Oct. 30, 1923. 1,472,514

W. H. CRYAN

MUFFLER CUT-OUT

Filed March 5, 1921

FIG. 1.

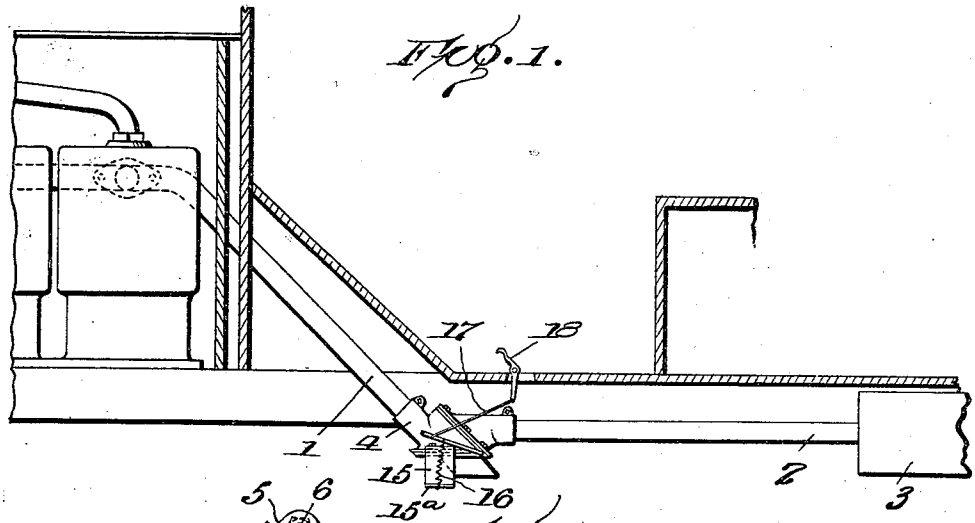


FIG. 2.

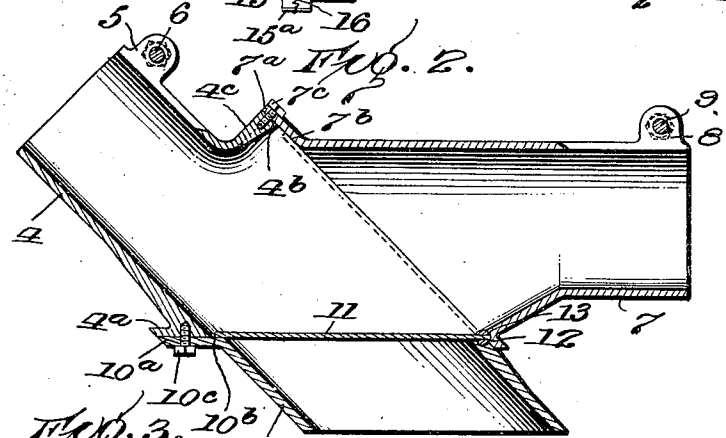


FIG. 3.

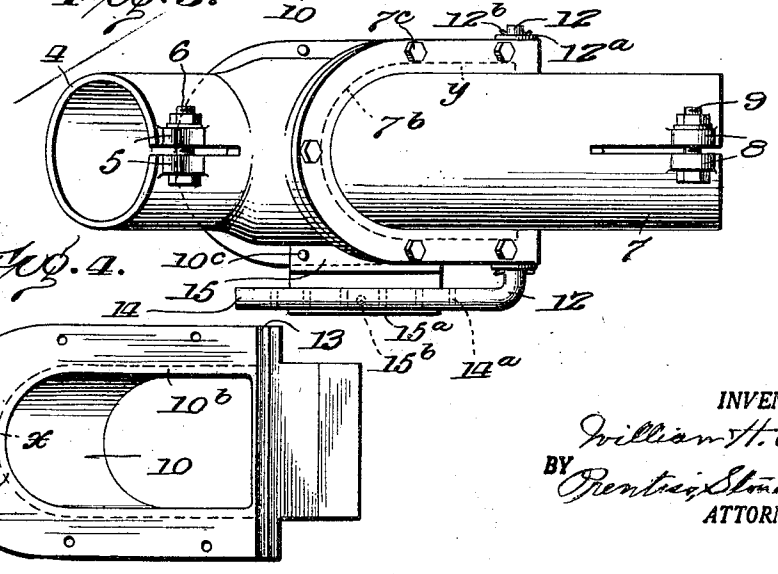


FIG. 4.

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UNITED STATES PATENT OFFICE.

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MUFFLER CUT-OUT.

Application filed March 5, 1921. Serial No. 449,628.

To all whom it may concern:

Be it known that I, WILLIAM H. CRYAN, a citizen of the United States, residing at Woonsocket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Muffler Cut-Outs, of which the following is a specification.

This invention relates to muffler cut-outs for internal combustion engines and pertains particularly to cut outs providing a straight away discharge of exhaust gases through the cut out to the open air.

One object of the invention is to provide a muffler cut out in which there may be no obstructions in the path of exhaust gases when the cut out is open.

Another object of the invention is to provide a cut out in which the valve when opened to the cut out position is entirely removed from the path of the gases into an offset position.

Another object of the invention is to provide for perfect seating of the valve, so as to completely close the exhaust passage to the open air when the muffler is in use, and likewise completely close the muffler connection when the cut out is open.

Another object of the invention is to provide a muffler cut out in which the valve and control handle may be removed and reversed with respect to the body of the cut-out.

One feature of the invention relates to the peculiar configuration of the parts and their combination with the peculiar mounting of the valve. These features include details providing for machine facing of certain parts which serve in a dual relation as clamping surfaces and as valve seats.

Another feature of the invention relates to the mounting of a bracket on one of the flanges of the cut out and adapted to carry a spring cooperating with the valve lever to normally hold the valve in closed position so as to divert exhaust gases into the muffler. This feature includes the removable nature of the bracket and the removable feature of the valve and lever arm therefor as a unit so as to be placed on the opposite side of the cut out without changing their relative position of parts.

Another feature of the invention includes the three part construction of the cut out, each part having the laterally extending flanges which serve not only as fastening flanges and valve seats, but also as air cooling flanges which serve to catch the rush of air and cool the cut out and the valve therein.

These and other details and advantages of the device are described and claimed in the following specification and claims, and illustrated in the accompanaying drawing, in which:

Figure 1 represents a side view of the cut out mounted in conjunction with the exhaust pipe and muffler pipe of an automobile engine;

Figure 2 is a vertical sectional view taken lengthwise of the cut out and looking at the interior thereof;

Figure 3 is a top plan view of the complete cut out; and

Figure 4 is a top plan view looking down on the lower member in its removed position, and showing the flat face of the flange thereof.

Referring in detail to the drawing, like reference numerals refer to like parts in the various figures.

1 indicates the exhaust pipe leading from an automobile engine. 2 is a muffler pipe leading from a cut out embodying the present invention to a suitable muffler 3. The cut out is formed of three main parts and a valve, as will be described. The first part 4 has an upper end adapted to receive the adjacent end of the exhaust pipe 1. This upper end is split along its upper surface and adapted to clamp the exhaust pipe 1 by means of the lugs 5 which are designed to be drawn together by suitable fastening means or bolt 6. The lower face of the part 4 is flat and formed by a machine faced flange surface 4^a which is adapted to receive a corresponding flange face on the lower part. The side of the member 4 is likewise provided with a flange which is machine faced to receive a corresponding flange face of a second part adapted to connect with the pipe 2 leading to the muffler. By referring to Figure 2, it will be noted that this side face of the part 4 is indicated at 4^b and is offset from the bore of the pipe 4 by an extension wall 4^c, the purpose and functions of which will be explained hereinafter.

The second part 7 of the cut out has an

end adapted to clamp the muffler pipe 2 by means of the split end having lugs 8 which are adapted to be drawn together by a bolt 9. The opposite end of the member 7 has a broad flange machine faced surface 7^a, adapted to be secured near its outer edge to the adjacent face 4^b by means 7^c represented as bolts or screws threaded into the wall 4^c. The bore of the member 7 adjacent the member 4 is somewhat less than the bore of the opening formed by the extension walls 4^c and therefore, the inwardly extending flat machine faced portion of the flange indicated at 7^b serves as a seat for a flat flap valve, as will be described.

A third chief part 10 provides an outlet pipe leading directly to the atmosphere and the bore of which is in alinement with the bore of the part 4. The third part 10 has an outwardly extending flange portion having a machine faced upper surface 10^a adapted to be secured to the adjacent under face 4^a of the part 4 by means of screws or bolts 10^c. An inwardly extending portion of the flange face is indicated at 10^b and corresponds to the face 7^b, and thus serves as a lower valve seat, as will be described.

The control valve is formed of a flat valve mounted as a flap valve 11 having a round pivot pin 12 rigidly secured thereto. The pin 12 serving as the mounting for the valve 11, is seated in a groove 13 formed in the adjacent faces of the parts 7 and 10 and extreme end of the part 4. The exact construction is provided by the relation of the flange faces of the three parts which lie in intersecting planes meeting at the extreme end of the part 4. Thus a groove is formed in the ends of the two side projections of the part 4, cutting away a portion of the flange surface 4^a and 4^5; likewise a corresponding groove is formed in the flange surface 7^a of the part 7, and a similar groove in the upper surface of the part 10 and in the face of the flange surface 10^a. Thus the valve 11 may be moved to either the valve seat 7^b or to the valve seat 10^b and make a tight fit by having the valve thus constantly parallel to these respective seats when in either closed position. It will be seen that the valve should be placed in position when the parts are assembled. Suitable washers 12^a and cotter pins 12^b are provided to limit the endwise movement of the pin 12 and maintain the central posititon of the valve 11. The dotted line X in Figure 4 represents the normal position of the edge of the valve 11 when resting on the lower valve seat 10^b, and the dotted line Y in Figure 3 indicates the normal position of the edge of the valve 11 when it rests on the valve seat 7^b and the cut out is wide open.

The pivot pin 12 is provided with a lever 14 illustrated as an extension of the pin 12, positioned at an angle thereto and alongside of the cut out. This lever arm 14 has a series of openings therethrough 14^a, which serve as points of attachment for a connecting spring and operating cable. On the same side of the cut out as the lever arm 14 is a bracket 15 which is secured in place to the flange 10^a by the fastening screws 10^c or by other suitable means. The bracket 15 has a downwardly extending main portion, which latter has an outwardly extending shelf at its lower end indicated at 15^a, and which in turn is provided with a central opening 15^b. A spring 16 extends from the opening 15^b to a convenient point of attachment 14^a along the lever 14. Likewise a cable 17 is secured to the lever 14 at any other of the points 14^a and is connected to an operating pedal 18 located in the automobile.

Operation of the foot pedal 18 serves to move the valve 11 to position against one or the other of the valve seats 7^b or 10^b. When the pedal 18 is released the spring 16 draws the lever arm 14 downward bringing the valve 11 to rest on the seat 10^b, completely closing the cut out and diverting all of the exhaust gases laterally through the muffler outlet member 7. In this position the exhaust gases enter the part 4 and into the enlarged interior thereof, thus slowing up the speed of the gases prior to their discharge into the muffler. The impact of the exhaust gases on the upper face of the valve 11 also serves to slow up the exhaust gases. When pressure is applied to the pedal 18 the lever 14 is moved upward and the valve 11 brought to its wide open position against the valve seat 7^b and completely out of the path of the exhaust gases as they enter through the part 4. There is no possible chance for the exhaust gases to strike the end or edge of the valve 11 for the reason that the extension 4^c provides a very substantial recess. It will be noted that the lower end of the valve 11 when in the wide open position, that is its pivotal point at 13, is substantially at the edge of the surface of the lower pipe portion 10, and conseqnuently the gases are led continuously through the member 4 and into the pipe 10 without striking any obstructions at the point where the valve is pivoted. Therefore, when in the raised position the valve permits the discharge of exhaust gases in a straight line through the cut out and direct to the open air without the possibility of meeting any obstructions whatsoever which might cause back pressure, such as might be caused by a valve in the discharge passage or any device for diverting the gases at an angle.

The mounting of the valve 11 and the necessary co-operation of the valve with the flat faces of the parts 7 and 10 makes it necessary that these parts 4, 7 and 10 be made separately and assembled to contain

the valve. This relation of parts therefore includes the feature of forming the faces thereof perfectly flat and in accurate planes. They should be machine faced by any suitable means. Mere castings would not prove very satisfactory because the operation of the cut out depends on the accuracy with which the control valve may be seated. In the construction shown the member 4 extends at an angle of 45 degrees and in this particular design has proved highly satisfactory. The position of the flanges thus extending at an angle of 45 degrees tends to trap the air and to materially assist in cooling the cut out. This cooling feature is of considerable importance because the life of the device is in part dependent on the freedom from warping due to overheating. In many constructions the valve is located in the path of the gases when the cut out is open, but in the present structure the valve is located at one side and is also cooled by the air engaging the laterally extending flanges.

What I claim is:

1. A cut out for internal combustion engines comprising a first separable part constituting the exhaust receiving member, a second separable part having an unobstructed passageway and constituting a muffler discharge member, a third separable part having a single straight opening therethrough and constituting a direct discharge to air member, a valve adapted to be moved to close off communication from said exhaust receiving member to either said second or said third separable parts for regulating the direction of discharge of exhaust gases, and means for holding said first, second, and third separable parts in fixed assembled relation.

2. A cut out for internal combustion engines comprising a first separable tubular part constituting the exhaust receiving member, a second separable tubular part having unobstructed passageway and constituting a muffler discharge member, a third separable tubular part having a single straight opening therethrough and constituting a direct discharge to air member, a valve adapted to be moved to close off communication from said exhaust receiving member to either said second or said third separable parts for regulating the direction of discharge of exhaust gases, and means for holding said first, second, and third separable parts in fixed assembled relation, the bore of said first and third part being in alinement, and the bore of said second part extending laterally from the bore of said first part.

3. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to communicate with the exhaust pipe of an engine and at the other end two substantially annular flat flanges arranged in different planes, a second distinct part having at one end a pipe opening to communicate with a muffler and at the other end a flat seat adapted to fit one of said flanges on said first member, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat seat adapted to fit on the other flange of said first member, means to secure said second and third members to said flanges on said first member, and a valve for regulating the direction of discharge of the exhaust gases.

4. A cut out for internal combustion engines comprising a first separable part constituting the exhaust receiving member, a second separable part constituting a muffler discharge member, a third separable part constituting a direct discharge to air member, means for holding said first, second and third separable parts in fixed assembled relation, and a pivoted flat valve mounted on a rocker shaft at the center point of the juncture of said first, second and third separable parts and adapted to regulate the direction of discharge of exhaust gases either directly and in a straight line through said third part or at an angle through said second part.

5. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to communicate with the exhaust pipe of an engine and at the other end two substantially annular flat flanges arranged in different planes, a second distinct part having at one end a pipe opening to communicate with a muffler and at the other end a flat seat adapted to fit one of said flanges on said first member, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat seat adapted to fit on the other flange of said first member, means to secure said second and third members to said flanges on said first member, and a flat valve pivoted at the point of intersection of the planes of the flat faces of said first, second and third members.

6. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to receive the exhaust pipe of an engine, and at the other end two flat machine faced flanges arranged in different planes, a second distinct part having at one end a pipe opening adapted to communicate with a muffler and at the other end a flat machine faced flange adapted to fit on one of said flanges on said first member, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat machine faced flange adapted to fit on the other flange of said first member, means to secure said second and

third members on the flanges of said first member, and a valve for regulating the discharge of the exhaust gases.

7. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to communicate with the exhaust pipe of an engine and at the other end two substantially flat machine faced flanges arranged in different planes, a second distinct part having at one end a pipe to communicate with a muffler and at the other end a flat machine faced seat adapted to fit one of said flanges on said first member, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat machine faced seat adapted to fit on the other flange of said first member, means to secure said second and third members to said flanges on said first member, and a flat valve pivoted at the point of intersection of the planes of said face of said flanges and the machine faced seats of said second and third members.

8. A cut out for internal combustion engines comprising a first separable part constituting the exhaust receiving member, a second separable part constituting a muffler discharge member, a third separable part constituting a direct discharge to air member, a flat valve seat formed by the face of said second part next adjacent said first part, a flat valve seat formed by the face of said third part next adjacent said first part, and a flat valve pivoted at one of its ends and with its free end towards said first pipe end and arranged to be moved to rest on either of said valve seats.

9. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to communicate with the exhaust pipe of an engine and at the other end two substantially annular flat flanges arranged in different planes, a second distinct part having at one end a pipe opening to communicate with a muffler and at the other end a flat seat adapted to fit on one of said flat flanges on said first member and providing also a first flat valve seat, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat seat adapted to fit on the other flat flange on said first member and providing a second flat valve seat, means to secure said second and third members to said flanges on said first member, and a flat valve pivoted at one of its ends and with its free end towards said first pipe end and arranged to seat on either said first or said second valve seats.

10. A cut out for internal combustion engines comprising a first separable part constituting the exhaust receiving member, a second separable part constituting a muffler discharge member, a third separable part constituting a direct discharge to air member, means for holding said first, second and third separable parts in fixed assembled relation, and a pivoted flat valve mounted on a rocker shaft at the center point of the juncture of said first, second and third separable parts and adapted to regulate the direction of discharge of exhaust gases either directly and in a straight line through said third part or at an angle through said second part, the faces of said second and third parts next adjacent said first part extending inwardly and providing flat seats for said valve.

11. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to communicate with the exhaust pipe of an engine and at the other end two substantially annular flat flanges arranged in different planes, a second distinct part having at one end a pipe opening to communicate with a muffler and at the other end a flat seat adapted to fit one of said flanges on said first member and providing also a first flat valve seat, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat seat adapted to fit on the other flange of said first member and providing also a second flat valve seat, means to secure said second and third members to said flanges of said first member, and a flat valve pivoted at one of its ends and with its free end toward said first pipe end and arranged to seat on either said first or second valve seats.

12. A cut out for internal combustion engines comprising a first member constituting the exhaust receiving member having at one end an opening to receive the exhaust pipe of an engine, and at the other end two flat machine faced flanges arranged in different planes, a second distinct part having at one end a pipe opening adapted to communicate with a muffler and at the other end a flat machine faced flange adapted to fit on one of said flanges of said first member and extending inwardly to provide a first flat valve seat, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat machine faced flange adapted to fit on the other flange of said first member and extending inwardly to provide a second flat valve seat, means to secure the flanges of said second and third members on the flanges of said first member, and a flat valve pivoted at one of its ends and with its free end toward said first pipe end and arranged to rest on either said first or second valve seats.

13. A cut out assemblage for internal combustion engines comprising a first pipe member constituting the exhaust receiving member having at one end an opening adapted

to communicate with an engine exhaust pipe, said first member being enlarged at the opposite ends to provide a valve chamber, two flanges extending from said first pipe member and arranged in different planes cutting said valve chambers, a second part having at one end a pipe opening to communicate with the muffler and at the other end a flange adapted to rest on one of said flanges of said first member and having an inwardly extending flat flange portion constituting a valve seat, a third member having at one end a pipe opening communicating with the atmosphere and at the opposite end a flat flange adapted to rest on the other flange of said first member and having an inwardly extending flat flange portion constituting a second valve seat, and a flat valve pivoted at the extreme end of said first member farthest removed from the exhaust receiving end and adapted to seat on said first or second inwardly extending flat flange valve seat.

14. A cut out for internal combustion engines comprising a first separable part constituting the exhaust receiving member, a second separable part constituting a muffler discharge member, a third separable part constituting a direct discharge to air member, means for holding said first, second and third separable parts in fixed assembled relation, a pivoted flat valve mounted on a rocker shaft at the center point of the juncture of said first, second and third separable parts and adapted to regulate the direction of discharge of exhaust gases either directly and in a straight line through said third part or at an angle through said second part, and a lever for said valve projecting from said rocker shaft at an angle thereto, said valve and lever being detachably removable as a unit when said first, second and third parts are unassembled and reversible with respect to said three parts to place said lever on the opposite side of said parts.

15. A cut out for internal combustion engines comprising a first separable part constituting the exhaust receiving chamber, a second separable part constituting a muffler discharge member, a third separable part constituting a direct discharge to air member, means for holding said first, second and third separable parts in fixed assembled relation, a pivoted flat valve mounted on a rocker shaft at the center point of the juncture of said first, second and third separable parts and adapted to regulate the direction of discharge of exhaust gases either directly and in a straight line through said third part or at an angle through said second part, a lever for said valve projecting from said rocker shaft at an angle thereto, said valve and lever being detachably removable as a unit when said first, second and third parts are unassembled and reversible with respect to said three parts to place said lever on the opposite side of said parts, a lever for said valve having a series of attachment points thereon, a bracket member secured to said assemblage and having a portion extending downwardly and outwardly, and a spring secured to said bracket and to said lever and normally holding said lever down and said valve against said third member and thereby diverting exhaust gases through said second member.

In testimony whereof I affix my signature.

WILLIAM H. CRYAN.