Feb. 9, 1926. 1,572,060

W. W. YARNALL

SHOCK ABSORBING SPRING AND SNUBBER

Filed Dec. 20, 1923 2 Sheets-Sheet 1

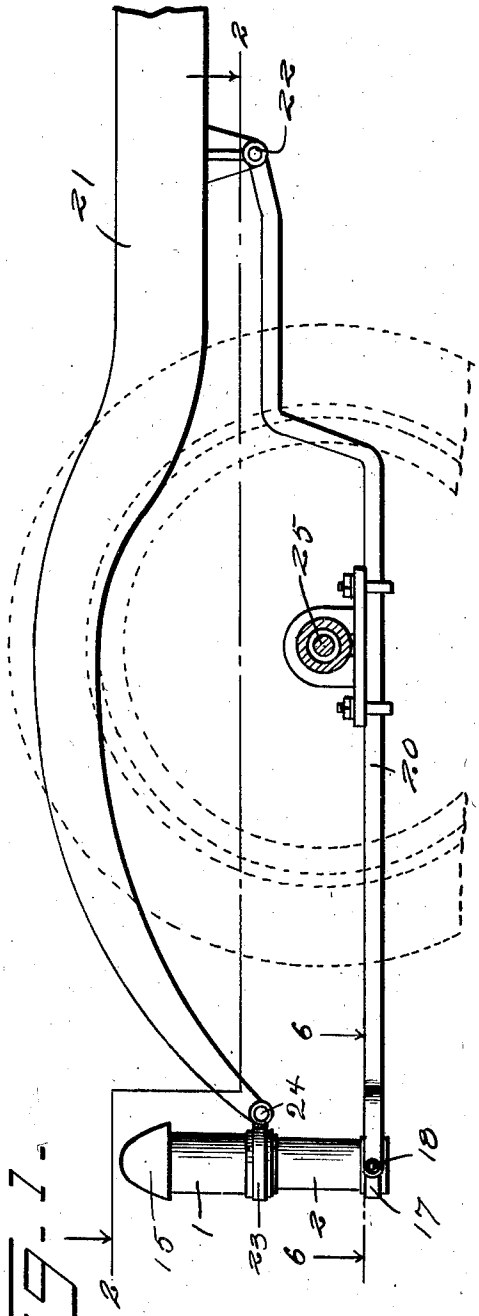


Fig. 1.

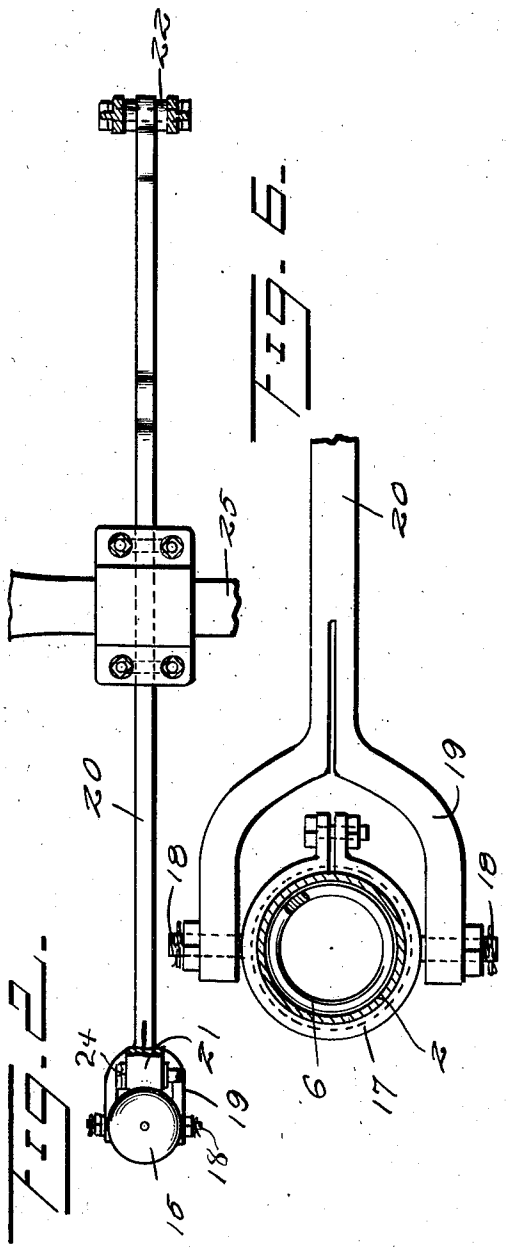


Fig. 2.

Fig. 6.

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Fig. 3.

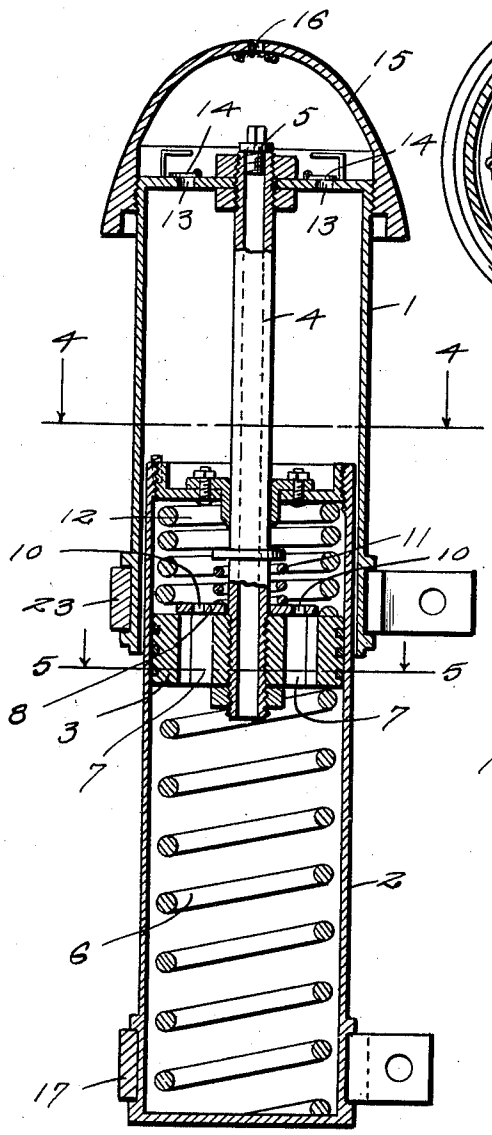


Fig. 4.

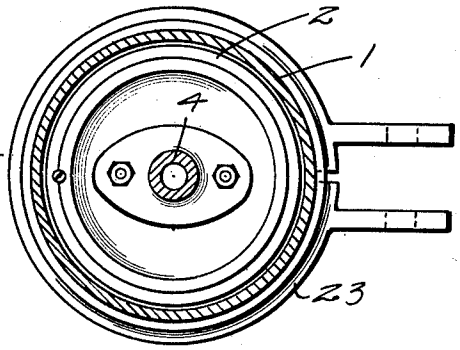


Fig. 5.

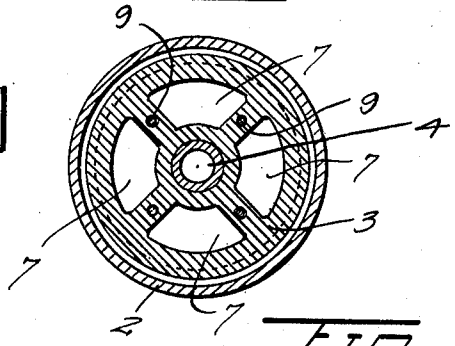
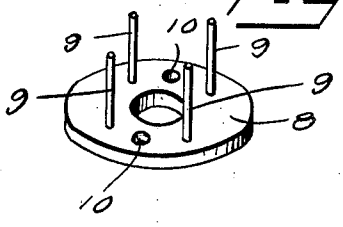


Fig. 7.



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Patented Feb. 9, 1926. 1,572,060

UNITED STATES PATENT OFFICE.

WILLIAM W. YARNALL, OF HARRISBURG, PENNSYLVANIA.

SHOCK-ABSORBING SPRING AND SNUBBER.

Application filed December 20, 1923. Serial No. 681,805.

To all whom it may concern:

Be it known that I, WILLIAM W. YARNALL, a citizen of the United States, residing at Harrisburg, in the county of Dauphin and State of Pennsylvania, have invented certain new and useful Improvements in Shock-Absorbing Springs and Snubbers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to means for neutralizing shock and vibration incident to the operation of vehicles and provides an appliance which may be substituted for a vehicle spring and which checks the rebound and also controls the movements of the vehicle body incident to road travel whereby the riding is made more comfortable and the wear and tear on the running gear and driving connection are reduced to the smallest amount possible.

Other objects and advantages will be apparent and suggest themselves as the nature of the invention is understood.

While the drawings illustrate an embodiment of the invention it is to be understood that in adapting the same to meet different conditions and requirements, various changes in the form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention.

Referring to the accompanying drawings forming a part of the application:

Figure 1 is an elevational view showing the application of the invention,

Figure 2 is a plan sectional view on the line 2—2 of Figure 1,

Figure 3 is an enlarged vertical central section of the device,

Figure 4 is a horizontal sectional view on the line 4—4 of Figure 3,

Figure 5 is a plan sectional view on the line 5—5 of Figure 3,

Figure 6 is an enlarged sectional view on the line 6—6 of Figure 1, and

Figure 7 is an inverted perspective view of the valve.

Corresponding and like parts are referred to in the following description and designated in the several views of the drawings by like reference characters.

The device comprises complemental barrels or cylinders 1 and 2 having a telescopic arrangement, the barrel 1 constituting a cover for the barrel 2 and carrying a plunger 3 which has a piston fit within the part 2. A hollow rod 4 is connected at its upper end to the upper closed end of the barrel 1 and at its lower end to the plunger 3. The hollow formation of the rod 4 provides for supplying a liquid to the barrel 2. A plug 5 closes the upper end of the rod 4 and is threaded thereto. A helical spring 6 within the barrel 2 is sufficiently stout to sustain the load and exert an upward pressure on the plunger 3. A plurality of openings 7 are formed in the plunger 3 and provide for a rapid upflow of the liquid therethrough when the plunger 3 is depressed. A valve 8 is placed upon the top of the plunger 3 and is maintained in proper position and directed in its movement by guide pins 9 which are disposed to operate in openings formed in the plunger. Small openings 10 are formed in the valve 8 and register with certain openings 7 and provide for a slow return of the liquid from the upper portion of the cylinder 2 to the lower portion thereof through the openings 7 of the plunger. A helical spring 11 mounted upon the rod 4 operates to normally hold the valve 8 seated. A helical spring 12 disposed in the upper portion of the cylinder 2 and confined between the plunger 3 and the head of the cylinder, cooperates with the spring 6 to control the movements of the plunger. Openings 13 are provided in the upper end of the cylinder 1 and are controlled by downwardly closing valves 14. A cap 15 is fitted to the upper end of the cylinder 1 and encloses and protects the valve 14 and is provided with a screened opening 16 which constitutes a vent to provide for the escape of air upon the down movement of the cylinder 1. In this connection it is observed that the air discharged from the opening 16 may be utilized in any preferred way by being led into a tank and stored for future use.

A clamp 17 is fitted to the lower end of the barrel 2 and is provided with opposed trunnions 18 which obtain a bearing in the fork 19 of a bar 20 which is pivoted at its rear end to a bracket or like part of the chassis 21, as indicated at 22.

A clamp 23, similar to the clamp 17, is applied to the lower end of the barrel 1 and is connected to the front end of the side bar 21 of the chassis by means of a pivot

bolt 24. The axle 25 is mounted upon the bar 20 and the latter may be rigid, the spring action being derived from the plunger 3 and the springs 6 and 12 coacting therewith and disposed within the barrel 2.

In practice, a liquid such as oil is supplied to the barrel 2 and is preferably admitted thereto through the hollow rod 4. Upon the downward movement of the plunger 3, a portion of the oil contained in the barrel 2 passes through the openings 7 into the upper portion of the barrel and upon the upstroke of the plunger, the valve 8 becomes seated and the oil or other liquid passes slowly through the openings 10 back into the lower portion of the barrel, thereby preventing any sudden rebound and adding materially to the comfort of the occupant of the vehicle and minimizing shock and jolt incident to shock and vibration.

What is claimed is:

1. An appliance of the class described having a plurality of barrels one telescoping into the other, a rod carried by one of the barrels and extending into the other barrel, a plunger on said rod in the last mentioned barrel, said plunger having an opening therethrough, a valve resting on the upper surface of said plunger and slidable along said rod, said rod being hollow whereby fluid may be supplied therethrough and discharged into the appliance below the plunger, a relatively weak spring surrounding said rod to urge said valve seated, springs to control the action of the shock of the appliance located on opposite sides of the plunger, said valve serving to retard the return of cushioning fluid through said opening.

2. An appliance of the class described having a plurality of barrels one telescoping into the other, a plunger rigid with one of the barrels and located in the other barrel, a rod carrying said plunger, said rod being hollow whereby fluid may be supplied therethrough and discharged into the appliance below the plunger, said plunger having openings therethrough for passage of a cushioning fluid, a perforated valve slidable along said stem to check the return of the cushioning fluid through said openings, said valve resting on the upper surface of said plunger, a relatively weak spring surrounding the stem and positioning and controlling said valve, controlling springs for the plunger located on opposite sides thereof, and an interfitting connection between the valve and the plunger to permit sliding of the latter without rotation relatively to the plunger.

In testimony whereof I affix my signature.

WILLIAM W. YARNALL.