

No. 873,747.

PATENTED DEC. 17, 1907.

C. O. HEDSTROM.
MEANS FOR OPERATING EXHAUST VALVES.
APPLICATION FILED MAR. 28, 1907.

Fig. 1.

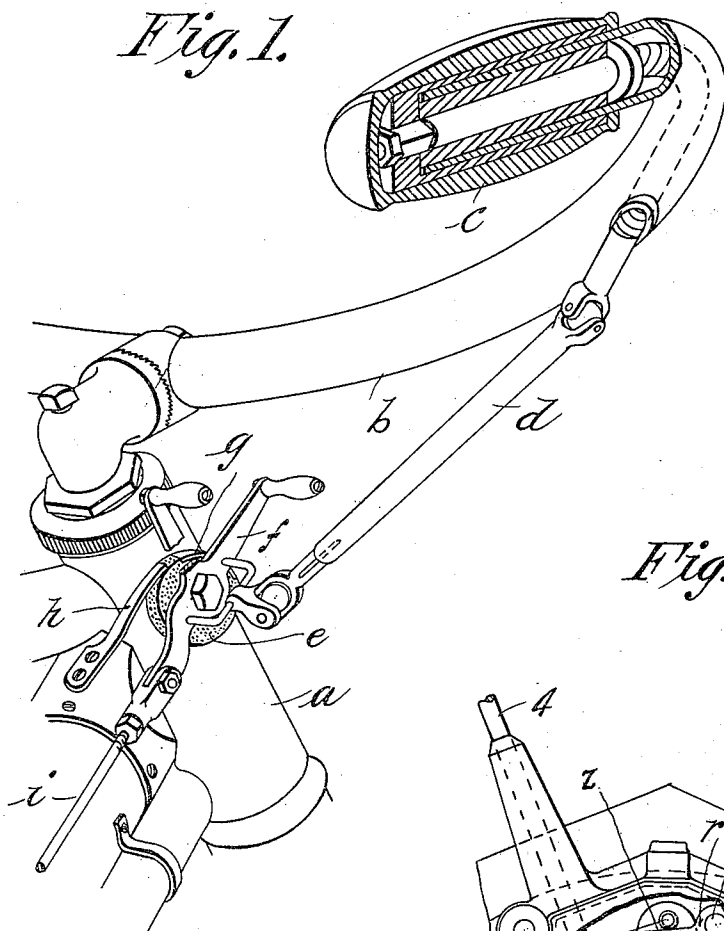


Fig. 2.

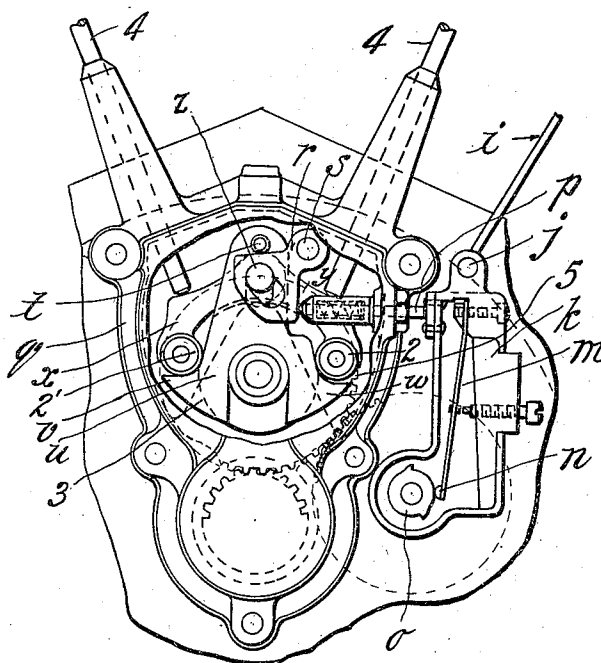
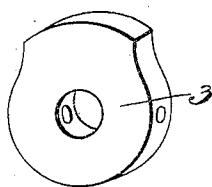


Fig. 3.



Witnesses:

H. L. Sprague
H. W. Brown

Inventor:

Carl O. Hedstrom
by Chapin & Co.
Attorneys.

UNITED STATES PATENT OFFICE.

CARL O. HEDSTROM, OF SPRINGFIELD, MASSACHUSETTS.

MEANS FOR OPERATING EXHAUST-VALVES.

No. 873,747.

Specification of Letters Patent.

Patented Dec. 17, 1907.

Application filed May 28, 1907. Serial No. 365,136.

To all whom it may concern:

Be it known that I, CARL OSCAR HEDSTROM, a citizen of the United States of America, residing at Springfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Means for Operating Exhaust-Valves, of which the following is a specification.

This invention relates to means for controlling the operation of internal combustion engines as applied to the propulsion of motor cycles; the object of the invention being, broadly, to control the exhaust valve or valves of the engine from the handle-bar of the machine and at the same time simultaneously operate the make and break mechanism of the circuit, and further to control the timing mechanism, that is, either to advance or retard the making and breaking of the spark circuit.

This invention relates to improvements shown in my prior Letters Patent of the United States dated July 12, 1904 numbered 765,138 and also to the structure disclosed in my prior application for United States Letters Patent filed January 19, 1907 under Serial No. 353,121.

With these objects in view, the invention will be fully described in the body of the specification.

In the drawings forming part of this application,—Figure 1 is a perspective view of a portion of the handle-bar, steering-head, handle-bar grip and circuit closing device, as shown in my aforesaid prior United States patent. Fig. 2 is a side elevation of the valve-release mechanism of an internal combustion engine showing a portion of the casing removed and disclosing the means for operating the exhaust valve-rods and also showing the timing mechanism by which the make and break device is opened and closed, and the spark advanced or retarded as disclosed in my prior application referred to above, and also showing my improvements by which one exhaust valve can be operated before the other. Fig. 3 is a detail view of the exhaust can.

Referring to the drawings in detail, *a* designates the steering head of the motor cycle; *b* one of the handle-bars to which is rotatably secured the handle-bar grip *c*, and extending therefrom is a flexible shaft designated as a whole by the letter *d* for operating the circuit-closing disk *e* which is made of some

suitable insulating material and is rotatably secured to the steering-head.

Moving with the disk *e* is an auxiliary lever *f* that is operated by the flexible shaft *d*, the disk *e* being provided with a circuit-closing piece *g* that is engaged by the brush *h*.

Connected to the lever *f* and extending rearwardly therefrom is a link *i*, shown also in Fig. 2. This link is pivotally connected at the point *j* to the casing *k* that carries the make and break lever *m* which has at its lower end the rider *n* for engaging the double lift-cam *o*. By means of the link *i* the casing *k* can be rotated, whereby the making and breaking of the electric circuit will be advanced or retarded.

Extending inwardly from the casing *k* is a rod *p* that is adapted for reciprocation through the walls of the casing *q* of the motor. The inner end of this rod *p* normally engages a cam *r* that is pivoted at the point *s*. The upper edge of the cam *r* engages a roller or stop *t* that is carried by the reciprocating lift-cam *u* which is provided with two laterally projecting portions *v* and *w*, the projection *w* being disposed in a lower horizontal plane than the projection *v*.

x and *y* designate two lift-arms that are pivoted on the pin *z* that is secured to the motor casing and carry at their outer ends rollers 2 and 2' which normally engage an exhaust cam 3 that is operated from the engine shaft whereby the valve operating rods 4 are operated; but when it is desired to prevent the operation of the motor, that is to destroy or partially destroy the compression in the ends of the cylinders, the link *i* is operated and the rod *p* moves the cam *r* which is rotated about its pivot *s* and elevates the cam *u* which, in turn, causes the arms *x* and *y* to be carried away from the cam 3 and consequently the rods 4 are elevated and the exhaust valves opened.

The above description relates partially to matter shown in my prior United States Letters Patent, and application for Letters Patent above referred to, and is given here for the purpose of rendering this improvement more clear.

Referring more particularly to the specific improvements and objects of this invention, it will be observed that the roller 2' engages the projection *v* of the lift-cam *u* while the other roller 2 does not normally engage the projection *w* of the cam *u*, that is, a space

is left between the right-hand roller 2 and the projection *w* of the cam, as shown. The effect of this construction is that the lift-arm *x* will be operated and elevated first or in advance of the arm *y* when the link *i* is operated from the grip *c* on the handle-bar with the result that the compression in one of the cylinders is wholly or partially destroyed, thus causing the engine to slow down.

Upon a further rotation of the handle-bar grip *c* both of the lift-arms *x* and *y* are operated and consequently both exhaust valves by means of the rods 4: At the same time the disk *e* has been rotated so that the contact piece *g* is carried away from the brush *h* thereby breaking the electric ignition circuit and the engine prevented from further operation and allowed to gradually come to a stop. Simultaneously with the movement of the disk *e* and the lifting of the arm *y*, the timing mechanism is moved which is carried by the framework or casing *k* bringing the rider *n* on the make and break lever *m* either forward or backward so as to retard or advance the time that the spark will occur at the spark-plugs, as readily understood.

It will thus be seen that I have devised a simple and efficient means by which the compression in one of the internal or explosion combustion engines can be operated from the handle-bar grip and simultaneously retard the spark make and break mechanism which is carried by the casing *k* and also when it is desired to bring the engines to a stand-still to operate both of the exhaust valves and break the electric circuit completely.

What I claim, is:—

1. The combination with the exhaust valves of an internal combustion engine, a lift-cam having a plurality of arms, one of the arms being so arranged in relation to the connecting means between the lift-cam and exhaust valves that one of the exhaust valves is operated in advance of the other when the lift-cam is operated, as described.

2. The combination with the exhaust valves of an internal combustion engine, a lift-cam provided with oppositely disposed arms and in different planes, the arms being located at one end of the operating means for the exhaust valves, whereby when the lift-cam is operated one of the exhaust valves will be operated in advance of the other, as described.

3. The combination with the exhaust valves of an internal combustion engine, a lift-cam, means thereon for supporting the operative connection between the exhaust

valves and lift-cam, the means being so arranged that one of the exhaust-valves will be operated in advance of the other, as described.

4. In combination with the exhaust valves of an internal combustion engine, an exhaust cam, a lift-cam, means normally engaging the exhaust cam and located between the exhaust valves and engaging the lift-cam, a cam for operating the lift-cam whereby the exhaust valves are independently operated.

5. In combination with the exhaust valves of an internal combustion engine, an exhaust cam, a lift-cam, means normally engaging the exhaust cam and located between the exhaust valves and engaging the lift-cam a cam for operating the lift-cam; said means having one arm engaging the lift-cam and another arm spaced therefrom, whereby upon movement of the lift-cam one arm will be operated in advance of the other arm, as described.

6. In combination with the exhaust valves of an internal combustion engine, a lift-cam having supporting portions thereon, a cam engaging the lift-cam and operable from the timing mechanism, means engaging the supporting portions and located between the lift-cam and the exhaust-valves, the means being so arranged that one of the valves will be operated in advance of the other.

7. In combination with the exhaust valves of an internal combustion engine, a lift-cam having means thereon arranged in different planes for supporting arms, said arms being operable by said cams, a roller carried by the lift-cam, a cam engaging the roller and so disposed that its line of action is vertical and normal to the roller, whereby the arms will be operated one in advance of the other, as described.

8. In combination with the exhaust valves of an internal combustion engine, a lift-cam having means thereon arranged in different planes for supporting arms, said arms being operable by said cam, a roller carried by the lift-cam, a cam engaging the roller and so disposed that its line of action is vertical and normal to the roller, whereby the arms will be operated one in advance of the other, and means connected with the timing mechanism for operating the last mentioned cam, as described.

CARL O. HEDSTROM.

Witnesses:

K. I. CLEMONS,
H. W. BOWEN.