

ABRASIVE BLASTING APPARATUS

1 This invention relates to abrasive blasting with
2 particulate material, and relates more particularly but
3 not exclusively to systems and equipment for abrasive
4 blasting, and to sub-systems and apparatus therefor.

5
6 The cleaning of surfaces by abrasive blasting is a well
7 known procedure, involving the hurling of particulate
8 material against the surface either by mechanical
9 means, or by entraining the particulate material in a
10 jet of air directed at the surface. The particulate
11 material is more or less abrasive, and may be in the
12 form of metal shot, sand or any other suitable
13 material. The particulate material may be coarse (e.g.
14 gravel-like), fine (e.g. a powder), or smooth (e.g.
15 beads). The impact of the particulate abrasive
16 material on the surface to be cleaned tends to abrade
17 and remove surface contamination (e.g. dirt), and may
18 even remove part of the surface itself.

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1
2 Practical advantages of abrasive blasting as a surface
3 cleaning process have led to attempted extension of the
4 process to cleaning of surfaces previously cleaned by
5 other methods, or which were left uncleaned. However,
6 abrasive blasting systems which are good at cleaning
7 the surfaces of metal castings (for example) may prove
8 unsuitable for cleaning more delicate surfaces, such as
9 mediaeval stonework. Success in the application of
10 abrasive blasting to cleaning or otherwise treating
11 surfaces presenting special problems requires care in
12 selection of abrasive material, its feed rate,
13 transport velocity and other parameters defining the
14 abrasive process. Reduction or elimination of the
15 possibility of operator error is also highly desirable,
16 that is it should ideally be difficult or impossible
17 for the operator to use the abrasive cleaning equipment
18 in a manner which (for example) results in unnecessary
19 damage to the surface being cleaned, and in excessive
20 consumption of abrasive material.

21
22 According to a first aspect of the present invention
23 there is provided a supply and control system for
24 holding a particulate material and for co-operating
25 with an apparatus utilising particulate material
26 initially held in the supply and control system, the
27 supply and control system comprising container means
28 for holding the particulate material, dispensing means
29 for controllably dispensing particulate material from
30 the container means, coupling means for coupling the
31 supply and control system to the apparatus, and
32 operational parameter storage and transmission means

1 for storing predetermined operational parameters for
2 the apparatus and for transmitting these stored
3 operational parameters to the apparatus when the supply
4 and control system is coupled thereto.

5
6 According to a second aspect of the present invention,
7 there is provided an apparatus for utilising
8 particulate material initially held in a supply and
9 control system according to the first aspect of the
10 present invention, wherein the apparatus comprises a
11 mixing chamber, operational parameter reception means,
12 and coupling means for coupling a supply and control
13 system according to the first aspect of the present
14 invention to the apparatus (100).

15
16 Embodiments of the invention will now be described by
17 way of example, with reference to the accompanying
18 drawings wherein:

19 Fig 1 is a side elevation of a preferred
20 embodiment of abrasive blasting system in accordance
21 with the invention, coupled to a preferred embodiment
22 of supply and control system, also in accordance with
23 the invention;

24 Fig 2 is a sectional elevation of the arrangement
25 of Fig 1;

26 Fig 3 is a sectional end elevation of the
27 arrangement of Fig 1;

28 Fig 4 is a sectional elevation, to a much enlarged
29 scale, of a dispensing unit forming part of the
30 arrangement of Fig 1;

1 Figs 5(a) and 5(b) are a cross-sectional side view
2 and end view, respectively of an aggregate container
3 for use with the present invention;

4 Fig 6 is a diametral section (to an enlarged
5 scale) of an upper plate forming part of a dispensing
6 unit of the supply and control system of Fig 1;

7 Fig 7 is a plan view of the upper (right) side of
8 the upper plate of Fig 6;

9 Fig 8 is a plan view of the under (left) side of
10 the upper plate of Fig 6;

11 Fig 9 is a diametral section (to an enlarged
12 scale) of a lower plate forming part of the dispensing
13 unit of the supply and control system of Fig 1;

14 Fig 10 is a plan view of the upper (right) side of
15 the lower plate of Fig 9;

16 Fig 11 is a plan view of the under (left) side of
17 the lower plate of Fig 9;

18 Fig 12 is a diametral section (to an enlarged
19 scale) of a rotor disc forming part of the dispensing
20 unit of the supply and control system of Fig 1;

21 Fig 13 is a plan view of the rotor disc of Fig 12;
22 and

23 Fig 14 is a pneumatic circuit diagram for
24 operation of the arrangement of Fig 1.

25

26 Referring first to Fig 1, this shows a side elevation
27 of the principal parts of an abrasive blasting system
28 100 having a supply and control system 200 (shown
29 incompletely) coupled to it. The abrasive blasting
30 system 100 comprises a mixing chamber 102 fed from
31 above with particulate material (as will be detailed
32 subsequently) and fed from the left with compressed air

1 by way of an inlet connector 104. A high-pressure
2 stream of airborne particulate material leaves the
3 right end of the mixing chamber 102 by way of a hose
4 coupling 106, a flexible hose 107, and an operator-held
5 nozzle (not shown) used to control the direction of the
6 abrasive blast, and its distance from the surface being
7 treated.

8

9 The mixing chamber 102, and the abrasive blasting
10 system 100 as a whole, is mounted on supports 108
11 carried by a foundation member 110. The right end of
12 the mixing chamber 102 is detachable to allow internal
13 access for cleaning and other maintenance, and is
14 normally held in place by a ring clamp (not shown)
15 fitted around a pair of tapered flanges 112 and 114.
16 An O-ring 116 (Fig 2) is fitted between the flanges 112
17 and 114 to render the joint air-tight.

18

19 A circular male coupling 118 (Figs 1, 2 and 3) is
20 welded to the top of the mixing chamber 102 for the
21 attachment of the supply and control system 200 by way
22 of a female coupling 202.

23

24 A vertical shaft 120 is rotatably mounted through the
25 centre of the mixing chamber 102 on lower and upper
26 bushes 122 and 124. The shaft 120 is surrounded by an
27 air-tight housing 126 where it passes through the
28 mixing chamber 102. The shaft 120 is vertically
29 supported at its lower end by a vertically slidable
30 dome-headed pin 128 urged upwards by a coiled
31 compression spring 130, the pin 128 and the spring 130
32 being mounted in the centre of the foundation member

1 110. A pulley 132 is fitted on the lower end of the
2 shaft 120 as part of a double-reduction belt drive 134
3 (Fig 3) driven by a pneumatic motor (not shown in Figs
4 1-4, but shown in Fig 14). The top end of the shaft
5 120 is fitted with a plug-in shaft coupling socket 136
6 for rotary connection to a dispensing unit 204 forming
7 part of the supply and control system 200.

8

9 The supply and control system 200 has the general form
10 of a container 206 (shown incomplete) with the
11 dispensing unit 204 mounted on the container's neck
12 flange 208. The supply and control system 200 is
13 stored upright when separate from the abrasive blasting
14 system 100, and inverted for coupling to the system 100
15 as shown in Figs 1-3.

16

17 The dispensing unit 204 (see Figs 2, 3 and especially
18 Fig 4), comprises a fixed upper plate 210, a fixed
19 lower plate 212, and a rotor disc 214 sandwiched
20 between the plates 210 and 212. The plates 210 and 212
21 are mutually secured by screws 216. The coupling 202
22 is an interference fit on the periphery of the upper
23 plate 210.

24

25 The upper and lower plates 210 and 212 have respective
26 central bearings 218 and 220 which rotatably support a
27 shaft 222 whose lower end extends below the lower plate
28 212. The shaft 222 is keyed to the rotor disc 214 such
29 that rotation of the shaft 222 causes matching rotation
30 of the rotor disc 214. (The screws 216 are not so
31 tight that the rotor disc 214 is prevented from
32 rotating). The upper and lower plates 210 and 212 also

1 have respective shaft seals 224 and 226 which protect
2 the bearings 218 and 220 against abrasive material.
3 The lower end of the shaft 222 is provided with a shaft
4 coupling 228 which automatically plugs into the shaft
5 coupling socket 136 (Figs 2 and 3) when the supply and
6 control unit 200 is mounted on top of the abrasive
7 blasting system 100. This ensures that rotation of the
8 shaft 120 causes matching rotation of the shaft 222 and
9 of the rotor disc 214.

10

11 The container neck flange 208 is fitted with an
12 inverted cone 230 which deflects particulate material
13 flowing from the interior of the container 206 to the
14 container outlet 232, the cone 230 helping to maintain
15 constant pressure of particulate material at the outlet
16 232. An upward extension (not shown) of the shaft 222
17 couples to a rotatable paddle (not shown) or other
18 suitable agitator mounted within the container 206 so
19 as to agitate particulate material within the container
20 206 in order to discourage caking or bridging that
21 would otherwise inhibit free flow of particulate
22 material through the outlet port 232.

23

24 Instead of the permanent container 206 shown in Figs 1-
25 4, the system 200 may use a replaceable container 500,
26 shown in Figs 5(a) and 5(b), which may be supplied as a
27 consumable item. This particular embodiment of the
28 container 500 is fabricated from strong cardboard or
29 plastic and is formed in the shape of a cuboid. At the
30 base of the container 500 is a tapered funnel section
31 501 and a flanged plate 502. Fixed over the funnel
32 section 501 is an inner bag 503 that holds the

1 aggregate. It will be appreciated that although the
2 funnel section 501 and plate 502 are referred to as
3 being at the base of the container 500, when the
4 container is being filled with aggregate, the container
5 will be inverted from what is shown in Fig 5(a). The
6 flanged plate 502 is the interface between the
7 container 500 and the dispensing unit 204.

8
9 Fig 5(b) shows the outlet and inlet arrangement of the
10 container 500. In order to receive this particular
11 container 500, the dispensing unit 204 would have to be
12 fitted with an adapter (not shown). When the container
13 500 is fitted to the dispensing unit 204, the adapter
14 acts upon a spring-loaded drawer 504 that runs between
15 a pair of rail members 505. The drawer 504 slides
16 between the rails 505 until an aperture 506 contained
17 in the drawer aligns with both the opening 507 of the
18 container 500 and the through hole 234 of the
19 dispensing unit 204, thus allowing the aggregate to
20 enter the dispensing unit 204. When the container 500
21 is removed from the dispensing unit 204, the spring 508
22 will push the drawer 504 back to its closed position,
23 thereby preventing aggregate from leaving the container
24 500. In other ways the replaceable container 500
25 functions in the same way as the permanent container
26 206.

27
28 The upper plate 210 (see Figs 4 and 6-8) has an off-
29 centre through hole 234 (ie a hole which is radially
30 displaced from the centre of the plate 210 and which
31 extends between opposite major faces of the plate 210),
32 the hole 234 being somewhat extended in a

1 circumferential direction to assist in efficient
2 filling of rotor cavities (as will be explained
3 subsequently). The dispensing unit 204 is secured to
4 the container neck flange 208 such that the hole 234 in
5 the upper plate 210 is directly under the container
6 outlet 232. Since the outlet 232 is central in the
7 lower face of the flange 208, whereas the hole 234 is
8 offset from the centre of the plate 210, alignment of
9 the hole 234 with the outlet 232 requires that the
10 plate 210, and ultimately the entire dispensing unit
11 204, be offset from the centre of the neck flange 208.

12
13 Referring to Figs 4, 12, and 13, the rotor disc 214 of
14 the dispensing unit 204 has eight equi-angularly spaced
15 through holes 236, each at the same radial displacement
16 from the centre of the disc 214 (which is also
17 identical to the radial displacement of the hole 234
18 from the centre of the upper plate 210). A hole 238 at
19 the centre of the rotor disc 214 is square in cross-
20 section in order to key the rotor disc 214 to the shaft
21 222. As the rotor disc 214 is rotated between the
22 plates 210 and 212 by continuous rotation of the shaft
23 222 (driven by the afore-mentioned air motor through
24 the double-reduction belt drive 134, the pulley 132,
25 the shaft 120, the shaft coupling socket 136, the shaft
26 coupling 228, the shaft 222, and the square hole 238),
27 successive ones of the holes 236 in the rotor disc 214
28 come under the hole 234 in the upper plate 210 and are
29 thereupon filled by particulate material in the
30 container 206 falling under gravity down the cone 230
31 and through the container outlet 232. The
32 circumferential extension of the hole 234 extends the

1 duration of the exposure of the full cross-section of
2 each of the moving rotor holes 236 to descending
3 particulate material, and hence improves the efficiency
4 of filling of the rotor cavities constituted by the
5 holes 236. Gravitational filling of the rotor cavities
6 236 with descending particulate material may be
7 assisted by pneumatically pressurising the interior of
8 the container 206 above the back-pressure within empty
9 ones of the rotor cavities 236 as they are rotated to
10 come under the hole 234.

11
12 Referring to Figs 4 and 9-11, the lower fixed plate 212
13 of the dispensing unit 204 has a through hole 240, the
14 lower end of which is fitted with an outlet spout 242.
15 The hole 240 is diametrically opposite the hole 234.
16 As the rotor disc 214 continues to rotate, the rotor
17 holes or cavities 236 which were previously filled
18 under the hole 234 come over the hole 240, and the
19 cargo of particulate material drops out the rotor
20 cavity 236 and into the hole 240. Emptying of each of
21 the filled rotor cavities 236 in turn is assisted by
22 providing the fixed upper plate 210 with a through hole
23 244 directly above the hole 240 in the lower fixed
24 plate 212, the hole 244 being provided with an air
25 supply 246 (depicted schematically) which purges each
26 of the rotor cavities 236 in turn with an air blast.

27
28 Reverting to Figs 2 and 4, it will be seen that the
29 outlet spout 242 depending from the dispensing unit 204
30 plugs in to an inlet tube 138 projecting through the
31 top of the mixing chamber 102. The lower end of the
32 outlet spout 242 is sealed in an airtight manner to the

1 upper end of the inlet tube 138 by means of an
2 elastomeric sleeve 140 lining the inside of the upper
3 end of the inlet tube 138, the bore of the sleeve 140
4 being dimensioned for the spout 242 to have a plug fit
5 in it.

6

7 The volume of particulate material metered and
8 dispensed by the dispensing unit 204 can be varied in a
9 number of ways:

10

11 (1) the volume per unit of time can be varied (without
12 any other changes) by varying the rotational speed of
13 the rotor disc 214, ie the greater the number of
14 revolutions per minute of the rotor disc 214, the
15 greater the volume of particulate material passed
16 through the dispensing unit 204 (assuming no
17 significant variation, with varying rotor speed, in the
18 volumetric efficiency of filling and emptying of the
19 rotor cavities 236).

20

21 (2) the volume per revolution of the rotor disc 214
22 can be varied by varying the number of holes or
23 cavities (without changing the volume per cavity).

24

25 (3) the volume per revolution of the rotor disc 214
26 can be varied (without varying the number of holes or
27 cavities) by varying the volume of each cavity. This
28 can be done by varying the diameter or cross-sectional
29 area of each hole, or by varying the length of each
30 hole (ie by varying the thickness of the rotor disc),
31 or by suitably varying both length and diameter. While
32 the volume per cavity in a rotor disc of unchanged

1 thickness could be altered by inserting an
2 appropriately dimensioned sleeve in each hole, it may
3 be simpler to exchange one rotor disc for another, each
4 rotor in the interchangeable series having cavity
5 dimensions and numbers selected to give a different
6 total cavity volume per revolution.

7
8 While the dispensed volume can be varied by adopting
9 any one of the above procedures, two or more of these
10 procedures could be adopted simultaneously.

11
12 Since there are so many variables associated with
13 abrasive blasting, (eg volumetric air flow rate, air
14 mass flow rate, volumetric abrasive flow rate, abrasive
15 mass flow rate, air/abrasive ratio, and nozzle exit
16 velocity), optimisation of abrasive blasting
17 performance requires suitable control of operational
18 parameters. Operator setting of controls requires
19 skill and diligence, whereas the present invention
20 avoids reliance on operators by storing parameter
21 settings on the supply and control unit 200 at the time
22 that it is filled with particulate material at a depot,
23 and causing these parameter settings to be imposed on
24 the abrasive blasting system 100 when the pre-filled
25 and pre-set supply and control unit is fitted. This is
26 schematically depicted in Figs 1 and 2, to which
27 reference will now be made.

28
29 An operational parameter storage and transmission
30 system 290 is mounted on the container neck flange 208,
31 adjacent the coupling 202 around the dispensing unit
32 204. The system 290 stores operational parameters in

1 an encoded form in an internal memory, and an internal
2 transmitter transmits the encoded parameter settings to
3 the abrasive blasting system 100 at an appropriate
4 time, eg in the course of attaching the supply and
5 control unit 200 to the abrasive blasting system 100,
6 or immediately afterwards, or immediately prior to (or
7 during) use of the abrasive blasting system 100. At
8 the depot where the container 206 is loaded with a
9 particulate material selected for a particular type of
10 task, optimum operational parameters are simultaneously
11 encoded into the internal memory of the system 290.

12

13 An operational parameter reception system 190 is
14 mounted on top of the mixing chamber 102 adjacent the
15 coupling 118 such that the reception system 190 will be
16 suitably adjacent to or in contact with the storage and
17 transmission system 290 when the couplings 118 and 202
18 are fully mated. The reception system 190 includes an
19 internal receiver for receiving a transmission 300 of
20 encoded operational parameters from the storage and
21 transmission system 290. The reception system 190 also
22 includes internal means for storing, decoding, and
23 applying operational parameter settings to the various
24 controls of the abrasive blasting system 100 (to be
25 detailed below with reference to Fig 20). The
26 transmission 300 may be of any suitable form, eg an
27 encoded radio, optical, or other electromagnetic signal
28 transmission, or (where the systems 190 and 290 are in
29 direct physical contact) by encoded electric currents
30 passed through an array of mated conductive contacts.
31 Alternatively, the transmission may be by means of

1 direct electrical connection of a connecting cable,
2 plug and socket (not shown).
3
4 The operational parameter storage and transmission
5 system 290 and the operational parameter reception
6 system 190 can each take many different forms
7 (provided, of course, that they are mutually
8 compatible). By way of example, the storage and
9 transmission system 290 can comprise an EE-PROM
10 (electrically erasable programmable read-only
11 semiconductor memory) pre-loaded with encoded
12 operational parameters, and the reception system 190
13 can comprise any compatible form of EE-PROM-reader.
14 Alternatively, the storage and transmission system 290
15 can comprise a bar code or the like, and the reception
16 system 190 can comprise any suitable form of bar code
17 reader. As a further alternative, the reception system
18 190 can comprise an array of spring-biassed pneumatic
19 valves or electric switches, and the storage and
20 transmission system 290 can comprise a compatible array
21 of valve/switch operators individually selectively
22 arrangeable into a valve/switch-operating
23 configuration, or into a valve/switch non-operating
24 configuration. As a still further alternative, the
25 reception system 190 can comprise an array of pairs of
26 mutually isolated electrical contacts, and the storage
27 and transmission system 290 can comprise a compatible
28 array wherein contact bridges can be selectively
29 deployed or omitted such as to bridge, or to leave
30 mutually unconnected, respective pairs of contacts in
31 the reception system 190 when the supply and control
32 system 200 is operationally mated with the abrasive

1 blasting system 100. The storage-
2 transmission/reception systems 290 + 190 could be
3 adopted from known film cassette/camera combinations
4 wherein use of a particular film cassette in a given
5 camera causes appropriate variations in the settings of
6 that camera.

7
8 Referring now to Fig 14, this schematically depicts a
9 mainly pneumatic supply and control system 400
10 including various controls of the operational
11 parameters. The pneumatic system 400 comprises a
12 compressed air supply 402 which feeds several air-
13 consuming sub-systems (detailed below).

14
15 A transport air and purge air sub-system of the
16 pneumatic system 400 comprises a pressure regulator 404
17 and an isolating valve 406 feeding through an
18 adjustable consumption-limiting throttle 408 to the
19 inlet connector 104 as a supply of transport air for
20 mixing with metered particulate material inside the
21 mixing chamber 102 and delivery of the air/abrasive
22 mixture through the outlet hose 107 to the nozzle (not
23 shown) by which the operator blasts the surface being
24 cleaned or otherwise treated. A pressure gauge 410
25 connected immediately upstream of the throttle 408
26 monitors the pressure of delivered transport air.

27
28 Purge air is branched from the transport air sub-system
29 between the valve 406 and the gauge 410 by way of an
30 isolating valve 412 and a further pressure gauge 414 to
31 be passed through an air drier 416, an adjustable
32 consumption-limiting throttle valve 418, and a non-

1 return valve 420 for delivery to the dispensing unit
2 204 via the rotor cavity purge line 246.

3

4 A motor supply sub-system of the pneumatic system 400
5 comprises a pressure regulator 422, an isolating valve
6 424, and a delayed-action self-switching valve 426
7 feeding through an adjustable consumption-limiting
8 throttle 428 to a pneumatic motor 430 which drives the
9 rotor disc 214 of the dispensing unit 204 by way of the
10 double-reduction pulley drive 134 and the shaft 120. A
11 pressure gauge 432 connected immediately upstream of
12 the throttle 428 monitors the pressure of delivered
13 motor air. The rotor drive motor 430 exhausts to
14 ambient atmosphere through a silencer 434.

15

16 Air for supply to another motor is branched from the
17 supply for the rotor drive motor 430 between the valve
18 426 and the gauge 432 by way of an isolating valve 436
19 and a further pressure gauge 438 to be passed through
20 an adjustable consumption-limiting throttle 440 for
21 delivery to a pneumatic motor 442 which drives a dynamo
22 444 through a belt drive 446. The output of the dynamo
23 444 is at a very low voltage which is intrinsically
24 safe, ie unable to cause sparks, and serves to power
25 the operational parameter reception system 190 together
26 with the storage and transmission system 290 as well as
27 charging a back-up battery 445. The dynamo drive motor
28 442 exhausts to ambient atmosphere through a silencer
29 448.

30

31 A further motor supply sub-system comprises a pressure
32 regulator 450, an isolating valve 452, and a delayed-

1 action self-switching valve 454 feeding through an
2 adjustable consumption-limiting throttle 456 to a
3 pneumatic motor 458 which drives first and second water
4 pumps 460, 462 for the supply of dust-suppressing
5 sprays, debris flushing, and general washing duties. A
6 pressure gauge 464 connected immediately upstream of
7 the throttle 456 monitors the pressure of delivered
8 air. The water pump drive motor 458 exhausts to
9 ambient atmosphere through a silencer 466.

10

11 An air-blast cleaning/flushing sub-system of the
12 pneumatic system 400 comprises a pressure regulator 468
13 and an isolating valve 470 feeding a hose 472 for the
14 supply of a jet of clean air which can be used for dry
15 cleaning of equipment, articles, etc, and for flushing
16 unwanted accumulations of abrasives, debris, and the
17 like.

18

19 The pneumatic system 400 may also be arranged to supply
20 dust-free breathing air for the operator.

21

22 Those parts of the pneumatic control system 400 which
23 are adjustable (eg a range of settings) or which are
24 otherwise controllable (eg switched off or on) are set
25 in respect of operational parameters by settings
26 initially stored in the transmission system 290 and
27 subsequently transmitted to the reception system 190.
28 The predetermined operational parameters may be exact
29 values, or they may be ranges of values within which
30 the operator has discretion to select a particular
31 value for operation.

32

1 The blasting nozzle through which air/abrasive mixture
2 is delivered from the hose 107 (usually but not
3 necessarily manually positioned by the operator)
4 against a surface to be treated by the abrasive jet may
5 incorporate separation sensing means to monitor the
6 separation of the nozzle from the surface with the
7 intention of warning the operator and/or temporarily
8 suspending the blast in the event that the nozzle is
9 too close to or too far from the surface.

10

11 Operator controls on or adjacent the nozzle may deliver
12 command signals (eg pneumatic or electric signals) to
13 the blasting system 100, such as start/stop signals,
14 and variations of such operational parameters as are
15 permitted to be varied within the predetermined
16 settings programmed into the reception system 190.

17

18 Other modifications and variations can be adopted
19 without departing from the scope of the invention as
20 defined in the following claims.



CLAIMS

- 1 1. A supply and control system (200) for holding a
2 particulate material and for co-operating with an
3 apparatus (100) utilising particulate material
4 initially held in the supply and control system
5 (200), the supply and control system (200)
6 comprising container means (206) for holding the
7 particulate material, dispensing means (204) for
8 controllably dispensing particulate material from
9 the container means (206), coupling means (202)
10 for coupling the supply and control system (200)
11 to the apparatus (100), and operational parameter
12 storage and transmission means (290) for storing
13 predetermined operational parameters for the
14 apparatus (100) and for transmitting these stored
15 operational parameters to the apparatus (100) when
16 the supply and control system (200) is coupled
17 thereto.
18
- 19 2. A supply and control system (200) as claimed in
20 Claim 1, wherein the dispensing means (204)
21 dispenses particulate material into the apparatus
22 (100) at a controlled rate, and the operational
23 parameter storage and transmission means (290)
24 transmits the stored operational parameters to the
25 apparatus (100) to control the operational
26 parameters thereof.
27
- 28 3. A supply and control system (200) as claimed in
29 either Claim 1 or Claim 2, wherein the supply and
30 control system (200) is transportable.



- 1
- 2 4. A supply and control system (200) as claimed in
- 3 any preceding claim, wherein the operational
- 4 parameter storage and transmission means (290) is
- 5 pre-set in accordance with the particulate
- 6 material selected for use with the supply and
- 7 control system (200).
- 8
- 9 5. A supply and control system (200) as claimed in
- 10 any preceding Claim, wherein the dispensing means
- 11 (204) comprises a rotor (214) obturating an outlet
- 12 (232) of the container means (206), the rotor
- 13 (214) comprising at least one cavity (236)
- 14 intermittently brought into communication with the
- 15 outlet (232) of the container means (206) by
- 16 rotation of the rotor (214), the dispensing means
- 17 (204) further comprising a transfer port (240),
- 18 wherein the at least one cavity (236)
- 19 intermittently comes into communication with the
- 20 transfer port (240).
- 21
- 22 6. A supply and control system (200) as claimed in
- 23 Claim 5, wherein the dispensing means further
- 24 comprises a purge port (244) aligned with the
- 25 transfer port (240) whereby, when the rotor cavity
- 26 or a given one of a plurality of cavities (236) in
- 27 the rotor (214) becomes aligned with the transfer
- 28 port (240), the purge port (244) and the transfer
- 29 port (240) are in fluid communication.
- 30
- 31 7. A supply and control system (200) as claimed in
- 32 Claim 6 wherein the rotor (214) further comprises



- 1 a rotational coupling (228) by which the rotor
2 (214) may be rotationally coupled to a rotor drive
3 means (430, 134, 120, 136) forming part of the
4 apparatus (100).
5
- 6 8. A supply and control system (200) as claimed in
7 any of Claims 5 to 7, wherein the rotor (214) is
8 formed as a disc having a plurality of through
9 cavities (236) substantially equi-angularly
10 disposed around the rotational axis of the disc
11 (214).
12
- 13 9. A supply and control system (200) as claimed in
14 any of Claims 5 to 8, wherein the rotor (214) is
15 interchangeable with one or more other rotors
16 having different cavity volumes and/or different
17 numbers of cavities.
18
- 19 10. A supply and control system (200) as claimed in
20 any preceding claim, wherein said container means
21 (500) comprises a substantially rigid outer
22 structure having an adjustable door means therein,
23 and a bag means (503) inside said outer structure,
24 said bag means (503) being open at one end where
25 the open end is adjacent said door means.
26
- 27 11. A supply and control system (200) as claimed in
28 Claim 11, wherein said door means comprises a
29 slidable plate member (504) having an aperture
30 (506) therein, said plate member (504) being
31 biased in a first position so that said aperture
32 (506) is closed, and said plate member (504)



- 1 moving to a second position in which said aperture
2 (506) is open when said container means (500) is
3 coupled to said dispensing means (204).
4
- 5 12. A supply and control system (200) as claimed in
6 either Claim 10 or Claim 11, wherein said
7 container means (500) is disposable.
8
- 9 13. A supply and control system (200) as claimed in
10 any preceding claim, wherein the container means
11 (206) comprises an agitator means disposed to
12 agitate particulate material therein.
13
- 14 14. A supply and control system (200) as claimed in
15 Claim 13, wherein the agitator means comprises a
16 paddle rotationally coupled to the rotor (214) of
17 the dispensing means (204).
18
- 19 15. An apparatus (100) for utilising particulate
20 material initially held in a supply and control
21 system (200) as claimed in any preceding Claim,
22 wherein the apparatus (100) comprises a mixing
23 chamber (102), operational parameter reception
24 means (190), and coupling means (118,136) for
25 coupling a supply and control system (200) as
26 claimed in any preceding Claim to the apparatus
27 (100).
28
- 29 16. An apparatus (100) as claimed in Claim 15, wherein
30 the dispensing means (204) of the supply and
31 control system (200) dispenses particulate
32 material at a controlled rate into the mixing



- 1 chamber (102) where it is mixed with transport
2 fluid supplied to the mixing chamber (102) at a
3 controlled rate.
4
- 5 17. An apparatus (100) as claimed in Claim 16, wherein
6 the apparatus (100) further comprises an
7 operational parameter setting means (400) which
8 receives parameter-denoting signals to set the
9 operational parameters of the apparatus (100).
10
- 11 18. An apparatus (100) as claimed in Claim 17, wherein
12 the operational parameter reception means (190)
13 receives the parameter-denoting signals from the
14 operational parameter storage and transmission
15 means (290) of the supply and control system
16 (200).
17
- 18 19. An apparatus (100) as claimed in any of Claims 15
19 to 18, wherein the settable operational parameters
20 of the apparatus include the mass flow rate and/or
21 the volumetric flow rate of the transport fluid,
22 the mass flow rate and/or the volumetric flow rate
23 of the particulate material, or a respective range
24 for each of the aforesaid parameters within which
25 an operator of the system may personally select an
26 operating parameter.
27
- 28 20. An apparatus (100) as claimed in any of Claims 15
29 to 19, wherein the apparatus is an abrasive
30 blasting apparatus.