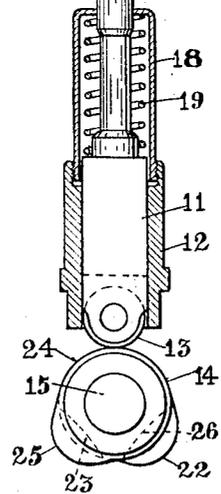
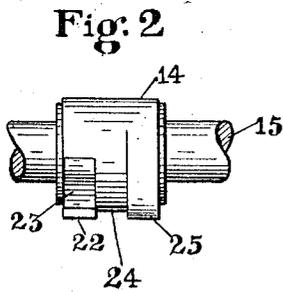
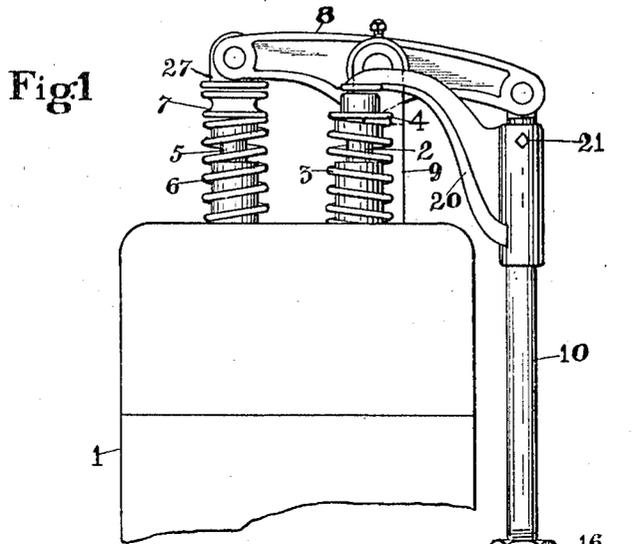


G. H. WATT.  
 VALVE MECHANISM.  
 APPLICATION FILED DEC. 27, 1909.

992,089.

Patented May 9, 1911.



Witnesses  
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By *[Signature]*  
 Attorneys

# UNITED STATES PATENT OFFICE.

GEORGE H. WATT, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO  
WESLEY A. PHILLIPS, OF DETROIT, MICHIGAN.

## VALVE MECHANISM.

992,089.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed December 27, 1909. Serial No. 534,929.

To all whom it may concern:

Be it known that I, GEORGE H. WATT, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Valve Mechanism, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to a valve mechanism for engines of the internal combustion type and more particularly to an arrangement thereof for allowing reversal of the engine.

15 The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a view in side elevation of a portion of an engine together with the valve mechanism that embodies features of the invention; a portion of the valve mechanism being shown in section; and Fig. 2 is a view in detail of a cam.

Referring to the drawings, an engine cylinder 1 has an inlet valve whose stem 2 extends through the cylinder head and is held projected with the valve in closed position by a suitable spring 3 in compression between the cylinder head and a stop 4 on the stem. An outwardly closing exhaust valve in the cylinder head has a stem 5 that is held with the valve seated or closed by a spring 6 that encircles the stem and is in compression between the cylinder head and a suitable collar or stop 7 on the outer end of the stem.

The exhaust valve is operated by a lever 8 of the first class which is fulcrumed on a standard 9 on the head, and has a foot piece 27 pivotally connected at one end thereto and adapted to bear against the end of the exhaust valve stem 5. The other end of the lever is pivoted to the upper end of a push rod or tappet 10 whose lower portion 11 is squared, polygonal or otherwise arranged to have non-rotatable and longitudinally reciprocable movement in a hollow guide 12 secured to the motor. A friction roll 13 in the extremity of the rod bears against a cam 14 on a cam shaft 15 which is driven in proper timed relation to the engine by any suitable means. The tappet rod may be lengthened or shortened by means of a collar 16 on the lower end of the portion 10 that telescopes with the upper portion of

the piece 11 and is adjustably secured thereon by suitable means, as for example, a set screw 17. A bonnet 18 encircles the upper portion of the piece 11 above the guide 12 to which the bonnet is secured and houses a spring 19 that is in compression between the outer end of the bonnet and a suitable shoulder or stop on the piece 11.

An arm 20 is longitudinally adjustable on the tappet 10, a set screw 21 holding it in desired position and its inner end bears against the upper face of the inlet valve stem 2.

The cam 15 has one lifting point 22 followed by a depression 23 which is arranged to operate the parts for forward motion of the engine. A neutral cylindrical face 24 separates the forward cam point from a second shoulder 25 adapted to operate the valves for turning the engine in the reverse direction. The latter point has a corresponding depression 26. The cam shaft 15 is longitudinally shiftable in its bearings, or the cam may be moved on the shaft.

In operation the raising of the tappet rod by either of the lifting points depresses and opens the exhaust valve positively. The spring 19 is of sufficient tension to force the cam roll on the tappet into the depression following the point against the action of the spring 3 so that the inlet valve is opened.

By this arrangement of parts a single oscillatory tappet rod and cam operates both the inlet and exhaust valves and reversal is obtained by shifting the double compound cam beneath the tappet. This avoids multiplicity of tappet rods and is a simple and easily adjusted mechanism for insuring proper action of the valves.

Obviously, changes in details of construction may be made without departing from the spirit of the invention and I do not care to limit myself to any particular form or arrangement of parts.

What I claim as my invention is:—

1. In an explosive engine, an inlet valve for the cylinder thereof having an outwardly closing spring-seated closure, an exhaust valve for the cylinder having an outwardly closing, spring-seated closure, stems extending from each closure, a lever pivoted on the cylinder one end of which is adapted to engage the stem of the exhaust valve closure and unseat the latter when the lever end is depressed, a longitudinally reciprocable tap- 110

pet pivoted at one end to the other end of the lever, a cam and a spring coacting therewith to reciprocate the tappet, and an arm adjustably secured on the tappet for depressing the stem of the inlet closure and unseating the latter at each stroke of the tappet.

2. In an explosive engine, an inlet valve for the cylinder thereof having an outwardly closing, spring-seated valve closure, an exhaust valve for the cylinder having an outwardly closing, spring-seated closure, stems extending from each closure, a lever pivoted on the cylinder one end of which is adapted to engage the stem of the exhaust valve closure and unseat the latter when the lever end is depressed, a longitudinally reciprocable tappet connected at one end to the other end of the lever, a cam and a spring coacting therewith to reciprocate the tappet, and an arm adjustably secured on the tappet for depressing the stem of the inlet closure and unseating the latter at each stroke of the tappet, the cam being longitudinally shiftable to bring either forward or reverse points

into operative relation with the tappet for changing direction of motion of the motor.

3. In an explosive engine, an inlet valve for the cylinder thereof having an outwardly closing spring-seated closure, an exhaust valve for the cylinder having an outwardly closing spring-seated closure, stems extending from each closure, a lever pivoted on the cylinder, a foot piece pivoted to one end of the lever that is adapted to abut the stem of the exhaust valve closure and unseat the latter when the lever end is depressed, a longitudinally reciprocable tappet pivoted at one end to the other end of the lever, a cam and a spring coacting therewith to reciprocate the tappet, and an arm adjustably secured on the tappet for depressing the stem of the inlet closure and unseating the latter at each stroke of the tappet.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE H. WATT.

Witnesses:

OTTO F. BARTHEL,  
LEWIS E. FLANDERS.

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