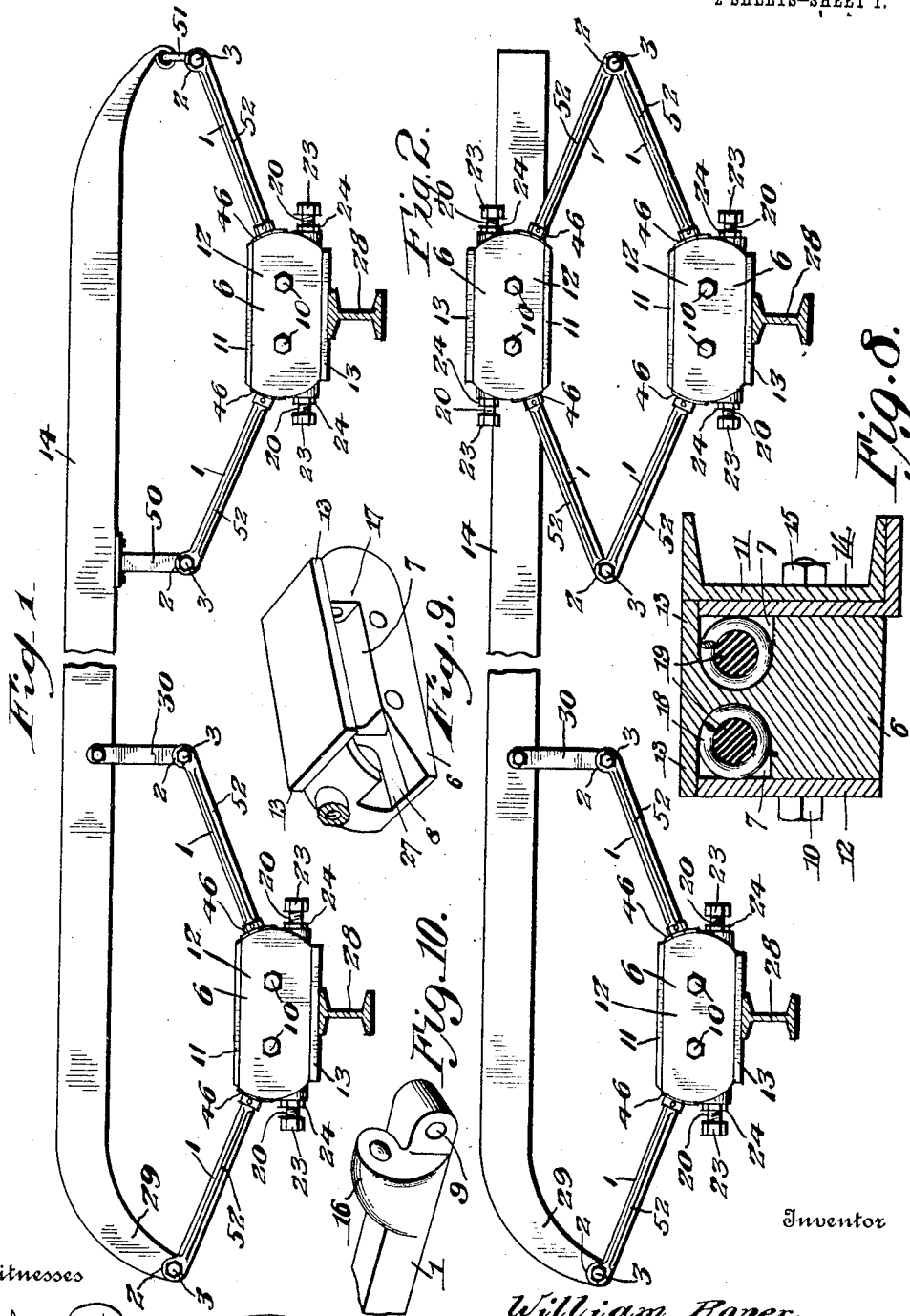


1,031,028.

Patented July 2, 1912.

2 SHEETS-SHEET 1.



Witnesses

Thos. Rosemann
R. H. Krenkel

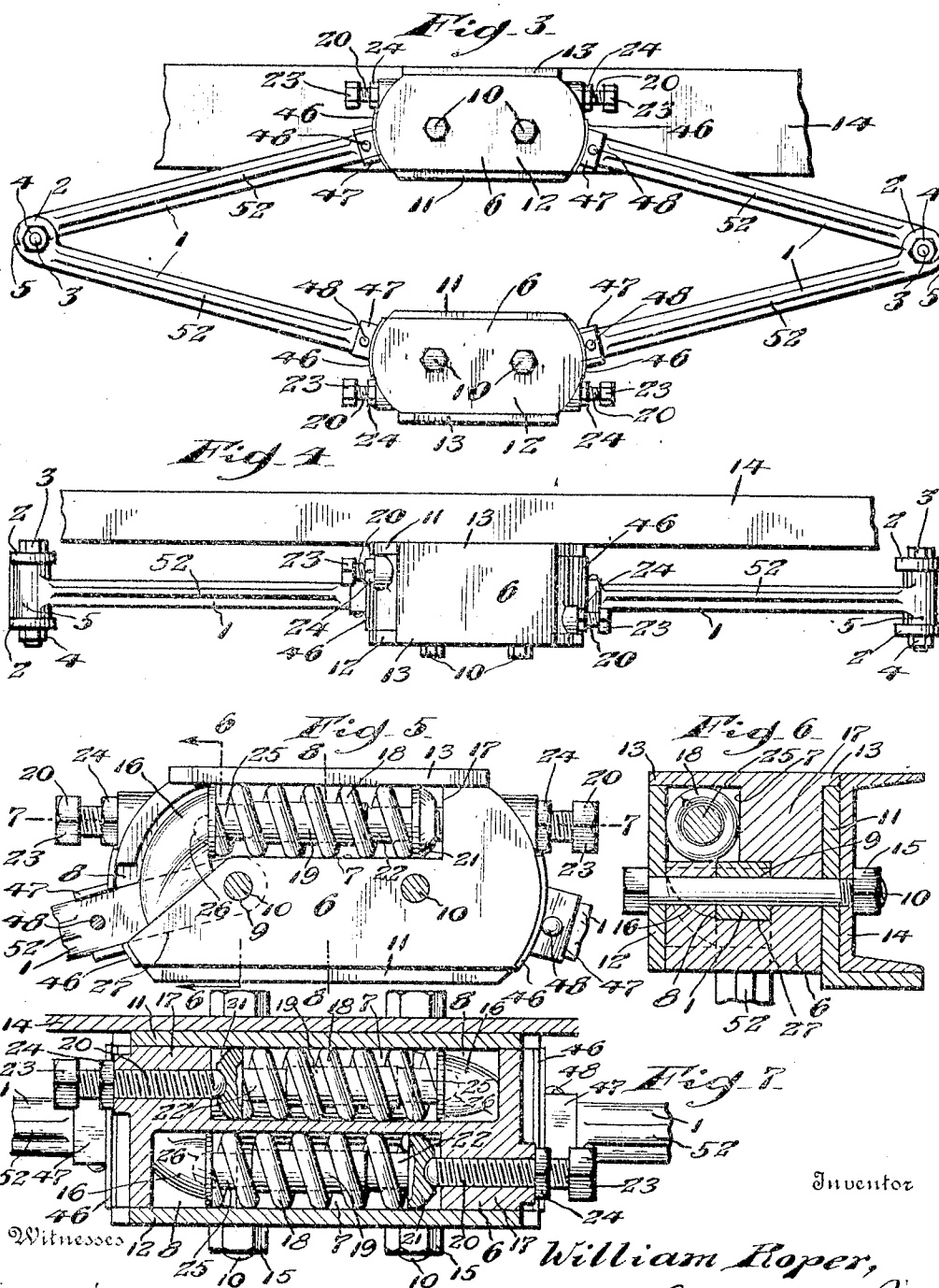
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W. ROPER.
VEHICLE SPRING.
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1,031,028.

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2 SHEETS—SHEET 2.



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VEHICLE-SPRING.

1,031,028.

Specification of Letters Patent.

Patented July 2, 1912.

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To all whom it may concern:

Be it known that I, WILLIAM ROPER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Vehicle-Springs, of which the following is a specification.

My invention relates to improvements in vehicle springs, the object of the invention being to provide a spring or an assemblage of springs which takes the place of the ordinary elliptical or semi-elliptical spring in general use.

A further object is to provide an arrangement of links pivotally connected and provided with an improved arrangement of spring mounting, whereby the device is held normally in a diamond shape, and is extremely sensitive to take up shocks and vibrations, and yet embodying great strength to support heavy loads thereon.

A further object is to provide a device of this character comprising four links, pivotally connected, and each link operating upon a separate coiled spring, and provide means for adjusting the tension of said springs, whereby the latter may be adjusted in accordance with the load.

A further object is to provide a device of the character stated in which coiled springs and rubber cushions are utilized together to withstand the strains and stresses, yet cushion the connection between the vehicle body and the axles.

A further object is to provide a device of the character stated which will dispense altogether with the ordinary elliptical spring, thereby reducing very materially the cost of the vehicle, and providing a construction which may be repaired in the event of injury.

With these and other objects in view, the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described and pointed out in the claims.

In the accompanying drawings: Figure 1, is a view in side elevation illustrating one arrangement of my improved spring structure in connection with a vehicle frame. Fig. 2, is a similar view showing another embodiment of my invention. Fig. 3, is a

view in side elevation on an enlarged scale illustrating a complete double spring unit. Fig. 4, is a top plan view of Fig. 3. Fig. 5, is a view on an enlarged scale in side elevation illustrating one of the spring heads as shown in Figs. 1, 2, 3, and 4, with the side plate removed. Fig. 6, is a view in section on the line 6-6 of Fig. 5. Fig. 7, is a view in section on the line 7-7 of Fig. 5. Fig. 8, is a view in section on the line 8-8 of Fig. 5. Fig. 9, is a perspective view of the block or casting constituting the casing of the spring head, and Fig. 10, is a detail perspective view of one of the links.

My improvement in vehicle springs comprises a number of separable parts which may be combined in various ways, either in whole or half units. A whole unit is illustrated in Fig. 3, in which four links are pivotally connected forming a diamond shaped frame.

1 represents four links which are arranged in the formation shown, the two lower links having perforated ears 2 to receive bolts 3 secured by nuts 4, and projecting through elongated bearings 5 on the ends of the upper links 1, and pivotally connecting the upper and lower links at their ends. The other ends of all four links are alike in construction. The two upper links and the two lower links are pivotally secured in spring heads 6, both of which are precisely alike in construction, one being reversed in position and the description hereinafter of one spring head will apply alike to both.

The construction of the spring head is shown most clearly in Figs. 5, 6, 7, 8, and 9. The spring head proper comprises a metal casting which is made in its upper portion with parallel longitudinal recesses 7. These recesses are open at the sides of the block and are spaced from each other. One end of each recess communicates with a cut out end 8 of the block, and in this cut out end, the end of link 1 is positioned.

In Fig. 10, it will be seen that each link has an opening 9 in its extreme end to receive a bolt 10 which is not only projected through the link, but also through side plates 11 and 12, which fit snugly against the sides of the block 6, and under outwardly projecting flanges 13 at the upper face of said block. These plates 11 and 12 constitute closures for the recessed sides of the

blocks, and plate 11 on the upper spring head is preferably in the form of an angle as shown to engage the channel bar 14 of the automobile frame, and when these bolts are
5 secured in place by nuts 15, the links are pivotally secured in the heads and the heads may be secured to the frame.

It will be noted that each link 1, at its end within the spring head, has a curved integral enlargement 16 which is off-set to one
10 side of the link, and in alignment with the recess 7. It is to be noted that while the links are centrally located within the block, the enlargements 7 are at one side, and as
15 the springs are in parallelism and the links located in a plane centrally between them, these enlargements 16 will be so positioned as to directly engage the ends of the springs, and while the block is cut out or recessed
20 precisely alike at both sides, these recesses or cut out portions are exactly reversed, so that the closed ends 17 of said recesses 7 are at opposite sides of the block, and they are also positioned reversely as is most clearly
25 seen in Fig. 7. In these recesses 7, coiled springs 18 are located and inside of each coiled spring, a bar of elastic, preferably rubber, 19 is positioned. Through the closed end 17 of each recess, a set screw
30 20 is projected, and is adjustable in a threaded opening in the end of the block.

The inner end of each screw 20 engages a jack pin 21. These jack pins have extensions 22 projecting inside the coil of the
35 spring, while their outer ends are enlarged to receive the ends of the coiled spring, and their rear faces are recessed to receive the rounded end of the screw 20, so that the adjustment of the screw moves the jack pin
40 longitudinally in the recess.

The outer end of the screws 20 have angular heads 23 to facilitate their movement by an ordinary wrench, and lock nuts 24 are provided on said screws to lock them in any
45 position of adjustment. The opposite ends of said springs 18 engage jack pins 25 and similar in construction to jack pins 21 except that they have rounded enlargements 26 which project into recesses in the enlargements 16, hence the coiled springs are
50 positioned between the jack pins 21 and 25, one jack pin bearing against the screw 20, and the other against the enlargement 16, so that the tension of the spring is always
55 against the enlargement tending to hold the link at the normal angle, and the ends of the block have inclined walls as shown at 27 to limit the movement of the links against the pressure of the springs.

To further increase the strength of the springs, and cushion the action thereof, the bars of elastic 19 which are located inside of the coils bear at their ends against the jack pins 21 and 25, and assist the springs
60 in their work of sustaining the load. It will

therefore be noted that with this preferred form of my construction, the coiled springs are maintained in straight lines, and in parallelism, and each link has a separate spring and an elastic cushion sustaining the same.
70 Each of these springs may be adjusted separately by means of the screws 20, and therefore the parts may be accurately adjusted in accordance with the load which they are to sustain.

It is of course to be understood that the lower spring heads will be secured in some way to the axles 28, and any movement of the body of the vehicle with relation to the axles causes the links 1 to pivot, and the
80 pivotal movement of the links compresses the springs and a cushioning action is had.

The complete construction illustrated in Fig. 3, I term a "unit," but it is to be understood that two links and a head which constitute a half unit may be utilized as a spring. To illustrate this, I have shown in Figs. 1, and 2, two applications of my improvements to an automobile frame.

In Fig. 1, I employ at front and rear,
90 half units, the front link of the front half link connected directly to a downwardly bent end 29 on the frame 14, while the rear link is connected by a pivoted link 30 with the frame. The forward link of the rear
95 half unit is connected by a rigid bracket 50 with frame 14, and the rear link of this rear half unit is connected by a clevis 51 with frame 14.

In the arrangement of parts shown in Fig. 2, the front half 9 is mounted precisely as it is in Fig. 1, but at the rear end I employ a complete unit constructed and mounted as above described.

Various slight changes might be made in the general form and arrangement of parts described without departing from my invention, and hence I do not limit myself to the precise details set forth, but consider myself at liberty to make such changes and
110 alterations as fairly fall within the spirit and scope of the appended claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A device of the character described, comprising a spring head having parallel recesses spaced apart, coiled springs in said recesses, links pivotally secured in the ends of said head, and enlargements on said links pressing against the ends of the springs, substantially as described.

2. A device of the character described, comprising a spring head having parallel recesses spaced apart, coiled springs in said
125 recesses, links pivotally secured in the head, enlargements on the links bearing against the ends of the springs, whereby the movement of the links presses the respective springs in opposite directions, and the pres- 130

sure of the springs tends to force the links toward each other, substantially as described.

3. A device of the character described, comprising a spring head having parallel recesses spaced apart, coiled springs in said recesses, links pivotally secured in the ends of said head, enlargements on said links pressing against the ends of the springs, screws projecting through the heads, jack pins between the ends of the screws and the springs, and jack pins between the ends of the springs and the enlargements, substantially as described.

4. A device of the character described, comprising a casting having recesses in its sides, removable plates secured to the sides of said block and covering the recesses, springs in said recesses, links pivotally mounted centrally in the ends of the casting, and laterally projecting curved enlargements on the said links engaging the ends of the springs, substantially as described.

5. A device of the character described, comprising a casting having recesses in its sides, removable plates secured to the sides of said block and covering the recesses, springs in said recesses, links pivotally mounted centrally in the ends of the casting, laterally projecting curved enlargements on the said links engaging the ends of the springs, said casting having screw-threaded openings in its ends, screws in said openings, jack pins on the ends of the screws engaging the ends of the springs, and means for locking the screws against movement, substantially as described.

6. A device of the character described,

comprising four links and two spring heads, one located above the other, each pair of links pivotally connected at their ends, the upper pair of links pivotally secured in the upper spring head, the lower pair of links pivotally secured in the lower spring head, a pair of coiled springs in each head, each spring bearing against a link, laterally projecting enlargements on the links against which the ends of the springs bear, and screws engaging the other ends of the springs, whereby the tension of the springs may be adjusted, substantially as described.

7. A device of the character described, comprising four links and two spring heads, one located above the other, each pair of links pivotally connected at their ends, the upper pair of links pivotally secured in the upper spring head, the lower pair of links pivotally secured in the lower spring head, a pair of coiled springs in each head, each spring bearing against a link, laterally projecting enlargements on the links against which the ends of the springs bear, screws engaging the other ends of the springs, whereby the tension of the springs may be adjusted, jack pins interposed between the springs and the enlargements and the springs and the screws, and elastic bars within the springs between the jack pins, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ROPER.

Witnesses:

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R. H. KRENKEL.