May 20, 1958 H. L. JENKINS 2,835,242

VALVE IN HEAD FOR INTERNAL COMBUSTION ENGINE

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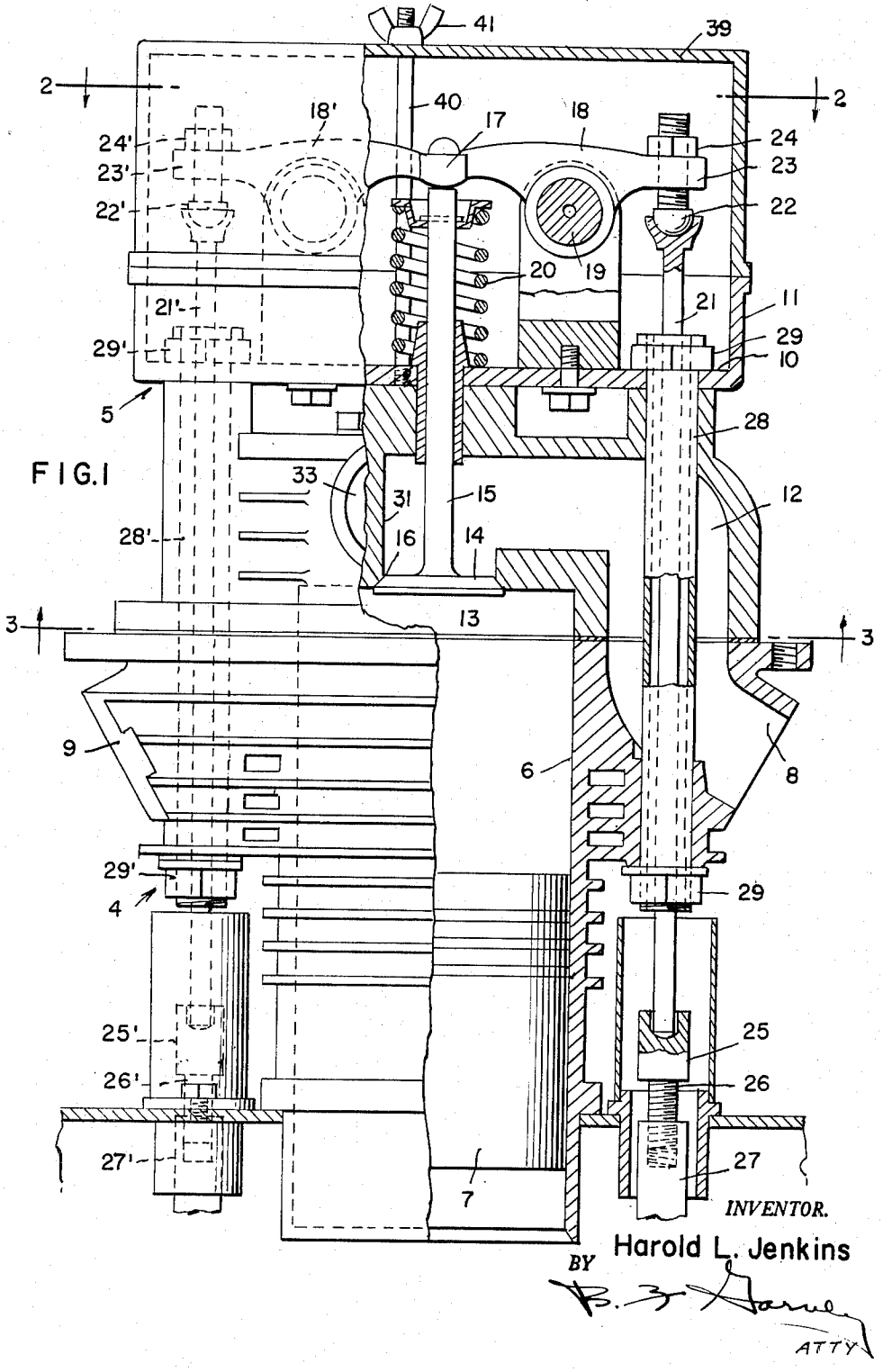



FIG. 1

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FIG.2

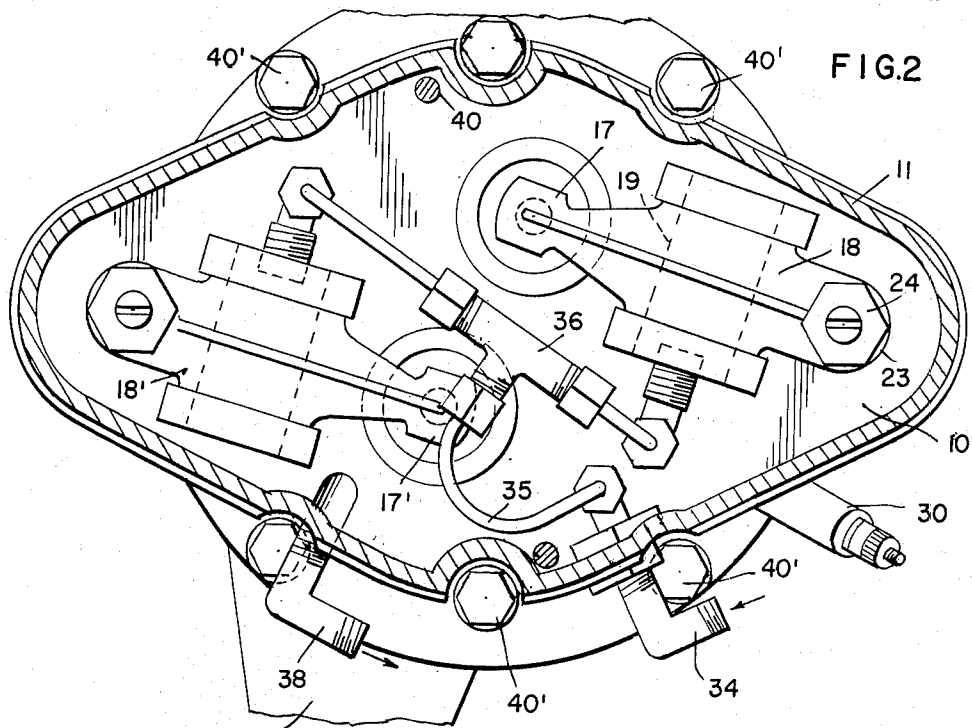
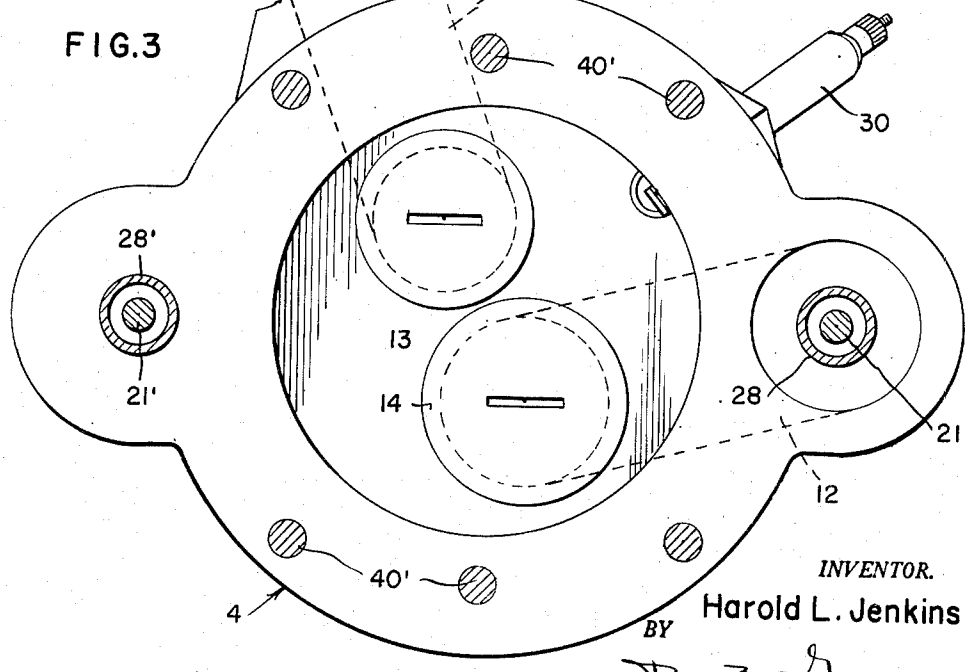



FIG.3




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2,835,242

# VALVE IN HEAD FOR INTERNAL COMBUSTION ENGINE

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1 Claim. (Cl. 123—191)

This invention relates to a valve in head designed to replace the T head of the internal combustion engine presently employed in the L model Gravely tractor.

In use of the L model Gravely tractor, considerable difficulty has been experienced, due to the unsatisfactory operation of the engine which is of the T head type and exhausts through a port in the engine block. The engine is superheated when in operation by the exhaust passing through the engine block, resulting, inter alia, in sticky valves. The T head engine has furthermore been found to be inefficient, due to the location of the firing chamber. It is within the contemplation of the present invention to provide an engine head to replace the T head presently used, which tests have shown to generate increased horsepower with reduced engine temperature.

Another object of this invention is to provide an engine head adapted to convert a T head engine to a valve-in-head engine, and which exhausts the products of combustion through a port in the head.

A further object is to provide an engine head of the character described which is designed to fit the engine block of the L model Gravely tractor engine without altering the block structure.

Other objects of the invention will be manifest from the following description of the present preferred form of the invention, taken in connection with the accompanying drawings, wherein:

Fig. 1 is a side elevational view of the cylinder head of the present invention, illustrating its application to the cylinder block of the L model Gravely tractor, a portion thereof being broken away to disclose details of construction;

Fig. 2 is a fragmentary sectional view taken along the lines 2—2 of Fig. 1, looking in the direction of the arrows; and

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 1, looking in the direction of the arrows.

In general, the valve-in-head of the present invention is designed to replace the T head of the L model Gravely tractor, this operation being carried out with a minimum amount of time and effort. With the engine head of my invention, fuel is admitted through the same engine block inlet port as heretofore. For carrying out the present invention, however, the valve and valve guides employed in the T head engine are removed and replaced by two (⅝ inch in diameter) tubes, each having an opening ⅜ of an inch in diameter, which tubes act as head bolts. Push rods extend through the openings for operating overhead valves. The exhaust valve port, used by the T head engine, is sealed and the exhaust valve port located in the head in order to direct heat generated by the exhaust away from the cylinder. In contrast to the T head engine, the valve-in-head is so designed that the entire firing chamber is directly over the piston, in order to obtain maximum power.

Referring now in greater detail to the drawings, there is shown in Fig. 1, a one cylinder internal combustion



engine designed for operating the L model Gravely tractor, which engine comprises an engine block 4, the upper terminal of which is engaged by a valve in head 5. Engine block 4 is of conventional construction and includes a cylinder 6 in which a piston 7 reciprocates. A fuel intake port is indicated at 8. In opposed relation to port 8 is a second port 9 which, in the T head type engine, serves as an exhaust port but which, in the present valve-in-head engine, is blocked off in order to prevent superheating of the engine caused by exhausting the products of combustion through the engine block.

Engine head 5 corresponds in shape to engine block 4 and includes a supporting surface 10 of irregular shape above which extends a peripheral wall 11. Head 5 further includes a fuel inlet passage 12 which communicates with fuel inlet port of engine block 4, and extends to a point near the center of the engine head where it communicates with the upper portion 13 of cylinder 6 which is formed in engine head 5. An inlet valve 14, having a valve stem 15 extends downwardly from a point above cylinder 8 and is adapted to move into and out of engagement with a valve seat 16 in a well known manner. The upper terminal of valve stem 15 is engaged and urged downwardly by the lever 17 of a rocker arm 18 pivoted on a suitably mounted shaft 19. A coil spring 20, convoluted about valve stem 15 serves to urge valve 14 to its seated position. Actuation of rocker arm 18 is effected by a push rod 21 having a ball and socket connection 22, which rod is connected to the tail 23 of the rocker arm by suitable means 24. The lower terminal of push rod 21 is mounted in seat 25 of a cap screw 26 which is threadedly engaged with a valve lifter 27 of conventional construction. There is further provided, a push rod guide or tube 28 which extends from a point below fuel intake port 10 of engine block 5 to a point above passage 12 of engine head 7 which guide is threaded at each end and secured to the engine block and head respectively, by nuts 29. Tube 28 is therefore not only a guide for the push rod, but also serves as a head bolt. Tubes 28 and push rods 21 are adapted to fit in engine block openings formerly occupied by the T head valve structure.

Combustion of the charge in cylinder 8 is effected by a spark plug 30. The structure of the exhaust valve and inlet valve assemblies is similar and therefore, like parts of the former are designed by primed numbers corresponding to the latter.

As shown to advantage in Fig. 1, port 9 in engine block 4 is cut off by a wall 31 thereby directing the exhaust through a passage 32 and exhaust valve or outlet port 33. As shown in Fig. 3, passage 32 and exhaust valve port 33 are contained within engine head 5 in order to avoid exhausting through port 9. By means of this structure, the heat generated by the exhaust is directed away from cylinder 6, resulting in a cooler engine than was heretofore possible.

Rocker arms 18 and 18′ are lubricated by a force feed lubricating system which includes an inlet 34, through which a lubricant is fed through a conduit 35 to a T section 36. From T section 36 the lubricant is fed through ducts 37 and 37′ to rocker arms 18 and 18′ respectively. A lubricant return line is indicated at 38.

The mechanism for operating the inlet and exhaust valves is protected by a cap 39 which complements the irregular shape of head 5. Cap 39 is removably mounted to the head by a plurality of bolts 40 carried by supporting surface 10, the upper terminals of which bolt are threaded to receive nuts 41. Head bolts are indicated at 40′. With the device of the present invention, the T head of the L model Gravely tractor may be expeditiously replaced without need for drilling holes in the engine block. Furthermore, tests have shown that the valve-

in-head engine hereby provided, is rated at seven horsepower, an increase of approximately two horsepower over the T head engine previously used. Despite the increase in horsepower, the engine remains cooler in operation and avoids sticky valves.

While I have herein shown and described the present preferred form of my invention, it is nevertheless to be understood that various changes may be made therein, without departing from the spirit and scope of the claim hereto appended.

What I claim is:

A process for converting a T-head engine to a valve-in-head engine which comprises removing the head, inlet and exhaust valves and valve guides from the engine, fitting on the block a valve-in-head to relocate the entire firing chamber of the engine directly above the piston, adding valve operating members for actuating the valves



in predetermined sequence, and blocking off the exhaust port in the engine block and exhausting the products of combustion through a port in the engine head.

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