

April 14, 1959

H. S. ANDREWS
SELF-CLEANING VALVE
Filed July 11, 1956

2,881,783

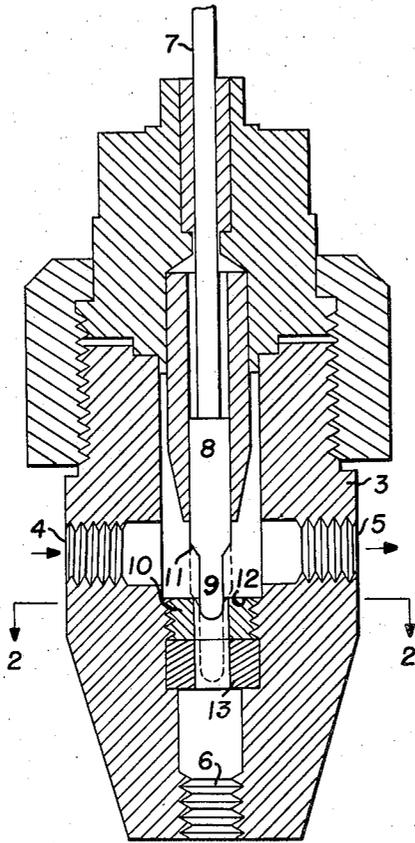


FIG-1

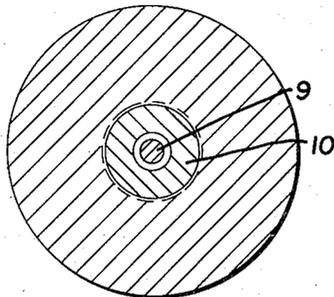


FIG-2

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SELF-CLEANING VALVE

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Application July 11, 1956, Serial No. 597,206

2 Claims. (Cl. 137-244)

The present invention relates to an improved valve. In particular, it relates to a valve used in systems which transport liquids or gases containing suspended solids.

Suspensoids, for example slurries, have a tendency to settle out over a period of time. The settled particles build up and eventually cause at least a partial interference with the system's operation. Settling out generally occurs in areas where openings are narrow and readily bridged with solids, for instance in valves. It has now been found that this build-up, in say the valve's discharge outlet, can be eliminated by employing a plug which has an elongated tip.

Figure 1 is a vertical section of the improved valve.

Figure 2 is a horizontal section taken along line 2-2 of Figure 1.

The improved valve, according to the present invention, has an inlet and an outlet through which the solid suspension is recycled and a reciprocating plug with an elongated tip, the movement of which opens and closes the valve. The cylindrical elongated tip serves to remove any solid material that may build up in the discharge outlet and also aids in seating the plug in the correct position.

Referring now to Figure 1, which is a vertical cross-section through a valve showing the unique parts according to this invention in full lines, the body of the valve defines a straight flow passage having an inlet 4 and an outlet 5. A discharge outlet 6 communicates with said passage, said discharge outlet 6 being a portion of a bore also defined in the valve body and extending therethrough in perpendicular intersecting relationship to said straight flow passage. The discharge outlet 6 is opened and closed by means of a reciprocating plug 8 which has an elongated tapered tip 9 on its inner end. The stem 7 is connected at its outer end to a timing device and actuating means, not shown, and at its inner end to the outer end of said plug. The timing device regulates the flow through discharge outlet 6 by opening and closing the valve for predetermined periods of time. The plug 8 has a surface 11 which fits snugly on the face 12 of seat ring 10 when the valve is in the closed position, as shown by the broken lines. The spacer ring 13 regulates and supports seat 10 which is located at the inner end of the discharge outlet 6.

The elongated tip 9 may be completely withdrawn from discharge outlet 6, or it may be removed to a point just inside the discharge outlet, but not beyond the face 12 of seat 10.

Figure 2 is a horizontal section of the valve along line 2-2 of Figure 1. It shows that the seat 10 is circular and that the cylindrical tip 9 of plug 8 passes through the narrow opening defined by the walls of the seat and spacer ring.

In practicing the present invention, the suspended solid is recycled through inlet 4 and outlet 5 by means of a pump. The recycling action prevents settling out of the particles before being discharged through outlet 6. The suspensoid is ejected by the valve in shots or spurts, the quantity of which being regulated by the timing device. The actuating means, not shown, removes the plug from

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the face of the seat, thereby permitting a portion of the suspension to discharge through outlet 6. Any solids that settle out while the valve is open are removed by the tip of the plug when it is returned to the closed position. In addition the tip of the plug guides the plug into the correct closed position.

The improved valve of the present invention may be used in numerous operations wherein solids are suspended in a liquid or gaseous phase. For example, in the preparation of polyisobutylene an insoluble powdered solid Friedel Crafts catalyst is slurried with a hydrocarbon solvent, such as hexane and sprayed on the surface of a rapidly stirred solution of the monomer. The valve may communicate with the spray by means of a line or it may be directly attached to it. As the valve opens and closes, definite quantities of suspended catalyst, for example aluminum chloride, are sprayed on the surface of the monomer solution. The catalyst slurry may be cooled by means of a refrigeration unit or bath located in the recycle line. The pumping rate through the system should be several times that of the withdrawal rate so as to avoid any disruption of the system when a portion of the slurry is sprayed on the monomer in the reaction vessel.

The pressure and other conditions may be varied according to the needs of the particular operation.

The tip of the plug should be of sufficient length to fill the opening formed by the walls of the seat and spacer rings, that is, it should be equal to the height of the two rings.

Resort may be had to modifications and variations of this improved valve without departing from the spirit of the invention or the scope of the appended claims.

What is claimed is:

1. A valve structure comprising a valve body; an inlet and outlet forming a straight flow passage through the valve body; a bore in the valve body perpendicular to and intersecting the straight through flow passage, said bore having a second outlet therein in communication with the straight through flow passage; a valve seat formed in the second outlet; a valve member reciprocally located in the bore opposite to the valve seat and coacting therewith to control flow through the second outlet; and a cylindrical extension tip on the valve member capable of being disposed in spaced relation within the valve seat to remove particles deposited thereon.

2. A valve structure adapted for the controlled discharge of portions of a fluid flow stream essentially consisting of finely divided solids suspended in a carrier fluid comprising a valve body, an inlet and outlet forming a straight flow passage of substantially uniform diameter through the valve body, a bore in the valve body perpendicular to and intersecting the straight through flow passage, said bore having a second outlet therein in communication with the straight through flow passage, a tapered valve seat formed in the second outlet, a valve member reciprocally located in the bore opposite to the valve seat and coacting therewith to selectively permit and prevent flow through the second outlet, a cylindrical extension tip on the valve member having a cross section and length to provide a means for removing the finely divided particles deposited upon the inner surface of the valve seat.

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