(No Model.)

G. H. F. SCHRADER.

TIRE OR LIKE VALVE.

No. 555,665. Patented Mar. 3, 1896.

FIG. 1.

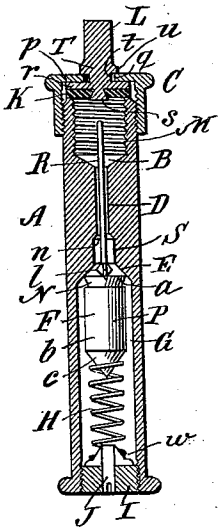


FIG. 2.

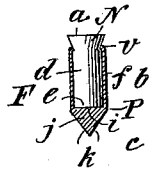


FIG. 3

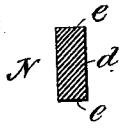


FIG. 4

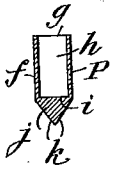
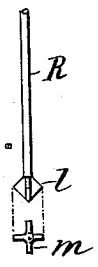


FIG. 5



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TIRE OR LIKE VALVE.

SPECIFICATION forming part of Letters Patent No. 555,665, dated March 3, 1896.

Application filed March 1, 1895. Serial No. 540,214. (No model.)

To all whom it may concern:

Be it known that I, GEORGE H. F. SCHRADER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Tire or Like Valves, of which the following is a specification.

This invention relates to tire-valves, pneumatic valves, and the like, and aims to provide certain improvements in such devices. Such valves must be of such small proportions that the several parts are necessarily very diminutive, usually consisting of a small plunger constituting the valve proper, a spring holding it to the seat, and a stem projecting from it exteriorly of the valve-casing and engaged by a stopper screwing on the latter. The casing inclosing these parts is usually secured within a small rubber tube inclosing its body when applied to the tire, and is adapted at its outer end, by a screw-threaded socket or otherwise, for attachment to an air-pump. To deflate the tire the valve is forced inwardly by pressing on its stem.

My invention provides an improved plunger or valve proper, improved means for deflating the valve, and an improved cap having a swiveled packing for closing the end of the casing, all as will hereinafter be more fully set forth.

In the accompanying drawings, Figure 1 is an axial section of a tire-valve embodying the preferred form of my improvements, the valve proper being closed and the cap on. Fig. 2 is a sectional view of the valve proper. Fig. 3 is an axial section of the packing-washer thereof. Fig. 4 is an axial section of the outer casing thereof, and Fig. 5 is a fragmentary side elevation and end view of my improved deflater on a larger scale.

Referring to the drawings, let A represent the valve-casing; B, the ingress end thereof; C, the cap therefor; D, the conduit through the valve; E, the valve-seat; F, the valve proper seating thereon; G, the valve-chamber inclosing the latter; H, the valve-spring; I, a plug closing the valve-chamber, and J the egress-duct from the valve. In their general features these parts may be of any usual or suitable construction. The construction shown operates in the usual manner, the valve proper, F, closing on the seat E under the pressure of the air confined within the valve and the tension of the spring H to prevent egress of air through the valve when the valve is closed, and moving inwardly from the seat to permit ingress of air when the valve is open. The cap C, as usual, screws onto the externally-screw-threaded end of the casing to close this end and carries a washer K, making a tight joint. It has the ordinary deflating-point L, which, when the cap is unscrewed, can be inverted and pushed into the casing to depress the valve proper if the latter has a projecting stem. Beneath the cap the casing has an internally-screw-threaded socket M, into which may screw the coupling of an air-pump for filling the valve.

According to that feature of my invention which relates to the valve proper, one point of improvement resides in the shape of this member and another in its details of construction. It preferably has the shape of an elongated and substantially cylindrical body extending from its seating-face *a* opposite the seat E downwardly in the form of a body *b* to its lower end, which is a tapering or conical part *c* terminating in a pointed or reduced end. The body is slightly less in diameter than the interior of the chamber G, leaving sufficient space between the adjacent walls for a passage through the valve, but being sufficiently large to prevent undue tilting of the valve proper within the chamber. The pointed end enters within the upper end of the coil-spring H, and by reason of its shape properly seats itself therein, so that thereby it is guided by this spring and hence maintained substantially centrally of the chamber. When thus constructed the manipulation of the body within the casing is an easy matter, and slight obstruction is offered to the escape through the valve when deflation is desired.

The top face of the valve is preferably a flat smooth circular face *a*, the edges of which bear on the annular inclined or otherwise suitably-shaped seat E, this bearing being at the periphery of the body only, so that a small portion of the valve proper and seat are in contact under relatively great pressure, thus insuring a tight joint at the point of contact.

The valve-body may be of any construction

or material; but I prefer that its face *a* should be of soft rubber or equally suitable packing material.

The improvement in the construction of the valve proper resides in constructing it of an elongated and imperforate piece of packing material, preferably a cylindrical bar of rubber having a body portion *d* and a square face *e* at each end, cut at right angles to the axis of the body, and providing a surrounding cup or covering for this body, formed of a slender outer wall of metal and a heavier inner end of the same material. The body of packing material is lettered N and the casing or covering P. The latter consists preferably of a single piece of metal in the form of a cylinder *f*, having an opening *g* at the top, very thin annular walls, a central socket *h*, a flat bottom *i*, and a solid inner end *j*, having tapering walls *k* extending from the cylindrical portion *f* downwardly to a point. The socket *h* is preferably slightly less in diameter and in length than the diameter and length of the packing-material body N, and the latter is forced into the former until its end face, *e*, seats on the bottom face, *i*, of the socket, whereupon its upper end will protrude slightly beyond the mouth *g* of the socket and the remainder of its body will be tightly held within the casing or envelope P. The envelope will serve as the outer and lower portion of the valve proper, and the rubber body as the inner portion thereof and the seating-face therefor. The envelope will give the necessary stability to the body and take the wear incident to its movements and contact with the spring, while the inner rubber will serve as an elastic member and a packing material. Thus the valve proper will be light of weight, strong, and abundantly yielding and effective in making a tight closure.

By making the seat taper the soft valve opposed to it can be squeezed tightly into the seat, its soft exposed end being compressed therein. Its imperforate body avoids the necessity of a metallic closing-cap for preventing leakage through the valve, and the envelope surrounding the body of the valve at rear of its soft seating end preserves the body from distortion and assists in properly guiding it as its end is squeezed into the seat.

Another feature of improvement relates to the means for deflating the valve, or holding the valve proper in the open position. For this purpose my invention provides an improved deflater, which consists of a rod or member normally inseparably mounted in the valve-casing, freely movable therein, and unattached to the valve proper. This is best constructed as a slender rod projecting with its narrow portion through the narrow neck or duct D of the casing, from the valve chamber into the outer socket M, and having an enlarged head *l* within the valve-chamber or this duct, of greater size than the diameter of the duct, serving to prevent outward escape of the deflater and answering as a head or bearing end for engaging the valve proper. The head *l* rests on the face *a* of the valve proper, and when the deflater is pushed inwardly, by the point L of the cap or otherwise, it correspondingly moves inwardly the valve proper, thus unseating the latter and permitting the escape through the valve. When released the deflater will be moved outwardly by the valve as the latter seats. To give abundant room for the deflater I prefer to form the casing A with a chamber S, between the valve-seat E and the duct D, into which the head of the deflater may pass, and to facilitate the passage of air around the head I construct the latter with notches or ducts *m* traversing its head. The contracted shoulder *n* at the top of the chamber S limits the outward movement of the deflater. The lower end of the deflater is preferably sharp or pointed, so that it penetrates centrally the soft face of the valve proper to a sufficient extent, as it is depressed against the latter, to maintain the latter in the central position after it leaves the seat E, thus avoiding the danger of tilting the valve and relying for its restoration to the proper position on pressure from within.

Many advantages result from making the deflater and valve separate and unconnected parts. When so made the deflater can be extremely small and light and the valve need not be perforated or otherwise constructed to permit a connection between itself and the deflater. Neither is hampered in its movements by the other, and the impairment of one does not affect the condition of the other. When thus constructed the valve can be an imperforate plug.

Another feature of improvement relates to the packing-washer in the cap C, and provides an improved swivel-washer in a cap having an internal screw-thread engaging an external thread on the casing. This feature of improvement consists in forming the cap with a smooth top face *p* and a central aperture *q*, and providing a swivel-stud T having a disk *r* within the cap rotatively engaging the face *p* thereof on its top side and carrying the washer K on its inner side by means of a pin *s* or otherwise, and above the disk *r* having a spindle *t* passing rotatively through the hole *q* and surmounted by a shoulder *u* passed up through the hole and then upset against and embracing the top face of the cap and locking the stud in place rotatively on the cap. The point or finger L is preferably an upward continuation of the stud T. When thus formed the cap when being screwed onto and off from the casing can rotate independently of the stud T and washer K, so that the latter will not be subjected to torsional strains.

It will be seen that my invention provides improvements in valves for tires, and for analogous purposes, which can be in whole or in part variously and advantageously availed of, and it will be understood that the invention is not limited to the particular details

of construction or combination of the several features of improvement set forth as constituting its preferred form, since these features may be employed as circumstances or the judgment of those skilled in the art may dictate without departing from the spirit of the invention.

I prefer to slightly indent or compress inwardly the upper edge of the envelope P against the body of the packing N, as shown at *v* in Fig. 2, to insure against relative displacement of the parts, but this precaution is not essential in all cases, as the engagement between these parts is otherwise very perfect. This indentation causes the rubber part N to flare slightly outwardly beyond the envelope P. Should this distortion impair the flatness of the face *a* or materially affect its circular periphery, it is desirable to recut or dress the face to make it substantially true.

The upper end of the plug I is preferably reduced or tapers to form a point *w*, which enters the lower end of the spring H and holds this end centrally of the chamber G.

What I claim is—

1. In tire-valves and the like, a casing having a valve-chamber and a seat, in combination with a valve proper within said chamber, having an imperforate cylindrical body, a seating-face at its one end engaging said seat, and a tapering part at its other end, and a spring within said chamber embracing the tapering end of said valve proper and holding it toward said seat.

2. In tire-valves and the like, a valve-casing having a valve-chamber and a seat, in combination with a valve proper in said chamber, freely movable therein and unconnected to said casing, consisting of an imperforate elongated substantially cylindrical body having a seating-face of soft packing material at one end engaging said seat, and having a tapering metallic point at its other end and a coiled spring in said chamber surrounding and embracing the tapering end of said valve proper and holding it toward said seat.

3. For tire-valves and the like, a casing having a valve-chamber and a tapering valve-seat, in combination with a valve proper consisting of an unguided body freely movable laterally against the side walls of said chamber, and having an elongated cylindrical imperforate bar of packing material having a yielding seating-face at one end, and a metallic casing surrounding and embracing the periphery and the other end of said material, and preserving the shape of said bar and protecting the latter against contact with said walls, substantially as and for the purpose set forth.

4. For tire-valves and the like, a free and loose valve proper consisting of an inner elongated imperforate cylinder of packing material of greater length than diameter, and an outer cup-shaped metallic casing embracing the periphery and one end of said cylinder, and preserving the shape of and protecting the sides of said bar, said cylinder and casing united together, unconnected to any other part, and constituting a complete and operative valve proper for freely and loosely entering a valve-chamber and engaging a valve-seat.

5. For tire-valves and the like, a casing having a valve-chamber and a contracting valve-seat, in combination with a valve proper in said chamber and freely movable against the side walls thereof, and consisting of an inner elongated cylindrical imperforate bar of rubber having a seating-face at one end, and an outer hollow metallic cylinder having a socket of less depth than the length of said bar and receiving the latter, an annular wall embracing the sides of said bar, and a solid head beneath said socket protecting the inner end of said bar, said bar projecting at its seating-face beyond said cylinder, there entering and compressed in said seat, and beyond the seat reinforced by said cylinder, said cylinder preserving the shape of said bar, and protecting the latter against contact with and wear from the side walls of said chamber, substantially as and for the purpose set forth.

6. In tire-valves and the like, a casing having a valve-chamber, a seat and a conduit beyond said seat, and a valve proper in said chamber seating on said seat opposite said conduit, in combination with a deflater in and passing through said conduit opposite said valve proper, unconnected to and movable independently of the latter, and unseating the latter when moved thereagainst, said deflater having an outer end beyond said conduit by which it can be operated, and means preventing the withdrawal of said deflater from said casing, substantially as and for the purpose set forth.

7. In tire-valves and the like, a casing having a valve-chamber G, a seat E at the end thereof, a conduit D leading from said seat, a chamber S between said seat and conduit, a shoulder *n* between said chamber and conduit, and a socket M beyond said conduit, in combination with a valve proper in said chamber engaging said seat, and a deflater for moving said valve proper, unconnected thereto, having a stem passing through said conduit and projecting into said socket at its outer end and into said chamber S at its inner end, and having an enlarged head on its inner end opposite said valve proper, of greater projection than the diameter of said conduit, movable against the valve proper to unseat the latter, and immovable outwardly past said shoulder *n*, substantially as and for the purpose set forth.

8. In tire-valves and the like, a tubular casing A, having an externally-screw-threaded outer end, in combination with a cap C having an internal screw-thread and screwing on said end to close the casing, a washer K carried by said cap, a stud T carrying said washer and having a disk *r* within and engaging the inner face of said cap, a spindle *t* above said

disk and a shoulder *u* projecting laterally above said spindle, said cap having a smooth top face *p* receiving said disk and a central aperture *q* surrounding said spindle, whereby said cap can rotate independently of said washer, substantially as and for the purpose set forth.

9. For tire-valves and the like, a free and unguided valve proper consisting of an inner elongated imperforate bar N of packing material having a substantially cylindrical periphery *d* and faces *e* at its ends, and an outer protecting-casing applied to and holding said bar and consisting of a thin annular metallic wall *f* traversed by a cylindrical socket *h*, said bar fitting into said socket, and said wall embracing the periphery of said bar and preventing distortion of and protecting the latter, said bar and casing connected and moving together and constituting a valve proper adapted to be inserted and used loosely and unguided in the valve-chamber of a valve.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

GEORGE H. F. SCHRADER.

Witnesses:
GEORGE H. FRASER,
THOMAS F. WALLACE.