May 31, 1960 W. L. BIPES 2,938,305

CONTROL SYSTEM FOR SANDBLASTING EQUIPMENT

Filed Oct. 12, 1953

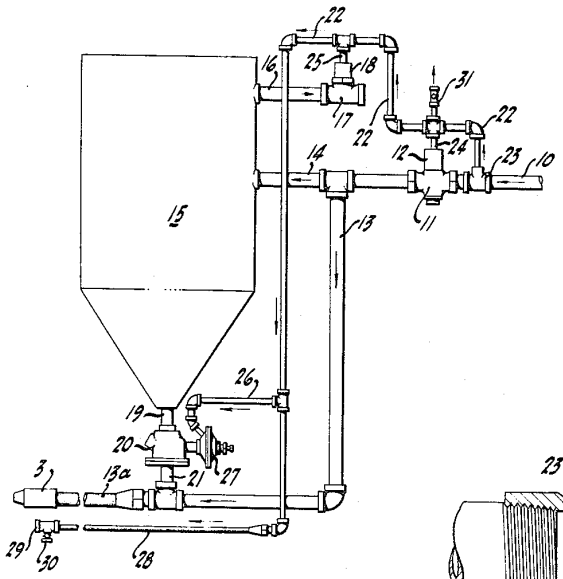
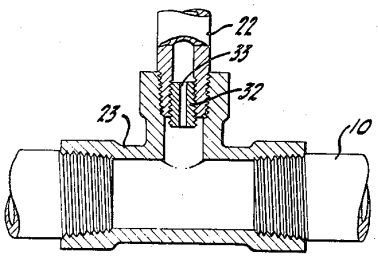


FIG. 1



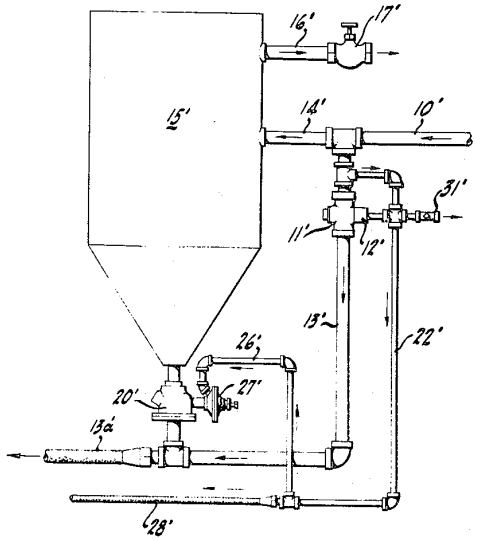


FIG. 3

FIG. 2

INVENTOR.
WILBUR L. BIPES

BY

Meelin and Hanscom

ATTORNEYS

United States Patent Office
2,938,305
Patented May 31, 1960

2,938,305

CONTROL SYSTEM FOR SANDBLASTING EQUIPMENT

Wilbur L. Bipes, San Francisco, Calif., assignor, by mesne assignments, to Clementina Ltd., San Francisco, Calif., a limited partnership

Filed Oct. 12, 1953, Ser. No. 385,332
4 Claims. (Cl. 51—12)

This invention relates to a control system for sandblasting equipment.

In the use of sandblasting equipment, it is very desirable to locate the cutoff valve for the main feed line as near as possible to the high pressure air supply and to the sand pot which feeds the sand into the main feed line. The reason for this is obvious since if the main feed line should break, the feed line under high pressure would whip and cause considerable damage or injury unless the flow of air can be stopped adjacent the equipment.

If, however, the cutoff valve is located adjacent the equipment, a serious control problem arises, since the operator may be working at some distance from the equipment; in some instances, even several stories above on a scaffold. It is obvious that some system is required whereby, the operator adjacent the nozzle end of the main feed line can control the action of the cutoff valve adjacent the equipment.

It is the principal object of this invention to provide a control system whereby, an operator adjacent the nozzle end of the main feed line may control a feed line cutoff valve adjacent the equipment end of the line.

A further object of this invention is to provide a control system which not only controls the entrance of high pressure air into the main feed line but also controls the flow of air to the sand tank and the tank exhaust valve.

A still further object is to provide a control system such as described in either of the previous objects, which is operable by the same type of power as the sandblasting equipment, namely, air pressure.

Another object of the invention is to provide a control system wherein a failure in any part of the control system will automatically shut down the sandblasting equipment.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawings, in which:

Fig. 1 is an elevational view of a sandblasting system embodying the principles of my invention.

Fig. 2 is a modification of the system shown in Fig. 1.

Fig. 3 is a sectional view of the bleed orifice to the control air line of either Fig. 1 or Fig. 2 drawn to an enlarged scale.

Referring now to the drawings wherein similar reference numerals are used to designate similar parts throughout, there is shown a sandblasting system comprising a main air inlet pipe 10 connected to a source of high pressure air (not shown) and feeding air to a normally spring closed main cutoff valve 11 having a piston type operator 12. From the main cutoff valve air is supplied through a pipe 14 to the upper portion of the sand tank 15 and similarly through pipe 13 to the flexible main feed line 13*a* leading to the nozzle 3. The tank 15 is supplied with an exhaust outlet pipe 16 having a normally open valve 17 controlling the flow of air therefrom, said valve 17 being supplied with a piston type operator 18. Adjacent the lower portion of the sand tank 15 there is an outlet pipe 19 for feeding sand through a sand control valve 20 and a pipe 21 into the main feed line 13*a*.

The control portion of the sandblasting equipment comprises a T-shaped fitting 23 in the main air line 10 and into which is screwed a control line 22, the fitting 23 being located in front of the cutoff valve 11. Screwed into the internal portion of the pipe 22 where it joins the T-fitting 23, there is a plug 32 having a restricted orifice 33 therethrough, the purpose of which will be described later. The control line 22 is connected by pipe 24 to the upper portion of the piston actuator 12 of the normally closed cutoff valve 11. Similarly, the control line 22 is connected by means of a pipe 25 to the upper portion of the piston actuator 18 of the normally open exhaust valve 17. The control line 22 is further connected by means of a line 26 to the back side of a diaphragm chamber 27 controlling the action of the normally closed sand admission valve 20. The end portion of the control line 22, designated by a reference numeral 28, is a flexible line leading to a normally open valve 29, having a spring pressed button 30 for closing the valve 29 under the influence of the operator's finger. The control line 28 being flexible is adapted to lie generally parallel to the main feed line 13*a*, and in some instances is even taped or otherwise affixed thereto with the valve 29 located adjacent the nozzle 3.

The operation of the system is as follows: As set forth above, valve 11 is a normally spring-closed valve, valve 17 is a normally spring-opened valve, and the sand-control valve 20 is a normally spring-closed valve. At the start of operation, the valves are in their normal positions, air is bled from the high-pressure line 10 into the control line 22 through the restricted orifice 33 and issues from the normally open valve 29 at the end of said control line.

When the operator desires to actuate the sandblasting equipment, he presses on the button 30 and hence closes the valve 29. The pressure builds up in the control line 22 and actuates the valve 17 to close the exhaust from the tank and then actuates the valve 11 to apply pressure to the main feed line and to the tank 15. The pressure in the control line 22 also acts on the diaphragm in the chamber 27 and opens the sand control valve to allow sand to issue from the tank 15 into the main feed line 13.

When the operator desires to shut down the sandblasting equipment, he merely releases the button 30 thus opening the valve 29 and allowing the air to bleed from the control line 22, thus lowering the pressure therein and allowing the valves to return to their normal spring-pressed positions; whereby the flow of air into the main feed line 13 and to the tank 15 is cut off, the exhaust to the tank 15 is opened, and the sand control valve 20 is closed to cut off the flow of sand into the main feed line.

In the modification shown in Fig. 2, the main feed line 10′ is connected directly to the tank 15′ by means of the line 14′. The cutoff valve 11′, in this instance, is located beyond the T-connection between the main air pressure supply line 10′ and the line 14′ leading to the sand tank 15′. In this instance, the exhaust line 16′ has a manually operated exhaust valve 17′ for controlling the flow of air from the exhaust line to the sand tank 15′, the remainder of the equipment being the same as that described with respect to Fig. 1.

In the modification shown in Fig. 2 it is obvious that the sand supply tank 15′ is under pressure at all times when the main supply line 10′ is connected with a source of high pressure air (not shown) and is only adapted to be exhausted by means of the manual valve 17′. The remainder of the equipment operates in the same manner as set forth with respect to Fig. 1. In this modification, the main cutoff valve 11′ controls only the flow of air in the main feed line and the sand control valve for cutting off the flow of sand into said main feed line.

In each of these systems there is provided adjacent the main cutoff valve a small petcock type bleed valve 31 or 31′, adapted to bleed the air from the control line. It is obvious that in order to condition the equip-

ment for operation, the small bleed valve 31 or 31' must be closed. In order to prevent operation of the device, should some one inadvertently pick up and close the valve 29, or otherwise restrict the passage of air through control line, 22 or 22', the valve 31 or 31' is normally left open except when the equipment is actually in operation.

From the foregoing description, it may be seen that I have provided a control system whereby the cutoff valve is located adjacent the equipment of the machine and that the said cutoff valve is capable of control from a position adjacent the nozzle of the device. It may be further seen from the description of the way in which the valves operate that should a break occur any place within the control system, the lowering of the pressure therein will cause the valves to automatically operate to shut down the sandblasting equipment.

Having thus described my invention, what I claim and desire to secure by means of Letters Patent, is as follows:

1. A control system for sandblasting equipment comprising a main feed line having a delivery end, said main feed line having its other end adapted to be connected to a source of high pressure fluid, a normally closed main valve in said main feed line, a fluid pressure actuator for said main valve, a sand pot for feeding sand into said main feed line between said main valve and said delivery end, a control line connected at one end thereof to said main feed line on the high pressure side of said main valve, a manually operable valve at the other end of said control line adjacent said delivery end of said main feed line, a conduit connected to and establishing fluid communication between said fluid pressure actuator of said main valve and said control line intermediate the ends thereof, and a conduit connected at one end to said main feed line between said main valve and the sand inlet to said main feed line and connected at its other end to said sand pot for applying fluid pressure to said sand pot when said main valve is in open position, the manually operable valve when in closed position allowing the fluid pressure in the control line to be communicated to said fluid pressure actuator for said main valve to allow said main valve to move to open position.

2. A control system for sandblasting equipment comprising a main feed line having a delivery end, said main feed line having its other end adapted to be connected to a source of high pressure fluid, a normally closed main valve in said main feed line, a fluid pressure actuator for said main valve, a sand pot for feeding sand into said main feed line between said main valve and said delivery end, a control line connected at one end thereof to said main feed line on the high pressure side of said main valve, a manually operable valve at the other end of said control line adjacent said delivery end of said main feed line, a conduit connected to and establishing fluid communication between said fluid pressure actuator of said main valve and said control line intermediate the ends thereof, a conduit connected at one end to said main feed line between said main valve and the sand inlet to said main feed line and connected at its other end to said sand pot for applying fluid pressure to said sand pot when said main valve is in open position, an exhaust port in said sand pot, a normally open exhaust valve for closing said exhaust port, a fluid pressure actuator for said exhaust valve, and a conduit connected to and establishing fluid communication between the fluid pressure actuator for the exhaust valve and said control line intermediate the ends thereof, the manually operable valve when in closed position allowing the fluid pressure in the control line to be communicated to said fluid pressure actuator for said main valve to allow said main valve to move to an open position, and to said fluid pressure actuator for said exhaust valve to allow said exhaust valve to move to closed position.

3. A control system for sandblasting equipment comprising a main feed line having a delivery end, said main feed line having its other end adapted to be connected

to a source of high pressure fluid, a normally closed main valve in said main feed line, a fluid pressure actuator for said main valve, a sand pot for feeding sand into said main feed line between said main valve and said delivery end, a control line connected at one end thereof to said main feed line on the high pressure side of said main valve, a manually operable valve at the other end of said control line adjacent said delivery end of said main feed line, a conduit connected to and establishing fluid communication between said fluid pressure actuator of said main valve and said control line intermediate the ends theerof, a conduit connected at one end to said main feed line between said main valve and the sand inlet to said main feed line and connected at its other end to said sand pot for applying fluid pressure to said sand pot when said main valve is in open position, an exhaust port in said sand pot, a normally open exhaust valve for closing said exhaust port, a fluid pressure actuator for said exhaust valve, a conduit connected to and establishing fluid communication between the fluid pressure actuator for the exhaust valve and said control line intermediate the ends thereof, a normally closed sand control valve in the connection between said sand pot and the sand inlet to said main feed lines, a fluid pressure actuator for said sand control valve, and a conduit connected to and establishing fluid communication between the fluid pressure actuator for the sand control valve and said control line intermediate the ends thereof, whereby when the manually operable valve is in closed position the fluid pressure in the control line is communicated to the fluid pressure actuator for said main valve to allow said main valve to open, and to the fluid pressure actuator for said exhaust valve to allow said exhaust valve to close, and to the fluid pressure actuator for said sand control valve to allow said sand control valve to open.

4. A control system for sandblasting equipment comprising a main feed line having a delivery end, said main feed line having its other end adapted to be connected to a source of high pressure fluid, a normally closed main valve in said main feed line, a fluid pressure actuator for said main valve, a sand pot connected to said main feed line between said main valve and said delivery end, a control line connected at one end thereof to said main feed line on the high pressure side of said main valve, a manually operable valve at the other end of said control line adjacent said delivery end of said main feed line, a conduit connected to and establishing fluid communication between said fluid pressure actuator of said main valve and said control line intermediate the ends thereof, a conduit connected between said main feed line on the high pressure side of said main valve and the upper portion of said sand pot for supplying fluid pressure to said sand pot, a normally closed sand control valve in the connection between said sand pot and the sand inlet to said main feel line, a fluid pressure actuator for said sand control valve, a conduit connected to and establishing fluid communication between the fluid pressure actuator for the sand control valve and said control line intermediate the ends thereof, whereby when the manually operable valve is closed the fluid pressure in the control line is communicated to the fluid pressure actuator for said main valve to allow the main valve to open, and to the fluid pressure actuator for said sand control valve to allow said sand control valve to open.

References Cited in the file of this patent

UNITED STATES PATENTS

1,641,342	Mauney	Sept. 6, 1927
1,858,475	Wolever	May 17, 1932
2,388,818	Bick	Nov. 13, 1945
2,395,420	Myers	Feb. 26, 1946
2,399,385	Rasmussen	Apr. 30, 1946
2,569,554	Buttolph	Oct. 2, 1951
2,633,708	Sedgwick	Apr. 7, 1953