

(No Model.)

4 Sheets—Sheet 1.

H. J. SWINDLEY.
WHEEL FOR VELOCIPEDES.

No. 475,828.

Patented May 31, 1892.

Fig. 1.

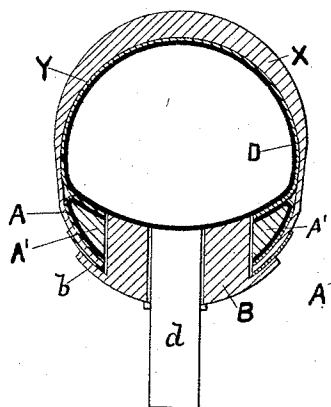


Fig. 2.

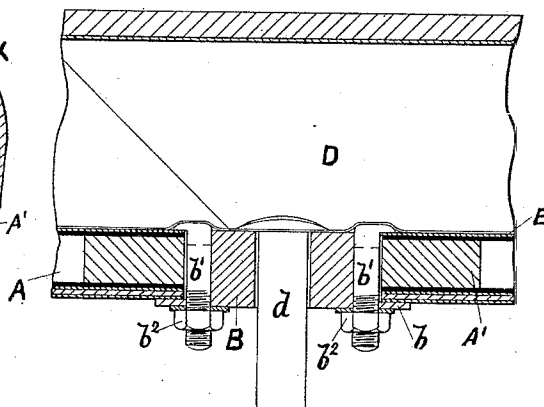


Fig. 3.

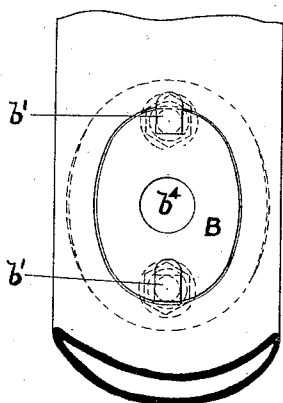
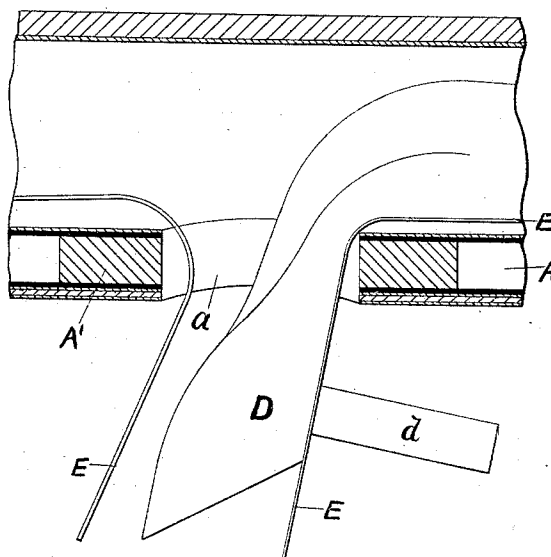


Fig. 4.



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FIG. 5.

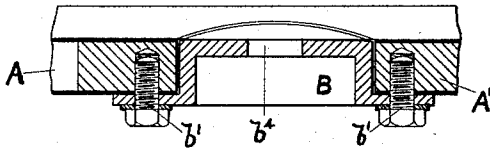


FIG. 6.

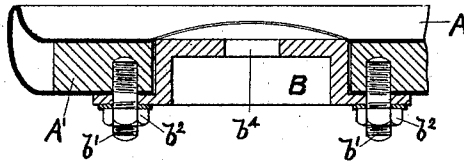


FIG. 7.

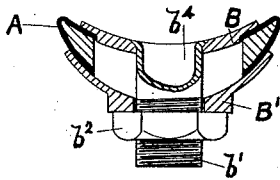


FIG. 8.

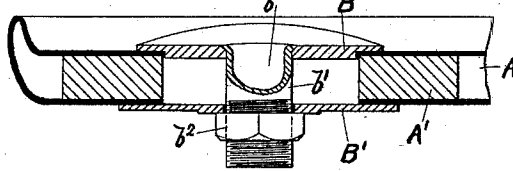


FIG. 9.

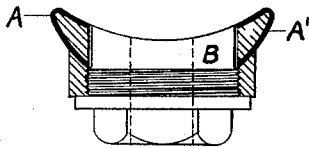


FIG. 12.

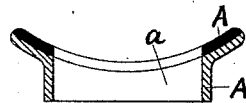


FIG. 10.

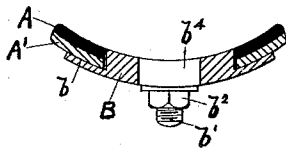
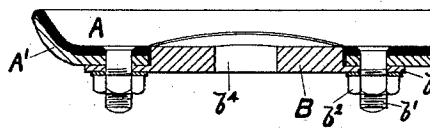


FIG. 11.



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Fig. 13.

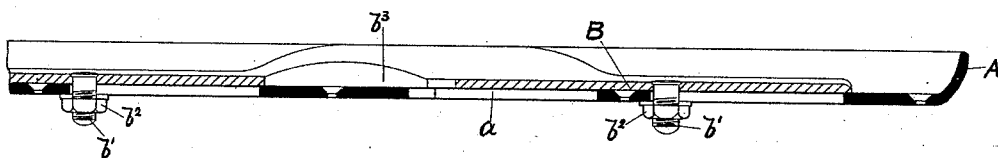


Fig. 14.

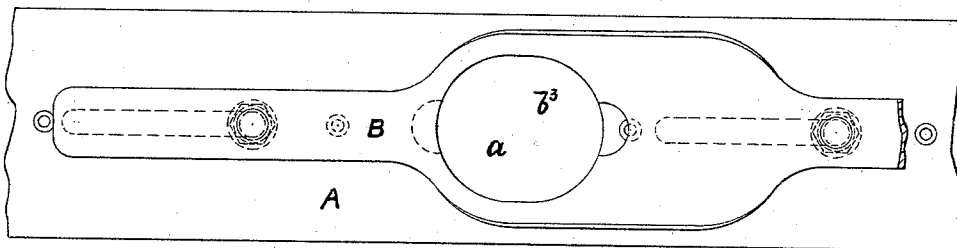


Fig. 15.

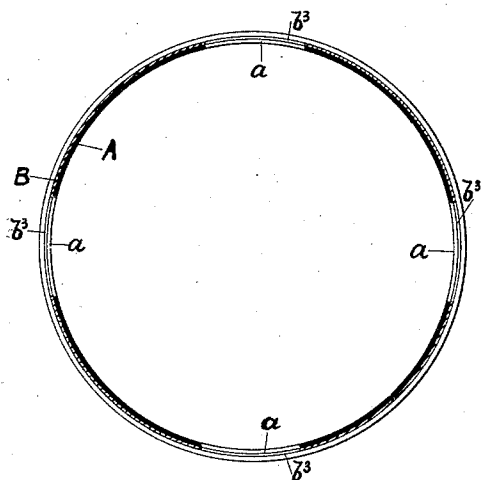


Fig. 16.

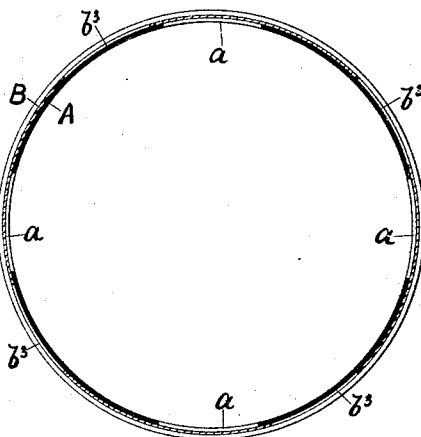


Fig. 17.

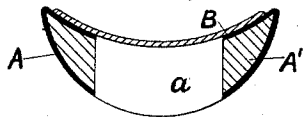
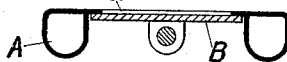


Fig. 18.



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FIG. 19.

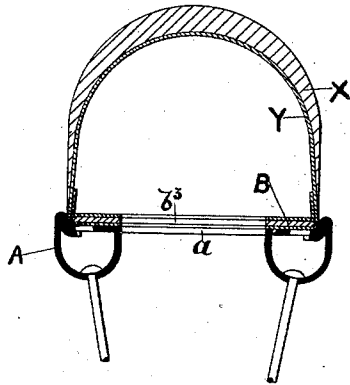


FIG. 20.

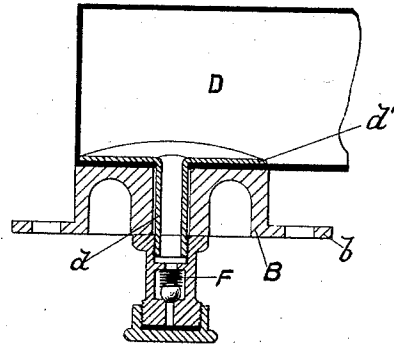


FIG. 21.

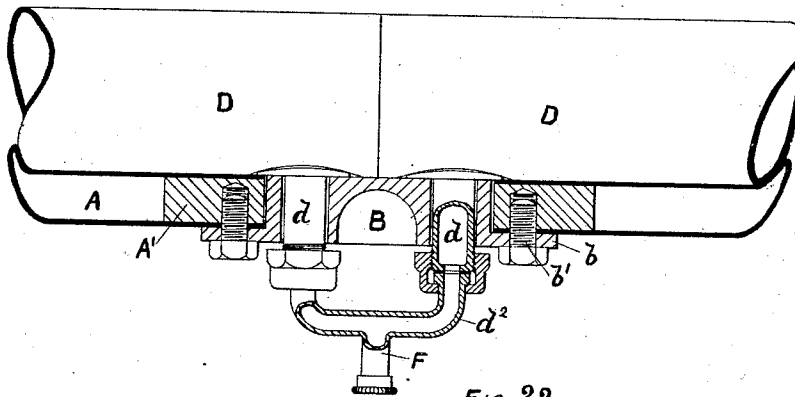
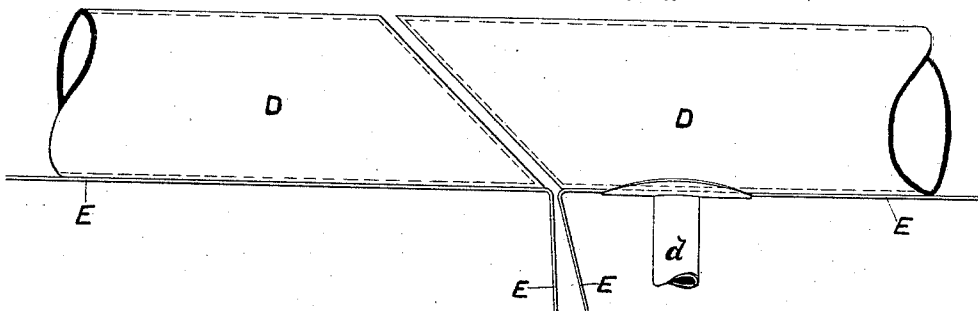


FIG. 22.



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UNITED STATES PATENT OFFICE.

HARRY J. SWINDLEY, OF BARNES, ENGLAND.

WHEEL FOR VELOCIPEDES.

SPECIFICATION forming part of Letters Patent No. 475,828, dated May 31, 1892.

Application filed August 20, 1891. Serial No. 403,176. (No model.) Patented in England February 13, 1891, No. 2,657.

To all whom it may concern:

Be it known that I, HARRY J. SWINDLEY, a subject of the Queen of Great Britain, residing at Barnes, in the county of Surrey, England, have invented a new and useful Improvement in Wheels for Velocipedes and other Road-Vehicles, (for which I have obtained a patent in Great Britain, No. 2,657, bearing date the 13th day of February, 1891,) of which the following is a full and complete specification.

My invention relates to improvements in pneumatic or air-inflated tires and in rims therefor for the wheels of velocipedes and other road-vehicles; and it consists in forming in the rim of the wheel one or more holes or slots, according to the diameter of the wheel, through which the air-tube can be inserted in and withdrawn from the hollow tire without disturbing the connection of the said hollow tire with the rim of the wheel and each of which is adapted to be closed by a suitable plug or plate, and in forming the air-tube of the tire in one more lengths; each in the form of a bag—*i. e.*, in a straight length with closed ends.

Pneumatic or air-inflated tires as at present constructed consist of three essential parts: first, the air-tube; second, the wrapping or covering of canvas or other suitable material for defining the size and shape of the tire and equalizing and distributing the pressure within it, and, third, the outer cover or tread, which is usually made of rubber. In some cases the two latter are combined, the best-known arrangement being the insertion of a canvas web in the outer rubber cover or tread during the process of manufacture. The outer rubber cover or tread and the canvas wrapper or cover, whether combined or separate, form the hollow tire and are fixed to the rim of the wheel either by cement or by some mechanical device, the air-tube being first placed within them. When the air-tube is damaged by puncturing or otherwise and will not hold and contain the air within it, it becomes necessary to get at it either to repair it in place or to get it out for the purpose of repair, and to do this it is necessary to open the hollow tire and sometimes also to remove either a portion or the whole of it from the rim of the wheel.

The object of my invention is to facilitate

the withdrawal of the air-tube from the hollow tire for the purpose of repairing it without interfering with the hollow tire or unfixing or removing it from the rim of the wheel, thereby enabling the hollow tire to be permanently and therefore more securely fixed thereto. I attain this end in the manner illustrated by the accompanying drawings, in which—

Figures 1 and 2, Sheet No. 1, are views in transverse and broken longitudinal section, respectively, of a part of a wheel embodying my invention. Fig. 3, Sheet No. 1, is a broken view in plan of the rim, showing a hole and closing plug or plate with one locking-bolt in position for inserting the plug or plate into the hole in the rim and the other in position for locking it thereto. Fig. 4, Sheet No. 1, is a broken view in longitudinal section showing how the air-tube is withdrawn from the hollow tire. Figs. 5 and 6, Sheet No. 2, are broken views in longitudinal section showing other means for fixing a closing plug or plate to the rim of the wheel. Figs. 7 and 8, Sheet No. 2, are views in transverse and broken longitudinal section, respectively, showing another device for closing the hole in the rim. Fig. 9, Sheet No. 2, is a view in transverse section showing a method of closing the hole in the rim by means of a screw-plug. Figs. 10 and 11, Sheet No. 2, are views in transverse section and broken longitudinal section, respectively, showing the application of my invention to a solid rim; and Fig. 12, Sheet No. 2, is a view in transverse section showing a method of strengthening solid rims where the holes are cut. Figs. 13 and 14, Sheet No. 3, are broken views in longitudinal section and plan, respectively, showing a method of closing the hole in the rim by means of a sliding plate. Figs. 15 and 16, Sheet No. 3, are views, on a reduced scale, in sectional elevation showing a method of closing the holes in the rim, when there are more than two, by means of a continuous plate. Fig. 17, Sheet No. 3, is a view in transverse section of a rim with a continuous internal closing-plate. Fig. 18, Sheet No. 3, is a view in transverse section of a rim with a continuous external closing-plate; and Fig. 19, Sheet No. 4, is a view in transverse section showing a further modification of this arrangement.

Fig. 20, Sheet No. 4, is a broken view in longitudinal section showing a method of attaching the air-tube to the closing plug or plate. Fig. 21, Sheet No. 4, is a broken view in longitudinal section showing an arrangement for connecting the two ends of the air-tube or two air-tubes together; and Fig. 22, Sheet No. 4, is a broken view in longitudinal elevation of the air-tube, showing the ends thereof and the continual canvasstrip or tape. Throughout the several views in longitudinal elevation or section the rim is, for convenience, shown straight instead of curved, and in Figs 5 to 18, both inclusive, the parts of the hollow tire are, for distinctness, not shown.

Similar letters denote similar parts throughout the several figures of the drawings.

In the rim A of the wheel are cut or formed one or more holes or slots *a* of any suitable size and shape, but preferably oval. The number of holes or slots in each rim will depend upon the diameter of the wheel and the size of the tire, and for the purpose of this specification I shall, unless otherwise stated, assume that there is but one hole or slot in each rim. The rim is strengthened at the point where the hole *a* is cut in any convenient manner. If the rim is a hollow one, I insert a strengthening-piece A', preferably at the joint of the rim, through which the hole is cut. If the rim is a solid one, it may be strengthened by means of an exterior plate A', as shown by Figs. 10 and 11, or by forming a flange A' around the hole or slot, as shown by Fig. 12. The slot or hole *a* is closed by a plug or plate B, which is made of the same thickness as the rim, so as to present an even surface on the concave face thereof when the hole or slot is closed, and it is preferably made hollow, as shown by Figs. 5 and 6, for lightness. The plug or plate has a flange *b*, adapted to bear against the convex face of the rim, and it is fixed to the rim by means of two bolts *b'* *b'*, having T-shaped heads, which on being turned inward permit the plug to be passed into the hole *a* in the rim, and on being turned outward to engage with the edge of the hole on the concave face of the rim, and thus allow the plug to be rigidly drawn up into and held in place by the nuts *b² b²* on the ends of the bolts *b' b'*. The plug may also be fixed to the rim by means of screws *b' b'*, threaded direct into the rim, as shown by Fig. 5, or by stud-bolts *b' b'*, fixed to the rim and passing through the holes in the plug, as shown by Fig. 6.

When a hollow rim is used, I sometimes close the hole on the concave face of the rim by a plate B, kept in position and fixed to the rim by means of a bridge or plate B', bearing against the convex face of the rim, the two being drawn together by means of a nut *b²*, threaded on a screw-stud *b'*, carried by the plate B, as shown by Figs. 7 and 8. The plate B is made of such a shape as will allow it to be passed through the hole *a* into the interior of the hollow tire. When the size of the rim

used will permit, I make the hole *a* in the rim round, thus enabling the plug B to be screwed into the said hole, as shown by Fig. 9.

As a modification I sometimes use a sliding plate to close the hole in the rim, as shown by Figs. 13 and 14. This plate B may be adapted to slide either on the convex or concave face of the rim, but preferably on the latter, as shown by Figs. 13 and 14. In the plate B is a hole *b³*, which, when the plate is in the position shown by Fig. 14, coincides with the hole *a* in the rim and thus opens it, and when the sliding plate is in the position shown by Fig. 13 the hole *a* is closed. The plate B is guided on the rim A and locked thereto by means of studs *b' b'*, fixed to the plate B and passing through slots *a' a'* in the rim and nuts *b² b²* being screwed on the studs *b' b'* to lock the plate to the rim. Owing to the length of this plate, it affords such additional strength to the rim A at the part where the hole *a* is cut that other means for strengthening it are not needed. When more than one hole or slot is required in the rim, I prefer to make the closing-plate B a continuous one in the form of a second rim extending entirely around the rim, the said plate having the same number of holes or slots *b³* as there are holes or slots *a* in the rim, as shown by Figs. 15 and 16, the former showing the holes or slots open and the latter closed. This continuous plate or second rim may be adapted either to slide on the concave face of the rim, as shown by Fig. 17, or on the convex face thereof, as shown by Fig. 18. When I use a continuous external plate or second rim, I prefer to mount the hollow tire on the said plate or rim, as shown by Fig. 19, and in this case I sometimes dispense with the hole or holes *a* in the rim, as the whole tire, mounted on the plate or second rim B, can be removed from the rim A when the said plate or second rim is slackened or loosened from the rim and the air-tube withdrawn or inserted through the hole or holes *b³* in the plate or second rim B, the whole tire being again placed on the rim and locked thereto by the plate or second rim B. The continuous plate or second rim may be fixed to the rim by expanding or contracting it by means of a right and left handed screw, as shown by Fig. 18, or by any other suitable device.

In the plug or plate B is formed a hole *b⁴* for the inflation-tube to pass through, and in the arrangement shown by Figs. 7 and 8 the stud *b'* is made hollow for the same purpose.

The ends of the air-tube D may be made either square or beveled, preferably the latter, as shown by Figs. 2 and 22, so that the end walls offer no appreciable resistance when the tire is compressed. The inflation-tube D is preferably fixed to the air-tube D in close proximity to one of its closed ends. To facilitate the withdrawal and insertion of the air-tube, I fix by cementation or vulcanization on the under side of the tube—i. e., on the side adapted to fit on the concave face of the

tire—a tape or strip of canvas E, having loose ends by which the two ends of the tube can be brought together and made fast to one another.

5 The plug or plate B may, if desired, be fixed to the air-tube D, as shown by Fig. 20, in which case I prefer to dispense with the inflation-tube and to fix the air-tube D to the plug or plate B by means of a tubular bolt *d*,
10 having a flat head *d'*, adapted to fit within the air-tube, so that when the tubular bolt *d* is drawn up taut either by an independent nut or by a threaded metal inflation-valve F, as shown by Fig. 20, it binds the air-tube D
15 tight to the plug or plate B.

To enable the air in the air-tube to circulate round the tire or to connect the separate lengths of the air-tube when more than one length is used, I connect the two adjacent ends
20 thereof by means of two small tubes *d'* *d'*, adapted to pass through the closing plug or plate B and to be connected to one another by a short length of pipe *d*², having suitable running-joints, with which is preferably combined the inflation-valve F, as shown by Fig.
25 21. It will be obvious that the ordinary air-tube with open ends may also be used; but such ends will have to be cemented together after the tube is placed in position and uncemented when it is required to withdraw it
30 from the hollow tire.

It will be understood that when the outer cover or tread X and the canvas wrapping or covering Y, whether combined or separate,
35 are fixed to the rim of the wheel one or more suitable holes are made through them to coincide with the hole or holes or slot or slots in the rim.

To withdraw the air-tube, the hole or holes
40 in the rim are opened, the air-tube having first been deflated, and it is then withdrawn through the said hole or holes, a piece of string or its equivalent having been first fixed to one end of tube to provide a means for re-
45 inserting the tube again.

It will be seen that by my invention a rider can easily repair a fractured tire in a few minutes, and by carrying one or more spare tubes reduce the time occupied in repairs to
50 a minimum.

My invention is applicable to all types of inflatable tires, whether inflated with air-gas or a liquid.

I wish it to be particularly understood that
55 I do not limit myself to the precise details of construction and the arrangements of the various parts, as hereinbefore described, and illustrated by the accompanying drawings; but that I hold myself at liberty to make such
60 changes and alterations as fully fall within the spirit and scope of my invention.

I am aware that holes have already been made in the rims of wheels for the attachment of the spokes, and I do not therefore
65 claim such, broadly, as my invention; neither do I make any claim to the general construction of the pneumatic or air-inflated tires, as

my invention is applicable to all such tires as at present constructed.

I hereby give notice of filing May 7, 1892, 70 another application, Serial No. 432,123, claiming a removable inner air-tube having closed ends and a lateral inflation-opening, whereby the ends of the tube are permitted to directly
75 abut together, and also claiming such a tube when combined with a rim and tire, one of which has an opening to permit its removal.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. In a wheel for velocipedes and other road- 80 vehicles, the combination, with a hollow tire permanently fixed to the rim and having an air-tube within it, of one or more holes or slots in the rim capable of allowing the air-tube to be withdrawn from the hollow tire, 85 and one or more plugs or plates adapted to close the said holes or slots in the rim, as and for the purpose set forth.

2. In a wheel for velocipedes and other road- 90 vehicles, the combination, with a hollow tire permanently fixed to the rim of the wheel, of one or more air-tubes, each made in the form of a bag—*i. e.*, with closed ends—one or more holes or slots in the rim capable of
95 allowing the air tube or tubes to be inserted in and withdrawn from the hollow tire, and one or more plugs or plates adapted to close the said holes or slots in the rim of the wheel, as set forth.

3. In a wheel for velocipedes and other road- 100 vehicles, the combination, with a hollow tire permanently fixed to the rim of the wheel, of one or more air-tubes, each made in the form of a bag—*i. e.*, with closed ends—and having an inflation-tube located at or near one end
105 thereof, one or more holes or slots in the rim capable of allowing the air tube or tubes to be inserted in and withdrawn from the hollow tire, and one or more plugs or plates adapted to close the said holes or slots in the
110 rim of the wheel and each having a hole for the passage of the inflation-tube, as set forth.

4. In a wheel for velocipedes and other road- vehicles, the combination, with a hollow tire permanently fixed to the rim of the wheel, of
115 one or more air-tubes, each having closed ends, and a continuous tape of non-stretchable material fixed along its under side and an inflation-tube located at or near one end thereof,
120 one or more holes or slots in the rim capable of allowing the air tube or tubes to be inserted in and withdrawn from the hollow tire, and one or more plugs or plates adapted to close the said holes or slots in the rim of
125 the wheel and each having a hole for the passage of the inflation-tube, as set forth.

5. In a pneumatic air-inflated tire for the wheels of velocipedes and other road-vehicles, the combination, with the rim of the wheel,
130 of an outer cover or covers of canvas or rubber, either combined or separate, one or more bag-shaped air-tubes having closed ends and adapted to be placed within the hollow tire formed by the outer cover or covers,

one or more holes or slots in the rim of the wheel, and one or more plugs or plates adapted to close the said holes or slots, all combined and arranged and operating as and for the purpose set forth.

6. In a pneumatic or air-inflated tire for the wheels of velocipedes and other road-vehicles, the combination, with the rim of the wheel, of an outer cover or covers of canvas and rubber, either combined or separate, one or more bag-shaped air-tubes having closed and beveled or chamfered ends, and a continuous tape of non-stretchable material fixed to that part of it adapted to come in contact with the concave face of the rim, one or more holes or slots in the rim of the wheel, and one or more plugs or plates adapted to close the said holes or slots, all combined, arranged, and operating as and for the purpose set forth.

7. In a pneumatic or air-inflated tire for the wheels of velocipedes and other road-vehicles, the combination, with an outer cover or covers of canvas and rubber, either combined or separate, of a rim having one or more slots therein, one or more plugs or plates adapted to close the said holes or slots, and two or more air-tubes, each having closed ends and each connected to the other by a junction-pipe, all combined, arranged, and operating as and for the purpose set forth.

8. In a wheel for velocipedes and other road-vehicles, the combination, with a hollow tire permanently fixed to the rim of the wheel, of one or more air-tubes made in the form of bags—*i. e.*, with closed ends—and each having an inflation-tube located at or near one end thereof, two or more holes or slots in the rim of the wheel capable of allowing the said air-tubes to be inserted in and withdrawn from the hollow tire, and a continuous internal or external plate or second rim adapted to close the said holes or slots in the rim, as set forth.

9. In a wheel for velocipedes and other road-vehicles, the combination, with the rim of the wheel, of a hollow tire mounted on a second rim or continuous plate having one or more slots therein and adapted to be fixed to the rim of the wheel, and one or more air-tubes having closed ends, all combined, arranged, and operating as set forth.

10. In a pneumatic or air-inflated tire giv-

ing access to the air tube or tubes without disturbing the outer cover or covers or removing them from the rim by forming in the rim carrying the tire one or more holes or slots, each of a sufficient size to allow the air tube or tubes when either partially or wholly deflated to pass therethrough and each provided with a closing plug or plate, as and for the purpose hereinbefore described, and illustrated by the accompanying drawings.

11. In a pneumatic or air-inflated tire attaching to that part of the air-tube which comes in contact with the concave face of the rim, a tape or strip of canvas or other un-stretchable material to prevent the said air-tube from stretching and so facilitates its withdrawal from the hollow tire, as set forth.

12. In a pneumatic or air-inflated tire, one or more air-tubes adapted to be placed within the said hollow tire end to end and each having sealed or closed ends beveled or chamfered so that the closing walls are not at right angles to the tread of the wheel and a tape or strip of canvas or other non-stretchable material fixed to its under side, as and for the purposes set forth.

13. In a pneumatic or air-inflated tire having an air-tube made in two or more lengths placed end to end in the said tire, connecting these lengths of tubes to one another, so that the pressure may be the same in each length by means of small pipes or tubes passing out through holes in the rim and connected together by a junction-pipe, as set forth.

14. In wheels for velocipedes and other road-vehicles, having pneumatic or air-inflated tires the air-tubes of which are adapted to be withdrawn through holes in the rims, connecting the air-tubes to the plugs or plates adapted to close the holes in the rims of the wheels by means of tubular bolts having flanged heads adapted to fit within the air-tubes and bind them to the closing plugs or plates, as set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HARRY J. SWINDLEY.

Witnesses:

ROBT. ED. PHILLIPS,
W. H. JAMES.