

Feb. 26, 1946.

W. M. MYERS

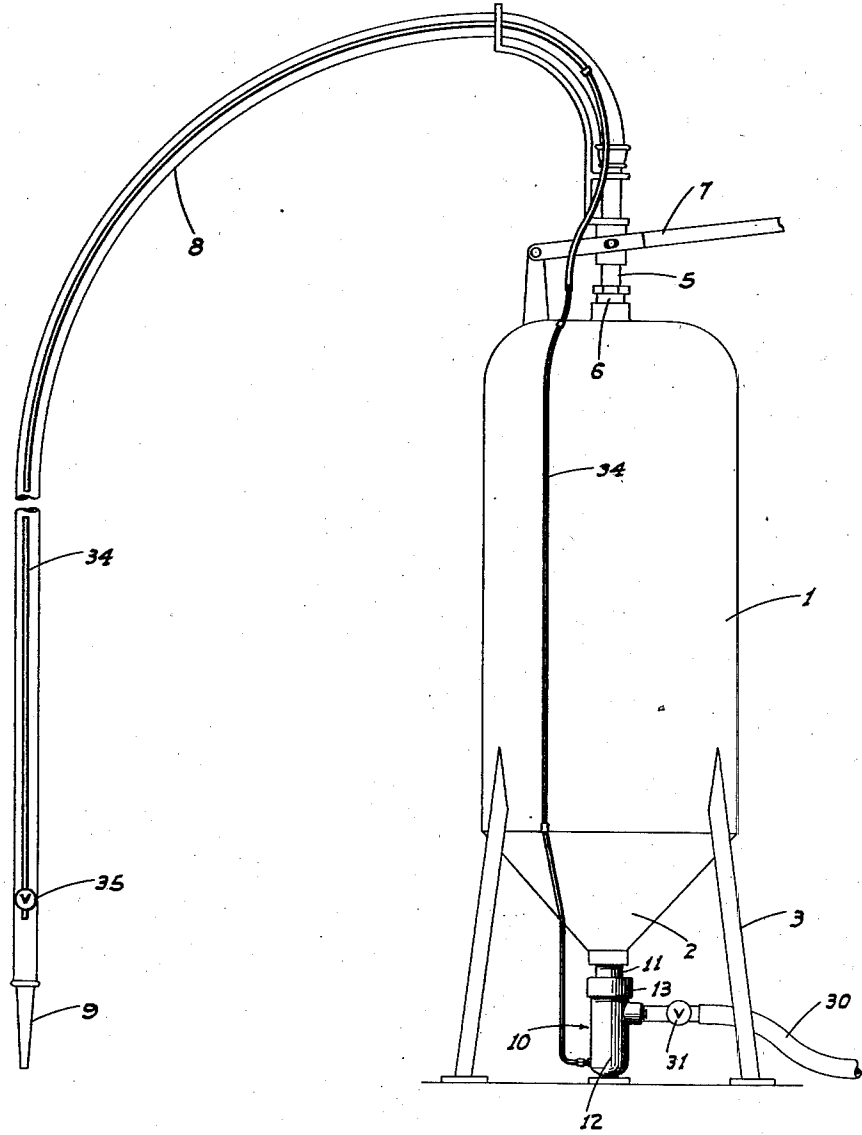
2,395,420

CONTROL VALVE

Filed Oct. 4, 1944

2 Sheets-Sheet 1

Fig. 1



INVENTOR

Wm. M. Myers

BY

Robert R. White

ATTORNEYS

Feb. 26, 1946.

W. M. MYERS

2,395,420

CONTROL VALVE

Filed Oct. 4, 1944

2 Sheets—Sheet 2

Fig. 2

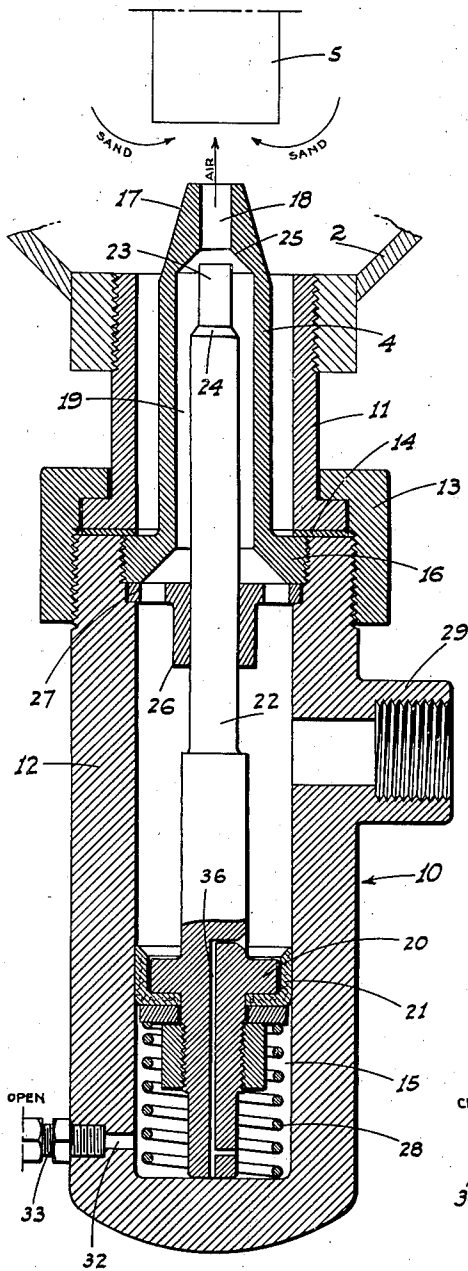
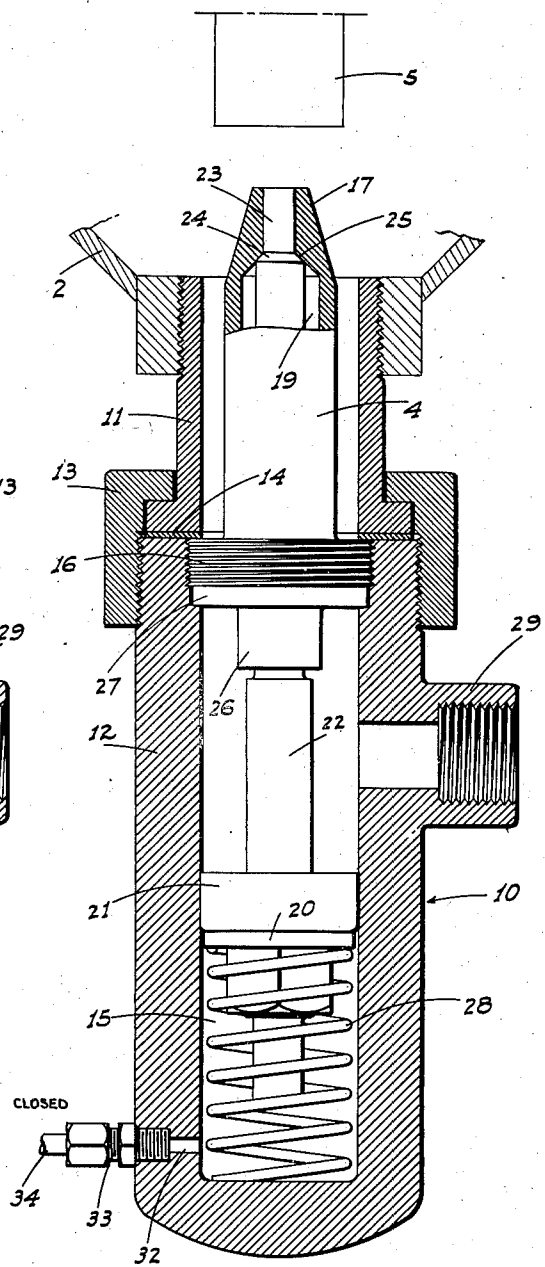


Fig. 3



INVENTOR
Wm. M. Myers

BY *Wm. M. Myers*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,395,420

CONTROL VALVE

William M. Myers, Fresno, Calif.

Application October 4, 1944, Serial No. 557,120

11 Claims. (Cl. 51—12)

This invention is directed to, and it is an object to provide, a novel control valve for a sand-blasting machine, and particularly the machine shown in United States Patent No. 2,261,565, dated November 4, 1941, and assigned to the applicant herein.

The machine shown in the above identified patent includes, in an upstanding sand retaining tank, a vertical air blast nozzle projecting into the tank at the bottom, and a vertically extending air and sand outlet pipe disposed with its lower end in adjacent, aligned relation to the nozzle. With this machine it was found that upon shutting off the air to the nozzle, a quantity of sand would fall back from the vertical outlet pipe into said nozzle. Thereafter, when air was again turned into the nozzle, the resulting blast drove the accumulated sand out of the nozzle with an abrasive action. This soon wore out the nozzle at the tip, requiring replacement or repair.

It is therefore another object of this invention to incorporate means in the machine to effectively plug or block the nozzle against entry of sand when the air in the machine is shut off; such means being actuated by a part of the control valve for the air pressure supply.

A further object of the present invention is to provide a device, as in the preceding paragraph, in which the air control valve is formed within the air blast nozzle and includes an axially movable member; there being an axially projecting plug on the upper end of said member adapted to engage in the tip of the nozzle when the air is shut off, whereby to then prevent access of sand into the nozzle.

It is also an object of the invention to provide a control valve arranged for remote control, and especially for control by the operator at the discharge end of the sandblasting hose.

A further object of the invention is to provide a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is an elevation of the sand blasting machine incorporating the present invention.

Figure 2 is an enlarged fragmentary sectional elevation of the control valve unit, with the valve open.

Figure 3 is a similar view, but with the valve closed.

Referring now more particularly to the characters of reference on the drawings, the sand-blasting machine comprises, as in the above identified patent, an upstanding vertically elongated sand tank 1 which includes an inverted frusto-conical bottom 2; said tank being supported by circumferentially spaced legs 3. A vertical air blast nozzle 4 projects into the bottom 2 of the tank centrally thereof, and a vertical outlet pipe 5 extends in adjustable relation through a packing gland 6 at the top of the tank 1; such outlet pipe depending into the tank to a termination in adjacent aligned relation to the nozzle 4. The means for adjusting the pipe vertically is indicated generally at 7. A sandblast hose 8 is connected at one end, in swiveling relation, to the upper end of the outlet pipe 5, while the outer end of said sandblast hose 8 is fitted with a sandblast nozzle 9.

The control valve unit to which the present invention is directed is indicated generally at 10 and is mounted in depending relation from the bottom 2 of the tank 1; such control valve unit comprising the following structural arrangement:

A depending attachment neck 11 is threaded into the bottom 2 of the tank centrally thereof, and a vertically elongated body 12 is secured in axially aligned dependent relation to the outer end of neck 11 by means of a removable, flanged nut 13; there being an air seal gasket 14 between adjacent ends of the neck 11 and body 12.

The body 12 is initially open at its upper end and is formed with an axially extending cylinder 15 closed at the bottom. The nozzle 4 includes, at the lower end thereof, an annular head 16 which is threaded into the upper end of, and forms a closure for, the cylinder 15. The nozzle 4 extends upwardly from the head 16, through the neck 11, and thence projects at the tip 17 a short distance into the bottom 2 of the tank; said tip including a reduced-diameter discharge bore 18 which communicates with the central passage 19 of the nozzle, and which central passage is in turn in communication at its lower end with the upper end of the cylinder 15.

A piston 20 is slidably disposed in the cylinder 15, and includes a cup leather 21 and a piston rod 22 which extends from said piston in the direction of the nozzle 4.

At its upper end portion the piston rod 22 is formed as an axially upwardly extending plug 23

which is adapted to engage in and fully close the bore 18 of the nozzle tip 17 when the piston 20 is in raised or advanced position, as shown in Fig. 3; said plug being withdrawn from said bore 18 into the central passage 19 of the nozzle 4 when the piston is lowered or retracted, as shown in Fig. 2.

Directly below the plug 23 the piston rod 22 is formed with an annular taper valve 24 adapted to engage in closing relation with a valve seat 25 when the piston 20 is raised or advanced, and when the plug 23 is engaged in the bore 18.

At the upper end of the body 12 and within the cylinder 15 the rod 22 slidably extends through a guide sleeve 26 supported by a ported annular flange 27.

A heavy-duty compression spring 28 is engaged between the closed bottom of cylinder 15 and the adjacent end of piston 20; said spring, under predetermined conditions in the valve unit, urging the piston upwardly so as to engage the plug 23 in bore 18, and to close valve 24 against seat 25.

Adjacent but short of its upper end, and above the raised or advanced position of the piston, the body 12 is fitted with a tapped air inlet boss 29 to which an air pressure supply conduit 30 is connected, said conduit including a hand valve 31 therein. A part 32 extends through the body 12 from the cylinder 15 adjacent the bottom of said body and below the lowered or retracted position of the piston; said port 32 being connected by a fitting 33 in communication with a similarly small-diameter conduit 34 which leads upwardly alongside the tank and thence along the sandblast hose 8 to a point adjacent the sandblast nozzle 9. The portion of the conduit 34 which corresponds to the sandblast hose 8 is likewise flexible. At the outer end of conduit 34 it is fitted with a manually controlled valve 35.

The piston rod 22 is formed with a bleed passage 36 which opens at its ends to the cylinder 15 on opposite sides of the piston 20, for the purpose as will be hereinafter set forth.

Operation

The above described control valve unit functions in the following manner:

When the manual valve 31 is open and the operator-controlled valve 35 is closed the piston 20 is in the advanced position shown in Fig. 3 with the plug 23 in bore 18 and valve 24 closed against seat 25. With the parts in this position the sandblasting machine is not in operation, for the reason that air pressure from the conduit 30, while entering the upper end of cylinder 15 and the interior of tip 17, cannot pass the valve 24. The piston 20 remains in its raised or advanced position at this time for the reason that the air pressure above and below the piston 20 is equalized through the medium of the bleed passage 36, which permits the spring 28 to maintain said piston raised.

When the operator at the outer end of the sandblast hose 8 desires to conduct a sandblasting operation he opens the valve 35. This permits the pressure in the portion of cylinder 15 below piston 20 to immediately escape, whereupon the pressure in the upper portion of cylinder 15 shifts the piston 20 downward to its lowered or retracted position. As the bleed passage 26 is relatively small the amount of air which escapes therefrom into the lower portion of the cylinder 15 and thence out through the conduit 34 is very slight.

When the piston 20 shifts to lowered position,

the plug 23 and valve 24 retract from the bore 18 and seat 25 whereby the air under pressure feeds upwardly through the central passage 19 of nozzle 4 and out through the bore 18 of the tip 17 as an air blast. This air blast discharges into the pipe 5 at its lower end, carrying with it the sand from the tank 1.

To shut off the machine the operator need only close valve 35, which produces the following results:

Upon closing of valve 35 air pressure can no longer escape from the lower portion of cylinder 15, and thus the pressure on both sides of piston 20 will soon equalize because of the bleed passage 36. When this occurs the spring 28 shifts the piston upwardly to its advanced position, engaging the plug 23 in bore 18 and simultaneously closing the valve 24 against seat 25 before the sand in pipe 5 can fall back onto the nozzle tip 17. As a result, sand cannot enter the nozzle when the machine is not in operation. As a consequence the hereinbefore undesirable abrasive action on the nozzle tip does not occur. In addition to this advantage, the remote control feature of the valve unit is of considerable importance.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. In a sandblast machine which includes an air supply conduit having a control valve therein, and a sandblast hose leading away from the machine; a valve control device comprising a cylinder, a piston in the cylinder, said piston being operatively connected with the control valve, passage means arranged to introduce air pressure into the cylinder from the supply conduit ahead of the valve, said air being introduced into the cylinder on the side of the piston to tend to cause movement thereof in a valve opening direction, there being a bleed passage through the piston from said one side thereof to the other, a spring normally urging the piston in a valve closing direction, and a hand valve arranged to vent air pressure from the cylinder on said other side of the piston, the venting valve having a greater capacity than said bleed passage.

2. A device as in claim 1 in which the hand valve is mounted on the sandblast hose adjacent its outer end, and a conduit connected between said hand valve and the cylinder on said other side of the piston.

3. In a sandblast machine which includes an upstanding sand supply tank, an air nozzle projecting into the tank from below, an outlet pipe projecting into the tank from above, said nozzle and pipe being substantially axially aligned, an air pressure supply conduit, a valve unit adjacent the tank connected between and operative to control air flow from the supply conduit to the nozzle, and a sandblast hose leading from the outer end of said pipe; there being means responsive to closing of the valve unit to mechanically block said nozzle against the entry of sand thereinto.

4. A device as in claim 3 in which said last named means comprises a plug movable from a position clear of the upper end portion of the bore of the nozzle when the valve unit is open, to a position plugging said portion of the nozzle bore when the valve unit is closed.

5. A device as in claim 3 in which said valve unit includes a movable valve, said blocking means being actuated by movement of the valve.

6. In a sandblast machine which includes an upstanding sand supply tank, an air nozzle projecting into the tank from below, an outlet pipe projecting into the tank from above, said nozzle and pipe being substantially axially aligned, an air pressure supply conduit, a valve unit adjacent the tank connected between and operative to control air flow from the supply conduit to the nozzle, and a sandblast hose leading from the outer end of said pipe; said valve unit comprising a body depending from the bottom of the tank, the body having a vertical cylinder therein in axially aligned communication at its upper end with the nozzle and closed at the bottom, a piston in the cylinder movable between a raised and a lowered position, a piston rod extending upwardly from the piston into the bore of the nozzle, an annular valve on said rod within the nozzle, the latter having an internal valve seat with which the valve closes when the piston moves to its raised position, and manually controlled means arranged to selectively cause movement of the piston to said raised or lowered position respectively.

7. In a sandblast machine which includes an upstanding sand supply tank, an air nozzle projecting into the tank from below, an outlet pipe projecting into the tank from above, said nozzle and pipe being substantially axially aligned, an air pressure supply conduit, a valve unit adjacent the tank connected between and operative to control air flow from the supply conduit to the nozzle, and a sandblast hose leading from the outer end of said pipe; said valve unit comprising a body depending from the bottom of the tank, the body having a vertical cylinder therein in axially aligned communication at its upper end with the nozzle and closed at the bottom, a piston in the cylinder movable between a raised and a lowered position, a piston rod extending upwardly from the piston into the bore of the nozzle, an annular valve on said rod within the nozzle, the latter having an internal valve seat with which the valve closes when the piston moves to its raised position, means connecting the air supply conduit to the cylinder above the raised position of the piston,

a loaded compression spring between the closed bottom of the cylinder and the piston, there being a bleed passage through the piston and a pressure venting port of greater capacity than the bleed passage leading from the cylinder below the lowered position of the piston, and a hand valve to control venting through said part.

8. In a sandblast machine which includes an upstanding sand supply tank, an air nozzle projecting into the tank from below, an outlet pipe projecting into the tank from above, said nozzle and pipe being substantially axially aligned, an air pressure supply conduit, a valve unit adjacent the tank connected between and operative to control air flow from the supply conduit to the nozzle, and a sandblast hose leading from the outer end of said pipe; said valve unit comprising a body depending from the bottom of the tank, the body having a vertical cylinder therein in axially aligned communication at its upper end with the nozzle and closed at the bottom, a piston in the cylinder movable between a raised and a lowered position, a piston rod extending upwardly from the piston into the bore of the nozzle, an annular valve on said rod within the nozzle, the latter having an internal valve seat with which the valve closes when the piston moves to its raised position, and manually controlled means arranged to selectively cause movement of the piston to said raised or lowered position respectively; there being an axially upwardly extending plug on the upper end of the rod adapted to engage in the bore of the nozzle at the upper end of the latter when the piston is raised and the valve closed.

9. In a sandblasting machine, a sand reservoir, a nozzle projecting vertically into the bottom of said reservoir, means to admit air pressure to and through said nozzle, a control valve for said air pressure means, means to operate the valve, means to discharge sand from the reservoir under the influence of such air pressure, and means to block the nozzle upon closing of the valve whereby to prevent sand falling by gravity from the sand reservoir into said nozzle.

10. A device as in claim 9, in which said last named means comprises a plug for the nozzle and means to move said plug into the nozzle upon closing of the valve.

11. A device as in claim 9, in which said last named means comprises a plug mounted on the valve and movable into the nozzle as the valve is closed.

WILLIAM M. MYERS.