

No. 670,273.

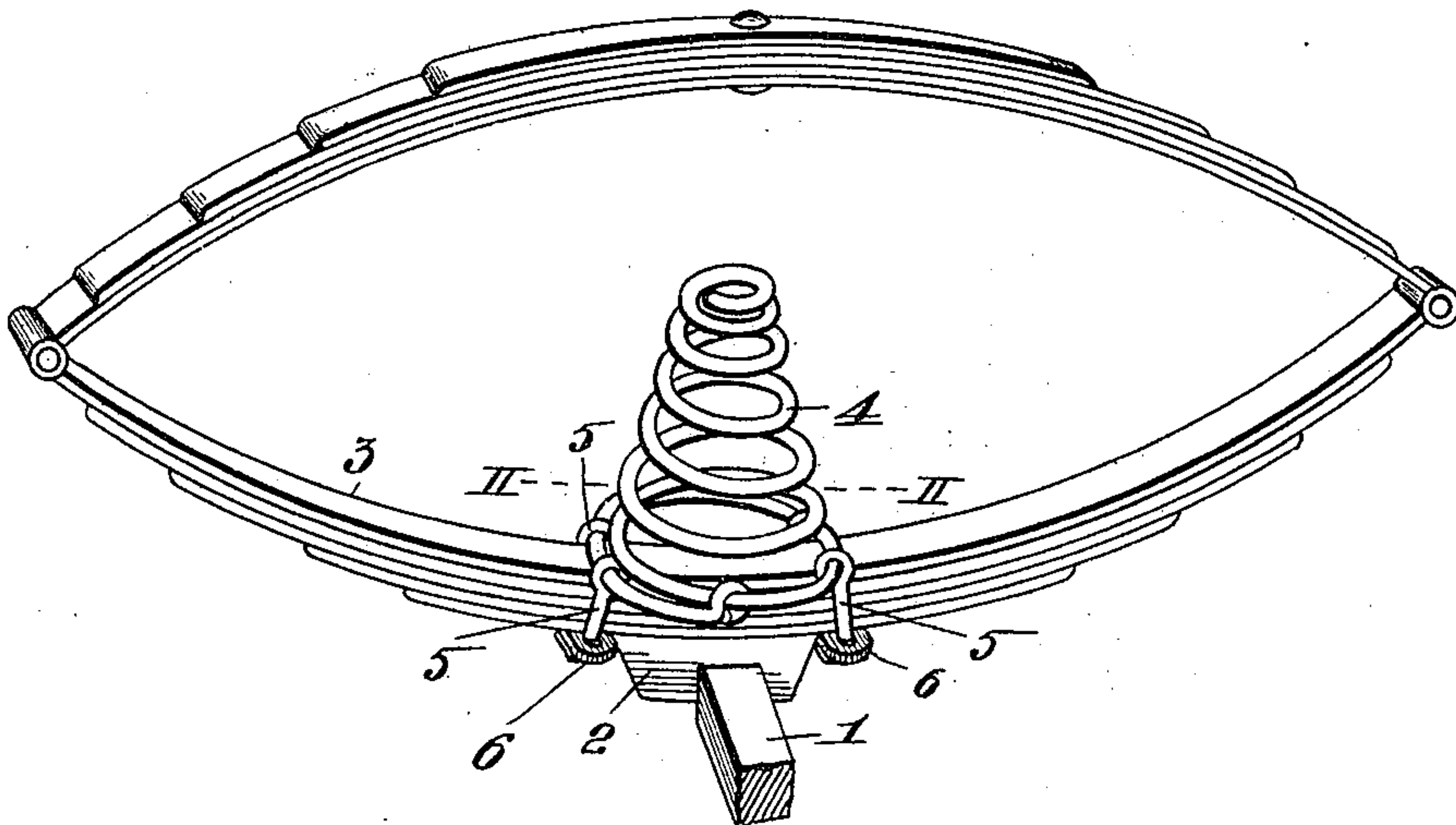
Patented Mar. 19, 1901.

A. FALKENHAINER.  
VEHICLE SPRING.

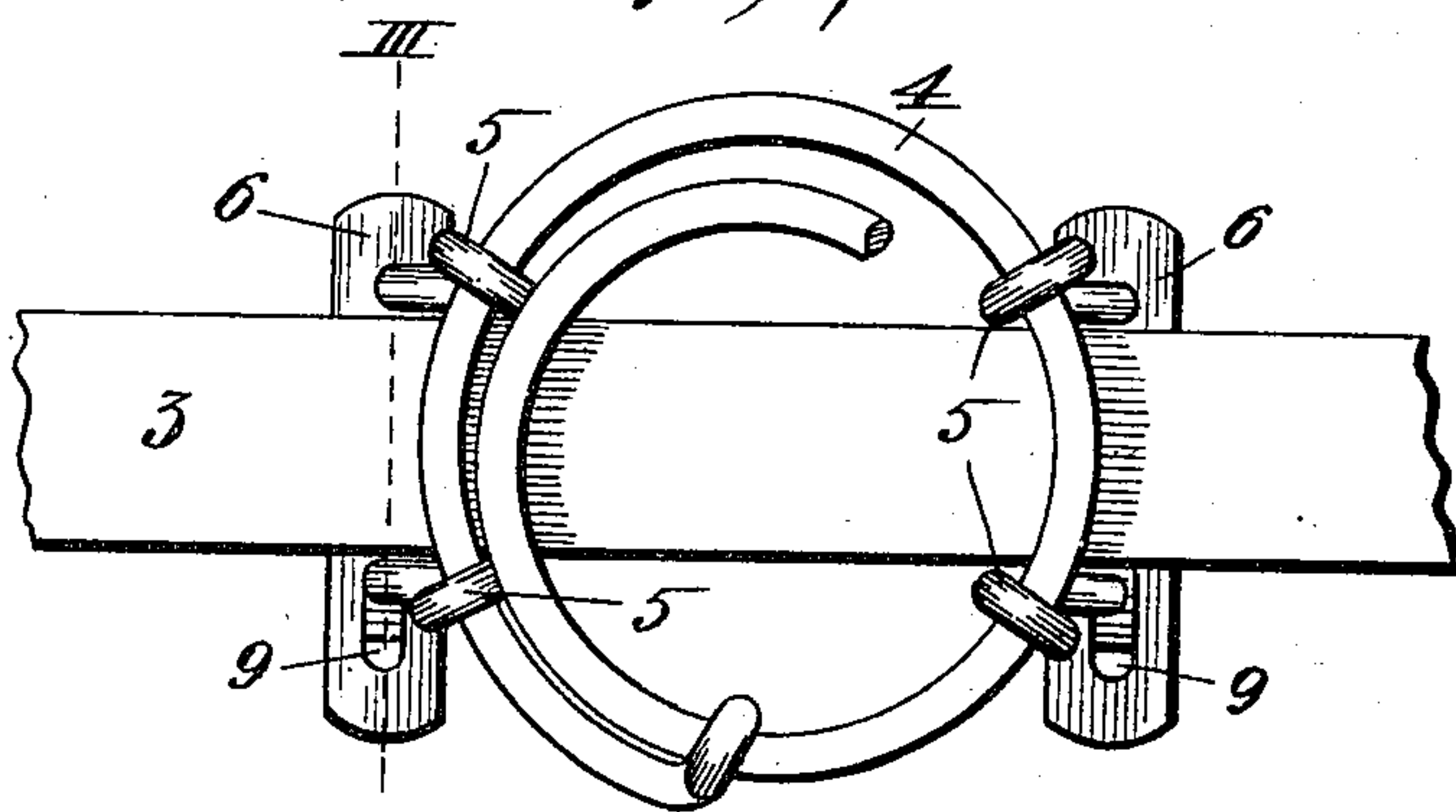
(Application filed Aug. 6, 1900.)

(No Model.)

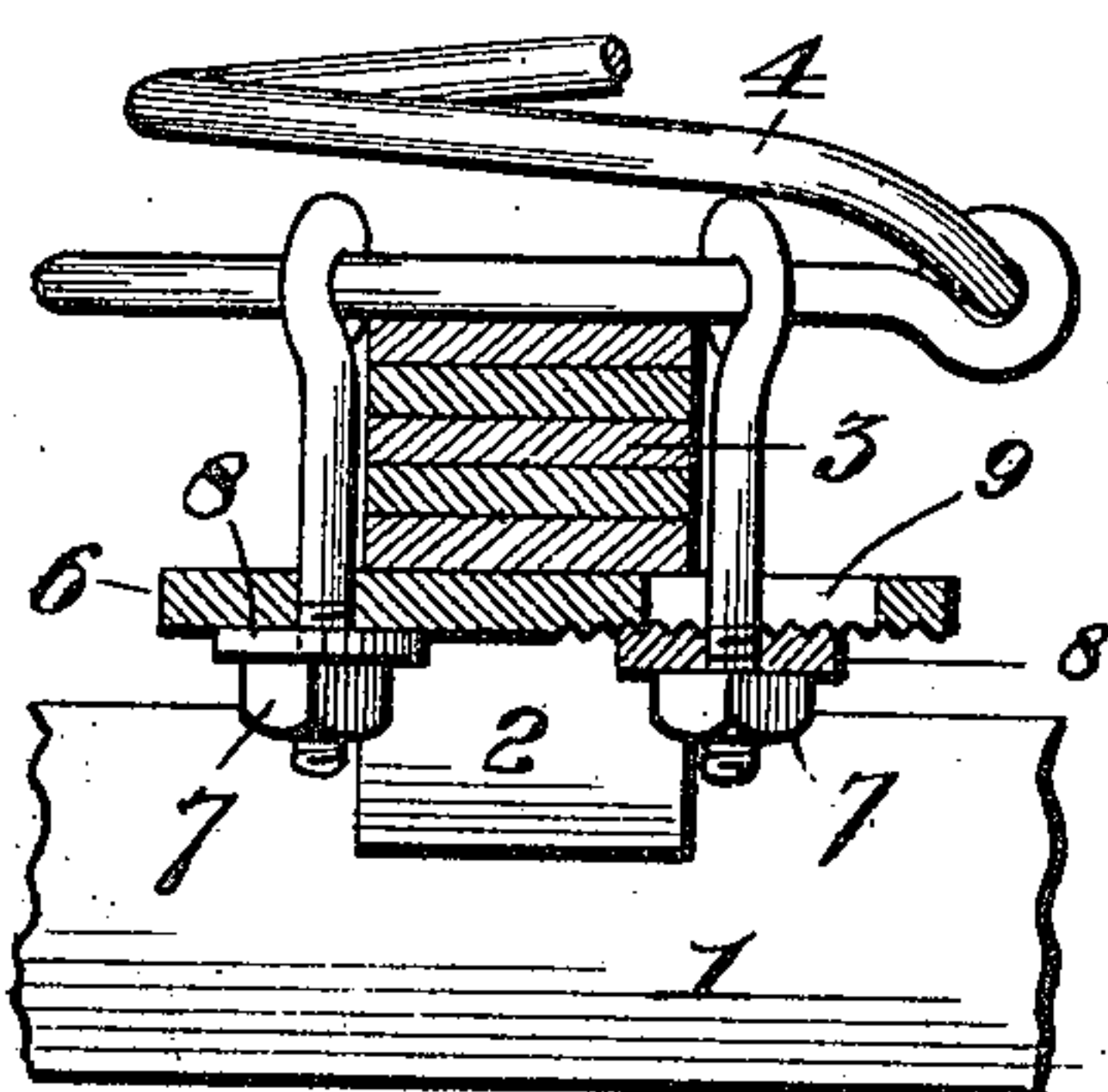
*Fig. I.*



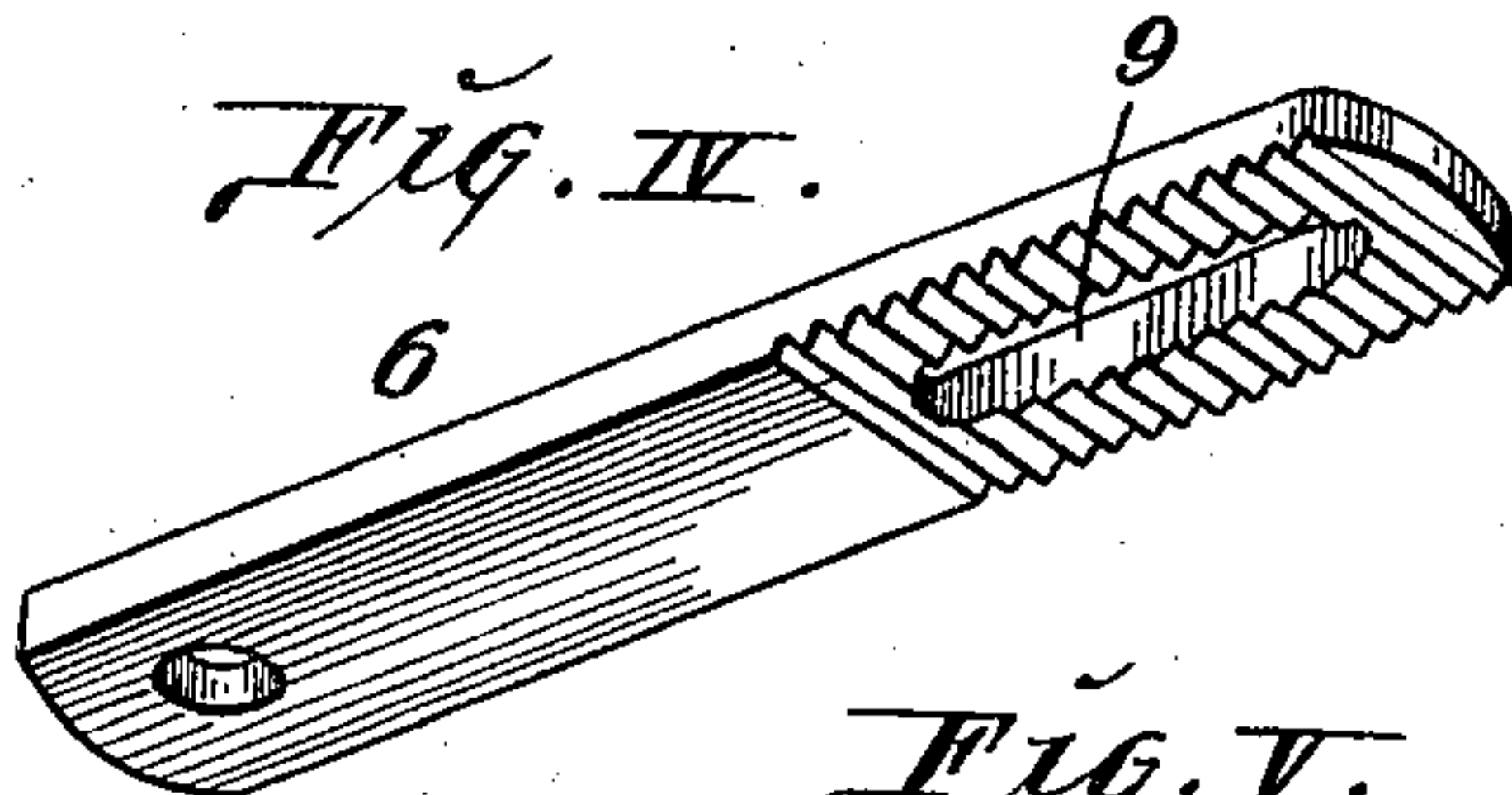
*Fig. II.*



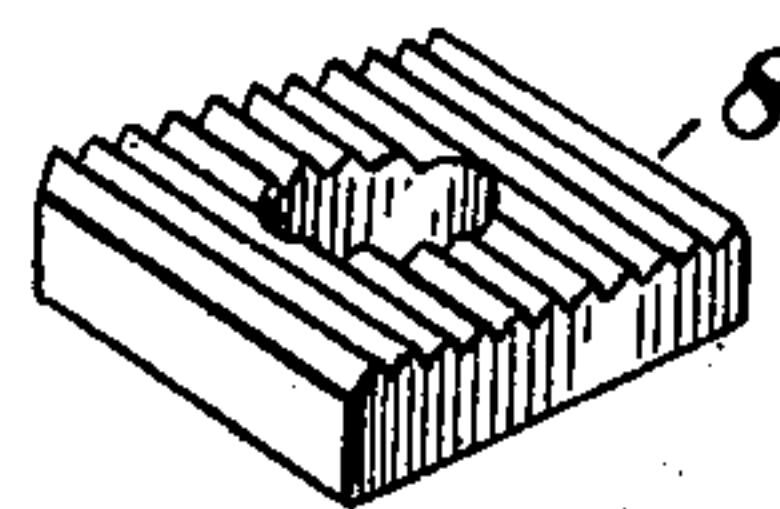
*Fig. III.*



*Fig. IV.*



*Fig. V.*



attest:—

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# UNITED STATES PATENT OFFICE.

ARTHUR FALKENHAINER, OF ST. LOUIS, MISSOURI.

## VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 670,273, dated March 19, 1901.

Application filed August 6, 1900. Serial No. 26,031. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR FALKENHAINER, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have  
5 invented certain new and useful Improvements in Vehicle-Springs, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

10 The object of my invention is to provide a spring which when the vehicle is carrying a light load will be sufficiently elastic or yielding to produce the desired effect that springs are used for, and when a heavy load is being  
15 carried this same effect will be maintained and at the same time substantially the full range of movement of the spring is maintained.

My invention consists in features of novelty hereinafter fully described, and pointed  
20 out in the claims.

Figure I is a perspective view of my improved spring. Fig. II is an enlarged horizontal section taken on line II II, Fig. I. Fig.  
25 III is a detailed vertical section taken on line III III, Fig. II. Fig. IV is a perspective view of one of the clamping-plates, and Fig. V is a perspective view of one of the clamping-washers.

Referring to the drawings, 1 represents part  
30 of the axle of a vehicle, and 2 one of the spring-blocks. 3 represents an ordinary elliptic spring, which is secured to the axle in the customary manner. Within the spring 3 and resting on the bottom thereof is a conical or  
35 helical coil-spring 4, the upper end of which terminates some distance beneath the top of the spring 3, as shown in Fig. I. The spring 4 is secured to the spring 3 by means of bolts  
40 5, bent at their upper ends around the lower coil of the spring 4 and passing at their lower ends through perforations in plates 6, located beneath the spring 3. On the lower ends of the bolts 5 are nuts 7, between which and the plates 6 are washers 8. One bolt of each plate  
45 passes through a hole in the plate, and the other bolt fits in a slot 9 in the plate, so that the bolts can be adjusted to different widths of springs 3, and the washers 8 of the bolts that fit in the slots 9 are serrated on the upper

faces to fit in notches formed in the under side  
50 of the plates, so that the bolts that fit in the slots will be held from movement when the nuts 7 are tightened. This forms a very inexpensive and effective manner of attaching  
55 the coil-springs to the elliptic springs and provides a means for attaching the coil-springs to any elliptic spring in use.

When a light load is being carried, the elliptic spring acts alone, and being comparatively light and elastic produces the desired  
60 spring effect to the load. When a heavy load is being carried, the top of the elliptic spring comes down upon the coil-spring and the latter thus supplements the former and helps it to carry the load, which would otherwise  
65 force the upper half of the elliptic spring down upon the lower half, thus destroying the spring effect. By using a cone-shaped coil-spring the different coils will "nest" as the spring is depressed, thus allowing the  
70 elliptic spring to act substantially the full throw of its movement.

I claim as my invention—

1. In combination with an elliptic spring, a conical spring secured within the elliptic  
75 spring and extending about midway of the height of the latter; whereby when a light load is being carried the elliptic spring acts alone, and when a heavy load is being carried the conical spring acts with the elliptic  
80 spring, its coils nesting to permit the elliptic spring to move substantially the full distance of its height, substantially as set forth.

2. In combination with an elliptic spring, a conical spring located within the elliptic  
85 spring and secured to the lower half of the latter by bolts connected to the lower coil of the conical spring and which pass through plates located beneath the elliptic spring, said conical spring extending about midway  
90 of the height of the elliptic spring; whereby when a light load is being carried the elliptic spring acts alone and when a heavy load is being carried the conical spring acts with the elliptic spring, its coils nesting to permit the  
95 elliptic spring to move substantially the full distance of its height, substantially as set forth.

3. In combination with an elliptic spring, a conical coil-spring located within the elliptic spring, and secured thereto by bolts made fast to the lower coil of the conical spring  
5 and passing through plates located beneath the elliptic spring; one pair of said bolts passing through slots in said plates and said plates being serrated to receive serrated washers, substantially as set forth.

ARTHUR FALKENHAINER.

In presence of—

E. S. KNIGHT,

N. V. ALEXANDER.