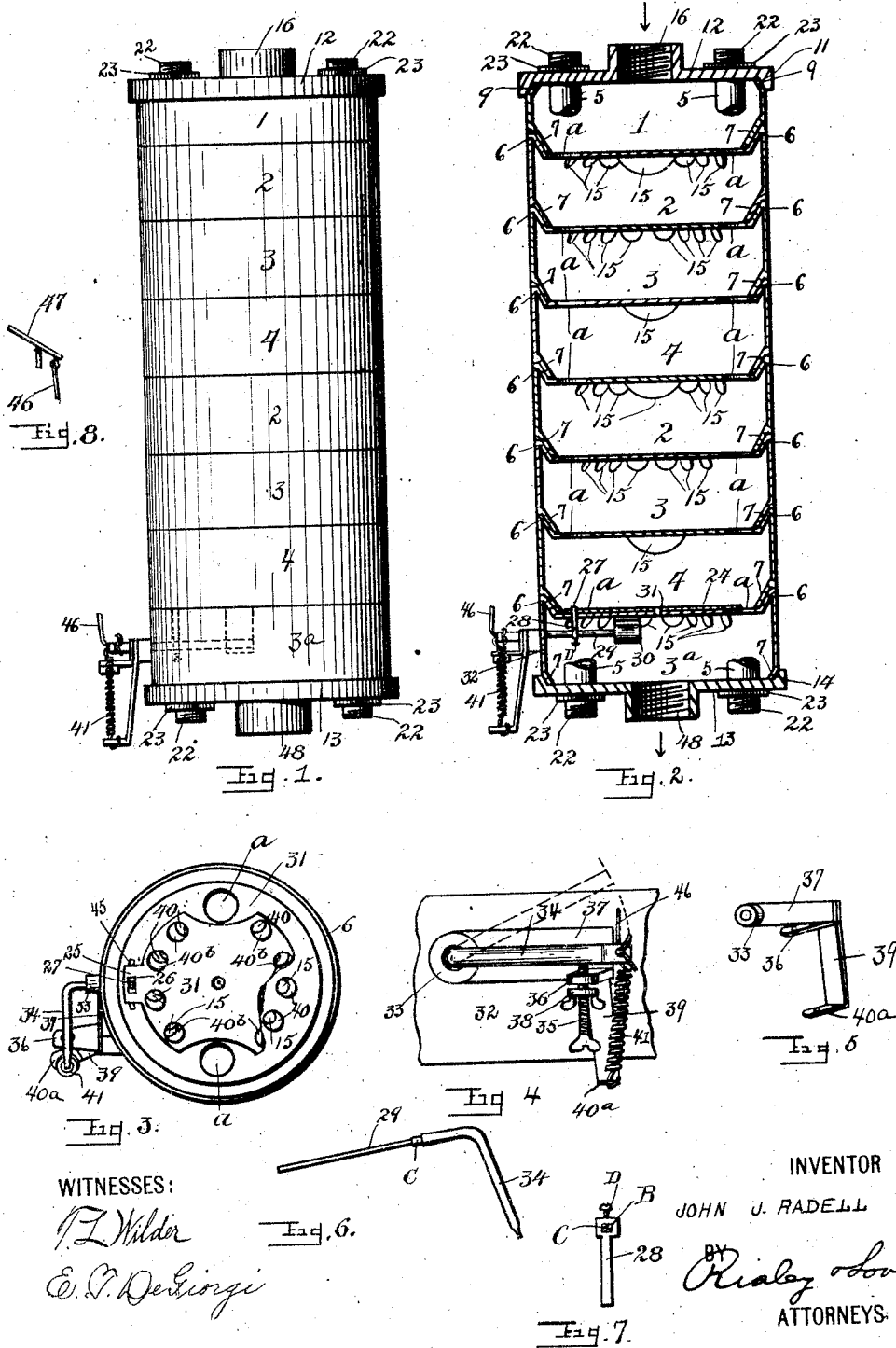


J. J. RADELL.
MUFFLER.
APPLICATION FILED APR. 8, 1910.

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Patented Apr. 18, 1911.



WITNESSES:

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JOHN J. RADELL, OF UTICA, NEW YORK.

MUFFLER.

990,165.

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To all whom it may concern:

Be it known that I, JOHN J. RADELL, citizen of the United States, residing at Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Mufflers, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to mufflers and I declare the following to be a full, clear, concise and exact description thereof sufficient to enable any one skilled in the art to which it appertains to make and use the same reference being had to the accompanying drawings in which like reference characters refer to like parts throughout the specification.

The object of the invention is to provide a muffler adapted more particularly for use on explosive engines of automobiles, although it may be used on any explosive engine.

The invention further contemplates certain improvements over an application for improvement in mufflers filed by me on the 7th day of January, 1910.

The improvement consists in providing one or more of a plurality of cups, which make up the muffler, with a pivotally mounted auxiliary shield or disk provided with apertures. By rotating this disk or shield it can be made to close the apertures in the partition of the cup to which it is pivotally mounted or it can by rotation in the opposite direction leave the apertures in the partition of the cup partially or entirely open according to the desired position with reference to back pressure of the muffler. Said auxiliary shield or disk is rotated or rather vibrated by a rock lever which may be actuated for short movements by a screw or in case of longer movements by a treadle to which it is intermediately connected. A muffler provided with this auxiliary shield or disk can be easily adjusted with reference to back pressure to any explosive engine and furthermore permits of an open or cut out exhaust when the engine is under great strain, as when the automobile is ascending a hill or under any like circumstance.

Further objects will appear in view of the drawings in which—

Figure 1 is a side elevation of the muffler complete; Fig. 2 is a longitudinal transverse section of the muffler; Fig. 3 is a plan view, looking in the direction of the arrows in

Fig. 2, of the partition of a cup provided with the improved shield or disk; Fig. 4 is a fragmentary detail view of certain parts and Figs. 5 and 6 are details somewhat enlarged of certain parts employed in the device; Fig. 7 is a transverse section of a rock shaft showing a lever connected thereto. Fig. 8 is a detail of a treadle of an automobile to which the muffler may be connected.

Referring to the drawings more particularly, the muffler comprises a series of independent, detachable cups denoted by 1, 2, 3, 3^a and 4, held together by a plurality of hollow tubes 5, two only being here shown. The cups are provided with partitions having suitable apertures *a* for the insertion of tubes 5, in order to assemble the cups. Hollow tubes 5 have their ends open, in order to connect their interiors with the atmosphere to form air passages adapted to lower the temperature of the medium within the muffler. Cups 2, 3, 3^a and 4 each have one edge formed with a shoulder as at 6 adapted to seat the beveled edge 7 of the preceding cup. Cup 1 has both edges beveled as at 7 and 9. The beveled edge 9 rests against the corresponding beveled edge 11 of end piece 12. Remote end pieces 13 has a beveled edge 14 adapted to correspond with beveled edge 7 of cup 3^a. As shown in Fig. 2 the edges of each succeeding cup reinforce those of the preceding ones and the end pieces have edges adapted to reinforce the adjacent edges of their respective cups. Cups 2, 3, 3^a and 4 are also each provided with a partition having openings partly closed by angularly disposed flanges 15 and are arranged in series of 2, 3, 4, preferably. Cup 2 having a partition with the greatest number of openings disposed nearest the inlet port 16 of the exhaust and the remaining cups 3 and 4 having partitions arranged with reference to openings in a diminishing progression or order. Tubes 5 have their ends externally screw threaded as at 22 upon which is screw mounted nuts 23 in order to hold the cups in assembled position. The above mentioned parts are more fully described in an application filed by me January 7, 1910, and I therefore refer to that application for a more complete understanding of the above described parts.

The improvement comprises a pivotally mounted auxiliary shield or disk 24 upon the partition of cup 3^a. The disk 24 has a wing 25 provided with a slot 26 in which loosely

rests the end 27 of rock lever 28. Rock lever 28 is rigidly mounted upon rock shaft 29 preferably in the manner shown most clearly in Fig. 7. Lever 28 has its end enlarged somewhat. The enlarged portion is provided with a square aperture B adapted to fit over a corresponding square portion C on shaft 29 and held rigidly to shaft 29 by set screw D. Rock shaft 29 is journaled at one end in bracket bearing 30 pendent from transverse partition 31 of cup 3^a. The other end of rock shaft 29 has a bearing in the side 32 of cup 3^a. The bearing in side 32 of cup 3^a is reinforced by bearing bushing 33 rigidly secured to side 32. Rock shaft 29 is provided with a right angularly disposed portion or arm 34 adapted to be held normally against the end of adjustment screw 35 screw mounted in horizontal portion 36 of bracket 37. Lock nut 38 is screw mounted upon screw 35 and is adapted to be screwed down tight to horizontal portion 36 of bracket 37 in order to hold screw 35 in any desired adjusted vertical position. Pendent from bracket 37 is arm 39 having horizontal portion 40 adapted to hold spring 41 in assembled position. Arm 39 does not hang vertically down from bracket 37 but is disposed at an angle in order that spring 41 may be held to one side of screw 35. Such arrangement makes it possible to more conveniently manipulate screw 35 without interfering with spring 41.

Bracket bearing 30 is held to transverse partition 31 of cup 3^a preferably by rivets. Bearing bushing 33, bracket 37, horizontal portion 36, arm 39 and its horizontal portion 40^a are preferably cast in one piece and the whole is riveted to side 32 of cup 3^a.

The operation of the muffler with reference to the improvement may be described as follows: The exhaust enters the chamber provided by cup 1 by way of port 16 which is suitably connected to the exhaust pipe of the engine by being screw mounted thereto. When the exhaust has entered the chamber of cup 1 it seeks or rather is urged to go farther subsequent explosions which drive the exhaust through the apertures in the partition of cup 2, said apertures being partly closed by flanges 15 tending to conduct the exhaust toward the sides of the muffler or toward the hollow tubes kept cool by the passage of air. The exhaust enters each cup in succession and in each instance is directed by the flanges 15 toward the sides of the entering cup. When the exhaust enters the next to last cup or cup 3^a its further passage forward is impeded or progressed by the position of auxiliary shield or disk 24 with reference to openings 40 in the partition 31 of cup 3^a. In order to regulate the size of openings from cup 4 or the preceding cup to cup 3^a or in other words in order to turn shield or disk 24 upon its pivot, so that its

openings will register to any degree with openings 40 in partition 31 of cup 3^a, I rotate rock lever 28 whose end 27 projects through slotted opening 45 in transverse partition 31 of cup 3^a and into opening 26 of auxiliary shield or disk 24. By turning screw 35 upward it will raise arm 34 of rock shaft 29, and thus cause the lever 28 to rock and rotate disk 24 whereby the openings of disk 24 may be brought to register with the openings of transverse partition 31 of cup 3^a with a view of relieving the back pressure of the muffler. If at any time it is desirable to have a complete exhaust or cut out, I provide a wire 46 connected to arm 34 of rock shaft 29. Wire 46 may be connected to a treadle 47 within convenient reach of the chauffeur's foot, so that by bearing down on the treadle, wire 46 will be pulled in a direction that will raise arm 34 of rock shaft 29 from off its normal seated position on the end of screw 35 and thus rotate lever 28 and disk 24 sufficiently to have the openings of the disk 24 exactly register with openings 40 in partition 31 of cup 3^a. The exhaust may then escape through outlet port 48. When the end 27 of rock lever 28 is at one extreme of slot 45 in transverse partition 31 of cup 3^a, the auxiliary disk 24 will completely close openings 40 of cup 3^a and when the end of the lever is at the other extreme of slot 45, the disk 24 will be rotated so that its openings 40^b will exactly register with openings 40 of cups 3^a. The arrangement will then give a maximum opening.

Many modifications may be made in the invention without departing from the principle thereof.

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

1. In a muffler, the combination of a plurality of independent separable cups having partitions and forming chambers interiorly connected by apertures, and external mechanism whereby the apertures in one of the partitions may be closed or opened.

2. In a muffler, the combination of a plurality of independent separable cups forming chambers interiorly connected by apertures and external mechanism whereby certain of said apertures may be closed, substantially as described.

3. In a muffler, the combination of a plurality of independent separable cups having partitions and internally connected by apertures, a pivotally mounted disk actuated by a lever whereby the apertures in one of the partitions of one of said cups may be closed or opened, substantially as described.

4. In a muffler of the character described, the combination of a plurality of independent, detachable cups having partitions and forming chambers interiorly connected by apertures in said partitions, lever mechanism

whereby the apertures in one of the partitions may be closed or opened, substantially as described.

5 5. In a muffler of the character described, the combination of a plurality of independent detachable cups forming chambers, said chambers being divided by partitions with apertures, a disk pivotally mounted on one of said partitions, and said disk adapted to
10 open or close the apertures of the partition to which it is mounted, substantially as described.

6. In a muffler of the character described, the combination of a plurality of independent detachable cups held together by hollow
15 tubes, said cups having transverse partitions with apertures, a disk pivotally mounted on one of said transverse partitions, and said disk adapted by lever mechanism to open or
20 close the apertures of the adjacent partition to which it is mounted.

7. In a device of the character described, the combination of a plurality of independent, detachable cups, having partitions with
25 flanged apertures, a disk pivotally mounted on one of said partitions, and external means whereby said disk may be rotated to open or close the apertures of said partition, substantially as described.

30 8. In a device of the character described, the combination of a plurality of independent, detachable cups certain thereof having partitions with flanged apertures, a disk pivotally mounted on one of said partitions and
35 lever mechanism controlled by external means whereby said disk may be rotated to open or close the flanged apertures of the adjacent partition, substantially as described.

9. In a device of the character described, the combination of a plurality of independent, separable cups, held together by hollow
40 tubes, each cup having edges adapted to reinforce the edge of the preceding cup, end members having edges adapted to reinforce
45 the adjacent edges of their respective cups, and certain of said cups having partitions with flanged apertures, and mechanism for closing or opening the apertures of one of said partitions, substantially as described.

50 10. In a muffler of the character described, the combination of a plurality of independent, separable cups arranged in series and held together by hollow tubes, the edges of said cups adapted to reinforce each other,
55 end members having flanges adapted to reinforce the adjacent edges of their respective cups, and certain of said cups having transverse partitions with partially covered apertures, a disk pivotally mounted on one of
60 said transverse partitions and lever mechanism

whereby said disk may be rotated or vibrated in order to open or close the apertures of said partition.

11. In a muffler of the character described, the combination of a plurality of independent detachable cups, end members adapted to
65 reinforce adjacent cups, partitions with apertures partially closed by flanges, said partitions being integral with said cups, and a rotatable disk mounted upon one of said partitions and lever mechanism actuated by
70 means whereby to rotate said disk, and a spring to normally close said disk over said apertures.

12. In a muffler of the character described, the combination of a plurality of independent, detachable cups forming chambers
75 interiorly connected by flanged apertures in partitions integral with certain of said cups, lever mechanism adapted to revolve a disk whereby the apertures in one of the partitions dividing the chambers may be closed.

13. In a muffler, the combination of a plurality of independent, detachable cups held together by hollow tubes, certain of said
80 cups having partitions with flanged apertures, a disk pivotally mounted on one of said partitions of said cups, mechanism for revolving said disk whereby the apertures of one of said partitions of said cups may be
90 closed or opened, substantially as described.

14. In a muffler, the combination of a plurality of separable cups forming chambers, certain of said cups having partitions with
95 flanged apertures, a disk pivotally mounted upon one of said partitions whereby the apertures in one of the partitions dividing the chambers may be closed.

15. In a muffler, the combination of a plurality of independent, detachable cups with
100 partitions having apertures and forming chambers, and mechanism whereby the apertures in one of the partitions dividing the chambers may be closed.

16. In a muffler, the combination of a plurality of separable cups forming chambers,
105 said cups having partitions with apertures, a disk rotatably mounted upon one of said partitions and having apertures corresponding to the apertures in said adjacent partition, means for adjusting the alinement of the apertures in said disk and in said partition, and means for rotating said disk.

In testimony whereof I have hereunto
115 affixed my signature in the presence of two witnesses.

JOHN J. RADELL.

Witnesses:

ELEANOR T. DE GEORGI,

T. L. WILDER.