(No Model.)

E. A. RIX.

AIR VALVE.

No. 602,170. Patented Apr. 12, 1898.

Fig. I.

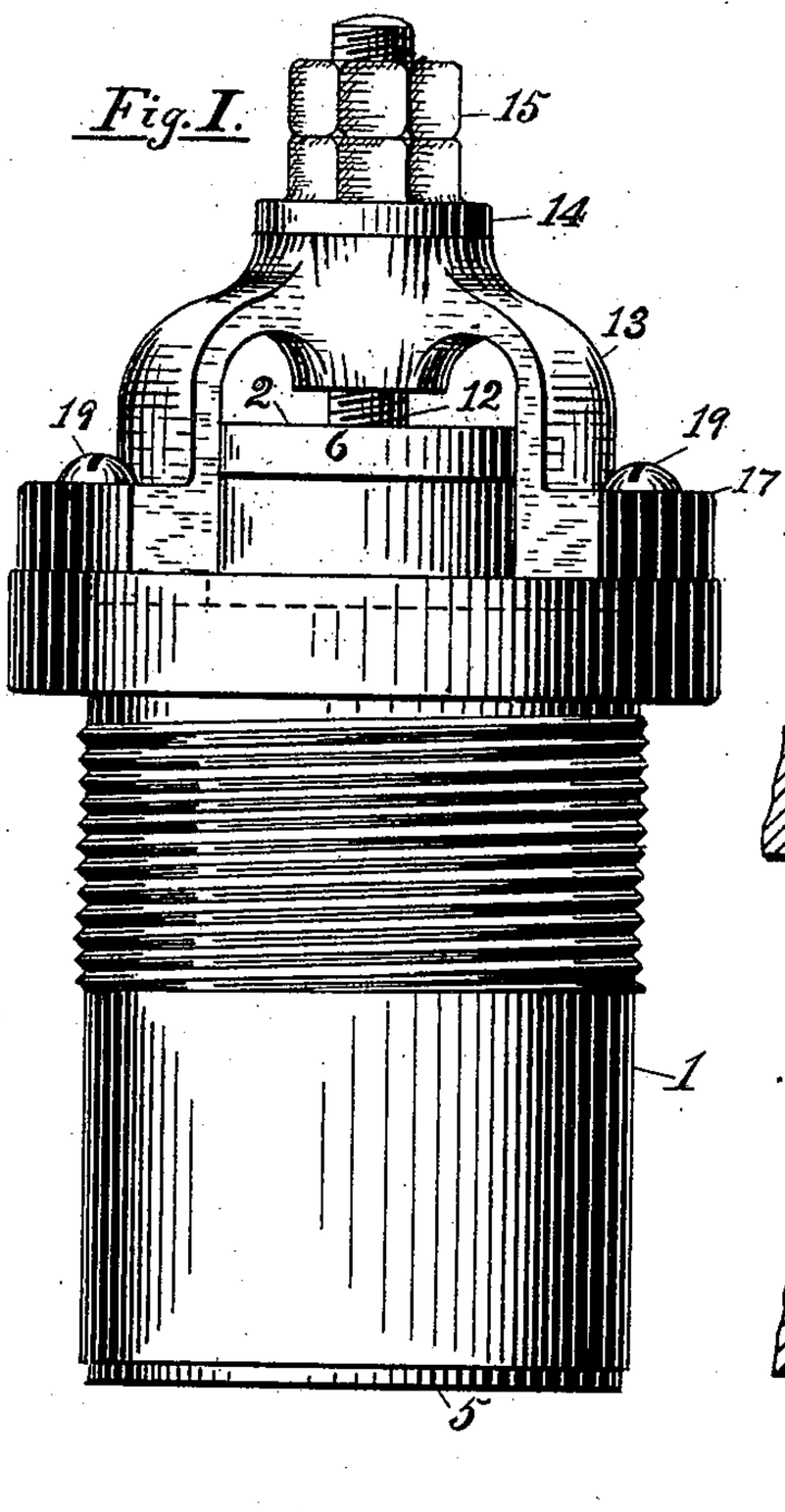


Fig. II.

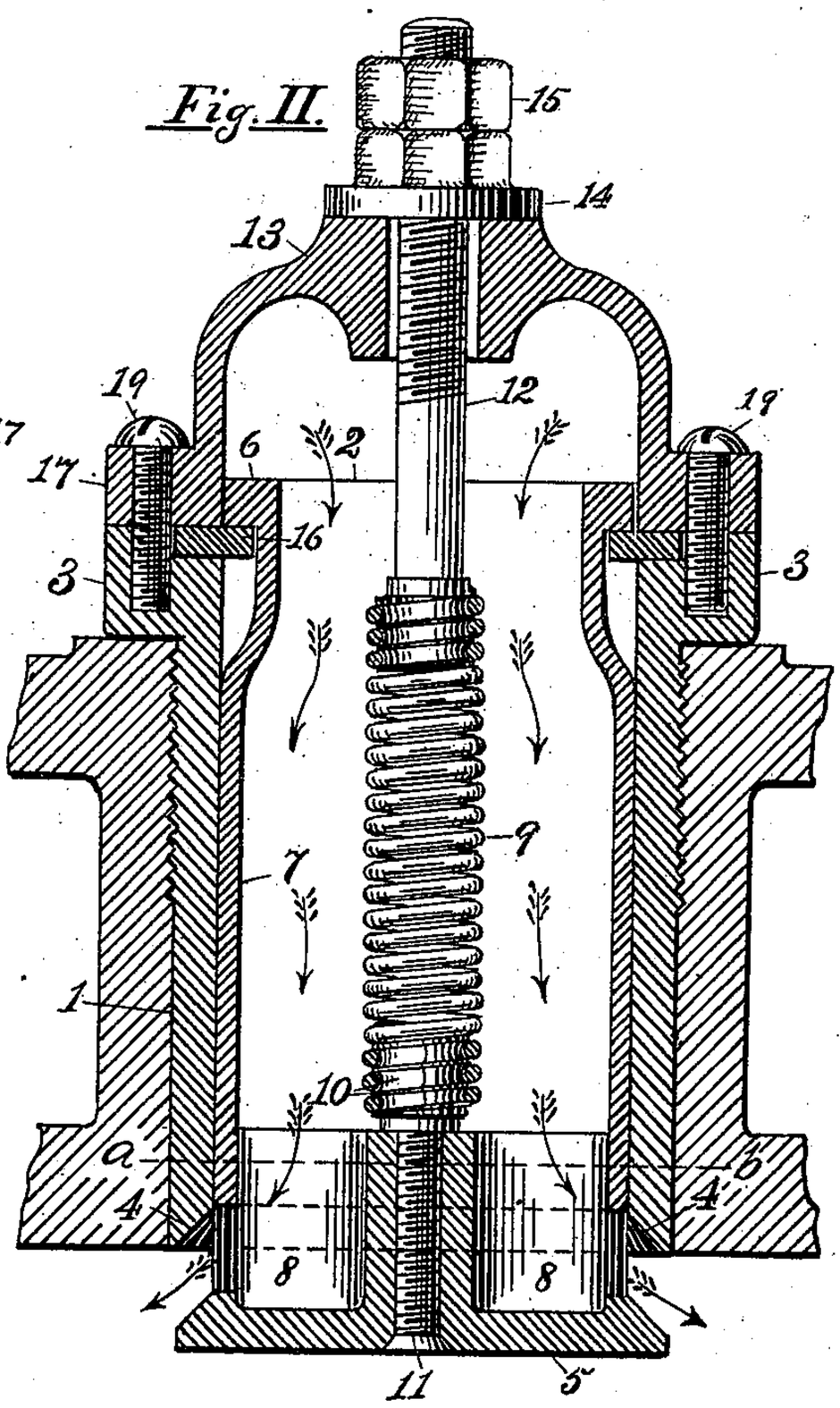


Fig. III.

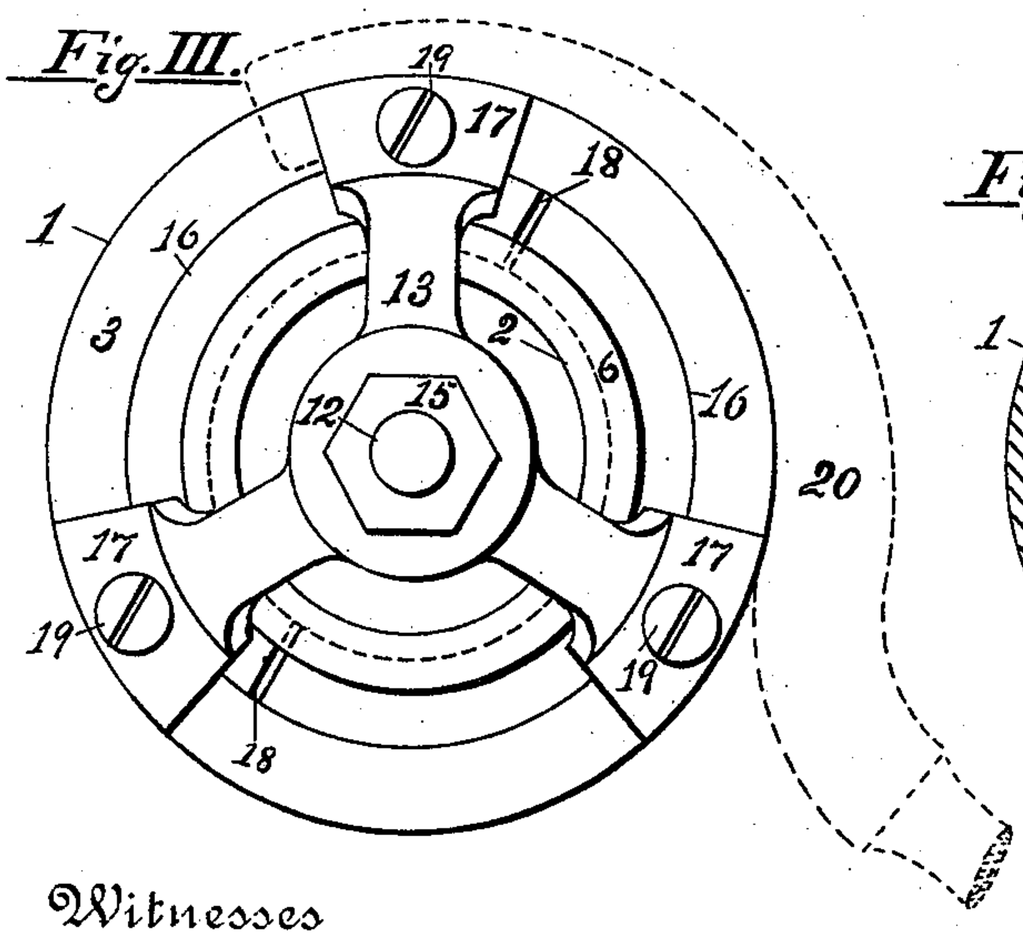
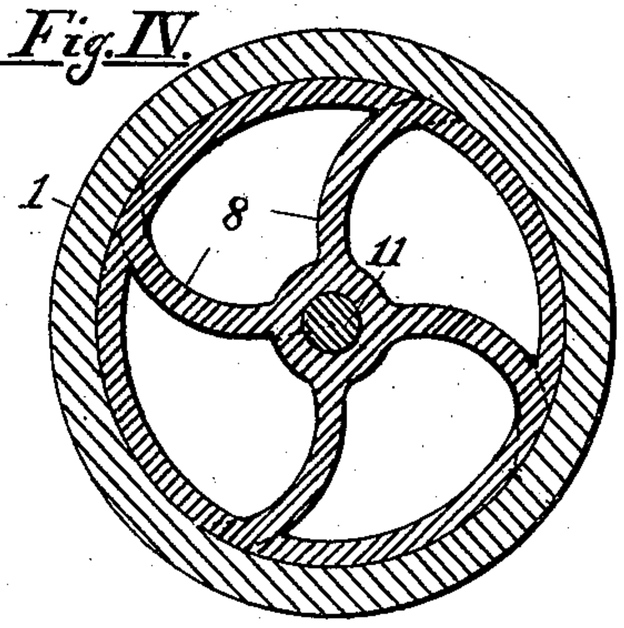


Fig. IV.



Witnesses
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UNITED STATES PATENT OFFICE.

EDWARD AUSTIN RIX, OF SAN FRANCISCO, CALIFORNIA.

AIR-VALVE.

SPECIFICATION forming part of Letters Patent No. 602,170, dated April 12, 1898.

Application filed August 18, 1897. Serial No. 648,712. (No model.)

To all whom it may concern:

Be it known that I, EDWARD AUSTIN RIX, a citizen of the United States, and a resident of the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Air-Valves, of which the following is a specification.

My invention relates to air-compressing apparatus and to an improvement in the induction-valves of engines for that purpose.

My improvements consist in a hollow cylindrical valve sliding in an outer or main shell so arranged as to provide a large area for the inlet of air, means to cause the valve to rotate when working, means to guard against the valve falling into the compressing-cylinder in case the spring is broken, in an extensible or tension spring instead of a compressed one to hold the valve shut, and in other constructive and operative features that will be pointed out in connection with the drawings.

The objects of my improvements are to attain safety from accident, durability, and a more efficient action of such valves.

Referring to the drawings, Figure I is a side elevation of one of my improved air-valves detached, showing the valve closed. Fig. II is a longitudinal section through the same valve, showing the valve open. Fig. III is a plan view showing the top of Fig. I, the dotted lines indicating a spanner for screwing the valve into its support. Fig. IV is a transverse section on the line *a b* in Fig. II.

The valve as a whole consists of two principal members—the main or supporting shell 1 and the movable part 2—the main shell 1 being provided with an abutting flange 3, screw-threads to hold the shell in place, and a valve-seat 4, against which the disk 5 closes when the valve is shut. This shell 1 instead of being secured into its support can be fastened by a flange and screw-bolts or be pressed in and held by friction. I have shown a method found preferable for valves of small size. The movable portion 2 is formed with a stop-flange 6 at the outer end, a cylindrical portion 7, that fits loosely in the shell 1, a valve-disk 5, and curved wings 8, that connect the disk 5 with the cylindrical portion 7, all formed integrally, as shown in Figs. II and IV. This valve or movable member 2 when not in action is held outward or shut by means of a coil-spring 9, attached at the bottom by means of the helical groove 10 to the stem 11, which is firmly secured in the bottom of the valve, as seen in Fig. II. This spring 9 is similarly attached to the stem 12, that passes loosely through the support 13, and is provided with washer 14 and lock-nuts 15.

The tension of the spring 9 and the closing strain on the valve 2 are regulated by the screw-nuts 15, the stem 12 remaining stationary in respect to the working stroke of the valve. The inward or opening stroke of the valve is regulated by the collar 6 coming in contact with the ring 16, which rests in a seat formed in the top of the shell 1, and is held in place by the feet 17 of the stem-support 13.

The ring 16 is divided, as shown at 18 in Fig. III, so as to be inserted beneath the flange 6 on the valve 2. The feet 17 of the stem-support 13 are held by the screws 19, and besides holding the ring or stop 16 furnish detents for a spanner 20, as indicated by dotted lines in Fig. III.

It is not necessary to make the safety-ring 16 in two pieces, as shown in Fig. III. It might be made in more than two pieces, and the stem-support 13 instead of holding the ring in position by three feet might be made with a continuous flange resting upon the safety-ring, or the ring itself might be fastened independently to the valve-casing 1 and be independent of the member 13, or instead of being a continuous ring might consist of one or more short segments.

The tension-spring 9, arranged as shown, is efficient for the purpose, because the rigid rods at each end of the spring constitute it a flexible rod and there are no pieces to shake or jar loose in its construction.

It is not necessary to rigidly fasten the tension-spring 9 to the rods 11 and 12, as shown in the drawings. They may be hooked to these rods or fastened in any other manner. The stem 12 being stationary as to reciprocation, the nuts 15 are not liable to jar loose.

The wings 8 are curved, as seen in Fig. IV, so the air passing out radially will exert some turning force on the valve and cause it to slightly rotate during its movement, thus preserving the valve-seat from irregular wear and maintaining a close joint against escape of air during compression.

The operation of my improved inlet-valve is as follows: The piston of the air-compressing engine after discharging the air from the cylinder in making a return stroke causes a slight vacuum within the compression-chamber and the atmosphere pressing upon the valve-disk 5 causes it to open against the resistance of the spring 9 and air rushes in, as indicated by the arrows, and passes into the air-cylinder, the valve closing upon completion of the stroke.

These inlet-valves, as will be understood, are inserted in the heads or cylinders of air-compressing engines, the number corresponding to the volume of air to be admitted, and, as seen, consist of a few simple elements or parts that are safe from accident or derangement.

Having thus described the nature and objects of my invention, I claim—

1. In an air-inlet valve, a main shell or casing, an annular valve-shell sliding therein, a stop-collar around the outer end of the valve-shell and a positive stop-ring therefor, fitting into a recess in the outer end of the main shell and held by the valve-stem support, substantially as described.

2. In an air-inlet valve, a main shell or casing, a tubular valve-shell sliding therein, having at one end an integrally-formed stop flange or collar, and at the other end an integrally-formed valve-disk reinforced by integral radial wings, passages or apertures through the valve-shell between the said wings and just above the valve-disk, a positive stop for the collar, removably secured to the said main shell, a tension-spring attached to said valve-disk, and a revoluble stem supporting said spring and valve-shell, substantially as specified.

3. In an air-inlet valve a fixed or main shell, a sliding annular valve-body therein, a disk-valve integrally joined to the latter by curved vanes, with radial passages through the shell between said vanes, and an extensible helical spring centrally attached to said valve by a rigid connection, and attached also to a rotating stem at the upper end of said spring, whereby the valve is kept closed when not in action, substantially as described.

4. In an air-inlet valve, a main shell or casing, with means for removably attaching the same to an air-cylinder, a tubular valve-shell sliding therein, having at one end an integrally-formed stop flange or collar, and at the other end an integrally-formed valve-disk, reinforced by integral radial wings, passages or apertures through the valve-shell between the said wings and just above the valve-disk, a positive stop-ring 16 for the stop flange or collar, an open-sided support 13 removably attached to the main shell and securing the said stop-ring 16, a revoluble stem 12 sustained by the open support 13, and a tension-spring 9 attached to the said stem and to the valve-disk, whereby the latter is held closed when not in action, substantially as specified.

5. In an air-inlet valve a fixed main shell, a hollow or annular valve-shell sliding therein, a coiled extension-spring to hold the valve shut when not in action, an adjustable stem connecting to the spring and held by an open-sided support 13 attached to the end of the main shell, partially covering and securing the stop-ring 6, in the manner substantially as described.

6. An air-inlet valve comprising a main shell with means for removably attaching the same to an air-cylinder, a tubular valve-shell sliding therein, having at one end an integrally-formed stop flange or collar, and at the other end an integrally-formed valve-disk reinforced by radial wings, passages or apertures through the valve-shell between the said wings and just above the valve-disk, a removable stop-ring 16 for the stop flange or collar, an open-sided support 13 removably attached to the main shell and securing the said stop-ring 16, a revoluble stem 12 sustained by the open support 13, having adjusting-nuts 15, and a tension-spring 9, attached to the said stem and to the valve-disk, whereby the latter is held closed when not in action, substantially as specified.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

EDWARD AUSTIN RIX.

Witnesses:
K. L. NEVINS,
H. SANDERSON.