

J. C. PLUMER.

Carriage-Spring.

Patented Sept. 5, 1865.

No. 49,786.

Fig. 1.

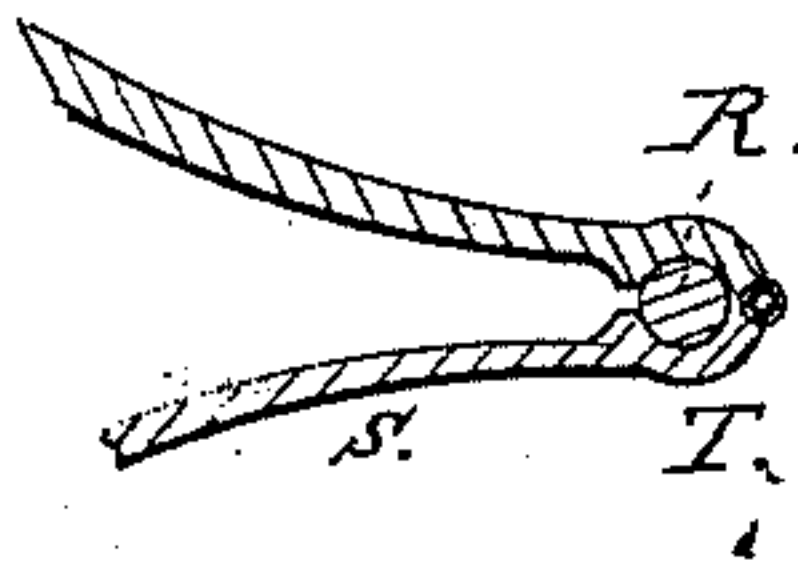


Fig. 2.

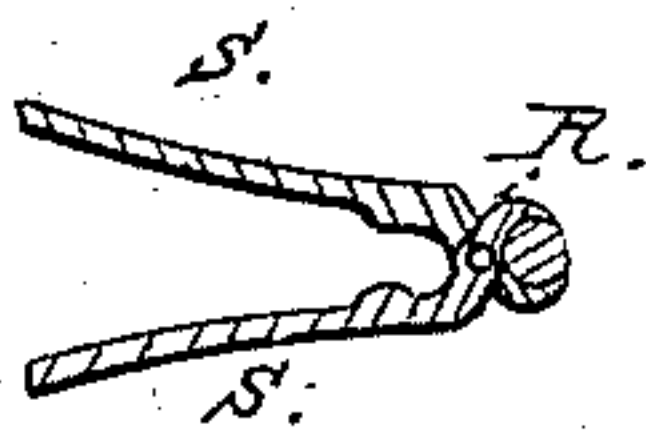


Fig. 3.

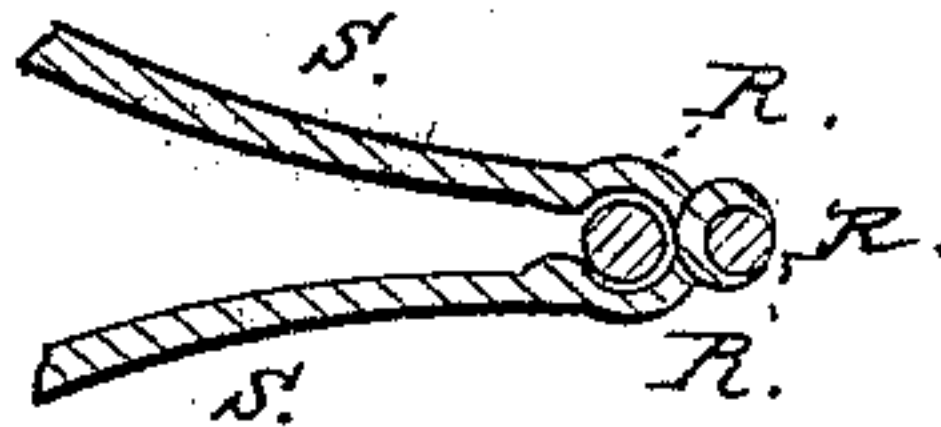


Fig. 4.

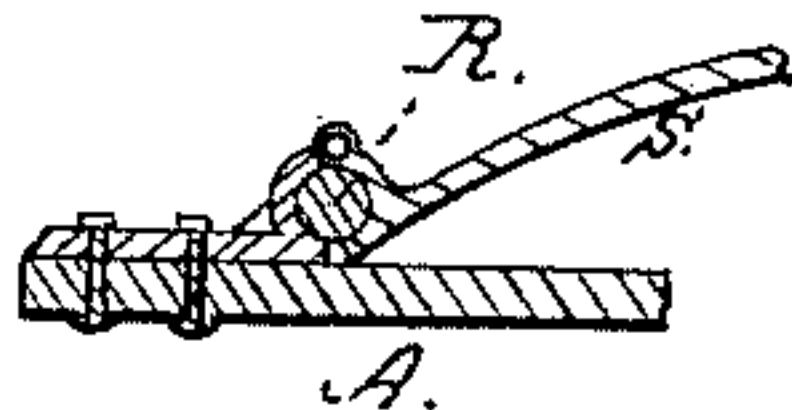


Fig. 5.

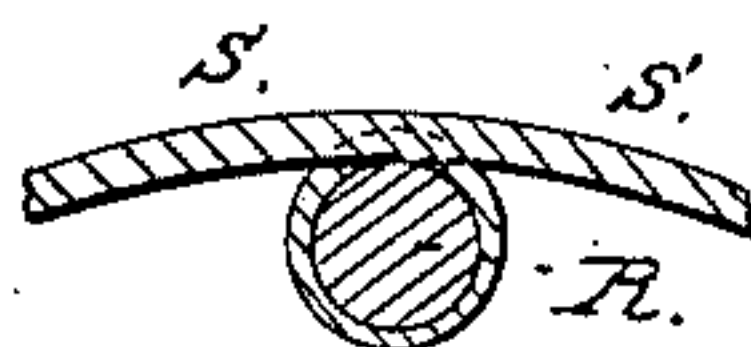


Fig. 6.

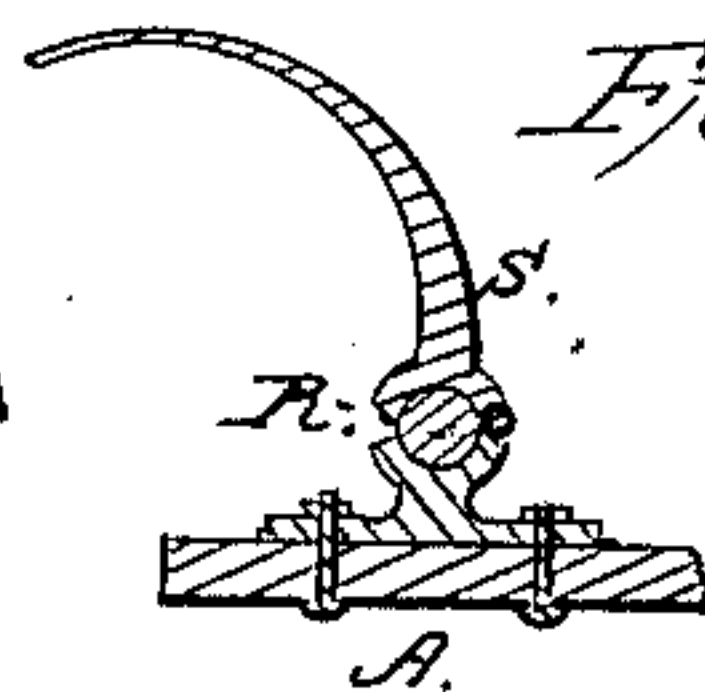


Fig. 7.

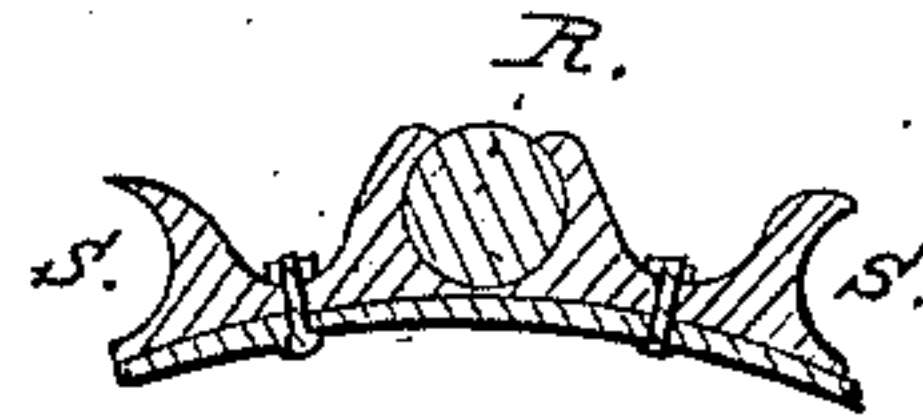


Fig. 8.

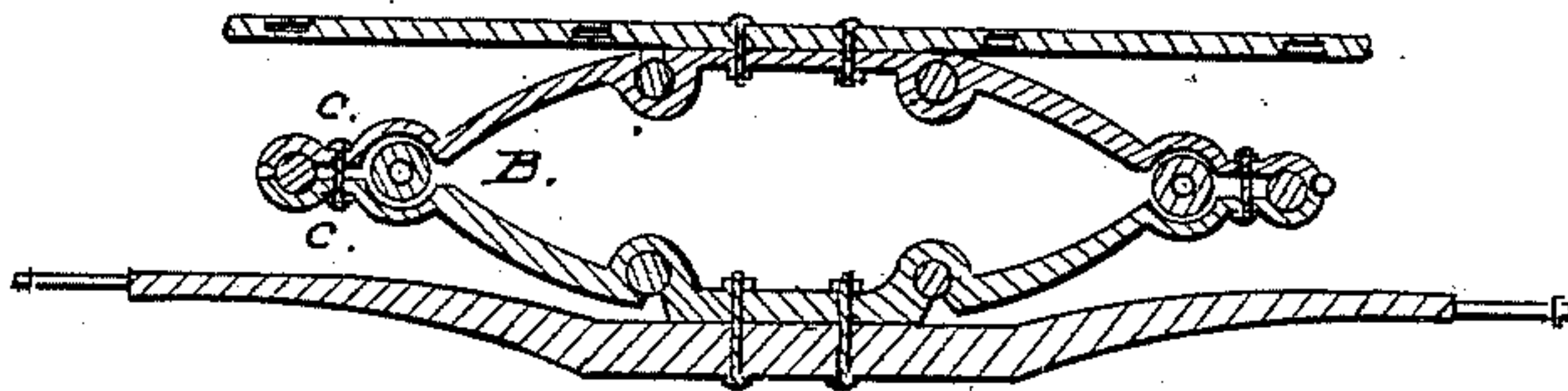


Fig. 10.

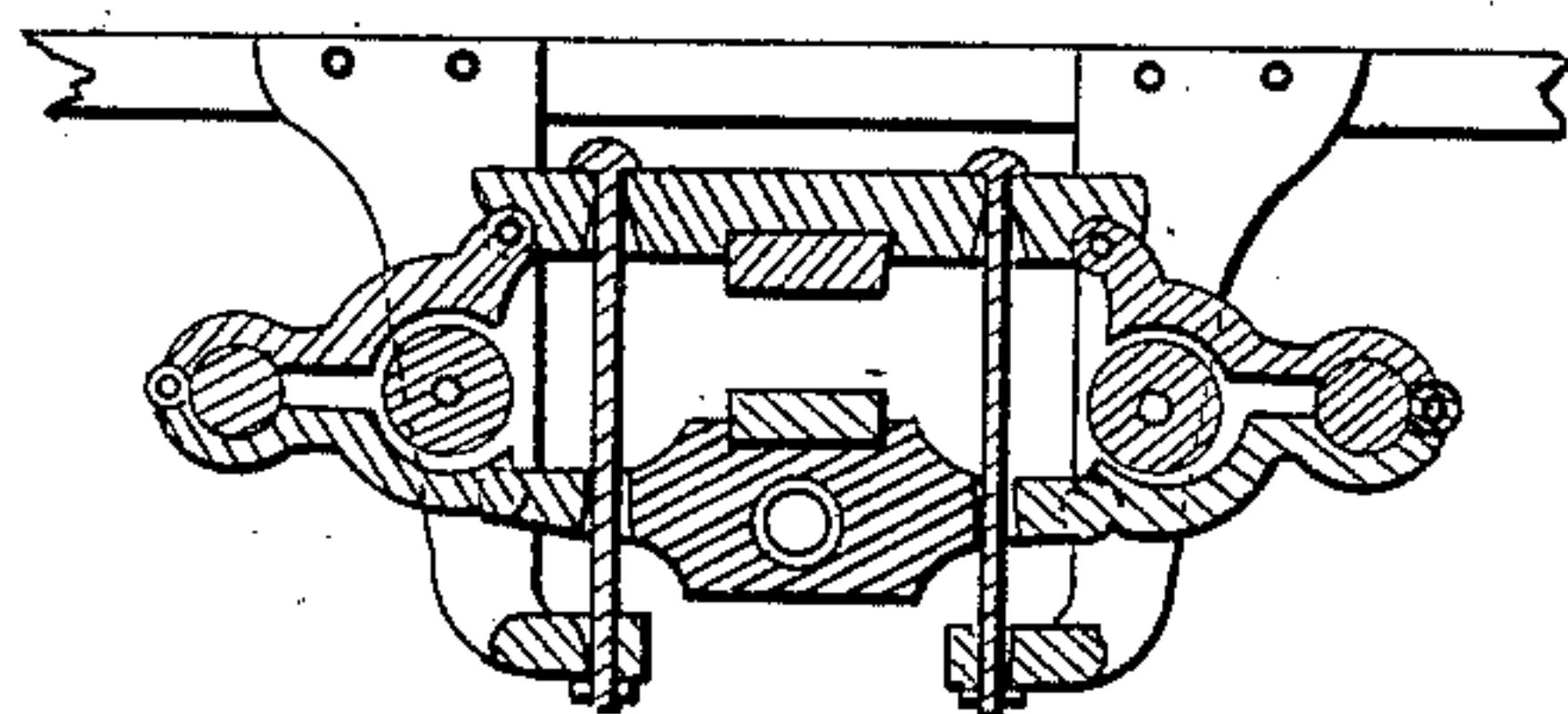


Fig. 11.

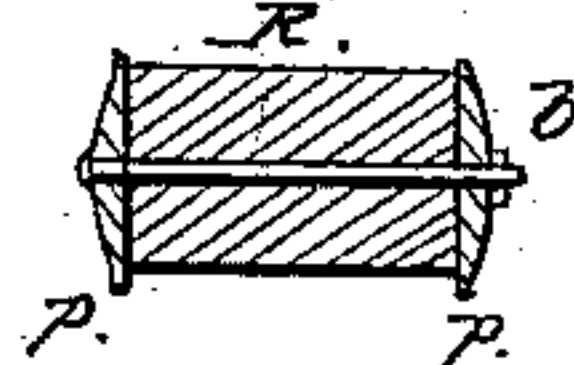


Fig. 9.

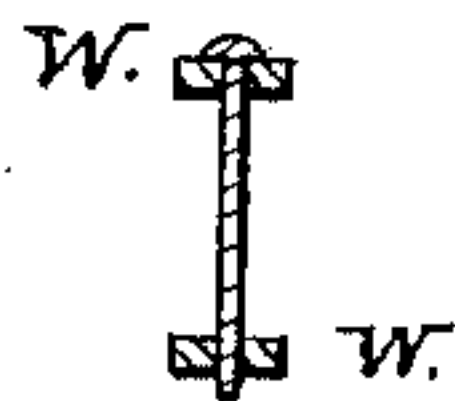


Fig. 12.

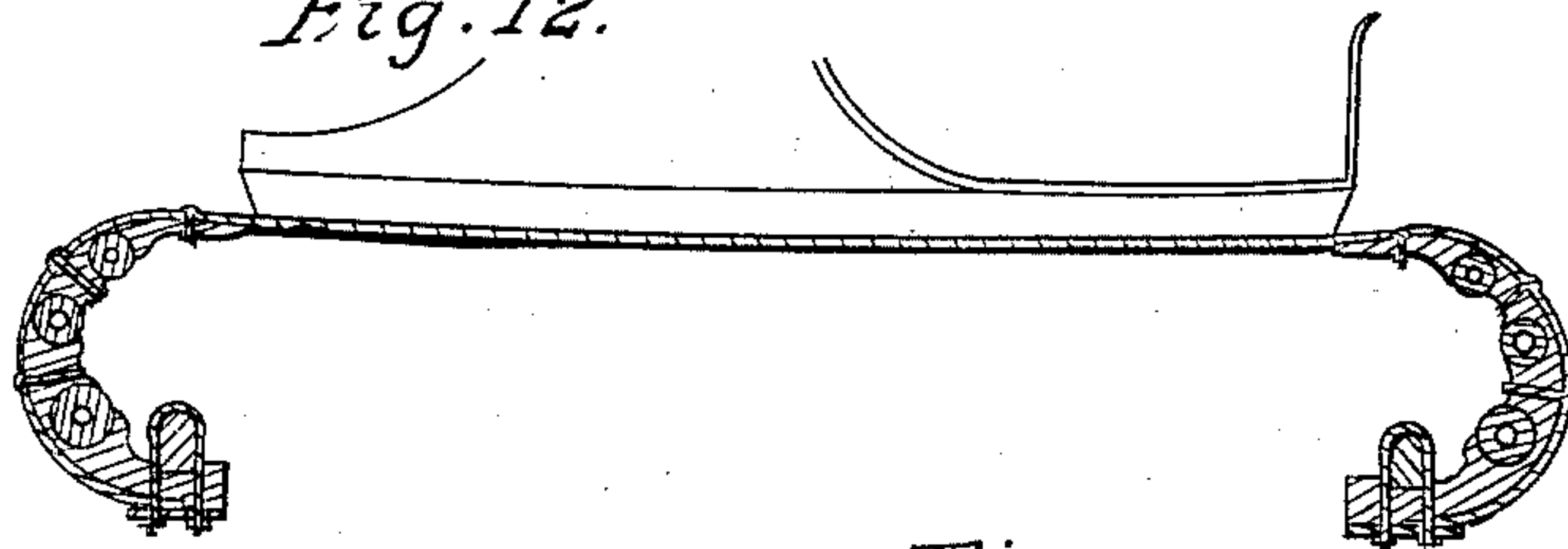


Fig. 13.

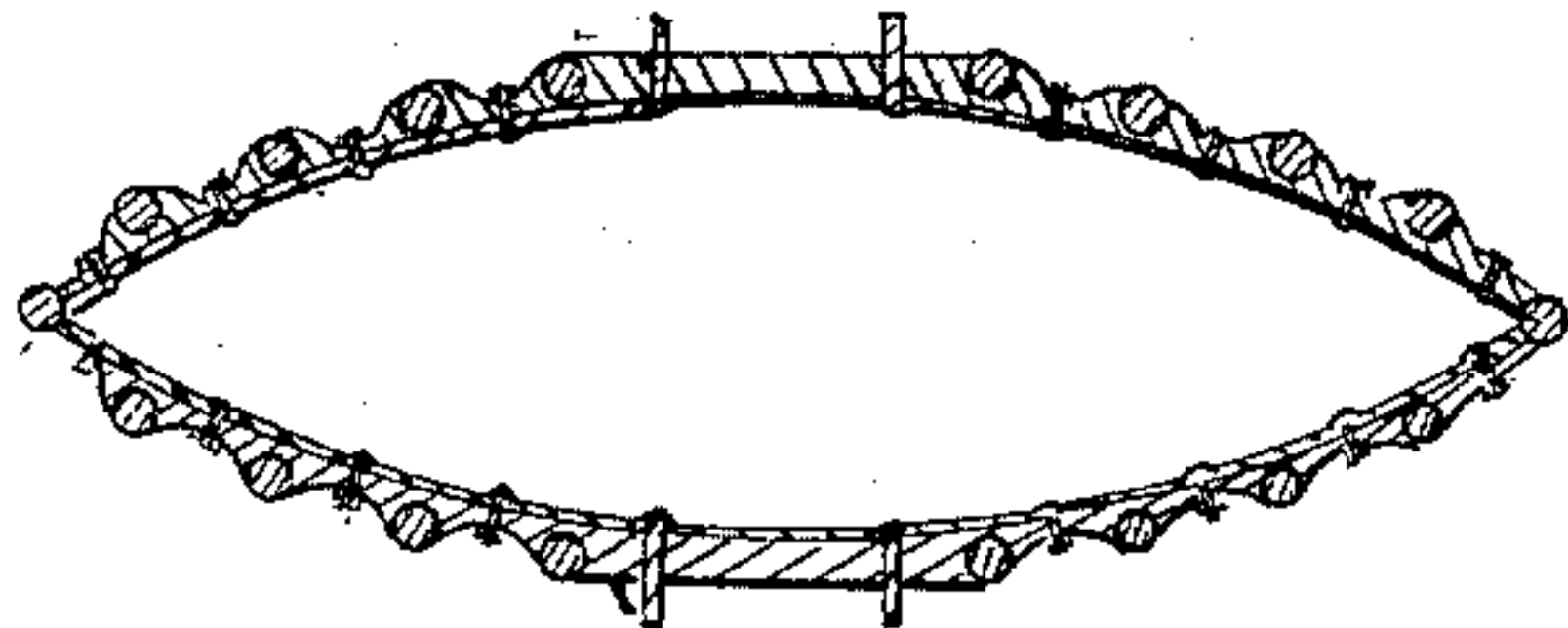
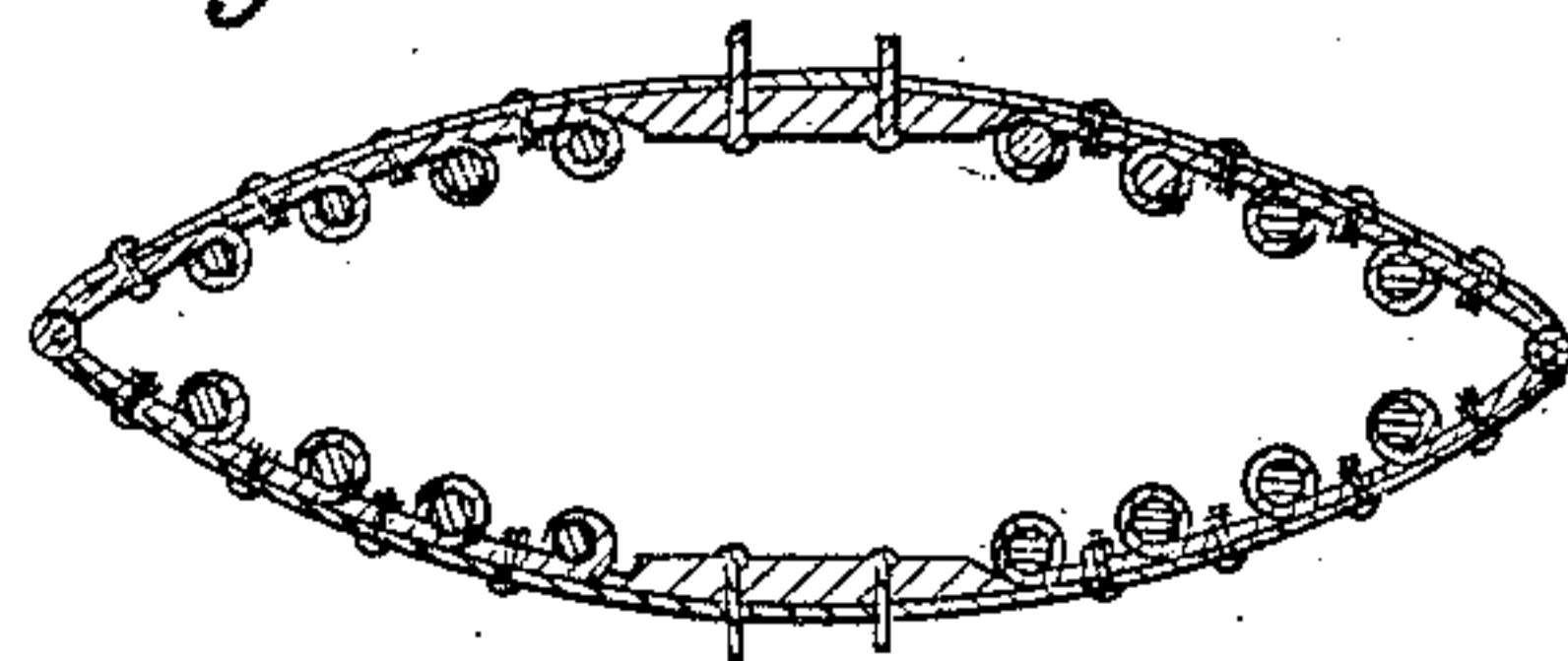


Fig. 14.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN SPRINGS.

Specification forming part of Letters Patent No. 49,786, dated September 5, 1865.

*To all whom it may concern:*

Be it known that I, J. C. PLUMER, of Boston, in the Commonwealth of Massachusetts, have invented a new and useful Improvement in Springs for Cars, Carriages, &c.; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figures 1, 2, 3, 4, and 5 represent different devices or modes of construction of my improved spring, the portions marked R being rubber introduced between pieces of metal or other inflexible substances, S, which are either both levers, as in Figs. 1, 2, 3, 5, and 7, or a lever and a stationary piece or fulcrum, as in Figs. 4 and 6; Fig. 8, a compound spring composed of the devices represented in Figs. 1 to 4; Fig. 9, the connecting-bolt *cc* of Fig. 10 with the rubber washers *ww*. The object of this is to control the motion of the levers. Fig. 10 represents a spring consisting of a combination of the improved springs, and applicable to heavy vehicles, &c., as rail-cars and locomotives. Fig. 11 represents a piece of rubber, R, clamped between the plates P P, to prevent, with the aid of the connecting-bolt, the expansion lengthwise of the rubber when subjected to the pressure of the levers or their equivalents. Figs. 12, 13, and 14 represent an application to carriage-springs of the devices shown in Figs. 6, 7, and 5, respectively.

The object of my invention is to produce a spring suitable to cars, locomotives, carriages of all kinds, and for all the various mechanical purposes to which a spring can be adapted.

My invention consists of an arrangement of levers, or their equivalents for the purpose—as a lever and stationary piece or fulcrum—with a piece or pieces of rubber introduced between them for the purpose of resisting their action, and thereby imparting the desired elasticity.

I construct my improved spring by arranging two or more pieces of iron or other suitably-inflexible material in such a way as to produce compression of the rubber through their leverage action upon it, which, by its expansive properties, will resist the action of the levers and have a tendency to throw them apart. I usually have the rubber in the form of a hol-

low cylinder, but do not intend to limit myself to any particular form.

The piece or pieces of rubber may have a straight or conical hole in or through them, so as to receive a straight or conical plug of wood or other rigid substance to resist compression.

The plug may be arranged so as to be thrust into the rubber by means of a screw, or some such device, so as to vary the rigidity of the spring by partly or wholly filling the hole, or even compressing the rubber from within outward. Where several pieces of rubber are used in the same spring some of them may be made less rigid than others; or the sockets for their reception may be larger than the pieces of rubber, so that all of them will not be compressed by any given amount of weight, but more or less of them brought into exercise in proportion as the weight be increased or diminished.

Comparison will illustrate that the quality of elasticity derived from rubber springs, or those employing rubber, is more agreeable and less liable to occasion fatigue than that produced from metal.

I am aware of the existence of various car-springs constructed of rubber and metal; but in these there is no leverage action or connection of the inflexible portions with or upon each other or upon the rubber, the rubber being compressed only by the direct weight of the car, &c., the weight of which it is designed to uphold. In these cases the motion of the superimposed weight is limited in extent to the degree of simple compression and expansion of the rubber, while in my spring it is greater in proportion as the arms of the levers are long. Different degrees of rigidity may also be imparted to the spring by the tightness with which the cylinder is embraced between the clamps P P, Fig. 11. This can be regulated by the screw and nut shown at *b*, same figure.

Various combinations of my device may be made for the various purposes and different burdens to which it may be desired to apply it, and I do not propose to limit myself to any particular mechanism or combination thereof embodying the principle, or to limit its application to any particular purpose.

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

1. A spring which is constructed of two or more arms or levers united by joints, and which derives its elasticity from a piece or pieces of rubber fixed in or between the arms, as described.

2. The plates applied to the exposed surface of the rubber and connected by a bolt, in com-

bination with the described spring, both as and for the purposes described.

J. C. PLUMER.

Witnesses:

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