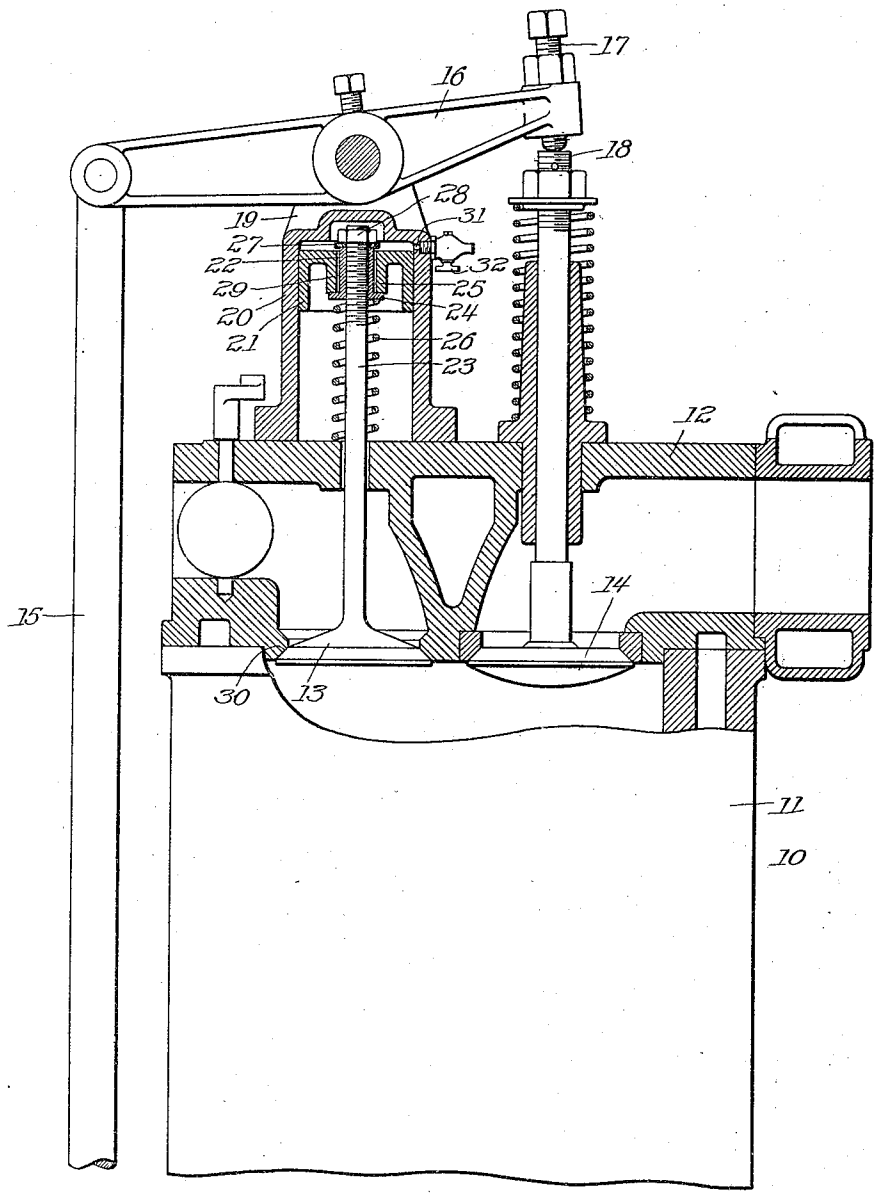
C. S. TUTTLE.

INTERNAL COMBUSTION ENGINE.

APPLICATION FILED JULY 31, 1914.

1,204,520. Patented Nov. 14, 1916.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES S. TUTTLE, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO INTERNATIONAL HARVESTER CORPORATION, A CORPORATION OF NEW JERSEY.

INTERNAL-COMBUSTION ENGINE.

1,204,520. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed July 31, 1914. Serial No. 854,289.

To all whom it may concern:

Be it known that I, CHARLES S. TUTTLE, a citizen of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Internal-Combustion Engines, of which the following is a full, clear, and exact specification.

This invention relates to internal combustion engines, and more particularly to valve mechanisms therefor.

The object of this invention is to insure perfect seating of a valve under all conditions of operation. This object is accomplished by providing a valve with guiding means therefor, there being a loose connection between said valve and guiding means to permit of a limited free movement of said valve to meet the desired end.

In the invention as illustrated on the accompanying drawing, the single figure is a fragmentary sectional view of an internal combustion engine embodying my invention.

The various novel features of my invention will be apparent from the description and drawing, and will be particularly set forth in the appended claims.

The internal combustion engine 10 includes a cylinder 11 having a cylinder head 12 in which are mounted an inlet valve 13 and an exhaust valve 14, the latter being actuated from a moving part of the engine through rod 15, rocker arm 16 having a set screw 17 in the end thereof which engages the stem 18 of the exhaust valve. The rocker arm 16 is pivotally mounted on a bracket 19 formed integrally with a cylinder member 20. This cylinder member forms part of a cushioning device for preventing the inlet valve 13 from seating with such force as to cause breakage of said valve. This cushioning device includes in addition to the cylinder 20, a piston 21 which is adapted to be reciprocated within the cylinder 20, said piston embracing a sleeve 22 which is threaded onto the stem 23 of the inlet valve 13. The sleeve 22 has a flange 24 which engages an inner circular flange portion 25 of the piston, the valve 13, sleeve 22 and piston 21 being forced in one direction to accomplish the closing of the valve 13 by a coiled spring 26 surrounding the valve stem 23, and being interposed between the cylinder head 12 and the flange 24 of sleeve 22. The valve 13 is opened by suction caused by the inhalation stroke of the main engine piston, the opening movement of the valve 13 being in opposition to the action of spring 26. The sleeve 22 extends beyond the piston 21, and is engaged by a collar 27 which is held in engagement with the sleeve by a nut 28 secured to the valve stem 23, thus preventing any cramping between collar 27 and piston 21.

There is a clearance space 29 between the piston or valve guiding member 21 and the sleeve 22 to insure the proper seating of the valve 13. If it were not for this loose connection between the piston 21 and sleeve 22, the piston 21, which has a working fit with the cylinder 20, the cylinder and piston being out of alinement slightly, proper seating of the valve 13 would not be accomplished. In other words one portion of the valve might engage a portion of its seat 30 while another portion of the valve would not. In addition to the great disadvantage of loss of compression the valve 13 would be cramped and possibly broken. However, by means of the loose connection between the guiding piston 21 and the sleeve 22 secured to the valve stem, the valve will seat properly under all conditions. By means of extending the sleeve 22 beyond the piston to space the collar 27 from the piston, more or less play is given between the piston and stem so that the parts can aline themselves without any cramping action. While the piston 21 acts to guide the valve 13 in its general line of movement the loose connection between the piston and valve stem will permit the proper seating of the valve. The cylinder is provided with a vent 31 controlled by a valve 32, the vent being located in one end of the cylinder 20 to vary the effective cushioning or retarding action of the closing movement of the valve 13.

By means of the arrangement of the valve mechanism, as above described, the valve will be properly guided in its opening and closing movements, retarded in its closing movement to prevent breakage of the valve, and permitted to seat properly under all conditions of operation.

There may be various modifications of the invention as here shown and described, and it is my intention to cover all such modifications which do not involve any departure from the spirit and scope of my invention as set forth in the appended claims.

What I claim is:—

1. In combination, a valve having a stem, relatively movable members for guiding said valve in its general line of movement, and a sleeve mounted on the stem of said valve, there being a loose connection between said sleeve and one of said relatively movable members for permitting said valve to seat properly.

2. In combination, a valve, and a cushioning device therefor including a cylinder and a piston for operating therein, said piston being loosely connected to a portion of said valve to insure proper seating of said valve.

3. In combination, a valve, and a cushioning device therefor including coöperating relatively movable members, one of said members being loosely connected to a portion of said valve to insure proper seating thereof.

4. In combination, a valve having a stem, coöperating relatively movable members for guiding the general line of movement of said valve, and a sleeve mounted on the stem of said valve and extending within one of said relatively movable members, there being a clearance space between said sleeve and one of said relatively movable members to insure proper seating of said valve.

5. In combination, a valve having a stem, a cushioning device for said valve including a cylinder and piston, a sleeve mounted on the stem of said valve and being loosely connected to said piston, a resilient member engaging said sleeve for closing said valve, and means for controlling the degree of cushioning of said valve.

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

CHARLES S. TUTTLE.

Witnesses:

R. F. WEBER,

L. B. SPERRY.

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