July 31, 1928. 1,679,177

W. SEYMOUR

MIXING DEVICE

Filed Feb. 10, 1926

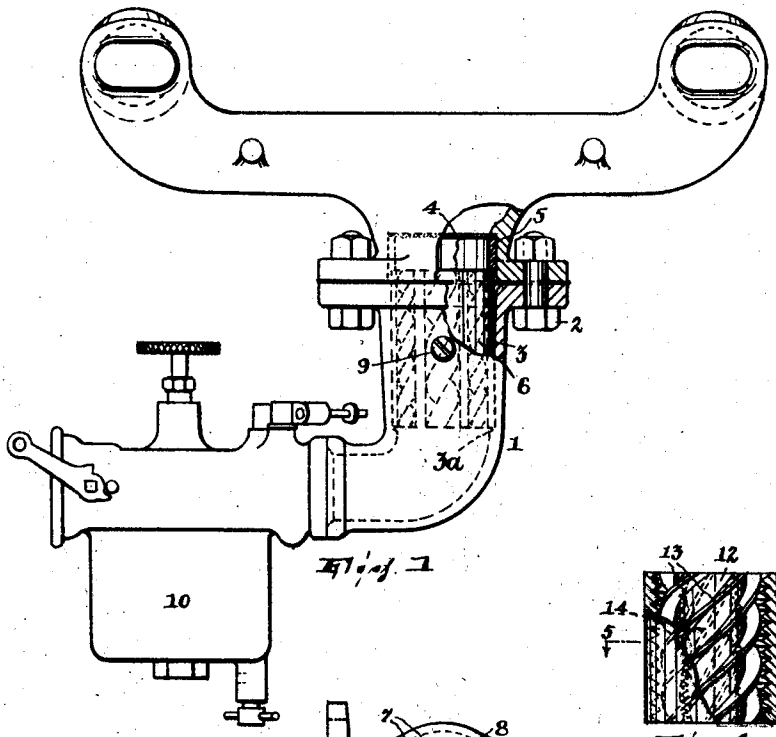


Fig. 1.

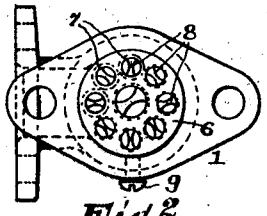


Fig. 2.

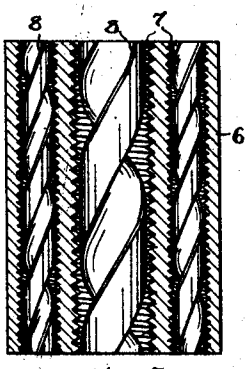


Fig. 3.

Fig. 4.

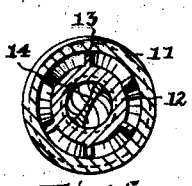


Fig. 5.

WITNESS

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Patented July 31, 1928. 1,679,177

UNITED STATES PATENT OFFICE.

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MIXING DEVICE.

Application filed February 10, 1926. Serial No. 87,225.

The principal object of this invention is to provide, at little expense and by simple mechanical operations, a device for both breaking up the liquid fuel constituent and mixing such constituent and the air of a combustible mixture. The device hereinafter set forth for accomplishing this object is especially adapted for use in connection with internal combustion engines, as in the manifold or equivalent connecting the carburetor with the engine, although its use is not necessarily limited to such an application, as will be apparent. The invention contemplates providing a passage having its surface roughened and the passage made spiral, whereby when a fluid is forced through the passage at the proper velocity it will be caused in swirling through the passage to impinge against the roughened surface, which will thus become a factor in breaking up or comminuting such liquid bodies as are being carried along and also in mixing the air or other gas therewith. In one form of the invention I have provided a suitable body with one or more (preferably several) bores therethrough having roughened, corrugated, surfaces and in each such bore I have placed a spiral vane; this represents a simple way in which to form a spiral passage having the roughened surface—in fact, a plurality of such passages to each bore. The operation of forming a device suitable for the purpose may be still further simplified by tapping each bore with a screw-thread, thus to produce the roughened surface in the form of corrugations. In another form I have simplified the operation of forming the device when there are to be a number of passages by providing a bored member or shell and fitting therein a member having spiral ribs to form with the shell the spiral passages.

In the accompanying drawing,

Fig. 1 shows the intake manifold of an internal combustion engine equipped with one form of the device of this invention;

Fig. 2 is a plan of the lower section of the manifold, containing this form of the device;

Fig. 3 is a vertical sectional view of this form of the device removed and on a larger scale; and

Figs. 4 and 5 are a side elevation, partly in section, and a section on line 5—5, Fig. 4, of the other form.

The manifold 1 may be conveniently formed in two sections provided with flanges and adapted to be secured together by bolts 2 connecting the flanges. The sections are somewhat enlarged internally to receive my device, hereinafter described, as shown at 3, and the chamber thus formed may be upwardly extended to receive also a gauze or other foraminous screen 4, for preventing admission to the engine of any solid particles carried along with the fluid travelling through the manifold, and a spacing sleeve 5 on which the screen rests and which in turn rests on my device.

My device is shown in Figs. 2 and 3 as formed from a cylindrical block or body 6 of metal. This body is drilled longitudinally to produce a series of bores 7; in the example shown there is one large central bore and a number of smaller bores around it, but this is not material. Each bore is corrugated, and this is most easily accomplished by screw-threading it. Into each bore is forced with a driven fit a spiral vane 8.

The device thus formed occupies the chamber 3 and may be held fast therein by a set-screw 9. It may be remarked that the object in enlarging the manifold to form chamber 3 is partly to afford a seat, at 3^a, for said device, and partly to accommodate a body 6 of such diameter that the combined areas of the passages formed therein may approximate as nearly as possible the normal cross-sectional area of the manifold passage, to the end that introduction of the device into such passage will not materially choke the latter.

When the device is in operative position in the manifold and the engine running the air and liquid fuel supplied thereto, usually already in a state of mixture due to the action of the carburetor shown at 10 and delivering into the manifold, of course are forced through the several bores (that is to say, the spiral passages formed therein both sides of their contained vanes) at great velocity, and in moving through the passages they are caused to impinge against the roughened surfaces thereof, which action both results in a breaking up of the liquid fuel particles and enhances the mixing of the air and the thus comminuted liquid particles.

In Figs. 4 and 5, 11 is a cylindrical shell, internally screw threaded. In its bore is fitted a member 12 having spiral external

ribs 13 which form spiral passages with the shell 11. Member 12 may be itself bored and tapped and its bore fitted with a spiral vane 14, the same as already described in reference to Figs. 1 to 3. The advantage of this structure over the first is that the parts may be cast (as di-cast) and therefore made at less expense than the first.

Having thus fully described my invention what I claim and desire to secure by Letters Patent is:

A gaseous fuel mixing device adapted to be positioned in the intake manifold of an internal combustion engine comprising, in combination, a body having a rough-surfaced bore therethrough, a spiral-ribbed element occupying and having its ribs at their outer edges in contact with the rough surface of the bore, said ribs and the roughened surface of the bore forming a spiral passage one side of which is constituted by said surface.

In testimony whereof I affix my signature.

WILLIAM SEYMOUR.