H. A. RAITZ.

AIR AND GAS MIXING VALVE.

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1,043,970.

Patented Nov. 12, 1912.

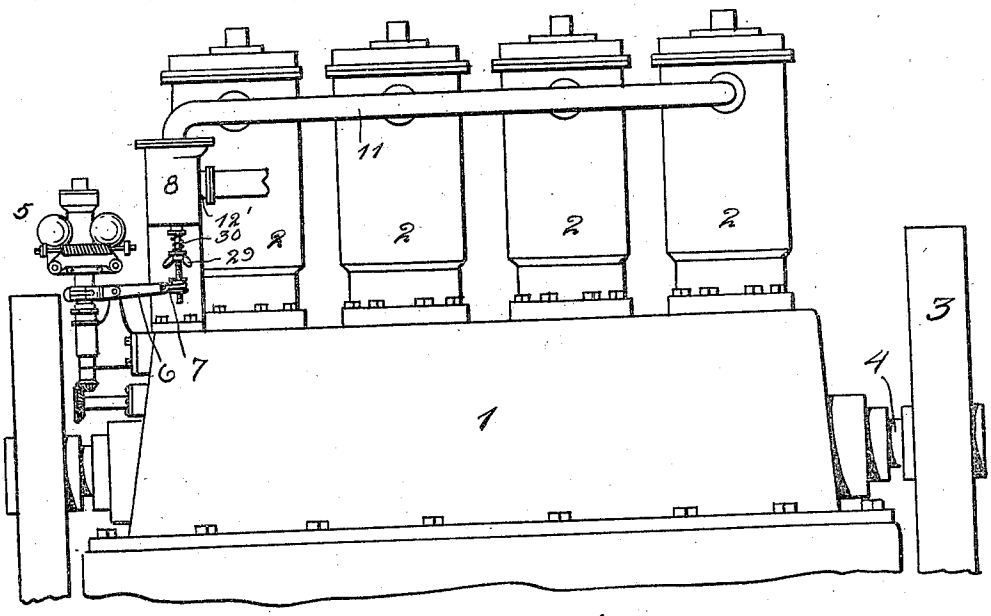

Fig. 1.

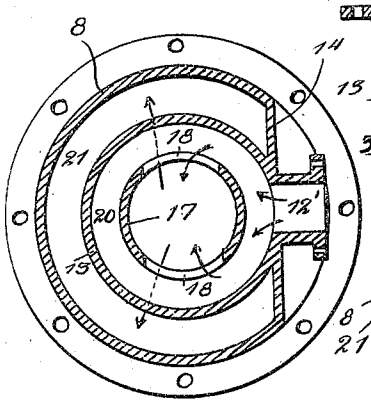

Fig. 5.

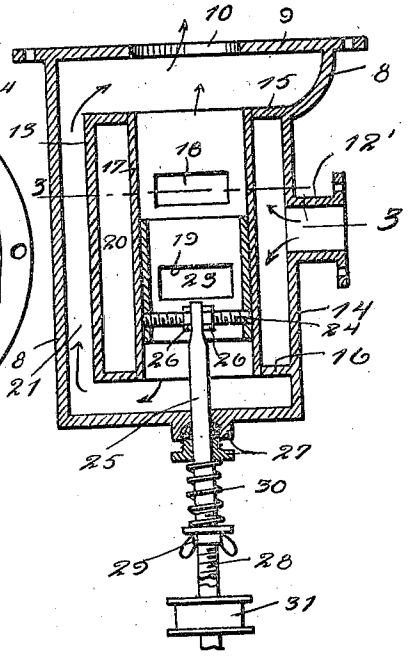

Fig. 2.

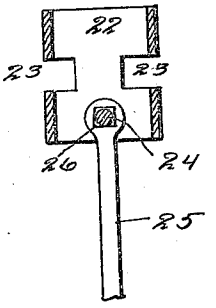

Fig. 4.

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AIR AND GAS MIXING VALVE.

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To all whom it may concern:

Be it known that I, HENRY A. RAITZ, a citizen of the United States, residing at Groton, in the county of Brown and State of South Dakota, have invented certain new and useful Improvements in Air and Gas Mixing Valves, of which the following is a specification.

The present invention relates to an air and gas mixing valve adapted to be automatically operated by a centrifugal governor for supplying the proper amounts of the air and gas to the engine cylinder, in accordance with the changes of load on the engine.

An important object of this invention is to provide a device of the above mentioned character, which will cause a thorough mixing of the air and gas and will operate easily, being free from undue friction caused by the gases impinging upon the elements thereof.

A further object of my invention is to provide a device of the above mentioned character, which is simple in construction, reliable in operation, and cheap to manufacture.

Other objects and advantages of this invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a side elevation of an explosion engine equipped with my combined gas and air mixing valve, Fig. 2 is an enlarged central longitudinal sectional view through the combined gas and air mixing valve, Fig. 3 is a horizontal sectional view taken on line 3—3 of Fig. 2, and, Fig. 4 is a sectional view through the movable valve, the same being removed from its casing.

In the drawings wherein is illustrated a preferred embodiment of my invention, the numeral 1 designates the crank-case of an explosive engine, 2 the explosion cylinders mounted thereon, and 3 the fly-wheel carried by a crank-shaft 4.

The numeral 5 designates a centrifugal governor of any well known or preferred type having suitable gearing with the crank-shaft 4, to be driven synchronously therewith. The centrifugal governor 5 operates a pivoted lever 6, having an outer forked end 7. When the speed of the engine increases, the centrifugal governor will operate the pivoted lever 6 to cause the forked end 7 to swing upwardly.

The gas and air mixing valve comprises an outer shell or casing 8, which may be rigidly attached to the engine, preferably near the centrifugal governor by any suitable means, as shown. The upper end of the shell or casing 8 is closed by a head 9, having an opening 10 for receiving the intake end of a pipe or manifold 11. This pipe or manifold 11 has communication with the interior of the explosion cylinders, as is customary.

Disposed within the outer casing or shell 8 and preferably in concentric relation thereto is an intermediate upstanding preferably cylindrical shell 13 being provided upon one side thereof and substantially midway its ends with an intake nipple 12′, to be connected with an air and gas supply pipe, having in turn connection with a carbureter (not shown). The shell 13 is rigidly connected with one side 14 of the outer shell or casing 8 and preferably cast integral therewith. The intermediate shell 13 is provided at its upper and lower ends with horizontal annular flanges 15 and 16, respectively, within which is rigidly mounted a tubular sleeve or shell 17, having both ends formed entirely open. The sleeve 17 is provided with upper and lower pairs of substantially diametrically arranged inlet openings or ports 18 and 19, which are disposed above and below the intake nipple 12′ and are at substantially right angles thereto. It is thus seen that there is a substantially annular space 20 formed between the shell 13 and the sleeve 17 and an approximately annular space 21 between the outer shell 8 and the intermediate shell 13. The opening of the nipple 12′ discharges into the space 20, as shown.

Mounted to reciprocate within the tubular sleeve or shell 17 is a tubular valve 22, having both ends formed entirely open and provided midway its ends with inlet openings 23, adapted for movement into and out of registration with the lower inlet openings 19 of the shell 17. In Fig. 2 the valve 22 is shown in its lowermost position whereby inlet openings 18 are entirely uncovered and inlet openings 23 are in registration with the openings 19, to supply the maximum amount of air and gas to the pipe 11. It is seen that when valve 22 is moved upwardly the open-

ings 18 and 19 will be gradually and finally completely closed.

Extending diametrically through the lower end of the tubular valve 22 and rigidly connected therewith is a pin 24, externally screw-threaded, as shown. This pin extends through the apertured head of a valve rod 25 and is provided with clamping nuts 26 to lock said head against accidental displacement. The valve rod 25 extends through a stuffing box 27 and has its lower portion externally screw-threaded, as shown at 28, for receiving an adjustable thumb-nut 29, engaging a compressible coil spring 30, which is confined between the same and the stuffing box 27. Rigidly connected with the lower end of the valve stem 25 is a grooved roller 31, engaged by the forked end 7 of the pivoted lever 6.

The operation of the device is as follows: Assuming that the engine is under maximum load, the valve 22 will be at its lowermost position, whereby the air and gas supplied through the nipple 12′ will pass into space 20 and into the shell 17 through openings 18 and 19. Part of the air and gas travels upwardly through the shell 17 and part downwardly and then upwardly through the space 21. The air and gas finally discharge into the pipe 11 from which they are fed into the explosion cylinders 2. As the load is taken off of the engine and it speeds up the centrifugal governor 5 will swing the forked end 7 of the governor upwardly, whereby the valve 22 will partially close the openings 18 and 19 for cutting down the supply of air and gas. The openings 18 and 19 are not entirely closed until the valve 22 has moved to its uppermost position.

I wish it understood that the form of my invention herewith shown and described is to be taken as a preferred example of the same and that certain changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:—

A device of the character described, comprising an outermost closed shell having a gas inlet between its ends and a gas outlet at its upper end, a stationary intermediate casing disposed in the outermost shell in spaced relation from the side and end walls thereof, said stationary intermediate casing being provided at its upper and lower ends with inwardly extending approximately annular flanges, an inner tubular shell having its upper and lower ends both entirely open, said tubular inner shell forming with the stationary intermediate casing an intermediate chamber having both ends closed, said inner tubular shell being provided with diametrically arranged pairs of openings disposed near the open upper and lower ends of the inner tubular shell, a tubular valve having both ends entirely open and disposed to reciprocate in the inner tubular shell, a stem to move the tubular valve, and a centrifugal governor to operate the stem.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY A. RAITZ.

Witnesses:
J. D. JONES,
L. D. JAMES.