W. F. LYONS.

SHOCK ABSORBER.

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1,142,825. Patented June 15, 1915.

Fig. I.

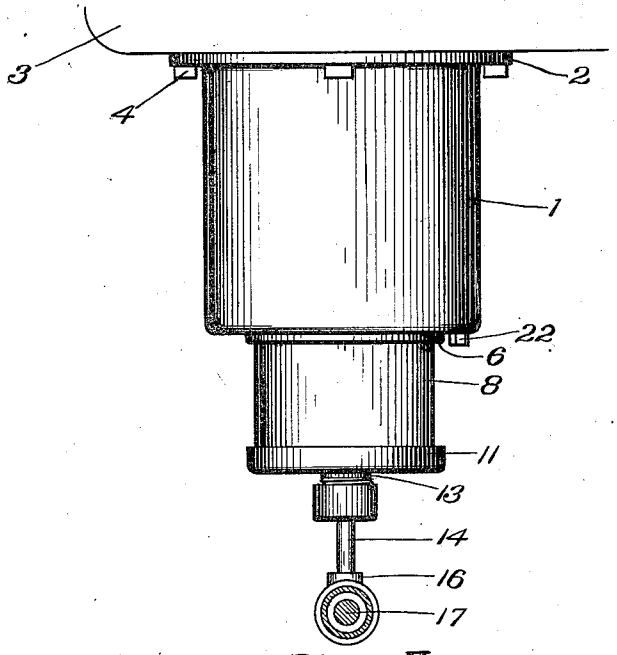
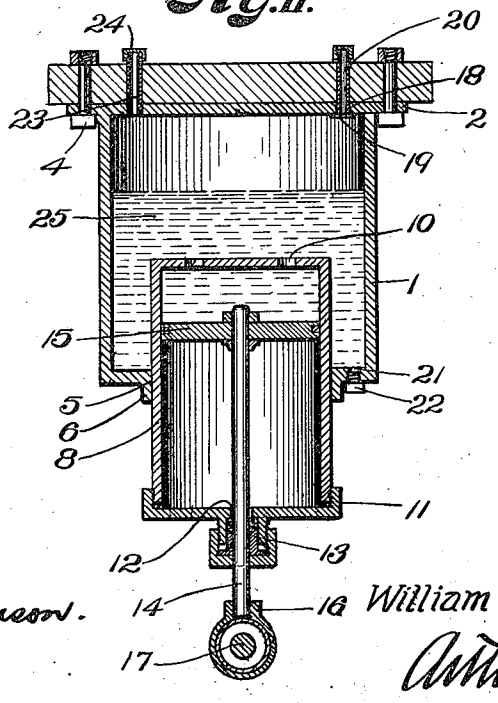


Fig. II.



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SHOCK-ABSORBER.

1,142,825. Specification of Letters Patent. Patented June 15, 1915.

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To all whom it may concern:

Be it known that I, WILLIAM F. LYONS, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Shock-Absorbers; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to a shock absorber, and more particularly to a device of that character for use on vehicles, and which is adapted to form a cushion between the vehicle axle and body; the principal object of the invention being to provide means for absorbing the jolt and jar incident to ordinary travel, otherwise than by the usual vehicle springs. In accomplishing this object, I have provided improved details of structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

Figure I is an elevation of a shock absorber constructed according to my invention, and indicating its connection with the axle and body of a vehicle. Fig. II is a central longitudinal section of the same.

Referring more in detail to the parts:—1 designates a cylinder having a base flange 2, whereby it may be rigidly and securely attached to a vehicle body 3 by bolts or the like 4.

The cylinder 1 has a central opening 5 at its lower end preferably provided with a downturned circumferential flange 6, and fixed within said opening by spot welding, or otherwise, is a smaller cylinder 8; the inner end of the small cylinder being projected into the interior of the outer cylinder and the joint between the two being tight in order to prevent the escape of air and fluid contained within the large cylinder.

The inner end of the small cylinder 8 is provided with a plurality of apertures 10 and the outer end thereof with a perforate guide cap or cross bar 11 having a central aperture 12, and provided with a stuffing box 13 through which a piston rod 14 is projected; the inner end of the rod being provided with a piston 15, and the outer end thereof with a collar 16 by which the rod is mounted on the axle 17.

The apertures in the inner end of the small cylinder serve to assist in resisting the shock, as the oil below them and in the small cylinder must be forced through them and into the larger cylinder before the piston head in the small cylinder can be forced up. The number and size of these apertures can be varied in accordance with the load carried.

The large cylinder 1 is provided at its upper end with a port 18, which is normally closed by an automatic valve 19, and fixed in said port is a tube 20 through which air may be pumped into the cylinder by any suitable means, and opening through the bottom of the cylinder is a port 21 that is normally closed by a plug 22, but through which the cylinder may be drained when the plug is removed. The cylinder 1 is also provided with a nipple 23, which is normally closed by a cap 24, but which may be opened to provide for the insertion of oil 25 into the cylinder; it being the purpose to maintain sufficient oil in the large cylinder to cover the top of the small cylinder under normal conditions of use.

In using the device, the cylinders are connected with the body and axle of the vehicle respectively, and a quantity of oil sufficient to cover the cylinder inserted through the nipple 23. Air is then pumped into the outer cylinder until the pressure is sufficient to support a determined load.

When a vehicle equipped with the device is in use, air pressure in the large cylinder normally retains the piston in the small cylinder depressed, but should the wheels of the vehicle encounter an obstruction the shock of contact of the wheels therewith forces the piston upwardly against the cushion of compressed air contained within the cylinders and breaks the jar which would otherwise be received by the body of the vehicle; the pressure of the piston being initially retarded by the partial confinement of the oil within the upper portion of the small cylinder and eventually by the volume of air in the large cylinder, owing to the fact that oil contained within the small cylinder is forced through the apertures 10 into the larger body.

It is apparent that immediately following the impact and operation of the piston, the air in the cylinders will force the piston

back to its normal or balanced position, so that it is immediately in condition for a succeeding operation.

The oil contained within the cylinders not only serves to supplement the cushioning action of the air, by its partial confinement within the upper portion of the small cylinder, but also serves to lubricate the piston and form a seal to prevent the escape and loss of air from the cylinders.

By utilizing a large cushion cylinder and relatively small piston cylinder, a longer thrust is afforded the piston rod in order to secure compression of air in the cushion cylinder, so that substantial vertical play of the running gear is permitted and the cushion developed gradually and without sudden shock; it being apparent that the relative sizes of the cylinders may be varied to meet the requirements of vehicles of different weight or capacity.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters-Patent, is:

1. A shock absorber comprising a cylinder having a closed end and provided with a valved port, a second cylinder having an apertured head projected into the first cylinder and having permanent sealed connection therewith, a piston operable in the second cylinder beneath said apertured head, and means for attaching the first named cylinder and said piston to the body and axle of a vehicle respectively.

2. A shock absorber comprising a cylinder closed at one end and containing an air and liquid cushion, a second cylinder projected into the first and having an apertured inner end located below the level of the liquid cushion, a cap closing the outer end of the second cylinder and provided with a stuffing box, a piston in said last named cylinder having a rod projected through said stuffing box, and means on the first named cylinder and on the piston for attaching the same to the body and axle of a vehicle respectively.

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

WILLIAM F. LYONS.

Witnesses:
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L. E. COATS.