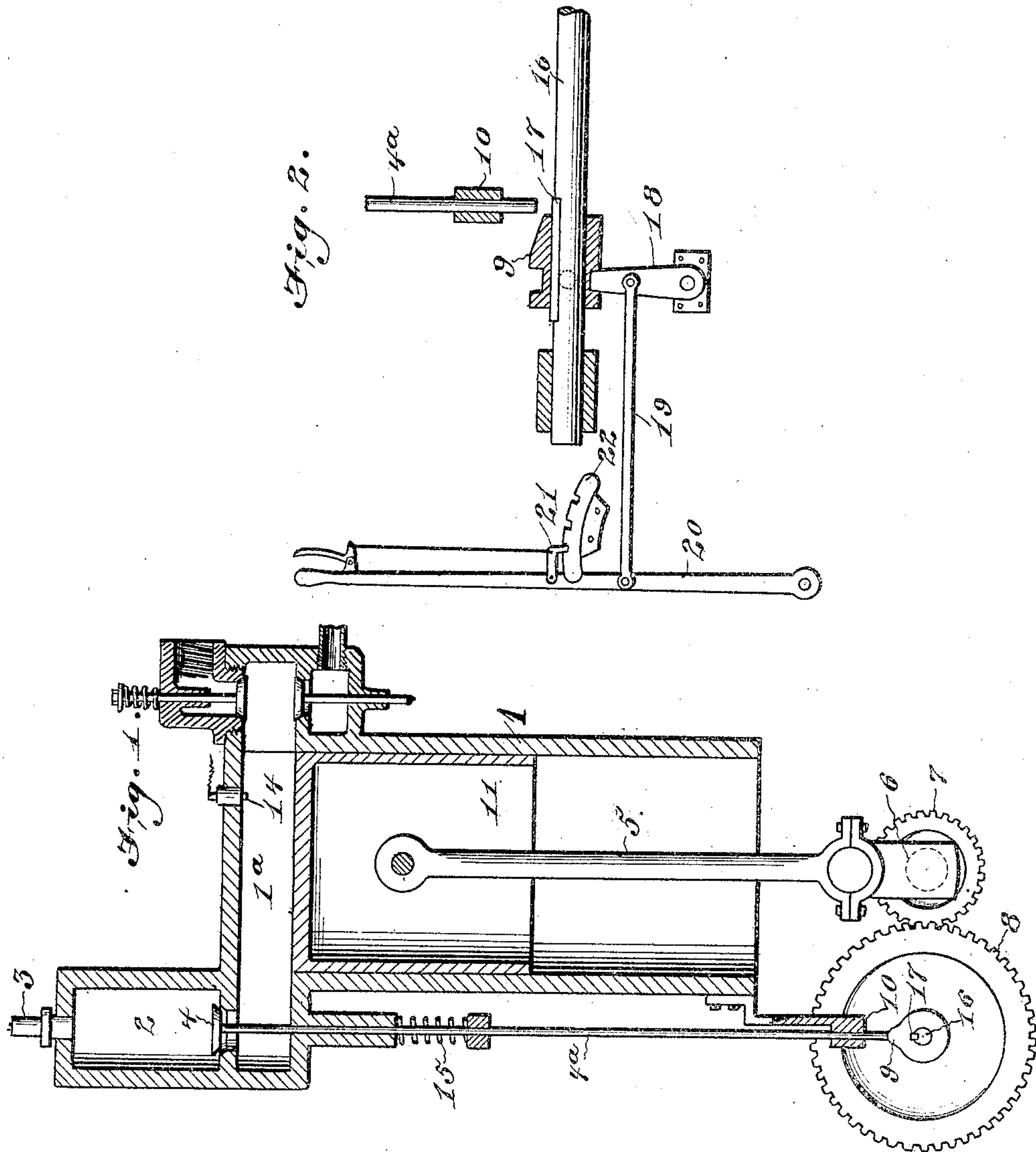


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F. A. SHARPNECK.
GAS ENGINE.

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Inventor

Franc A. Sharpneck.

Witnesses

M. Schmidt

Geo. E. Tew.

By

Wm. B. Swinerton.

Attorney

UNITED STATES PATENT OFFICE.

FRANK A. SHARPNECK, OF CHICAGO, ILLINOIS, ASSIGNOR OF THREE-FOURTHS TO EUGENE HOWARD MOORE, OF CHICAGO, ILLINOIS.

GAS-ENGINE.

No. 887,703.

Specification of Letters Patent. - Patented May 12, 1908.

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To all whom it may concern:

Be it known that I, FRANK A. SHARPNECK, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Gas-Engines, of which the following is a specification.

This invention relates to internal combustion engines, and has for its object to increase the power of the engine by increasing the compression pressure at the time of explosion. This is done by means of a supplemental or reserve compression chamber in which high or explosion pressure is maintained during the operation of the engine.

In the accompanying drawings, the invention is illustrated in connection with a four cycle engine, Figure 1 being a vertical section through the cylinder and said chamber. Fig. 2 is a sectional elevation illustrating mechanism for throwing the device constituting the invention in or out of action.

Referring specifically to the drawings, 1 indicates the cylinder casting and 2 the reserve or auxiliary compression chamber. These are connected by the usual combustion or compression chamber 1^a and a puppet valve at 4. The compression chamber has a relief valve 3 which may be set at any desired pressure. The valve 4 is operated by a stem 4^a having around the same a coiled spring 15 which normally closes the valve.

The piston is indicated at 11, the main connecting rod at 5, the crank shaft at 6, the small gear of the two-to-one gearing at 7 and the large gear at 8, the latter being carried upon a way shaft 16 which also carries a cam 9 which operates the valve stem 4^a. Said stem is guided by a bracket 10. The engine is of course provided with the usual inlet and exhaust valves, not shown.

The cam 9 is splined upon a way shaft 16, as indicated at 17, and is movable back and forth on said shaft, to be thrown in or out of operation, by a yoke 18 connected by a rod 19 to a hand lever 20, the latch 21 of which engages in a segment 22.

Assuming that the cam 9 is thrown into action under the valve stem 4^a, the operation is as follows: As the piston starts down on the suction stroke the vapor is drawn in through the usual intake valve, and as the piston starts back the intake valve closes and the charge is compressed in the usual manner. When the crank has nearly reached

the center the cam 9 lifts the valve 4, allowing the compression to equalize in both the combustion chamber 1^a and the auxiliary chamber 2. The charge is now ignited by the spark plug 14 and begins to drive the piston down, immediately following which the cam 9 runs from under the stem 4^a and allows the valve 4 to seat, thereby trapping substantially the explosion pressure in the chamber 2. The power is of course transmitted to the piston during the downward stroke, at the expiration of which the usual exhaust valve is opened and the dead gas is forced out by the up stroke of the piston. Successive revolutions cause a repetition of the operation described, and it will be understood that with each successive revolution the pressure in the tank 2 is raised until the limit is reached at which point the relief valve 3, previously set at any required pressure, opens and allows the excess to escape. Inasmuch as the valve 4 opens just before the ignition the compression of the charge is increased from the ordinary compression pressure to substantially the explosion pressure, thereby creating greater force when the charge is exploded. The effect is to cause an exceedingly high compression pressure, before the explosion.

For the purpose of cutting the device out of action and thereby allowing the engine to pick up quickly without having to run until a high pressure is accumulated in the auxiliary chamber, the device as shown in Fig. 2 may be operated. Thus, when the lever is thrown back as shown in the drawing the cam 9 is pulled out from under the valve stem 4^a and so does not operate, but it is thrown into operation by moving the lever forward to the last notch. An intermediate notch is shown for the purpose of varying or modifying the action of the above described devices by bringing a lower point of the cam 9 into action, said cam having an incline parallel to the axis of the way shaft, as clearly shown in Fig. 2.

I claim:

1. In an internal combustion engine, in combination, a cylinder, a pressure storage chamber connected thereto, a normally closed valve controlling the connection, means to open the valve during the ending of the compression period and the beginning of the expansion period, and means to throw said means out of action.

2. In a four cycle engine, in combination, a cylinder, a pressure storage chamber connected thereto, a normally closed valve controlling the connection, and means actuated
5 by the crank shaft and including two-to-one gearing to open the valve during the ending of the compression period and the beginning of the expansion period.

3. In a four cycle engine, in combination,
10 a cylinder, a pressure storage chamber connected thereto, a normally closed valve controlling the connection, a way shaft having two-to-one gearing to the crank shaft, a cam on the way shaft, and means operated by the
15 cam to open the valve, the cam being shaped to open the same during the ending of the compression period and the beginning of the expansion period.

4. In a four cycle engine, in combination,
20 a cylinder, a pressure storage chamber connected thereto, a normally closed valve controlling the connection, a way shaft having two-to-one gearing to the crank shaft, a cam on the way shaft, and means operated by the

cam to open the valve, the cam being shaped to open the same during the ending of the compression period and the beginning of the expansion period, and to allow the same to remain closed during the remainder of said periods, and means to govern the action of
30 the cam.

5. In an internal combustion engine, in combination, a cylinder having a pressure storage chamber connected thereto, means
35 to trap in said chamber exploded gases under pressure from the cylinder at the time of an explosion and retain the same during successive strokes of the engine, and means to admit said trapped compressed gases to the cylinder just prior to the following explo-
40 sion.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK A. SHARPNECK.

Witnesses:

NELLIE FELTSKOG,
H. G. BATCHELOR.