United States Patent [19]

Rose

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[54] **SNOWMOBILE MUFFLER WITH HEAT SHIELD**

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[52] **U.S. Cl.** ..... **181/36 R,** 181/36 D, 181/72, 180/54 A, 180/64 A

[51] **Int. Cl.** **F01m 3/06**

[58] **Field of Search** .. 181/72, 36 C, 36 D, 36 E, 58, 181/36 R; 180/5 R, 54 A, 64 A

[56] **References Cited**

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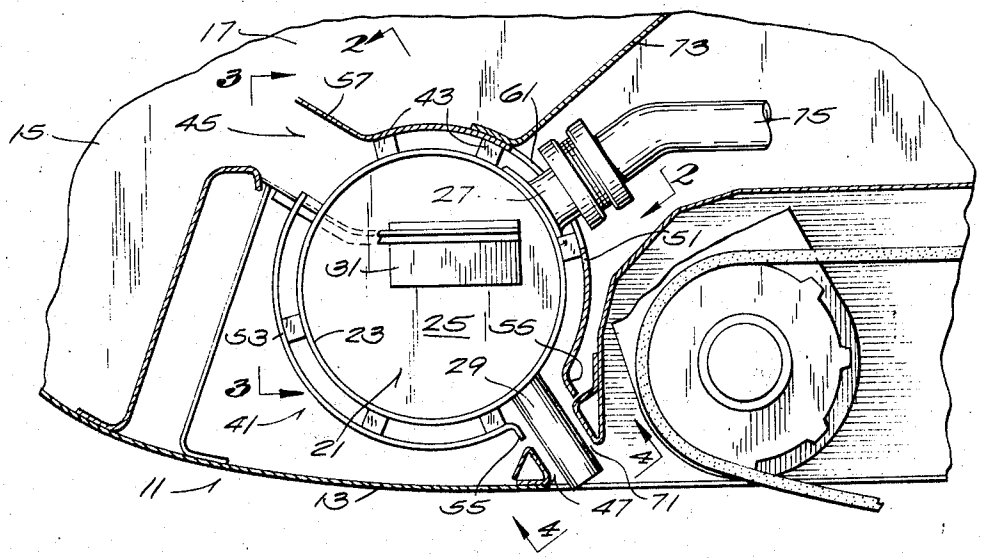
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Primary Examiner—Richard B. Wilkinson
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Attorney, Agent, or Firm—Michael, Best & Friedrich

[57] **ABSTRACT**

Disclosed herein is a muffler comprising a cylindrical shell or drum including radially extending and circumferentially spaced inlet and outlet pipes and a shield supported by the shell and extending in spaced relation thereto for substantially the length of the shell and arcuately about the shell for substantially the whole of the circumferential periphery from adjacent to one side of the outlet pipe to adjacent to the other side of the outlet pipe. The shield includes an air inlet on the side thereof opposite from the outlet pipe, which inlet extends lengthwise to permit entry of air into the space between the shell and the shield. The shield also includes an air outlet extending lengthwise of the shield and defined by shield portions extending in spaced relation to each other on opposite sides of the outlet pipe to provide for air discharge from between the shield and the shell.

7 Claims, 4 Drawing Figures



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Fig. 1

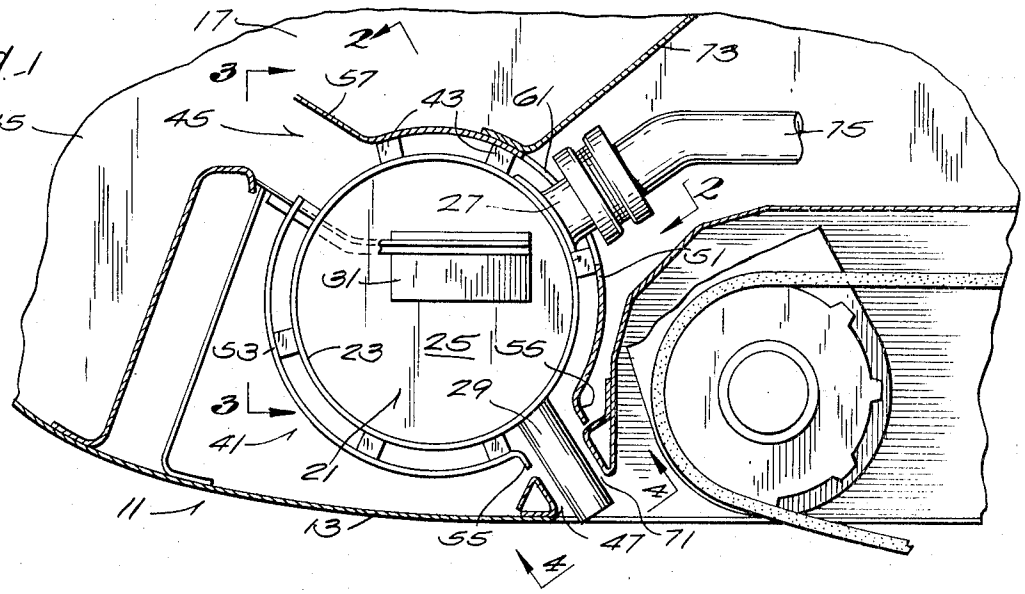


Fig. 2

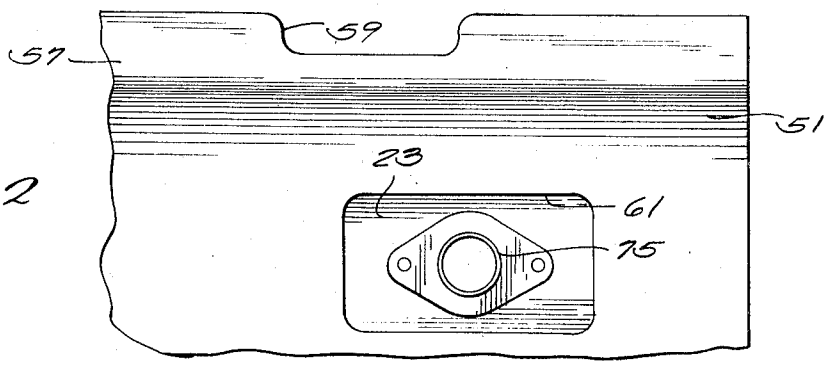


Fig. 3

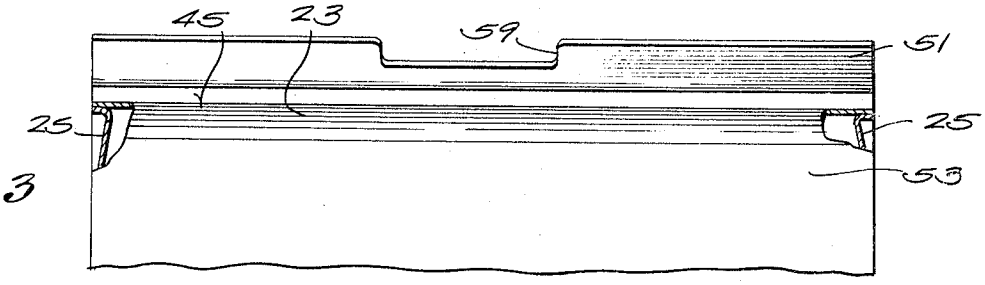
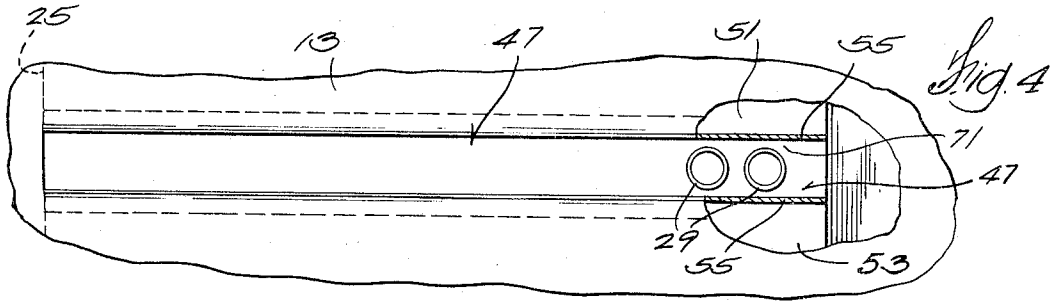


Fig. 4



SNOWMOBILE MUFFLER WITH HEAT SHIELD

BACKGROUND OF THE INVENTION

The invention relates generally to muffler constructions and, more particularly, to muffler constructions especially adapted for use in snowmobile engine compartments. The invention also relates to mufflers including shields for guiding cooling air flow around the outer surface of the muffler shell or drum and for reducing heat radiation from the shell or drum into the adjacent environment.

One example of a muffler intended to be employed in the engine compartment of a snowmobile is disclosed in the Betts et al U.S. Pat. Application Ser. No. 274,445 filed July 24, 1972, assigned to the assignee of this application, and incorporated herein by reference.

Examples of snowmobile constructions including mufflers mounted within an engine compartment are found in the Aaen et al U.S. Pat. Application, Ser. No. 319,891 filed Dec. 29, 1972, and assigned to the assignee of this application, and in the Smale U.S. Pat. Application, Ser. No. 258,260 filed May 31, 1972, and assigned to the assignee of this application.

Examples of muffler constructions including shields for guiding cooling air flow and reducing heat radiation to the immediate environment include the Iderstiene U.S. Pat. No. 1,862,043 issued June 7, 1932, the May U.S. Pat. No. 2,508,463 issued May 23, 1950 and the Parsons U.S. Pat. No. 3,237,716 issued Mar. 1, 1966. All of these patents are characterized by cooling air flow axially of the muffler.

SUMMARY OF THE INVENTION

The invention provides a muffler comprising an interior shell with radially extending and circumferentially spaced inlet and/or outlet pipes and an exterior shield supported by the shell and extending in spaced relation thereto for at least substantially the length of the shell and arcuately about the shell for substantially the entire circumferential periphery from adjacent to one side of the outlet pipe to adjacent to the other side of the outlet pipe. The shell includes an air entry means on the side thereof opposite from the outlet pipe, and extending lengthwise of the shield for permitting entry of air into the space between the shell and the shield. In addition, the shield also includes air outlet means extending lengthwise of the shield and defined by shield portions extending in spaced relation to each other on opposite sides of the outlet pipe to provide for discharge of air from between the shield and the shell.

In the illustrated and preferred construction, the shield comprises two members which respectively extend from opposite sides of the outlet pipe and which terminate on the opposite side of the muffler to provide the air inlet. One of the members icludes an opening which affords passage of the inlet pipe and additional entry of cooling air into the space between the shell and the shield. In the preferred construction, for the most part, the shield extends at a uniform spacing from the shell.

One of the principal features of the invention is the provision of a muffler which includes a shield affording heat radiation reduction, which defines circumferentially extending cooling air passages, and which is especially adapted for use in substantially closed snowmobile engine compartments.

Another of the principal features of the invention is the provision of a muffler including a shield which directs cooling air circumferentially around a muffler having a radially extending inlet and/or outlet pipe.

Other features of the invention will become known by reference to the following description, claims, and accompanying drawings.

THE DRAWINGS

FIG. 1 is a fragmentary side elevational view, with parts broken away, of a snowmobile embodying various of the features of the invention.

FIG. 2 is a fragmentary view taken generally along line 2—2 of FIG. 1.

FIG. 3 is a fragmentary view, with parts broken away, taken generally along line 3—3 of FIG. 1.

FIG. 4 is a fragmentary view, with parts broken away, taken generally along line 4—4 of FIG. 1.

Before explaining the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts set forth in the following general description or illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

GENERAL DESCRIPTION

Shown in FIG. 1 of the drawings is a fragmentarily illustrated snowmobile **11** including a frame or chassis **13** and a hood **15**, such as shown in the above-identified U.S. Application, Ser. No. 319,891 which is incorporated herein by reference. The hood **15** and the chassis **13** define, at least in part, a substantially closed engine compartment **17** in which are mounted an engine (not shown) and a muffler **21**.

Various muffler constructions can be employed. In the illustrated construction, the muffler **21** includes a cylindrical shell or drum **23** having respective end walls **25** as well as a radially outwardly extending inlet pipe **27** located intermediate the muffler end walls and one or more radially outwardly extending outlet pipes **29** located intermediately of muffler end walls **25** and in circumferentially spaced relation from the inlet pipe **27**. Various constructions interiorly of the shell can be employed. One such construction is shown in the above-identified U.S. Application, Ser. No. 274,445. The muffler **21** is attached to the snowmobile frame or chassis **13** by mounting brackets **31** which extend from the end walls **25** and which are also illustrated in U.S. Application Ser. No. 274,445 and identified therein by the numeral **21**.

In accordance with the invention, the shell or drum **23** is provided with a shield **41** designed to provide circumferential cooling flow around the drum or shell **23** and to reduce the ambient temperature in the engine compartment **17** by reducing heat radiation into the compartment **17** from the shell **23**.

More specifically, the shield **41** is supported by the shell **23**, and preferably adjacent to each of the end walls **25** by a plurality of angularly spaced brackets or spacers **43** which are suitably connected, as for instance by welding, to each of the drums **23** and the shield **41**.

In order to afford entry and exit of circumferentially flowing air, the shield **41** includes air entry means in the form of an air inlet **45** and an outlet means in the form of an air outlet **47** which is located on the opposite side of the muffler **21** from the air inlet **45** and through which the outlet pipe **29** extends.

In the illustrated construction, the shield comprises two oppositely projecting members **51** and **53** which extend substantially for the length of the shell **23** and which each have a major portion which extends circumferentially of the muffler **21** at a generally uniform spacing therefrom. The member **51** extends rearwardly from one side of the outlet pipe **29** and arcuately around the shell **23** for a distance greater than 90° to the opposite side thereof. The other member **53** extends forwardly from the other side of the outlet pipe **29** in the other direction arcuately around the shell **23** for a distance greater than 90° to the other side of the shell **23**.

Adjacent to the outlet pipe **29**, the members **51** and **53** each include margins or portions **55** which are bent outwardly into parallel relation to each other to define the air outlet **47** which extends in the form of a slot for the length of the muffler **21**.

At the other side of the muffler **21**, the members **51** and **53** terminate in circumferentially spaced relation to each other to thereby define the air inlet **27**. In addition, the member **51** includes a margin **57** which extends outwardly from the adjacent portion of the member **53** and partially across the entering air inlet **45** in order to at least partially reduce rectilinear, radially outward heat radiation into the engine compartment **17** through the entering air inlet **45**, without materially adversely affecting entry of air. Intermediate its ends, the margin **57** is preferably also provided with an inwardly extending recess **59** affording greater opportunity for the entrance of air.

The member **51** also includes an opening **61** which affords projection therethrough of the inlet pipe **27** and which also affords entry of additional air into the space between the shield **41** and the shell **23**.

The ends of the shield **41** can be closed or can be opened to permit some air to enter between the shell **23** and the shield **41** from the ends thereof and for discharge through the air outlet **47**.

The muffler **21** is installed on the chassis **13** so that the air outlet **29** communicates with a transverse slot **71** in the under surface of the chassis **13** through which cooling air and exhaust gas exit from the engine compartment **17**. Preferably, except for the slot **71** and and entering air opening into the engine compartment **17**, the engine compartment **17** is otherwise substantially closed.

As explained in the above-identified U.S. Application, Ser. No. 319,891 the opening **61** in the member **51** can communicate with a passageway **73** which more or less encloses an exhaust pipe **75** leading from the engine (not shown) to the muffler **21**. As also explained in said application, Ser. No. 319,891, an engine shroud (not shown) can be arranged to direct at least a portion of the engine cooling air into the passageway **73** for cooling of the exhaust pipe **75** and for entry into the space between the shield **41** and the shell **23** and for subsequent discharge through the outlet **47**.

When the engine compartment **17** is constructed so that the air discharge outlet **47** constitutes the major area open for discharge of air from the engine compartment **17**, then the fan which directs cooling air over the engine will also serve to pressurize the engine compartment **17** and thereby induce air flow through the air inlet **45** (and through the opening **61**) for circumferential flow around the shell **23** and between the members **51** and **53** and the shell **23** and for discharge through the outlet **47** and through the slot **71** in the chassis **13**. Thus, the shield **41** serves both to afford a passage for air to cool the muffler **23** and to reduce heat radiation from the muffler **23** into the engine compartment **17**. Furthermore, mounting of the shield **41** on the muffler **21** greatly simplifies assembly of the snowmobile and assures proper dimensional relationship between the shield **41** and the muffler **21**.

Various of the features of the invention are set forth in the following claims.

I claim:

1. A muffler comprising a circular shell having opposed ends, respective end walls closing the respective ends of said shell, an inlet pipe extending generally radially from said shell, an outlet pipe extending generally radially from said shell in circumferentially spaced relation to said inlet pipe, and a shield supported by said shell and extending in spaced relation to said shell for at least substantially the length of said shell and arcuately about the axis of said shell from adjacent to one side of said outlet pipe to adjacent to the other side of said outlet pipe, said shield including air inlet means on the side thereof opposite from said outlet pipe and extending lengthwise of said shield for permitting entry of air into the space between said shell and said shield and air outlet means extending lengthwise of said shield and including shield portions extending in spaced relation to each other on opposite sides of said outlet pipe to provide for discharge of air from between said shield and said shell.

2. A muffler in accordance with claim **1** wherein said shield includes therein an opening surrounding said inlet.

3. A muffler in accordance with claim **1** wherein said shield includes a major portion located at a generally uniform distance from said shell.

4. A muffler in accordance with claim **1** wherein said shield includes a first member extending arcuately from one of said edges for at least 90°, a second member extending arcuately from the other of said edges for at least 90°, and terminating, at least in part, in spaced relation from said first member in the area on the opposite side of said muffler from said outlet pipe to provide said air entering means.

5. A muffler in accordance with claim **4** wherein one of said members includes a margin located at said opposite muffler side and extending outwardly from said shell beyond the adjacent portion of said one member and including a notch extending inwardly of said margin and located intermediate the ends of said margin.

6. A muffler in accordance with claim **4** wherein one of said members includes therein an opening in encircling relation to said inlet pipe.

7. A muffler in accordance with claim **3** wherein said shield is supported from said shell by a plurality of spacers located adjacent to each of the ends of said shell, and, at each end, located in angularly spaced relation to one another.

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