Nov. 11, 1924. 1,515,523

C. A. SKÄRLUND

INTERNAL COMBUSTION ENGINE

Filed Dec. 5, 1922

Fig. 1

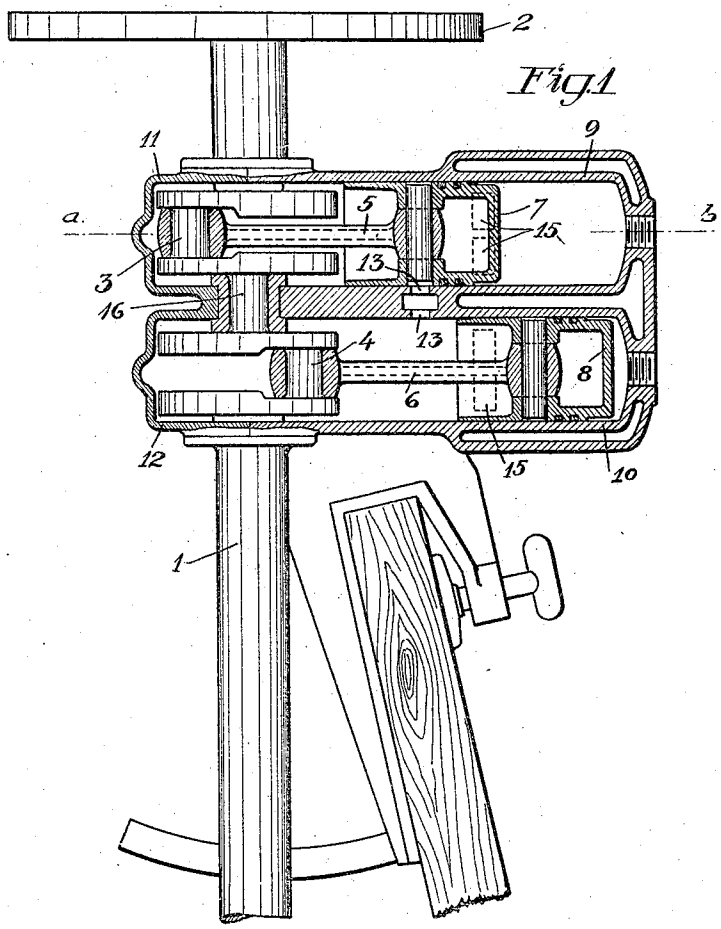


Fig. 2

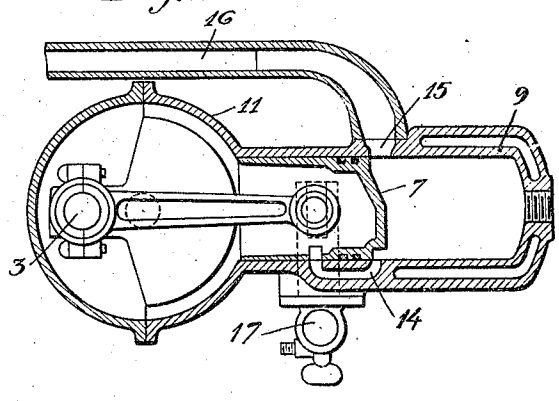
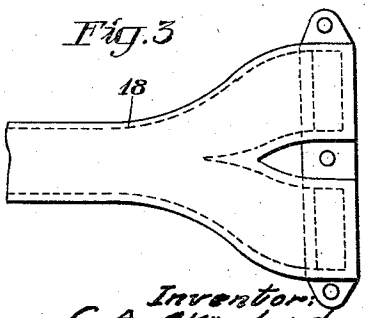


Fig. 3



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UNITED STATES PATENT OFFICE.

CARL AXEL SKÄRLUND, OF STOCKHOLM, SWEDEN, ASSIGNOR TO AKTIEBOLAGET PENTAVERKEN, OF STOCKHOLM, SWEDEN, A CORPORATION OF SWEDEN.

INTERNAL-COMBUSTION ENGINE.

Application filed December 5, 1922. Serial No. 605,096.

To all whom it may concern:

Be it known that I, CARL AXEL SKÄRLUND, a subject of the King of Sweden, residing at Odengatan 58, Stockholm, Sweden, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a specification.

The present invention refers to an arrangement in multiple cylinder two stroke cycle internal combustion motors having the cylinders situated in the same or approximately the same plane, and the object of the invention is to bring about an admission as abundant as possible in the crank casing and, consequently, better scavenging of the cylinders, during the compression stroke of the respective pistons, and also to simplify the arrangement of the carburetter employed in the motor, especially in cases when a so-called valve carburetter is being used, in that the latter need not then be provided with more than one valve, the different pistons of the motor serving alternately as valve members during their movements.

The invention is principally distinguished by the feature that an inlet for gas mixture common to the crank casings opens into adjacent crank casings in such a manner that each motor piston will cover the mouth of the inlet during a portion of its compression stroke, thereby producing vacuum in the crank casing, after which, on the piston having uncovered said mouth, it will suck in gas mixture during the continuation of the compression stroke, which gas mixture is then preliminarily compressed during the power stroke, partly by the closing of a non-return valve situated in the inlet, under the action of the pressure from the crank casing, and partly by the piston corresponding to the other crank casing cutting simultaneously off the latter from the inlet.

A further feature characteristic of the invention is that the outlets for burnt gases from both cylinders are so connected with and branched relatively to each other that gas issuing through the one branch acts ejectingly with respect to the other branch, thereby facilitating scavenging of the cylinder corresponding to the said other branch.

The accompanying drawing illustrates an embodiment of the invention. Fig. 1 shows, partly in elevation and partly in vertical section, a two-cylinder tiller motor arranged according to the invention. Fig. 2 is a horizontal section on line *a*—*b* in Fig. 1, and Fig. 3 represents the arrangement of the outlets from the two cylinders.

1 is the vertical motor shaft with the flywheel 2 and the cranks 3 and 4 forming an angle of 180 degrees between them. 5 and 6 are the connecting rods, and 7, 8 the pistons of the cylinders 9 and 10 respectively, which cylinders are arranged the one above the other on the same side of the motor shaft 1. According to the drawing, the cylinders are cast in one piece. Arranged in the partition between the two crank casings 11 and 12 are the ports 13 through which the inlet for the gas mixture communicates with the two crank casings. Arranged in the inlet 17, at a suitable distance outside the ports 13, is a non-return valve, in such a manner, that it may open under a pressure acting from the outside, but not under the pressure acting from within the crank casings.

Starting from the position where one of the pistons 7 or 8 begins its stroke in a direction from the crank shaft 1, there will be produced a vacuum in the crank casing 11 or 12 during the progress of the piston, until the latter has reached a position where it uncovers the corresponding port 13 communicating with the carburetter. The valve situated in the carburetter or between the carburetter and the motor will then open through the atmospheric pressure, and gas mixture is admitted into the crank casing. During this portion of the stroke, the motor thus operates according to the so-called three-passage system. During the continuation of the progress upwards of the piston, gas mixture is sucked in from the carburetter until the piston has reached its uppermost position. Now the non-return valve closes, and the gas mixture cannot escape from the crank casing through the valve out in the open air, nor can it flow into the other crank casing because the other piston covers the port thereof. Consequently, the gas mixture is preliminarily compressed during the stroke of the piston toward the crank shaft. When the piston performing the power stroke covers its port in the cylinder, the other crank casing has been brought in communication with the carburetter in the same way, and the same cycle of operations is repeated.

The last described-arrangement has the

advantage that only one non-return valve need be provided between the motor and the carburetter thereof, instead of, as otherwise, two valves, and if it is desired to use the so-called valve carburetter common in tiller motors, such valve carburetter may be provided with a single valve instead of with double valves. Moreover, the considerable advantage is attained that the admission to each crank casing will be more complete and that the difference in pressure between the crank casings will not be so great that the gas mixture is apt to be forced through the bearing 16 from the one crank casing to the other.

Each cylinder is provided with an outlet 15 which, on the power stroke having been completed, is uncovered by the piston. According to the invention, both outlets 15 communicate with a common exhaust pipe 18 which is forked in the two outlets 15, in the manner shown in Fig. 3, so that burnt gases from the one cylinder issuing through the one branch act ejecting with respect to the other branch, whereby a suction is produced in the cylinder corresponding to this branch, which suction will greatly facilitate scavenging of the cylinder so that remainders of burnt gases in the cylinder will be entirely removed.

What I claim as new and desire to secure by Letters Patent of the United States of America is:—

1. A multiple cylinder two stroke cycle internal combustion motor, wherein an inlet for gas mixture common to the crank casings opens into adjacent crank casings in such a manner that each motor piston will cover the mouth of the inlet during a portion of its compression stroke, thereby producing vacuum in the crank casing, after which, on the piston having uncovered said mouth, it will suck in gas mixture during the continuation of the compression stroke, which gas mixture is then preliminarily compressed during the power stroke, partly by the closing of a non-return valve situated in the inlet, under the action of the pressure in crank casing, and partly by the piston in the other crank casing simultaneously cutting off the latter from the inlet.

2. A multiple cylinder two stroke cycle internal combustion motor as claimed in claim 1, wherein the outlets for burnt gases from two adjacent cylinders are connected with an exhaust pipe common to both outlets, said exhaust pipe being bifurcated into the two outlets not only so that gas issuing through the one branch from the one cylinder will act ejectingly in the other branch for the purpose of scavenging the cylinder corresponding to the said branch, but also symmetrically so that the said ejecting action will be equally powerful for both cylinders.

In testimony whereof I affix my signature in presence of two witnesses.

CARL AXEL SKÄRLUND.

Witnesses:
ERIC HALGER,
L. BERG VON CHIEDE.