H. E. BIEDINGER.

CUSHIONING DEVICE FOR VEHICLES.

APPLICATION FILED JUNE 11, 1920.

1,410,645.

Patented Mar. 28, 1922.

2 SHEETS—SHEET 1.

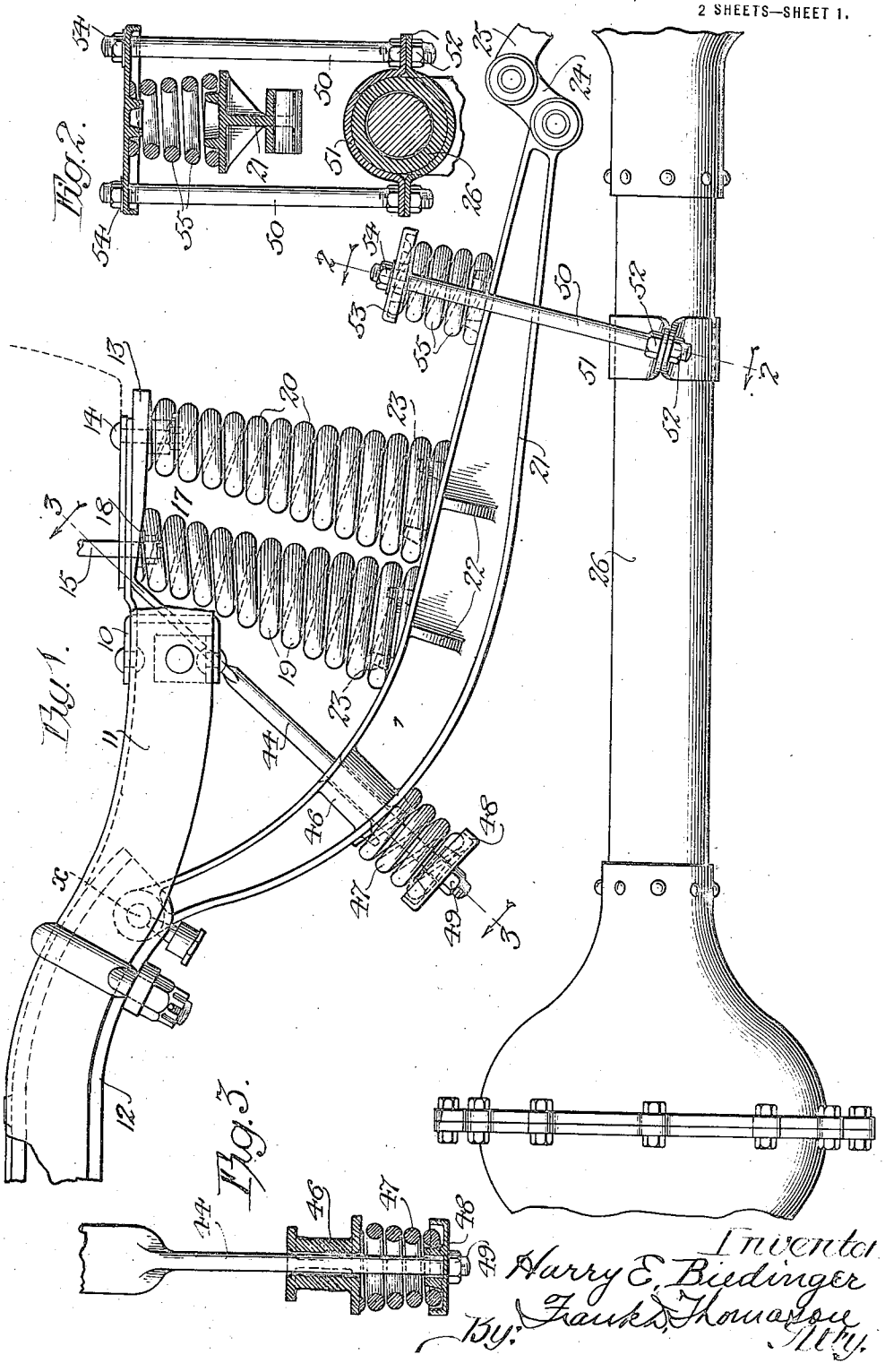


Fig. 2.

Fig. 1.

Fig. 3.

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2 SHEETS—SHEET 2.

Fig. 5.

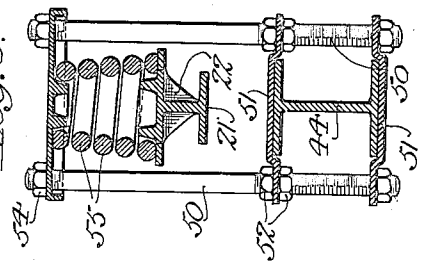


Fig. 7.

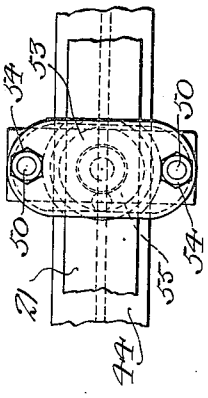
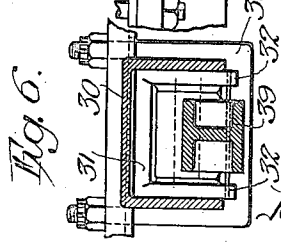


Fig. 4.

Fig. 6.



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UNITED STATES PATENT OFFICE.

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CUSHIONING DEVICE FOR VEHICLES.

1,410,645. Specification of Letters Patent. Patented Mar. 28, 1922.

Application filed June 11, 1920. Serial No. 388,229.

To all whom it may concern:

Be it known that I, HARRY E. BIEDINGER, a citizen of the United States, residing at East Chicago, in the county of Lake and State of Indiana, have invented new and useful Improvements in Cushioning Devices for Vehicles, of which the following is a full, clear, and exact description.

My invention relates to springs for vehicles and particularly automobiles. The object of this invention is primarily to dispense with the necessity of elliptical springs; to provide a substitute for the same in which the resistance of the resilient members gradually increase accordingly as the load or downwardly movement of the load increases, and also to limit the rebound. My invention is illustrated in the accompanying drawings in which:

Figure 1 shows a broken away portion of an automobile comprising a fragment of its bolster, and of its rear axle, and also including a lever and springs cooperating therewith constituting the principal feature of my improvements.

Figure 2 is a vertical section taken on dotted line 2, 2, Figure 1.

Figure 3 is a vertical section taken on dotted line 3, 3, Figure 1.

Figure 4 is a view similar to Figure 1 of the front end portion of an automobile, showing a modified construction of the invention illustrated in Figure 1.

Figure 5 is a vertical section taken on line 5, 5, Figure 4.

Figure 6 is a vertical section taken on line 6, 6, Figure 4.

Figure 7 is a plan view of the member 53 showing its relation to the main spring.

In the drawings 10 represents one of the side-sills of the chassis of a Ford automobile, in connection with which, for the purpose of illustration only, my invention is shown; 11 is a transverse inverted channel-iron bar connecting the rear ends of the sills which is supported by a bolster 12 extending transversely under the rear end of the body of the automobile. The ends of the cross-bar 11 extend beyond the ends of the bolster and beyond the side-sills, and the horizontal flange of the end portion of said bar is, preferably, offset upwards, and has a shim 13 secured to the underside thereof by bolts and nuts 14 and 15. These bolts extend vertically through the horizontal flange or bar 11 down through the said shim and the center of bosses 17 and 18 made integral with and extending downwardly from the same. This shim is thicker at its outer end than at its inner end and is made somewhat wedge-shaped by inclining its under surface from its outer to its inner end, substantially as shown in the drawings.

Bosses 17 and 18 center the upper smaller ends of two helical springs, 19 and 20, respectively, whose axes extend in an inclined direction downwards toward the center of width of the vehicle and have their lower larger ends resting upon the upper flanged edge of a lever 21 of the second class. This lever is disposed in the same transverse vertical plane as bolster 12, and their inner ends are suitably fulcrumed between the vertical flanges of said bolster at X, substantially as shown in Figure 1. The depth of said lever is greatest at its center of length where it is, preferably, provided with integral struts 22, 22, immediately under said springs whose lower wider ends are centered by centering bosses 23, 23, cast in one piece with the upper flange of the lever. The axes of the springs are disposed an equal distance on either side of the center of length of lever 21, and the outer end of said lever is pivotally connected to a link 24 by means of which it is suspended from the bracket 25, the base of which latter is secured to and supported on the outer end portion of the casing 26 of the rear axle of the vehicle.

In Figures 4, 5, and 6, of the drawings, a modification of the construction of my invention is shown, which provides the necessary resiliency for the front end of the vehicle. The inverted channel-shaped bar 30 to which the body is attached is supported by a bolster 31, which latter, is shown to consist of a solid metal bar whose ends have pivotal lugs 32, 32, projecting down therefrom. The ends of bar 30 extend in an upwardly inclined direction beyond the ends of the bolster, to which it is secured by clips 33. A flat metal member 34 is placed immediately under the horizontal web of the ends of this bar 30 and below this a wedge-shaped shim 35 is secured by means of a bolt 36 that extends down through the lower horizontal flange of the side-sills 10 of the chassis, the member 34, and said shim, which latter has a centering boss 37 made integral and extending down from the shim 35. This boss 37 centers the upper narrower

end of a single helical spring whose lower wider end is supported upon the center of length portion of a lever 39 of the second class, where it is centered by a centering boss made integral with said lever. This lever 39 is disposed in the same transverse vertical plane as bolster 31 and its inner end is fulcrumed between the lugs 32, 32, of the same as at 41, and its outer end is pivotally suspended by a link 42 to the upper end of an overhanging bracket 43, whose base is secured to and supported upon the stationary central portion of the front axle 44 of the vehicle.

In order to retain the springs in their assembled position whenever they are subjected to an excessive rebound, I prefer to extend the inner ends of the shim 13 in a downwardly and inwardly inclined direction exceeding the incline of the axis of spring 19, when two springs are used, and to merge the lower ends of this extension into a rod 44, substantially as shown in Figure 1 of the drawings. This rod extends down through an axial bore in a boss 46 made integral with lever 21, to a suitable point below said lever, and its lower end is screw-threaded and has a hat-shaped washer 48 mounted thereon, which is retained in position by a nut 49. In addition to this means of preventing excessive rebounds, I prefer to provide two parallel vertically disposed rods 50, the lower ends of which extend through the flanged ends of the semi-circular members of a clip 51, and have nuts 52 on them that clamp the clip on the casing of the rear axle. The upper portion of these rods extend upwards on each side of lever 21 and their upper ends are connected by a horizontal plate 53 that is retained thereon by nuts 54 on the upper screw-threaded ends of said rods. Between said rods, plate 53 has an integral centering boss depending therefrom, and between the upper edge of the lever and said connecting plate a helical spring 55 is interposed, whose lower end is centered by a centering boss 56, projecting upwards and made integral with the upper edge of the latter. These rods 44, and 50, 50, and their coordinating devices are the same, both for the front levers and its coordinating elements, and the rear lever and its coordinating elements, and it is evident that in practical use the rod 44 and rods 50, 50, may both be used or the use of one or the other may be dispensed with.

What I claim as new is:

1. A cushioning device for vehicles comprising a transversely disposed lever one end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle, means supported by said axle to which the outer end of said lever is movably attached, and a pair of springs associated with said lever and interposed between the same and said chassis and springs which engage with opposite faces of the lever the latter springs having connecting bars for engagement with the springs, one of the bars engaging the chassis and the other bar with the axle.

2. A cushioning device for vehicles comprising a transversely disposed lever one end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle, means supported by said axle to which the outer end of said lever is attached, and a pair of helical springs supported by said lever and interposed between the same and said chassis, a shorter helical spring that bears against a portion of the lever between its upper end and the approximate center of the lever, said spring being associated by a rod with the chassis, and a similar helical spring for engagement with the lower end portion of the lever the latter being connected by a rod with the axle.

3. A cushioning device for vehicles comprising a transversely disposed lever one end of which is movably connected to a transverse member of the chassis of said vehicle, an axle, means supported by said axle, to which the outer end of said lever is movably attached, a pair of coiled springs supported by said lever and interposed between the same and said chassis, a spring maintained for engagement with the inner underside of the lever and with the chassis by a bar, and a spring maintained to engage the upper side of the lever and the axle.

4. A cushioning device for vehicles comprising a transversely disposed bolster, a transverse member of the chassis of said vehicle which extends parallel to said bolster and whose ends extend beyond the ends of the same, a lever the inner end of which is fulcrumed to said bolster, an axle, means supported by said axle from which the outer end of the lever is suspended, a spring interposed between the extended end of the transverse member and said lever and a shim secured to the underside of said member that is engaged by the upper end of said spring.

5. A cushioning device for vehicles comprising a transversely disposed bolster, a transverse member of the chassis of said vehicle which extends parallel to said bolster and whose ends extend beyond the ends of the same, a lever the inner end of which is fulcrumed to said bolster, an axle, a bracket supported by said axle, a link pivotally secured to said bracket from which the outer end of the lever is suspended, a spring interposed between the extended end of the transverse member and said lever and a shim secured to the underside of said member that is engaged by the upper end of said spring.

6. A cushioning device for vehicles comprising a transversely disposed lever one

end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle, means supported by said axle to which the outer end of said lever is attached, a spring interposed between said lever and chassis, and a rod connected to said chassis that extends downward beyond said lever and a spring retained between the lower end of said rod and the lever, for restricting the rebound of said spring.

7. A cushioning device for vehicles comprising a transversely disposed lever one end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle, means supported by said axle to which the outer end of said lever is attached, a spring interposed between said lever and chassis, a shim connected to said transverse member to which the upper end of the spring is anchored whose inner end is extended downwards and reduced to a rod that passes freely through said bolster, a nut on the lower threaded end of said rod, a washer mounted on the rod above said nut and a spring surrounding the rod between said washer and lever.

8. A cushioning device for vehicles comprising a transversely disposed lever one end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle, means supported by said axle to which the outer end of said lever is attached, a spring interposed between said lever and chassis, and means for restricting the rebound of said spring including a yielding device connecting said axle and lever.

9. A cushioning device for vehicles comprising a transversely disposed lever one end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle means supported by said axle to which the outer end of said lever is attached, a spring interposed between said lever and chassis, and means for restricting the rebound of said spring including parallel rods the lower ends of which are secured to the axle and whose upper ends extend on either side of and terminate above said lever, a plate connecting the upper ends of said rods and a spring interposed between said lever and plate.

10. A cushioning device for vehicles comprising a transversely disposed lever one end of which is fulcrumed to a transverse member of the chassis of said vehicle, an axle, means supported by said axle to which the outer end of said lever is attached, a spring interposed between said lever and chassis, and means for restricting the rebound of said spring including a yielding device connecting the chassis and lever located between the inner fulcrumed end of the same, and said spring and a yielding device connecting said axle and lever located between the outer end of the lever and the spring.

In witness whereof I have hereunto set my hand this 28th day of May, 1920.

HARRY E. BIEDINGER.

Witnesses:
FRANK D. THOMASON,
VIOLET WARDELL