Dissolver for Solid and Liquid Materials

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ABSTRACT

An apparatus for mixing and dissolving a solid in a solvent comprises an injector device for initially mixing the two materials together, and a centrifugal dissolver comprising an helical deflector and a cylindrical screen, for receiving the initial mixture and thoroughly dissolving the solid in the solvent.

2 Claims, 4 Drawing Figures
DISSOLVER FOR SOLID AND LIQUID MATERIALS

The present invention relates to a system for combining solid and liquid media in the proper proportion and sequence with high speed.

An object of the present invention is to provide a closed circuit dissolving system for solid material, such as sugar, into a flowing liquid stream.

The invention will now be further described by detailed reference to specific embodiments which are illustrated in the drawings, wherein:

FIG. 1 is a diagrammatic view of a closed system for a sequential sugar mixing process;
FIG. 2 is a diagrammatic view of an open system similar to the system of FIG. 2;
FIG. 3 is a diagrammatic view of a syrup mixer;
FIG. 4 is a diagrammatic view of a closed circuit dissolving arrangement.

Referring now to FIG. 1, a sugar mixing and dissolving apparatus encompassing a closed system is illustrated. A dispenser-mixer device 24 is shown in which the granulated sugar is injected by the injector 26 into the line 28 and into the dissolver 30A provided with an helical deflector 32 and a cylindrical central screen 34. Thus, the mixture moves up helical deflector 32 and is directed into the screen 34 and down through line 36 back to the pump 38 of the closed system. The mixture not passing through the screen 34 continues on through line 40 to the substantially similar dissolvers 30B and 30C respectively. The latter two dissolvers have essentially the same construction as dissolver 30A, and in which like parts have like reference numerals.

FIG. 2 illustrates another sequential sugar mixing apparatus having dissolvers 40A, 40B and 40C connected at various levels in an open system, whereby a gravity flow is accomplished from dissolver 40A to dissolver 40B and then to dissolver 40C. The helical defectors 32 are the same as those shown in the closed system of FIG. 1. Similarly, the central screen 34 is identical with that shown in the closed system of FIG. 1.

Thus, as shown in FIGS. 1 and 2, all soluble material is substantially dissolved when reaching the top of each of the dissolvers and there is practically no introduction of matter that is not dissolved in the system. It should also be noted that in the construction shown in FIG. 2 the open dissolvers are in a vertical, staggered relationship so that siphons can be used to transfer liquid from one dissolver to the other in a continually downward direction.

Referring now to FIG. 3 in which a high intensity syrup mixer is shown, a dispenser mixer 42 is illustrated having a spray jet supply introduced therein at 44. In this construction the injector receives and passes the mixture into the dissolver 48 having a helical deflector 50 and a circumferential, cylindrical filter screen 52. The screen is surrounded by a water jacket 54. A bypass 56 is shown and the syrup drain is indicated at 58. A pump motor 60, is also shown connected into the system. Thus, it should be noted that each of the helical defectors 50 are surrounded by the circumferential cylindrical filter screens 52 and form a centrifugal filter which throws sugar particles to the outside screen 52. Therefore, high liquid velocity and friction work together to consume all soluble matter until the moving matter reaches the top of the dissolver. This procedure is repeated again and the result is a clear, filtered syrup which is collected in the outer rim and drawn off through the drain 58.

FIG. 4 shows a closed circuit dissolving system having a dispenser mixer 61 in which the solid material to be mixed with a flowing liquid is supplied to an injector 62. A pump 64 moves the mixture through an in-line dissolver-mixer 66, and through conduit 68 to complete the circuit back to pump 64. The product is collected in collecting tank 70. It should be apparent that this is a simplified version of a closed circuit apparatus which is designed to function effectively.

I claim:

1. A mixer comprising a dispenser of a mixture of a solid and a solvent for said solid, an injector connected to receive the mixture from said dispenser, a pump connected to supply motive fluid to said injector, a dissolver comprising a central chamber within which a helical deflector is disposed, a screen surrounding said deflector and separating the central chamber from a solution collection chamber and a water jacket surrounding said collection chamber, said injector delivering to said central chamber whereby the mixture delivered to the central chamber has a centrifugal force imparted to it by said deflector to be directed against said screen, said solid being consumed in the central chamber and a solution passing through the screen to the collection chamber.

2. A mixer as claimed in claim 1 comprising two dissolvers arranged in series.