J. B. MERIAM AND H. W. PRICE.

COMBINED DISTRIBUTER AND HEATER FOR INTAKE MANIFOLDS.

APPLICATION FILED NOV. 13, 1919.

1,361,477.

Patented Dec. 7, 1920.

2 SHEETS—SHEET 1.

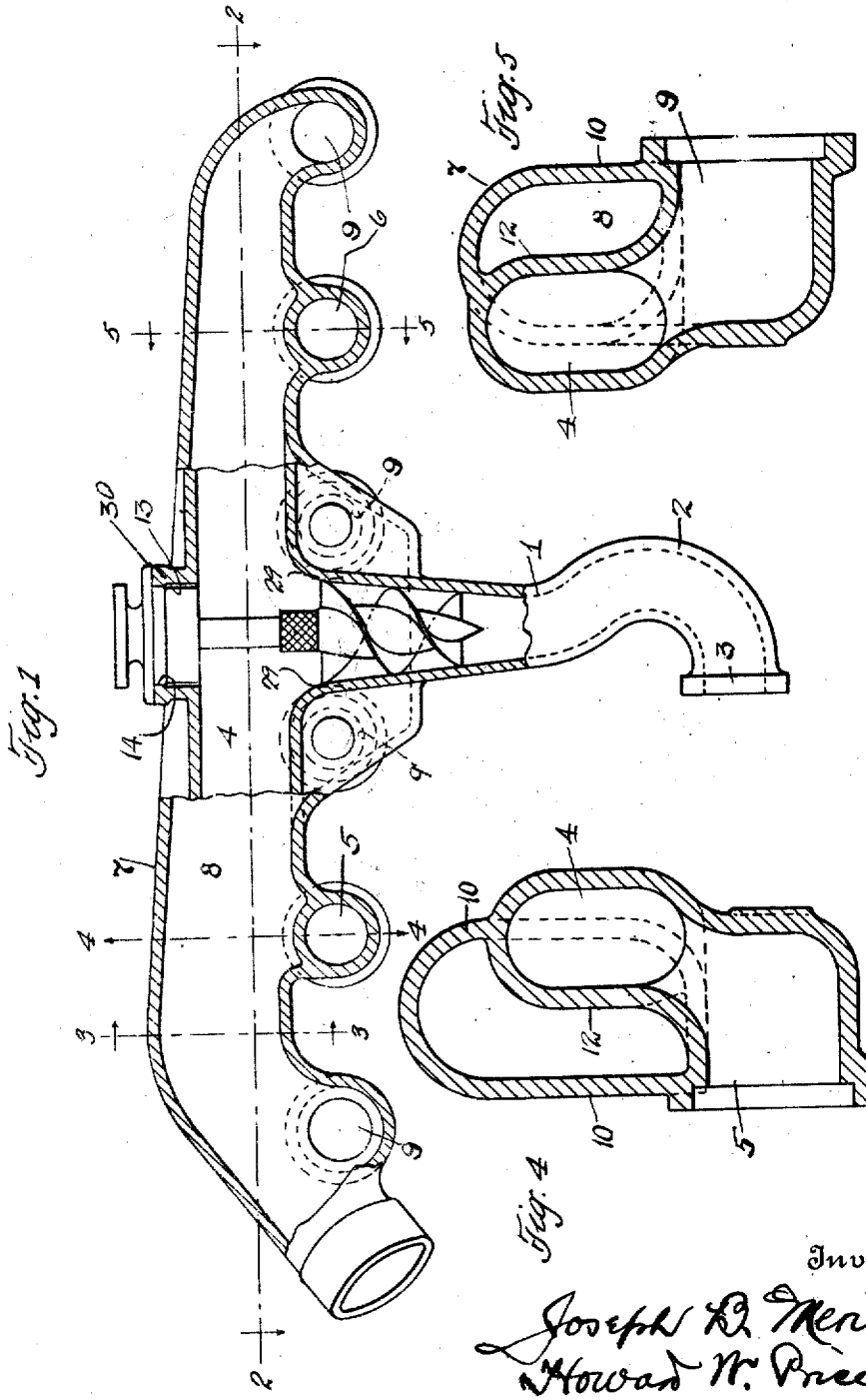


Fig. 1

Fig. 5

Fig. 4

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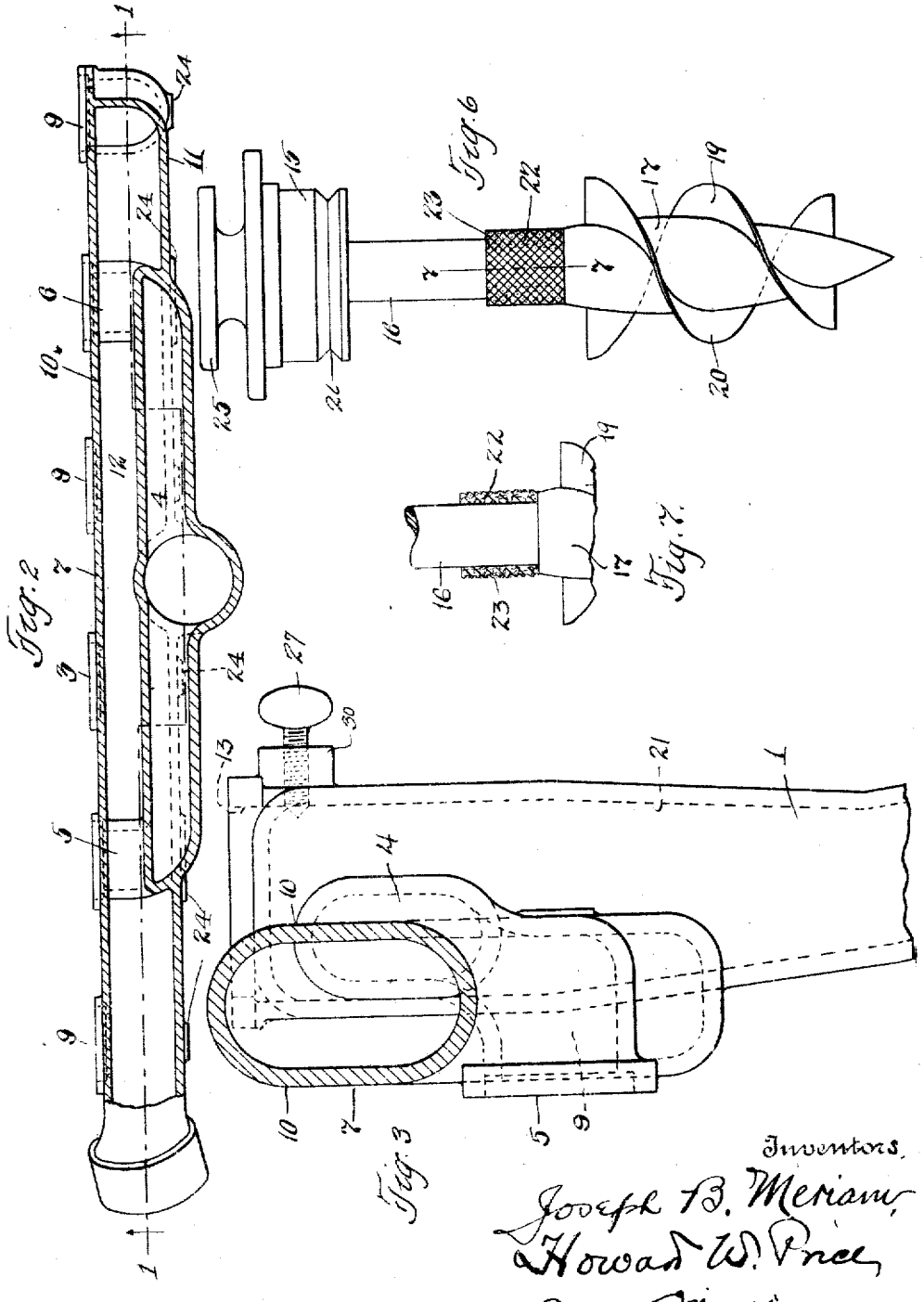


Fig. 2

Fig. 6

Fig. 7

Fig. 3

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UNITED STATES PATENT OFFICE.

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COMBINED DISTRIBUTER AND HEATER FOR INTAKE-MANIFOLDS.

1,361,477. Specification of Letters Patent. Patented Dec. 7, 1920.

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To all whom it may concern:

Be it known that we, JOSEPH B. MERIAM and HOWARD W. PRICE, citizens 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 Combined Distributers and Heaters for Intake-Manifolds, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

Our invention relates to intake and exhaust manifolds for internal combustion engines. One of its objects is to provide for an even distribution of the combustible gases to all the cylinders. Another object is to provide a simple arrangement for combining the intake and exhaust manifolds to cause preheating of the gases passing to the cylinders. A further object of the invention is to provide a simple and efficient means for heating the combustible mixture to facilitate starting the engine after it has become cold.

It has been proven by experiment and use of four-cylinder engines, having two intake ports connected to the intake manifold and each of said ports branching to a cylinder from below and from the rear, that the two front cylinders receive more gas than the two rear cylinders. A more specific object of this invention, therefore, is to provide means, inserted in the intake passages, to overcome this and give the two front cylinders and the two rear cylinders an equal amount of gas.

Our invention is hereinafter more fully described in connection with the accompanying drawings. Objects of a more specific nature will become apparent in the description, and the essential characteristics are summarized in the claims.

In the drawings Figure 1 is a longitudinal section of a side elevation of the manifold; Fig. 2 is a horizontal section taken in the plane indicated by the line 2—2 of Fig. 1; Fig. 3 is a transverse section taken in the plane indicated by the line 3—3 of Fig. 1; Fig. 4 is a transverse section taken as indicated by the line 4—4 of Fig. 1; Fig. 5 is a transverse section taken as indicated by the line 5—5 of Fig. 1; Fig. 6 is a side elevation of one of the parts, and Fig. 7 is a section taken as indicated by the line 7—7 of Fig. 6. The planes of the sections of Fig. 1 are indicated by the offset line 1—1 of Fig. 2.

Describing our invention by use of reference characters, the main intake passage 1 comprises a downwardly tapered tube having an offset curved portion shown at 2, and having a flange 3 to which the carbureter (not shown) is attached. The upper end of the passage 1 opens into the intake manifold proper. This comprises a main passage 4, which has ports 5 and 6 passing through the exhaust manifold 7 and normally connecting with two ports in the cylinder block (not shown), each of the latter ports being connected by branches with two cylinders.

The exhaust manifold 7 consists of a passage 8 preferably inclosed by the walls 10 and 11, part of the wall 11 being offset as shown at 12 and forming the front wall of the intake manifold 4. Four ports 9 are adapted to connect the passage 8 with each of four cylinders.

Directly above the passage 1 is shown an opening 13 within an upstanding rim 30, having an internal flange 14 adapted to receive a tight fitting plug 15, which carries a flattened knob 25. The plug 15 is provided with a circumferential groove 26 which may be engaged by a set screw 27 arranged in the side of the rim 30 to permit the plug 15 to be locked in closed position. A rod 16 rigid with and projecting downwardly from the plug 15 carries an enlarged cigar shaped stem 17, pointed at its lower end and carrying double spiral vanes running from its lower end to the upper end. These spirals 19 and 20 are preferably so shaped as to closely engage, at their outer edges, the walls of the passage 1, which flare upwardly as shown.

Directly above the stem 17 and vanes 19 and 20 is a wick 22 which is closely wrapped around the rod 16, and preferably secured by a perforated brass collar 23.

In operation the device is used as follows: The manifold is attached to a cylinder block by clamps bearing against pads 24 formed on the manifold. When it is desired to start the engine after it has been idle for some time and has become cold, the engine is turned over a few times, thereby drawing liquid fuel upwardly over the vanes 19 and 20 and around the wick 22. The set screw 27 is then loosened and the plug 15 and attached parts are withdrawn from the opening 13 by lift-

ing the knob 25. The plug may then be inverted and the knob 25 permitted to rest on any suitable surface, whereupon the liquid on the vanes 19 and 20 will drain into the wick 22. This is then ignited, and in burning will heat the stem 17 and the spiral vanes 19 and 20. As soon as the gasolene is burned the plug is again inserted into the opening 13.

Thereafter when the combustible gases mixed with some liquid fuel are drawn through the carbureter and up through the passage 1, they will pass around the curved stem 17 and the spirals 19 and 20, and be whirled equally onto the adjacent surfaces 29 of the manifold, regardless of the angular position of the plug 15 and spiral surfaces 19 and 20, when inserted into the opening 13. On account of the preheating of the stem 17 and vanes 19 and 20, the fuel will be quickly vaporized thus enabling the engine to be easily started. The vaporization process is of course more rapid and thorough when the surfaces 29, against which the mixed gas and liquid fuel is whirled, become heated.

The whirling motion given to the gases as they pass through the passage 1, around the curved portion 17 and the spirals 19 and 20, equally divides the gases as they reach the branching of the passage into the horizontal manifold passage 4. This insures an even distribution of the gases to the front and the rear cylinders.

As the engine continues to run the wall 12 between the intake and the exhaust manifold becomes heated from the exhaust gases passing through the passage 8. This heats the gases coming into the intake manifold and into contact with the wall 12 and thus more completely vaporizes them before entering the cylinders.

A person on leaving a machine which is equipped with our device may conveniently "lock" the same by simply removing the plug 15 and slipping it into his pocket or otherwise carrying it with him. No suction then of course can be produced in the intake manifold until the opening 13 is closed. This will be difficult without an accurately fitting plug, even though a prospective thief may have discovered the reason why the engine cannot be started.

Having thus described our invention, what we claim is:

1. The combination of an intake manifold with means for heating the same, a removable plug fitted into one of its walls, a projection on said plug, and a spiral vane carried by the projection and extending to the walls of the intake passage, whereby fluid passing therethrough may be heated.

2. In a device of the character described, the combination of an intake manifold having an upright passage branching to a plurality of cylinders, a plug in a wall opposite to said passage, a spiral vane carried by the plug and fitted against the walls of the upright passage and extending substantially to the point where said upright passage branches.

3. The combination with an intake manifold of a passage leading from the carbureter and flaring as it leads toward the cylinder branches, a stationary helical vane extending substantially to the wall of the flaring passage and leading along that passage for a distance back from the point of branching and adapted to give the gases a whirling motion as they pass from said flaring passage to the branches.

4. The combination of an intake or exhaust manifold having an intermediate wall in common, the intake manifold having an upright passage tapering downwardly and having an opening opposite said passage, a plug occupying said opening, a projection carried by the plug extending downwardly into the passage, spiral vanes carried by said projection and a wick between the plug and said vanes.

5. The combination with an intake manifold having a passage leading from the carbureter and branching to a plurality of cylinders, of a removable plug carrier by the manifold, and a fibrous substance carried by the plug and adapted to carry combustible liquid to be ignited whereby adjacent parts may be heated to facilitate vaporization.

6. In a device of the character described the combination of an intake manifold having an opening, a plug carried by the opening and having a projection extending into the intake passage, fibrous material carried by the projection and adapted to be saturated by combustible liquid whereby the surrounding parts may be heated as the combustible liquid is burned, thus providing a heating element in the intake passage to facilitate vaporization.

7. An intake manifold provided with an opening in its wall, a plug fitting said opening and carrying projections extending into the intake passage, a vane extending outwardly from said projection, and absorbent means for carrying combustible material for heating said vane when the plug is removed, whereby the heated elements may be placed in the intake passage to facilitate vaporization.

8. The combination with an intake manifold of a removable plug fitted into one of its walls, a projection on said plug, spiral vanes carried by the projection and extending to the walls of the intake passage, a wick adjacent to said vanes adapted to carry combustible liquid whereby the vanes may be heated by removing the plug and igniting the combustible liquid while so removed.

9. The combination with an intake manifold and an exhaust manifold so arranged

that exhaust gases heat the intake manifold, spiral vanes in the intake passage over which all the gas must pass in the intake manifold, a removable plug carrying said vanes, and a fibrous material carried by the plug adapted to be saturated with combustible fluid for heating the vanes when ignited.

10. In a device of the character described, the combination of an intake manifold having an upright passage branching to a plurality of cylinders, an opening in said passage, a plug fitted into said opening, spiral vanes carried by the plug and fitted against the walls of the upright passage and extending substantially to the point where said upright passage branches.

11. The combination with an intake manifold of a passage leading from the carbureter and flaring as it leads toward the cylinders, of a plug in the wall of the flaring passage, a projection carried by the plug, and spiral vanes carried by the projection and adapted to be removed through the opening occupied by the plug, said vanes extending to the walls of the flaring passage and adapted to give the gases a whirling motion.

12. The combination of an intake or exhaust manifold having an intermediate wall in common, the intake manifold having an upright passage tapering downwardly and having an opening opposite said passage, a plug occupying said opening, a projection carried by the plug extending downwardly into said passage and pointed at its lower end, spiral vanes carried by said projection and extending to the tapering walls of the intake passage, and a wick between the plug and said vanes.

13. An intake manifold provided with an opening in the wall, a plug fitting said opening carrying projections extending into the passage, vanes extending outwardly from said projection, and means for carrying the combustible material for heating said vanes when the plug is removed, said plug having a knob provided with a flattened upper surface on which the plug may stand when removed and inverted.

14. A combined intake and exhaust manifold having an opening into the intake portion, combined with a removable member projecting therein through said opening and having a head to close the opening, and a helical vane carried thereby extending along the wall of the intake passage whereby the fluids are brought into close contact therewith.

15. In a device of the character described, a manifold having an intermediately positioned intake passage, a plug fitted in a wall of the manifold and extending into the intake passage, and double helical vanes around said plug adapted to give the fluids a whirling motion with a balanced discharge.

16. In an intake manifold, a removable plug in a wall opposite to the passage leading from the carbureter, said passage connecting with the manifold intermediate of its ends, and said plug having an extension projecting into said passage, vanes symmetrically arranged in multiple about said extension extending along the walls of said passage and adapted to discharge the fluids under balanced lateral pressure.

17. The combination with an intake manifold having an upwardly extending tubular supply portion and a laterally extending tubular portion with which the first mentioned portion communicates, and an opening through the top of the lateral portion directly opposite the upwardly extending portion combined with a removable member adapted to occupy the opening and extend into the said upwardly extending portion, and having therein means for deflecting the fluid against the wall.

18. The combination with an intake manifold having a main intake passageway and a laterally extending tubular head with an opening in its wall opposite said main intake passageway and a removable heat distributing member having a head adapted to occupy said opening, a shank adapted to extend across the head of the manifold and a helical vane adapted to occupy the main intake passage.

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