respectively, the entrance opening being closed by an entrance window whereby the possible microscopic objects present in the fluid scatter part of the light, the scattered and non-scattered light interfering so as to form interference fringes behind the microscopic objects; an image sensor comprising a light sensitive cell, the image sensor being arranged to capture a hologram digital image frame by receiving the light propagated across the cuvette; and an exit window arranged to close the exit opening of the cuvette.

Advantageously, the image sensor may be mounted in the arrangement in direct contact with the cuvette.

According to a first aspect, there is provided a measuring arrangement for in-line holography microscopy, comprising: an illuminating arrangement configured to emit coherent light; a cuvette defining an inner volume for receiving a fluid possibly comprising microscopic objects of foreign origin, the cuvette being arranged to receive the coherent light and let it, after propagating across the cuvette, exit therefrom through opposite entrance and exit openings, respectively, the entrance opening being closed by an entrance window, whereby the possible microscopic objects present in the fluid scatter part of the light, the scattered and non-scattered light interfering so as to form interference fringes behind the microscopic objects; an image sensor comprising a light sensitive cell, the image sensor being arranged to capture a hologram digital image frame by receiving the light propagated across the cuvette; and an exit window arranged to close the exit opening of the cuvette; characterized in that the image sensor is mounted in direct contact with the cuvette.

According to a second aspect, there is provided an apparatus comprising a measuring arrangement as defined in the first aspect, and a computing arrangement connected to the measurement arrangement to receive image data of the hologram digital image frame, and to detect the presence of the microscopic objects on the basis of hologram patterns formed by the interference fringes in the image data of the hologram digital image frame.

Many of the attendant features will be more readily appreciated as the same becomes better understood by reference to the following detailed description considered in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The present description will be better understood from the following detailed description read in light of the accompanying drawings, wherein:

FIGs. 1 to 3 illustrate, as schematic drawings, measuring arrangements for detecting microscopic objects of foreign origin present in a fluid; and

FIG. 4 illustrates, as a schematic block diagram, an apparatus for detecting microscopic objects of foreign origin present in a fluid.

CLAIMS

1. A measuring arrangement for in-line holography microscopy, comprising:

an illuminating arrangement configured to emit coherent light;

a cuvette defining an inner volume for receiving a fluid possibly comprising microscopic objects of foreign origin, the cuvette being arranged to receive the coherent light and let it, after propagating across the cuvette, exit therefrom through opposite entrance and exit openings, respectively, the entrance opening being closed by an entrance window, whereby the possible microscopic objects present in the fluid scatter part of the light, the scattered and non-scattered light interfering so as to form interference fringes behind the microscopic objects;

an image sensor comprising a light sensitive cell, the image sensor being arranged to capture a hologram digital image frame by receiving the light propagated across the cuvette; and

an exit window arranged to close the exit opening of the cuvette;

c h a r a c t e r i z e d in that the image sensor is mounted in direct contact with the cuvette.

2. A measuring arrangement as defined in claim 1, wherein the exit window is mounted to the cuvette, and the image sensor comprises a protective window positioned in front of the light sensitive cell, the protective window being mounted to the exit window.

3. A measuring arrangement as defined in claim 1, wherein the image sensor comprises a protective window positioned in front of the light sensitive cell, the image sensor being mounted to the cuvette with the protective window forming the exit window, the

protective window being in direct contact with the inner volume of the cuvette.

4. A measuring arrangement as defined in any of claims 1 to 3, wherein the cuvette is of flow-through type configured to allow flow of the fluid through it.

5. An apparatus comprising a measuring arrangement as defined in any of claims 1 to 4, and a computing arrangement connected to the measurement arrangement to receive image data of the hologram digital image frame, and to detect the presence of the microscopic objects on the basis of hologram patterns formed by the interference fringes in the image data of the hologram digital image frame.