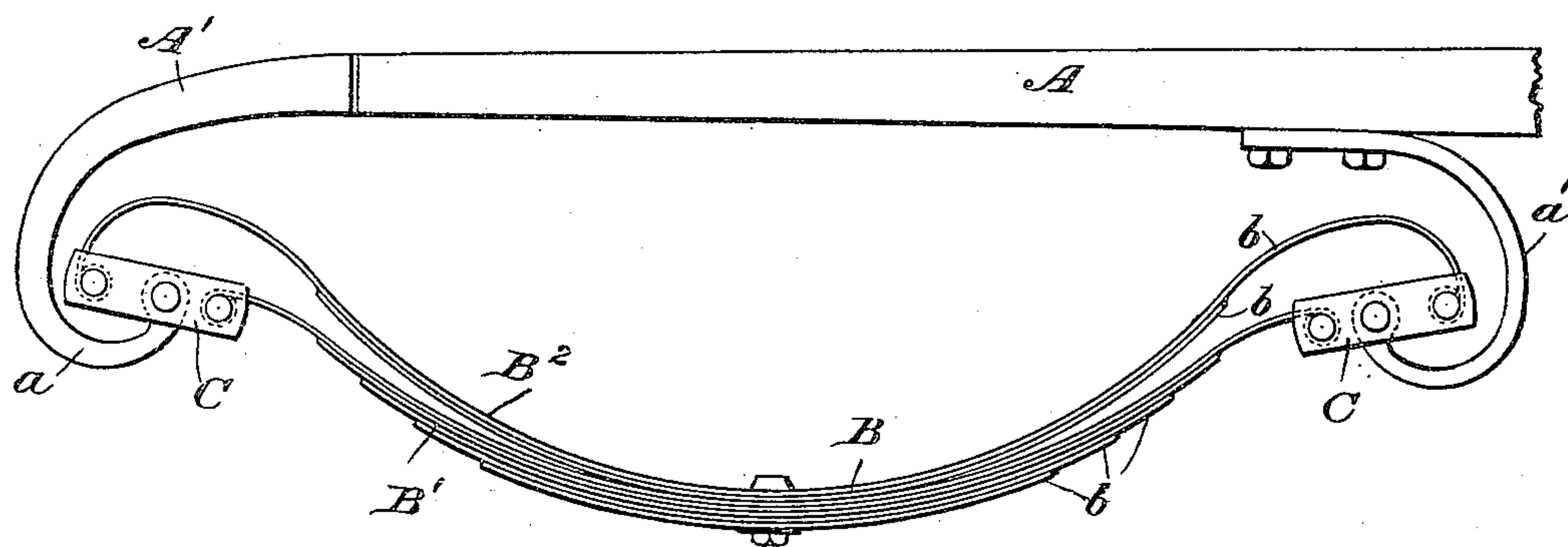


No. 838,792.

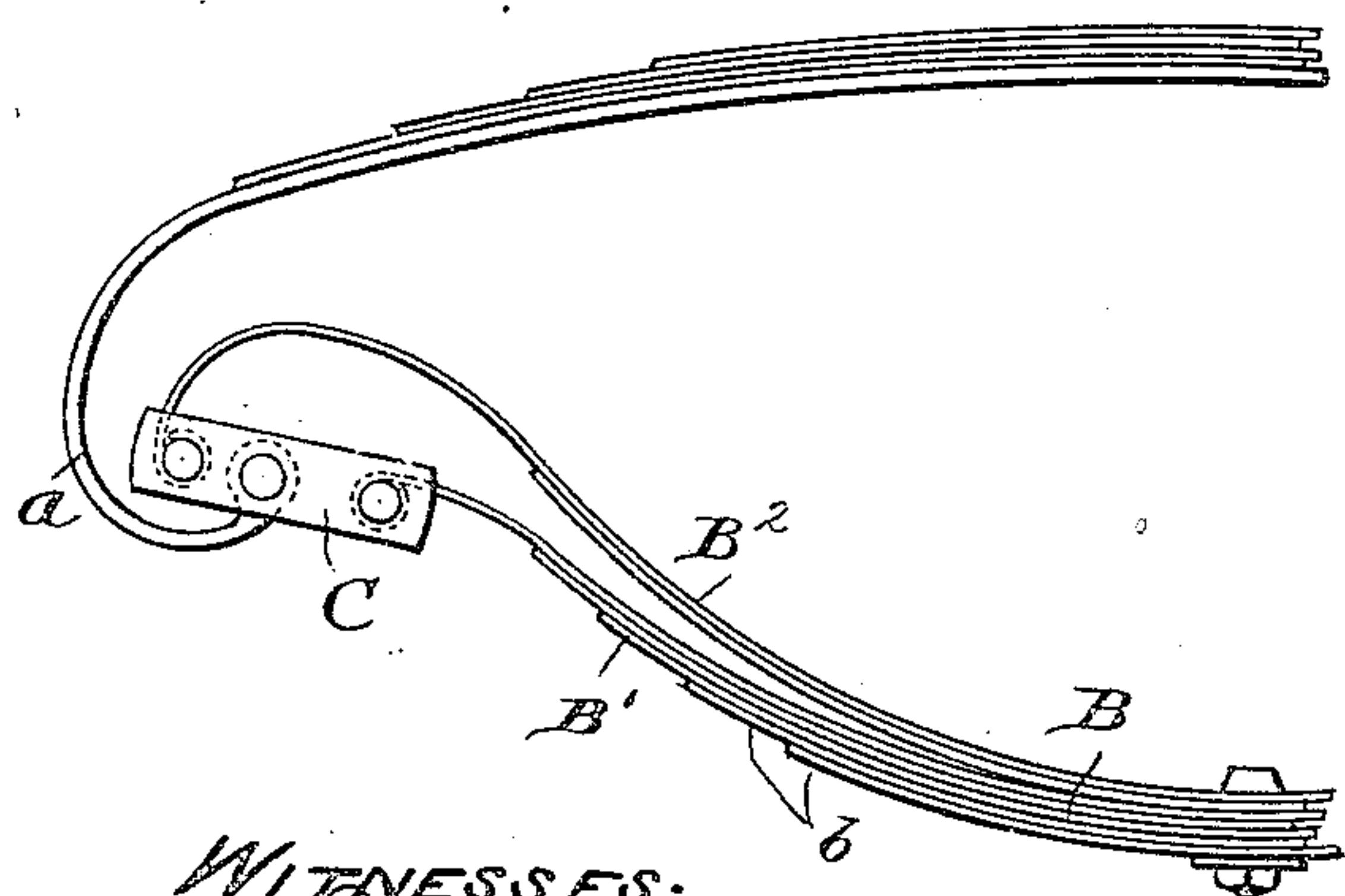
PATENTED DEC. 18, 1906.

J. A. LANNERT.  
VEHICLE SPRING.  
APPLICATION FILED JUNE 2, 1906.

*Fig. 1.*



*Fig. 2.*



WITNESSES:  
S. I. Davies  
Geo. F. Oberlin

INVENTOR:  
John A. Lannert  
by his attorney  
J. B. Fay



# UNITED STATES PATENT OFFICE.

JOHN A. LANNERT, OF CLEVELAND, OHIO.

## VEHICLE-SPRING.

No. 838,792.

Specification of Letters Patent.

Patented Dec. 18, 1906.

Application filed June 2, 1906. Serial No. 319,817.

*To all whom it may concern:*

Be it known that I, JOHN A. LANNERT, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Vehicle-Springs, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle so as to distinguish it from other inventions.

My invention relates to improvements in vehicle-springs, and while it has regard both to the form of the spring itself and to the manner of hanging the vehicle-body therefrom it is to the latter feature that I would call more particular attention.

The object of the invention is to provide means for combining two springs so as to support the load normally from one only and yet cause the other to be brought into play the moment the strength of such first spring is exceeded. This first spring may be lighter than the second, although not necessarily so, for in either event it will be seen that a relatively light spring sustains all the lighter jars and strains transmitted by the body-hanger and that a relatively heavy spring—in fact, a spring combining the strengths of the two component springs—receives the severer jolts and carries the heavier load.

To the accomplishment of the above and allied objects said invention consists of means hereinafter fully described, and particularly set forth in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings, Figure 1 represents a side elevation of a vehicle-spring embodying my several improved features, while Fig. 2 shows a detail of the same with a slightly different arrangement of the parts entering therein.

In such Fig. 1 merely the spring and the hangers, by means of which the vehicle-body is suspended therefrom, are shown, both such body and the axle upon which the spring is in turn supported being omitted. The appurtenances shown, however, may be readily identified as belonging to the front end of an automobile-frame. Thus A represents the left side member of such frame, and A' the

front spring-horn that projects forwardly therefrom, the lower recurved end *a* of such horn serving as a body-hanger. To this the forward end of the spring is attached, the rear end being secured to a similar but oppositely-disposed spring-hanger *a'*, that is secured to the frame side A in any approved manner.

The spring B in view of its situation is naturally of the semi-elliptical type. Such spring is composed of two superposed parallel springs B' B<sup>2</sup>, that are in all respects structurally separate and distinct, although in their action they are mutually interdependent, as will presently appear. As shown, each is composed of a plurality of successively overlapping leaves *b*, the lower spring B' being made up of five such leaves and the upper spring B<sup>2</sup> of only two. The lower spring is hence obviously the heavier or stronger of the two; but this relationship, it should be distinctly stated, is not essential, but may be varied as desired or found necessary to meet the conditions of a service other than that in connection with which I have chosen to illustrate my invention. It should also be stated that I do not present the direct superposition of spring B<sup>2</sup> upon spring B' as being an essential feature of my construction, for the result to be secured would be equally well attainable were there a block interposed between the two springs at their point of attachment to the vehicle-axle.

The feature to which I do call attention is the manner in which I attach the respective ends of springs B' and B<sup>2</sup> to hangers *a* and *a'*. Such spring ends are designed under normal conditions of load and with the vehicle standing at rest to lie in substantially horizontal alinement, and they are pivotally connected by links or shackles C. These links are in turn pivotally attached to the hangers *a a'* at points intermediately of the points of attachment of the spring ends. From this construction it follows that each of links C is, in effect, a lever having its fulcrum-point at the point of attachment of the lower spring B' and the power in the form of the load of the vehicle-body applied through hanger *a* or *a'* at a point between such fulcrum and the point of attachment of upper spring B<sup>2</sup>. Consequently any movement of the hanger produces a magnified movement on the part of the end of such upper spring. The downward movement of the spring end, however, is limited before it becomes excessive or im-



poses an undue strain on the spring by the engagement of the end of spring B<sup>2</sup> with the recurved hanger. Further depression of the hanger thereupon results in a simultaneous  
 5 and equal depression of link C and of the two attached spring ends. When this degree of depression is reached, the lower leaf of the upper spring is designed to rest upon the top of the lower spring and the two springs thus  
 10 constrained to act, in effect, as a single spring. Until the vertical movement of the upper spring is thus arrested the lower spring yields but comparatively little and to all intents and purposes serves as merely a sup-  
 15 port upon which the shackle is fulcrumed. Indeed, I might suggest that I contemplate the possibility of actually pivoting the inner end of the shackle to a fixed support and employing a single spring to cover the entire  
 20 range of load. The action of such spring in that its outer end would be obliged to move through a greater distance than the hanger end is identical with its operation in the double construction which I have adopted.  
 25 The range of independent movement of the upper spring before combined action of the two springs is reached may be considerably varied by attaching the hanger nearer one or the other of the spring ends. Obviously in  
 30 the same way the relative operative strengths of the two springs may be varied, for even if their nominal strengths should be the same by giving a longer leverage to the power represented by the hanger the upper spring  
 35 would act as a comparatively light spring. This is the arrangement of hanger illustrated in Fig. 2, as will be readily ascertained by referring to the same. In the approved construction, however, that I show the upper  
 40 spring is made lighter than the lower one at the start, and then by shortening the power-arm of the lever the range of vertical movement of such upper spring is increased, thereby rendering it particularly responsive  
 45 to light jars and the vehicle to a corresponding degree easy-riding. It needs scarcely be stated, in conclusion, that the application of my improved spring construction is not limited to automobiles, but that it may be em-  
 50 ployed with equally successful results on any vehicle. It will be also understood that if found desirable the form of suspension characterizing my spring may be employed at one end of such spring only and any other  
 55 kind of suspension used at the other and that instead of being semi-elliptical such spring may be just as well quarter-elliptical in form. Indeed, the spring may be made three-quarters or full elliptical, if desired, by substitut-  
 60 ing for the hangers *a* and *a'*, one or both, an inverted quarter or half elliptical spring. This is the construction indicated in Fig. 2, where, in addition to a shifting of the point of attachment of the rear hanger to the shackle,  
 65 such hanger is shown replaced by a quarter-

elliptical spring. The construction last suggested would be the one preferably employed in connection with buggies and carriages, where the length of body is considerably shorter than in an automobile and room for  
 70 two hangers hence not to be conveniently had.

Having thus described my invention in detail, that which I particularly point out and distinctly claim is—

1. The combination of a support, a spring, a shackle pivotally attached to said support and the end of said spring, respectively, said shackle being normally substantially horizontal, and a hanger pivotally attached to  
 80 said shackle intermediately of the respective points of attachment of the latter to said support and spring.

2. The combination of springs having their ends normally in substantially horizontal  
 85 alinement, a shackle connecting such spring ends, and a hanger pivotally attached to said shackle intermediately of the points of attachment of two of such spring ends.

3. The combination of two superposed  
 90 springs, a shackle connected with the respective ends of said springs, said shackle being normally substantially horizontal, and a hanger pivotally connected with said shackle intermediately of the ends of the same.

4. The combination of two superposed springs having their ends normally in substantially horizontal alinement, a shackle connecting such spring ends, and a hanger  
 100 pivotally attached to said shackle intermediately of the points of attachment of such spring ends.

5. The combination of two superposed springs, a shackle connected with the respective ends of said springs, said shackle being  
 105 normally substantially horizontal, and a hanger pivotally connected with said shackle intermediately of the ends of the same, said hanger being adapted to limit the movement of said shackle.

6. The combination of two superposed springs having their ends normally in substantially horizontal alinement, a shackle connecting such spring ends, and a hanger  
 115 pivotally attached to said shackle intermediately of the points of attachment of such spring ends, said hanger being adapted to limit the downward movement of said shackle.

7. The combination of two superposed  
 120 springs having their ends normally in substantially horizontal alinement, a shackle connecting such spring ends, and a hanger pivotally attached to said shackle intermediately of the points of attachment of such  
 125 spring ends, said hanger being adapted to engage and support the end of the upper of said springs when such end is depressed from aforesaid horizontal position.

8. The combination of a relatively heavy  
 130



spring, a relatively light spring superposed thereon, the ends of said springs normally lying in substantially horizontal alinement, a shackle connecting such spring ends and a hanger attached to said shackle intermediately of the points of attachment of such spring ends.

9. The combination of two superposed springs, a shackle connecting the ends of said springs, and a hanger pivotally attached to said shackle intermediately of the points of attachment of said spring ends, said hanger being adapted to engage and support the end of the upper of said springs when such end is depressed.

10. The combination of a relatively heavy spring, a relatively light spring superposed thereon and parallel therewith, the ends of said springs normally lying in substantially horizontal alinement, a shackle connecting such spring ends, and a hanger pivotally attached to said shackle intermediately of the

points of attachment of such spring ends, said hanger being adapted to engage and support the end of the upper of said springs when such end is depressed from aforesaid horizontal position.

11. The combination of two superposed parallel springs having their ends in substantially horizontal alinement, a shackle connecting such spring ends, and a hanger pivotally attached intermediately of the points of attachment of such spring ends, said hanger being adapted to engage and support the end of the upper of said springs when such end is depressed from aforesaid horizontal position, such upper spring being disposed so as to simultaneously rest upon the lower spring.

Signed by me this 29th day of May 1906.

JOHN A. LANNERT.

Attest:

D. T. DAVIES,  
JNO. F. OBERLIN.