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H. DINGER ETAL

3,194,221

CYLINDER HEAD CONSTRUCTION

Filed April 22, 1963

FIG. 1

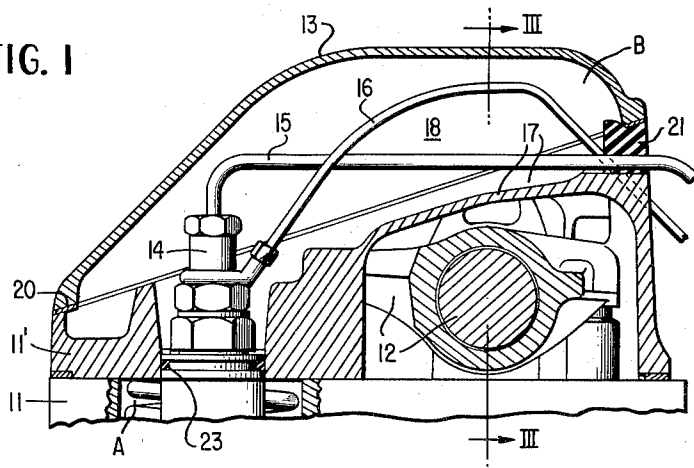


FIG. 2

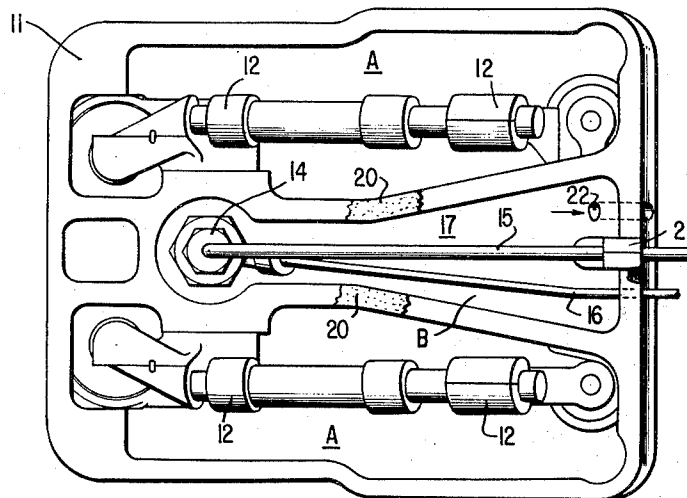
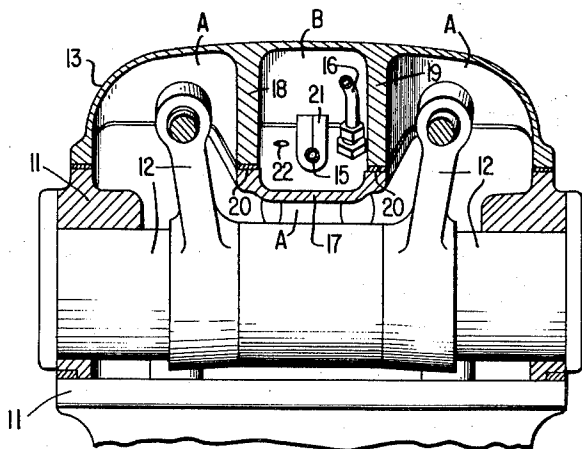


FIG. 3



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CYLINDER HEAD CONSTRUCTION

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D 38,756

15 Claims. (Cl. 123—32)

The present invention relates to the construction of an internal combustion engine, and more particularly to the construction of the assembly of cylinder head and hood member covering the same for injection-type internal combustion engines in which the space above the cylinder head is sub-divided or compartmented in such a manner as to prevent, in case of leakage in the fuel line leading to the injection nozzle, any mixing of the fuel with the lubricant.

It is known with injection-type internal combustion engines having suspended valves, to arrange on the cylinder head the valve actuating members such as rocker arm, push rods, rocker arm shaft, etc., and to cover the so-called control space in the upward direction thereof by a hood-like member, below which also extend the fuel lines—with diesel engines the fuel supply lines or injection lines and the leakage oil lines leading to the injection nozzle body secured in the cylinder head. The lubricating oil which comes from or flows out of the bearings and between the pressure- and/or contact-surfaces of the individual valve actuating members, collects in the prior art constructions at the bottom of the control space and flows off again through bores into the lubricating oil trough or oil pan disposed therebelow. In case the fuel injection line extending through the control space breaks or in case leaks develop in the line connections disposed within this space, there results the disadvantage that the relatively thin-flowing fuel is mixed with the more viscous lubricating oil whereby a sufficient lubrication of the bearing places of the internal combustion engines is no longer assured.

In order to avoid this disadvantage, it is proposed in accordance with the present invention, to separate the installation space into which extends the upper part of the fuel injection nozzle body and through which extend the fuel lines, with diesel engines, the fuel supply or injection lines and the leakage oil lines, by wall portions of the cylinder head or of the upper part of the cylinder head and by wall portions of the hood for the cylinder head from the remaining space provided under the cylinder-head hood, namely the control space in which are located the valve actuating members, and to mutually seal the two spaces with respect to each other.

According to a further feature of the present invention, it is additionally proposed to limit the installation space into which extends the upper part of the fuel injection nozzle body and through which extend the fuel lines, by a trough-shaped part of the cylinder head and by two partition walls which extend parallelly to the fuel lines. According to the present invention, the two separating walls thereby rest upon the upper rim of the trough-shaped part by the interposition of a seal and are made in one piece with the cylinder-head hood, properly speaking.

Accordingly, it is an object of the present invention to provide a cylinder head construction, particularly for fuel injection internal combustion engines which eliminates, by simple means, the aforementioned drawbacks and shortcomings encountered with the prior art constructions.

It is another object of the present invention to provide

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a composite cylinder head and protective hood construction which effectively sub-divides the space disposed below the hood so as to separate the space accommodating the valve actuating parts from the space accommodating those parts associated with the fuel injection system.

A further object of the present invention resides in the provision of a compartmentation for the cylinder head and the protective hood cover which is so constructed and arranged as to assure at all times proper lubrication of the bearing parts of the engine by eliminating the danger of thinning the lubricant by the admixture of possible leakage fuel.

These and other objects, features and advantages of the present invention will become more obvious from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein:

FIGURE 1 is a partial cross sectional view, perpendicularly to the rocker arm shaft, through a cylinder head structure with a protective hood cover placed thereon in accordance with the present invention,

FIGURE 2 is a plan view of the cylinder head of FIGURE 1 with the hood cover removed therefrom, and

FIGURE 3 is a cross sectional view taken along line III—III of FIGURE 1.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, the cylinder head in the illustrated embodiment consists of a lower part 11 and of an upper part 11'. The valve actuating members 12 such as rocker arm, push rods, rocker arm shaft, etc., are arranged on top of the two-partite cylinder head. The cylinder head upper part 11' is closed off in the upward direction by a protective hood-like cover member 13. The injection nozzle body 14 is secured in any conventional manner within the cylinder head upper part 11'; the fuel supply line 15 forming the injection line and the leakage oil line 16 lead to and from the injection nozzle body 14, respectively.

In order to separate the space A, namely the so-called control space in which are disposed the valve actuating members 12, from the space B into which extends the upper end of the injection nozzle body 14 and through which extend the fuel lines 15 and 16, there are provided in accordance with the present invention, on the side of the cylinder head, a trough-like shaped part 17 and, on the side of the hood-like cover 13, partition walls 18 and 19. A seal 20 is inserted between the two parts consisting of the trough-like part 17, on the one hand and of the partition walls 18, 19 on the other. An elastically constructed securing means 21 for the fuel supply line 15 is provided at the inlet of the fuel supply line 15 into the installation space B. A seal 23 is inserted between the injection nozzle body 14 or the holder thereof and the cylinder head upper part 11' in order to separate also within this area the space B from the space A.

It is achieved by the present invention that in case of a break in the fuel supply line 15 or in case the connections at the injection nozzle body 14 become leaky, the outflowing or leaking relatively thin fuel cannot reach from the installation space B the control space A in which is disposed the lubricating oil; instead, the leaking fuel is carried off toward the outside through a bore 22 within the trough-shaped part 17.

By reason of the fact that the fuel lines 15 and 16, on the one hand, are secured at the cylinder head upper part 11' or extend therethrough or are guided through a holding means 21 arranged between the cylinder head upper part 11' and the lower edge of the hood 13, as is the case with the injection line 15, the hood cover 13

may be removed without any great difficulties for purposes of service and repair work at the valve actuating members 12; this is in contra-distinction to the prior art constructions in which the fuel lines are guided through the hood member for the cylinder head.

While we have shown and described one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to a person skilled in the art, and we, therefore, do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

We claim:

1. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other.

2. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, said first space portion being limited to a trough-like part and two separating walls which extend nearly parallel to the fuel line means.

3. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and to

provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other,

said first space portion being limited by a trough-like part and two separating walls which extend nearly parallel to the fuel line means,

said trough-like part being operatively associated with said cylinder head, and said two separating walls resting on the upper rim of said trough-like part by the interposition of a seal and being made in one piece with the hood member.

4. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other,

said first space portion being limited by a trough-like part and two separating walls which extend nearly parallel to the fuel line means,

said trough-like part being operatively associated with said cylinder head, and said two separating walls resting on the upper rim of said trough-like part by the interposition of a seal and being made in one piece with the hood member,

further seal means within the area of the injection nozzle body disposed between the cylinder head part and the nozzle body structure.

5. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members,

and seal means for sealing said first and second space portions with respect to each other,

said first space portion being limited by a trough-like part and two separating walls which extend nearly parallel to the fuel line means,

said trough-like part being operatively associated with said cylinder head, and said two separating walls resting on the upper rim of said trough-like part by the interposition of a seal and being made in one piece with the hood member,

further seal means within the area of the injection nozzle

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zle body disposed between the cylinder head part and the nozzle body structure, discharge means provided in said trough-like part and leading toward the outside.

6. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, said first space portion being limited by a trough-like part and two separating walls which extend nearly parallel to the fuel line means, said trough-like part being operatively associated with said cylinder head, and said two separating walls resting on the upper rim of said trough-like part by the interposition of a seal and being made in one piece with the hood member, further seal means within the area of the injection nozzle body disposed between the cylinder head part and the nozzle body structure, discharge means provided in said trough-like part and leading toward the outside, and elastic means arranged between the lower rim of said hood member and the cylinder head for guiding the fuel line means at the inlet into said first space portion.

7. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said two space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, said trough-like part being operatively associated with said cylinder head, and said two separating walls resting on the upper rim of said trough-like part by the interposition of a seal.

8. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which

lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, further seal means within the area of the injection nozzle body disposed between the cylinder head part and the nozzle body structure.

9. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, discharge means provided in said trough-like part and leading toward the outside.

10. An arrangement of the cylinder head structure and of the hood member covering the cylinder head structure in the upward direction thereof, particularly for injection-type internal combustion engines having an injection nozzle body, and in which there are provided, within the space below the hood member for the cylinder head, valve actuating members arranged on the cylinder head and through which space extend fuel line means which lead to the injection nozzle body secured in the cylinder head, comprising:

means for sub-dividing said space into two space portions, each of said space portions including wall parts of said cylinder head and of said hood member to effectively provide a first space portion into which extends the upper part of the injection nozzle body and through which extend the fuel line means, and provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, and elastic means arranged between the lower rim of said hood member and the cylinder head for accommodating the inlet of the fuel line means into said first space portion.

11. In an internal combustion engine in which a hood-like cover covers the cylinder head in the upward direction and in which there are arranged within the space below the hood-like cover valve actuating members arranged on the cylinder head and in which a fuel line also extends through said space which line leads to the injection nozzle body structure secured in the cylinder head,

the improvement essentially consisting of means including wall parts of said cylinder head and wall parts of said hood-like cover for sub-dividing said space to provide a first space portion into which extend the

upper part of the injection nozzle body structure and through which extends the fuel line, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, said wall parts of said hood-like cover for subdividing said space comprising wall members depending from a portion of said cover intermediate opposite lateral edges thereof.

12. In an internal combustion engine in which a hood-like cover covers the cylinder head in the upward direction and in which there are arranged within the space below the hood-like cover valve actuating members arranged on the cylinder head and in which a fuel line also extends through said space which line leads to the injection nozzle body structure secured in the cylinder head,

the improvement essentially consisting of means including wall parts of said cylinder head and wall parts of said hood-like cover for sub-dividing said space to provide a first space portion into which extend the upper part of the injection nozzle body structure and through which extends the fuel line, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other, said parts of said hood-like cover for subdividing said space comprising wall members depending from said cover and disposed laterally of said fuel line.

13. In an internal combustion engine in which a hood-like cover covers the cylinder head in the upward direction and in which there are arranged within the space below the hood-like cover valve actuating members arranged on the cylinder head and in which a fuel line also extends through said space which line leads to the injection nozzle body structure secured in the cylinder head,

the improvement essentially consisting of means including wall parts of said cylinder head and of said hood-like cover for sub-dividing said space to provide a first space portion into which extend the upper part of the injection nozzle body structure and through which extends the fuel line, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, and seal means for sealing said first and second space portions with respect to each other,

said first space portion being limited by a trough-like part and two separating walls,

said trough-like part being operatively associated with said cylinder head and said two separating walls

being operatively associated with said cover and resting against the rim of said trough-like part by the interposition of a seal.

14. In an internal combustion engine in which a hood-like cover covers the cylinder head in the upward direction and in which there are arranged within the space below the hood-like cover valve actuating members arranged on the cylinder head and in which a fuel line also extends through said space which line leads to the injection nozzle body structure secured in the cylinder head,

the improvement essentially consisting of means including wall parts of said cylinder head and wall parts of said hood-like cover for sub-dividing said space to provide a first space portion into which extend the upper part of the injection nozzle body structure and through which extends the fuel line, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members, discharge means provided in said first space portion and leading therefrom toward the outside, said wall parts of said cover comprising wall parts common to said first space portion and to said second space portion, said common wall parts depending from said cover.

15. In an internal combustion engine in which a hood-like cover covers the cylinder head in the upward direction and in which there are arranged within the space below the hood-like cover valve actuating members arranged on the cylinder head and in which a fuel line also extends through said space which line leads to the injection nozzle body structure secured in the cylinder head,

the improvement essentially consisting of means including wall parts of said cylinder head and said hood-like cover for sub-dividing said space to provide a first space portion into which extend the upper part of the injection nozzle body structure and through which extends the fuel line, and to provide a second space portion separated from said first-mentioned space portion for accommodating therein said valve actuating members,

and elastic means arranged between the lower rim of said cover and the cylinder head for accommodating the inlet of the fuel line into said first space portion.

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RICHARD B. WILKINSON, *Primary Examiner*.