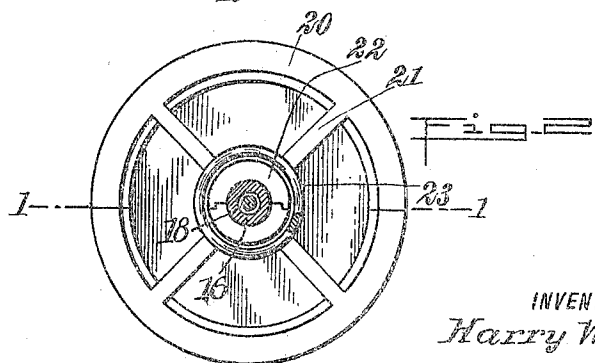
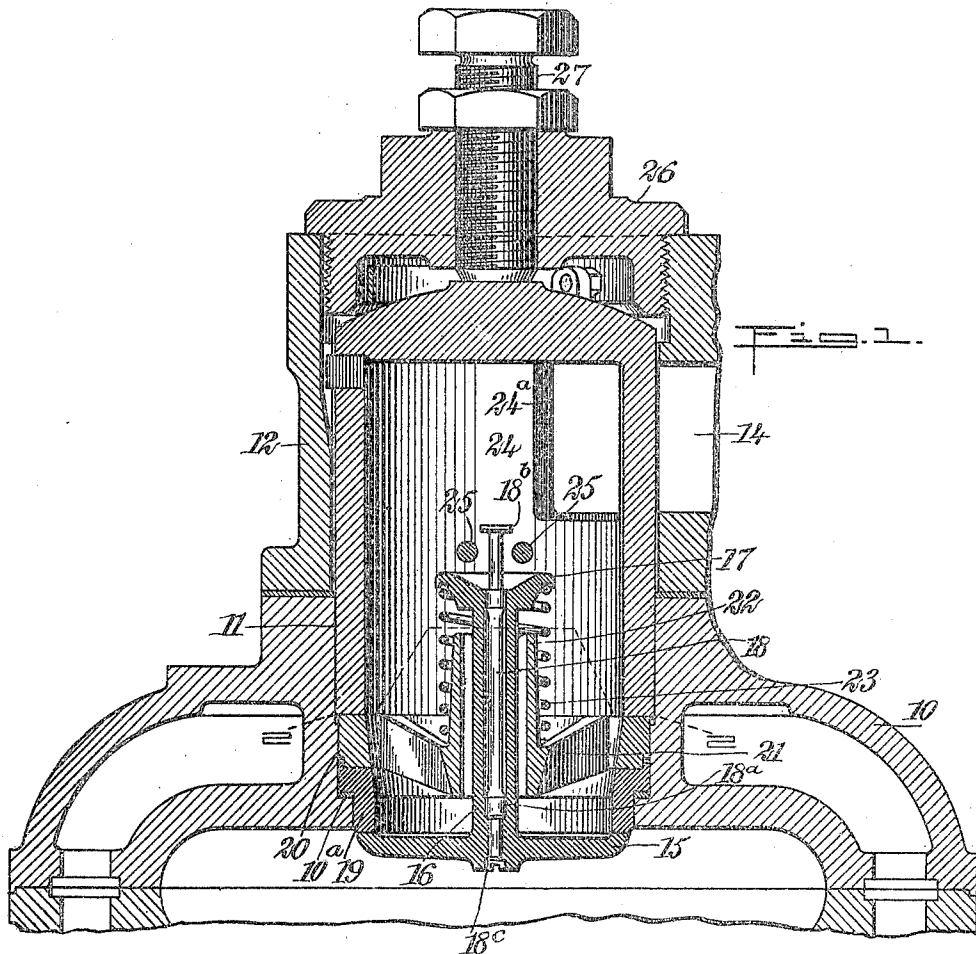


No. 811,361.

PATENTED JAN. 30, 1906.

H. W. BEACH.
VALVE.

APPLICATION FILED MAR. 22, 1905.



WITNESSES:
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HARRY W. BEACH, OF MONTROSE, PENNSYLVANIA.

VALVE.

No. 811,361.

Specification of Letters Patent.

Patented Jan. 30, 1906.

Application filed March 22, 1905. Serial No. 251,441.

To all whom it may concern:

Be it known that I, HARRY W. BEACH, a citizen of the United States, and a resident of Montrose, in the county of Susquehanna and State of Pennsylvania, have invented a new and Improved Valve, of which the following is a clear, full, and exact description.

The invention relates particularly to valves for internal-combustion engines, but it is useful in connection with other machinery, as will be apparent to persons skilled in the art.

The essential object of my invention is to provide a valve of the puppet type, which in the event of the fracture of the valve-stem will not fall into the chamber with which it communicates, the arrangement being such that the valve will be held approximately to its seat notwithstanding the fracture of the stem. I attain this end by certain peculiar features of construction and arrangement of parts, which will be fully set forth hereinafter and particularly pointed out in the claims.

Reference is had to the accompanying drawings, which illustrate the preferred embodiment of my invention, in which drawings like numerals of reference indicate like parts in both views.

In said drawings, Figure 1 is a sectional view showing the valve, its housing, and the adjacent parts thereof on the line 1 1 of Fig. 2; and Fig. 2 is a sectional plan on the line 2 2 of Fig. 1.

I have shown my invention applied to the cylinder-head 10 of an internal-combustion engine. In Fig. 1, 11 indicates a cavity formed in the head to receive the valve and its housing, and 12 indicates a case which is mounted on the head over the cavity 11 and has a port 14 therein, through which the explosive mixture passes to the valve, as will be hereinafter described.

15 indicates the valve, which is here shown as of the puppet type and the stem 16 of which is tubular and provided with a head or enlargement 17 at the end opposite the valve. Located within the tubular stem 16 of the valve 15 is a rod 18, the lower end of which is securely fastened in the valve or its stem below the point at which breaking is liable to occur. Preferably said lower end of the rod is driven into place and the extremity of the rod upset or riveted, as is indicated at 18^c in Fig. 1. The rod is provided with a head 18^b of such size that it will be incapable of passing through the opening in the tubular stem 16.

19 indicates the seat of the valve, which

seat is annular in form and is secured within the opening 11 of the cylinder-head, the cylinder-head having a shoulder 10^a, as shown, against which the annular valve-seat bears. Bearing against the valve-seat 19 is a split ring 20, the form of which is best shown in Fig. 2. This split ring 20 carries with it inwardly-projecting spider-arms 21, which support a split stem-guide 22. The stem-guide 22 extends vertically and engages loosely and guides the tubular valve-stem 16.

23 indicates a spring which bears on the arms 21 and on the head 17, said spring tending to keep the valve 15 seated, but permitting the valve to open from pressure against the inner side thereof, as will be understood from the prior art.

Located within the opening 11 of the cylinder-head and within the case 12 is the cage 24 of the valve. This cage is cylindric in form, according to the construction here illustrated, and it is formed with an opening 24^a, registering with the port 14. The cage is held in position by means of a screw-plug 26 in the top of the case 12 and a set-screw 27 operating in said plug. Secured within the case 24 and extending across the same are two stop-rods 25, which pass over the head 17 of the tubular valve-stem 16 and are intended to limit the upward movement of said head upon the breakage of the valve-stem, as will hereinafter fully appear.

The valve-stem thus constructed and arranged operates as an ordinary automatic or spring-seated valve, the valve opening upon pressure against the inner side and closing upon the relief of this pressure. Should the stem 16 of the valve break, the lower part of the stem and the valve attached thereto will drop, bringing with it the rod 18 until the head 18^b of the rod engages the head 17 of the valve-stem. This will limit the dropping or downward movement of the valve and the lower fractured part of its stem. Meanwhile the spring 23 will have asserted itself and lifted the upper part of the stem and the head 17 until the stop-rods 25 are engaged by the head 17. This limits the upward movement of the upper fractured part of the stem and its head. It will be seen, therefore, that by this arrangement the valve is kept from dropping into the chamber with which it communicates. While the stop-rods 25 are preferred, they are not absolutely essential. A stop of other form might be used or the stop dispensed with and the tension of spring

23 made such as to lift the head 17 only to the desired point, or the length of the pin 18 may be increased to compensate for the extra movement given the head 17 in case of break-

5 age.

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

10 1. A valve having a tubular stem, a rod extending through the stem, and fastened therein adjacent to the valve, and means co-acting with the end of the rod opposite the valve for sustaining the rod and its attach-

15 2. A valve having a tubular stem, a rod extending through the stem and having one end in connection with the valve, and means co-acting with the other end of the rod for sustaining the rod and its attachments.

20 3. A valve having a tubular stem with a head or enlargement at the end opposite the valve, a rod extending through the stem and having one end in connection with the valve, the other end of the rod having an enlarge-
25 ment adapted to engage the stem, and means for sustaining the rod and its attachments through the medium of the head of the valve-stem.

30 4. A valve having a tubular stem with a head or enlargement at the end opposite the valve, a rod extending through the tubular stem and having one end in connection with the valve, the rod having at the opposite end a head or enlargement adapted to engage the
35 valve-stem, a spring pressing the head of the valve-stem upward, and a stop for limiting the upward movement of the head.

40 5. The combination with a valve-seat, of the valve coacting therewith, a tubular stem connected to the valve and having a head or enlargement at the end opposite the valve, a

stem-guide, a spring bearing between the stem-guide and the head of the valve-stem, a rod extending through the tubular stem and having connection with the valve, and a stop
45 lying opposite the enlargement on the head and adapted to be engaged by the head upon the fracture of the valve-stem.

6. The combination of a valve, a stem connected thereto, a rod also connected to the
50 valve, means operative upon the fracture of the stem for connecting the rod and stem at the end of the stem removed from the valve, and a means for sustaining the last-named end of the stem.

7. The combination of a valve, a stem connected thereto, a rod also connected to the
55 valve, means operative upon the fracture of the stem for connecting the rod and stem at the end opposite the valve, a spring pressing said end of the stem to sustain the stem and valve, and a stop for limiting the movement of the stem under the action of the spring.

8. The combination with a valve-seat, of a
65 valve coacting therewith, a tubular stem connected to the valve, a rod extending through the tubular stem and connected to the valve, means operative upon the fracture of the stem for joining the rod and stem at the end removed from the valve, a split stem-guide
70 loosely receiving the tubular stem, a spring acting between the stem-guide and stem, and a stop for limiting the movement of the stem under the action of the spring.

In testimony whereof I have signed my
75 name to this specification in the presence of two subscribing witnesses.

HARRY W. BEACH.

Witnesses:

S. R. SPROUT,

H. H. MORRIS.