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2,664,862

SHUTTER MOUNTING FOR ENGINE COOLING SYSTEMS

Filed Sept. 1, 1951

2 Sheets-Sheet 1

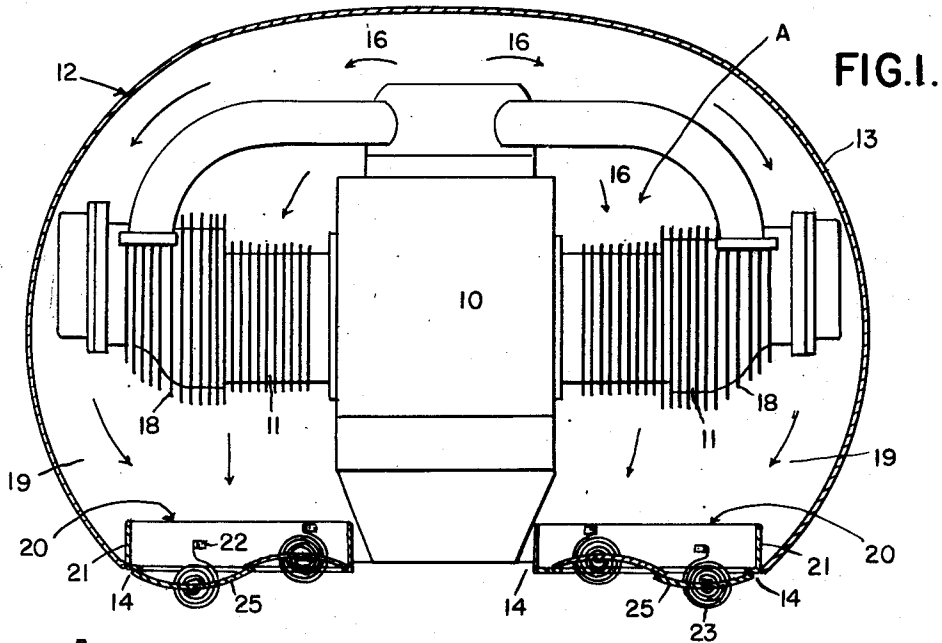


FIG. 1.

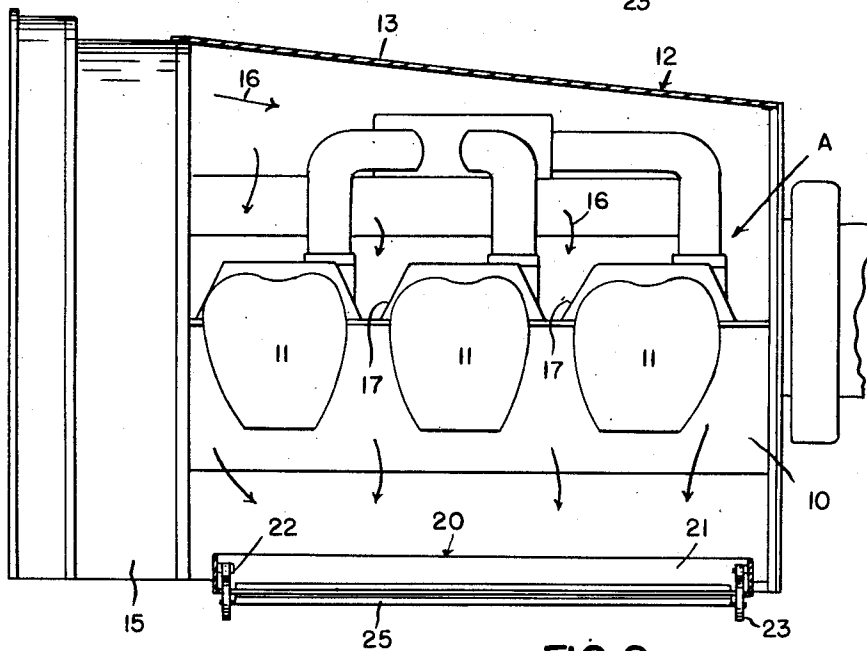


FIG. 2.

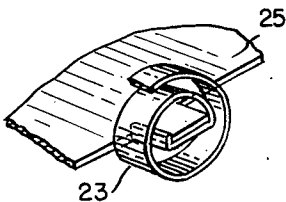


FIG. 6.

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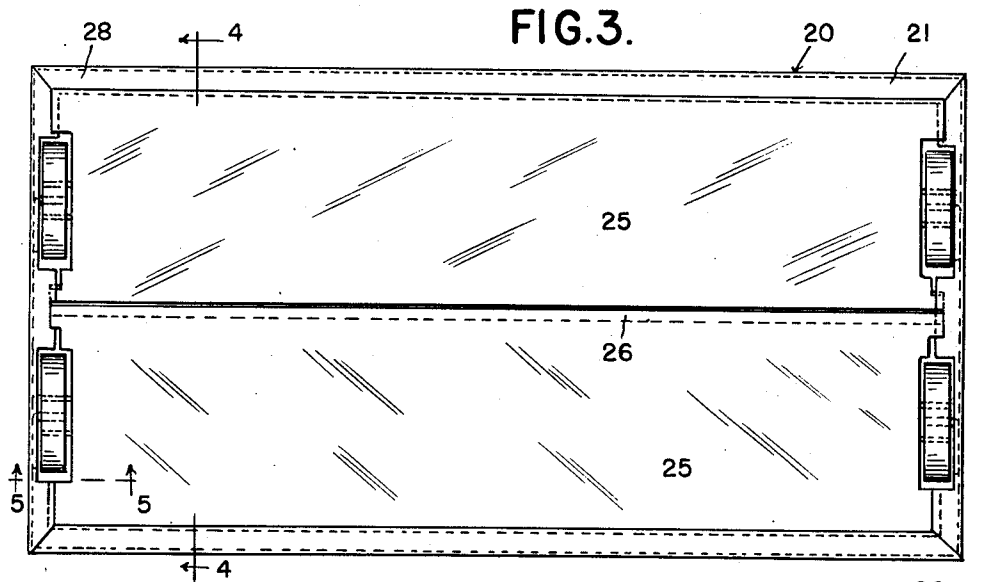
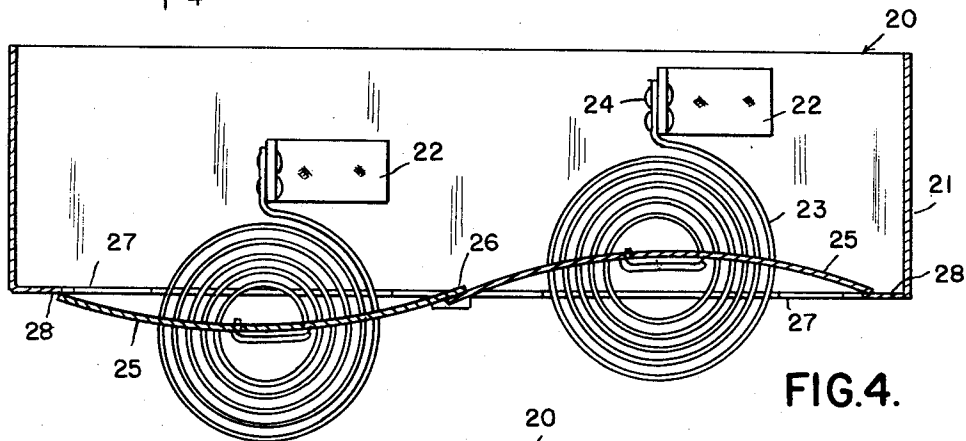
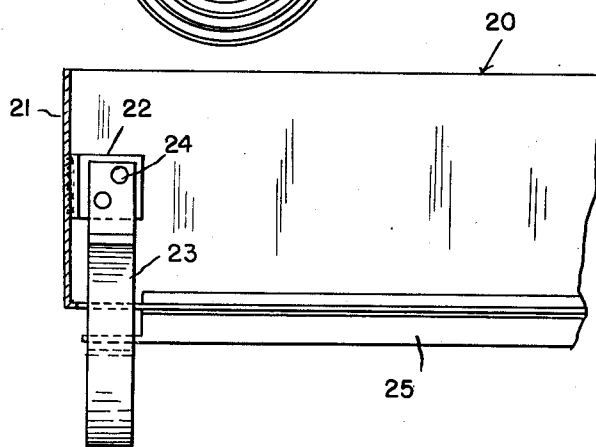
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SHUTTER MOUNTING FOR ENGINE COOLING SYSTEMS

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2 Sheets-Sheet 2



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SHUTTER MOUNTING FOR ENGINE
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4 Claims. (Cl. 123—41.04)

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My invention relates to internal combustion engines and more particularly to an air cooling system for such engines and to an improved control of the flow of the cooling fluid about said engine.

The control of air flow over an air cooled internal combustion engine has been the subject of numerous experiments, all seeking to provide a better control but at the most economical manufacturing cost.

An object of my present invention is to obtain an efficient cooling system construction for an air cooled internal combustion engine with a minimum of manufacturing expense by providing an automatic thermal control therefor, and more especially to an improved means for mounting adjustable shutters controlling the one or more air outlet openings.

More particularly, it is the object of my present invention to facilitate the manufacture and maintenance of the cooling system control by mounting the adjustable shutters controlling the one or more air outlet openings on means operable in response to temperature changes of the cooling medium at the outlet, said means comprising the sole support for said shutters, the said unit adjustable shutter and its support being readily assembled and disassembled from the engine with a minimum of time and labor, thereby materially facilitating the servicing of said engine.

For a more detailed understanding of my invention, reference may be had to the accompanying drawings illustrating a preferred embodiment thereof in which like characters refer to like parts throughout the several views, and in which

Fig. 1 is a transverse vertical sectional view through the power plant incorporating my improved air flow control and showing same in section and associated with multicylinder engine having horizontally opposed cylinders and shown in end elevation;

Fig. 2 is a longitudinal vertical sectional view thereof;

Fig. 3 is a plan view of the unit air flow control means adapted to be mounted in the engine shroud and carried thereby at the air outlet means;

Fig. 4 is a transverse vertical sectional view taken substantially on the line 4—4 of Fig. 3;

Fig. 5 is a fragmentary longitudinal vertical sectional view taken on the line 5—5 of Fig. 3; and

Fig. 6 is a fragmentary detail perspective view showing the thermal responsive bi-metal coil which supports the adjustable shutter of the air control means.

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I have chosen, for purposes of illustration, to incorporate my improved control with a cooling system of a multi-cylinder engine of the type having horizontally opposed air cooled cylinders. The

engine illustrated in the accompanying drawings, generally indicated in its entirety by the reference character "A" comprises a crankcase 10 having opposed cylinders 11. A shroud 12 encloses the engine and comprises a hood portion 13 extending over the entire engine, terminating at a point below the crankcase, so as to provide outlet openings 14 beneath the engine cylinders one on each side of the engine crankcase.

The engine is provided with a blower housed with the blower casing 15 which blows air over the top of the engine (see arrows 16 in Figs. 1 and 2). This air is confined to flow in the air duct or passage defined by the shroud casing 13 and engine "A," and thence flows downwardly between and around the engine cylinders 11, the inter-cylinder baffles 17 serving to confine the air flow to close heat exchange relation with the fins 18 on said cylinders. The air, after passing the engine cylinders, flows into the chamber 19 beneath the cylinders 11 and is subsequently discharged through the outlet openings 14.

The control of the air discharged through outlet openings 14 is had by adjustable shutters or other suitable means, and I have preferably provided a unitary control means 20 comprising an open bottom tray-like support or closure 21 for each of said openings 14. Brackets 22 are secured, preferably by welding, to the end walls of the tray 21 and one end of a bi-metal coil 23 is anchored or otherwise rigidly secured to the bracket 22 as at 24. The free end of this coil 23 is secured to a shutter 25. I have preferably provided a pair of these shutters for each tray (see Figs. 3 and 4), but obviously one or more of such shutters may be employed as desired. Each shutter 25 is supported at each end by one of these coils 23 and this bi-metal coil is operated in response to temperature changes of the air at the outlet opening, and these coils provide the sole support for the said shutters.

These bi-metal coil supports are thermal responsive and tend to unwind when subjected to air of increased temperature or wind up as same is subjected to colder air. These shutters thus are adjustable to open or close the outlet opening in response to temperature changes in the air at the outlet of the air duct or passage serving to conduct a cooling air over said engine. Preferably these shutters as used in the application illustrated are longitudinally dished for strength and when more than one shutter is used for each tray,

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the adjacent shutters are slightly overlapped as shown at 26 and also slightly overlap the rim of the tray opening 27 as at 28.

It will be apparent to those skilled in the art to which my invention pertains, that various modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

I claim:

1. In a cooling system for an internal combustion engine, comprising a shroud enclosing an engine and cooperating with the engine to provide an air duct through which a flow of air is conducted in heat transfer relation with said engine to cool same, an outlet opening for said air duct, shutters for said outlet opening, and means for pivotally supporting said shutters comprising a thermal responsive coil operable as the sole means for supporting said shutters and constructed to respectively unwind or wind up in response to an increase or decrease in the temperature of the air at said outlet opening to adjust said shutters.

2. In a cooling system for an internal combustion engine, comprising a shroud enclosing an engine and cooperating with the engine to provide an air duct through which a flow of air is conducted in heat transfer relation with said engine to cool same, an outlet opening for said air duct, a shutter for said outlet opening, and means for pivotally supporting said shutter comprising a thermal responsive coil at each end of said shutter, each said coil anchored at one end to the shroud and secured at its free end to said shutter, and serving as the sole means for supporting the shutter, said coil operable to respectively open or shut said shutter in response to an increase or decrease in temperature of the air at said outlet opening.

3. In a cooling system for an internal combustion engine, comprising a shroud enclosing an engine and cooperating with the engine to pro-

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vide an air duct through which a flow of air is conducted in heat transfer relation with said engine to cool same, an outlet opening for said air duct, an open bottom tray like closure for said outlet opening, one or more shutters associated with the open bottom of said closure, and thermal responsive means serving as the sole means to pivotally support said one or more shutters, said means operable in response to temperature changes of the air at said outlet opening to open or shut the shutter.

4. In a cooling system for an internal combustion engine, comprising a shroud enclosing an engine and cooperating with the engine to provide an air duct through which a flow of air is conducted to heat transfer relation with said engine to cool same, an outlet opening for said air duct, an open bottom elongated tray like closure member for said outlet opening, one or more shutters extending lengthwise of the elongated open bottom opening in said tray-like closure and movable to open or close the said opening, and a thermoresponsive bi-metal coil support at each end of said shutter, said coil anchored at one end to the closure member and secured at its free end to the shutter and serving as the sole means for supporting said shutter, said coil constructed to respectively unwind or wind up in response to temperature changes of the air at said outlet opening to urge said shutter to an open position as the temperature of the air increases or to a closed position as the temperature of the air decreases.

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