

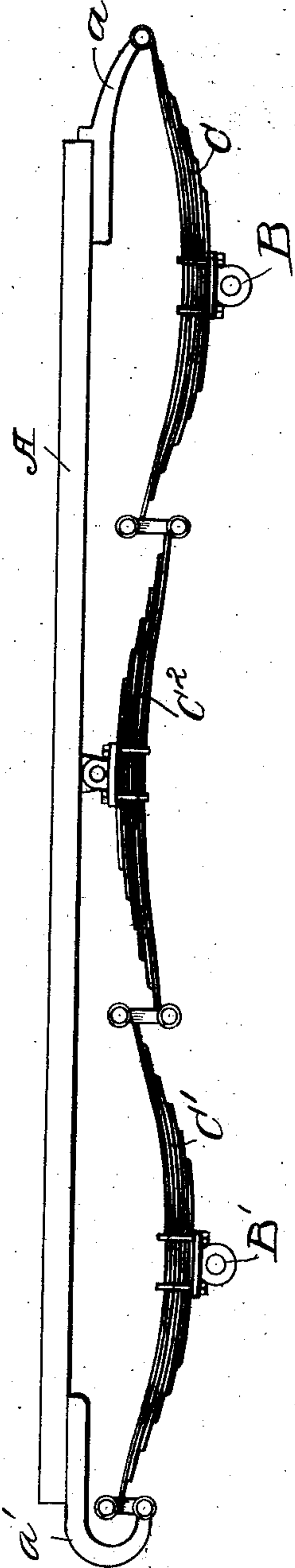
F. H. WARNER.
 SPRING EQUALIZER.

APPLICATION FILED NOV. 29, 1907.

924,862.

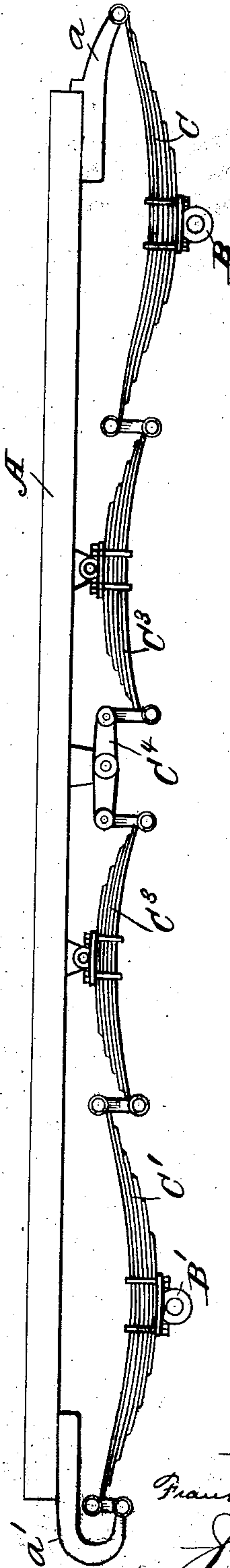
Patented June 15, 1909.

Fig. 1



Witnesses:
J. C. Turner
Jno. F. Oberlin

Fig. 2



Inventor:
Frank H. Warner
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 Attorney

UNITED STATES PATENT OFFICE.

FRANK H. WARNER, OF ASHTABULA, OHIO.

SPRING-EQUALIZER.

No. 924,862.

Specification of Letters Patent.

Patented June 15, 1909.

Application filed November 29, 1907. Serial No. 404,253.

To all whom it may concern:

Be it known that I, FRANK H. WARNER, a citizen of the United States, resident of Ashtabula, county of Ashtabula, and State of Ohio, have invented a new and useful Improvement in Spring-Equalizers, 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.

This invention relates to improvements in springs such as are employed about vehicles to support the body of the vehicle upon the running gear, or axles, in other words.

Such invention is applicable to all types of vehicles in general, but will find, perhaps, its greater field of usefulness in automobiles, to the perfection of the springs of which, as is well known, considerable attention has been given of late in order to produce an easy riding effect in spite of the relatively heavy load required to be carried.

The object of the present invention is to secure such easier riding effect, and at the same time sustain the load without risking the integrity of individual springs, by equalizing the burden imposed upon the latter no matter which one is exposed to the initial shock.

To the accomplishment of the above and related ends said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claim.

The annexed drawing 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 drawing: Figure 1 is a side elevation of a portion of a vehicle frame, *e. g.* an automobile chassis, in which has been embodied one form of my improved spring construction; and Fig. 2 is a similar view illustrating a modified form of the invention.

Having regard then to the several figures of the drawing just described, A will be seen to designate the side member of the vehicle frame, here assumed to be an automobile for the purposes of illustration. Such side member accordingly terminates at its ends in recurved horns *a a'*, as they are technically known. The frame, thus composed, is the basis upon which the body is mounted and

whereby are supported the engines and other heavy parts of the driving mechanism, none of which, however, are shown. Such frame is in turn supported upon the running gear, of which only the axles B B' are shown, by means of a suitable system of springs. As has been indicated it is with the latter alone that we are here concerned.

In the first form of the invention illustrated in Fig. 1, such spring system comprises essentially two spring members C C', respectively borne on the front and rear axles of the running gear and a spring equalizer C² intermediate between said springs C C'. The latter are of course longitudinally alined and being semi-elliptic in form and having their outer ends respectively connected with the downturned ends of horns *a a'*. Their inner ends are similarly connected with the respective ends of the spring equalizer C². Spring equalizer C² instead of being rigidly secured or attached to the frame A of the vehicle body is pivotally attached thereto in the manner clearly shown in the figure of reference, thus becoming an equalizer in function and operation, as well as in name, as will be presently more clearly explained.

In the second form of the invention, illustrated in Fig. 2, the adaptation there shown is designed to permit utilization of the principle of the invention in connection with a longer body than that illustrated in Fig. 1. The modification consists simply in the introduction of a plurality of spring equalizers intermediate between the two springs C, C' in place of the single equalizer shown in Fig. 1. Thus there are two such spring equalizers C³ C³ in the structure illustrated, both connected in the same fashion as before with the inner ends of the main springs C C', and having their inner ends in turn connected by a suitable rigid equalizer bar C⁴, that is likewise pivotally attached to the frame A.

From the foregoing illustrations of my invention it will be seen that by the introduction of an intermediate spring pivotally attached to the frame of the vehicle, a very desirable result is obtained; for such intermediate spring acts not only as a spring itself but serves to convey the vibrations received from the first spring to the other spring, or springs, thus truly equalizing the burden imposed upon the first one. It is well known that the half elliptic spring has little range up and down so that when a wheel meets an

obstruction or depression the limit of flexibility or compression of the spring is quickly reached, and a jolt, or else a broken spring, must inevitably result. By the present device when such a shock is met it is transferred to all the other springs through the pivotally attached spring equalizer C² of Fig. 1, or the equivalent arrangement of Fig. 2. I am aware that an inverted semi-elliptic spring rigidly attached to the body has been interposed between two semi-elliptic springs carried on the front and rear axles, respectively, of the vehicle. This arrangement, however, obviously is but in effect a three-quarters elliptic spring. It does not transmit the shock from one spring to the other or equalize the burden imposed upon any one spring. I accordingly am able to secure a greater range of spring movement with a minimum travel of the spring members at their free ends by the present arrangement, while at the same time the shock delivered to any one spring is absorbed by all on that side. Obviously, if desired by the interposition of similar spring equalizers between the springs along the respective sides of the vehicle, such equalization could be effected throughout the entire system of springs.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by the following claim or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

In a vehicle, the combination of two longitudinally alined upwardly disposed semi-elliptic springs borne by the front and rear axles respectively of the vehicle, a downwardly disposed semi-elliptic spring pivotally attached to the vehicle body intermediate between said first named springs and alined therewith; connections between the outer ends of said first named springs and the vehicle body; and other connections between the inner ends of said first named springs and the respective ends of said intermediate pivotally attached spring.

Signed by me, this 23 day of November, 1907.

FRANK H. WARNER.

Attested by—

J. M. SEYMOUR,
NETTIE BECHTEL.