

(No Model.)

J. LYALL.
WOVEN FABRIC FOR WHEEL TIRES.

No. 505,294.

Patented Sept. 19, 1893.

Fig. 1.

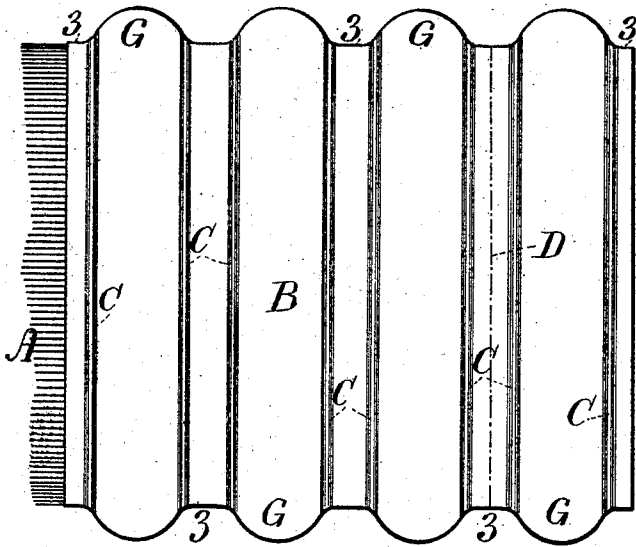


Fig. 2.

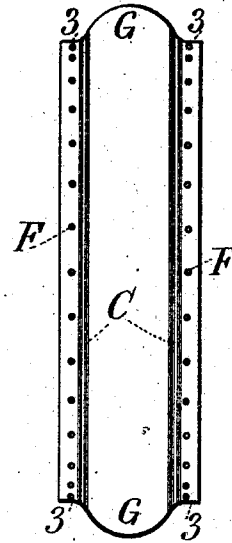


Fig. 3.

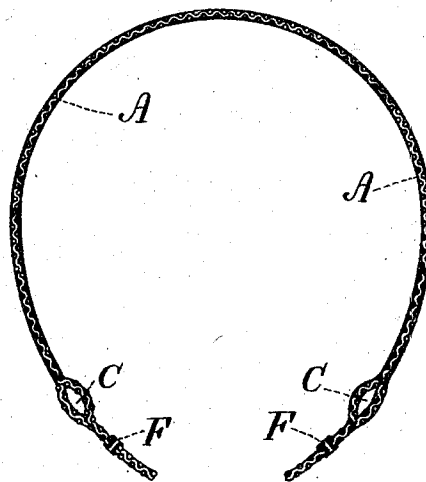
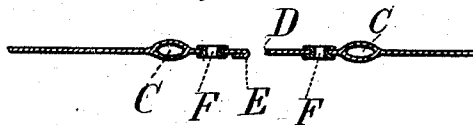


Fig. 4.



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UNITED STATES PATENT OFFICE.

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WOVEN FABRIC FOR WHEEL-TIRES.

SPECIFICATION forming part of Letters Patent No. 505,294, dated September 19, 1893.

Application filed February 9, 1893. Serial No. 461,559. (No specimens.)

To all whom it may concern:

Be it known that I, JAMES LYALL, a citizen of the United States, residing in the city and State of New York, have invented an
5 Improvement in Woven Fabrics for Wheel-Tires, of which the following is a specification.

In the construction of elastic wheel tires, especially those employed for bicycles and tricycles, a strip of canvas has been made
10 use of, either woven straight or cut on the bias and bent into a tubular form and united at the edges, or at the ends, so as to be introduced into the india rubber forming the tire or tread of the wheel or employed around the
15 expansible inflated tube of such tire. In the employment of such heavy woven fabric or canvas the ends have necessarily been lapped and united together, thereby forming a seam or irregularity in the periphery of the wheel.
20 In the present invention I weave a tubular fabric of a diameter corresponding or approximately so to the diameter of the elastic tire, so that the warps in the tubular fabric extend from edge to edge of such tubular fab-
25 ric and the weft threads pass around the fabric, the fabric being cut off in ring-shaped sections of the proper width to wrap around and form the canvas tube, the seam of the same or the points at which the edges are se-
30 cured or brought together being adjacent to the felly of the wheel, thereby the canvas or fabric is substantially seamless, because it is of a uniform fabric all around the tread portion of the flexible tire. In weaving this
35 tubular fabric I make use of divergent reeds upon the lathe and raise or lower such divergent reeds progressively by a Jacquard or other movement, so that the width of the double or tubular fabric woven is varied, the
40 object being that the larger diameter of the tubular fabric shall correspond to the exterior portion of such fabric when applied to the flexible tire and the narrower portion of such double or tubular fabric shall be ap-
45 proximately the measurement of the felly of the wheel, and when desired pockets are woven in the fabric across the same at proper distances apart so that wires, reeds or other similar devices may be introduced into these
50 pockets and employed in holding the inner portions or edges of the fabric adjacent to the felly. It is to be understood that the double

or tubular fabric, woven as aforesaid, is cut across transversely at the proper places between the piece of fabric for one tire and the
55 piece of fabric for the next tire.

In the drawings, Figure 1 is a plan view illustrative of the shape in which the tubular fabric is woven. Fig. 2 shows one piece of
60 the tubular fabric cut off and ready for use. Fig. 3 is a cross section of such tubular fabric on a larger scale in the form in which the same will assume, or approximately so, when surrounding an inflated tube within or forming
65 part of the flexible tire, and Fig. 4 is a section in larger size of the edges of the fabric.

The warp threads are represented at A and these are manipulated by any suitable Jacquard or other mechanism and the weft thread
70 or threads is or are laid in by any suitable shuttle and the weaving is progressed regularly, the shuttle passing in one direction through the upper shed and returning in the other direction through the lower shed, there-
75 by forming a woven tube B.

In cases where a plain woven tube is employed that is parallel throughout its length, sections of such woven tube are cut off with
80 the warp threads of such a length that the tube section when applied to the wheel can be drawn around the inflated tube or other portion of the elastic tire, and the edges of such woven or canvas tube can be secured in
85 any usual or suitable manner, the ends of the warp threads extending to the felly or portions adjacent thereto. I however prefer to weave into the fabric pockets C which pass around the double or tubular fabric at proper
90 places so as to be at the proper distance from the line D at which one tubular section is severed from the other, in order that the fabric near the edge thereof may be folded back-
95 wardly and hemmed, as represented at E, if desired, for strengthening the edges of such fabric.

Into the pockets C wires, cords, reeds or similar devices may be inserted to be used
100 in connection with the appliances common in bicycle and tricycle wheels for clamping and holding such cords, wires or similar devices and thereby securing the woven fabric or
canvass in its proper position in the wheel tire; and in cases where a lacing is made use of for connecting the edges of the woven fab-

rice adjacent to the felly, eyelets F are introduced at proper distances apart into the woven fabric for the reception of the lace or other connecting device.

5 The weft threads at the middle portions G of the tubular woven sections may be elastic to increase the facility with which the tubular section can be caused to assume the proper shape as such woven tubular section is drawn
10 around the inflated tube or elastic portion of the tire, such elastic weft threads stretching under the expanding action of the inflated tube and causing the woven fabric to assume the proper shape without creases or folds
15 near the inner edges. The aforesaid object is also promoted by introducing a movable reed with diverging wires, so that the reed may be raised and lowered as the weaving progresses, the central portion of each tubular section being woven when the longest part
20 of the divergent reed is used to beat up the weft threads; and the edge portions 3 of the woven fabric are formed when the narrowest portion of the reed is in position for beating
25 up the weft threads. Hence the tubular fabric will be woven in a shape approximating that represented in Fig. 1, and when the section of the fabric is cut off on the line D and distended into a circular shape it will form a
30 hollow ring with a concavity at the inner side and be convex on the outer side so as to approximate the shape of the inflated or flexible tube of the tire. Hence such woven tubular section is easily applied around such inflated
35 tire and its edges drawn toward each other and secured in any of the well known modes.

In consequence of the fabric being closely woven the risk of the flexible tire or inflated tube being punctured is reduced to a minimum, and the warp and weft threads can be
40 of any desired strength so as to be durable and adapted to particular characters of wheels.

I claim as my invention—

1. As a new article of manufacture, a section of heavy cylindrical canvas fabric having the weft threads running around such cylindrical section and with the warp threads extending across from edge to edge thereof, and means woven with such section for securing its edges in place, whereby such tubular section is adapted to form the canvas or
50 woven fabric in the elastic tire of a wheel, substantially as set forth.

2. As a new article of manufacture, a section of heavy cylindrical canvas fabric having the weft threads running around such cylindrical section and with the warp threads
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extending across from edge to edge thereof, the weft threads in the central portion of such woven tubular canvas section being elastic, 60 such tubular section being adapted to form the canvas or woven fabric in the elastic tire of a wheel, substantially as set forth.

3. As a new article of manufacture, a cylindrical fabric section woven and having the 65 weft threads running around such cylindrical section and with the warp threads extending across from edge to edge thereof and pockets woven around such tubular section and near the edges thereof, such tubular section being adapted to form the canvas or
70 woven fabric in the elastic tire of a wheel, substantially as set forth.

4. As a new article of manufacture, a cylindrical fabric section woven and having the 75 weft threads running around such cylindrical section and with the warp threads extending across from edge to edge thereof, such tubular section being adapted to form the canvas or woven fabric in the elastic tire of a
80 wheel, and eyelets introduced into such fabric and near the edge thereof, substantially as set forth.

5. As a new article of manufacture, a cylindrical fabric section woven and having the 85 weft threads running around such cylindrical section and with the warp threads extending across from edge to edge thereof and pockets woven around such tubular section and near the edges thereof, such tubular section being adapted to form the canvas or
90 woven fabric in the elastic tire of a wheel, and eyelets introduced into such fabric and near the edges thereof, substantially as set forth.

6. As a new article of manufacture, a ring-shaped fabric section woven and having the 95 weft threads running around such cylindrical section and with the warp threads extending across from edge to edge thereof, the weft threads near the edges of the section being shorter than the weft threads near the middle portions of the section, so that the ring-shaped fabric section is contracted to a less
100 diameter near the edges than in the middle portions and adapted to form the canvas fabric for the elastic tire of a wheel, substantially as set forth. 105

Signed by me this 25th day of January, 1893.

JAMES LYALL.

Witnesses:

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