(No Model.)

H. N. RHODES.

TIRE VALVE.

No. 597,655. Patented Jan. 18, 1898.

Fig. 1.

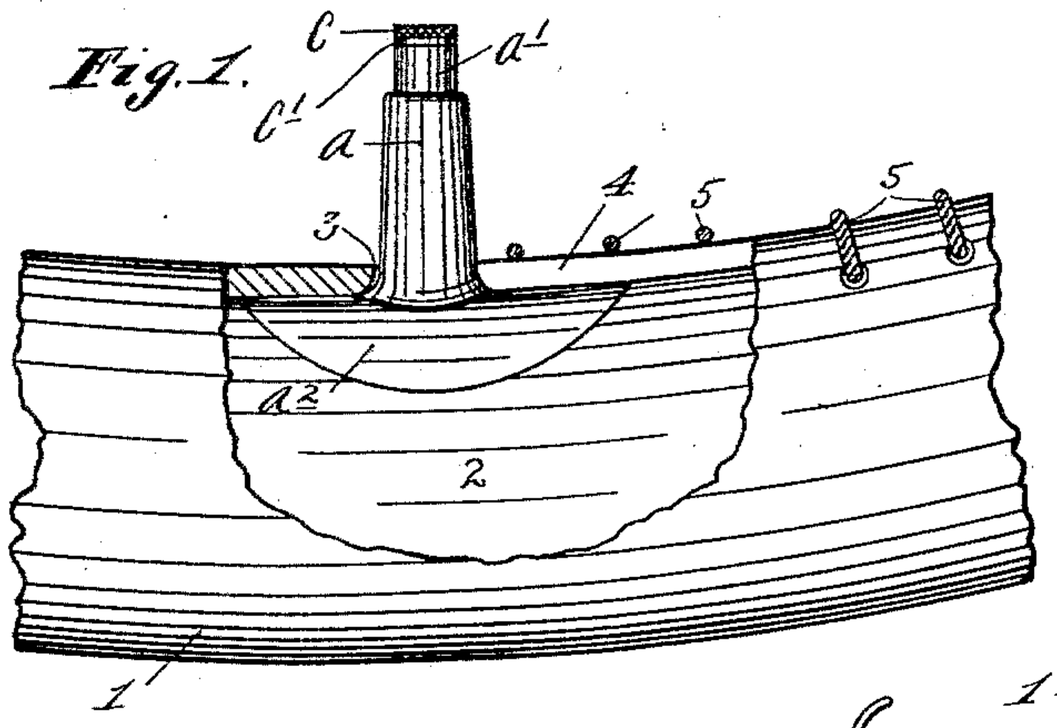


Fig. 2.

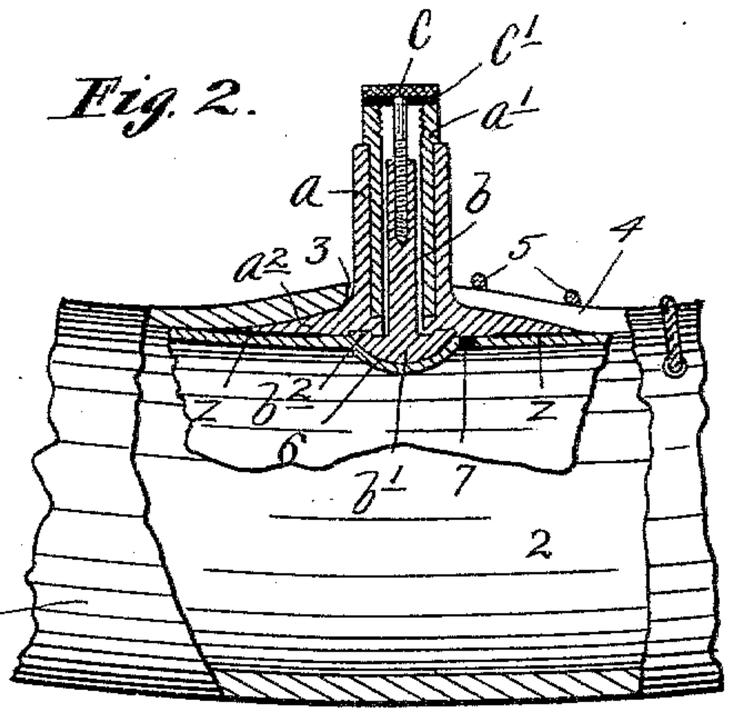


Fig. 3.

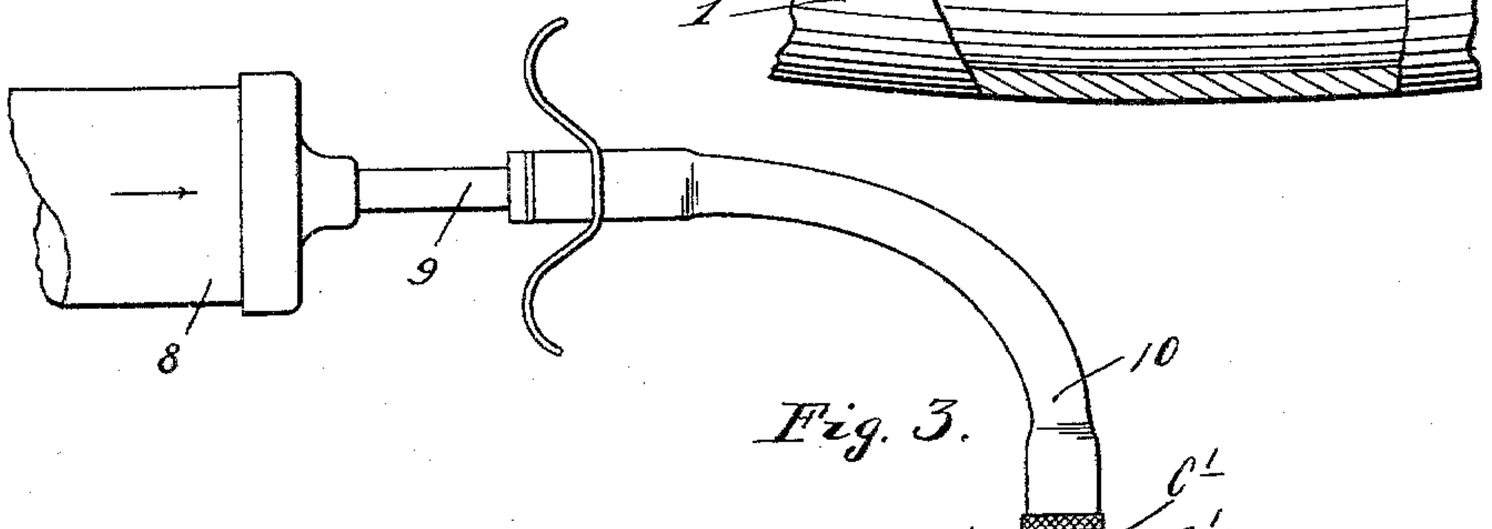


Fig. 4.

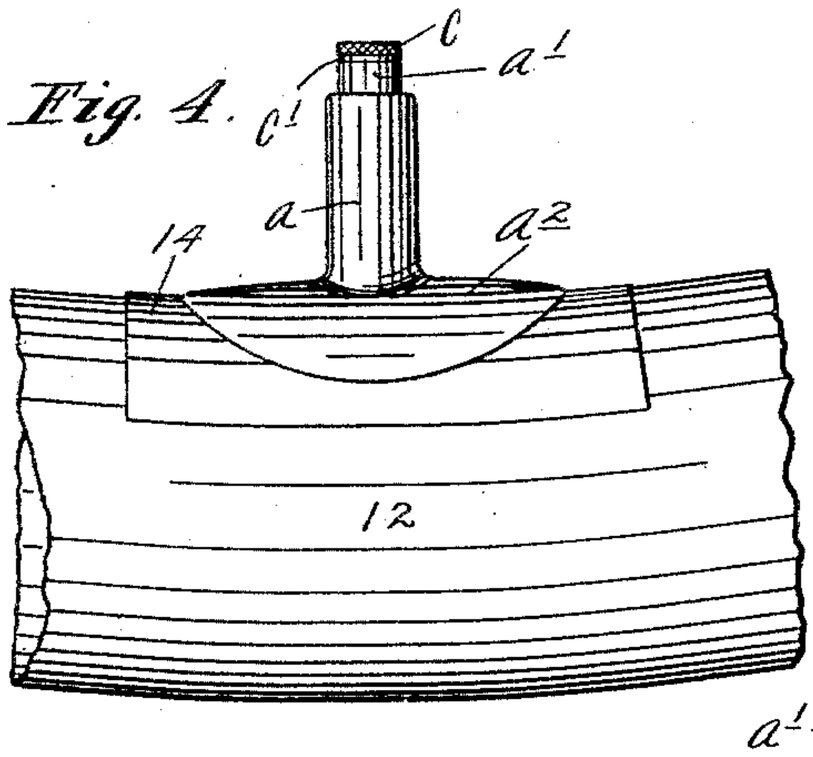
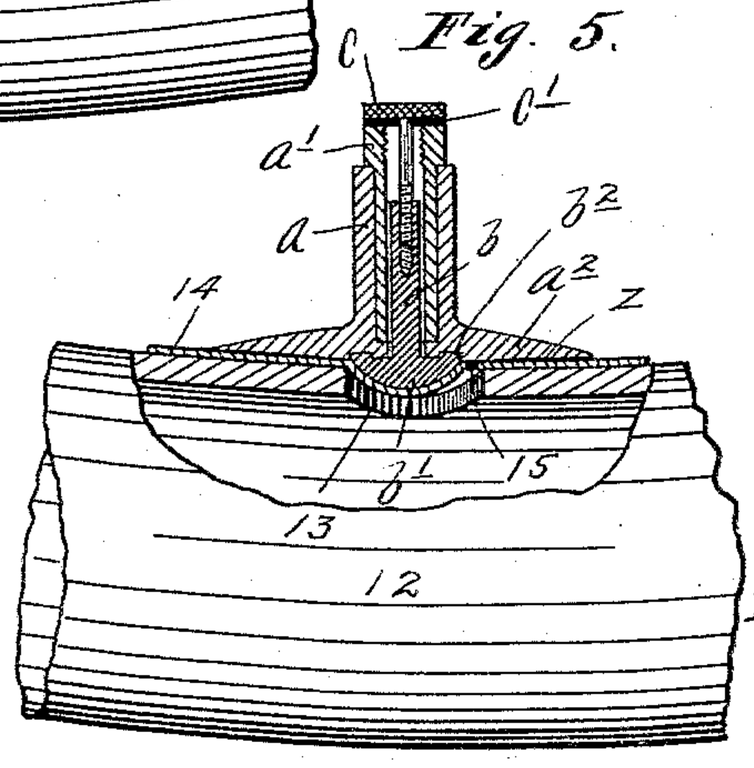


Fig. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

HIRAM N. RHODES, OF DULUTH, MINNESOTA, ASSIGNOR OF ONE-HALF TO KITTY L. HOWARD, OF SAME PLACE.

TIRE-VALVE.

SPECIFICATION forming part of Letters Patent No. 597,655, dated January 18, 1898.

Application filed January 28, 1897. Serial No. 621,025. (No model.)

To all whom it may concern:

Be it known that I, HIRAM N. RHODES, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Tire-Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has for its object to provide an improved valve for pneumatic tires.

To this end my invention consists of the novel devices and combinations of devices hereinafter described, and defined in the claims.

My invention is illustrated in the accompanying drawings, wherein like characters refer to like parts throughout the several views.

Figure 1 is a view in side elevation with some parts broken away, showing a portion of a double-tube tire equipped with my improved valve. Fig. 2 is a view of the same parts as in Fig. 1, but showing the nipple and valve in vertical central section. Fig. 3 is a similar view to Fig. 2, but illustrating the manner in which the air-pump is applied to the nipple in the charging action and showing the valve forced into its open position by the pressure from the pump. Fig. 4 is a view in side elevation showing a portion of a single-tube tire as equipped with my improved valve. Fig. 5 is a view of the same parts as in Fig. 4, but with some parts broken away and with nipple and valve shown in central vertical section.

Considering my valve, first, as applied to a double-tube tire (illustrated in Figs. 1, 2, and 3) the numeral 1 indicates the outside tube, and 2 the inside tube, of an ordinary double-tube pneumatic tire, such as are used on bicycles. The outer tube 1 is provided with the ordinary nipple-seat 3 and a slotted mouth or opening 4, closed by the lacing 5. The nipple a a^2 is of the standard construction, being formed of soft rubber, while the bushing a' is preferably of metal and is cemented within the nipple-stem a. The disk-like base a^2 of the nipple is placed inside of the exterior tube 1 and is cemented to the interior tube 2 at its peripheral margin by means of cement, (indicated at z.) In this manner the portion of the inner tube 2, which underlies the body of the nipple a and the central portion of the disk-like base a^2, is left loose to form a diaphragm 6, which, as shown, is provided with a single perforation 7, located eccentric to the axis of the nipple.

b b' indicates a valve that is substantially T-shaped in longitudinal cross-section or, in other words, involves a stem portion b and head portion b'. When this valve b b' is placed in working position, its stem b works in the bore of the bushing a' and its head b' is located between the nipple-base a' and the diaphragm portion 6 of the inner tube 2 in position to seat against the inner face of the nipple-base. The valve-stem b' is of considerable less diameter than the bore of the bushing a', so as to permit the free passage of air through the nipple. Preferably the working face of the valve or head b' is provided with a raised annular flange b^2, which is adapted to be embedded into the soft-rubber face or end of the nipple a^2, thus insuring an air-tight joint when the valve is seated. When the valve is in working position, the perforation 7 of the diaphragm 6 is directly adjacent to the outer edge or rim of the valve-head.

When the tire is charged for use, the valve b b' is preferably positively clamped in its closed position by means of a cap-screw c, the head of which bears against the outer end of the bushing a' or against an interposed washer c', and the stem of which has screw-threaded engagement with the interior of the outer end of the valve-stem b.

In Fig. 3 the numerals 8, 9, and 10 indicate, respectively, the cylinder, the piston, and the flexible discharge-section or hose of an ordinary pump the hose-section of which terminates in a screw-threaded nozzle 11 for engagement with the nipple-bushing a' in the usual way.

When the clamping cap or screw c is removed and the pump is applied to the nipple, as illustrated in Fig. 3, the action of the valve mechanism will be substantially as follows: Under the pressure of air from the discharg-

ing-stroke of the pump the valve *b b'* will be forced inward or into its open position, as illustrated in Fig. 3, under which action the elastic diaphragm 6 will readily yield to permit the said movement of the valve and to open the perforation or air-passage 7, thus permitting the air from the pump to pass into the interior of the inner tube 2. Under the suction or air-drawing stroke of the pump or when the pressure from the pump on the valve *b b'* is otherwise taken off or relieved the air-pressure from within the tube 2, acting upon the diaphragm portion 6 of said tube, will force the said valve into its closed position, thus insuring the rapid and positive seating of said valve with a completely-air-tight joint.

In securing the valved nipple to a single-tube tire, as illustrated in Figs. 4 and 5, the said single tube 12 should be cut away on its rim-engaging face to form an opening 13 of somewhat larger diameter than the valve-head *b'*. Over this opening 13 and extending over a considerable of the surrounding surface of the tube 12 I securely cement a thin flexible diaphragm 14, preferably of rubber. The base a^2 of the nipple is then cemented to the outer surface of this diaphragm 14 of the single-tube tire in the same way as above described for the double-tube tire. This diaphragm 14 is provided with a small perforation or air-passage 15, which is located eccentric to the axis of the nipple, but in close proximity to the periphery of the valve-head *b'*, as in the double tube. The action of this construction is substantially identical with that of the construction above described in connection with Figs. 1, 2, and 3.

From the foregoing description it is thought to be obvious that the portion of the tube that I have termed the "diaphragm" may be formed of an independent piece provided solely for that purpose, or that it may be formed by a portion of one of the tubes of which a tire or similar body is constructed. Otherwise stated, it is obvious that my improved valve may be readily applied either to a single or to a double tube tire. It is also thought to be evident that various other alterations in the details of construction above specifically set forth may be made without departing from the spirit of my invention.

From the drawings and the foregoing description it must be obvious that I have provided a tire-valve which is of extremely simple and cheap construction and which insures an absolutely air-tight joint.

By actual usage I have demonstrated the efficiency of this valve and find that there is no leakage and that the charging or pumping action is rendered comparatively easy and rapid as compared with the valve now in general use. It is also obvious that there are no parts liable to displacement or loss.

What I claim, and desire to secure by Letters Patent of the United States, is as follows:

1. The combination with a tire-nipple, of a valve adapted to be seated against the inner face of said nipple, and a perforated diaphragm inward of said valve, yielding under the opening movement of said valve, to pass the air in the charging action, and operative on said valve, to coöperate in closing the same, under the fluid-pressure from the charged tire, substantially as described.

2. The combination with a tire-nipple, of a valve adapted to be seated against the inner face of said nipple, and an elastic diaphragm provided with a perforation located eccentric to said valve, which diaphragm is adapted to yield under the opening movement of said valve, to pass the air, in the charging action, and to operate on said valve to close the same, under the fluid-pressure from the charged tire, substantially as described.

3. The combination with the tire-nipple, of the valve *b b'* adapted to be seated against the inner face of said nipple, the clamping cap-screw *c* having screw-threaded engagement with the stem *b* of said valve, and the perforated diaphragm inward of said valve, yielding under the opening movement of said valve, to pass the air in the charging action, and operative on said valve to close the same under the fluid-pressure from the charged tire, substantially as described.

4. The combination with the tire-nipple *a* a^2 formed of soft rubber, of the valve *b b'*, the head *b'* of which is pressure-seated against the inner face of said nipple and is provided with the annular flange b^2, substantially as and for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HIRAM N. RHODES.

Witnesses:
E. C. HOWARD,
JAS. F. WILLIAMSON.