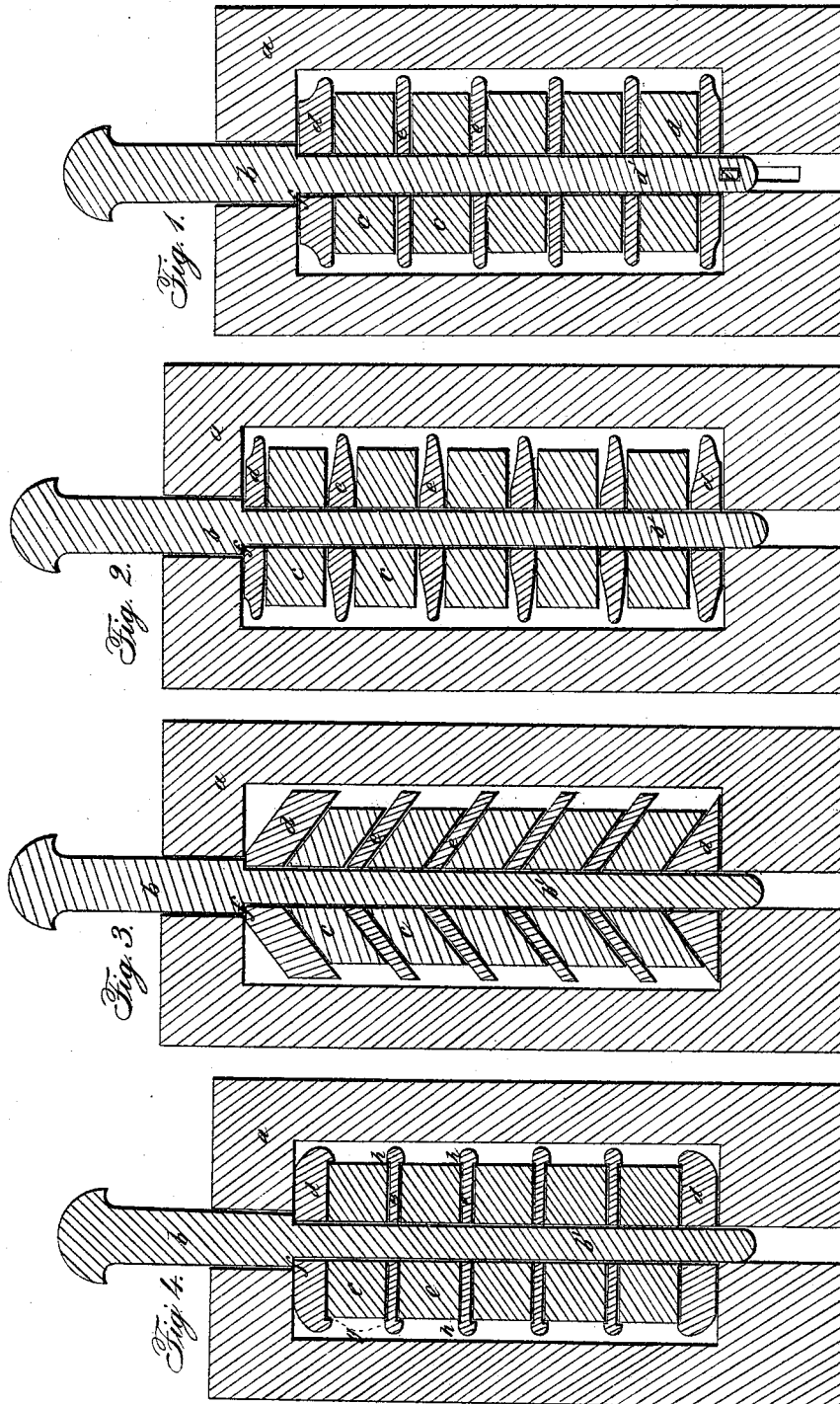


F. N. RAY.

Car Spring.

No. 7.706.

Patented Oct. 8, 1850.



UNITED STATES PATENT OFFICE.

FOWLER M. RAY, OF NEW YORK, N. Y.

VULCANIZED INDIA-RUBBER SPRING.

Specification of Letters Patent No. 7,706, dated October 8, 1850.

To all whom it may concern:

Be it known that I, FOWLER M. RAY, of the city, county, and State of New York, have invented new and useful Improvements in Springs for Railroad Trucks, Bumpers, and all other Purposes to Which They are Applicable; and that the following is a full, clear, and exact description of the principle or character which distinguishes them from all other things before known and of the manner of making, constructing, and using the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1, 2, 3, and 4 represent vertical sections of four different modes of applying springs on my improved plan.

The same letters indicate like parts in all the figures.

My improvements relate to the making of springs to be used as substitutes for metal and other springs heretofore used, whether applied to resist a thrust or pull, as for instance to support the bodies of rail road cars on their trucks, common carriages on their running gear, to resist the thrust or pull of rail road trains by connecting them with the draft links, &c., and to all other purposes which require an elastic resistance to a thrust or pull. And the nature of my invention consists in forming the spring or elastic medium of a ring or rings, or disks of what is known as vulcanized or metallic india rubber combined with a series of solid disks or plates of metal or other solid substance placed above and below the series and interposed between them to increase the elastic force and extend the play.

My invention also consists in making the elastic rings and the solid plates in the form of frustums of hollow cones with the view of increasing the elastic force of the elastic rings and prevent them from spreading out when under pressure.

In the accompanying drawings (*a*) represents a frame within which is arranged the spring, and (*b*) a rod that slides freely in holes made in the two end pieces thereof. A series of rings (*c*) made of any of the compounds or preparations of caoutchouc under the various appellations of "metallic rubber," "vulcanized rubber," &c., are placed onto the rod (*b*) on which they slide freely, and at each end of the series there is a metal plate (*d*), and between all the rings (*c*) are interposed metal disks or circular

plates (*e*) which are also made to slide freely on the rod (*b*). The lower one (*d*) of the metal disks or plates rests on the lower end piece of the frame, and the rod (*b*) which is cylindrical along the port (*b'*) is of an enlarged diameter at the upper end to form a shoulder (*f*) that bears on the upper one of the disks or plates (*d*), so that when the rod (*b*) is borne down by any weight or pressure applied to it the shoulder on the rod will thus compress all the elastic rings equally, each one yielding to an equal extent. In this way by multiplying the number of elastic rings the extent of play of the rod (*b*) can be increased to any desired extent. By this means each ring can be made of sufficient strength to resist the force intended to be applied to it either by increasing its diameter, or by reducing the thickness, the number of rings being increased to give the required play, for each one will be equally compressed, and by increasing the number the amount of play will of course be increased.

By making the metal disks or plates, interposed between the elastic rings, with convex surfaces as represented in Fig. 2, it will be seen that the disks at first rest on a very small surface of the elastic rings, and therefore that they will at first yield to a very slight pressure, and that the resistance will gradually increase as the surfaces of the solid disks or plates settle on the surfaces of the elastic rings. The same end may be attained but less perfectly by making the solid disks flat and the surfaces of the elastic rings convex; and in fact the same principle may be carried out when great sensitiveness is required by making the surfaces of the elastic rings and the interposed disks convex.

When the elastic rings are made flat as represented in Fig. 1, or convex as shown in Fig. 2 they swell out when under pressure, as represented by the dotted line (*g*). To prevent this effect, and at the same time increase the elastic force of the spring, I make them in the form of a frustum of a hollow cone, as shown in Fig. 3, the metal disks being of a corresponding form. And finally to increase the elastic force of the springs I make the metal disks with projecting flanches (*h*) at their peripheries which confine in part the peripheries of the elastic rings and thus confine them and prevent them from spreading out.

When my improved springs are to be applied to resist a pressure the frame and rod are interposed between the two bodies to be separated, as for instance between the body and trucks of a railroad car, that the rod (b) may act on the elastic rings. But when it is to be applied to resist a pull, or a pull and thrust as in the draft link of railroad cars or bumpers—then the rod (b) is to be provided with a key (i), (see Fig. 1), or a nut or other equivalent that when the rod (b) is pulled the key or nut may confine the lower plate (d) and cause it to act on the elastic rings in the same manner that the shoulder acts on the upper plate.

I do not wish to confine myself to the mode above described of acting on the elastic rings by means of a central rod, although I deem it the best, but to retain to myself the privilege of altering this at my pleasure, as it can be effected in a variety of ways, as for instance, instead of the central rod passing through all the elastic and solid rings, guide rods may be placed around them, or they may all be placed within a tube. Other modifications might be suggested, all involving the same principle or mode of operation. When the cen-

tral rod passing through the rings is dispensed with the central hole through the elastic, and solid rings need not be made.

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

1. The employment of a ring, or rings, or disks, made of any of the preparations of caoutchouc known under the various appellations of metallic or vulcanized rubber, as a substitute for metal, or other kinds of springs, heretofore known and used when such ring or rings, or disk or disks, or the equivalents thereof, are applied in manner substantially as herein described, in combination with a series of solid disks or plates, or their equivalents substantially as herein described, whether made of metal or other solid or nonelastic substance.

2. I also claim making the surfaces of all or either of the plates above and below and interposed between the elastic rings or their equivalents or the surfaces of the elastic rings or either of them convex, substantially in the manner and for the purpose specified.

F. M. RAY.

Witnesses:

ALEX. PORTER BROWNE,
WM. BISHOP.