(No Model.)

# J. BLUM & T. J. ANDERSON.

## VEHICLE SPRING.

No. 588,813. Patented Aug. 24, 1897.

Fig. 1.

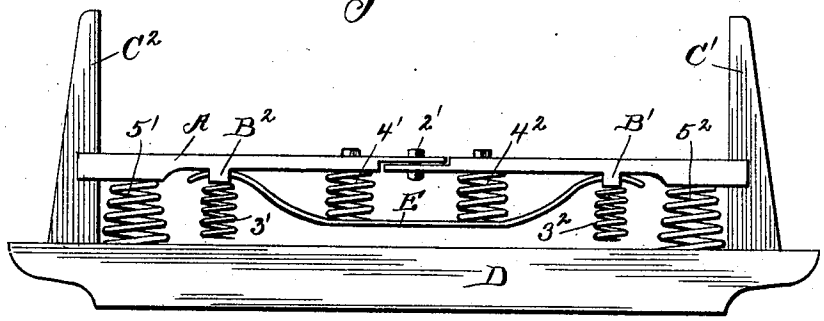



Fig. 2.

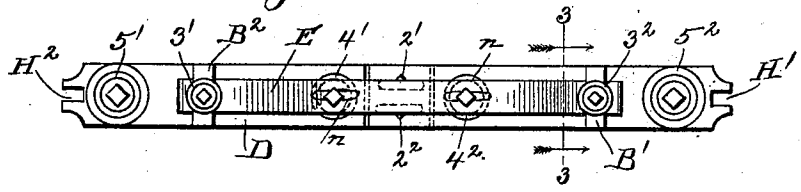



Fig. 3.

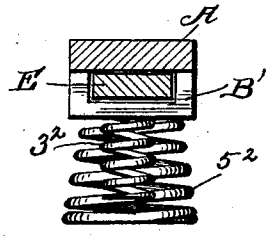
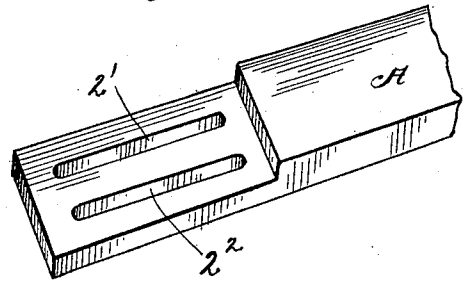



Fig. 4.




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# UNITED STATES PATENT OFFICE.

JOSEPH BLUM AND THOMAS J. ANDERSON, OF FREEPORT, ILLINOIS.

## VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 588,813, dated August 24, 1897.

Application filed April 25, 1896. Renewed February 13, 1897. Serial No. 623,320. (No model.)

*To all whom it may concern:*

Be it known that we, JOSEPH BLUM and THOMAS J. ANDERSON, citizens of the United States, and residents of the city of Freeport, in the county of Stephenson and State of Illinois, have invented certain new and useful Improvements in Vehicle-Springs, of which the following is a complete and exact description, reference being had to the drawings accompanying the same and forming part thereof.

Our invention relates to that class of vehicle-springs in which an elliptic spring is combined with a spiral spring to produce a graduated resistance.

The objects of our invention are to produce or provide, first, a vehicle-spring constructed entirely of metal, in which the semielliptic portion of the spring has its reaches permanently in contact with the supporting-bar and which will operate independently of the coil-springs; second, an extension vehicle-spring that will be adjustable in the center and adapted to furnish a uniform yielding resistance whether the vehicle is loaded or unloaded. These objects are attained by the arrangement and combination of devices illustrated in the accompanying drawings, in which—

Figure 1 is a front view of the spring set on the bolster and ready for use. Fig. 2 is an inverted view of the spring, showing the adjustment of the coil-springs to the cross-bar. Fig. 3 is a sectional end view of the spring at 3, where the dotted line is drawn through the arrows. Fig. 4 is a perspective view of a part of the spring in the center, showing the slotted holes for adjusting the cross-bar.

In springs of this character heretofore in use the supporting cross-bar is made of wood, to which the base of the semielliptic spring is rigidly fastened, and the reaches of the elliptic spring are attached to the end coil-springs and impinge on the bolster, so that when a moderate load is placed on the vehicle the elliptic portion exerts a lateral pressure on the spiral or coil springs and spreads them apart, so that the elastic elements of the spring are rendered partially useless, and the resistance is neither positive nor uniform. Besides, the constant friction of the semielliptic part of such springs on the bolster wears an irregular groove in the bolster, and that part of the spring is frequently broken under the weight of an ordinary load. These defects are overcome by our invention, in which—

A is a metallic cross-bar united in the center by two bolts $2'$ $2^2$, inserted in slotted holes, whereby the cross-bar is made adjustable to fit vehicles of varying width. The cross-bar being thus provided with slotted holes in which said bolts are inserted when it is necessary to extend the bar the bolts are loosened, the bar extended to the required distance, and the bolts tightened again. The two end extension devices commonly used on springs of this character are thus dispensed with, and the extension thus made in our invention does not interfere with or change the operation of the semielliptic spring E or any of the coil-springs.

At each end of the bar A guides and spring-supports $B'$ $B^2$ are provided for the semielliptic spring and which also serve as supports for the coil-springs $3'$ $3^2$. The coil-springs $4'$ $4^2$ are attached to the cross-bar A by bolts which engage the springs on the under side of the cross-bar and are attached to the semielliptic spring E by similar bolts inserted in slotted holes, as hereinafter explained.

The cross-bar A is provided with open slots $H'$ $H^2$ at each end, which slide upward and downward on the bolster-stakes $C'$ $C^2$. The coil-springs $5'$ $5^2$ at the ends of the cross-bar are cone-shaped, the base resting on the bolster and furnishing a broad substantial rest for the spring. These two springs $5'$ $5^2$ are of sufficient strength to bear the weight of the ordinary vehicle when unloaded and operate entirely independent of the semielliptic spring. As the load is increased the cross-bar descends and the coil-springs $3'$ $3^2$ and the base of the elliptic spring E come in contact with the bolster D, thus providing a sufficient spring-bearing for a moderate load. When the load is further increased to the given limit, the pressure will be evenly exerted on the semielliptic spring E, the intermediate coil-springs $4'$ $4^2$, and the end springs. Thus it will be seen that a graduated and uniform spring is provided by our invention whether the vehicle is loaded or unloaded. The capacity of the spring is regu-

lated by the size and weight of the coil and semielliptic springs.

We have found by actual experiment and observation that a spring having its base attached to the cross-bar and the ends resting on the bolster does not furnish that uniform yielding resistance that is provided by our invention, in which the semielliptic spring is set with its concave surface toward the cross-bar and having its ends or reaches operating independent of the coil-springs and against the under side of the cross-bar E.

Another feature of our invention is found in the method of maintaining the intermediate springs $4'$ $4^2$ always in a perfectly perpendicular position when the cross-bar E is lengthened or shortened. This result is attained in the present instance by providing slotted holes $N'$ $N^2$ in the base of the semielliptic spring E, through which the bolts to hold the lower end of the coil-springs $4'$ $4^2$ are inserted.

By this construction and arrangement of devices no part of our spring is attached to the bolster, and the semielliptic part of the spring is never brought in contact with the bolster except when the vehicle is loaded. The body of the vehicle can thus be removed from the running-gear without loosening a bolt or touching a spring connected with our device.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. A vehicle-spring comprising a metal cross-bar united in the center and made adjustable by means of bolts and slotted holes, a semielliptic spring the ends of which operate in guides on the under side of said cross-bar, two intermediate coil-springs inserted between the cross-bar and the base of the semielliptic spring, said coil-springs being rigidly fastened to the cross-bar, and adjustably attached to the semielliptic spring by bolts and slotted holes therein, whereby the coil-springs may be kept in a perpendicular position when the cross-bar is lengthened, a cone-shaped coil-spring attached to each end of the cross-bar, and made longer than the other coil-springs whereby the semielliptic spring is held out of contact with the bolster when the vehicle is unloaded, two supplementary springs attached to the bridge of the guides at the ends of the cross-bar substantially as set forth.

2. In a vehicle-spring the combination of a metal cross-bar having an adjustable connection in the center and lugs for engaging the bolster-stakes at each end, a semielliptic spring, the ends of which bear against the under side of the cross-bar, two coil-springs rigidly attached to the cross-bar and adjustably attached to the semielliptic spring near the center, the bridge-guides $B'$ $B^2$ each having a coil-spring attached and the cone-shaped springs at the ends of the cross-bar substantially as shown and described.

3. In a vehicle-spring the combination of the adjustable cross-bar A, a semielliptic spring E having its reaches operating in guides $B'$ $B^2$ on the under side of the cross-bar, intermediate coil-springs $4'$ $4^2$ adjustably attached to the semielliptic spring, and the cone-shaped coil-springs $5'$ $5^2$ rigidly attached to the cross-bar at each end, and made sufficiently long to hold the other parts of the spring out of contact with the bolster when the vehicle is unloaded substantially as shown and described.

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