E. SCHNEIDER.

REDUCING VALVE FOR COMPRESSED FLUID MOTORS.

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903,325. Patented Nov. 10, 1908.

Fig. 1.

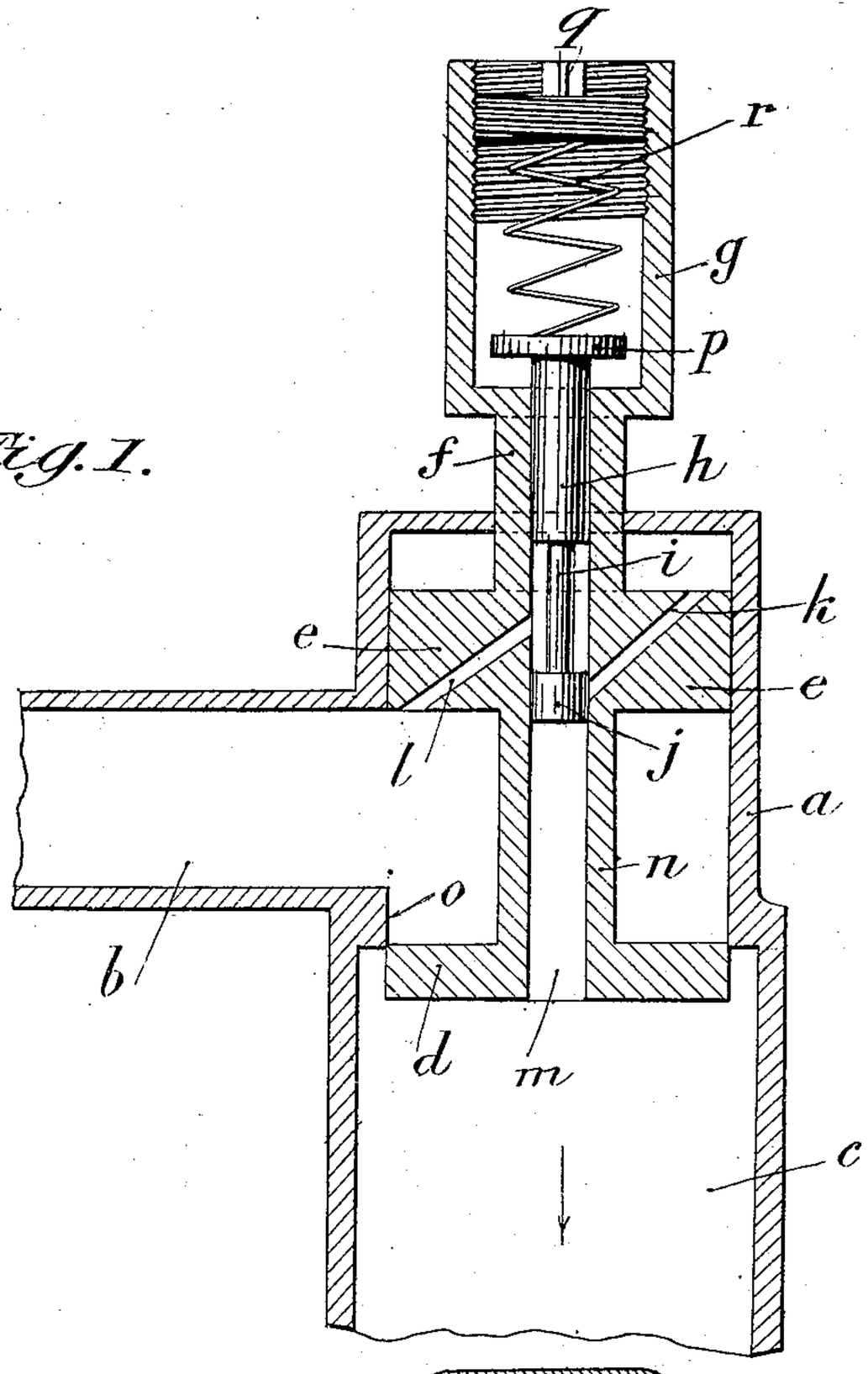
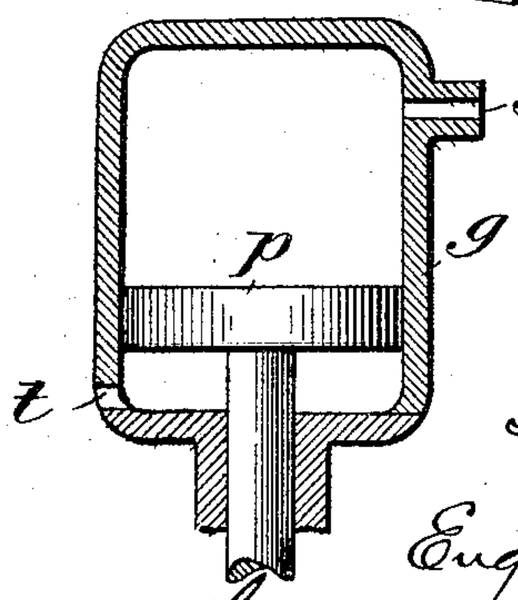


Fig. 2.



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UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF LE CREUSOT, FRANCE.

REDUCING-VALVE FOR COMPRESSED-FLUID MOTORS.

No. 903,325. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed January 27, 1908. Serial No. 412,877.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, citizen of the Republic of France, residing at Le Creusot, (Saône-et-Loire,) France, have invented certain new and useful Improvements in Reducing-Valves for Compressed-Fluid Motors, of which the following is a specification.

The present invention relates to reducing valves or pressure regulators for controlling the supply of motive fluid to motors that are driven by a compressed liquid or gas.

The object of the apparatus is to reduce to a predetermined extent the pressure of a fluid of any kind (liquid or gaseous) stored at a high pressure in a reservoir, so that this fluid may be employed in a motor in which it is necessary for the pressure of the motive fluid always to be constant when admitted to the motor.

In order that my invention may be clearly understood and readily carried into effect I will describe the same with reference to the accompanying drawing in which one constructional form of the apparatus is illustrated in section in Figure 1. Fig. 2 is a view in section of a modified detail.

a is the body of the apparatus, and *b* and *c* are two tubular members leading respectively to and from the body; the fluid passing from the reservoir in which it is stored enters through the member *b* and proceeds to the motor through the member *c*.

d and *e* are two pistons connected by a rod *n* and capable of being displaced in the body *a;* a cylindrical passage *m* extends through the pistons *d* and *e*, their connecting rod *n*, and the counter rod *f* of the piston *e*. *h*, *i*, *j* is a cylindrical slide valve that is adapted to move in this passage; the portions *h* and *j* are fitted so as to move in this passage with a slight friction, and the portion *i* is of reduced diameter. A spring *r* acts upon the upper portion *p* of the slide valve; the tension of this spring is adjustable by means of a screw *q*, and it is inclosed in the casing *g*. In the piston *e* two ports *l* and *k* are provided to place the lower and upper faces respectively of the said piston in communication with the inner passage *m*. Assuming the spring *r* to have been compressed to a known extent and that the parts occupy the position represented in the drawing,—if the fluid passes into the member *b* at a very high pressure it will fill the annular cavity around the reduced portion *i* of the slide valve. Assuming that the pressure in *c* is *nil*,—the portion *j* of the slide valve receiving no pressure in the upward direction,—the slide valve will be pressed right home in the downward direction under the influence of the spring *r*. In this position the annular cavity around *i* will place the ports *l* and *k* in communication with each other and the fluid at high pressure will be able to pass from *b* to the upper face of the piston *e*.

It having been assumed that the pressure upon the lower face of *d* is *nil*, the entire fluid distributer *d*, *n*, *e*, *f*, *g*, will be pressed downwards, and the piston *d*, in descending, will permit the fluid to pass from *b* to *c*. The pressure in *c* will therefore increase; the fluid under pressure will fill *c* and the lower portion of the passage *m*, and will act upon the part *j* of the slide valve; the pressure increasing, the slide valve will ascend, compressing the spring *r* more and more; the passage *k* will first be cut off by the part *j* of the slide valve, but as this valve continues to rise, it will be uncovered again; at this moment, owing to fluid passing through the ports *k* and *m*, an equal pressure will be established upon the upper face of *e* and the lower face of *d;* by reason of the provision of the counter rod *f* the pressure in the upward direction will be exerted upon a larger surface than the pressure in the downward direction, the entire fluid distributer *d*, *n*, *e*, *f*, *g* will ascend and communication between *c* and *b* will be interrupted as soon as the piston *d* in rising enters the narrow portion *o*.

If the pressure in *c* (that is to say on the motor side) decreases, the slide valve *h*, *i*, *j* will again descend and the action described above will be repeated.

To sum up, the apparatus will act by a series of oscillations during which the pressure in the member *c* will preserve a substantially constant mean value, and this mean value will correspond with the compression of the spring *r* in the position indicated in the drawing, in which the upper face of the piston *e* is cut off both from the member *b* and the member *c*.

It will of course be understood that the spring *r* may be replaced by any suitable compressed fluid. One way of effecting this is shown in Fig. 2 in which the head *p* of the slide valve acts as a piston working in a chamber *g* supplied with fluid at the desired pressure through a duct *s*. An opening *t* permits atmospheric pressure to be main-

tained on the back of this piston. In order to cause the pressure in *c* to vary at will, it is only necessary to modify the compression of the spring *r*, or the pressure of the fluid replacing this spring.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a pressure reducing valve, a valve casing having a high pressure inlet and low pressure outlet, a piston-valve within said casing comprising a valve member and a piston member, said members having faces exposed to reservoir pressure and balancing each other, passages in said piston-valve connecting the space in the rear of said piston member with said inlet and outlet and a slide piston-valve held under predetermined pressure working in said piston-valve to control said passages and the movements of said piston-valve.

2. In a pressure reducing valve, a valve casing having a high pressure inlet and a low pressure outlet, a piston-valve within said casing comprising a valve member and a piston member, said members having faces exposed to reservoir pressure and balancing each other, passages in said piston valve connecting the space in the rear of said piston member with said inlet and outlet, a slide valve piston held under predetermined pressure working in said piston-valve, and having a face exposed to outlet pressure and subject to balanced reservoir pressure to control said passages and the movement of said piston-valve.

3. In a pressure reducing valve, a valve casing having a high pressure inlet and a low pressure outlet, a piston-valve within said casing comprising a valve member a piston member and a tubular stem connecting said members, and open to low pressure, one face of said piston member balancing one face of said valve member against reservoir pressure, passages in said piston member providing communication for the space in the rear of said piston member with the high and low pressure sides of said valve member and a slide valve piston working in said stem and held under predetermined pressure to control said passages and the movement of said piston valve.

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

EUGÈNE SCHNEIDER.

Witnesses:
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