Aug. 18, 1925. 1,550,419

A. W. BEAURLINE

VALVE STRUCTURE

Filed Feb. 27, 1924

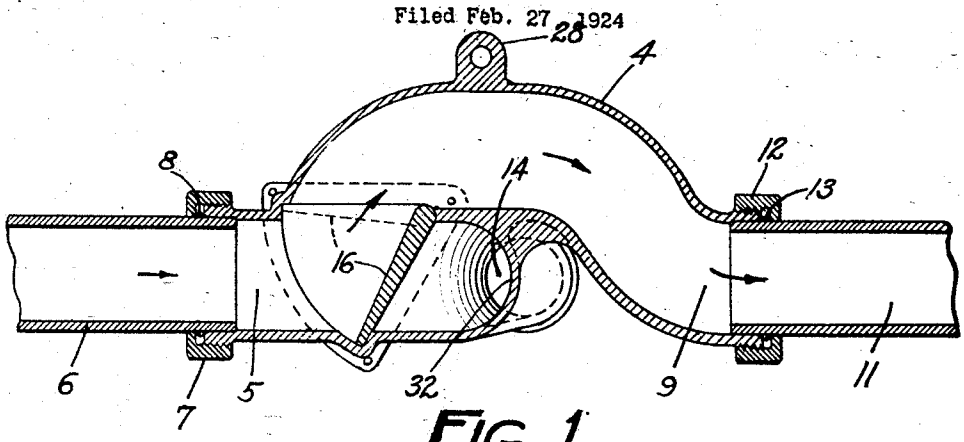


FIG. 1

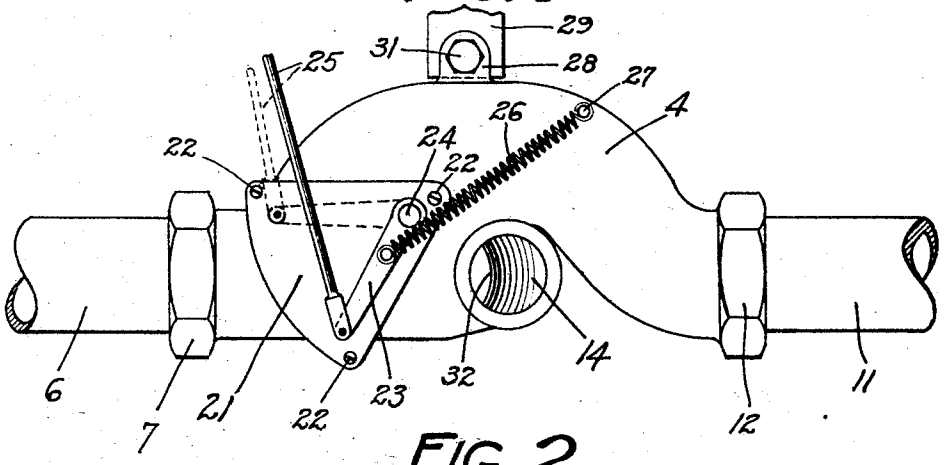


FIG. 2

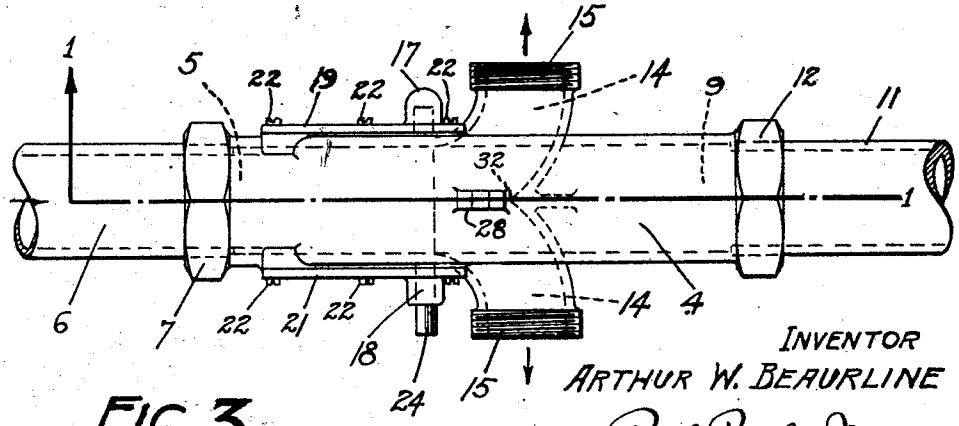


FIG. 3

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UNITED STATES PATENT OFFICE.

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VALVE STRUCTURE.

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To all whom it may concern:

Be it known that I, ARTHUR W. BEAURLINE, a citizen of the United States, resident of St. Paul, county of Ramsey, and State of Minnesota, have invented certain new and useful Improvements in Valve Structures, of which the following is a specification.

This invention relates to new and useful improvements in valve structures and more particularly relates to such valve structures which are adapted to direct the flow of a liquid through and from the structure. In other words, this valve structure is not primarily useful for shutting off the flow of a fluid but is primarily useful in directing the flow of the fluid in such manner that there will be offered substantialy a minimum of resistance to the directed fluid-flow through the structure. In addition to such minimizing of resistance to flow, the valve structure has the added advantage of compactness and its construction is such that it may be integrally formed from a single casting.

The particular form of valve structure here shown is one operable to direct the exhaust from an internal combustion engine for the purpose of employing the hot exhaust gases to heat the interior of a bus, automobile or similar vehicle driven by the engine. This novel valve structure is adapted to receive the hot exhaust gases from such an engine and to direct them through a main exhaust passage to the usual muffler or to direct the gases through an auxiliary passage to a radiator or heating units. During warm weather the exhaust gases are directed to the muffler while in cold weather they are directed through the radiating element. This unitary valve structure has an intake passage, an exhaust passage and one or more auxiliary passages through which the gases may be selectively directed through operation of a suitable valve or gate.

The object therefore of this invention is to provide an improved valve structure.

A more specific object of this invention is to provide an inexpensive and compact valve structure by which the directional flow of a fluid may be controlled with minimized resistance.

Other objects of the invention will appear from the following description and the accompanying drawings and will be pointed out in the annexed claims.

In the drawings, there has been disclosed a structure designed to carry out the various objects of the invention but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawings:

Figure 1 is a vertical sectional view on the line 1—1 of Figure 3, showing the valve in normal position, the gate therein being positioned to allow the exhaust gases to pass directly through the valve to the muffler in the usual manner;

Figure 2 is a view in side elevation showing the preferred means for actuating the valve; and

Figure 3 is a top view of the valve showing the openings on the sides thereof adapted to be connected to the heating elements.

In the selected embodiment of the invention here shown, there is illustrated a valve structure comprising a novel casing 4 which may be formed of an integral compact casting. This casing has an intake passage 5 at one end thereof adapted to be connected to one end of the usual exhaust pipe 6 of the engine preferably by such means as the usual nut 7 and compression gasket 8. A main exhaust or discharge passage 9 is provided at the other end of the casing substantially in horizontal alinement with the passage 5 and normally is in communication therewith, as shown in Figure 1. The main passage 9, in like manner, is connected to a section 11 of the exhaust pipe by means of a similar nut 12 and compression gasket 13. The exhaust pipe section 11 preferably has its other end connected to the usual exhaust muffler (not shown) commonly employed in conjunction with an internal combustion engine.

A feature of this invention resides in the provision of means whereby the exhaust gases, expelled from the engine, may be directed from the usual exhaust pipe to suitable heating elements mounted in the vehicle for heating purposes. Such means consists in the provision of opposed auxiliary passages 14 in the valve casing 4. These passages are adapted to be in communication with the intake passage 5 and are provided with suitable threads 15 by means of which they may be connected to pipes leading to the heating elements (not shown).

A valve or gate 16 is pivotally mounted within the casing 4 and functions to direct the flow of exhaust gases from the pipe 6 through the casing to the main exhaust passage 9 at the end of the casing or, outwardly through the opposed auxiliary passages 14 to the heating elements. The gate 16 is mounted in bearings 17 and 18, preferably formed in a pair of plates 19 and 21 secured to the sides of the casing by suitable means such as screws 22.

Means are provided for actuating the gate 16 which preferably consist in mounting an arm 23 on the pivotal portion 24 of the gate. An operating rod 25 is terminally connected to the depending end of the arm 23 and leads to a place where it may conveniently be reached by the driver for the purpose of operating the gate. A tension spring 26 is preferably mounted yieldably to retain the gate in either of its positions because the longitudinal axis of the spring passes through the pivotal axis of the gate as the gate is moved from one position to another. This spring has one end connected to the central portion of the arm 23 and its other end is connected to the casing by means of a stud 27 secured thereto.

The casing 4 may conveniently be supported by means of a lug 28, provided on the valve casing. This lug is apertured and adapted to cooperate with a stationary member 29 and a bolt 31 to support the valve structure and therefore the exhaust pipe.

The auxiliary exhaust passages 14 oppositely extend from the intake passage and in this preferred embodiment, these auxiliary passages oppositely extend in axial alinement with each other and further, the corresponding walls of each passage 14 meet within the intake passage 5 substantially in its median plane in order to assure an equal distribution of the intaken gases to the two auxiliary passages 14. The juncture of these two walls is in a pointed edge 32 which functions as a deflecting means so that lessened resistance to flow is thereby offered while the corresponding outer walls of the two auxiliary passages arcuately extend from this edge 32 and such sweeping curves minimize the resistance to flow caused by the change of direction. It may also be noted that it is preferable to form the auxiliary passages so that their longitudinal axes as they arcuately extend into the intake passage meet each other substantially in the similar axis of the intake passage. The main passage 9 is upwardly offset to pass around the juncture of the auxiliary passages with the intake passage.

In the use of this particular embodiment of the valve structure, the casing may be conveniently mounted by the lug 28 so that the pipe connections from the engine and to the muffler and radiating units may be made while the operating rod 25 may project upwardly in position conveniently accessible to the operator of the vehicle. When the rod 25 is in its full line position shown in Figure 2, the exhaust gases from the engine are passed through the main passage 9 as shown by the arrows in Figure 1 and, when the rod is moved to the dotted line position shown in Figure 2, the valve or gate 16 will be moved to its dotted line position in Figure 1 and the heated gases will be directed to the auxiliary passages 14.

Having thus described my invention what I claim as new and desire to secure by Letters-Patent, is:

1. A valve structure comprising a casing having an intake passage and a communicating main exhaust passage, a pair of oppositely extending auxiliary exhaust passages opening into the intake passage, a deflecting means fixed to the casing adjacent the inner end of the intake passage and positioned to deflect the intaken fluid substantially equally to the auxiliary passages, and a valve in the casing cooperable with the deflecting means to direct the fluid to the main or auxiliary passages.

2. A valve structure comprising a casing having an intake passage and a communicating main exhaust passage, a pair of oppositely extending auxiliary exhaust passages opening into the intake passage, a deflecting means fixed to the casing in the median plane of the intake passage and adjacent the inner end thereof to deflect intaken fluid substantially equally to the auxiliary passages, and a valve in the casing cooperable with the deflecting means to direct the fluid to the main or auxiliary passages.

3. A valve structure comprising a casing having an intake passage and a communicating main exhaust passage in combination with a pair of auxiliary exhaust passages communicating with the intake passage and extending at an angle therefrom, the main exhaust passage having a portion offset from the intake passage, and means operable selectively to direct intaken fluid through the auxiliary passages or the main passage.

4. A valve structure comprising a casing having an intake passage and an exhaust passage in combination with a pair of auxiliary exhaust passages arcuately extending from the median plane of the intake passage, the main exhaust passage having a portion offset from the intake passage, and means operable selectively to direct intaken fluid through the auxiliary passage or the main passage.

5. A valve structure comprising an integral casing having an intake passage and a main exhaust passage and a pair of integral auxiliary exhaust passages extending from the opposite sides of the intake passage, the

auxiliary exhaust passages having corresponding walls meeting in the median plane of the intake passage whereby substantially equal distribution of the intaken fluid to the auxiliary passages may be assured, and means operable selectively to direct an intaken fluid through the main or auxiliary passages.

6. A valve structure comprising a casing having an intake passage and a communicating main exhaust passage, a pair of oppositely extending auxiliary exhaust passages opening axially into the intake passage substantially in the longitudinal axis thereof, the main exhaust passage opening from the intake passage and extending around said auxiliary passage, and means operable selectively to exhaust an intaken fluid through the main or auxiliary passages.

7. A valve structure comprising a casing having an intake passage and a communicating main exhaust passage in combination with a pair of auxiliary exhaust passages communicating with the intake passage and having their outer portions oppositely extending and their inner portions arcuately extending with their longitudinal axes meeting in the similar axis of the intake passage, a deflecting means adjacent the inner end of the intake passage and positioned substantially in the median plane of the latter to deflect the intaken fluid substantially equally to the auxiliary passages, and a valve in the casing to direct the fluid to the main or auxiliary passages.

8. In a valve structure, the combination of a casing having an intake opening and an exhaust opening in substantial alinement, with oppositely extending auxiliary passages communicating with the casing, and the casing having an offset portion out of said alinement and forming a passage between the intake opening and the exhaust opening, and a valve movable to direct fluid flow through the structure.

9. In a valve structure, the combination of a casing having an intake opening and an exhaust opening in substantial alinement, with oppositely extending auxiliary passages communicating with the casing and the casing having an offset portion out of said alinement and forming a passage between the intake opening and the exhaust opening, and said offset passage being disposed adjacent the section of the casing which has communication with the auxiliary passages, and a valve movable to direct fluid flow through the structure.

10. In a valve structure, the combination of a casing having intake and exhaust openings in substantial alinement, a relatively stationary deflecting partition in the casing intermediate said openings and substantially in the median plane of the openings, oppositely extending auxiliary passages communicating with the casing adjacent said partition, and a relatively movable valve cooperable with said stationary partition to direct fluid flow through the structure.

11. In a valve structure, the combination of a casing having intake and exhaust openings in substantial alinement, a deflecting partition in the casing intermediate said openings and substantially in the median plane of the openings, oppositely extending auxiliary passages communicating with the casing adjacent said partition, a valve cooperable with said partition to direct fluid flow through the structure, and the casing having an offset portion adjacent said partition forming a passage between the intake and exhaust openings.

In witness whereof, I have hereunto set my hand this 23rd day of February 1924.

ARTHUR W. BEAURLINE.