Feb. 26, 1957 J. KREMSER 2,782,776

SCAVENGING AIR HOUSING FOR INTERNAL COMBUSTION ENGINES

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FIG. 1.

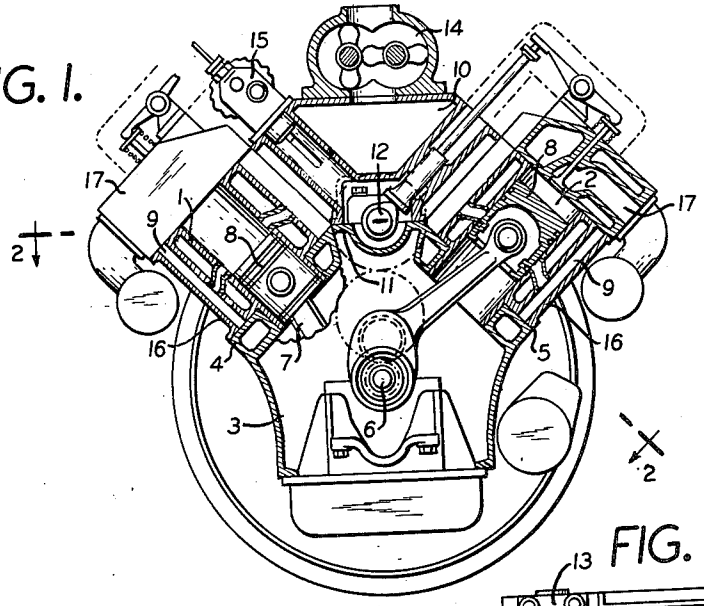


FIG. 2.

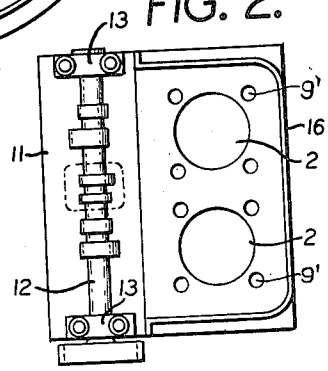
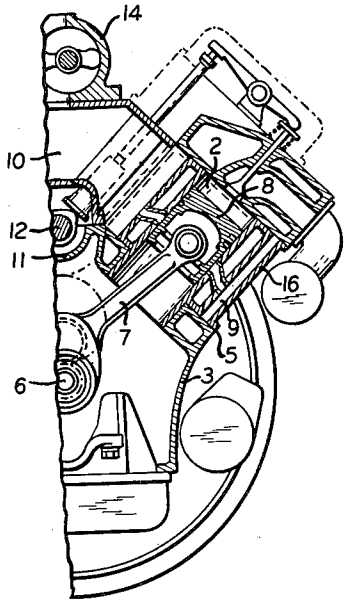


FIG. 3.



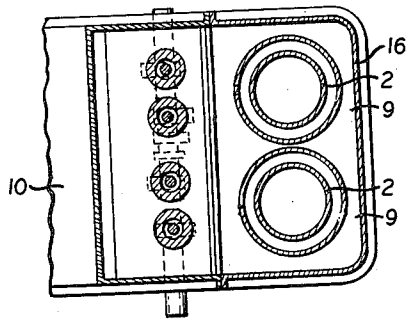


FIG. 4.

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SCAVENGING AIR HOUSING FOR INTERNAL COMBUSTION ENGINES

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7 Claims. (Cl. 123—55)

The present invention relates to a two-stroke cycle engine provided with two cylinder banks which are arranged at a definite angle.

Two-stroke cycle engines are known in which the crank case extends to the bottom side of the cylinder heads, and in which the space formed between both cylinder banks is utilized as a scavenging receiver.

Furthermore, it is known to design a V-type engine with separate cylinder units mounted on the crank case, the scavenging receiver in this case being formed in the crank case and the scavenging air being supplied through the separating surface between the crank case and the cylinder. The design described first is unfavorable in so far as it requires much constructional work and special cylinder sleeves to be inserted into the crank case. Ties have to transmit the forces from the cylinder head to the bearing bridge, the sectional dimensions of said ties being restricted by the scavenging air channels. The crank case may be made of a light metal as, for instance, aluminum. The casting, however, is very complicated. A gray iron cast crank case is too heavy.

The other known design with mounted cylinders has the advantage that the cylinders may all be of the same design which enables a large-scale production. There is, however, the disadvantage that the scavenging air has to be supplied from the narrowed crank case through the separating surface between the crank case and the mounted cylinders, which necessitates the distances between the cylinders in one line to be increased, which results in greater overall dimensions.

It is, therefore, one object of the present invention to provide a two-stroke cycle engine in which the cylinders are individually mounted on the crank case and the scavenging air is supplied from a receiver enclosing the cylinders, said receivers being connected with a center scavenging receiver arranged between the cylinder lines and mounted on top of the crank case. Thus, the scavenging air is not supplied through the separating surface between the cylinders and the crank case as it has been proposed in known structures. A light-weight and inexpensive design is thus achieved by the design of the present invention, and the deficiency of the two known designs, described above, are eliminated.

It is another object of the present invention to provide a two-stroke cycle engine in which a further fitting surface is provided for the center scavenging receiver between the separating surface for the cylinders on the crank case, whereby said fitting surface at the same time is utilized for journalling the cam shaft. The cam shaft is secured in its position in the place of the center fitting surface by means of special bearing caps. The scavenging receiver may be made of light metal and may carry the scavenging blower and the injection pumps. In the area of the bearing for the cam shaft the center scavenging receiver is preferably of tubular shape. Thus, the distance between the axis of the cam shaft and the axis of the crankshaft is fixed.

It is yet another object of the present invention to provide a two-stroke cycle engine in which the lateral scavenging receiver enclosing the cylinders is formed by a C-shaped sheet metal frame which is suitably connected with the center scavenging receiver between the cylinder banks. The top cover of the scavenging receiver is formed by a sealing plate arranged between the cylinder sleeves and the cylinder heads, which is connected with the lateral scavenging receivers as well as with the center scavenging receiver.

The invention may be applied in valve-controlled and in port-controlled two-stroke cycle engines.

With these and other objects in view which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawings, in which:

Figure 1 is a vertical cross sectional view through a two-stroke cycle engine;

Fig. 2 is a cross section along the lines 2—2 of Fig. 1;

Fig. 3 is an axial section through the crank case and one of the cylinders; and

Fig. 4 is a longitudinal section of the cylinder bank.

Referring now to the drawings, the two-stroke cycle engine comprises banks of cylinders 1 and 2 which are arranged at a definite angle. Each cylinder bank comprises, for instance, two cylinders. Said cylinders 1 and 2 are individually mounted on the crankcase 3 by means of bolts 9'. For this purpose the crank case 3 is provided with fitting surfaces 4 and 5. The crank shaft 6 is mounted in the crank case 3 and carries the connecting rods 7 with the pistons 8. Each of the cylinders 1 and 2 is enclosed by a lateral scavenging receiver 9. Said lateral scavenging receivers 9 are connected with a center scavenging receiver 10 formed between the cylinders 1 and 2 and mounted on the crank case 3 by means of conduits. Between the fitting surfaces 4 and 5 for the cylinders 1 and 2 on the crank case 3, a further fitting surface 11 is provided for the center scavenging receiver 10. Said fitting surface 11 at the same time serves as a bearing surface for the cam shaft 12. By means of bearing caps 13 the cam shaft 12 is secured in its position in the plane of the center fitting surface 11 on the crank case. Thus, the cam shaft 12 is journalled on the fitting surface 11, and the distance between the axis of the cam shaft 12 and the axis of the crank shaft 6 is fixed. The center scavenging receiver 10 is formed of a light metal housing. It is provided with the scavenging blower 14 and the injection pumps 15. Preferably the center scavenging receiver 10 is shaped like a tube in the area of the bearing for the cam shaft 12. The lateral scavenging receivers 9, enclosing the cylinders 1 and 2, are formed of a C-shaped sheet metal frame 16 and are suitably connected with the center scavenging receiver 10 arranged between the banks of the cylinders 1 and 2.

The top cover of the scavenging receivers is formed by the cylinder heads 17.

While I have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

I claim:

1. A two-stroke cycle internal combustion engine, comprising a crank case, two rows of cylinders mounted on said crank case in form of a V, a casing mounted on the center part of said crank case between said two rows of cylinders and forming a center scavenging receiver, and a lateral scavenging receiver surrounding each of said rows of said cylinders and removably mounted on said crank case, and each of said lateral scavenging

receivers being connected with said center scavenging receiver between said rows of cylinders.

2. The two-stroke cycle internal combustion engine, as set forth in claim 1, in which said crank case is provided with lateral seats for said cylinders and said lateral scavenging receivers and with a horizontal seat for said center scavenging receiver disposed between said lateral seats.

3. The two-stroke cycle internal combustion engine, as set forth in claim 1, in which said crank case is provided with lateral seats for said cylinders and said lateral scavenging receivers, and with a horizontal seat for said center scavenging receiver disposed between said lateral seats, a cam shaft supported by said crank case and said horizontal seat also forming bearing means for said cam shaft.

4. The two-stroke cycle internal combustion engine, as set forth in claim 1, in which said center scavenging receiver is formed of a sheet-metal casing.

5. The two-stroke cycle internal combustion engine, as set forth in claim 1, in which said lateral scavenging receivers are formed of a sheet-metal housing.

6. The two-stroke internal combustion engine, as set forth in claim 1, in which said lateral scavenging receivers are formed of U-shaped sheet metal housings,

each of said housings encloses one row of cylinders and is in communication with said casing forming the center scavenging receiver.

7. The two-stroke cycle internal combustion engine, as set forth in claim 1, which includes cylinder heads, each of said cylinder heads extends over the corresponding of said lateral scavenging receivers and means for locking said cylinder heads with said crank case, so that said cylinders and said lateral scavenging receivers are held in position on the crank case.

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