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MEANS FOR OBSERVING COMBUSTION IN INTERNAL COMBUSTION ENGINES.

APPLICATION FILED JUNE 7, 1921.

1,433,530. Patented Oct. 31, 1922.

Fig. 1.

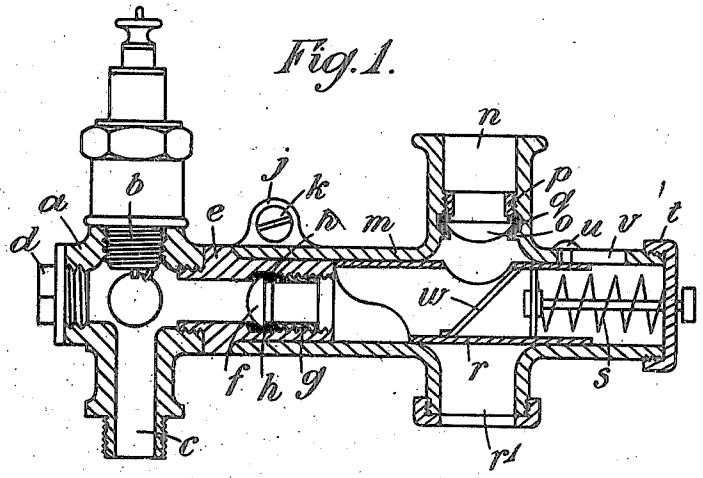


Fig. 2.

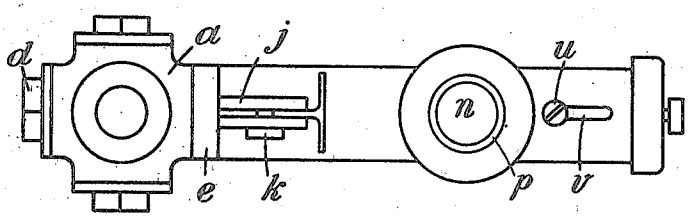
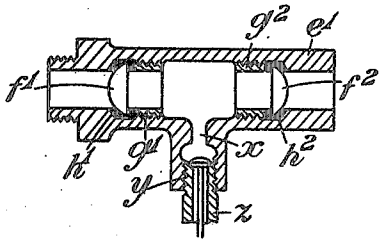


Fig. 3.



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Patented Oct. 31, 1922. 1,433,530

UNITED STATES PATENT OFFICE.

HARRY CHAPMAN, OF SHEFFIELD, ENGLAND.

MEANS FOR OBSERVING COMBUSTION IN INTERNAL-COMBUSTION ENGINES.

Application filed June 7, 1921. Serial No. 475,790.

To all whom it may concern:

Be it known that I, HARRY CHAPMAN, a subject of the King of Great Britain and Ireland, residing at 34 Meersbrook Road, city of Sheffield, county of York, England, have invented certain new and useful Improvements in or relating to the Means for Observing Combustion in Internal-Combustion Engines, of which the following is a specification, reference being had to the accompanying drawing.

This invention relates to the method and means for making visible the combustion of explosive mixtures or other fuel in internal combustion engines.

The object of this invention is to provide an improved method and means for making visible the said combustion.

A device made in accordance with this invention comprises one or more pieces of transparent or partly transparent materials which may be of the form of lenses and of such shape or form as will withstand heat or pressure and one or more reflectors suitably disposed in a convenient position with regard to the engine.

The device may be disposed in a tube preferably in the form of a T or may be so disposed in the T piece that the sparking plug may be fixed on one of the openings of the T piece. One or more lenses may be disposed in the other end of the T piece. Means may be provided to allow for expansion and contraction of the lenses said means may comprise packing of asbestos or other suitable material forming a gas-tight joint around one or more of the lenses and render it less liable to fracture. Two or more of the lenses may be disposed to form air tight or gas-tight or fluid tight chambers which may be made to contain air, gas or other suitable fluid under compression adapted to oppose the combustion pressure in the cylinder. The reflectors and lenses of the device may be so disposed that the observer may observe the explosion indirectly, or so as to protect the eyes of the observer in the event of a reflector or lens fracturing, and a safety automatic shutter may also be provided for this purpose. Means may be provided for excluding all exterior light.

Referring to the accompanying drawings:—

Fig. 1 shows a sectional elevation of one form of device made in accordance with this invention disposed on a sparking plug;

Fig. 2 is a plan of the exterior of the device and attachment as shown in Fig. 1 with the sparking plug removed;

Fig. 3 shows a sectional elevation of one form of pressure resisting chamber.

A T piece a is adapted to receive a sparking plug b and is provided with a threaded portion c which may be screwed into any convenient place on the cylinders. Into one arm of the T piece is inserted a plug d and into the other arm is screwed a tubular member e carrying a bull's-eye lens f which is held in position by a screwed nipple or locking ring g.

Asbestos packing h is provided to form a gas tight joint. Clamped to the tubular member e by means of a split lug j and screw k is a tubular casing m having an eye piece n in which is disposed a lens o held in position by a locking ring p. Asbestos packing q is provided. Slidably mounted in a tubular casing m is a cylindrical member r held in its forward position by means of a spring s, said cylindrical member r is held from rotating by a screw u moving in a slot v which allows for a sliding movement. A reflector w is mounted in the cylindrical member at an angle of about 45° in order to reflect through the lens o, the light received from the lens f.

The cylindrical member r in its normal position covers the outlet r' but in case of the lens f breaking by explosion or from any other cause the pressure will force the cylindrical member r backward against the action of the spring s and allow the explosive gases to escape through the outlet r'. If desired the cylindrical member may be dispensed with and the reflector suitably attached to the interior of the tubular casing in such a manner as to allow the outlet r' to become uncovered in case of the lens or reflector fracturing.

In a modified form of device made in accordance with this invention as shown in Fig. 3 for the member e is substituted a tubular member e' adapted to be screwed into one arm of the T piece. The member e' carries bull's-eye lenses f', f^2 which are held in position by locking rings g', g^2 asbestos packing h', h^2 being provided to form air-tight joints. The tubular member e' has an opening x, its mouth being internally screw-

threaded at y adapted to receive a tube z forming an inlet whereby the air, or fluid is introduced under pressure a suitable valve for retaining same being provided.

The tubular casing m may be clamped to the tubular member e' in a similar manner as shown in Fig. 1.

In operation when the device above described is fitted to an internal combustion engine in a suitable position, the electric spark may be seen on looking through the lens and turning the engine round before turning on the explosive mixture.

When running the engine under its own power the flame of the explosion can be seen on looking through the lens and the strength of quality of the explosive gases judged by noting the colour of the flame.

Claims—

1. Means for making visible the combustion of fuel in internal combustion engines, comprising a passage forming member having a pair of openings, said member being connected to the engine cylinder of a combustion engine and directed towards the ignition point, a piece of transparent material secured gas-tight in the passage, one of said openings forming an eye-piece, a piece of transparent material secured in said eye-piece, a reflector located in the passage to reflect light from the igniting point towards the eye-piece, and means for uncovering the other of said openings in case of escape of combustion gases along the passage.

2. Means for making visible the combustion of fuel in internal combustion engines, comprising a sparking plug, a passage forming member having a pair of openings, said member being connected to said sparking plug and directed towards the sparking points thereof, a piece of transparent material secured in the passage, one of said openings constituting an eye-piece, a piece of transparent material secured in said eye-piece, a reflector located in the passage to reflect the light from the sparking points towards the said eye-piece, and means for uncovering the other of said openings in case of an escape of combustion gases down the passage.

3. Means for making visible the combustion of fuel in internal combustion engines, comprising a sparking plug, a passage forming member connected to said sparking plug and directed towards the sparking points thereof, said member having a plurality of openings, two pieces of transparent material secured in the passage, one of said openings being provided in the side of the passage between said pieces of transparent material, another of said openings constituting an inlet arranged between said pieces of transparent material, a valve disposed in said inlet, another of said openings in the side of the passage constituting an eye-piece, a piece of transparent material secured in said eye-piece, a reflector located in the passage to reflect the light from the sparking points toward said eye-piece, and another of said outlet openings for gases being provided in the side of the passage, and means for uncovering said last-mentioned opening in case of an escape of combustion gases down the passage.

In witness whereof I have hereunto set my hand in presence of two witnesses.

H. CHAPMAN.

Witnesses:
BERNARD E. DRURY,
ENSOR D. DRURY.