P. G. GARDINER.

Car Spring.

No. 90,657. Patented June 1, 1869.

Fig: 1.

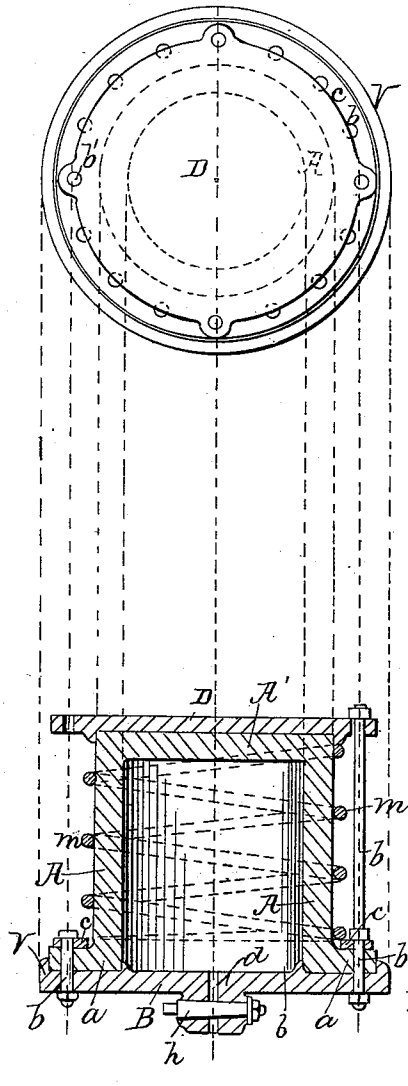


Fig: 2.

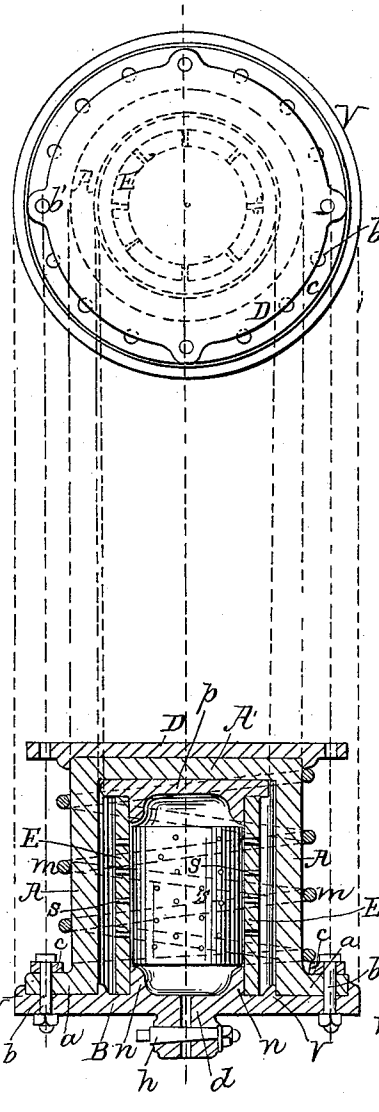
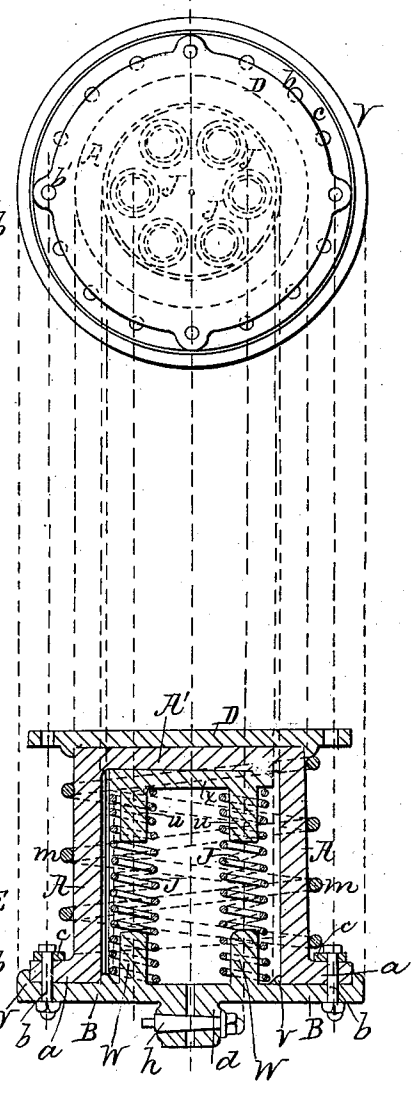


Fig: 3



Witnesses;
Duery & Roeder
Louis Stumm.

Inventor
Perry G. Gardiner

United States Patent Office.

PERRY G. GARDINER, OF NEW YORK, N. Y.

Letters Patent No. 90,657, *dated June* 1, 1869.

IMPROVED AIR-SPRING FOR RAILROAD-CARS.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, PERRY G. GARDINER, of New York, in the county and State of New York, have invented a new and useful Air-Spring for Carriages, Railroad-Cars, and various other purposes; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and the letters of reference marked thereon.

The nature of my invention consists—

First, in the peculiar construction of a rubber cylinder, and in the combination therewith of top and bottom plates, a cock for the admission of air, an encircling spring or band, and rods which connect said upper and lower plates together and serve as guides.

Secondly, my invention consists in combining, with a rubber cylinder of peculiar construction, top and bottom plates, and an encircling spring or band, as above referred to, an inner cylinder, also of rubber.

And, further, in the combination, with an India-rubber or elastic chamber or cylinder, constructed as above described, and filled with compressed air, a number of spiral steel springs, or a cylindrical India-rubber spring, arranged in the interior of the chamber, for the purpose of increasing the strength of the spring, all as hereinafter more fully described.

In the accompanying drawings, different arrangements and combinations of my improved air-spring are represented in plan and section, which will be referred to more particularly in the general description.

Similar letters represent similar parts in all the figures.

A represents an India-rubber cylindrical chamber, closed at the top, and provided with an external flanch, *a*, around its bottom.

This India-rubber chamber is securely fastened to the bottom or sole-plate B by means of suitable bolts, *b*, passing through the sole-plate B and flanch *a* on the chamber, as well as through a metal ring, *c*, by which latter ring the India-rubber flanch *a* is strengthened.

Suitable lips or projections *v v* are made on the sole-plate B, between which the flanch *a* fits.

On the top A′ of the India-rubber chamber A, a metal plate, D, is placed, and fastened in its proper position by means of bolts, *b′*, in such a manner as to allow to said plate D a free motion downward.

In the sole-plate B, a passage, *d*, is made, provided with a cock, *h*, through which the atmospheric air is forced into and confined in the interior of the chamber A at any desired pressure.

Around the outside of the India-rubber cylinder A, a spiral spring, *m*, is placed, to prevent the internal pressure of the atmospheric air bulging out the sides of the chamber.

This arrangement of an air-spring, which is represented in Figure I in section and plan, is particularly well adapted for light wagons and carriages, calculated for a light and fixed load.

The cylinder A being filled with air of the desired pressure, the sole-plate B is fitted upon the wheel-truck, with the projecting passage *d* and its valve or cock *h* let into the wood or metal forming the truck, to prevent the cock *h* from being interfered with, and the body of the carriage is made to rest upon the top of the chamber, or, if a metal plate, D, is used, which I prefer, it rests upon the top of said metal plate D.

The India-rubber chamber may be made of any desirable shape, and may be made so that the bottom shall form a part of the same, provided with a suitable opening, closed by a metal or India-rubber valve, and filled with compressed air, but I prefer making the bottom of metal, and arrange the same as above described.

For heavier loads, or for railroad-cars, I arrange, in the inside of the cylinder or chamber A, a cylindrical India-rubber spring, E, (see Figure II,) fitting between or around suitable projections, *n*, fast to the sole-plate B, and provided with a metal plate, *p*, resting on its top, and bearing against the under side of the top A′ of the chamber A.

This India-rubber spring E may be made solid, but I prefer to make the same hollow, as represented in Fig. II, in section and plan, and provided with a number of holes or perforations, *s*, in its sides, to equalize the pressure of the atmospheric air forced into the chamber around its inner and outer surfaces.

Instead of placing an India-rubber spring in the interior of the chamber A, as here described, two or more may be arranged in the same, or one, three, or more spiral steel springs, J, as represented in Figure III, in section and plan, may be arranged in the interior of said chamber.

These springs J are placed around projecting pins or bolts *w*, fast to the sole-plate B, and carry on their top a metal plate, *x*, provided with bolts or pins, *u*, similar and corresponding with the bolts or pins *w* on the sole-plate B.

This plate *x* acts against the under side of the solid top A′ of the elastic chamber A.

The pins or bolts *u* and *w* may be made of such a length as to regulate and determine the amount of motion to be allowed to the cylinder A, and to touch each other, or allow the spring to bottom, whenever any excess of pressure is placed upon the same.

The length of the India-rubber spring E, or of the spiral steel springs J, may be made somewhat less than the internal depth of the elastic cylinder A, so as to allow the internal atmospheric pressure, forced into the cylinder, to operate in the beginning alone, until the load increases, when the combined strength of the India-rubber spring E, or of the spiral steel springs J, and of the compressed air, will act and operate to overcome and counteract the external load.

The elastic chamber A may be made sufficiently strong to dispense with the metal top plate D and with the external spiral spring *m*, or either of them, and to

act thus only with the compressed air, or in combination with either an internal India-rubber spring or spiral steel springs.

Instead of arranging either an India-rubber spring or springs, or spiral steel springs, in the interior of the chamber, an India-rubber spring, surrounded by spiral steel springs, may be arranged inside the India-rubber or elastic chamber.

A band may be substituted for the spiral spring *m*, as its only use is to confine the India-rubber cylinder, and prevent it from expanding unequally when under pressure, and not to give any strength as a spring. It has been found in practice that a band is all that is required; therefore, I do not limit my claim simply to the encircling spring.

I do not claim broadly a spring encircling a rubber cylinder in which a column of air is confined, as I am aware that this is not new; but

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The rubber cylinder A, having a closed end, A, and flange, *a*, whereby it is secured to the plate B, having a cock, *d h*, said cylinder A being encircled by a spring, *m*, and covered by a plate, D, connected with the lower plate by rods *b'*, which serve as guides, all substantially as herein shown and described.

2. The combination of the outer cylinder A A' *a*, inner cylinder E, plates B D *p*, and spring *m*, all constructed and arranged substantially as and for the purpose herein set forth.

3. The combination of the cylinder A A' *a*, plates B, *w*, *x*, *u*, supporting-springs J, and spring *m*, all substantially as herein described, for the purpose specified.

PERRY G. GARDINER.

Witnesses:
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LOUIS STUMM.