(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 424 488 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
02.06.2004 Bulletin 2004/23

(51) Int Cl.[7]: **F02M 29/06**, F01N 1/08

(21) Application number: **02258134.2**

(22) Date of filing: **26.11.2002**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR IE IT LI LU MC NL PT SE SK TR
Designated Extension States:
AL LT LV MK RO SI

(71) Applicant: **Burnett, David**
Alliance, NE 69301 (US)

(72) Inventor: **Burnett, David**
Alliance, NE 69301 (US)

(74) Representative: **Wilson, Peter David et al**
Dummett Copp,
25 The Square,
Martlesham Heath
Ipswich, Suffolk, IP5 3SL (GB)

(54) Vortex spinning device for an automotive vehicle

(57) A fuel saver device is made of a cut and deformed piece of stainless steel in the shape of a cylinder. The strip is provided in a length sufficient to correspond to the inner diameter of the inlet pipe to a vehicle engine or from its turbo fan outlet, or into the inlet pipe leading to the turbo fan or in the exhaust pipe from the engine. A series of square-shaped tabs are cut along one side of the strip and then bent diagonally to form a series of dog-ears. Finally, the strip is rolled into the shape of a cylinder in which the edges meet and the resulting device is inserted into the intake of a vehicle.

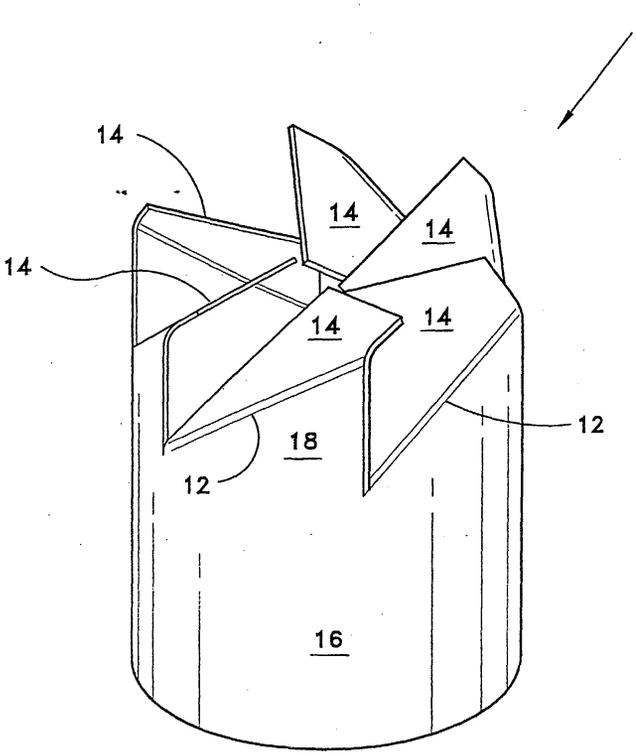

FIG. 1

EP 1 424 488 A1

Description

[0001] The present invention relates to an insertable device for creating a vortex in a vehicle inlet or exhaust pipe, in order to enhance vehicle performance, e.g., to boost power and save fuel.

[0002] A number of insertable devices are known that are used to provide mixing to liquid and/or gases including, inter alia, US 830 268, which is designed to improve the circulation in heating systems, US 1 345 791, US 1 584 046, and US 1 868 902. There have also been a number of insertable devices for use in internal combustion engines, for example US 1 115 699, US 1 182 954 and US 1 396 054 that teaches that the mixing device can be formed from a single strip of cut and formed metal.

[0003] In the mixing devices described above, the devices include flanges or are made from materials that have proven inferior when applied to internal combustion engines. Present-day large vehicles, like tractors, diesel trucks and diesel locomotive consume large amounts of fuel. Any savings in fuel will add up to a large amount of savings in operating cost over the lifetime of the vehicle.

[0004] Present-day large vehicles use air intake pipes that are corrugated for increased strength, or are otherwise rough along their internal surfaces. Therefore, the pattern of air or gas flow through the intake or exhaust is generally turbulent, thereby contributing to inefficient gas flow and resulting in poor fuel economy.

[0005] The inventor of the present invention has found that by designing the fuel saver device to ensure that the gas rotates through the intake or exhaust, the flow enters intake efficiently.

[0006] None of the above inventions and patents, taken either singly or in combination, is seen to describe the instant invention as claimed.

[0007] The invention is directed to an insertable device in which a strip of stainless steel is cut and bent into a cylindrical shape that is capable of being inserted into a vehicle inlet or exhaust pipe and that improves the vehicle performance during normal operation of the vehicle. The types of vehicles which can benefit by this device include large tractors, diesel locomotives, outboard boat motors and lawnmowers, including both turbo-boosted and carburetted vehicles.

[0008] Accordingly, it is a principal object of the invention to provide a fuel saver device for use in the intake or exhaust pipes of vehicles.

[0009] It is another object of the invention to provide a device as described above which is made from a cut and deformed stainless steel strip that is shaped into a cylinder.

[0010] It is a further object of the invention to provide a device as described above for use in carburettor equipped vehicles, in which the device includes a plurality of cut and diagonally bent tabs, which cause the gases to flow out of the device in a clockwise direction during use, i.e., to rotate clockwise as the gases flow downstream.

[0011] Still another object of the invention is to provide a method of using the above device.

[0012] It is an object of the invention to provide improved elements and arrangements thereof in an apparatus for the purposes described which is inexpensive, dependable and fully effective in accomplishing its intended purposes.

[0013] These and other objects of the present invention will become readily apparent upon further review of the following specification and drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014]

Fig. 1 is an environmental, perspective view of a power booster fuel saver according to the present invention.

Fig. 2 is a plan view of the strip of stainless steel before cutting and deforming into the fuel saver.

Fig. 3 is a plan view of the strip of stainless steel after cutting the tabs and bending the tabs along their diagonals, but before final shaping into a cylinder.

Fig. 4 is a view axially into a pipe containing the fuel saver in place.

[0015] Similar reference characters denote corresponding features consistently throughout the attached drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0016] Fig. 1 shows a fuel saver 10 according to the present invention showing its cylindrical shape. The structure is made from a single strip of Grade 304 or 316 stainless steel with a thickness of 25 mil for large trucks or 10 mil for other automotive vehicles. Tabs 18 extend from the remaining skirt 16 of the cylindrical structure 10. Each tab 18 is bent diagonally along folds 12 to produce dog-ears 14 that are oriented in an upward direction from the page.

[0017] Referring to Fig. 2, the starting strip of stainless steel, preferably Grade 304 or 316, and preferably 10 mil or 25 mil in thickness, depending upon application, is initially cut along cut lines 20 to form square-shaped tabs 18 that extend from the skirt 16, as shown in Fig. 3. The strip is shaped and joined at the ends to form a cylinder, and the tabs 18 are bent radially inward in overlapping fashion to form the fuel saver 10. The reason for using either Grade 304 or 316 rather than carbon steel is to avoid stress fractures that may occur because of vehicle and engine vibration. The fuel saver 10 can be fabricated in two possible configurations: a clockwise or a counter-clockwise vortex-producing configuration.

[0018] For turbo-boosted vehicles, i.e., vehicles including turbo-fans in the inlet and/or the exhaust, the fuel saver 10 creates a vortex that rotates in the same direction as the direction of rotation of the nearest turbo-fan. For non-turbo-boosted vehicles, the fuel saver 10 preferably creates a clockwise vortex, when viewed in the downstream direction.

[0019] In the case of a turbo-assisted vehicle, the resulting cylindrical device is placed either inside the vehicle intake line leading to the intake manifold, upstream or downstream of the turbo fan, or inside the exhaust line in an orientation that ensures that the resulting vortex rotation produced by the gases moving through the device is the same as the rotation of the nearest turbo fan. In the case of carburetted engines, the fuel saver 10 causes intake air to swirl, causing better atomization of fuel in the intake manifold, thereby providing more complete combustion of the air-fuel mixture and increased fuel economy and, in the case of turbo-assisted engines, assists the turbo fan for more power through the complete range of engine speed (i.e., rpm). In the case of diesel or fuel-injected engines, placement of the device in the intake or fuel-injected engines, placement of the device in the intake ensures improved air flow into the combustion chamber.

[0020] Preferably the tabs are offset from the skirt by substantially 45° as this has been observed to provide a measurable increase in fuel economy across a range of engines. It has also been observed that for low-speed engines, such as diesel engines, an increased tab offset tends to provide greater fuel efficiency. Also, for high-speed engines, it has been found that a tab offset of less that 45° has been found to provide improved fuel efficiency. It will be readily apparent to those skilled in the art that the appropriate tab offset angle can be determined by trial and error, with the fuel efficiency, or power output, being monitored as different tab offset angles are used.

[0021] Some turbo-assisted vehicles are equipped with at least two turbo fans, one placed in the inlet to the engine and another in the outlet, the two axles of the turbo fans being connected directly to each other with a shaft and, in some cases, with additional intervening gears. The resulting inlet-outlet turbo fans have opposite rotations. Therefore, the correct device (i.e., clockwise or counter-clockwise) to use in the inlet or outlet of these vehicles must be selected accordingly as discussed above.

[0022] The modified vehicle may also include more than one device for greater efficiency, e.g., a device can be installed both before and after each turbo fan for a total of 4 devices.

[0023] It is to be understood that the present invention is not limited to the sole embodiments described above, but encompasses any and all embodiments within the scope of the following claims.

Claims

1. A device for use in a vehicle comprising:

a cylindrical tube having a first and second end; and

a plurality of tabs disposed around the circumference of the first end of said tube, said tabs being bent radially toward an axial midline of said tube in an overlapping pattern;

wherein said tube is adapted for being positioned in a throttle in order to impart a swirling motion to air entering through the throttle.

2. A device according to claim 1, wherein the tans are bent at an angle of approximately 45° to the tube

3. A device according to claim 1 or claim 2, wherein the device is located in an air inlet.

4. A device according to claim 1 or claim 2, wherein the device is located in an air outlet.

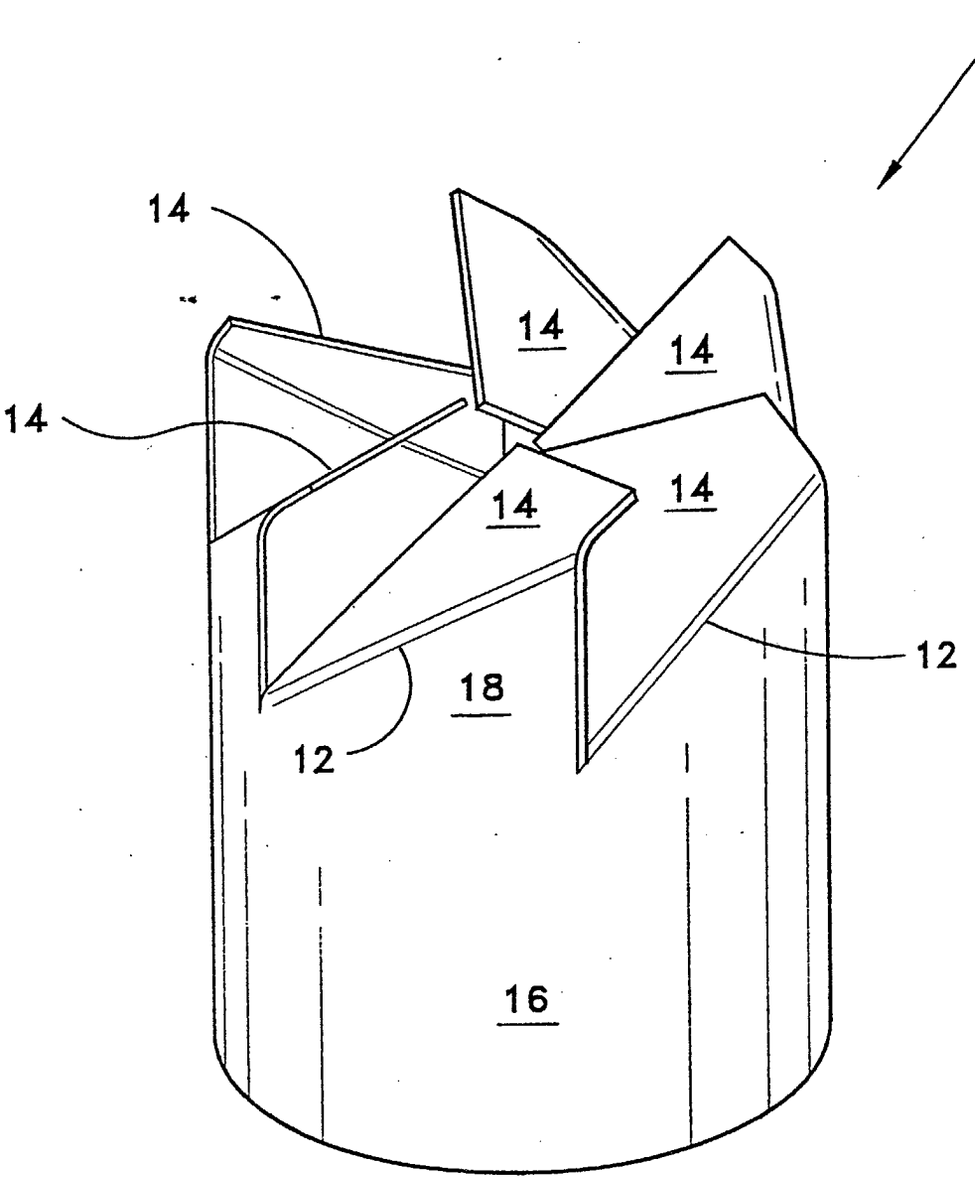

FIG. 1

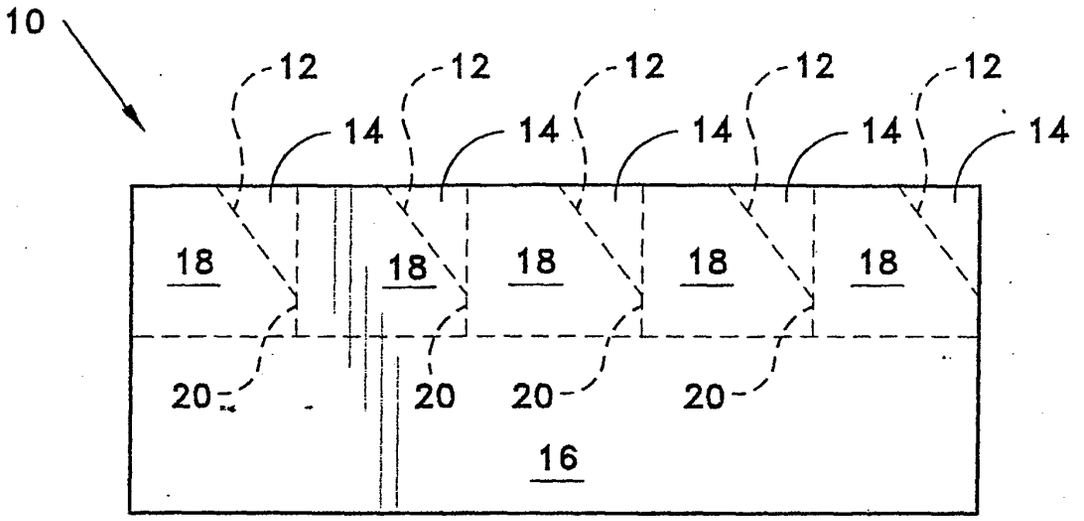
10
12
12
12
12
12
14
14
14
14
14
18
18
18
18
18
20
20
20
20
16

FIG. 2

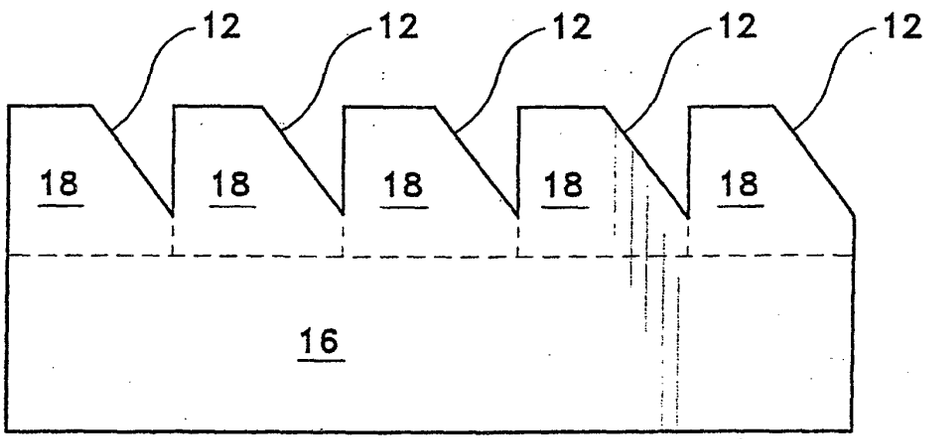
12
12
12
12
12
18
18
18
18
18
16

FIG. 3

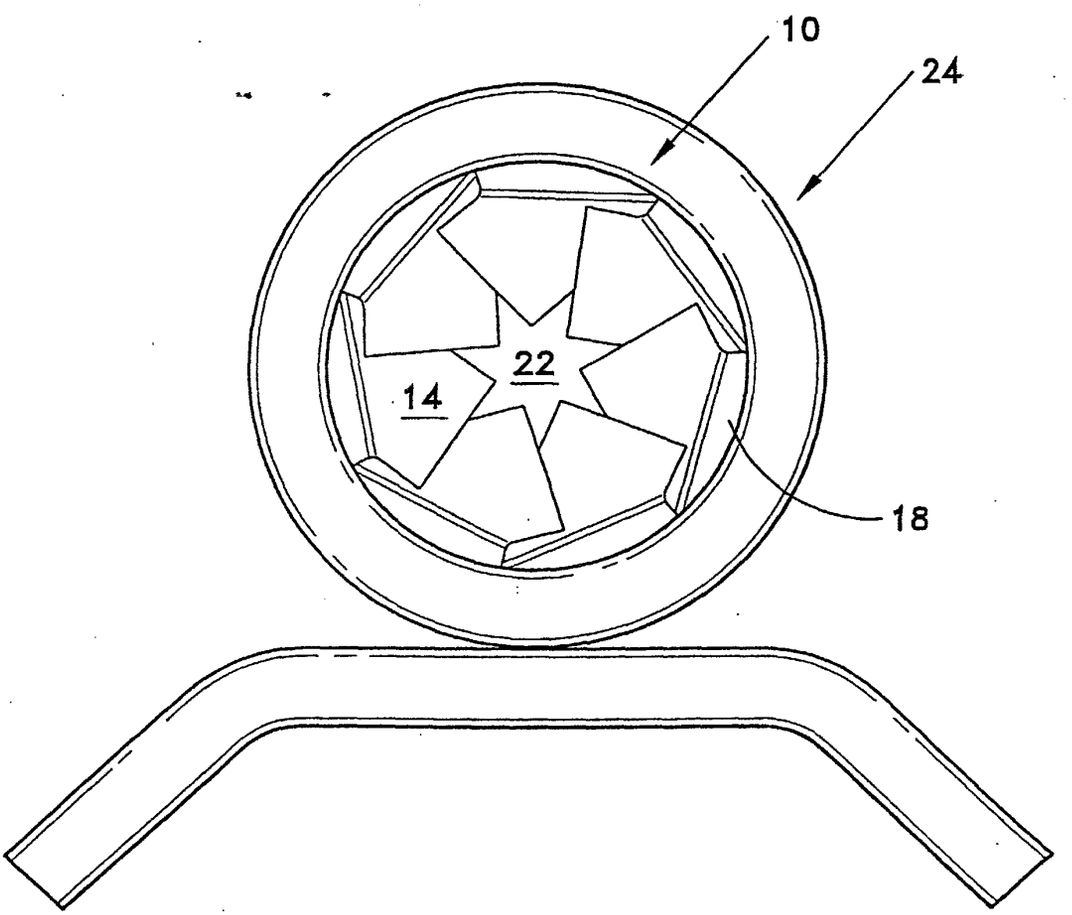

FIG. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 25 8134

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X,D	US 1 182 954 A (WOLF) 16 May 1916 (1916-05-16) * the whole document *	1-4	F02M29/06 F01N1/08
X	US 4 515 138 A (AGADI) 7 May 1985 (1985-05-07) * the whole document *	1-4	
X,D	US 1 345 791 A (LIVINGSTONE) 6 July 1920 (1920-07-06) * the whole document *	1,3,4	
A	US 5 113 838 A (KIM) 19 May 1992 (1992-05-19) * the whole document *	1-4	
A,D	US 1 115 699 A (LOOSE) 30 April 1912 (1912-04-30) * the whole document *	1-4	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7) F02M F01N

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	10 April 2003	Van Zoest, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 25 8134

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

10-04-2003

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 1182954 A		NONE	
US 4515138 A	07-05-1985	NONE	
US 1345791 A	06-07-1920	NONE	
US 5113838 A	19-05-1992	AU 633216 B2	21-01-1993
		AU 7831591 A	19-12-1991
		BE 1004764 A3	26-01-1993
		CA 2044358 A1	13-12-1991
		CN 2105560 U	27-05-1992
		DE 4119081 A1	19-12-1991
		FR 2663083 A1	13-12-1991
		GB 2245028 A ,B	18-12-1991
		HK 106094 A	14-10-1994
		IT 1248490 B	19-01-1995
		SE 9101770 A	13-12-1991
		SG 104094 G	28-10-1994
		RU 2023899 C1	30-11-1994
US 1115699 A		NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82