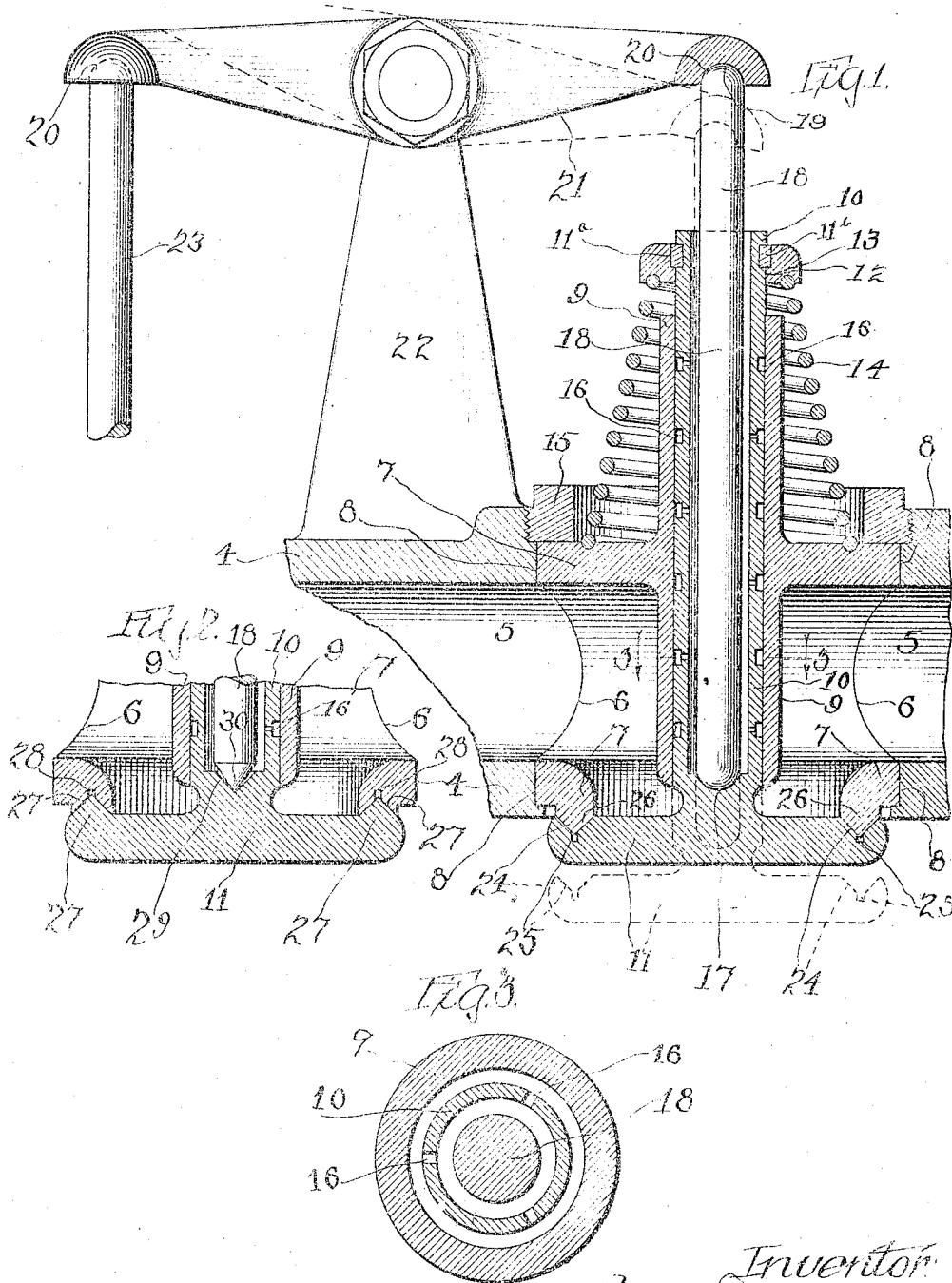


1,235,816.

Patented Aug. 7, 1917.



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UNITED STATES PATENT OFFICE.

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VALVE.

1,235,816.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOHN F. KYTLICA, a citizen of the United States, and a resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention relates to improvements in valves of the reciprocating type, and has particular relation to valves of said class or type, which are designed to be used in connection with internal combustion engines and located in the cylinder heads thereof, but may be used for other or general purposes, and it consists in certain peculiarities of the construction, novel arrangement and operation of the various parts thereof as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is to provide a valve of the reciprocating type, which shall be of an extremely inexpensive and simple construction, strong, durable, and efficient in operation, with its parts so made, arranged and coöperating with respect to one another, as to prevent the usual wear on the valve-carrying-stem, incident to the inclination thereof in its reciprocations, and so that said valve-stem will be caused to travel in an absolutely true straight line, thus effecting a perfect closure of the valve-head when seated. A further object of the invention is to provide means for operating the valve-head and its stem in such a manner that the parts of the mechanism may be automatically lubricated, and so that the friction incident to the contacting portions of the operating parts will be reduced to a minimum.

Other objects and advantages of the invention, will be disclosed in the subjoined description and explanation.

In the accompanying drawing, which serves to illustrate an embodiment of the invention,

Figure 1, is a fragmental vertical sectional view of the upper portion of an engine cylinder, showing the valve embodying my invention mounted thereon, and by continuous lines the positions the parts will occupy when the valve is closed and by dotted lines the positions said parts will occupy when the valve is open.

Fig. 2 is a fragmental view of the lower

portion of the valve casing showing a modification in the construction of the valve head and the seat therefor, and

Fig. 3 is an enlarged cross-sectional view taken on line 3—3 of Fig. 1, looking in the direction indicated by the arrows.

Corresponding numerals of reference refer to like parts throughout the different views of the drawing.

The reference numeral 4 designates the upper portion or head of an engine cylinder or any other suitable support or part in connection with which the valve is employed, and in the present instance is shown as having inlet ports 5 which communicate with suitable openings 6 in the valve casing or cage 7 which is by preference circular in cross-section and is located in suitable openings 8 in the engine head or other suitable support 4 as is clearly shown in Figs. 1 and 2 of the drawings. The valve casing or cage 7 is provided centrally with a tube 9 which extends from a point near the lower part of the casing or cage 7 to any suitable distance above the top of said casing. Slidably located in the tube 9 is a hollow valve stem 10 which carries on its lower end a valve head 11 which is of sufficient size to close a suitable opening or seat for the valve in the lower portion of said casing. The upper portion of the tubular or hollow valve stem 10 is provided with an annular groove 11^a in which is fitted a split ring or bushing 11^b which is firmly held in position by means of a collar 12 which has a shoulder 13 within its opening to rest against the lower portion of the ring or bushing 11^a as will be clearly seen and readily understood by reference to the drawings. Surrounding the tube 9 is a coiled spring 14 one end of which rests against the collar 12 and the other end thereof rests against the upper surface of the valve casing. The opening 8 in the upper portion of the engine head or support 4 may be provided with internal screw-threads to engage external screw-threads on a nut or collar 15 which surrounds the lower portion of the spring 14 as shown. The valve stem 10 is provided with a number of openings 16 to permit a suitable lubricant, placed in the cavity of the valve stem 10, to pass outwardly so as to lubricate the surfaces of said stem and the tube 9 which surrounds the same. In its

lower end the valve stem 10 is provided with a rounded depression or recess 17 to receive the correspondingly shaped lower end of an operating rod 18 for the stem and its valve. This operating rod is of sufficient length to extend some distance above the upper end of the valve stem 10 and has its upper end rounded as at 19 to fit in a correspondingly shaped recess 20 formed in the lower surface of a rocker-arm 21 which is mounted on a bracket 22 extended upwardly from the engine head 4 or other suitable support. The opposite end of the rocker-arm 21 is also provided with a rounded bearing 20 in its lower surface for the upper end of a rod 23 which may be reciprocated or operated in the usual manner by means of the cam shaft, not shown, of the engine, or any other suitable instrumentality.

The valve head 11 has on its upper surface near its periphery an annular groove 24 which is substantially V-shaped in cross-section but terminates at its apex in a recess 25 which is for the purpose of receiving dust or dirt or other foreign substances which might collect on the walls of the groove 24 and prevent the valve head 11 being properly seated on its seat 26 which is circular in shape and has its lower surface V-shaped in cross-section to correspond with the shape of the groove 24 in the valve head. The operating rod 18 is of such a size that in the operation of the valve said rod will not touch the valve stem 10 at any point except at the bottom of said stem.

In Fig. 2, of the drawing, I have shown a modification in the construction of the valve head, its seat, and in the construction of the lower end of the operating rod 18 and in the bearing for the lower end of said rod. In this modified form the valve stem or tube 10 is slidably located in the tube 9 of the valve casing, as in the other construction, and has on its lower end a valve head 11 which has near its periphery an upwardly extended annular head or rib 27 which is in the form of an inverted V in cross-section. This annular head or rib fits in a correspondingly shaped annular groove 27 formed in the lower surface of the valve seat of the casing, and said groove has at its apex an annular recess 28 employed for the same purpose as the annular groove or recess 25 in the above described construction. In this modified construction the bottom of the tube or stem 10 is provided with a conical shaped recess or depression 29 to receive the correspondingly shaped lower end 30 of the operating rod 18 for the valve and its stem, which rod is otherwise of the same construction and operated in a similar manner to that shown in Fig. 1 and above described.

From the foregoing and by reference to the drawing, it will be readily understood and clearly seen that as the rocker-arm 21 is

tilted in one direction, as shown by dotted lines in Fig. 1 of the drawing, the valve head 11 will be depressed so as to open the valve seat and to permit of the passage of motive fluid through the same into the cylinder. When moved as above stated, by the action of the rod 23 on the rocker-arm, it is apparent that the operating rod will be slightly inclined as shown by dotted lines in Fig. 1 as it contacts with the valve stem or tube 10 at its lower end only, and as it is of such size as to be incapable of contacting with said stem at any other point, it is obvious that there will be no friction between said parts except at their bearing points, yet the valve and its stem will be caused to reciprocate in an absolutely straight line, it being understood that the spring 14 will cause the upward or closing movement of the valve stem and valve head. While I have illustrated and described an embodiment of the invention in a form of construction for carrying it into effect, yet this is capable of variations and modifications, without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of the construction as set forth and disclosed, but desire to avail myself of such variations, modifications, and modes of its use, as come within the scope of the appended claim.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

1. A valve consisting of a casing having a valve seat, a hollow valve-stem slidably mounted in said casing, a valve head on said stem to close said seat, an operating rod freely located in the hollow valve-stem, and loosely engaging the same at its inner end, and means to reciprocate said rod, stem and valve.

2. A valve consisting of a casing having a valve seat, a hollow valve-stem slidably mounted in said casing, a valve-head on said stem to close said seat, an operating rod located in the hollow valve-stem and having one end in bearing contact therewith but otherwise free from said stem, and means to reciprocate said rod, stem and valve.

3. A valve consisting of a casing having a valve seat, a hollow valve-stem slidably mounted in said casing, a valve-head on said stem to close said seat, an operating rod located in the hollow valve-stem and having one end reduced and centered in bearing contact therewith but otherwise free from said stem, and means to reciprocate said rod, stem and valve.

4. A valve consisting of a casing having a valve seat, a tubular member extended through the casing from a point near said seat, a hollow valve-stem slidably mounted in said tubular member, a valve-head on said stem to close said seat, an operating

rod located in the hollow valve-stem, and means to reciprocate said rod, stem and valve.

5 5. A valve consisting of a casing having a valve seat, a tubular member extended through the casing from a point near said seat, a hollow valve-stem slidably mounted in said tubular member, and having one or more openings in its walls, a valve-head on said stem to close said seat, an operating rod located in the hollow valve-stem, and means to reciprocate said rod, stem and valve.

10 6. A valve consisting of a casing having a valve seat, a tubular member extended through the casing from a point near said seat, a hollow valve-stem slidably mounted in said tubular member, a valve-head on said stem to close said seat, a spring surrounding the tubular member and resting at one of its ends on the valve casing and having its other end connected to the valve-stem, an operating rod located in the hollow valve-stem and means to move said rod against the tension of said spring.

25 7. A valve consisting of a casing having a valve seat, a tubular member extended through the casing from a point near said

seat, a hollow valve stem slidably mounted in said tubular member and having one or more openings in its walls, a valve-head on said stem to close said seat, a collar on the opposite end of said stem, a spring interposed between said collar and the casing around said tubular member, an operating rod located in the hollow valve-stem and having one end reduced and centered in bearing contact therewith but otherwise free from said stem, and means to move the operating rod against the tension of said spring.

40 8. A valve consisting of a casing having a valve seat, a valve-stem slidably mounted in said casing, a valve-head on said stem to close said seat, said head and seat having a co-acting annular groove and an annular projection to fit in said groove, said grooves and projection being angular in cross-section and the groove having at its apex an annular recess.

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