(No Model.)

T. J. MAYALL.

CAR SPRING.

No. 286,042. Patented Oct. 2, 1883.

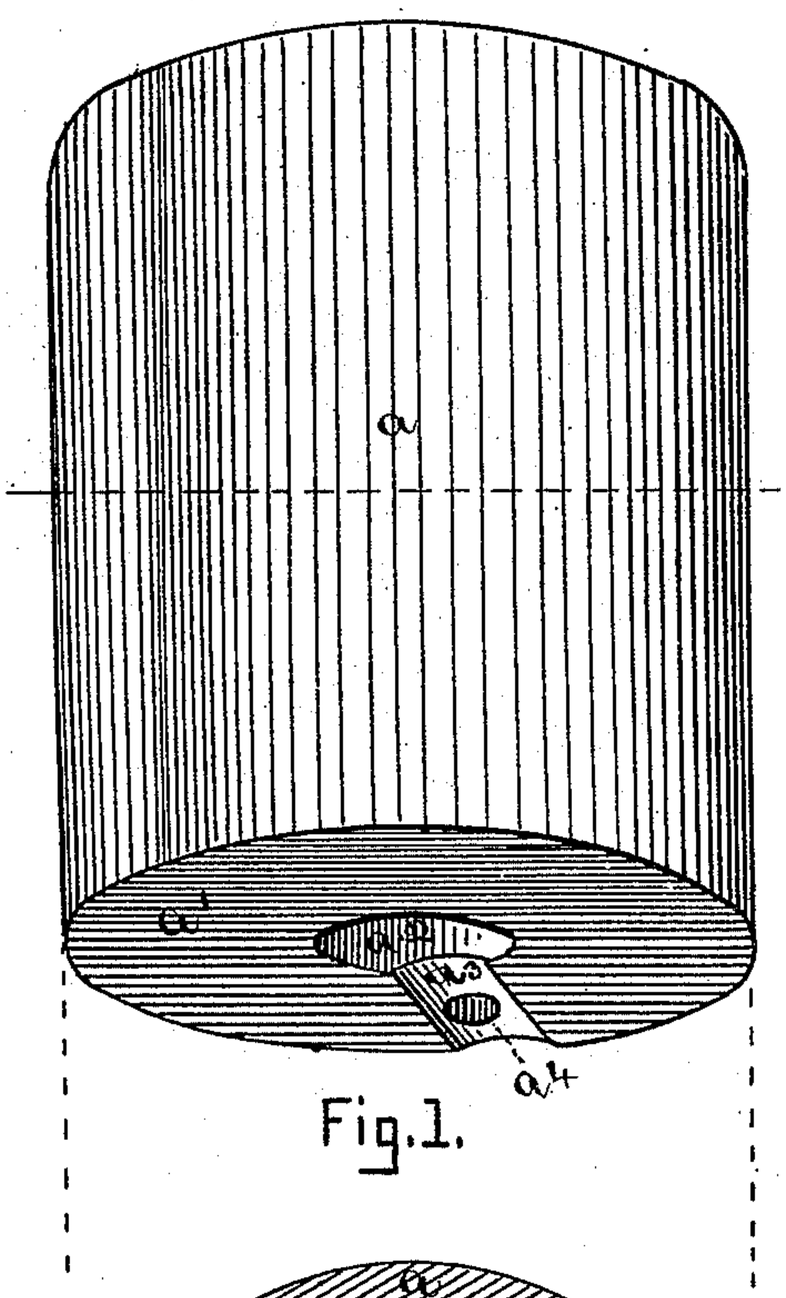

Fig. 1.

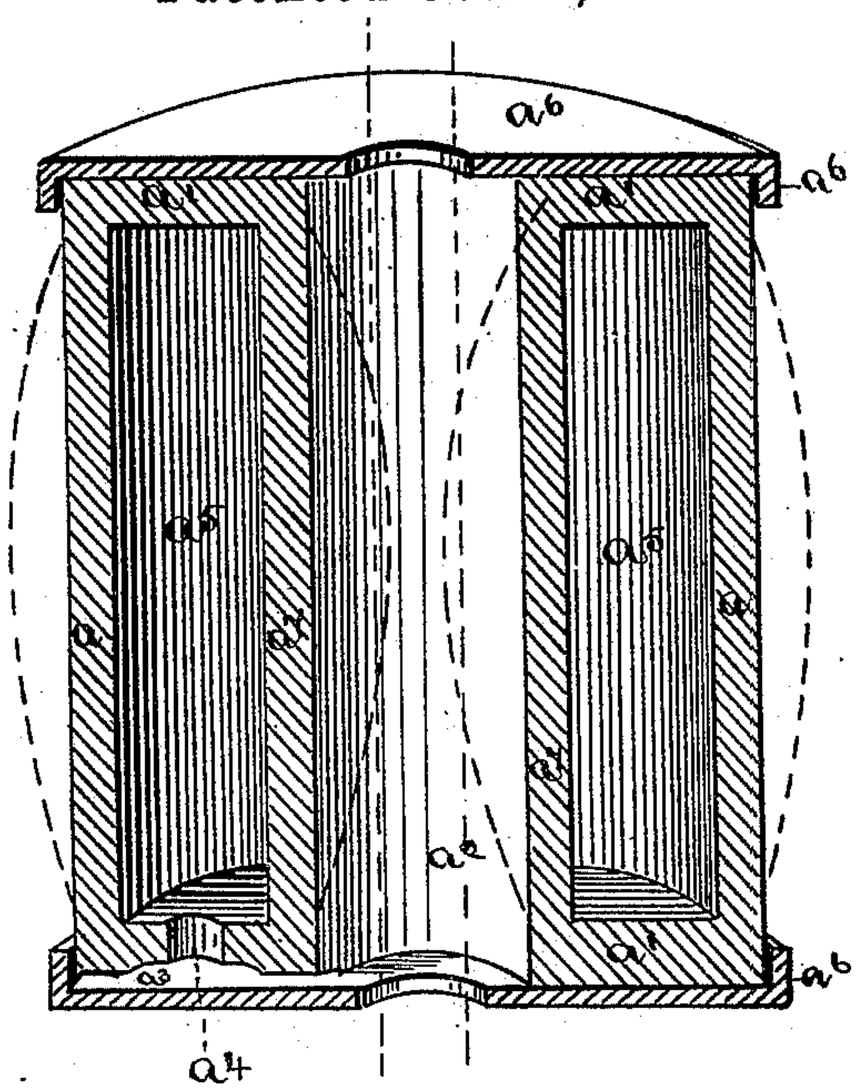

Fig. 2.

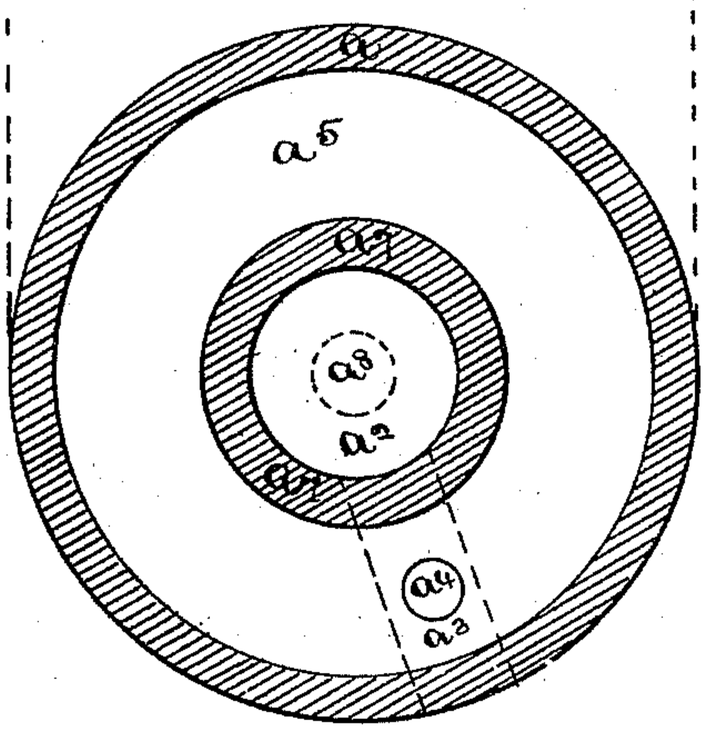

Fig. 3.

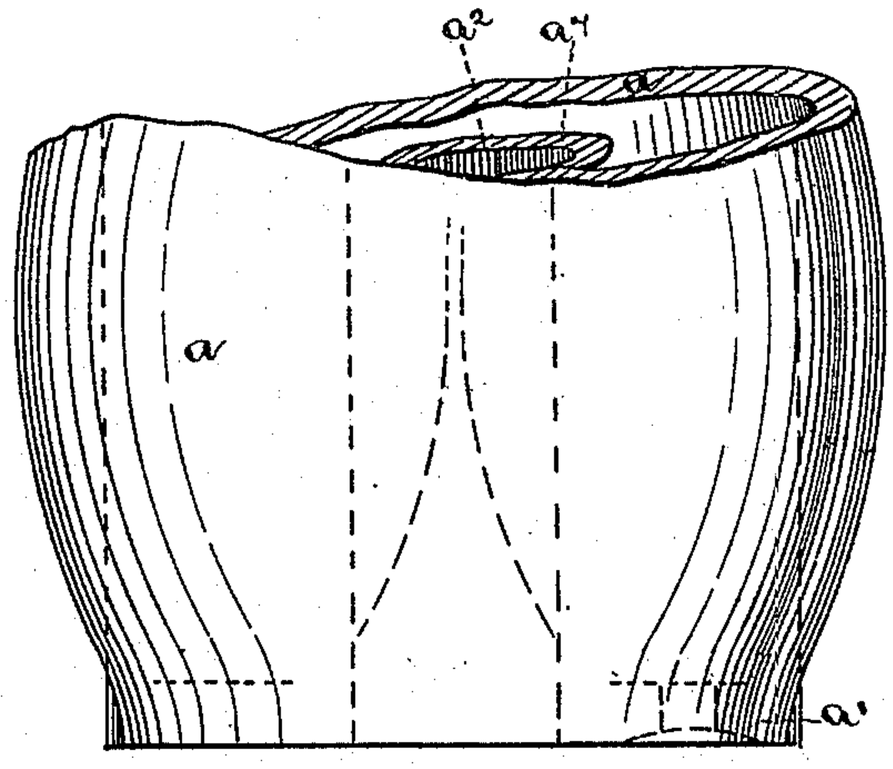

Fig. 4.

Witnesses:

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UNITED STATES PATENT OFFICE.

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CAR-SPRING.

SPECIFICATION forming part of Letters Patent No. 286,042, dated October 2, 1883.

Application filed March 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. MAYALL, of Reading, in the county of Middlesex and Commonwealth of Massachusetts, have invented an Improved Spring for Railroad-Cars, of which the folowing is a specification.

My invention relates to that class of car-springs which are made of rubber in the form of a cylinder, the object of it being to make a spring which will cost considerably less than the rubber springs heretofore made, and which will have greater elasticity and durability; and it consists in so making the cylindrical rubber spring that it will have one or more air-chambers within it, in which the air will be compressed by the pressure of the load, and into which air will be drawn when the load is raised by the motion of the car.

In the drawings annexed, Figure 1 shows a side and bottom perspective of my improved car-spring, with the central hole and air-passage from it, and also the air-opening to the chamber within the spring. Fig. 2 shows a longitudinal sectional view through the center of the spring, and the air-chamber within it, and the iron caps on both ends of it. Fig. 3 shows a cross-sectional view of the spring at near the bottom of it. Fig. 4 shows a spring broken transversely near the middle.

The letters used indicate the same parts in all the figures.

A indicates the outer wall of the spring.

A′ indicates the end walls of the spring.

A^2 indicates the central hole through the spring, which, being closed at both ends by the metallic caps on both ends of the spring, is made an air-chamber.

A^3 indicates the air-passage from the central hole through the spring, which forms the central air-chamber to the outer circumference of the spring. It is a shallow groove in the rubber, which will be closed as the load presses on the spring, and will open when the load rises.

A^4 indicates an opening from the annular air-chamber in the body of the spring to the air-passage A^3, by which air may enter into or pass from the annular chamber in the spring.

A^5 indicates an annular chamber in the body of the spring, which is closed by the side and end walls of the spring at all points except the passage A^4 and A^3.

A^6 indicates metallic caps—one on each end of the spring—which inclose and support the corners of the spring.

A^7 indicates an annular wall of rubber between the central hole through the spring and the annular air-chamber A^5, which is jointed to the end walls of the spring A′.

A^8 indicates a metallic pin or bolt extending through both the metallic caps A^6, with a head on one end and a nut on the other, with a packing-washer under both heads and nuts, the spindles of the bolt extending through the central hole in the spring, though filling only a part of the space, being of about half the diameter of the central hole.

This spring is made wholly of rubber, vulcanized or cured in the usual manner of curing rubber for car-springs.

A better article of rubber for car-springs than has heretofore been used for that purpose is made by compounding with pure rubber about an equal quantity, by weight, of penta-sulphide or golden sulphuret of antimony, the rubber so compounded having much greater strength, elasticity, and durability; but as I have made this the subject of another application for a patent, I will not describe it further here.

I make this spring by winding up plastic sheet-rubber prepared for valcanizing, as wide as the length of the spring, on a mandrel of the diameter required for the central hole, as thick as the annular wall A^7 is to be. A metallic former or mold of the dimensions required for annular chamber A^5 is then placed around the rubber for the wall A^7, and sheet plastic rubber prepared for vulcanizing is wound around the mold sufficient to make the annular outside wall, A. A mold is prepared the inside dimensions and form of which are exactly what the outside dimensions and form of the finished spring are to be. Disks of plastic sheet-rubber prepared for vulcanizing are cut out sufficient to make the end walls of the spring, and enough for one end wall of the spring is placed in one end of the mold. The

rubber to form the annular outer walls of the springs is then placed in the mold in contact with the disks for this end wall, and the rubber to form the annular wall between the annular chamber in the spring and the center hole through the spring is then set in place in contact with the end wall. The mold or former which made the space for the annular chamber in the spring, and the central mandrel, having been removed, the plastic rubber disks to form the outer end wall of the spring are placed in the mold, a hole having been punched in the rubber for the air-opening A^4. There will be projections on the inside of the mold to form the air-openings A^4 and A^3. The mold being tightly closed and placed in the curing or vulcanizing oven, the air in the chambers of the spring, being confined so that it cannot escape, will be so expanded by the heat of the oven, which will be from 250° to 275° Fahrenheit, that the outer annular walls of the spring will be forced against the inside of the mold with considerable force, so that when the spring is cured it will closely fit the mold, and the inner annular wall between the annular chamber and the central hole in the spring will, in consequence of having had an equal pressure of the heated and expanded air on both sides of it, remain in the position in which it was placed in the mold, and the outer annular wall and the inner annular wall, and both end walls of the spring, will be by the heat of the oven and the pressure of the heated air in the chamber and central hole firmly welded together in one homogeneous whole, and capable of withstanding the pressure of the load on the spring, and the air-pressure in the annular chamber and central hole, which the load on the spring may produce.

I claim as new and of my invention—

1. A rubber car-spring of cylindrical shape, comprising a central longitudinal air-chamber and a second surrounding air-chamber, the end wall of the spring having a groove which communicates by small openings with said air-chambers, substantially as described.

2. The combination of the rubber spring having air-chambers, as explained, and the metal caps, the face of the rubber spring being provided between it and the adjacent cap with a shallow groove communicating with said air-chambers, substantially as described.

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Witnesses:

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