

(No Model.)

2 Sheets—Sheet 1.

C. E. & J. F. DURYEA.
MOTOR VEHICLE.

No. 588,103.

Patented Aug. 10, 1897.

Fig. 1.

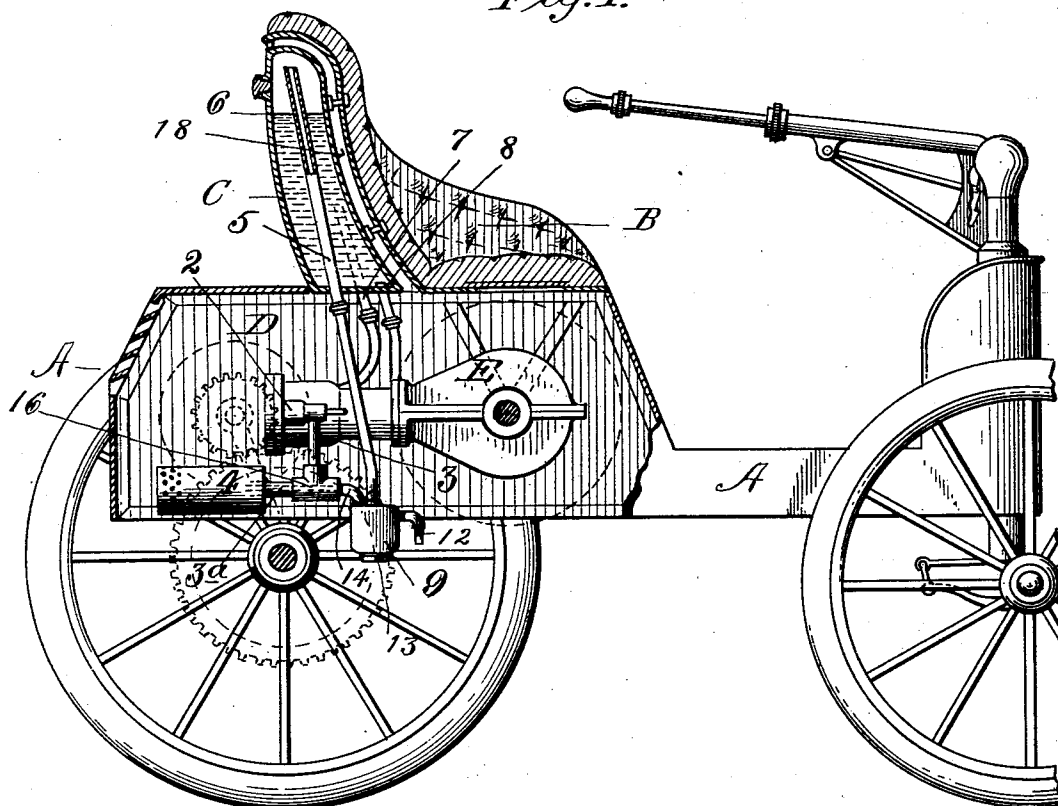


Fig. 2.

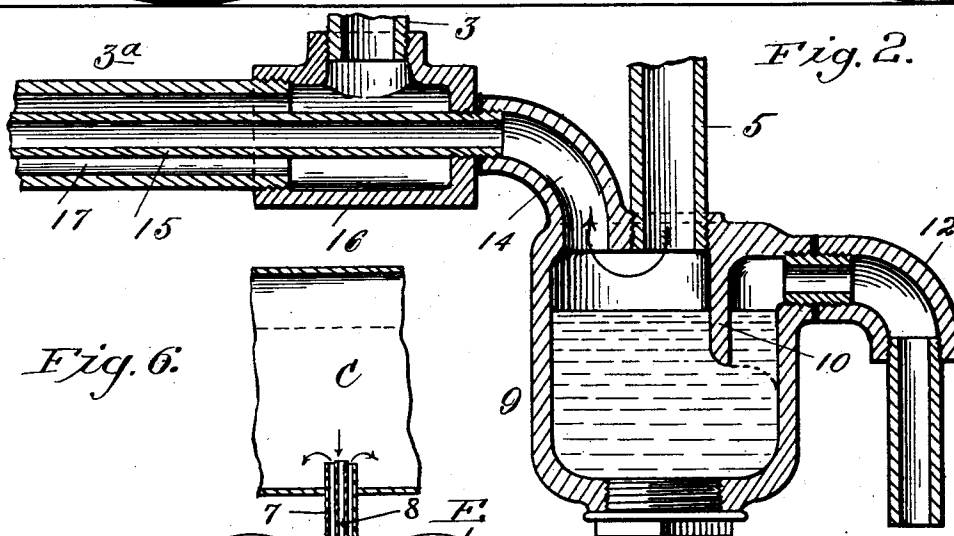
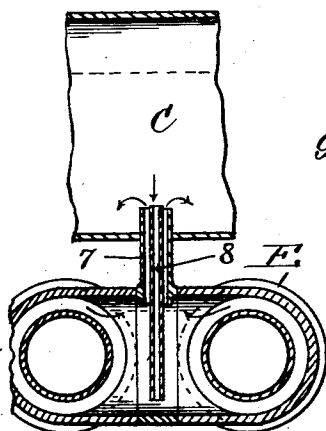


Fig. 6.



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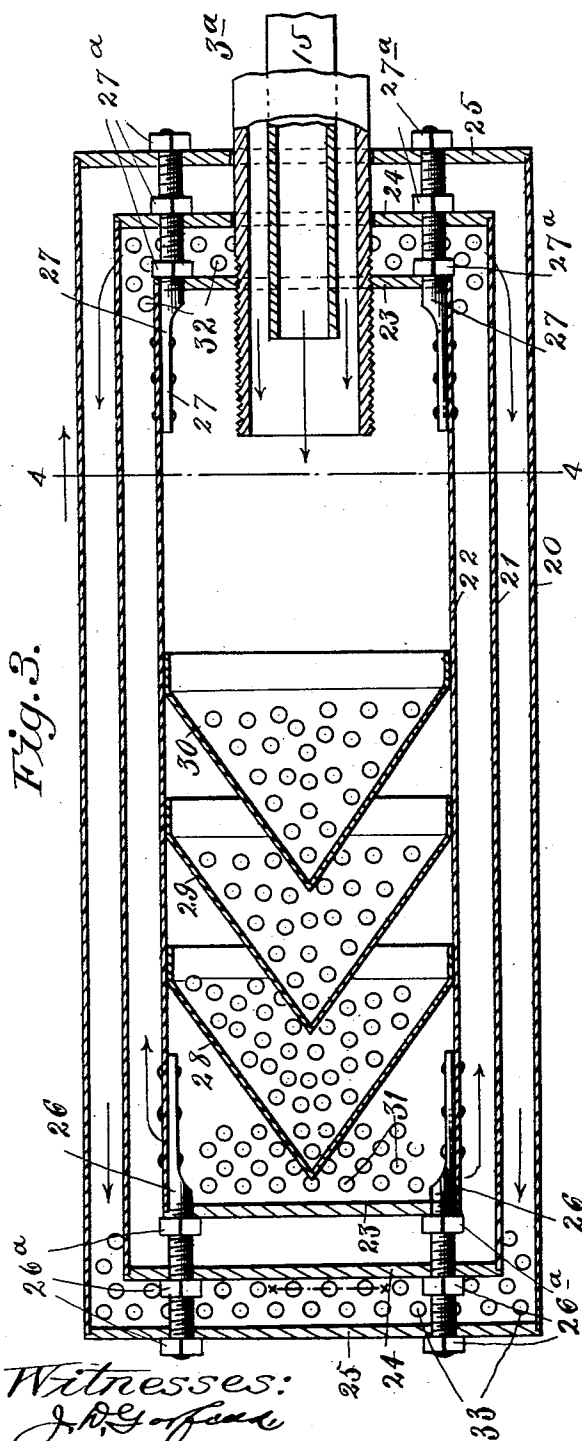
(No Model.)

2 Sheets—Sheet 2.

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No. 588,103.

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Witnesses:
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H. J. Clemons

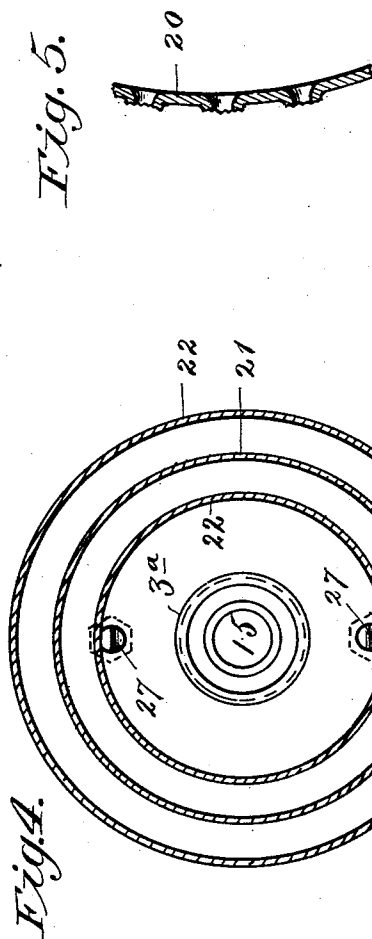


Fig. 5.



Inventors,
Charles E. Duryea, and
James F. Duryea,
by
Attorneys.

UNITED STATES PATENT OFFICE.

CHARLES E. DURYEA, OF PEORIA, ILLINOIS, AND JAMES FRANK DURYEA, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNORS TO THE DURYEA MOTOR WAGON COMPANY, OF SPRINGFIELD, MASSACHUSETTS.

MOTOR-VEHICLE.

SPECIFICATION forming part of Letters Patent No. 588,103, dated August 10, 1897.

Application filed November 7, 1896. Serial No. 611,335. (No model.)

To all whom it may concern:

Be it known that we, CHARLES E. DURYEA, residing at Peoria, in the county of Peoria and State of Illinois, and JAMES FRANK DURYEA, residing at Springfield, in the county of Hampden and State of Massachusetts, citizens of the United States, have invented new and useful Improvements in Motor-Vehicles, of which the following is a specification.

10 This invention relates to improvements in motor-carriages, and more particularly to the muffling devices connected to the exhaust-port of the motor, to improvements in the construction of the water-tank, and means for dissipating the vapors from said water-tank; and the invention consists in the construction and arrangement of the various devices, all as hereinafter set forth and claimed.

15 In the drawings forming part of this specification, Figure 1 is a side elevation, partly in section, of a motor-carriage containing the invention. Fig. 2 is a sectional view of a trapped drip-cup and connections. Fig. 3 is a longitudinal section of a muffler connected with the exhaust-port of the motor. Fig. 4 is a cross-section of the same on line 4 4, Fig. 3. Fig. 5 is a section through one of the plates of the muffler. Fig. 6 is a sectional view of the water-tank and cylinders of the engine and water-jackets therefor, showing a modified construction of the pipe connections between said tank and jackets.

20 Referring to the drawings, A represents the body of the motor-carriage; B, the seat thereof, having the water-tank C, incidentally forming the back of said seat.

D is the body of the wagon or carriage, containing the motor or engine E.

25 Secured to the exhaust-port 2 of the motor E by the pipes 3 3^a and supported thereby is the muffler 4, which preferably lies in the horizontal position shown in the drawings, Fig. 4. A pipe 5 enters the water-tank C through the bottom thereof and is of such length that its upper extremity is near the top of the chamber in said tank and always above the surface of the water therein, (indicated by 6.) Two pipes 7 and 8 also enter the said water-tank C through the bottom thereof for conveying the water to and from the water-jack-

ets surrounding the cylinders of the motor in the usual manner. Said pipe connections, if desired, may be constructed, as shown in Fig. 6, of pipes of two diameters, one within the other, whereby greater compactness is obtained. The said pipe 5 is connected by its lower extremity to the trapped drip-cup 9. Said drip-cup is of a well-known construction, being cast usually with a cylindrical body and having the diaphragm 10 cast integral with the upper part thereof and extending downwardly therefrom to a point below the overflow 12. A plug 13 in the bottom of said cup is provided for the purpose of cleaning it out when desired. An outlet 14 projects from the upper part of said drip-cup, preferably curved, as shown in the drawings, for connecting thereto in a horizontal position an outlet-pipe 15.

30 The pipes 3 3^a, supporting the muffler 4, as above stated, are connected by the T 16, as shown in the drawings, and said outlet-pipe 15 enters centrally through one end thereof and extends into said pipe 3^a for a certain distance beyond the end of the pipe 3, entering the top of said T. Pipe 3^a is of such diameter that when the pipe 15 is located therein, as stated, there will be left a space 17 between the outer surface of said pipe and the inner surface of the pipe 3^a, the area of which space is considerably larger than the area of said pipe 15.

35 The muffler 4 is preferably secured to the end of the pipe 3^a, as shown in Fig. 3 of the drawings—viz., by being screwed thereon.

40 The water-tank C forms practically the back of the seat and is located in that position not only to economize space, but in order to expose the sides of said tank having the greatest area to the air. To that end an air-space 18 is provided between the support of the upholstered back of the seat and the side of said tank. Said air-space opens into the body of the wagon, which is open at the bottom thereof, and air may freely circulate through the space 18 between the side of said tank C and the back of said seat and aid materially to keep down the temperature of the water in said tank, which in time becomes more or less heated by constantly cir-

culating through the water-jackets surrounding the cylinders of the motor, from which it is conveyed to and from the tank C by the pipes 7 and 8, as aforesaid.

5 When the water in the tank C becomes heated, any vapor therefrom passes out of said tank through pipe 5 and heretofore has been allowed to escape into the open air, which has been an objection, as many horses
10 are frightened by the sight of steam even in small quantities. In order to overcome this objection and dissipate the vapor arising from the water in the tank C under circumstances just spoken of, said pipe 5 is connect-
15 ed, as aforesaid, to the trapped drip-cup 9, and said vapor passing therethrough in the direction of the arrow shown in Fig. 2 of the drawings discharges into the pipe 3^a of the muffler 4 through the pipe 15, which is con-
20 nected with said trapped drip-cup. Any of the water of condensation which forms in the pipes leading to or from said trapped drip-cup flows down into said cup and out of it through the outlet-overflow 12. The abso-
25 lute removal of said vapor is assured by the construction of the inlet to the muffler through the pipes 3^a and 15 from said drip-cup. The pipe 3^a, carrying the exhaust, being of larger area than the pipe 15, carrying the vapor, and
30 the exhaust moving more rapidly through pipe 3^a than said vapor moves through pipe 15 and said pipe 15 terminating inside of the pipe 3^a, the passing of the exhaust through said pipe produces a suction action through
35 pipe 15 on the well-known principle of similar constructions, as in injectors, &c., and consequently any vapor forming in the space in the top of the said tank above the water will be instantly drawn off and discharged into
40 the muffler 4 and mixed with the hot gases of the exhaust from the cylinders of the engine. The said muffler 4 consists of three cylinders 20, 21, and 22, said cylinders each having its ends closed by the heads 23, 24,
45 and 25. Said cylinders are arranged one within the other (see Figs. 3 and 4) on the same longitudinal axis and secured in their proper relative positions by the bolts 26 and 27, fixed to the inner side of cylinder 22, and
50 which pass through the heads of all of the cylinders and have the jam-nuts 26^a and 27^a thereon for securing said cylinders tightly on said bolts and securing said heads to said cylinders. As aforesaid, said heads 23, 24,
55 and 25, at one end of said cylinders, are perforated to receive the end of the pipe 3^a, only one, 23, of said heads being shown screw-threaded for screwing onto the end of said pipe.
60 Several cones 28, 29, and 30, preferably made of perforated sheet metal, are arranged equidistant from each other within the cylinder 22, being secured to the inner walls of said cylinder in any suitable manner with
65 their bases opening toward the open end of the pipe 3^a.

The sides of the cylinder 22 are perforated

for a certain distance from one end thereof, as shown at 31, and the opposite end of the cylinder 21 is similarly perforated, as shown
70 at 32, and the end of cylinder 20 is perforated at its end which is oppositely located to the perforated end 32 of cylinder 21, and said perforations of cylinder 20 are indicated by
75 33. By reason of the said oppositely-located perforated ends of said cylinders and the said cones within one of them the gases of the exhaust and any vapor it may have mixed
80 therewith are first separated into fine streams by passing through the perforated cones 28, 29, and 30, and then through the perforations 31 of cylinder 22 back to the other end of the second cylinder 21. Passing through the
85 perforations 32 thereof it again changes its course, and passing to the opposite end of the cylinder 20 it can finally escape into the open air through the perforations 33 of said cylinder.

The constant interruptions offered to the free passage of the exhaust gases and vapor
90 from the water-tank C by the perforated cones and perforated heads, as described, completely mix the two and dissipate the vapor so completely that it is invisible, the rather high temperature of the exhaust-gases
95 contributing to this end more or less.

It has been demonstrated in practice that the muffler is much more effective in sup-
100 pressing all noise arising from the escape of the gases of the exhaust through the perforated partitions through which they pass if the said perforations are made, as shown in Fig. 5—viz., from the inside to the outside—
105 with a sharp-tapered instrument, which will make a tapered hole in the metal with a bur projecting more or less from the outside of the sheet of metal. If the holes are made
110 by punching out a circular disk, which is the method which has heretofore been employed, it is necessary to more frequently interrupt the current of the exhaust, in order to do
115 away with all noise, than is necessary when the perforations are made as shown in Fig. 5.

We are aware that exhaust-muffling devices provided with perforated diaphragms
115 are old, and such a construction is not broadly claimed.

Having thus described our invention, what we claim, and desire to secure by Letters Pat-
120 ent, is—

1. In a motor-vehicle, a seat provided with a back wall, a water-tank fixed in proximity
125 to said back wall thereby providing a clear air-space between said wall and tank, pipes, as 7 and 8, connecting said tank with the water-jackets of a motor for said vehicle, and a vapor-escape pipe, as 5, one extremity of which communicates with the upper part of
130 said tank-chamber, and having its opposite end extending downwardly through the bottom of said tank, substantially as described.

2. In a motor-vehicle, a motor, a muffling device connected to the exhaust-port of said
motor, a trapped drip-cup, a water-tank hav-

ing a chamber in the upper part thereof, a pipe connection from said chamber to said drip-cup and from said cup to the inlet of said muffling device, and pipe connections
5 between the bottom of said tank and the cylinder of said motor, substantially as described.

3. In a motor-vehicle, in combination, a motor, a muffling device connected to the exhaust-port of said motor, a water-tank for
10 supplying water to said motor, and suitable pipe connections between said muffling device and said tank for conveying vapor from a chamber in said tank to said muffler, substantially as described.

15 4. In a motor-vehicle, in combination, a muffling device consisting of several cylinders of varying diameters having closed ends, said

several cylinders being contained one within another, several hollow cones having cone-shaped perforations therethrough secured to
20 the interior of the innermost of said cylinders and in axial alinement therewith, and a series of cone-shaped perforations through the sides of said cylinders alternately disposed as regards the ends thereof whereby the gases pass-
25 ing through said muffling device are caused to follow a zigzag course, substantially as described.

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