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BY A. P. C.

V. POGIOLI
VALVELESS ENGINE
Filed June 9, 1941

Serial No.
397,246
2 Sheets-Sheet 1

FIG. 1

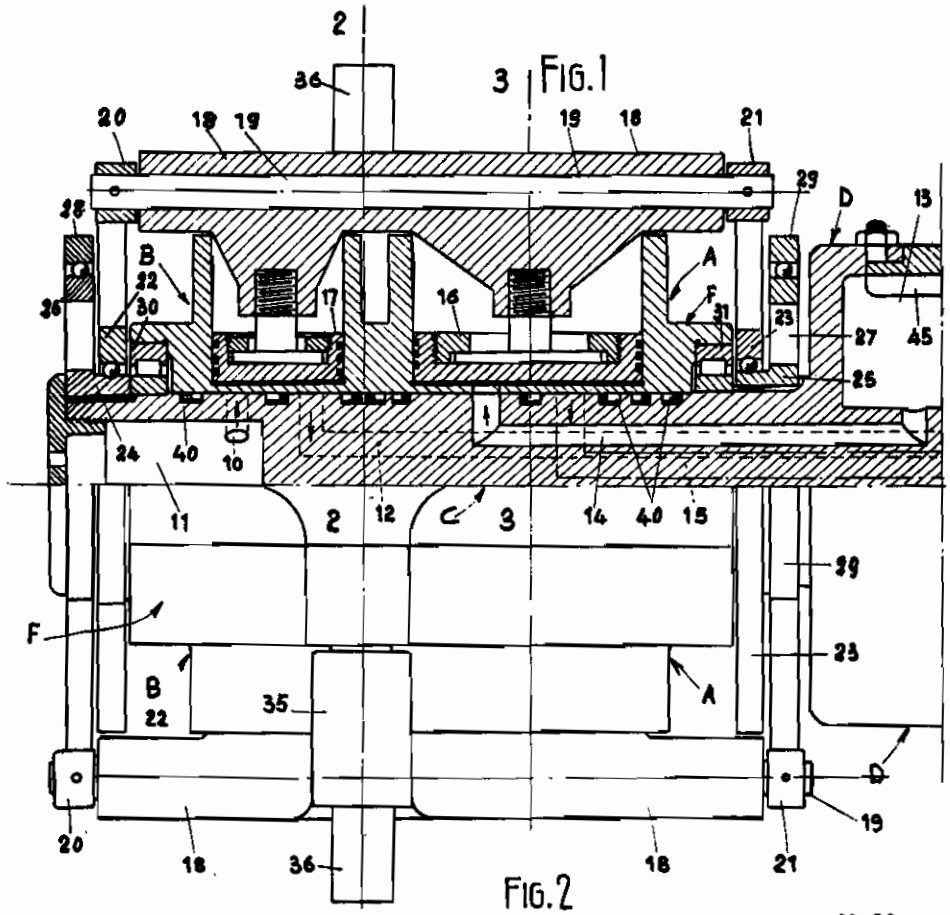

FIG. 2

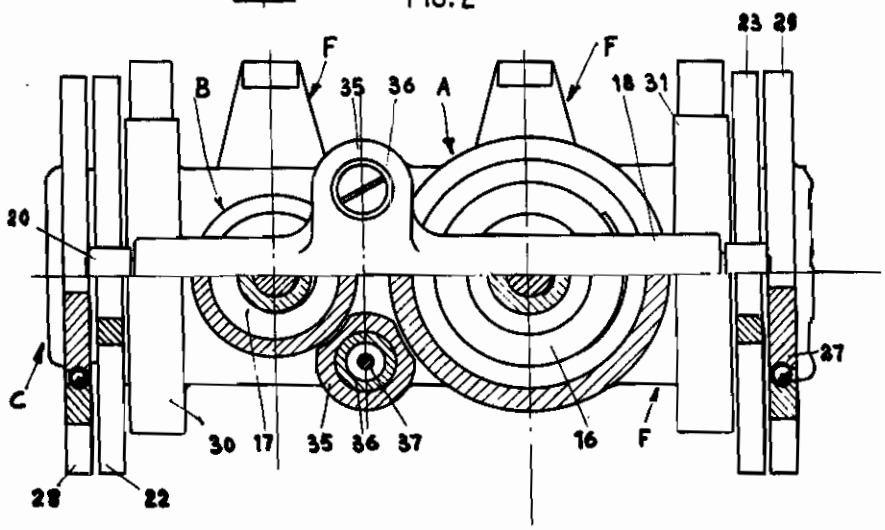

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FIG. 1'

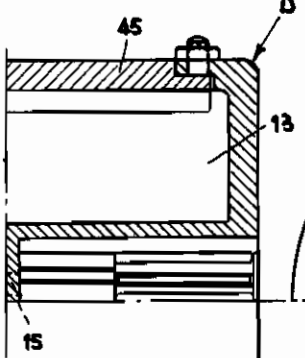


FIG. 3

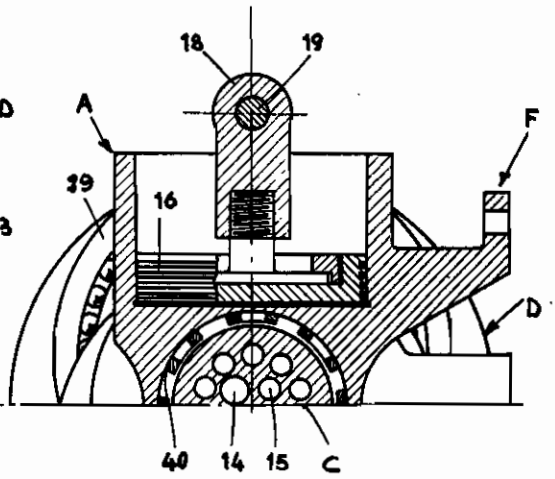


FIG. 4

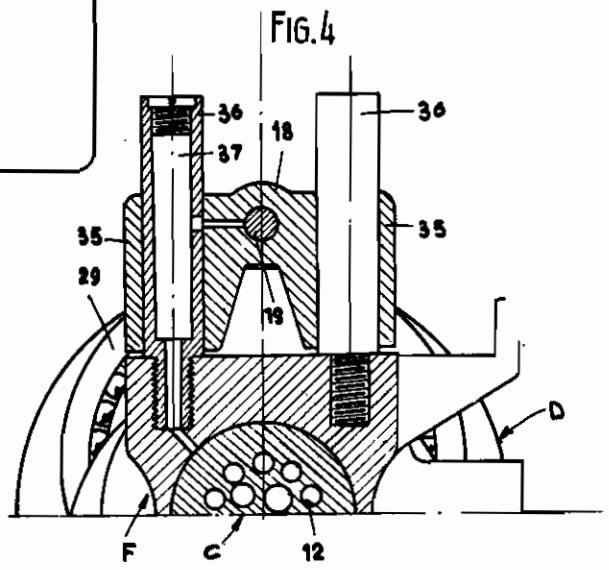
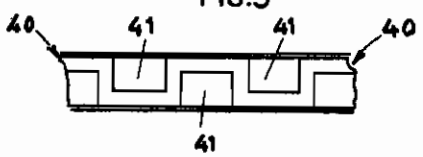


FIG. 5



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ALIEN PROPERTY CUSTODIAN

VALVELESS ENGINE WITH FEEDING CYLINDERS, COMBUSTION CHAMBER AND WORKING CYLINDERS

Vittorio Pogioli, Milan, Italy; vested in the Alien Property Custodian

Application filed June 9, 1941

The subject-matter of this invention is a valveless engine with feeding cylinders, combustion chamber and working cylinders.

The object of the invention is to create an alternating model engine suitable to work with any fuel, by using the increased volumes of fluid by means of the heat generated by the fuel in "optimum" chemical and physical conditions.

For this purpose one or more pistons let the fluid in the chamber where the said fluid acts as fuel by allowing the fuel to be burnt and increasing the volume of the fluid by means of the heat absorbed, and one or more cylinders larger in proportion receive the thrust which is in function with the larger surface on which the fluid acts. In this way the work of compressing air is given to cylinders capable only of doing this.

Combustion takes place in a chamber for this purpose and the work is entrusted to cylinders whose sizes are calculated in such a way as to thoroughly exploit all the calories, which, after having been generated by the combustion, will have increased the volumes of the fluid.

Practically, the highest pressure given by the compressor cylinders is equal to that of the combustion chamber as well as that which acts in the working cylinders.

The ducts in the engine shaft and distributor are arranged in such a way as to interrupt communication with the driving cylinders in the suitable position in which the compressor cylinder passage opens. This is because the quantity of fluid which has penetrated into the working cylinders can spread until the volume and calories are exhausted, and act according to an identical diagram both in the stage of compression as well as in the driving stage.

The invention will now be explained with reference to the annexed drawing which is to be considered only as an indicating example which does not confine the range of the invention in any way.

Fig. 1 is a raised view, half sectioned, of the engine according to the invention, of the type with cylinders set against each other, which is completed by fig. 1' in which the different distribution ducts are considered as being placed on one plane only.

Fig. 2 is a plan with parts in a section.

Figures 3 and 4 are sections on lines 3—3 and 2—2 of fig. 1.

Fig. 5 is a fragment view on a larger scale developed in a plane, of a form of performance of a tight segment for the shaft.

The engine comprises a set of driving cylinders A in line with a second set of compressor cylinders B. These suck the air and the fuel mixture through a duct 10 which puts hollow 11 of shaft C (that can be used if necessary as a filter or purifying chamber) in communication with the operating cylinders B. The air sucked from the latter is compressed in a second duct 12, which runs into a ring shaped hollow 13 formed by a container D, which in the case illustrated, is in one with shaft C. A third duct 14 likewise runs in the aforesaid hollow, that is always worked out in shaft C, which ends in correspondence with the driving cylinders A. A fourth duct 15 joins the said driving cylinders with the outside. The ducts now seen are arranged in shaft C in such a way as to form a determined angle so that when the aforesaid shaft revolves, they make the different cylinders A and B communicate with the respective ducts, thereby having the different driving and operating stages ensue.

The pistons 16 and 17 of each set of cylinders A and B, are coupled to a crosspiece 18 joined in its turn to a cross rod 19 in one with arms 20 and 21. The latter are in one with collars 22 and 23 respectively, which with balls or the like, revolve on eccentrics 24 and 25 cottered on shaft C. To these eccentrics other eccentrics 26 and 27 are in one and they are angularly moved by 180° in regard to the first, which by means of the respective collars 28 and 29 are coupled as mentioned before with the other set of cylinders A and B opposite to that under consideration. Shaft C is supported by roller bearings 30 and 31 in housing F of the engine to which also cylinders A and B are fixed.

The crosspieces 18 comprise side extensions 35, which run on guide rods 36 fixed to the engine's housing. The said rods have axial holes 37 to oil shaft C and extensions 35 by means of auxiliary passage ducts for the lubricating material. Tightness in correspondence with ducts 10, 12, 14 and 15 for shaft C is obtained by means of segments 40 housed in grooves made in the aforesaid shaft. Fig. 5 illustrates a form of performance for these segments, whose tightness is efficient from all points of view, although better lubricating conditions are allowed owing to the recesses 41 made in the outside surfaces of the said rings in order to keep the oil back and thereby have a continuous film of oil which helps for tightness as well as for lubricating.

Chamber D for the mixture calls for a port 45 for cleaning or the like, which can be opened in the inside so that it does not jut out to-

wards the outside during revolving. Means can be provided in the said chamber to help turbulence and mixing of the mixture, as well as means for holding the said mixture foreseen in a suitable position for obtaining a withdrawal of the mixture that does not feel the effects of the centrifugal actions. It is obvious that with the revolving of shaft C, when piston 17 is raised, it sucks air from duct 10, after which this is taken away by cylinder B, and with the latter duct 12 is put in communication; the compression stage then takes place and the compressed fluid is gathered together in chamber D. At the same time piston 18 receives the compressed fluid from the chamber D, and terminates the active stage during which the gases expand. The expanded gases are then expelled from duct 15 to the outside and the cycle is terminated with each revolution of shaft C. The volumes of cylinders A and B are provided for in such a way that the increased air volumes of chamber D are used completely.

With a suitable pitch for cylinders B, the engine can act as a compressor too and by eventually modifying the different communication ducts suitably as well as the cylinders, a gas compressor with steps can be obtained. Valves are done away with in this way and perfect cooling is obtained. The particulars of performance and uses can vary in any way in practice without leaving the range of the invention.

VITTORIO POGIOLI.