

Dec. 10, 1929.

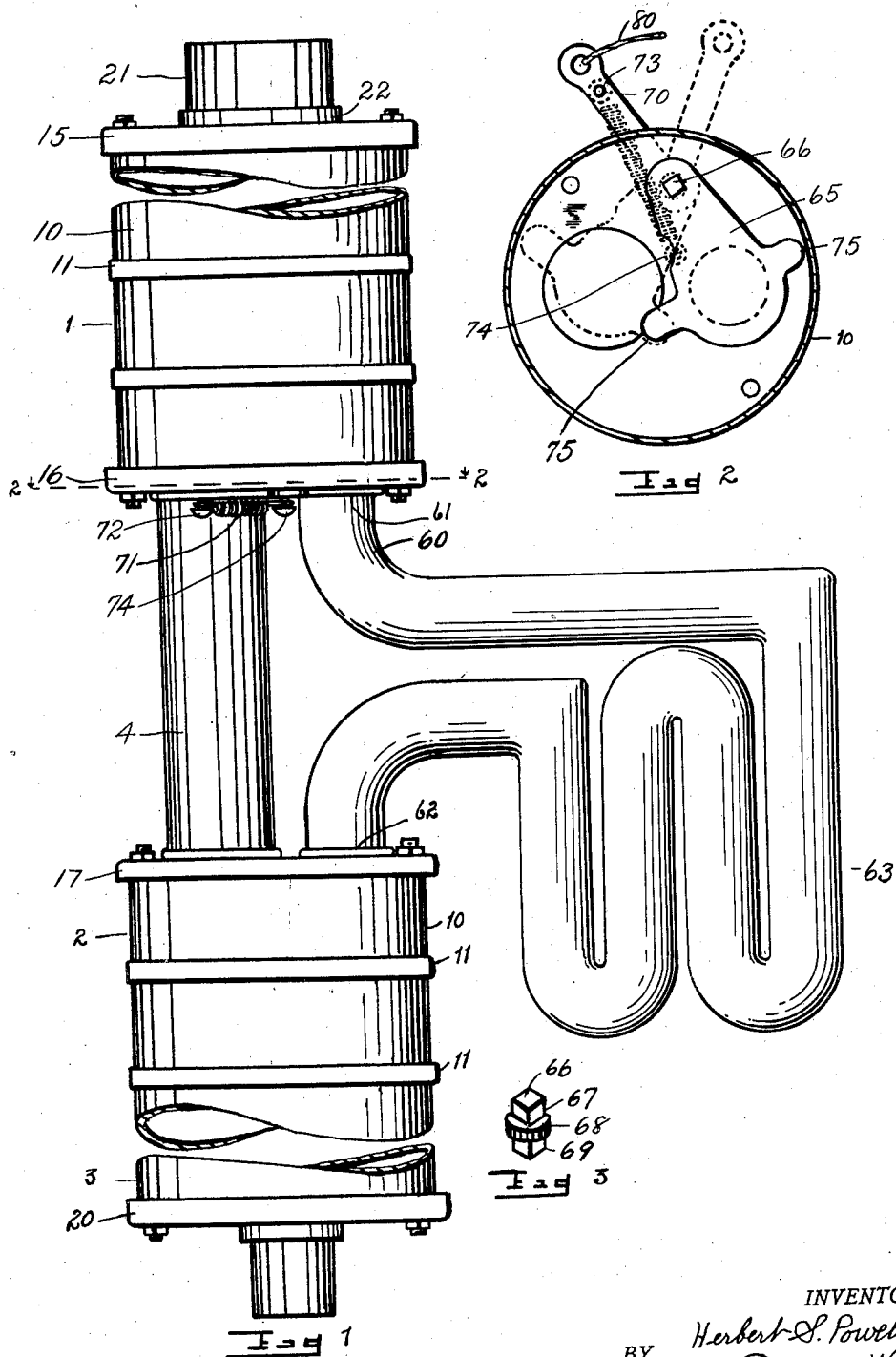
H. S. POWELL

1,739,039

MUFFLER

Filed June 8, 1926

2 Sheets-Sheet 1



INVENTOR
Herbert S. Powell
BY Thomas L. Wilder
ATTORNEY

Dec. 10, 1929.

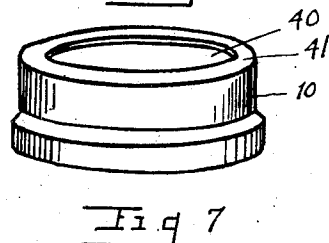
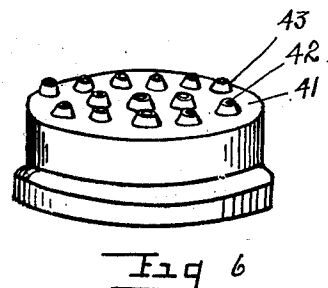
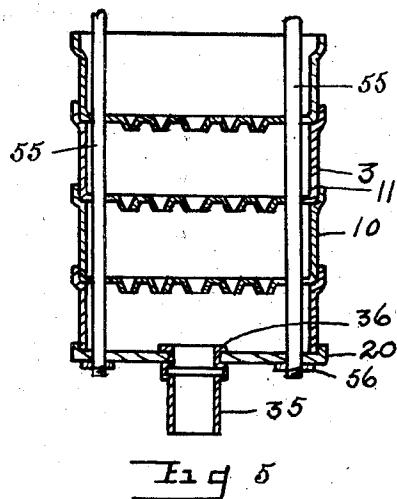
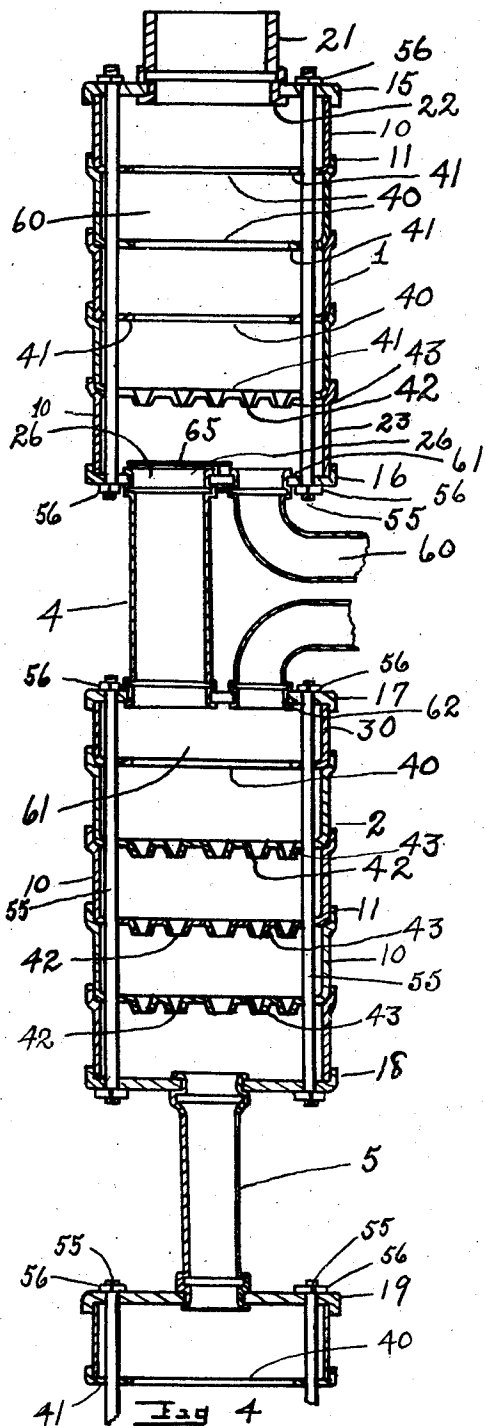
H. S. POWELL

1,739,039

MUFFLER

Filed June 8, 1926

2 Sheets-Sheet 2



INVENTOR
Herbert S. Powell
BY Thomas L. Wilder
ATTORNEY

UNITED STATES PATENT OFFICE

HERBERT S. POWELL, OF UTICA, NEW YORK

MUFFLER

Application filed June 8, 1926. Serial No. 114,524.

My invention relates to a muffler and I declare the following to be a full, clear, concise and exact description thereof sufficient to enable anyone skilled in the art to which it ap-
 5 pertains 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
 10 muffler of simple construction and adapted to effectively silence the noise incident to the discharge of the exhaust gases of an internal combustion engine.

The muffler is built in sections, of the dumb-bell type, which sections are connected by
 15 tubes that diminish in size progressively as the gases of explosion progress towards the atmosphere. Each of the sections is made up of cups that can be replaced easily in the event
 20 of the destruction of one or more of the same.

Furthermore, the muffler is equipped with pipes leading to a heater located within the automobile, whereby to heat said interior.
 25 There is a valve also for shutting off the admission of the exhaust to the heater and means for controlling the actuation of said valve.

The object will be understood by referring to the drawings in which:

30 Fig. 1 is the elevational view of the muffler showing parts broken away.

Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1.

35 Fig. 3 is a detail enlarged view of a pivot used.

Fig. 4 is a central vertical section of the muffler showing parts broken away; other parts in full lines and made on a reduced
 40 scale.

Fig. 5 is a fragmentary view showing a central vertical section of the remaining part omitted from Fig. 4 and made on the same scale.

45 Fig. 6 is a detail perspective view of one of the cups employed, showing the same in inverted position and drawn to the same scale as Figs. 4 and 5.

50 Fig. 7 is a detail perspective view of another cup employed, showing the same in in-

verted position and drawn to the same scale as Figs. 4 and 5.

Referring more particularly to the drawings, the muffler is made up of two or more sections, as 1, 2 and 3, which are connected
 55 by the tubes 4 and 5 arranged to diminish in size, as the gases progress towards the atmosphere. The connecting tubes 4 and 5 give the muffler more or less the appearance of a dumb-bell, and diminishing in size allow
 60 for the greatest expansion as the gases enter the muffler and a gradual contraction thereof as they progress towards the atmosphere.

Each of the sections is built up of detach-
 65 able cups 10 that are made to interfit by flaring out the upper peripheral edge at 11, whereby to form a shoulder against which the bottom of the preceding cup 10 fits or nests. Moreover, the several cups 10 of each section,
 70 as 1, 2 and 3 are provided with end closing members 15 and 16 relative to section 1; 17 and 18 relative to section 2; and 19 and 20 relative to section 3. Inlet pipe 21 is connect-
 75 ed to closing member 15 by spinning or otherwise secured the end, as at 22, thereto. Likewise, the last cup 10 of section 1 is formed with the circular wall 23 fixed in an air-tight
 80 manner to closure member 16, which has an aperture through which projects the end 26 of tube 4, said end 26 being spun thereto. The opposite end of tube 4 is riveted in like
 85 manner to the closure member 17 fixed in an air-tight manner to the circular wall 30, which forms the first cup of second section 2.

Second section 2 is united to third section
 85 3 by a tube 5 spun at opposite ends to the closure members 18 and 19 respectively, of sections 2 and 3. It will be observed that tube 5 is smaller in diameter than tube 4,
 90 whereby the gases will be forced to pass through a smaller closure into third section 3.

An outlet tube 35 is spun at end 36 to closure member 20. Tube 35 is still smaller in diameter than tube 5, whereby the gases are
 95 forced to pass through a still smaller closure to atmosphere.

In order to further break up the gases in their passage through the muffler apertures of different forms have been made in each
 100 of the cups 10 of each section.

In section 1 an expansion chamber is formed by making large central apertures 40 in the bottoms 41 of each of the first three cups 10. The fourth cup 10 is equipped with small apertures 42 made by punching or stamping the same through the bottom 41, thereby forming flanges 43 surrounding said apertures 42 to disseminate the heat and, thence aid in cooling the muffler.

The apertures 42 will tend to break up and segregate the on-rushing gases which will be contracted then by passing through the connecting tube 4 which is smaller in diameter than the cups 10. From tube 4 the gases will pass to the second section 2 which is made up also of five cups 10, the first of which has a large central aperture 40 for the unimpeded progress of the gases, whereas, the next three cups 10 are equipped with apertures 42 formed with flanges 43 for disseminating the gases.

The gases will pass from section 2 to section 3 by way of tube 5 which is spun at end 44 to closing member 18 of section 2 and at its opposite end 45 to closing member 19 of section 3. Cups 10 in section 3 are similar to the cups 10 in section 2 and arranged in the same order with the first one having a large central aperture 40 in its bottom 41 and the next three with small flanged apertures 42. The gases will pass from section 3 to atmosphere through tube 35.

Tube 35 is spun at one end, as at 36, to the end closure member 20 of the third section 3. It is still smaller in diameter than connecting tube 5, and, as above stated, tube 5 is smaller in diameter than tube 4, whereby there is effected a progressive diminishing ratio relative to the sizes of the diameters of said tubes 4, 5 and 35.

The several cups and sections of the muffler are held together by stay rods 55, 55 that are projected through apertures made in said cups and end members and terminate at each section. The ends of said stay rods are threaded for the mounting of nuts 56, 56 that are tightened thereon to bind the parts together.

The means for diverting the gases from a direct passage through the muffler embodies the pipe or tube 60 which has one end spun at 61 to the edge of the aperture formed in closing member 16 of section 1 and its opposite end spun at 62 to the edge of the aperture formed in closing member 17 of second section 2. Pipe 60 is doubled on itself in parallel planes to form a heater 63, which part will be disposed within the interior of the automobile, not here shown.

The means for controlling the passage of the gases of explosion to the heater 63 embodies a rock valve 65 that is fulcrumed and mounted on the square end 66 of a pivot 67 with which said valve 65 turns. Pivot 67 has a cylindrical part at 68 fitting

loosely in a corresponding aperture made in closing member 16, so as to turn therein. The opposite end 69 of pivot 67 is squared also for mounting one end of operating lever 70 which has a square hole for the purpose. Ends 66 and 69 of pivot 67 are spun to the corresponding parts of valve 65 and lever 70 respectively. When valve 65 is in full line position illustrated in Fig. 2 it will completely cover the opening into pipe 60 and, thereby prevent the exhaust gases from entering heater 63; when it is moved to the dotted line position in said Fig. 2 it will partially close the opening to pipe 4, whereby some of the gases will be allowed at all times to pass through pipe 4 though in small quantities when valve 65 is in dotted line position illustrated in Fig. 2. Valve 65 is held temporarily in either full or dotted line positions illustrated in Fig. 2 by a coiled spring 71 fastened at 72 to a stud 73 mounted in lever 70 near its free end and at its other end to a stud 74 mounted to closing member 16 and substantially half way between the centers of the openings of pipes 4 and 60. This mounting of spring 71 will cause it to exert a pull on the end of lever 70 which will be off center. Nubs or projections 75 are formed on valve 65, whereby to make contact with the sides of closing member 16 to limit the movement of valve 65 in either the full or dotted line positions illustrated in Fig. 2.

In operation the exhaust gases enter the muffler through inlet pipe 21 and are allowed to expand in a chamber 60 formed by the first three cups 10. They are contracted, however, as they pass through the apertures 42 of the fourth cup and still further contracted on passing through connecting tube 4. On entering the second section 2 the gases are allowed to again expand through a smaller expansion chamber 61 formed by the first two cups 10 and then contracted on passing through the next three cups 10 and still further on passing through connecting tube 5. On entering the third section, the gases are allowed to expand only while passing through the first two cups 10 and contracted through the next three cups 10 and still further contracted while passing through outlet tube 35 to atmosphere. It will be observed that the gases in passing through the muffler are subjected to an alternating expansion and contraction movement that aids materially in breaking up and disseminating the gases without unduly impeding their progress with the resultant back pressure on the engine.

A cord 80 will be attached to the lever 70 and runs to the interior of the automobile. In the event that it is desired to have the exhaust gases enter heater 63, the operator will actuate the same to move valve 65 from full to dotted line position or in the event

that he wishes to divert the gases from heater 63 and entirely through the muffler, he will again actuate lever 70 by a pull on cord 80 to move valve 65 to dotted line position illustrated in Fig. 2.

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

1. In a muffler for exhaust gases, a plurality of sections, tubes connecting said sections and said tubes being disposed in prolongation of each other and reduced progressively in size, whereby to aid in breaking up the exhaust gases, and a rock valve for controlling the gases from a direct passage through the muffler.

In testimony whereof I affix my signature.
HERBERT S. POWELL.

2. In a muffler for exhaust gases, a plurality of sections, each of said sections comprising a series of cups, apertures formed in said cups for causing the exhaust gases to take a tortuous course, tubes disposed in prolongation of each other and gradually diminishing in size for connecting said sections, whereby to aid in breaking up the exhaust gases.

3. In a muffler for exhaust gases, a plurality of groups of cups, certain of said cups having apertures with conical shaped flanges, whereby to aid in disseminating the heat of the exhaust gases, and tubes disposed in prolongation of each other and progressively diminishing in size connecting said groups of cups, whereby to aid in causing said gases to take a tortuous course.

4. In a muffler for exhaust gases, a plurality of sections, tubes for connecting said sections, said tubes disposed in prolongation of each other and diminishing in size, whereby to aid in causing the exhaust gases to take a tortuous course, said sections being built up of a plurality of interfitting cups, and certain of said cups having conical shaped flanges, whereby to aid in disseminating the heat of the exhaust gases.

5. In a muffler for exhaust gases, a plurality of sections, each of said sections comprising a plurality of interfitting cups, certain of said cups forming an expansion chamber and certain others having apertures with conical shaped flanges to aid in disseminating the heat of said exhaust gases, tubes disposed in prolongation of each other and progressively diminishing in size for connecting said sections, whereby to aid in causing the exhaust gases to take a tortuous course, and means for holding said cups together.

6. In a muffler for exhaust gases, a plurality of groups of cups, certain of said cups having conical shaped apertures, to aid in disseminating the heat of the exhaust gases, tubes connecting said sections and said tubes being disposed in prolongation of each other and reduced progressively in size, whereby to aid in breaking up the exhaust gases, and means for controlling the gases from a direct passage through the muffler.

7. In a muffler for exhaust gases, a plurality of groups of cups, certain of said cups

70

75

80

85

90

95

100

105

110

115

120

125

130