Jan. 16, 1923. 1,442,256.

G. P. DORRIS.

INTERNAL COMBUSTION ENGINE.

FILED APR. 4, 1921. 2 SHEETS—SHEET 1.

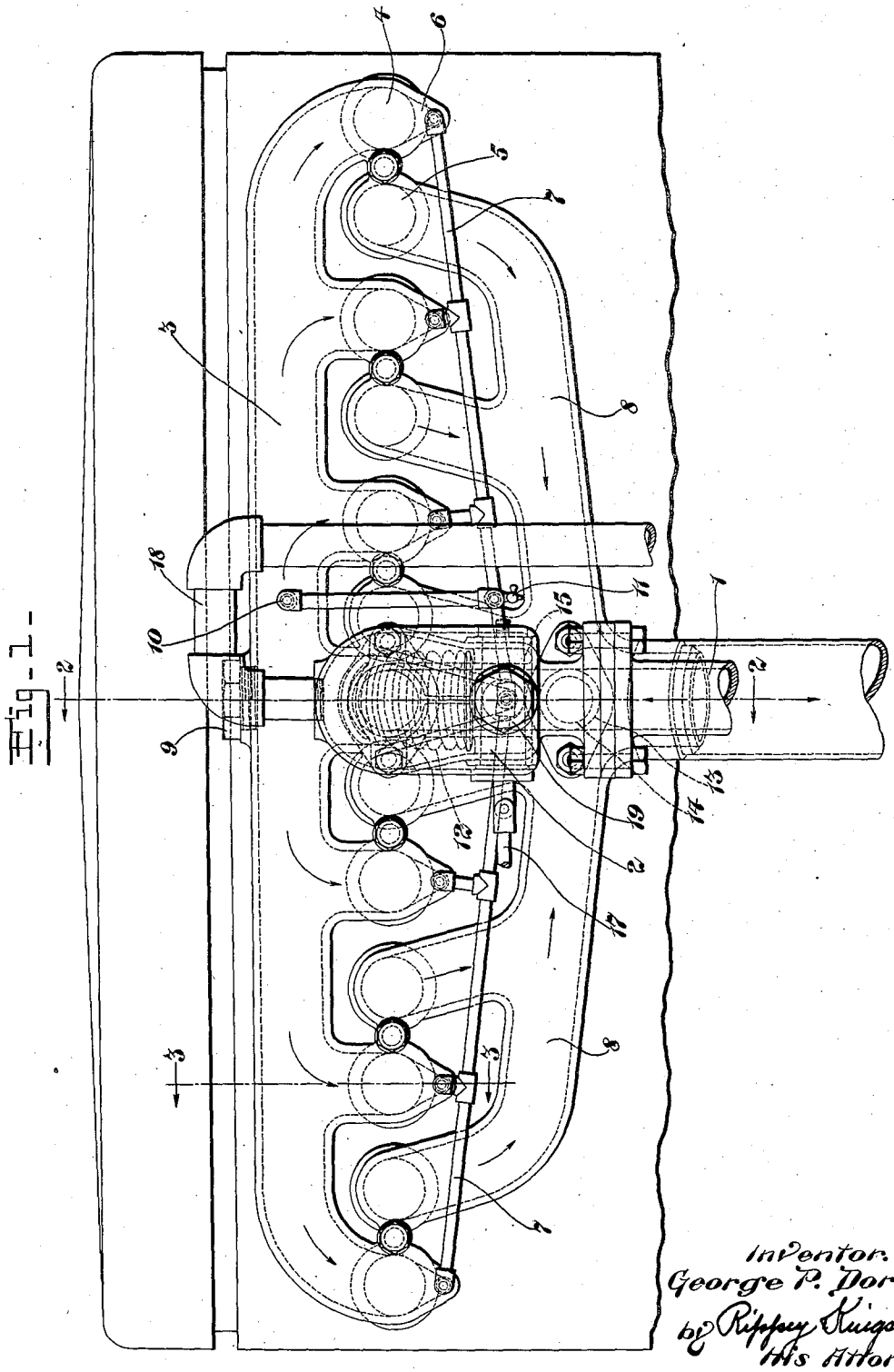

Fig. 1.

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2 SHEETS—SHEET 2.

Fig. 2.

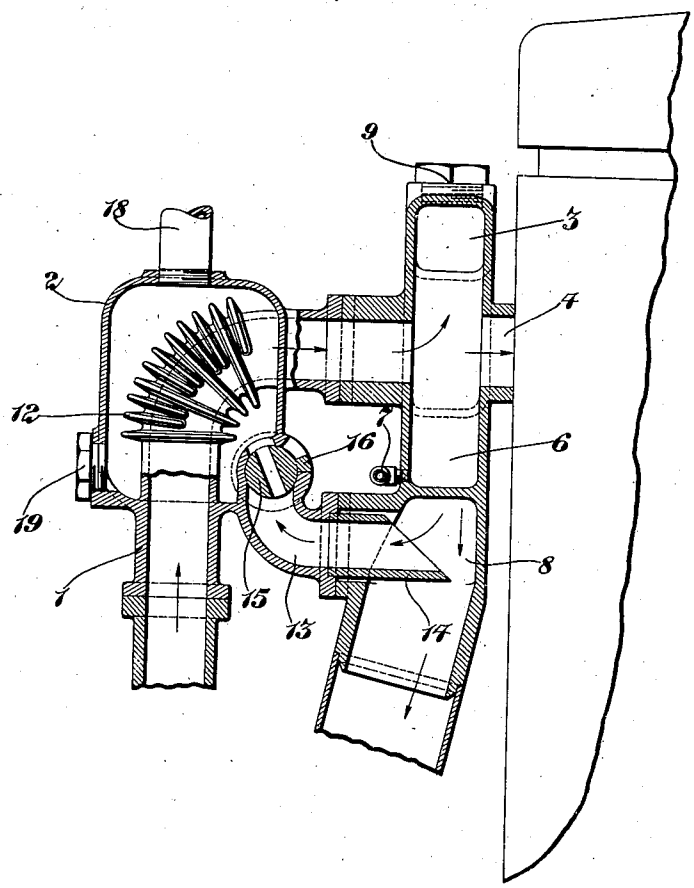
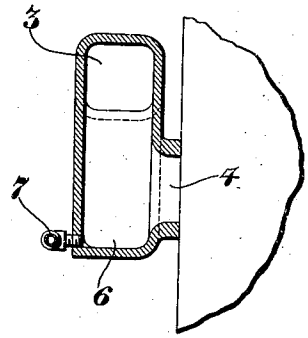


Fig. 3.



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George P. Dorris,
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Patented Jan. 16, 1923. 1,442,256

UNITED STATES PATENT OFFICE.

GEORGE P. DORRIS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO DORRIS MOTOR CAR COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF MISSOURI.

INTERNAL-COMBUSTION ENGINE.

Application filed April 4, 1921. Serial No. 458,299.

To all whom it may concern:

Be it known that I, GEORGE P. DORRIS, a citizen of the United States, residing at St. Louis, Missouri, have invented a new and useful Internal-Combustion Engine, of which the following is a specification.

This invention relates to internal combustion engines.

An object of the invention is to provide improved means for trapping or delaying the passage of the heavy ends of gasoline toward the cylinders so as to prevent these heavy ends of the gasoline from entering the cylinders.

Another object of the invention is to provide improved means for vaporizing the trapped or delayed heavy ends of the gasoline and passing the vapor to the cylinders for combustion.

Another object of the invention is to provide equipment for trapping the heavy ends of the gasoline that pass the carburetor, in combination with a gage device whereby inspection may be made to observe the amount of the deposit of the heavy ends of the gasoline so that the relative amount and time of vaporization thereof can be ascertained.

Another object of the invention is to provide the construction for trapping or delaying the heavy ends of the gasoline to prevent such heavy ends from entering the cylinders, with equipment for draining or removing the accumulated heavy ends to check its specific gravity and comparative value, and to remove the surplus accumulations, and to obtain other desirable results.

In mentioning the above objects of the invention I do not in any sense restrict myself to the accomplishment of these objects alone, but I contemplate obtaining various other objects and advantages by use of my invention, all of which will be apparent from the following description, reference being made to the drawings, in which—

Fig. 1 is an elevation showing one embodiment of the invention applied to an internal combustion engine.

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

Fig. 3 is a sectional view on the line 3—3 of Fig. 1.

In the construction shown the intake 1 passes through a heater 2 and opens into the manifold 3. From the manifold 3 the vaporized gasoline is delivered into the respective cylinders through inlet ports 4, and the products of combustion are discharged from the cylinders through exhaust or outlet ports 5.

My invention comprises means for trapping or delaying the passage of the heavy ends or unvaporized portions of the gasoline to the cylinders. In using the term "heavy ends" in this and in my companion applications Serial Nos. 459,915 and 459,916, I have reference to the unvaporized gasoline. In the embodiment shown I have provided, in connection with the manifold adjacent to each inlet port, a depending well or receptacle 6 which receives or traps the heavy ends or unvaporized portions of the gasoline and prevents such heavy ends or unvaporized portions from entering the cylinders, while leaving the vaporized gasoline free to enter the cylinders. The well or receptacle 6 at the middle of the series is preferably of relatively greated depth and size than the other wells or receptacles 6, so that the trapped heavy ends from the other wells or receptacles may be received in the central one, causing a return or circulation for re-evaporation. For the purpose of delivering the trapped heavy ends of gasoline from the smaller ones of the wells or receptacles 6 to the large one pipes 7 are provided. The pipes 7 are in communication with the different relatively shallow wells or receptacles 6 and have their lower inner ends opening into the deeper or larger central well or receptacle 6, so that the trapped heavy ends of the gasoline will flow by gravity into the central well or receptacle.

In the embodiment shown the exhaust ports 5 open and discharge into the leads of an exhaust manifold 8. The adjacent side walls of the two centrally disposed exhaust leads constitute the side walls of the central relatively deeper well or receptacle 6 into which the heavy ends of the gasoline are delivered from the remaining wells or receptacles 6 in which the heavy ends of the gasoline are trapped at the inlet ports to the respective cylinders. Thus the relatively large and deep centrally arranged well or receptacle 6 is heated by the exhaust with the result that the heavy ends of the gasoline delivered into said centrally disposed well or receptacle are vaporized and

returned in vaporized form to the manifold 3 and thence to the cylinders for combustion.

Since the heavy ends or unvaporized portions of the gasoline are delivered into the centrally disposed relatively large well or receptacle 6 it may be desirable to obtain access to said well or receptacle for the purpose of removing the carbon or other deposits that may accumulate therein. For this purpose a removable plug 9 may be set in one of the walls of the central well or receptacle. When the plug is removed access is afforded to the interior of the well or receptacle and any carbon or other deposit that has accumulated therein may be removed.

In some uses of the invention it may be desirable to know the amount of the heavy ends of gasoline that have accumulated, so that the relative amount and time of vaporization may be known. For this purpose I have provided a device for affording visual indication of the amount of the heavy ends of gasoline that have accumulated and by means of which the relative amounts and time of vaporization of the heavy ends may be noted. In the embodiment shown said device comprises a transparent cylinder 10 of glass or other appropriate material having its lower end in communication with the accumulated heavy ends of gasoline and its upper end opening into the intake manifold 3. Thus the pressure at the opposite ends of the accumulated gasoline is equalized since both ends of the indicating or gage device are effected alike by the pressure in the manifold. The lower end of the indicating or gage device is preferably equipped with a drain valve 11 for the purpose of draining off the accumulated heavy ends of the gasoline to remove surplus accumulations, to check the gravity and comparative values, and for other desired purposes.

The heater 2 which I have mentioned as being in connection with the intake to the manifold may be of any desired construction and formation. In the embodiment shown the heater is a box-like casing enclosing a portion of the intake. Within the heater casing the intake is provided with a number of heater fins 12 in order to obtain better results in utilizing the heat. A passage 13 from the heater casing 2 opens into the exhaust manifold 8 and is provided with a baffle 14 in the exhaust manifold for deflecting a part of the heated exhaust through the passage 13 into the heater casing 2. The passage 13 is equipped with a valve 15 controlling the admission of the heated exhaust in the heater casing. The valve 13 may be turned from open position shown (Fig. 2) to closed position, turning movement of said valve being limited by a lug 16 contacting with the ends of a slot in the valve case in which said lug extends. Operation of the valve may be effected by an appropriate connection 17 (Fig. 1) leading to any desired place of use.

When it is desired to utilize the heat of the exhaust to heat the intake the valve 15 is opened, permitting a part of the heated exhaust to enter the heater 2 which opens to atmosphere through a pipe 18. Access to the interior of the heater 2 may be obtained by removing a closure plug 19 from the opening in the wall of the heater in which said plug is removably located.

It is apparent that my invention may be embodied in various forms without departing in the least from the nature and principle thereof. By preventing the heavy ends and unvaporized portions of gasoline from entering the engine cylinders, the life of the engine is greatly prolonged. Imperfect combustion is prevented. The formation and accumulation of carbon within the cylinders and other parts of the engine are reduced to a minimum, all of which results in a relatively large saving and decrease in the amount of gasoline required by the engine. The invention is therefore of an important and valuable nature and is clearly not to be restricted to the specific construction and arrangement shown, nor otherwise except as by the scope of the appended claims.

I am aware that the invention may be widely varied as to its construction and arrangement without departing from the scope and principle thereof. The heavy ends of the gasoline may be trapped or delayed otherwise and may be delivered to other points of delivery without departing from the invention, whether such heavy ends are vaporized and used immediately or not.

It is apparent that the invention satisfactorily serves all of its intended purposes in a highly efficient manner.

What I claim and desire to secure by Letters Patent, is:—

1. The combination with an internal combustion engine comprising individual cylinders, and an intake pipe communicating with the individual cylinders of the engine, of receptacles for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the respective cylinders, a heated receptacle extending below the lower ends of the first-named receptacles, an inclined pipe for conducting the accumulated heavy ends of the gasoline from the first-named receptacles to the heated receptacle for vaporization, and a device for indicating the amount of the heavy ends of the gasoline that has passed through the intake pipe and has been prevented from entering the cylinders.

2. The combination with an internal combustion engine comprising individual cyl-

inders, an intake manifold, downward extensions from the intake manifold communicating with the individual cylinders of the engine, and an intake pipe communicating with the intake manifold, of receptacles at the lower ends of said downward extensions below the openings into the cylinders for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the cylinders, and one of such receptacles being of greater depth than the others and being heated when the engine is running, inclined pipes having their lower ends opening into the receptacle of greater depth, said pipes being in communication with said other receptacles and arranged to conduct the heavy ends of gasoline into said deeper receptacle, and means for indicating the amount of the heavy ends of gasoline accumulated in said receptacles.

3. The combination with an internal combustion engine, comprising individual cylinders, an intake manifold and downward extensions on the intake manifold communicating with the individual cylinders of the engine; of a receptacle at the lower end of each of said downward extensions below the opening into the manifold for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the respective cylinders; an inclined pipe communicating with certain of said receptacles; a cylinder having its lower end opening into said pipe and its upper end opening into the intake manifold above said receptacles and arranged to receive the gasoline passing into said pipe from said receptacles; and means permitting withdrawal of the accumulated heavy ends of the gasoline from said pipe.

4. In combination with an internal combustion engine comprising individual cylinders, and an intake manifold communicating with the individual cylinders of the engine, of receptacles for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the respective cylinders, a heated receptacle, pipes for delivering the accumulated heavy ends of the gasoline from the first-named receptacles to the heated receptacle for vaporization, and a device communicating with one of said pipes and with the intake manifold for indicating the amount of the heavy ends of gasoline received in said receptacles.

5. The combination with an internal combustion engine comprising individual cylinders, and an intake manifold communicating with the individual cylinders of the engine, of receptacles for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the respective cylinders, a heated receptacle, pipes for delivering the accumulated heavy ends of the gasoline from the first-named receptacles to the heated receptacle for vaporization, a device communicating with one of said pipes and with the intake manifold for indicating the amount of the heavy ends of gasoline received in said receptacles, and means permitting the withdrawal of the accumulated heavy ends of gasoline.

6. The combination with an internal combustion engine comprising individual cylinders, and an intake pipe communicating with the indivdual cylnders of the engine, of receptacles for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the respective cylinders, a heated receptacle, means for delivering the accumulated heavy ends of the gasoline from the first-named receptacles to the heated receptacle for vaporization, and a device for indicating the amount of the heavy ends of gasoline that have passed through the intake pipe and have been prevented from entering the cylinders.

7. The combination with an internal combustion engine comprising individual cylinders, and an intake pipe communicating with the individual cylinders of the engine, of receptacles for receiving the heavy ends of the gasoline and preventing such heavy ends from entering the respective cylinders, a heated receptacle, means for delivering the accumulated heavy ends of the gasoline from the first-named receptacles to the heated receptacle for vaporization, a device for indicating the amount of the heavy ends of gasoline that have passed through the intake pipe and have been prevented from entering the cylinders, and means for permitting the withdrawal of the accumulated heavy ends of the gasoline.

8. The combination with an internal combustion engine comprising individual cylinders, an intake manifold opening into the individual cylinders of the engine, and an admission pipe opening into the intake manifold, of a receptacle adjacent to the place at which the manifold opens into each cylinder to receive the heavy ends of gasoline and prevent such heavy ends from entering the cylinders, a heated receptacle in communication with the intake manifold and arranged to receive the accumulation of the heavy ends of gasoline from said first-named receptacles to cause such accumulations to be vaporized in the heated receptacle and discharged in vaporized form into the intake manifold, and a device for indicating visually the amount of the heavy ends of gasoline accumulated in said receptacles.

9. The combination with an internal combustion engine comprising individual cylinders, an intake manifold opening into the individual cylinders of the engine, and an admission pipe opening into the intake manifold, of a receptacle adjacent to the place at which the manifold opens into each cylinder to receive the heavy ends of gaso-

line and prevent such heavy ends from entering the cylinders, a heated receptacle in communication with the intake manifold and arranged to receive the accumulation of the heavy ends of gasoline from said first-named receptacles to cause such accumulations to be vaporized in the heated receptacle and discharged in vaporized form into the intake manifold, and means for draining off the accumulated heavy ends of gasoline from all of said receptacles to remove the surplus accumulation.

GEORGE P. DORRIS.