(No Model.)

A. M. SHURTLEFF.

VALVE FOR PNEUMATIC TIRES.

No. 494,089. Patented Mar. 21, 1893.

Fig: 1.

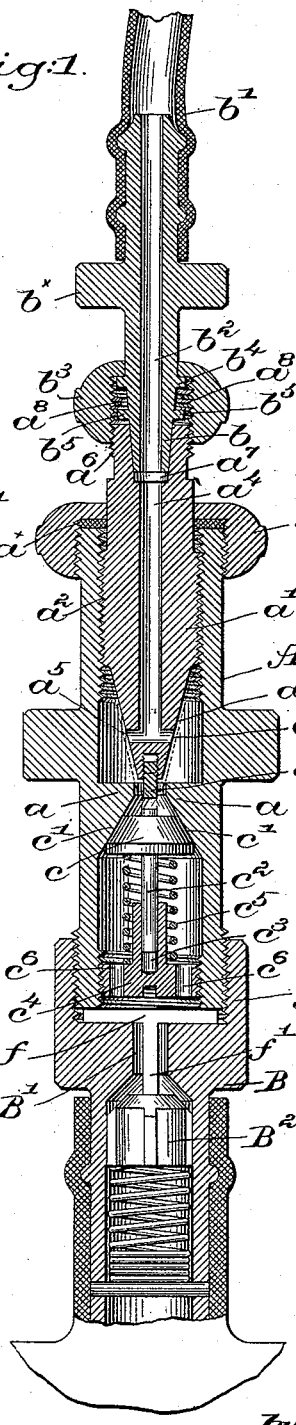

Fig: 2.

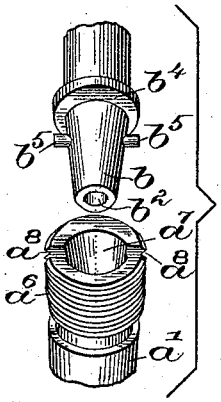

Fig: 4.

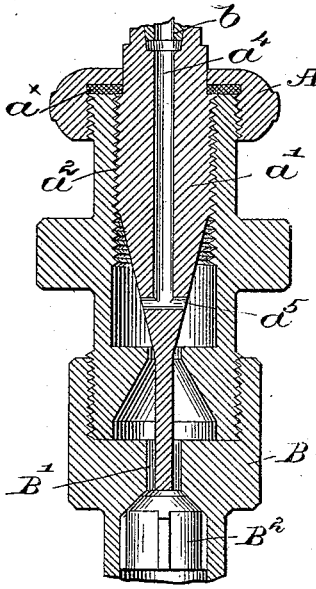

Fig: 3.

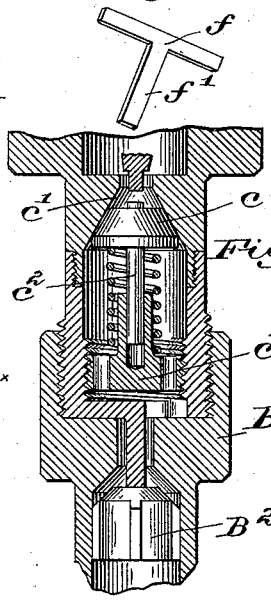

Fig: 5.

Witnesses.

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VALVE FOR PNEUMATIC TIRES.

SPECIFICATION forming part of Letters Patent No. 494,089, dated March 21, 1893.

Application filed September 16, 1892. Serial No. 446,096. (No model.)

To all whom it may concern:

Be it known that I, ASAHEL M. SHURTLEFF, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Valves for Pneumatic Tires, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to valves for pneumatic or inflatable tires, the object of the invention being to provide an improved valve which will facilitate the inflation of the tire and thereafter more perfectly retain the inflating fluid within the tire.

Many tire makers prefer to apply the valve to the tire, before the latter is placed upon the wheel making it necessary to provide an opening in the rim of the wheel of sufficient size to permit the valve to be placed through to the inside of the rim. When the valve is provided with a lateral nipple by which to attach the pump to it, this opening must necessarily be of considerable size and thereby weakens the rim of the wheel. In order to reduce, as much as possible, the size of this opening the valve proper of my improved valve is made tubular, and is fitted at its upper end to receive a coupling or nipple upon the end of the inflating tube, so that the air forced from the pump into the tire passes through the valve itself, thus avoiding the necessity for any lateral or independent nipple or attachment to the inflating tube. The opening in the rim, therefore, need be only of sufficient size to admit the introduction of the valve casing which is comparatively small and does not consequently very much weaken the rim of the wheel.

The valve proper of my improved valve is not provided with the usual operative handle.

The handle for operating my improved valve is placed upon and forms a part of the nipple at the end of the inflating tube and is detachably connected to the valve with the said tube, for I have found that when the handle is permanently attached to the valve itself there is great liability of its being tampered with or opened by accident when in use and permit the escape of the confined air. The nipple when attached to the valve forms a convenient handle by which the valve may be opened and closed.

There are in use at the present time many tires provided with imperfect valves, and as such valves cannot be removed without danger of permanently injuring the tire, I construct my improved valve so that it can be applied to the old or defective valve without the necessity of removing the latter, and it is then necessary to throw out of action the old or defective valve in order that the air may be controlled entirely by my improved valve. I, therefore, provide the casing of my improved valve with a projection, which, when the casing is secured to the defective valve, will act upon the defective valve and render it inoperative, or I may insert an independent piece between the valve casing of the new valve and the defective valve which will throw the defective valve out of action so long as the new valve is attached to it. My improved valve is also provided with a check valve.

Many air pumps are not provided with check valves and to admit of the use of such pumps after the imperfect valves referred to are rendered inoperative, I provide my improved valve with a check valve which controls the passage of air during the operation of the pump, the main or positively actuated tubular valve being thereafter utilized to permanently retain the air, owing to its more perfect and positive closure. The check-valve is preferably acted upon and opened by the main valve when the latter is closed, the check valve being again returned to its operative position to control the air whenever the main valve is opened.

Figure 1, in longitudinal section shows a valve embodying this invention, said figure showing the valve applied to a defective valve secured to a tire, and also showing the nipple upon the inflating tube as coupled to the end of the valve. Fig. 2, in perspective, shows the nipple and its socket as they will appear when about to be coupled together, said figure showing the pin and slot connection between the two. Fig. 3, a perspective detail showing the T-shaped piece for rendering the defective valve inoperative. Fig. 4 shows the extension

piece on the end of the positively movable valve as adapted to act upon the defective valve, or the valve in the casing secured to the tire and to which my improved valve is applied; and Fig. 5 is a modification showing a projection on the end of the valve casing to take the place of the T-shaped piece *f*.

Referring to the drawings in the valve selected to illustrate this invention, A represents the valve casing substantially cylindrical in shape and shaped at its interior near its middle to present an annular edge *a*, which constitutes a seat for the main valve *a'* threaded at a^2 within the casing and having its lower end a^3 made conical, as shown, to cooperate with the annular valve seat *a* and form an air-tight closure. The valve *a'* is hollow, it having an interior longitudinal passage a^4, terminating at its lower conical end with one or more lateral passages a^5, communicating with the interior of the casing A above the valve seat *a*. The stem a^6 of the valve *a'* projects outwardly through a suitable cap A' threaded upon the exterior of the casing, a packing washer $a^\times$ being placed between the cap and casing, as shown. The valve stem a^6 has in its outer end a conical recess or socket a^7, into which may be inserted the conical end or nipple *b* in or secured to the end of a flexible tube *b'* connected with a suitable pump, the said nipple having an interior passage b^2 through which communication is had between the tube *b'* and the hollow valve *a'*. The nipple *b*, which constitutes one member of a detachable coupling, is drawn tightly into the conical socket a^7 in the threaded outer end of the valve stem a^6 which constitutes the other member of the coupling by means of a cap b^3, threaded upon the end of the valve stem a^6 and acting upon a flange b^4 on the nipple, rotation of the cap in the proper direction acting upon the flange to draw the nipple into the socket and form an air-tight connection between the tube *b'* and the valve *a'*.

I have herein shown the nipple *b* as provided with diametrically opposite projecting pins b^5 which enter corresponding slots a^8 in the end of the valve stem a^6 so that when the nipple *b* is inserted in its socket a^7, rotation of the nipple by hand will cause like rotation of the valve *a'*. The annular edge or valve seat *a* at its under side is formed to present a seat *c'*, preferably conical, as shown, for a check valve *c* of suitable construction, the same being herein represented as provided with a stem c^2 fitted to move in the guide opening c^3 in the plug c^4 tapped into the bottom of the valve casing, a spring c^5 interposed between the plug and check valve, acting to seat the latter. The plug c^4 is perforated as at c^6 to permit passage of air through the valve. An extension piece *d* interposed between the main and check valves, and preferably tapped into one of the valves, as shown, for adjustment, or forming a part of or attached to one of the valves acts to positively move the check valve from its seat when the main valve *a'* is closed or upon its seat as represented by dotted lines; when however the main valve is in its full line or open position, the check valve remains seated to fulfill its functions as a check valve and to permit entrance of air into the tire, but to close against the escape of air therefrom.

When my improved valve, thus far described, is to be applied to a new tire, its casing will preferably be prolonged beyond the plug c^4, to form a suitable neck, over or about which may be placed the usual rubber tube or neck communicating with the interior of the tire. When, however, a tire is already provided with a valve casing of usual construction containing a defective check valve, and it is desired to apply my improved valve, the lower end of the valve casing A is suitably threaded as at $A^\times$, to be screwed to the threaded end of the valve casing as B of the defective valve. This valve casing B, has the usual passage B' normally closed by a check valve B^2 of common construction as shown.

Inasmuch as my improved valve A is also provided with a check valve of durable and effective construction, when it is applied to the valve casing B of the old valve it is desirable that the check valve B^2 in the old valve should be rendered inoperative. To accomplish this I preferably provide a T shaped piece *f*, which is placed at the entrance to the valve casing B as shown, to be clamped in place by the valve A, the arm *f'* of the T-shaped piece extending downwardly within the valve casing B to act at its lower end upon the check valve B^2 which is positively held open or inoperative thereby. My improved valve may thus be applied to an old valve without removing the latter from its tire, and the old valve rendered inoperative as a valve, leaving the air entirely under the control of the new valve. This is a great desideratum, as an attempt to remove the old valve is liable to result in the ruin of the tire.

In lieu of the T-shaped piece *f*, a tubular piece may be employed or the valve casing A may be provided with a depending projection $f^\times$ as shown in Fig. 5, which reaches down and holds the check valve B^2 in an inoperative position.

The valve A in practice is manipulated as follows, viz:—The nipple *b* on the inflating tube is inserted in the socket a^7 in the end of the valve with its pins b^5 in the slots a^8 and the nipple firmly drawn into place by rotation of the cap b^3. The nipple is now rotated by grasping its enlarged portion $b^\times$ to thereby through its pins b^5 rotate and open the valve *a'*. The enlarged portion $b^\times$ thus constitutes a valve operating handle on the nipple. The pump is then operated to force the air or inflating fluid through the tube *b'* and valve casing A into the tire, the check valve *c* opening before the entering air but closing against any escape of air from the tire, the check valve B^2 remaining at all times inoperative.

When the tire has been properly inflated, the cap b^3 may be rotated by the fingers in a direction to close the valve, and thereby acts through its threads to draw the nipple b into the socket a^7 until it can be drawn in no farther, when further rotative movement of the cap must cause the nipple and the valve connected thereto by the lateral pin and slot connection to be rotated in unison with the cap until further rotation of the valve is prevented by the seating of the valve, as represented in dotted lines, when escape of the air is then impossible, the check valve c being opened by the extension piece d as described. Rotation of the cap b^3 in a direction to close the valve a' acts through its threads to draw the nipple b into the socket a^7 and establish a firm frictional contact between it and the flange b^4 so that a firm closing of the valve is assured, for the greater force exerted in turning the cap, the greater is the friction to cause rotation of the nipple and the valve. When, however, the cap is rotated in the opposite direction to unscrew it, the threads immediately relieve the friction between it and the flange b^4, and permit the cap to be unscrewed from the valve a' without rotating the latter, after which the nipple b may be readily withdrawn from its socket in the valve. The passage in the valve a' will preferably be closed by a suitable cap not shown to prevent the entrance of dust and dirt when the tire is in use upon the road.

When the valve A is constructed for the express purpose of being attached to an old-valve already provided with a check valve, as the valve B^2 the check valve c, may be omitted, and the extension piece d made of sufficient length to reach down to and act upon the valve B^2 in the manner in which the valve c is acted upon in the drawings.

When it is desired to free the tire of the air contained within it, the valve a' may be opened slightly but not sufficiently to permit the check valve to move to its seat, so that both valves are open at the same time to permit the air in the tire to escape.

I claim—

1. The combination with a valve casing containing a valve seat, of a hollow valve movable longitudinally within the casing to co-operate with said valve seat, and formed at its outer end to constitute one member of a detachable coupling, the other member of which is on the inflating tube, substantially as described.

2. A valve casing open at its end in the direction of movement of the valve and having a valve seat, combined with a hollow longitudinally movable valve to co-operate with said seat whereby air admitted at the open end of the said casing may be forced through said valve and between it and its seat, substantially as described.

3. A valve casing containing a valve seat, a co-operating longitudinally movable hollow valve therefor, and a socket in the end of said valve, combined with an inflating tube fitted at its end with a nipple to enter said socket, and means to draw the nipple into the socket to form an air-tight joint, substantially as described.

4. A valve casing containing a valve seat and a co-operating longitudinally movable hollow valve therefor provided at one end with a conical socket, combined with a conical nipple adapted to enter said socket and a cap adapted to be screwed upon the end of the valve and acting upon and to draw said nipple into its socket, substantially as described.

5. A valve casing containing a valve seat, and a co-operating longitudinally movable hollow valve therefor provided at one end with a socket, combined with a nipple adapted to enter said socket, a lateral pin and slot connection between the nipple and its socket to prevent rotation of one with relation to the other, and means to draw the nipple into its socket, substantially as described.

6. A valve casing containing a valve seat, and a longitudinally movable valve therefor formed at its outer end to constitute one member of a detachable coupling, combined with a co-operating coupling member adapted to be carried by the end of the inflating tube, and a handle on the co-operating member by which to operate the valve when the two members are coupled together, substantially as described.

7. A valve casing containing a valve seat and a longitudinally movable valve therefor having a socket at its outer end, combined with a nipple adapted to enter said socket, means to lock the nipple in the socket, and a valve operating handle on the nipple by which to rotate the valve, substantially as described.

8. A valve casing having inlet and outlet passages, and a valve seat between the same, combined with a hollow longitudinally movable valve to co-operate with said seat, whereby air admitted through the inlet passage may be forced through said valve and between it and its seat, a check valve in and controlling the said outlet passage, and an extension piece between the said hollow valve and check valve whereby the latter is unseated by seating of the former, substantially as described.

9. A valve casing having inlet and outlet passages and a valve seat between the same, combined with a hollow longitudinally movable valve to co-operate with said seat, whereby air admitted through the inlet passage may be forced through said valve and between it and its seat, a check valve in and controlling the said outlet passage, and an adjustable extension piece between the said hollow valve and check valve whereby the latter is unseated by seating of the former, substantially as described.

10. The combination with a tire provided with a valve B containing a check valve, of a

valve casing adapted to be secured to said valve B, and containing a main valve, and a device interposed between said valve casing and check valve to retain the latter in its unseated position so long as the said valve B and valve casing are secured one to the other, substantially as described.

11. The combination with a valve casing and main and check valves therein, of a T-shaped piece adapted to be interposed between said casing and another valve, substantially as and for the purpose specified.

12. The combination with a tire provided with a valve B containing a check valve, of a valve casing adapted to be secured to said valve B and containing a valve seat and a co-operating main valve, and a device to act upon said check valve to hold the same positively in one position, independently of and to permit free movement of said main valve substantially as described.

13. A valve casing containing a valve seat, and a co-operating longitudinally movable hollow valve therefor provided at one end with a socket, combined with a nipple adapted to enter said socket, and devices co-operating with said nipple and socket whereby the nipple and socket may be moved in unison in a direction to effect the closing of the valve, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ASAHEL M. SHURTLEFF.

Witnesses:
FREDERICK L. EMERY,
EMMA J. BENNETT.