L. A. PECKHAM.

SHOCK ABSORBER.

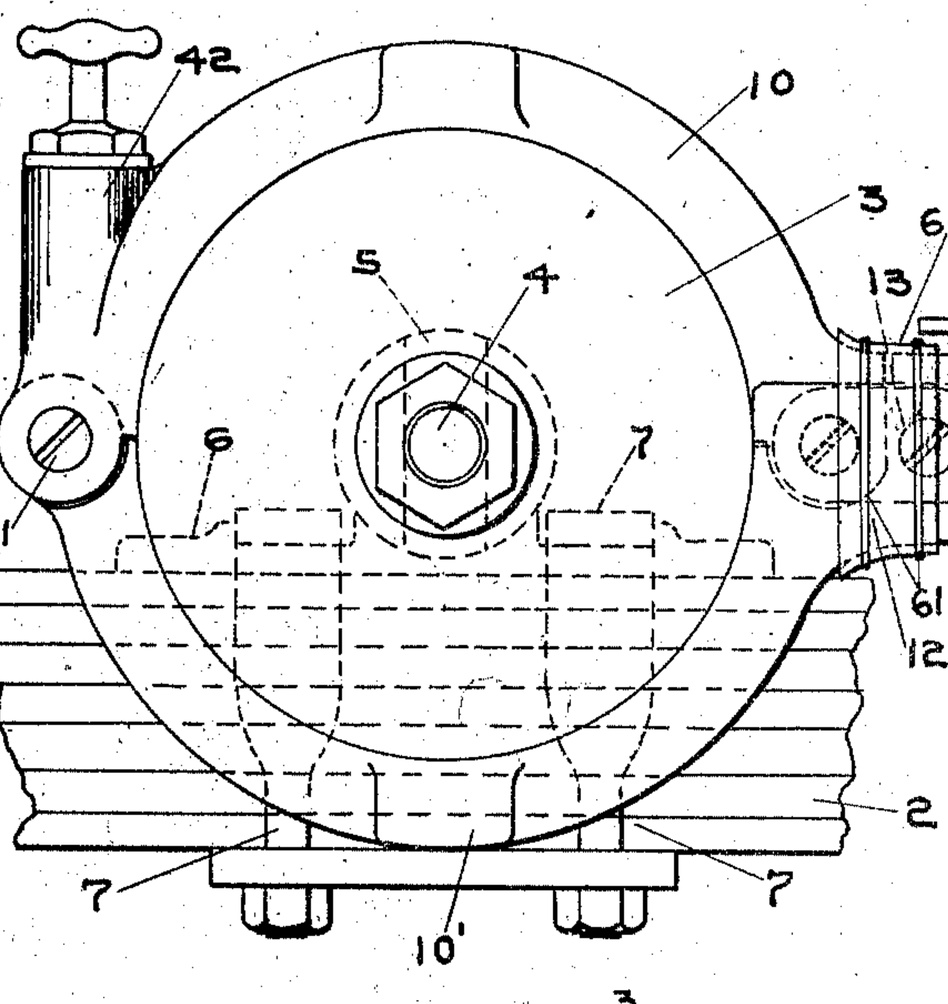
APPLICATION FILED APR. 6, 1910.

989,408.

Patented Apr. 11, 1911.

2 SHEETS—SHEET 1.

Fig. 1



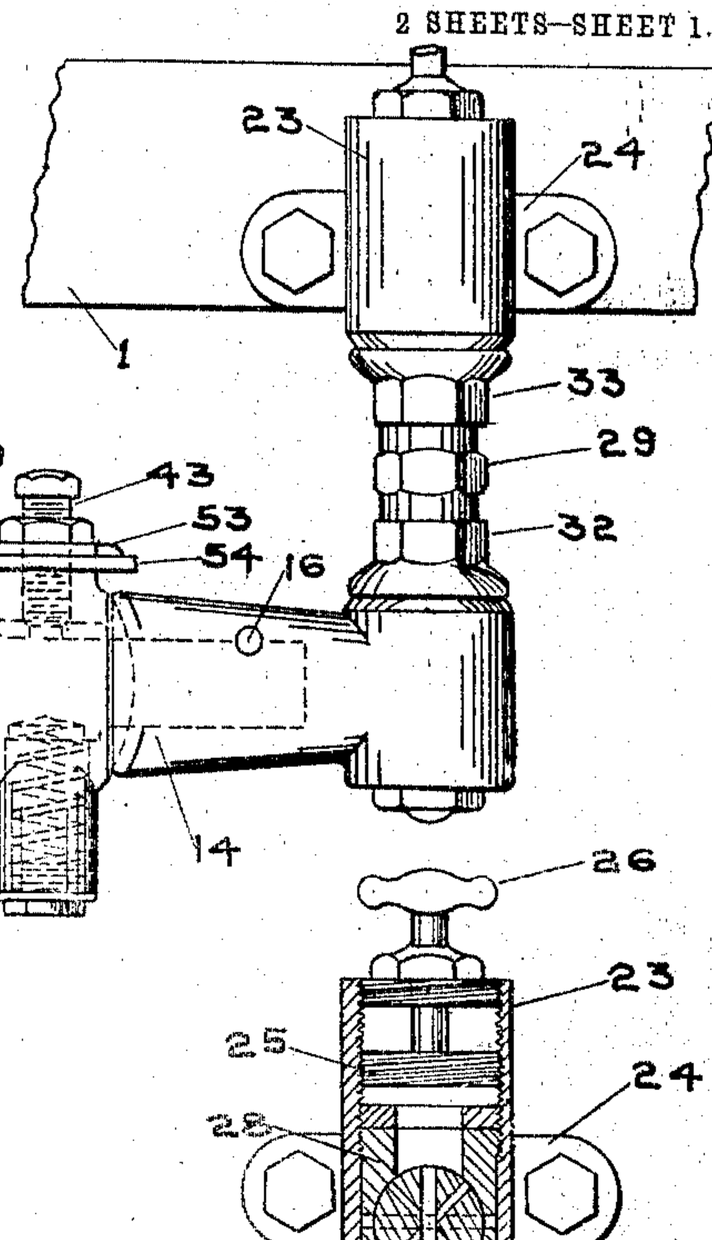


Fig. 2

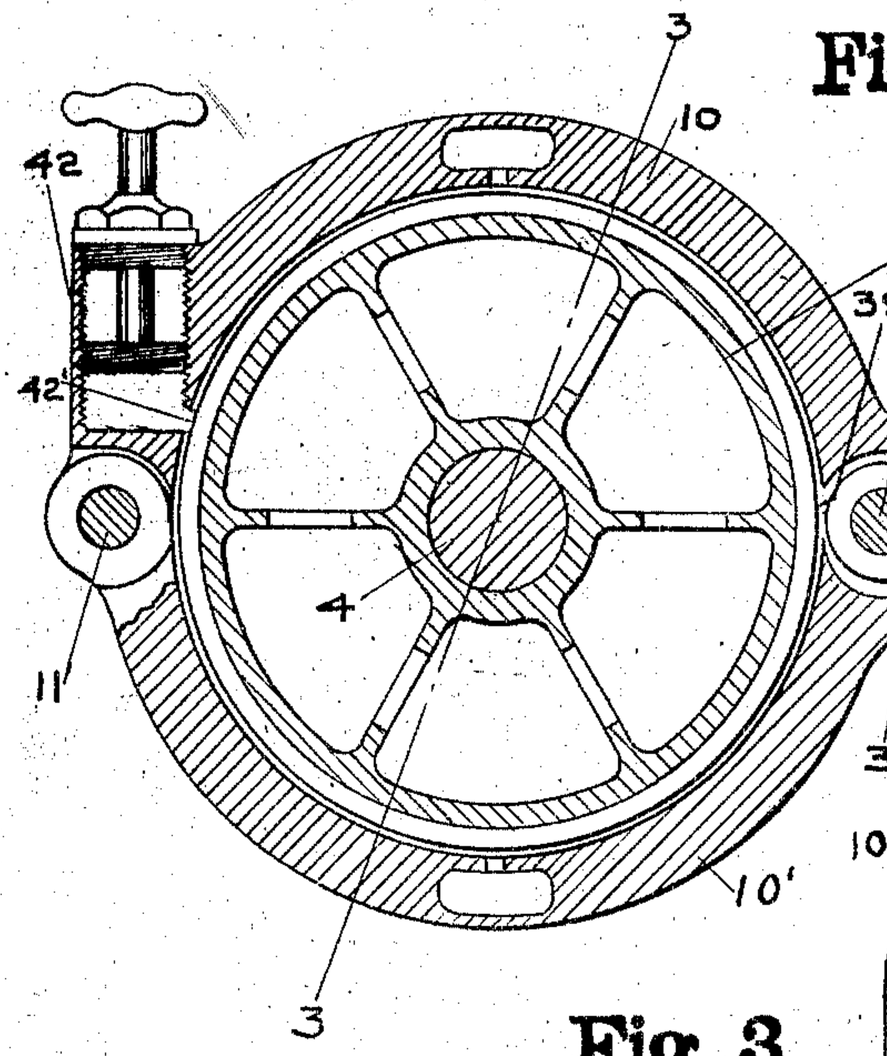
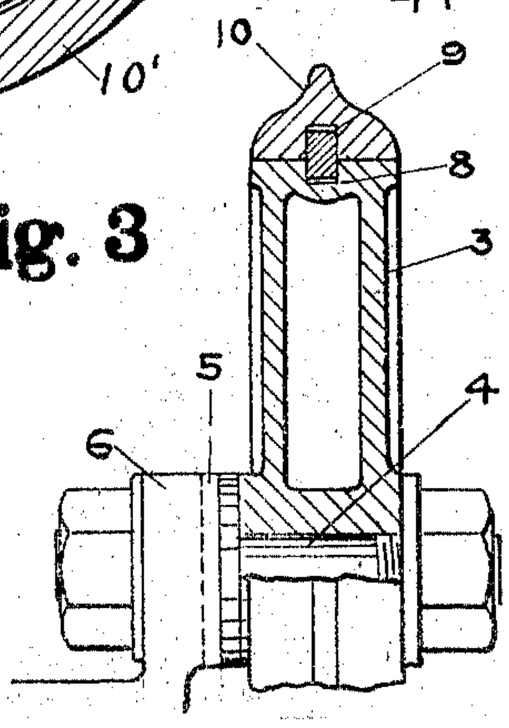
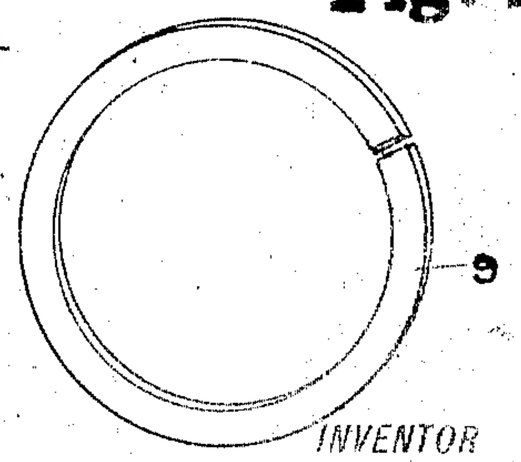


Fig. 4

Fig. 3





WITNESSES

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2 SHEETS—SHEET 2.

Fig. 5

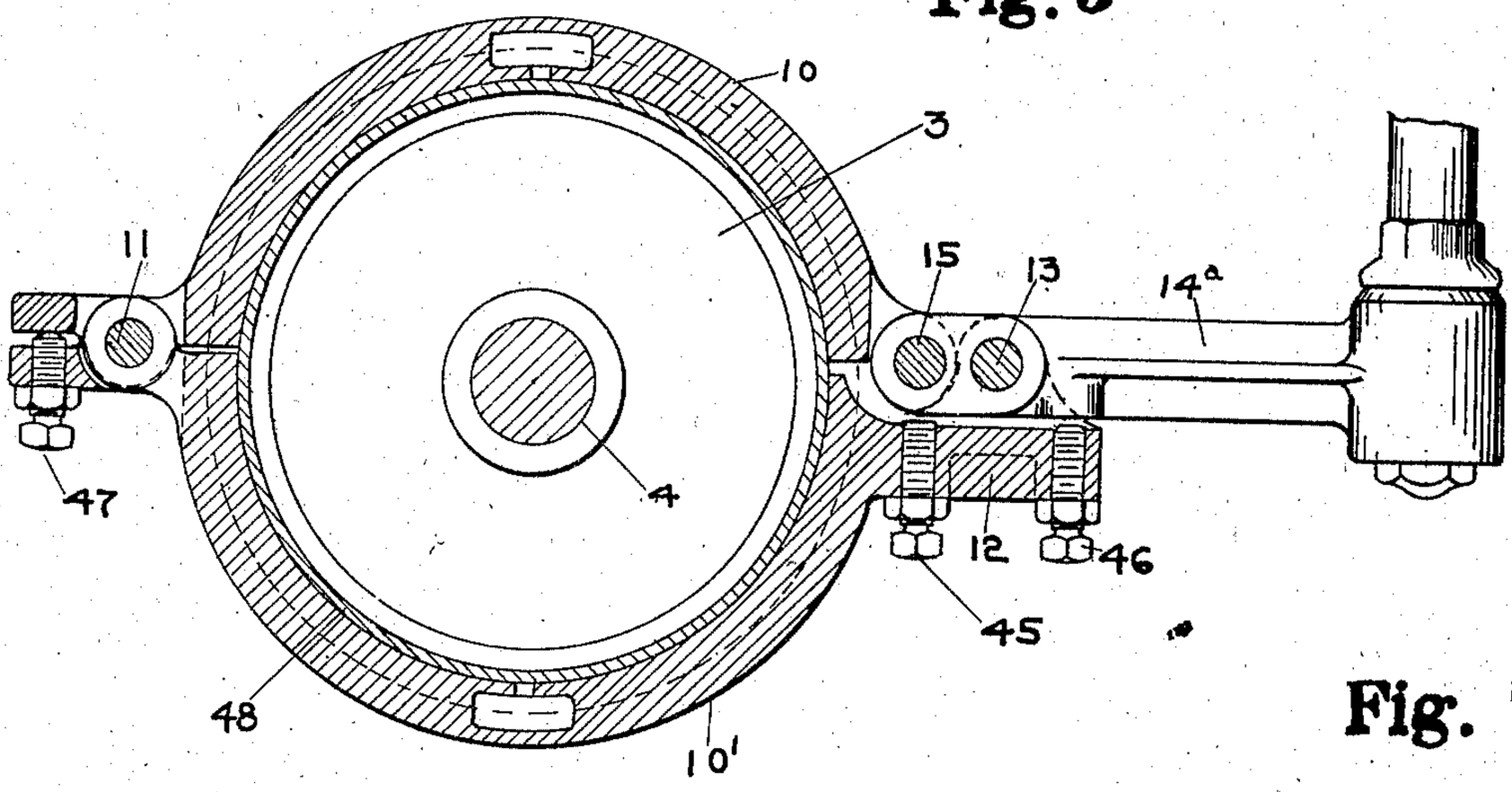

Fig. 6

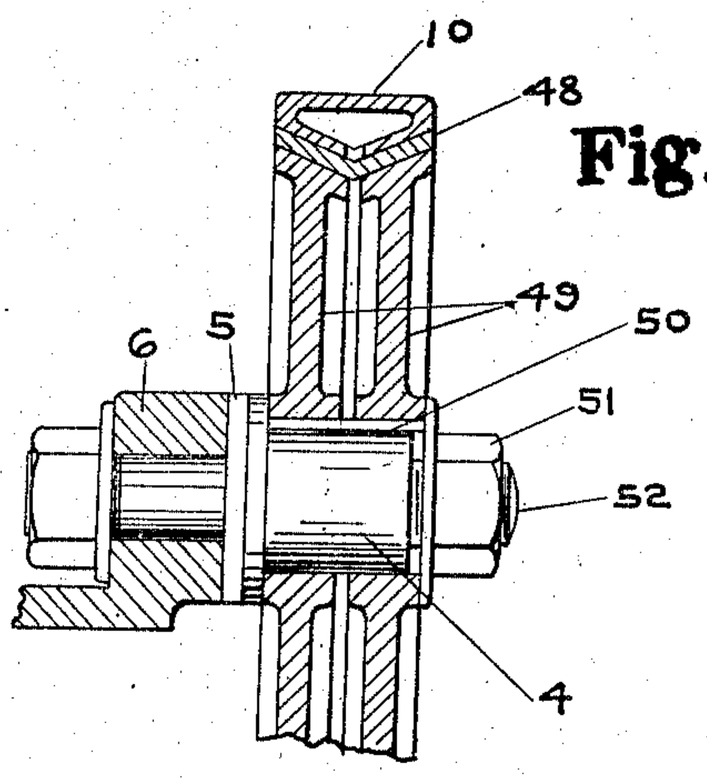

Fig. 7

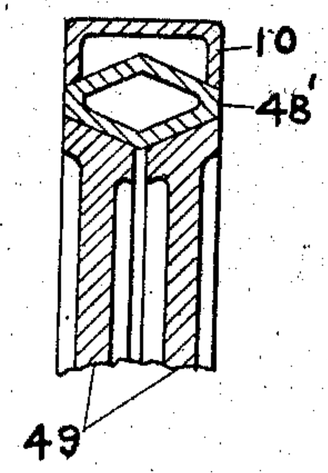

Fig. 8

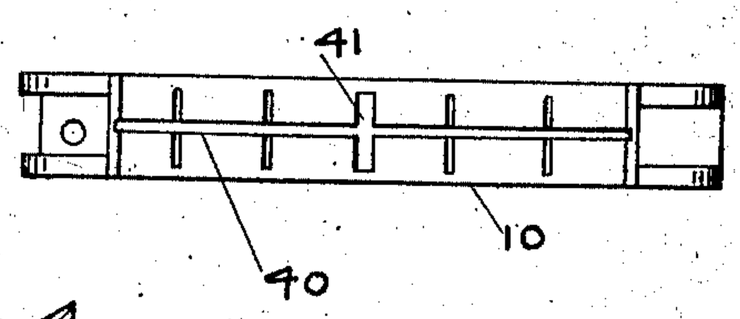

Fig 9

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UNITED STATES PATENT OFFICE.

LUTHER A. PECKHAM, OF EDGEWOOD, RHODE ISLAND.

SHOCK-ABSORBER.

989,408. Specification of Letters Patent. Patented Apr. 11, 1911.

Application filed April 6, 1910. Serial No. 553,703.

To all whom it may concern:

Be it known that I, LUTHER A. PECKHAM, a citizen of the United States, residing at Edgewood, in the town of Cranston, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Shock-Absorbers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to attachments for vehicles for neutralizing or minimizing the effect of shocks and jars due to obstacles or unevennesses in the road, and it relates especially to that type of shock absorber which will present no resistance to relative movements in one direction, but will provide a strong resistance to recoil.

One of the objects of the invention is to provide a simple and powerful device adapted to be readily applied to any kind of vehicle, said device being so constructed that the grip which resists recoil will come into effect instantly and exert its maximum power at the very beginning of any tendency to recoil.

A further object of the present invention is to provide improved means, including a ring or band, which may oscillate on the face of a drum, with devices for regulating the frictional pressure of the ring on said drum.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1— is a side elevation illustrating an embodiment of my improved shock absorber attached to the spring or axle of a vehicle and the friction band operating lever connected to the vehicle frame. Fig. 2— is a sectional view of my device illustrating its action and also the lubricating system. Fig. 3— is a section on line 3—3 of Fig. 2. Fig. 4— is a perspective view of the circular key or ring for retaining the band on the drum. Fig. 5— is a view similar to Fig. 2 but illustrating a modification hereinafter described. Figs. 6 and 7— are detail sectional views illustrating modifications hereinafter described. Fig. 8— is a detail view showing the inner face of one of the members of the friction band. Fig. 9— is a detail elevation, partly in section, of the form of friction ring shown in Fig. 6.

Similar reference characters indicate the same or similar parts in all of the views.

Referring first to the embodiment illustrated in Figs. 1 to 4 of the drawings, a portion of the frame or chassis of an automobile is indicated at 1, a portion of one of the springs of the vehicle being indicated at 2.

The shock absorbing device comprises a body portion 3 which is preferably, as shown in the drawings, made in the form of a circular drum which is mounted on a pin 4 supported by a bracket 6. To secure the drum firmly against rotation, it is shown as formed with a transverse key or projection 5 at one end of its hub portion, said key fitting a vertical key-way or groove in the face of the bracket 6. The bracket 6 is indicated as attached to the spring 2 by means of straps 7, but I do not limit myself to the particular means for supporting the drum 3.

As best shown in Fig. 3, the periphery of the drum is formed with an annular groove 8 which receives a ring 9 (see Fig. 4) said ring serving to prevent lateral movement of the members of the friction band mounted on the drum.

The friction band comprises two members 10 and 10′ connected by a pivot or hinge 11, one of said members, the lower member 10′ in this instance, being formed with an extension 12 which supports a pivot 13. On the pivot 13 is mounted an arm or lever 14 which arm is shown as formed of two members, the outer member 14′ being fitted to the member 14 and locked thereon by a transverse pin 16. The inner end of the arm or lever 14 is connected by means of a pivot pin 15 with the upper band member 10 as shown in Fig. 2 and by dotted lines in Fig. 1, the connection being such that any movement of the arm 14 on its pivot 13 will release or close the band members 10 and 10′ relatively to the drum 3, according to the direction in which the arm 14 is oscillated.

For convenience of description reference hereinafter will be made to the pin 4 and drum 3 as being stationary, while the frame 1 may move up or down relatively to the horizontal plane of the pin 4; but it will be understood that, in practice, when the vehicle is moving, the frame 1 might really possess less vertical movement than the pin 4.

The mounting or connections of the arm or lever 14 just described is such that when

the outer end of said lever moves downward, the members 10 10′ of the band open somewhat so as to take practically no frictional hold upon the drum. But when movement occurs in the other direction, the two members of the band are caused to bind tightly on the drum, this being due to the fact that the two members are pivoted together at 11 while the arm has independent pivotal connections 13 and 15 with the two parts 10 and 10′ of the band.

The extreme outer end of the extension 12 is rounded like a portion of a sphere, and the rear end of the part 14′ of the lever is correspondingly shaped as shown at 17, this structure providing a dust proof joint, while still permitting the portion 14 of the arm or lever to work up and down in the opening in the extension 12. The outer end of the portion 14′ of the lever is formed as a socket 18 in which are fitted two blocks 20 and 21, said blocks being formed to receive between them the ball 19 on the lower end of an upwardly projecting stem 31. A nut 22 in the lower end of the socket holds the lower block 21 against the ball 19 and enables the proper adjustment to be effected when assembling or to compensate for wear. The stem 31 of the ball 19 projects upward through an opening in the top of the outer end of the portion 14′ of the lever.

A grease cup 23 is secured to the frame 1 of the machine, as by means of ears 24, said grease cup containing a plunger 25 which can be forced downward by means of a handle 26. Within said grease cup, at the bottom thereof, are two blocks 28 which are formed to receive between them the ball 27 having a stem 30 projecting downwardly through an opening in the bottom of the grease cup. The adjacent ends of the stems 30—31 are connected by a tube 29 check nuts 32—33 being interposed between the ends of said tube and the socket 18 and grease cup 23 respectively.

As shown in Fig. 2, the top face of the outer end of the lever portion 14′, and the lower end face of the grease cup, are convex. The check nuts 32, 33 have concave faces fitting said convex faces. The concave portions of the check nuts form dust caps and serve to effectually protect the joints.

Each of the balls and its stem is formed with a duct or channel 34 so that grease from the cup 23 can be forced down to the lower ball. The balls themselves are provided with radial ducts so that, in operation, as the members oscillate, grease will work out to the bearings of the balls in their seats. Oscillation of the members in use causes one or more of the ducts in the lower end 19 to occasionally pass to a position so as to communicate with the space 35 between the blocks 20 and 21 in the socket 18, so that grease can then pass into the space 36 in the outer end of the member 14 of the lever. Said member 14 is formed with one or more channels 37 leading back sufficiently far to permit grease to proceed into the space 38 within the extension 12 of the member 10′ of the band. The grease can then pass through opening 39 and follow along the channels formed in the inner faces of the members 10 10′ of the band. The channel 40 of each member may be formed with sockets 41 at intervals, as best shown in Fig. 8, thereby increasing the capacity of these surfaces to hold the grease.

It sometimes happens that when the device is put in position for use, it is difficult to gain access to the grease cup 23 to fill it or to actuate the plunger. To enable the grease to be forced in, under such circumstances, I provide a grease cup 42 in the member 10 of the band, said grease cup being constructed substantially the same as the cup 23, being provided with a plunger which may be actuated by a handle to force grease through an aperture into the crevices between the drum and band members and to be gradually worked along in a direction reverse to that described in connection with the forcing of grease from the cup 23.

In order that the lever 14 may normally remain in the position indicated in Figs. 1 and 2, I provide a spring 44 in a suitably formed recess in the extension 12 under the lever 14, and an adjusting screw 43 tapped through the upper wall of the extension 12. By adjusting a screw 44′ below the spring 44 the tension of spring 44 may be adjusted. The screw 43 may be adjusted to limit the amount of movement which the arm 14 may have upon its pivot 13. To determine the position of the screw 43, I may employ a suitable pointer 53 connected to said screw, to act in conjunction with a graduated disk 54 to indicate the position of said screw 43.

In Fig. 5 I have illustrated an embodiment of the invention in which the grease ducts are dispensed with, and in which also means are provided for restricting the movements of oscillation which may be imparted to the lever 14^a on its pin 13. For this purpose, the extension 12 carries two adjustable stop screws 45 and 46 in positions in front of and behind the vertical plane of the pivot 13. By setting these two screws 45 and 46 inward more or less the amount of vibration or oscillation which can be imparted to the arm 14^a can be determined without allowing such amount of vibration to be limited by the gripping of the band members. In other words, if the set screws 45, 46 are loosened considerably the band members 10—10′ will be brought much more firmly and tightly against the drum than if said screws are set in the position shown in Fig. 5. In said

figure 1 also show an adjustable stop screw 47 mounted in one ear at the rear of the hinge 11 and bearing against another ear so as to limit the degree to which the band members 10 10′ can be opened. In some cases, the screws 45, 46 can be dispensed with and the screw 47 alone relied upon. Or the screws 45—46 can be used without the screw 47, or all three of said screws can be used to conjointly serve the purpose described.

In some instances it is found advisable to interpose a friction ring 48 between the drum and band. When this is used, it is best to form it somewhat V-shape in cross section, as indicated in Figs. 6 and 9, so that it cannot slip out of place. In such cases the internal faces of the band members will be of course similarly formed. To assemble the parts when so constructed, the drum is formed of two members 49 mounted side by side upon the pin 4 and secured thereon by a key 50 and held by a nut 51 secured on the end 52 of the pin 4. As shown in Fig. 7, the friction ring may be somewhat diamond-shape in cross section as shown at 48′, the band members being then formed in cross section so as to accommodate this form of friction ring.

Referring again to Figs. 1 and 2, it will be seen that the structure is such that grease might escape from, or dust gain access to, the chamber 38. To prevent this, the crevices which are provided may be advantageously covered by a flexible wrapping or shell 60 which may be of leather secured in place by bands 61.

In practice as the vehicle travels over the road the unevennesses cause the spring, and consequently the shock absorber, to continuously vibrate. This constant action will soon wear out and destroy the utility of a shock absorbing device if the wearing parts are not properly lubricated. It is found that the only practical lubricating material is a comparatively heavy grease with which all of the chambers and recesses in the interior of the device are packed. In order to preserve the thorough lubricated condition of the parts the grease forcing cup is especially desirable particularly when located in position to enable access to be readily had for the purpose of forcing additional lubricating material to all parts of the device which require it.

The drum and the band constitute inner and outer frictional members, the outer one being mounted to oscillate relatively to the inner one. Owing to the fact that this oscillating member has two parts which are pivotally connected, and an arm having independent pivotal connections with said two parts. whenever there is a tendency to recoil from the action of the spring 2, the two parts of the oscillating member grasp the relatively stationary member so firmly as to sufficiently if not entirely prevent recoil. The grip might be so rigid as to result in breakage of the arm or some of the connections. Possibility of such excessive gripping occurring, however, is avoided by the adjusting screw mechanism described.

It will now be understood that my invention includes a compound lever, said lever consisting of three members 10, 10′, and the arm 14, the members 10 and 10′ being each substantially semi-circular and pivoted together at one end, as at 11, the other ends of said members 10, 10′ being pivotally connected at 13, 15 to the third member 14 of said compound lever. Since the pivotal connections 13, 15 are at different points longitudinally of the arm 14, oscillation of the arm 14 in the plane permitted by the pivotal connections will enlarge or diminish the circle within the members 10, 10′ and therefore release or increase the friction upon the stationary drum which is inclosed by the said semi-circular members 10, 10′.

A feature of my invention which I regard of importance is the structure of the universal jointed link which connects the outer end of the oscillating arm with the grease cup or other member which connects the link with the frame of the machine. Referring to Figs. 1 and 2 it will be seen that each of the nuts 32 and 33 are formed with portions which may be referred to as "skirts" somewhat concavo-convex in form, the concave surfaces fitting partially spherical surfaces of the outer end of the arm and the bottom of the grease cup respectively. This structure provides an absolutely dust-proof connection so that while the link is capable of universal movement, no dust can gain access to the ball and socket joints or grease escape therefrom.

My invention is not restricted to the precise construction and arrangement of parts herein shown and described, nor to the various details thereof, as the same may be variously modified or re-arranged within the limits of mechanical skill, without departing from the spirit and scope of my invention.

I claim—

1. A shock absorber comprising a compound lever consisting of three members two of which are substantially semi-circular and are pivoted together at one end, the other ends being pivotally connected to the third member at different points of the latter, a non-rotary friction drum inclosed by the said semi-circular members, and means carried by one of said semi-circular members for limiting the closing effect of the semi-circular members due to operations of the third member.

2. A shock absorber comprising a drum, a two-part band inclosing said drum, one of

said parts having a radial extension formed as a housing, an arm or lever member in said housing and projecting beyond it, said arm being pivotally connected with the members of said band, a sleeve secured to the lever arm beyond the extension and having means at its outer end whereby it may be connected to the frame of the vehicle, and means for limiting the movement of said arm or lever member in said housing.

3. A shock absorber comprising a two-part band, one of said parts having a radial extension, a drum inclosed by said band, an arm in said extension and pivotally connected to the two parts of the band, the said parts of the band being pivotally connected together at a point opposite the said extension, the said extension having a depending socket, a spring mounted in said socket and bearing against the underside of the arm, and an adjustable stop screw mounted above said arm.

4. A shock absorber comprising a drum, a two-part band inclosing said drum, one of said parts having a radial extension formed as a housing, an arm or lever member in said housing and projecting beyond it, said arm being pivotally connected with the members of said band, a sleeve secured to the lever arm beyond the extension and having means at its outer end whereby it may be connected to the frame of the vehicle, the outer end of said housing being formed as a portion of a sphere, and the inner end of said sleeve being formed to closely fit the outer end of said housing.

5. A shock absorber comprising a non-rotary drum, two semi-circular members pivotally connected together and inclosing said drum, an extension from one of said semi-circular members, said extension being formed as a housing, a lever pivotally mounted in said housing and having a pivotal connection with the other semi-circular member, a sleeve secured to said arm, and a link having a universal joint connection with said sleeve.

6. A shock absorber comprising a compound lever consisting of three members two of which are substantially semi-circular and are pivoted together at one end, the other ends being pivotally connected to the third member at different points of the latter, a non-rotary friction drum inclosed by the said semi-circular members, means carried by one of said semi-circular members for adjustably limiting the closing effect of the semi-circular members due to operations of the third member, and means for indicating the amount of adjustment of said means.

In testimony whereof I affix my signature in presence of two witnesses.

LUTHER A. PECKHAM.

Witnesses:
HOWARD E. BARLOW,
E. I. OGDEN.