No. 821,410. PATENTED MAY 22, 1906.

P. P. G. HALL, JR.

RELIEF FOR EXPLOSIVE GAS ENGINES.

APPLICATION FILED JULY 11, 1905.

Fig. 1.

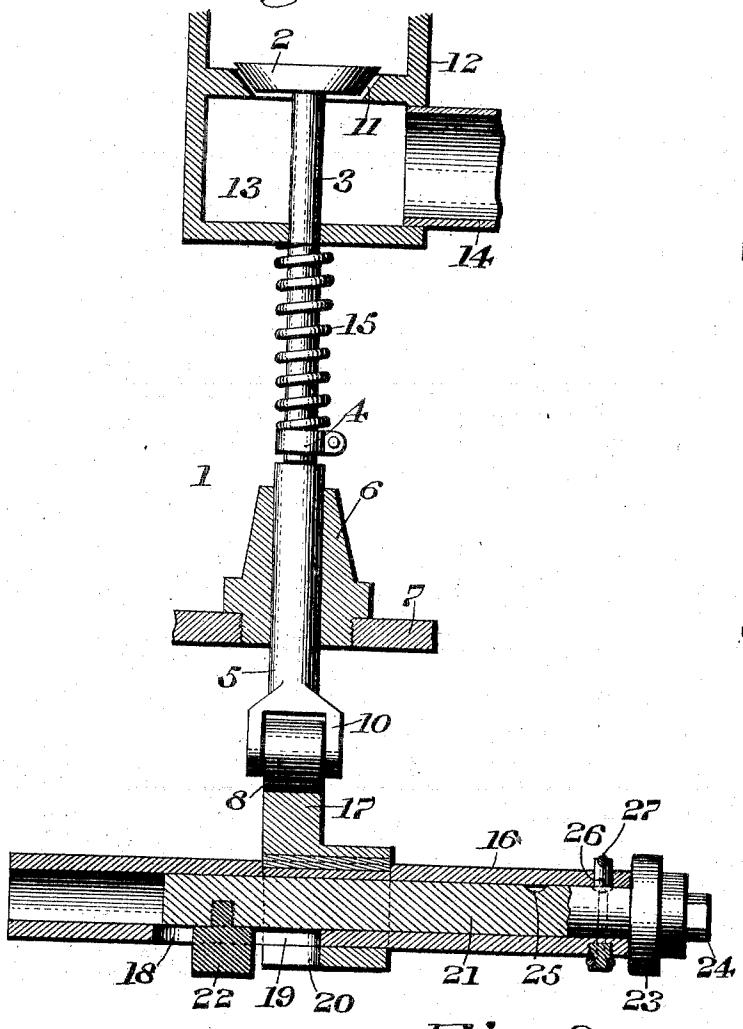


Fig. 2.

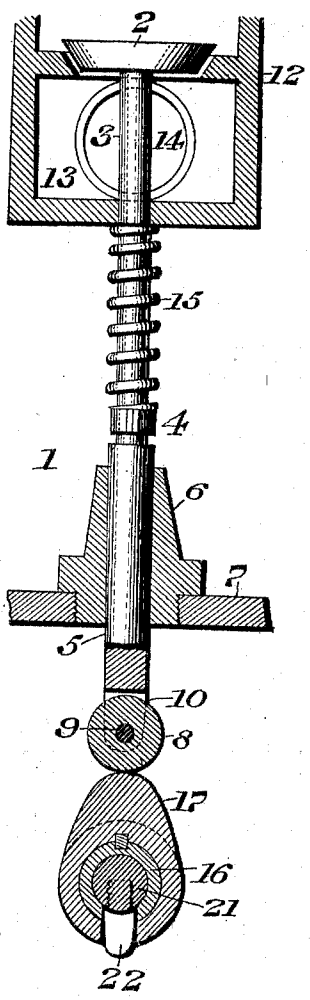
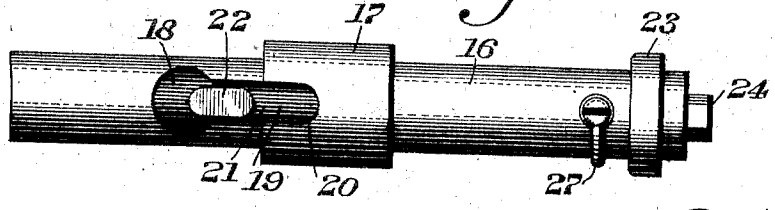


Fig. 3.



Witnesses

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RELIEF FOR EXPLOSIVE-GAS ENGINES.

No. 821,410. Specification of Letters Patent. Patented May 22, 1906.

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To all whom it may concern:

Be it known that I, PETER P. G. HALL, Jr., a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Relief for Explosive-Gas Engines, of which the following is a specification.

My invention consists of a new and useful relief for explosive-gas engines whereby the compression of the cylinder is relieved and the engine more easily started.

It further consists of novel details of construction, all as will be hereinafter set forth.

Figure 1 represents a sectional view of the relief embodying my invention. Fig. 2 represents a sectional view on a line substantially through the center of Fig. 1. Fig. 3 represents a plan view of a portion of the device.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings, 1 designates a relief for explosive-gas engines, consisting of the exhaust-valve 2, carried by the valve-stem 3, the latter having the adjustable collar 4 thereon and being adapted to rest upon a lifter 5, the latter moving in a guide or collar 6, which is suitably supported in the base 7 of the engine or other suitable place.

The end of the lifter is provided with an antifriction device, such as a roller 8, which in the present instance is mounted on a pin 9 within the yoke 10 on the lifter.

The valve 2 has a seat 11, thus controlling a passage between the interior of the cylinder 12 and the exhaust-passage 13, with which communicates the exhaust-pipe 14, a suitable spring 15 leaning against said collar 4 and the walls of the cylinder and tending to seat the valve 2.

16 designates the cam-shaft, having the exhaust-cam 17 thereon and so situated as to be in line with the lifter 5 and to actuate the same in its rotation, said cam-shaft having an opening 18 and the slot 19 therein, while the cam at a suitable point is provided with a slot 20, adapted to be in register with the slot 19 in the cam-shaft.

21 designates the auxiliary or relief cam-shaft, the same in the present instance being seated and movable with the cam-shaft 16, said shaft 21 having the relief-cam 22 attached thereto in any suitable manner.

In the drawings I have shown the same as screwed to the shaft, which latter is provided at its end with the handle 23, held in place by the nut 24, it being noted that the relief-cam in cross-section is oblong, whereby it engages in the slot in its normal position, as seen in Fig. 3, thus preventing unscrewing of the same; but it may be removed by unscrewing the nut 24 and taking off the nut, so that the relief-shaft can be pushed onto the shaft 16 until the cam is situated in the opening 18, when it can be unscrewed.

In the relief-shaft 21 are the depressions or recesses 25, into which is adapted to enter the pin 26, which passes through a suitable opening in the cam-shaft 16 and is supported by the spring 27, said pin limiting the lateral movement of the relief-shaft 21.

The operation is as follows: In starting a gas-engine it is customary to overcome the compression in the cylinder, as it would be extremely hard to turn the engine over unless relieved in some way, as the pressure is about ninety pounds to the square inch. My device is designed to relieve the compression without displacing any of the parts which operate in the running of the engine. The exhaust-cam 17 as the shaft 16 rotates contacts at predetermined intervals with the valve-lifter 5, thus raising the valve and permitting the gas, &c., to the required or necessary amount to pass out through the exhaust 14, it being understood that this action takes place when the engine is in operation, the relief-cam 22 being in the position seen in Figs. 1 and 3. When it is desired to start the engine, the operator will grasp the handle 23 and move the relief-shaft 21 to the right, as seen in Fig. 1, whereby the auxiliary cam 22 will enter the slot 20 in the cam 17 and the said cam 22 will be in a plane with the lifter 5, so that when the operator turns the shaft 16 the two cams 17 and 22 will alternately strike the lifter 5 to raise the valve 2, so that the compression is relieved, the effect of which is evident. It will be seen that as soon as the engine is properly started the auxiliary shaft 21 is pushed back into its normal position, (seen in Figs. 1 and 3,) and the relief-cam will thus not affect the valve 2. From the above it will be understood that the cam 17 and the lifter 5 are not disturbed with respect to their position.

It will be evident that various changes may be made by those skilled in the art which will come within the scope of my invention, and I do not, therefore, desire to be limited in every instance to the exact construction herein shown and described.

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

1. In a device of the character described, an exhaust-valve for the cylinder, means for holding the same normally in closed position, a lifter for said valve, a cam-shaft, a cam carried by said shaft and adapted to actuate said valve to open the same, an auxiliary shaft within said cam-shaft and means secured to said auxiliary shaft which can be moved into and out of alinement with said lifter for actuating said valve.

2. In a device of the character described, an exhaust-valve for the cylinder, means for normally holding the same in closed position, a lifter for said valve, a cam-shaft, a cam carried on said shaft and adapted to actuate said valve, an auxiliary cam-shaft mounted in said first-mentioned shaft and movable therein, and a cam directly connected to said auxiliary shaft, said cam-shaft and cam having slots into which said auxiliary cam is moved longitudinally by the movement of said auxiliary shaft.

3. In a device of the character described, an exhaust-valve for the cylinder, means for normally holding the same in closed position, a lifter for said valve, a cam-shaft, a cam carried on said shaft and adapted to actuate said valve, an auxiliary cam-shaft mounted in said first-mentioned shaft and movable therein, a cam directly connected with said auxiliary shaft, said cam-shaft and cam having slots into which said auxiliary cam is moved longitudinally by the movement of said auxiliary shaft, and means for holding said auxiliary shaft in its adjusted position.

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Witnesses:
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