Nov. 22, 1966 J. E. BROWNELL 3,287,094

FLAME ARRESTER

Filed Sept. 30, 1963

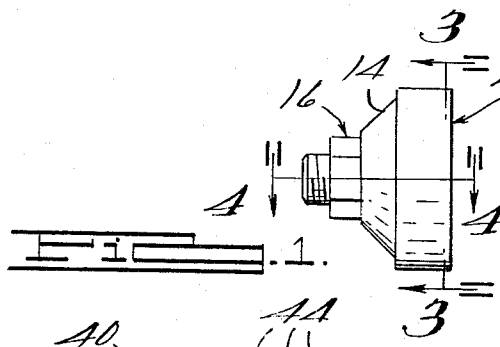


Fig. 1.

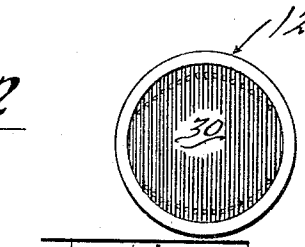


Fig. 2.

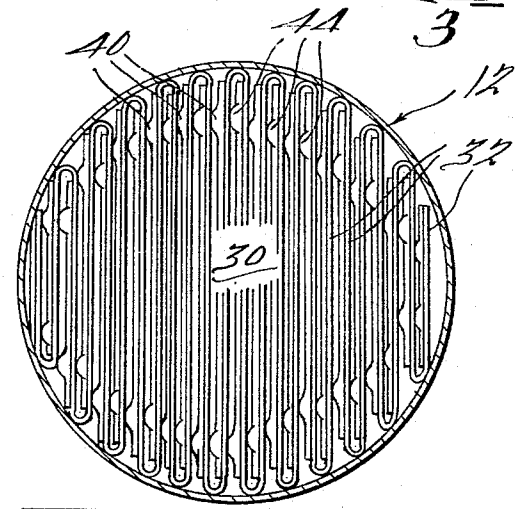


Fig. 3.

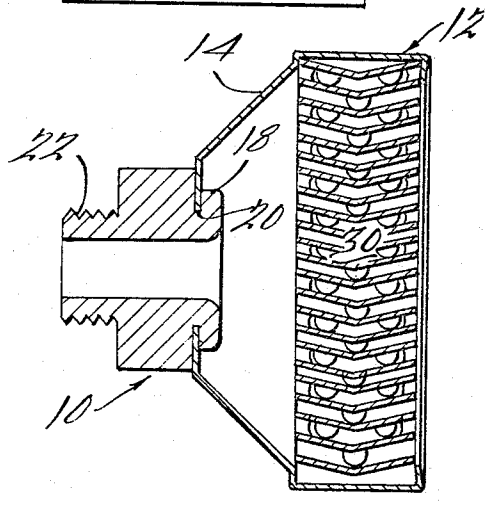


Fig. 4.

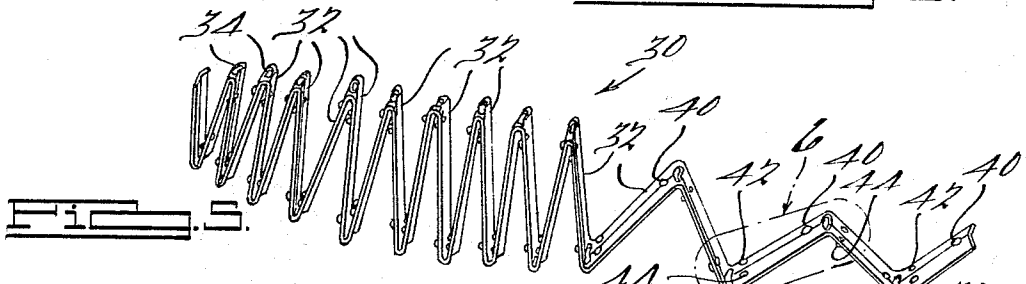


Fig. 5.

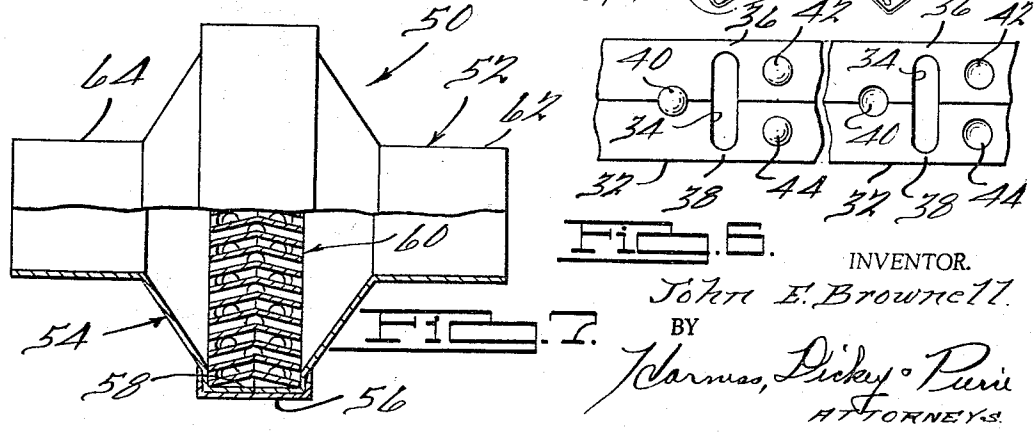


Fig. 6.

Fig. 7.

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FLAME ARRESTER

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This invention relates generally to flame arresters, and more particularly to an improved flame arrester for use in, for example, crankcase venting systems of automotive type vehicles, and the like.

The increased emphasis on smog control in many of the larger cities of the United States has resulted in a new venting system for the crankcase of an internal combustion engine that effects venting of the crankcase directly to the carburetor of the engine as opposed to the atmosphere. However, while solving one problem, such a system creates another in that venting of the crankcase to the carburetor subjects the crankcase to flames due to backfiring of the engine. A flame front traveling through the carburetor could possibly travel from the carburetor to the crankcase. Obviously, propagation of a flame front into the crankcase of an engine could result in an explosion therein and destruction of the engine.

The flame arrester of the instant invention solves the latter problem. It is connected either within a suitable cavity in the carburetor at the terminal end of the conduit leading to the carburetor or at some intermediate point between the crankcase and the carburetor.

The flame arrester of the instant invention comprises a novel one-piece folded metal arrester element that is retained in a complementary case. The element is provided with suitable embossments in a novel array which, in combination with complementary apertures, provide for spacing of adjacent sections of the arrester element and folding thereof into a configuration that facilitates assembly into a circular case.

Accordingly, one object of the instant invention is an improved flame arrester.

Another object of the instant invention is a flame arrester utilizing a one-piece arrester element.

Another object of the instant invention is a flame arrester that can be relatively easily assembled.

Another object of the instant invention is a unique method of folding the element of a metallic flame arrester.

Another object of the instant invention is an improved means for maintaining the arrester element of a flame arrester in spaced relationship.

Other objects and advantages of the instant invention will be apparent from the following specification, claims and drawings, wherein:

FIGURE 1 is a side elevational view of a flame arrester in accordance with an exemplary constructed embodiment of the instant invention;

FIG. 2 is taken in the direction of the arrow 2 of FIGURE 1;

FIG. 3 is a cross sectional view taken substantially along the line 3—3 of FIGURE 1;

FIG. 4 is a cross sectional view taken substantially along the line 4—4 of FIGURE 1;

FIG. 5 is an exploded perspective view of the arrester element;

FIG. 6 is a view taken substantially within the circle 6 of FIGURE 5 with the element flattened out, and

FIG. 7 is a side elevational view, partially in section, of a modified flame arrester.

As seen in FIGURE 1 of the drawings, a flame arrester 10 comprises a generally cylindrical casing 12 having a truncated conical section 14 into which a coupling nipple 16 extends. The nipple 16 has an inner flange 18 and is secured within a circular aperture 20 in the conical section as by staking. The nipple 16 has a threaded section 22 for the acceptance in a complementary threaded aperture in, for example, the side wall of a carburetor (not shown).

In accordance with the instant invention, an arrester element 30 is of generally circular cross sectional configuration so as to be acceptable within the housing 12. The circular configuration of the element 30 is achieved by folding sections 32 thereof into spaced parallel relationship. The sections 32 when folded are essentially chords of a circle of increasing then decreasing length.

Adjacent sections 32 of the arrester element 30 are of generally V-shaped cross section and are of necessity creased in opposite directions laterally thereof so that when the sections 32 are stacked as by reentrantly folding adjacent sections 32 into nesting relationship, the V sections are nested within one another.

In accordance with another feature of the instant invention, folding of adjacent sections 32 of the arrester element 30 is facilitated by the provision of elongated transversely extending apertures 34 between each of the sections 32 at the point of reentrant folding therebetween. The apertures 34 define relatively narrow junctures 36 and 38 at opposite ends thereof that are easily bendable without effecting distortion of the adjacent sections 32.

In accordance with yet another feature of the instant invention, the spacing between adjacent sections 32 of the arrester element is positively maintained by an array of embossments 40, 42 and 44, the embossment 40 being placed on one side of each aperture 34 and the embossments 42 and 44 being placed on the opposite side. When adjacent sections 32 of the arrester element 30 are folded into nested relationship, the embossments 40, 42 and 44 are engageable with an unembossed surface of an adjacent section 32 thereby to space the sections 32 from one another.

Referring now to FIGURE 7 of the drawings, a modified flame arrester 50 comprises a pair of housings having telescoped annular sections 56 and 58, respectively, for the acceptance of an arrester element 60. The arrester element 60 is similar in construction to the element 30 discussed hereinbefore, the modified flame arrester 50 being usable in a conduit leading from a carburetor to the crankcase of an internal combustion engine. A pair of nipples 62 and 64 on the housing portions 52 and 54, respectively, facilitate assembly into such a conduit by merely cutting the conduit and inserting the nipples into the severed ends thereof. When inserted, the flame arrester 50 precludes passage of a flame front from the carburetor to the crankcase of the engine.

From the foregoing description it should be apparent that the flame arrester of the instant invention is relatively easily assembled since it comprises a circular one-piece arrester element that is foldable to its final configuration. The arrester element also features a novel array of apertures and embossments that facilitate folding and effect spacing of the section thereof.

It is to be understood that the specific construction of the improved flame arrester herein disclosed and described are presented for the purpose of explanation and illustration and are not intended to indicate the limits of the invention, the scope of which is defined by the following claims.

What is claimed is:

1. A flame arrester for an internal combustion engine comprising

an elongated one piece arrester element defined by a plurality of connected sections each of which is oppositely folded relative to an adjacent section to form a stacked arrester element assembly,

and a housing for said arrester element having a configuration complementary thereto when said element

is in the folded and nested condition, said arrester element being orientated to traverse said housing so that flow therethrough is between the sections in a direction substantially parallel to the folded ends of the sections.

2. A flame arrester for an internal combustion engine comprising

an elongated one piece arrester element having a plurality of connected sections of V-shaped transverse cross section,

each of said sections being folded in the opposite direction relative to an adjacent section to form a nested arrester element assembly,

and a housing for said arrester element complementary to the configuration of said arrester element in the folded and nested condition, said arrester element being orientated to traverse said housing so that flow therethrough is between the sections in a direction substantially parallel to the folded ends of the sections.

3. A flame arrester for an internal combustion engine comprising

an elongated one piece arrester element having plurality of spaced apertures defining

a plurality of connected sections, each of said sections being of V-shaped transverse cross section, the V-shaped sections of adjacent sections being oppositely directed,

adjacent sections being folded in the opposite direction relative to one another thereby to form a nested arrester element assembly,

and a housing for said arrester element complementary to the configuration of said arrester element in the folded and nested condition, said arrester element being orientated to traverse said housing so that flow therethrough is between the sections in a direction substantially parallel to the folded ends of the sections.

4. A flame arrester for an internal combustion engine comprising

an elongated one piece arrester element having plurality of spaced apertures defining

a plurality of connected sections, each of said sections being of V-shaped transverse cross section, the V-shaped sections of adjacent sections being oppositely directed,

adjacent sections being folded in the opposite direction relative to one another thereby to form a nested arrester element assembly, a plurality of embossments on each of said sections extending in the direction of the apex of said V-shaped cross section and disposed in an array such that each embossment contacts an unembossed portion of an adjacent section when said element is folded to the nested condition, and

a housing for said arrester element complementary to the configuration of said arrester element in the folded and nested condition, said arrester element being orientated to traverse said housing so that flow therethrough is between the sections in a direction substantially parallel to the folded ends of the sections.

5. A flame arrester for an internal combustion engine comprising

an elongated one piece arrester element defined by

a plurality of connected sections each of which is oppositely folded relative to an adjacent section to form a nested arrester element assembly, the length of said sections first increasing then decreasing whereby the sections form parallel chords of a circle when folded to the nested condition, and

a housing for said arrester element having a circular configuration complementary to the configuration of said element in the folded and nested condition, said arrester element being orientated to traverse said housing so that flow therethrough is between the sections in a direction substantially parallel to the folded ends of the sections.

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