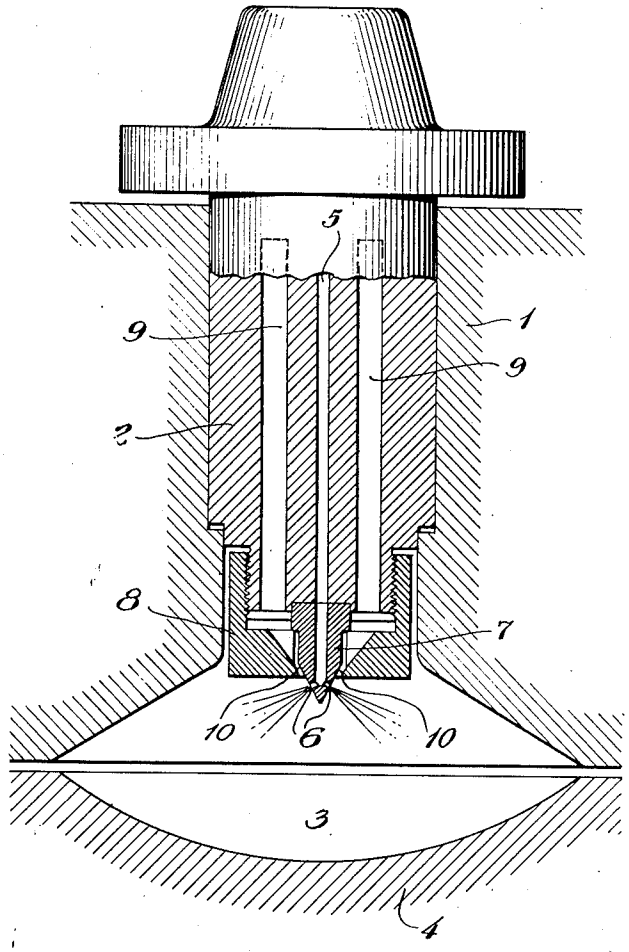
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INTERNAL COMBUSTION ENGINE

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# UNITED STATES PATENT OFFICE

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## INTERNAL-COMBUSTION ENGINE

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This invention relates to internal combustion engines and in particular to means for preventing the fouling of the fuel injection nozzle.

It has been found that the injection nozzles with which solid or airless injections are ordinarily provided are apt to become fouled or carboned-up, due to the fact that after each injection a quantity of fuel remains on the injector. This fuel, although of small quantity, is sufficient after some operation of the engine, to form a considerable carbon deposit which interferes considerably with the efficient operation of the engine. To overcome this objection it is therefore proposed to scavenge that portion of the nozzle which is subject to fouling by causing a cleansing fluid to flow thereover, preferably at each cycle in the operation of the engine.

A simple way to effect this scavenging and one which in no way interferes with the normal running of the engine, is to trap or confine a portion of the charging air ordinarily supplied to the engine and to release it into the combustion space during each working stroke so that it will flow, under pressure, over the surface of the nozzle and sweep off any particles of fuel or solid matter remaining thereon.

In the accompanying drawing in which one form of such arrangement is illustrated, the cylinder head 1 is provided with nozzle unit 2, which, at its lower end, enters the combustion space 3 above the piston 4. The fuel is supplied, as usual for solid or airless injection, by way of a passage 5 which terminates in a plurality of jet openings 6. In the form illustrated the nozzle 7 is held in place by a nut 8, engaging the body 2 of the injector unit. Within the body of the nozzle unit there is provided one or more chambers 9 which, at their lower end, open into the combustion space by way of passages 10 in the nut 8, the passage being so formed as to cause the air leaving the chamber or chambers 9 to flow over the surface of the nozzle.

During the operation of the engine air is forced into the chambers 9 on the compression stroke and when the piston moves downward on the working stroke, this air escapes into the combustion space by way of the passages 10 and in so doing sweeps over the surface of the injector nozzle and effectively removes any particles of fuel or other matter remaining thereon.

Although closely associated therewith in the form shown it will be understood that the scavenging arrangements are actually independent of the fuel spraying means, although the scavenging may to some extent assist the spraying action in so far as the flow coincides with the injection period but its principal effect is the cleansing of the nozzle after the spray has ceased.

It will therefore be apparent that the construction shown is merely illustrative and that the invention is capable of embodiment in numerous forms without departing from the scope of the following claims.

Claims:

1. The combination in an internal combustion engine of a fuel injection nozzle having a discharge orifice opening directly into the engine cylinder, a fluid chamber having an independent opening into the cylinder adjacent the nozzle and means for directing the outflow from said chamber in cleansing relationship to the discharge orifice.

2. In an internal combustion engine, a nozzle unit comprising a chambered body portion, an apertured nut member secured thereto, a nozzle projecting through the aperture in the nut member into the combustion space and having a fuel discharge orifice therein, said nut member arranged to direct the flow from the body chamber over the surface of the nozzle adjacent said orifice, for the purpose described.

In testimony whereof, I have signed this specification.

CHARLES SCHAER.