

Jan. 14, 1936.

F. R. HIGLEY

2,027,480

MANIFOLD

Filed April 12, 1934

2 Sheets-Sheet 1

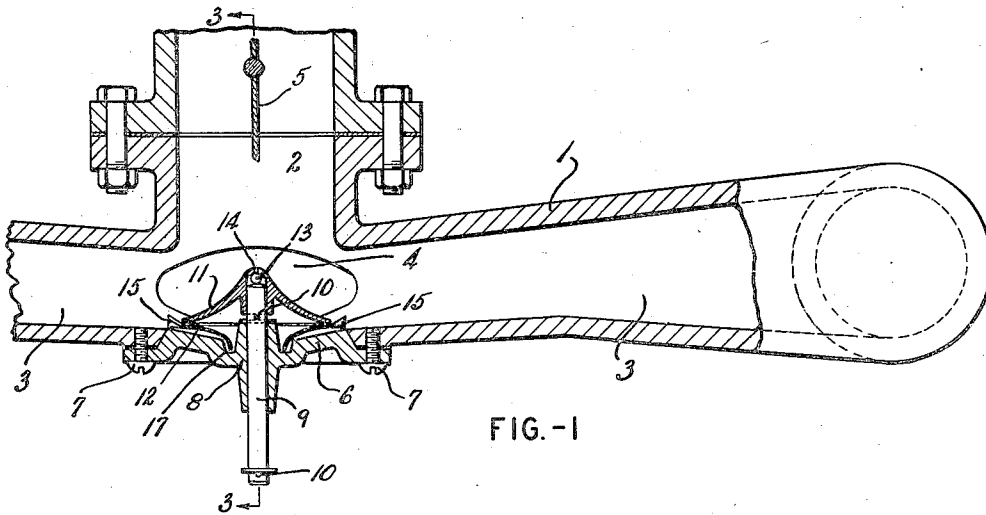


FIG. -1

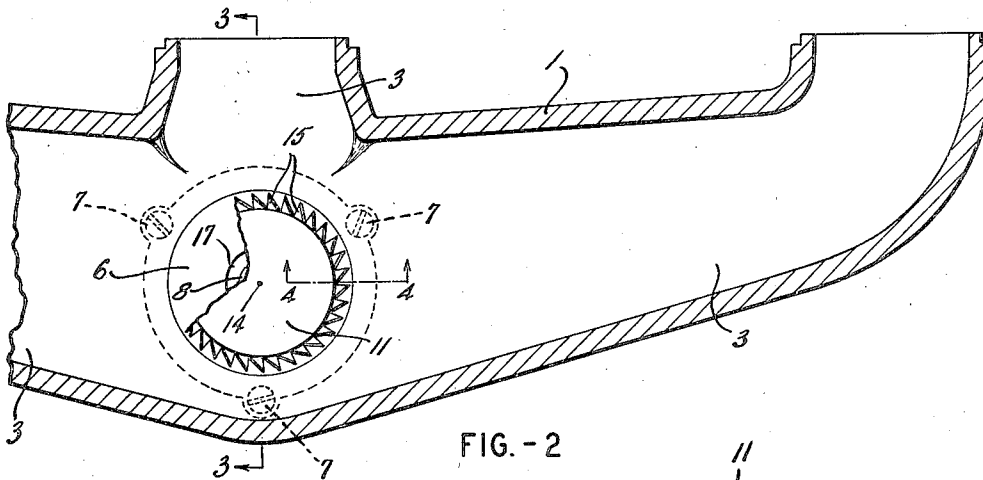


FIG. -2

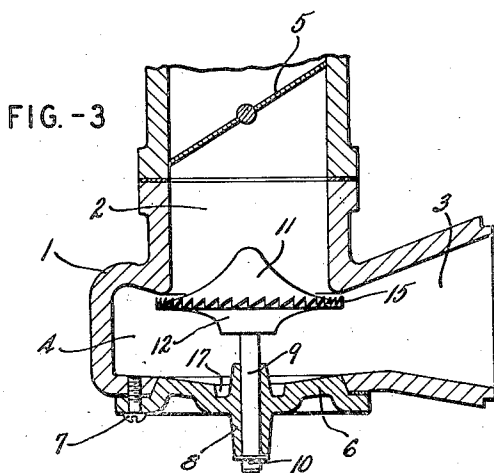


FIG. -3

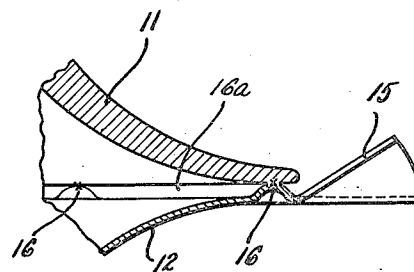


FIG. -4

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2 Sheets-Sheet 2

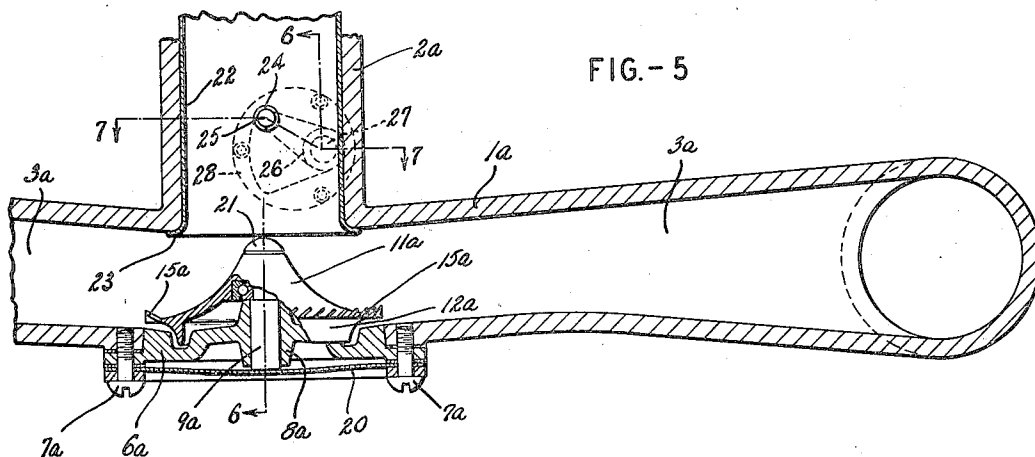


FIG. - 5

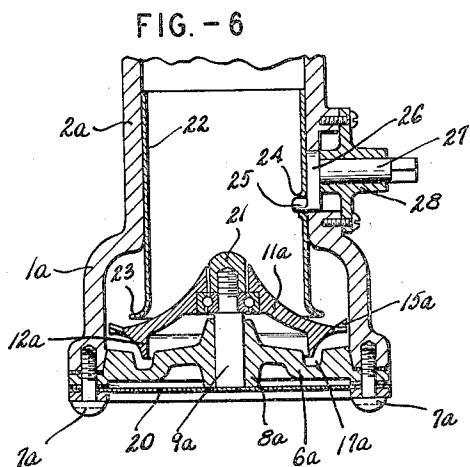


FIG. - 6

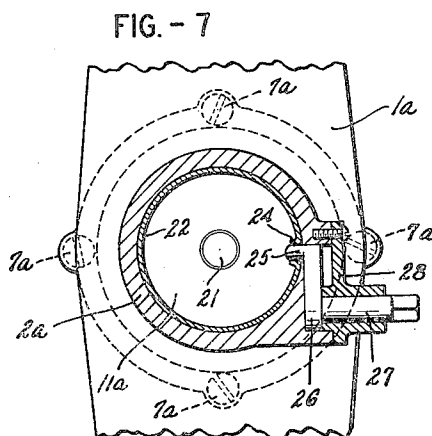


FIG. - 7

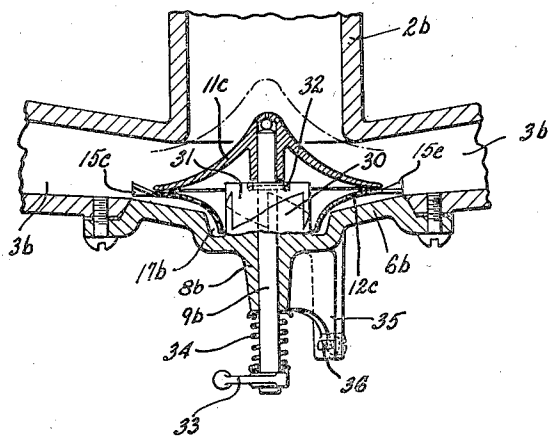


FIG. - 8

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Application April 12, 1934, Serial No. 720,163

19 Claims. (Cl. 123—141)

This invention relates to fuel intake manifolds for multiple cylinder internal combustion engines.

The function of such a manifold is to receive a combustible mixture formed in a carburetion device from liquid fuel and air, and deliver this mixture to a number of inlet ports in the engine cylinder block. For the purpose, the manifold has a master passage leading from the carburetor, and a plurality of two or more distributing passages leading divergently from a base part thereof and usually disposed in a common general plane.

My copending application, Serial No. 605,759, filed August 18, 1933, shows such a manifold and discloses provision therein for improving flow through the manifold particularly equalizing flow of parts of the mixture under accelerating conditions, utilizing for the purpose a rotor disposed in the base part of the manifold, arranged to be actuated by gaseous flow therethrough and adapted to receive from the mixture liquid particles deposited by their inertia from the master passage and to distribute such particles by centrifugal force generally radially outwardly toward the distributing passages.

An object of the present invention is to improve upon the arrangement of said prior application.

More particularly it is an object of this invention to provide such a rotor together with means whereby all of the liquid received by the rotor will be ultimately distributed into the mouths of the distributing passages as distinguished from the master passage walls intervening therebetween. This is accomplished by draining the intervening walls of liquid delivered thereto from the rotor, and returning such drained liquid to the rotor, so that eventually all such liquid finds its way directly from the rotor into one or another of the distributing passages, and equally to all.

As is well known in the art, it is desirable that the combustible mixture of liquid fuel and air be temporarily enriched during accelerating conditions. It is a further object of this invention to provide that much of the liquid drained from the described intervening manifold walls under other than accelerating conditions, be accumulated, to be returned to the stream or delivered to the distributing passages of the manifold under accelerating conditions.

The invention embraces controlling the return to the mixture of the accumulated liquid particles received therefrom, automatically respon-

sive to acceleration characteristics in the system, such as full throttle opening, rise in pressure in the distributing passages and others as will appear.

Another object of the invention is to provide improved throttle valve means particularly adapted for cooperation with the rotor employed.

Further objects are to provide a manifold wherein flow between distributing passages and reverse flow in distributing passages is diminished by dampened effect, whereas flow in feeding direction is improved by minimized turbulence.

The exact nature of this invention together with further objects and advantages thereof will be apparent from the following description taken in connection with the accompanying drawings, in which Figs. 1 to 4 inclusive, Figs. 5 to 7 inclusive, and Fig. 8, illustrate respectively differing embodiments of the invention. Fig. 1 is a typical sectional elevation through pertinent parts of a manifold with parts therein appearing in open throttle position; Fig. 2 is a typical horizontal section through the same manifold; Fig. 3 is a sectional elevation as in the plane of line 3—3, Figs. 1 and 2, but showing the parts in throttled position; and Fig. 4 is an enlarged sectional detail as in the plane of line 4—4, Fig. 2. Fig. 5 is a view similar to Fig. 1 but showing a modification; Fig. 6 is a sectional elevation as in the planes of line 6—6, Fig. 5; and Fig. 7 is a horizontal section as in the plane of line 7—7, Fig. 5. Fig. 8 is a sectional elevation of a third modification.

With reference now to the drawings and first to the modification of Figs. 1-4 thereof, 1 indicates generally a manifold for a six-cylinder engine, the manifold having the usual down-draft master passage 2 with three distributing passages 3 leading divergently from a base part 4 of the master passage and arranged to deliver to inlet ports in the cylinder block of the engine. It will be understood that the master passage 2 is served by a down-draft carburetor, the carburetion device having the usual throttle 5 of butterfly type.

The manifold opposite the master passage has an opening which may be of circular form, closed by a base member 6, which may be a die casting or the like, of similar form, mounted as by the screws 7 to seal its opening in the manifold.

The base member 6 has a central boss 8 with a through opening aligned with the master passage 2, to receive a spindle or plunger 9 slidable

in the base between the positions indicated in Figs. 1 and 3 and having suitable means 10 alternately engageable with the corresponding ends of the boss 8 to limit the plunger movement. Rotatably mounted at the upper end of the plunger 9, within the hollow of the base part 4 of the manifold, is a turborotor here shown as comprising two principal parts, an upper part 11 which may be a casting as indicated, and a lower part 12 which may be of pressed metal. The rotor member 11 is drilled as indicated in Fig. 1, to provide a good free-running bearing for it on the plunger 9, a steel ball 13 or the like serving to take the thrust of the bearing. The member 11 is preferably perforated as at 14 to provide lubrication for its bearing on the plunger as well as lubrication of the plunger in the base 6. The member 11 preferably has its upper surface formed to provide the generally conical antilastic characteristics indicated, to improve flow conditions from the master passage 2 of the manifold into the distributing passages 3, and to better accommodate the bearing of the rotor upon the plunger 9.

The member 12 of the rotor is in the form of a skirt having its periphery extending beyond the periphery of the other rotor member 11, and deformed to provide blades 15 adapted to impart rotational forces to the rotor as the result of gaseous flow from the master passage 2 of the manifold. The skirt 12 is generally annular, curving downwardly as it curves inwardly, as indicated in Figs. 1 and 3 so that while its peripheral part immediately within its blades 15 lies generally in a plane transverse to its axis, its inner peripheral part lies generally in a cylinder of relatively small diameter, with a cylindrical edge directed downwardly. The skirt part 12 is secured to the upper part 11 of the rotor, slightly spaced therefrom by an arrangement such as that indicated in Fig. 4, wherein the skirt part is upset at a few peripheral points as at 16, and there welded or otherwise attached to the member 11, leaving a substantially continuous slight annular clearance 16a between the rotor parts generally at their periphery.

The base closure part 6 is provided with an annular trough 17 to receive the lower extremity of the skirt part 12 of the rotor when the rotor is in lowermost position as in Fig. 1. The upper face of the base member 6 and the adjacent parts of the manifold as well, are slopingly disposed to drain into the trough 17 as indicated in Figs. 1 and 3.

The parts are so proportioned and arranged, and particularly the sectional dimension of the plunger 9 is related with the combined weight of the plunger and its rotor, that when the throttle 5 is open the plunger will assume its lowermost position as in Fig. 1, and when the throttle is substantially closed as in idling position, the plunger will assume its uppermost position as indicated in Fig. 3. As will be appreciated by one familiar with the art, such plunger adjustment will automatically follow the pressure differential within and without the manifold under the described throttle conditions.

Operation will therefore be as follows, it being appreciated that a combustible mixture, generally gaseous but containing entrained particles of liquid fuel, is delivered from the carburetor downwardly through the master passage 2 of the manifold, subject to the throttle 5. Commencing with the parts in idling position as indicated in Fig. 3, there being a high vacuum in the dis-

tributing passages 3 of the manifold, the plunger 9 is caused to rise acting as a piston under the higher or atmospheric pressure on its outer face, and raising the rotor 11 to effect a somewhat restricted annular orifice at the mouth of the master passage 2. This orifice is directed to the blades 5 of the motor so that the latter is set into rapid rotation upon the plunger acting as a spindle. Particles of liquid fuel entrained in the stream down-flowing through the master passage 2, will by their inertia be thrown against the upper face of the rotor. Centrifugal force will then move these liquid particles downwardly and outwardly so that the rotor will deliver them almost instantly radially outwardly in all directions. Some of these liquid particles will thus be thrown along the distributing passages 3 in feeding direction. Others will strike the wall parts of the manifold between the distributing passages, flow downwardly by gravity and be collected in the trough 17.

Upon opening of the throttle as in Fig. 1, the vacuum within the manifold being broken, the plunger 9 will drop to its lowermost position, lowering the skirt part 12 of the rotor into the liquid collected in the trough 17, increased gaseous flow through the master passage, plus inertia of the rotor itself, maintaining the rotor in operation at high speed.

Upon submersion of the lower extremity of the rotor skirt part in the liquid fuel, capillary attraction of the latter will cause it to climb upwardly on both inner and outer surfaces of the skirt portion 12 which, rotating at high speed, causes the liquid to be advanced upwardly and outwardly over the surfaces until discharged radially outwardly by centrifugal force, that liquid on the upper face of the member 12 passing outwardly by way of the openings 16a between the points of joinder 16.

Thus, at all times the rotor will assist in distributing the liquid particles, but particularly upon sudden opening of the throttle, more fuel will be delivered to the distributing passages.

The opening 14 in the rotor permits sufficient liquid fuel entry to the rotor bearing to lubricate the latter.

With reference now to the modification of Figs. 5 to 7 inclusive, the manifold, generally indicated at 1a, is provided with a down-draft master-passage part 2a leading to divergent distributing passages 3a, all generally as before, except that here but two distributing passages, are indicated, disposed at 180° apart leading directly oppositely from the master passage base. This two-branch manifold arrangement will be recognized by one familiar with the art as characteristic of four and eight cylinder engines.

The manifold is provided with a circular opening in its base part opposite its master passage 2a, in which is seated a base 6a having an adjacent diaphragm 23, both base and diaphragm being preferably secured, as indicated in the drawings, by a common set of screws 7a. The base 6a has a central hub part 8a in which is slidably mounted a plunger 9a which serves as a spindle for a rotor 11a. The rotor here shown has a ball bearing mounting upon the spindle 9a, as indicated in Fig. 6, including a nut 24 threaded upon the end of the spindle to secure the inner ball race thereupon, the outer ball race being seated in the indicated recess in the rotor. The rotor is of one-piece construction carried by the outer ball race, and includes peripherally located turbo-blades 15a, 75

and inwardly extending therefrom an annular skirt part 12a. The base member 6a has an annular trough 17a adapted to receive the skirt part 12a of the rotor, and the adjacent parts of the base member 6a and manifold are slopingly arranged to drain into this trough, all generally as before.

By the arrangement described, the rotor has limited adjustment toward and from the master passage 2a of the manifold, automatically dependent upon the pressure differential within and without the manifold distributing passages. In the drawings the upper limit of adjustment of the plunger 9a, and consequently of the rotor, is provided by the extremity of the downwardly extending part of the boss 8a, which limits inward flexure of the diaphragm 20, as indicated Fig. 6. The lower limit of adjustment is had, wherein the parts are positioned as in Fig. 5, by engagement of the inner race of the ball bearing with the upper extremity of the boss 8a.

Operation of the rotor 11a will obviously be generally as in the modification of Figs. 1 to 4. Liquid fuel particles entrained in the generally gaseous mixture delivered through the master passage 2a, will be received upon the face of the rotor 11a which will throw them outwardly in all directions by centrifugal force, the rotor being maintained in rotation by the gaseous stream from the master passage. The head of the bearing-securing nut 21 will not rotate but this will be substantially inconsequential as the absolute speed at this central part of the rotor would in any event be slight. Some of the liquid particles will, however, find their way downwardly between the rotor and the nut 21, lubricating the ball bearing and thence draining about the upper part of the boss 8a and into the trough 17a. Most of the liquid particles discharged peripherally by the rotor will be thrown along the distributing passages 3a and find their way directly into the corresponding engine cylinders. Some of the liquid particles discharged by the rotor will, however, strike the adjacent wall parts of the manifold from which they will drain into the trough 17a.

When there is a high vacuum in the manifold, as when the engine is operating under light load conditions, the diaphragm 20 will maintain the rotor in its uppermost position, as in Fig. 6, so that there will be an accumulation of liquid fuel in the trough 17a up to a maximum level determined by the position of the rotor skirt 12a, any liquid accumulated above this amount finding its way upwardly and outwardly upon the outer face of the skirt and being thrown by centrifugal force from the rotor.

When the vacuum is sufficiently reduced, as under open throttle conditions, the diaphragm 20 will be unable to maintain the rotor in raised position, the rotor will consequently under its own weight and that of the plunger 9a, assume the lowered position of Fig. 5, plunging its skirt part 12a into the accumulated liquid in the trough 17a and instantly discharging substantially all of this accumulated fuel outwardly and into the distributing passages 3a of the manifold.

The web part of the base member 6a which supports its boss part 8a is preferably continuous so that liquid finding its way down the plunger 9a and onto the diaphragm 20 will, under vacuum conditions, be recovered from the diaphragm compartment.

Preferably, the novel throttle means illustrated is provided for cooperation with the rotor arrangement just described, which is one suitable for large sizes and heavy duty types of engines.

Such a throttle comprises a generally cylindrical thin-walled sleeve member 22 slidably and rotatably fitting in the master passage 2a to extend therefrom adjustably toward the rotor 11a, the master passage being preferably finished inside for the purpose. At its extremity toward the rotor, the valve 22 is preferably flared outwardly as at 23, to improve flow conditions for the gaseous stream which leaves its mouth.

For control of the valve 22, it is provided with a side opening 24 to receive a pin 25. This pin 25 is carried upon a head or crank part 26 of a stub shaft 27 to which a throttle lever or equivalent controlling member is attachable. The stub shaft 27 is rotatably mounted in a plug 28 secured over an opening through the side of the manifold, such opening being suitable to receive the head 26.

Obviously, by the arrangement described, relative adjustment of the stub shaft 27 will effect sliding adjustment of the throttle 22 between its positions of Figs. 5 and 6, the crank pin 25 imparting a slight rotational motion to the valve in addition to its principal longitudinal motion.

Of course, the parts will be so adjusted that when the valve is in its lowermost or extreme closed position, it will have sufficient clearance from the rotor 11a that the latter may operate and that enough fuel for idling operation will be delivered to the engine by way of the annular space between valve and rotor.

Also, when the valve is in its lowermost position it will serve to largely block interflow between distributing passages and thus dampen out undesirable alternating pulsations which cause much trouble in many manifolds under certain conditions, as will be appreciated by one familiar with the art.

With reference now to the modification of Fig. 8, an arrangement is shown wherein the rotor itself comprises the valve means generally after the teachings of my above identified so-called application.

Here the manifold parts are generally as before, comprising a down-draft master passage part 2b and associate divergent distributing passages 3b. The manifold has an opening opposite the master passage 2b closed by a base casting 6b having an annular trough 17b into which adjacent manifold parts are arranged to drain. The base part 6b is provided with a central boss 8b in which a spindle 9b is mounted for adjustment with helical characteristics, to have longitudinal motion accompanied by rotatable motion. In the arrangement shown, for the purpose of providing such motion at a minimum of expense, the upper extremity 30 of the boss 8b, which extends within the trough 17b, as indicated, is peripherally serrated, as shown, to cooperate with a correspondingly serrated collar 31. The serrations on these parts are in the form of teeth, each tooth having a longitudinally extending extremity with a helical face leading from its extremity to the base part of the inner longitudinal extremity of the next adjacent tooth. Three such teeth are indicated in the drawings for each of the cooperative parts. The

collar 31 is secured against rotation on its spindle 9b is by a pin 32 seating in an end slot provided in the collar. Mounted on the upper extremity of the spindle 9b for rotation thereon is a rotor 11c, here shown as similar to the rotor 11 of Figs. 1 to 4, and having a skirt part 12c cooperative with the trough 17b, the rotor having blades 15c whereby it is maintained rotating during operation of the engine.

The rotor is of sufficiently greater diameter than the master passage that the rotor may be raised against the mouth of the master passage to substantially close the latter, yet with sufficient clearance to permit free rotor operation and idling operation of the engine; it being understood that the base part of the manifold in which the rotor is adjustable, has sufficient width to clear the rotor blades at all times.

The spindle 9b is of sufficient length to carry at its lower end a control lever 33, a compression spring 34 effective to maintain the pin 32 seated in the collar 31, and to permit longitudinal adjustment of the spindle to move the rotor between its full and dotted line positions, Fig. 8. The base casting 5b may be provided with a lug 35, carrying a set screw 36 adapted to engage the lever 33 to limit the rotor-raising, valve closing position of the latter, whereby an idling adjustment for the rotor, acting as a valve, may be had, as will be apparent to one familiar with the art.

Operation will also be apparent. The rotor is maintained constantly running, as in the other modifications, by the gaseous stream from the master passage of the manifold. Liquid fuel particles entrained in the stream will strike the rotor and be thrown thereby radially outwardly in all directions, such particles as are not thrown into one or another of the distributing passages eventually collecting in the trough 17b.

When considered as a valve, by suitable adjustment of the lever 33, the rotor may be adjusted toward its dotted line position at the mouth of the master passage with throttling effect, and vice versa. As the valve is adjusted to wide open position, that shown in full lines, accumulated fuel will be discharged by the rotor effect of the valve by entry of its skirt part 12c into the accumulated liquid. Under all conditions, the spring 34 will serve to yieldably maintain the teeth of the collar 31 in engagement with the teeth 33, so that rotative adjustment of the spindle 9b will always produce corresponding longitudinal adjustment of the rotor.

It will be apparent that all three above described modifications provide for mounting of the rotor upon the base casting upon which it rotates, as a unit, before mounting of the base upon the manifold. In each arrangement, the manifold is preferably widened or flattened out at the base of its master passage, and the mouths of its distributing passages similarly widened, both to accommodate the rotor and to improve gaseous flow conditions from master to distributing passage, such conformation being indicated in all figures of the drawings with the exception of Fig. 4.

A particular advantage to be noted is that, by this invention and particularly the feature of recirculating by way of the rotor of such liquid fuel as is not discharged by the rotor immediately into one or another of the distributing passages, all liquid fuel is ultimately discharged directly into the distributing passages. All distributing passages will receive an instantly en-

riched mixture immediately upon attainment of full throttle conditions, the enrichment being had by fuel collected during partial throttle and idling conditions. Especially to be noted is that each distributing passage will receive an equal portion of the liquid fuel, provided only that its mouth is equal to those of the other distributing passages, and entirely independent of the disposition of its mouth about the rotor axis with respect to the mouths of the other distributing passages. Thus, the improvement by this invention is equally applicable to a straight line manifold, as indicated Figs. 5 to 7, a three-way manifold, such as indicated in Figs. 1 to 3, or to an X-form of manifold as in a V-type motor.

What I claim is:

1. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, means located at said base part for separating liquid particles from a generally gaseous mixture fed through said master passage, means for collecting some of said particles and rotary means for delivering the accumulated liquid to said distributing passages at the will of the operator.

2. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, means located at said base part for separating liquid particles from a generally gaseous mixture fed through said master passage, and rotary means for delivering the accumulated liquid to said distributing passages automatically dependent upon pressure in said distributing passages.

3. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, means located at said base part for separating liquid particles from a generally gaseous mixture fed through said master passage, and rotary means for delivering the accumulated liquid to said distributing passages automatically coincident with acceleration of gaseous flow through said manifold.

4. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, means located at said base part for accumulating liquid particles from a generally gaseous mixture fed through said master passage, and rotary means for thereafter delivering the accumulated liquid to said distributing passages.

5. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, and means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor.

6. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and

against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor, said means comprising a receiver into which said intervening wall parts drain, and an element of said rotor having a path by way of said receiver.

7. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor, said means comprising a receiver of annular trough form into which said intervening walls drain, disposed concentrically with the rotor, and an element of said rotor arranged to move in said trough.

8. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts, and means for returning said collected liquid to said rotor at the will of the operator.

9. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts, and means for returning said collected liquid to said rotor dependent upon flow through said master passage.

10. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts, and means for returning said collected liquid to said rotor dependent upon pressure in said distributing passages.

11. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts, and means for returning said collected liquid to said rotor coincident with

acceleration of said mixture through said manifold.

12. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor, said means comprising a receiver into which said intervening wall parts drain, and an element of said rotor having a path by way of said receiver, and means for adjusting the relation between said rotor element and said receiver, to control their relative elevations.

13. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor, said means comprising an annular receiver of trough form into which said intervening walls drain, disposed concentrically with the rotor, said rotor having an element adapted to be immersed in the liquid of said trough, and means for adjusting said element along said rotor axis to control its said immersion.

14. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor, said means comprising a receiver into which said intervening walls drain, said rotor having an element adapted to be immersed in the liquid of said receiver, and means for lowering said element lengthwise of said rotor axis automatically dependent upon rise in pressure in said distributing passages and vice versa.

15. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, a rotor in said base part arranged to receive liquid particles from a generally gaseous mixture fed through said master passage into said base part, and distribute said particles to said distributing passages and against the intervening manifold wall parts, means for collecting the liquid received by said intervening wall parts and returning said liquid to said rotor, said means comprising an annular receiver of trough form into which said intervening walls drain, disposed concentrically with the rotor, said rotor having an element adapted to be immersed in the liquid of said trough, and means responsive to pressure in said distributing passages for adjusting said element along said rotor axis to control its said immersion.

16. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading divergently from a base part thereof, with manifold wall parts
5 intervening therebetween, a rotor arranged in said base part coaxial with said master passage and having associated actuating means, means for adjusting said rotor lengthwise of said master passage for controlling flow from the latter,
10 receiver means for collecting liquid received from said rotor by said intervening wall parts, said parts being so proportioned and arranged that said rotor may be adjusted in opening direction to extend into said receiver, whereby said rotor
15 will deliver said collected liquid from said receiver toward said distributing passages when adjusted to be farthest removed from said master passage.
17. In a manifold for the purpose described
20 and having a master passage and a plurality of distributing passages leading from a base part thereof, valve means adjustable longitudinally of said master passage with a concurrent rotative component of motion about the master pas-
25 sage axis to extend variably into said manifold

base part to control flow from said master passage.

18. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading from a base
5 part thereof, a rotor arranged in said base part coaxial with said master passage and having associated actuating means, and valve means adjustable longitudinally of said master passage
10 toward and from said rotor for controlling flow from said master passage to said distributing passages.

19. In a manifold for the purpose described and having a master passage and a plurality of distributing passages leading from a base part
15 thereof, a rotor arranged in said base part coaxial with said master passage and having peripherally located blades for its actuation by gaseous flow therefrom, and valve means adjustable longitudinally of said master passage
20 toward and from said rotor for controlling flow from said master passage to said distributing passages, said valve means having a mouth directed towards said rotor and cooperative therewith
25 within the path of said blades.

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