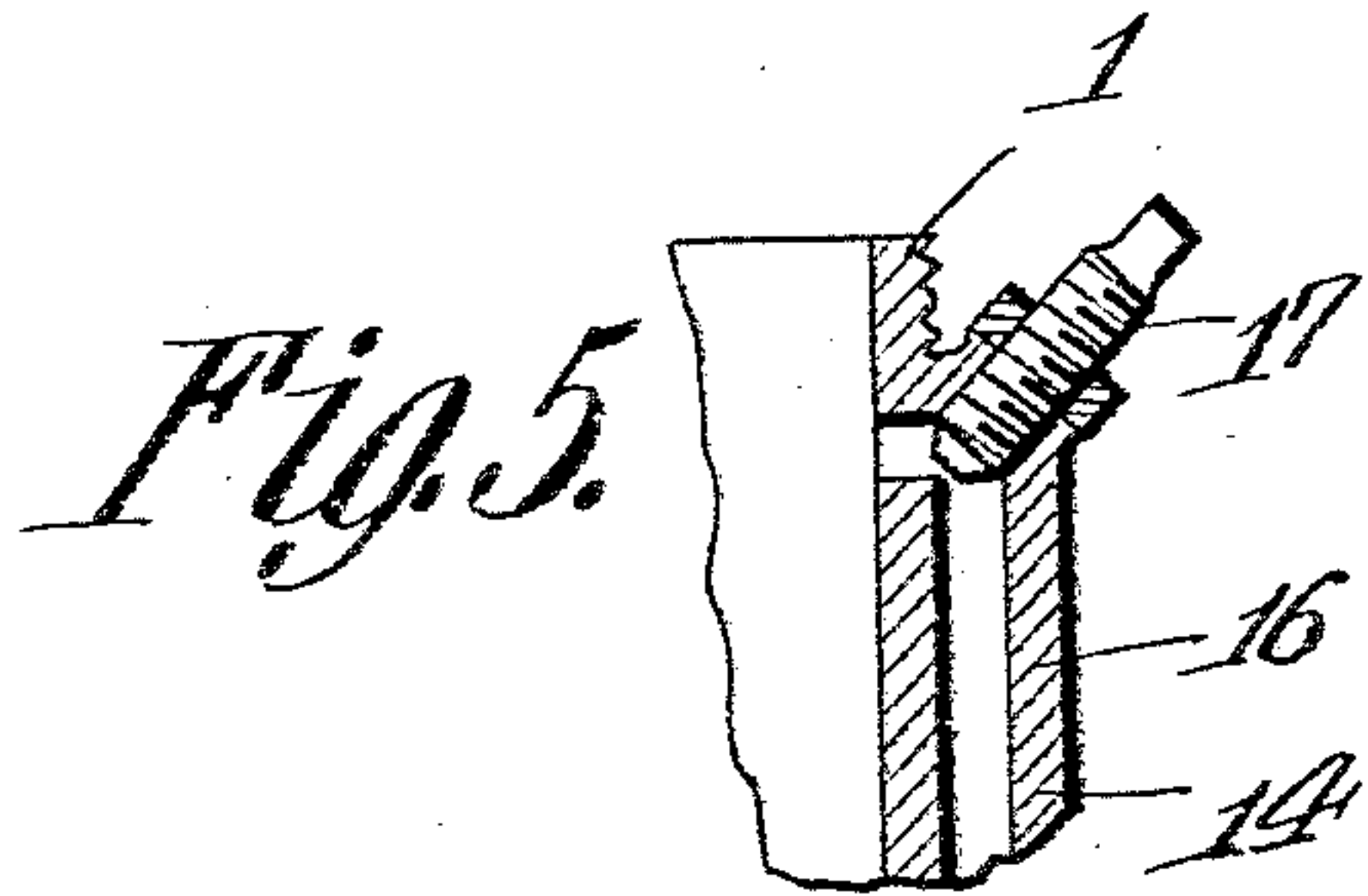
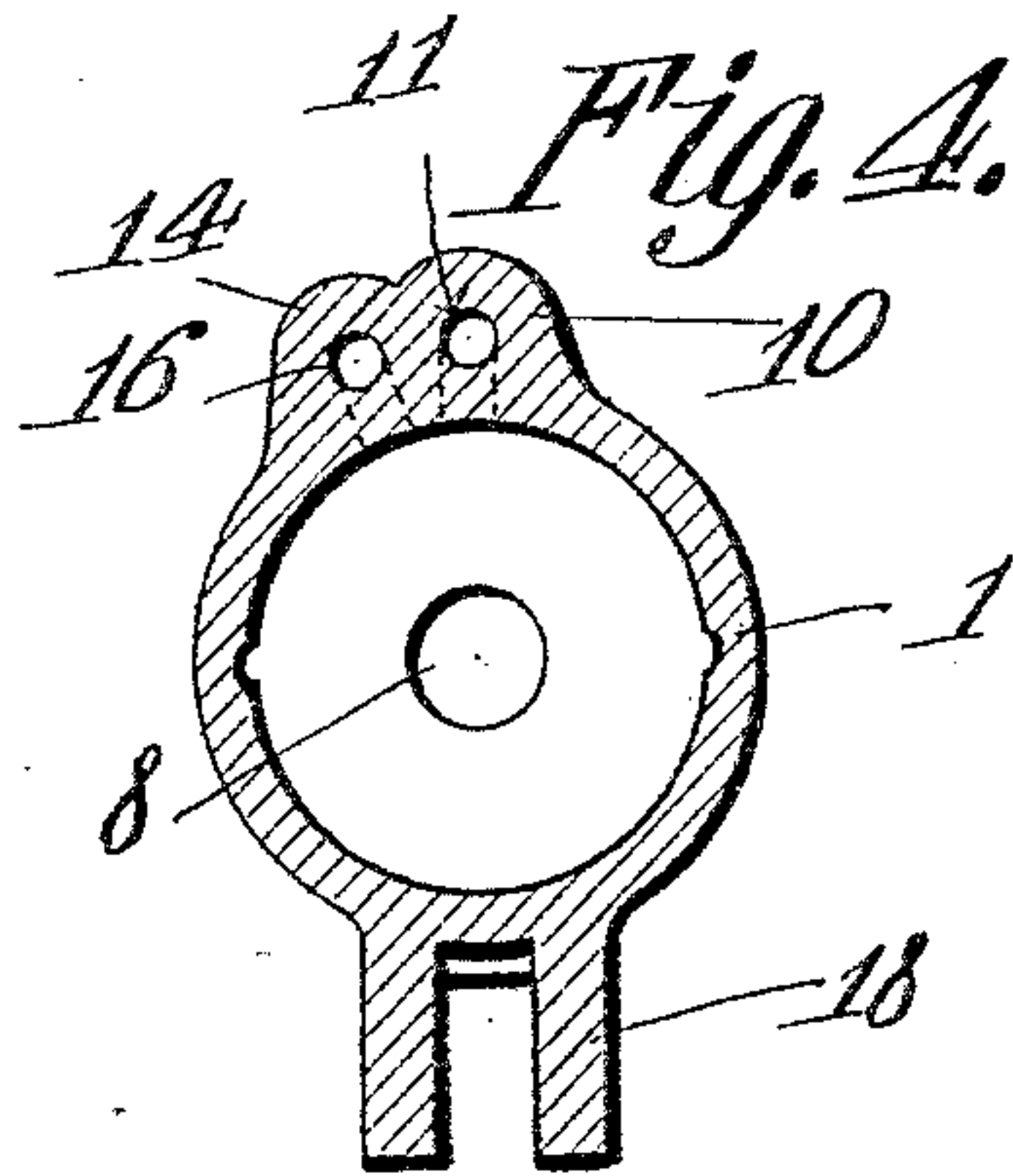
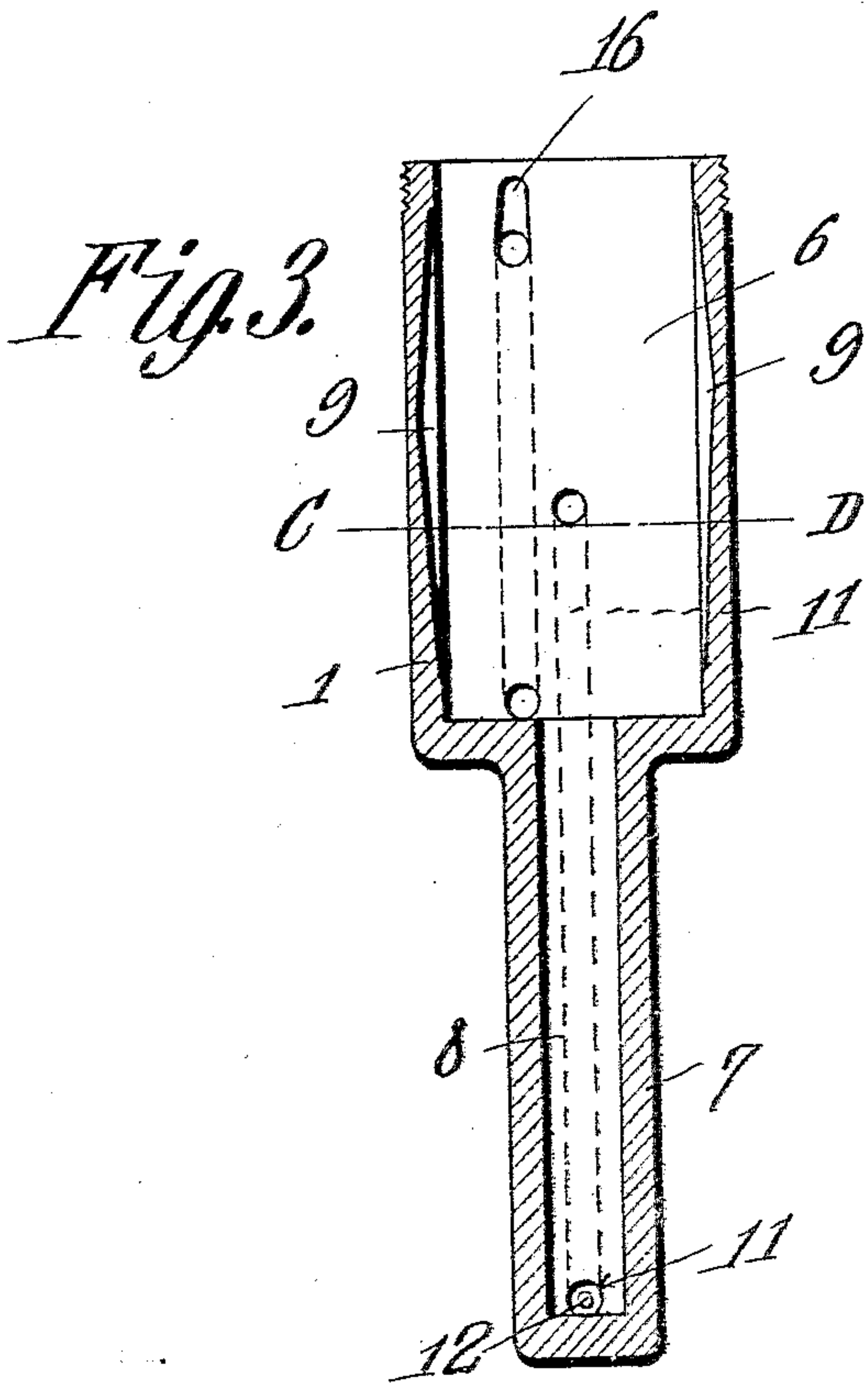
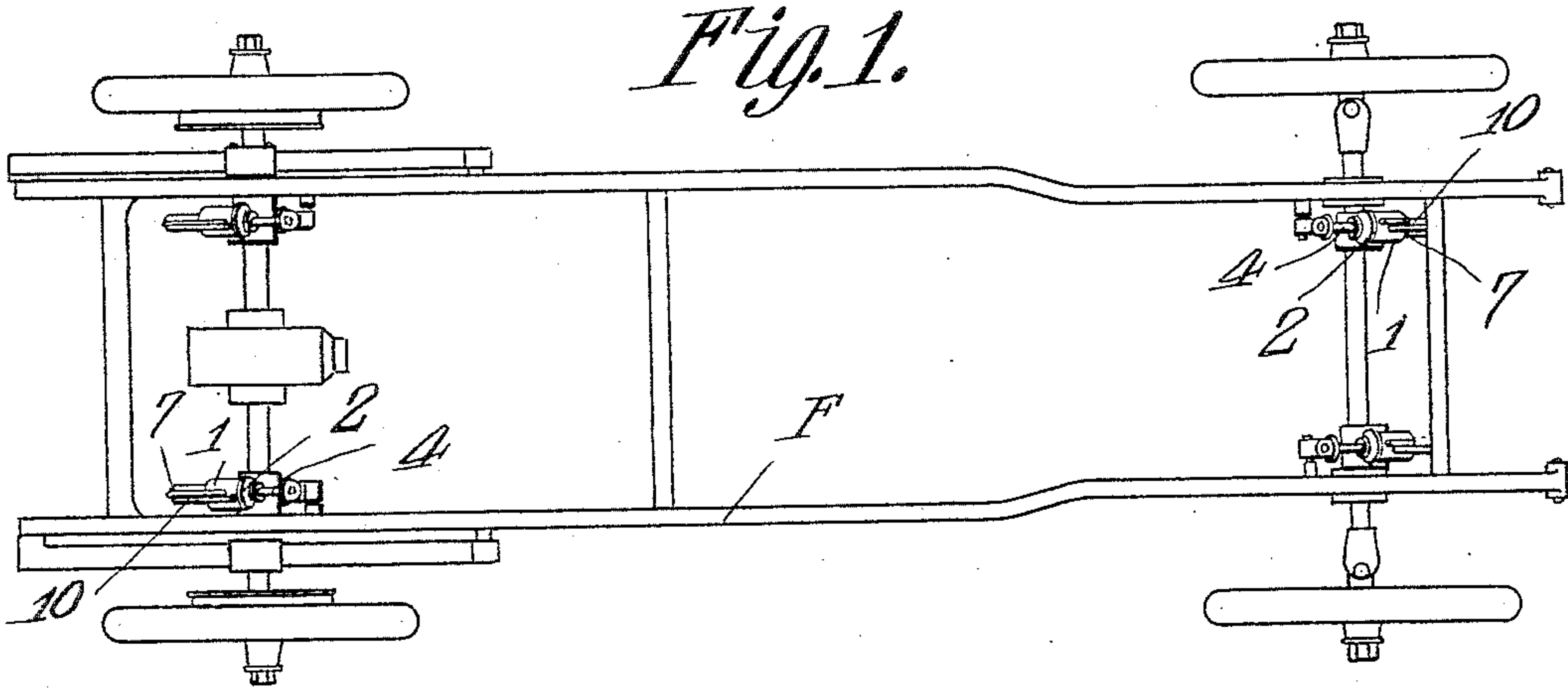


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SHOCK ABSORBER FOR AUTOMOBILES AND THE LIKE.  
APPLICATION FILED MAR. 10, 1909.

943,774.

Patented Dec. 21, 1909.

2 SHEETS—SHEET 1.



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# UNITED STATES PATENT OFFICE.

ROBERT B. EWART, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO BENJAMIN A. SEITZ, OF KANSAS CITY, MISSOURI.

SHOCK-ABSORBER FOR AUTOMOBILES AND THE LIKE.

943,774.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed March 10, 1909. Serial No. 482,439.

*To all whom it may concern:*

Be it known that I, ROBERT B. EWART, a citizen of the United States, residing at New York city, in the county of New York and State of New York, have invented a new and useful Shock-Absorber for Automobiles and the Like, of which the following is a specification.

This invention relates to apparatus for absorbing shocks and is especially designed for use in connection with automobiles and other vehicles, although it is also useful wherever it is desired to absorb shocks.

The object of the invention is to provide a dashpot in which oil or other suitable liquid is used as a retarding means, a by-pass of novel form being utilized to permit the necessary displacement of the retarding fluid, means being utilized whereby this displacement may be controlled so as to regulate the efficiency of the device.

With these and other objects in view the invention consists in certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a plan view of the frame and running gear of a motor vehicle provided with shock-absorbing devices embodying the present improvements. Fig. 2 is an enlarged vertical section through a shock-absorber such as constitutes the present invention. Fig. 3 is a section through the casing of the dashpot, said section being taken on the line A—B Fig. 2 and longitudinally of the inner by-passes. Fig. 4 is a section on line C—D Fig. 3. Fig. 5 is a longitudinal section through the valved portion of the upper exterior by-pass.

Referring to the figures by characters of reference 1 designates the casing of the dashpot, the same being preferably cylindrical and having a removable cap 2 at one end provided with a bushing 3 through which extends a piston rod 4 designed to reciprocate. A piston 5 is arranged on that portion of the rod within the casing 1 and works within the main compartment 6 within the casing, said casing being provided at one end with a reduced longitudinal extension 7 having a longitudinal bore 8 constituting an auxiliary compartment within

which one end portion of the rod 4 works as a piston. The piston 5 fits snugly within the compartment 6 and formed within the wall of this compartment at diametrically opposed points are longitudinally extending grooves 9 gradually increasing in depth toward their centers, as clearly indicated in Fig. 3. These grooves 9 constitute interior by-passes which obviously increase in depth toward their centers, and it will be apparent therefore that when the piston 5 moves longitudinally of the compartment 6 the fluid in the path thereof will be free to pass slowly through the grooves from one side to the other of the piston, the speed of displacement of the fluid increasing as the piston moves toward the center of said by-passes 9, and diminishing as said piston moves away from the center of the grooves.

A rib 10 is formed exteriorly upon the casing 1 and extends from the free end of the extension 7 to an intermediate point of the compartment 6, this rib having a passage 11 therein communicating at its ends with the middle portion of the compartment 6 and with the outer end of the compartment 8, thus forming a lower exterior by-pass. A spring-controlled check valve 12 may be arranged within that end portion of the by-pass 11 opening into the compartment 8, a screw plug 13 being provided for holding the valve normally in place, this valve being readily accessible by removing the plug, as will be obvious. Another rib 14 is formed upon the outer portion of the casing 1, and has a passage 16 extending therethrough and opening at its ends into the opposite end portions of the compartment 6, this passage thus forming an upper exterior by-pass, constituting an auxiliary means for permitting the flow of fluid around the piston 5. A needle valve 17 or any other suitable cut-off device may be mounted within the rib 14 for the purpose of controlling the passage of fluid through the by-pass 16.

The shock-absorber herein described is preferably mounted in the manner as shown in Fig. 2. Ears 18 are arranged upon the casing 1 at a point between the ends thereof and receive a pivot pin 19 extending through a head 20 which is formed at one end of a clamping bolt 21. This bolt extends through the end portions of a clip 22 and is designed to draw said ends together so as to clamp



the clip about the axle E of a vehicle, or about any suitable supporting structure. If preferred the head 20 may be swiveled upon the bolt 21 so as to thus permit the casing 1 to have a universal movement. When the shock-absorber is used in connection with an automobile the clips 22 are placed upon the front and rear axles and are so located as to permit the shock-absorbers to incline toward the center of the frame F of the machine, the outer ends of the piston rods 4 being connected to the frame by yokes 23 which are pivotally connected to ears 24 mounted for swinging movement upon studs or trunnions 25 extending laterally from the frame. Inasmuch as the axes of the ear 24 and the yoke 23 are at right angles to each other it will be apparent that this connection constitutes a universal joint and that the movement of the frame F in any direction with relation to the axle E is thus permitted without danger of breaking the shock-absorber.

As heretofore stated the shock-absorbers utilize oil or other suitable fluid, this fluid being arranged within the chamber 6 of each casing 1 and completely filling said chamber at both sides of the piston 5. When the said piston is forced downwardly within the chamber 6 the fluid in the path thereof is permitted to escape through the inner by-passes 9 and past the piston, the quantity of fluid escaping past the piston gradually increasing until the piston reaches the middle portions of the by-passes 9, whereupon the amount of circulating fluid gradually diminishes as the piston approaches the lower ends of the by-passes 9. A portion of the liquid is of course free to flow past the piston 5 by way of the by-pass 16, and it will obviously be possible to control the movement of the piston 5 by adjusting valve 17 so as to regulate the flow of fluid through this by-pass 16. Should any of the liquid contents of the chamber 6 leak past the piston rod 4 and into the compartment 8 the downward movement of the said piston rod within said compartment will force this liquid against the valve 12 and open it, the liquid then passing through the by-pass 11 and back into the compartment 6. The valve 12 is designed to prevent any of the liquid contents of the dashpot from flowing back into the compartment 8 from the by-pass 11.

It is of course to be understood that various changes may be made in the construction and arrangement of parts without departing from the spirit or sacrificing the advantages of the invention.

What is claimed is:—

1. A shock absorber comprising a fluid containing casing having main and auxiliary compartments, connected reciprocatory elements in the respective compartments, means for permitting displacement of the fluid from one compartment to the other,

means for permitting displacement of the fluid from one end to the other of the main compartment, and separate fluid-controlling devices carried by said means.

2. A shock-absorber comprising a casing having main and auxiliary compartments therein, said main compartment constituting a liquid-container, elements mounted for reciprocation within the compartments, a by-pass for establishing communication between the two compartments, means for preventing back-flow from the by-pass to the auxiliary compartment, said main compartment having means for permitting variable displacement of fluid within said compartment during the movement of the elements in either direction.

3. A shock-absorber comprising a casing having main and auxiliary compartments therein, elements mounted for reciprocation within the respective compartments, means for permitting flow of fluid from the auxiliary compartment to the main compartment, but for preventing back-flow of said fluid, said main compartment constituting a fluid-container, valved means for permitting displacement of fluid within the main compartment and past the reciprocating element therein.

4. A shock-absorber comprising a casing having main and auxiliary compartments therein, elements mounted for reciprocation within the respective compartments, means for permitting flow of fluid from the auxiliary compartment to the main compartment, but for preventing back-flow of said fluid, said main compartment constituting a fluid-container, valved means for permitting displacement of fluid within the main compartment and past the reciprocating element therein, said main compartment having means for permitting variable displacement of liquid during the movement of said element in either direction.

5. The combination with structures movable with relation to each other, of a shock-absorber comprising a casing having a main compartment and an auxiliary guide compartment, a universal joint constituting a connection between said casing and one of the structures, a piston rod mounted to reciprocate within the two compartments and constituting a piston within the auxiliary compartment, a piston carried by said rod and mounted to reciprocate within the main compartment, a universal joint constituting the connection between the piston rod and the other structure, said main compartment of the casing constituting a fluid-container and having means for permitting variable displacement of the fluid irrespective of the pressure to which the piston is subjected, and a valved by-pass for maintaining communication between the two compartments, said by-pass constituting



means for permitting the flow of fluid in one direction but preventing back-flow thereof.

6. A shock absorber comprising a fluid-  
5 containing casing having main and auxiliary compartments, connected reciprocatory elements mounted within the respective compartments, separate means for permitting displacement of fluid from one compartment  
10 to the other and from one end to the other of

the main compartment during the movement of said elements, and an adjustable fluid-controlling device within each of said means.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ROBERT B. EWART.

Witnesses:

THEO. E. GORDON, Jr.,

CHAS. H. HOLT.