

July 28, 1970

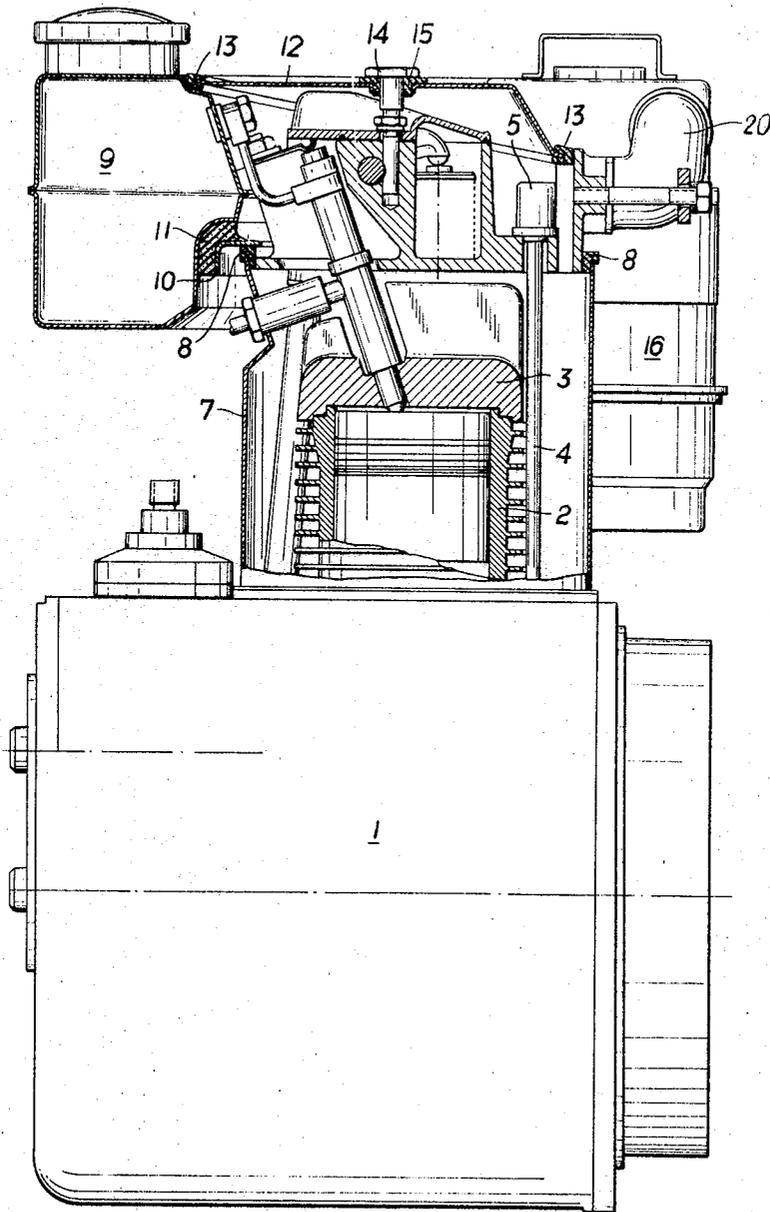
F. FREYN
AIR-COOLED INTERNAL COMBUSTION ENGINE
WITH SOUND-PROOFED SHEATHING

3,521,726

Filed March 21, 1969

2 Sheets-Sheet 1

FIG. 1



Inventor
Fritz Freyn
By
Watson, Cole, Grindle & Watson
Attys.

July 28, 1970

F. FREYN
AIR-COOLED INTERNAL COMBUSTION ENGINE
WITH SOUND-PROOFED SHEATHING

3,521,726

Filed March 21, 1969

2 Sheets-Sheet 2

FIG. 3

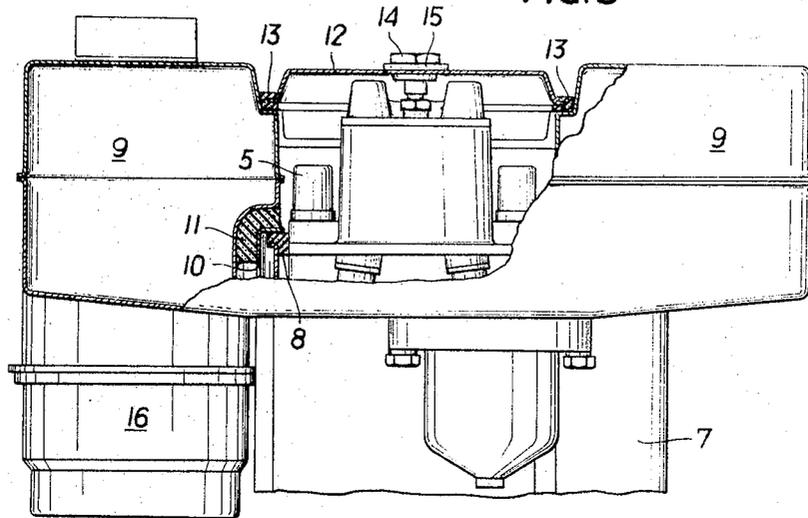
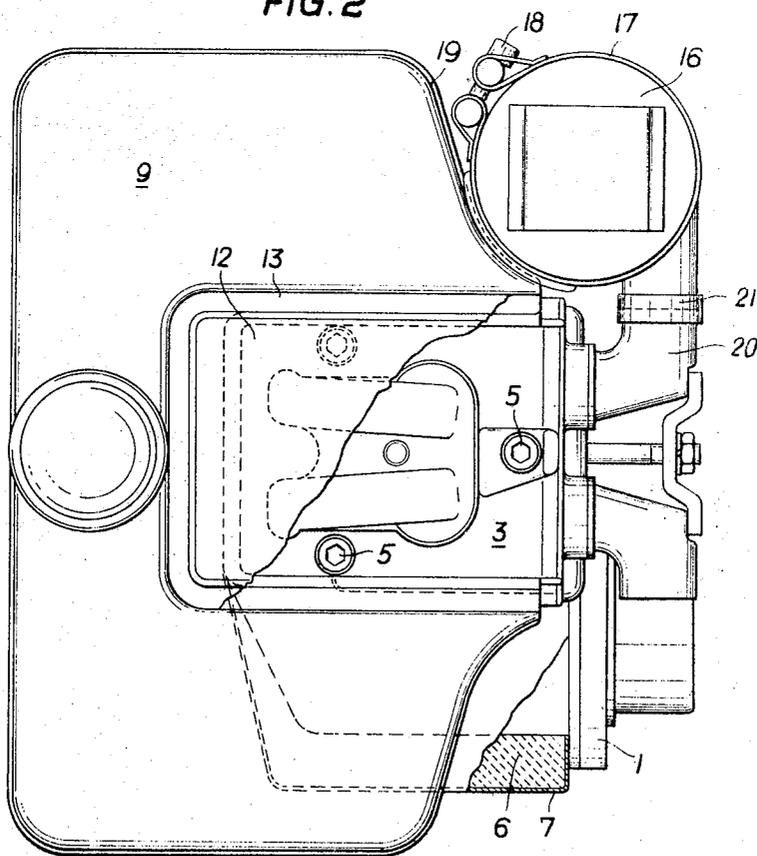


FIG. 2



Inventor
Fritz Freyn
By
Watson, Cole, Grindle & Watson
Attys

1

3,521,726
**AIR-COOLED INTERNAL COMBUSTION ENGINE
WITH SOUND-PROOFED SHEATHING**

Fritz Freyn, Graz, Austria, assignor to Hans List,
Graz, Austria

Filed Mar. 21, 1969, Ser. No. 809,211

Claims priority, application Austria, Apr. 16, 1968,

A 3,705/68

Int. Cl. F02F 7/00, 77/00; F16m 1/00

U.S. Cl. 181—33

5 Claims

ABSTRACT OF THE DISCLOSURE

An air-cooled internal combustion engine with a sound-proofed sheathing and having a sound-proofed fuel reservoir secured to and surrounding the cylinder head at least on three sides as a sound-absorbing sheath.

Sound-proofing means are provided for air-cooled internal combustion engines to an ever increasing extent in view of the fact that this type of engine is particularly liable to sound radiation from its external surfaces owing to the absence of a water jacket.

In addition to the conventional application of sound-proofing coatings to the external surfaces of the crankcase requiring complicated preliminary treatments of the surfaces to be coated and restricted to areas subject to a relatively low temperature only, a variety of sound-proof sheathings such as covers, caps and other sound-adsorbing coverings surrounding the outer surfaces of the engine in spaced relation thereto have already been suggested.

A major drawback of these conventional types of engines resides in the fact that a considerable number of sound-proofing elements are called for, resulting both in increased space requirements and greater weight of the entire engine assembly. Besides, in air-cooled internal combustion engines, particularly in diesel engines where the generally exposed cylinder and the cylinder head together with the valve gear are a major source of operational noises, the provision of conventional sound-proofing means fails to produce satisfactory results.

It is the object of the invention to provide effective sound-proofing at comparatively moderate expense particularly for air-cooled internal combustion engines with fuel reservoirs attached thereto of the type chiefly used for stationary engines. According to the invention, the fuel reservoir is secured to the cylinder head in such a manner as to provide effective sound-proofing of the latter, the said fuel reservoir surrounding the cylinder head and preferably also part of the cylinder block as a sound-absorbing sheathing at least on three sides. This design not only eliminates the transfer of sound vibrations to the fuel reservoir but serves also to substantially attenuate sound irradiation from such areas of the engine as are subject to the greatest concentration of noise. The essential feature of the present invention resides in the fact that for the first time, an already existing functional element of the engine is used for sound-proofing purposes so that it is not necessary to make provision for separate screening means for the area of the cylinder head.

The fuel reservoir is particularly suitable for use as a sound-proofing element, since the fuel contained therein also attenuates sound vibrations to a certain degree.

A further attendant advantage of the design according to the invention stems from the almost always desirable preheating of the fuel due to the particular arrangement of the fuel reservoir.

According to another embodiment of the invention the chamber enclosed by the fuel reservoir above the cyl-

2

inder head is preferably closed on top by means of a sound-proofing cover resting on the fuel reservoir, thereby substantially attenuating sound irradiation upwards of the cylinder head without significantly impairing the easy access to the cylinder head for the performance of adjustments.

According to a further feature of the invention the air filter of the internal combustion engine is part of the sound-proofing sheathing and is secured to the fuel reservoir exclusively. As a result, not only special elements for the attachment of the air filter to the cylinder head can be dispensed with but moreover, the transfer of vibrations from the engine to the filter by means of the sound-proofed fuel reservoir is precluded.

Further details and advantages of the invention will become apparent from the following description of an embodiment of the invention with reference to the accompanying drawing in which:

FIG. 1 is a partial sectional elevation of an air-cooled single-cylinder internal combustion engine according to the invention,

FIG. 2 is a top view of the internal combustion engine shown in FIG. 1 and

FIG. 3 is a front view of the upper portion of an internal combustion engine as shown in FIG. 1.

The largely sound-proofed crankcase 1 of the internal combustion engine carries the cylinder liner 2 provided with cooling ribs, with the superimposed cylinder head 3 clamped in the direction of the crankcase 1 by means of studs 4 and nuts 5 with hexagonal recesses.

The cylinder liner 2 and the lower portion of the cylinder head 3 are surrounded by the cooling-air baffle 7 provided with a sound-proofing coating 6 and secured both to the crankcase 1 and to the cylinder head 3 with the interposition of sound-proofing packing strips 8.

The fuel reservoir 9 of the internal combustion engine is designed as a sound-absorbing sheathing of the cylinder head 3. As appears in particular from FIG. 2, it surrounds the cylinder head 3 on three sides. For the attachment of the fuel reservoir 9 to the internal combustion engine the former carries alongside its inner rim an angular frame 10 connected with the fuel reservoir 9 by the interposition of a cured rubber shim 11 in such a manner as to produce a sound-absorbing effect. The angular frame 10 is secured to the cylinder head 3 by means of bolts not shown in the drawing.

The chamber above the cylinder head 3 enclosed by the fuel reservoir 9 is closed on top by means of a cover 12 resting with its rim provided with packing strips 13 upon a shoulder of the fuel reservoir 9 and screwed by means of a central clamping bolt 14 with the interposition of a sound-absorbing ring 15 to the cylinder head 3. For the performance of adjustments the top of the cylinder head 3 can be conveniently exposed by loosening the bolt 14 and removing the cover 12.

In the embodiment of the invention illustrated in and by the accompanying drawing, the air filter 16 of the internal combustion engine is also part of the sound-proofing sheathing of the cylinder head 3. For that purpose, the air filter 16 is secured to the side 19 of the fuel reservoir 9 by means of a clamping strip 17 and a clamping bolt 18. Connection between the air filter 16 and the suction socket 20 is provided by means of a rubber sleeve 21 so as to preclude any transfer of engine vibrations to the air filter 16 also in this area.

A number of variants of the embodiments of the invention hereabove described and illustrated in and by the accompanying drawings are possible within the scope of the present invention, particularly as regards the shape of the fuel reservoir which can also be designed as a closed ring.

I claim:

1. An air-cooled internal combustion engine with a sound-proofing sheathing, comprising a fuel reservoir secured to the cylinder head of the engine in such a manner as to provide a means for sound-proofing the same and surrounding the said cylinder head at least on three sides, thereby providing a sound-absorbing sheathing.

2. An air-cooled internal combustion engine according to claim 1, wherein the said sound-absorbing sheathing also surrounds part of the cylinder block of the engine.

3. An air-cooled internal combustion engine according to claim 1, comprising a sound-proofing cover, resting on the said fuel reservoir in such a manner as to provide a means of sound-proofing the said engine and closing the chamber enclosed by the fuel reservoir above the said cylinder head on top of same.

4. An air-cooled internal combustion engine according to claim 1, comprising an air filter secured exclusively to the said fuel reservoir and being part of the said sound-proofing sheathing.

5. An air-cooled internal combustion engine according to claim 1, comprising a cooling-air baffle surrounding

the said cylinder block, the upper rim of the said baffle encompassing the said fuel reservoir, a sound-proofing coating applied to the inner surface of the said baffle, the latter being secured both to the crankcase and to the cylinder head of the engine, sound-absorbing packing strips provided at the upper and lower rim of the baffle between the latter and its point of attachment to the cylinder head and to the crankcase.

References Cited

UNITED STATES PATENTS

1,316,912	9/1919	Marschall	----	123—41.42	XR
1,617,845	2/1927	Hall	-----	123—41.42	
2,413,770	1/1947	Knoy.			
2,676,559	4/1954	Davies.			
3,464,398	9/1969	Scheiterlein et al.			

ROBERT S. WARD, JR., Primary Examiner

U.S. Cl. X.R.

123—195, 198; 180—1, 69