Jan. 2, 1934. H. H. TIMIAN 1,942,227

ENGINE

Filed June 22, 1931

Fig. 1

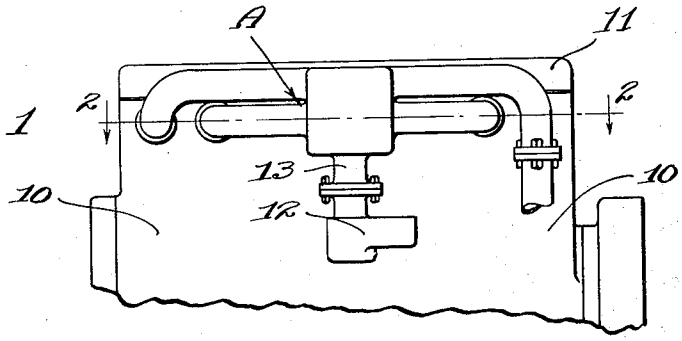
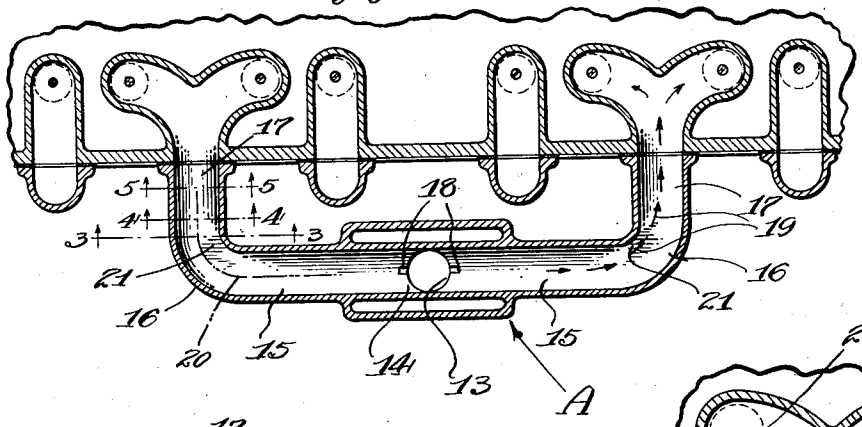


Fig. 2



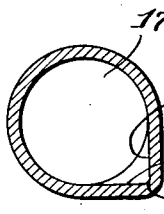


Fig. 3

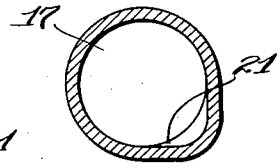


Fig. 4

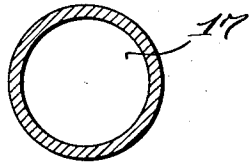


Fig. 5

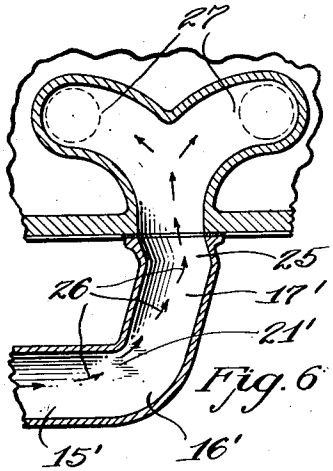


Fig. 6

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1,942,227

ENGINE

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14 Claims. (Cl. 123—52)

My invention relates to internal combustion engines and more particularly to an intake manifold structure adapted for assembly therewith.

The controlling of the fuel mixture flow in a manifold fuel conducting portion is somewhat difficult when a fuel is required to flow around a bend. In manifold structures employing fuel conducting portions substantially circular in cross-section, I find that this difficulty is more serious, and when such a circular fuel conducting portion is bent, the fuel mixture flows in such a way as to counteract the advantages gained by initially inducing a stratified fuel flow in said manifold portion.

Experience has shown that wet fuel flowing along the center portion of the manifold floor of such a fuel conducting manifold portion tends to cut the corner where the manifold branch is bent. As a result it has been found that the fuel stream tends to ride on the outer wall of the fuel mixture conducting manifold portion beyond the bend and prevent the uniform distribution of said fuel mixture to the engine cylinders when connecting said fuel mixture conduction portion to Siamese ports. It is the aim to uniformly distribute the fuel to the engine cylinders and this can be only accomplished with this type of manifold by controlling the fuel flow in such a way as to confine the same to flow in the center of the manifold at the point where the same is discharged into the cylinder intake passage.

It is the object of this invention to construct a manifold structure having generally improved fuel distributing characteristics.

Another object of the present invention is to provide a manifold structure employing fuel conducting portions substantially circular in cross-section and to provide means for acting on the fuel flow to induce same to flow in a predetermined path.

For a further understanding of my invention, reference may be had to the accompanying drawing which illustrates one form which my invention may assume, and in which:

Fig. 1 is a fragmentary side elevational view of an internal combustion engine illustrating a manifold structure assembled therewith which is constructed in accordance with my invention,

Fig. 2 is a horizontal sectional view taken on the line 2—2 of Fig. 1,

Figs. 3 to 5 inclusive are sectional views taken respectively on the lines 3—3, 4—4 and 5—5 of Fig. 2, and

Fig. 6 is a fragmentary sectional view of a modified construction.

In the accompanying drawing I have illustrated my intake manifold structure A assembled with an internal combustion engine which includes the engine cylinder block 10, cylinder head 11 and a fuel mixture forming device or carburetor 12. The manifold structure includes a primary fuel mixture conducting portion 13 which communicates with a fuel mixture distributing chamber 14 which in turn is communicated with the manifold branches 15. In many instances it is desirable to provide manifold branches of circular cross-section and in this construction shown in the illustrated embodiment of my invention the manifold branches 15 are substantially circular in cross-section and connected by a bend 16 to the port runner portions 17, said port runner portions being also constructed substantially circular in cross-section. I find that the fuel mixture is preferably induced to flow along the central longitudinal plane through the manifold branch 15 and such stratified fuel flow is preferably induced therein by means of grooves or other suitable means 18 located adjacent the junction of the manifold branches 15 and the primary fuel mixture conducting portion 13.

In order to prevent the irregular flow of this stratified fuel mixture as the same is caused to flow around the bend 16 I have provided a novel construction for controlling the stratified fuel flow in such a way as to induce the same to flow in general in the direction as indicated by the arrows 19, shown in Fig. 2. This is accomplished by flattening the floor of the manifold structure at the bend 16 and preferably the inside portion of the bend is flattened. It will be noted that the floor portion of the manifold structure to the inside of the centerline 20 is flattened as at 21 and the inside wall 22 of the manifold structure is constructed substantially perpendicular to the flattened wall portion 21. It will be also noted that the flattened floor portion 21 extends in a plane substantially parallel to the horizontal plane containing the axes of the manifold portions 15 and 17. Beyond the bend 16 the port runner 17 again assumes a circular cross-section, the said circular sections of manifold portions 15 and 17 being merged into the construction at the bend having a flattened floor portion. The stratified fuel flow flowing around the bend may readily cut the corner but is prevented from climbing the inside vertical wall at the bend because of the relatively sharp angle connecting the side wall and floor of the manifold structure as designated at 23.

In Fig. 6 the manifold structure includes a lat-

eral runner or manifold branch 15', and a port runner 17' connected by a bend 16'. In this construction the inside portion of the manifold is flattened as at 21' in a manner as illustrated in Fig. 2 and the port runner 17' is provided with a kick-back portion 25 for straightening out the stratified fuel flow thereby inducing a fuel flow substantially as shown by the arrows 26 which thereby uniformly distributes the fuel mixture to the intake passage associated with the Siamese ports 27.

Results have proved that the construction herein illustrated provides a very accurate control for the fuel mixture flow in a manifold having fuel mixture conducting portions of substantially circular cross-section. Such fuel mixture flow control is obtained with a minimum of losses due to friction and eddy currents set up by turning the fuel flow in order to direct the same into the cylinder intake passage.

It will be apparent to those skilled in the art to which my invention pertains that various modifications and changes may be made therein without departing from the spirit of my invention or from the scope of the appended claims.

What I claim as my invention is:

1. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the floor of said manifold structure adjacent the inside corner of the bend being relatively flattened.

2. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the bend of said manifold structure being constructed to direct the wet fuel flow around the bend to one side of the center and to induce the wet fuel to flow substantially along the center of the fuel mixture conducting portion beyond the bend.

3. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the floor of the manifold structure in the vicinity of the bend and to the inside thereof being flattened to induce a fuel flow substantially along the center of the fuel mixture conducting portion beyond the bend.

4. An intake manifold structure for an internal combustion engine having a Siamese intake port and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, one of said fuel mixture conducting portions connected with said Siamese intake port, the bend of said manifold structure being constructed to direct the wet fuel flow off center at the bend and to correct said off center flow beyond the bend whereby to uniformly distribute said wet fuel flow into said Siamese intake port.

5. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the inside wall of said manifold structure in the vicinity of the bend being constructed substantially perpendicular with respect to a horizontal plane containing the axes of the fuel mixture conducting portions.

6. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, that portion of the inside wall of said manifold structure in the vicinity of the bend and intermediate the floor and the horizontal plane containing the axes of the fuel mixture conducting portions being constructed substantially perpendicular with respect to said plane.

7. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the floor of said manifold structure in the vicinity of the bend and to the inside thereof being flattened and arranged to lie in a plane substantially parallel to a horizontal plane containing the axes of the fuel mixture conducting portions.

8. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the floor of said manifold structure in the vicinity of the bend and to the inside thereof being flattened and arranged to lie in a plane substantially parallel to a horizontal plane containing the axes of the fuel mixture conducting portions, the inside wall of said manifold structure in the vicinity of the bend extending from the floor to said plane containing the axes of the fuel mixture conducting portions being arranged substantially perpendicular to the flattened floor portion.

9. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the floor of said manifold structure adjacent the inside corner of the bend being relatively flattened, the fuel mixture conducting portion beyond the bend being connected with an engine intake port and constructed with a kick back bend adjacent the outlet to induce uniform fuel flow through said outlet.

10. An intake manifold structure for an internal combustion engine including substantially circular lateral and port runner portions connected by a bend, the floor of said manifold structure in the vicinity of the bend being relatively flattened to control fuel flow in the port runner.

11. An intake manifold structure for an internal combustion engine including substantially circular lateral and port runner portions connected by a bend, the floor of said manifold structure in the vicinity of the bend being relatively flattened and the inside wall at the bend being arranged to lie substantially perpendicular to the flattened floor portion to control fuel flow in the port runner.

12. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, said manifold structure deviating from a circular cross-section at the bend whereby to correct off center wet fuel flow at the bend whereby to induce the wet fuel to flow substantially along the center of the conducting portion beyond the bend.

13. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, said manifold structure

having a cross-sectional area at the bend greater than the cross-sectional area of the conducting portion preceding the bend whereby to control wet fuel flow in the conducting portion beyond the bend.

14. An intake manifold structure for an internal combustion engine and including substantially circular fuel mixture conducting portions positioned at an angle to each other and connected by a bend, the manifold portion at the bend deviating from a true circular cross section whereby to provide a cross-sectional area of the conducting portion at the bend greater than the cross-sectional area of the conducting portion preceding the bend in order to control wet fuel flow in the conducting portion beyond the bend.

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