

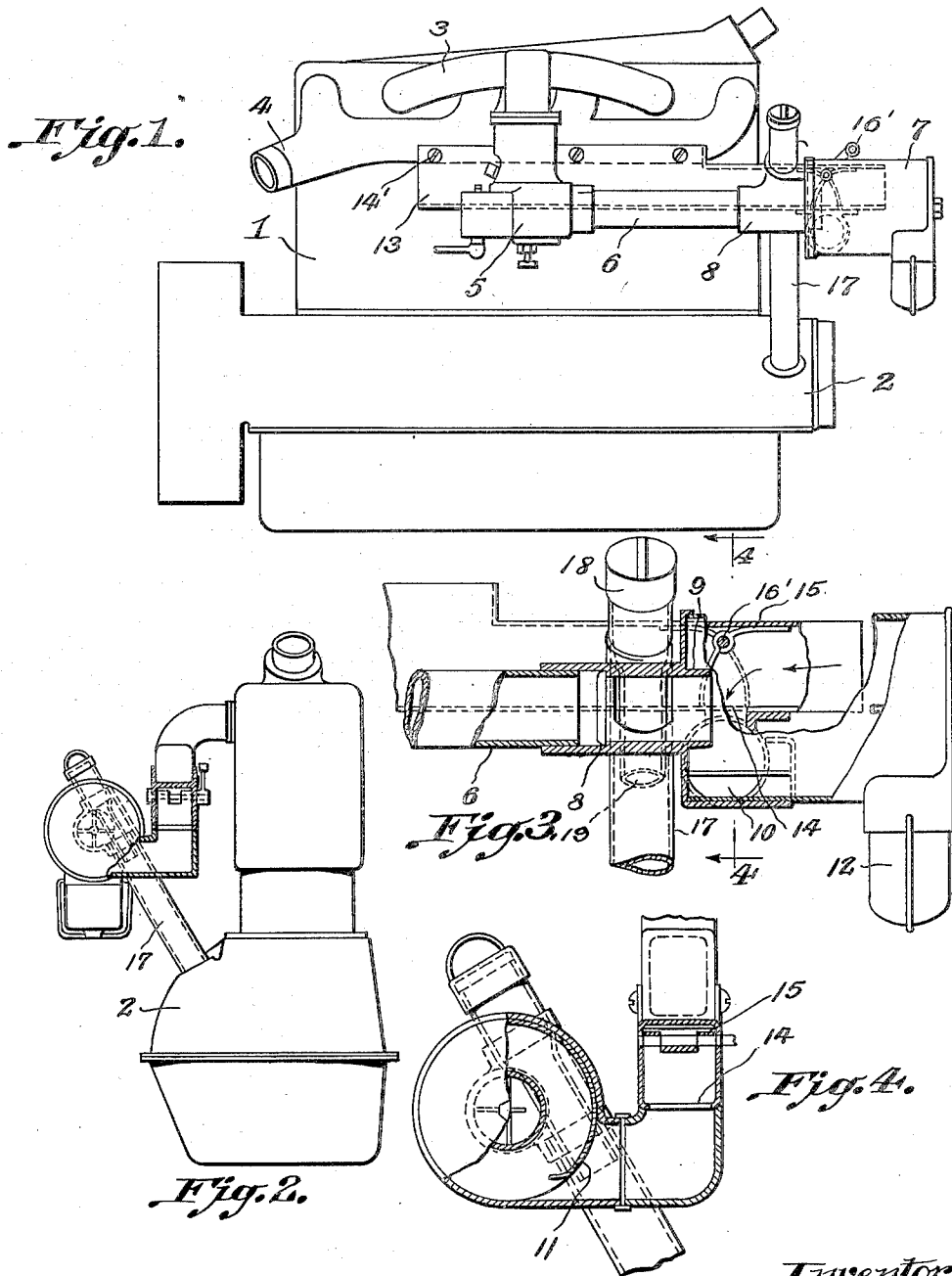
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COMBINED AIR CLEANER, OIL FILLER, AND CRANK CASE BREATHER

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COMBINED AIR CLEANER, OIL FILLER, AND CRANK-CASE BREATHER.

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This invention combines an air cleaner, an oil filler, and a crank case breather.

It is an object of the invention to associate an air cleaner with an air heater in such a way that cold air or warm air may be admitted to the air cleaner at the will of the operator.

As a further object the invention aims to afford a ready means of escape for the gases in the crank case to the carbureter.

The invention also has for an object to provide an oil filler delivering oil through the breather tube to the crank case, although the breather tube also serves as a conduit for crank case gases passing to the intake of the motor.

A further object is to combine these several instrumentalities in a simple structure which shall be efficient in serving its purpose and also economical in manufacture.

The invention will be understood from the following specification and the accompanying drawing.

In the drawings, Fig. 1 is a side view of an explosive motor provided with the accessories comprising the invention;

Fig. 2 is an end view of the motor;

Fig. 3 is a side view, parts broken away and parts in section;

Fig. 4 is a vertical section on line 4-4 of Fig. 3.

Referring to the drawing, numeral 1 represents, in a conventional way, a gas engine, its crank case being represented by numeral 2. The intake manifold is shown at 3, the exhaust manifold at 4, and 5 is the carbureter, the latter communicating with the intake manifold. A pipe 6 connects the carbureter with an air cleaner designated as a whole by numeral 7.

The air cleaner in its intermediate portion is of generally circular shape. It has a head 8 in the form of a casting having a reduced end for a connection with pipe 6 as clearly shown in Fig. 3. The head 8 is also provided with an internal tubular extension within the outer wall of the cleaner as shown at 9. At the lower part of the cleaner a circular opening as at 10 is provided for the entrance of air into the cleaner, and extending across and beyond this opening is a curved plate 11. This structure causes the air entering the cleaner to travel tangentially and to form a whirl moving along the circular wall of the air cleaner.

The particles of dust coming in with the air are separated from the air and collected in the dust trap 12 at the end of the cleaner opposite the head 8. The air thus freed from dust leaves the cleaner through the opening 9 in head 8, and passes to the carbureter by way of the pipe 6.

In supplying air to the air cleaner, an arrangement is made whereby the air may be taken from the atmosphere or the air may be first warmed by being taken from position in proximity to the exhaust manifold. To that end a pipe, stove or heater 13 is shown connected to the exhaust manifold by fastening means 14. This pipe is extended to a point just back of the air cleaner as perhaps best shown in Fig. 3, where the air cleaner is broken away to show the end of the heater pipe behind it. Near its open end, adjacent the cleaner, it is provided with an opening 14 in its lower wall communicating with an elbow at the inlet of the air cleaner. Within the said end of pipe 13 and above the opening 14 is a valve member 15 carried on a pivot 16, there being an operating arm 16' for said valve at the end of the pivot 16. As seen in Fig. 3, the valve in one position permits cold air from the adjacent open end of pipe 13 to enter the air cleaner. When the valve is turned to its opposite or dotted line position, as shown in Fig. 3, the cold air opening is closed and the cleaner receives warm air from the stove or pipe 13, i. e., from the part of pipe 13 situated in the vicinity of the exhaust manifold. It is possible to clean either the cold air or warm air with this arrangement of cleaner and heater.

A breather pipe 17 extends upwardly from the crank case. It is well known that in the heated condition of a gas engine much volatile gas is wasted through this breather pipe. By the structure now to be described this waste is prevented. The head 8 of the air cleaner in addition to being axially bored for engagement with pipe 6 is also transversely bored to snugly receive the end of the breather pipe 17. The upper end of this last named opening receives an oil filler pipe 18 which is reduced in diameter as shown at 19 within the casting 8 and is extended to enter the upper end of the breather pipe 17. This second opening in the casting 8, into the ends of which the breather and filler pipe are admitted, intersects the axial

opening in part 8 so that an air passage is afforded into pipe 6 from the breather pipe 17 by way of the annular space around the reduced end of the oil filler pipe 18.

5 With the structure as above described, it will be seen that a continuous passage is made use of from the heater to the carbureter. In the several portions of this pas-
 10 sage air is heated, cleaned from sediment and mixed with crank case gases. Also at that portion of the passage where the crank case gases are admitted, provision is made for the introduction of oil to the crank case by way of the breather pipe, without danger
 15 of oil being admitted to the passage from the breather to the carbureter air intake.

The structure will be seen to be very simple, requiring little more than a few pipe elements and a special air cleaner cover, which latter is provided with two intersecting passageways. The construction, simple as it is, nevertheless performs its several functions very efficiently.

What I claim is:

25 1. In an explosive motor, the combination of an intake conduit, an air cleaner associated therewith, a breather pipe affording communication between the motor casing and the intake conduit, an oil filler tube in
 30 axial alignment with the breather conduit, the filler tube being of smaller diameter than the breather pipe and extending into the breather pipe beyond its point of communication with the intake conduit.

35 2. An air cleaner for an explosive motor including a head for one end of the cleaner, the head having an axial passage for attachment to an air inlet for the motor, a second passage in the head at an angle to
 40 the first passage, said passages intersecting each other, a breather connecting the motor casing to the second passage-way.

45 3. In an air cleaner, breather and oil filler combination, an air cleaner, a head for one end of the cleaner, the head having an axial passage affording an outlet communication from the air cleaner to the motor intake, the head also having a transverse pas-
 50 sage intersecting the axial passage, a crank case breather connected to one end of the transverse passage, and an oil filler pipe connected to the other end of the transverse passage.

55 4. A combination as set forth in claim 3 wherein the oil filler pipe is of smaller diameter than the breather pipe, and extends into the breather pipe, thereby permitting the introduction of oil from the oil filler pipe through the breather pipe and into the
 60 crank case, and also the passage of crank case gases from the crank case, through the breather, around the extended end of the oil filler pipe and into the motor intake pipe.

65 5. In combination, a heater, an air cleaner,

means admitting cold air or air from the heater to the air cleaner, a tube connecting the outlet of the cleaner with a gas engine, a breather connecting the crank case with the cleaner outlet, and an oil filler positioned
 70 so as to pass oil into the crank case by way of the breather without entering the passage affording communication between the breather and the motor intake.

6. In a gas engine, a carburetor, a continuous air conduit leading into the carburetor comprising a portion for heating the air, a portion for cleaning the air, a portion wherein volatile gases from the crankcase are mixed with the air, and means associ-
 80 ated with the portion wherein the volatile gases are admitted to the conduit to provide for the introduction of oil to the crankcase.

7. In an internal combustion engine having a conduit for the exhaust gases, an open-
 85 ended air heater associated with and extending longitudinally of and at one end beyond the exhaust conduit, an air cleaner, means for conducting air from adjacent the extended end of the conduit to the air in-
 90 take of the air cleaner, a valve in the air heater whereby either end of the conduit may be opened to said means.

8. In an internal combustion engine having an exhaust manifold, means to conduct
 95 either hot or cold air to the carburetor including a conduit extending longitudinally of and secured to the manifold and extending at one end beyond the manifold, means for conducting air from adjacent the ex-
 100 tended end of the conduit and a valve in the conduit whereby either end of the conduit may be opened to said means.

9. In an internal combustion engine having an exhaust manifold, means to conduct
 105 either hot or cold air to the carburetor including a conduit extending longitudinally of and secured to the manifold and extending at one end beyond the manifold, means for conducting air from adjacent the ex-
 110 tended end of the conduit and a valve in the conduit whereby the air leaving the conduit can be taken from either end of the conduit or from both ends in any desired proportion.

115 10. In combination, an intake conduit and a breather pipe, said breather pipe having an opening in its side between its end communicating with the intake conduit and an oil filler tube located to discharge oil into
 120 the breather pipe below the opening therein.

11. In combination, an intake conduit and a breather pipe, said breather pipe having an opening in its side communicating with the intake conduit and an oil filler tube lo-
 125 cated to discharge oil into the breather pipe below the opening therein.

In testimony whereof I affix my signature.

CHARLES R. SHORT.