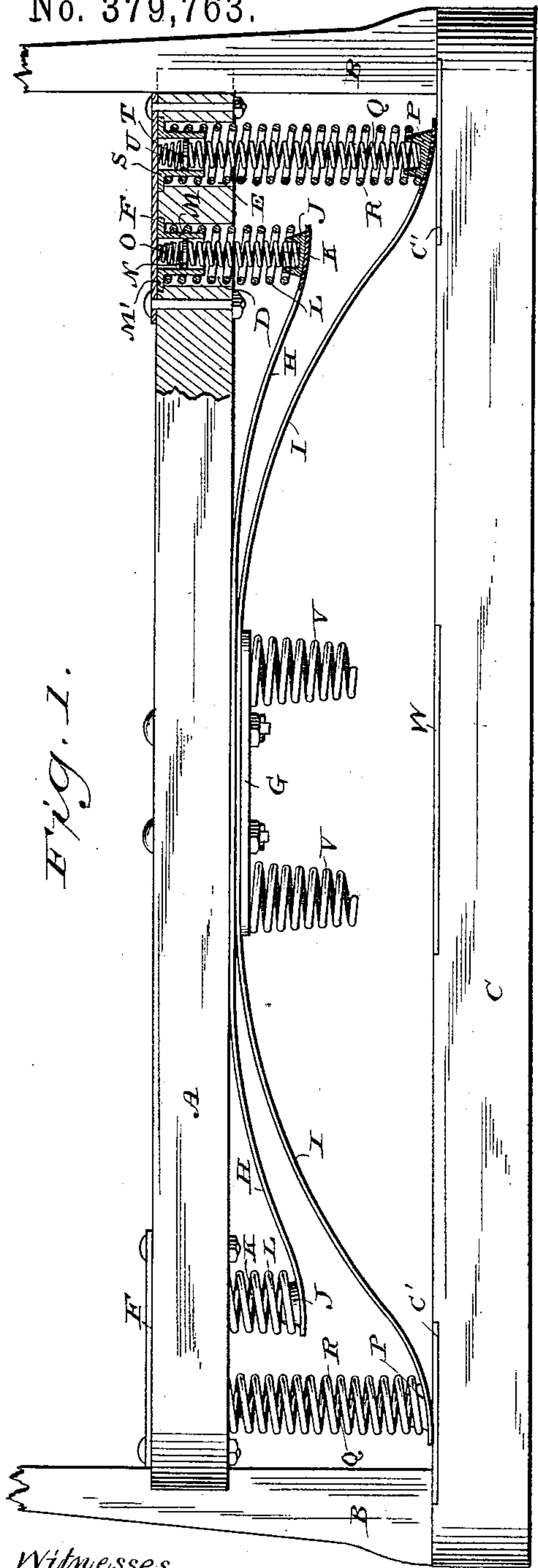


(No Model.)

R. CROCKER & J. DIEHL.

VEHICLE SPRING.

No. 379,763.

Patented Mar. 20, ~~1898~~.

1. 6th

Witnesses
Geo. W. Young.
N. E. Oliphant.

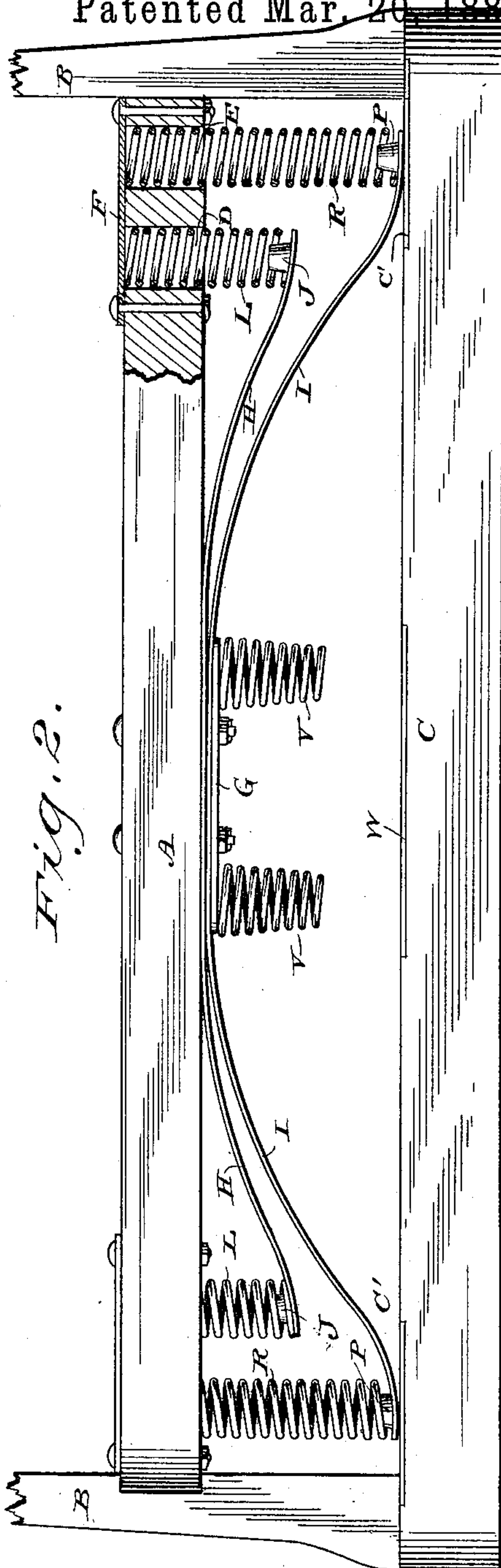


Fig. 2.

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UNITED STATES PATENT OFFICE.

RICHARD CROCKER, OF MAZOMANIE, AND JOHN DIEHL, OF FRANKSVILLE,
WISCONSIN.

VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 379,763, dated March 20, 1888.

Application filed October 24, 1887. Serial No. 253,185. (No model.)

To all whom it may concern:

Be it known that we, RICHARD CROCKER, of Mazomanie, in the county of Dane, and JOHN DIEHL, of Franksville, in the county of Racine, and in the State of Wisconsin, have invented certain new and useful Improvements in Vehicle-Springs; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention relates to vehicle-springs, being an improvement on the devices set forth in our applications Serial No. 237,671, filed May 10, 1887, and Serial No. 242,203, filed June 23, 1887, said invention consisting in certain peculiarities of construction and combination of parts, to be hereinafter described with reference to the accompanying drawings, and subsequently claimed.

In the drawings, Figure 1 represents a side elevation, partly in section, of one form of our spring in position upon a wagon bolster; and Fig. 2, a similar view of another form of our spring.

Referring by letter to the drawings, A represents a bar, preferably recessed at its ends to fit the standards B of a bolster, C, and at a sufficient distance from each of these ends said bar is provided with recesses D E. In making the recesses D E we prefer to bore entirely through the bar A, and bolt or otherwise secure thereto, over the openings thus formed, metallic plates F; but it is obvious that we may only bore part way through said bar and omit the plates.

Bolted or otherwise suitably secured to the central portion of the bar A, and preferably between the latter and a metallic stay-plate, G, are two semi-elliptic springs, H I, arranged one upon the other and having different lengths, the upper one being the shorter and of such curve that an outwardly-increasing space is left between it and the lower one on each side of the center when said springs are in their normal position.

The ends of the short semi-elliptic spring H are provided with lugs J, and in the form of our invention shown by Fig. 1 these lugs are recessed to receive the lower ends of spiral springs K, that are inclosed by other spiral springs, L, whose lower ends embrace the lugs on said semi-elliptic springs.

The spiral springs L are longer than the ones K, for the reason that the latter are not designed to come into play unless the load is so great as to contract the former springs to the length of the latter. As shown, the upper ends of the spiral springs L extend up into the recesses D of the bar A, and inclosed by each of these springs is a shell, M, provided with a flange, M', that comes against the adjacent plate F.

The upper ends of the spiral springs K come within the shells M, and are thus kept from interfering with the spiral springs L; and in order to prevent vertical displacement of said springs K we place on each one thereof a washer, N, and interpose between this washer and the adjacent plate F a spiral spring, O, the latter having comparatively little strength.

The ends of the semi-elliptic spring I rest on rub-irons C' on the bolster C, and are provided with lugs P, similar to the ones J on the semi-elliptic spring H. The lugs P form seats for the lower ends of spiral springs Q, that are inclosed by similar springs, R, of greater length and whose lower ends embrace said lugs P. Arranged in the upper ends of the spiral springs R, that extend up into the recesses E of the bar A, are flanged shells S, that bear against the adjacent plates F and inclose the upper ends of the spiral springs Q. Interposed between the plates F and the springs Q (to prevent vertical displacement of the latter) are washers T and comparatively weak spiral springs U. Vertically depending from the stay-plate G, on each side of its center, is a short spiral spring, V, and these springs on coming into play bear upon a rub-iron, W, on the bolster.

In the form of our invention above described the resistance to the load is first offered by the spiral springs R, and when they are sufficiently contracted the spiral springs Q come into play. If the load overcomes the resistance of the spiral springs R Q, the semi-elliptic spring I offers its resistance, and being sufficiently flattened out to come against the adjacent semi-elliptic spring H, the spiral springs L K will next offer their resistance in the order named and be followed by said spring H until finally the spiral springs V V come into play.

By the operation just described it will be

seen that the resistance is multiplied in proportion to the increase of load, and by the construction and arrangement of the several parts we provide an easy-riding spring that is capable of supporting extremely heavy loads.

For light-draft vehicles we may omit the inner spiral springs, K Q, shells M S, washers N T, and springs O U, this form of our device being shown in Fig. 2.

Having now fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A vehicle-spring comprising a bar, two semi-elliptic springs of different lengths arranged one upon the other and secured to the central portion of the bar, the upper one of these springs being the shorter and of such curve that an outwardly-increasing space is left between it and the lower one on each side of the center, and spiral springs interposed between the respective ends of the semi-elliptic springs and said bar, substantially as set forth.

2. A vehicle-spring comprising a bar provided at each end with two recesses, two semi-elliptic springs of different lengths arranged one upon the other and secured to the central portion of the bar, the upper one of these springs being the shorter and of such curve that an outwardly-increasing space is left between it and the lower one, and spiral springs arranged on the respective ends of the semi-elliptic springs to extend up into the recesses of said bar, substantially as set forth.

3. A vehicle-spring comprising a bar, a semi-elliptic spring secured to the bar, a spiral spring interposed between each end of the semi-elliptic spring and said bar, a spiral spring of less length inclosed by the one first named, a washer arranged on the upper end of the latter spring, and a spiral spring interposed between the washer and bar, substantially as set forth.

4. A vehicle-spring comprising a bar, two semi-elliptic springs of different lengths arranged one upon the other and secured to the central portion of the bar, the upper one of these springs being the shorter and of such curve that an outwardly-increasing space is left between it and the lower one, spiral springs interposed between the respective ends of the semi-elliptic springs and said bar, and the short spiral springs depending beneath said lower semi-elliptic spring, substantially as set forth.

5. A vehicle-spring comprising a recessed bar, two semi-elliptic springs of different lengths arranged one upon the other and secured to the central portion of the bar, the upper one of these springs being the shorter and of such curve that an outwardly-increasing space is left between it and the lower one, recessed lugs arranged on the respective ends of the semi-elliptic springs, a spiral spring seated in each lug and extended up into one of the recesses of said bar, a washer and similar spring of less power supported on said spiral spring, a flanged shell surrounding this latter spring, and another spiral spring arranged to have its lower end embrace the lug and its upper end bear against the flange of the shell, substantially as set forth.

6. A vehicle-spring comprising the bar A, semi-elliptic springs H I, spiral springs K, L, Q, R, O, U, and V V, substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands, at Franksville, in the county of Racine and State of Wisconsin, in the presence of two witnesses.

RICHARD CROCKER.
JOHN DIEHL.

Witnesses:

H. A. CROCKER,
J. H. SUMMERTON.