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2,358,690

EXHAUST SYSTEM

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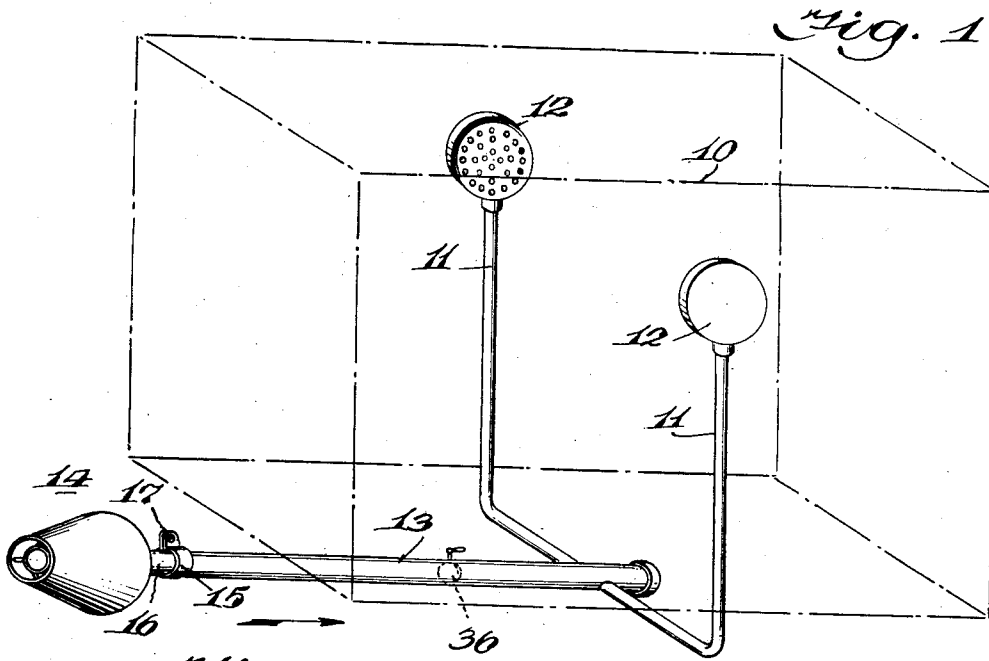


Fig. 2

Fig. 3

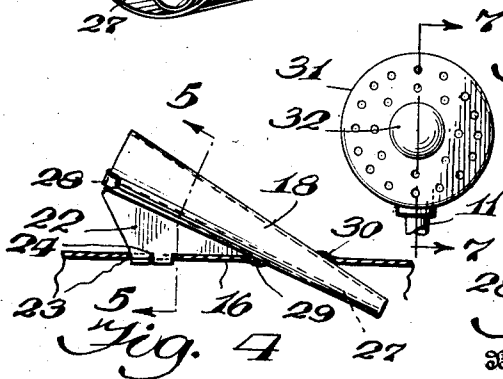
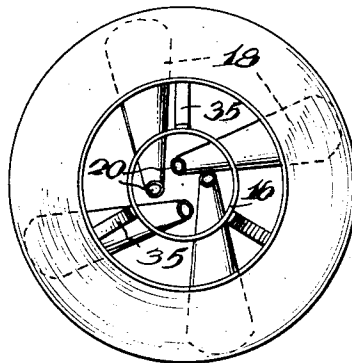
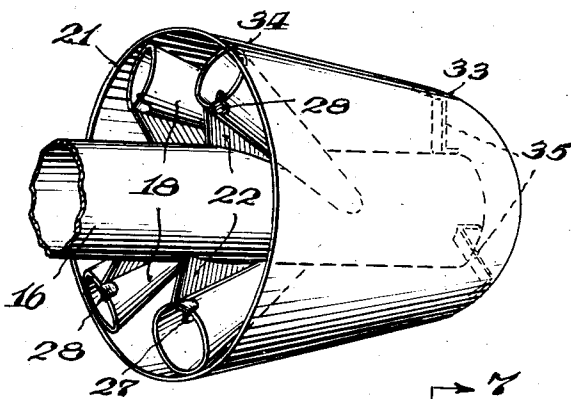


Fig. 6

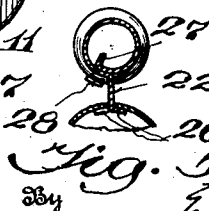
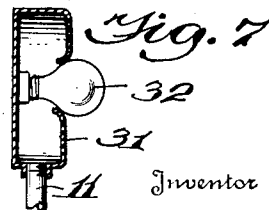


Fig. 4

Fig. 5

Fig. 7

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EXHAUST SYSTEM

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7 Claims. (Cl. 230—103)

This invention relates to an exhaust system or means, for use on vehicles of any kind, as desired, and is an improvement over that mechanism disclosed in my United States Patent No. 2,308,059 dated January 12, 1943.

The invention will be hereinafter described with relation to its broader aspect for exhausting air from any chamber or enclosed moving body such as the interior of an automobile, subway car, aircraft, boat, etc., although it is, of course, to be understood to be equally applicable in other relations than that above mentioned as, for example, the same use and relation as disclosed in my above mentioned patent, that is, at the end of an exhaust pipe of the motive system of any vehicle. Its operation depends upon the relative movement of the chamber to be evacuated and the surrounding atmosphere and its effectiveness depends upon the amount of such relative rate of movement. To effect proper ventilation it is not essential that the chamber be moving. For example, a car may be ventilated by the action of the wind blowing past the end of the exhaust pipe while the car is stationary.

One of the objects of the present invention is to provide a relatively simple and practical exhaust mechanism which may be easily and quickly applied to existing constructions and installations without material modifications of alterations.

A further object is to provide a mechanism having relatively few parts which may be inexpensively manufactured and assembled.

Another object is to provide a mechanism of the above character which is subject to a variety of uses for ventilating vehicles or the motive power exhaust system of such vehicles.

A further object is to provide a mechanism of the above character which will be strong and durable and not likely to be broken in ordinary use.

Other objects will be in part obvious from the annexed drawing and in part hereinafter indicated in connection therewith by the following analysis of the invention.

This invention accordingly consists in the features of construction, combination of parts and in the unique relation of the members and in the relative proportioning and disposition thereof, all as more completely outlined herein.

To enable others skilled in the art to fully comprehend the underlying features of this invention, that they may embody the same by the numerous modifications in structure and relation contemplated by the invention, drawing depict-

ing several forms of the invention have been annexed as part of this disclosure, and in such drawing like characters of reference denote corresponding parts throughout all of the views, in which:

Figure 1 is a simple diagrammatic view showing the complete system as applied to a vehicle body of any character;

Figure 2 is a perspective view of a part of the system;

Figure 3 is an end elevational view;

Figure 4 is a detailed sectional view showing one of the major parts in elevation;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 4;

Figure 6 is a side elevational view of one of the exhaust members within a vehicle;

Figure 7 is a sectional view taken substantially on the line 7—7 of Figure 6.

Referring now to the drawing in detail, 10 indicates diagrammatically the interior of any vehicle body which may be either an ordinary sedan pleasure car, truck, boat, aeroplane, etc. Within this chamber 10 and preferably at one or more sides thereof are upright easily bendable pipes 11 of any suitable material terminating at their upper ends in intake ventilators 12 which may be relatively flat cylindrical boxes having a plurality of perforations over the face through which the air is drawn by the action of the exhausting element. These pipes 11 are connected with a main outlet pipe 13 preferably beneath the vehicle body of an automobile and to the outer end of which the exhausting element broadly designated as 14 is secured, if a separate element, in any desired manner, as a clamping ring 15 embracing the main pipe 13 which may be of a different material, and an inner tubular member 16 as shown in Figure 2, which member is preferably of metal. By tightening up clamps such as set screws 17, a clamping ring 15 securely holds the end of the tubular member 16 in tight engagement with the exterior surface of the pipe 13. If the pipe 13 and part 14 are of the same material the joint 15 is unnecessary unless for assembly reasons.

The exhaust element 14, of course, is positioned on this pipe with the larger end or ends facing the normal direction of travel of the vehicle, as indicated by the arrows in Figure 1. Positioned above the exterior surface of the tubular member as shown in Figure 2 are a plurality of flaring members 18 preferably of conical shape by reason of ease of manufacture and assembly. The smaller ends of these members pass through the

tube 16, at an angle, as shown in Figure 3, and are offset with respect to the axial line of the tube 16, and at an angle to any plane passing through this axis to provide a substantially clear passage through the center of tube 16, but these flaring or conical members 18 are not only positioned at an angle offset with respect to the axis of the tube 16, but also are diagonally inclined with respect to any plane passing through the axis in any direction. Further, these flaring members are arranged in staggered relation, that is, the smaller ends 20 are in advance of one another or all are in spiral relation. Thus, air passing in through the larger ends 21 of these conical members 18 impinges tangentially with respect to the axis as more clearly shown in Figure 3 to produce a whirling action of the entering air.

The blank from which each of these flaring members 18 is made, if of metal, is provided with an integrally formed web 22 which web is, of course, the continuation of the blank forming the cone 18 itself. The inner end of these webs may be spot welded on the outer surface of member 16, or secured in any other suitable manner. For instance, they may pass through a slot 23, Figure 4, and be split transversely, as indicated at 24 and bent in opposite directions, as shown clearly at 26 in Figure 5 to provide a firm anchorage. The opposite end of the blank may be turned in sharply at right angles in the opposite direction as shown at 27 in Figure 5, thus providing a strong reinforcing rib extending longitudinally of the interior of the tube or cone, to diminish the possibilities of collapsing or bending of the flaring members under ordinary shocks, such as caused by the throwing of stones by the rapidly rotating wheels of a car if such is the application.

The particular means employed for connecting the members and holding them rigid in respect to each other will, of course, vary with the materials employed and the use to which the invention is put.

These webs 22 may be spot-welded or otherwise rigidly secured in place, simultaneously with the welding of the adjacent effective edges of the blank forming the side seam of the cone adjacent this tab 28. Likewise, the bent over ends 26 of the web may be spot-welded or otherwise rigidly secured to the main tubular member. It will probably also be desired to spot-weld each cone where it passes through the tube 16, as indicated at 29-30 in Figure 4.

The intake cylinders or drums 12 shown at Figure 1 may be modified as desired, according to circumstances, and in Figures 6 and 7 there is shown intakes 31 as forming the light supports for the bulbs 32, in the rear of an automobile or the cabin of a boat. These intakes are connected by the same pipes 11, as above explained.

It will be obvious that the ventilating action may be readily controlled as for instance by a damper 36 or any other suitable means.

While I have herein described this improvement especially applicable for automobile vehicle ventilating systems, it is again pointed out that the exhaust element by itself is capable of a variety of uses and applications and is also particularly adapted to be secured to the end of the exhaust system of the motive power of any vehicle. The air is scooped up by not only the small flaring conical members 18 but also a protective outer shield 33 of general flaring or conical construction and this is secured not only to the ends of the flaring members 18, as at the

points 34, but is also provided with braces 35 facing the smaller end concentrically with respect to the extreme end of the exhaust pipe 13 as herein shown. This outer shield 33 not only

5 makes stronger and more durable construction as a protection to the smaller members, but also increases the efficiency of the device as a whole for the cones 18, being diagonally disposed at an angle with respect to any plane passing through 10 the axis, provided with the webs a series of spirally positioned channels between the tube 16 and the outer shield 33 and this scooped in air exiting at the small end of the outer cone 33 increases the suction at the extreme end of the tube 16, thus 15 greatly reducing the back-pressure on the muffler, for example, if it is used as a part of the motive system of a vehicle or an aid in exhausting the air from a closed container or chamber when used in any of the several manners herein de- 20 scribed.

The end element is preferably made of thin sheet metal and well enameled to prevent rust by reason of the atmospheric condition to which it may be exposed. The rest of the system, how- 25 ever, which is not exposed to an equal extent, may be of fibroid or plastic pipes or any material suitable to the exposed temperature, depending upon the use to which the system is put. In fact, all of the parts may be non-metallic and substan- 30 tially integral. If the invention were applied to a motor boat, then the entire installation as shown in Figure 1 should probably be inverted. If on an aeroplane, then it could be used at any angle and applied to the top, bottom or sides 35 without modification or change.

The invention is of simple and practical construction which may be inexpensively manufactured and assembled and in use reliably and efficiently accomplish the desired functions and ob- 40 jects either as an exhausting means or a part of the ventilating system.

Without further analysis the foregoing will so fully reveal the gist of this invention that others can, by applying current knowledge, readily adapt 45 it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of the invention, and, therefore, such adaptations should 50 and are intended to be comprehended within the meaning and range of equivalency of the following claims.

I claim:

1. An exhaust system comprising a tubular 55 body member at the end of an exhaust pipe, an intake member of flaring shape extending through the wall of said tubular member at an angle with the larger end outside and its smaller end inside and a web integral with said intake 60 member and anchored inside said tubular member, said web having a split edge passing through the wall of said tubular member and bent in opposite direction to engage the inner surface of said wall.

2. An exhaust system comprising a tubular 65 body member at the end of an exhaust pipe, a plurality of flaring intake members mounted around said body member and extending through the side walls thereof, and a single flaring mem- 70 ber enclosing said first mentioned flaring members with its large end in substantially the transverse plane of the larger ends of the first mentioned flaring members and its smaller end ad- 75 jacent the smaller ends of said first mentioned

flaring members and positioned outside of said exhaust pipe.

3. An exhaust system comprising a tubular body member having a substantially straight central passage therethrough adapted to be attached to the end of an exhaust pipe, a plurality of air guiding members mounted around said body member, said members being positioned in planes angularly disposed with respect to a plane passing through the axis of said tubular member, and a single flaring member enclosing said first mentioned members with its large end in substantially the transverse plane of the larger ends of the first mentioned members and its smaller end adjacent the smaller ends of said air guiding members and surrounding said tubular body.

4. An exhaust system comprising a tubular body member having a substantially straight central passage therethrough, a plurality of conical intake members mounted around said body member and extending through the side walls thereof, the smaller ends of said flaring member being positioned within said body member, the axes of said flaring members being positioned in planes angularly disposed with respect to a plane passing through the axis of said tubular member, and the smaller ends of said flaring members being positioned in advance of one another whereby air entering said flaring members passes therethrough and into the tubular member at angles to produce a whirling action, and a single flaring member enclosing said smaller first mentioned flaring members.

5. An exhaust system comprising a tubular body member at the end of an exhaust pipe, a plurality of intake members mounted around said body member and extending through the side walls and all facing in the same direction, the said flaring members being positioned partly within said body member and positioned in advance of one another whereby air entering said flaring members passes therethrough and into the tubular member at angles to produce a whirling action, and a single flaring member enclosing said smaller first mentioned flaring member.

6. An exhaust system comprising a tubular body member at the end of an exhaust pipe, a plurality of flaring intake members mounted around said body member and extending through the side walls thereof with the larger ends of said flaring members on the outside of but spaced from said body member and all facing in the same direction, webs connecting the larger ends of said members to the interior of the tubular member, the smaller ends of said flaring member being angularly positioned with respect to the axis of said member and within said body member with the smaller ends of said flaring members positioned in advance of one another whereby air entering said flaring members passes therethrough and into the tubular member at angles to produce a whirling action.

7. An exhaust system comprising a tubular body member having a substantially straight central passage therethrough, means for attaching said body member to the end of an exhaust pipe, a plurality of flaring intake members mounted around said body member and extending through the side walls thereof with the larger ends of said flaring members on the outside of said body member and all facing in the same direction, the smaller ends of said flaring member being positioned within said body member, the axes of said flaring members being positioned in a plane angularly disposed with respect to a plane passing through the axis of said tubular member and the smaller ends of said flaring members being positioned in advance of one another whereby air entering said flaring members passes therethrough and into the tubular member at angles to produce a whirling action, and a single-flaring member enclosing said smaller first mentioned flaring members with its large end in substantially the transverse plane of the larger ends of the first mentioned flaring member and its smaller end adjacent the smaller ends of said first mentioned flaring member and surrounding said body member.

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