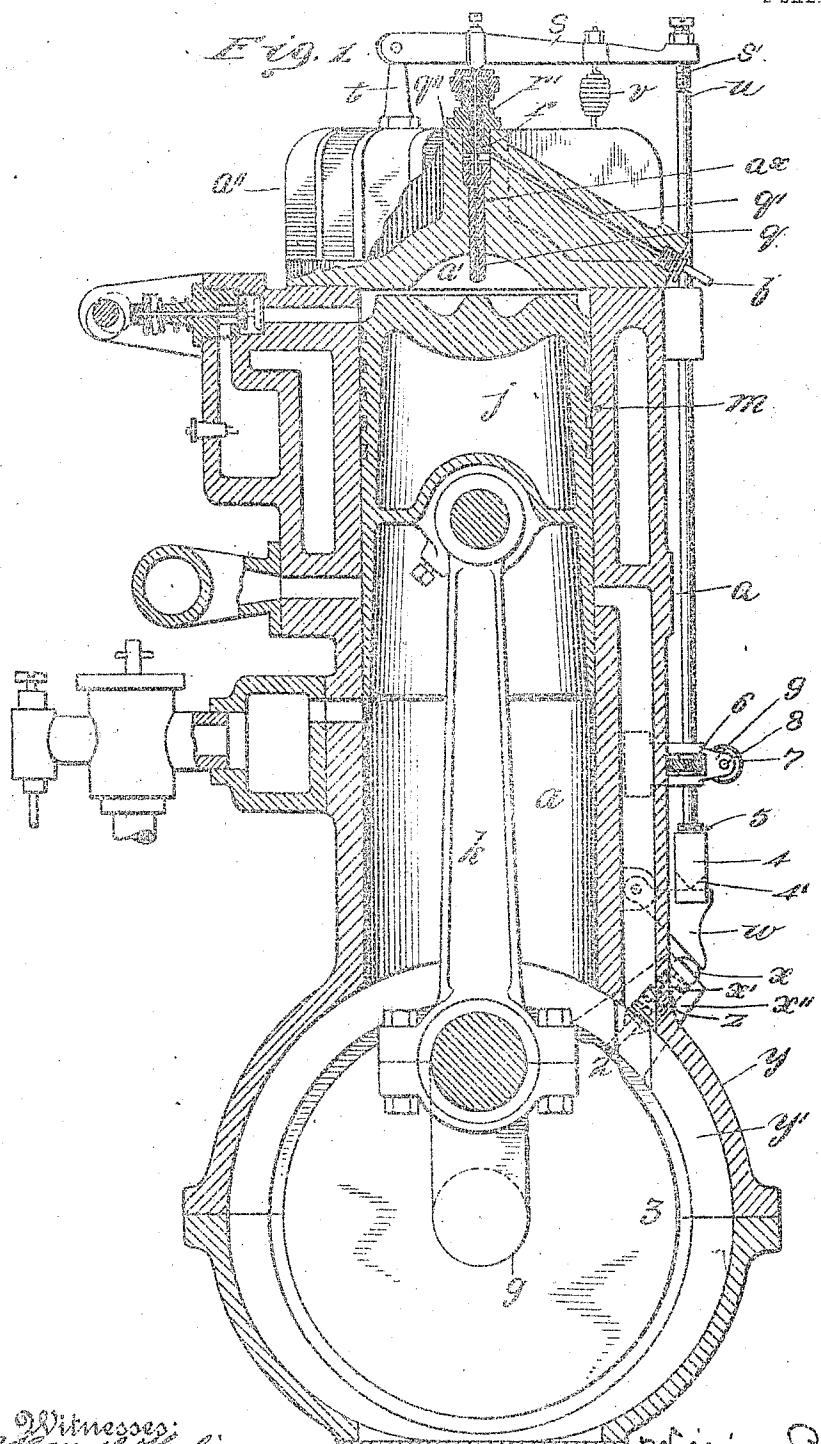


W. RABSILBER.  
VALVE MECHANISM.  
APPLICATION FILED JUNE 16, 1910.

998,801.

Patented July 25, 1911.

2 SHEETS—SHEET 1.



Witnesses:  
George H. Big  
M. Hamilton

Inventor  
William Rabsilber  
By his Attorney  
James A. Compton

W. RABSILBER.

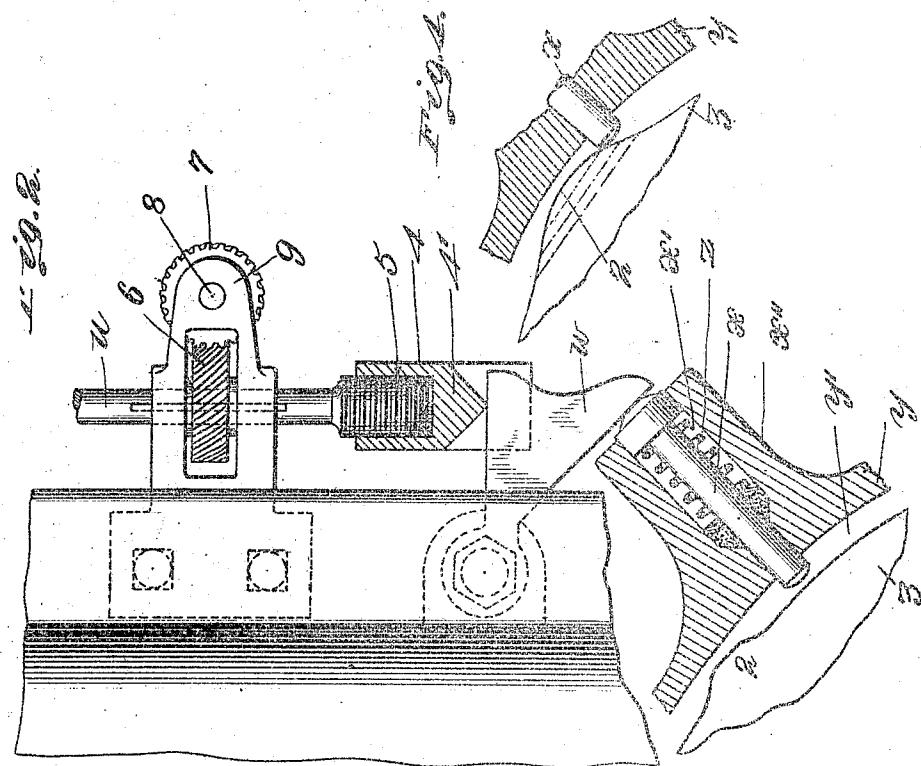
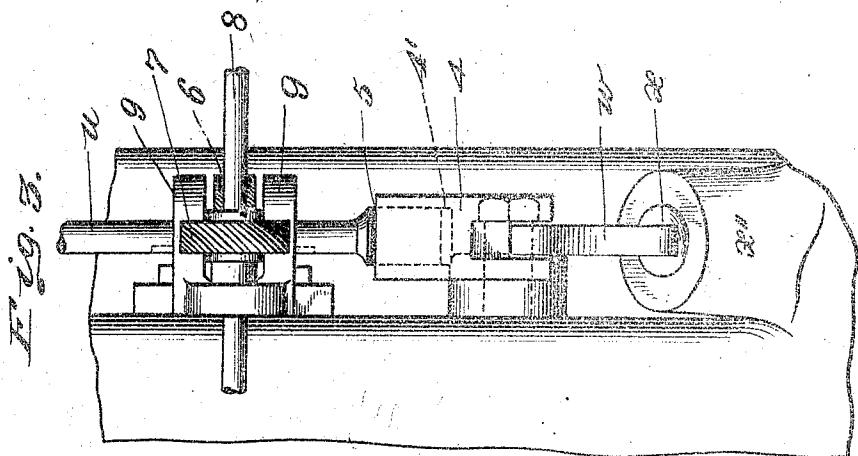
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Witnessed:  
W. Rabsilber  
Mr. Hamilton.

William Rabsilber, Inventor  
By his Attorney  
James D. Hamilton

# UNITED STATES PATENT OFFICE.

WILLIAM RABSILBER, OF NEW YORK, N. Y.

## VALVE MECHANISM.

998,801.

Specification of Letters Patent. Patented July 25, 1911.

Application filed June 16, 1910. Serial No. 567,187.

To all whom it may concern:

Be it known that I, WILLIAM RABSILBER, a subject of the Emperor of Germany, residing in the borough of Brooklyn, city of 5 New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Valve Mechanisms, of which the following is a specification, reference being had to the accompanying 10 drawings.

This invention relates to improvements in valve mechanism for use in engines and particularly to improvements in valve mechanism for use in internal combustion engines; and an object of this invention is to provide a valve mechanism in which the degree of opening and the dwell in open position of the valve may be varied by very small amounts; that is, finely adjusted.

20 Another object of this invention is to provide a valve mechanism operated from the crank-shaft of the engine without the use of a special cam-shaft, the valve-controlling cam being mounted within the crank-casing.

25 A further object of my invention is to provide a valve mechanism which will prove simple in construction and efficient in operation.

In the drawings illustrating the principle 30 of this invention and the best mode now known to me of applying that principle, Figure 1 is a central vertical section through one of the cylinders of an engine equipped with my new valve mechanism, a part of 35 the cylinder-head being shown in full; and Figs. 2, 3 and 4 are details which illustrate the adjusting mechanism of my new valve mechanism.

Referring to Fig. 1, in each cylinder  $m$  40 of the engine  $a$  is slidably fitted a piston  $j$  which is connected by a pitman or connecting-rod  $k$  with the crank-shaft  $g$  of the engine. Upon the shaft  $g$  is mounted a cam-disk  $8$  having a nose or cam-lug  $2$ . Each 45 cylinder-head  $a''$  is formed with a central vertical hole or passage  $a''$  which extends through from top to bottom of the cylinder-head and in the lower end of which is seated a nozzle  $q$ . The inner end of the latter projects into the recess  $a'$  formed in the lower 50 face of the cylinder-head  $a''$ . One end of the fuel-inlet branch-pipe  $b$  is inserted in the outer end of the passage  $q'$  formed in the cylinder-head  $a''$ . In the upper end of the vertical passage  $a''$  is fitted a plug  $r'$  in which is slidably mounted a needle-valve  $r$ .

Between the inner end of the plug  $r'$  and the top of the nozzle  $q$  is a chamber  $q''$  with which communicates the inner end of the passage  $q'$ . The fuel will obviously be subjected to the action of the heat generated by the combustion and absorbed by the cylinder-head, while it is in the passage  $q'$  and the chamber  $q''$ . The inner end of the needle-valve  $r$  is seated in its closing position on the top of the nozzle  $q$  and prevents the flow of the fuel from the passage  $q'$  and chamber  $q''$  through the nozzle  $q$ . The outer end of the needle-valve  $r$  is attached to the lever  $s$  one end of which is pivotally 60 mounted in the post  $t$  fastened to the top of the cylinder-head  $a''$  and the other or free end of which carries a screw-pin  $s'$ . A coil-spring  $v$  is interposed between the lever  $s$  and the top of the cylinder-head  $a''$  and 65 tends to hold the needle-valve  $r$  firmly upon its seat in the top of the nozzle  $q$ . The lower end of the screw-pin  $s'$  bears upon the top of a slide-rod  $u$  the lower end of which is in the form of a shoe  $4$  formed in its top with a threaded socket  $5$ , whereby the shoe is 70 adapted to be screwed on the slide-rod  $u$ . The lower end of the shoe  $4$  is bifurcated and is formed with a centrally-disposed toe 75 having an edge; that is, the toe is V-shaped. The latter rests upon an arm  $w$  which is pivotally fastened to the engine-casing  $a$  at one end and this pivoted arm in turn bears upon the outer end of a plunger-pin  $x$  which is mounted in a socket  $x'$  formed 80 in a boss  $x''$  which projects from the crank-casing  $y$ . A coil spring  $z$  mounted in the socket  $x'$  tends to force the plunger-pin  $x$  outwardly and thereby to press the arm  $w$ , shoe  $4$  and slide-rod  $u$  upwardly, whereby 85 the top of the latter is held in close contact with the screw-pin  $s'$  on the free end of the lever  $s$ .

The inner end of the plunger-pin  $x$  projects into the crank-chamber  $y'$  and the fine 90 adjustment of the position of this inner end is accomplished as follows: A shaft  $8$  extends transversely of the engine and is supported free to turn in brackets  $9$ . Upon the shaft  $8$  is mounted a spiral gear  $7$  which 95 meshes with a spiral gear  $6$  keyed upon the slide-rod  $u$ . By turning the shaft  $8$  the slide-rod  $u$  will be turned and will be screwed into or out of the socket  $5$  in the top of its shoe  $4$ , whereby the active length 100 of the slide-rod  $u$  will be changed. The 105 spring  $v$  is much stronger than the spring 110

*z*; hence, when the shoe *4* and the slide-rod *u* are moved relatively to each other so as to lengthen the active length of the slide-rod, the weaker spring *z* will yield and the 5 plunger-pin *x* will be forced inwardly toward the peripheral edge of the cam-disk. 3. The closer the inner end of the plunger-pin *x* approaches the latter, the greater will be the movement of the valve *r* and the 10 longer will that valve dwell in open position, as will be readily seen from an inspection of Fig. 4. The coil-spring *z* acts to press the top of the slide-rod *u* against the lower end of the screw-pin *s'* and thereby to prevent 15 any lost motion. It will be found that, by the arrangement of parts just described, an extremely fine adjustment of the degree of opening and the time of dwell in open position of the valve *r* may be obtained. Further, no special cam-shaft is necessary, the 20 cam disk *3* is mounted on the crank-shaft *g* and within the crank-chamber *y'* and may be made of as large a diameter as the size of the latter will permit. The cam-nose *2* 25 may be given a long bearing surface and the construction simplified by this arrangement.

I claim

1. The combination with a valve; of a rod connected therewith and adapted to 30 actuate the same, said rod being provided with a shoe having a socket at one end in which said rod fits rotatively and being bifurcated at its opposite end; and mechanism for rotating said rod relatively to said shoe.
2. The combination with a valve; of a rod connected therewith and adapted to 35 actuate the same; a pivoted arm; mechanism for swinging the latter; a shoe which engages said pivoted arm; and mechanism for turning said rod relatively to said shoe.
3. The combination with a valve; of a rod connected therewith and adapted to 40 actuate the same; a pivoted arm; mechanism

for swinging the latter; a shoe which engages said pivoted arm; and mechanism for 45 moving said shoe along said rod, whereby the effective length of said rod between said arm and valve is varied to change the travel of the valve.

4. The combination with a valve; of a 50 shaft; a cam-disk mounted thereon; a plunger device adapted to be brought into contact with said cam-disk; means for transmitting the movement of said device to said valve to open the same; and means for varying the 55 position of said device with respect to said cam-disk.

5. The combination with a valve; of a 60 shaft; a crank-casing in which the latter is mounted; a cam-disk mounted on said shaft and within said crank-casing; a plunger device which extends through the latter and into close proximity with the edge of said cam-disk; means for transmitting the movement of said device to said valve to 65 open the same; and means for varying the position of said device with respect to said cam-disk.

6. The combination with a valve; of a 70 shaft; a cam-disk mounted thereon; a plunger device adapted to be brought into contact with said cam-disk; a rod provided with a shoe and adapted to transmit the movement of said device to said valve to open the same; and means for varying the active 75 length of said rod and thereby changing the position of said device with respect to said cam-disk.

Signed at New York city, N. Y., this fifteenth day of June, 1910, in the presence 80 of the two undersigned witnesses.

WILLIAM RABSILBER.

Witnesses:

EMMA I. McCARTHY,  
JAMES HAMILTON.