Feb. 11, 1964 E. F. LIRETTE 3,120,876

AIR INTAKE SILENCER

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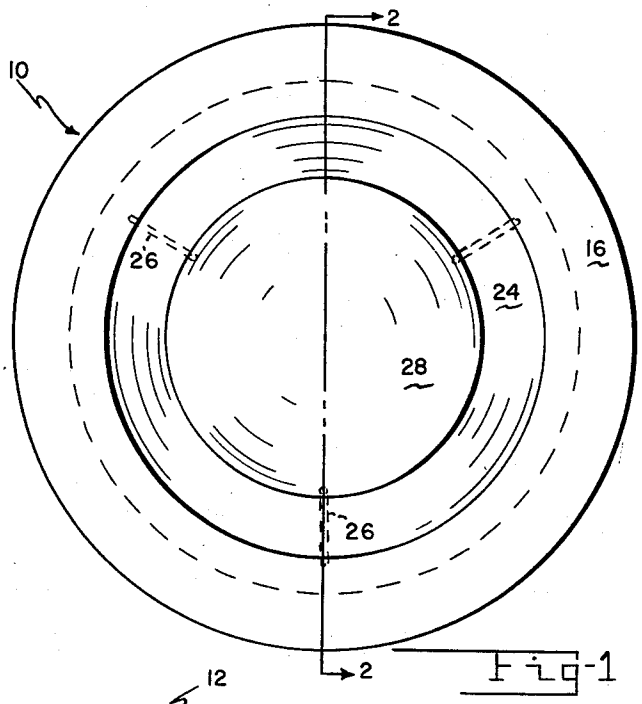


Fig-1

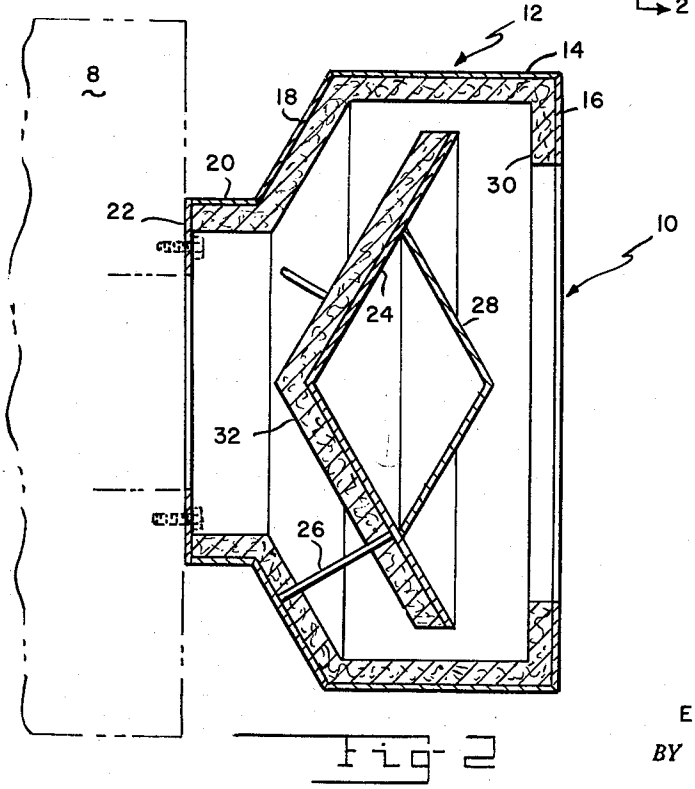


Fig-2

INVENTOR.
EDWARD F. LIRETTE
BY Wade Bourne
Louis E. Sayre Jr.
ATTORNEYS

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AIR INTAKE SILENCER

Edward F. Lirette, Ann Arbor, Mich., assignor to the United States of America as represented by the Secretary of the Air Force

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This invention relates to the attenuation of noise by the containment and harmless dissipation into heat of the acoustic energy generated by an offending machine. While this invention is specifically in connection with a pneumatic blower supplying cooling air for use on air ground-support equipment, it is equally applicable to other equipment with comparable noise generating propensities. This invention is applicable to air and other gaseous fluid handling machines, the term gas being construed to include all non-solid and non-liquid mediums.

Noise emissions from machines may be merely annoying or they may be hazardous. Annoying or nuisance noise will produce no serious auditory effect although there may be physiological effect. However, this is not true of hazardous noise which will produce serious auditory effects including auditory or non-auditory physiological reactions depending on the character of the noise.

Among the consequences of hazardous noises are temporary or permanent loss of hearing and the masking of one sound by another.

The ability of the ear to hear two sounds at one time is a physiological phenomenon. However, this function, which provides for the discrimination between sounds, is subject to the effect of imposing one sound on another. This causes one of the sounds to become indistinct, or, as it may be said, auditory masking has occurred.

Connection with aircraft ground-support equipment, the masked sounds will be limited to speech and the masking sounds will therefore refer to any other sounds which may interfere with the speech signals from a communications standpoint. It is apparent that any masking which would impair a communication channel in such manner as to adversely affect the receptability of orders, instructions and other vital information can lead to dire results.

Random noise such as generated by operating machinery is a more effective masker of speech than are pure tones at the same sound-pressure level. It is also known that low frequency noises have a greater masking effect than noises of high frequency.

The silencer embodied by this invention is of the absorptive type which is broadly tuned and maintains its effectiveness over a wide range of frequencies and operating speeds.

The object of this invention is to attenuate the noise emitting from pneumatic machinery such as blowers and the like by providing a suitable inlet silencer.

Other objects will become more apparent from the following description of the invention as depicted by the drawings in which:

FIG. 1 is an end view of the silencer; and

FIG. 2 is a vertical sectional view on line 2—2 of FIG. 1.

Referring to the drawings which illustrate a preferred embodiment of the invention comprising a silencer **10** removably secured to the inlet of a blower or like machine **8**. The outer casing or shell **12** comprises a tubular casing member **14** to one end of which is welded or otherwise joined to an inlet ring **16**. A truncated cone member **18** has its larger diameter end welded or otherwise joined to the other end of casing member **14**. The smaller diameter of truncated cone member has welded or otherwise joined thereto a neck **20** to which is welded or otherwise joined to a mounting flange **22**. Mounting

flange **22** must be formed to fit the particular application of the silencer and the particular configuration used and does not constitute part of this invention.

Inner cone **24** is formed to substantially the same slope as the truncated cone **18** and is coaxially supported within the outer casing or shell **12** by means of studs **26** which may be welded or riveted in place and with its apex directed downstream in the air flow. The inner cone is mounted in such longitudinal relationship with the outer casing or shell **12** as will produce the least impedence to flow through the silencer.

The outer or splitter cone **28** is substantially smaller than inner cone **24** and is spot welded or otherwise joined to inner cone **24** as shown with its apex directed upstream into the air flow. The slope of outer cone **28** is such as will deflect impinging air and direct it toward the passageway between inlet ring **16** and inner cone **24**.

The interior surface of the outer casing or shell **12** is lined with sound absorbing material **30** such as for example, Owens-Corning Fiberglass PF–335, which may be held in place with hardware cloth or other means known to the art. Like sound absorbing material **32** is joined to the downstream side of inner cone **24**.

The particular sound-absorbing material used or method of attachment form no part of this invention. Any suitable material may be used.

In operation, inflowing air will flow freely through the silencer which will at the same time attenuate and dissipate as heat, certain acoustic energy generated by the machine to which attached.

While the embodiment of this invention disclosed by the specification and drawings has taken a given form, it is obvious that modifications may be made as dictated by the requirements of the specific machine on which the invention is to be used.

I claim:

1. A gas inlet silencer comprising an outer shell member, an inner cone member coaxially mounted within said outer shell member and with apex directed downstream, gas passageway between the base periphery of said inner cone member and said outer shell member, an outer cone member with base periphery smaller than base periphery of said inner cone member, said outer cone member being coaxially mounted within said outer shell member and with apex directed upstream, all inside surfaces of said outer shell member and downstream surface of said inner cone member being lined with a layer of sound absorbing material.

2. A gas inlet silencer comprising an outer shell member, an inner cone member coaxially mounted within said outer shell member, a plurality of struts joining said inner cone member and said outer shell member, said inner cone member being mounted with apex directed downstream, gas passageway between the base periphery of said inner cone member and said outer shell member, an outer cone member with base periphery smaller than base periphery of said inner cone member, said outer cone member being coaxially mounted within said outer shell member with apex directed upstream, all inside surfaces of said outer shell member and downstream surface of said inner cone member being lined with a layer of sound absorbing material.

3. In pneumatic machinery and the like, an inlet silencer comprising a tubular casing member, an inlet ring joined to one end of said tubular casing member, a truncated cone member joined to the other end of said casing member, a neck member joined to small periphery of said truncated cone, means joined to said neck member for attaching to said machinery, an inner cone member coaxially mounted within said tubular casing member, a plurality of struts joining said truncated cone mem-

ber and said inner cone member with apex directed downstream and providing an annular passageway between base periphery of said inner cone member and tubular casing member, means for directing inflowing air into said outer casing member, said means being a splitter cone coaxially mounted to said inner cone with its apex directed upstream, said splitter cone having a base periphery smaller than the base periphery of said inner cone, the inside surfaces of said tubular casing member, said inlet ring, said truncated cone, said neck and the downstream side of said inner cone being lined with a layer of sound absorbing material.

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