H. F. DIERCKS.

RECOIL SHOCK ABSORBER.

APPLICATION FILED JAN. 15, 1916.

1,204,253. Patented Nov. 7, 1916.

Fig. 1.

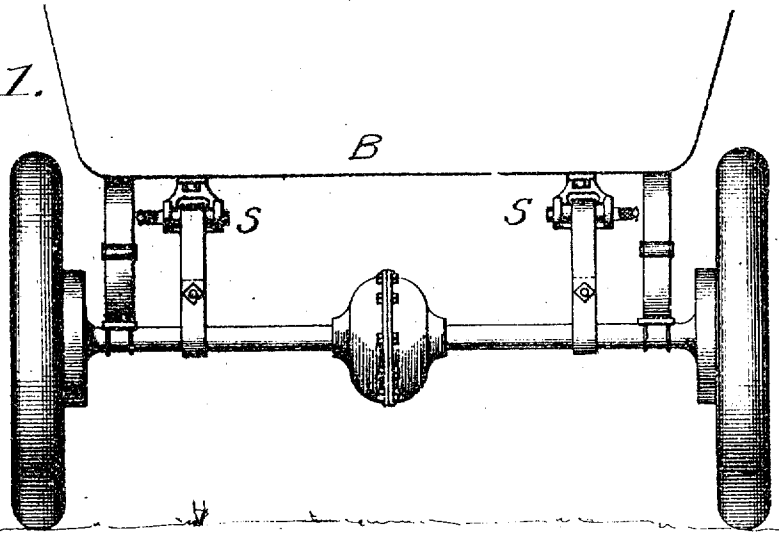


Fig. 2.

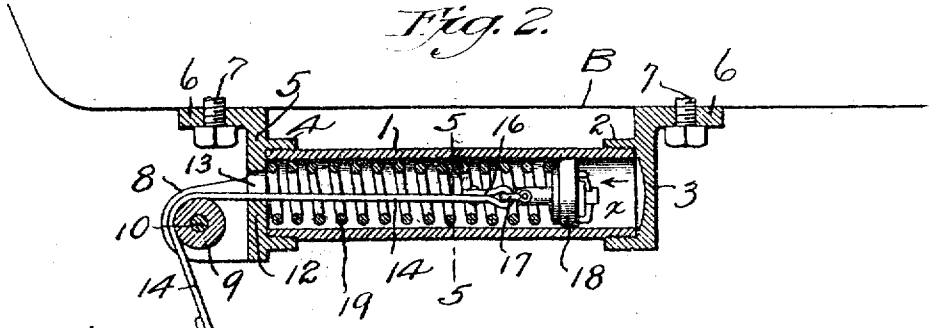


Fig. 3.

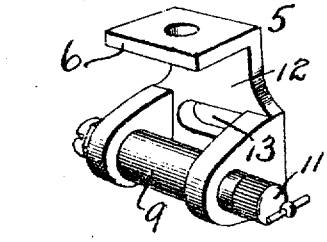


Fig. 4.

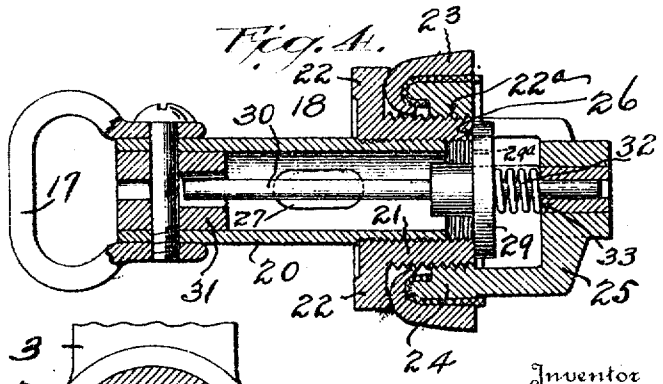
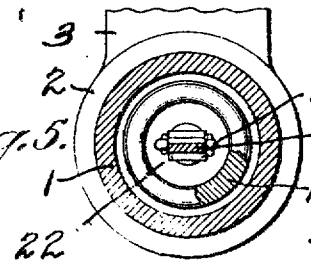


Fig. 5.



Witnesses

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RECOIL SHOCK-ABSORBER.

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Application filed January 15, 1916. Serial No. 72,312.

To all whom it may concern:

Be it known that I, HENRY F. DIERCKS, a citizen of the United States, residing at Algonquin, in the county of McHenry and State of Illinois, have invented certain new and useful Improvements in Recoil Shock-Absorbers, of which the following is a specification.

This invention relates to the general subject of shock absorbers for vehicles, and has special reference to a novel improvement in recoil check devices that are particularly adapted for use on motor cars.

A primary object of the present invention is to provide a simple and reliable device which comes into play when the body of the vehicle rises or rebounds, to thereby prevent such a sudden upward movement or rise of the body as would be likely to break the springs of the vehicle. As is well known, there is great strain imposed upon the ordinary springs when the body of the car rises or bounds upwardly, and often this strain is so great that the springs are ruptured or broken. Accordingly, the present invention proposes to provide a device which may be relied upon to effectually check the upward movement of the vehicle body and thus protect the springs from damage.

Another object of the invention is to provide a combined metallic and pneumatic cushioning device which affords maximum resiliency, and consequently a greater degree of efficiency in counteracting the relatively opposite movements of the axle and body.

A further object of the invention is to provide a simple construction and arrangement of parts which may be easily and economically manufactured, and may also be readily assembled and taken apart to thereby facilitate cleaning, adjustments, or repairs when necessary.

With the above and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination and arrangement of parts hereinafter more fully described, illustrated and claimed.

A preferred and practical embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a rear elevation of a portion of a motor vehicle showing the application of the present invention. Fig. 2 is a longitudinal sectional view thereof. Fig. 3 is a detail perspective view of roller abutment blocks. Fig. 4 is an enlarged detail sectional view of the valved plunger. Fig. 5 is an enlarged cross section on the line 5—5 of Fig. 2.

Similar reference characters designate corresponding parts throughout the several figures of the drawings.

In carrying out the present invention, it is proposed to provide a construction having the novel characteristic of a shock absorbing medium arranged in a horizontal plane, or parallel to the bottom of the vehicle body, and a flexible axle connection having a portion which is adapted to work in a plane at substantially right angles to the plane of the shock absorbing medium, thereby utilizing to the best possible advantage the relatively small space usually existing between the vehicle body and the springs while at the same time providing for the use of a much stronger and more efficient shock absorbing medium than would otherwise be possible. Accordingly, as will be observed from the drawings, the present invention includes in its organization a recoil shock absorbing device carried in a horizontal position on the underside of the car body conveniently located with respect to the axle with which it is intended to be used. This device is designated generally by the reference character S, and is preferably employed in pairs as shown in Fig. 1 of the drawings. That is to say, in order to obtain the best distribution of strain and wear, it is preferred to place one of these devices adjacent each of the usual vehicle springs, the same of course being connected with the rear axle by means which will hereinafter be more fully set forth in detail. This device S preferably comprises a tubular casing or shell 1 which is exteriorly threaded at one end to receive the interiorly threaded flange 2 of an end closure cap 3, and is also exteriorly threaded at the opposite end to receive the internally threaded flange 4 of the roller supporting bracket 5. These members 3 and 5 thus constitute a support for each end of the casing 1, and are preferably provided with reversely disposed attaching ears 6 which are capable of receiving suitable fastening elements 7 for attaching and holding the casing in a hori-

zontal position on the underside of the car body B.

Referring more particularly to the roller supporting bracket 5, it will be observed that the same is preferably provided with the parallel extension arms 8 which are adapted to receive therebetween a roller 9 mounted on a transverse axle 10 having an end bearing in each of the arms. This axle may be provided with a suitable grease cup 11 as shown in Fig. 3 to supply sufficient lubricant to the roller to insure its freedom of movement at all times. The main wall 12 of the bracket 5 is provided with a clearance slot 13 which is arranged in such a position that it provides an approximately central outlet for the casing 1, and also permits of the periphery of the roller 9 being freely accessible for contact with a flexible axle connecting strap 14. This axle connecting strap is provided at its exposed end with an axle embracing loop 15, and after passing over the roller 9 passes through the clearance slot 13 into the interior of the casing 1 where its opposite end is secured as at 16 to the pivoted bail 17 of a plunger device designated in its entirety by the reference 18. This plunger device is slidable in the casing 1, and works against the tension of a relatively stout coil spring 19, which is confined between one side of the plunger and the inner face of the wall 12 of the roller supporting bracket 5. Thus, it will be apparent that as the body of the vehicle rises upwardly, it will be resisted by the spring 19, owing to the fact that the flexible axle connecting strap 14 is respectively secured to the plunger and axle while its intermediate portion rides over the roller 9.

In connection with the plunger device 18, it will be observed that the same essentially comprises a hollow shank 20 having the bail 17 carried at one end, and a suitable plunger head at the other end which preferably includes an internally threaded nipple 21 which screws onto the end of the shank 20, and is also provided with a clamping flange 22 and the externally threaded portion 22^a. A felt or equivalent washer cup 23 whose edge portion contacts with the inside of the casing is clamped to the flange 22 by means of a suitable clamping ring 24 which threads onto the threaded portion 22^a of the base. This ring is also provided with a skeleton-like valve cage portion 25, and surrounds the open end of the shank 20, the edge 26 of which forms a valve seat and is also in communication with the interior of the cylinder through the openings 27 in the wall of the hollow shank 20.

A suitable valve member 29 carried by a valve stem 30 normally rests on the valve seat 26, while the stem thereof is guided at one end in the head portion of the skeleton-like cage 25 and its opposite end is loosely guided in the bushing 31 within the hollow shank 20. The said valve member 29 is normally held onto its seat by means of a coil spring 32 arranged on the stem 30 and confined between one side of the valve and the abutment face 33 of the head of the cage 25. From this arrangement, it will be clear that when the spring 19 is compressed by the rebound or upward rise of the vehicle, the plunger device 18 will be pulled in the cylinder in the direction indicated by the arrow in Fig. 2, thus opening the valve 29, and destroying the vacuum which would be brought about in the space x at the end of the casing 1, and at the same time permitting the free and unhindered action of the spring 19.

When the vehicle returns to its normal position, the spring 19 would tend to push the plunger 18 to its normal position, and as the valve 29 becomes closed, the said plunger will return to its normal position against the air cushion in the chamber or space x without shock or jar, but sufficiently rapid to insure the spring 19 extending to its full length to impose the normal force thereof on the plunger head 18, whereby it may be prepared for a succeeding operation. If desired, the valve member 29 may be provided with a relatively small opening or openings 29^a to facilitate the return of the plunger to its normal position by permitting the gradual escape of air caged in the chamber x.

From the foregoing, it will be apparent that the present invention provides a recoil shock absorbing construction which essentially comprises a recoil shock absorbing device including a reciprocating plunger adapted to operate against the tension of the coil spring in one direction and against an air cushion in the opposite direction; and which plunger movement is brought about by means of a flexible axle connecting strap which has one end connected thereto, and the opposite end connected to one of the axles of the vehicle while the intermediate portion freely rides over a roller abutment 9. This arrangement is not only advantageous because it admits of the use of a much larger spring and consequently affords a much greater resiliency, than if the spring were arranged vertically, but at the same time provides for the proper working of the spring under all conditions. That is to say, it provides for distributing the strain equally over the entire spring, because it always pulls on the center or on a line parallel to the axis thereof, there being no possibility of the connection canting or slanting away from the center or axis of the coil on account of its passing over the roller, thus insuring greater freedom and more positive action of the spring under all service conditions.

Without further description, it is thought that the many features and advantages of the present invention will be readily apparent to those familiar with the art, and it will also be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from the spirit of the invention or scope of the appended claims.

I claim:

1. In a shock absorbing device of the character described, the combination with a tubular casing open at one end and having a closed air cushion chamber at the other end, of a spring pressed plunger device arranged within the casing, said plunger device comprising a hollow head having a valve seat at one end and a loop element at the other, a valve cage member detachably fitted to said plunger head and surrounding the valve seat thereof, a washer member clamped between said valve cage and plunger head, and a valve yieldably held between the valve cage and said valve seat.

2. In a shock absorbing device of the character described, the combination with a tubular casing open at one end and having a closed air cushion chamber at the other end, of a spring pressed plunger device arranged within the casing and including a flexible axle connector passing out of said open end, and a hollow plunger head having an annular abutment flange and a threaded nipple portion providing a valve seat, a valve cage member having an interiorly threaded clamping ring portion for engaging with said threaded nipple, a flexible washer cup having a portion thereof clamped between said annular abutment flange and the ring of the valve cage, and a valve member yieldably held on said valve seat and having a guiding engagement in the valve cage.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

HENRY F. DIERCKS.

Witnesses:
B. C. GETZELMAN,
GEO. D. KEYES.