No. 647,077. Patented Apr. 10, 1900.

J. COTTRELL.

WHEEL RIM AND MEANS FOR HOLDING COVERS OF PNEUMATIC TUBES THERETO.

(Application filed Sept. 9, 1897.)

(No Model.)

2 Sheets—Sheet 1.

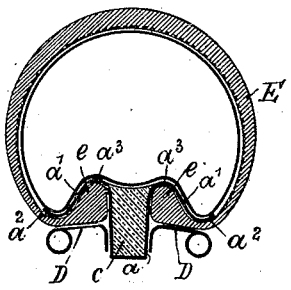

Fig. 1.

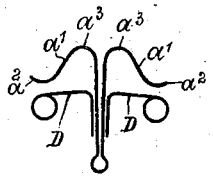

Fig. 2.

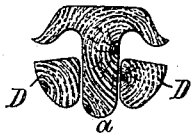

Fig. 3.

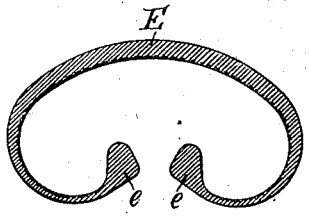

Fig. 4.

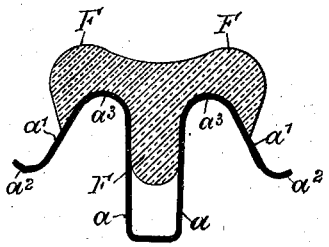

Fig. 5.

Witnesses.

Fred K. W. Lane

Robt. A. Blake

INVENTOR,

James Cottrell.

by Henry N. Keith

Attorney.

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J. COTTRELL.

WHEEL RIM AND MEANS FOR HOLDING COVERS OF PNEUMATIC TUBES THERETO.

(Application filed Sept. 9, 1897.)

(No Model.) 2 Sheets—Sheet 2.

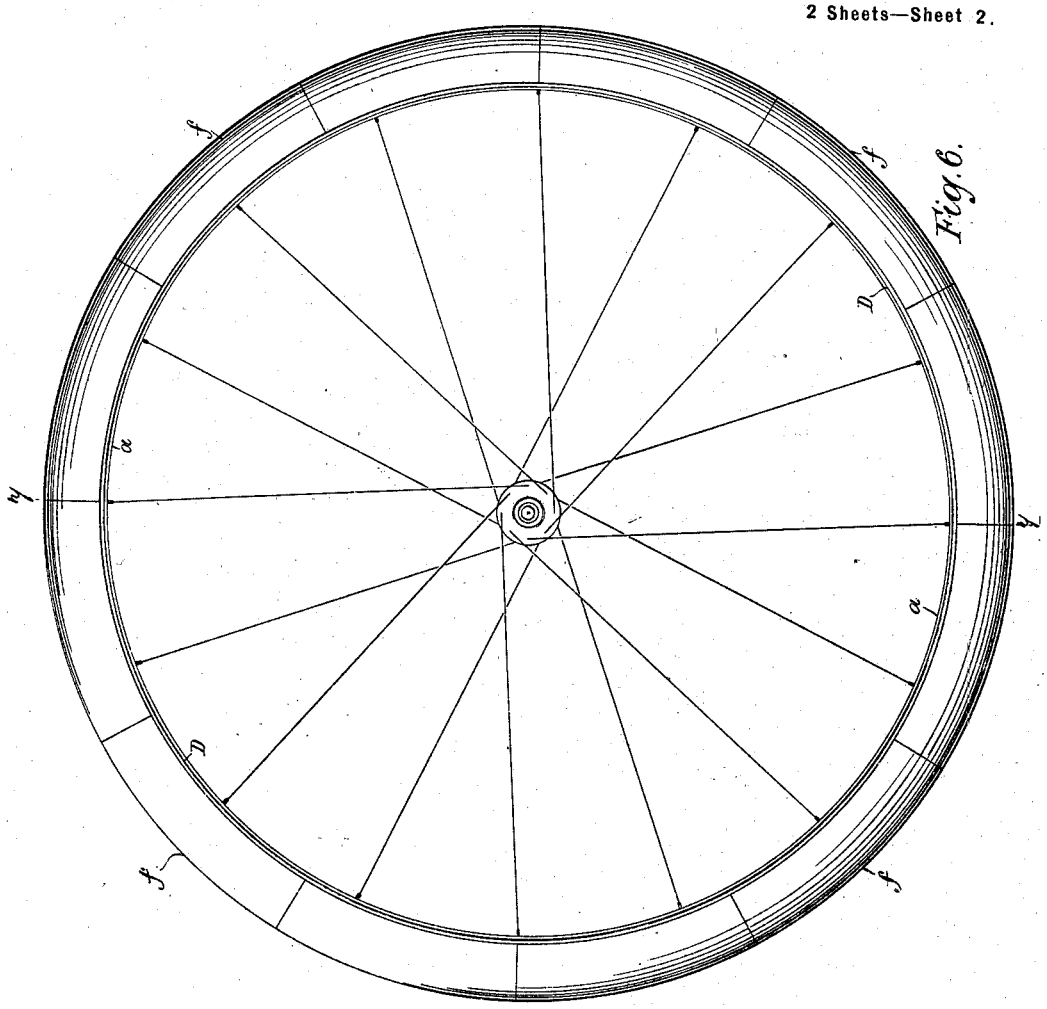

Fig. 6.

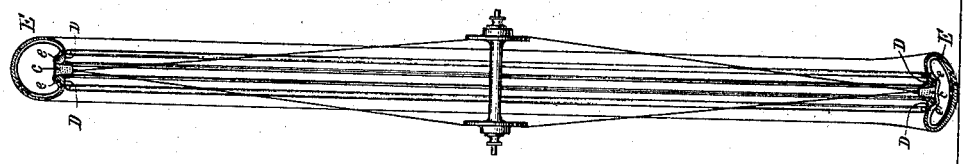

Fig. 7.

Witnesses:
Fred K. W. Lane
Robt. A. Blake

Inventor,
James Cottrell,
by Henry H. Leigh
Attorney.

UNITED STATES PATENT OFFICE.

JAMES COTTRELL, OF LONDON, ENGLAND, ASSIGNOR TO ALFRED HENRY SMITH, OF SAME PLACE.

WHEEL-RIM AND MEANS FOR HOLDING COVERS OF PNEUMATIC TUBES THERETO.

SPECIFICATION forming part of Letters Patent No. 647,077, dated April 10, 1900.

Application filed September 9, 1897. Serial No. 651,091. (No model.)

To all whom it may concern:

Be it known that I, JAMES COTTRELL, a subject of the Queen of the United Kingdom of Great Britain and Ireland, residing at No. 168 Upper Kennington Lane, London, in the county of Surrey, England, have invented certain new and useful Improvements in and Connected with Wheel-Rims and in the Means for Holding the Covers of Pneumatic Tubes Thereto, (for which I have obtained patents in the following countries:—Great Britain, No. 11,562, dated June 13, 1895; France, No. 25,705, dated June 20, 1896, and Germany, No. 6,199 11/63, dated June 20, 1896;) and I do hereby declare that the following is a full, clear, and exact description of the invention, reference being made to the accompanying drawings, which are to be taken as part of this specification and read therewith, and one which will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to improvements in and connected with wheel-rims and in the means for holding the covers of pneumatic tubes thereto.

The objects of it are to improve the connection of the cover of the pneumatic tube to the wheel-rim, to facilitate the act of either attaching the said cover to the wheel-rim or of detaching it from it, and to facilitate access to the pneumatic tube as well as to prevent the rim cutting either the pneumatic tube, or its cover.

Referring to the accompanying figures, which are to be taken as part of this specification and read therewith, Figure 1 is a transverse section through the cover, the pneumatic tube, the wheel-rim, and the locking-rings of the cover. Fig. 2 is a transverse section of a modified form of metal wheel-rim, together with the locking-rings. Fig. 3 is a transverse section of a wooden wheel-rim and wooden locking-rings. Fig. 4 is a transverse section of an improved pneumatic-tube cover detached from the wheel. Fig. 5 is a transverse section through a metal wheel-rim and the improved ring for preventing the tread of either the pneumatic tube or of the cover of it being cut by the rim. Fig. 6 is a side elevation illustrating the capacity of the present invention for providing for the cover of the pneumatic tube being made in separate sections. Fig. 7 is a section taken on the line 7 7 of Fig. 6.

The wheel-rim may be of either metal or wood. When it is of metal, it is either U-shaped in cross section, as shown at *a* in Figs. 1 and 5, or the two sides of the U may be approached toward each other till they touch more or less throughout their length, as indicated in Fig. 2. This last-mentioned shape is applicable to very light and small wheels. The outer portion *a'* of each side, about a third of it, more or less, is bent outward through about a right angle and then inward toward the axis of the rim, terminating there in a surface a^2, convex to the axis and of a smaller diameter than the rim at the angle above mentioned, as well as smaller than the concave annular recess between the said surface and the respective side above mentioned. The trough between the above-mentioned sides is filled with some soft material *c*, such as rubber or hemp, to protect the inner tube from damage by the rough ends of the spokes.

The edges *e* of the cover E (shown detached in Fig. 4) are thickened by the incorporation therewith of soft material that will bend, but retain its section under strain. Each thickened edge is laid within the concave annular recess above mentioned, which, it is to be noted, has the largest diameter of the rim on that side of the wheel between it and the ground. Each said edge is held in the respective recess by a locking-ring D. The diameter of a locking-ring across the inner edge of it is larger than that across the outer edge of it and is of a sufficient diameter relatively to the smaller diameter of the rim to be capable of allowing the thin part of the cover next to the thickened edge to pass between them, thus locking the said edge in the recess formed in the rim, as shown in Fig. 1.

The diameter of a locking ring or band being larger across one side than the other it has the conformation of a frustum of a cone, and when placed in position axially, with its larger or base diameter inward, it presents

its slant or conical surface to the edge of the tire in its recess. When the tire is inflated, the edge tries to get out of its recess and in so doing tightens around the slant surface of the locking-band and forces it in the direction of its larger or base diameter—that is, inward against the U-shaped central portion of the rim—which prevents the band moving in the direction of its inclination. Therefore the compression of the tire edge locks the band tightly in place, and in its turn the band locks the tire edge into its recess.

When the rim is made of wood, the central portion of it is conveniently solid, as shown in Fig. 3. The locking-rings D are preferably of the same material as the rim itself; but the selection of material does not form part of the present invention, and any suitable one may be made use of, provided that it is capable of furnishing the relatively-different diameters and the general contour of the rim described above.

In the case of a cycle-wheel built to carry a heavy load there is always the risk that the convex ridge a^3 of the rim on each side of the trough which contains the soft material *c* will be forced down upon the tread or portions of the pneumatic tube and its cover which are then between it and the ground and cut one or both. To obviate such tendency to cut, the two ridges are covered by a solid rubber ring F, sufficiently thick to prevent such cutting, as illustrated in Fig. 5. When the ring F is used, the filling *c* is dispensed with.

The cover E instead of being continuous may be made in sections *f*, in which case their ends would overlap each other. Some advantage would thereby be gained in that should the tire become damaged or cut at any point it would only be necessary to replace the section containing such point.

Hitherto it has been the practice to connect the cover E of a pneumatic tube to the outside (side turned away from the axis) of the wheel-rim. When the tube flattens out under the weight of the rider, as indicated in Fig. 7, the cover is liable to be cut by the edges of the rim, whereas when it is held to the inside (side facing the axis) of the wheel-rim, as it is under the present invention, flattening of the pneumatic tube has the effect of moving it away from the said rim-ridge.

It will be noticed and understood that the novel and peculiar shape of both the rim and the locking-bands coöperating with each other insures the retention of the thickened edges of the tire in the rim without any other holding device whatever.

Having now described my invention, what I desire to claim and secure by Letters Patent is—

1. The combination with the rim or felly of a cycle or other vehicle wheel, consisting of an endless or undivided ring having a central deep U-shaped circumferential recess, the outer or peripheral edges of which are bent over outward and downward into ⟃-shaped flanges directed toward the axis of the wheel, of an endless inflatable tube fitted around the outside of the rim, a circular outer cover circumferentially divided on the side fitted to the rim, the edges on either side of the division being thickened on the inner surface, and overlapping the inside surface of the flanges of the rim, and an endless retaining ring or band having the conformation of a frustum of a cone placed in position outside each edge of the cover parallel with the plane of the wheel, and with its larger diameter inward or toward the middle of the rim, substantially as and for the purposes described.

2. In wheels for cycles and other vehicles, the means for holding the covers of pneumatic tubes to the rims thereof, consisting in the combination with the rim of substantially ⋀⋁-shaped section and the thickened edges of the tire-cover, of a pair of endless or undivided rings or bands each having the form of a frustum of a cone and being placed over (outside) one of the edges of the cover parallel with the plane of the wheel and with its larger diameter inward facing the middle of the rim, substantially as described.

In witness whereof I have hereunto affixed my signature, in presence of two witnesses, this 19th day of May, 1897.

JAMES COTTRELL.

Witnesses:
ROBT. A. BLAKE,
W. M. HARRIS.