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ENGINE COWL AND MAGNETO VENTILATION SYSTEM

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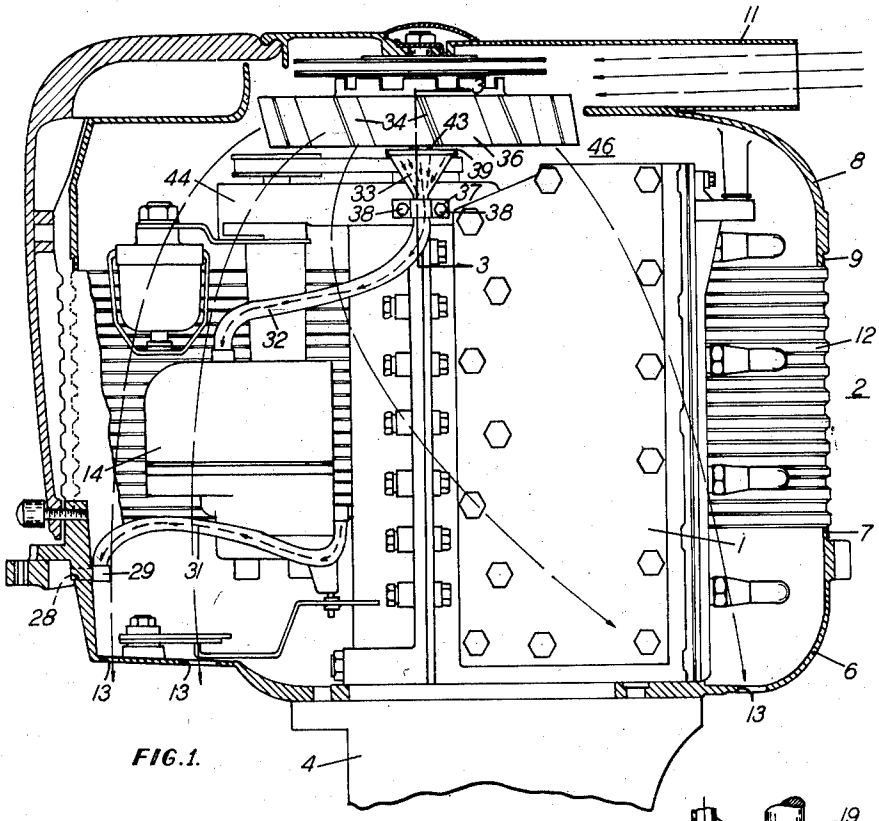


FIG. 1.

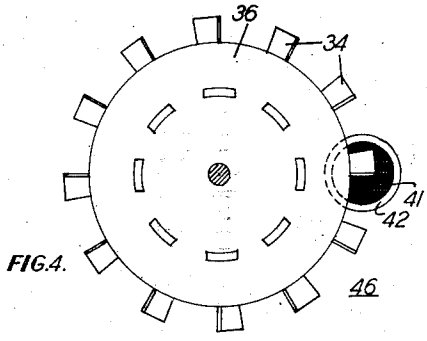


FIG. 4.

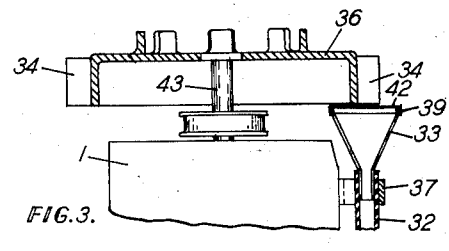


FIG. 3.

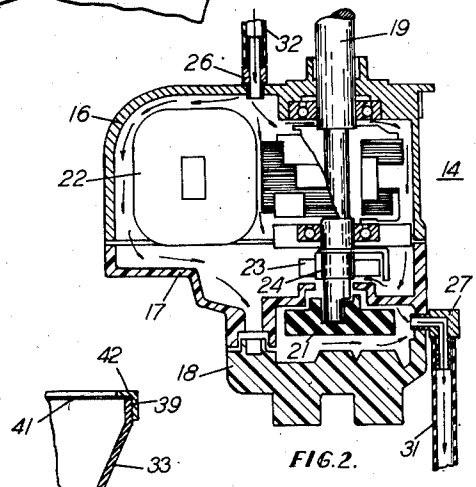


FIG. 2.

FIG. 5.

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ENGINE COWL AND MAGNETO VENTILATION SYSTEM

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3 Claims. (Cl. 123—198)

This invention relates generally to internal combustion engines and more specifically to an improved cowl and magneto ventilation system for an internal combustion engine encased within a relatively air tight cowl.

Internal combustion engines are normally provided with a cowl encasing the engine to protect it from rain and other foreign matter and to present a pleasing streamlined appearance. Where the cowl is constructed to be relatively air tight, that is normally provided with air openings of capacity to admit only a sufficient quantity of air into the engine for combustion purposes without restricting engine breathing, there is a possibility that a mixture of gas and air will accumulate within the cowl as a result of blow back and gas leakage out of the carburetor. This mixture of gas and air if correctly proportioned will explode when ignited by a spark from the electrical ignition system.

The internal combustion engine is normally equipped with an electrical ignition system in which the high potential current flashes or sparks passing between the distributor rotor contact and the successive distributor contacts controlling the current flow to the spark plugs of the engine's cylinders apparently breaks down the surrounding air and generates nitric oxide and ozone fumes in substantial amounts. Venting means are provided to remove the nitric oxide and ozone fumes from the electrical ignition system to prevent any deleterious effect that the fumes may have upon the bearings and other parts of the ignition system.

It is therefore an object of the present invention to provide an improved cowl and magneto ventilation system for an internal combustion engine for eliminating the explosive and fire hazard resulting from the accumulation of gas and air mixture within the cowl.

Another object of the invention is the provision of an improved cowl and magneto air vent for an internal combustion engine for removing the nitric oxide and ozone fumes formed by the electric ignition system.

Objects and advantages other than those set forth above will be apparent from the following description when read in connection with the accompanying drawing, in which:

Fig. 1 is a segmental side elevation view of an outboard motor comprising an internal combustion engine encased within a cowl and embodying applicant's invention;

Fig. 2 is an enlarged side elevation view in section of the magneto shown in Fig. 1;

Fig. 3 is a section view taken along line 3—3 of Fig. 1 showing the flywheel fan and the funnel-shaped opening leading to the magneto;

Fig. 4 is a plan view of Fig. 3; and

Fig. 5 is a fragmentary view of the funnel-shaped member showing how the screen is fastened thereto.

As shown in the drawings, a preferred embodiment of this invention is illustrated as applied to an internal combustion engine 1 encased within a cowl 2 as embodied in an outboard motor, only a portion of which is shown. The engine 1 is mounted on a drive shaft housing 4 and the cowl 2 has a lower part 6 in the form of a generally

upwardly dished member mounted between the housing 4 and the engine 1. The lower part 6 is provided with an annular flange 7 along the top thereof. The upper part 8 of the cowl 2 is mounted to the engine 1 and forms a cover therefor, and is also provided with an annular flange 9 along the bottom thereof registering with the annular flange 7 of the lower part 6. The upper cowl 8 further forms a rearwardly extending and inwardly tapering conduit 11 to form an air passage means. An intermediate part 12 of the cowl 2 which is rectangularly shaped is wrapped around the lower and upper parts 6, 8 with the edges thereof supported by the flanges 7, 9 and mating therewith to enclose and protect the engine 1. The ends, not shown, of part 12 are spaced from one another to form an air opening and are joined together by some suitable fastening means, not shown. The lower cowl 6 also forms openings 13 therein to provide an air passage means. The cowl 2 with slight modifications forms the subject matter of applicant's pending application Serial No. 455,492, now Patent No. 2,756,736, and is described in detail therein.

An electrical ignition system for the engine 1 comprises a magneto 14 formed essentially of a housing 16, an end cap 17 mounted on the housing 16 by any suitable means such as screws, not shown, and a distributor cap 18 mounted on the end cap 17 by any suitable means. The housing 16 and end cap 17 carry a magneto shaft 19 upon which is mounted a rotor 21 adapted to coact with a coil 22 upon rotation of the magneto shaft 19. The end cap 17 and distributor cap 18 form a cavity within which the distributor rotor 21 is disposed and mounted on the end of the magneto shaft 19 for rotaton therewith. Breaker points 23 shown diagrammatically are carried by the end cap 17 actuable by a cam 24 mounted on the magneto shaft 19. During rotation of the magneto shaft 19, the distributor rotor 21 acts as a centrifugal blower assisting in moving the air and gases out of the distributor housing 16. In the distributor ventilation system of this invention, the housing 16 and end cap 17 form tapped openings into which threaded ends of fittings 26, 27 respectively are tightly screwed therein. The other end of each of the fittings 26, 27 is provided with a hose engaging portion. The lower cowl member 6 also forms a tapped opening 28 therethrough shown dotted in Fig. 1 into which the threaded end of fitting 29 similar to the aforementioned fitting 27 is tightly screwed. A flexible conduit 31 constructed of a fire resistant material forms a magneto air passage means and has one end fastened to the hose engaging end of the fitting 29 carried by the lower cowl member 6 and the opposite end connected to the corresponding hose engaging end of the fitting 27 carried by the end cap 17. Another flexible conduit 32 similar to conduit 31 forms a magneto air passage means and has one end fastened by any suitable means to the hose engaging end of the fitting 26 carried by the housing 16, and the other end is fastened to a funnel-shaped member 33 positioned adjacent to and in register with fan blades 34 of a flywheel 36, and mounted to the engine 1 by means of a clamp 37 and screws 38. The funnel-shaped member 33 is provided with a peripheral rim 39 upon which a screen 41 is disposed and held in position by means of an annular cover 42 as shown in Fig. 5. The screen 41 furnishes an effective barrier against the passage of flame from within the magneto 14 through the conduit 32 and member 33 thereby preventing ignition of the fuel-air mixture within the cowl 2.

The internal combustion engine 1 is of the normal type having a crankshaft 43 carried by the crankcase 44 and extending therethrough at one end to provide a support for the flywheel 36 which is secured to the crankshaft 43 by any suitable means. The flywheel 36 is provided with air moving means comprising a plurality of the fan

blades 34 to form a blower 46 which in operation forces air through the cowl 2 in one of two possible directions depending on the manner in which the fan blades 34 are positioned on the flywheel 36. Where the blades 34 are positioned, as shown in Fig. 1, the blower 46 draws fresh air into the cowl 2 through the conduit 11 and develops a positive pressure forcing air contaminated with gas out of the cowl 2 through the openings 13 to vent the cowl. A portion of the positive pressure developed by the blower 46 forces air through the conduit 32 and the magneto 14 to atmosphere causing the nitric oxide and ozone fumes developed by the distributor rotor 21 to be expelled therefrom. The operation of the blower 46 with the fan blades 34 reversed develops a low pressure area at the lower surface of the flywheel 36. The difference in pressure existing between atmospheric pressure and the low pressure area causes air to be forced into the cowl 2 through the openings 13 and expelled from the cowl through the conduit 11 by the blower 46 to vent the cowl 2. This pressure difference also forces air from atmosphere through the hose 31, cavity within caps 17 and 18, housing 16, hose 32, and member 33 to the low pressure area of the blower 46 to vent the magneto 14.

Although but one embodiment has been illustrated and described, it will be apparent to those skilled in the art that various changes and modifications of the invention may be made without departing from the spirit of the invention or from the scope of the appended claims.

It is claimed and desired to secure by Letters Patent:

1. In combination in an internal combustion engine having a carburetor and a magneto and enclosed in a substantially airtight cowl, air inlet and air outlet means for the cowl, air impelling means within the cowl and actuated by the engine to force the circulation of air through the cowl from said air inlet means to said air outlet means, a separate housing forming a chamber for the magneto within the cowl, air passage means connecting one side of the chamber formed by said magneto housing to a port through the cowl, and an air passage means connecting the opposite side of the chamber formed by said magneto housing to the space adjacent said air impelling means, whereby said magneto and said carburetor are effectively separately vented by the same air impelling means and objectionable gas mixtures are avoided within the cowl.

2. In combination in an internal combustion engine having a magneto and enclosed in a substantially airtight cowl, a housing for the magneto within the cowl, air passage means connecting the housing to a port through the cowl, air impelling means within the cowl and operated by the engine, an air port in the cowl adjacent said air impelling means, and air passage from said magneto housing to adjacent said air impelling means whereby said impelling means effects circulation of air through said magneto housing from outside the cowl, and a screen over the mouth of said last-named air passage adjacent said air impelling means.

3. In combination in an internal combustion engine having a carburetor and a magneto and enclosed in a substantially air tight cowl, a flywheel for the engine and disposed near the top of the cowl on a vertical axis, an air inlet opening through the wall of the cowl adjacent and above said flywheel, fan blades on said flywheel directed to pull air through said opening and force the same downwardly into the space in the cowl, air discharge ports at the bottom of the cowl, a housing for the magneto within the cowl, an air passage having a funnel-shaped mouth adjacent and beneath said fan blades to receive air therefrom and discharging into said magneto housing, and air discharge passage from said magneto housing to a port in the cowl, and air discharge openings in the bottom of the cowl, whereby air is separately circulated about the carburetor and through said magneto housing and separately discharged from the cowl without mixing.

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