Nov. 10, 1925. 1,560,947

D. M. SKELTON

EXHAUST MUFFLER FOR INTERNAL COMBUSTION ENGINES

Filed April 28, 1921

Fig. 1.

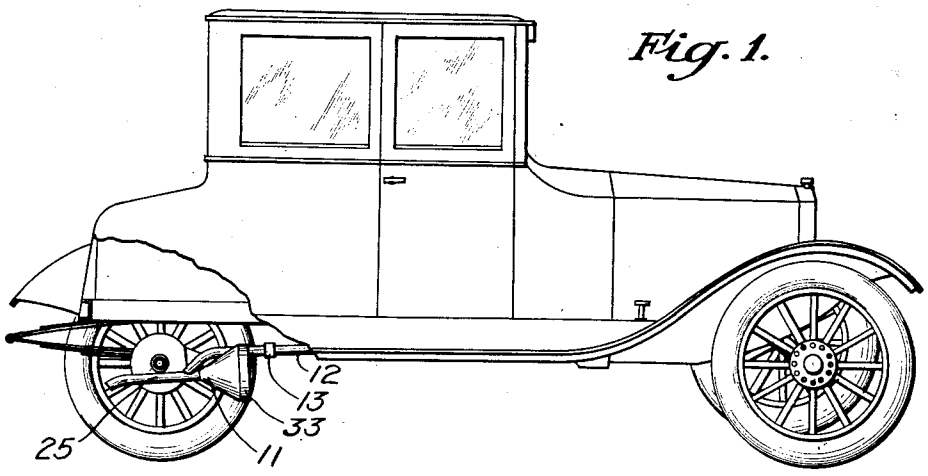
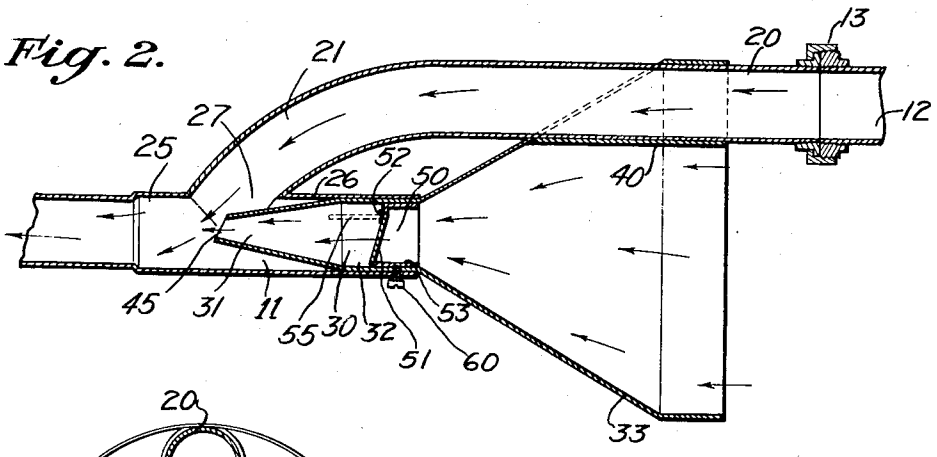


Fig. 2.



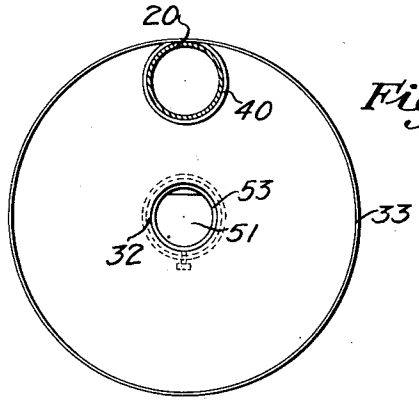


Fig. 3.

INVENTOR:
DOROTHY M. SKELTON,
BY
Graham & Harris
ATTORNEYS.

Patented Nov. 10, 1925. 1,560,947

UNITED STATES PATENT OFFICE.

DOROTHY M. SKELTON, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO WILLIS A. SKELTON, OF LOS ANGELES, CALIFORNIA.

EXHAUST MUFFLER FOR INTERNAL-COMBUSTION ENGINES.

Application filed April 28, 1921. Serial No. 465,146.

To all whom it may concern:

Be it known that I, DOROTHY M. SKELTON, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Exhaust Muffler for Internal-Combustion Engines, of which the following is a specification.

My invention relates to devices used in connection with the exhaust pipes of internal combustion engines for the purpose of regulating the outflow of the combustion gases and thereby muffling the sounds caused thereby.

The type of mufflers now in common use consist chiefly of receiving chambers having baffle plates situated therein through which the exhaust gases must pass before being delivered into the air. It is a conceded fact that such mufflers create a back pressure which has the result of considerably reducing the effective power of the engine and also causes an unnecessary overheating of the motor cylinders, and it is for this reason that mufflers are not used on aeroplane driving motors.

The principal object of my invention is to provide a muffler which will allow the free passage of the exhaust gases into the open air, and which will be free of back pressure creating elements, thereby allowing the motor in connection with which it is employed to operate at its highest efficiency.

Other objects and advantages will appear hereinafter from the following description and drawings.

Referring to the drawings which are for illustrative purposes only,

Fig. 1 is an elevation of an automobile showing a muffler embodying my invention in application thereto.

Fig. 2 is a longitudinal section through the muffler shown in Fig. 1.

Fig. 3 is a front view of the muffler.

The sound, or report, accompanying the emission of combustion gases into the open air is caused by these gases being delivered into the air in the form of impulses which cause sound vibrations to be set up. The ejection of a body of gas into the air compresses the air into which it enters and creates an initial oscillation in the air formation, and, due to its forward momentum, a vacuum is created before the mouth of the pipe from which it has been discharged. The discontinuance of the pressure upon the air by the exhaust impulse allows the air acted upon to return to its normal state, and to fill the vacuum created by the outrushing exhaust gases, thus a return oscillation is produced in the air formation and a complete sound vibration results.

In my muffler the exhaust gases are combined with a flow of air and are delivered therewith into the open air in a continuous stream, thereby acting upon the air into which it is discharged in a continuous manner so that no strong vibrations are set up.

In the form of my invention shown in the drawings, the muffler 11 is attached to the exhaust pipe 12 by a union coupling 13. The exhaust gases are received from the exhaust pipe 12 by a delivery pipe 20 and are delivered thereby through the curved portion 21 of the pipe 20 into a discharge pipe 25. Inserted in that portion 26 of the discharge pipe 25 which extends rearwardly from the point of connection 27 of the delivery pipe 20 to the discharge pipe 25 is a nozzle 30 comprised essentially of a converging nose 31 extending from a cylindrical formation 32.

Within the cylindrical portion 32 of the nozzle 30 is provided a check valve 50 formed of a flat closure plate 51 hinged at 52 to a sleeve 53. The plate 51 is kept normally closed by gravity, and assumes the position indicated by the dotted lines 55 upon the passage of air therethrough in a forward direction. In order that the muffler 11 may be installed in positions other than that shown in the drawings, I make the check valve turnable within the nozzle 30 so that the covering means 51 may be suspended from the top as shown. I secure the valve structure in place by a set screw 60 so that it may be adjusted in position to conform with the installation.

Enlarging rearwardly from the cylindrical portion 32 of the nozzle 30 is a collector funnel 33 which in passing through the air causes a flow of air through the nozzle 30 as indicated by the arrows in Fig. 2. In order that the muffler 11 may be compact in construction, I pass the delivery pipe 20 through a sleeve 40 located within the confines of the funnel 33.

The exhaust impulses in being delivered through the pipe 20 into the discharge pipe 25 pass across the opening 45 provided in

the nose 31 of the nozzle 30 and induce a flow of air therethrough which relieves the vacuum which would ordinarily be created behind each impulse and prevents the existence of vibration causing conditions. The flow of air induced by the passage of the exhaust by the opening 45 of the nozzle 30 is greatly assisted by the pressure created in the funnel 33 due to its passage through the air.

I have shown and described my invention in use with an automobile, and, although it is particularly adapted to this use, the muffler is equally efficient where used in connection with internal combusion engines of all types, and especially aeroplane motors. It is to be understood that nozzles of various sized openings may be used without departing from the spirit of my invention.

I claim as my invention:

1. In a muffler, the combination of: a discharge pipe; a delivery pipe to deliver exhaust gases from the motor into said discharge pipe; a nozzle in said discharge pipe through which a flow of air is interspersed between the impulses of exhaust gases by the passage of said exhaust gases across the mouth of said nozzle; a check valve located centrally within said nozzle for preventing a reverse flow therethrough; and a collector to direct a flow of air through said nozzle, said delivery pipe extending through a sleeve in said collector.

2. In a muffler, the combination of: a discharge pipe; a delivery pipe to deliver exhaust gases from the motor into said discharge pipe; a nozzle in said discharge pipe through which a flow of air is interspersed between the impulses of exhaust gases by the passage of said exhaust gases across the mouth of aid nozzle; a check valve located in said nozzle; a collector to direct a flow of air through said nozzle; and a relatively movable sleeve in said air collector to support said check valve, said delivery pipe extending through a sleeve in said collector.

3. In a muffler, the combination of: a discharge pipe; a delivery pipe to deliver exhaust gases from the motor into said discharge pipe; a nozzle in said discharge pipe through which a flow of air is interspersed between the impulses of exhaust gases by the passage of said exhaust gases across the mouth of said nozzle; a check valve located in said nozzle; a collector to direct a flow of air through said nozzle; and a sleeve in said air collector to support said check valve, said sleeve being rotatably adjustable to suit the position in which said muffler is mounted, said delivery pipe extending through a sleeve in said collector.

In testimony whereof, I have hereunto set my hand at Los Angeles, California, this 22nd day of April, 1921.

DOROTHY M. SKELTON.