

Dec. 18, 1923.

E. H. PARKER

1,478,055

DUST CAP FOR TIRE VALVES

Filed April 1, 1920

Fig.1.

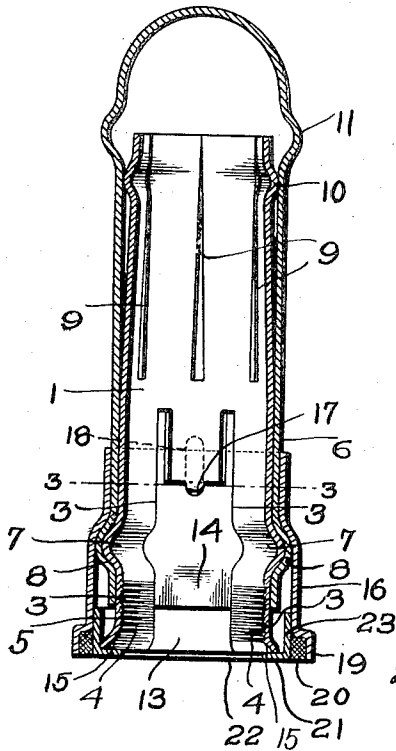


Fig.2.

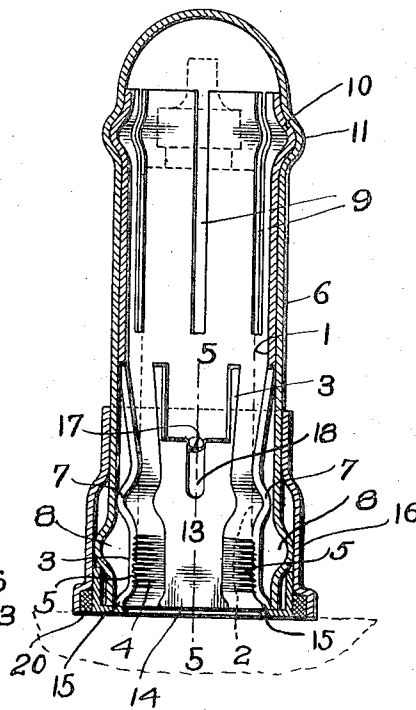


Fig.3.

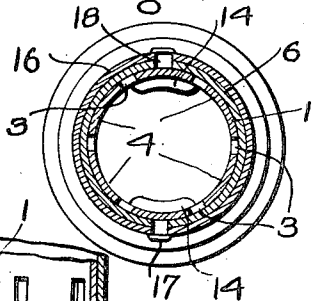


Fig.4.

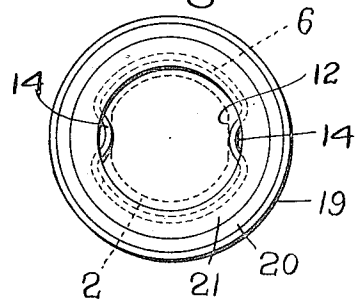
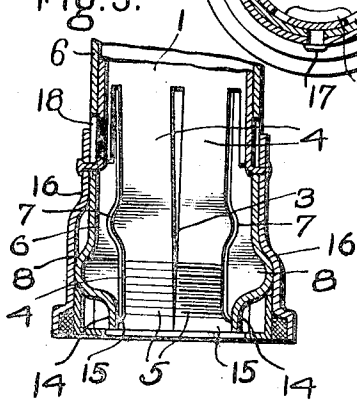


Fig.5.



Inventor,
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Atty's.

UNITED STATES PATENT OFFICE.

EDWARD H. PARKER, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO PUSHPULL VALVE CAP COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

DUST CAP FOR TIRE VALVES.

Application filed April 1, 1920. Serial No. 370,523.

To all whom it may concern:

Be it known that I, EDWARD H. PARKER, a citizen of the United States, residing at Somerville, county of Middlesex, State of Massachusetts, have invented an Improvement in Dust Caps for Tire Valves, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to dust caps such as are used on valve stems of pneumatic tires, and it has for its object to provide a novel dust cap which is constructed so that it can be applied to the valve stem simply by slipping it over the latter and can be locked to the valve stem by applying to the dust cap pressure in the direction of its length and without giving the dust cap any turning movement.

Another object of the invention is to provide a novel construction by which the dust cap can be removed from the valve stem by applying a pulling strain thereto in the direction of the length of the valve stem and without turning the dust cap.

Still another object of the invention is to provide a novel construction by which the dust cap not only performs the ordinary function of a dust cap, but in addition performs the function of the check nut which is usually employed on the valve stem for holding the latter in place.

My improved dust cap is provided at its inner end with an interiorly-screw-threaded portion to engage the screw-threads of the valve stem, and such screw-threaded portion is made capable of expansion or contraction in a radial direction. When the dust cap is removed from the valve stem, this screw-threaded portion is in its expanded condition, and when in this condition, such screw-threaded portion is large enough to permit the dust cap to be slipped over the threaded valve stem. When the dust cap is in proper position, the screw-threaded portion thereof is contracted radially thereby to cause its screw-threads to engage firmly the screw-threads of the valve stem, and this contracting is accomplished by merely applying endwise pressure to the dust cap.

The dust cap is provided with means for locking the screw-threaded portion thereof

in its contracted position after it has been applied to the valve stem, such lock becoming operative automatically when the dust cap is applied.

The construction is such that when endwise pulling strain is applied to the dust cap for the purpose of removing it, the lock will first be released thereby allowing the screw-threaded portion to expand and thus become disengaged from the screw-threads of the valve stem, and when this occurs, the dust cap can be readily withdrawn from the valve stem.

In order to give an understanding of my invention, I have illustrated in the drawings a selected embodiment thereof which will now be described, after which the novel features will be pointed out in the appended claims.

In the drawings, Fig. 1 is an enlarged longitudinal sectional view of a dust cap embodying my invention showing the dust cap open in condition to be inserted over the valve stem;

Fig. 2 is a similar view showing the dust cap with the screw-threaded portion thereof contracted onto the valve stem, the valve stem being shown in dotted lines;

Fig. 3 is a section on the line 3—3, Fig. 1;

Fig. 4 is an end view of the dust cap;

Fig. 5 is a section on the line 5—5, Fig. 2.

My improved dust cap comprises a cylindrical member 1 which is adapted to fit over the valve stem 2 indicated in dotted lines, Fig. 2, and the inner end of which is expansible and contractible in a radial direction and is provided with interior screw-threads to engage the screw-threads of the valve stem 2. The inner end of the member 1 can be thus made capable of expansion or contraction by forming slots 3 therein, thus dividing said inner end into separate sections 4. These sections 4 are formed with interior screw-threads 5 which correspond to the screw-threads of the valve stem.

When the inner end of the member 1 is in its expanded condition, as shown in Fig. 1, the interior diameter of the inner screw-threaded end is such as to permit the dust cap to be slipped over the valve stem, and means are provided for contracting the screw-threaded end when the dust cap is in place, as shown in Fig. 2, thereby bring-

ing the screw-threads 5 into firm engagement with the screw-threads of the valve stem.

In the construction herein shown the inner screw-threaded end of the member 1 which I will hereinafter refer to as the inner member is contracted into the position shown in Fig. 2 by means of an outer shell 6 which encircles the member 1, said outer member or shell being capable of having a movement longitudinally of the member 1. This outer member 6 is a cap-shaped cylindrical member which entirely encloses the inner member 1. The inner member 1 is formed adjacent its inner end and preferably beyond the screw-threads 5 with a bead or enlarged portion 7, and the outer member 6 is provided with a similar shaped groove 8 adapted to receive this bead 7. When the bead occupies the groove, as shown in Fig. 1, the inner screw-threaded end of the member 1 is in its expanded condition. If the member 6 is moved longitudinally of the member 1, as shown in Fig. 2, so as to carry the groove 8 beyond the bead 7, then the bead will be forced into the body of the member 6, and the sections 4 will thereby be contracted or forced inwardly, as shown in Fig. 2. The construction of the parts is such that when the parts are in the relative position shown in Fig. 2, the screw-threads 5 will firmly grip the screw-threads of the valve stem and thus lock the dust cap to the valve stem.

The dust cap is applied to the valve stem when the parts are in the relative position shown in Fig. 1, and as stated above, when in this relative position, the dust cap can be slipped over the valve stem because the interior diameter of the member 1 is large enough to permit this. When the dust cap is fully inserted over the valve stem, then endwise pressure is applied to the outer member 6 thereby moving the latter into the position shown in Fig. 2, such movement contracting the screw-threaded sections 4 and causing them to become interlocked with the screw-threads of the valve stem.

I have provided herein means for locking the two parts in the relative position shown in Fig. 2 so as to prevent any relative movement of the parts into the unlocked position shown in Fig. 1. This locking of the inner and outer members in the relative position shown in Fig. 2 may be accomplished in various ways without departing from the invention. One simple way is to provide the outer end of the member 1 with slots 9 so that said outer end can expand and contract, and making said outer end with a bead 10 adapted to fit into a groove 11 formed interiorly of the member 6. This bead 10 and groove 11 have such relative positions that when the outer member 6 is moved into the position shown in Fig. 2, thereby to lock the inner member to the valve stem, the bead

10 is carried into the groove 11 and the expanding action of the outer end of the member 1 will frictionally hold the bead in the groove and thus lock the members 1 and 6 in the relative position shown in Fig. 2.

To remove the dust cap the operator grasps the member 6 and pulls outwardly thereon with sufficient force to contract the outer end of the member 1 and to draw the outer member 6 into the position shown in Fig. 1. When in this position the bead 10 is withdrawn from the groove 11 and is situated in the body of the member 6, and the bead 7 will be carried into the groove 8. As soon as the bead 7 comes into register with the groove 8, the screw-threaded sections 4 will expand and thus release their engagement with the screw-threaded valve stem. The dust cap is then free to be withdrawn from the valve stem.

Most valve stems are flattened on opposite sides, as shown at 12, and I propose to make my dust cap with an opening of less diameter in one direction than in the opposite direction thereby to fit the non-circular shape of the valve stem. I provide for this by forming the inner end of the member 1 with two oppositely-disposed relatively wide spaces 13 between the sections 4, and by upsetting the portions 14 of the inner end of the member 6 which bridge these wide spaces 13. These upset portions 14 thus occupy the wide spaces and are shaped to fit against the flat sides 12 of the valve stem. The wide spaces 13 are of sufficient length to permit the upset portions 14 of the outer member to travel up and down therein when the members 1 and 2 move relatively from the position shown in Fig. 1 to that shown in Fig. 2.

The inner ends 15 of the screw-threaded sections 4 are bent outwardly and are so shaped that when said sections are contracted, as shown in Fig. 2, these outwardly-bent ends 15 thereof fit within the inner end of the outer member 6. Both ends of each screw-threaded section 4 are thus subjected to inward pressure by the outer member 6, and the screw-threads 5 will thus be positively locked to the valve stem.

My dust cap is so designed that it not only operates as a dust cap, but also takes the place of the ordinary lock nut which is usually screw-threaded to the valve stem.

Surrounding the inner end of the outer member 6 and slidably mounted thereon is a sleeve 16, said sleeve being secured to the inner member 1 by means of projections 17 which operate in slots 18 formed in the outer member 6. These projections are formed as integral parts of the inner member 1 and are secured in the slots 18 by forming heads thereon. The sleeve 16 is provided with an enlarged or flared inner end 19 which is constructed to receive a gasket 20. 21 indi-

cates an end member which fits within the gasket 20 and is provided with a central opening 22 of a size to receive the valve stem. The member 21 is provided with a flange 23 which fits within the sleeve 16. This member 21 bears against the inner ends of the screw-threaded sections 4, and it, together with the gasket 20, forms a seat adapted to have bearing against the rim of the wheel when the dust cap is applied.

In placing the dust cap on the valve stem, it will be inserted over the latter until the end member 21 strikes against the wheel rim or against the check-nut on the valve stem if one is used. End pressure will then be applied to the member 6 thereby to bring the parts into the relative position shown in Fig. 2, as above described, and when in this position, the dust cap is firmly locked to the valve stem. The construction of the inner end of the dust cap with its end member 21 and gasket 20 is such that it will perform the function of the check-nut in holding the valve stem in position if for any reason the check-nut is not used. In fact, it is an advantage not to use the check-nut because the elimination of it facilitates the operation of removing the tire from the wheel. Where a check-nut is employed, it is necessary not only to remove the dust cap, but also to unscrew the check-nut before the tire can be removed, but if no check-nut is employed, then it is simply a matter of removing the dust cap, and with my improved dust cap, this operation takes but an instant of time.

The sleeve 16 has the further advantage that it provides means by which the two members can be moved relative to each other when the dust cap is removed from the valve stem, for by grasping the sleeve 16 in one hand and the outer member 6 in the other, the inner and outer members can be moved relatively into the positions shown in either Figs. 1 or 2. Therefore, if the valve cap should be accidentally dropped and in its fall should become locked into the position shown in Fig. 2, it can be readily unlocked by holding the sleeve 16 in one hand and pulling upwardly on the outer member 6 with the other.

While I have illustrated herein a selected embodiment of my invention, I do not wish to be limited to the constructional features shown.

I claim:

1. In a dust cap, the combination with an inner cylindrical member which is slit at its ends so as to be capable of expanding and being contracted, of an outer member slidably mounted on the inner member, said outer member being closed at one end and provided at said closed end with an internal groove, said inner member having at its corresponding end beads formed on the

split portions which expand into interlocking engagement with the groove to yieldingly hold the two members in one of two adjustable positions, the opposite ends of the inner member being formed to normally expand and the open end of the outer member being formed to encircle and contract the said opposite end to hold the dust cap in position when the groove and beads are interlocked, movement of the outer member to allow the contracted end to expand being limited by coacting portions on the outer and inner members.

2. A dust cap for valve stems of pneumatic tires of that type having two opposite flattened sides, said dust cap comprising an inner member having its inner end interiorly screw-threaded and provided with two opposite flat portions to fit the flat sides of the valve stem, whereby the dust cap is prevented from turning on the valve stem, said inner interiorly screw-threaded end being capable of expansion and contraction, an outer member slidably mounted on the inner member and by its sliding movement operating to contract the inner end of the inner member, and means rendered operative by the longitudinal movement of the outer member to lock the two members from relative movement.

3. A dust cap for valve stems of pneumatic tires having an inner interiorly-screw-threaded end capable of expansion and contraction and in its expanded condition adapted to be placed over the valve stem by an endwise movement, means to contract said inner end when the dust cap is in place, locking means at the outer end of the dust cap for locking said inner-end-contracting means in operative position and means to prevent the dust cap from turning on the valve stem.

4. A dust cap for valve stems of pneumatic tires of that type having two opposite flattened sides, said dust cap comprising an inner member having its inner end interiorly screw-threaded and provided with two opposite flat portions to fit the flat sides of the valve stem, whereby the dust cap is prevented from turning on the valve stem, said inner interiorly screw-threaded end being capable of expansion and contraction, an outer member slidably mounted on the inner member and by its sliding movement operating to contract the inner end of the inner member, and spring locking means to lock the members from relative movement.

5. In a dust cap, the combination with an inner member having its inner end interiorly screw-threaded and capable of contracting and expanding, of an outer member slidably mounted on the inner member and constructed so that movement of the outer member relative to the inner member will contract the inner screw-threaded end

of the inner member, said inner and outer members having co-operating portions which frictionally lock them in either of two relative positions.

6. In a dust cap, the combination with an inner member adapted to fit over the valve stem of a tire and which is slit at its inner end and is provided at said end with interior screw-threads to engage those of the valve stem, said slit portion having an exterior bead, of an outer member slidably mounted on the inner member and having a groove to receive said bead when said inner and outer members are in one relative position, movement of the outer member relative to the inner member forcing the bead out of the groove and thus contracting the screw-threaded portion of the inner member.
7. In a dust cap, the combination with an inner member adapted to fit over the valve stem of a tire and which is slit at its inner end and is provided at said end with interior screw-threads to engage those of the valve stem, said slit portion having an exterior bead, of an outer member slidably mounted on the inner member and having a groove to receive said bead when said inner and outer members are in one relative position, movement of the outer member relative to the inner member forcing the bead out of the groove and thus contracting the screw-threaded portion of the inner member, and a frictional locking means to hold said members in the last-named relative position.
8. In a dust cap, the combination with an inner member having its inner end interiorly screw-threaded and capable of contracting and expanding, of an outer member slidably mounted on the inner member and constructed so that movement of the outer member relative to the inner member will contract the inner screw-threaded end of the inner member, said end of the inner member and the outer members having complementary portions operating to hold the members from relative movement with the inner member expanded.
9. In a dust cap, the combination with an inner member having its inner end interiorly screw-threaded and capable of contracting and expanding, and an outer member slidably mounted on the inner member and constructed so that movement of the outer member in one direction relative to the inner member will contract the inner screw-threaded end of the inner member, one of said members having a resilient portion at its outer end which co-operates with the other member to hold said members in their relative position with the screw-threaded end of the inner member contracted.
10. In a dust cap, the combination with an inner member having its inner end interiorly screw-threaded and capable of contracting

and expanding, of an end member secured to the inner member and adapted to rest against the rim of the wheel when the dust cap is applied to a valve stem, said inner member having a gasket, an outer member slidably mounted on the inner member and adapted by its sliding movement to contract the screw-threaded end of the inner member and a resilient locking means for holding the two members from relative movement.

11. A dust cap for valve stems of pneumatic tires of that type having two opposite flattened sides, said dust cap comprising an inner member having its inner end interiorly screw-threaded and provided with two opposite flat portions to fit the flat sides of the valve stem, said inner member interiorly screw-threaded end being capable of expansion and contraction, an outer member slidably mounted on the inner member and by its sliding movement in one direction operation to contract the inner end of the inner member, said members having complementary portions which become operative by such sliding movement of the outer member to hold the two members from relative movement and said flattened sides preventing the dust cap from turning on the valve stem.

12. A dust cap for valve stems of pneumatic tires of that type having two opposite flattened sides, said dust cap comprising an inner member having its inner end interiorly screw-threaded and provided with two opposite flat portions to fit the flat sides of the valve stem, whereby the dust cap is prevented from turning on the valve stem, said inner member interiorly screw-threaded end being capable of expansion and contraction, an outer member slidably mounted on the inner member and by its sliding movement in one direction operating to contract the inner end of the inner member and by its sliding movement in the opposite direction to permit said inner end to expand, said members having complementary portions which become operative by the sliding movement of the outer member to lock the outer member in either of said two positions.

13. In a dust cap, the combination with an inner member having its inner end interiorly screw-threaded and capable of contracting and expanding, of an outer member mounted on the inner member, said members being capable of relative movement in the direction of their length, relative movement in one direction operating to contract the inner screw-threaded end of the inner member and relative movement in the opposite direction permitting said screw-threaded end to expand, said members having complementary portions which become operative by such relative movement to hold the members in either of two positions.

14. In a dust cap, the combination with an inner member having its inner end interiorly screw-threaded and capable of contracting and expanding, of an outer member
5 mounted on the inner member, said members being capable of relative movement in the direction of their length, relative movement in one direction operating to contract the inner screw-threaded end of the inner mem-
10 ber and relative movement in the opposite direction permitting said screw-threaded end to expand, said members having complementary portions which become operative by such relative movement to hold said mem-
15 bers from relative movement when in a relative position, in which the inner member is expanded.

In testimony whereof, I have signed my name to this specification.

EDWARD H. PARKER.