

No. 675,510.

Patented June 4, 1901.

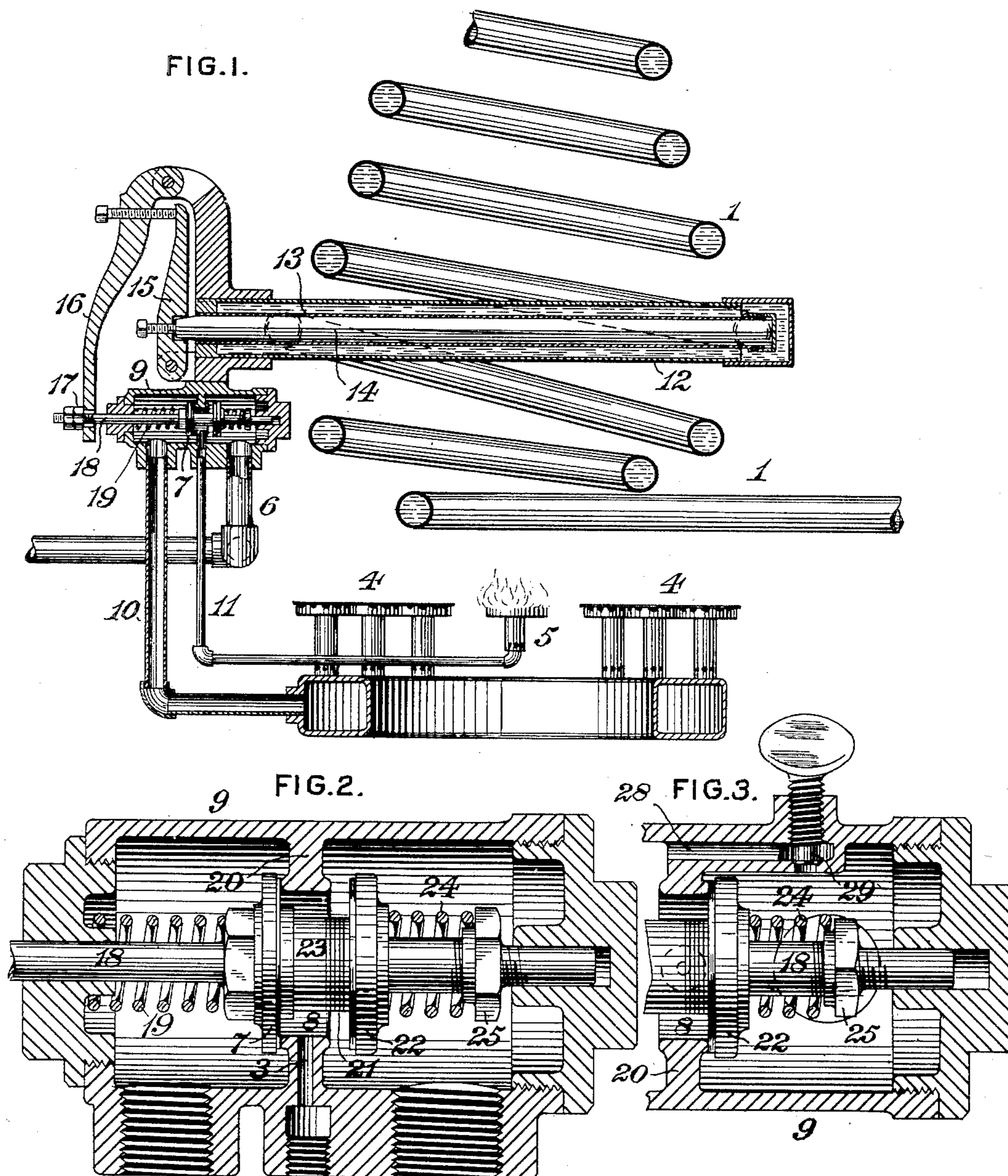
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AUTOMATIC CUT-OFF FOR GAS SERVICE PIPES.

(Application filed Nov. 10, 1897.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:
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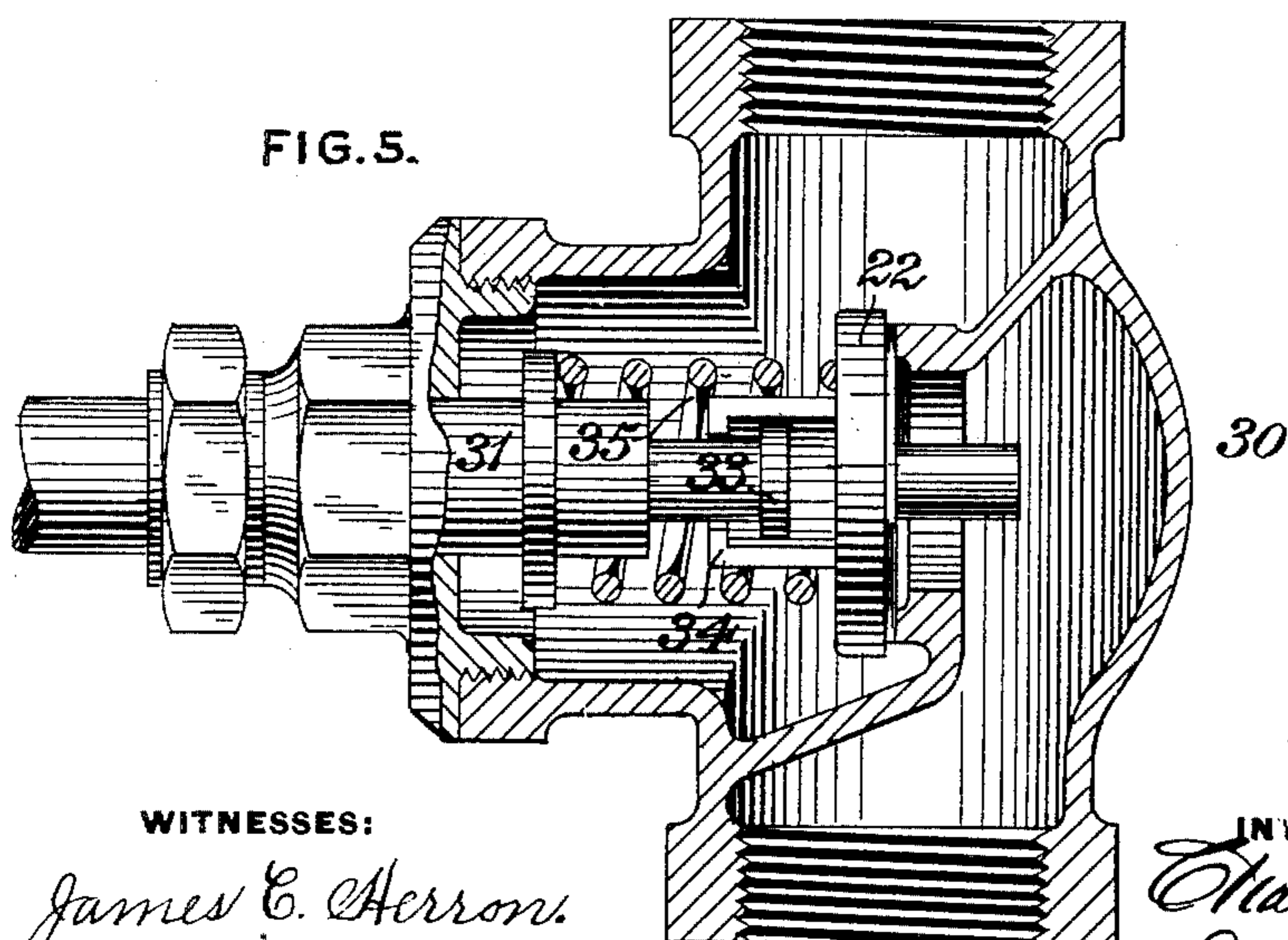
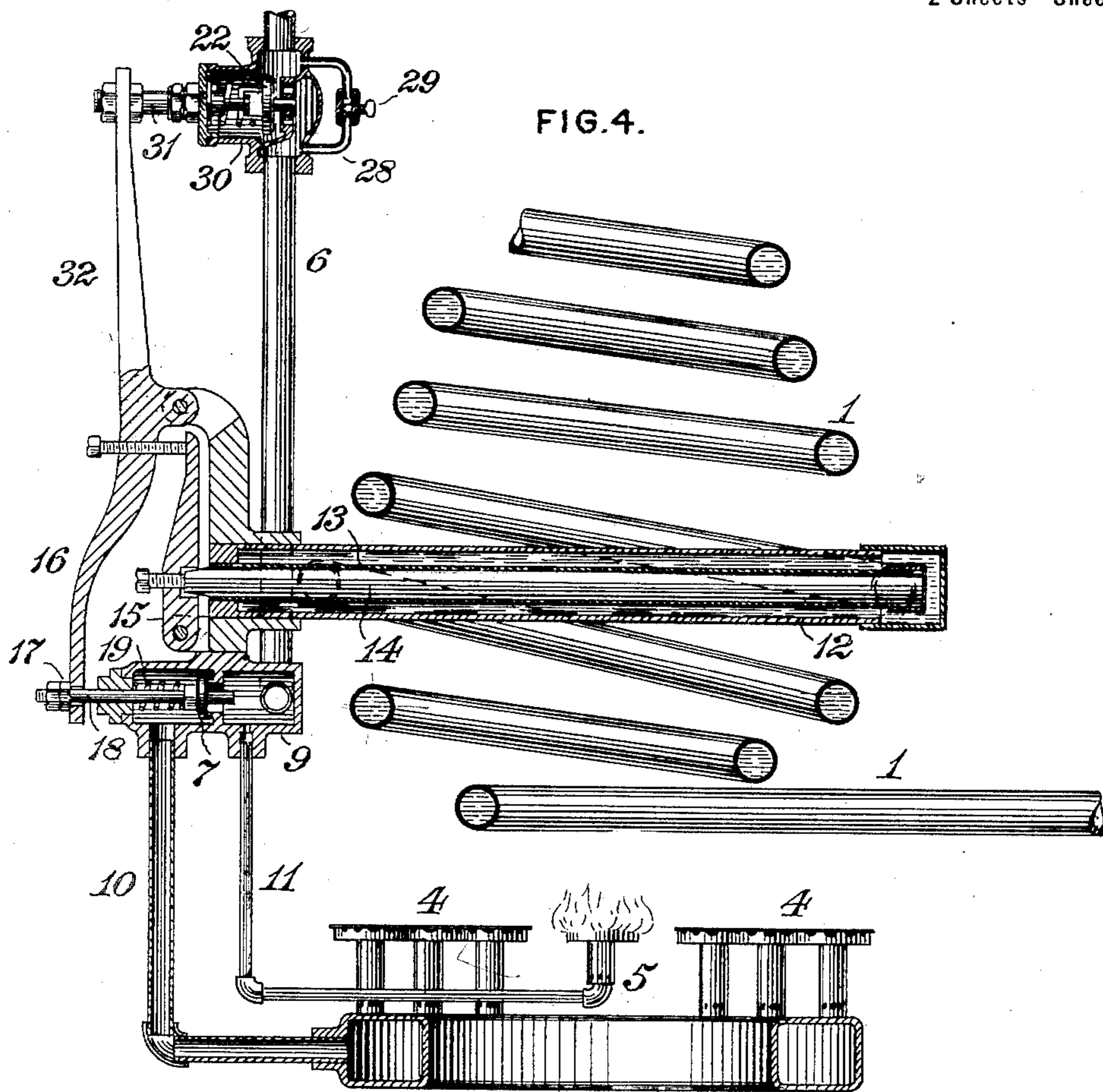
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WITNESSES:

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UNITED STATES PATENT OFFICE.

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AUTOMATIC CUT-OFF FOR GAS-SERVICE PIPES.

SPECIFICATION forming part of Letters Patent No. 675,510, dated June 4, 1901.

Application filed November 10, 1897. Serial No. 658,076. (No model.)

To all whom it may concern:

Be it known that I, CHARLES S. FOLSOM, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Automatic Cut-Offs for Gas-Service Pipes, of which improvement the following is a specification.

My invention is more particularly designed for application in connection with a water heating apparatus in which the supply of gas to the burners is regulated and controlled by a thermostat, but is equally applicable in connection with gas heating apparatus of other descriptions in which regulation is effected by a thermostat.

The object of my invention is to provide simple, reliable, and inexpensive means by which communication from a gas-service pipe to a burner in a heating apparatus in which gas-supply is regulated by a thermostat may be automatically cut off upon the extinguishment of the flame at the burner without interfering with the normal regulation of supply during the periods in which combustion is maintained at the burner.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical section through a water-heater with my improvement applied; Fig. 2, a similar section, on an enlarged scale, through the valve-casing of the same; Fig. 3, a section, on the same scale, through a portion of the valve-casing, taken at right angles to Fig. 2; Fig. 4, a view similar to Fig. 1, showing the cut-off valve as located in an independent casing; and Fig. 5, a longitudinal section through the cut-off-valve casing of Fig. 4.

The water heating apparatus to which my invention is herein shown as applied, and which in and of itself is not claimed as of my invention, consists, essentially, of a coil of pipe 1, to the opposite ends of which are connected a cold-water-inlet pipe and a hot-water-outlet pipe, which are not shown. The coil is heated by a series of main gas-burners 4 and a lighting or "pilot" burner 5, to which burners gas is supplied by a service-pipe 6. The supply of gas to the main burners is controlled by a supply-valve 7 of the lift or puppet type, seating over a port 8 in a transverse

partition 20, formed in a valve-casing 9, from which an inlet-pipe 10 leads to the several main burners 4. An independent inlet-pipe 11 leads from a port or passage 3 in the valve-casing 9 to the pilot-burner 5. The total or partial opening and closure of the gas-supply valve 7 is regulated so as to supply a greater or less quantity of gas to or to entirely cut off gas from the main burners 4 by a thermostat or thermal regulating device located in position to be subjected to the heat of the several burners and in the instance shown consisting of an outer tube 12, forming part of the circuit for water through the coil, an inner tube 13, formed of metal having a comparatively high coefficient of expansion and fixed at one end, and a rod 14, which is formed of less-expansible metal than the tube 13 and bears at one end against a pivoted lever 15. The lever 15 bears against another pivoted lever 16, the free end of which bears against a nut 17, which is adjustable upon the stem 18 of the gas-supply valve, and a closing-spring 19 bears on the supply-valve with a constant tendency to bring the same to and hold it upon its seat, such tendency being counteracted by the contraction of the tube 13 under reduction of temperature, which acting through the rod 14 and levers 15 and 16 moves the gas-supply valve 7 to a greater or less extent from its seat.

In water heating apparatus of the general character of that above described, as constructed prior to my invention, the inlet-pipe 11 of the pilot-burner 5 is constantly in communication with the gas-service pipe 6, and consequently if the flame at the pilot-burner should be accidentally or carelessly extinguished, as by a temporary interruption of the gas-supply or from any other cause, the thermostat would, by reason of the consequent reduction of temperature, open the gas-supply valve 7, and upon the resumption of supply, if interrupted, gas would escape from the main burners 4, as well as from the pilot-burner 5, and not being ignited by a flame at the pilot-burner, as provided for in the normal operation of the apparatus, the escape of gas would, unless freely discharged through a tight flue, (which discharge cannot always be insured,) involve liability to explosion or

other injurious action. By the application of my invention, which can be readily and inexpensively effected, the supply of gas from the service-pipe to both the main and pilot burners is automatically cut off upon the extinguishment of the flame at the pilot-burner, and danger of accident from escape of gas is effectually prevented.

In the practice of my invention, referring first to Figs. 1, 2, and 3, the casing 9 of the gas-supply valve 7 is made of slightly-increased length, and a cut-off valve 22, adapted to control the supply-port 8 and to seat on the opposite side of the partition 20 from the supply-valve 7, is fitted freely on the stem 18 between a collar 23, fixed thereon, and a spring 24, which bears at one end on the back of the cut-off valve and at the other on a nut 25, engaging a screw-thread on the stem, by which the tension of the spring may be adjusted as desired. Washers 21 are preferably interposed between the collar 23 and the cut-off valve, by the removal of one or more of which and the location of one or more of which adjacent to the nut 25 the distance of the cut-off valve from the collar, and consequently the distance through which the cut-off valve will move before closing the port 8, may be adjusted as desired. The cut-off valve is thus held up to the collar by the spring, and longitudinal movement of the valve-stem independently of the cut-off valve is permitted when required. A washer-plate may be interposed between the nut and spring, if desired, to provide larger bearing-surface, and the nut may be held in adjusted position by a lock-nut. The cut-off valve 22 is adjusted upon the valve-stem at such distance from the supply-valve 7 that the latter may be raised from its seat by the thermostat sufficiently to effect the maximum supply of gas to the burners which is required in the normal operation of the apparatus without causing the valve-stem to coincidentally bring the cut-off valve 22 close enough to its seat on the partition 20 to cut off or impede the flow of gas to the burners. In order to enable the operation of the apparatus to be readily resumed after the cut-off valve has been seated, a by-pass 28, controlled by a cock or plug 29 and leading from the supply side of the partition 20 to a communication with the port 3 of the pilot-burner delivery-pipe, may be cored in or connected to the valve-casing 9.

In the normal operation of a heating apparatus with my improvement applied as above described the supply of gas to the burners is regulated by the thermostat in the manner heretofore practiced, the traverse of the cut-off valve toward its seat being, as before stated, insufficient to affect the supply. When, however, the flame at the pilot-burner is extinguished, the resultant reduction of temperature causes the contraction of the tube 13, which acting through its connections in the manner normal to the apparatus on the valve-stem 18 moves the supply-valve 7 far-

ther from its seat and coincidentally brings the cut-off valve 22 to its seat, thereby cutting off the supply of gas from the service-pipe to all the burners and preventing any escape of gas from the latter. Any further outward movement of the valve-stem 18 which may be effected by the thermostat after the cut-off valve has been brought to its seat is permitted without strain or injury to any of the parts by the cut-off valve being fitted, as before described, freely on the stem, which moves through it after it has been seated as far as may be due to the continuous action of the thermostat, the cut-off valve being held to its seat by the spring. When it is desired to relight the pilot-burner to resume the operation of the heater, the cut-off valve may be opened by moving the valve-stem by hand by pressing on the lever 16, which will allow the valve-stem to move sufficiently to open a passage for gas, or if a by-pass is provided the cock or plug thereof may be opened.

Figs. 4 and 5 illustrate a form of my invention corresponding in all operative features with that above described and differing therefrom structurally only in the particular that the cut-off valve 22 is fitted to seat in an independent valve-casing 30, interposed between two sections of the service-pipe 6 on the supply side of the supply-valve casing, and is connected with a valve-stem 31, which is moved in direction to open and close the cut-off valve, as required, by an arm 32. The arm 32 is formed upon or fixed to the thermostat-lever 16, which is connected to the supply-valve and projects in opposite direction from the pivot of said lever, so that closing movement shall be imparted to the cut-off valve coincidentally with the opening movement of the supply-valve, and vice versa. The relative lengths of the lever 16 and the arm 32 are so proportioned that, as in the instance first described, the traverse of the supply-valve toward and from its seat which is required in the normal operation of the heater may be effected without completely closing the cut-off valve, and traverse of the cut-off-valve stem 31 independently of the cut-off valve after said valve has been seated is provided for, as in the former instance, by connecting the cut-off-valve stem to the cut-off valve with the capacity of independent movement of the former. To this end a collar 33 is formed on the inner end of the valve-stem and a cage or series of projections 34, adapted to engage said collar, is formed on the back of the valve. The cut-off valve is seated by a spring 35 and is held to its seat by said spring, except when raised therefrom by the engagement of the collar on the valve-stem with the cage on the valve by outward movement of the valve-stem. Upon the release of such engagement by the inward movement of the valve-stem coincident with a lift of the supply-valve greater than that required in the normal operation of the heater the cut-off valve is seated and held seated by the

spring, and any further inward movement of the valve-stem, due to the continued action of the thermostat, is effected without imposing strain or pressure on the cut-off valve.

5 A by-pass 28, extending from one side of the cut-off valve to the other and controlled by a plug or cock 29, is preferably provided, as in the instance first described, to enable gas to be supplied to the pilot-burner 5 independently of the action of the thermostat for re-lighting the same after it has been extinguished, and in Fig. 4 such a by-pass is shown as connected directly to the valve-casing 30.

15 I claim as my invention and desire to secure by Letters Patent—

20 1. The combination, substantially as set forth, of a gas-burner, a gas-service pipe leading thereto, a valve-casing in the service-line to the burner, a ported partition in said valve-casing, a stem working in said valve-casing, a supply-valve fixed on said stem and fitted to seat on one end of the partition-port, a cut-off valve fitted on said stem, with the capacity of independent longitudinal movement

on the stem, and adapted to seat on the other 25 end of said port, a spring through which a limited degree of traverse of the valve-stem is imparted to the cut-off valve, and a thermostat connected to and imparting longitudinal movement to the valve-stem. 30

2. The combination, substantially as set forth, of a main gas-burner, an independent or pilot burner, a cut-off valve controlling the supply of gas to the pilot-burner, a supply-valve controlling the supply of gas to the main 35 burner, a thermostat, connections from the thermostat to the supply and cut-off valves whereby opening movement is imparted to one of said valves and coincident closing movement to the other, and means for per- 40 mitting a partial traverse of the supply-valve without coincident movement of the cut-off valve.

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Witnesses:

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