A. E. SALWAY.

VALVE AND VALVE GEAR OF INTERNAL COMBUSTION ENGINES.

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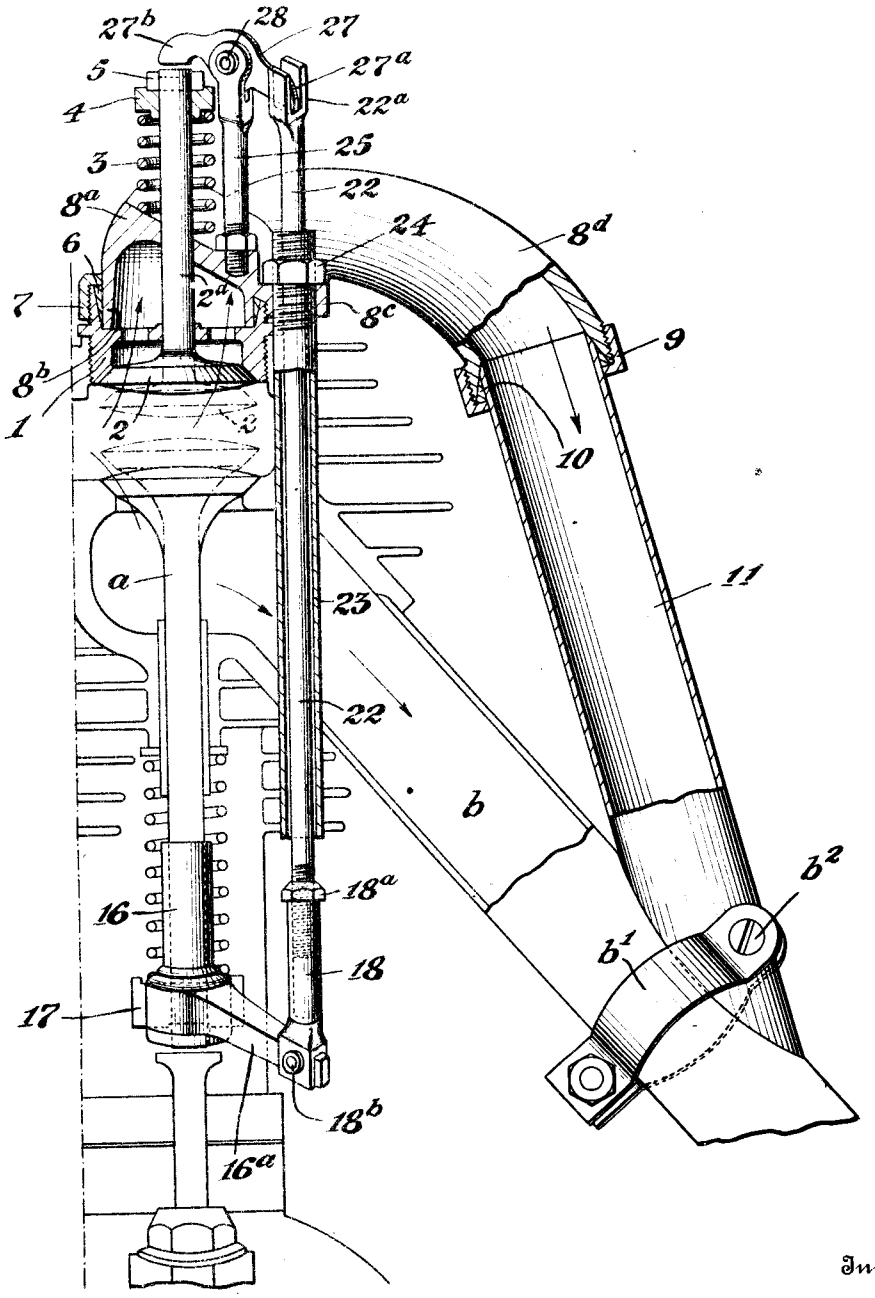

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VALVE AND VALVE-GEAR OF INTERNAL-COMBUSTION ENGINES.

1,118,686. Specification of Letters Patent. Patented Nov. 24, 1914.

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To all whom it may concern:

Be it known that I, ALBERT E. SALWAY, a subject of the King of Great Britain, and a resident of Taibach, Port Talbot, Glamorganshire, Wales, have invented certain new and useful Improvements in Valves and Valve-Gear of Internal-Combustion Engines, of which the following is a specification.

This invention relates to valves and valve gear for internal combustion engines of the type wherein two exhaust valves are employed on one cylinder, said valves co-acting with the objects, among others, of obtaining quicker release of the exhaust gases, cooler engine, higher engine speed and more power.

According to the present invention these desirable results are obtained by means of auxiliary exhaust devices adapted to be fitted to any existing and already constructed four stroke internal combustion engine with side by side valves, without alterations, one or two valves being placed in a cylinder, one in place of the inlet valve cap, and the other in place of the exhaust valve cap, the valves being operated from the engine's existing exhaust valve spindle, or the engine's exhaust valve tappet and therefore not interfering with the valve timing gear.

The invention is illustrated by the accompanying drawing as applied to a single cylinder.

In carrying the invention into effect, the usual cap which is screwed over the exhaust valve is removed as are also the collar and cotter of the engines exhaust valve spindle.

A long collar 16 with an extending arm 16^a is now secured by means of a cotter 17 to the lower end of the exhaust valve spindle *a* and the auxiliary exhaust valve 2 of the same size as that of the existing exhaust valve placed in its position in the valve seating 1 which is now screwed into the opening left by the removal of the beforementioned cap, a copper or asbestos washer being inserted between its flange and the cylinder head to effect a gas-tight joint.

The dome locking nut 7 is then placed over the lower part 8^b of the valve dome 8^a with a split locking ring 6 shaped to fit the valve seating interposed therebetween and the dome passed over the valve spindle 2^a and positioned in the valve ring and the locking nut 7 screwed on said ring locking the dome to said valve seating. 3 is the valve spring held between the dome 8^a and collar 4 by the cotter 5. In the arm or extension 8^c of the dome is screwed the top end of tappet rod guide 23, the same being locked in position by nut 24, and through said guide is passed the tappet rod 22, the same at its lower end being adjustably screwed into the tappet rod sleeve 18 and locked there by nut 18^a, said sleeve 18 at its lower end being forked to take therebetween the end of the arm 16^a of the collar 16, said arm 16^a being secured to said fork by bolt and nut or equivalent devices 18^b.

The upper end of the tappet rod 22 is provided with a fork 22^a into which takes and bears one end 27^a of the rocker 27 pivotally mounted in any suitable manner at 28 to the rocker carrier 25, the same being screwed into the dome top and locked thereto by nut, while the other arm 27^b of the rocker 27 is adapted to bear on the center of the auxiliary valve stem 2^a, a play of one-sixteenth of an inch being allowed to said arm 27^b.

The auxiliary exhaust pipe 11 is beveled so as to fit on the usual exhaust pipe-band and is held thereto by clip b^1 and screws b^2 screwing into the metal of said auxiliary exhaust pipe 11, the upper end of which is locked to the extension 8^d of the valve dome 8^a by means of split ring 10 and locking nut 9 which screws on to the end of the extension 8^d.

From an inspection of the drawing it will be readily understood that as the valve *a* rises so is the auxiliary valve 2 depressed an amount corresponding to the rise of the valve *a*, such depression being effected by the intermediary of the arm 16, tappet 22 and rocker 27, and, as the areas of valves *a* and 2 are equal, there obtains an exhaust of double capacity, part passing by way of exhaust pipe *b* and part by way of the auxiliary exhaust 11.

The auxiliary exhaust valve can be applied to any number of cylinders an engine may have, fitting one to each cylinder, and where in cases such as twin cylinders the exhaust gases pass away in opposite directions the valve domes are duplicated; all

other parts do for either front or back cylinders.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent of the United States of America, is:—

1. In a valve mechanism of the character described, a hollow body provided with spaced ports, valves for the body ports, one of the valves having a stem carrying an outwardly projecting arm, and means operable by the arm for effecting movement of the other of said valves.

2. In a valve mechanism of the character described, a body provided with spaced ports, a valve for each port, a rocker lever supported for moving one valve, and an adjustable connection between the other of said valves and the rocker lever for imparting motion to the latter on movement of the last specified valve.

3. In a valve mechanism of the character described, a body provided with spaced ports, a valve for each port, spring means normally retaining the valves closed, an outwardly extending arm on the stem of one valve, a rocker lever supported for opening the other valve, and a connection between the arm and lever for effecting movement of the latter on operation of the first specified valve.

4. In a valve mechanism of the character described, a body provided with spaced ports, a valve for each port, spring means normally retaining the valves closed, an outwardly extending arm on the stem of one valve, a rocker lever supported for opening the other valve, being normally free thereof, and an adjustable connection between the arm and lever for effecting movement of the latter on operation of the first specified valve.

5. In a valve mechanism of the character described, a body having spaced ports, valves for the ports mounted for opposing movement, an outwardly extending arm on the stem of one valve, a rocker lever supported for opening the other valve, a sleeve guide supported by the body, and a connection arranged in the guide and between the arm and lever for transmitting motion to the latter on opening the first specified valve.

6. In a mechanism of the character described, a body provided with spaced ports, valves for said ports, means normally free from one valve and operable by the other valve for engaging the first valve for effecting simultaneous movement of said valves, and means for operating the second named valve.

7. In a mechanism of the character described, a body provided with spaced ports, valves for said ports, means operable by one valve for operating the other valve, said means being normally free from the second named valve and adjustable relatively to the latter, and means for operating the first named valve.

Signed at Cardiff, Wales, this 10th day of November, 1913.

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