

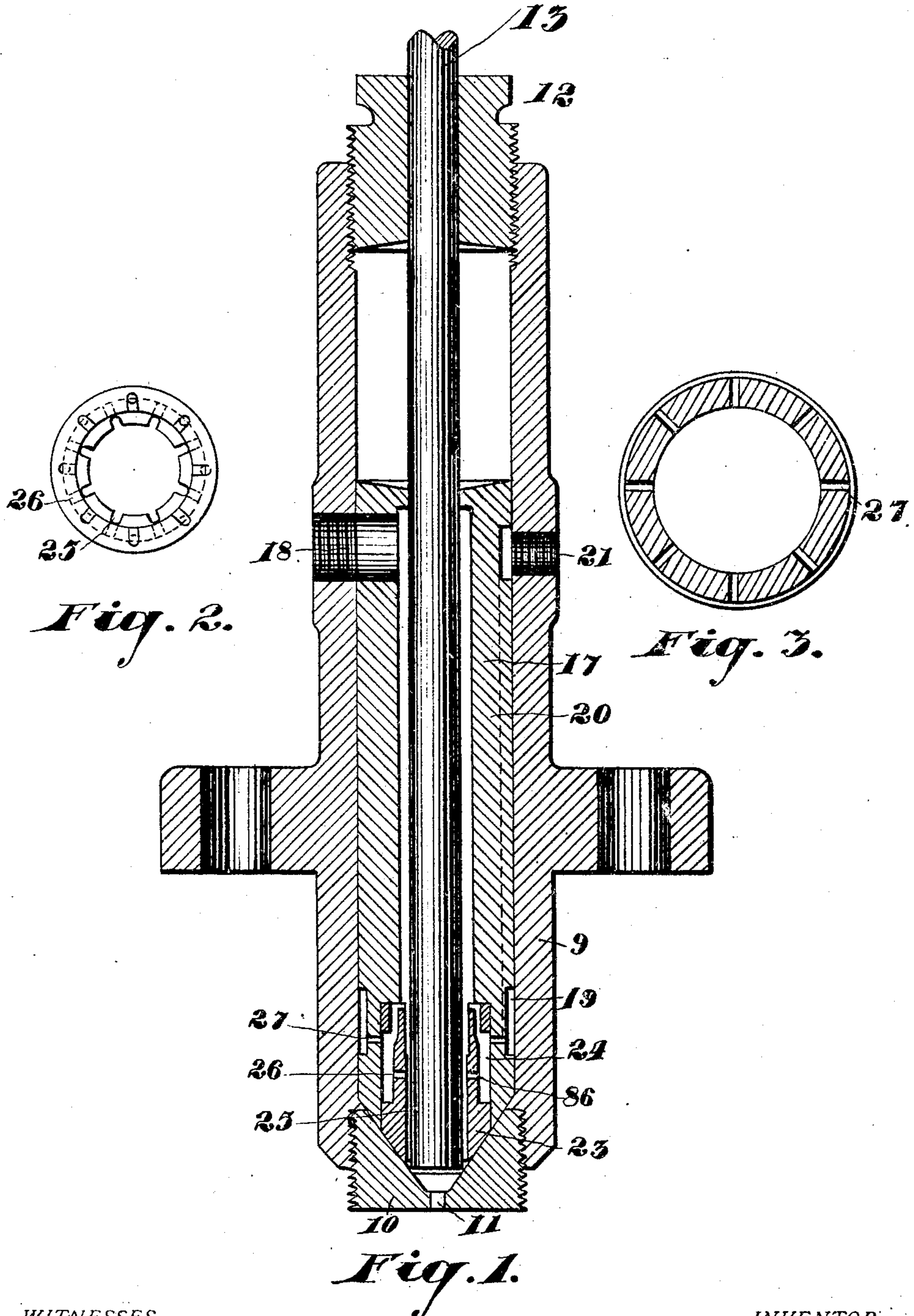
No. 886,513.

PATENTED MAY 5, 1908.

H. A. JOHNSTON.

FUEL SPRAYER FOR INTERNAL COMBUSTION MOTORS.

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WITNESSES:
J. M. Kendrick
J. M. Biddifield

INVENTOR:
Howard A. Johnston
BY *Ridout & Gaybee*
ATTORNEY.

UNITED STATES PATENT OFFICE.

HOWARD A. JOHNSTON, OF TORONTO, ONTARIO, CANADA.

FUEL-SPRAYER FOR INTERNAL-COMBUSTION MOTORS.

No. 886,513.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed April 22, 1907. Serial No. 369,522.

To all whom it may concern:

Be it known that I, HOWARD A. JOHNSTON, of the city of Toronto, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Fuel-Sprayers for Internal-Combustion Motors, of which the following is a specification.

My object is to improve the fuel spraying means of an internal combustion motor in which liquid fuel is injected at the end of the compression stroke.

Heretofore the most satisfactory sprayer has depended for the breaking up of the fuel upon forcing it together with the air through apertures in a series of disks. In the present invention I obtain a much more perfect action by directing the liquid fuel into the path of a series of jets of compressed air, and by subsequently taking the mixture of atomized oil and air and bringing it into the path of a further series of jets of compressed air, resulting in a very complete breaking up of the liquid fuel into fine spray.

Figure 1 is a vertical section through my improved sprayer. Fig. 2 is a plan view of part of the sprayer showing the passageways therein. Fig. 3 is a sectional view of the inner shell of the sprayer showing the oil passages therein.

In the drawings like letters of reference indicate corresponding parts in the different figures.

The sprayer is provided with a cylindrical outer casing 9, which is closed at its lower end by the screw plug 10, through which is formed the spray outlet 11. The upper end of the casing is closed by the screw plug 12, through which passes the fuel valve 13, which is adapted to close the spray outlet 11, as indicated. When this valve is opened, a free outlet is provided from the casing to the interior of the combustion chamber of the engine with which the spraying device may be employed. The valve may be controlled in any desired manner. Within the casing of the sprayer is closely fitted an inner casing 17, bored out internally to a greater diameter than the fuel valve.

An opening 18 is formed through the inner and outer casings for connection with any pipe which may be employed to convey compressed air to the sprayer. Towards the lower end of the inner casing 17 an annular passage 19 is cut in its external surface. A groove 20 is cut longitudinally in the outer surface of the casing extending up from the

passage 19. With this groove communicates an aperture 21 formed in the outer casing of the sprayer for communication with an oil supply pipe.

The lower end of the inner casing 17 is counterbored and a plug 23 inserted therein. It will be noted that the lower ends of the inner casing and the plug are coned to fit closely in the coned upper end of the plug 10. Longitudinally in the plug 23 are formed the air passages 24. These passages communicate at their lower ends with the annular space or chamber 86, but at their upper ends communicate with the space between the inner casing and the fuel valve. In the inner casing are bored a series of passages 27 which form a communication between the annular passages 19 and 86 at the lower ends of the air passages 24 at an angle to the latter. At the inner side of the plug 23, preferably between it and the fuel valve, are formed a second series of longitudinal air passages 25. Between each of these latter passages and the annular space 86 is formed a passage 26, said passages being forward of the point of communication of the passages 27 with the space 86. By forward I mean relative to the direction of movement of the air and oil through the sprayer.

The operation of the device is as follows:— When the valve 13 is opened oil flows down through the groove 20 into the annular passage 19, thence it flows through the passages 27 and meets the separate blasts of air passing through the air passages 24. This breaks up the oil into fine particles and the mingled air and oil pass down through the space 86 and thence through the passages 26 to meet the air passing down the second air passages 25. The oil having thus been twice brought under the atomizing action of the air currents, passing substantially at right angles to the direction of the oil, it is very finely and evenly atomized, and as all the air passages 25 discharge into the common spray outlet 11 a perfectly evenly atomized jet of liquid fuel is produced.

I find in practice that this sprayer is exceedingly reliable and certain in its action, and is not at all liable to be choked or clogged in any way.

What I claim as my invention is:—

1. In an internal combustion motor a spraying device for fuel, comprising a casing having an air chamber formed therein, a plurality of passages for air, leading from said

chamber; an oil chamber; and a plurality of passages for fuel, leading from said oil chamber and each opening into one of the air passages at an angle thereto, substantially as described.

2. In an internal combustion motor a spraying device for fuel, comprising a casing having an air chamber formed therein, a plurality of passages for air, leading from said chamber; an oil chamber; and a plurality of passages for fuel, leading from said oil chamber and each opening into one of the air passages at an angle thereto, and a common outlet for all the passages, substantially as described.

3. In an internal combustion motor a spraying device for fuel, comprising a casing having a plurality of passages formed therein for air, and a plurality of passages for fuel, each opening into one of the air passages at an angle thereto; a common outlet for all the passages; and a common inlet for all the air passages and a common inlet for all the fuel passages, substantially as described.

4. In an internal combustion motor a spraying device for fuel, comprising a casing

having a plurality of longitudinal passages formed therein for air, a plurality of passages for fuel, each opening across one of the air passages; a chamber receiving the atomized fuel; a second set of longitudinal air passages; and a plurality of passages each connecting one of these latter air passages with the said chamber, substantially as described.

5. In an internal combustion motor a spraying device for fuel, comprising a casing having a plurality of longitudinal passages formed therein for air, a plurality of passages for fuel, each opening across one of the air passages; a chamber receiving the atomized fuel; a second set of longitudinal air passages; a plurality of passages each connecting one of these latter air passages with the said chamber; and a common inlet for all the air passages and a common inlet for all the fuel passages, substantially as described.

Toronto, Ont., 1st April, 1907.

HOWARD A. JOHNSTON.

Signed in the presence of—

J. EDW. MAYBEE,

F. W. McKENDRICK.