

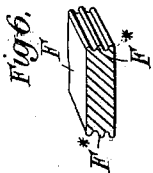
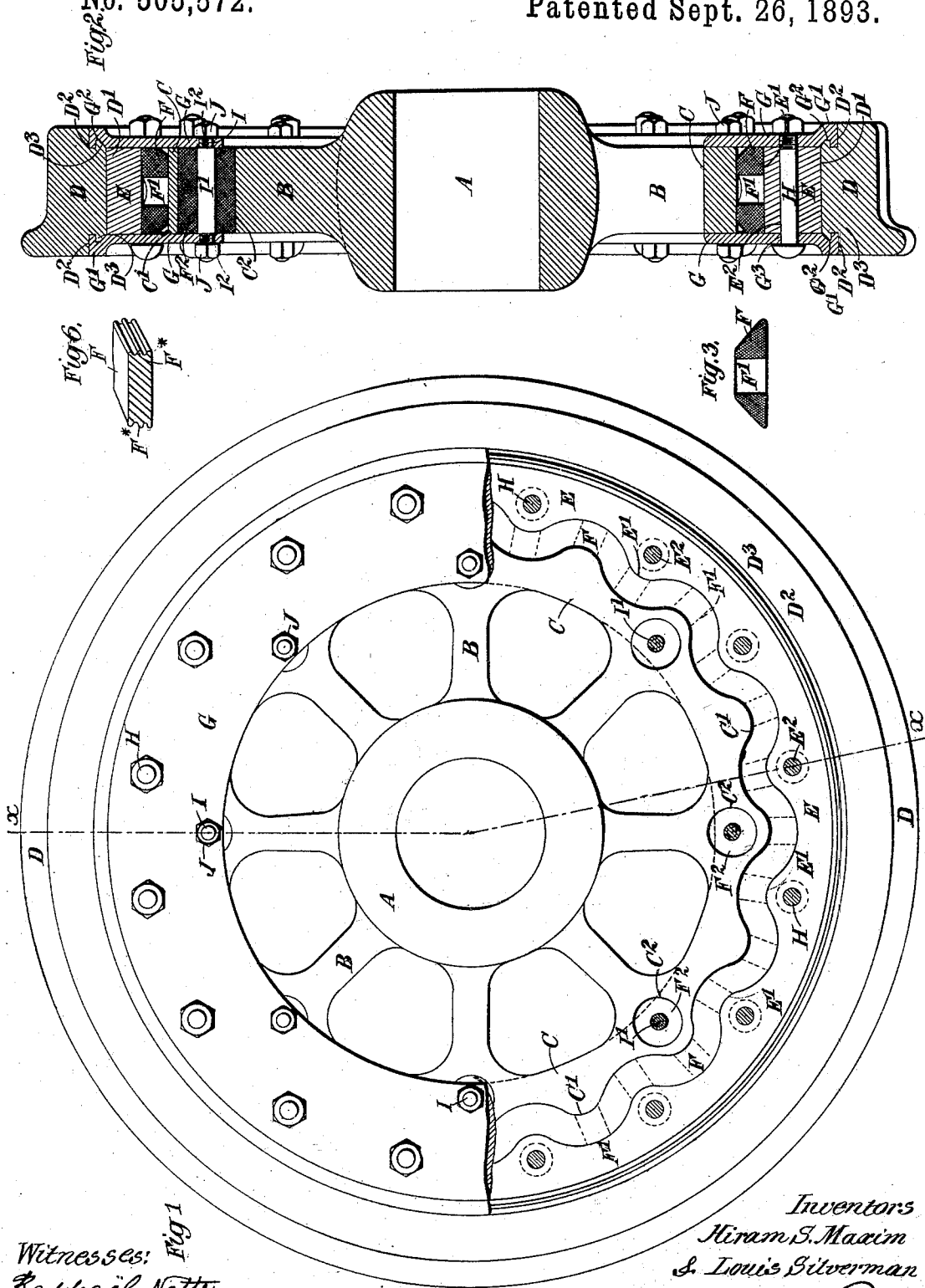
(No Model.)

2 Sheets—Sheet 1.

H. S. MAXIM & L. SILVERMAN.
CAR WHEEL.

No. 505,572.

Patented Sept. 26, 1893.



Witnesses: *Fig. 1*
Raphael Netter
James Catlow

Inventors
Hiram S. Maxim
L. Louis Silverman
by *Duncan & Page*
Attorneys

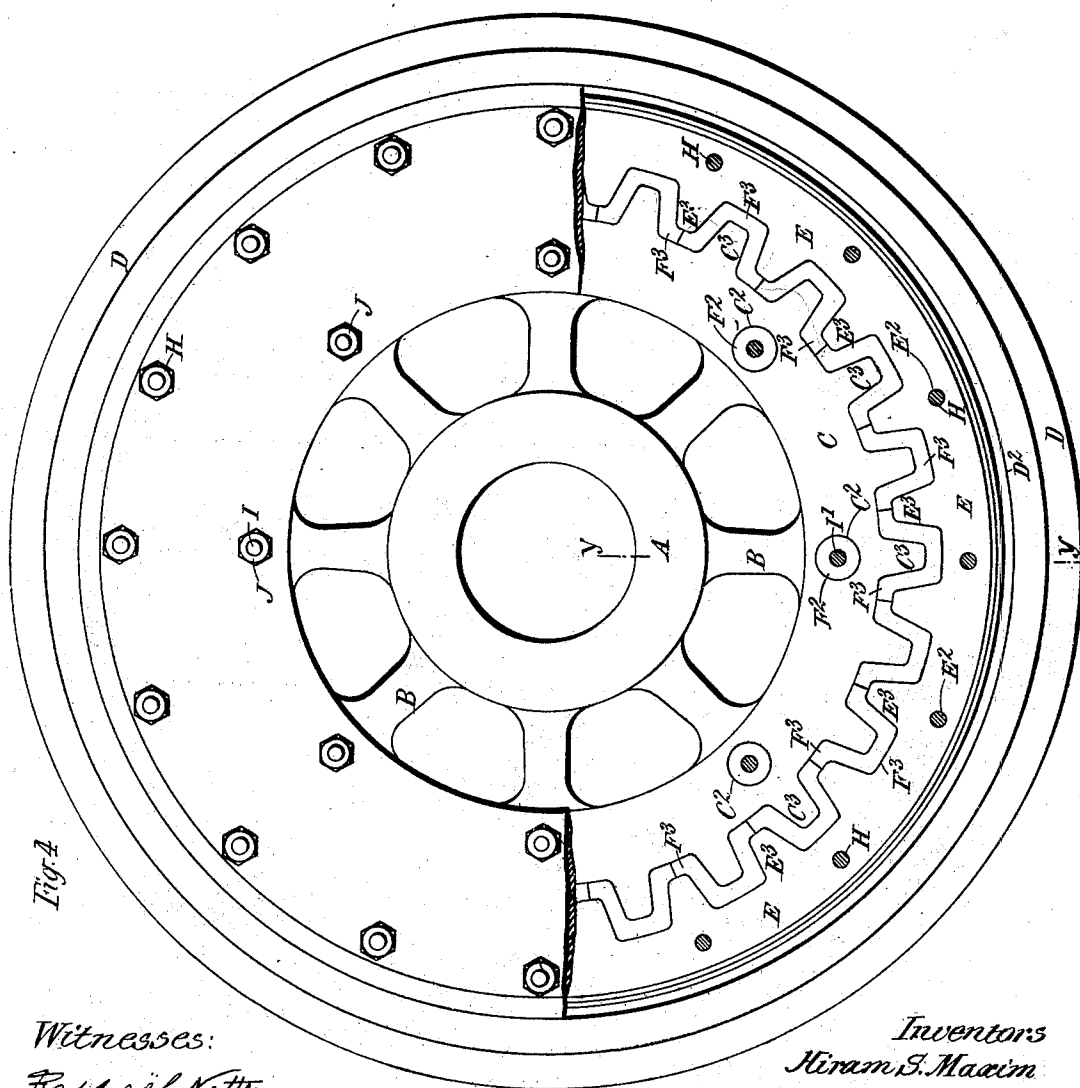
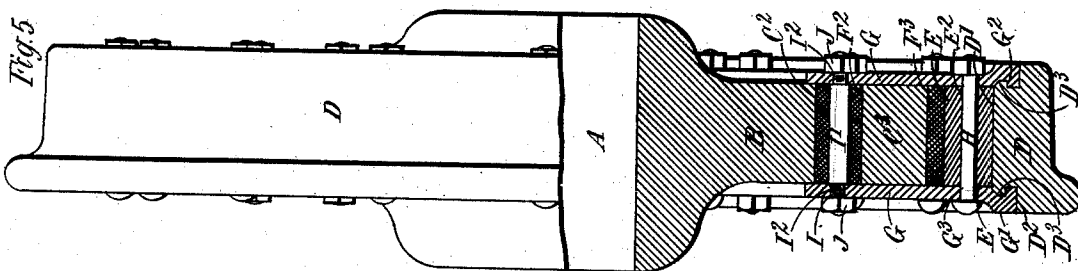
(No Model.)

2 Sheets—Sheet 2.

H. S. MAXIM & L. SILVERMAN.
CAR WHEEL.

No. 505,572.

Patented Sept. 26, 1893.



Witnesses:

Raphael Ketter

James Galloway

Inventors

Hiram S. Maxim

& Louis Silverman

by Duncan & Page
Attorneys

UNITED STATES PATENT OFFICE.

HIRAM STEVENS MAXIM, OF BEXLEY, AND LOUIS SILVERMAN, OF
CRAYFORD, ENGLAND.

CAR-WHEEL.

SPECIFICATION forming part of Letters Patent No. 505,572, dated September 26, 1893.

Application filed February 21, 1893. Serial No. 463,211. (No model.)

To all whom it may concern:

Be it known that we, HIRAM STEVENS MAXIM, mechanical engineer, a citizen of the United States, and a resident of Bexley, and LOUIS SILVERMAN, engineer, a subject of the Queen of Great Britain, and a resident of Crayford, Kent, England, have invented certain new and useful Improvements in Wheels for Railway and Tramway Vehicles and Engines, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to wheels for railway and tramway vehicles and engines, and is intended to provide an elastic wheel which will absorb shocks very effectually and will be very durable.

We are aware that in the construction of car-wheels it has been proposed to form the rim and hub portions independently and to interpose between them an elastic material, but such wheels have not been used to any extent owing to a lack of provision for enabling the wheels to withstand the torsional strain upon them when the car or other vehicle is rounding a curve, and by reason of other defects in their construction by which the elastic material was liable to be rapidly worn or destroyed. These disadvantages are overcome by the construction of wheels according to our invention, which we will now proceed to describe with reference to the accompanying drawings, wherein—

Figure 1 is an elevation of an improved car wheel constructed according to our invention, with a part of the wheel removed, for the sake of clearness. Fig. 2 is a transverse section through the center of the wheel illustrated in Fig. 1, on the line *x x* of the latter figure. Fig. 3 is a view of a detail of Figs. 1 and 2, and is hereinafter fully explained. Fig. 4 is a view, similar to Fig. 1, of an alternative construction of car-wheel according to our said invention. Fig. 5 is an elevation at right angles to Fig. 4, half in section on the line *y y* of the latter figure. Fig. 6 is a perspective

view of a detail and is hereinafter more particularly referred to.

Like reference-letters indicate corresponding parts throughout the drawings.

With reference first to Figs. 1, 2, and 3, A is the boss of the wheel, B B are the spokes, and C is an inner rim formed with corrugations C' thereon; the said boss, spokes, and inner rim are in rigid connection with each other, and constitute a hub which can move relatively to the tire, against a suitable elastic resistance, in the manner hereinafter explained.

D is the tire, flanged as is customary. E is a ring of smaller width than the tire, placed within the same and fitting upon a central raised portion D' of the inner periphery thereof. The inner periphery of the said ring E is provided with corrugations E' of similar form to those on the rim C; the said ring E and rim C are placed so that the corrugations on one are opposed to the recesses between corrugations on the other. A space is left between the rim C and the ring E, in which a filling F of india-rubber is placed. The said filling F is perforated with holes F' at intervals to enable the form of its cross section to alter under the stress induced by the movement of the rim C and ring E relatively to each other when the wheel is in use. The said filling is of such form as to fit the said space between the rim C and the ring E. The corrugated rim C, india-rubber filling F, and the corrugated ring E, are important features of our invention.

The aforesaid raised portion D' has a circular ledge D² on each side thereof, and the opposite edges of the portions D' overhang, to form annular projections D³.

G G are two annular plates placed at opposite sides of the wheel to confine the ring E and rubber filling F in place, and to constitute guides between which the rim C can turn or move, in a plane at right angles to the axis of the wheel.

In order to insure that the rubber filling F

shall bed properly and tightly on the rim C and on the ring E we make the same at the outer periphery thereof, wider than the ring E on which it beds, as is illustrated in Fig. 3 which is a cross section of the said filling, so that when the plates G are bolted to the wheel they act to squeeze the rubber laterally and force it tightly into the bottom of the spaces between the corrugations C' and E'.

The rubber filling might be made throughout wider than the space between the plates G, but we prefer to make it slightly taper from the outer periphery inward so that it is wider than the said space only at the outer diameter and for a portion of the depth inward.

Instead of providing holes in the rubber filling to allow it to expand laterally when put under radial pressure we can with advantage make the sides thereof ribbed as at F* Fig. 6, which is a perspective view of a small piece of the said filling. The ribs are provided so that it will not bed solidly against the side plates G which as aforesaid maintain the rubber in position. The said plates G are each provided with a thickened rim G' and with a groove G² on one face of the said rim. The rims G' rest on the ledges D² and the annular projections D³ on the tire are held in engagement with the said grooves in the rims G, by bolts H, which fit holes E² in the ring E and holes in the plates G and serve also to keep the said rings in contact with each other.

I I are studs which pass through holes C² in the inner rim C. The said holes C² are of greater diameter than that of the central portions I' of the studs, in order that the inner rim C may be free to move relatively to the said studs. The space around the said studs can be filled, if desired, with india-rubber or other elastic-material F². The said central portions I' of the studs are made of greater diameter than the ends to serve as distance-pieces against which the inner faces of the rings G are firmly held by nuts J screwed upon the ends I² of the studs which are slightly riveted over them to prevent them from slackening back.

The distance between the rings G at the places at which the studs I are situated is just sufficient to enable the inner rim C to move between them with the necessary freedom.

In the alternative construction of wheel illustrated in Figs. 4 and 5, teeth C³ and E³ are placed on the inner rim C and ring E respectively, in substitution for the corrugations on the said rims in Figs. 1 and 2. The rubber filling is placed in the space between the said teeth in separate pieces F³ as shown. When the said improved wheels are in use pressure or a sudden shock communicated thereto effects the movement of the boss A

and tire D relatively to each other, and in such movement, whether it be rotational or rectilinear or both, the rubber filling is compressed, so that the pressure or shock is taken up thereby and not by the vehicle to which the wheel is applied. The interspacing of the teeth or corrugations of the rim C and ring E is of particular advantage inasmuch as in any rotational movement of the said rim and ring relatively to each other the corrugations or teeth on the one afford a firm support to the rubber filling, against which the said filling is compressible by the corrugations or teeth of the other; moreover the said filling is not only supported against compression by the said corrugations or teeth, but is prevented from being forced round in the wheel, or torn or otherwise injured as it would be if simply held against or secured to a plain cylindrical surface. The rubber filling instead of being constructed as hereinbefore described may consist of two or more parallel rings or series of segments. Instead of employing a corrugated or toothed ring E within the tire, the corrugations or teeth may be formed directly upon the interior of the tire.

We sometimes provide sheet steel or iron casings to attach to the sides of the wheel, for the purpose of preventing dust and dirt getting into the space occupied by the rubber and so preserving the rubber from the grinding action which might occur were the dust and dirt not excluded. Other modifications of detail may obviously be made without departing from the nature of our invention.

What we claim is—

1. In a wheel, the combination of a hub having a corrugated or toothed outer periphery, a tire therefor with a toothed or corrugated inner periphery having its peripheral projections opposed to the spaces between the peripheral projections on the hub a filling of resilient material placed in the space between the said peripheries and guides attached to the tire between which guides the said hub is adapted to move substantially as set forth, for the purpose specified.

2. In a wheel, the combination of a hub having a corrugated or toothed outer periphery, a tire therefor with a toothed or corrugated inner periphery having its peripheral projections opposed to the spaces between the peripheral projections on the hub, bolts connected with the tire passed through holes in the hub and surrounded in the said holes with resilient material, and guides attached to the tire substantially as set forth for the purpose specified.

3. The combination of the hub having peripheral projections thereon, the tire having internal peripheral projections, the elastic or resilient material between the hub and tire,

said elastic material having holes formed therein substantially as described for the purpose specified.

4. In a wheel, the combination of a hub
5 having a corrugated or toothed outer periphery, a tire therefor with a toothed or corrugated inner periphery having its peripheral projections opposed to the spaces between the peripheral projections on the hub and
10 tire, elastic material interposed between the hub and the tire, ribs or projections on the sides of the elastic material, and side plates secured to the tire and bearing against the sides of the elastic material, substantially as
15 described for the purpose specified.

In witness whereof we have hereunto set our hands this 7th day of February, 1893.

HIRAM STEVENS MAXIM.
LOUIS SILVERMAN.

Witnesses to the signature of Hiram Stevens Maxim:

GEO. HARRISON,
WILNER M. HARRIS.

Witnesses to the signatures of Louis Silverman:

WM. JNO. TENNANT,
THOMAS LAKE,
17 Gracechurch Street, London.