

STRUCTURE OF TIRE VALVE ASSEMBLY

This present invention relates to a structure of tire valve assembly.

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In recent years, because the economical, industrial and business prosperity people's livelihood has been greatly improved in all details, and motorcycles and automobiles become so popular. As a consequence, the frequency of traffic accidents has been increasing year after year. Among the various traffic accidents, tire blow-out problem is one of the common causes. Because the conventional tire valve assembly can not detain the exhausted air from blowing out of a tire when such a tire is punctured, accident may happen easily. The conventional tire valve assembly, as illustrated in Fig. 1, is generally comprised of a valve nozzle attached to an inner tube of a vehicle tire and penetrate through a wheel rim. If a tire is punctured by an iron nail or any pointed object to exhaust, the inflated air is instantaneously forced to blow out of the tire through the punctured hole and the clearance

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between the valve nozzle and the wheel rim (see Fig. 2). If a tire deflates suddenly while the vehicle is travelling at high speeds, the driver may lose control and there may be an accident. Further, a car or motorcycle may be equipped with a spare tire which is kept inflated. However, the inflation air may gradually escape from a spare tire during storage. Some vehicles may be equipped with solid tires which avoids problems due to the deflation in use. However, solid tires can only be used for the small motor vehicles up to around 1.75 tonnes. In any event motor vehicles are generally equipped with pneumatic tires.

An object of the present invention is to provide a tire valve assembly which retains inflation air from blowing out of a tire when punctured.

According to one aspect of the present invention there is provided an inner tube for a tire mountable on the rim of a wheel, having a valve nozzle assembly, peripheral sealing means for the valve nozzle assembly for location between the inner tube and wheel rim, and having a central aperture which is smaller than the outside diameter of the valve nozzle assembly, and clamping means including a washer, mounted on the nozzle for compressing the peripheral sealing means against the rim to seal the aperture in the rim through which valve nozzle projects.

According to another aspect of the present invention there is provided a tire assembly including:

a valve nozzle incorporated with the inner tube of a tire and having an external thread, for insertion through a wheel rim;

a ring-shaped rubber cushion between said inner tube and said wheel rim, and having a center hole smaller than the outer diameter of said valve nozzle;

5 a washer over the valve nozzle on the outside of said wheel rim; and

a threaded nut screwed up with said external thread of the valve nozzle whereby the ring-shaped rubber cushion may be compressed between the inner tube and the wheel rim.

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An embodiment of the present invention will now be described with reference to the accompanying drawings, in which:

15 Fig. 1 is a schematic drawing illustrating a tire having a prior art tire valve assembly;

Fig. 2 is a schematic drawing illustrating a condition of the tire valve of Fig. 1 when the tire is punctured to exhaust by a pointed object;

20 Fig. 3 is a sectional view illustrating a tire having a tire valve assembly in accordance with the present invention;

Fig. 4 is an enlarged sectional elevation of the tire valve of Fig. 3; and

25 Fig. 5 is a schematic drawing illustrating a condition of the tire valve of Fig. 3 when the tire is punctured to exhaust by a pointed object.

30 In the drawings, like reference numerals indicate like parts.

Referring to Figs. 3 and 4, a tire valve assembly of the present invention is generally comprised of a valve nozzle 4, a screw nut 5, a washer 6 and a ring-shaped rubber cushion 7. The valve nozzle 4 is incorporated with the inner tube 3 of a vehicle tire and comprises a thread portion 40 externally on its central part for the mounting thereon of the screw nut 5. The bottom end of the valve nozzle 4 has a smooth outer surface suitable for the mounting thereon of the rubber cushion 7. The center hole of the ring-shaped rubber cushion 7 is smaller than the outer diameter of the lower end of the valve nozzle 4 so that it can be tightly secured to the bottom end of the valve nozzle 4. The valve nozzle 4 comprises therein a check valve to control the passing of air flow through a round hole 42 into the inner tube 3. After the mounting of the ring-shaped cushion 7, the valve nozzle 4 is inserted through a wheel rim 9. After the insertion of the valve nozzle 4 through the rim 9, a clearance 41 is left between the valve nozzle 4 and the rim. The washer 6 is then sleeved on the valve nozzle 4 and externally attached to the rim 9, and the screw nut 5 is screwed up with the valve nozzle 4 to tightly squeeze the rim 9 and the ring-shaped

rubber cushion 7 together.

5 Referring to Fig. 5, if the inner tube 8 is punctured to exhaust by a pointed object 90, the air escaping from the inner tube can not flow out of the outer tire through the clearance 41 between the rim 9 and the valve nozzle 4 since it is tightly sealed by the ring-shaped rubber
10 cushion 7. Because the pointed object 90 is tightly gripped by the outer tire, only a small quantity (about one percent) of the air from the inner tube 8 escapes from the outer tire. Therefore, the majority of the exhausted air is kept inside the tire and the tire can be used for a
15 period of time. Thus, a driver will have sufficient time to get the tire fixed.

The tire valve arrangement which has been described is suitable for heavy-duty vehicles, including commercial
20 vehicles, as well as light vehicles, including motor cycles and bicycles.

CLAIMS:

1. An inner tube for a tire mountable on the rim of a
5 wheel, having a valve nozzle assembly, peripheral sealing
means for the valve nozzle assembly for location between
the inner tube and wheel rim, and having a central aperture
which is smaller than the outside diameter of the valve
nozzle assembly, and clamping means including a washer,
10 mounted on the nozzle for compressing the peripheral
sealing means against the rim to seal the aperture in the
rim through which valve nozzle projects.
2. An inner tube as claimed in claim 1, wherein the
15 material of the peripheral sealing means is rubber.
3. An inner tube as claimed in claim 1 or claim 2,
wherein said nozzle assembly is externally threaded and
said clamping means comprises a nut cooperating with the
20 external thread.
4. A tire assembly including:
a valve nozzle incorporated with the inner tube of a
tire and having an external thread, for insertion through
25 a wheel rim;
a ring-shaped rubber cushion between said inner tube
and said wheel rim, and having a center hole smaller than
the outer diameter of said valve nozzle;
a washer over the valve nozzle on the outside of said
30 wheel rim; and
a threaded nut screwed up with said external thread of
the valve nozzle whereby the ring-shaped rubber cushion may
be compressed between the inner tube and the wheel rim.



5. An inner tube according to claim 1 substantially as hereinbefore described with reference to, and as illustrated in, Figs. 3 to 5 of the accompanying drawings.

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6. A tire assembly substantially as hereinbefore described with reference to, and as illustrated in Figs. 3 to 5 of the accompanying drawings.
