Jan. 17, 1928. 1,656,581

C. HANOCQ

TWO-CYCLE MULTICYLINDER INTERNAL COMBUSTION ENGINE

Filed Feb. 12, 1926

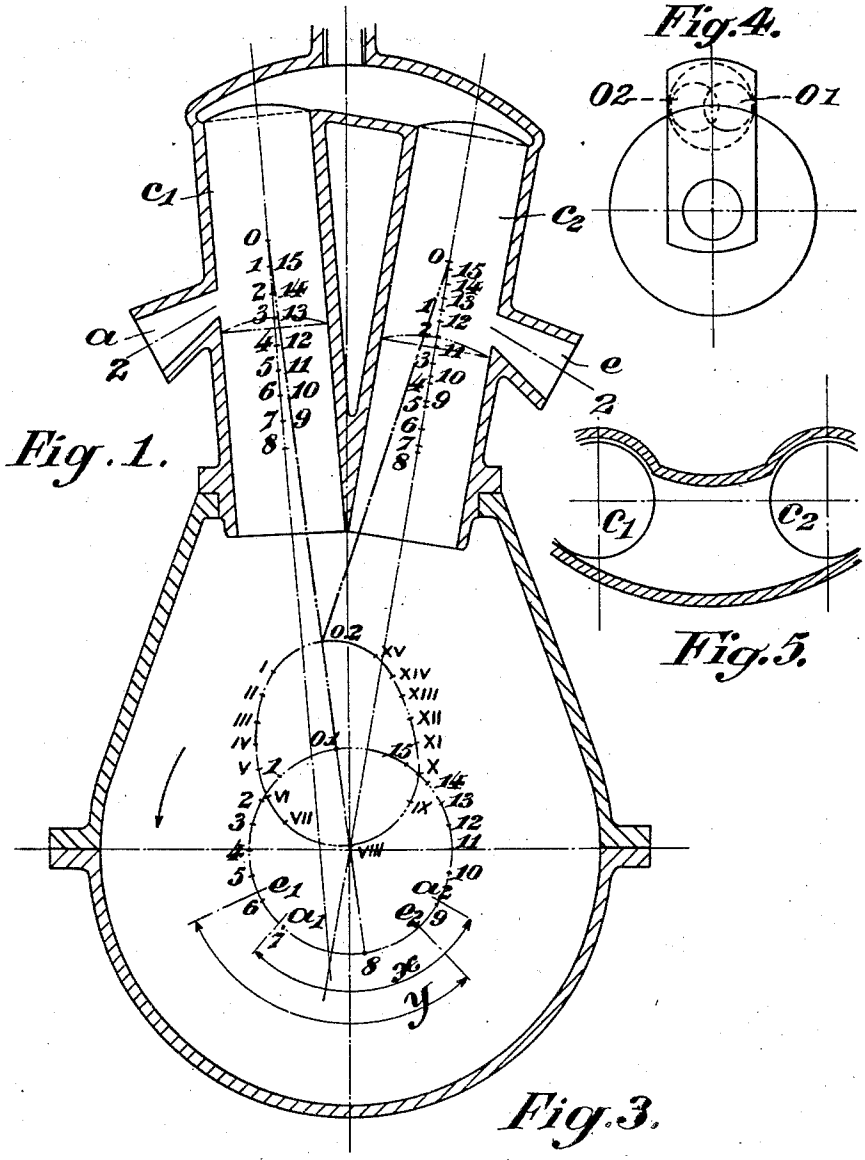


Fig. 1.

Fig. 4.

Fig. 5.

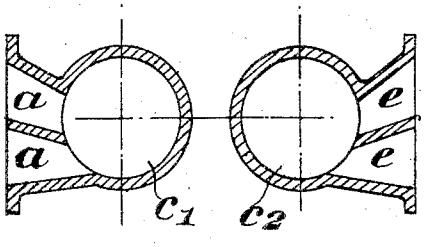


Fig. 2.

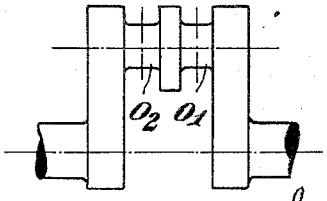


Fig. 3.

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TWO-CYCLE MULTICYLINDER INTERNAL-COMBUSTION ENGINE.

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The present invention consists essentially in providing a multi-cylinder two cycle internal combustion engine having double inclined V cylinders, the axes of which are angularly displaced around the axis of rotation of the crankshaft so that suitable timing is obtained between the admission and exhaust periods, in order to not only enable the cylinders to be well filled without wasting the mixture but also to insure a very perceptible over compression with a sufficiently high inlet pressure. In addition, the inlet and exhaust ports are shaped and placed so as to cause the burnt gas to be scavenged energetically and to produce a rarefaction in the cylinders facilitating the admission of fresh gas.

According to this invention, a main connecting rod connects the piston of one of the double cylinders to the crank pin, while an auxiliary connecting rod connected to the piston of the other cylinder is also connected to the said main connecting rod.

A special crank pin is provided with two journals slightly offset relative to each other, and each connected to one of the two connecting rods.

The examples of forms of construction are represented diagrammatically in the accompanying drawings in which,

Fig. 1 shows a section of a double cylinder engine with two connecting rods connected to the crankpins of the crankshaft.

Fig. 2 is a reduced scale section taken on the line 2—2 of Fig. 1, in order to show the arrangement of the inlet and exhaust ports.

Fig. 3 shows a crankpin with two journals in line for connecting the two connecting rods.

Fig. 4 shows a crankpin with two journals offset relative to each other.

Fig. 5 is a cross section of the common combustion chamber showing the special shape of this chamber facilitating the filling and the scavenging, caused by the whirling motion of the gas.

In the different figures, the same reference letters designate the same or analogous parts.

As shown in Fig. 1, the relative inclination of the axes of the two cylinders forming a V set is selected so as to obtain suitable timing between the admission and exhaust periods, and also so that the point O_2, at which the auxiliary connecting rod from the right-hand cylinder C_2 is pivoted to the main connecting rod from the left-hand cylinder C_1, will be situated as close as possible to the dead center, when the said left-hand cylinder connecting rod is at the top of its stroke. The object of this arrangement is to avoid any appreciable retard in the ignition of the charge in one of the two cylinders of the set considered.

The operating diagram represented in the figure shows how this arrangement enables the exhaust period y to be commenced for the right-hand cylinder C_2 at the point e_1, in the path followed by the crank pin O_1 on the crankshaft, whereas the admission period x, during which the carbureted mixture is drawn in, only commences at A_1.

Because of the angle between the cylinders around the crankshaft axis, the inlet port will be closed at A_2 while the exhaust port will have been shut at e_2.

This not only enables the double cylinder of each set to be very completely filled with gas but also permits a very perceptible increase over compression to be obtained provided that the available admission pressure at the inlet port a be sufficiently high.

The efficacy of the distribution obtained correctly by the combined action of the two pistons forming an angle with each other about the center of rotation is rendered complete by the arrangement and the shape of the inlet and exhaust ports and passages, as shown in Fig. 2. The inlet passage a is composed in this case of two or more converging nozzles, while the exhaust passage e is formed by two diverging nozzles, the said nozzles being directed to the top of the corresponding cylinders and tangentially to its circumference so as to produce a whirling motion of the gas having the effect of facilitating the complete and energetic scavenging of the dead gas. The transverse shape of the head common to the two cylinders in the same set and shown especially in Figure 5 further facilitates the production of such whirling motion.

Under the action of the transformation of the kinetic energy into potential energy, the diverging exhaust nozzles e will have the effect of causing a rarefaction in the double cylinder during the admission period. The entrance of the fresh mixture will thus be facilitated and the pressure required for the admission can be consequently reduced.

The number of inlet and exhaust nozzles *a* and *e* can be as large as is suitable for insuring the best filling and scavenging conditions in each double cylinder.

The two connecting rods are absolutely identical and have a simple shape, but the inconvenience caused by the dead centers not occurring simultaneously for the two pistons may be accentuated. In order to avoid or attenuate the inconvenience of the nonsimultaneous occurrence of the dead centers of the two cylinders the invention provides an arrangement which consists in offsetting one of the parts O_1 of the crank pin shown in Fig. 3 relative to the other part O_2.

Such an arrangement is shown in Fig. 4.

In the case of air cooled engines and principally for engines designed for airplanes, the invention provides that two sets of double cylinders inclined in V and having their axis forming an angle along the longitudinal axis of the crankshaft which will be distributed radially around said crankshaft so as to assure a convenient cooling of all cylinders.

What I claim is:

A two cycle internal combustion engine having two inclined V-cylinders, the axes of which form an angle with each other, a combustion chamber connecting the inner ends of said cylinders, said chamber having a concave side wall and a convex side wall between said cylinders so that a curved passageway is formed by said combustion chamber between the inner ends of said cylinders, one of said cylinders having a plurality of air intake ports arranged tangentially with respect thereto and narrowing toward said cylinder and also inclined toward said combustion chamber, the other cylinder having an plurality of diverging exhaust passages inclined in the opposite direction from said intake ports and also arranged tangentially with respect to the last named cylinder, said intake and exhaust ports and said combustion chamber coacting to cause the gases in said cylinders and combustion chamber to whirl as they pass therethrough.

In witness whereof I affix my signature.

CHARLES HANOCQ.