Aug. 21, 1923. 1,465,904

F. J. HERDLE

MUFFLER

Filed Jan. 16, 1920

Fig. 1

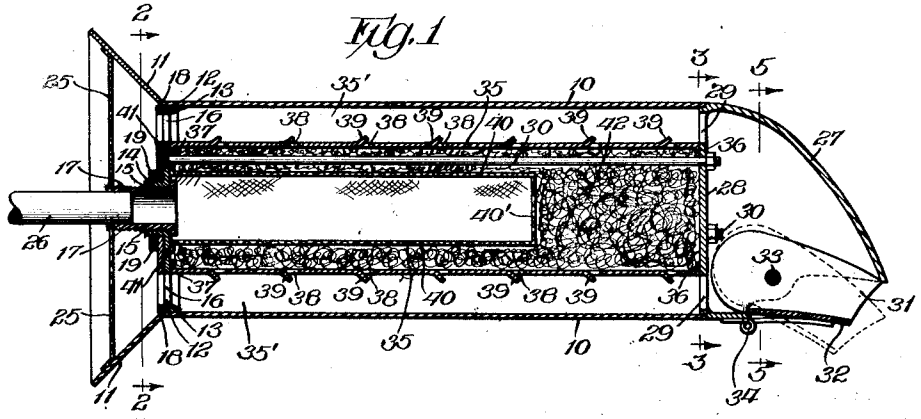


Fig. 2

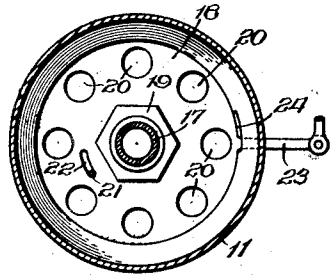


Fig. 3

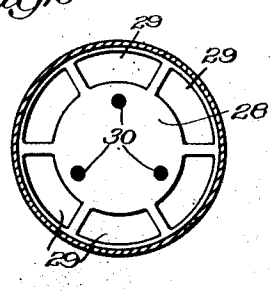


Fig. 4

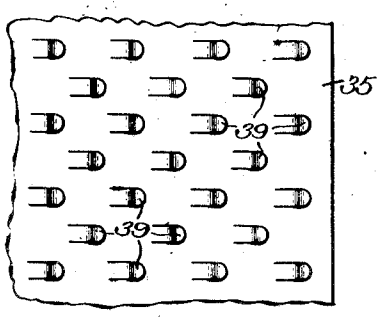


Fig. 5

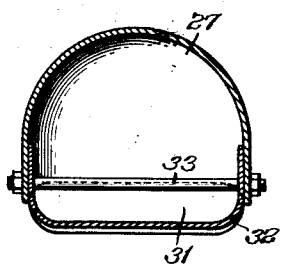
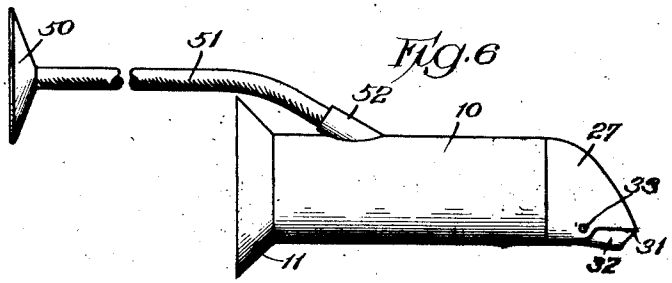


Fig. 6



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UNITED STATES PATENT OFFICE.

FREDERICK J. HERDLE, OF CHICAGO, ILLINOIS.

MUFFLER.

Application filed January 16, 1920. Serial No. 351,854.

To all whom it may concern:

Be it known that I, FREDERICK J. HERDLE, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Mufflers, of which the following is a full, clear, and exact description.

My invention relates to exhaust mufflers for motor cars, and it consists in the combinations, constructions, and arrangements herein described and claimed.

An object of my invention is to provide a muffler in which there are means for reducing the back pressure upon products of combustion or exhaust gases passing therethrough.

A further object of my invention is to provide a device of the type described having a novel means for reducing noise occasioned by the rush of exhaust gases therethrough.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which

Figure 1 is a sectional view of the device,

Figure 2 is a sectional view along the line 2—2 of Figure 1,

Figure 3 is a sectional view along the line 3—3 of Figure 1,

Figure 4 is a fragmentary plan view of a blank used to form a portion of the device,

Figure 5 is a sectional view along the line 5—5 of Figure 1, and

Figure 6 is a perspective view of a modified form of the device.

In carrying out my invention, I make use of an outer casing having a cylindrical portion 10, and one end formed into a funnel shaped portion 11. A circular head 12, having a flanged rim 13, is secured within the cylindrical portion 10 of the outer casing near the juncture of the cylindrical portion 10 with the funnel shaped portion 11. The circular head 12 has an outwardly extending hub portion 14 about a central opening 15, and has a number of openings 16 near its outer edge. The hub portion 14 is threaded internally and also has its end threaded externally.

A flanged bushing 17 is screwed into the central opening 15 of the circular head 12, until the flanged head is flush with the inner surface of the circular head 12, the body extending toward the mouth of the funnel shaped portion 11 of the outer casing.

A circular disc 18 is loosely mounted upon the hub portion 14 of the circular head 12 and is held in place thereon by the nut 19. The circular disc 18 has openings 20 positioned to register with the openings 16 in the circular head 12. A stud 21 upon the circular head 12 fits in the slot 22 in the circular disc 18, and limits the rotatable movement of the circular disc 18. The disc 18 may be rotated by means of a laterally extending integral arm 23 which extends through an opening 24 in the funnel shaped portion 11 of the outer casing.

It will be obvious that the openings 20 in the circular disc 18 will no longer register with the openings 16 in the circular head 12, when the circular disc 18 is rotated as far as possible by means of the arm 23 which may be connected to a lever or any other suitable mechanism.

A circular screen 25 is securely mounted upon the bushing 17 near its end, and is secured at its rim to the funnel shaped portion 11 of the outer casing. An exhaust pipe 26 from an engine fits within the bushing 17.

The end of the cylindrical portion 10 of the casing opposite the funnel shaped portion 11 is closed by a circular head of an outlet chamber 27. The circular head 28 is webbed by openings 29 near its outer edge, and is held in place by bolts 30 extending the length of the cylindrical portion 10 of the casing, and having their heads countersunk in the circular head 12 at the other end of the cylindrical portion 10 of the casing.

The top wall of the outlet chamber 27 tapers arcuately from the circular head 28. An outlet vent 31 is provided, as shown in Figure 1 of the accompanying drawings. A U-shaped member 32 is pivotally mounted upon a bolt 33 which extends through the upwardly extending sides of the U-shaped member 32 and the sides of the outlet chamber 27. The U-shaped member 32 is normally held in the position indicated in Figure 1 of the accompanying drawings by a spring 34, and by reason of the fact that the rear portion of the U-shaped member 32 is weighted. The U-shaped member 32

may be rotated downwardly to assume the position indicated by the dotted lines in Figure 1 of the accompanying drawings, and the outlet vent 31 is thereby considerably enlarged.

An intermediate cylinder 35, having inwardly extending annular flanges 36 and 37, is disposed within and spaced from the cylindrical portion 10 of the outer casing to provide an air passage 35′. The flanges 36 and 37 are secured to the circular heads 12 and 28 respectively, and are further held in spaced relation to the cylindrical portion 10 of the casing by the flanges 36 and 37 resting upon the bolts 30 which extend from the circular head 12 to the head 28. The intermediate cylinder 35 is perforated by a plurality of openings 38, having lips 39 slanting outward and toward the outlet chamber 27. The lips 39 near the circular head 12 slant at a greater angle from the cylinder 35 than the lips 39 nearer the outlet chamber 27.

An inner foraminous cylinder 40, having one end 40′ closed, is disposed within and and is spaced from the intermediate cylinder 35 with the closed end toward the outlet chamber 27. The open end of the cylinder 40 has a laterally extending annular flange 41 which is secured to the circular head 12 by any suitable and well-known means (none being shown) so that the exhaust pipe 26 opens centrally through the bushing 17 into the cylinder 40. The space between the inner cylinder 40 and the intermediate cylinder 35 is filled with steel wool 42.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. The exhaust gases coming from the exhaust pipe 26 pass through the bushing 17 into the foraminous inner cylinder 40. They then pass through the steel wool and are drawn through the openings 38 into the air passage 35′, between the intermediate cylinder 35 and the cylindrical portion 10 of the outer casing. When the car is in motion, air rushes into the funnel shaped portion 11 of the outer casing, then through the registering openings 20 and 16 in the circular disc 18 and the circular head 12 respectively into the air passage 35′. The gases drawn into the air passage 35′ are entrained by the air through the openings 29 in the circular head 28 of the outlet chamber 27, into the outlet chamber 27, and out of the outlet chamber 27 through the outlet vent 31, thus relieving the back pressure upon the exhaust gases. An increased exhaust pressure tends to enlarge the vent 31 by swinging the U-shaped member downwardly against the action of the spring 34.

Referring now to Figure 6 of the accompanying drawings, it will be noted that I have shown a modified form of the device. The construction of device is identical with the construction shown in Figure 1, with exception that additional provision is made for maintaining a sufficient air pressure when the car is not moving to entrain the gases along the air passage 35′ and out through the outlet vent 31 in the manner described. To this end, I provide a funnel shaped member 50 which is placed near a fan under the hood of a car, so that the current of air occasioned by the operation of the fan is guided by the funnel shaped member 50 through a pipe 51 and a pipe fitting 52, secured to the cylindrical portion 10 of the outside casing, into the air passage 35′ between the cylindrical portion 10 of the outside casing and the intermediate casing 35 (not shown in Figure 6), to entrain the gases which have penetrated to that space into the outlet chamber 27 and through the outlet vent 31 in the manner described.

It will be noted that a continuous flow of air is passing through my device in the direction away from the car. The suction thus created draws the exhaust gases into and along with the current of air moving through the device, and back pressure on the exhaust gases is relieved. The gases must pass through the steel wool which fills the space between the inlet from the exhaust pipe and the air passage through my device. Consequently, the noise of the exhaust is greatly decreased, since the exhaust gases are scattered through the steel wool, from which they are drawn into the air current passing through my device. The noise of exhaust is further lessened by the construction of the outlet chamber and outlet vent in my device, since the current of air with its entrained gases, in passing out of my device, impinges against the wall of the outlet chamber, and is then guided downwardly by the arcuate wall of the outlet chamber through the outlet vent.

I claim:

1. In a device of the type described, the combination of an outer casing having a cylindrical portion and a funnel shaped portion, a perforated intermediate cylinder disposed within and spaced from the cylindrical portion of said outer casing to provide an air passage, and having upon its outer surface a plurality of lips inclined toward the outer casing at an angle of less than 90°, a head at the juncture of the cylindrical and funnel shaped portions of said outer casing, means of communication between the funnel shaped and cylindrical portions of said outer casing, a strainer disposed within the funnel shaped portion of said outer casing, an inner foraminous cylinder within and spaced from said intermediate cylinder, an inlet for exhaust gases opening into said inner fo-

raminous cylinder, means disposed within the space between said inner cylinder and said intermediate cylinder for retarding the rate of flow of the exhaust gases into said air passage, an outlet chamber, means of securing said outlet chamber to said outer casing, means of communication between the said air passage within the said outer casing and said outlet chamber, and an extensible outlet in the said outlet chamber operated by the pressure of the gases passing therethrough.

2. In a device of the type described, the combination of an outer casing having a cylindrical portion and a funnel shaped portion, auxiliary means for guiding a current of air into said outer casing, a perforated intermediate cylinder disposed within and spaced from the cylindrical portion of said outer casing to provide an air passage, and having upon its outer surface a plurality of lips inclined toward the outer casing at an angle of less than 90°, a head at the juncture of the cylindrical and funnel shaped portions of said outer casing, means of communication between the funnel shaped and cylindrical portions of said outer casing, a strainer disposed within the funnel shaped portion of said outer casing, an inner foraminous cylinder within and spaced from said intermediate cylinder, an inlet for exhaust gases opening into said foraminous cylinder, means disposed within the space between said inner cylinder and said intermediate cylinder for retarding the rate of flow of the exhaust gases into said air passage, an outlet chamber, means of securing said outlet chamber to said outer casing, means of communication between the said air passage within the said outer casing and said outlet chamber, and an extensible outlet in the said outlet chamber operated by the pressure of the gases passing therethrough.

3. In a device of the type described, the combination of an outer casing, a perforated intermediate cylinder closed at both ends disposed within and spaced from said outer cylinder to provide an annular air passage, an inner foraminous cylinder within and spaced from said intermediate cylinder, an inlet for exhaust gases opening into said foraminous cylinder, means disposed within the space between said inner cylinder and said intermediate cylinder for retarding the rate of flow of the exhaust gases into said air passage, an outlet chamber secured to said outer casing, and an extensible outlet in said outlet chamber operated by the pressure of the gases passing therethrough.

4. In a device of the type described, the combination of an outer casing having a cylindrical portion and a funnel shaped portion, a perforated cylinder of less diameter than the first named cylindrical portion disposed within and spaced from the latter to provide an air passage, an outlet for the air passage, an inlet for the exhaust gases and opening into the second named cylinder, and means for regulating the flow of air from the funnel shaped portion of the outer casing into the said air passage.

FREDERICK J. HERDLE.