

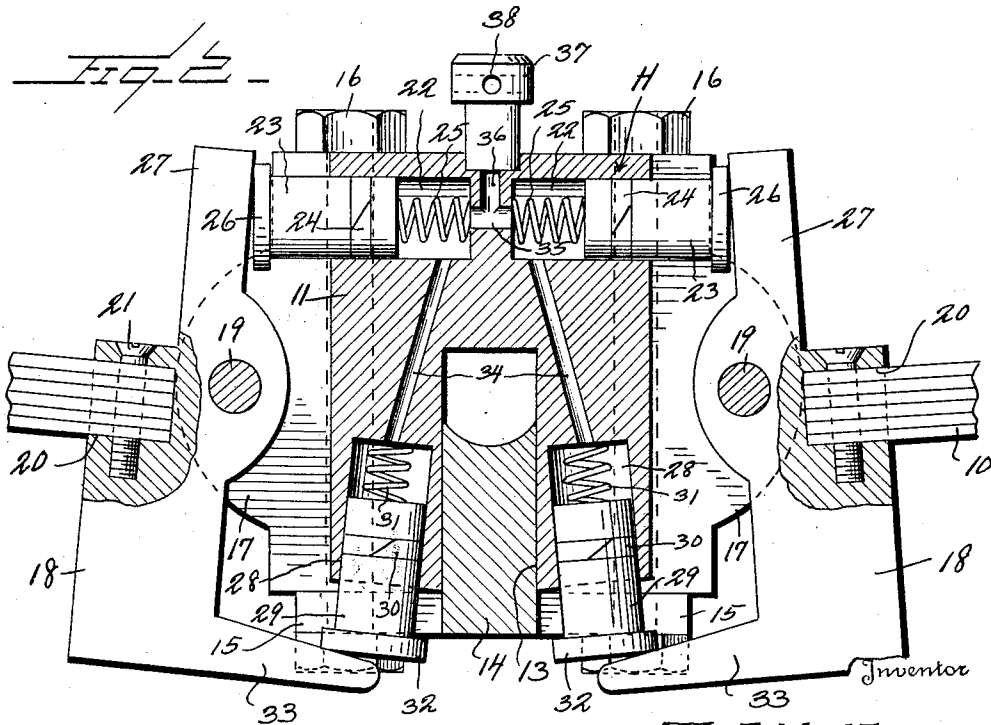
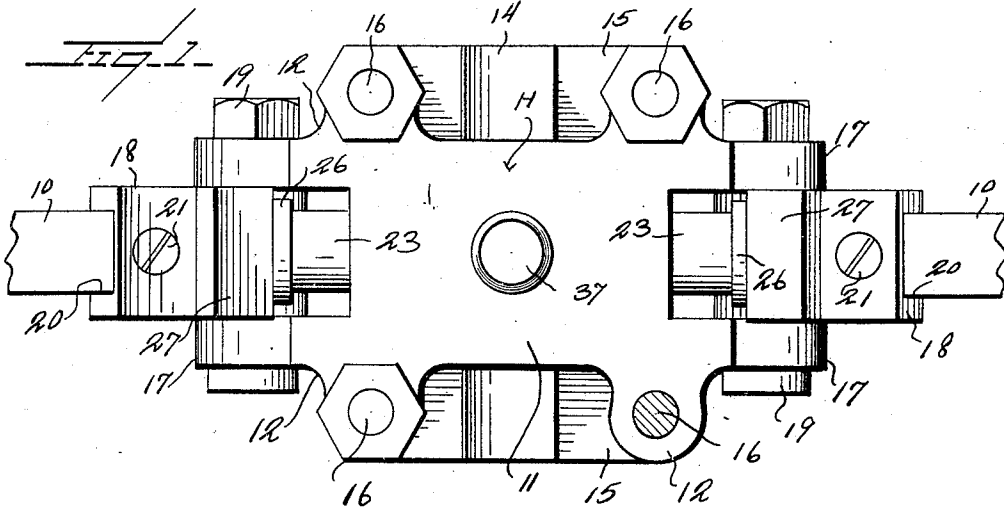
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SHOCK ABSORBER

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# UNITED STATES PATENT OFFICE

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SHOCK ABSORBER

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This invention relates to cushioning devices, and more particularly to a shock absorbing cushioning means for vehicle springs.

An object of this invention is to provide a cushioning device which is so constructed that when one portion or leaf of the spring becomes broken, the side of the vehicle will not become unduly depressed thereby so as to place undue strain on the remaining portion of the spring.

Another object of this invention is to provide a cushioning means which can be mounted on any type of vehicle, the device including opposed springs of the cantilever type.

A further object of this invention is to provide in a device of this kind a central block or housing embracing the vehicle axle in which cushioning pistons are mounted, these pistons being engaged by piston operating members carried by the inner ends of the springs.

A still further object of this invention is to provide in a device of this kind means by which the movement of the pistons can be controlled under the action of a control member mounted on the housing.

The above and various other objects and advantages of this invention will in part be described in and in part be understood from the following detailed description of the present preferred embodiment, the same being illustrated in the accompanying drawing, wherein:—

Figure 1 is a detail top plan view of a device constructed according to the preferred embodiment of this invention, the springs attached to the device being shown in fragmentary form;

Figure 2 is a longitudinal sectional view partly in detail and partly broken away taken substantially through the longitudinal center thereof.

Referring to the drawing wherein like numerals of reference designate corresponding parts throughout the several views, the numeral 10 designates generally a spring of the cantilever type and the letter H designates generally a housing secured to the inner end of opposing or complementary spring mem-

bers 10. This housing H comprises a main body 11 which is provided at each side thereof with outstanding ears 12 and the body 11 is provided with a downwardly opening slot or passage 13 for receiving an axle securing member 14 which is provided with suitable ears 15 alining with the ears 12 of the main body 11 for receiving securing bolts 16 or the like, so that the axle securing member 14 will be retained into engagement with the axle which is disposed at the inner end of the opening 13 in the main body 12 and held therein by the inner end of the axle securing member 14.

The housing H is also provided at each end thereof with opposed ears 17 and a rocking spring engaging member 18 is mounted on a pintle or shaft 19 which has each end thereof engaged with the opposed ears 17. This spring securing or engaging member 18 has a substantially U-shaped channel 20 facing outwardly within which the inner end of the spring 10 is positioned and secured by means of a bolt or rivet or other securing member 21. In this manner, the spring engaging member 18 will rock on the shaft or bolt 19 coactive with the flexing of the spring 10.

The housing H is provided adjacent the upper end thereof with opposed openings 22 constituting cylinders, which cylinders are preferably substantially horizontally disposed, and a piston or plunger 23 is slidably mounted in this cylinder 22 and is provided with a ring 24 intermediate the ends thereof so as to substantially seal the piston 23 within the cylinder 22. An expanding spring 25 engages at one end against the inner end of the cylinder 22 and the opposite end engages against the piston 23 so as to constantly urge the piston 23 outwardly. The piston 23 is provided with a head 26 which engages against a piston operating member 27 which is formed with the spring engaging member 18 and extends upwardly from the spring engaging member.

The housing H is provided adjacent the lower end thereof and on opposite sides of the slots 13 with downwardly opening passages 28 constituting lower cylinders for

slidably receiving lower pistons 29 and these pistons 29 are provided with piston rings 30 and an expanding spring 31 engages against the inner end of the cylinder 28 and against the inner end of the piston 29 so as to constantly urge the piston downwardly.

The piston 29 is also provided with a piston head 32 which is preferably larger than the diameter of the piston 29 and a lower piston operating member 33 is formed with the spring engaging member 18 and extends inwardly of the housing so that rocking movement of this spring engaging member 18 in one direction will move the upper piston 23 inwardly of the housing H while rocking movement in the opposite direction will move the piston 29 inwardly of the housing H and the cylinder 28.

The housing H is provided with four pistons and four cylinders, one upper and one lower piston being on each side of the center thereof, and it is believed that further description of the two pistons is unnecessary. The housing H is provided with an air passage 34 connecting the upper and lower cylinders 22 and 28 together adjacent the inner ends of each cylinder, and an upper air passage 35 connects opposing upper cylinders together.

A vertically disposed outlet passage 36 extends through the top of the housing H and an apertured plug or nipple 37 is threadably mounted in the housing H and is provided with an air vent 38 communicating with the bore of the plug 37 so that the air pressure formed in the cylinders of the housing can be released, the speed of release depending upon the size of the air vent 38. The upper pistons 23 operate between the opposed ears 17 of the housing H and the tension of the spring 25 against the piston 23 is such as to cushion the inward movement of this piston while the air vent 38 operates to control the release of the compression formed on the inner end of the cylinder 22.

In the operation of this device, the housing H may be secured on the axle by inserting the axle within the opening 13 and placing the plug or axle securing member 14 in this slot 13 and tightening up the bolts 16 so that the opposed ears 17 will extend in the direction of the length of the vehicle. When the axle moves in an upward direction, the spring 10 will flex and the spring engaging member 18 will rock on the shaft or bolt 19 so as to cause the piston operating member 33 to rock upwardly and force the piston 29 inwardly of the cylinder 28. The spring 31 will operate to cushion or retard the movement of this piston 29 as well as the compression formed between the inner end of the piston 29 and the end of the cylinder 28. The air passage 34 connecting the upper and lower cylinders together will permit the compression in the lower cylinder

28 to pass up into the upper cylinder 22 and will operate to cause the upper horizontal piston 23 to move outwardly against the piston operating member 27. Upon downward movement of the axle, the piston operating member 27 will move inwardly whereas the piston operating member 33 will move downwardly. Inward movement of the member 27 will move the piston 23 inwardly and compress the air in the air passages 34 and 35 as well as in the lower cylinders 28. The tension of these springs 25 and 31 is such that in the event one of the leaves of the spring 10 becomes broken, the broken side of the spring will be properly supported by reason of the increased strain applied to the opposite side of the housing which will act to compress the air in the upper and lower cylinders on the broken side to a greater degree. Through the provision of these connecting air passages 34 and 35, the action of these pistons 23 and 29 is substantially the action of hydraulically operated pistons and in this manner, the pressure on each side of the housing will be equalized, thereby preventing one side of the vehicle from being depressed more than the opposite side as is the case where one or more leaves of the spring 10 becomes broken.

It is, of course, understood that various changes and modifications may be made in the details of construction and design of the above specifically described embodiment of this invention without departing from the spirit thereof, such changes and modifications being restricted only by the scope of the following claims.

What is claimed is:

1. A shock absorber comprising a housing, means for securing the housing to a vehicle axle, spring engaging members, means for rockably securing said members in opposed relation one on each side of the housing, a pair of opposed upper cylinders formed with the housing, upper pistons slidable in said cylinders and having one end portion thereof projecting outwardly of the housing, piston operative members formed with said spring engaging members, and coacting means carried by said spring engaging members and the lower portion of the housing to cushion the rocking movement of said spring engaging members in one direction.

2. A shock absorber as described comprising a housing, means for securing the housing to a vehicle axle, spring engaging members, means for rockably securing said members in opposed relation one on each side of the housing, cylinders formed in the housing adjacent the upper end thereof, upper pistons slidable in the cylinders, lower cylinders, lower pistons slidable in the lower cylinders, cushioning means for cushioning the inward movement of the upper and lower cylinders, upper cylinder operating members

carried by said spring engaging members, and lower cylinder operating members carried by said spring engaging members.

3. A shock absorber as described comprising a housing, opposed ears formed on each side of the housing, spring engaging members positioned between said ears, means for rockably mounting said spring engaging members between said ears, upper cylinders formed in the housing, lower cylinders formed in the housing, said housing having a connecting passage connecting all of the cylinders together, an outlet member for said passage, a piston for each cylinder, springs positioned in the upper and lower cylinders and engaging the pistons for constantly urging the pistons outwardly of the cylinders, heads formed on the upper and lower pistons, upper piston operating members formed with said spring engaging members, and lower piston operating members formed with said spring engaging members.

In testimony whereof I hereunto affix my signature.

THOMAS J. HOBBS.