

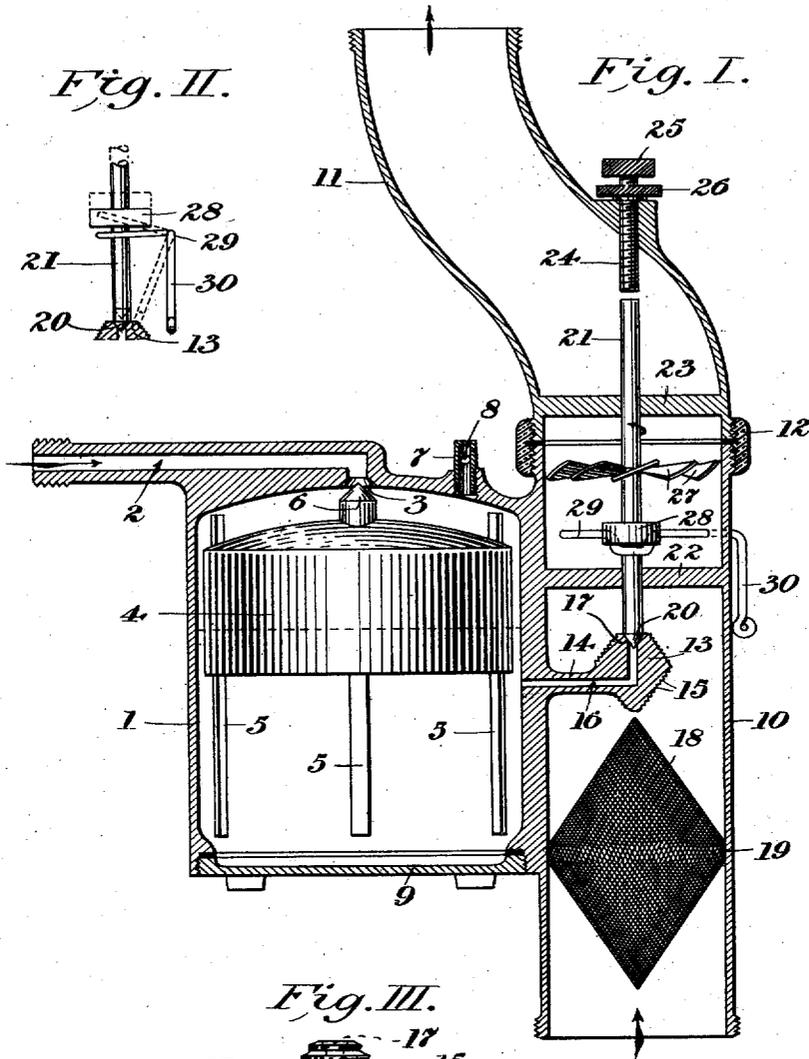
No. 760,673.

PATENTED MAY 24, 1904.

M. C. WHITE & O. C. DURYEY.
VAPORIZER FOR EXPLOSIVE ENGINES.

APPLICATION FILED JUNE 17, 1902.

NO MODEL.



Witnesses:

G. T. Hackley,
Edmund A. Haus,

Inventors:
Morris C. White,
Otho C. Duryea

by Townsend & Bras
their attys

UNITED STATES PATENT OFFICE.

MORRIS C. WHITE AND OTHO C. DURYEY, OF LOS ANGELES, CALIFORNIA,
ASSIGNORS TO NATIONAL FREE PISTON ENGINE COMPANY, (LIMITED),
OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

VAPORIZER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 760,673, dated May 24, 1904.

Application filed June 17, 1902. Serial No. 112,101. (No model.)

To all whom it may concern:

Be it known that we, MORRIS C. WHITE and OTHO C. DURYEY, citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Vaporizer for Explosive-Engines or the Like, of which the following is a specification.

Our invention relates to means for mixing a fluid with air and converting the mixture into a vapor suitable for use in an explosive-engine.

One object of our invention is to provide means whereby the vaporizing is accomplished and freely supplied to the engine in such a manner that there is no appreciable drag given to the piston during its suction-stroke.

Other objects—such as simplicity of construction, effectiveness of operation, and other desirable advantages—will be hereinafter fully brought out in the following specification.

Referring to the drawings, Figure I is a vertical sectional view of the complete device. Fig. II is a detail of detached portions of the device. Fig. III is a detail.

1 is a supply-reservoir for holding a substantially definite amount of fluid, such as gasoline or other explosive mixture, and may preferably be substantially cylindrical in form, as shown. The reservoir is provided with a fluid-inlet passage 2 at its upper end. The passage 2 may preferably terminate in a conical valve-seat 3.

4 is a float, preferably cylindrical and of a slightly less diameter than the internal diameter of the reservoir 1. The float is movable vertically in the chamber and may be held concentric with the chamber by means of ribs 5, which project from the inner wall of the reservoir and extend longitudinally thereof. Six ribs are preferably employed, spaced equally apart. The space between the float and the wall of the reservoir permits of a free circulation of the fluid. A valve 6, preferably conical in form, projects from the center of the upper portion of the float and is adapted to close the passage 2 when moved against the seat 3.

7 is a pipe screwed into the upper wall of the reservoir and is provided with a vent 8, so that air may escape from the reservoir as fluid flows in. The dotted line indicates approximately the fluid-level which is maintained in the reservoir. As fluid passes from the reservoir the float falls and the valve 6 moves away from its seat and allows more fluid to flow into the reservoir. When the fluid in the tank has again reached the level indicated by the dotted lines, the float is raised and the valve 6 is seated and the supply cut off. A substantially uniform amount of gasoline is thus maintained in the reservoir automatically.

The reservoir may be provided with a removable bottom 9, whereby access may be had to the interior when desired.

10 is the vaporizing-chamber, which is preferably cylindrical in form and attached to one side of the reservoir, extending longitudinally thereof. The vaporizing-chamber may preferably be formed integral with the reservoir.

11 is a pipe which extends from the upper end of the vaporizing-chamber to the engine (not shown) and may be attached to the vaporizing-chamber by means of a screw-coupling 12.

13 is a spreader in the form of a double cone, which lies in the center of the vaporizing-chamber and is supported by an arm 14, which extends from the wall of the vaporizing-chamber. The spreader is provided externally with a series of horizontal annular parallel ribs 15.

16 is a passage for fluid which extends from the reservoir centrally through the arm 14 and through the spreader 13 and terminates in an orifice or conical valve-seat 17, formed in the upper portion of the spreader. The upper end of the spreader 13 is slightly below the level of the fluid which is maintained in the reservoir, so that the fluid may flow through the passage 16 and over the upper edge of the spreader.

18 is a screen formed, preferably, of a fine wire-gauze and in the form of a double cone. The screen 18 is positioned directly under the

spreader 13, the apex of the upper cone of the screen being adjacent to and directly under the apex of the lower cone of the spreader, there being a clear space between the nearest

5 points of the spreader and the screen, said screen occupying the entire plan area of the vaporizing-chamber. The screen may be fastened in the vaporizing-chamber by soldering at the joint 19.

10 One advantage of making the screen in the form of a cone is to increase the area of space through which air may enter, so that little, if any, vacuum will be formed in the vaporizing-chamber during the suction-stroke of the engine. The large passage area also allows the

15 fluid which comes in contact with the cone to spread out and thoroughly mingle with the entering air. By making the screen in the form of a double cone particles of fluid which may drip from the spreader are arrested and held until picked up by the entering air. 20 is a valve having a stem 21 which extends through supports or bars 22 and 23. The bar 22 is preferably formed integral with

25 the vaporizing-chamber, the bar 23 being preferably formed integral with the pipe 11. The valve 20 normally rests upon the valve-seat 17 and closes the passage 16, preventing fluid from flowing out onto the spreader. The valve-stem 21 is allowed a slight longitudinal

30 movement, the limit of which may be regulated by an adjusting-screw 24, which may have a knurled head 25. 26 is a knurled lock-nut.

35 Extending radially from the valve-stem 21 is a series of suitably-inclined vanes 27. Ten vanes may preferably be employed, spaced equally apart.

40 28 is a collar forming an abutment rigidly mounted on the valve-stem 21. 29 is a shaft pivoted in the vaporizing-chamber and provided with a U-shaped bend, which lies slightly below the collar 28. The outer end of the shaft 29 is provided with a finger-lever 30.

45 The pipe 11 is contracted at its discharge end and is sufficiently large to permit the free passage of the mixture, consisting of air which has entered through the screen 18 and the vaporized fluid which has entered through the spreader.

50 The operation of the device is as follows: During the suction-stroke of the piston air is drawn in the direction of the arrow through the screen 18 by the spreader 13 and between the inclined vanes 27, which causes the valve-stem 21 to be quickly lifted. Fluid then flows over the edge of the spreader 17 and over the ribs 15. As the fluid trickles over the ribs 15 it is spread out in a thin film and is picked up by the inrushing air as it passes by the spreader and formed into a spray or vapor and drawn through the pipe 11 into the explosion-chamber of the engine. As the mixture is

65 drawn by the vanes 27 a rapid rotation is given

to the valve-stem 21 in the direction of the arrow. When the suction-stroke ceases, the inertia of the valve and vanes causes them to continue rotating in the direction of the arrow. This inertial movement rapidly propels the valve 20 against the seat 17 and shuts off the flow of fluid. The whirling inertial movement of the inclined vanes 27 when the suction ceases causes a more rapid and effective closing of the passage 16, owing to the screw action of the vanes, than would be accomplished were the valve-stem and parts to act by gravity only. As the mixture is drawn between the vanes the latter act to spread and diffuse the particles of fluid through the air, and thus effectively promote the vaporizing of the fluid, and an even diffusion and distribution of the component particles of the vapor in the mixture are secured. If some of the fluid forms in masses or clots too heavy to be picked up from the spreader by the inrushing air, this fluid will continue its movement down the spreader over the ribs 15, meanwhile breaking up into smaller particles, which finally drop off onto the upper cone of the screen 18, where it spreads out and is picked up from the screen by the next inrush of air. Fluid that is not taken off directly from the upper portion of the screen 18 percolates through the upper cone of the screen and works down onto the lower cone of the screen, where it is eventually picked up by the inrushing air.

When it is desired to start the vaporizer into action, the finger-lever 30 may be moved into the position shown in dotted lines in Fig. II. This movement of the finger-lever causes the U-shaped part of the shaft to bear against the collar 28, and thereby raise the valve-stem and valve into the position shown in dotted lines. Fluid is then allowed to flow out and form a film over the spreader ready to be picked up by the inrushing current of air, which commences with the suction-stroke of the engine.

By adjusting the screw 24 the longitudinal movement of the valve 20 may be limited to any desired throw. After the device is in operation the action of the valve is automatic. The wires of the screen 18 restrict the passage of air somewhat, and the area of the upper end of the pipe 11 is contracted to give a passage of a size which will allow the resulting mixture to pass freely. It will be seen that the size of the vaporizing-chamber is such that the air and vapor is allowed to freely pass therethrough, so that there is little or no dragging effect given to the piston during its suction-stroke.

It is obvious that many changes may be made in the herein-described embodiment of our invention without evading the scope of the claims.

What we claim, and desire to secure by Letters Patent of the United States, is—

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1. A vaporizing-chamber, a double conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, means for conveying fluid to said passage, a valve for said orifice, a conical screen below said spreader having its apex adjacent thereto. 5
2. A vaporizing-chamber, a double conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, means for conveying fluid to said passage, a valve for said orifice, a valve-stem carrying said valve, an inclined vane projecting radially from said valve-stem, and a conical screen below said spreader having its apex adjacent thereto. 10 15
3. A vaporizing-chamber, a double conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, substantially horizontal ribs on the exterior of said spreader, means for conveying fluid to said passage, a valve for said orifice, and a conical screen below said spreader having its apex adjacent thereto. 20 25
4. A vaporizing-chamber, a double conical spreader in said chamber, said spreader having an interior passage with an orifice on the upper portion of the spreader, annular parallel ribs on the spreader, a valve for said orifice, a valve-stem carrying said valve, and a conical screw below said spreader having its apex adjacent thereto, said stem provided with means for moving the valve. 30 35
5. A vaporizing-chamber, a spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, annular parallel ribs on the exterior of said spreader, means for conveying fluid to said passage, a valve for said orifice, inclined vanes carried by said valve, and a conical screen in said chamber, the apex of said screen being adjacent the lower portion of said spreader. 40 45
6. A vaporizing-chamber, a spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, means for conveying fluid to said passage, a valve for said orifice, a stem carrying said valve, an inclined vane projecting radially from said valve-stem, and a conical screen in said chamber, the apex of said screen being adjacent the lower portion of said spreader. 50 55
7. A vaporizing-chamber, a spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, annular parallel ribs on the exterior of said spreader, means for conveying fluid to said passage, a valve for said orifice, a stem carrying said valve, an inclined vane projecting radially from said valve-stem, and a conical screen in said chamber, the apex of said screen being adjacent the lower portion of said spreader. 60 65
8. A cylindrical vaporizing-chamber, a double, conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, means for conveying fluid to said passage, a valve for said orifice, a stem carrying said valve, an inclined vane projecting radially from said valve-stem, and a double conical screen in said chamber, one of the apexes of said screen being adjacent the spreader. 70 75
9. A cylindrical vaporizing-chamber, a double, conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, annular parallel ribs on the exterior of said spreader, means for conveying fluid to said passage, a valve for said orifice, a stem carrying said valve, an inclined vane projecting radially from said valve-stem, and a double conical screen in said chamber, one of the apexes of said screen being adjacent the spreader. 80 85
10. A cylindrical vaporizing-chamber, a double conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, means for conveying fluid to the spreader, a valve for said orifice, a stem carrying said valve, an inclined vane projecting radially from said valve-stem and lying transversely of the chamber, a double conical screen in said chamber below said spreader, and means for manually moving said valve. 90 95
11. A cylindrical vaporizing-chamber, a double conical spreader in said chamber, said spreader having an interior passage with an orifice in the upper portion of the spreader, means for conveying fluid to the spreader, a conical valve for said orifice, an inclined vane projecting radially from said valve-stem, a conical screen in said chamber below said spreader, a shoulder on said valve-stem, a rod mounted in said chamber and having an abutment adapted to engage with said shoulder, and a finger-lever exterior of the chamber and connected to said rod. 100 105 110
12. A reservoir, means for maintaining a substantially even amount of fluid in said reservoir, a vaporizing-chamber having an air-inlet and a fluid-inlet, a conical spreader having external annular ribs in said chamber, said spreader forming the walls of said fluid-inlet, a valve for said spreader, a valve-stem carrying said valve and mounted in suitable supports, a series of inclined vanes projecting radially from said valve-stem and above the fluid and air inlets, a double conical screen in said vaporizing-chamber closing said air-inlet, means for regulating the movement of said valve, and means for manually moving said valve. 115 120 125
13. A reservoir, a vaporizing-chamber having an air-inlet, a double conical spreader in said vaporizing-chamber, said spreader having a fluid-passage which communicates with 130

the reservoir and opens at the top of said spreader, a valve for closing the opening in said spreader, means connected to said valve for rotating the valve and propelling it in a longitudinal direction.

14. A reservoir, a vaporizing-chamber having an air-inlet, a double conical spreader in said vaporizing-chamber, said spreader having a fluid-passage which communicates with the reservoir and opens at the top of said spreader, a valve for closing the opening in said spreader, means connected to said valve for rotating the valve and propelling it in a lon-

gitudinal direction, and a wire-gauze screen below said spreader in the form of a double cone and between the air-inlet and the spreader. 15

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, at Los Angeles, California, this 12th day of June, 1902. 20

MORRIS C. WHITE.
 OTHO C. DURYEA.

Witnesses:

GEORGE T. HACKLEY,
 F. M. TOWNSEND.

Correction in Letters Patent No. 760,673.

It is hereby certified that in Letters Patent No. 760,673, granted May 24, 1904, upon the application of Morris C. White and Otho C. Duryea, of Los Angeles, California, for an improvement in "Vaporizers for Explosive Engines," an error appears in the printed specification requiring correction, as follows: In line 32, page 3, the word "screw," should read *screen*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of June, A. D., 1904.

[SEAL.]

E. B. MOORE,
Acting Commissioner of Patents.

the reservoir and opens at the top of said spreader, a valve for closing the opening in said spreader, means connected to said valve for rotating the valve and propelling it in a longitudinal direction.

14. A reservoir, a vaporizing-chamber having an air-inlet, a double conical spreader in said vaporizing-chamber, said spreader having a fluid-passage which communicates with the reservoir and opens at the top of said spreader, a valve for closing the opening in said spreader, means connected to said valve for rotating the valve and propelling it in a lon-

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