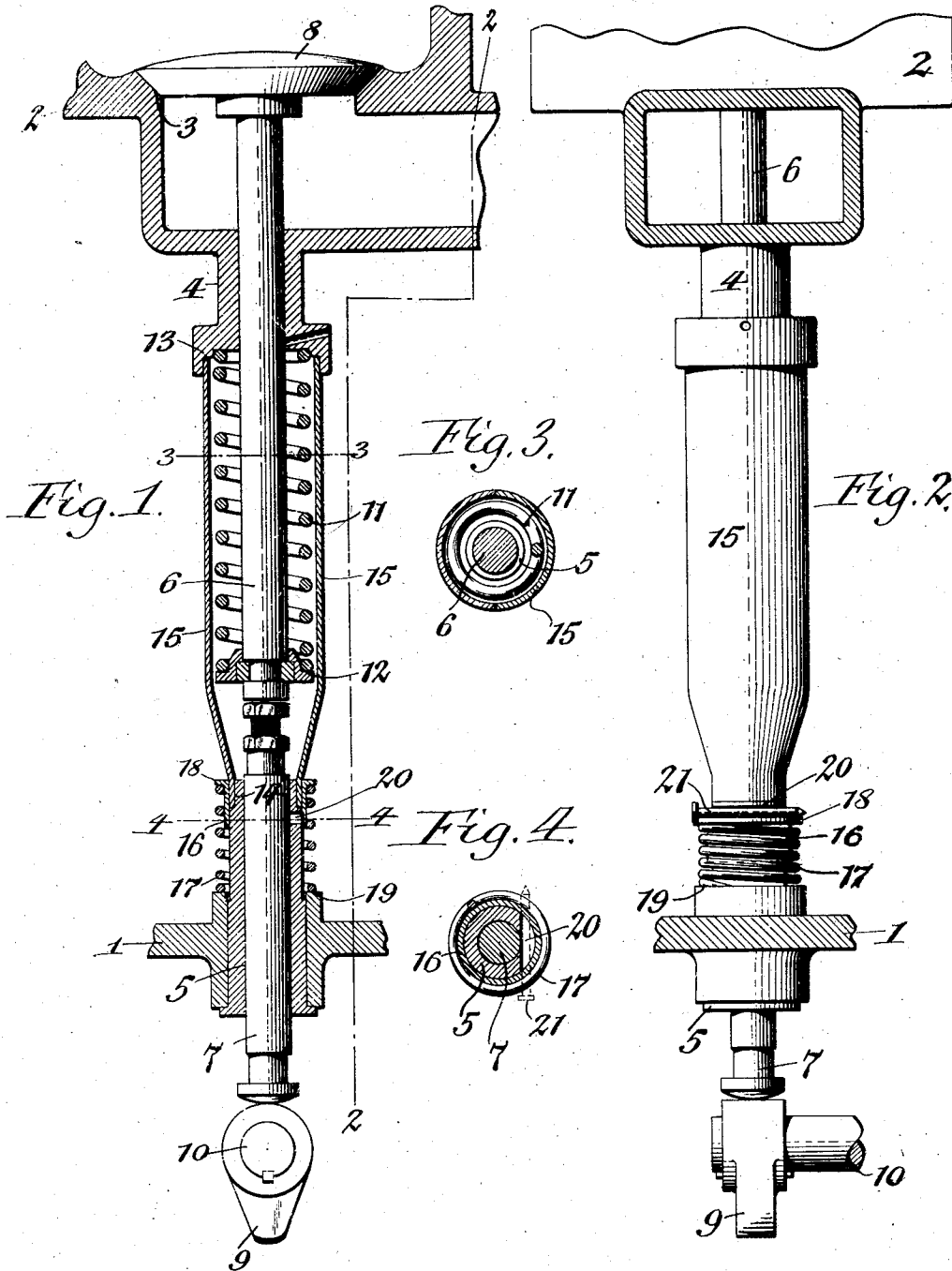


W. E. BLAIR.
VALVE STEM HOUSING.
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1,037,856.

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UNITED STATES PATENT OFFICE.

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VALVE-STEM HOUSING.

1,037,856.

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To all whom it may concern:

Be it known that I, WILLIAM E. BLAIR, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Valve-Stem Housings, of which the following is a specification.

This invention relates to means for protecting the valve guides and the valve stems of explosion and other engines or machines so as to exclude dirt or grit from these guides and stems and prevent undue wear thereof.

It is the purpose of this invention to provide improved means for this purpose which can be readily, quickly and conveniently applied to the engine and removed therefrom and which are reliably held in place and not liable to get out of order when in use.

In the accompanying drawings: Figure 1 is a fragmentary vertical cross section of an explosion engine showing one of its valves and the operating mechanism therefor equipped with my improved protecting means. Fig. 2 is a longitudinal sectional elevation thereof taken in line 2—2, Fig. 1. Figs. 3 and 4 are horizontal sections in the correspondingly numbered lines in Fig. 1.

Similar characters of reference indicate corresponding parts throughout the several views.

1 represents the lower part of the engine frame or base, 2 the valve chest or chamber having a port 3, 4 an upper valve stem guide arranged on the dust below the port thereof and 5 a lower valve stem guide arranged on the base in line with the upper guide.

Sliding vertically in the upper and lower guides are the upper and lower sections 6, 7 of a divided valve stem which are arranged to abut at their opposing ends. On the upper end of the upper valve stem section is arranged a valve 8 which is adapted to open and close said port. This valve may be either the gas inlet or the exhaust valve of an explosion engine or it may be embodied in other kinds of engines or machines where similar conditions exist. Engaging with the lower end of the lower valve stem section is a rotatable cam 9 which is mounted on an operating shaft 10. When the high part of this cam engages with the valve stem the latter together with the valve is raised and the valve is opened.

11 represents a spiral valve spring sur-

rounding the upper section of the valve stem and bearing at its upper end against the lower end of the upper guide while its lower end engages with a collar or shoulder 12 on the upper valve stem section. When the cam presents its low part to the valve stem the latter and the valve are depressed by the valve spring and the valve is closed. At its lower end the upper valve stem guide is provided with an annular recess 13 around the valve stem which opens downwardly. At its upper end the lower valve stem guide is reduced so as to form, an annular upwardly facing shoulder 14.

Arranged between the upper and lower guides is a tubular housing or casing which is preferably divided lengthwise into two like longitudinal sections 15, 15, the upper end of this housing being preferably cylindrical and of comparatively large diameter and the lower end also of cylindrical form but of small diameter and connected by a downwardly tapering intermediate part with said upper end.

While separated the two sections of the housing are applied to the guides on opposite sides thereof so as to inclose the valve spring and the adjacent parts of the valve stem by first tilting these housing sections so that they diverge downwardly relatively to each other and while in this position slipping their upper ends into the recess of the upper guide. After the housing sections have been thus engaged at their upper ends with the recess of the upper guide the lower ends of these sections are swung inwardly or toward each other so that they engage with the reduced upper end of the lower guide and rest on the shoulder 14 thereof. The housing sections are then held in this position by means of a locking collar 16 which surrounds the lower guide and is slipped upwardly so as to inclose the lower ends of the housing sections which together are of cylindrical form. The locking sleeve is yieldingly held in this position by a retaining spring 17 surrounding the lower guide and the locking sleeve and bearing at its lower end against a shoulder 19 formed on the adjacent part of the base or other support while its upper end bears against an external annular shoulder or flange 18 arranged at the upper end of the locking sleeve. The upward movement of the locking sleeve under the action of the retaining

spring is limited by engagement of the conical or tapering intermediate part of the housing. While the locking sleeve is thus elevated into its upper operative position the retaining spring does not carry the weight of the housing inasmuch as the latter is supported solely by the shoulder 14 of the lower guide and the retaining spring merely serves to hold the locking sleeve in its operative position. When the locking sleeve is depressed below the lower end of the housing sections the latter can be moved freely toward and from the lower guide.

In order to permit of using both hands when applying the housing sections to or removing the same from the guides means are provided for holding the locking sleeve in its depressed inoperative position when required. The preferred means for this purpose comprises a horizontal slot, notch or groove 20 formed on one side of the periphery of the lower guide and below its shoulder 14 and a retaining key or pin 21 adapted to be placed in said slot after the locking sleeve has been depressed, whereby the latter will be pressed at its upper end against the key by the retaining spring and thus prevented from rising, as shown in Fig. 2.

My improved housing for valve stem does not disturb the valve spring or other parts of the engine and can be as readily applied to or removed from the engine when the same is running as when the same is standing still, which is important as this permits the operator to inspect the valve springs without stopping the engine. There are no parts in this fixture which are liable to become loose or rattle due to the constant vibration of the engine, on the contrary, all the parts are held tight against one another by the retaining spring so that all possibility of noise or looseness is eliminated.

I claim as my invention:

1. The combination of a valve chamber having a port, an upper valve stem guide and an annular recess around the outer end of said upper guide, a lower valve stem guide, a valve stem sliding in said guides and provided at its upper end with a valve which is adapted to open and close said port, a cam engaging the lower end of said stem for opening the valve, a spring surrounding the stem between said guides and operating to close said valve, a tubular housing inclosing said spring and divided lengthwise to form longitudinal sections, said housing sections being engaged at their upper ends with the recess of the upper guide and their lower ends engaging with the outer side of said lower guide, and a longitudinally movable locking sleeve engaging with the outer side of said housing sections at the lower ends thereof.

2. The combination of a valve chamber

having a port, an upper valve stem guide and an annular recess around the outer end of said upper guide, a lower valve stem guide provided with an external annular shoulder which faces upwardly, a valve stem sliding in said guides and provided at its upper end with a valve which is adapted to open and close said port, a cam engaging the lower end of said stem for opening the valve, a spring surrounding the stem between said guides and operating to close said valve, a tubular housing inclosing said spring and divided lengthwise to form longitudinal sections, said housing sections being engaged at their upper ends with the recess of the upper guide and their lower ends engaging with the shoulder on the outer side of said lower guide, and a longitudinally movable locking sleeve engaging with the outer side of said housing sections at the lower ends thereof.

3. The combination of a valve chamber having a port, an upper valve stem guide and an annular recess around the outer end of said upper guide, a lower valve stem guide provided with an external annular shoulder which faces upwardly, a valve stem sliding in said guides and provided at its upper end with a valve which is adapted to open and close said port, a cam engaging the lower end of said stem for opening the valve, a spring surrounding the stem between said guides and operating to close said valve, a tubular housing inclosing said spring and divided lengthwise to form longitudinal sections, said housing sections being engaged at their upper ends with the recess of the upper guide and their lower ends engaging with the shoulder on the outer side of said lower guide, a longitudinally movable locking sleeve engaging with the outer side of said housing sections at the lower ends thereof, and a spring operating to hold said sleeve yieldingly in its elevated position in engagement with said housing sections.

4. The combination of a valve chamber having a port, an upper valve stem guide and an annular recess around the outer end of said upper guide, a lower valve stem guide provided with an external annular shoulder which faces upwardly, a valve stem sliding in said guides and provided at its upper end with a valve which is adapted to open and close said port, a cam engaging the lower end of said stem for opening the valve, a spring surrounding the stem between said guides and operating to close said valve, a tubular housing inclosing said spring and divided lengthwise to form longitudinal sections, said housing sections being engaged at their upper ends with the recess of the upper guide and their lower ends engaging with the shoulder on the outer side of said lower guide, a longitudi-

5 dinally movable locking sleeve engaging with the outer side of said housing sections at the lower ends thereof, a spring operating to hold said sleeve yieldingly in its elevated position in engagement with said housing sections, and means for holding said locking sleeve yieldingly in its lowered inoperative position.

10 5. The combination of a valve chamber having a port, an upper valve stem guide and an annular recess around the outer end of said upper guide, a lower valve stem guide provided with an external annular shoulder which faces upwardly, a valve stem sliding in said guides and provided at its upper end with a valve which is adapted to open and close said port, a cam engaging the lower end of said stem for opening the valve, a spring surrounding the stem between said guides and operating to close said valve, a tubular housing inclosing said spring and divided lengthwise to form lon-

gitudinal sections, said housing sections being engaged at their upper ends with the recess of the upper guide and their lower ends engaging with the shoulder on the outer side of said lower guide, a longitudinally movable locking sleeve engaging with the outer side of said housing sections at the lower ends thereof, a spring operating to hold said sleeve yieldingly in its elevated position in engagement with said housing sections, and means for holding said locking sleeve yieldingly in its lowered inoperative position comprising a retaining key adapted to engage with a transverse slot in the exterior of said lower guide and with the upper edge of said locking sleeve.

Witness my hand this 7th day of February, 1912.

WILLIAM E. BLAIR.

Witnesses:

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