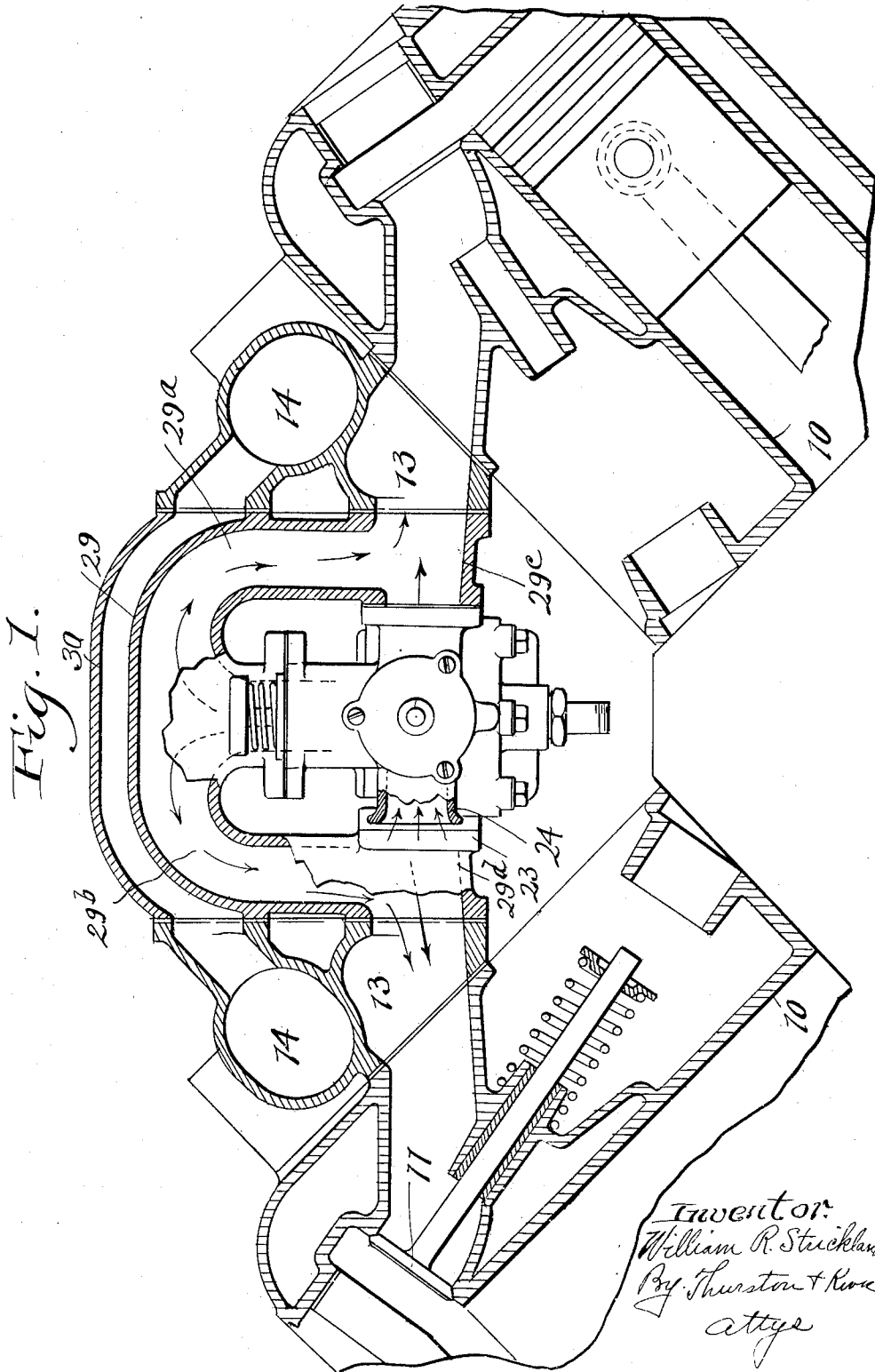


W. R. STRICKLAND.
INTERNAL COMBUSTION ENGINE.
APPLICATION FILED MAR. 15, 1918.

1,365,564.

Patented Jan. 11, 1921.

4 SHEETS—SHEET 1.

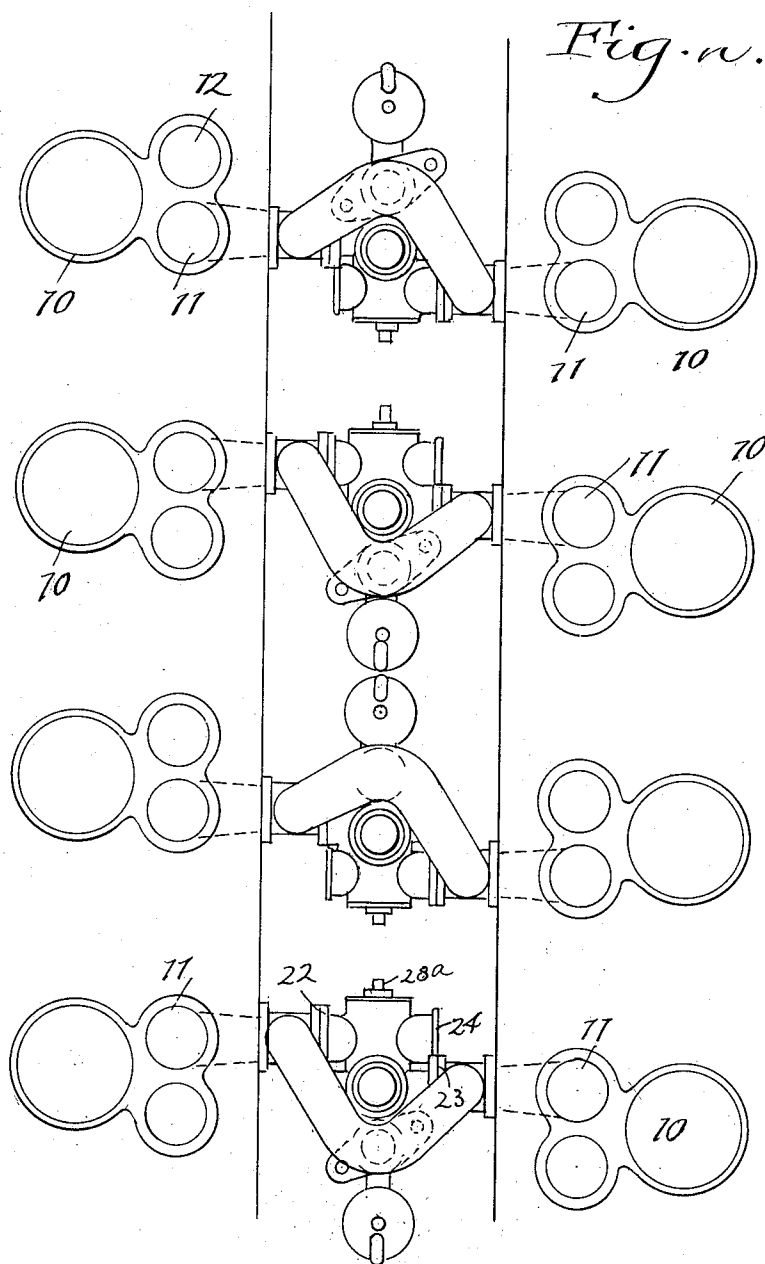


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4 SHEETS—SHEET 2



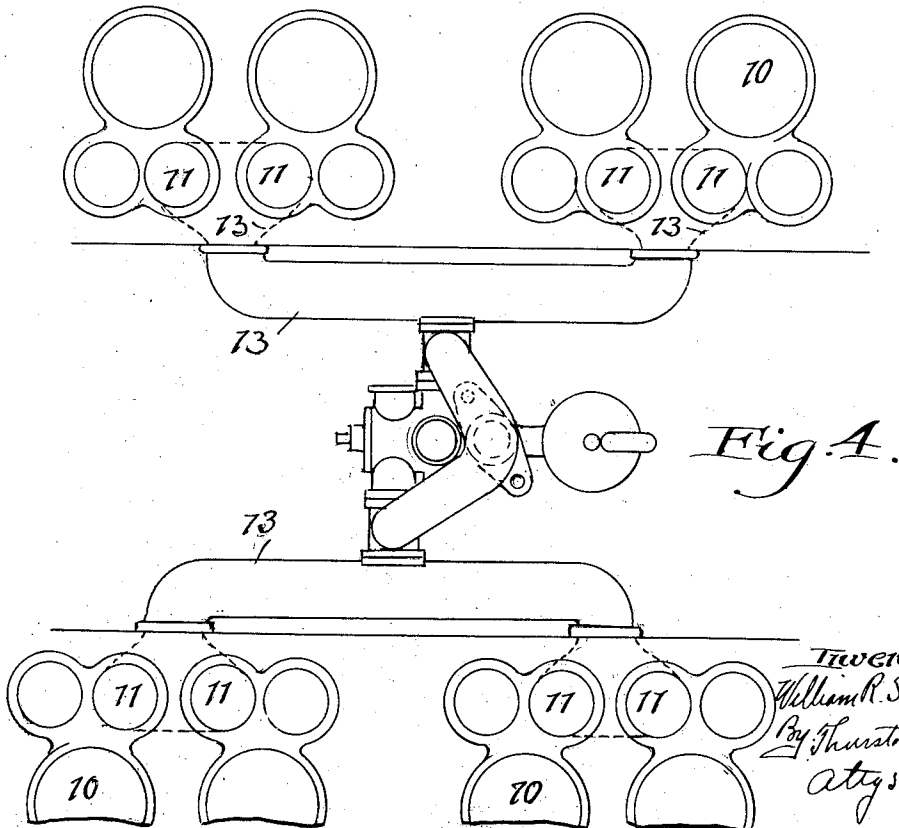
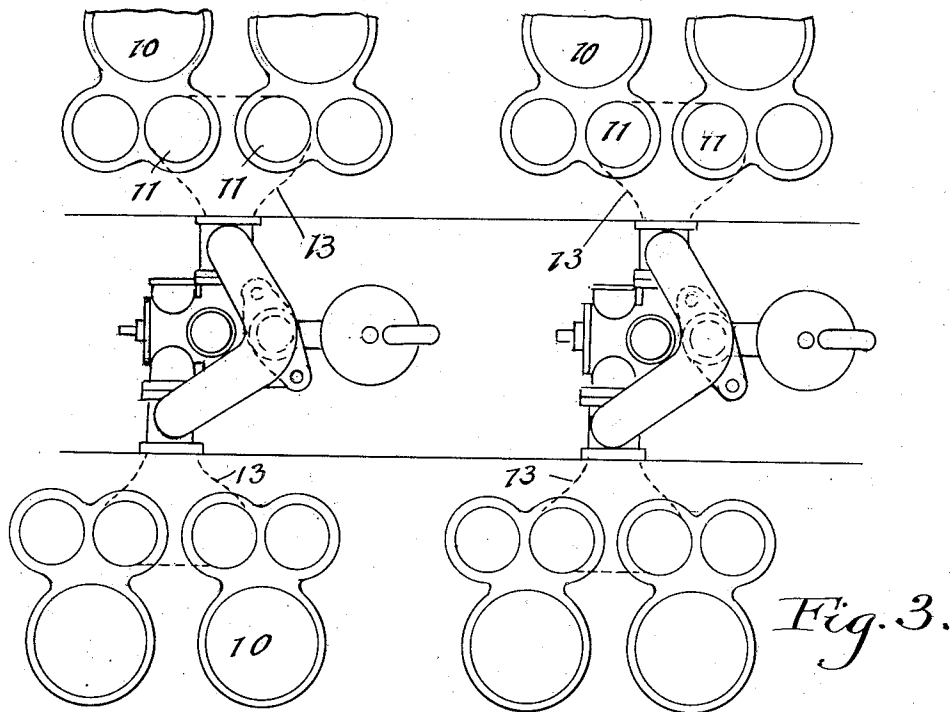
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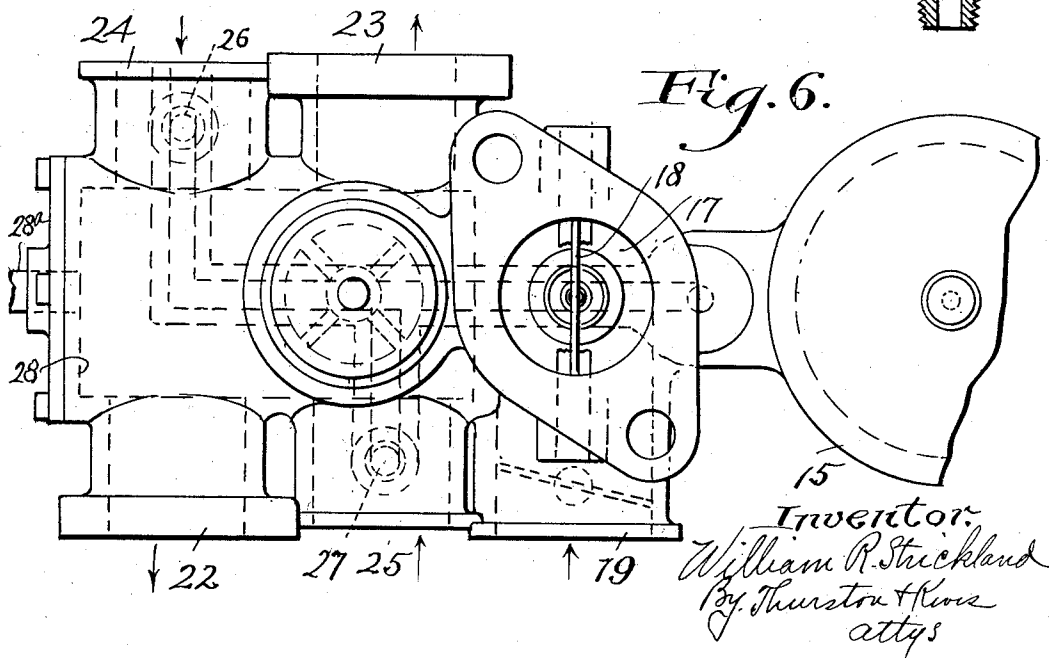
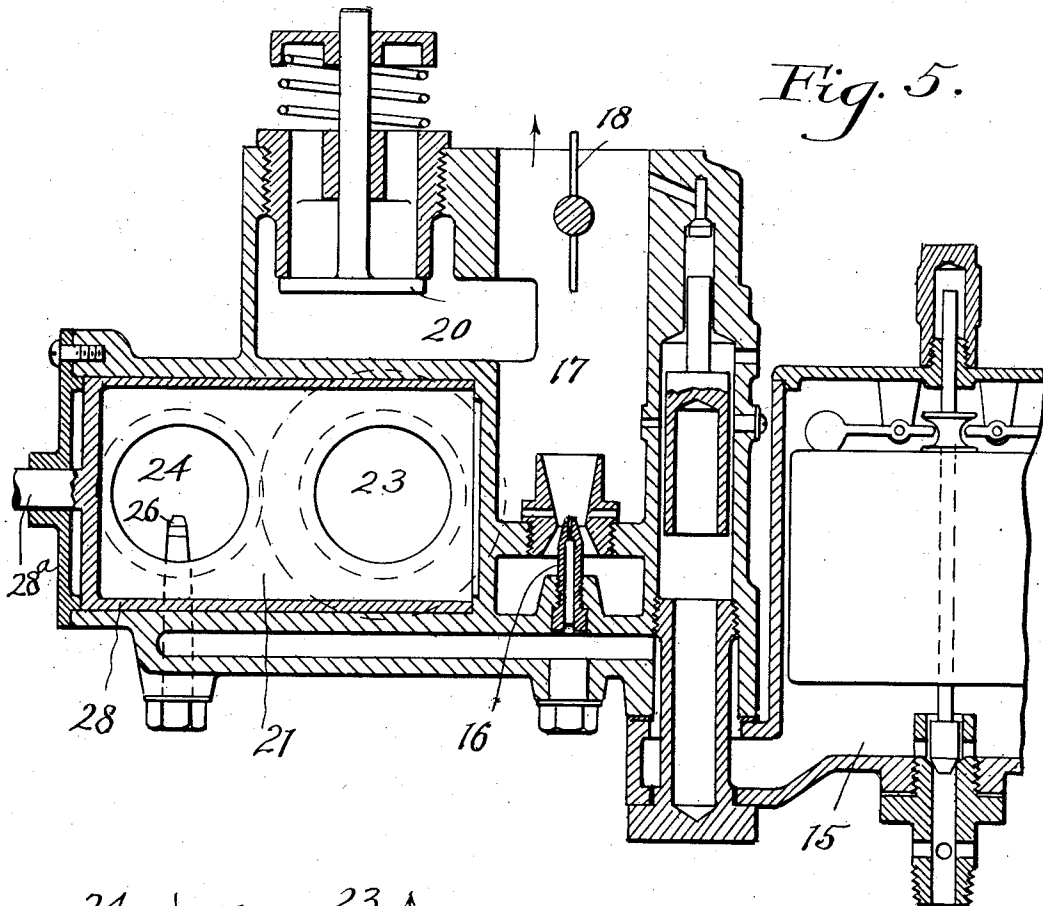
4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

WILLIAM R. STRICKLAND, OF CLEVELAND, OHIO, ASSIGNOR TO THE PEERLESS MOTOR CAR COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

INTERNAL-COMBUSTION ENGINE.

1,365,564.

Specification of Letters Patent.

Patented Jan. 11, 1921.

Application filed March 15, 1918. Serial No. 222,571.

To all whom it may concern:

Be it known that I, WILLIAM R. STRICKLAND, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Internal-Combustion Engines, of which the following is a full, clear, and exact description.

This invention relates to internal combustion engines, and particularly to certain improvements in the carbureter connections and in the arrangement of conduits for supplying combustible mixture from one or more carbureters to the cylinders of an engine, such of the V-type having two groups of cylinders between which the carbureter or carbureters are located.

The principal object of this invention is to secure maximum volumetric efficiency and maximum power by reducing loss due to skin friction and eddying and separation of the gas from air through the reduction of curves and bends in the connections or conduits conveying the mixture to the cylinders.

Still further, the invention aims to provide a carbureter together with mixture conveying means which discharge or convey the mixture from the carbureter in straight lines and in opposite directions to the cylinders or groups of cylinders of the V-type construction, either directly into the cylinders or into manifolds which are connected thereto.

Further objects, such as the provision of a construction wherein two speed ranges are obtained simultaneously with the attainment of the above objects, are attained by my invention, which may be briefly summarized as consisting in certain novel details of construction and combinations and arrangements of parts which will be described in the specification and set forth in the appended claims.

In the drawings, Figure 1 is a transverse sectional view through a form of V-type engine containing my invention; Fig. 2 is a conventional plan view of an 8-cylinder V-engine utilizing four carbureters, each supplying mixture to two cylinders on opposite sides thereof; Fig. 3 is a similar view showing my invention embodied in an 8-cylinder engine but utilizing two carbureters for the 8 cylinders; Fig. 4 is a similar view wherein

a single carbureter is used to supply mixture to the eight cylinders; Fig. 5 is a central vertical sectional view through a carbureter which may be used in carrying out my invention in any of the embodiments shown in Figs. 2 to 4; and Fig. 6 is a top plan view of the carbureter.

Referring now to the drawings, 10—10 represent cylinders arranged in two opposite blocks or rows, and generally in the form of a V, as shown in Fig. 1. In Fig. 1 I have shown what is generally termed an engine of the L-type, but whether the engine is of the L-type or of the T-type or whether the cylinders have overhead valves is a matter of no consequence. In Figs. 1 to 4, 11 represents the inlet valves, and in Figs. 2 to 4, 12 represents the exhaust valves, the latter not being shown in Fig. 1. In Fig. 1, 13 represents the inlet manifolds, and 14 the exhaust manifolds, and in the conventional or diagrammatic views of Figs. 3 and 4, the inlet manifolds are shown but the exhaust manifolds are omitted to avoid confusion.

In carrying out my invention I provide between the cylinders one or more carbureters with mixing chambers connected to cylinders on opposite sides so that the mixture will be discharged horizontally or substantially horizontally in opposite directions from the carbureter to the cylinders, so as to reduce practically to a minimum the curves or bends of the connecting pipes or conduits. As will subsequently appear, this advantage is gained to the greatest extent by using one carbureter for each opposite pair of cylinders (by opposite is not meant precisely opposite, but includes also the customary slight staggering), and to a somewhat decreased extent by a smaller number of carbureters, but even with the single carbureter my invention has great utility in the way of high volumetric efficiency and increased power due to the direct discharge from the carbureter in opposite directions to the headers or inlet manifolds which directly supply the cylinders on both sides.

In the preferred form of my invention I utilize a carbureter having provision for two speed ranges, what are sometimes termed the loafing range and the sporting range, *i. e.*, for low and moderately low speeds and high speeds, respectively, and in this embodiment it is when the high speed

portions or stages of the carbureter are used that the greatest benefits of the present invention are realized.

For an understanding of this part of the invention reference will first be had to the construction of the carbureter which is shown in Figs. 5 and 6. This carbureter has a float controlled gasoline chamber 15 which supplies fuel to three jet tubes. One of these jet tubes is shown at 16, this being nearest to the float chamber 15 and discharging into a mixing chamber 17 at the top of which is a butterfly throttle valve 18, and to which air is supplied through a main air inlet passageway 19, and through an auxiliary air valve 20. As will subsequently appear, the mixture is supplied from the chamber 17 by conduits leading to the cylinders of the engine for the relatively low speeds so that this constitutes what may be termed the loafing stage of the carbureter.

Additionally the carbureter has a chamber 21 from opposite sides of which there extend two mixture outlet extensions 22 and 23, and from opposite sides two air inlet extensions 24 and 25, the air inlet extension 24 being directly opposite the mixture outlet extension 22, and the air inlet extension 25 being directly opposite the mixture extension 23.

The air inlet extension 24 contains a jet tube 26, (see Fig. 5,) and the air inlet extension 25 has a jet tube 27 which is shown by dotted lines in Fig. 6, these fuel jet tubes both being connected to the float controlled fuel chamber 15, and being similarly located with reference to the air inlet extensions 24 and 25 respectively. The admission of air to the chamber 21 through the air inlet openings 24 and 25 and the discharge of mixture through the extensions 22 and 23 are controlled by a common throttle valve 28, which is in this case, of the cylindrical type and is operated in any suitable manner through a stem 28^a.

Mixture is supplied from the low speed stage of the carbureter or from the mixing chamber 17 into the middle of a conduit 29 which as here shown diverges and extends with two arms or branches 29^a and 29^b downwardly to the two oppositely disposed mixture outlets or extensions 22 and 23 from the high speed stage of the carbureter. At their lower ends these arms 29^a and 29^b form connections 29^c and 29^d with the cylinders 10 of the two blocks of the engine or manifolds 13, as shown in Fig. 1, and also with the two discharge extensions 22 and 23 of the high speed stage of the carbureter, the construction being such that mixture may be supplied through the conduit 29 to the cylinders, or at the higher speeds both through said conduit and from the high speed stage of the carbureter, the latter discharging in opposite directions and in

straight lines direct from the carbureter into the cylinders or manifolds.

In practice the throttles are preferably so operated or coupled that first the throttle valve 18 will be opened so that mixture will be supplied only from the low stage speed of the carbureter, and then when it is opened to a predetermined amount and while it remains open, the valve 28 of the high speed stage will open allowing the mixture to pass in straight horizontal lines direct to the cylinders or manifold in the manner indicated by the arrows of Fig. 1, thus avoiding the curves and bends of the upper part of the conduit which have a tendency to check or obstruct the flow through eddying and skin friction, and to cause a separation of gas and air.

The elimination of curves and bends to the greatest possible extent, and therefore maximum volumetric efficiency is obtained if the mixture is discharged in straight lines and in opposite directions from the outlets 22 and 23 of the carbureter direct into the cylinders of the engine. This can be obtained in a V engine of many cylinders by a separate carbureter and separate carbureter connections for each pair of cylinders, each carbureter supplying mixture to one cylinder in each block or leg of the V. In other words, for an eight cylinder engine, as indicated in Fig. 2 four carbureters would be utilized. This arrangement could be employed to advantage in the exceptionally high power engines such as are used for racing purposes.

For ordinary uses, however, a separate carbureter for each pair of cylinders would not be desirable. In Fig. 3 I have shown my invention embodied in an eight cylinder engine, utilizing only two carbureters. In this case each carbureter will be of the same construction previously described, but the connections 29^c and 29^d will discharge into manifolds 13, each of which will be connected to two cylinders as shown, for example, in Fig. 3. In this instance, a slight deviation from the straight line discharge from the carbureter to the cylinders naturally results, but the straight line discharge and the elimination of friction and eddying between the carbureter and manifolds is obtained.

In Fig. 4, wherein I have shown a single carbureter for the eight cylinders, my invention can also be used to great advantage, for here again the mixture is discharged in straight lines in opposite directions direct from the discharge extensions 22 and 23 of the carbureter into the manifolds, although from the manifolds to the cylinders the gas must of necessity pass through somewhat circuitous paths.

In the construction shown in Fig. 1 the conduit 29 is heated by an exhaust conduit

30 which is connected to two opposite exhaust manifolds 14, the connections being made to the latter at points such that a small part of the exhaust entering the manifolds 14 will be discharged back and forth through the connecting conduit 30.

With my invention above described, I am enabled to obtain greater volumetric efficiency and greater power from an engine employing one or more carbureters each supplying gas to one or more cylinders in both blocks than is obtainable with the ordinary curved or angular conduits which are utilized to connect the carbureter to the cylinders or manifolds. As will be understood from the above description and drawings, the number of carbureters compared with the number of cylinders may be varied, and it will be understood without illustration, that the invention is of course applicable to an engine having more or less than eight cylinders. It will be understood, also, that my invention may be used to advantage with a carbureter not having the low speed stage as herein shown, in which event, for high and low speeds the mixture would be discharged in opposite directions and in straight lines such as through the connections 29^c and 29^d direct to the cylinders or manifolds.

Having described my invention, I claim:

1. In an engine of the V-type, two groups of cylinders having mixture receiving means, a carbureter having a chamber with fuel feeding means therein, and having two outlets each connected to the mixture receiving means of one or more cylinders on one side of the carbureter, so that the mixture may pass in opposite directions and in substantially straight lines from said chamber direct to said mixture receiving means of the two groups of cylinders.

2. In an engine of the V-type, two groups of cylinders having mixture receiving means, a carbureter having a chamber with fuel feeding means therein, and having two outlets each connected to the mixture receiving means of one or more cylinders on one side of the carbureter, so that the mixture may pass in opposite directions and in substantially straight horizontal lines from said chamber direct to said mixture receiving means of the two groups of cylinders.

3. In an internal combustion engine of the V-type, two groups of cylinders having mixture receiving means, a carbureter between the groups of cylinders and provided with a mixing chamber with a pair of fuel feeding tubes and mixture outlets at substantially the level of said tubes, said outlets having straight line connections from said chamber to the mixture receiving means of the cylinders on opposite sides of the carbureter.

4. In an internal combustion engine of the V-type, two groups of cylinders having mixture receiving means, and a carbureter between the two groups, said carbureter having a mixing chamber with two jet tubes therein, and having on opposite sides at substantially the level of said jet tubes two outlet openings, and a straight line connection between each of said openings and the mixture receiving means of one or more cylinders.

5. In an internal combustion engine of the V-type, two groups of cylinders having mixture receiving means, and a carbureter between the two groups, said carbureter having a mixing chamber with two jet tubes therein, there being on opposite sides of said chamber outlet openings at substantially the level of said jet tubes, and on opposite sides of the chamber air inlet openings at substantially the level of said jet tubes, each outlet opening having a straight line connection with the mixture receiving means of one or more cylinders on one side of the carbureter.

6. In combination with an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having a mixing chamber, a conduit connecting said chamber to cylinders on both sides of the carbureter, and said carbureter having independent of said conduit mixture outlets by which mixture may be supplied to the cylinders independently of said first-named mixing chamber, one of said outlets supplying mixture to cylinders on one side of the carbureter, and the other supplying mixture to the cylinders on the other side of the carbureter.

7. In combination with an internal combustion engine of the V-type, a carbureter located in the space between the cylinders, said carbureter having a mixing chamber with an outlet, a conduit connecting said outlet to cylinders on both sides of the carbureter, and said carbureter having two additional outlets connected to the cylinders and through which mixture passes from the carbureter to the cylinders in opposite directions and independently of the first-named outlet, one of said outlets supplying mixture to cylinders on one side of the carbureter, and the other supplying mixture to the cylinders on the other side of the carbureter.

8. In an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having an outlet, a conduit having its middle portion connected to said outlet and having branches connected to the cylinders, and said carbureter having two additional outlets connected to the cylinders at the points where said branches are connected thereto, one of said outlets supplying mixture to cylinders on one side of the carbureter, and the other supplying mixture to the cylinders on the other side of the carbureter.

9. In an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having an outlet, a conduit having its middle portion connected to said outlet and having branches connected to the cylinders, and said carbureter having two additional outlets connected to the cylinders at the points where said branches are connected thereto, one of said outlets supplying mixture to cylinders on one side of the carbureter, and the other supplying mixture to the cylinders on the other side of the carbureter.

9. In combination with an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having three outlets, one outlet supplying mixture to cylinders on both sides of the carbureter, and each of the other outlets supplying mixture to one or more cylinders on one side of the carbureter only.

10. In combination with an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having three separate outlets, a conduit having its middle portion connected to one of said outlets and having its ends connected to the cylinders on opposite sides of the carbureter, and the other two outlets each supplying mixture to cylinders on one side of the carbureter only, and each connected to said cylinder through the end of the corresponding branch of the conduit.

11. In combination with an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having three outlets, a conduit by which mixture is supplied from one of said outlets to cylinders on both sides of the carbureter, the other two outlets being connected one to cylinders on one side of the carbureter and the other to cylinders on the opposite side, and throttle valves by which the first-named outlet may be controlled so as to supply mixture independently of the other two.

12. In combination with an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having three outlets, a conduit by which mixture is supplied from one of said outlets to cylinders on both sides of the carbureter, the other two outlets being connected one to cylinders on one side of the carbureter and the other to cylinders on the opposite side and discharging in substantially straight lines and in opposite directions from the carbureter, and throttle valves by which the first-named outlet may be controlled so as to supply mixture independently of the other two.

13. In combination with an internal combustion engine of the V-type, a carbureter in the space between the cylinders, said carbureter having three separate outlets, a conduit having its middle portion connected to one of said outlets and having its ends connected to the cylinders on opposite sides of the carbureter, and the other two outlets each supplying mixture to cylinders on one side of the carbureter, and each connected to said cylinders through the end of the corresponding branch of the conduit, whereby mixture may be supplied simultaneously from all outlets.

In testimony whereof, I hereunto affix my signature.

WILLIAM R. STRICKLAND.