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Norton

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[54] **FLAME ARRESTOR**

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[52] **U.S. Cl.** ..... **48/192**; 55/278; 55/385; 55/DIG. 28; 60/39.11; 123/142; 123/198 D; 220/88 A; 261/DIG. 6; 431/346

[51] **Int. Cl.**[2] **F17D 3/00**

[58] **Field of Search** ..... 48/192; 123/198 E, 198 D, 123/142; 220/88 A; 261/1, DIG. 6; 431/346; 222/189; 55/385, 278, DIG. 28, DIG. 20; 60/39.11; 126/85 R, 85 A

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[57] **ABSTRACT**

Disclosed herein is a flame arrestor for the air intake of an internal combustion engine having improved resistance to the ingress of moisture into the air intake and including a plurality of arcuate fin elements which have a generally inverted V-shaped cross section and which are stacked in vertically spaced relationship to form an annular assembly, a base having a barrel section adapted to be received by the air intake and an annular ledge extending radially from the barrel section for supporting the fin element assembly, and a cover overlying the fin element assembly and the base. The cover includes an outer portion which extends radially beyond the outer edges of the fin elements and the base to prevent impingement of water draining from the cover onto the fin elements. Moisture collecting on the base ledge is prevented from draining into the air intake by an integral annular raised portion which is located adjacent to the inside edges of the bottommost fin elements to act as a barrier or dam. One or more openings are provided in the outer perimeter of the ledge to afford overboard drainage of moisture from the ledge and the fin elements.

7 Claims, 6 Drawing Figures

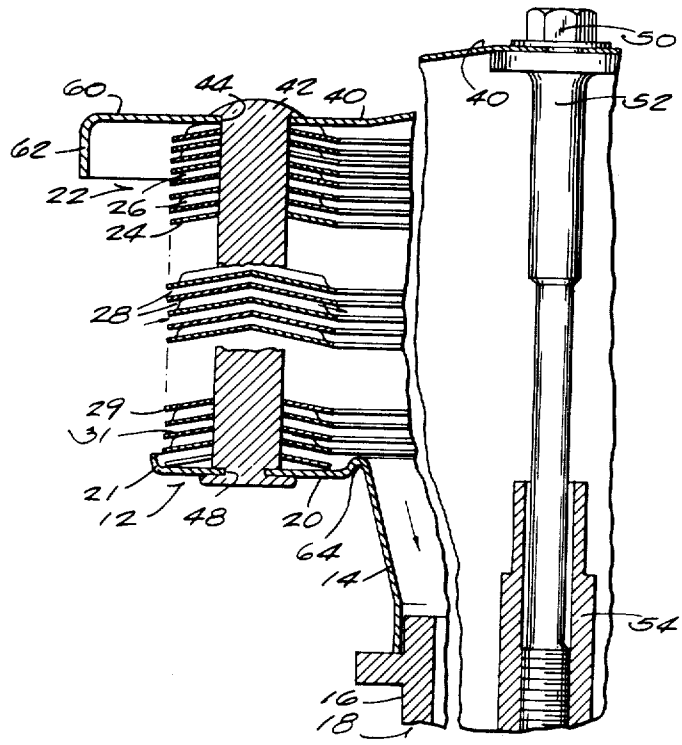


Fig. 1

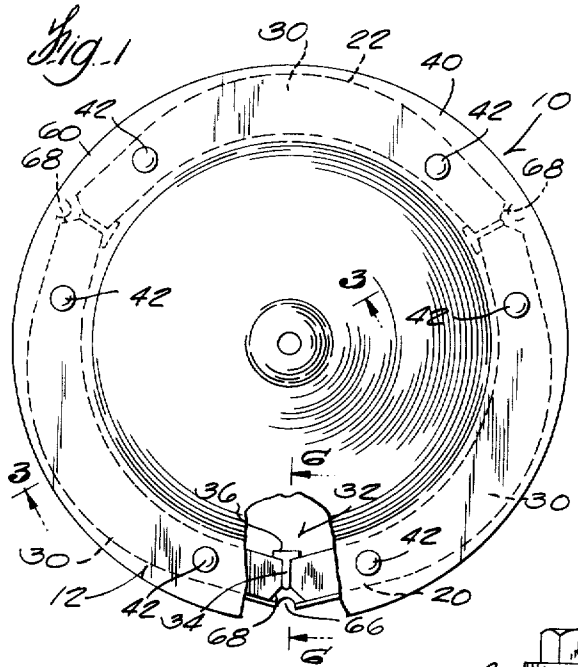
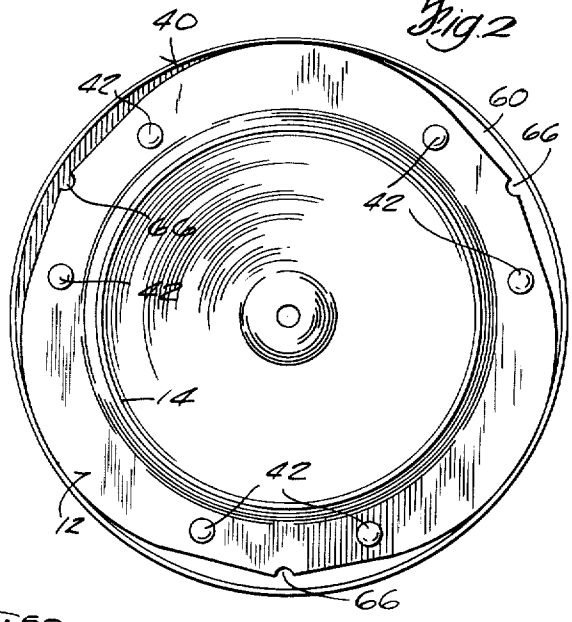


Fig. 2



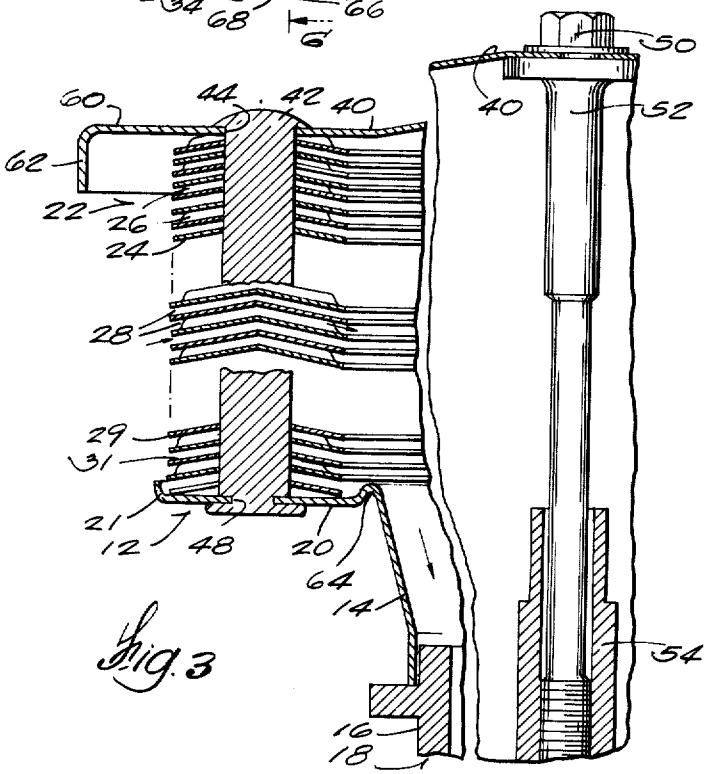


Fig. 3

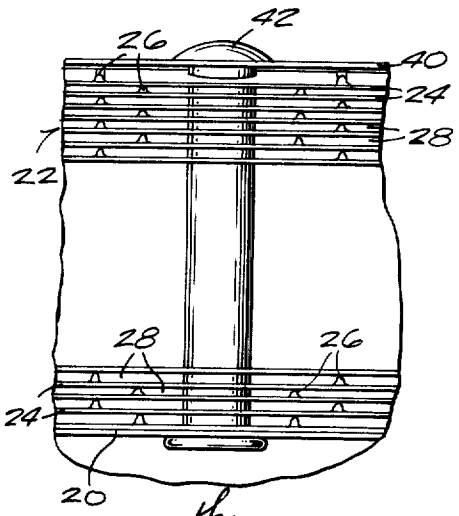


Fig. 4

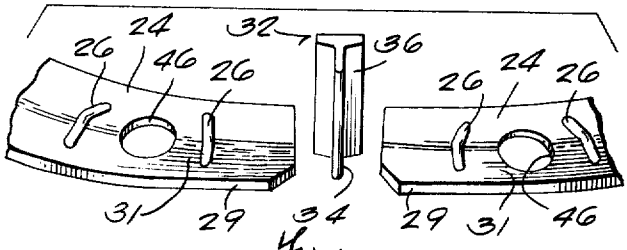


Fig. 5

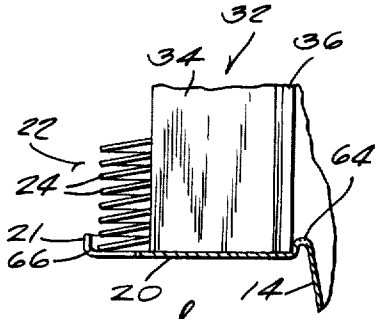


Fig. 6

FLAME ARRESTOR

BACKGROUND OF THE INVENTION

This invention relates to flame arrestors for an air intake of an internal combustion engine.

As a safety precaution, various internal combustion engines, such as marine propulsion engines, are commonly provided with fire arrestors which are mounted over the air intake of the carburetor to prevent the propagation of back firing flames from the carburetor. Although providing adequate protection against the propagation of back firing flames, prior art flame arrestors often did not provide adequate protection against the ingress of water into the carburetor air intake, which of course can adversely affect the engine performance.

Filed herewith with the Patent Office is a copy of a drawing illustrating two different prior art flame arrestors.

SUMMARY OF THE INVENTION

The invention provides a flame arrestor for an internal combustion engine including a plurality of vertically spaced fin elements which are assembled to form an annular stacked array, a base having a barrel section adapted to be received by the air intake and an annular ledge which extends radially outwardly from the barrel section and on which the fin element assembly is supported, and a generally horizontal cover overlying the fin element assembly. The fin elements are provided with an outer portion which inclines downwardly to prevent moisture from collecting thereon. Means are provided for preventing the impingement of moisture draining from the cover onto the fin elements. More specifically, the cover is provided with an outer portion which extends radially outwardly beyond, i.e., overhangs, the outer perimeter of the fin elements and the ledge of the base.

Means are also provided for preventing moisture which may collects on the ledge from draining into the engine air intake. More specifically, such means includes a continuous annular raised portion which is integral with the base ledge and is located adjacent to the inner edges of the bottommost fin elements to act as a barrier or dam.

Also, means are provided for affording the overboard drainage of moisture from the base ledge and from the fin elements. More specifically, such means includes one or more openings provided in the outer perimeter of the ledge through which the moisture can drain overboard from the ledge. Preferably, the fin element assembly includes one or more vertical grooves or notches which extend transversely of the outer perimeter of the fin element assembly and which are aligned with a respective ledge opening to further promote overboard drainage of moisture from the fin elements.

A principal feature of the invention is to provide a flame arrestor for an internal combustion engine having improved resistance to the ingress of water into the engine air intake.

Other features, aspects, and advantages of the invention will become apparent upon reviewing the following detailed description, the drawing, and the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top plan view of a flame arrestor embodying various of the features of the invention.

FIG. 2 is a bottom plan view of the flame arrestor of FIG. 1.

FIG. 3 is an enlarged, fragmentary, sectional view taken along the plane designated 3—3 in FIG. 1.

FIG. 4 is an enlarged, fragmentary, elevational view of the flame arrestor of FIG. 1.

FIG. 5 is an enlarged, fragmentary, exploded view of the fin element assembly.

FIG. 6 is an enlarged, fragmentary, sectional view taken along the plane designated 6—6 in FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

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 the arrangements of the components set forth in the following description or illustrated in the drawing. The invention is capable of other embodiments and of being practiced and carried out in the various ways. Also, it is to be understood that the phraseology and terminology employed herein is for the purposes of description and should not be regarded as limiting.

Illustrated in the drawing is a flame arrestor **10** embodying various features of the invention. The flame arrestor **10** includes a base **12** having a generally cylindrical barrel section **14** which is adapted to be received by an air intake **16** (shown fragmentarily in FIG. 3) of a carburetor **18** (shown fragmentarily in FIG. 3) for an internal combustion engine (not shown), such as a marine propulsion stern drive. Extending radially outwardly from the barrel section **14** is an annular ledge **20.** Extending upwardly from the outer perimeter of the ledge **20** is a upturned lip **21.**

Supported on the ledge **20** is an annular fin element assembly **22** including a plurality of arcuately shaped, fin elements **24** which are stacked in vertically spaced, parallel relationship. Each of the fin elements **24** includes a plurality of integral, upstanding ribs **26** which are dimensioned so that, upon stacking the fin elements **24,** narrow, radially extending air passages **28** are provided between vertically adjacent fin elements. The air passages **28** are wide enough to permit free passage of air into the carburetor intake **16** but narrow enough to prevent the passage of a flame front from the carburetor **18** when the engine backfires.

The fin elements **24** are arranged to prevent moisture from entering into the carburetor air intake **16** through the air passages **28.** More specifically, each of the fin elements **24** includes an outermost edge **29** and an outer portion **31** which inclines radially and downwardly towards the outermost edge **29** so as to promote the overboard drainage of any moisture entering into the air passages **28.** Preferably, the fin elements **24** have a generally inverted V-shaped cross section as shown in FIG. **3.**

While the fin elements can be of various arrangements to form the annular fin element assembly **22,** in the construction illustrated, the planar configuration of each of the fin elements **24** is generally in the form of a circular arc and the fin elements **24** are assembled to form a series of circumferentially spaced, generally cylindrical segments **30.** Positioned between adjacent of

the segments **30** is a T-shaped column **32** which has a radially extending leg **34** located in the spacing between the fin element segments **30** and a cross leg **36** generally abutting the inner edges of the fin elements **24** of adjacent segments **30.**

Overlying the fin elements **24,** the ledge **20,** and the carburetor air intake **16** is a circular, generally horizontally extending cover **40.** The base **12,** the fin elements **24,** and the cover **40** are connected together to form a unitary assembly by suitable connecting means, such as a plurality of rivets **42** which extend through axially aligned apertures **44, 46,** and **48** provided in the cover **40,** the fin elements **24,** and the base **20,** respectively. Upon assembly the columns **32** are captured between the cover **40** and the ledge **20.**

The flame arrestor **10** is removably secured to the carburetor air intake **16** by suitable fastening means. Although various arrangements can be used, in the illustrated construction, such fastening means includes a cap bolt **50** which extends through a central aperture in the cover **40** and is threaded into a spindle **52** which in turn is threaded into a spider **54** (shown fragmentarily in FIG. **3**) provided in the carburetor air intake **16.**

In accordance with the invention, the cover **40** includes means for preventing the drainage of moisture from the cover **40** into the carburetor air intake **16.** More specifically, the cover **40** has an outer portion **60** which extends radially outwardly beyond, i.e., overhands, the outermost edges of the stacked fin elements **24** so that moisture draining off the cover **49** does not impinge onto the fin elements **24.** In order to further prevent draining moisture from impinging on the fin elements, there is provided on the cover **40** a flange **62** which depends from the outer perimeter of the cover **40.** Still further, in order to prevent moisture accumulation on the cover, and particularly at the center thereof, the cover includes (as seen in FIGS. **1** and **3**) a central portion which tapers upwardly from the outer portion **60** to the center adjacent the cap bolt **50.**

Also, in accordance with the invention, the base **12** includes means for preventing the drainage of moisture from the ledge **20** into the carburetor intake **16.** While various arrangements can be used, in the construction illustrated, the base **12** includes a continuous, annular raised portion **64** which is integral with the ledge **20** and which is located generally adjacent the inside edges of the bottommost fin elements **24** to act as a barrier or dam against moisture which may collect on the ledge **20.**

Further in accordance with the invention, means is provided for affording the overboard drainage of moisture from the ledge **20.** While various arrangements can be used, in the construction illustrated, such means comprises one or more openings **66** in the upturned lip **21** through which moisture can drain overboard from the ledge **20.** In order to further promote overboard drainage of water from the fin element **24** on the ledge **20,** the outer corners of the fin elements **24** are preferably cut off or bevelled, as seen in FIG. **1** so that, when assembled, the adjacent fin element segments **30** extending from the respective column **32** disposed therebetween, form a vertical, generally V-shaped groove or notch **68,** as shown in FIG. **1.** The notch **68** extends transversely of the outer perimeter of the fin element assembly **22** and are generally aligned with respective of the openings **66.**

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

I claim:

1. A flame arrestor for an internal combustion engine including an air intake, said arrestor including an assembly of a plurality of vertically spaced fin elements forming an annular stacked array having a top, each of said fin elements having an outermost edge and an outer portion which inclines radially downwardly towards said outermost edge, said fin element at the bottom of said array including an inner edge, a base having a barrel section adapted to be received by the engine air intake, an annular ledge extending radially outwardly from said barrel section for receiving said fin element assembly, and a continuous, annular raised portion which is integral with said ledge and is located generally adjacent to said inner edge so as to act as a barrier against water draining from said ledge into the engine air intake, and a generally horizontal cover overlying said top of said fin element assembly and terminating in an outer edge portion which extends radially beyond the outermost edges of said fin elements and said ledge.

2. A flame arrestor according to claim **1** wherein said fin elements have a generally inverted V-shaped cross section.

3. A flame arrestor for an internal combustion engine including an air intake, said arrestor including an assembly of a plurality of vertically spaced fin elements forming an annular stacked array having a top, each of said fin elements having an outermost edge and an outer portion which inclines radially downwardly towards said outermost edge, a base having a barrel section adapted to be received by the engine air intake, an annular ledge extending radially outwardly from said barrel section for receiving said fin element assembly and including an outer perimeter, said base also including an upturned lip extending from said outer perimeter of said ledge, said lip including means defining an opening for affording drainage of moisture from said ledge, and a generally horizontal cover overlying said top of said fin element assembly and terminating in an outer edge portion which extends radially beyond the outermost edges of said fin elements and said outer perimeter of said ledge.

4. A flame arrestor according to claim **3** wherein said fin elements have a generally inverted V-shaped cross section.

5. A flame arrestor according to claim **3** wherein said fin element assembly includes a generally vertical notch extending in general alignment with said lip opening.

6. A flame arrestor for an internal combustion engine including an air intake, said arrestor including an assembly of a plurality of vertically spaced fin elements forming an annular stacked array having a top, said fin elements each being of generally inverted V-shaped cross section and including an inner edge and an outer edge, a base having a barrel section adapted to be received by the engine air intake, and annular ledge extending radially outwardly from said barrel section for receiving said fin element assembly and terminating in an upturned lip, said lip including means defining an opening for affording the drainage of moisture from said ledge, a continuous, annular raised portion on said base located generally adjacent to said inner edge of the bottommost of said fin elements to act as a barrier

against moisture draining from said ledge into the engine air intake, and a generally horizontal cover overlying said top of said fin element assembly and terminating in an outer edge portion extending radially beyond said outer edges of said fin elements and said ledge.

7. A flame arrestor according to claim 6 wherein said fin element assembly includes a generally vertical notch extending in general alignment with said lip opening.

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