# N° 11,820 A.D. 1893

*Date of Application, 15th June, 1893*
*Complete Specification Left, 16th Oct., 1893—Accepted, 18th Nov., 1893*

## PROVISIONAL SPECIFICATION.

### Improvements in Pneumatic Tyres for the Wheels of Velocipedes and other Vehicles.

We, JOHN BOYD DUNLOP, Senior, of Talbot House, Blackrock, County Dublin, Ireland, Veterinary Surgeon, and JOHN BOYD DUNLOP, Junior, of Talbot House, Blackrock, County Dublin, Ireland, Student, do hereby declare the nature of this invention to be as follows :—

This invention relates to pneumatic tyres for the wheels of velocipedes and other vehicles, and has for its object to so provide that the tread portion of the tyre is strengthened, the friction between the tyre and the road surface is reduced and the speed of the vehicle correspondingly increased.

The chief feature of our invention relates to the provision of a non-expansible cover preferably of woven canvas having the weft or warp threads extending circumferentially around the wheel and so woven and applied to the rim of the wheel that the threads, whether warp or weft, which runs circumferentially round the tread surface of the tyre shall be stronger, or thicker, or closer together than the threads running transversely across the tyre.

We sometimes use an ordinary canvas cover having the threads extending diagonally and secure on the outer pheripheral or tread surface thereof a strip or band or bands of linen, silk, cloth or other suitable pliable material. The longitudinal threads of said strip or band are stronger, or closer, or stronger and closer than the cross or transverse threads of the strip and those of the canvas cover to which the strip is secured. Instead of a woven strip or band we sometimes use a series of straight longitudinal threads held together by india rubber solution or other cement without cross threads.

The strip or band may be made or woven endless and slightly shorter in circumference than the largest circumference of the canvas cover in the tyre when the latter is inflated, the result being that the tread surface of said cover is slightly flattened when the tyre is pumped hard. The band is covered with rubber as is usual. When our improved strengthening band is used, the wear of the canvas cover is to a great extent taken by the strong longitudinal threads of the band. The tyre is moreover rendered firmer in a circumferential direction yet at the same time owing to the absence or weakness of the cross-threads the lateral stiffness is not increased.

Dated this 15th day of June 1893.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, W.C., Agents for the Applicants.

## COMPLETE SPECIFICATION.

### Improvements in Pneumatic Tyres for the Wheels of Velocipedes and other Vehicles.

We, JOHN BOYD DUNLOP, Senior, of Talbot House, Blackrock, County Dublin, Ireland, Veterinary Surgeon, and JOHN BOYD DUNLOP, Junior, of Talbot House, Blackrock, County Dublin, Ireland, Student, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

This invention relates to pneumatic tyres for the wheels of velocipedes and other vehicles and has for its object to so provide that the tread portion of the tyre is

strengthened, the friction between the tyre and the road surface is reduced and the speed of the vehicle is correspondingly increased.

According to our invention we provide a non-expansible cover of woven canvas or the like, having the threads which run circumferentially round the tread surface of the tyre stronger or closer together and stronger than the threads running transversely across the tyre.

These strong threads may be woven in the centre of the canvas cover in the form of a strip, or a separate woven strengthening band or strip may be provided the same being placed on or secured to the tread surface of the canvas cover.

The longitudinal threads of the band or strip are much stronger or closer together than the cross threads thereof and are also stronger than the other threads composing the canvas or non-expansible cover. Instead of a woven strip we sometimes employ a series of straight or longitudinal threads held together by india-rubber solution or other cement without cross threads.

The strip or band may be made or woven endless. In some cases we use two or more strips or folds of canvas and thereby increase the number of longitudinal threads which obviously is the equivalent of longitudinal threads which are stronger or woven closer together.

In all cases the canvas cover, or, (when a separate band is used) the band, is made short enough to have the effect of slightly flattening the canvas cover.

In a tyre so constructed a much greater tensional stress, obviously, falls on the longitudinal threads at the tread than on the other longitudinal threads and on the cross threads of the cover, therefore the threads are strongest or closer and stronger where the tyre is subject to the greatest strain.

The longitudinal threads in the woven cover which are close to the rim are subject to comparatively little stress and may be made comparatively weak or dispensed with but we prefer in most cases to use these threads in order to have the air tube better protected as well as to facilitate the manufacture of the tyre.

In order that our invention may be more clearly understood we will now describe the manner of carrying it into practice.

In the accompanying drawings

Figure 1 is a cross section of a tyre fitted to a velocipede wheel rim for example and provided with a strengthening band according to our invention.

Figure 2 is a view of a portion of the band without cross threads.

Figure 3 is a view of a portion of the band in which cross threads are used for maintaining the longitudinal threads of the band in position.

Referring now to Figure 1, A is the rim of the wheel; B is the outer cover of the pneumatic tyre; C is the air-tube thereof; and D is the inexpansible cover or jacket surrounding said air-tube. E is an endless band or strip composed of longitudinal threads $E^1$, $E^1$ held together by cement or solution as shown in Figure 2, or held together by cross threads as shown at $E^2$ in Figure 3.

We sometimes secure the band to the canvas cover or jacket or we may leave it loose on the canvas cover, the radial pressure of the air in the tyre keeping it in position, or we may place the band on the outside of the rubber cover of the tyre, said band being covered with a strip of rubber to protect it from wear on the road surface.

Having now particularly described and ascertained the nature of our said invention, and in what manner the same is to be performed, we declare that what we claim is:—

1. In a pneumatic tyre a non-expansible woven cover or jacket having the threads at the tread and extending circumferentially round the tyre stronger or closer and stronger than the cross threads of said cover, substantially as, and for the purposes, specified.

2. The combination, with a pneumatic tyre having a non-expansible cover or jacket, of a strengthening band made of threads extending circumferentially round the tread of the tyre, with or without weaker cross threads, and covered with rubber

or other suitable material to protect it from wear, substantially as, and for the purposes, specified.

3. The combination, with a pneumatic tyre having a non-expansible cover or jacket, of a strengthening band extending round the tread of the tyre stronger longitudinally than the threads which run transversely across the non-expansible cover and covered with rubber or other suitable material to protect it from wear, substantially as and for the purposes, specified.

Dated this 16th day of October 1893.

HASELTINE, LAKE & Co.,
45, Southampton Buildings, London, W.C., Agents for the Applicants.

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*Fig. 1.*

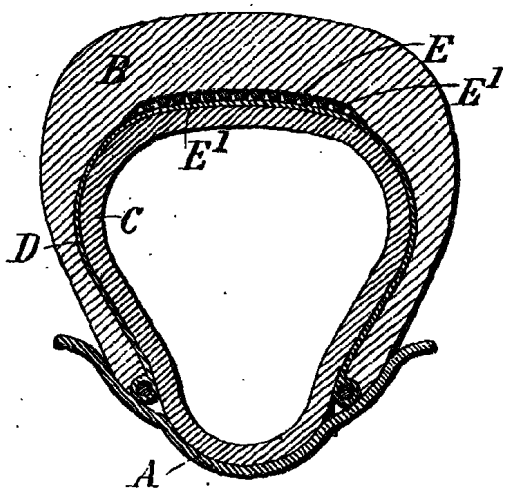



*Fig. 2.*

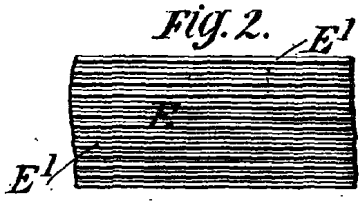
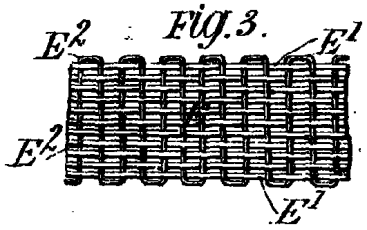



*Fig. 3.*




*[This Drawing is a full-size reproduction of the Original.]*

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