

Aug. 5, 1958

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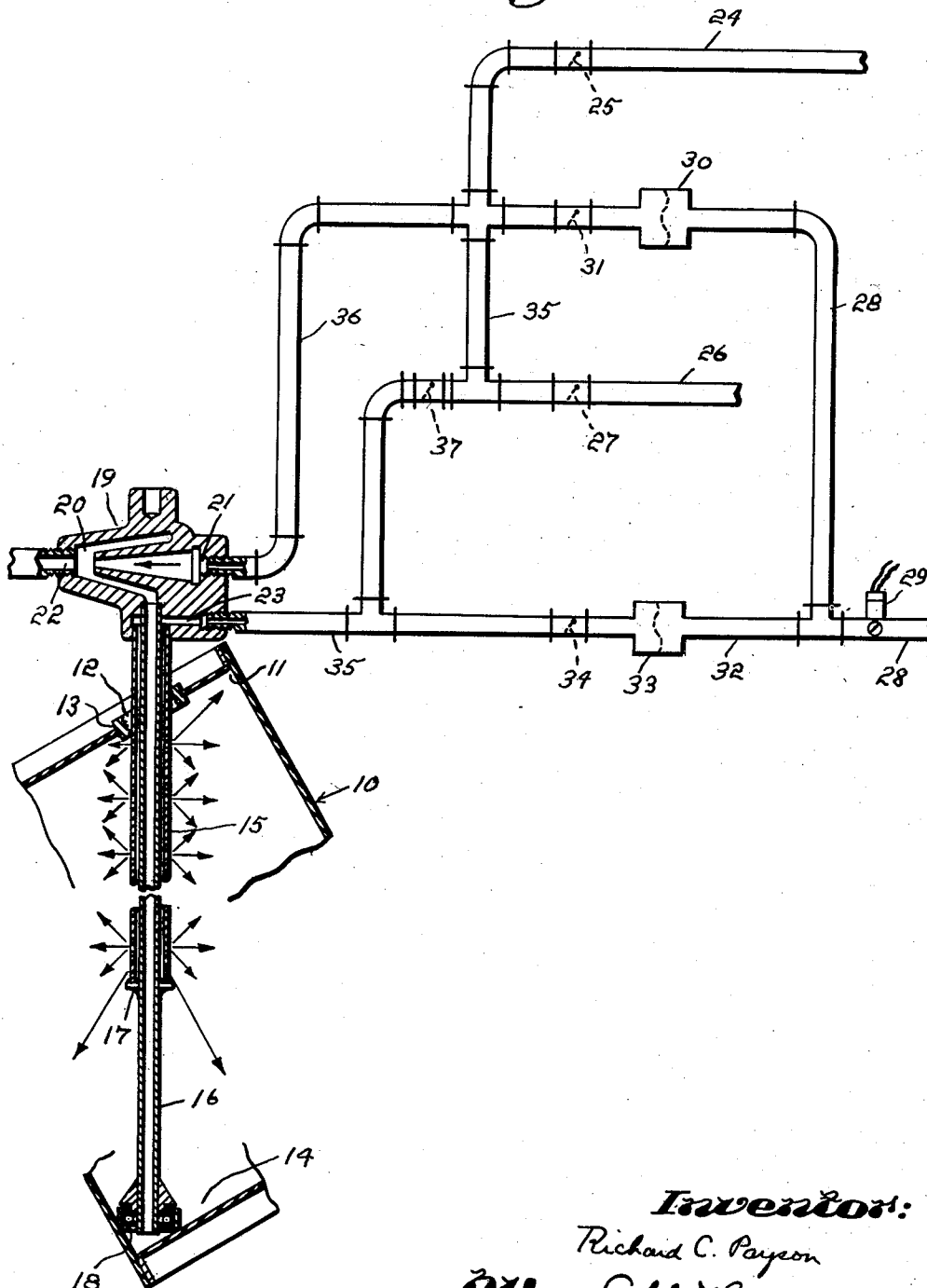
2,845,934

APPARATUS FOR USE IN CLEANING THE INTERIORS OF BARRELS

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3 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

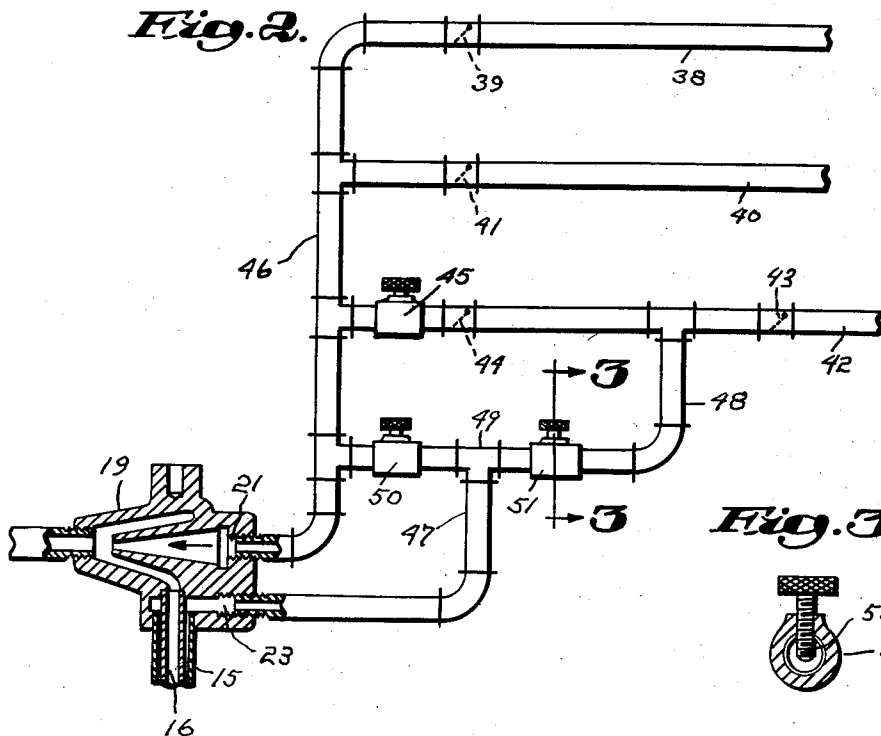


Fig. 3.

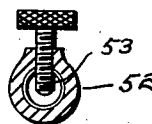
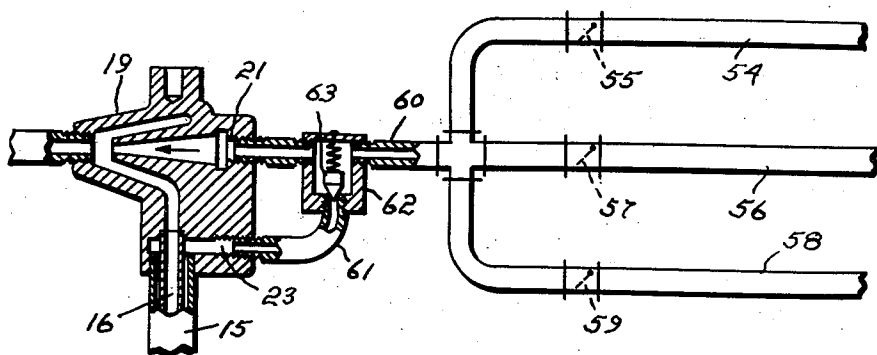


Fig. 4.



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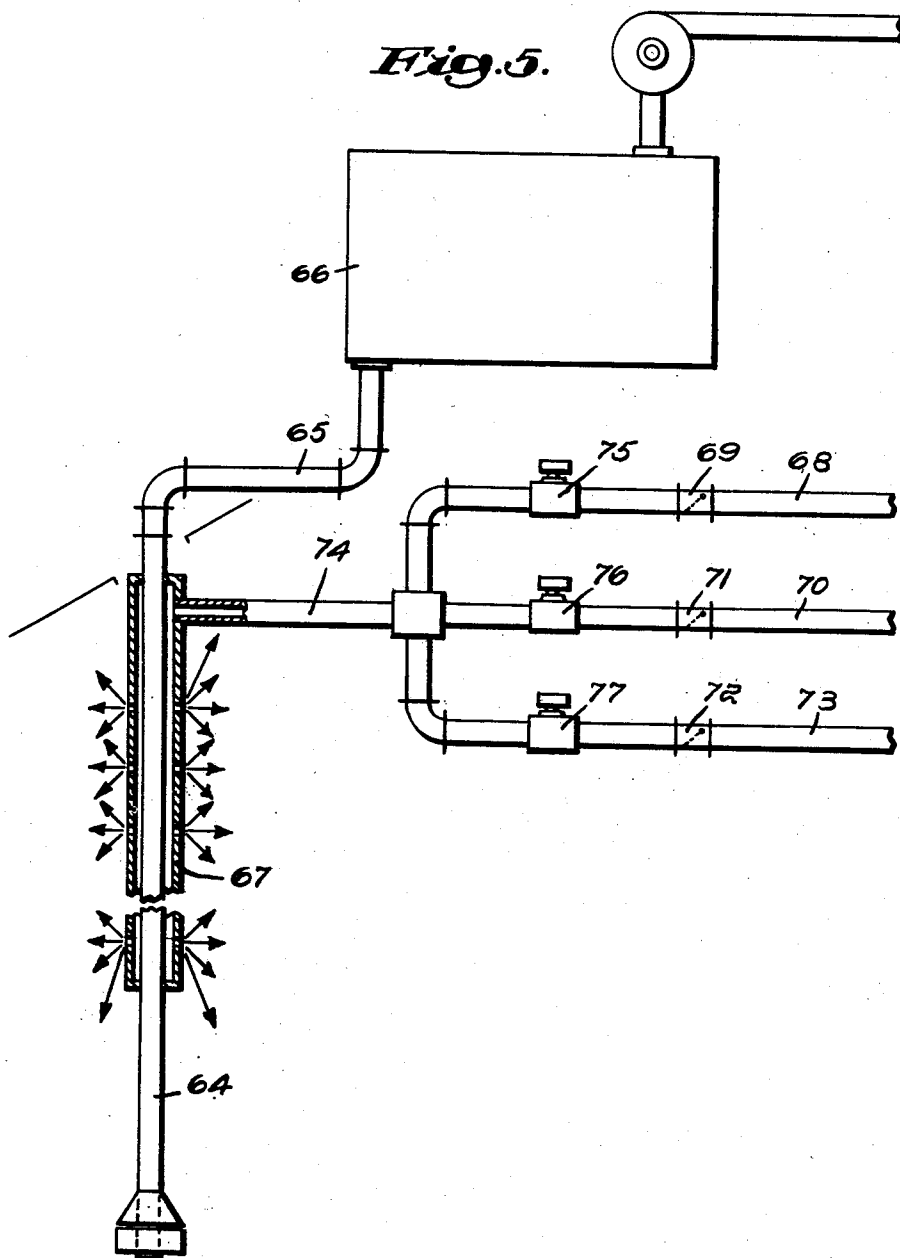
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APPARATUS FOR USE IN CLEANING THE INTERIORS OF BARRELS

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3 Sheets-Sheet 3



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2,845,934

APPARATUS FOR USE IN CLEANING THE INTERIORS OF BARRELS

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18 Claims. (Cl. 134—56)

This invention relates to apparatus for use in reconditioning the interiors of barrels, which term, as used herein, includes other containers having relatively small openings.

In Letters Patents of the United States No. 2,147,247, dated February 14, 1939, and No. 2,240,364, dated April 29, 1941, apparatus and method, respectively, are disclosed by which the interiors of barrels may be effectively reconditioned.

The reconditioning of barrels is economically desirable but is made difficult by the fact that their construction usually is such that their interiors cannot be completely drained by gravity and, as a result, the drying of the interiors presents problems. In accordance with the above mentioned patents, the reconditioning of barrel interiors, which usually consists in washing, rinsing, and drying them, as effected by the use of a spray tube insertable into a barrel through its bung hole and evacuating means whose suction tube is similarly positioned with its intake end disposed in a pocket established by tilting the barrel to make the pocket downwardly accessible.

Each fluid, such as washing and rinsing fluids and air, is delivered to the spray tube. In order that liquids may be employed without any appreciable accumulation thereof in the barrel, the flow through the suction tube is so balanced relative to the flow to the spray tube that the exhaust stream through the suction tube is at least equal to that of the delivered liquid. As a substantial part of the fluid delivery system is common to the various sources, the same relation also existed, in the case of air, between the delivery and exhaust air streams.

The present invention is directed to an improvement in the drying of the interiors of barrels with the objective of drying them more completely in a shorter time. In accordance with the invention, this objective is attained by maintaining the above indicated relationship between the delivery and exhaust streams of liquid but, in the case of air, changing the relationship therebetween to ensure the discharge of air through the bung hole.

Where the apparatus entails a fluid delivery system of which a substantial part is common to all sources, control means are necessary to enable the desired fluid streams to be automatically established and these may include, for example, thermostatically operated valves, and pressure or volume regulating devices.

In the accompanying drawings, there are shown illustrative embodiments of the invention from which these and other of its objectives, novel features and advantages will be readily apparent.

In the drawings:

Fig. 1 is a partly sectioned fragmentary view of apparatus in accordance with the invention in which pressure regulating means are employed to control the air streams;

Fig. 2 is a like view of a different embodiment in which the control of the streams is effected by the adjustable orifices;

Fig. 3 is a fragmentary section, on an enlarged scale, taken along the indicated lines 3—3 of Figure 2;

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Fig. 4 is a generally similar view of another embodiment of the invention in which the control is effected by a thermostatically operated valve; and

Fig. 5 is a view illustrating a further embodiment of the invention in which the suction tube is connected to a vacuum chamber.

The barrel 10 shown in some detail in Fig. 1 is illustrative in that it has liquid retaining chimes 11 and a bung hole 12 established by the threaded collar 13 projecting interiorly of the barrel to prevent complete gravity drainage. When, however, the barrel is in a tilted position with its bung hole 12 disposed upwardly, a fluid collecting pocket 14 is established that is accessible downwardly therethrough.

Fluids are delivered against the interior of the thus positioned barrel as by means of a spray tube 15 dimensioned to be inserted through the bung hole 12 while liquids are simultaneously exhausted through a suction tube 16 also extending downwardly through the bung hole 12 but with its open end extending downwardly into the pocket 14.

Preferably the suction tube 16 is of such size that it may extend freely through the spray tube 15 whose lower end is sealed thereto as at 17. The suction tube 16, when the barrel 10 is to be rotated while being cleaned, may have, at its lower end, a rotatable bearing 18.

The tubes 15 and 16 are shown in Figs. 1, 2 and 4 as connected at their upper ends to an ejector head 19 with the suction tube 16 in communication with the suction chamber 20 with which the ejector inlet 21 and the ejector discharge port 22 are in communication. The spray tube 15 is, for convenience, illustrated as being in communication with a second inlet port 23.

In Fig. 1, the fluid delivery system is shown as consisting of a washing conduit 24 in communication with a source of a washing liquid, and provided with a check valve 25, a conduit 26 in communication with a source of rinsing liquid, and provided with a check valve 27, and a conduit 28 in communication with a source of air under pressure, and provided with a normally closed solenoid operated valve 29, a pressure regulator 30, and a check valve 31. While the fluid sources are not shown, it will be understood that each source is adapted to be placed in communication with the system to the exclusion of the others and it is for this purpose that each source is provided with a check valve. For reasons that will presently be apparent, there is a branch air conduit 32 provided with a pressure regulator 33 and a check valve 34. The pressure regulator 33 is set to provide for the delivery of a greater volume of air than is established by the pressure regulator 30. Obviously, two independent sources of air under pressure can be used, if desired.

The conduits above referred to are all in communication with the common supply pipe 35 which is connected to the spray tube 15 via the inlet port 23 and which includes a branch supply pipe 36 in communication with the ejector inlet 21.

When washing water is used, it flows to the ejector head via the branch line 36 and through the delivery conduit 35 to the spray tube 15. The check valve 27 prevents flow of the washing liquid towards the rinse water source while the check valves 31 and 34 prevent the flow thereof towards the air source.

When the interior of a barrel is to be rinsed, the rinse water flows through the delivery conduit 35 to the spray tube 15 and to the ejector via the branch line 36. The check valve 25 in the washing liquid conduit and the check valves 31 and 34 in the air supply conduits prevent the flow of rinse water towards those sources.

When the interior of a barrel is to be dried, the valve

29 is opened, thus to admit air under pressure through the air lines 28 and 32 to the supply pipe 35 which is furnished with a check valve 37 between the junctions of the air conduits 28 and 32 therewith. The check valve 37 is opened by the pressure of the liquids when in use and is adapted to be closed by the greater pressure in the conduit 35 adjacent the spray tube 15 established by means of adjustments of the pressure regulators.

At this point, it will be helpful to note that when a liquid is to be introduced into the barrel 10, it is necessary to effect its withdrawal through the suction tube 16 in a stream at least equal in volume to that delivered to the spray tube 15 to avoid accumulation of liquid therein and the flow from either liquid source to the spray tube 15 and ejector head 19 is proportioned to produce such streams. While, during siphoning, there is usually some variation between the streams, the desired objective is that the exhaust stream be capable of handling all the delivered liquid during the delivery cycle. The pressure regulators are set, however, to ensure the delivery of an air stream into the barrel of greater volume than the stream through the suction tube 16 thus to ensure the discharge of some air through the bung hole.

In the embodiment of the invention shown in Fig. 2, the washing liquid conduit 38 is provided with a check valve 39, the rinsing liquid conduit 40 has a check valve 41, and the air conduit 42 has a pair of check valves 43 and 44. It also may be provided with an adjustable orifice 45. Those fluid supply conduits join a supply pipe 46 in communication with the ejector inlet 21. The supply pipe 46 has a branch 47 in communication with the spray tube 15 via the inlet port 23. Intermediate its check valves 43 and 44, the air conduit has a branch 48 connected to the T 49 with which the branch supply pipe 47 is provided.

On opposite sides of the T 49 are adjustable orifices 50 and 51. The adjustable orifices 45, 50 and 51, as shown in Fig. 3, may consist of a boss 52 threaded to receive the partial plug 53. The orifices 45, 50 and 51 are so adjusted as to allow a larger stream to flow through the orifice 51 than through the orifices 45 and 50 thus to ensure that when liquids are in use, the exhaust stream through the suction tube 16 is at least of the volume of the stream delivered through the spray tube 15 and, when air is used, that the delivered volume of air is sufficiently great to cause air to flow out through the bung hole of the barrel.

With reference to Fig. 4, there is therein shown a washing liquid conduit 54 provided with a check valve 55, a rinsing liquid conduit 56 having a check valve 57, and an air conduit 58 also including a check valve 59. These conduits are all in communication with the supply pipe 60 connected to the ejector inlet 21 and including a branch pipe 61 connected to the inlet 23 thus to deliver fluids to the spray tube 15.

At the junction of the lines 60 and 61, there is a chamber 62 for the adjustable thermostatically actuated valve 63. The valve 63 is adjusted to close partially in response to the heat of the washing or rinsing liquid thereby to provide the correct balance between the delivery and exhaust liquid streams and to open, when air is used thereby, increasing the flow of air to the spray tube 15.

In the embodiment of the invention shown in Fig. 5, there is shown evacuating means consisting of a suction tube 64 connected by the conduit 65 to a vacuum chamber 66. The spray tube 67 may be in the form of a sleeve suitably sealed at its ends to the suction tube 64.

The conduit 68 from the washing liquid source has a check valve 69, the conduit 70 from the rinsing liquid source is provided with a check valve 71, and a check valve 72 is also located in the conduit 73 for air under pressure. Communication between the conduits 68, 70 and 73 is effected by means of the pipe 74 to which they are connected.

As illustrative of means to establish the desired rela-

tionship in the volume of the delivery and exhaust streams, there are shown valves 75 and 76 in the liquid conduits 68 and 70, respectively, which are operable to provide that the volume of the potential exhaust stream is at least equal to that of any liquid stream that is delivered into the barrel. The valve 77 in the air conduit 73 illustrates control of the air source to ensure that the volume of delivered air is greater than the volume of the exhaust stream.

It will thus be apparent that by these or like means, the invention makes possible the treatment of the interior of a barrel by a liquid or liquids without appreciable accumulation of liquid therein. This results because the volume of the exhaust stream is at least equal to that of the delivered stream. At the same time, the invention makes possible more efficient and complete drying of the interior of the barrel since it provides for a change in the relationship between the delivery and exhaust air streams to ensure the discharge of air through the bung hole carrying moisture therewith and improving the action of the evacuating means.

What I therefore claim and desire to secure by Letters Patent is:

1. A system for delivering fluids into and exhausting fluids from a barrel, said system comprising a suction tube, a spray tube, both tubes being insertable into a barrel through its bung hole, means to deliver liquid to said spray tube, evacuating means connected to said suction tube to establish an exhaust stream therethrough, means to deliver air to said spray tube, and control means interposed between said spray tube and said liquid and air delivery means adjusted to provide that the volume of said exhaust stream is at least equal to the delivered liquid stream and that the volume of said air stream is greater than the volume of said exhaust stream.

2. The system of claim 1 in which the evacuating means is a vacuum chamber with which the suction tube is in communication.

3. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising means to deliver a liquid to said ejector and to said spray tube to provide an exhaust stream through said suction tube means to deliver air under pressure to said ejector and to said spray tube to provide a stream of air through said delivery tube, and control means interposed between said spray tube and said liquid and air delivery means adjusted to provide that the volume of said exhaust stream is at least equal to the delivered liquid stream and that the air stream is of greater volume than the exhaust stream through said suction tube.

4. A fluid delivery system for delivering fluid into and exhausting fluid from the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole, said system comprising a spray tube insertable into said barrel through its bung hole, a suction tube insertable into said barrel and dimensioned to enter said pocket, means to deliver a liquid to said spray tube, means to deliver air under pressure to said spray tube, means operable by the fluid in use to create suction in said suction tube to provide an exhaust stream, and control means interposed between the spray tube and said liquid and air delivery means adjusted to establish that the relationship between the delivery and exhaust streams as in the case of liquid that the exhaust stream is at least equal in volume to the delivery stream and in the case of air, that the delivery stream is greater in volume than the exhaust stream.

5. A fluid delivery system for a spray tube for deliver-

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ing fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising means to deliver a liquid to said ejector and to said spray tube to provide an exhaust stream through said suction tube of at least the volume of the stream through said spray tube, means to deliver air under pressure to said ejector and to said spray tube, each of said means including a part common to the other, and a control element in said common part operable, when said air delivery means is in use, to effect the delivery into the barrel of an air stream of greater volume than the exhaust stream through said suction tube.

6. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means to deliver air under pressure, means connecting either one of said delivery means to said ejector and to said spray tube and including a part common to both of said delivery means, and a control element in said common part operable to maintain the exhaust stream through said suction tube at least of the volume of the stream through the spray tube when said liquid delivery means is in use and to provide a stream of greater volume through said delivery tube than through said suction tube when the air delivery means is in use.

7. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means to deliver air under pressure, means connecting either one of said delivery means to said ejector and to said spray tube and including a part common to both delivery means in which air and liquid flow in opposite directions, and a control in said common part operable when liquid is used to provide an exhaust stream in said suction tube at least equal to the stream through said spray tube and when air is used to provide a stream through said delivery tube greater than the stream through said suction tube.

8. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means to deliver air under pressure, means connecting either one of said delivery means to said ejector and to said spray tube, and a control element in said connecting means having first and second positions in the first of which the exhaust stream through said suction tube is at least of the volume of the stream through the spray tube when said liquid delivery means is in use and in the second of which the stream through said delivery tube is of greater volume than the stream through said suction tube, said second position being in response to the delivery of air to said connecting means.

9. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means to deliver air under pressure, means connecting either one of said delivery means to said ejector and to said spray tube, and a control element in said connecting means, said control element being a valve having

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first and second positions in the first of which the exhaust stream through said suction tube is at least of the volume of the stream through the spray tube when said liquid delivery means is in use and, in the second of which the stream through said delivery tube is of greater volume than the stream through said suction tube, said second position being in response to the delivery of air to said connecting means.

10. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means to deliver air under pressure, means connecting either one of said delivery means to said ejector and to said spray tube, and a control element in said connecting means, said control element being a thermostatically actuated valve having first and second positions, in the first of which the exhaust stream through said suction tube is at least of the volume of the stream through the spray tube when said liquid delivery means is in use and, in the second of which the stream through said delivery tube is of greater volume than the stream through said suction tube, said second position being in response to the delivery of air to said connecting means.

11. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means connecting said liquid delivery means to said ejector and to said spray tube, means to deliver air under pressure in two separate streams of different volume to said connecting means and a control in said connecting means operable when liquid is used to provide an exhaust stream in said suction tube at least equal to the stream through said spray tube and when air is used to isolate said air streams from each other, the air stream of greater volume being then in communication with said spray tube thus to provide a stream through said spray tube greater in volume than the stream through said suction tube.

12. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means connecting said liquid delivery means to said ejector and to said spray tube, means to deliver air under pressure in two separate streams of different volume to said connecting means and a check valve in said connecting means open when liquid is used to provide an exhaust stream in said suction tube at least equal to the stream through said spray tube and closed when air is used to isolate said air streams from each other, the air stream of greater volume being then in communication with said spray tube thus to provide a stream through said spray tube greater in volume than the stream through said suction tube.

13. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means connecting said liquid delivery means to said ejector and to said spray tube, means to deliver air under pressure in two separate streams of different volume to said connecting means and a control in said connecting means operable when liquid is used to provide an exhaust stream in said suction tube at least equal to the stream through said spray tube and when air is used

to connect the air stream of greater volume to said spray tube thus to provide a stream through said spray tube greater in volume than the stream through said suction tube.

14. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising liquid delivery means, means connecting said liquid delivery means to said ejector and to said spray tube, means to deliver air under pressure in two separate streams of different volume to said connecting means and a control in the form of an adjustable orifice in said connecting means operable when liquid is used to provide an exhaust stream in said suction tube at least equal to the stream through said spray tube and when air is used to maintain the volumetric difference between said air streams, the air stream of greater volume being then in communication with said spray tube thus to provide a stream through said spray tube greater in volume than the stream through said suction tube.

15. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising a first liquid delivery means used in washing the interior of the barrel, a second liquid delivery means used in the rinsing thereof, air delivery means in that system used in drying the interior of the barrel, each of said means including a check valve closed except during the use thereof, and a connection with said spray tube and said ejector with which each of said means is in communication, and said connection including valve means operable to effect, when either liquid source is used, an exhaust stream through said suction tube of at least the volume of the stream through said spray tube and when said air delivery means is used to maintain that flow of air through said connection that ensures the discharge of air through said bung hole.

16. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising a first liquid delivery means used in washing the interior of the barrel, a second liquid delivery means used in the rinsing thereof, means in that system to deliver two air streams of different volume for use in drying the interior of the barrel, check valves in control of said means, each being closed except during the use thereof, and a connection with said spray tube and said ejector with which each of said means is in communication, said air streams being separately connected to said connection, and said connection including an adjustable orifice between said air streams to provide, when

either liquid source is used, an exhaust stream through said suction tube of at least the volume of the stream through said spray tube and means in said system operable when said air delivery means is used to maintain that flow of air through said connection that ensures the discharge of air through said bung hole.

17. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising a first liquid delivery means used in washing the interior of the barrel, a second liquid delivery means used in the rinsing thereof, means in that system to deliver two air streams of different volume for use in drying the interior of the barrel, check valves in control of said means, each being closed except during the use thereof, and a connection with said spray tube and said ejector with which each of said means is in communication, said air streams being separately connected to said connection, and said connection including a check valve between said air streams to provide, when either liquid source is used, an exhaust stream through said suction tube of at least the volume of the stream through said spray tube and means in said system operable when said air delivery means is used to maintain that flow of air through said connection that ensures the discharge of air through said bung hole.

18. A fluid delivery system for a spray tube for delivering fluid into the interior of a barrel supported in such a position that its lowermost part establishes an internal liquid collecting pocket accessible downwardly through its bung hole and to an ejector whose suction tube extends into that pocket, said system comprising a first liquid delivery means used in washing the interior of the barrel, a second liquid delivery means used in the rinsing thereof, air delivery means in that system used in drying the interior of the barrel, each of said means including a check valve closed except during the use thereof, and a connection with said spray tube and said ejector with which each of said means is in communication, and a thermostatically operated valve in said connection establishing, when either liquid source is used, an exhaust stream through said suction tube of at least the volume of the stream through said spray tube and when said air delivery means is used that flow of air through said connection that ensures the discharge of air through said bung hole.

References Cited in the file of this patent

UNITED STATES PATENTS

1,891,592	Fitzgerald	Dec. 20, 1932
1,939,836	Tolfree	Dec. 19, 1933
2,161,131	Burger	June 6, 1939
2,240,364	Kimball	Apr. 29, 1941
2,443,721	Butcher	June 22, 1948
2,454,289	Neef	Nov. 23, 1948
2,526,265	Nulph	Oct. 17, 1950
2,763,274	Blake	Sept. 18, 1956