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A. C. MENGES.

INTAKE VALVE FOR EXPLOSIVE ENGINES.

APPLICATION FILED SEPT. 14, 1904.

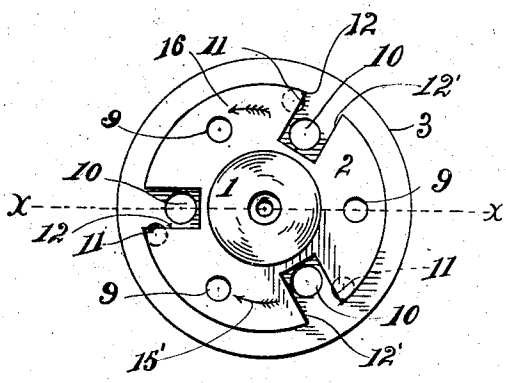


Fig. 1.

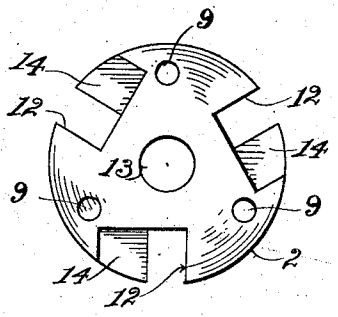


Fig. 4.

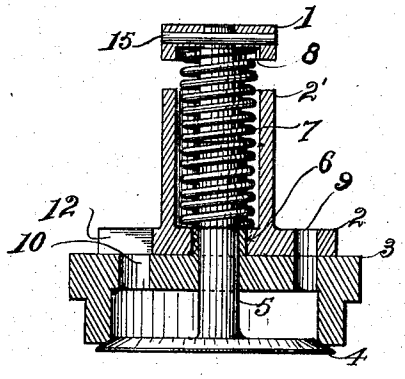


Fig. 2.

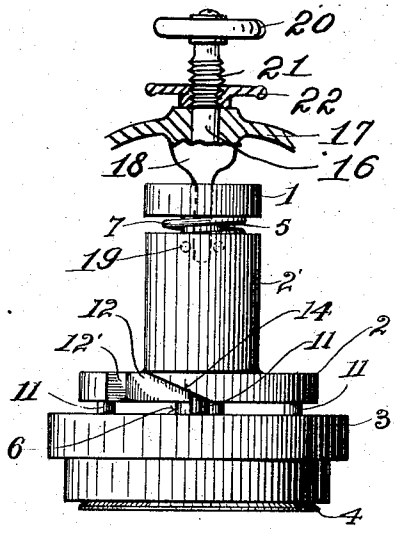


Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

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INTAKE-VALVE FOR EXPLOSIVE-ENGINES.

No. 820,230. Specification of Letters Patent. Patented May 8, 1906.

Application filed September 14, 1904. Serial No. 224,457.

To all whom it may concern:

Be it known that I, ALBERT C. MENGES, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented new and useful Improvements in Intake-Valves for Explosion-Engines, of which the following is a specification.

This invention relates to certain new and useful improvements in intake-valves for explosive-engines; and the invention consists in the combination and arrangement of parts hereinafter described and claimed.

The objects of the invention are, first, to produce a valve for an explosive-engine which will furnish the required amount of explosive charge to correspond with the amount of work to be accomplished by the engine; second, to produce a valve which will furnish a minimum amount of explosive charge, so that the engine may be continued in operation without producing any other work; third, to furnish a valve whereby the tension on the spring which controls the valve may be increased and its stroke shortened at the same time, so that the valve will act quickly, and thereby increase the speed of the engine. These objects I accomplish by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 shows a plan view of the valve detached from the engine, showing the position of the ports when they are all open and the valve has its maximum amount of throw. Fig. 2 is a cross-section of the valve on the line *x x* of Fig. 1, showing the position of the valve-stem, the spring, and the ports when open. Fig. 3 shows a side elevation illustrating the valve adjusted so that it has only a slight throw. Fig. 4 is an inverted plan view of the upper valve-case, which is indicated by 2 in the drawings.

Like numerals refer to like parts throughout the several views.

Referring to the drawings, the valve is formed of what may be termed "two sections," an upper and a lower section. Said upper section is indicated by the reference character 2 and is rotatable, and said lower section is indicated by the reference character 3 and is secured to the engine-cylinder. The upper section 2 at its lower portion is substantially disk-shaped and is provided centrally thereof with an upwardly-projecting cylindrical extension 2′, and, furthermore, provided with a cap 1. Within the cylindrical extension 2′ is arranged an actuating-spring 7, and said extension 2′ has also arranged therein the valve-stem 5. The cap 1 is what may be termed "cup-shaped," as indicated by the reference character 8, so as to receive and retain the upper end of the spring 7.

The reference character 4 denotes the valve, which is secured to the lower end of the stem 5 and finds its seat against the lower face of the lower section 3. A bearing 6 is provided for the valve-stem 5.

The compression-spring 7 finds a bearing at one end against the disk-shaped portion of the section 2 and at its upper end against the cap 1, and said spring 7 is adapted to automatically close the valve 4 and move the same to its seat after it has been drawn away by the ingoing charge. The upper portion of the lower section 3 is substantially disk-shaped and has depending therefrom a tubular extension of a diameter nearly as large as the disk-shaped portion of said section 3. The disk-shaped portions of each of the sections 2 3 are provided with ports 9, which are adapted to register with each other, and the said disk-shaped portion of the lower section is provided with the ports 10, which are adapted to register with the cut-away portions 12, formed in the disk-shaped portion of the upper section, for the purpose hereinafter described. The cut-away portions 12 have one wall thereof beveled. The lower section 3 is provided with upwardly-extending projections 11, which are beveled, so that when the upper section 2 is rotated the beveled wall of the cut-away portions 12 can easily ride over the projections 11. These cut-away portions or openings 12 at one side are practically at right angles to the upper section 2, as shown by 12′, and are wedge-shaped on the other side, so that when the upper section 2 is turned it will be raised away from the lower section 3, thereby compressing the spring, the beveled portions being shown by 14.

13 is an opening in the upper section showing a bearing for the projection 6. This opening 13 is shown in Fig. 4, and the bearing 6 is shown in Fig. 2.

15 is a pin or other suitable means for securing the cap 1 in place upon the valve-stem 5.

The arrows 15′ and 16 merely show directions for turning the section 2 for the purposes of opening and closing the ports.

In Fig. 1 the valve is shown with all the ports open in position for the engine to run at its full power. This figure also shows the position when the cap is raised, so as to give the valve its maximum throw and the free passage of the explosive charge into the engine. By turning the section 2 in the direction shown by the arrow 15′ the beveled portions 14 of the openings 12 are brought in contact with the projections 11, and as the same is turned the upper section 2 is raised, thereby shortening the stroke gradually of the valve and valve-stem. This may be continued until the stroke is reduced to a minimum. The object of this is to prevent the engine from rattling when the power required for running it is shut off or partially shut off, and it may be turned to such an extent that the engine will move without conveying any power to outside machinery.

Starting with the valve in the position shown in Figs. 1 and 2, all the ports are open; but the upper section 2 may be turned backward in the direction shown by the arrow 16 until it will practically close the ports 9 9 9 and will decrease the openings 10 to such an extent that but a small quantity of explosive charge may be taken through them into the engine, leaving, however, the piston and valve in position to have the maximum throw. Thus the structure is such that the valve may be adjusted to its minimum throw with the ports open and to its maximum throw with the ports nearly closed, or to any intermediate position between the two, thus enabling me to adjust the amount of the ingoing charge to the required work to be performed by the engine from the point where the engine will run without producing any outside power to the position where it will produce the maximum amount of power, and inasmuch as the openings and closings are governed by the inclined or cam-shaped surfaces the valve can be adjusted with great accuracy and precision. Thus the valve can be throttled without interfering with the throw of the valve and can be regulated so as to take on more or less of the explosive charge without interfering with the throw of the valve. The same also may be adjusted so as to increase the explosive charge by turning the upper section and at the same time shortening the throw of the valve. In Fig. 4 of the drawings a conventional means is shown for adjusting the upper section and for retaining said upper section in its adjusted position, said means consisting of a rod 16, extending down through a casing 17 and having a forked lower end 18 extending between a pair of stop-pins 19. The rod 16 carries a hand-wheel 20 and is also screw-threaded, as at 21, and with the said screw-threaded portion 21 a jam-nut 22 engages, which when rotated in one direction will fix the rod 16 to the casing 17. It will be evident that when the nut 22 is loosened the rod 16 can be turned to shift the upper section to the desired position, and after said section is adjusted the screwing home of the nut 22 will prevent the rod 16 from movement, thereby retaining the upper section in its adjusted position. By this means the tension of the spring is increased, which gives a more rapid motion to the valve, and consequently a more rapid motion to the engine.

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

1. In a valve for explosive-engines, the combination of the valve and valve-stem, a casing formed of a lower section and an upper section rotatable thereon, the lower section provided with beveled projections and the upper section with openings having inclined sides adapted to engage with the projections as the upper section is rotated for the purpose of lengthening or shortening the throw of the valve.

2. The combination in a valve for explosive-engines, of a casing formed of an upper and a lower section, the lower of which is secured to the engine and provided with ports, the upper of which is secured to the lower section and provided with ports adapted to register with the ports of the lower section, a series of projections upon the lower section, said upper section having a plurality of openings provided with inclined or wedge-shaped sides adapted to engage with the projections on the lower section when the upper section is turned, whereby the upper section may be raised and lowered for the purpose of shortening or lengthening the throw of the valve, a spring adapted to automatically close the valve and a cap on the stem for retaining said spring in position.

3. An intake-valve comprising a pair of sections, one of said sections provided with a valve-seat and upwardly-extending projections and the other of said sections provided with openings having inclined sides engaging with the upward projections on the other of said sections, a valve provided with an upwardly-extending valve-stem, a spring surrounding the valve-stem, a cap on the upper end of the valve-stem, a suitable bearing for

the valve-stem, one of said sections being rotatable for the purpose of raising and lowering the same with respect to the other of said sections, whereby the stroke of the valve and the tension of the spring may be adjusted, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALBERT C. MENGES.

Witnesses:
EDWARD TAGGART,
MARY S. TOOKER.