E. F. COLLINS.

CUT-OUT SILENCER.

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1,179,075.

Patented Apr. 11, 1916.

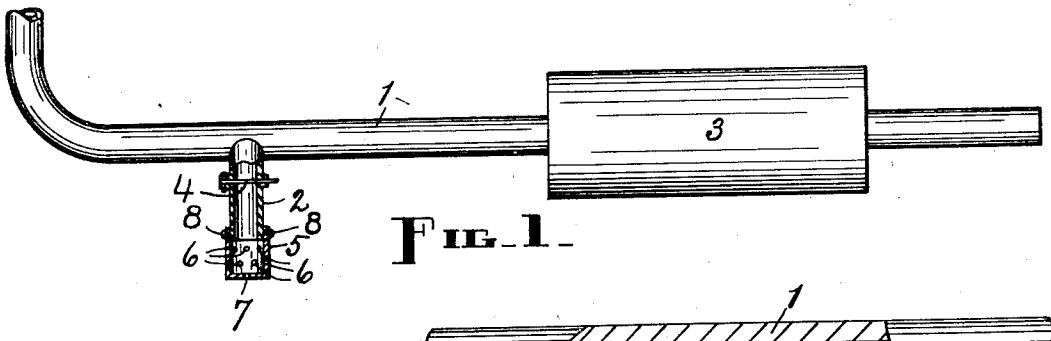


FIG. 1.

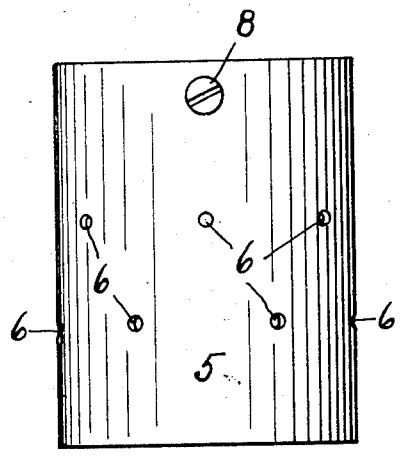


FIG. 2.

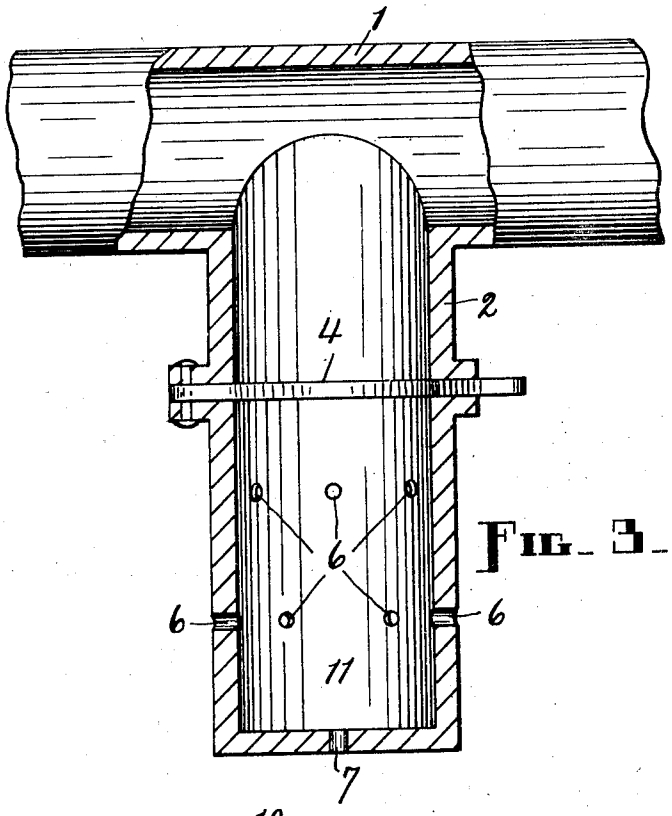


FIG. 3.

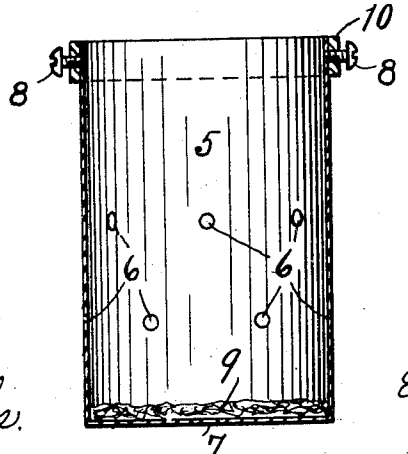


FIG. 4.

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CUT-OUT SILENCER.

1,179,075. Specification of Letters Patent. Patented Apr. 11, 1916.

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To all whom it may concern:

Be it known that I, EDWARD F. COLLINS, a citizen of the United States of America, residing at Indian Orchard, in the county of Hampden and State of Massachusetts, have invented a new and useful Cut-Out Silencer, of which the following is a specification.

My invention relates to improvements in devices for cutting out the mufflers of explosives or internal-combustion engines and permitting the exhaust to pass directly into the atmosphere, and consists essentially and generally of a perforated part or member at or over the outer or discharge terminal of the cut-out tube or pipe which opens from the exhaust tube or pipe at a point between the engine and the muffler, as hereinafter set forth.

The advantage of running the explosive engine of a motor-cycle or other vehicle, under certain conditions, with the cut-out open, is well understood, and it is equally well understood that the exhaust from the engine in escaping through the cut-out produces a noise of such a character that it is exceedingly annoying and even a positive nuisance, and the principal object of my invention is to provide the cut-out with means to silence the exhaust escaping through the same and prevent the objectionable noise, and this without defeating the purpose of the cut-out by producing back pressure in the explosion chamber or chambers of the engine.

A further object is to produce a silencer, capable of attaining the desired end, which is simple and inexpensive, requires no water spray or other auxiliary element, and can be incorporated with or applied to the ordinary exhaust appliance of either a new or an old engine without material change or difficulty.

The silencer may be made an integral part of the cut-out, especially in the case of a new engine, or it may be in the form of an attachment fitted to the cut-out pipe and detachable therefrom. The separable attachment is preferred in many if not most cases, because of the facility with which it can be applied to the exhaust appliance of either an old or a new engine, and with which it can be removed and replaced.

Other objects and advantages will appear in the course of the following description.

I attain the objects and secure the advantages of my invention by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation, on a reduced scale, of the exhaust appliance of an internal-combustion engine, such as is generally provided therefor, with my detachable silencer applied to the cut-out of such appliance, the cut-out pipe and silencer being in section; Fig. 2, an enlarged side elevation of said silencer; Fig. 3, a central vertical section through a cut-out and silencer, the latter being integral with the former, and, Fig. 4, a central vertical section through a modified form of the detachable silencer.

Similar numerals refer to similar parts throughout the several views.

In the first view an exhaust pipe 1, a cut-out pipe 2, and a muffler chamber or muffler 3 are represented, said cut-out pipe being forward of said muffler and provided with a valve 4 as usual, and all of said parts being of ordinary construction and operating or functioning in the customary manner. A portion of the pipe 1 also appears in Fig. 3.

In the preferred form the silencer consists of a hollow cylindrical member or cup 5, which is open at the top to receive the open end of the cut-out pipe 2, and has a plurality of perforations or holes 6 in the side walls thereof. The cup 5 also has by preference a perforated bottom for clean-out purposes, a single opening 7 in such bottom usually affording the necessary amount of perforation and being sufficient.

The size of the silencers and the number and size of the holes or openings 6 will vary to accommodate said silencers to engines of different types and horse-powers, wherefore I do not restrict my invention in these particulars, or in other particulars, such as shape, fastening means, etc., which are not vital or material to the invention as hereinafter claimed.

The open top of the cup 5 is adapted to fit snugly or tightly around the bottom part of the cut-out pipe 2, and as a convenient means for fastening said cup to said pipe two screws 8 may be employed, such screws being tapped into said cup near the upper edge thereof. When the cup 5 is in place

the screws 8 are tightened against that part of the pipe 2 which is within said cup, and so prevent said cup from becoming detached from said pipe. Whenever occasion requires the cup 5 can be detached from the pipe 2, upon loosening the screws 8, and afterward returned to place and secured.

The holes 6 are located far enough from the top edge of the cup 5 to permit the pipe 2 to enter said cup a sufficient distance to enable a proper connection to be made between the members without covering said holes.

In practice, when the valve 4 is open, the exhaust, instead of passing through the pipe 1 to the muffler and escaping in that way, as it does when said valve is closed, passes into and through the cut-out pipe 2 and out through the holes or perforations 6 and 7 in the silencer cup 5, and said exhaust in thus making its escape does so without producing the loud, discordant, and irritating not to say distressing sound incident to the escape of the exhaust from an open cut-out unequipped with my silencer, the escape through said cup being practically noiseless or silent. This result is due to the fact that the gases of the exhaust are, instead of being free to rush in full volume from the wide-open mouth of the cut-out, caught in the silencer and broken up before being permitted to escape into the surrounding atmosphere. The exhaust gases are broken up to an extent sufficient to insure a noiseless departure from the silencer through the perforations 6 and 7. The perforations are sufficiently large and numerous fully to accommodate the exhaust, so that the escape of the same is not checked to an appreciable extent or an extent likely to produce back pressure. The exhaust after leaving the pipe 2 impinges on the approximately tight bottom of the silencer and thus the force of said exhaust is broken, wherefore the escape through the perforations is made without sufficient force and velocity to produce sound.

In the event the cup 5 be made of thin sheet-metal or the like, a sheet, layer, or mass of some suitable sound-deadening material, such as mineral-wool or asbestos, may be placed in the bottom of said cup, as represented at 9 in Fig. 4. This sound-deadening or muffling material absorbs as it were the more or less noisy vibrations produced when the exhaust passes through the aforesaid thin sheet-metal silencer cup, so that there is no noise from this source. The Fig. 4 cup is reinforced at the top, as shown at 10, to afford sufficient thickness for the screws 8, but this cup is substantially like the cup of thicker material shown in the first two views, and functions in a similar manner.

The silencer may be made an integral part of the cut-out pipe 2 simply by increasing the length of said pipe if necessary, closing the bottom, and perforating, so as to convert as it were said pipe at its lower terminal into a member similar to the cup 5 hereinbefore first described—see Fig. 3. In this view the silencer is indicated at 11. The integral cut-out-pipe silencer 11 operates or functions in precisely the same manner as does either of the cup silencers 5 herein shown, and produces the same result correspondingly, that is, a noiseless escape of the exhaust through or from the cut-out.

Each of the silencers shown in Figs. 3 and 4 has the clean-out opening 7 in the bottom. The opening 7 in each case is in a measure auxiliary to the openings 6, as some of the exhaust gases escape therethrough, but the principal objects of said opening 7 is to provide a bottom exit from the silencer, whether the latter be in the form of either cup 5 or of the part or member 11, so that the entire interior of said silencer may be kept clear and no deposit from the gases permitted to accumulate on the floor or bottom thereof. The openings (as 6) required to accommodate the exhaust in such a manner as to prevent noise therefrom must be in the walls or sides of the silencer, and it might and probably would not be possible to keep the silencer free from deposits by removal through the side openings only.

In order to clear the Fig. 4 cup through the opening 7, it is necessary to detach said cup from the cut-out pipe, remove the sound-deadening material or mass 9, reattach said cup, and open the valve 4. After the cup has been blown out, the old mass 9 is returned or a fresh mass is placed in the cup, the latter being again removed temporarily to permit this to be done.

The facility with which the silencer in any of its several forms can be applied to the exhaust cut-out of any machine, together with the simplicity of the same, is a very important and valuable feature of the invention, more especially in view of the fact that the cut-outs of old machines can be equipped as readily as the cut-outs of new machines.

I am aware that perforated tubular members have been used for various purposes and are old, and I do not therefore seek to claim such a member by itself, but only in connection with an exhaust cut-out, such combination being broadly new and results being obtained therewith that had never before been obtained. Heretofore the opening of the cut-out while the engine was running was always followed by loud and discordant sounds, a result which is entirely obviated by the presence of my silencer. In fact, so far as noise is concerned, the cut-out

provided with the silencer might be left open all the time and the cut-out valve discarded, but on other accounts it would not, of course, be advisable to omit or remove such valve.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A cut-out silencer comprising a cut-out pipe provided at the lower terminal with a closed-bottom member having perforated side walls.

2. A cut-out silencer comprising a cut-out pipe provided at the lower terminal with a closed-bottom member having perforated side walls, the closed bottom of said member also being perforated.

3. The combination, in a cut-out silencer, with a cut-out pipe, of a cup attachable to said pipe and having perforated side walls.

4. The combination, in a cut-out silencer, with a cut-out pipe, of a cup attachable to said pipe and having perforated side walls and a perforated bottom.

5. The combination, in a cut-out silencer, with a cut-out pipe, of a cup attachable to said pipe and having perforated side walls, and a mass of sound-deadening material in said cup.

6. The combination, in a cut-out silencer, with a cut-out pipe, of a cup adapted to fit the discharge end of said pipe, said cup having perforated side walls, and means to attach said cup to said pipe and detach it therefrom.

7. The combination, in a cut-out silencer, with a cut-out pipe, of a cup adapted to fit the discharge end of said pipe, said cup having perforated sides and a perforated bottom, a mass of sound-deadening material in said cup, and means to attach said cup to and detach it from said pipe.

8. As a new articles of manufacture, a cut-out silencer comprising a cup having perforated side walls and being adapted to fit the discharge end of a cut-out pipe, together with means to secure said cup to said pipe.

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Witnesses:
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