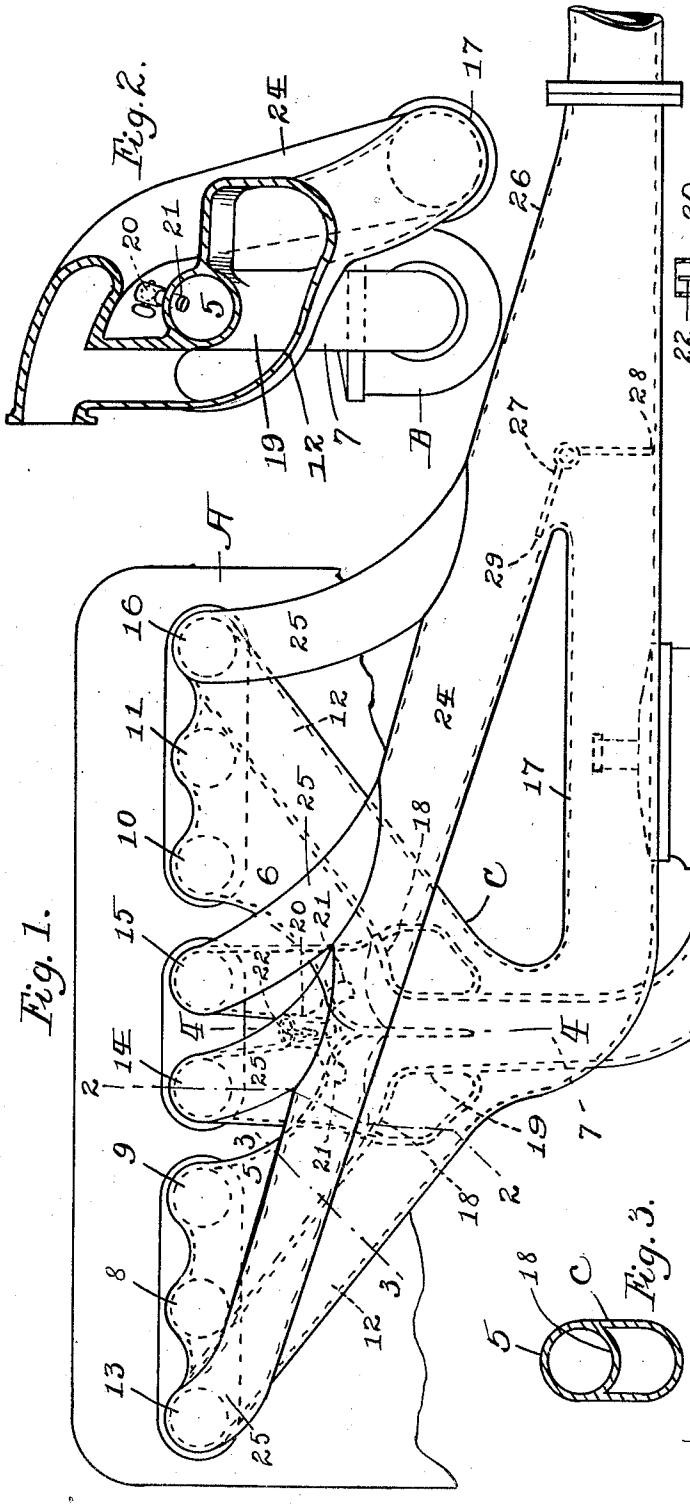
F. G. FARR.

GAS GENERATOR.

APPLICATION FILED DEC. 16, 1918.

1,407,850. **Patented Feb. 28, 1922.**



Inventor:
Frank G. Farr,
by: H. S. Bradbury.
Attorney

UNITED STATES PATENT OFFICE.

FRANK G. FARR, OF FAIRMONT, MINNESOTA.

GAS GENERATOR.

1,407,850. Specification of Letters Patent. Patented Feb. 28, 1922.

Application filed December 16, 1918. Serial No. 266,994.

To all whom it may concern:

Be it known that I, FRANK G. FARR, a citizen of the United States, residing at Fairmont, in the county of Martin and State of Minnesota, have invented a new and useful Improvement in Gas Generators, of which the following is a specification.

This invention relates to gas generators for internal combustion engines and more particularly comprises an exhaust manifold having simple means for facilitating heat exchange to efficiently transpose waste heat passing from the engine about the fuel intake manifold so as to properly condition the fuel mixture before its admission to the working cylinders. The primary object of the invention therefore is to construct a manifold for internal combustion engines so that the fuel mixture for combustion in the cylinders is most effectively heated by the passage of the spent gases through the exhaust manifold.

Another object is to provide means for governing the amount of heat admitted from the exhaust manifold for the purpose of conditioning the mixture prior to its admission into the power cylinders. Another object is to admit air at the hottest point of contact of the manifold with the fuel to assist in gasifying the fuel mixture after starting the engine and thereby eliminating carburetter trouble. Other and further objects of the invention will be hereinafter set forth and claimed.

In the drawing forming part of this specification Figure 1 is a side elevation partly broken away, of an engine and its carburettor and manifolds, showing the application of the invention thereto; Fig. 2 is a section taken on the line 2—2 of Fig. 1; Fig. 3 is a section taken on the line 3—3 of Fig. 1; and Fig. 4 is a section taken on the line 4—4 of Fig. 1.

Referring to the drawings, A represents an internal combustion engine having the usual power cylinders not illustrated in detail, a carburetter B of any approved type and a casting C forming manifolds as will be described. As illustrated in the drawing the casting is formed with fuel supply ducts 5 and 6 diverging from a common fuel passage 7 connected in any suitable manner with a carburetter, each of said ports at their spaced ends communicating with a pair of engine intake ports of which there are four, as shown, numbered 8, 9, 10 and 11. A plurality of main exhaust receiving passages 12, are also formed in the casting which communicate with the exhaust receiving ports 13, 14, 15 and 16 in the engine and which merge into a common exhaust passage outlet or trunk 17 at a point remote from the exhaust ports referred to and extending laterally therefrom. The exhaust receiving passages 12 are separated from the supply ports 5 and 6 by interior dividing walls 18 and it is preferably desired that the ports 5 and 6 be arranged between the engine cylinders and passages 12 so as to be partially enveloped or surrounded by such passages. The casting is formed with a neck portion 19 in the exhaust manifold which due to the contracted area thus produced forms a hot plate upon which the waste particles of combustion lag to increase and concentrate heat at that point and thereby most effectively gasify the inflowing fuel mixture in the fuel supply ducts leading to the intake ports 8 to 11 inclusive. In this manner the fuel mixture is prepared in a most perfect state of efficiency just prior to its entrance into the power cylinders. To increase this efficiency extra air may be admitted into the fuel passages by an air duct 20 having a pair of branches 21 leading from its trunk down into the fuel supply ducts 5 and 6 directly over the neck 19 of the exhaust manifold. This additional air will assist in gasifying the fuel mixture after starting the engine and will thereby assist in eliminating carburetter trouble. This air supply may be regulated or checked entirely by a butter-fly valve 22 in the trunk of the air duct 20.

Should it be desired for any reason to decrease the heat radiation of my improved manifold a by-pass pipe 24 is provided, branch portions 25 of which communicate with the passages or ports 13, 14, 15 and 16 at a point adjacent to their connection with the engine and the other end 26 opening into the trunk of the exhaust outlet 17 at a point remote from the neck 19. The main and auxiliary exhaust ducts are regulated by the double valve 27 which is journaled in the trunk 17 of the exhaust at a point adjacent to the junction of the main and auxiliary exhaust ducts. One portion 28 of said double valve is adapted in one position to fully close the main exhaust duct, while the auxiliary exhaust duct is fully open and vice versa when the duct 24 is closed by the portion 29 of valve 27 the main exhaust duct

is closed. When in median position the valve in the main and auxiliary ducts may be regulated to govern the heat of the neck or hot-plate 19 and thereby regulate the temperature of the neck and gasifying of the fuel under varied conditions and temperature of the outside atmosphere and according to the load on the engine, less heat being required for a heavy load and a large amount of heat for a light load. Any suitable means of operating the regulating valves 22 and 27 may be employed none being shown other than for hand operation.

In accordance with the patent statutes I have described the principles of operation of my invention together with the apparatus which I now consider to represent the best embodiment thereof, but I desire to have it understood that the construction shown is only illustrative and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims.

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

1. In a device of the class set forth, the combination, with an internal combustion engine of multiple cylinder type, having a combined fuel and exhaust manifold formed with a single narrow trunk containing two main ducts, from the fuel supply portion of which fuel supply branches spread to the fuel supply ducts of the engine and from the exhaust portion of which exhaust branches spread to the exhaust ducts of the engine, said fuel and exhaust branches being merged into single structures for each cylinder, said trunk being formed at the junction of said fuel supply and exhaust branches with a hot pan to concentrate heat, and said exhaust side of said trunk being extended laterally, and having an auxiliary branch directly connected by external spreading branches with the exhaust ducts of the engine to provide two direct lines of travel for the exhaust gases from the engine, one by way of the hot pan and the other by way of a direct connection isolated from the hot pan, and a valve in said exhaust manifold arranged to open or modify one branch while the other is closed or modified, to direct the exhaust gases in contact with or remotely away from said pan.

2. In a device of the class set forth, the combination, with an internal combustion engine of multiple cylinder type, having a combined fuel and exhaust manifold formed with a single narrow trunk containing two main ducts, from the fuel supply portion of which fuel supply branches spread to the fuel supply ducts of the engine and from the exhaust portion of which exhaust branches spread to the exhaust ducts of the engine, said fuel and exhaust branches being merged into single structures for each cylinder, said trunk being formed at the junction of said fuel supply and exhaust branches with a hot pan to concentrate heat, and said exhaust side of said trunk being extended laterally and having an auxiliary branch directly connected by external spreading branches with the exhaust ducts of the engine to provide two direct lines of travel for the exhaust gases from the engine, one by way of the hot pan and the other by way of a direct connection isolated from the hot pan, a valved duct admitting air over said pan, and a valve in said exhaust manifold arranged to open or modify one branch while the other is closed or modified, to direct the exhaust gases in contact with or remotely away from said pan.

In testimony whereof, I have signed my name to this specification.

FRANK G. FARR.