

C. E. SQUIRES.  
 FLUID PRESSURE CUSHIONING DEVICE.  
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912,502.

Patented Feb. 16, 1909.

Fig. 1.

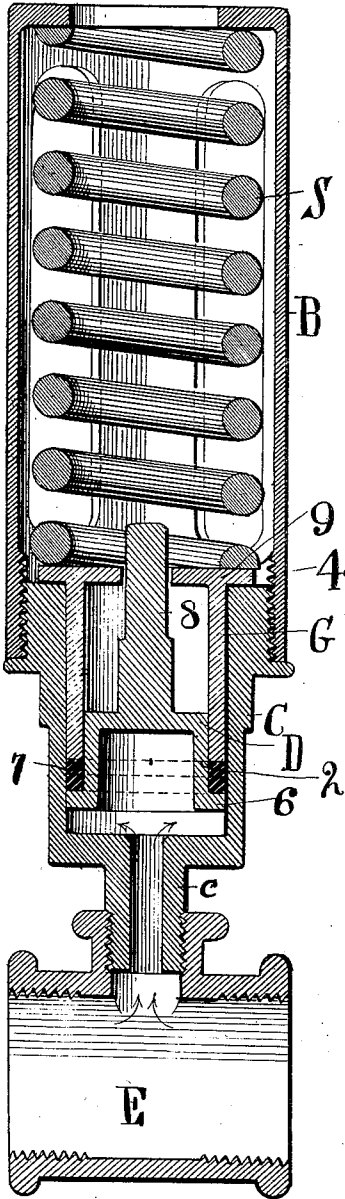
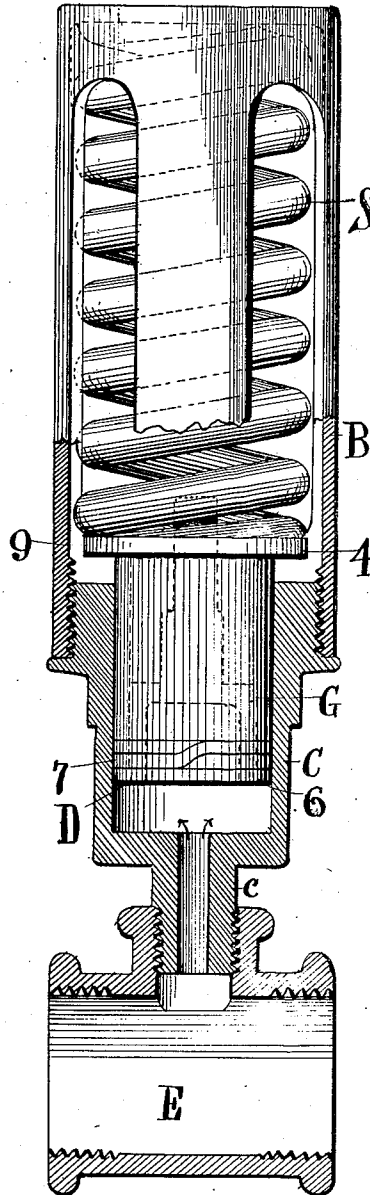


Fig. 2.



ATTEST  
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# UNITED STATES PATENT OFFICE.

CHARLES E. SQUIRES, OF CLEVELAND, OHIO.

## FLUID-PRESSURE-CUSHIONING DEVICE.

No. 912,502.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed December 21, 1907. Serial No. 407,523.

To all whom it may concern:

Be it known that I, CHARLES E. SQUIRES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Fluid-Pressure-Cushioning Devices, and do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a cushioning device adapted to operate in the feed water line of steam generators in automobiles, and the object of the invention is to provide a device which will relieve hammering and shocks in said line.

In the accompanying drawings, Figure 1 is a vertical sectional elevation of all the parts in normal relation, and Fig. 2 is a side elevation thereof partly in section, and showing the parts as under fluid pressure.

It is common practice at this time to employ feed pumps to force the water forward into the steam generator, and the line of pipe is supplied with suitable check valves here and there to prevent back flow. These valves are necessarily very active because in at least one make of machine in which this device is used the pump runs at a rate of twelve to eighteen hundred strokes to the minute. Under the usual heavy pressure from the pump and with this rapidly repeated action, the wear and tear on the valves is very severe, and without the necessary relief they are also very noisy. Now, to remedy these conditions, I have provided an automatic relief, which is adapted to absorb or neutralize the excess pressure in the water supply line which otherwise reacts so violently upon the valves and the pump, and the said automatic device consists in the cushioning attachment herein shown, comprising a spring inclosing shell or casing B and cylinder C, which has a tubular externally threaded stem *c* adapted to be removably engaged with pipe joint or coupling E. The said joint or coupling will be understood as forming a part of the water feed pipe.

Three independent active members or parts are located within the housing or casing B and cylinder C comprising a fluid plunger D, a substantially barrel shaped plunger G, and spring S. The said plungers work in

opposite directions against each other and have the requisite play together in cylinder C. Thus, plunger D has a head 2 mounted for the most part in the lower open end of plunger barrel C and otherwise bears against the wall of cylinder C, through flange or rib 4 thereon, while plunger barrel G has a closed outer end or top forming a rest for spring S. The barrel or body portion of said part G fits comfortably in cylinder C to slide therein, and plunger D has a lateral flange or rib about its bottom between which and the edge of barrel G I interpose hemp or equivalent packing rings 7. Fluid pressure from beneath holds plunger D in working relation with barrel G, and guide stem 8 on said plunger projects through the otherwise closed top 9 of said barrel.

In action the parts D and G work together as one part, and under pressure of the fluid said parts will be raised more or less from cylinder C, say as seen in Fig. 2, in which case they are subject to counter pressure spring S and as thus suspended are responsive to the pulsations in the fluid or water resulting from the rapidly repeated strokes of the pump and which would otherwise work themselves out in shocks and hammerings in pump and valves as hereinbefore described.

The packing rings 7, interposed as they are between the two parts D and G, and between head 2 of the plunger inside and the wall of cylinder C outside, make a perfectly tight bearing so far as leakage of water is concerned and are practically indestructible. It will be understood that the feed water is liable to reach approximately to the boiling point in long runs and leather or like packing would soon be destroyed under such conditions, but heat does not injuriously affect hemp which will endure protracted usage.

What I claim is:—

1. A fluid pressure cushioning device comprising a cylinder open at one end for the inflow of fluid, a spring pressed plunger fitting closely about the wall of said cylinder and having a flange seated thereon, a fluid actuated plunger seated against the opposite end of said spring pressed plunger and a spring confined over said spring pressed plunger.

2. A fluid pressure cushioning device comprising a suitable cylinder with a fluid inlet at its bottom, a substantially barrel shaped

plunger slidably mounted in said cylinder  
from the top and having a closed upper end,  
a spring confined above said cylinder and  
bearing on said plunger, a fluid actuated  
5 plunger mounted in the lower end of said  
barrel shaped plunger and packing between  
said plungers.

In testimony whereof I sign this specification in the presence of two witnesses.

CHARLES E. SQUIRES.

Witnesses:

R. B. MOSER,  
F. C. MUSSUN.