5 further
 including a pressure equalizing tube extending from the mixing
 chamber through the main body of the storage vessel and opening
 at its upper end within the storage vessel which is below the
 cap thereof.
- 40 7. Grit blasting apparatus as claimed in Claim 6 wherein
 the gas operated vibrator means includes a vibrator chamber in the
 base block having a pressurized gas inlet and outlet and, mounted

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within the vibrator chamber, a rotary vibrator block.

8. Grit blasting apparatus as claimed in Claim 7 wherein the rotary vibrator block is a generally cylindrical metal block having a groove around the outside, the vibrator chamber
5 also being cylindrical of larger diameter and slightly larger length; the cylindrical vibrator block and chamber having their longitudinal axes generally horizontal.

9. Grit blasting apparatus as claimed in Claim 8 wherein the propellant gas inlet and gas outlet are located to one side
10 of the vertical central plane of the chamber.

10. Grit blasting apparatus as claimed in Claim 9 wherein the apparatus is adapted to be supplied from at least one external source of pressurized gas through at least one gas conduit including a pressure relief valve, a master on/off valve
15 and adjustable pressure regulator and a pressure gauge.

11. Grit blasting apparatus as claimed in Claim 10 wherein the gas conduit supplies pressurized gas to the vibration chamber.

12. Grit blasting apparatus as claimed in Claim 11 wherein a gas conduit supplies pressurized gas to the vibration chamber
20 and then to the mixing chamber.

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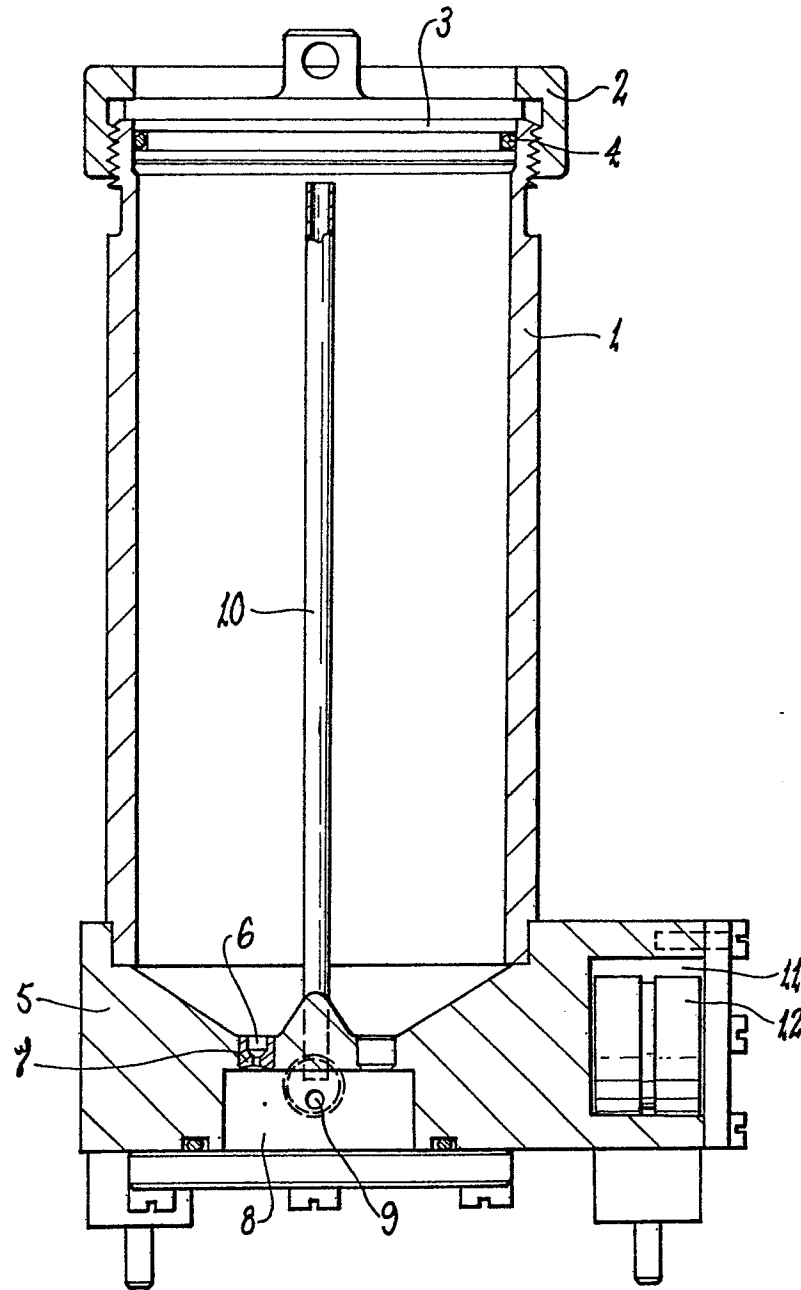


Fig 1

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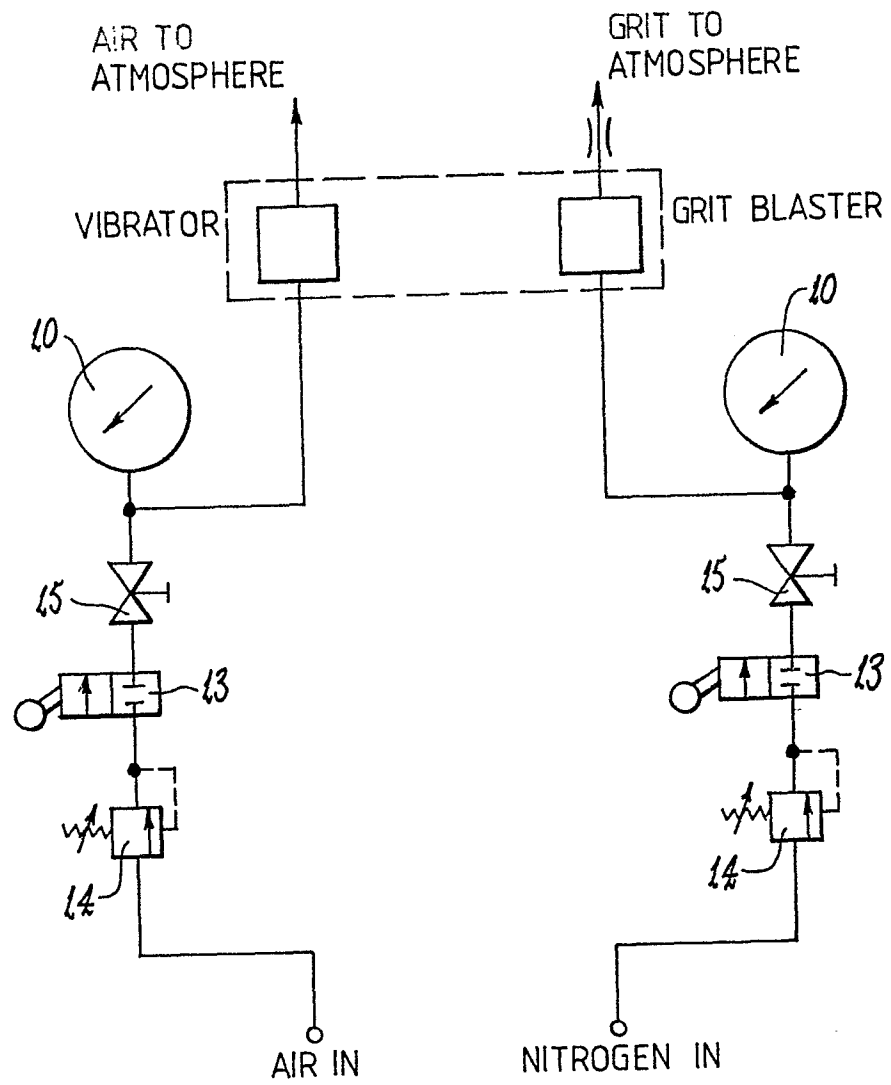


Fig 2