March 2, 1943. L. S. SPETH 2,312,679

VALVE STEM

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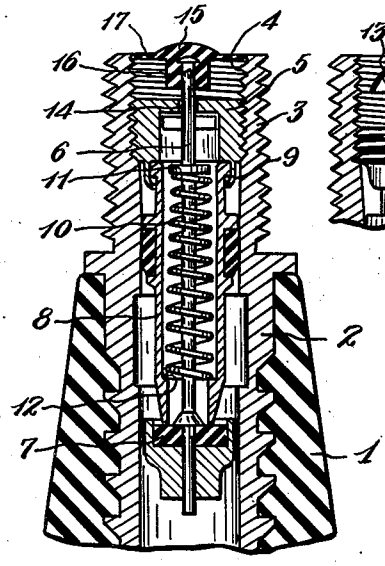


FIG. 1

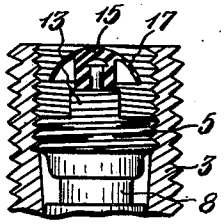


FIG. 2

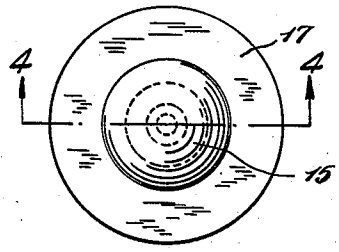


FIG. 3

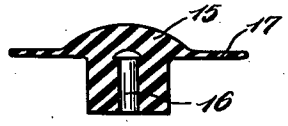


FIG. 4

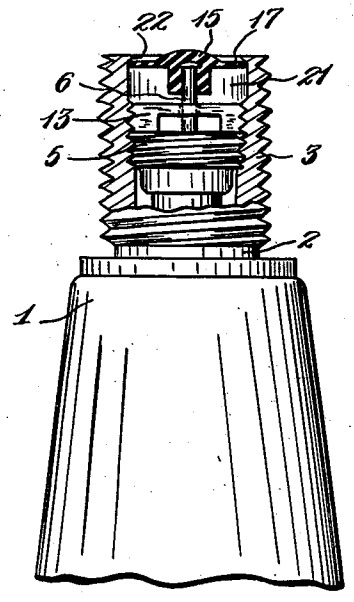


FIG. 5

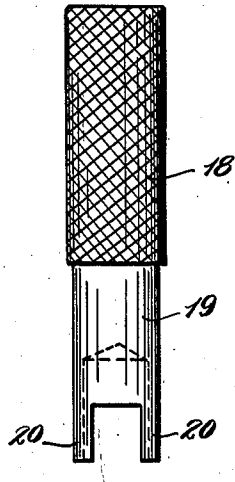


FIG. 6

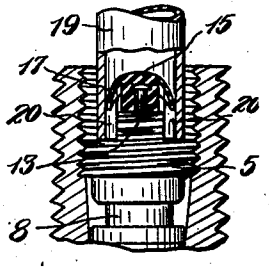


FIG. 8

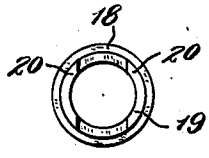


FIG. 7

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VALVE STEM

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6 Claims. (Cl. 251—119)

The present invention relates broadly to valve stems adapted and intended for use with inflatable rubber articles, as an example of which may be mentioned inner tubes for automobile tires.

The principal object of the invention is to provide a construction wherein there is provided a means for preventing the entry of dirt or water into the open end of the valve stem.

A further object of the invention is to provide a dirt excluding member at the open end of the valve stem which is of such material that the peripheral portion thereof may be flexed for purposes which will be apparent from the further description of the invention.

A further object of the invention is to provide a dirt excluding member at the outer end of the valve stem which is adaptable to existing forms of stems employing the well known Dill and Schrader type of valve insides or cores.

A further object of the invention is to provide a dirt excluding member which will be low in cost and which may be attached to the valve pin of the valve mechanism with which the dirt excluding member is to be associated with ease and quickly.

Reference should be had to the accompanying drawing forming a part of this specification, in which:

Fig. 1 is a sectional elevation of a rubber valve stem having an insert as a part thereof in which is employed a well known form of valve insides, showing the dirt excluding member associated therewith;

Fig. 2 is a partial sectional elevation of the outer end of the valve stem and parts associated therewith, showing the position assumed by the dirt excluding member when the usual air inflating chuck is applied to the valve stem (the chuck being not shown);

Fig. 3 is a top plan view of the dirt excluding member;

Fig. 4 is a section on the line 4—4 of Fig. 3;

Fig. 5 is an elevation, with portions in section, of a valve stem in which the outer portion of the valve stem is slightly modified for cooperation with the dirt excluding member;

Fig. 6 is an elevation of a screw driver such as would be appropriate for inserting and removing standard cores or valve insides for valve stems, in connection with which the dirt excluding member of the present invention is employed;

Fig. 7 is a bottom plan view of the screw driver shown in Fig. 6; and

Fig. 8 is a sectional elevation illustrating the application of the screw driver to the valve insides or core where the core has associated with it a dirt excluding member of the present invention.

At the present time valve stems for use in connection with inner tubes for pneumatic tires customarily have associated with the outer end of the stem a valve cap which is attached to the outer end of the stem by screwing the same on the stem and customarily the valve cap has a packing inside which, cooperating with the end of the stem, forms a secondary air seal, which simply means an air seal which is additional to the air seal provided by the valve mechanism which is carried within the bore of the stem.

While unquestionably it is very desirable that a valve cap be used both from the point of providing a secondary air seal and from the standpoint of providing a means which will exclude the entrance of dirt or water into the end of the valve stem, nevertheless, it is a well known fact that many valve caps become lost in actual use of tires and, of course, it is also necessary to remove a valve cap when the tire is to be inflated and replace the same after inflation, which latter operation is many times forgotten or neglected.

Of course, a valve stem, when on a vehicle that is being driven and unprotected at its outer end by means of a valve cap is subject to the likelihood of the entrance of dirt or water into the outer end of the valve stem, which may have the result of interfering with the proper functioning of the valve within the valve stem, particularly if dirt works its way in far enough to lodge upon the valve proper or adhere to the seat with which the valve proper cooperates.

The physical embodiment in connection with which my invention is herein disclosed has to do with a construction which is commonly used on automobile tires at the present time.

Referring to Fig. 1, 1 indicates a portion of a rubber stem in the outer portion of which there is secured a rigid or metal insert 2. A portion of this insert extends beyond the end of the rubber part of the stem and the exterior portion of the insert is threaded as indicated at 3 and is intended to receive a usual form of valve cap, examples of which are well known in the trade. The insert 2 is hollow and at its outer end is interiorly threaded as indicated at 4 for the purpose of receiving the threaded portion 5 of a conventional form of valve insides.

As is well known, the conventional valve insides comprises a pin 6, upon one end of which is secured a valve member 7, which valve member

cooperates with the lower end of a sleeve 8, which sleeve is secured to the head portion 5 usually by means of a swivel joint such as indicated at 9. Within the sleeve is a spring 10 which cooperates with a member 11 fixed upon the pin 6 and the spring at its opposite end cooperates with a shoulder formed in the sleeve itself, as indicated at 12.

The threaded member 5 is customarily formed with a bridge member 13 which extends transversely of the member 5, or with some equivalent structure, the purpose of which is to cooperate with a suitable tool, usually known in the trade as a screw driver, by which the valve insides may be caused to rotate either for screwing the same into the stem or removing the insides from the stem.

The bridge member 13 has a suitable central opening 14, through which the pin 6 extends. In carrying out the present invention, a member 15 is provided which may conveniently be made of rubber. This member 15 has an opening 16 which is adapted to receive the outer end of the valve pin 6 and be held thereon either by frictional engagement or the pin may be cemented within the member 15. This member 15 has a radially extending skirt portion 17 which in its transverse dimension is such as to substantially or approximately be of the same diameter as the interior diameter of the outer chamber portion of the insert. The member 15 at the central portion thereof is slightly extended above the plane of the skirt portion 17 so that when the member 15 is in normal position, with the valve of the valve core closed, the central portion of the member 15 will extend slightly beyond the end of the insert so that it will be in position to be engaged by the proper part of an inflation air chuck, when such chuck is applied to the end of the stem, and cause the depression of not only the member 15 but the valve pin 6, opening the valve 7 and permitting the passage of air for inflating purposes, into the tube or other inflatable article in connection with which the valve stem is used.

It will be noted that the skirt portion 17 of the member 15 extends radially and may extend into actual contact with the wall of the chambered portion at the outer end of the insert or be in a position which is just short of contact. The function of the member 15 with its extending skirt is, of course, to form what may be termed a closure member or perhaps more properly called a dirt excluding member, so that whether the skirt 17 is in full contact with the inner wall or is slightly out of contact with the inner wall of the chambered portion at the end of the insert is not a matter of importance. The important feature is that the member 15 shall be of such size as to efficiently form a barrier to the entrance of dirt and water, when the valve stem is in actual use on a tire.

In Fig. 5 there is shown a slightly modified construction to that which has been previously described, in that the insert 2 at the outer end thereof and interiorly thereof is formed with a chamber 21, which is slightly enlarged in width over that of the remaining portion of the chamber at the end of the stem. In this form the wall at the outer end of the insert is slightly deformed to provide an inwardly extending lip 22. In this case, the member 15, with its radial skirt 17, is of such width, or diameter, that with the valve insides in normal position, the periphery of the skirt portion 17 will substantially lie in contact with the inturned lip 22.

While I have referred to the member 15 as preferably being made of rubber, it will be understood that no limitation is intended in that direction. The essential feature with respect to the member 15 is that the radial skirt portion 17 shall be formed of a flexible and resilient material, but whether the main portion of the member 15 is formed of such material is not a matter of importance.

The reason for the importance of the skirt portion of the member 15 being formed of flexible and resilient material lies first in the fact that, as shown in Fig. 2, when an inflating chuck is applied to the end of the valve stem, and the pin 6 of the valve core is depressed to open the valve of the core, the inflating air under high pressure can deflect the flexible skirt 17 so as to permit a free passage of air around the member 15 or, in other words, there is no choking of the air passage due to the presence of the member 15.

In the second place, the flexible skirt of the member 15 permits the application of a screw driver member such as shown at 18 in Fig. 6 to the valve insides in the customary manner. A suitable tool is indicated at 18 in Fig. 6, provided with an extension 19 which is hollow and also provided with a reentrant slot that provides depending lugs 20 at the end of the portion 19. The width of the slot or, in other words, the distance between the extensions 20 will, of course, be sufficient to straddle the bridge 13 of the valve insides. This member 18 may therefore be inserted into the end of a valve stem and the screw driver provisions of the member 18 caused to function with respect to the bridge of the valve insides, either to screw the same in or to screw them out and, because of the flexible character of the skirt 17 of the member 15, these members are, so to speak, folded over within the hollow portion of the part 19 of the member 18, as illustrated in Fig. 8.

Thus it will be seen that the provision of the member 15, with its resilient and flexible skirt portion 17, not only functions as a means to exclude dirt and water from entrance into the end of the valve stem, but, because of its construction, permits, without removal, the application of the screw driver either for inserting or withdrawing a valve insides.

While I have shown the application of my invention to a type of valve stem wherein the body is made of rubber and has an insert within the rubber portion, it will at once be apparent that such a member as that indicated at 15 is likewise applicable to the situation where the valve stem is constructed entirely of metal and where a standard core or valve insides is used within the same.

Another feature that should be noted is that the member 15 is such an article as may be separately made and sold so that persons may purchase these rubber members 15 and make their own application of the same to valves which are at present on cars they may be driving.

It will also be apparent that with the use of the member 15 in the manner which has been described, and doing away with the use of a valve cap, it will be possible to omit the operation of threading the outer surface of the valve stem as has been customary where a valve cap is used.

Moreover, it will be apparent that the dirt and water excluding member 15 may be used in con-

nection with any valve construction wherein there is a chambered portion at the outer end of the stem, into which chamber there extends a pin which is a part of the valve mechanism that controls the passage of air through the stem, this being true whether the valve mechanism employed is the same or different from that which is specifically shown in this application.

Where in the claims reference is made to a "dirt excluding member" it will, of course, be understood that it includes a member which excludes dust, water, or any other foreign substance.

Having thus described my invention, I claim:

1. An article of manufacture adapted to be used on the headed outer end of the movable valve pin of a valve mechanism of the type used in the tubular valve stems for inflatable containers, said article comprising a relatively thick body portion having provision for securing it to the headed outer end of a valve pin, and a flexible relatively thin skirt portion extending radially from said body portion, said article having a total diameter substantially equal to the internal diameter of the outer end of the valve stem with which it is used.

2. An article of manufacture adapted to be used on the headed outer end of the movable valve pin of a valve mechanism of the type used in the tubular valve stems for inflatable containers, said article being formed of rubber and having a relatively thick body portion provided with a recess for encompassing and engaging the headed outer end of a valve pin and tenaciously retaining itself thereon by the gripping action of the rubber material, and a flexible relatively thin skirt portion extending radially from said body portion, said article having a total diameter substantially equal to the internal diameter of the outer end of the valve stem with which it is used.

3. A valve core adapted to be removably secured in a valve stem which is provided adjacent its outer end with internal threads and comprising a barrel having a valve seat at one end thereof and externally threaded means at the opposite end thereof provided with a tool engaging portion, a valve pin movably extending through said barrel and means and provided with a valve adapted to cooperate with said valve seat, a spring operatively associated with said valve for normally maintaining said valve in engagement with said seat, and a dirt excluding member mounted upon the outer end of said pin and beyond said means, said member comprising a central body portion having provision for securing the member to the outer end of said valve pin, and a flexible skirt portion extending radially from said body portion, the total diameter of said member being substantially equal to the internal diameter at the outer end of the valve stem with which the valve core is used.

4. An article of manufacture adapted to be used on the outer end of the movable valve pin of a valve mechanism of the type used in tubular valve stems for inflatable containers and to exclude dirt from entering the open end of the stems, said article comprising a central body portion having provision for encompassing and releasably gripping the outer end of the valve pin to retain the article thereon, and a relatively thin skirt portion connected with said body portion and extending radially therefrom and possessing sufficient rigidity to normally maintain itself substantially in a plane yet sufficiently flexible to be flexed from said plane when pressure is applied thereto by a tool or by the fluid pressure of an air line, said article having a total diameter substantially equal to the internal diameter of the outer end of the valve stem with which it is used.

5. In combination, a tubular valve stem, a valve mechanism in said stem and including a valve and a movable valve pin operatively connected with said valve for actuating the latter and having its outer end located when said valve is seated in the open outer end of the stem, and a closure member for said open end of the stem having a total diameter substantially equal to the internal diameter of the stem at the outer end thereof and comprising a central body portion having provision for encompassing and releasably gripping the outer end of the valve pin to retain the member thereon, and a relatively thin skirt portion connected with said body portion and extending radially therefrom and possessing sufficient rigidity to normally maintain itself substantially in a plane yet sufficiently flexible to be flexed from said plane when pressure is applied thereto by a tool or by the fluid pressure of an air line.

6. In combination, a tubular valve stem, a valve mechanism in said stem and including a valve and a movable valve pin operatively connected with said valve for actuating the latter and having its outer end located when said valve is seated in the open outer end of the stem, and a rubber closure member for said open end of the stem having a total diameter substantially equal to the internal diameter of the stem at the outer end thereof and comprising a central body portion provided with a recess for encompassing and engaging the outer end of the valve pin and tenaciously retaining itself thereon by the gripping action of the rubber material, and a relatively thin skirt portion connected with said body portion and extending radially therefrom and possessing sufficient rigidity to normally maintain itself substantially in a plane yet sufficiently flexible to be flexed from said plane when pressure is applied thereto by a tool or by the fluid pressure of an air line.

LEONARD S. SPETH.