R. BROWN.

MUFFLER.

APPLICATION FILED MAR. 13, 1919.

1,335,872. Patented Apr. 6, 1920.

Fig. 1.

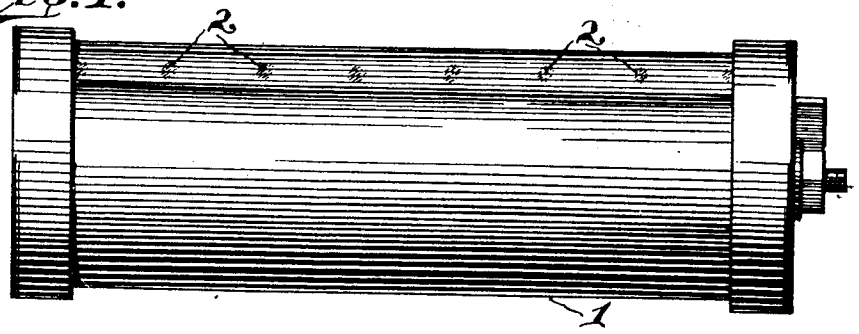


Fig. 2.

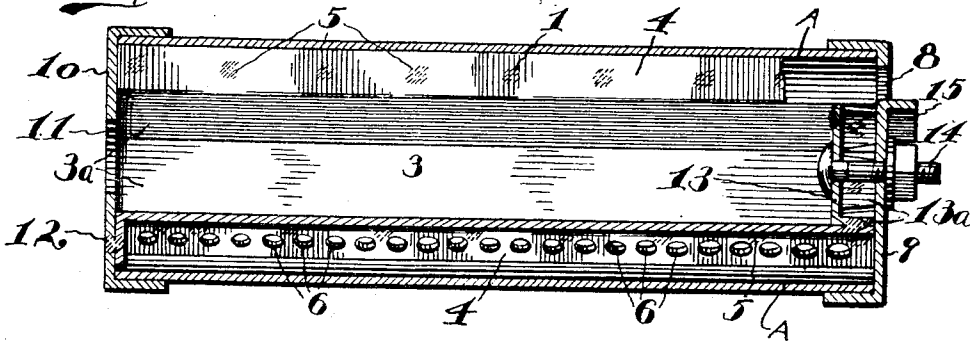


Fig. 3.

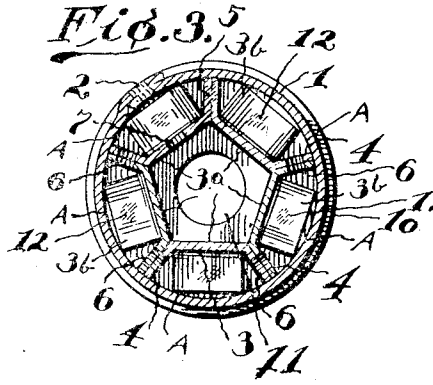
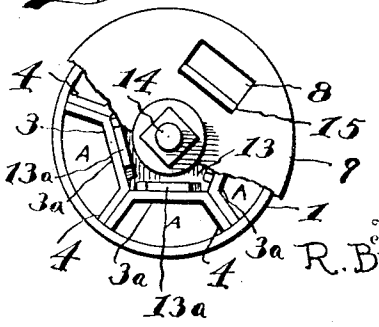


Fig. 4.



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UNITED STATES PATENT OFFICE.

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MUFFLER.

1,335,872. Specification of Letters Patent. Patented Apr. 6, 1920.

Application filed March 13, 1919. Serial No. 282,253.

To all whom it may concern:

Be it known that I, ROBERT BROWN, a citizen of the United States, residing at Toledo, in the county of Lucas, State of Ohio, have invented a new and useful Muffler; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to a muffler for silencing the exhaust from internal combustion engines, and has for its object to provide a device of this character which embodies novel features of construction whereby the exhaust noises are effectively silenced without producing excessive back pressure upon the engine.

Further objects of the invention are to provide an efficient and effective muffler which can be inexpensively constructed from sheet metal, which can be quickly assembled or taken apart for cleaning, and which has a strong and rigid construction well adapted to withstand the hard usage to which such devices are subject.

With these and other objects in view, the invention consists in certain novel combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a side elevation of a muffler constructed in accordance with the invention.

Fig. 2 is a longitudinal sectional view through the same.

Fig. 3 is a transverse sectional view.

Fig. 4 is a rear end view of the muffler with portions of the rear end cap broken away.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, which illustrate one embodiment of the invention, the numeral 1 designates an elongated tubular outer casing which has a uniform cross section throughout its length and is shown as cylindrical in shape. This outer casing may be conveniently formed by rolling a strip of sheet metal, the longitudinal edges being overlapped and secured in any suitable manner as by means of spot welding, as indicated at 2. Extending longitudinally through the center of the outer casing 1 and spaced therefrom is an inner tubular shell 3. This inner shell 3 is preferably polygonal in cross section, each of the flat faces of the shell being formed of a sheet metal strip 3^a of which the longitudinal edges are bent outwardly. The abutting outwardly bent edges of adjacent strips or plates 3^a form longitudinal flanges 4 which project radially from the inner shell and engage the outer casing 1, thereby dividing the space between the shell 3 and outer casing 1 into a series of longitudinally extending expansion chambers A. The flanges 4 are thus each formed of two thicknesses of material fitting closely against each other, and these thicknesses of material may be secured in any suitable manner as by means of the spot welding indicated at 5.

One of the flanges 4 is imperforate, while all of the other flanges are provided with openings 6 which place the adjacent expansion chambers A in communication with each other. The expansion chamber A on one side of the imperforate flange 4 communicates with the interior of the inner shell 3 through a series of openings 7, while the expansion chamber A on the opposite side of the imperforate flange communicates with an outlet opening 8 in an end cap 9 which is fitted upon the rear end of the outer casing 1. The opposite end of the casing is provided with an end cap 10 which closes the forward ends of all of the expansion chambers A and is provided with a central opening 11 adapted to receive the exhaust pipe from the engine. The various sheet metal plates of the inner shell 3 are provided at their forward ends with flanges 3^b which fit against the end cap 10 and are rigidly secured thereto in any suitable manner as by means of the spot welding indicated at 12. The inner shell 3 is thus carried by the end cap 10 so that it is removable therewith.

The rear end of the inner shell 3 is provided with a transverse plate 13 which has a polygonal shape corresponding to the cross section of the inner shell, the edges of the plate being formed with flanges 13^a which fit against and are secured to the inner walls of the shell 3. A bolt 14 extends through

the transverse plate 13 and rear end cap 9, and it will be obvious that when this bolt is tightened the inner shell 3 will be rigidly connected to both of the end caps so as to be held firmly in position within the outer casing. However, by removing the bolt the rear end cap 9 can be removed and the inner shell drawn out of the outer casing with the forward end cap 10 attached thereto. The parts can thus be readily taken apart or assembled, as may be desired.

The exhaust pipe from the engine may pass through the central opening 11 of the end cap 10, and the exhaust gases will thus enter the interior of the inner shell 3. From this comparatively large chamber they will pass through the openings 7 into one of the expansion chambers A located adjacent the imperforate flange 4. From this first expansion chamber A the products of combustion will pass successively through the series of expansion chambers until they reach the expansion chamber on the opposite side of the imperforate flange 4. From this last expansion chamber the products of combustion will be finally discharged through the opening 8 in the end cap 9, and the passage of the exhaust gases through the various chambers will act in a most effective manner to silence the exhaust. The outlet opening 8 is shown as formed by cutting a lip from the end cap, said lip being bent outwardly as indicated at 15 and being arranged so as to deflect the exhaust gases away from the vehicle or other machine upon which the muffler is mounted.

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

1. In a muffler, the combination with an elongated tubular casing and removable end caps therefor, of a tubular shell extending longitudinally through the casing and permanently connected to one of the end caps so as to be removable therewith, a series of longitudinal flanges projecting radially from the tubular shell and subdividing the space between the outer casing and inner shell into a series of longitudinal expansion chambers, one of the flanges being imperforate and the other flanges being perforate, the inner shell being formed at one side with openings establishing communication between the interior of the shell and the expansion chamber on one side of the imperforate flange, the other end cap being formed with an outlet opening communicating with the expansion chamber on the other side of the imperforate flange, and detachable fastening means between the inner shell and the opposite end cap.

2. In a muffler, the combination with an elongated tubular casing and removable end caps therefor, of an inner shell extending longitudinally through the casing and permanently connected to one of the end caps so as to be removable therewith, a series of longitudinal flanges projecting radially from the tubular shell and subdividing the space between the outer casing and inner shell into a series of longitudinal expansion chambers, one of the flanges being imperforate while the other flanges are perforate, and the shell being formed with openings establishing communication between the interior of the shell and the expansion chamber on one side of the imperforate flange, the end cap to which the shell is attached being formed with a central inlet opening leading to the interior of the shell, a transverse wall extending across the opposite end of the shell and permanently connected thereto, and a fastening member detachably connecting the said transverse wall to the other end cap for holding the parts in an assembled position, said other end cap being formed with an outlet opening communicating with the expansion chamber on the opposite side of the imperforate flange.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT BROWN.

Witnesses:
KNIGHT HAGER,
JOSEPH S. MCCARRICK.