

W. S. HARLEY.

MUFFLER.

APPLICATION FILED MAY 28, 1914.

1,122,388.

Patented Dec. 29, 1914.

Fig. 2.

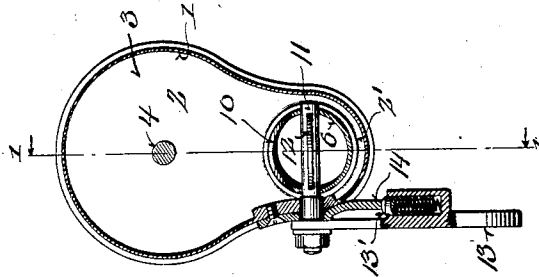
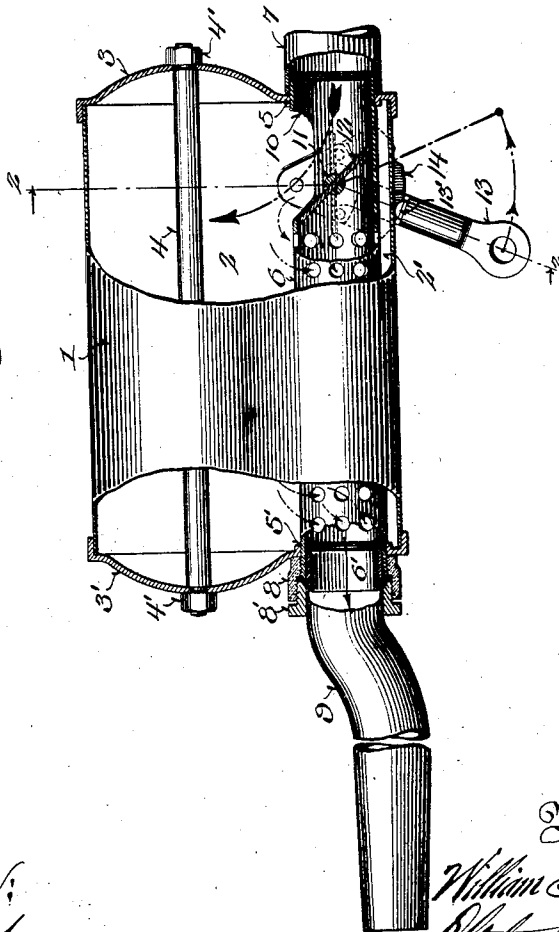


Fig. 1.



Witness:
Cammack Young
May Downey.

Inventor
William S. Harley
By *Robert F. Young*
Attorneys.

UNITED STATES PATENT OFFICE.

WILLIAM S. HARLEY, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO HARLEY-DAVIDSON MOTOR COMPANY, OF MILWAUKEE, WISCONSIN.

MUFFLER.

1,122,388.

Specification of Letters Patent.

Patented Dec. 29, 1914.

Application filed May 28, 1914. Serial No. 841,467.

To all whom it may concern:

Be it known that I, WILLIAM S. HARLEY, a citizen of the United States, and resident of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Mufflers; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention has for its object to provide a simple, economical and effective muffler especially designed to be applied to internal combustion engines, the arrangement and construction being such as to reduce the cost of manufacture to a minimum and having means whereby the explosions are materially muffled even though the expansion chamber is cut out.

With the above object in view the invention consists in certain peculiarities of construction and combination of parts as set forth hereinafter with reference to the accompanying drawings and subsequently claimed.

In the drawings Figure 1 represents a side elevation of a muffler embodying the features of my invention, with parts broken away and parts in section to more clearly illustrate details of construction, and Fig. 2, a detailed cross-section of the same, the section being indicated by line 2—2 of Fig. 1.

Referring by characters to the drawings, 1 represents the circular body of a drum, which drum in cross-section is key-hole shaped to form an expansion chamber 2 and an offset restricted throat 2'. The drum-shell is closed at its ends by heads 3, 3', having inturned flanges, which flanges overlap the ends of the shell, as shown, the heads being confined by a draw-bolt 4 having threaded ends for the engagement of nuts 4', whereby the drum-heads are clamped securely to the drum-shell. The heads are provided with apertures 5, 5', in alinement with the drum throat 2', which apertures are provided for the reception of the open ends of a perforated tube 6 that extends through the throat. The intake or feed end of the tube is fitted within and secured to an exhaust feed pipe 7, the end of which shoulders against the adjacent exterior wall of the head 3. The opposite end of the perforated tube is exteriorly threaded and projects through the head 3' for engagement with a stuffing-box ring 8, whereby the tube

is confined and tight adjustment effected between its ends and the drum-heads. The threaded or discharge end of the tube 6 is also internally reinforced by a thimble 6', which thimble and the end of the tube are tapered inwardly to form a beveled face. This beveled face is adapted to receive the mouth of a discharge pipe 9, which mouth is expanded over said beveled face as shown and confined by a gland 8', the gland being in threaded union with the stuffing-box ring. Thus a tight coupling joint is effected between the discharge pipe and tube, the construction being such that the parts can readily be assembled and knocked down. The tube 6 is also cut away adjacent to its feed end to form a by-pass mouth 10 that communicates with the expansion chamber 2, whereby the gases may be admitted into said chamber to produce a muffling result.

Just back of the by-pass mouth 10 the tube 6 is fitted with a transversely disposed valve-stem 11 carrying a butterfly valve 12, which valve is adapted to deflect all of the gases through the expansion chamber 2 when positioned as shown in Fig. 1. This valve which constitutes a cut-out when shifted to the position indicated in dotted lines, in effect cuts out the muffler and permits the exhaust to discharge freely. However, when the muffler is cut out a certain percentage of the gases passing through the perforated pipe will escape through said perforations and also through the by-pass mouth 10 into the expansion chamber, which expansion of the gases will produce an appreciable muffler effect without causing any back pressure upon the engine, this effect being also due to the fact that the pressure is relieved as the gases are discharged through the discharge mouth of the discharge pipe 9, which is slightly restricted with relation to the cross-sectional area of the tube.

The cut-out valve 12 is controlled by a lever 13, which lever is secured to an end of the valve-stem 11 that projects through the drum shell 1. The lever 13 carries a spring-controlled plunger 13' that is adapted to engage notches of a sector-plate 14, which plate is secured to the exterior wall of the drum shell in any suitable manner.

I claim:

1. A muffler comprising a headed shell having an expansion chamber and a re-

stricted throat therein, a perforated tube extending through the throat and drum heads having a by-pass mouth adjacent to its feed end and in communication with the expansion chamber, and a cut-out valve located in the tube back of the by-pass throat to close said tube at its feed end, whereby all gases are caused to enter the chamber from the by-pass mouth and to pass from said chamber through the tube apertures to exhaust.

2. A muffler comprising a drum-shell, heads fitted thereto having alined apertures, a draw-bolt for securing the heads to the drum-shell, the drum being in key-hole shape in cross-section whereby an expansion chamber and a restricted throat is formed in said drum in alinement with the head aperture, a perforated tube extending through the head apertures having a by-pass mouth adjacent to its feed end in communication with the expansion chamber, a cut-out valve located in the perforated tube back of the by-pass mouth, means for shouldering the feed end of the tube against the face of one of the drum heads, a stuffing-box ring in threaded union with the discharge end of the tube and engageable with the juxtaposed

drum-head, a discharge pipe fitted to the discharge end of the tube, and a gland for confining the discharge pipe in threaded union with the stuffing-box ring.

3. A muffler comprising a drum-shell, heads fitted thereto having alined apertures, the drum being in key-hole shape in cross-section whereby an expansion chamber and a restricted throat is formed in said drum in alinement with the head apertures, a perforated tube extending through the head apertures having a by-pass mouth adjacent to its feed end in communication with the expansion chamber, a cut-out valve located in the perforated tube back of the by-pass mouth, a feed pipe in communication with the feed end of the tube, and a discharge pipe in communication with its delivery end.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

WILLIAM S. HARLEY.

Witnesses:

CRYSTAL HAYDEL,
E. J. MUELLER.