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GAS ENGINE EXHAUST MECHANISM.

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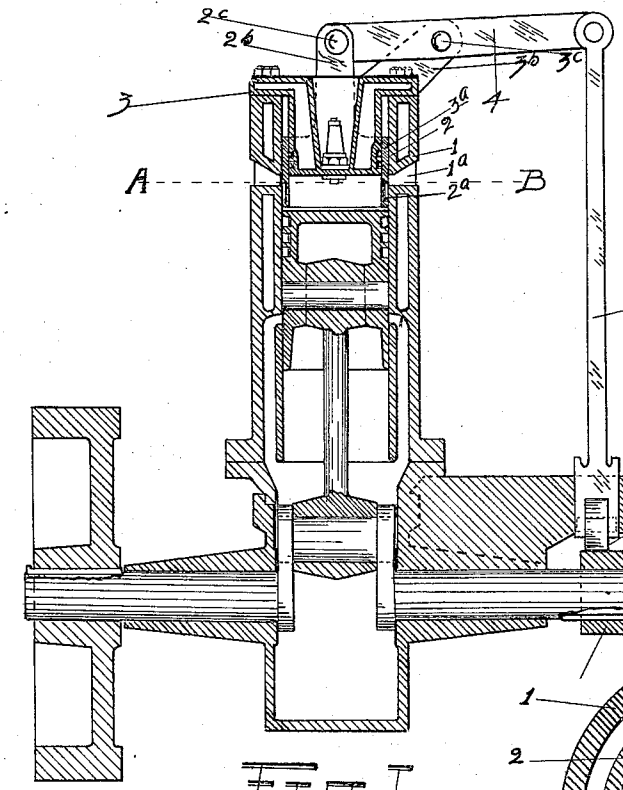


Fig. 1

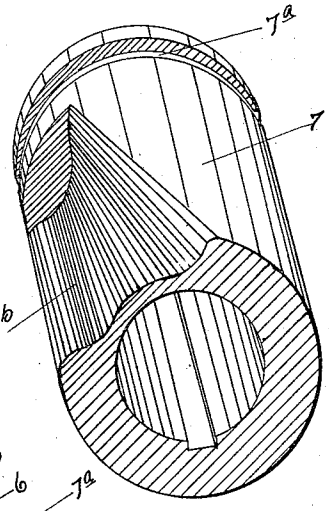


Fig. 4

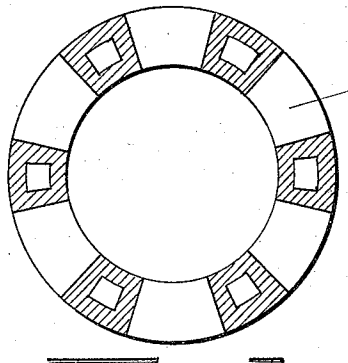


Fig. 3

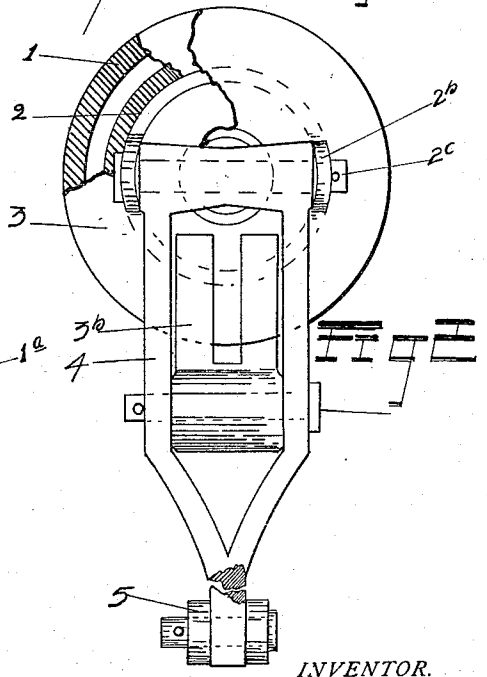


Fig. 2

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GAS-ENGINE EXHAUST MECHANISM.

1,149,831. Specification of Letters Patent. Patented Aug. 10, 1915.

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To all whom it may concern:

Be it known that I, WILLIAM H. HUNT, a citizen of the United States, and a resident of National City, in the county of San Diego and State of California, have invented certain new and useful Improvements in Gas-Engine Exhaust Mechanism, of which the following is a specification.

My invention relates to exhaust mechanism for internal combustion engine, wherein a sleeve is reciprocated on the inner surface of the cylinder for opening and closing the exhaust ports of two-cycle engines, and the objects of my invention are, first, to provide an exhaust mechanism for two-cycle gas engines that will provide a quick and free exit to the burned gases, and that will be independent of the piston; second, to provide such a mechanism that will be quick in operation, and third, to provide such a mechanism that is very efficient and simple of construction and installation.

With these and other objects in view as will hereinafter appear, my invention consists of certain novel features of construction, combination and arrangement of parts as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this specification, in which:

Figure 1 is a vertical sectional view of a two-cycle engine with the ordinary compression type crank case in which the piston opens the ports between the crank case and cylinder close to the lower end of the piston's travel, showing my sleeve mechanism and actuating means in connection therewith, Fig. 2 is a top view of the cylinder head and my valve actuating levers showing a portion of the cylinder head broken away to facilitate the illustration, Fig. 3 is a sectional view through A—B of Fig. 1, showing the exhaust ports and Fig. 4 is a perspective view of my valve actuating cam.

Similar characters of reference refer to similar parts throughout the several views.

The cylinder 1, sleeve 2, cylinder head 3, lever 4, connecting rod 5, roller 6, and actuating cam 7, constitute the principal parts of my device.

The engine cylinder 1, is provided near the head end with a plurality of ports in a row around said cylinder, as shown best in Figs. 1 and 3. These ports are the exhaust ports. On the inner surface of said cylinder is provided the sleeve 2, which reciprocates therein and operates as a valve for opening and closing said ports and fits closely the inner surface of the cylinder 1. It is provided in its outer surface with an expansion ring 2^a adapted to make a tight joint between the inner surface of the cylinder 1 and the outer surface of the sleeve 2. The cylinder head is shaped as shown best in Fig. 1, a portion extending into the cylinder leaving a space between the extending portion and the cylinder for the sleeve 2 to reciprocate in. In its surface which engages with the sleeve is provided expansion rings 3^a adapted to make a tight joint between the inner surface of said sleeve and the contacting surface of the cylinder head. The sleeve 2 is provided with oppositely disposed lugs 2^b, preferably integral therewith which extend some distance above the outer surface of the cylinder head. Between these two lugs is pivotally mounted a double lever 4 by means of pin 2^c. This lever is pivotally mounted on a lug 3^b on the cylinder head preferably integral therewith by means of a pin 3^c. At the end of lever 4 is pivotally mounted connecting rod 5, which extends toward the main shaft of the engine near which it is guided by means of a lug 1^b, provided with a slot adapted for the lower end of said rod on the crank case of the engine and it is provided in its lower surface with a roller 6 revolubly mounted therein.

Upon the main shaft of the engine is shiftably mounted a cam 7 adapted to engage with the roller 6 in the connecting rod 5. This cam 7 is shaped as shown best in Fig. 4 and is provided with a groove 7^a around the outer surface near one end adapted for any ordinary shifting lever connection. This cam is also provided with a groove 7^b longitudinally therein. This groove on one side is straight and parallel with the shaft upon which it is mounted while on its other side it gradually broadens toward one end as shown best in Fig. 4, so that if the cam is in a certain position the time that the roller 6 remains in the groove is longer than it would be at the opposite end or at any point between the two ends, so that the length of time that the valve remains open may be readily regulated by the longitudinal position of the cam 7 on the shaft. This cam is provided with a key 7^c adapted to hold it in certain torsional re-

lation with the main shaft, but allows it to be shifted longitudinally. The cam is shown on the main shaft for simplicity, but for a multiple cylinder engine the cams would have to be on a separate shaft and turned by gears or a silent chain, not shown in the drawings.

Though I have shown and described a particular construction and arrangement of parts, I do not wish to be limited to this particular construction and arrangement, but desire to include in the purview of my invention, the construction and arrangement substantially as set forth in the appended claims.

It will be readily seen that with this construction there is provided an exhaust mechanism for two-cycle gas engines which is simple of construction, durable, easily installed and easily operated; that the length of time that the exhaust port is open may be readily regulated by the operator, thus adding to the efficiency of the engine, that the exhaust port may be opened and closed quickly, or may be opened and held open until the burnt gas of the previous charge has been expelled from the cylinder; that the weight of the rod 5 and roller 6, together with the pressure in the cylinder, will cause the roller 6 to drop into the groove in the cam when in the proper relative position.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an exhaust mechanism for two-cycle gas engines the combination with a crank case and a two-cycle cylinder provided with exhaust ports in its head end and with intake ports near its other end connecting with the crank case, of a portless short reciprocatory sleeve mounted therein of the same external diameter as the piston for opening and closing said exhaust ports.

2. In a two-cycle gas engine exhaust mechanism the combination with a crank case and a two-cycle cylinder provided with exhaust ports in the head end thereof and intake ports near its opposite end connecting with the crank case, of a plain portless reciprocatory sleeve on the inner surface of said engine cylinder of the same external diameter as the internal diameter of said cylinder adapted to reciprocate in said cylinder and close and open the exhaust ports only of said engine.

3. In an exhaust mechanism for two-cycle gas engines the combination with a crank case and a two-cycle cylinder provided with exhaust ports near its head end and the intake ports near its other end connecting with the crank case, of a portless short plain reciprocatory sleeve of the same external diameter as the piston provided with oppositely disposed lugs thereon extending out through the cylinder head of said engine for opening and closing said exhaust ports.

4. In a two-cycle gas engine exhaust mechanism the combination with a crank case and a two-cycle cylinder provided with exhaust ports near its head end and intake ports near its other end connecting with the crank case, of a short portless plain reciprocatory sleeve of the same external diameter as the piston provided with oppositely disposed lugs thereon mounted on the inner surface of said engine cylinder adapted to reciprocate therein and close and open the exhaust ports only of said engine cylinder.

5. In a two-cycle gas engine exhaust mechanism the combination with a crank case and a two-cycle gas engine cylinder provided with a plurality of exhaust ports near the head end thereof extending through the walls thereof and with intake ports near its other end connecting wtih the crank case, of a short portless plain reciprocatory sleeve of the same diameter as the internal diameter of said cylinder mounted therein, adapted to reciprocate past said exhaust ports only of said engine cylinder for opening and closing the same.

In testimony whereof, I have hereunto subscribed my name in the presence of two subscribing witnesses.

WILLIAM H. HUNT.

Witnesses:
ELMER E. RODABAUGH,
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."