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FAN SHROUD

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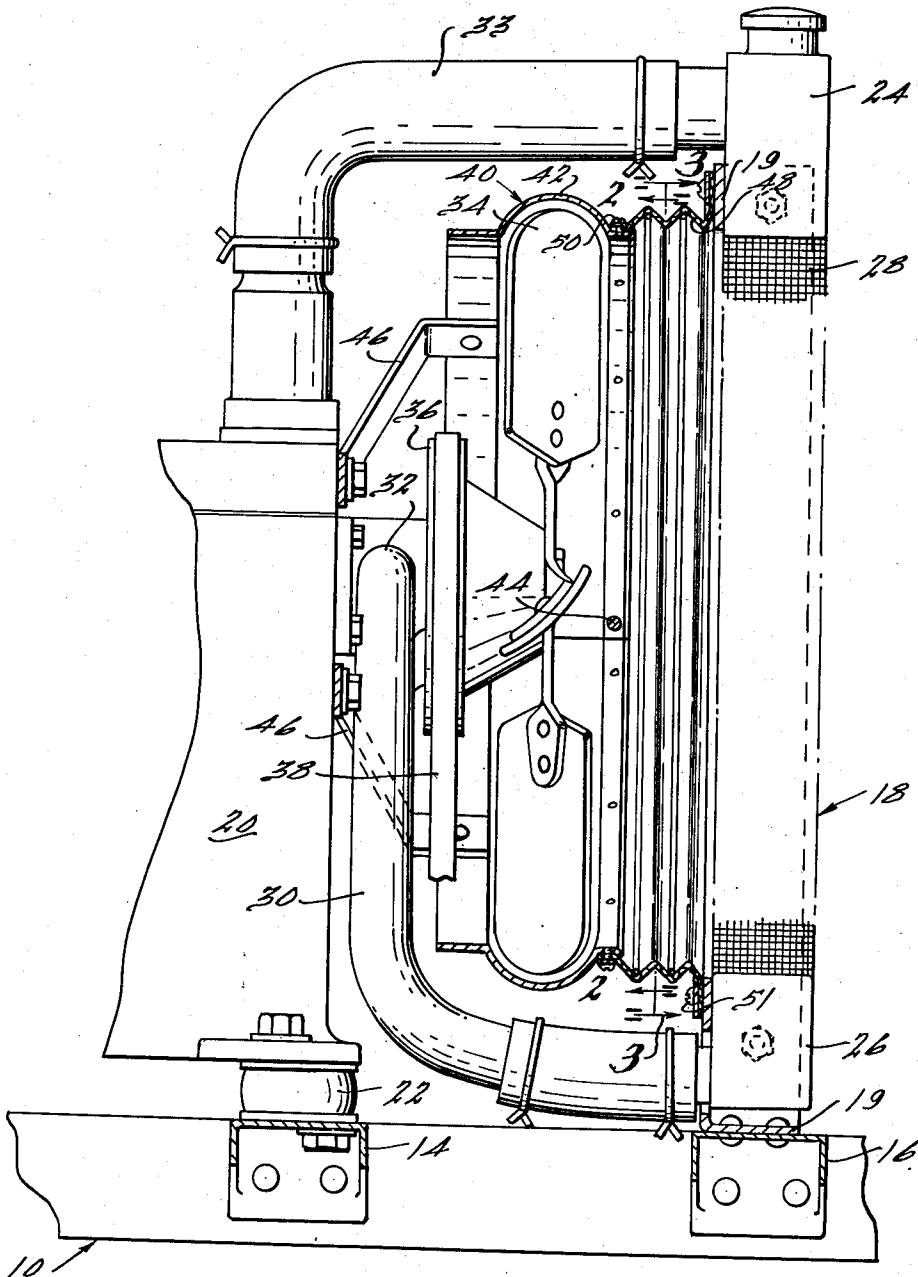


FIG. 1.

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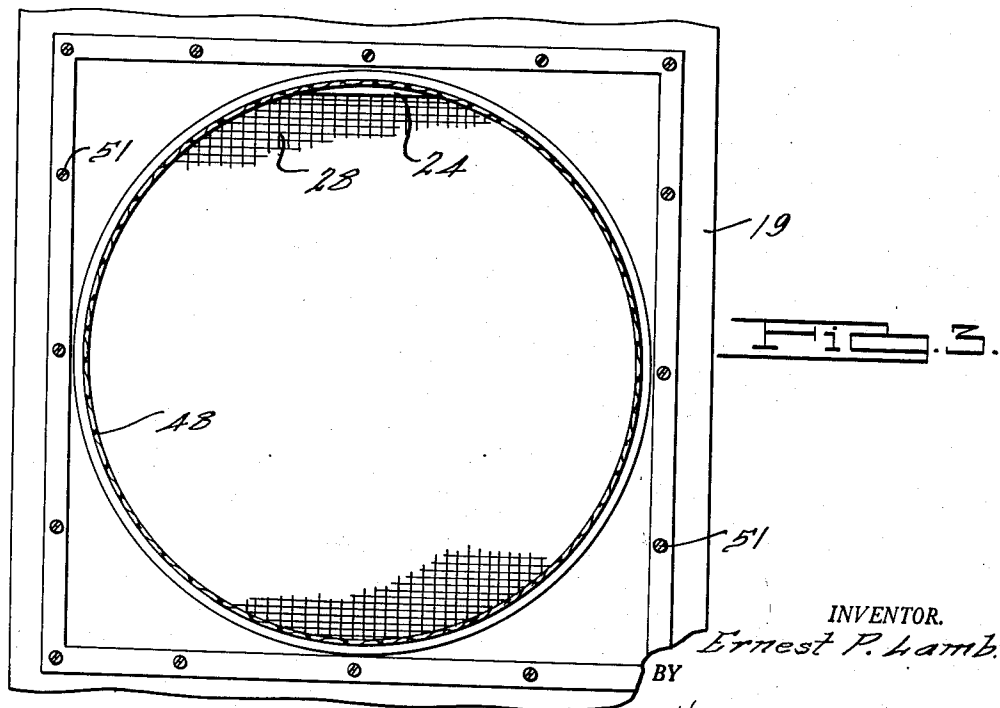
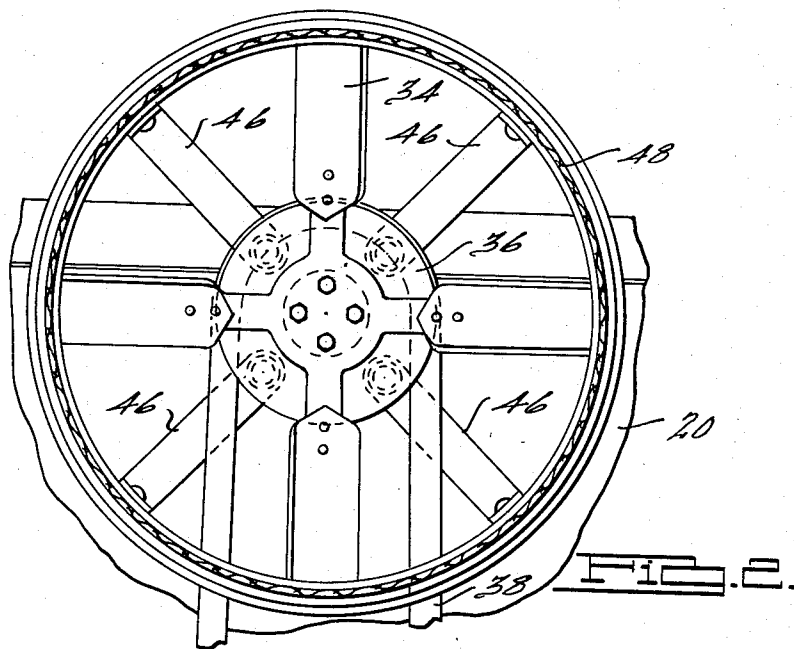
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6 Claims. (Cl. 123-41.49)

This invention relates to a fan shroud and more particularly a mounting for the shroud which facilitates positioning the shroud in extremely close relationship to the fan blade tips.

It has heretofore been common practice to mount an engine and a radiator on a supporting structure with the engine resiliently mounted thereon and the radiator rigidly mounted thereon. In automobiles and industrial power units where this mounting is commonly used there is generally provided a multi-bladed fan which is positioned between the engine and radiator and driven by the engine. The fan is intended to draw air through the radiator to cool a liquid which is circulated through the radiator and engine to control the temperature of the engine.

In the above construction it is evident that as the engine rocks and moves on its resilient mountings the fan also moves relative to the radiator. Since it has been common practice to provide a metal shroud to define an air path from the radiator to the fan and to mount this shroud on the radiator the relative movement between the fan and shroud necessitates that the shroud be of considerably larger diameter than the fan so that there will be no interference between the fan blade tips and the shroud and this detracts from the effectiveness of the shroud in controlling air flow.

It is a principal object of this invention to provide a shroud which has a rigid portion of ring-like configuration circumscribing the fan in close proximity to the fan blade tips and supported by the engine for movement therewith and that this rigid portion of the shroud be connected to the radiator by a flexible or bellows-like portion.

By providing a shroud that has a minimum space between it and the fan blade tips the air flow through the radiator for any given size of fan is increased and this makes it possible for savings to be obtained by reducing the size of the radiator or the fan.

In the drawings:

Fig. 1 is a side elevation of a portion of an engine, its support and associated radiator and fan provided with my invention;

Fig. 2 is a vertical section on the line 2-2 of Fig. 1; and

Fig. 3 is a vertical section on the line 3-3 of Fig. 1.

A frame 10 having a side rail 12, and cross members 14 and 16 is provided as a support. An air cooled radiator 18 is bolted to a radiator

support 19 which is bolted to the cross member 16. An engine 20 is supported by the frame on resilient mountings, one of which is illustrated at 22 as carried on cross member 14.

The radiator 18 includes an upper tank 24, a lower tank 26 and an intermediate core structure 28. The lower tank 26 is connected by a suitable fluid passage 30 to a water pump 32 carried by the engine 20. The upper tank is connected by a suitable fluid passage 33 to the engine 20. A closed circuit is thus provided for the circulation of liquid through the engine and then through the radiator for cooling.

A multi-bladed fan 34 having a pulley wheel 36 connected thereto is rotatably mounted on the water pump 32 of engine 20 and is adapted to be driven by a belt 38. The belt 38 may be driven in a conventional manner, which has not been illustrated although it is common practice to provide a pulley wheel on the engine crankshaft for this purpose.

A shroud 40 is provided to direct air passing through the intermediate core structure 28 to the fan 34 to increase the flow of air over the core structure. The shroud 40 includes a rigid portion 42 of ring like configuration, which is preferably assembled from upper and lower halves secured together by bolts 44. The rigid portion 42 is retained in concentric relation with respect to fan 34 by a plurality of braces 46 secured to the engine 20. Since the fan 34 and rigid portion 42 of shroud 40 are both carried by the engine they will move together when the engine 20 moves on its resilient mountings 22 and, therefore, the clearance between the fan blade tips and the rigid portion 42 of the shroud 40 may be very small.

The shroud 40 also includes a flexible portion 48 which is connected to the ring-like portion 42 by screws 50 and is connected to the radiator support 19 around the periphery of the core structure by screws 51. The flexible portion 48 is provided with a round opening at one end adjacent the rigid portion 42 and a rectangular opening at the other end adjacent the radiator core structure 28.

During operation the rigid portion 42 of shroud 40 and the fan 34 will move with the engine relative to the frame 10 when the engine moves on its resilient mountings and the radiator will not move relative to the frame 10. The flexible portion 48 of shroud 40 which is secured between the rigid shroud portion 42 and the radiator support 19 will accommodate the relative movement involved.

I claim:

1. A power unit including an internal combustion engine rockably movable as an incident to its operation, a fan driven by the engine and movable therewith, a stationary heat exchanger unit in fluid flow communication with the engine and a shroud for the fan comprising a ring element mounted on said engine in concentric relation to said fan and a flexible casing defining an air passage and having one end secured to said ring element and the other end secured to said radiator.

2. A power unit including a supporting structure, an internal combustion engine resiliently mounted thereon, an air cooled radiator rigidly mounted on said supporting structure, a fan driven by the engine and carried therewith, said fan being located between said engine and said radiator, and a shroud comprising a rigid portion circumscribing said fan and mounted on said engine and a flexible portion extending between said rigid portion and said radiator.

3. A power unit including an internal combustion engine and an air cooled heat exchanger, said engine and said heat exchanger being mounted for limited relative movement, a fan driven by the engine and supported thereby, said fan being located between said engine and said heat exchanger, and a shroud comprising a rigid portion of ring-like configuration supported by said engine in concentric relation with said fan and a flexible portion carried by said rigid portion and said heat exchanger and defining an air path from said heat exchanger to said rigid portion.

4. A power unit including an internal combustion engine and an air cooled heat exchanger, said engine and said heat exchanger being mounted for limited relative movement, a fan driven by the engine and supported thereby, said fan being located between said engine and said heat exchanger, and a shroud comprising a rigid portion of ring-like configuration supported in con-

centric relation with said fan by spaced brackets secured to said engine, said brackets being sufficiently small to present a minimum obstruction to the passage of air through said shroud and a flexible portion carried by said rigid portion and said heat exchanger and defining an air path from said heat exchanger to said rigid portion.

5. A power unit including an internal combustion engine and an air cooled heat exchanger, said engine and said heat exchanger being mounted for limited relative movement, a fan driven by the engine and supported thereby, said fan being located between said engine and said heat exchanger, and a shroud comprising a rigid portion of ring-like configuration supported by said engine in concentric relation with said fan and a flexible portion carried by said rigid portion and said heat exchanger and defining an air path from said heat exchanger to said rigid portion, said flexible portion having a bellows-like configuration to accommodate relative movement between said rigid portion and said heat exchanger.

6. A power unit including an internal combustion engine and an air cooled heat exchanger, said engine and said heat exchanger being mounted for limited relative movement, a bladed fan driven by the engine and supported thereby, said fan being located between said engine and said heat exchanger, and a shroud comprising a rigid portion of ring-like configuration having a cross section approximating the curvature of the fan blade tips, said rigid portion being supported by said engine with a very small radial clearance between the fan blade tips and said rigid portion, and said shroud further comprising a flexible portion carried by said rigid portion and said heat exchanger and defining an air path from said heat exchanger to said rigid portion.

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No references cited.