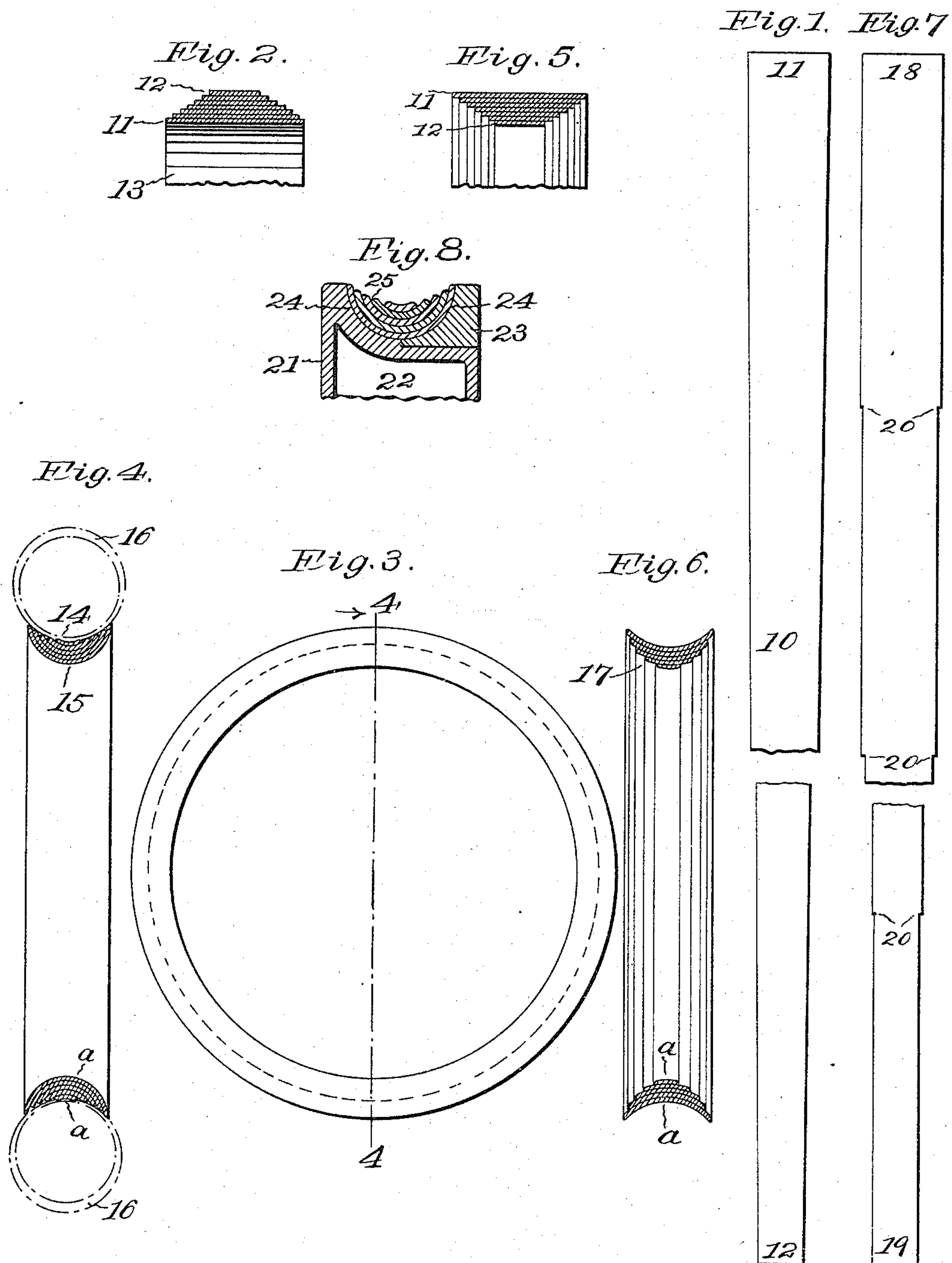


(No Model.)

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PAPER RIM FOR BICYCLE WHEELS.

No. 580,377.

Patented Apr. 13, 1897.



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PAPER RIM FOR BICYCLE-WHEELS.

SPECIFICATION forming part of Letters Patent No. 580,377, dated April 13, 1897.

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To all whom it may concern:

Be it known that I, EDWARD E. CLAUSSEN, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Paper Rims for Bicycle-Wheels, of which the following is a full, clear, and exact specification.

My invention relates to improvements and construction of rims for wheels, and is especially adapted for paper rims for wheels used on the safety-bicycle. Heretofore the rims have usually been made of wood from a continuous single strip or built up from a number of strips curved into circular form and having their ends skived off at an angle and overlapped or having their meeting ends joined by a series of interlocking tongues or grooves. Serious objections have been found in practice, owing to the wooden rims, as they are apt to spread apart and split, and, furthermore, as the bicycle-wheel is of the tension-spoke character its stiffness depends upon the rigidity of the circular arch formed by the rim of the wheel and therefore it is subjected to a continuous strain and must be of a strong and firm construction.

The object of my invention is to provide a bicycle-rim that is light, resilient, and yielding, but strong and durable and will sustain and maintain its shape and have no tendency to work loose, become weakened, spread, or split when in use upon an uneven track or when under heavy strains, and stand the test of all climatic changes and temperatures, as heat, cold, and moisture.

In the drawings accompanying and forming part of this specification, Figure 1 represents a strip of paper of sufficient length to be wound upon a mandrel to give the required thickness of the rim. Fig. 2 is a cross-sectional view of the circular form as wound on a mandrel, showing the layers of paper with their edges overlapping each other, resembling in cross-section a truncated cone. Fig. 3 is a side view of the rim after having been pressed from its truncated-cone cross-section into its final crescent-shaped cross-section. Fig. 4 is a cross-sectional view of the rim, the section being taken on line 4 4 in the direction of

the arrow of Fig. 3. Figs. 5 and 6 are modified forms of what is represented in Figs. 2 and 4. Fig. 7 is a modification of the strip of paper shown in Fig. 1. Fig. 8 is still another modification, showing the strip wound upon a mandrel containing a groove which is at the same time the pressing-mold for compressing the layers and holding them in the form under pressure.

In the accompanying drawings, in which similar numerals of reference indicate corresponding parts in the several views, the numeral 10 indicates a strip of paper which in its preferred form is tapering, as shown in Fig. 1, the wide end being indicated by the numeral 11 and its narrow end by 12. The strip, which can have previously been made waterproof by immersing in any suitable waterproofing compound and having been supplied with paste, shellac, rubber cement, or any other waterproof cementing compound, is wound upon a mandrel 13 in such a manner that the wide end 11 is first applied and the succeeding layers wound and cemented one upon the other, keeping the center line of the strip in the same plane with the mandrel. Thus each succeeding layer overlaps the previous layer, as clearly shown in the cross-section of the rim in Fig. 2, forming substantially a truncated cone.

After a sufficient amount of paper has been wound upon the mandrel to form the required thickness of the rim the annular rim is then pressed into the crescent-shaped cross-section, as shown in Fig. 4, the shape being such that the serrated concavity of the outer wall 14, to which the pneumatic tire 16 (indicated in dash and dotted lines) is applied, exceeds the concavity of the inner wall 15, so that each layer of flat paper is more or less deflected in the center, as at *a a*. (See Figs. 4 and 6.) Thus each layer is individually formed into a curved layer, giving far greater strength than in its flat state, the serration of the concave wall 14 serving as an increased surface to apply the cement that holds the pneumatic tire to the rim. The gradually-increasing thickness at the center of the belt is produced by the strip being tapering and the wide end of the strip forming the first

outer layer or cover. When the fibers near the edge of the belt have been stretched, due to the larger circumference of the outer edge of the belt, and the cement has set while the rim is still in the mold under pressure, the different layers which are wound upon one another will join and form one solid body and retain the shape of the mold after same has been removed.

The modifications shown in the drawings are represented in Figs. 5, 6, 7, and 8.

Fig. 5 represents the cross-section of the rim, in which the strip is wound in circular form in such a manner that the narrow end 12 is first applied on the mandrel and the succeeding layers wound and cemented one upon the other, keeping the central line of the strip in the same plane with the mandrel, leaving a small step between each previous and succeeding layer. After a sufficient amount of paper has been wound upon the mandrel to form the required thickness of the rim the annular ring is then pressed from the cross-section, resembling a truncated cone, of Fig. 5 into the crescent-shaped cross-section, as shown in Fig. 6. The gradually-increasing thickness at the center of the belt is accomplished in the same manner as previously described; but the inside of the rim shows the steps left by the tapering strip, as at 17. (See Fig. 6.)

In Fig. 7 a modified form of the strip is shown, and the decreasing width of the paper is accomplished by reducing steps. The wide end is indicated by 18, the narrow end by 19, and the reducing steps by 20.

In some cases it may be preferable to omit the mandrel and wind the strip direct on the mold, and I have therefore represented in Fig. 8 such a mold. The numeral 21 indicates the mold, which may be hollow, as at 22, to be heated by steam and provided with the removable flange 23 and having the groove 24, formed between them, of the contour of the inner side of the rim. The flexible tapering strip when wound on the mold will then at once assume that curvature and may be pressed and held in said mold until the cement has set.

The mode of operation of the process, as shown in Figs. 2, 3, 4, 5, and 6, is as follows: A piece of paper of sufficient length and size is wound on a mandrel, having previously been supplied with a cementing compound, to form an annular band of superimposed layers and then placing that band in a green or moist state in the pressing-mold until the cement has set.

The mode of operation of the process, as shown in Fig. 8, is as follows: A piece of paper of sufficient length and size is wound on a mold, having previously been supplied with a cementing compound to form an annular

band of superimposed layers, and then pressing that band until the cement has set.

Either of the two described methods may be used without departing from the spirit of my invention.

The pressing-molds must be built very heavy to stand the great pressure to which they are subjected and therefore are exceedingly cumbersome to handle and not easily managed to wind the paper strip upon them. To overcome this manipulation and handling of these heavy molds, I preferably wind the strip upon a mandrel, which is done in an expeditious, economical, and efficient manner, and then place the annular band in the mold to be pressed into the desired form.

In the specification I have stated the band or strip to be of waterproof paper, but it is understood that any rope or Manila paper will answer and made waterproof after the rim has been pressed into its crescent-shaped cross-section.

Other modifications may be readily made, as taking two or more pieces of paper instead of a single strip.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, what I claim, and desire to secure by Letters Patent, is—

1. As a new article of manufacture, an annular paper rim consisting of superimposed curved layers of paper, of uniform thicknesses cemented together and forming substantially a crescent shape in cross-section and having the serrated wall, substantially as described.

2. As an article of manufacture, an annular rim built up of superimposed layers of waterproof sheet material of uniform thicknesses, cemented and compressed together into substantially the form of a crescent in cross-section and provided with the serrated wall substantially as described.

3. As a new article of manufacture an annular rim composed of a series of curved layers of circular form, each succeeding layer having a greater radius of curvature than the preceding one and compressed together, and of uniform thicknesses, into substantially the form of a crescent in cross-section and provided with the serrated concave wall 14 and the smooth convex wall 15 substantially as described.

4. A wheel-rim consisting of a tapering strip of paper, wound and cemented upon itself in uniform thicknesses of layers to form an annular belt, the constantly-narrowing strip serving to thicken the center of the belt, so as to form substantially a crescent shape in cross-section, the inner wall 15 being represented by the first turn of the wide end of the strip, and the outer wall 14 being represented by the serrated edges formed by the

repeated superimposing of the constantly-narrowing strip.

5 5. A wheel-rim consisting of a tapering strip of paper, wound and cemented upon itself in superimposed layers of uniform thicknesses to form an annular belt, the inner wall 15 being represented by the first turn of the wide end of the strip and each succeeding

layer being formed by the successive superimposing of the tapering strip and forming 10 the serrated concave wall 14 substantially as described.

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