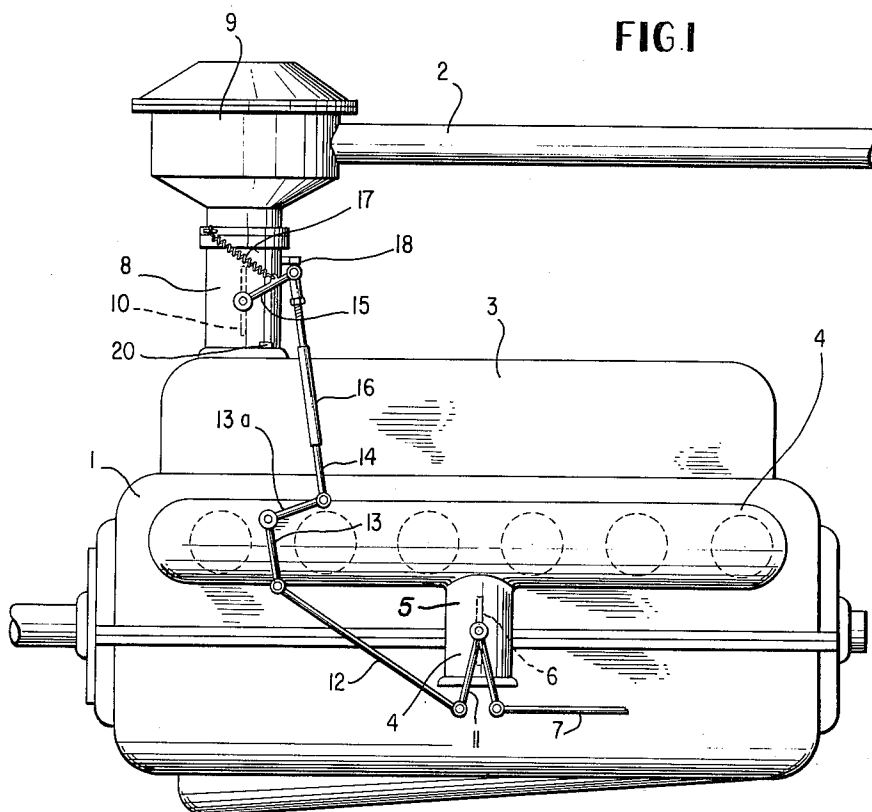
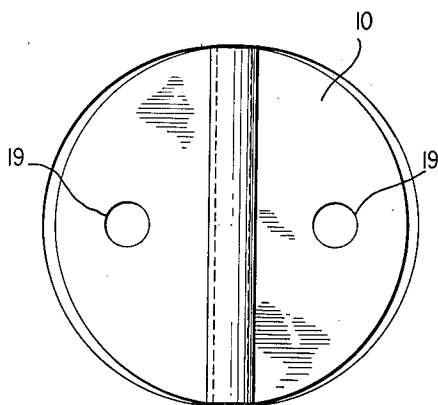


Aug. 10, 1965

W. SCHOLTYSEK  
NOISE-SUPPRESSION SYSTEM FOR DIESEL ENGINES HAVING  
EXHAUST BRAKE MEANS  
Filed Sept. 10, 1962

3,199,498



INVENTOR  
WOLFGANG SCHOLTYSEK

BY

*Dicke & Craig*

ATTORNEYS

1

3,199,498

## NOISE-SUPPRESSION SYSTEM FOR DIESEL ENGINES HAVING EXHAUST BRAKE MEANS

Wolfgang Scholtyssek, Waiblingen, Germany, assignor to Daimler-Benz Aktiengesellschaft, Stuttgart-Unterturkheim, Germany

Filed Sept. 10, 1962, Ser. No. 222,308

Claims priority, application Germany, Sept. 14, 1961,

D 37,031

6 Claims. (Cl. 123—97)

The present invention relates to a noise-suppression system for internal combustion engines, and particularly, to noise-suppression systems for diesel engines in which a valve is arranged within the suction or inlet line and is operatively associated with a brake valve in the outlet or exhaust line.

In motor vehicles with diesel engine drive, particularly those having a relatively long intake or suction line, such as, for example, busses, noises with resonance peaks in the entire speed range of the vehicle arise in the oil-bath air filter within the engine space in the rear and at the fresh-air suction place in front during engine-braking operation. These noises with resonance peaks are unpleasantly noticeable at the inside of the vehicle and are oftentimes objected to by the passengers of the motor vehicles. The various individual resonance peaks may be suppressed or reduced by the use of resonators in the air intake line. However, an effective reduction of the entire noise level cannot be achieved in this manner.

On the other hand, such an effective reduction of the overall noise level becomes feasible according to the present invention by the provision of an additional throttle valve arranged between the diesel engine and the oil-bath fresh-air filter, which valve is actuated simultaneously with and in the same direction as the engine-exhaust brake valve. By the use of the present invention, practically all of the disturbing resonance peaks are removed and the entire noise level is thus considerably lowered.

Accordingly, it is an object of the present invention to provide a noise-suppressing system of the type described hereinabove which effectively eliminates the shortcomings and inadequacies of the prior art constructions.

It is another object of the present invention to provide a noise-suppressing system for internal combustion engines, particularly diesel engines, which permits, by simple means, a noise reduction and a leveling of the resonance peaks over the entire rotational speed range of the engine.

Still a further object of the present invention resides in the provision of a noise-reducing system which obviates the need for complicated resonator systems involving a large number of resonators that are effective, at best, only for individual resonance peaks.

A further object of the present invention resides in the provision of a noise-suppressing system for suppressing the noises that occur especially with vehicles having relatively long suction lines, which is actuated in unison with the exhaust brake of the engine, yet prevents the occurrence of unfavorable pressure conditions on the suction side of the engine.

These and other objects, features and advantages of the present invention will become more obvious from the following description, when taken in connection with the accompanying drawing which shows, for purposes of illustration only, one embodiment in accordance with the present invention, and wherein

FIGURE 1 is a side elevational view of a motor vehicle engine with an exhaust brake valve and with a noise reduction valve in the intake connecting line, and

FIGURE 2 is a plan view, on an enlarged scale, of the throttle valve in the intake connecting line.

Referring now to the drawing, wherein like reference

2

numerals are used throughout various views to designate like parts, and more particularly to FIGURE 1, reference numeral 1 designates therein the motor or internal combustion engine, while reference numeral 2 designates the air intake line at the vehicle, reference numeral 3 the air intake conduit or pipe at the engine and reference numeral 4 the exhaust line. An engine-exhaust brake valve 6 is arranged within the pipe connection 5 for the exhaust line leading to the muffler, which valve 6 is actuated from the driver's seat, for example, via a lever system or linkage 7.

In accordance with the present invention, a second throttle valve 10 is arranged within the pipe connection 8 leading to the air intake line 2, behind an oil-bath air filter 9, which valve 10 is actuated simultaneously with and in the same sense as the throttle valves 6. For that purpose, the adjusting lever of the valve 6 is constructed, for example, as a bell crank lever 11. The actuating linkage 7 engages one leg portion of this lever 11 and a rod 12 engages the other leg portion thereof, the rod 12 being, in turn, hingedly or pivotally connected to a bell crank lever 13, 13a. The lever arm 13a of this bell crank 13, 13a is operatively connected by means of a linkage 14 with the adjusting lever 15 of the air throttle valve 10. In order to avoid, during assembly, the required exact adjustment or setting of both valves 6 and 10, and thus to facilitate the assembly, the adjusting lever system 7, 11, 12, 13, 13a and 14 is so constructed and arranged that the end of the bell crank lever 13a travels a greater distance than is actually necessary for closing the air throttle valve 10. A spring-path lost motion means 16 is provided in the link 14 to compensate for any excess adjusting path on the part of the lever system portion 7, 11, 12, 13 and 13a. Additionally, a spring 17 acts on the adjusting lever 15 of the air throttle valve 10 tending to pull the throttle valve 17 into the opening position thereof which is limited by an abutment 18.

The manipulation and operation of the present invention is believed obvious from the foregoing description of FIGURE 1. With the closing of the exhaust valve 6 for braking purposes, the air throttle valve 10 is simultaneously closed with the effect or result of the already previously mentioned noise damping or reduction. In order to avoid unfavorable pressure conditions on the suction side of the engine, the air throttle valve 10 is either not allowed to close completely, or is provided with small free cross sections, for instance, with small bores 19, as shown in FIGURE 2. In the former case, the air throttle valve closing position is limited by a second abutment 20 (FIGURE 1), which may be adjustable, if so desired. Such arrangement, however, is not necessary in the latter case.

While I have shown and described one embodiment in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of many changes and modifications within the spirit and scope of the present invention and I, therefore, do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

I claim:

1. An arrangement for reducing the noises in a motor vehicle having a diesel engine and provided with an engine exhaust brake, said diesel engine having air suction means including a suction line, an air intake manifold and an oil-bath air filter between said suction line and said intake manifold, exhaust means provided with engine exhaust brake means, said engine exhaust brake means including throttle valve means and means

3

for selectively actuating said throttle valve means, and means for reducing the noises occurring in the oil-bath air filter and the suction line including further throttle valve means within the suction means of the engine located to the rear of said oil-bath air filter, and means operatively connecting said first-mentioned throttle valve means with said second-mentioned throttle valve means to operate said throttle valve means essentially in unison and in the same sense.

2. In a motor vehicle having a diesel engine, said diesel engine being provided with air suction line means, exhaust line means and with an engine exhaust brake in the exhaust line means, an air intake manifold and an oil-bath air filter between said suction line means and said intake manifold, the engine exhaust brake including a throttle valve, the improvement essentially consisting of means for reducing the noises occurring within said suction line means comprising an air throttle valve in said suction line means located to the rear of said oil-bath air filter, and connecting means operatively connecting the throttle valve of said engine brake with said air throttle valve to operate both of said valves essentially in unison and in the same direction, said air throttle valve being provided with aperture means which leave open a predetermined cross-sectional passage area upon complete closure of said air throttle valve.

3. In a motor vehicle having a diesel engine, said diesel engine being provided with air suction line means, exhaust line means and with an engine exhaust brake in the exhaust line means, an air intake manifold and an oil-bath air filter between said suction line means and said intake manifold, the engine exhaust brake including a throttle valve, the improvement essentially consisting of means for reducing the noises occurring within said suction line means comprising an air throttle valve in said suction line means located to the rear of said oil-bath air filter, and connecting means operatively connecting the throttle valve of said engine brake with said air throttle valve to operate both of said valves essentially in unison and in the same direction, and an abutment means determining the closure end-position of said air throttle valve to prevent complete closure of said air suction line means thereby avoiding unfavorable pressure conditions on the suction side of the engine.

4. An arrangement for reducing the noises in a motor vehicle having a diesel engine provided with an engine exhaust brake, said diesel engine having air suction means including a suction line, an air intake manifold and an oil-bath air filter between said suction line and said intake manifold, exhaust means provided with engine exhaust brake means, said engine exhaust brake means including throttle valve means and means for selectively actuating said throttle valve means, and means for reducing the noises occurring in the oil-bath air filter and the suction line including further throttle valve means within the suction means of the engine located behind said oil-bath air filter, and means operatively connecting said first-mentioned throttle valve means with said second-mentioned throttle valve means to operate said throttle valve means essentially in unison and in the same sense, said further throttle valve means having an adjusting

4

lever, and said connecting means including linkage means operatively connected with said adjusting lever and spring-loaded lost motion means in said linkage means to enable relative movement between said valve means.

5. An arrangement for reducing the noises in a motor vehicle having a diesel engine provided with an engine exhaust brake, said diesel engine having air suction means including a suction line, an air intake manifold and an oil-bath air filter between said suction line and said intake manifold, exhaust means provided with engine exhaust brake means, said engine exhaust brake means including throttle valve means and means for selectively actuating said throttle valve means, and means for reducing the noises occurring in the oil-bath air filter and the suction line including further throttle valve means within the suction means of the engine located behind said oil-bath air filter, spring means normally urging said further throttle valve means into the opened position thereof and means operatively connecting said first-mentioned throttle valve means with said second-mentioned throttle valve means to operate said throttle valve means essentially in unison and in the same sense, said further throttle valve means having an adjusting lever and being provided with aperture means which leave open a predetermined cross sectional passage area upon complete closure of said further throttle valve means, and said connecting means including linkage means operatively connected with said adjusting lever and spring-loaded lost motion means in said linkage means to enable relative movement between said valve means.

6. An arrangement for reducing the noises in a motor vehicle having a diesel engine provided with an engine exhaust brake, said diesel engine having air suction means including a suction line, an air intake manifold and an oil-bath air filter between said suction line and said intake manifold, exhaust means provided with engine exhaust brake means, said engine exhaust brake means including throttle valve means and means for selectively actuating said throttle valve means, and means for reducing the noises occurring in the oil-bath air filter and the suction line including further throttle valve means within the suction means of the engine located to the rear of said oil-bath air filter and means operatively connecting said first-mentioned throttle valve means with said second-mentioned throttle valve means to operate said throttle valve means essentially in unison and in the same sense, said connecting means including linkage means to displace the second-mentioned throttle valve means to the closing position thereof prior to the end position in the closing movement of said connecting means and spring-loaded lost motion means to enable the relative movement between said second-mentioned throttle valve means and said linkage means.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

|           |      |                |        |
|-----------|------|----------------|--------|
| 2,074,651 | 3/27 | Huffman et al. | 188—99 |
| 2,440,336 | 4/48 | Hill           | 123—97 |

FRED E. ENGELTHALER, *Primary Examiner.*