

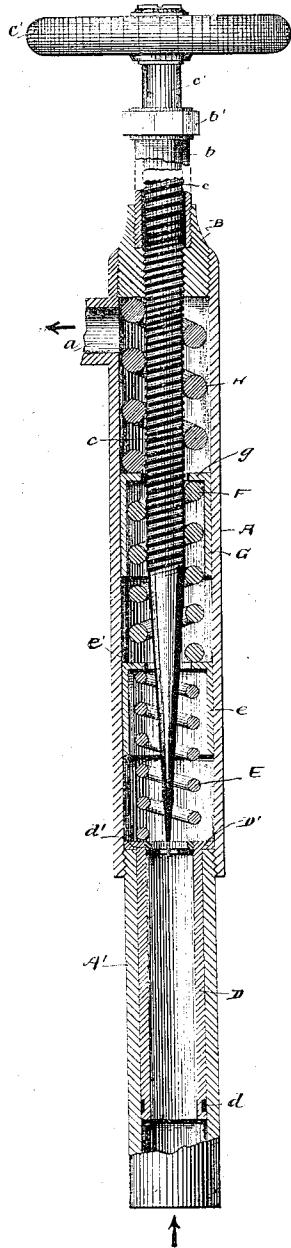
(No Model.)

J. THOMAS.

## GAS PRESSURE REGULATING VALVE.

No. 366,702.

Patented July 19, 1887.



WITNESSES

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# UNITED STATES PATENT OFFICE.

JOSHUA THOMAS, OF CLEVELAND, OHIO.

## GAS-PRESSURE-REGULATING VALVE.

SPECIFICATION forming part of Letters Patent No. 366,702, dated July 19, 1887

Application filed April 19, 1887. Serial No. 235,327. (No model.)

To all whom it may concern:

Be it known that I, JOSHUA THOMAS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful

5 Improvements in Gas - Pressure - Regulating Valves; and I do hereby 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 pertains to make and use 10 of the same.

My invention relates to improvements in gas-pressure-regulating valves; and it consists in certain features of construction and in combination of parts, hereinafter described, and 15 pointed out in the claims.

In the accompanying drawing, the figure is a plan view, mostly in section, of an apparatus embodying my invention, a portion of the sleeve connected with the stuffing-box and a 20 portion of the valve-stem being broken away to reduce the size of the drawing.

A and A' are respective sections of the casing, each having a cylindrical bore, and the latter section being screwed into the former, 25 as shown. The induction-pipe is connected with the outer or forward end of section A', and the discharge-pipe is supposed to be screwed into the nozzle a of section A, neither of these pipes being shown. A plug, B, is screwed into 30 the rear end of section A. This plug has a threaded bore for engaging the threaded portion c of the valve C. Attached to or made integral with this plug is a sleeve, b, with a stuffing-box, b', attached to the outer end of the 35 same. The shank c' of the valve-stem and the sleeve b should be of considerable length, so that in manipulating the valve the threaded section c will not enter the stuffing-box. A hand-wheel, C', is provided for operating the 40 valve. The valve proper consists of a long slightly-tapering cone, substantially as shown. A sleeve, D, is made to fit easily inside of section A' of the casing, and has a flange, D', that fits easily in the bore of section A. The sleeve 45 has suitable packing, d, preferably slight metallic rings, to make a tight joint and allow the sleeve to move easily endwise.

A detachable valve-seat, d', is screwed into or otherwise secured to the inner end of the 50 sleeve D. The object of making the seat detachable is that interchangeable seats, hav-

ing respectively different-sized openings, may be used, according to the amount of gas that is required for consumption. The sleeve D, bearing the valve-seat, is supported as against end 55 pressure of gas acting toward the valve, first, by a light spiral spring, E. This spring at the rear end is seated on an internal flange, e', of the sleeve e, the latter having an easy fit in section A of the casing. The sleeve e is supported 60 by a spring, F, the latter being made considerably heavier and stiffer than the spring E. The spring F is seated on the flange g of the sleeve G, this sleeve also having an easy fit in the casing. The sleeve G is supported by a spring, H, 65 made considerably heavier than the spring F. The rear end of the spring H abuts against the inner end of the plug B. The internal area in cross-section of section A' of the casing is supposed to be so much greater than the capacity 70 of the discharging-pipe that approximately a full pressure of gas is had on the sleeve D and valve-seat d'. Where natural gas is used, the pressure thereof is likely to vary greatly on different days or at different times of the same 75 day. This may arise from various causes—for instance, from the limited or extra amount of gas used at any particular time. It is therefore important to have some device for regulating the supply, so that it may be constant 80 under any pressure, and with such arrangement of parts that the amount of gas supplied may be varied at the will of the operator. The amount of gas discharged through the apparatus is regulated by adjusting the valve in or 85 out to reduce or enlarge the opening at the valve-seat, after which the supply is regulated as against the variable pressure by the movable valve-seat. With a light pressure of gas the valve D and attached valve-seat will be moved 90 rearward a short distance, thereby slightly compressing the spring E. If the pressure be considerably increased, the sleeve D will be forced back until the flange D' strikes the forward end of sleeve e, after which the spring 95 F is brought into operation, and if the pressure becomes so great that the sleeve e is brought against the sleeve g the spring H is made to act. By having a series of springs arranged as aforesaid, a great range of action of the valve-seat is 100 had, so that the flow of gas under high or low pressure may be regulated. The operator at any

time has only to adjust the valve, in or out, to give the desired supply of gas for consumption, after which no further attention is required, so long as substantially the same amount of gas is wanted. The bore of the valve-seat should be large enough to admit of the maximum amount of gas wanted under a minimum pressure, and the taper of the valve should be such as to give substantially a full movement of the valve-seat before closing the opening in the latter. By having the valve-seat detachable, different sizes of valves and openings in the seat may be used, so that the balance of the apparatus may be used where a large or a small quantity of gas is consumed. A cylindrical hollow-ended valve adapted to fit into the bore of the valve-seat, such valve having a long V-shaped slit in the wall thereof, the base of such slit presenting rearward, would give, in connection with the valve-seat, a graduated opening and would answer the purpose; but for various reasons I prefer the construction shown.

What I claim is—

1. The combination, with a suitable casing and a valve made adjustable endwise therein, of a movable valve-seat located in the casing to co-operate with the valve, the said valve being supported as against end pressure by one or more springs, substantially as set forth.

2. The combination, with a needle-valve 30 having a screw-threaded shank for adjusting the valve endwise, of a movable co-operating valve-seat made to slide endwise forward or from the valve, and a series of springs for supporting the valve as against end pressure toward the valve, substantially as set forth.

3. The combination, with a valve and movable valve-seats, substantially as indicated, of a series of springs, respectively of different tension, for supporting the valve-seat as against 40 end pressure toward the valve, substantially as set forth.

4. The combination, with casing, valve, valve-seat, and series of springs, substantially as indicated, of sleeves made to move inside the 45 casing, said sleeves having internal flanges or seats for the respective valves, and said sleeves in their engagement with each other forming stops to limit the compression of the respective springs, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 11th day of April, 1887.

JOSHUA THOMAS.

Witnesses:

CHAS. H. DORER,  
ALBERT E. LYNCH.