# United States Patent [19]

**Mitchell**

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[54] **VIBRATION DAMPENER**


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[52] **U.S. Cl.** ..... **74/574,** 188/1 B
[51] **Int. Cl.** ..... **F16f 15/12**
[58] **Field of Search** ..... 74/574; 188/1 B, 188/218 A



[56] **References Cited**

UNITED STATES PATENTS

2,505,031 4/1950 Dach ..... 188/1 B

FOREIGN PATENTS OR APPLICATIONS

519,010 11/1955 Canada ..... 188/218 A



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[57] **ABSTRACT**

A vibration dampener for use on rotors such as brake discs during machining operations is an elastomeric band having a plurality of lead buttons mounted thereon and a fastener at one end for holding the band on the rim of the rotor with the lead buttons in engagement with the rotor.


**10 Claims, 5 Drawing Figures**

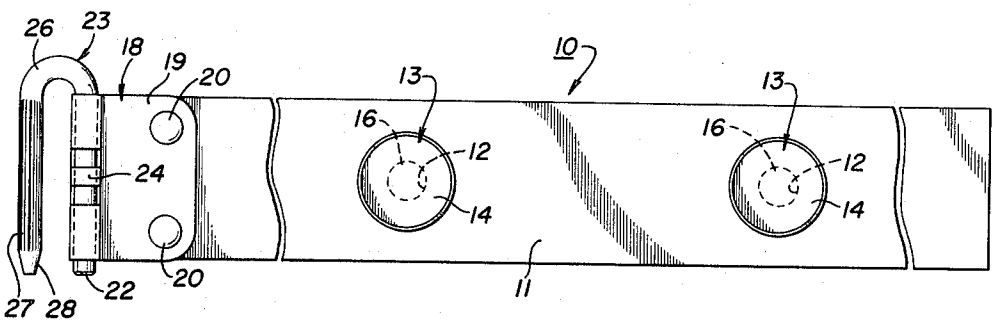


FIG. 1

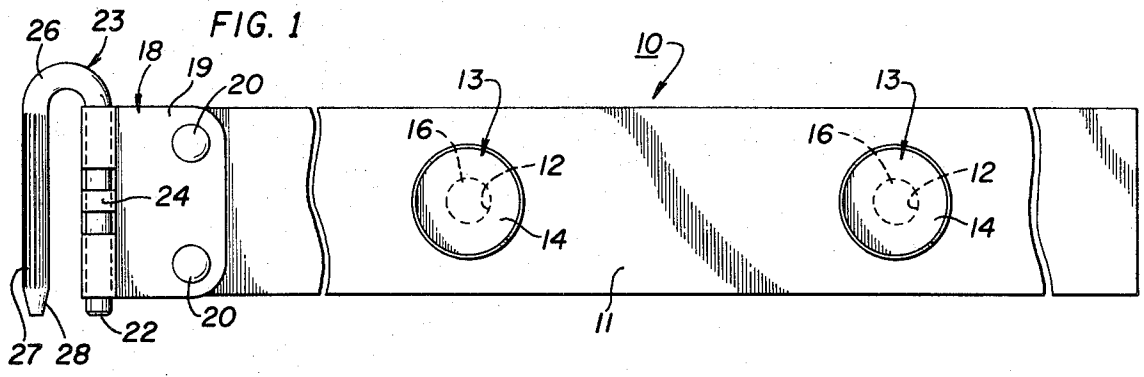



FIG. 2

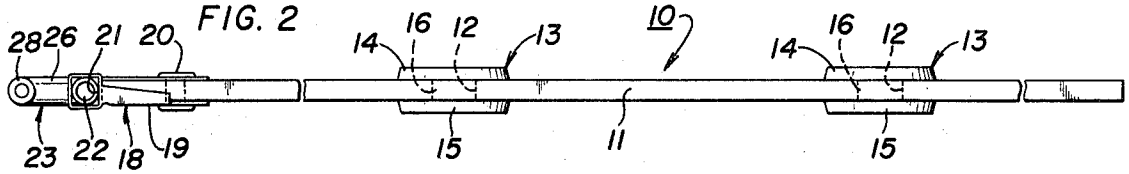



FIG. 3

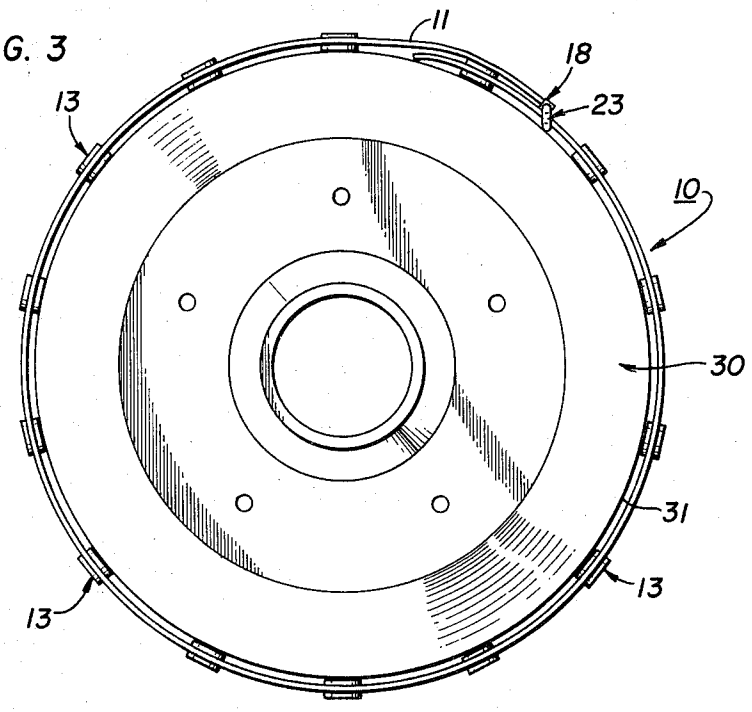



FIG. 4

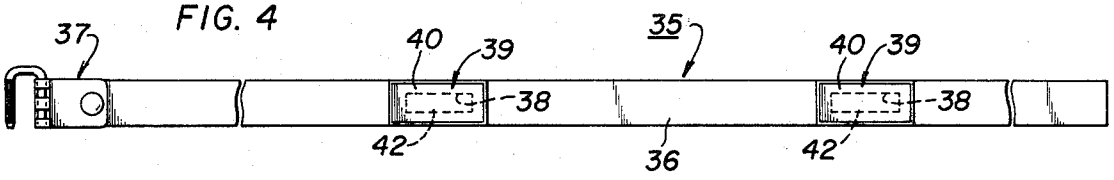
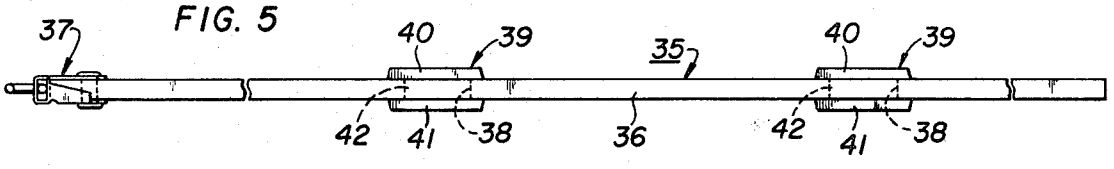



FIG. 5



# VIBRATION DAMPENER

The present invention relates in general to vibration dampeners of the type commonly known as silencer bands which are placed over the periphery of the rotor to inhibit vibration of the rotor during metal removal operations thereon.

## BACKGROUND OF THE INVENTION

In order to reduce vibration or chattering in thin rotors during metal removal operations it is known to stretch resilient bands over the rims of the rotors. However, some vibration still results when such prior art silencer bands have been used whereby smooth facial finishes with minimum radial readouts across the rotor faces have not been achieved. Because of the need to provide smoother faces on brake discs, other vibration dampeners have been developed. See, for example, U.S. Pat. No. 3,611,830 issued Oct. 12, 1971 and assigned to the same assignee as the present invention, disclosing the use of lead blocks mounted on a flexible band for direct engagement with the rim of the rotor. The present invention is an improvement over this prior art silencer band and has the added advantages of ease of use, ease of repair and versatility of use.

## SUMMARY OF THE INVENTION

Briefly, a preferred embodiment of the silencer band of the present invention employs a resilient band to which a plurality of lead buttons are removably secured at spaced apart locations and a hook-like fastener fixed to one end of the band for clamping engagement with an intermediate portion of the band to maintain the band in a stretched condition around the rim of the rotor with the lead buttons in engagement therewith.

## BRIEF DESCRIPTION OF THE DRAWING

Further objects and advantages and a better understanding of the invention may be had from the following detailed description taken in connection with the accompanying drawing, wherein:

FIG. 1 is a fragmentary plan view of a silencer band embodying the present invention;

FIG. 2 is a side elevational view of the silencer band of FIG. 1 taken from the bottom thereof;

FIG. 3 is an elevational view of a rotor with a silencer band of the present invention operatively mounted thereon;

FIG. 4 is a fragmentary plan view of another silencer band embodying the present invention; and

FIG. 5 is a side elevational view of the silencer band of FIG. 4 taken from the bottom thereof.

## DETAILED DESCRIPTION OF THE DRAWING

Referring now to the drawing and particularly to FIGS. 1 and 2 thereof, a silencer band 10 includes a strip 11 formed of an elastomeric, easily stretchable material such as rubber or plastic and having a plurality of circular holes 12 provided at spaced apart locations therein. A plurality of lead button-like members 13 each having head portions 14 and 15 interconnected by an integral shank portion 16 of reduced diameter are mounted in the holes 12. As shown, the shank portion 16 has a diameter approximately the same as that of the holes 12 and the diameter of the head portions 14 and 15 is substantially greater. The buttons are assembled to the strip 11 by inserting one of the head portions through the hole 12, whereupon the portions of strip material around the hole stretches and then returns to its relieved state to removably secure the button in place. Should one or more of the buttons be damaged they can be readily replaced. While the exact spacing between the members 13 is not critical, a space of two inches between the members 13 has produced very satisfactory results.



Secured to one end of the strip 11 is a fastener assembly 18 comprising a U-shaped member 19 rivetted to the strip 11 by a pair of rivets 20 and defining at the end of the strip a transverse opening 21 in which a leg 22 of a U-shaped hook member 23 is pivotably secured. The leg 22 is provided with a centrally disposed circumferential groove into which a portion 24 of the member 19 is pressed to hold the hook member 23 in place while permitting some pivotal movement thereof. The other leg 26 of the hook member 19 has a longitudinally knurled intermediate section 27 and a tapered distal end 28.

Referring to FIG. 3, in use the silencer band 10 is placed on a rotor 30 by stretching the strip 11 over the rim portion 31 with the hooked end overlying the other end portion of the strip. The leg 26 of the hooked member 19 is then inserted under an intermediate portion of the strip 11 between a pair of the buttons 13. Preferably the leg 26 has a diameter greater than the thickness of the head portions 14 and 15 of the buttons 13 so as to be under compression between the strip 11 and the rim 31 to hold the band in the stretched condition on the rim of the rotor. The extent to which the ends of the strips 11 overlap depends upon the relative length of the strip 11 and the diameter of the rim 31 but the amount of such overlap has no effect on the operation of the silencer band. Hence, one silencer band is usable with all sizes of brake discs and brake drums without excessively stretching any part of the strip 11 and without any pigtail hanging loose at one end.

Referring now to FIGS. 4 and 5, there is shown another silencer band 35 embodying the present invention and which is particularly suitable for use with brake discs. The band 35 includes a strip 36 formed of an easily stretchable elastomeric material such as rubber on plastic to one end of which is rivitted a fastener assembly 37. The fastener assembly is substantially identical to the fastener assembly 18 of FIGS. 1 and 2 except for dimensional differences. Removably mounted to the strip 36 in spaced apart rectangular holes 38 therein is a plurality of rectangular button members 39 cast of lead and having head portions 40 and 41 interconnected by a central portion 42 of reduced cross-sectional area corresponding in size and shape to that of the holes 38. The button-like members 39 are elongated in the longitudinal direction of the strip 36 and have a width equal to that of the strip 36. Hence, the members 39 each provide a greater mass for a support strip of given width than do the members 13. The silencer band 35 is used in the same way as is the silencer band 11. Because of the larger relative sizes of the lead buttons 39 in this embodiment of the invention, a relatively thin band having a width of one-half inch has sufficient mass to substantially eliminate vibration of a thin brake disc and is sufficiently narrow to facilitate assembly thereof onto the rim of the disc. Like the silencer band 10, however, it also has application on brake drums and other rotors.

As described hereinbefore the bands 11 and 36 are formed of a suitable stretchable material to permit in-

sertion of the double headed buttons **13** or **39** therein. The bands **11** and **39** may, however, be made of spring steel and the buttons may be directly and permanently cast thereon or made in two interconnectable parts for assembly to and removal from the associated band. The spring steel is sufficiently stretchable in the longitudinal direction to be tightly fitted over the rim **31** of the rotor **30** to secure the band thereon.

While the present invention has been described in connection with particular embodiments thereof, it will be understood that those skilled in the art may make many changes and modifications without departing from the true spirit and scope thereof. Accordingly, the appended claims are intended to cover all such changes and modifications as fall within the true spirit and scope of the present invention.

What is claimed is:

**1.** A silencer band for mounting on a rim portion of a rotor, comprising

an elongated strip of elastomeric material,

a plurality of lead members fastened to said strip at spaced apart locations thereon and protruding outwardly from the surface thereof, and

fastening means mounted to one end of said strip for fastening engagement with an intermediate portion of said strip when said strip is stretched around the rim portion of a rotor.

**2.** A silencer band according to claim **1** wherein said lead members are insertable in and removable from holes in said strip.

**3.** A silencer band according to claim **2** wherein

said lead members each have head portions at each end connected by an intermediate portion of reduced diameter.

**4.** A silencer band according to claim **3** wherein

said lead members are elongated in the longitudinal direction of said strip.

**5.** A silencer band according to claim **1** wherein said fastening means comprises

a U-shaped hook including a leg for insertion between said intermediate portion of said strip and the adjacent portion of said rim.

**6.** A silencer band according to claim **5** wherein

the thickness of said leg is greater than the distance said lead members extend from the surface of said strip.

**7.** A silencer band according to claim **6** wherein said leg is knurled.

**8.** A silencer band according to claim **1** wherein

said fastening means includes a hook-shaped member pivotably mounted to said strip about an axis transverse to said strip.

**9.** A silencer band according to claim **1** wherein

said lead members protrude from both sides of said strip.

**10.** A method of dampening vibrations in a rotating rotor, comprising

stretching a resilient band to which lead pieces are affixed at spaced apart intervals around the rim of said rotor with said lead pieces in engagement with said rim,

overlapping one end portion of said band with the other end portion, and

connecting said other end of said band to an intermediate portion of said band to secure said band in said stretched condition on said rim.

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