

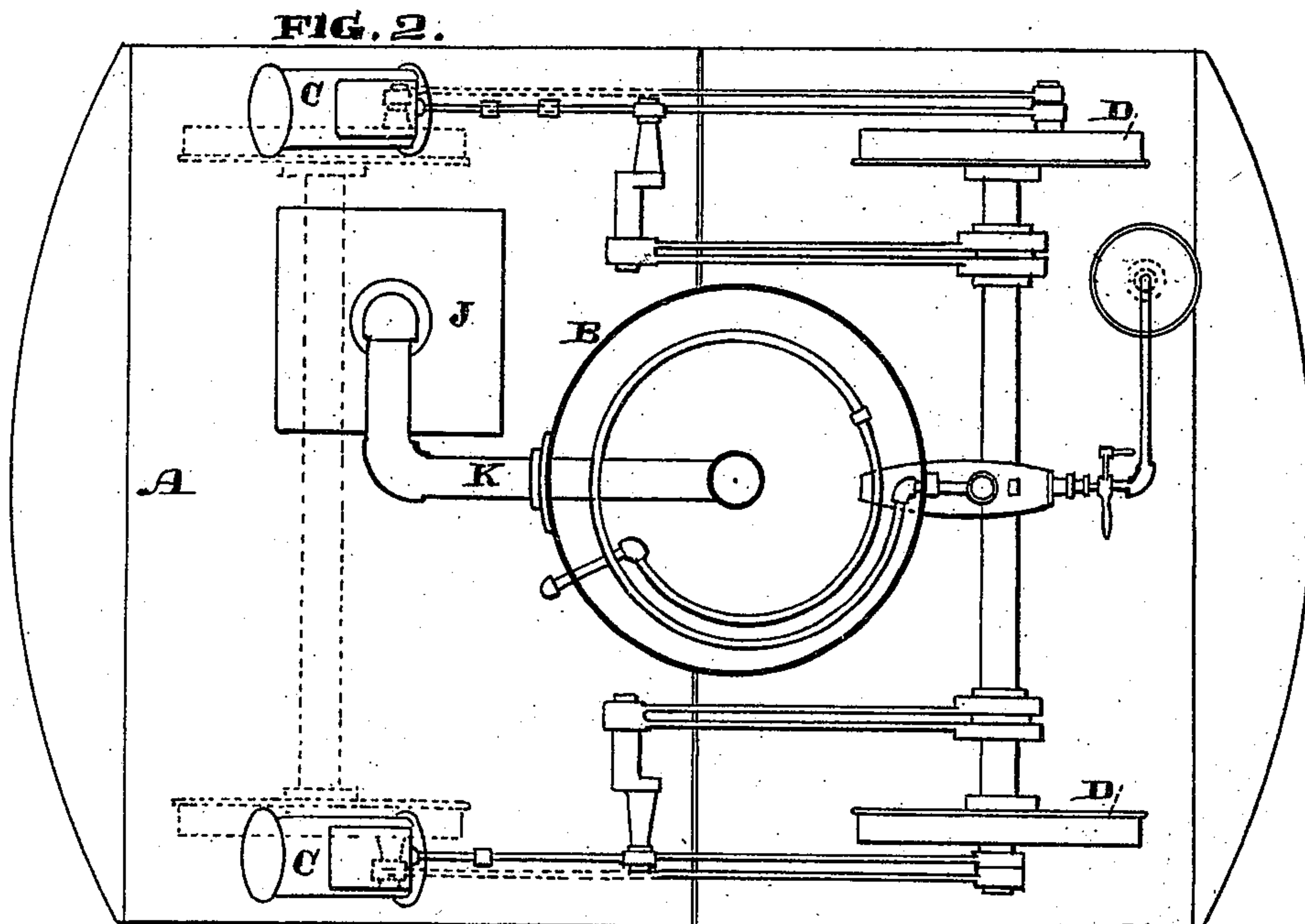
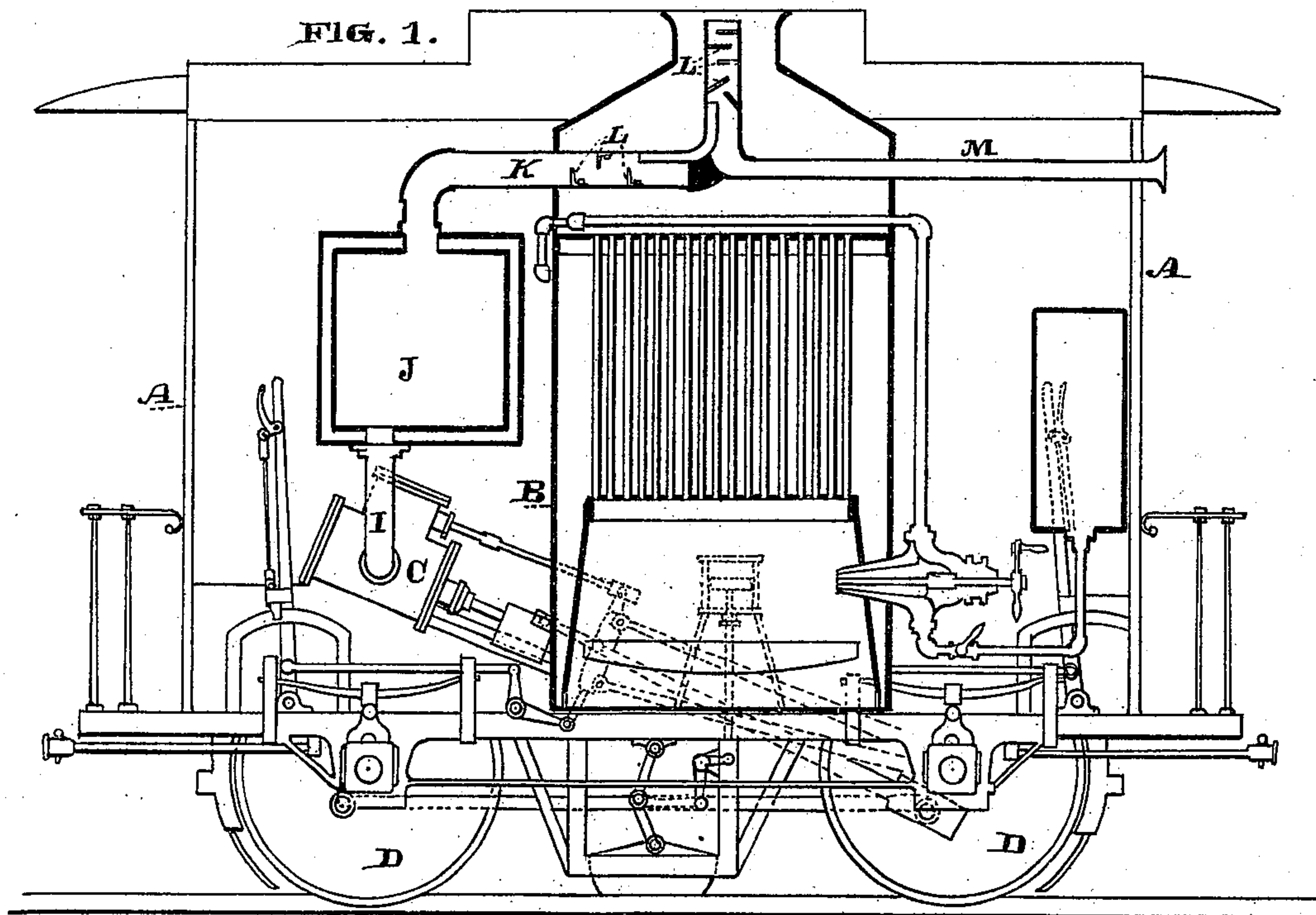
(No Model.)

G. SUTRO.

MOTOR.

No. 354,667.

Patented Dec. 21, 1886.



Witnesses,  
Geo. H. Strong.  
J. H. House.

Inventor,  
Gustav Sutro  
By Dewey & Co.  
Attorneys



# UNITED STATES PATENT OFFICE.

GUSTAV SUTRO, OF SAN FRANCISCO, CALIFORNIA.

## MOTOR.

SPECIFICATION forming part of Letters Patent No. 354,667, dated December 21, 1886.

Application filed September 14, 1885. Serial No. 177,119. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV SUTRO, of the city and county of San Francisco, State of California, have invented an Improvement in  
5 Motors; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to certain improvements in motors; and it is especially adapted  
10 for that class which are to be used on street-railways where it is desirable to reduce the noise of escaping steam and smoke from the products of combustion as much as possible.

It consists of an engine and boiler, the discharge from the exhaust-engine and safety-valve being conducted into a peculiarly-constructed box and passages having baffle-plates to check it.

My invention further consists in certain details of construction, all of which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of a car with engines, boilers, and other devices  
25 composing my apparatus. Fig. 2 is a horizontal plan or top view.

A is the body of the car or motor, which is supported by suitable traction of bearing-wheels.

30 B is a steam-boiler, which may be of any suitable pattern. In the present case I have shown it as of the vertical type with a furnace in the lower part and vertical tubes extending up through the water-space.

35 C C are engines, which are so placed and connected as to drive the car by acting upon its bearing-wheels D. Steam from the boiler passes to the engines, so as to drive the machinery in the usual manner.

40 The exhaust from the engines takes place through a pipe, I, and passes into a chamber, J, of considerable size. This chamber may be made with double walls, of any substance which will serve to muffle the sound of the escaping steam, and the intermediate space  
45 may be filled with some material which will deaden the sound, such as asbestos, sawdust, hair, or other substance. From the chamber J the steam passes out through a pipe or pipes,

50 K, which are provided with plates or shelves L, projecting alternately from opposite sides of the pipe or passage extending partially

across it, so that the steam will be forced to pass around the edges of the plates in a tortuous manner, being thus impeded and prevented from passing out too rapidly. These  
55 plates may be composed of or lined with any material which will act to deaden the sound of the passing steam, and they may be made either stationary or hinged, so that any over-  
60 pressure of steam will act to turn them back so as to leave the passage more open for the direct escape of the steam, and when the pressure is again reduced they will fall back to their original places. These escape-pipes K may  
65 be made in one or several sections, and may be straight, or curved, or tortuous, as found most desirable. In some cases it may be found desirable to connect a large air tube or passage, M, with this escape pipe or passage, one end  
70 of the tube opening into it in the direction of the passing steam and having its other end opening toward the front, so that the movement of the dummy or locomotive will cause a draft or current of air to enter the tube and  
75 pass either between the outer and inner walls when the tube is composed of double walls, or it may pass along the interior with the steam. The tendency of this current of cold air will be to condense the steam, so as to still further  
80 lessen the amount which will eventually escape into the open air. The safety-valve of the engine may also be connected with the same receiver, J, and escape-passages K, so that in the event of this valve being open by  
85 pressure the steam will escape into the same receptacle and the noise will be so muffled and deadened that it will not frighten horses or produce a disagreeable result.

Other mechanical devices may be employed  
90 for producing this result without materially altering the character of my invention. The double walls of the chamber and the pipes, together with the filling, serving to prevent the vibration of the sides of the chamber,  
95 while this construction, taken in connection with the plates before described, will deaden the sound of the exhaust to such an extent as to be nearly or quite noiseless, and from the perfect combustion little or no smoke will be  
100 seen.

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

1. A motor having a boiler and engine, an enlarged receiver having double unperforated walls with an intermediate filling, and a passage through which exhaust-pipes and safety-valve escape open into the receiver, in combination with a passage or passages opening outward from the opposite side of the receiver and having alternately-placed baffle-plates hinged to its opposite sides, substantially as  
10 and for the purpose herein described.

2. An enlarged receiver or chamber into which the exhaust-pipe and safety-valve escape of the engine and boiler open, said receiver having double unperforated walls with  
15 an intermediate filling, and a passage opening

outwardly from the side of the receiver opposite to the inlet-passage, having alternately-hinged baffle-plates, as shown, in combination with an air-pipe opening into said discharge-pipe, so that a draft or current of air will enter the tube or its surrounding jacket, substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand.

GUSTAV SUTRO.

Witnesses:

J. F. GAWTHORNE,  
EDWD. CHATLIN.