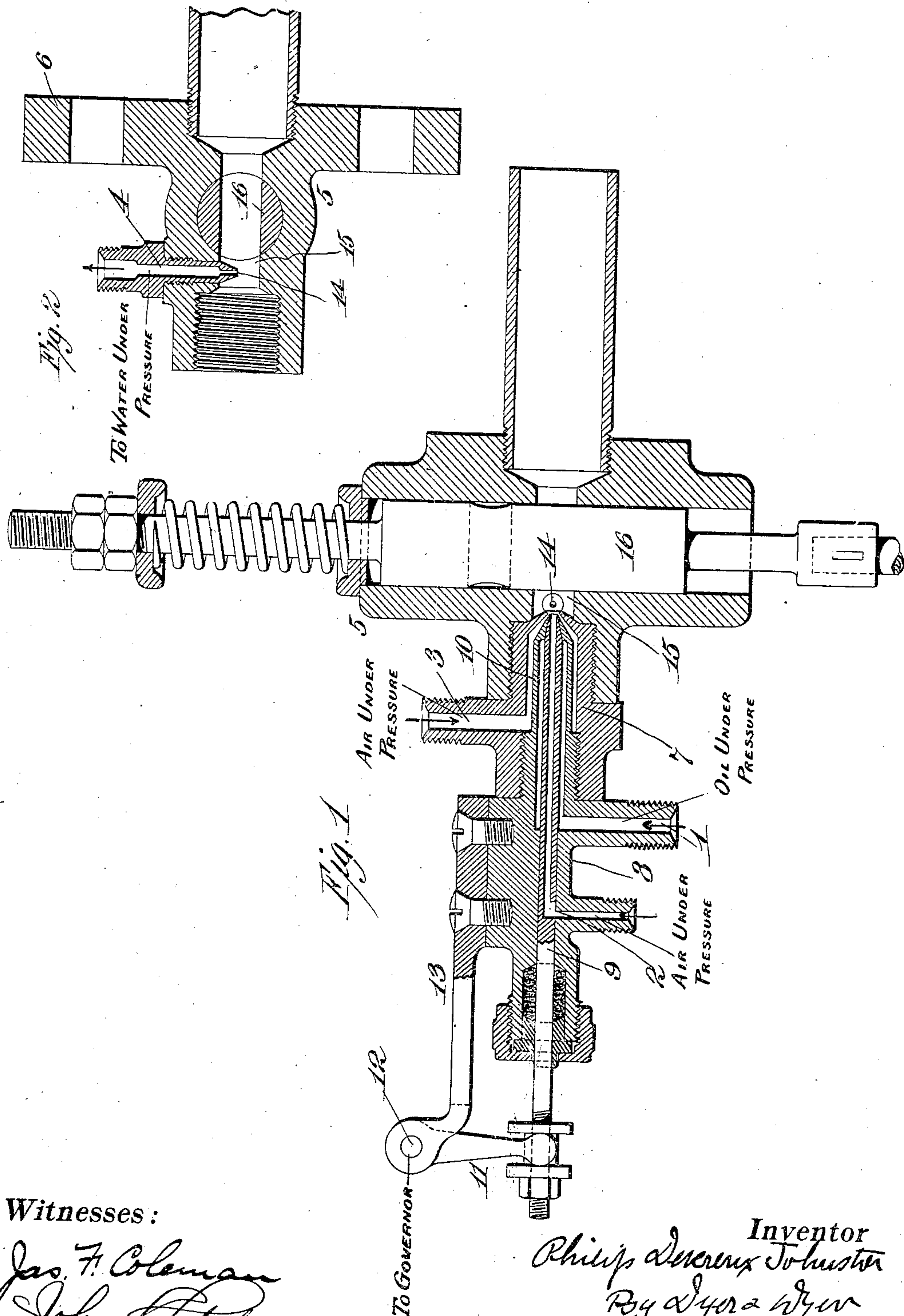


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VAPORIZER FOR INTERNAL COMBUSTION ENGINES.
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943,684.

Patented Dec. 21, 1909.



Witnesses:

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UNITED STATES PATENT OFFICE.

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VAPORIZER FOR INTERNAL-COMBUSTION ENGINES.

943,684.

Specification of Letters Patent.

Patented Dec. 21, 1909.

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To all whom it may concern:

Be it known that I, PHILIP DEVEREUX JOHNSTON, a citizen of the United States, residing in Cold Spring, county of Putnam, and State of New York, have invented a certain Invention in Vaporizers for Internal-Combustion Engines.

The objects of this invention are, the production of a device for vaporizing and atomizing heavy oils, or a mixture of heavy oils and water, in connection with internal combustion engines, in which the oil will be more completely vaporized and more intimately mixed with the water and air than has heretofore been possible.

The invention also relates to improvements in details of construction as will more fully appear from the following specification.

I attain the objects of my invention by the mechanism illustrated in the accompanying drawings, in which Figure 1 is a longitudinal sectional view of a vaporizer embodying my invention, and Fig. 2 is a horizontal sectional view of a portion of same.

In both views like parts are designated by the same reference characters.

In carrying out my invention I provide means for injecting oil and air in concentric streams, the oil preferably surrounded by an annular stream of air, with a stream of air within the center of the stream of oil. The angles at which the several streams are discharged are such that the oil is thoroughly broken up between the two streams of air. This broken up oil mixed with air is then met by a stream of water at an angle, whereby the mixture of oil, air and water is rendered complete.

In the drawings, the character 1 represents the oil passage. Within this passage is an air passage 2, and surrounding it a second air passage 3. The passage for the water is indicated at 4, and is shown at right angles to the other passages, although the angle may vary, as is obvious.

The structural means of carrying out the invention, is shown as consisting of a body 5, having a flange 6, which may be bolted to the combustion chamber. This body has a threaded opening in which a tubular body 7 is inserted. This tubular body carries the air passage 3. The tubular body 7 has an extension 8, containing the oil passage 1. A

spindle 9 which carries a portion of the air passage 2, slides within the extension 8. The rest of the air passage is in the form of a nipple which extends out at an angle to the extension 8. The inner end of the spindle 9 is beveled as shown, and closely engages with the beveled opening formed within the projection 10 of the extension 8, such projection lying within the hollow portion of the tubular body 7. The end of this extension 10 is beveled as shown, and the corresponding end of the hollow of the body 7 is beveled also, but at a different angle, the space between the two forming an annular tapering passage. By moving the spindle 9 outward an opening will be disclosed between it and the inner surface of the projection 10, through which the stream of oil from the passage 1, may be injected. The size of this opening may be varied by moving the spindle 9 outward or inward. The spindle 9 is preferably moved by means of a lever 11, carried upon a shaft 12 which is properly connected to a source of governing. This shaft 12 is shown as mounted in a bearing on a support 13, which is screwed to the extension 8.

The passage 4, for the water, ends in a nozzle 14, which is shown at right angles to the other nozzle already described. This nozzle 14 is beyond the other nozzles, and preferably extends about half way into a mixing passage 15, which communicates with the interior of the combustion chamber. A slide valve 16, is interposed in the mixing passage 15 so as to close the same at the proper time, during the explosion stroke of the engine.

The operation is as follows:—Air under constant pressure is admitted through the passages 2 and 3, oil and water are pumped through the passages 1 and 14 by pumps which are timed to inject a quantity of oil and water at the proper interval during the operating cycle of the engine. The valve 16 being open, and the back pressure within the combustion chamber sufficiently low, a stream of air will be driven in through the passage 2, in the form of a solid pencil and a second stream of air will be driven through the passage 3, and will be formed in the shape of an annular stream and discharged through the passage formed by the inner walls of the center of the tubular body 7

and the beveled end of the projection 10. The opening between the spindle 9 and the projection 10, being sufficient, owing to the position of the rod 9, caused by the operation of the governor, the oil will be driven in by the oil pump, and also partly by the injector-like action of the air. It will be noted that owing to the shape of the stream of air through the passage 3, and the stream of air through the passage 2, the oil will be thoroughly broken up and mixed with the air. At the same time the mixture of air and oil will meet the stream of water issuing from the nozzle 14, which stream of water will strike the opposite wall of the passage 15 and be deflected back into the passage in the form of fine spray, thoroughly mixing with the air and oil.

The richness of the mixture will be affected through the movement of the shaft 12, and rod 9, the position of the rod determining the amount of oil driven in to the combustion chamber.

It will be seen that the air in the center of the spindle 9 intimately breaks up the oil which is driven and drawn in in the form of an annular stream which striking the side walls of the passage 15 is there mixed with the stream of water. The balance of the air through the passage 3 will strike at a different angle the mixture of oil and air already formed and will further break it up. At this place it will be understood it is met by the stream of water which preferably moves at high velocity and is of high pressure, which striking the opposite wall of the

passage 15 will be there finally divided and thoroughly mixed with the oil and air.

Having now described my invention, what I claim is:

1. A vaporizer having an oil passage, and an air passage outside of it and an air passage inside of it, with a mixing chamber into which the said passages enter, the said chamber having a passage for water entering it at an angle to the other passages.

2. A vaporizer having an oil passage, and an air passage outside of it, and an air passage inside of it, with a mixing chamber into which the said passages enter, the said chamber having a passage for water entering it at right angles to the other passages.

3. A vaporizer having means for introducing oil into a closed chamber, means for introducing air, the said latter means including a hollow spindle, means controlled by the sliding of the spindle for varying the amount of oil introduced, and means for introducing water into the chamber at an angle to the air.

4. A vaporizer having an oil passage, and an air passage outside of it, and an air passage inside of it, in combination with means for injecting water at an angle into the issuing jets of air and oil.

This specification signed and witnessed this 3rd day of July, 1906.

PHILIP DEVEREUX JOHNSTON.

Witnesses:

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