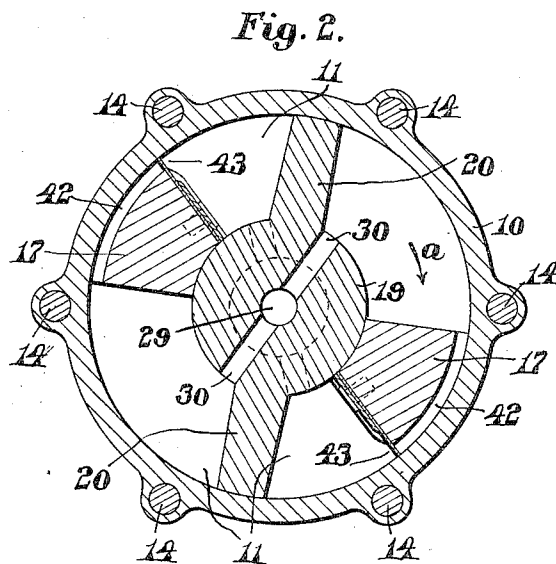
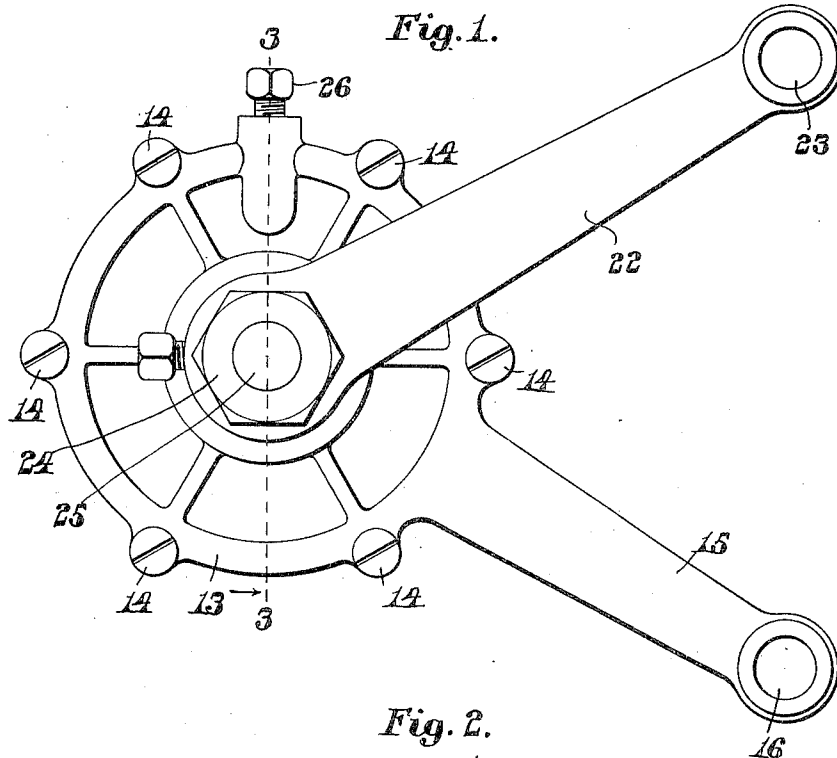


1,051,288.

P. SZYDLOWSKI.
SHOCK ABSORBER.
APPLICATION FILED JUNE 5, 1912.

Patented Jan. 21, 1913.

2 SHEETS-SHEET 1.



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2 SHEETS—SHEET 2.

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Fig. 3.

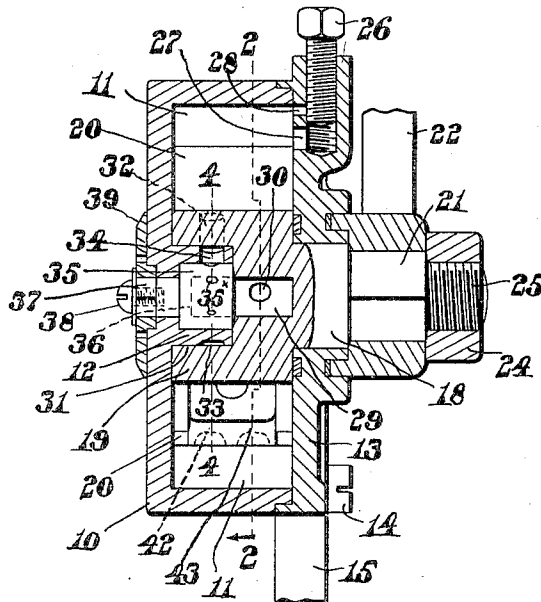


Fig. 4.

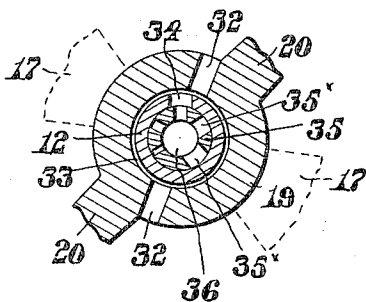
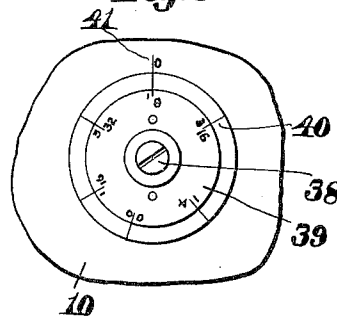


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SHOCK-ABSORBER.

1,051,288.

Specification of Letters Patent.

Patented Jan. 21, 1913.

Application filed June 5, 1912. Serial No. 701,915.

To all whom it may concern:

Be it known that I, PAUL SZYDLOWSKI, a subject of the Emperor of Austria-Hungary, and a resident of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Shock-Absorbers, of which the following is a specification.

This invention relates to shock absorbers for motor cars and similar vehicles, and particularly to that class of devices in which oil or some similar liquid confined within the casing is utilized as a cushion to overcome the jouncing of the vehicle. Its particular object is to provide a means whereby the various parts after an initial operation will return slowly to their normal position.

The invention consists in certain novel features of construction and arrangement of parts which will be fully understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents an elevation of a shock absorber embodying the features of the present invention. Fig. 2 represents a vertical section of the same, the cutting plane being on line 2—2 on Fig. 3. Fig. 3 represents a transverse section of the same, the cutting plane being on line 3—3 on Fig. 1, the piston blades being shown in a slightly advanced position. Fig. 4 represents a partial section through the valve mechanism, the cutting plane being on line 4—4 on Fig. 3. Fig. 5 represents an elevation of the indicator for controlling the valve setting.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings 10 represents a casing member having a cylindrical chamber 11 therein into the center of which extends a cylindrical hub 12. The chamber 11 is closed by means of the cover 13 secured to the casing member 10 by a plurality of bolts 14. This cover 13 is provided with a radial arm 15 having an opening 16 in the outer end thereof by which it may be secured to one portion of a motor car or other vehicle. Formed integral with the cover 13 are the abutments 17 extending into the chamber 11 and adapted to divide said chamber into two compartments. The cover 13 has a central opening therein in which is positioned the shank 18 of an oscillating

piston 19 having formed integral therewith the radial blades 20 extending into each of the compartments of the chamber 11. The shank 18 has extending outwardly therefrom a squared portion 21 to which is fitted the movable arm 22, the outer end of which is provided with an opening 23 by which it may be secured to another portion of the motor vehicle in any well-known manner. This arm 22 is held in position upon the squared portion 21 of the piston shank 18 by means of the nut 24 threaded to the extension 25, all as indicated in Fig. 3 of the drawings.

The chamber 11 is adapted to be filled with oil or some similar liquid by removing the filling plug 26 and permitting the oil or liquid to flow into said chamber through the passage 27, the air contained within said chamber passing outwardly during this operation through the passage 28. The piston member 19 has a central cavity 29 therein from which extend radial passages 30 to the two compartments of the chamber 11, the ends of which are just in advance of the blades 20. The piston member 19 has also formed therein a larger cylindrical chamber 31 from which extend passages 32, the outer ends of which communicate with the compartments of the chamber 11 immediately the rear of the piston blades 20. The hub 12 of the casing 10 extends into this chamber 31 as clearly indicated in Fig. 3 of the drawings, this hub being provided with an annular peripheral groove 33 registering with the radial passages 32. The wall of the annular hub 12 is provided with a perforation 34 extending from the annular groove 33 to the interior of said hub. Positioned within the hub 12 is a cup-shaped valve member 35, the central cavity 36 therein communicating with the cavity 29 in the piston 19 in alignment therewith. From this central cavity 36 to the periphery of the valve member 35 are a plurality of radial perforations 35* of different diameters, any one of which is adapted to register with the perforation 34 when the valve member 35 is moved about its axis. The valve 35 is provided with a valve stem 37 squared at its outer end and extending through the wall of said casing 10. Secured to the squared portion of said stem 37 by means of the screw 38 is a disk 39 having thereon a plurality of indicators 40 corresponding to the plurality of openings 35*.

The wall of the casing 10 is provided with a suitable index 41 so that when one of the indicators 40 registers with this index 41 the operator knows that the corresponding perforation 35* is in register with the perforation 34. These perforations are of different diameters, the smallest being a $\frac{1}{16}$ " opening, while the largest is a $\frac{1}{4}$ " opening. It is obvious that by turning the indicator disk 39 so as to make any one of the perforations 35* register with the perforation 34, the flow of the oil from one side of the piston blade 20 to the other may be accurately controlled to accommodate the device to different vehicles, some vehicles requiring a larger flow of oil to overcome the shock during the jouncing of the car than is the case with other cars. The outer peripheral wall of the abutments 17 is provided with grooves 42, the rear ends of which are closed by means of the spring plate 43 extending to the peripheral wall of the casing 10. When the blades 20 are moved in the direction of the arrow α on Fig. 2 of the drawings, the oil in advance of said blades will be forced through the grooves 42, thereby forcing the spring plates 43 away from the face of the abutments 17, thus allowing the oil to pass laterally around the edges of said plates from one compartment of the chamber 11 into the other. When the blades 20 move in the opposite direction the pressure of the oil in the compartment will hold the spring plates 43 to their seat, thereby preventing any of the oil passing through the grooves 42. During the movement of the blades in this reverse direction the oil must flow through the passages 32 and thence through the perforations 34 and whichever perforation 35* is registering therewith into the central cavity 36 of the valve member 35 and thence through the piston cavity 29 and passages 30 to the opposite side of the blades 20. As a result of controlling the movement of the oil in this manner when the device is operated to overcome any shock caused by the jouncing of the car as it passes over uneven roads and the oil in advance of the blades has produced the required cushioning effect, the various parts will return to their normal positions as slowly and without jar as the chauffeur may desire, this being readily determined by the setting of the indicator 40.

It is believed that the operation and many advantages of the invention will be thoroughly understood from the foregoing description.

Having thus described my invention, I claim:

1. A shock absorber comprising a casing having a closed chamber containing liquid; an oscillating piston therein provided with radial blades acting upon said liquid; abutments extending into said chamber between said blades and having a plurality of grooves

in the peripheral wall of each; and spring pressed members narrower than said abutments secured to the face thereof with their free outer edges extending to the inner cylindrical wall of said casing, said members being adapted to close said grooves under normal conditions and under abnormal conditions permit the passage of fluid around the sides thereof.

2. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment and an unobstructed connecting passage between said compartments, an axial opening communicating with said unobstructed passage; and means communicating with said opening whereby the liquid in advance of each blade may flow to the rear of said blade.

3. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment, an unobstructed connecting passage between said compartments, and other passages in a different plane from said connecting passage permitting the flow of liquid in advance of each blade through the axis of said piston to the rear of said blade; and means coacting with the last mentioned passages for controlling the flow of said liquid.

4. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment and having a central chamber communicating by two aligned passages with said compartments in advance of said blades and other passages in a different plane from said aligned passages communicating with said compartments in the rear of said blades; and a valve in said central chamber adapted to coact with the last mentioned passages to control the flow of liquid from one side of said blades to the opposite side thereof.

5. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment and having a central chamber communicating by unobstructed passages with said compartments in advance of said blades and other passages in a different plane communicating with said compartments in the rear of said blades; and a valve in said central chamber provided with a plurality of passages of different sizes, adapted to register with the

last mentioned passages and control the flow of liquid from one side of said blades to the opposite side thereof.

6. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment and having a central chamber communicating by unobstructed passages with said compartments in advance of said blades and other passages in a different plane communicating with said compartments in the rear of said blades; a rotary valve in said central chamber adapted to coact with the last mentioned passages and control the flow of liquid from one side of said blades to the opposite side thereof, said valve having a stem extending through said casing; and means secured to said stem for regulating the position of said valve about its axis.

7. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment and having a central chamber communicating by unobstructed passages with said compartments in advance of said blades and other passages in a different plane communicating with said compartments in the rear of said blades; a rotary valve in said central chamber fixed from end movement and adapted to control the flow of liquid from one side of said blades to the opposite side thereof, said valve having a stem extending through said casing; and a graduated disk secured to said stem coacting with an index on said casing for regulating the position of said valve about its axis.

8. A shock absorber comprising a casing having a closed chamber containing liquid and inwardly extending abutments dividing said chamber into two compartments; an oscillating piston provided with a radial blade in each compartment and having a central chamber communicating by unobstructed passages with said compartments in advance of said blades and other passages in a different plane communicating with said compartments in the rear of said blades; and a rotary valve fixed from end movement in said central chamber adapted to coact with the last mentioned passages and control the flow of liquid from one side of said blades to the opposite side thereof controlled from the outside of said casing.

9. A shock absorber comprising a casing having a chamber and a central cylindrical hub extending inwardly into said chamber the periphery of which is provided with an annular groove having a perforation extending inwardly therefrom; a cover there-

for closing said chamber and provided with two abutments extending to the opposite wall of said chamber and dividing it into two compartments; an oscillating piston member provided with a blade in each compartment and having a central opening therein adapted to receive said hub communicating by passages through said piston with said compartments in advance of said blades and having other passages extending therethrough at the rear of said blades and communicating with said central chamber opposite said annular groove; and a rotary valve in said cylindrical hub having a plurality of different sized holes therethrough either of which is adapted to register with said hub perforation.

10. A shock absorber comprising a casing having a chamber and a central cylindrical hub extending inwardly into said chamber the periphery of which is provided with an annular groove having a perforation extending inwardly therefrom; a cover therefor closing said chamber and provided with two abutments extending to the opposite wall of said chamber and dividing it into two compartments; an oscillating piston member provided with a blade in each compartment and having a central opening therein adapted to receive said hub communicating by passages through said piston with said compartments in advance of said blades and having other passages extending therethrough at the rear of said blades and communicating with said central chamber opposite said annular groove; a rotary valve in said cylindrical hub having a plurality of different sized holes therethrough either of which is adapted to register with said hub perforation; and means for locking said rotary valve in adjusted position.

11. A shock absorber comprising a casing having a chamber and a central cylindrical hub extending inwardly into said chamber the periphery of which is provided with an annular groove having a perforation extending inwardly therefrom; a cover therefor closing said chamber and provided with two abutments extending to the opposite wall of said chamber and dividing it into two compartments; an oscillating piston member provided with a blade in each compartment and having a central opening therein adapted to receive said hub communicating by passages through said piston with said compartments in advance of said blades and having other passages extending therethrough at the rear of said blades and communicating with said central chamber opposite said annular groove; a rotary valve in said cylindrical hub having a plurality of different sized holes therethrough either of which is adapted to register with said hub perforation; a graduated scale secured to and revoluble with said valve; and means

for locking said rotary valve in adjusted position.

12. A shock absorber comprising a casing having a chamber and a central cylindrical hub extending inwardly into said chamber the periphery of which is provided with an annular groove having a perforation extending inwardly therefrom; a cover therefor closing said chamber and provided with two abutments dividing said chamber into two compartments; an oscillating piston member provided with a blade in each compartment and having a central opening therein adapted to receive said hub communicating by passages with said compartments in advance of said blades and having other passages in a different plane communicating with said annular groove and extending to said compartments in the rear of said blades; and a rotary valve in said cylindrical hub having a plurality of different sized holes therethrough either of which is adapted to register with said hub perforation.

13. A shock absorber comprising a casing having a chamber and a central cylindrical hub extending inwardly into said chamber the periphery of which is provided with an annular groove having a perforation extending inwardly therefrom; a cover therefor closing said chamber and provided with two abutments dividing said chamber into two compartments; an oscillating piston member provided with a blade in each compartment and having a central opening therein adapted to receive said hub communicating by passages with said compartments in advance of said blades and having other pas-

sages in a different plane communicating with said annular groove and extending to said compartments in the rear of said blades; and a rotary valve fixed from end movement in said cylindrical hub having a plurality of different sized holes therethrough either of which is adapted to register with said hub perforation.

14. A shock absorber comprising a casing having a chamber and a central cylindrical hub extending inwardly into said chamber the periphery of which is provided with an annular groove having a perforation extending inwardly therefrom; a cover therefor closing said chamber and provided with two abutments dividing said chamber into two compartments; an oscillating piston member provided with a blade in each compartment and having a central opening therein adapted to receive said hub communicating by passages with said compartments in advance of said blades and having other passages in a different plane communicating with said annular groove and extending to said compartments in the rear of said blades; a rotary valve in said cylindrical hub having a plurality of different sized holes therethrough either of which is adapted to register with said hub perforation; and means for locking said rotary valve in adjusted position.

Signed by me at 4 Post Office Sq., Boston, Mass., this 1st day of June, 1912.

PAUL SZYDLOWSKI.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."