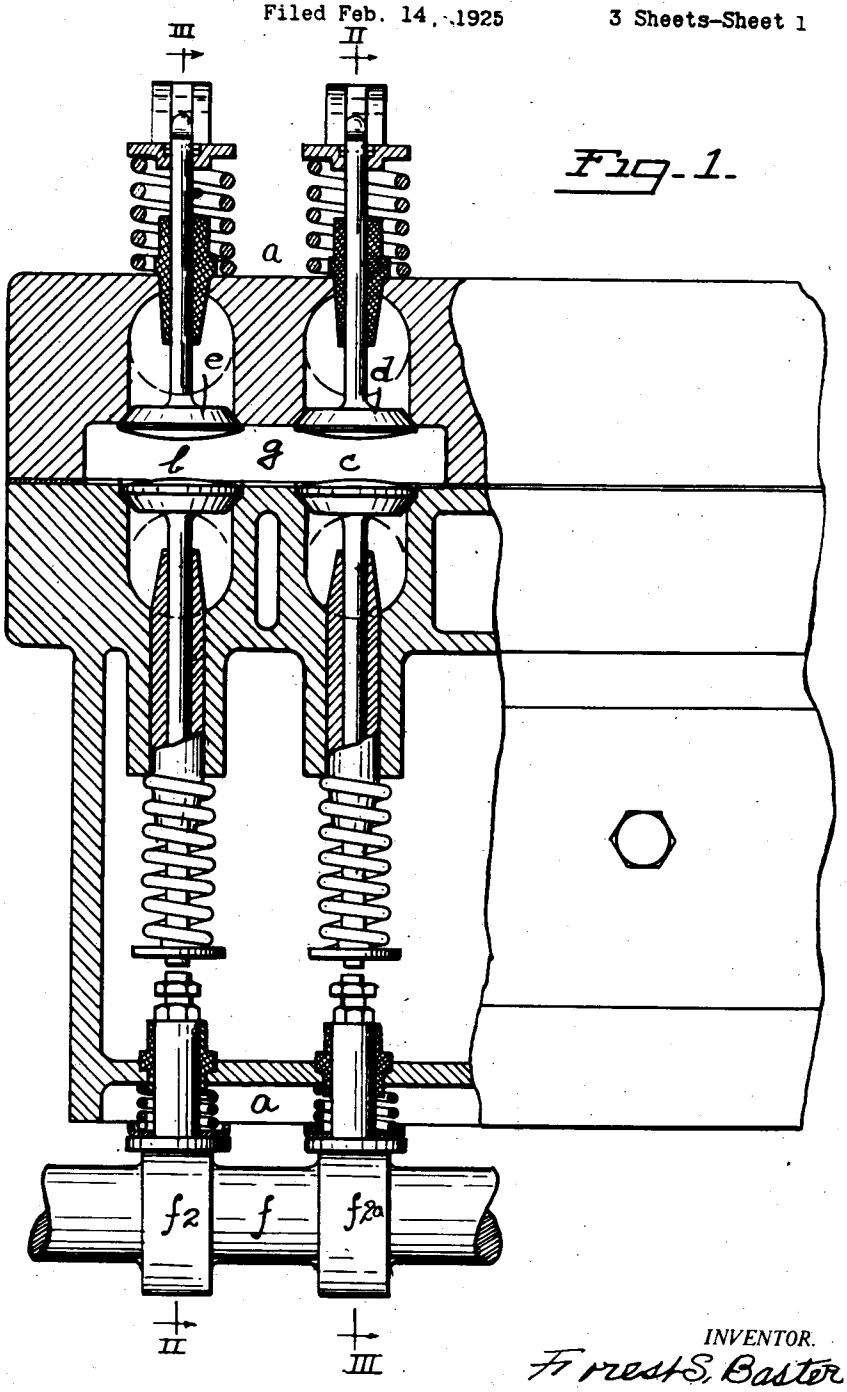
Jan. 18, 1927. 1,614,709

F. S. BASTER

VALVE GEARING FOR INTERNAL COMBUSTION ENGINES

Filed Feb. 14, 1925 3 Sheets-Sheet 1

Fig. 1.

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VALVE GEARING FOR INTERNAL COMBUSTION ENGINES

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Fig. 2

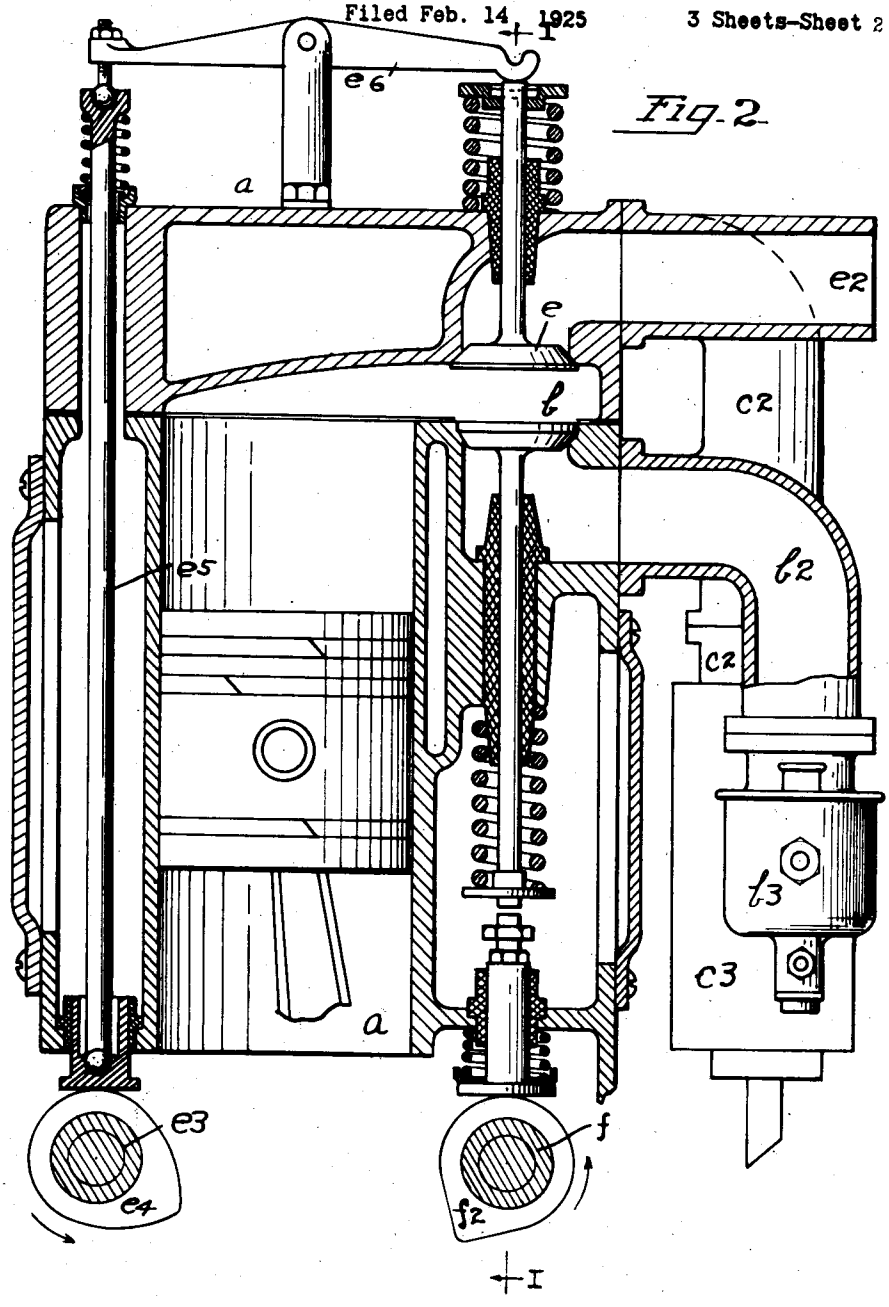


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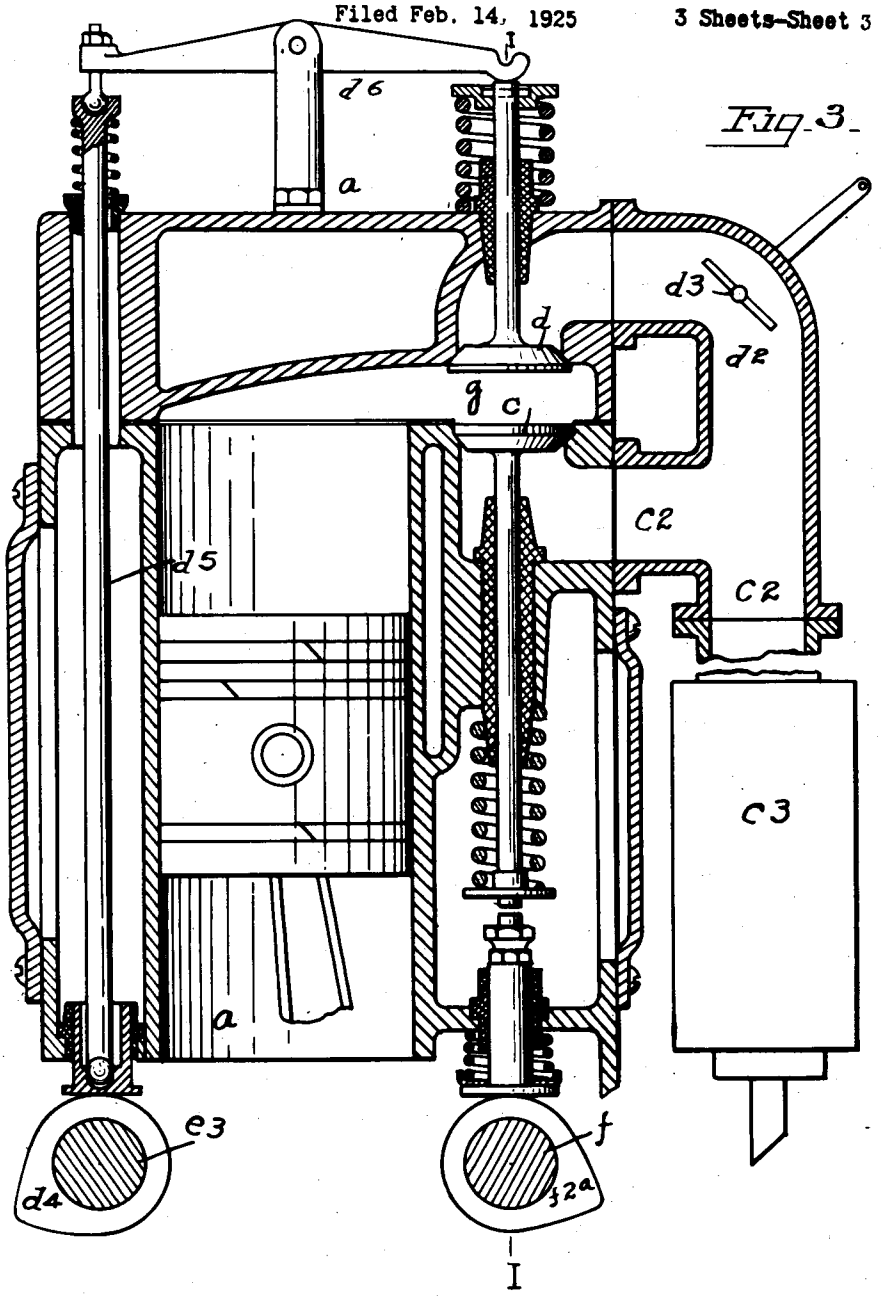
Fig. 3.

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Patented Jan. 18, 1927. 1,614,709

# UNITED STATES PATENT OFFICE.

FOREST S. BASTER, OF DETROIT, MICHIGAN,

## VALVE GEARING FOR INTERNAL-COMBUSTION ENGINES.

Application filed February 14, 1925. Serial No. 9,095.

My invention relates to valve gearing for internal combustion engines and objects of my improvements are to secure greater economy of fuel and greater volumetric efficiency in this type of engine.

I secure these objects in the way and by the means illustrated in the accompanying drawings and hereinafter described.

Figure 1 is a section through the ports and adjacent portions of an internal combustion engine, the section being taken on the lines I—I, (Figs. 2 and 3), looking in the directions of the arrow.

Figure 2 is a section on the line II—II, Fig. 1;

Figure 3 is a section on the line III—III, Figure 1.

*a* indicates the cylinder generally. *b* is the intake and *c* the exhaust valve. I preferably construct these valves as shown and described by me in an application pending concurrently herewith and having the Serial Number 746,936, in which the ports are opened sharply after the valves leave their seats. *d* is an auxiliary intake valve and *e* is an auxiliary exhaust valve.

$c^2$, (Fig. 3), is the exhaust passage leading from the port of the valve *c* to and through the muffler $c^3$. The auxiliary intake valve *d* communicates by a passage $d^2$ with the passage $c^2$. $d^3$ is a valve by which the passage $d^2$ may be closed or opened.

The port of the valve *e* communicates with the exterior air preferably by an open and unobstructed passage $e^2$.

The valves *b* and *c* are actuated by cams $f^2$, $f^{2a}$ on the cam shaft *f* in any proper way, and the auxiliary valves *d* and *e* are actuated in any ordinary way by a cam shaft $e^3$ and cams $d^4$, $e^4$, on said cam shaft.

For convenience, I have shown an L-head cylinder, the intake and exhaust valves being actuated by the usual valve mechanism in this kind of construction, and I have shown the usual overhead valve mechanism for actuating the auxiliary valves *d* and *e*, which for convenience are shown in the L-compartment of the cylinder. Conventional actuating mechanism, $e^3$, $d^4$, $d^5$, $d^6$, $e^4$, $e^5$, $e^6$, is shown for the overhead valves.

The operation of the above described mechanism is as follows:—

The charge being in the cylinder and compressed is ignited and expands on the working stroke. The valve *c* is then opened, permitting the charge to escape under considerable pressure through the passage $c^2$ and muffler $c^3$. Toward the end of the exhaust stroke the main exhaust valve *c* closes and the auxiliary exhaust valve *e* opens. The main inlet valve *b* then opens and the auxiliary exhaust valve *e* closes; then the main inlet valve *b* closes and the auxiliary inlet valve *d* opens, permitting the vacuum in the cylinder to be filled from the exhaust passage $c^2$, in which the gases are still under some pressure in the passages $d^2$, $c^2$. The auxiliary inlet valve *d* then closes and compression again takes place and the cycle is repeated.

What I claim is:—

1. In an internal combustion engine, the combination of a main inlet valve, an exhaust valve and an auxiliary intake valve, the port of said auxiliary intake valve communicating with the passage from the port of said exhaust valve and means for opening said auxiliary intake valve at the closing of the main intake valve.

2. In an internal combustion engine, the combination of a main inlet valve, an exhaust valve and an auxiliary intake valve opening to an exhaust passage with a muffler therein, the port of said intake valve communicating with the passage from the port of said exhaust valve between said exhaust valve and the muffler and means for opening said auxiliary intake valve at the closing of the main intake valve.

3. In an internal combustion engine, the combination of a main inlet valve, an exhaust valve and an auxiliary intake valve, the port of said auxiliary intake valve communicating with the passage from the port of said exhaust valve, means for opening said auxiliary intake valve at the closing of the main intake valve, and a throttle valve in the passage communicating with said auxiliary intake valve and the exhaust passage.

4. In an internal combustion engine, the

combination of a main inlet valve, an exhaust valve opening to an exhaust passage with a muffler therein and an auxiliary intake valve, the port of said intake valve communicating with the passage from the port of said exhaust valve between said exhaust valve and the muffler, means for opening said auxiliary intake valve at the closing of the main intake valve, and a throttle valve in the passage communicating with said auxiliary intake valve and the exhaust passage.

In testimony whereof, I sign this specification.

FOREST S. BASTER.