



## CONTINUOUS MONITORING AND RECORDING SYSTEM OF GAS EXPLOSION PARAMETERS

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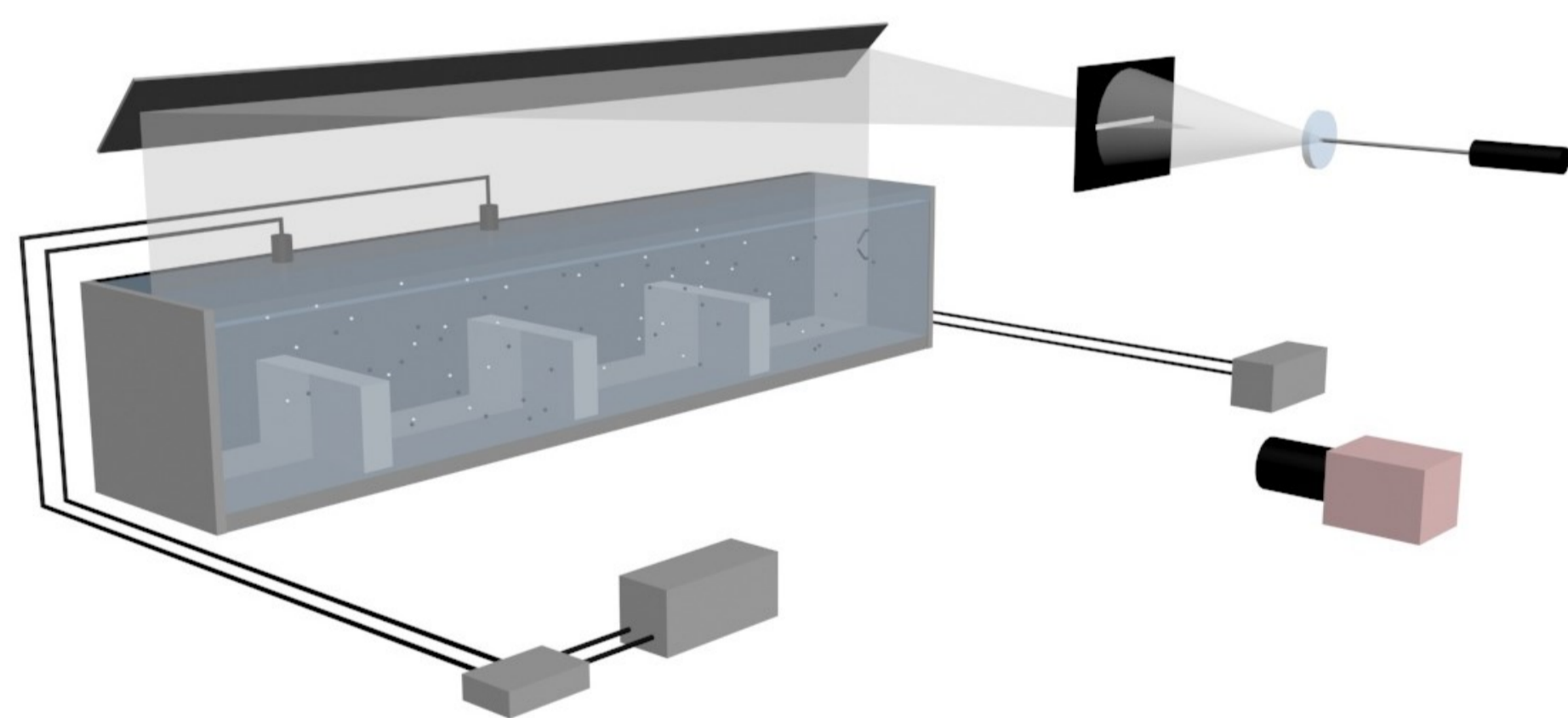
### Summary of the invention

The invention relates to a system for monitoring and continuously recording the parameters of gas explosions. The system is capable of analyzing the explosion phenomena of air-combustible gas mixtures at higher recording speeds of the parameters.

The invention provides the material basis for understanding the mechanisms of ignition and propagation of gas explosions in controlled environments (at various gas concentrations, in a quiet or turbulent state of the explosive mixture), as well as for calibrating computational simulations of flammable gas explosions.

Videos are recorded using a high-speed camera, on a vertical longitudinal section through the explosion chamber. This section is highlighted by a laser light beam, elongated along the entire length of the transparent tube by using a divergent lens to diffuse the beam into a cone shape. To obtain the vertical plane of the laser beam, the beam is reflected, with the help of a flat mirror, at an angle of 90 degree and is passed through a slit located on the upper and transparent wall of the rectangular tube. The fluid movement is highlighted by the introduction of inert particles of very small mass inside the tube, particles that become more visible in the vertical plane generated by the laser source.

Explosion pressures data are recorded using pressure sensors, amplifier and oscilloscope, the data on the velocities and accelerations of the flame front and inert dust particles are calculated directly in the video files recorded by the high-speed camera through its dedicated software.



The problem solved by the invention consists in the possibility of analyzing the explosion phenomena of air-fuel-fuel mixtures at higher recording speeds of parameters and at relatively low costs due to the simplicity of the system components, its ability to record gas explosion phenomena from the moment of the initiation of the explosive atmosphere until the development of the flame front and the passage of the flow in turbulent regime.

