

S. L. SEARS.
VALVE FOR PNEUMATIC TIRES.

No. 553,791.

Patented Jan. 28, 1896.

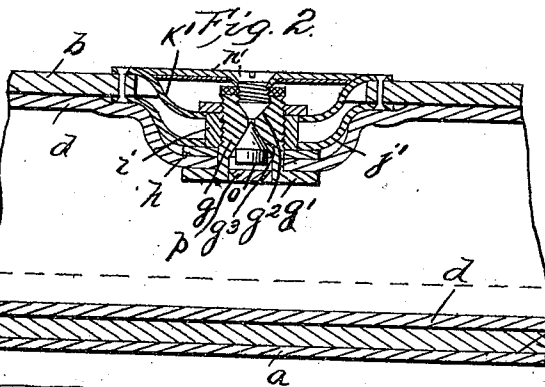
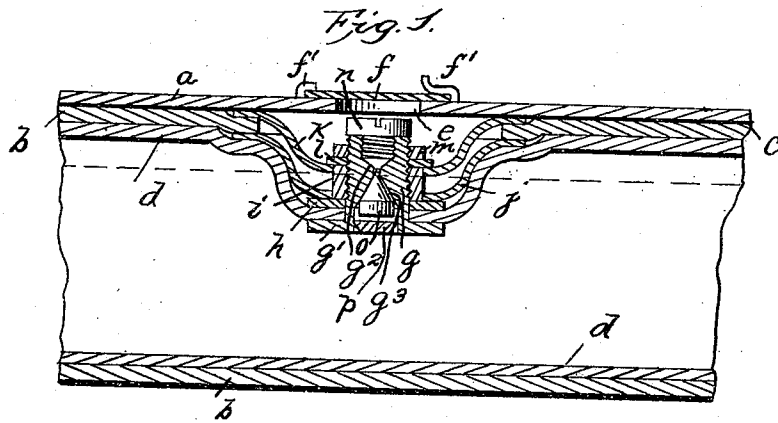


Fig. 3.

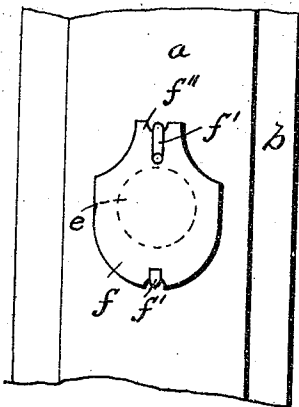
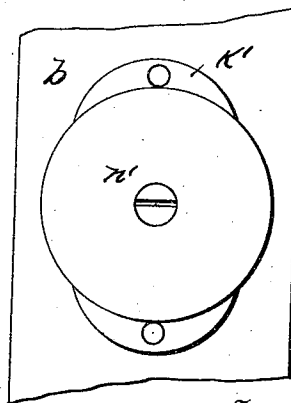
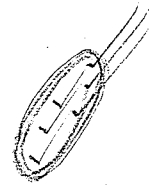


Fig. 4.



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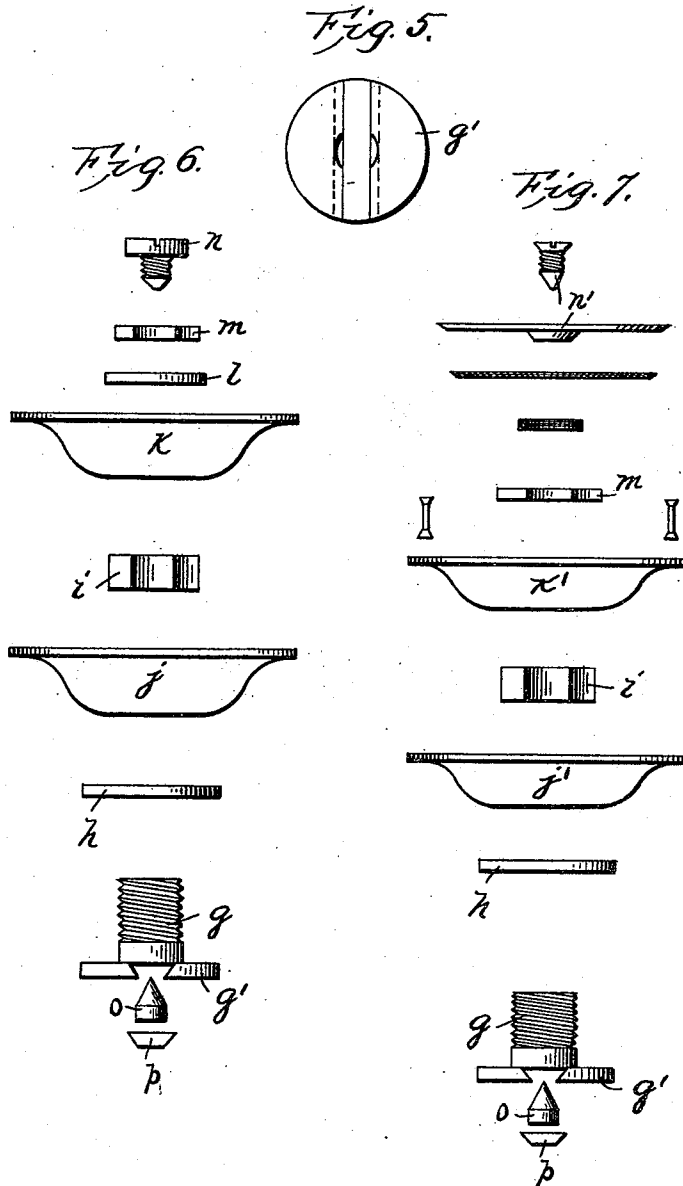
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 per *E. C. Duff*
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UNITED STATES PATENT OFFICE.

SYDNEY L. SEARS, OF NORFOLK, VIRGINIA, ASSIGNOR OF ONE-HALF TO J. EDWARD COLE AND RO. W. SHULTICE, OF SAME PLACE.

VALVE FOR PNEUMATIC TIRES.

SPECIFICATION forming part of Letters Patent No. 553,791, dated January 28, 1896.

Application filed January 12, 1895. Serial No. 534,687. (No model.)

To all whom it may concern:

Be it known that I, SYDNEY L. SEARS, of Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Valves for Pneumatic Tires; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to certain improvements in valves.

The object of the invention is to provide certain improvements in valves and in the manner of securing, locating and arranging the same, so that in inflatable bodies provided with outer coverings the valve and its casing will be arranged within the outer covering and the inner body can be inflated and deflated through the outer covering and said valve-casing.

A further object of the invention is to provide certain details in construction and arrangements and combinations of parts whereby a highly-efficient valve and means for securing are produced overcoming certain grave defects hereinbefore experienced in the art.

The invention consists in certain novel features of construction and in combinations and arrangements of parts more fully and particularly described and pointed out hereinafter.

Referring to the accompanying drawings, Figure 1 is a longitudinal section of a part of the rim and pneumatic tire of a bicycle, showing the valve arranged to be reached through an opening in the rim. Fig. 2 is a similar view showing the valve arranged to be reached through an opening in the tread of the outer covering of the pneumatic tire. Fig. 3 is an outside view of the inner side of the rim of the construction of Fig. 1. Fig. 4 is an outside plan of the tread of the tire as illustrated in Fig. 2. Fig. 5 is a bottom plan of the valve-tube, showing its inner flange and the means for confining the reciprocating check-valve. Fig. 6 shows in elevation the various

parts of the construction of Fig. 1 separated. Fig. 7 is a similar view of the parts of the construction of Fig. 2.

In the drawings, *a* is the metal rim of a wheel in which the spokes are secured.

b is the outer covering or tube of the tire, in this construction, preferably, not cemented to the rim, as is usual, but retained therein by the pressure of the compressed air within the inner tube. The inner concave surface of the metal rim is also preferably covered with a protecting or cushioned layer or coating, *c*, of suitable fabric or other material to prevent all wear and undue injury of the spoke or nipple ends on the rubber tire.

d is the inner tube of the tire, of any suitable or desirable construction and of any suitable material. This inner tube is closed and hollow throughout, so that when inflated it will inflate and expand the tire to sustain the desired amount of weight and compressing pressure. At any suitable point the valve casing or tube extends through the inner tube and the outer covering, and in Fig. 1 the rim is shown with an opening *e* opposite the outer end of the valve-tube within the tire and rim. A cover *f* is removably located on the outer surface of the rim to normally cover this opening, suitable fastenings *f'* being provided to hold said cover, which is so formed as to have the edge *f''* to serve as a screwdriver to remove the cap in the outer end of the valve-tube.

g is the valve-tube externally threaded in one direction throughout its length, and extending through the inner tube and outer cover, and provided with the flange *g'* at its inner end in and fitting the inner surface of the inner tube.

h is a washer fitting the exterior of the tube and the outer surface of the inner tire-tube, against which it is most tightly clamped to prevent all leakage and firmly secure the valve-tube by the nut *i*, screwed on the exterior of the valve-tube outside of the inner tire-tube.

The outer covering is provided with an opening around the valve-tube of greater size than the diameter of said valve-tube. This opening is closed, and the valve-tube is firmly held in position, and the inner tube is held

depressed at this point to permit the valve-tube being held approximately within the plane of the outer covering and not to project outwardly beyond the same by the two plates *j k*, both bulged laterally or countersunk at their centers. The inner plate, *j*, at its edges, fits the inner surface of the tire-covering around the opening therein, while its central depressed portion is perforated to receive the said clamping-nut before described, which passes through the same. The outer plate, *k*, at its edge, fits the outer face of the tire-cover, and its central inwardly-depressed portion is perforated to surround said nut. These two plates are rigidly clamped to the outer tire-cover and to the valve-tube and parts thereof by the washer *l* and outer nut *m* on the valve-tube.

The opposite ends of the bore of the valve-tube are enlarged and provided with conical or tapered valve-seats *g²* and *g³*, and the outer end of the bore is internally threaded to receive the cap *n*, screwing into said bore and having the tapered inner end to fit the valve-seat *g²* and prevent all leakage and the outer rim or head to fit the outer end of the valve-tube. This outer head preferably has the cross-slit, so that it can be removed by a screw-driver.

A conical check-valve *o* is arranged in the inner enlarged end of the bore to seat against the seat *g³* and completely close the bore against the outward passage of air. The inner end of this check-valve is preferably formed flat so as to receive the full force of the air-pressure within the inner tire-tube, which will thereby firmly hold said valve to its seat to close the bore. Hence to relieve the pressure within the tire when it is to be deflated a pin or any suitable article is inserted through the valve-tube and engages the inner end of said check-valve and forces the same from its seat, permitting the air to escape outwardly around the same. Also when the air-pump is screwed in the outer end of the valve-tube and operated the excessive inmoving pressure unseats the valve to permit inflow of the air, yet the valve immediately resumes its seat to prevent outflow of the air, the valve being retained in the end of the bore by a cross-bar *p*, extending across the inner end of the valve-tube and preferably removable by being slidable in a transverse undercut way. This cross-bar is so located as to permit ample reciprocation of the valve for the purposes stated.

This valve can be of rubber or other suitable material and is most durable and lasting because it is not subjected to such excessive pressure or friction as is ordinarily the case in reciprocating air-valves operated by springs, &c., and which cause feathering and jamming.

In Fig. 2 I show my invention applied to the outside of a tire so that access to the valve-tube is had through the tread of the outer tire-covering. In this instance the outer covering is formed with a suitable opening in its

tread and the plates *j' k'* are arranged therein so that the outer covering is rigidly clamped between the plates, which can be riveted together and through the same, and the valve-tube is held approximately within the outer circle of said outer cover by the inwardly-deflected parts of said plates. A portion of the outer plate, it will be seen, is located on the tread of the tire and the central depressed portion thereof is covered by cap *n'*, having packing to fit the outer end of the valve-tube and the screw to enter the same, as before described. This cap maintains the even continuity of the tire-tread without materially affecting the smoothness of running or resiliency thereof. By reason of this peculiar construction and arrangement all cutting off and severing of the air or valve tubes by reason of the creeping of the tire is avoided, as the valve-tube is held within the outer cover so as not to pass through the rim and is below the rim. Thereby in case of creeping the valve passes along under the rim, not touching the rim and thereby not injuring or deflecting the valve in any way; also all leakage of air is avoided through or around the parts, and yet the device is exceedingly easy of operation, so that the air-pump can be operated quickly and with slight effort.

It is evident that various changes might be made in the forms, arrangements, and constructions of the parts described and that this invention can be applied to other devices without departing from the spirit and scope of my invention. Hence I do not limit myself to the construction herein shown and specifically described.

What I claim is—

1. The combination with an inner tube, and cover of a pneumatic tire, of an air-valve comprising the valve-tube having securing means at its inner end for the inner tube, and a dished plate secured to the valve-tube and provided with securing means for fastening to the cover so as to hold the valve-tube and inner tube pressed in, substantially as described.

2. An inflatable body and its cover, in combination with an air-valve comprising a valve-tube containing a check-valve and exteriorly threaded, means substantially as described to fasten the inner end of the tube to the inflatable body, the dished plates having the tube passing through their depressed portions, and nuts on the tube to clamp the edge of an opening in the cover between said plates, substantially as described.

3. The combination with an inflatable body and its cover, of an air-tube containing a check-valve and at its inner end opening into the inflatable body, the two plates centrally depressed and perforated to receive the tube, and means to secure the plates on the tube at an opening in the cover and to clamp the cover between them to close the opening therein, substantially as described.

4. In a wheel, the combination of a rim

5 having an opening and a closure therefor, with a pneumatic tire, and a rigid valved air-tube therefor opposite the rim-opening and held inwardly within the circle of the tire, substantially as described.

10 5. The valve-tube having its bore enlarged at the ends with tapered valve-seats, the removable cross-bar at the inner end of the tube, the freely movable tapered valve in said end, the outer end of the tube internally threaded, the cap to screw therein having a

valve, the tube externally threaded and flanged at its inner end, clamping-nuts on the tube, and plates thereon held by the nuts, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

15 SYDNEY L. SEARS.

Witnesses:

O. E. DUFFY,
C. M. WERLE.