when the low-frequency frequency component is present, then the electrical signal is induced by a bubble.

6. A method of claim **5**, wherein said step of detecting a rise time includes a step of forming an approximation to the envelope of the high frequency component of the electrical signal.

7. A method for discriminating an electrical signal induced by a particle in a fluid from an electrical signal induced by a bubble, comprising the steps of

detecting the presence of a high-frequency component of an electrical signal during a first predetermined period,

detecting the presence of a low-frequency component of an electrical signal during a second predetermined period,

wherein when the low-frequency component is absent, then the electrical signal is induced by a particle, and when the low-frequency component is present, then the electrical signal is induced by a bubble.

8. A sensor device adapted to detect at least one of a particle and a bubble in a fluid, comprising

(a) a fluid nozzle defining a center of a fluid flow in a first direction; and

(b) a plurality of sensor elements arranged in spaced relation in a plane normal to the first direction of fluid flow, a first sensor element being arranged closer to the center of fluid flow than a second sensor element, so that a larger particle tends to strike said first sensor element than the remaining sensor elements, each of said sensor elements being capable of directly converting an impact of one of a particle and a bubble into an electrical signal so that said plurality of sensor elements simultaneously detects particles of different sizes.

9. A sensor device of claim **8**, wherein said sensor elements are arranged in a line.

10. A sensor device of claim **8**, wherein each of said sensor elements includes:

a diaphragm having a sufficiently small mass for responding to a collision with a solid particle; and

an apparatus for converting a vibration of said diaphragm element into an electrical signal so as to detect the vibration.

11. A sensor device of claim **8**, wherein each of said sensor elements includes:

a detecting unit including a piezoelectric film consisting essentially of a first ceramic material, a first electrode coated onto at least a portion of the outer surface of said piezoelectric film, and a second electrode coated onto at least a portion of the inner surface of said piezoelectric film; and

a vibrating portion having a sufficiently small mass for responding to a collision with a solid particle and consisting essentially of a second ceramic material, said detecting unit being placed on said vibrating portion so that said second electrode is coated onto at least a portion of said vibrating portion;

wherein when one of a solid particle and a bubble in the fluid strikes one of said detecting unit and said vibrating portion, said piezoelectric film converts a resulting vibration into an electrical signal.

12. A sensor device of claim **8**, wherein said sensor is adapted to generate electrical signals representative of a plurality of particles, the electrical signals being utilized to calculate average particle size and particle size distribution.

13. A sensor device of claim **8**, wherein said sensor is adapted to generate electrical signals representative of a plurality of particles, the electrical signals being utilized to calculate a number of particles larger than a predetermined size.

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