

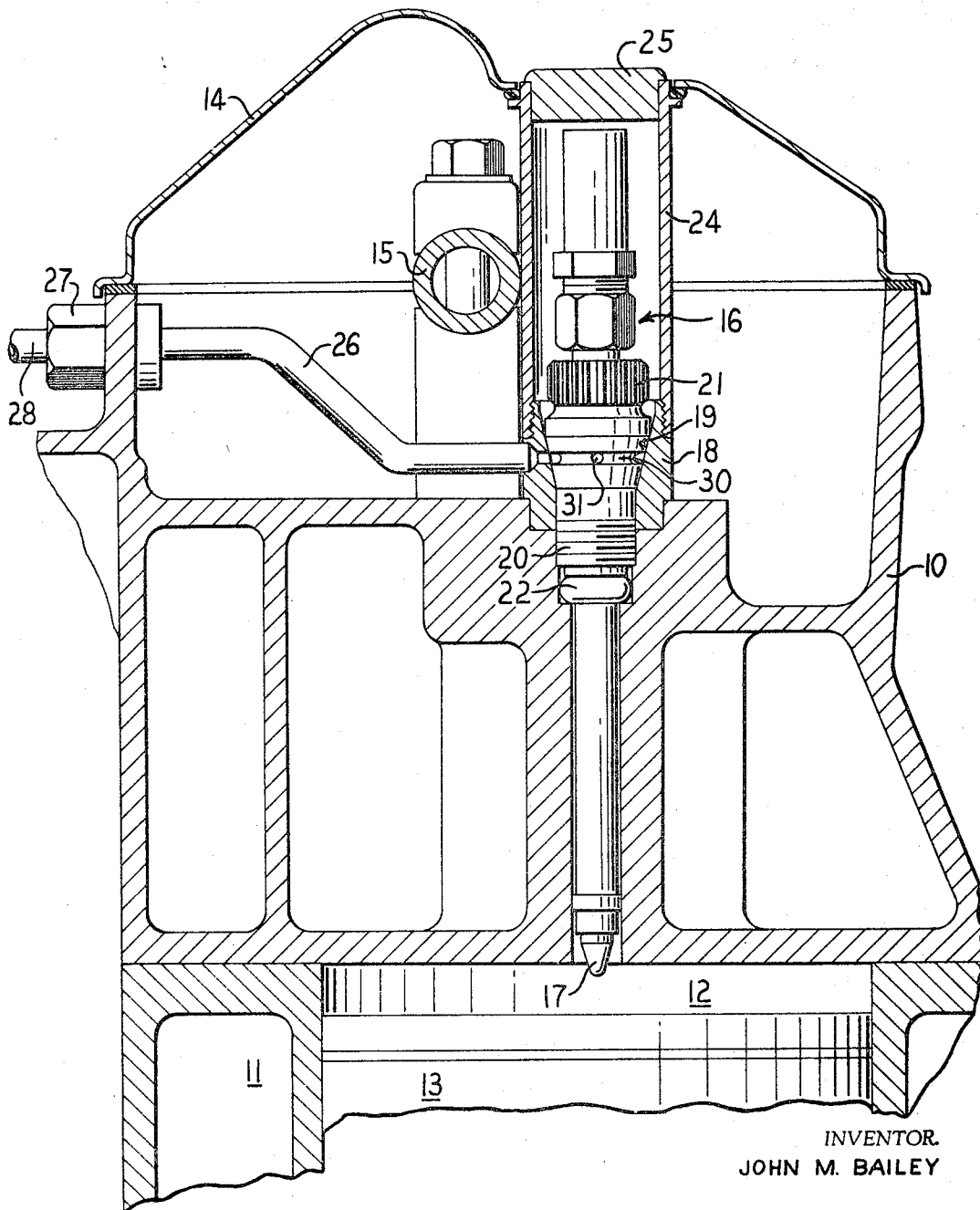
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# ENGINE FUEL INJECTION VALVE ASSEMBLY

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**ENGINE FUEL INJECTION VALVE ASSEMBLY**  
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1 Claim

## ABSTRACT OF THE DISCLOSURE

A fuel injection valve assembly in which the valve and nozzle are disposed within the engine head cover and in which a permanent adapter and supply line enable removal of the valve and nozzle without disturbing the supply line or removing the head cover.

Fuel injectors are usually secured to the cylinder head by a clamping means or by a threaded adapter which locks the injector to the head. Fuel lines are attached to the injectors by threads, brazing, etc. and usually pass through a side wall of the cylinder head or head cover where they lead to the fuel injection pump. Seals are necessary where the lines pass through cylinder heads to prevent fuel leakage and to prevent oil and fumes from escaping from the head.

To service conventional injectors, the cylinder head cover must be removed and fuel lines disconnected before the fuel lines can be removed. In some engines it is necessary even to remove the rocker arm shaft and other components to enable removing of the injector. Such operations are time consuming and result in unnecessary wear and damage to the parts which must be removed and replaced.

It is the object of the present invention to overcome the disadvantages referred to above and to provide a fuel injection valve assembly in which a single valve and nozzle unit is very readily removable and replaceable by means permitting removal and replacement without the necessity of adjusting or disturbing any adjacent engine structure. Or other objects and advantages of the invention and the manner in which it is carried into practice are made apparent in the following specification wherein reference is made to the accompanying drawing.

The drawing is a view in vertical transverse section through an engine head showing the head cover and a portion of the block and illustrating the assembly of a fuel injection valve therein which embodies the present invention.

The engine head is shown at 10 in the drawing as resting on a conventional block 11 wherein the usual cylinder provides a combustion space 12 above a piston 13. A head cover 14 is secured on top of the head by conventional means (not shown) and encloses such equipment as a valve rocker arm support 15 and its related supporting mechanism.

A fuel injection valve, generally indicated at 16 and having a nozzle 17 for injecting a spray of fuel into the

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combustion chamber 12, is mounted in the head 10 by means of an adapter 18 with a conical opening 19 therein for reception of a complementary conical portion on the valve. A threaded part 20 on the valve is received within a threaded opening in the head just below the adapter and by threading the valve into the head by means of a suitable tool engaged in a serrated part 21 on the valve, the valve compresses a seal 22 to prevent escape of gases from the combustion chamber and is at the same time brought down into sealing engagement with the adapter at the the meeting conical surfaces. A tubular shroud 24 is threaded to the upper end of the adapter and sealed at its upper end by a plug-like seal 25 with a friction fit. The seal 25 may be readily removed when it is desired to remove the valve and nozzle assembly.

Fuel is supplied to the valve by means which remain in place when the valve is removed. This means comprises a short fuel line 26 passing through the cylinder head and secured by a conventional fitting including a nut 27 to an external line 28 which leads to the usual fuel pump (not shown). At its inner end, the line 26 is secured as by brazing or the like to the adapter 18 and delivers fuel to an annular groove 30 in the tapered part of the valve and through radial orifices 31 in the groove to the interior of the valve which is of conventional construction.

With the construction illustrated, the valve and nozzle assembly may be removed for replacement or repair by simply removing the seal 25 and releasing the threaded connection 20 with a suitable tool which extends into the shroud 24 for engagement with the serrated surface 21.

I claim:

1. In combination with an engine having a head fitted to a cylinder block, an adapter in the head for reception of a fuel injection valve, a fuel line extending through a wall of the head and communicating with the adapter, and registering passages in the adapter and fuel injection valve to communicate fuel from the line to the interior of the valve whereby the valve can be removed without disturbing the fuel line, the adapter and valve having complementary tapered sealing surfaces, a threaded connection for drawing the surfaces into sealing contact, said passages being disposed between the ends of the tapered sealing surfaces, a cylindrical shroud extending from the adapter through the head cover to surround the valve, and removable means closing the external end of the shroud, said valve having an external surface for reception of a tool for imparting turning movement thereto without removing the shroud.

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