

P. M. FREER.
SHOCK ABSORBER.
APPLICATION FILED JAN. 25, 1909.

930,468.

Patented Aug. 10, 1909.

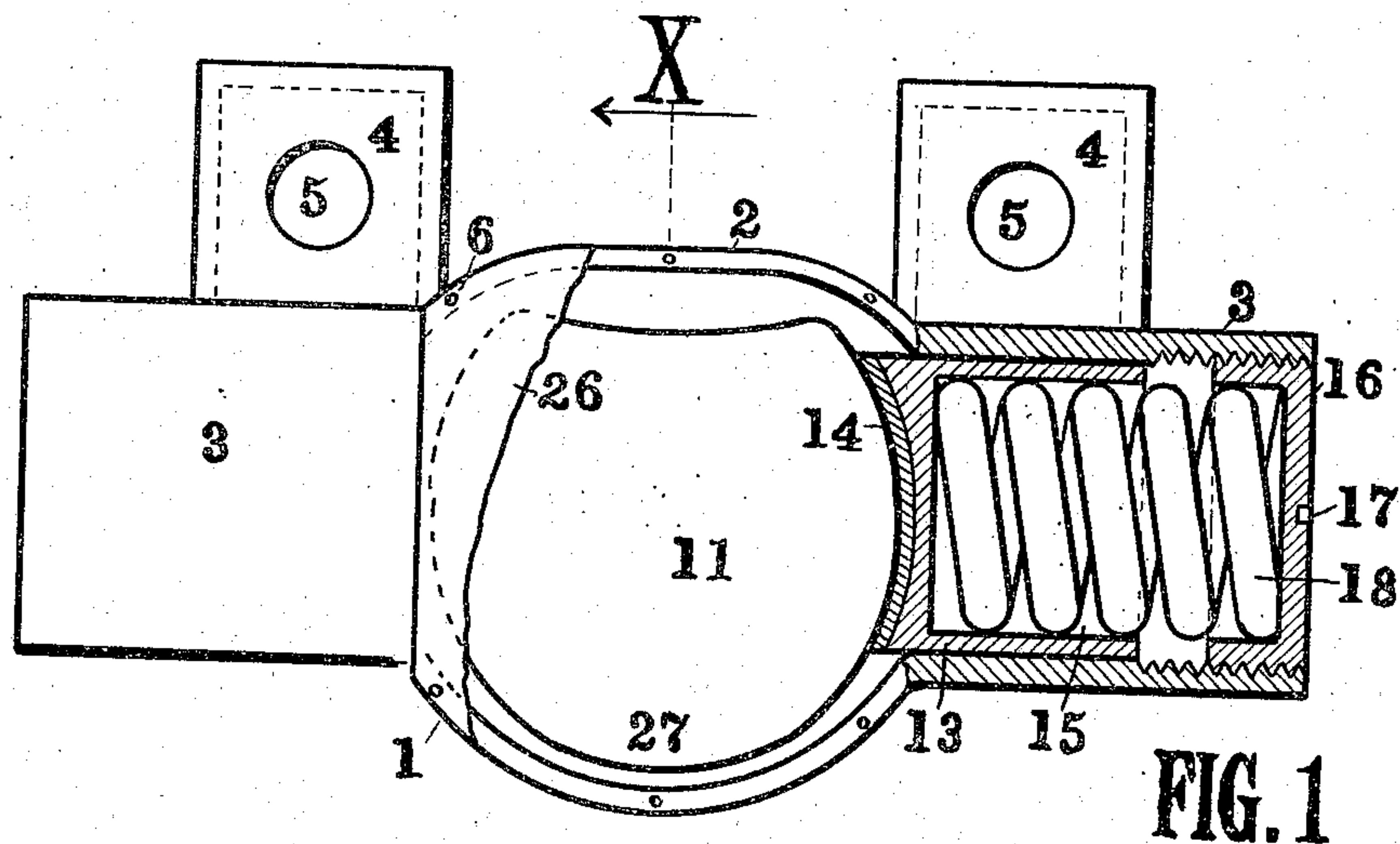


FIG. 1

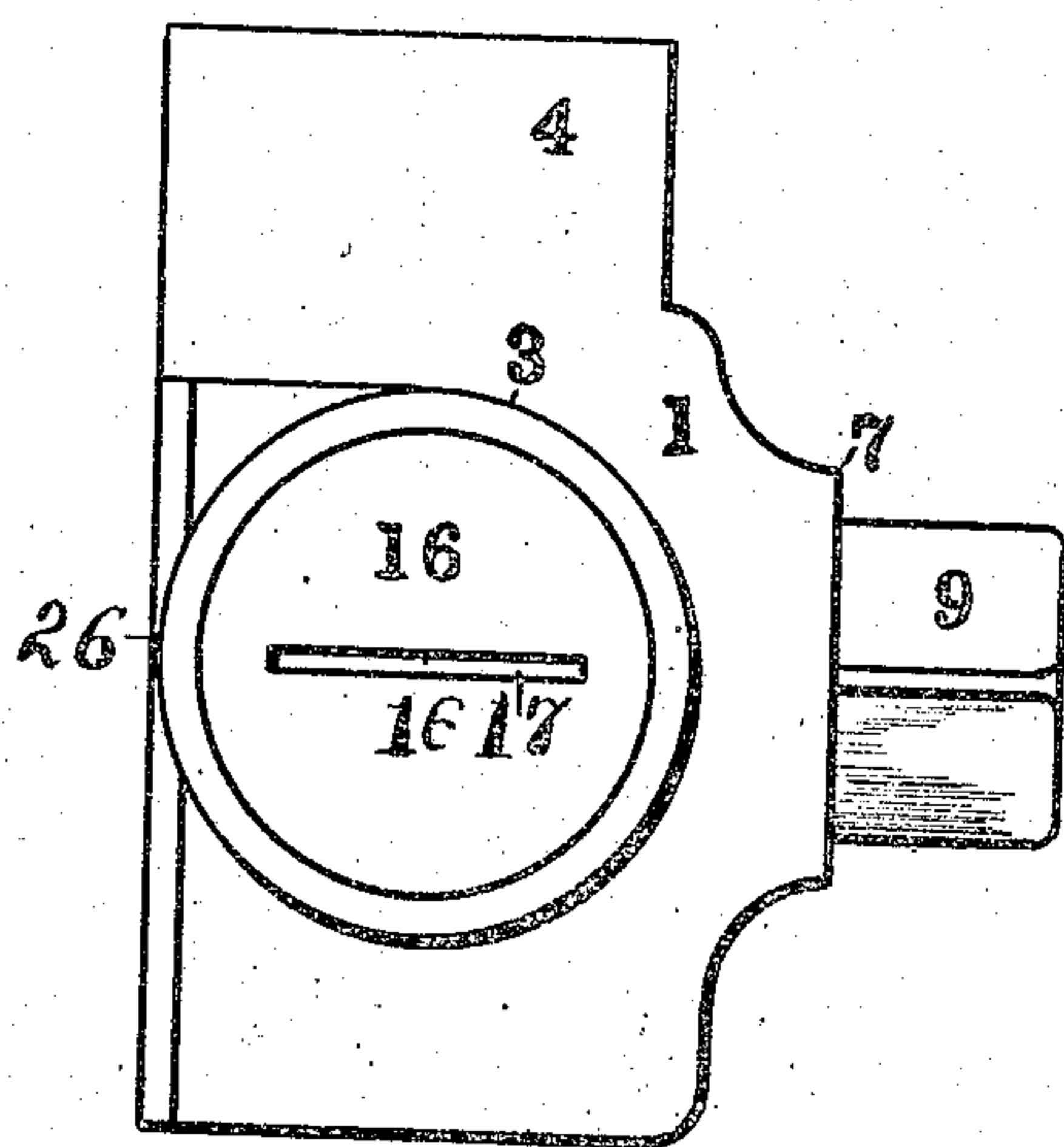


FIG. 2

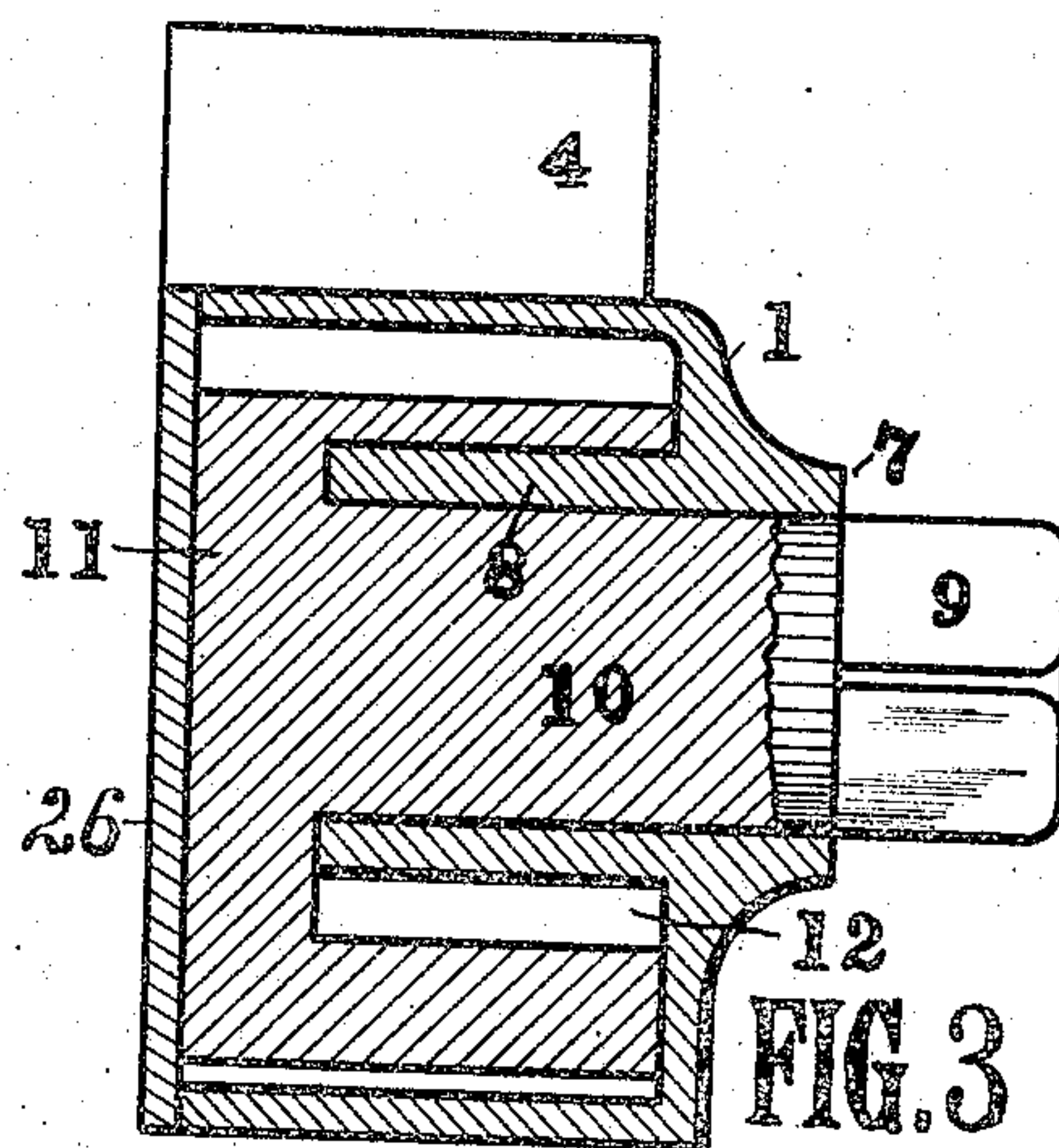
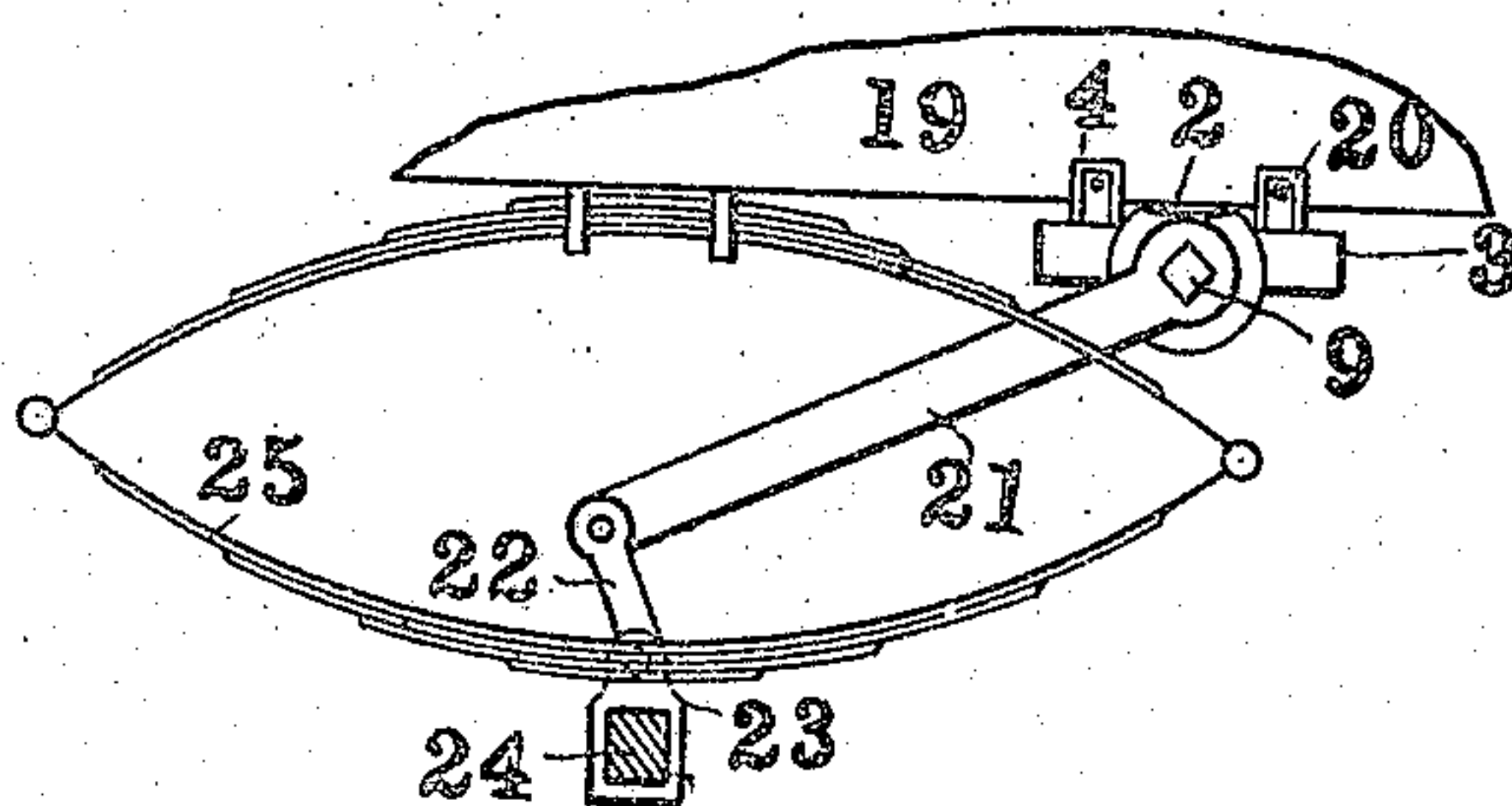


FIG. 3

FIG. 4



WITNESSES

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SHOCK-ABSORBER.

No. 930,468.

Specification of Letters Patent.

Patented Aug. 10, 1909.

Application filed January 25, 1909. Serial No. 474,077.

To all whom it may concern:

Be it known that I, PHELPS M. FREER, a citizen of the United States, residing at Lansing, in the county of Ingham and State of Michigan, have invented new and useful Improvements in Shock-Absorbers, of which the following is a specification.

This invention relates to shock absorbers designed to absorb or neutralize a shock communicated from one instrumentality to the other through the medium of springs and the object thereof is to provide a device of the class named primarily designed for use in connection with self-propelled vehicles to absorb or neutralize the sudden shock incident to the use of vehicle springs, to prevent transmission of a sudden vertical movement of the axle relative to the body of the vehicle.

A further object of this invention is to provide a device which will be simple, strong, durable in use, easily manufactured, possessed of a high degree of efficiency and one which is capable of employment in connection with any type of springs, either those in use on a vehicle or elsewhere.

A still further object of this invention is to so construct the device that it may be applied to vehicles after their completion with little or no alteration in the general make up thereof, thereby making it a substantially universally applicable device.

With the foregoing and other objects in view, the invention consists in the novel construction, combination and arrangement of parts constituting the invention to be hereinafter specifically described and illustrated in the accompanying drawings which form a part hereof wherein is shown the preferred embodiment of the invention, but it is to be understood that changes, variations and modifications can be resorted to which come within the scope of the claims hereunto appended.

In the drawings, in which similar reference numerals indicate like parts in the different figures: Figure 1 is a view in side elevation of the rear face of the device with a portion thereof broken away to better illustrate the interior thereof. Fig. 2 is a view in end elevation looking from the right in Fig. 1. Fig. 3 is a vertical, central, transverse sectional view on line X of Fig. 1; and, Fig. 4 is a view in side elevation of the device shown in Figs. 1 and 2 in operative re-

lation with respect to the rear portion, axle and springs of a vehicle.

In the drawings, 1 denotes a casing which embodies a central enlarged hollow body portion 2 from which extend a pair of oppositely-disposed tubular members 3, 3. Preferably formed integral with the casing are a pair of lugs 4 provided with openings 5 through which may be passed holdfast devices for suitably supporting the device. One side of the body portion 2 of the casing 1 is open and may be closed through the medium of a cover 26 held in position by screws 6 or their equivalents. The opposite wall of the body portion 2 is provided with an outwardly-projecting annular beading 7 and an integral bushing 8, the latter projecting into the interior of the body portion 2.

The opening surrounded by the bushing 8 constitutes a bearing for a rotatable member having an outwardly-projecting and preferably squared shank 9 formed integral with a cylindrical portion 10 which has on its inner end a cam-shaped portion 11. The cam-shaped portion 11 is provided with an annular recess 12 to receive the inwardly-extending bushing 8 and is adapted to rotate with the cylindrical portion 10 as a center in the bushing 8 as a bearing. The portion of the cam having the greatest radius is indicated in the drawings by the reference numeral 27.

The tubular members 3 are preferably formed integral with the casing 1 and have cylindrical interiors, in each of which is mounted a slidable plunger 13 having the front end thereof preferably provided with a wear-resisting substance 14 such as vulcanized fiber which is formed upon curvilinear lines corresponding in contour to the outer periphery of the face of the cam-shaped portion 11 and adapted to bear thereon. The plungers on opposite sides are approximately diametrically disposed to each other and are further preferably placed with their axes in alinement. The rear portion of each of the plungers 13 is recessed at 15 for a purpose to be later described.

The outer ends of the tubular members 3 are preferably interiorly threaded to receive a cup-shaped closure device 16 exteriorly threaded to engage the same. The outer faces of each of the closure members 16 is

further provided with some means such as a slot 17 to receive a suitable tool for adjusting the position thereof in the end of the tubular member 3.

5 Mounted in the recess 15 and the interior of the cup-shaped closure member 16 on each side of the device is a coiled resilient element 18 the normal tendency of which is to force the inner face of the plunger 13, in connection with which it is used, against the outer periphery of the cam-shaped portion 11 for resisting the rotation thereof and constituting a braking member therefor. The tension of the spring 18 may be readily adjusted by inserting a suitable tool in the slot 17 and changing the position of the cup-shaped closure member 16 with respect to the member 3.

10 It will be noted that in Fig. 1 only one of the tubular members is shown with the wall thereof broken away, to better illustrate its interior construction, but it will be obvious that the description which has just been given with reference to the mechanism described therein applies with equal force to the mechanism of the tubular member situated on the opposite side of the cam-shaped portion 11.

20 In setting up a device embodying the structure just described, the cover 26 is removed and the rotatable member positioned in its seat in the bushing 8 with the squared shank 9 thereof projecting forwardly, after which the cover 26 is replaced. The two closure members 16 are then removed and the plungers 13 inserted in the cylindrical openings in the tubular members 3, after which the springs 18 are positioned. The plungers are then forced into operative and breaking engagement with the exterior periphery of the cam-shaped portion by screwing the closure members 16 to place.

25 When the device is set up as just described, the springs 18 are under a partial tension when the cam-shaped portion 11 is in its normal position with the plungers 13 bearing against opposite sides thereof, which engagement prevents the cam returning to its normal position when partially rotated without the employment of extraneous force applied to the shank end thereof and as the pressure exerted by the springs 18 is applied on opposite sides of the cam, as already noted, the thrust on the bearing in which the member 10 is mounted is to a large extent eliminated.

30 The operation of the device is shown diagrammatically in Fig. 4 in which the device is secured to the frame 19 of a vehicle by holdfast devices 20 with the lower end thereof depending. A lever 21 is then attached to the squared shank 9 and its opposite end is pivotally-connected to a member 23 fixedly-secured to an axle 24 of the vehicle, which is also provided with ordinary elliptical springs 25.

It will be obvious of course that the device may be attached to the axle of a vehicle and the link 22 pivotally-attached to the frame 19, thereby reversing the position of the members; but the device performs the same function in either position. The vertical movement of the axle 24 of the vehicle during its progress over the roadway will cause the link 22 to oscillate the lever 21 causing thereby a rotary movement of the rotatable member in its bearing. This rotary movement is resisted by the frictional contact of the peripheral portion thereof on the plungers 13 held against it by the resilient action of the springs 18 which maintain constant resistance to the rotation of the cam-shaped portion 11 in either direction. It will be noted that when the cam-shaped portion 11 is rotated the tendency will be to bring those portions thereof which have the greater radii and which are designated in the drawings by the reference numeral 27 into engaging relation with one or the other of the plungers 13, thereby increasing the frictional resistance to the rotation thereof after the first portion of the rotation has commenced, thereby so constituting the device that slight rotations of the cam-shaped portion 11 will be resisted with less force than where the rotation is greater. From this it will be seen that slight shocks which would be normally transmitted from one instrumentality to the other are resisted with less force than greater shocks, and the greater the movement of one instrumentality with respect to the other the greater will be the rotation of the cam-shaped portion 11, thereby producing greater resistance to its movement, due to the compressing of the springs 18 by bringing the portion 27 of the cam-shaped portion 11 into engagement with the inner forward end of the plungers 13, and which, by reason of its greater radius will tend to compress the springs and increase their effective force.

35 From the foregoing it will be seen that this device affords an unusually simple and effective means to neutralize or absorb a sudden relative movement of one instrumentality, such as the axle of a vehicle, with respect to the position of any instrumentality, such as the body, and while this device has been described with reference to and in connection with a vehicle, its usefulness in other places will be apparent.

40 What I claim and desire to secure by Letters Patent, is:—

1. A device for neutralizing or absorbing the shock incident to the movement of two instrumentalities connected by a spring, comprising a rotatable element suitably-supported by one of said instrumentalities, provided with a cam-shaped portion, an arm having one end thereof connected with said element for rotating the same, the opposite

end of said arm being pivotally-connected to a complementary instrumentality, a radially-shiftable plunger constituting a brake shoe, the inner face of which is provided with wear-resisting material and fashioned to engage the outer periphery of said cam-shaped portion and a coiled resilient element adapted to force the wear-resisting material carried by said plunger into frictional engagement with the outer surface of said element.

2. A device for neutralizing or absorbing the shock incident to the movement of two instrumentalities connected by a spring, comprising a casing suitably supported by one of said instrumentalities, provided with a bearing, a rotatable element provided with a cam-shaped portion mounted in said bearing, an arm having one end thereof connected with said element for rotating the same, the opposite end of said arm being pivotally-connected to a complementary instrumentality, said casing provided with an extension arranged approximately radially to the axis of said element, a shiftable element mounted in said extension, the inner face adapted to bear on the outer periphery of said cam-shaped portion and a resilient element for causing cooperation between said shiftable element and the periphery of said cam-shaped portion.

3. A device for neutralizing or absorbing the shock incident to the movement of two instrumentalities connected by a spring, comprising a casing suitably supported by one of said instrumentalities provided with a bearing, a rotatable element provided with a cam-shaped portion mounted in said bearing, an arm having one end thereof connected with said element for rotating the same, the opposite end of said arm being pivotally-connected to a complementary in-

strumentality, said casing provided with an extension approximately radial to the axis of said rotatable element, a shiftable member having the inner face thereof fashioned to engage the cam-shaped portion of said element, mounted in said extension, a resilient element within said extension and a closure device constituting an abutment for the outer end of said resilient element to enable the latter to force said shiftable member into frictional engagement with the cam-shaped portion of said rotatable element.

4. A device for neutralizing or absorbing the shock incident to the movement of two instrumentalities connected by a spring, comprising a casing suitably supported by one of said instrumentalities, provided with a bearing, a rotatable element provided with a cam-shaped portion mounted in said bearing, an arm having one end thereof connected with said element for rotating the same, the opposite end of said arm being pivotally-connected to a complementary instrumentality, said casing provided with an extension disposed radially with respect to the axis of said element, a shiftable member carried by said extension, the inner face of which is fashioned to engage the periphery of said cam-shaped portion, means carried by said extension for yieldingly holding said shiftable member in operative position and adjustable means on said extension adapted to constitute an abutment for said yieldable means.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PHELPS M. FREER.

Witnesses:

JAMES HARRIS,
S. L. KILBOURNE.