A. BACCHI.

SHOCK ABSORBING DEVICE.

APPLICATION FILED OCT. 21, 1911.

1,023,795. Patented Apr. 23, 1912.

Fig. 1.

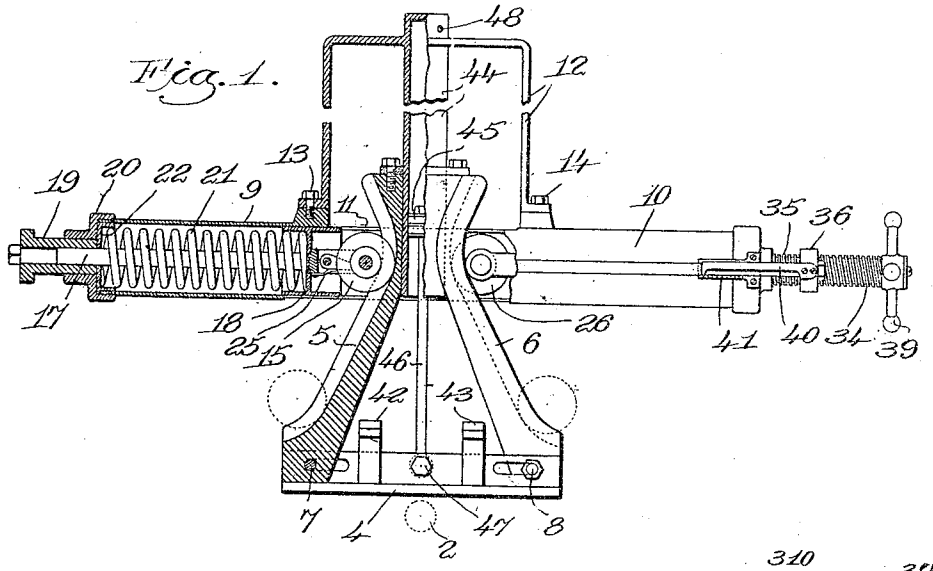
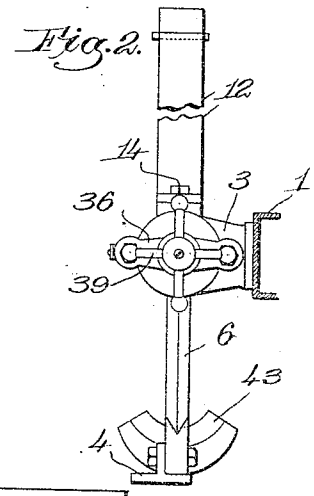


Fig. 2.



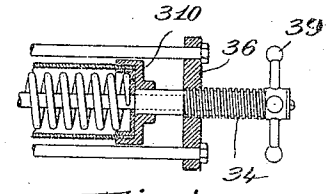
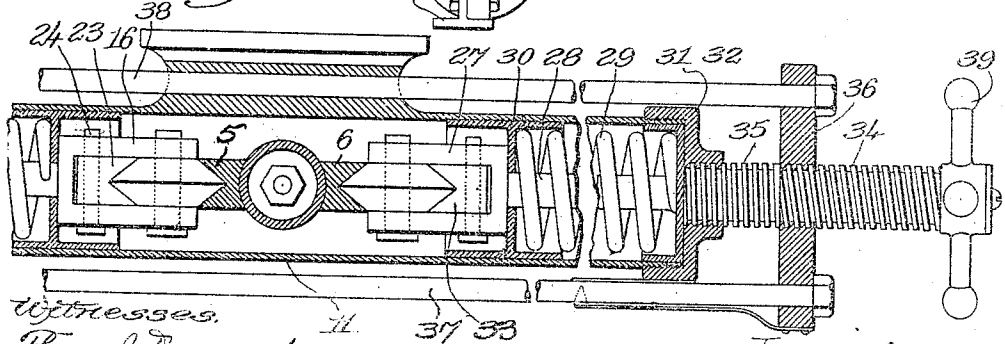


Fig. 4.

Fig. 3.



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UNITED STATES PATENT OFFICE.

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SHOCK-ABSORBING DEVICE.

1,023,795. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed October 21, 1911. Serial No. 656,063.

To all whom it may concern:

Be it known that I, ABDENAGO BACCHI, a citizen of Argentina, residing at Quincy, county of Norfolk, State of Massachusetts, have invented an Improvement in Shock-Absorbing Devices, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

The object of this invention is to provide a device for the prevention of sudden and disagreeable shocks such as are due to the sudden or abrupt recoil of the springs of automobiles and other vehicles, and to provide a device of this character which shall absorb such shocks without impairing the effectiveness of the vehicle springs.

The device of this invention may be used in any connection where there are two parts having relative movement toward and from each other, and in which it is desirable to absorb the shock resulting from the sudden character of such relative movement, and the invention is not to be limited to use in any particular vehicle or machine.

The nature of the invention will appear more fully from the accompanying description and drawings, and will be particularly pointed out in the appended claims.

The drawings illustrate the preferred form of device embodying the invention.

In the drawings, Figure 1 is a side elevation of the device with the left hand portion shown chiefly in central vertical cross section. Fig. 2 is an end elevation of the device. Fig. 3 is a view in horizontal cross section of the central and right hand portions of the device enlarged. Fig. 4 is a detail chiefly in cross section of a modification of the construction shown in Fig. 3.

The drawings do not illustrate in detail the two parts which have the relative movement, because these form no part of the invention. If the device be used for automobiles 1 may be considered as a portion of the chassis, and 2 may represent the axle or a portion of the running gear. These elements 1 and 2 are, however, simply typical of two parts having a relative movement toward and from each other, and in connection with which it is desirable to absorb or diminish the shock due to a sudden relative movement.

The device of this invention comprises a pair of frame members adapted to be secured respectively to the parts such as the chassis and running gear of an automobile, having a relative movement toward and from each other. In the particular construction illustrated in the drawings one of these frame members is indicated at 3 and the other at 4. The one frame member, and in the form shown the lower one 4, is provided with a pair of tracks 5 and 6 adjustably connected at 7 and 8 by bolts thereto. These tracks are secured together at their upper ends in any suitable manner, and diverge from a point near their upper ends both upwardly and downwardly. The other, or upper frame member 3, has its main portion consisting of a long tube extending transversely of the parallel tracks 5 and 6. The end sections 9 and 10 of the tube present unbroken, preferably cylindrical, walls, but the central section 11 is slotted vertically to allow the movement of the tracks 5 and 6 vertically therethrough. A brace shown as an upwardly extending U shaped bracket 12 is secured at 13 and 14 to the upper side of the tubular portion of the member 3 near each end of the slotted central section.

A pair of oppositely disposed rolls are mounted for transverse bodily movement toward and from each other in the frame member 3, and in the construction shown this is secured by mounting the rolls respectively on plungers carried in the inclosed end sections of the tubular portion of the frame member 3. Each roll co-acts with the adjacent track 5 or 6, and is held thereagainst by a powerful spring pressure. In the construction shown powerful helical springs are provided, one for each plunger, but it is not essential that both springs should be used, and either might be omitted if desired.

The roll 15 coöperating with the track 5 is journaled in a head 16 connected to a plunger-rod 17. This plunger-rod 17 is supported at its forward end in a piston 18 sliding in the tubular end section 9, while its rear end slides in a sleeve 19, which sleeve in turn slides in a cap 20 closing the end of the tubular section 9. A powerful helical spring 21 surrounds the plunger rod 17 and extends between the piston 18 and

the plate 22 resting against the inner end of the sleeve 19. It will thus be seen that when the sleeve 19 is forced inwardly the helical spring 21 will be compressed, thus increasing the pressure tending to force the roll 15 against the track 5. A friction pawl 23 is pivoted at 24 in the head 16 and held upwardly against the roll 15 by a spring 25, so that the roll 15 may rotate freely when it rides down the track 5, but will be retarded in its rotation or held against rotation as it moves in the opposite direction, or upwardly.

The construction of the roll 26 coöperating with the track 6 and the parts connected therewith and by which it is operated are similar to those already described, comprising the head 27, the plunger-rod 28, helical spring 29, piston 30, cap 31, plate 32 and pawl 33. In the case of these parts, however, the plunger-rod 28 instead of extending into a sleeve, extends at its rearward end into the screw-threaded cap 31, and which screw abuts against the plate 32.

The screw extending through the cap 31 of the tubular end section 10 is as shown provided with threaded sections of different pitch, that section 34 toward the outer end of the screw being twice the pitch of that section 35 entering the cap 31. A crosshead 36 is threaded upon the section 34, and a similar crosshead is secured to the sleeve 19, and these crossheads are connected by parallel rods 37 and 38. It will be seen, therefore, that if the screw at the right hand end be turned by means of the hand wheel 39 so as to move inwardly through the cap 31 and press the plate 32 toward the center, the movement of said screw will at the same time through the agency of the crosshead 36 and connections to the opposite end of the frame, force the plate 22 an equal distance toward the center. Thus both springs are compressed and the position of the two rolls 15 and 26 is maintained centrally of the frame.

In Fig. 4 a modification of the above construction is shown, whereby the same result may be secured. In this figure the section of the screw extending through the cap 310 has no threads but is exteriorly smooth, while the section extending through the cap 36 is threaded at 34, as in the previous case. In this construction, and assuming that the two springs are of substantially the same resiliency, when the screw is turned by means of the hand wheel 39 the crosshead 36 will move toward the hand wheel owing to its threaded connection with the screw, and the screw will slide in through the cap, thus simultaneously pressing both springs, as in the construction already described. In either case a pointer arm 40 may be attached to the crosshead 36 and extend along a scale 41. This scale may be marked to indicate in pounds or other units the degree to which the screw must be turned to correspond with the load carried by the member 1. For example, if the device is employed in an automobile and two passengers are carried, the screw may be turned until the pointer indicates the combined weight of the passengers. If an additional passenger is carried, the screw is turned farther until the pointer indicates an amount equal to the weight of the three passengers. Thus by the use of this scale the amount of compression may readily be given to the springs to absorb the shock due to the varying load.

The operation of the device as thus far described will now be apparent. The screw is first adjusted to compress the springs and secure the required pressure, forcing the rolls toward each other. When a sudden movement of the frame member 3 toward the frame member 4 takes place, the rolls 15 and 26 riding down the diverging tracks 5 and 6 compress the springs and absorb the shock. Buffers 42 and 43 are provided on the frame member 4 so that in case of an extreme movement the tubular portion of the frame member 3 may contact therewith. Upon the return or recoil movement the friction pawls 23 and 33 come into action, and the rollers slide upwardly on the tracks 5 and 6 without rotating, and the friction of this sliding movement serves materially to minimize the recoil movement. The tracks 5 and 6 diverging at their upper ends also serve to take care of the recoil because the springs are again compressed as the rollers pass above their normal position.

In the construction thus illustrated and described the friction pawls 23 and 33 serve to minimize the effect of the return or recoil movement, but there may be used in place thereof, or in connection therewith, the dashpot construction illustrated. This construction comprises a piston connected with one frame member, such as the frame member 4, and a cylinder connected with the opposing frame member, such as 3. The cylinder 44 is shown as rigidly connected to the brace 12 and extending centrally between the tracks 5 and 6. The piston 45 is carried by a rod 46 connected at 47 to the frame member 4. The cylinder is provided with one or more air holes 48. This dashpot construction thus serves to minimize sudden movement not only due to the recoil, but due to the movement of the frame members together. Either the friction pawl or the dash-pot constitutes means independent of the means for yieldingly retarding the separation or bodily movement of the rolls, for retarding the movement

of the frame members away from each other.

By varying the divergence of the tracks 5 and 6 by changing the proportions of piston and cylinder by selecting the desired resilience of the springs, and by adjusting the compressing force of the springs by the hand screw, it is possible to construct a shock absorbing device embodying this invention adaptable to almost any purpose, and one in which the shocks may be absorbed due to varying conditions of load or usage, so that the invention presents a device capable of a very wide range of use, and capable of satisfying a very wide range of conditions.

The invention having been described, what is claimed as new and desired to be secured by Letters Patent, is:

1. A shock absorber comprising a pair of frame members adapted to be secured respectively to parts having relative movement toward and from each other, a pair of oppositely disposed rolls mounted for transverse bodily movement toward and from each other in the one frame member, means for yieldingly retarding the bodily movement of said rolls away from each other, a pair of diverging tracks coöperating respectively with said rolls and carried by the other frame member, and means for holding said rolls against rotation during the movement of the frame members away from each other and permitting their rotation at other times.

2. A shock absorber comprising a pair of frame members adapted to be secured respectively to parts having relative movement toward and from each other, a pair of oppositely disposed rolls mounted for transverse bodily movement toward and from each other in the one frame member, springs acting to press said rolls toward each other, and means for simultaneously adjusting the compression of said springs without disturbing the position of said rolls with respect to said frame, and a pair of diverging tracks coöperating respectively with said rolls and carried by the other frame member.

3. A shock absorber comprising a pair of frame members adapted to be secured respectively to parts having relative movement toward and from each other, a pair of oppositely disposed rolls mounted for transverse bodily movement toward and from each other in the one frame member, springs acting to press said rolls toward each other, means for simultaneously adjusting the compression of said springs without disturbing the position of said rolls with respect to said frame, a pair of diverging tracks coöperating respectively with said rolls and carried by the other frame member, and means for holding the said rolls against rotation during the movement of the frame members away from each other and permitting their rotation at other times.

4. A shock absorber comprising a pair of frame members adapted to be secured respectively to parts having relative movement toward and from each other, a tubular section carried by the one frame transversely thereof, a pair of oppositely disposed plungers sliding in said tubular section, a pair of rolls carried respectively by said plungers near the middle of said section, helical springs surrounding said plungers and acting to move said rolls toward each other, means for simultaneously compressing said springs without disturbing their position relative to the frame, a pair of diverging tracks coöperating respectively with said rolls and carried by the other frame member.

5. A shock absorber comprising a pair of frame members adapted to be secured respectively to parts having relative movement toward and from each other, a tubular section carried by the one frame transversely thereof, a pair of oppositely disposed plungers sliding in said tubular section, a pair of rolls carried respectively by said plungers near the middle of said section, helical springs surrounding said plungers and acting to move said rolls toward each other, means for simultaneously compressing said springs without disturbing their position relative to the frame, a pair of diverging tracks coöperating respectively with said rolls and carried by the other frame member, and means independent of the devices acting to retard the transverse movements of the said rolls for retarding the movement of said frame members away from each other.

6. A shock absorber comprising a pair of frame members adapted to be secured respectively to parts having relative movement toward and from each other, the one frame member presenting a transverse tubular portion comprising end sections and a slotted central section, plungers mounted in each end section and carrying at their adjacent ends rolls, a plate located in the outer ends of each tubular end section, helical springs located in each tubular end section between the said plate and the roll-carrying end of the plunger, a screw threaded into one end section and bearing against one plate, said screw provided throughout its outer section with a thread of double the pitch of the pitch of that portion entering the tubular end section, a crosshead threaded on the outer threaded section of the said screw, a crosshead at the opposite tubular end section, a sleeve carrying said second crosshead and abutting against the other plate, rods connecting said crossheads whereby upon the turning of said screw

the said two plates are drawn together to compress the springs simultaneously without disturbing the position of the rolls with respect to the frame, a pair of diverging tracks coöperating respectively with said rolls and carried by the other frame member, said tracks passing through the slotted tubular portion.

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

ABDENAGO BACCHI.

Witnesses:
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HUGO WILKAIDORF.