

988,382.

Patented Apr. 4, 1911.

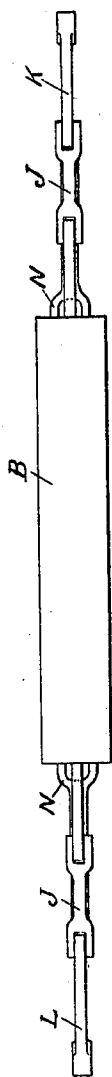


Fig. 2.

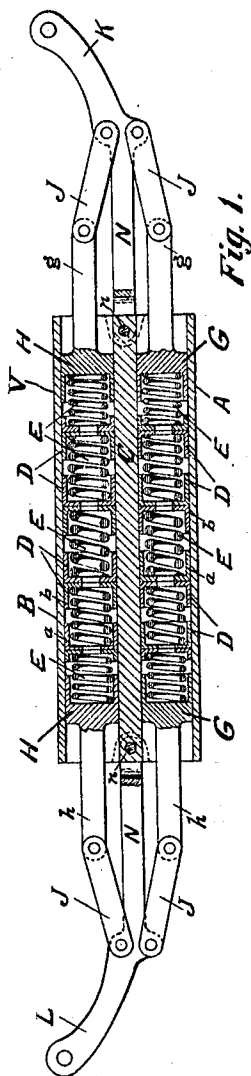


Fig. 1.

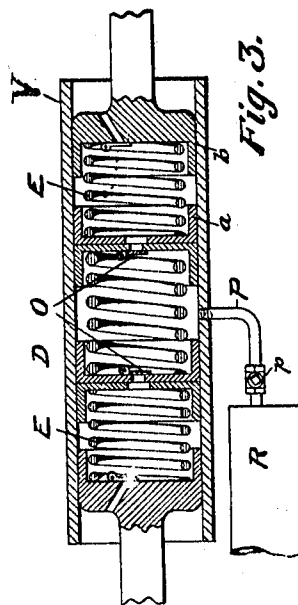


Fig. 3.

WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM J. PHELAN, OF BENNINGTON, VERMONT.

SPRING.

988,382.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed April 19, 1909. Serial No. 490,840.

To all whom it may concern:

Be it known that I, WILLIAM J. PHELAN, a citizen of the United States, residing at the village of Bennington, in the county of Bennington and State of Vermont, have invented certain new and useful Improvements in Springs, of which the following is a specification.

My invention relates to vehicle springs, and the object of my invention is to provide a spring, or series of springs so adjusted and connected up that the load thereon will be supported thereby, without the possibility of causing violent or sudden jarring or motion to the load, and so arranged that the load may effect the spring in successive degrees, whereby one portion or one of the separate parts going to make up the spring shall be acted upon before the others, together with such other objects, elements and combinations as are hereinafter more particularly described and claimed. I accomplish these objects by means of the mechanism illustrated in the accompanying drawings, in which:

Figure 1 is a longitudinal section, partly in elevation. Fig. 2 is a plan. Fig. 3 is a section with parts broken away of a modified form of my invention.

Similar letters refer to similar parts throughout the several views.

The tubes, A and B, are arranged parallel to each other and preferably slightly separated, as at C, and may be formed by coring out a casting V. Within each tube I place a series of boxes, D. The boxes each containing a spring or suitable resilient member E. The boxes, D, are arranged so that when the spring is in its normal position the two portions, *a* and *b*, which go to make up the boxes, D, are extended, but when the spring, E, is contracted the two portions, *a* and *b*, will be drawn together. I preferably place within the boxes, D, springs differing in resilient power or strength, placing in the boxes nearest the ends of the tubes, respectively, the lightest springs, those next being slightly heavier and those nearer the center being still heavier.

In each of the tubes, A and B, in each end thereof, I place the pistons, G, G, and H, H. The piston rods, *g*, *g*, and *h*, *h*, are connected by links, J, to the levers, K and L, respectively. The load, not shown, being carried at the ends of the levers, K and L. The levers, K and L, having portions, N, N, re-

spectively, which are fulcrumed, preferably by means of the bolts, *n*, *n*, to a casting carrying tubes A and B.

The casting, V, containing the tubes, A and B, may be attached to the axle and the levers, K and L, to the body or vice versa.

It will be readily seen that when the load presses on the lever, K, the pistons, G, G, will be forced into the tube, A, from each end thereof. The springs in the boxes, D, nearest the ends will be compressed and after the two portions, *a* and *b*, of the boxes have been thus brought together and indeed slightly before the meeting of the two portions of the boxes the springs in the next adjoining boxes will be acted upon and in the same manner and then springs in the boxes next adjoining them, whereby the load is gently, evenly and buoyantly carried by the spring. When any uneven surface of the road over which the vehicle carrying the spring is encountered the tendency to cause a jouncing will be taken up by the springs in the tube B. The pistons, H, H, acting upon the springs in said tube in the same manner as has been described in reference to the action of the springs in tube A. The spring system in tubes A and B operates to carry the load on a resilient cushion, because a movement of the load either up or down, such as may be occasioned by a swaying or undulating motion will be taken up. When the load is carried on the springs in the tube A those springs provide, as has already been stated, for a gradual, even, gentle adjustment of the load. When the load gives on one side, tending to rise, the links and pistons in the tube V operate upon the springs therein and tend to equalize and thus adjust the equilibrium of the load.

In Fig. 3 I have shown a modified form of my invention in which I place check valves, O, between the adjacent ends of the boxes, D, and at the center of the tubes I place a pipe or suitable conveyer, P, leading to a reservoir, R, whereby air forced by the action of the pistons, G, G, and H, H, may be carried into the reservoir, where it may be used for any desired purpose. I preferably place a check valve, *p*, in the conveyer, P.

I do not limit myself to the number of springs used, nor to their arrangement regarding the difference in size or strength of the springs, as it may be advisable to make them all of the same size in some instances or to have more or less in number than that

shown in the drawing, nor is it necessary in all cases to have two tubes or receptacles for the springs, as in some cases one is sufficient.

5 I have shown the boxes, D, made up of two parts, *a* and *b*, they may be compressible boxes or telescopic in construction.

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

10 1. A vehicle spring comprising a series of springs; compressible boxes within which said springs are placed, respectively; a receptacle within which said boxes and springs are placed; pistons at each end of said receptacle; means for mounting said pistons
15 all so arranged and connected up that the thrust by either piston will be caused to impinge upon the springs successively, step by step.

20 2. A vehicle spring comprising two receptacles; a series of boxes in each receptacle; springs in said boxes; pistons at each end of said receptacle; means for mounting said pistons whereby the pistons when forced
25 into their respective receptacles will act upon the springs successively.

3. A vehicle spring comprising a receptacle; a series of resilient members therein differing in power of resiliency; a means for
30 exerting pressure on each end of the series of members whereby the impact will be taken up and gradually lessened in force from one member to another.

4. A spring comprising a receptacle; a series of compressible boxes therein; check
35 valves in the ends of said boxes; springs in said boxes; pistons in each end of said receptacle; a conveyer registering with one of said boxes; a reservoir with which said conveyer also registers.

40 5. A spring comprising a series of receptacles; a series of compressible boxes in each of said receptacles; a resilient member in each of said boxes; pistons at each end of said receptacles; a means for mounting said
45 pistons so connected up that the impact of the pistons on the box with which they come in contact, respectively, will be conveyed, in less degree, to the adjoining box and from
50 that one to the next adjoining, etc., gradually reducing the effect of the impact and the spring, substantially as described.

6. A spring comprising a series of receptacles; a series of compressible boxes in each
55 of said receptacles; a resilient member in each of said boxes; pistons at each end of said receptacles; links connecting said pistons to levers; levers to which said links are connected hinged to said receptacles and
60 adapted to carry a load.

In testimony whereof I have affixed my signature in presence of two witnesses.

WILLIAM J. PHELAN.

Witnesses:

LOTTIE PRIOR,

FREDERICK W. CAMERON.