J. A. McKNIGHT.

SHOCK ABSORBER.

APPLICATION FILED APR. 8, 1914.

1,104,064.

Patented July 21, 1914.

3 SHEETS—SHEET 1.

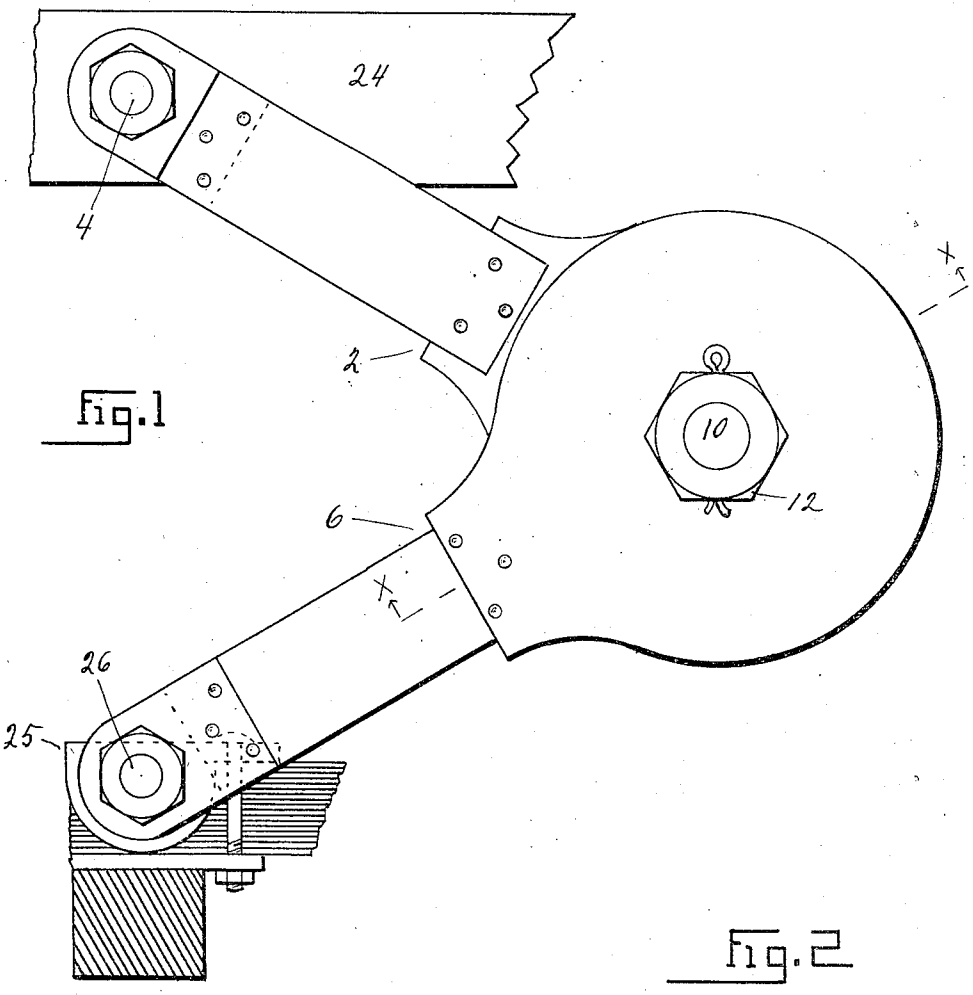
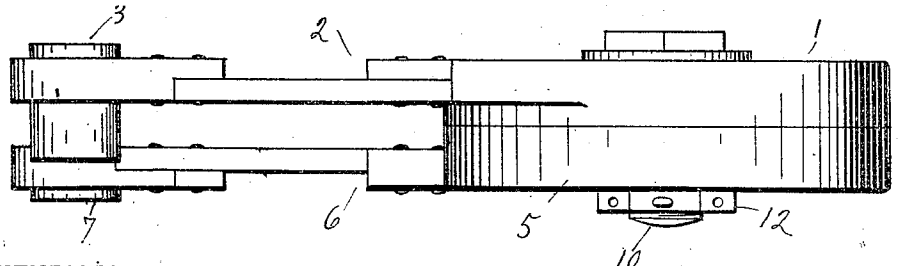


Fig. 1

Fig. 2



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3 SHEETS—SHEET 3.

Fig. 3

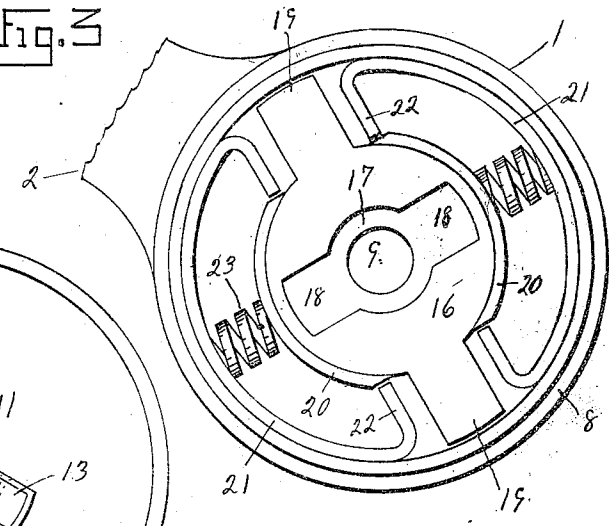


Fig. 4

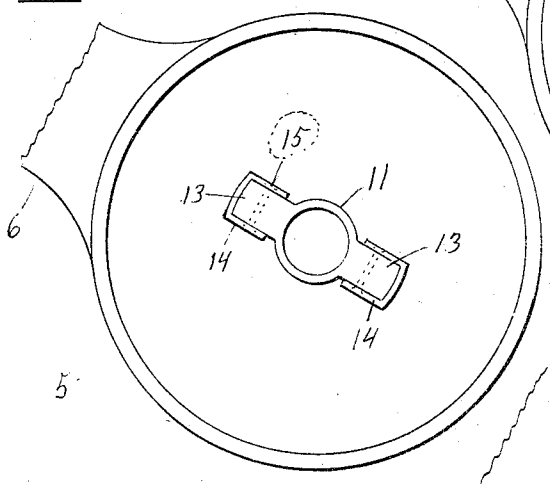


Fig. 5

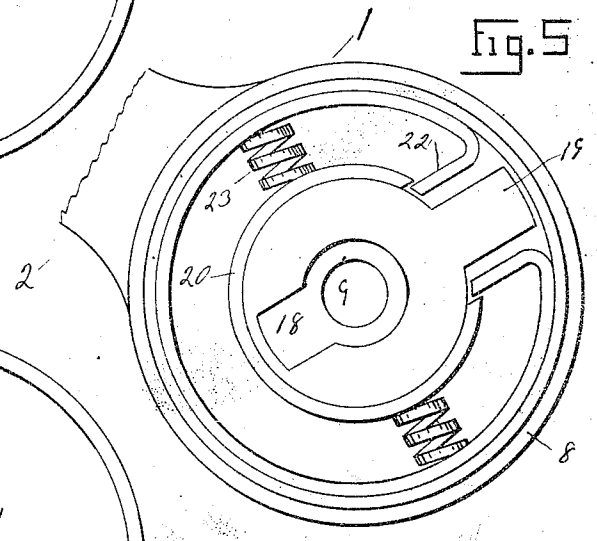
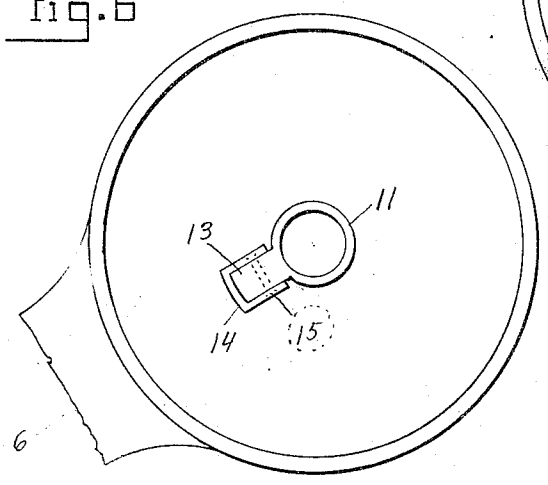


Fig. 6



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APPLICATION FILED APR. 8, 1914.

1,104,064. **Patented July 21, 1914.**

3 SHEETS—SHEET 3.

Fig. 7

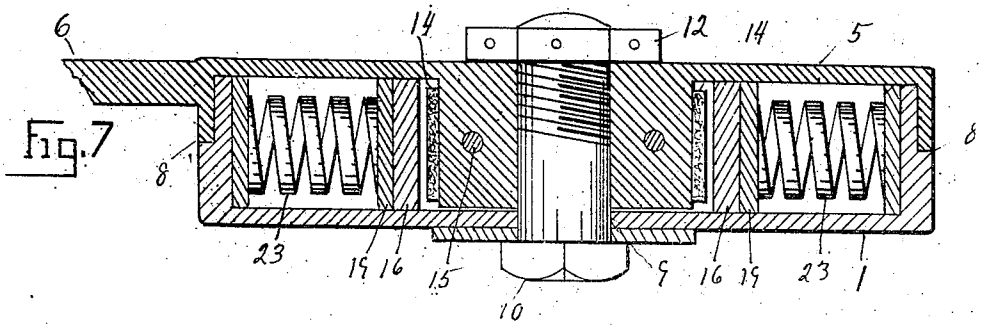


Fig. 9

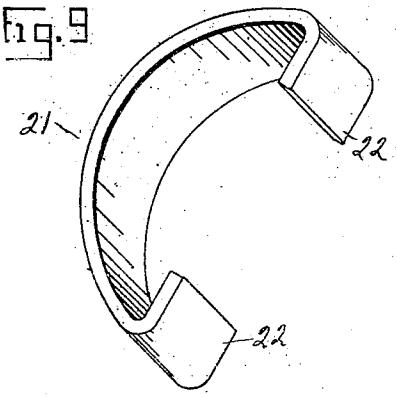


Fig. 8

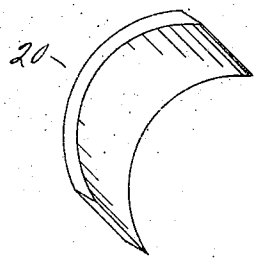


Fig. 11

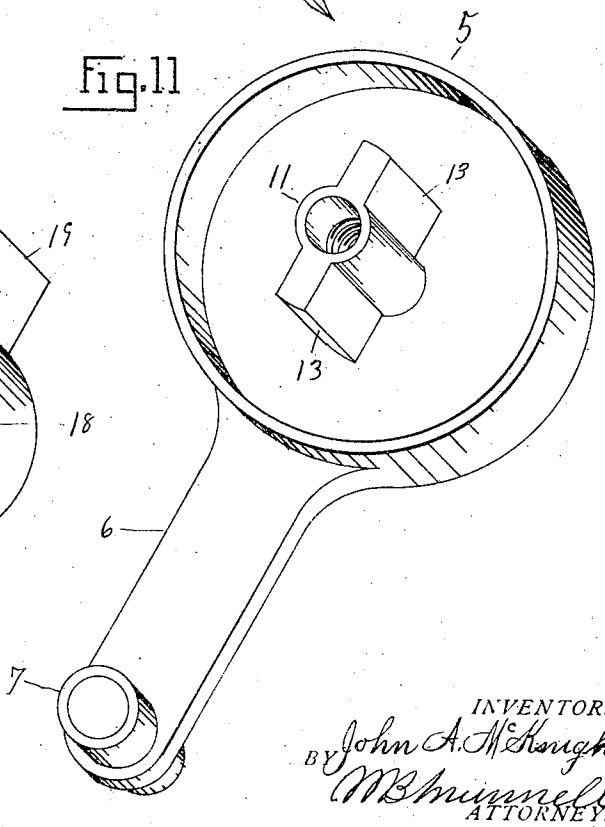
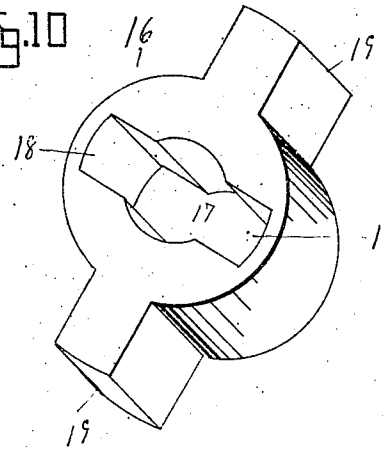


Fig. 10



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JOHN A. McKNIGHT, OF LOUISVILLE, KENTUCKY, ASSIGNOR TO THE MILLNITE MFG. CO., A CORPORATION OF KENTUCKY.

SHOCK-ABSORBER.

1,104,064. Specification of Letters Patent. Patented July 21, 1914.

Application filed April 8, 1914. Serial No. 830,320.

To all whom it may concern:

Be it known that I, JOHN A. McKNIGHT, a citizen of the United States, residing at the city of Louisville, in the county of Jefferson and State of Kentucky, have invented certain new and useful Improvements in Shock-Absorbers, of which the following is a specification.

This invention relates to improvements in devices for minimizing the shock due to the reaction of springs positioned between the body and axle of a vehicle.

An object is to provide a device in which the resistance to the action of the springs is increased by graduated steps.

Another object is the provision of a device in which the wearing of the friction elements will not destroy the efficiency thereof.

A further object is to provide a device of the character described that will be economical in construction and efficient in service.

With the foregoing and other objects in view the invention consists of the novel construction and arrangement of parts illustrated in the accompanying drawings, comprising three sheets, which form a part of this specification, in which is set forth an embodiment of the invention, but it is to be understood that changes, variations and modifications may be resorted to that come within the scope of the appended claims.

In the drawings, in which like reference characters designate corresponding parts in the several views; Figure 1, is an elevation of the invention as applied for service; Fig. 2, a side elevation; Fig. 3, a plan view, with the cap removed and the arm broken away; Fig. 4, a plan of the inner side of the cap, with an arm broken away; Figs. 5, and 6, modifications respectively of Figs. 3 and 4; Fig. 7, a section on line X—X of Fig. 1; Fig. 8, a perspective of the inner brake shoe; Fig. 9, a perspective of the outer brake shoe; Fig. 10, a perspective of the intermediate member; Fig. 11, a perspective of the cap.

Referring to the drawings —1— designates a cupped-shaped casing from the periphery of which extends an arm —2—, provided on its outer end with a sleeve —3—, through which a bolt —4— may be passed for the purpose of attachment to a movable part of the vehicle. A cap, or cover —5— has an arm —6— extending from the periphery thereof, said arm having on its outer end a sleeve —7— through which a bolt may be passed for attachment to a part of a vehicle. The arms 2 and 6 may be sectional, as shown in Figs. 1 and 2, or integral as shown in Fig. 11. The cap 5 fits over the casing 1, seating on an exterior, annular seat —8—, in such manner that dust and moisture will be excluded from the interior of the casing, while permitting free relative rotary movement of the two parts. The casing has a central apperture —9— through which passes a screw threaded bolt —10— that engages in a lug —11—, integral with and extending in from the cap, the bolt being provided with a lock-nut —12— that prevents the bolt from becoming loose from vibration. The bolt 10 holds the cap in position on the casing. The lug 11 has lateral extensions, or wings —13— on which is disposed a layer of suitable sound-deadening material —14—, such as leather, that may be secured in place by any suitable means, such as rivets —15—. An intermediate member —16—, centrally positioned within the casing 1, has a central perforation —17— and lateral slots —18—, radiating therefrom, for the reception of the lug 11 and associated wings 13. On the exterior of the intermediate member are lateral extensions, or wings —19—, which extend to the walls of the casing. The lug 11 may have a pair of oppositely disposed wings as shown in Fig. 4, or a single wing as shown in Fig. 6. The intermediate member may have a pair of oppositely disposed slots 18 and a pair of oppositely disposed arms 19 arranged at right angles to the slots, as shown in Fig. 3, or a single slot and single arm arranged in the same radial line, as shown in Fig. 5. The wings 13 lie within the slots 18, and are of less thickness than the width of the slots, the arrangement being such that the cap 5 may have a limited movement relative to the casing 1 before the wings strike the sides of the slots, and advance the intermediate member.

Concavo-convex brake shoes —20— bear on opposite sides of the intermediate member 16, and offer frictional resistance to its movement, during a portion of its travel. A pair of concavo-convex brake shoes —21—, having inward extensions —22— on each end thereof, bear against the inner surface of the walls of the casing 1. A plurality of springs —23— positioned between, and bearing on the inner and outer brake shoes serve to

force the shoes respectively against the intermediate member and the wall of the casing and resist the relative movement thereof. The relatively movable parts 1 and 5 may be attached to relatively movable parts of the vehicle by suitable means, such as the bolt 4 passing through the sleeve 3 and engaging in a part —24— of the body of the vehicle, and a bolt —26— passing through the sleeve 7 and engaging suitable means such as an ear carried by a spring-clip —25—. But one spring 23 is shown on either side, between the inner and outer brake shoes, but it is to be understood that as many may be employed as the requirements demand.

In Fig. 3, the position of the different members is that assumed when the vehicle, to which the absorber is attached, is traveling under normal conditions over a smooth surface. The space between the wings 13 and the sides of the slots 18 is arranged to allow of a limited movement of the body of the vehicle relative to the axle with out bringing resistance offered by the brake shoes into service. When the body approaches the axle a distance to bring the wings 13 into contact with the walls of the slots in the intermediate member, said member will be carried therewith against the friction of the brake shoes 20: when the distance traveled is sufficient to bring the arms 19 against the extensions 22 on the outer brake shoes, the movement of the intermediate member relative to the inner shoes will cease, and said member will advance the outer shoes, and the additional resistance due to the larger area of frictional contact of the outer brake shoes will be offered to the movement of the body. It is to be observed that the initial movement of the intermediate member is opposed by the inner brake shoes, but that owing to the greater area of frictional contact the outer brake shoes do not move therewith. After a predetermined extent of travel the arms 19, on the intermediate member impinge on the extension 22 of the outer brake shoes and advance them simultaneously. As the intermediate member picks up the outer brake shoes, the movement thereof relative to the inner shoes ceases and the added resistance to torque is the difference between the frictional area of the inner and outer brake shoes. In Fig. 5, is illustrated a modification wherein only one inner and one outer brake shoe is employed, they being nearly circular, instead of arcuate, on the rebound, or movement of the body from the axle, the sequence of actions is the same, but in the reverse direction. It is thought that the manifold advantages, and operation of the invention may be clearly understood from the foregoing without more extended description.

Having thus described the invention so that any one skilled in the art pertaining thereto may make and use the same, I claim;—

1. A shock absorber comprising a casing, a cover therefor, an intermediate member engaged by said cover, friction members between said intermediate member and said casing, said cover adapted to advance said intermediate member against the resistance of certain of said friction members and to engage and simultaneously advance certain other members against their friction with said casing.

2. In a shock absorber, a casing, a cover therefor, an intermediate member positioned in said casing, a lug on said cover adapted to engage said member, a brake shoe embracing a major portion of said member, a brake member in contact with a major portion of the wall of said casing, springs positioned between said shoes, a projection on said intermediate member adapted to engage the shoe in contact with casing wall.

3. In a shock absorber, a casing, a cover for said casing, an intermediate member engageable by said cover, a plurality of friction couples disposed between said intermediate member and said casing, said couples comprising inner and outer members, springs between said members forcing same respectively against said casing and intermediate member, projections on said intermediate member adapted to engage said members and advance same simultaneously.

4. In a shock absorber, a casing, a cover rotatably seated on said casing, an intermediate member positioned in said casing, a lug on said cover entering said member, a bolt passing through said casing and engaged in said lug, a projection on said lug adapted to engage said member, a brake shoe in contact with said member, a brake shoe in contact with the wall of said casing and a projection on said member adapted to engage said second mentioned brake shoe and advance same.

5. In a shock absorber, a casing and a cover, said casing and cover relatively rotatable, a bolt connecting said casing and cover, an intermediate member within said casing, means associated with the cover for engaging said member, brake shoes in contact with said member, brake shoes contacting with the wall of said casing, means associated with said member for simultaneously engaging said second mentioned brake shoes.

6. In a shock absorber, a casing and a cover therefor rotatably associated, arms extending from the periphery of each thereof, an intermediate member positioned within said casing, a plurality of inner brake shoes bearing on said member, a plurality of outer brake shoes bearing against the wall of the casing, springs positioned between

said brake shoes, a lug on said cover adapted to engage and advance the intermediate member relative to said brake shoes, and a projection on said intermediate member adapted to simultaneously engage and advance said outer brake shoes.

7. In a shock absorber, an open ended casing, an arm extending from the periphery thereof, a cover rotatably secured on said casing, an arm extending from the periphery of said cover, an intermediate member within the casing, a lug on said cover adapted to advance said member, inner and outer brake shoes bearing respectively on said member and the wall of said casing, springs between said inner and outer shoes, a projection on said member adapted to advance the outer brake shoes simultaneously.

8. In a shock absorber, a casing, a cover rotatably secured thereon, an intermediate member positioned in said casing, said member, provided with a radial slot, a lug on the cover fitting loosely in said slot, inner and outer brake shoes bearing respectively on said member and the wall of the casing and an arm on said member adapted to advance the outer brake shoes simultaneously.

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