Jan. 26, 1932. H. H. TIMIAN 1,842,771

MANIFOLDING SYSTEM FOR ENGINES

Filed Feb. 8, 1929

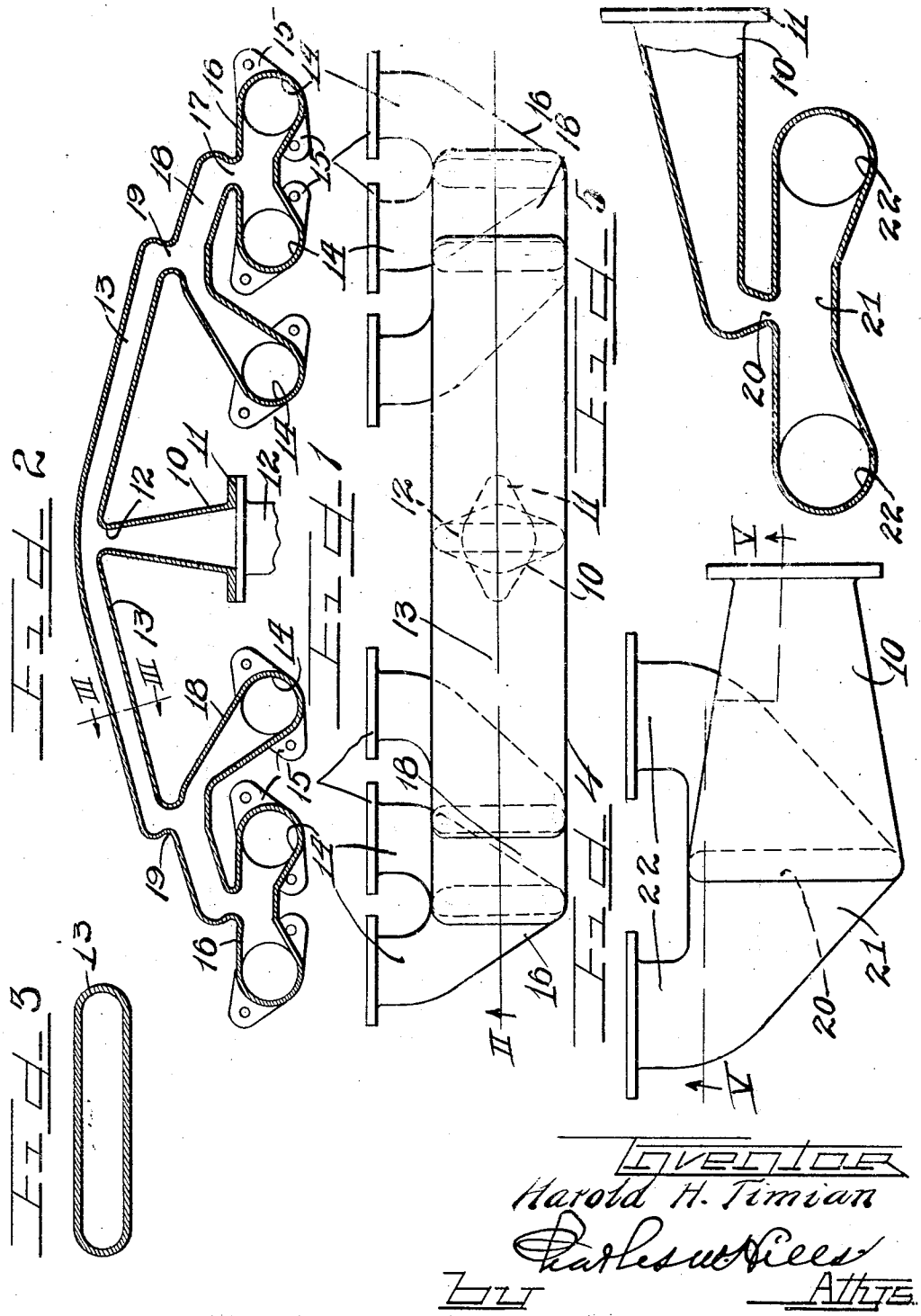


Fig. 2

Fig. 1

Fig. 3

Inventor
Harold H. Timian
By Charles W. Rees
Atty.

Patented Jan. 26, 1932 1,842,771

UNITED STATES PATENT OFFICE

HAROLD H. TIMIAN, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO WHEELER-SCHEBLER CARBURETOR COMPANY, OF INDIANAPOLIS, INDIANA, A CORPORATION OF INDIANA

MANIFOLDING SYSTEM FOR ENGINES

Application filed February 8, 1929. Serial No. 338,373.

This invention relates to an improved form of intake manifold for internal combustion engines operating under a widely varying range of speed and load.

It is the principal object of this invention to provide an intake manifold adapted to supply an equal division of a wet fuel and air mixture to a plurality of intake ports which may be and often are, at unequal distances from the carburetor.

In the operation of an engine under idling conditions of very low manifold velocities, the heavier drops of liquid fuel tend to follow the stream flow in the manifold as the low velocity is not conducive to centrifugal action. As the volume of flow is correspondingly light, the flow cuts corners and the precipitated or liquid fuel tends to follow the inner surface or radius of a bend in a manifold of circular cross section. The liquid fuel is thus discharged nearer one port than another, the first-mentioned port thus receiving more than its share of the heavy ends comprising the bulk of the liquid in the manifolds. Under full power and speeds, on the other hand, the manifold velocities are very high with the consequent development of centrifugal action which throws liquid fuel particles to the outer surface or radius of the bend, thus reversing the fuel supply conditions mentioned with regard to idling conditions. It is accordingly an object of this invention to correct the fuel distribution by correlating the wall contours of a manifold cross section immediately preceding a branch or point of division in the manifold.

It is a further object of this invention to provide an elongated passageway having a nozzle-like cross section adapted to promote reintroduction of liquid fuel deposited on the manifold walls into the air stream.

It is also an object of this invention to provide an improved manifold of the type described for multicylinder engines wherein the various branches are so constructed as to facilitate proper division and reintroduction of liquid fuels at each dividing point in the manifold.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a top plan view of a manifold embodying the features of this invention.

Figure 2 is a vertical section on the line II—II of Figure 1.

Figure 3 is a cross section on the line III—III of Figure 2.

Figure 4 is a top plan view of a simple form of manifold embodying the features of this invention.

Figure 5 is a section on the line V—V of Figure 4.

As shown on the drawings:

Inasmuch as a conventional carburetor has an outlet passage of circular cross section, the main intake pipe 10 terminates in a conventional carburetor mounting flange as shown at 10 with a fragment of a carburetor 11 secured thereto. The intake pipe 10 gradually changes in section until it becomes an elongated passage 12 adjacent the point of juncture with the manifold 13 which distributes the mixture to the different cylinders. The pipe 10 is shown as vertical in Figures 1 and 2, while it is shown horizontal in Figures 4 and 5, as both arrangements are commonly used and do not affect the present invention.

In Figures 1 and 2 a series of six intake ports are to be supplied by individual branch outlets 14 which are provided with flanges 15 for bolting to the cylinder block. The ports are normally circular in section thus defining the corresponding shape of the branch outlets. As shown, two adjacent outlets may be joined by a common sub-manifold branch 16 having a nozzle-like connection 17, corresponding to the elongated passage 12, to another manifold branch 18 also connected to a third of the branch outlets 14, the manifold branch 18 in turn having an elongated nozzle-like connection 19, to one end of the manifold 13. The other three ports are supplied with fuel by a similar arrangement of

manifold branch from the other end of the manifold 13.

The nozzle-like passages 12, 17, and 19 are alike in configuration, being so designed as to throw off liquid traveling along the walls so that the liquid will be restored to the air stream substantially centrally thereof to assure proper division between the branches. The simple form of manifold of Figures 4 and 5 utilizes a horizontal intake pipe 10 terminating in a nozzle-like elongated passage 20 of the same general form which opens into a manifold branch 21 supplying two branch outlets 22.

In the description of the operation of the manifold of this invention, it will be more convenient to first consider the manifold of Figures 4 and 5. The usual characteristics of a fuel and air mixture include both entrained fuel droplets carried by the air stream, and a film of liquid flowing along the walls of the manifold and maintained by accumulation of fuel droplets deposited on the walls or condensed out of the air stream. The fuel wetting the manifold walls flows at a more sluggish rate than the air mixture, hence the need of an accelerating pump, when the throttle is opened wide, in order to add more fuel to the air stream to temporarily compensate for the fuel delayed by flowing along the walls.

Under idling conditions the fuel carried as droplets in the air stream tends to follow the stream and to cut corners at the bends because of the lack of centrifugal action thereon at low air speeds. Thus in Figure 5, the fuel will hug the right side of the bend at the nozzle 21 and if the passage were of the same area at the dividing point as elsewhere, a preponderance of fuel would reach the right hand port. Under full throttle conditions on the other hand, the fuel would be thrown to the outer or left hand wall of the bend due to centrifugal action in the rapidly moving air stream, so that the left hand port would then get more than its share of the liquid fuel. According to the present invention, the nozzle-like restricted passage opening into the manifold branches at each point of division of the air stream serves to promote reintroduction of fuel fractions subject to inertia forces, at a point midway between the outlet ports. The action of the nozzle-like passage centers the fuel in the air stream regardless of whether it is thrown out on one wall or the other, and it has a similar action on fuel flowing along the walls of the manifold.

Figures 4 and 5 illustrate only a single bend whereas in adapting this invention to multicylinder engines, use is made of these nozzle-like passages at each point of stream division as is shown in Figure 1 for the case of a six cylinder engine.

I am aware that numerous details of the invention may be varied through a wide range without departing from the spirit of this invention, and I do not desire limiting the patent granted other than as necessitated by the prior art.

I claim as my invention:

1. A manifold for multicylinder engines comprising a carburetor connection, a manifold branch connected thereto by an elongated passage of restricted area with the axis of the passage at right angles to the branch, and a plurality of inlet port connections similarly connected to the manifold branch.

2. A manifold for multicylinder engines comprising a single carburetor connection, a plurality of inlet port connections, manifold branches interconnecting said inlet ports with said carburetor connection, and restricted passage areas at each point of manifold division.

3. A manifold for multicylinder engines comprising a single carburetor connection, a plurality of inlet port connections, manifold branches interconnecting said inlet ports with said carburetor connection, and an elongated passageway at each point of division located on the centerline with its longer axis at right angles to the axis of the branch manifolds.

4. A manifold comprising a common intake passage dividing into branches serving individual intake ports, and narrow relatively long passageways at each point of division into branches whereby to reintroduce precipitated fuel into the air stream.

In testimony whereof I have hereunto subscribed my name at Indianapolis, Ind., county, Marion.

HAROLD H. TIMIAN.