

A. H. CRUSE.
REGULATING APPARATUS FOR BURNERS.
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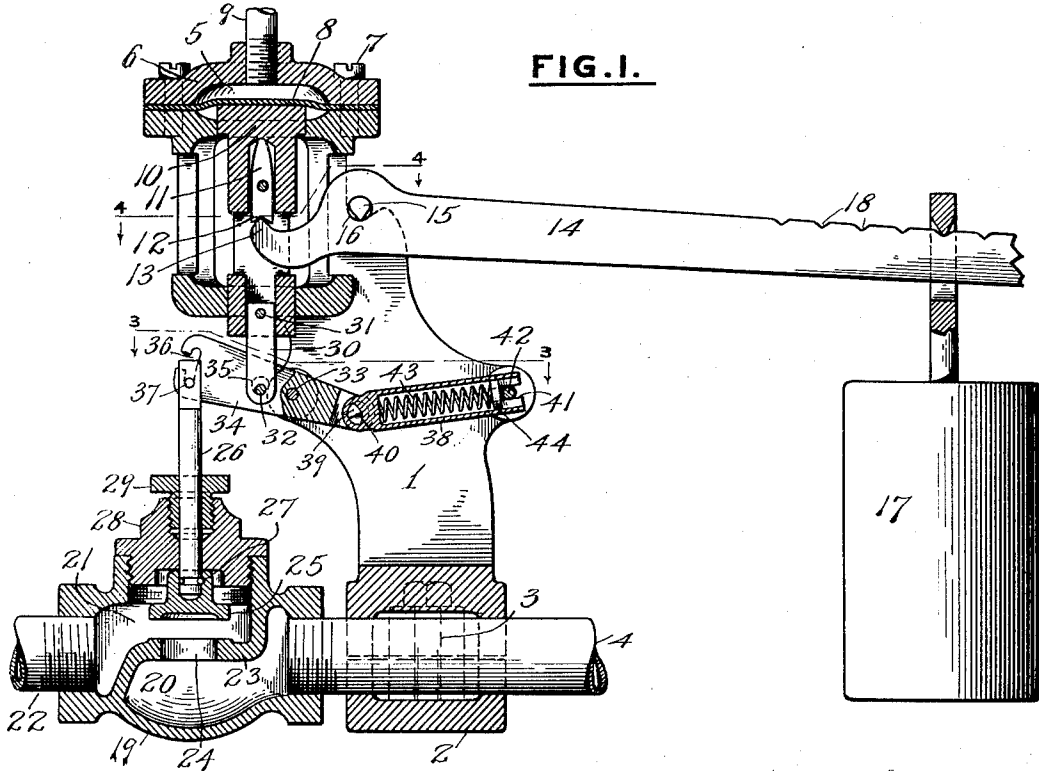


FIG. 2.

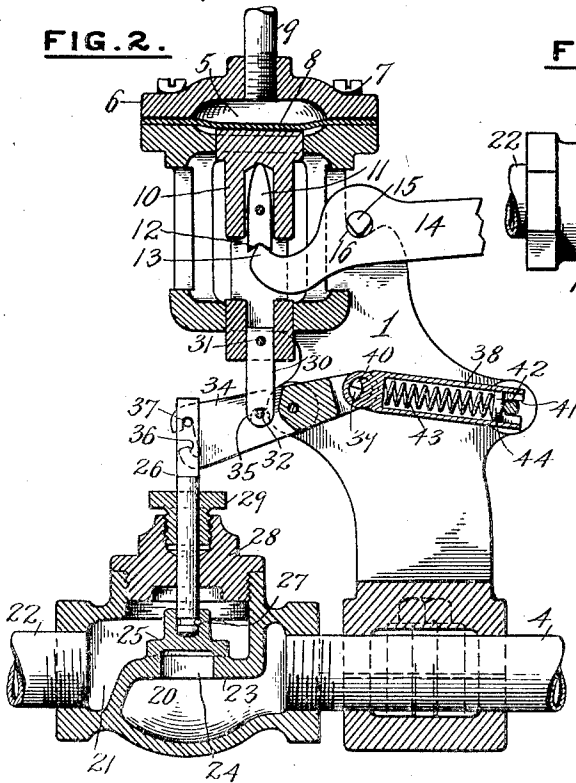


FIG. 3.

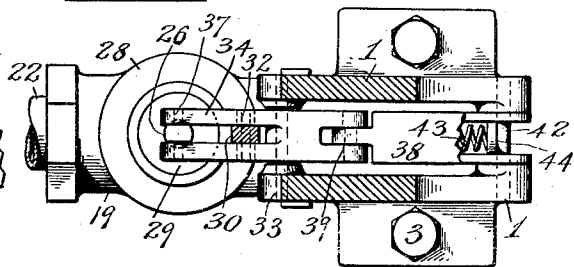
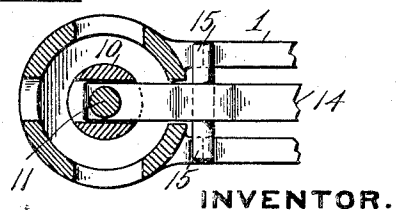


FIG. 4.



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REGULATING APPARATUS FOR BURNERS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, AMANDUS H. CRUSE, a citizen of the United States, residing at New York city, county of Kings, and State of New York, have invented certain new and useful Improvements in Regulating Apparatus for Burners, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to certain improvements in regulating apparatus and particularly to an improved valve construction for controlling the supply of gas to burners using gas or gaseous fuel.

The invention has for its especial object to provide an improved valve construction which shall act automatically and with a very quick opening and closing movement to control the gas supply to burners, as, for instance, the burners used for steam drying tables employed in the production of the matrices used as molds in the production of stereotype plates, this quick opening and closing movement being such as to practically instantly shut off or open the gas supply, whereby the temperature of the tables may be evenly maintained at the desired point, and back lighting or firing avoided.

A further object of the invention is the production of a regulating apparatus which will be simple in design, and consequently inexpensive to construct, and the parts of which shall be strong and durable, and which can be readily installed.

With these and other objects in view, the invention consists in certain novel parts and combinations which will be described in detail in conjunction with the accompanying drawings, in which—

Figure 1 is a central sectional view of so much of the improved apparatus as is necessary for an understanding of the invention, the valve being shown open;

Fig. 2 is a similar view, certain parts being omitted, showing the parts in the position they occupy when the valve is closed;

Fig. 3 is a horizontal section taken on the irregular line 3—3 of Fig. 1, and

Fig. 4 is a horizontal section, partly broken away, taken on the line 4—4 of Fig. 1.

Referring now to these drawings, 1 indicates the body or frame which, as shown,

may be formed with a pair of spaced sides, this body being clamped or otherwise suitably secured, by means of a cap 2 and bolts 3, to the pipe 4, through which the gas or other gaseous fuel is supplied to the burner (not illustrated).

Apparatus embodying the invention will include a pressure chamber 5 connected with the boiler of the steam table or other mechanism, the temperature of which it is desired to regulate. While this pressure chamber may be formed in various ways, as shown it is formed between the main body 1 and a cap piece 6 clamped to the main body by suitable bolts 7, these parts being shaped to provide the chamber. Located in the pressure chamber is a flexible diaphragm 8 which is actuated by the varying pressure in the chamber, the chamber being connected with the mechanism which is to be controlled or regulated by a suitable pipe or other connection indicated at 9. Arranged to be actuated by the diaphragm is a controller in the form of a piston or plunger 10 which has, as shown, a sliding fit in the frame 1. Apparatus embodying the invention in its best form will include pressure resistance means, which will preferably be adjustable, these means acting to prevent the action of the piston or plunger except upon a predetermined pressure in the pressure chamber. As shown, this piston or plunger is preferably at its upper end recessed, in which recess is located a floating center 11, the lower end of which is recessed or notched at 12, this notch receiving the knife edge 13 of a balance lever 14. The balance lever 14 is pivoted preferably through a pair of knife edges 15 extending on each side of the lever, as shown in Fig. 4, these knife edges taking into notches 16 formed in the main frame or body 1. This lever 14 is provided with resistance means, which, in the construction shown, is a weight 17 preferably adjustable along the lever arm, notches 18 being provided for holding the weight in position. This lever acts as a resistance means for preventing the piston or plunger 10 from being operated by the diaphragm until a pressure predetermined by the weight and its position on the lever arm is present in the pressure chamber 5.

Any suitable form of valve mechanism may be employed, that shown being simple

and convenient, embodying a valve body 19 having an inlet chamber 21 connected with the gas intake pipe 22, before referred to, and outlet chamber 20 connected with a pipe 4 leading to the burner, these chambers being divided by a partition 23 having port 24 controlled by a valve body 25 provided with a valve stem 26, the valve being secured to the valve stem with a pin and groove construction 27, so that it may have a movement around the stem. The inlet chamber is closed by the usual cap 28 and the stem is surrounded by the usual stuffing gland 29.

15 In apparatus embodying the invention, means are provided of simple form whereby this valve is operated from the piston or plunger, before referred to, in such manner so as to have a very quick opening and closing movement, so as to be opened or closed practically instantaneously. While these means may be somewhat varied, they will include a single lever with lost motion connections between the plunger and the lever 25 and between the lever and the valve stem. In the best constructions, furthermore, there will be provided a single spring cooperating with the lever, this spring being compressed during a portion of the movement of the lever and released to give the lever a quick throw, so as to cause it to operate the valve with a very quick movement. While these parts may be variously constructed and arranged, as illustrated the plunger 10 before 30 referred to is provided with an extension 30 secured thereto in any suitable manner, as by pin 31, this extension being provided at its lower end with pins 32 extending or projecting from each side thereof. Pivoted in the body 1 by a pin 33 is a single operating lever 34. This lever is or may be, as illustrated (see Fig. 3), a forked lever, and is provided with holes or slots 35 in which take the pins 32 in the lower end of the projection 30 before referred to, the holes or slots and the pins being so dimensioned that the pins have a certain play in the holes or slots, thus effecting a lost motion connection between the plunger and the operating lever. 50 The outer ends of the forks of this lever 34 are provided with long slots 36 in which works a pin 37 formed on the upper end of the valve stem 26, before referred to, this pin and slot construction forming a lost motion connection between the lever and the valve stem. 55

In apparatus embodying the invention, and preferably for simplicity in construction, a single spring is employed cooperating 60 with the lever, this spring being put under compression during a portion of the lever movement and released after a certain movement of the lever, so as to give the lever a very quick throw, the lost motions before 65 described permitting this to be done. While

the cooperative relation between the lever and the spring whereby this is effected may be varied, as illustrated the spring is a pivoted spring and is also pivotally connected with the lever, forming, in effect, a spring 70 toggle. While the construction may be somewhat varied, there is provided a spring carrier 38 in the form of a casing, this casing being pivoted to the end of the lever by a knife edge pin 39 on the lever end cooperating with a knife edge 40 in the casing. 75 This casing at its other end is slotted at 41 and pivotally secured to the frame 1 by a pin 42 working in the slot. This casing incloses a spring 43 which takes against the head of the casing and against a collar or head 44 at the slotted end of the casing. This spring is put under compression while the lever is moving to a horizontal position and released after the lever has passed such position, and consequently acts to give the lever 85 a very quick throw, thus effecting an almost instantaneous opening and closing movement of the valve.

While the invention has been described in 90 its preferred form, it will be understood that various changes and variations may be made in the specific construction and arrangement of the parts, and that while the improved valve movement has been particularly designed for use with steam drying tables of matrix presses, it will also be understood that it may be used in other relations, where it is desired to control the supply of gaseous fuel 95 to a burner. 100

What is claimed is:

1. In a regulating apparatus, the combination of a pressure chamber; a diaphragm therein, a controlling plunger actuated thereby, a variable resistance means connected directly to the plunger for preventing the diaphragm from actuating the plunger before a predetermined pressure in the pressure chamber, a valve chamber, a valve therein having a stem, a lever, a lost motion connection between the lever and the plunger, and a lost motion connection between the lever and valve stem. 105 110

2. In a regulating apparatus, the combination of a pressure chamber, a controlling 115 plunger actuated by the pressure therein, a resistance means connected directly to the plunger for preventing the action of the plunger before a predetermined pressure in the pressure chamber, means for varying the resistance of the resistance means, a valve chamber, a valve therein having a stem, a lever, a lost motion connection between the lever and the plunger, a lost motion connection between the lever and the valve stem, 125 and means independent of the plunger for operating the lever with a quick throw in either direction.

3. In a regulating apparatus, the combination of a pressure chamber, a plunger 130

actuated therefrom, a lever coöperating with the plunger, a weight adjustable on the lever and acting to resist the movement of the plunger before a predetermined pressure in
5 the pressure chamber, a valve chamber, a valve therein having a stem, a lever, a pin and slot connection between the lever and the plunger, a pin and slot connection between the lever and the valve stem, and a spring
10 for giving the lever a quick movement in either direction.

4. In a regulating apparatus, the combination of a pressure chamber, a diaphragm, a valve chamber, a valve therein having a
15 stem, a single lever, a pin and slot connection between the lever and the valve stem, means including a pin and slot connection between the lever and the pressure chamber for actuating the lever, a casing pivoted
20 at one end and having a pivotal connection with the lever at its other end, and a spring in the casing for giving the lever a quick movement in either direction.

5. In a regulating apparatus, the combination of a gas pipe, a frame and means for
25 securing the frame to the pipe, a pressure chamber carried by the frame, a diaphragm therein, a controlling plunger actuated thereby, variable resistance means connected

directly to the plunger, a valve chamber, a
30 valve therein having a stem, a single lever pivoted on the frame, a lost motion connection between the lever and the plunger, a lost motion connection between the lever and the valve stem, and a single spring for
35 giving the lever a quick movement in either direction.

6. In a regulating apparatus, the combination of a gas pipe, a frame and means for
40 securing the frame to the pipe, a casing secured to the frame, a pressure chamber in the casing, a diaphragm, a controlling plunger actuated thereby having a slot, a lever entering the slot and provided with
45 resistant means for holding the plunger against actuation by the diaphragm, said lever being pivoted on the frame, a valve chamber, a valve therein having a stem, a single operating lever pivoted on the frame,
50 a lost motion connection between the lever and plunger, a lost motion connection between the lever and the valve stem, and means pivoted on the frame for operating the lever with a quick throw in either direction.
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In testimony whereof I have hereunto set my hand.

AMANDUS H. CRUSE.