

E. E. MALONE.
SHOCK ABSORBER.
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1,154,996.

Patented Sept. 28, 1915.

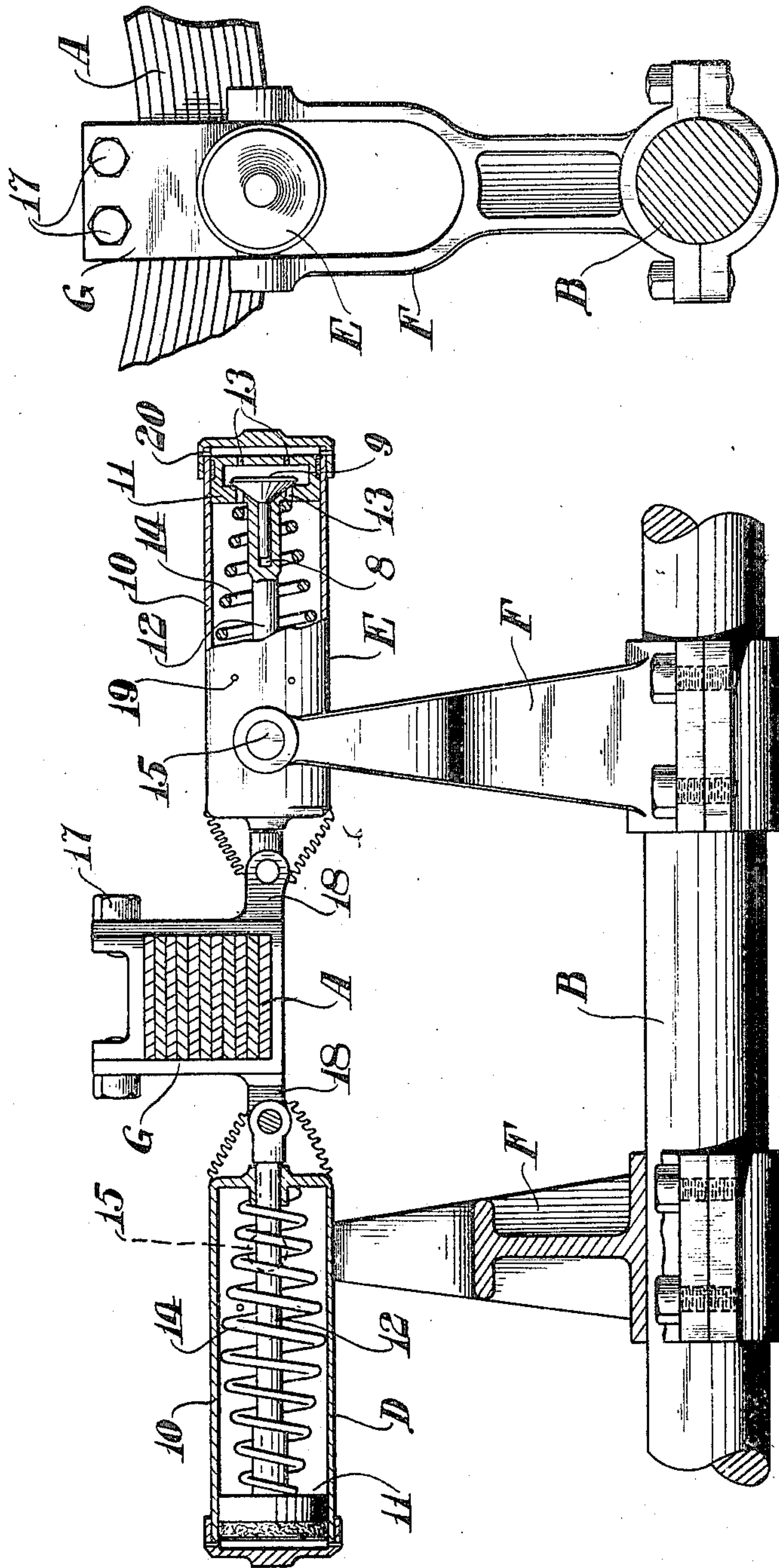


Fig. 2

Fig. 1

WITNESSES
Wm. H. H. H. H.
R. O. H. H. H.

INVENTOR
E. E. MALONE
By *Frederick H. H. H.* Atty

UNITED STATES PATENT OFFICE.

ERNEST E. MALONE, OF OTTAWA, ONTARIO, CANADA.

SHOCK-ABSORBER.

1,154,996.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ERNEST E. MALONE, a citizen of Canada, residing at Ottawa, in the Province of Ontario, Canada, have invented certain new and useful Improvements in Shock-Absorbers, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts, the principle of the invention being herein explained and the best modes of applying that principle, so as to distinguish it from other inventions.

This invention relates to improvements in shock absorbers adapted to be placed between two relatively movable parts such as the axle and springs of a vehicle, and the objects of the invention are to resist movement of the springs and particularly to offer a graduated resistance to the compression of the springs and to the rebound thereof.

Further objects are to produce a uniform dampening action to thereby reduce vibratory movement of the spring and to cause the resistance of the spring to increase in proportion to the violence of the shock.

Further objects still are to generally improve and simplify the various parts of the shock absorber to better adapt them to perform the functions required of them, and it consists essentially of the improved construction of shock absorber hereinafter described in detail in the accompanying specification and drawings.

In the drawings, Figure 1 is an elevation, partly in section, of an embodiment of the invention. Fig. 2 is an end view of the same, also partly in section.

Like characters of reference refer to like parts in the several drawings.

Referring to the drawings, A and B represent two parts movable relatively to each other, the parts illustrated being the upper spring and the axle of a vehicle.

D and E represents a pair of shock absorbing members each including a cylinder 10, piston 11 and piston rod 12. The piston 11 is preferably made hollow and adapted to house the valve 9 designed to co-act with the by-pass passageways 13 provided in the said piston. This valve is slidably mounted in the orifice 8 extending partially through the longitudinal axis of that end of the piston rod 12 adjacent to the piston, the said valve being adapted to allow the air to flow

relatively slowly from one side of the piston to the other, thereby providing a pneumatic cushioning resistance to rapid movement in either direction.

The piston normally lies at the outer end of the cylinder and its resistance to movement may be increased by a spiral compression spring 14 which surrounds the piston rod and bears against one side of the piston and against the inner end of the cylinder.

Each piston is supported with freedom to swivel about a transverse axis desirably near the inner end of the cylinder, this being accomplished in the embodiment illustrated by U-shaped bracket members F which engage trunnions 15 on opposite sides of the cylinder near the inner ends thereof, the lower end of the brackets being connected to the axle B.

The piston rods are in alinement and extend toward each other and are adapted to have pivotal engagement with part A, which pivotal engagement is secured in the embodiment illustrated by a clamping device G secured to the springs A by bolts 17 and having lugs 18 to which the ends of the piston rods are pivoted.

It will be seen that as the parts A and B are moved toward each other the cylinders will turn about the transverse axis through the trunnions 15 and thus the leverage through which the piston 11 operates to resist the movement of the spring is automatically increased. In the same way, on the rebound of the spring when the pivoting points of the connecting rod pass the center line which connects the trunnions, then a gradual resistance will be offered to the rebound action. In normal or neutral positions there is practically no resistance offered to slight movement between the springs.

When such a device is operated with light loads I preferably provide small orifices 19 and 20 which extend through the cylinders 10, such orifices being located on different sides of the pistons.

As many changes could be made in the above construction and many apparently widely different embodiments of my invention, within the scope of the claims, constructed without departing from the spirit or scope thereof, it is intended that all matter contained in the accompanying specification and drawings shall be in-

terpreted as illustrative and not in a limiting sense.

I claim—

1. In a shock absorber and in combination, a leaf spring, an axle, a cylinder having its axis extending transversely of the direction of movement of the parts, a bracket connected to the axle and supporting the cylinder with freedom to swing about a transverse axis, a piston in the cylinder, a piston rod, and means pivotally connecting the piston rod with the leaf part in such a way that as the parts are moved toward each other the cylinder will be swung about its transverse axis.

2. In a shock absorber and in combination, two parts movable relatively to each other, a cylinder having its axis extending

transversely of the direction of movement of the parts, resilient suspending means, a bracket connected to one part and supporting the cylinder with freedom to swing about a transverse axis, a piston in the cylinder, a piston rod and means pivotally connecting the piston rod with the opposite part to that to which the bracket is connected in such a way that as the parts are moved toward each other the cylinder will be swung about its transverse axis.

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

ERNEST E. MALONE.

Witnesses:

Jos. J. LEDDY,

A. J. BURTON.