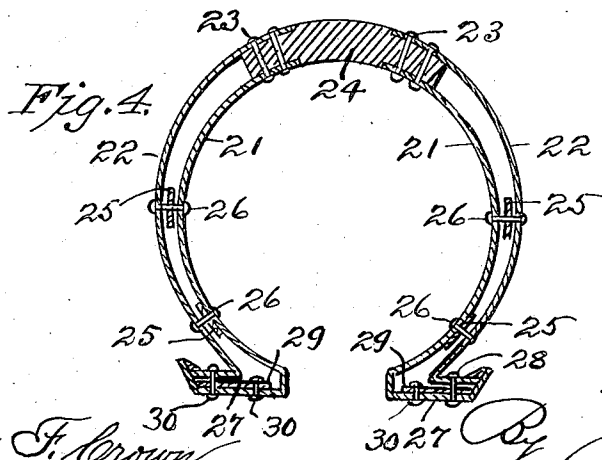
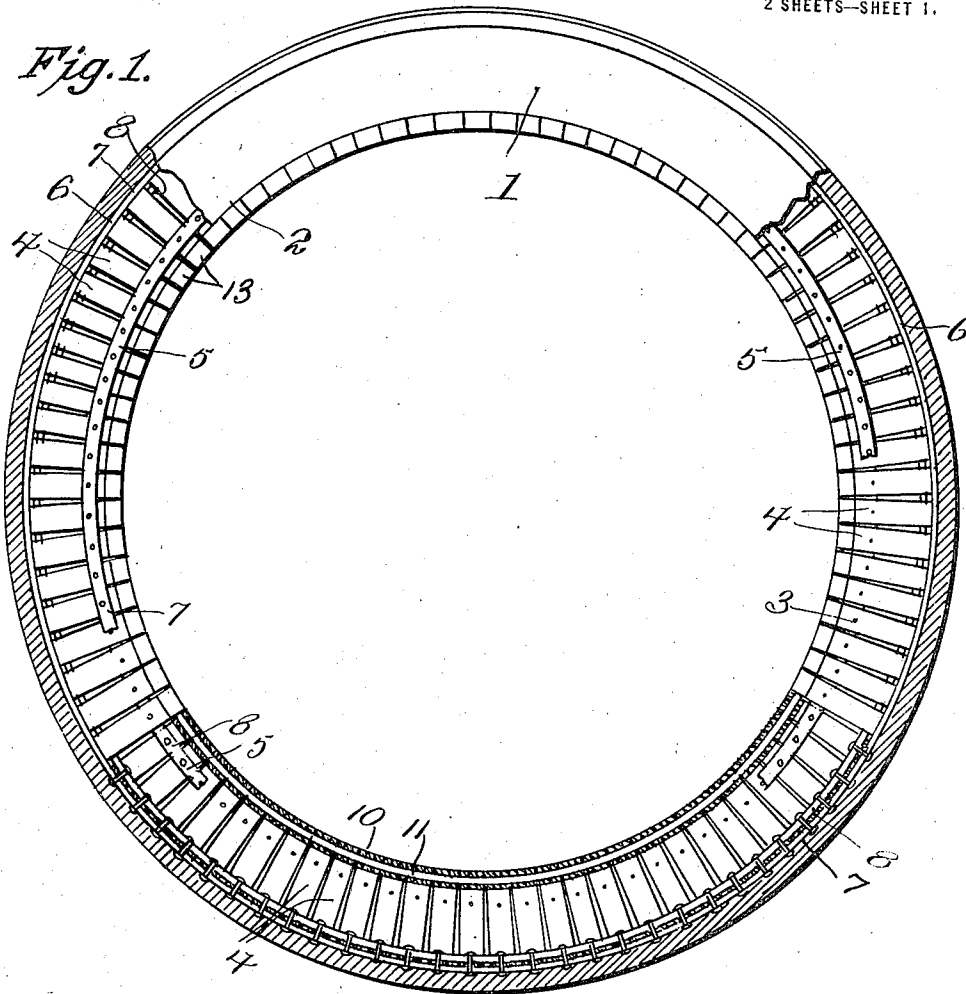


D. B. FREEL.
 PROTECTOR FOR PNEUMATIC TIRES.
 APPLICATION FILED SEPT. 25, 1918.

1,311,340.

Patented July 29, 1919.
 2 SHEETS—SHEET 1.



WITNESSES

James F. Brown,

INVENTOR

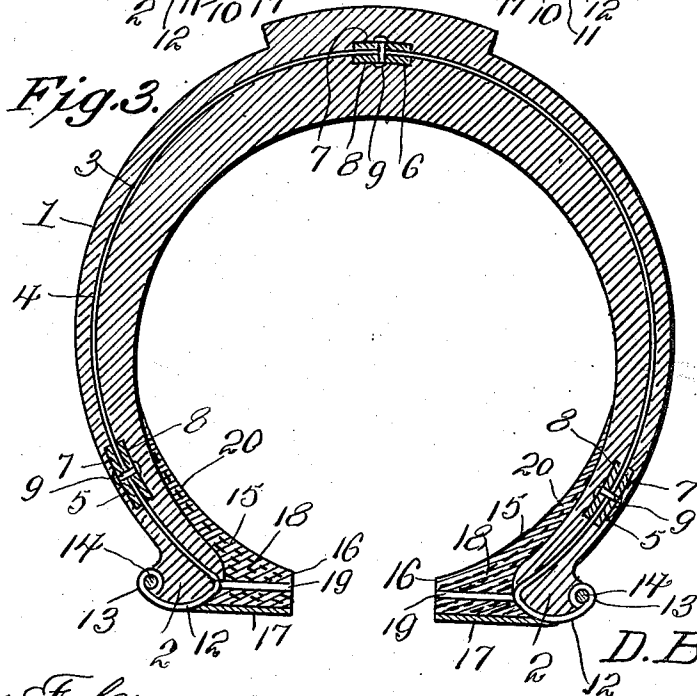
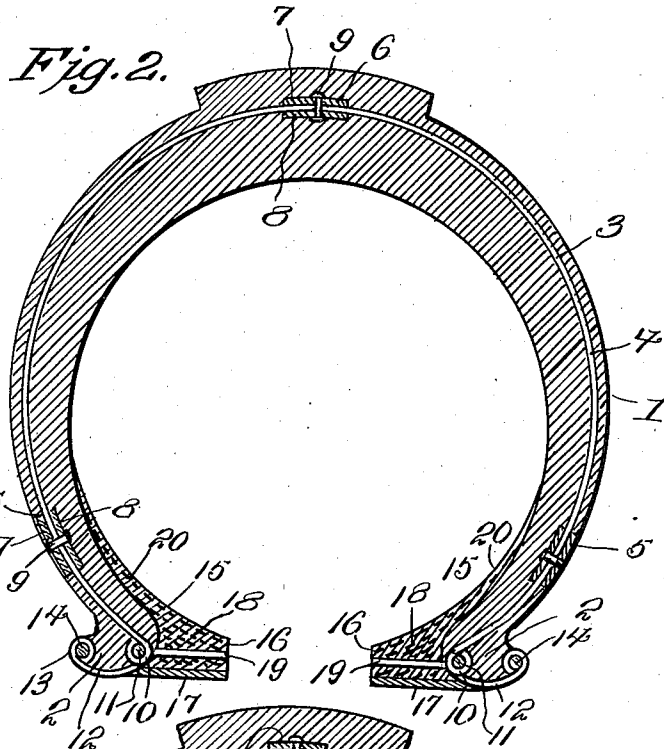
D.B. Freel,

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UNITED STATES PATENT OFFICE.

DANIEL B. FREEL, OF DETROIT, MICHIGAN.

PROTECTOR FOR PNEUMATIC TIRES.

1,311,340.

Specification of Letters Patent.

Patented July 29, 1919.

Application filed September 25, 1918. Serial No. 255,705.

To all whom it may concern:

Be it known that I, DANIEL B. FREEL, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Protectors for Pneumatic Tires, of which the following is a specification.

This invention relates to a protector for pneumatic tires, one object of the invention being to provide a light, strong and durable construction of spring metal frame which will strengthen, reinforce and increase the life of the tire, while at the same time preventing blow-outs and punctures.

The invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

Figure 1 is a view partly in section and partly in side elevation of a tire casing or shoe embodying my invention, and showing a construction wherein the spring frame protector is embedded within the casing or shoe.

Fig. 2 is a vertical transverse section through the same.

Fig. 3 is a view similar to Fig. 2 showing a slightly modified construction of protector.

Fig. 4 is a transverse section showing a further modification.

Referring to the drawings, 1 designates a pneumatic tire shoe or casing of the ordinary or any preferred general construction, the casing shown in the present instance being of that type provided with clenchers or other beads 2.

The improved protector embodying my invention is generally designated at 3, and comprises essentially a continuous annular series of transverse metallic bands 4 and longitudinal metallic bands 5 and 6, all of said bands being made of spring steel or other similar spring and resilient material.

The transverse bands 4 are substantially horseshoe-shaped, or conform in shape to the transverse cross sectional shape of the shoe or casing 1, and said strips 4 are connected and held in properly spaced relation by the longitudinal bands 5 and 6.

The band 5 is arranged centrally of the bands 4 and connects the same at a point centrally and circumferentially of the tire,

said band 5 being arranged so as to coincide with the central portion of the tread of the tire. The bands 6 connect the ends of the bands 4 at points adjacent to the extremities of said bands 4 and between the transverse centers of the sides of the shoe or casing 1 and the beaded edges 2. Each band 5 or 6 is of similar construction, comprising outer and inner metallic strips 7 and 8 arranged on opposite sides of the bands 4 and suitably fastened thereto as by means of rivets 9.

By the construction described a spring metallic frame which is of great strength, light in weight and of great resiliency is produced, which is adapted to materially strengthen and reinforce the shoe or casing 1 and protect the casing or inner tube, or both, from punctures, and the casing from blow-outs or other ruptures of any material degree liable to seriously damage or impair the efficiency of the tire. It will be observed that the bands 4 are arranged in close order, practically edge to edge, around the surface of the tire, and will thus form a guard which will effectually prevent the penetration of the inner tube by any objects liable to cause punctures.

By arranging the strips of one set of bands to lie between pairs of strips of the other set of bands, the sets of bands are more stably connected and mutually reinforced, and at the same time the ribs or fastening connections between them are braced to prevent said connections from working loose or being subjected to undue strains liable to break them.

As shown in the present instance, the ends of the bands 4 project into the beads 2 and are formed with coils or loops 10 which embrace longitudinally extending inner reinforcing rods or wires 11 extending along the inner edges of the beads. The bands are also provided with terminal extensions 12 embracing the under faces of the beads and extending to the outer edges thereof, said extensions 12 having coils 13 to embrace the outer reinforcing rods 14 extending along the outer edges of the beads. By this construction the beads are given increased strength, while the extensions 12 are hinged or pivoted to the rods 11 to allow the beads to have the requisite degree of flexing motions necessary for movement into and out of engagement with the body receiving

edges of the wheel rim, thus insuring the firm and secure retention of the tire in position.

In the slightly modified form of the invention shown in Fig. 3 I have shown a construction in which the ends 12' of the bands 4 are continuous and bent outwardly and coiled or looped at their outer ends for engagement with the rods 14 as previously described, such construction being employed in certain types of tires and when the rods 11 are omitted. With this construction the ends 12' of the bands 4 will have sufficient resiliency to allow the beads 2 to have the requisite amount of flexibility.

For use in connection with the protector I may provide a base to support the rim side of the inner tube and to give a continuous circular shape to the inner periphery of the shoe or casing. This base is composed of a pair of base sections 15 arranged in transverse alinement and having inner edges 16 to abut when the tire is in operative position, thus forming a closed base to support the base of the inner tube. The base pieces 15 are each composed of an inner metallic plate 17 and one or more plies 18 of canvas and rubber, or other similar materials. The base pieces abut at their outer edges against the inner surfaces of the beads and are provided at intervals with rods or fastening strips 19 whereby they are attached to the ends of the bands 4, or to the inner reinforcing rods 11. The base pieces are provided with extension flaps 20 of tapering form and arranged to bear against the inner faces of the sides of the shoe or casing to provide with the major portion of the inner periphery of the shoe a continuously circular surface against which the inner tube may bear.

Where semi-rigid or less than maximum flexibility of the beaded edges is desired, it is to be understood that an additional rod 14 may be used at the center of each hinge to stiffen the hinge to the required degree.

In Fig. 4 I have shown a modification wherein the transverse bands or straps are arranged in pairs, each consisting of an inner strap member 21 and an outer strap member 22. Instead of being continuous,

these strap members may be divided at the tread and riveted, as at 23, to a tread piece 24 of metal, rubber or composite structure. Between these members 21 and 22 are arranged the longitudinal side straps or bands 25 connected thereto by rivets 26. The straps 21 and 22 are provided with angled bead forming members 27 and 28 between which are inserted stiffening plates 29, the whole being united by rivets 30. This construction provides a strong and durable spring frame which may be employed for any of the specific purposes set forth.

Having thus fully described my invention, I claim:—

1. A protector for pneumatic tires comprising a resilient frame composed of sets of arcuately shaped transverse strips and sets of longitudinally extending tread and side strips, the strips of one of said sets being arranged in pairs and embracing the strips of the other set, and fastening means connecting said sets of strips at their points of intersection.

2. A protector for pneumatic tires comprising a resilient frame composed of a continuous annular series of transversely arranged horseshoe-shaped transverse strips and longitudinal tread and side strips, each of said longitudinal strips consisting of inner and outer members lying against opposite sides of the transverse strips, said longitudinal strips being secured to the transverse strips and binding the same together.

3. A protector for pneumatic tires comprising a resilient metallic frame composed of a continuous annular series of transversely arranged substantially horseshoe-shaped metallic strips and longitudinally extending tread and side strips, said strips being united to form a unitary frame structure, the transverse strips being provided with integral end extensions bent outwardly therefrom, and inner and outer longitudinal reinforcing rods connecting said end extensions at their outer edges and at their points of junction with the main body portions of said strips.

In testimony whereof I affix my signature.

DANIEL B. FREEL.