No. 712,879. Patented Nov. 4, 1902.

D. C. WILGUS.

HYDROCARBON BURNER.

(Application filed Nov. 11, 1901.)

(No Model.)

Fig. 1.

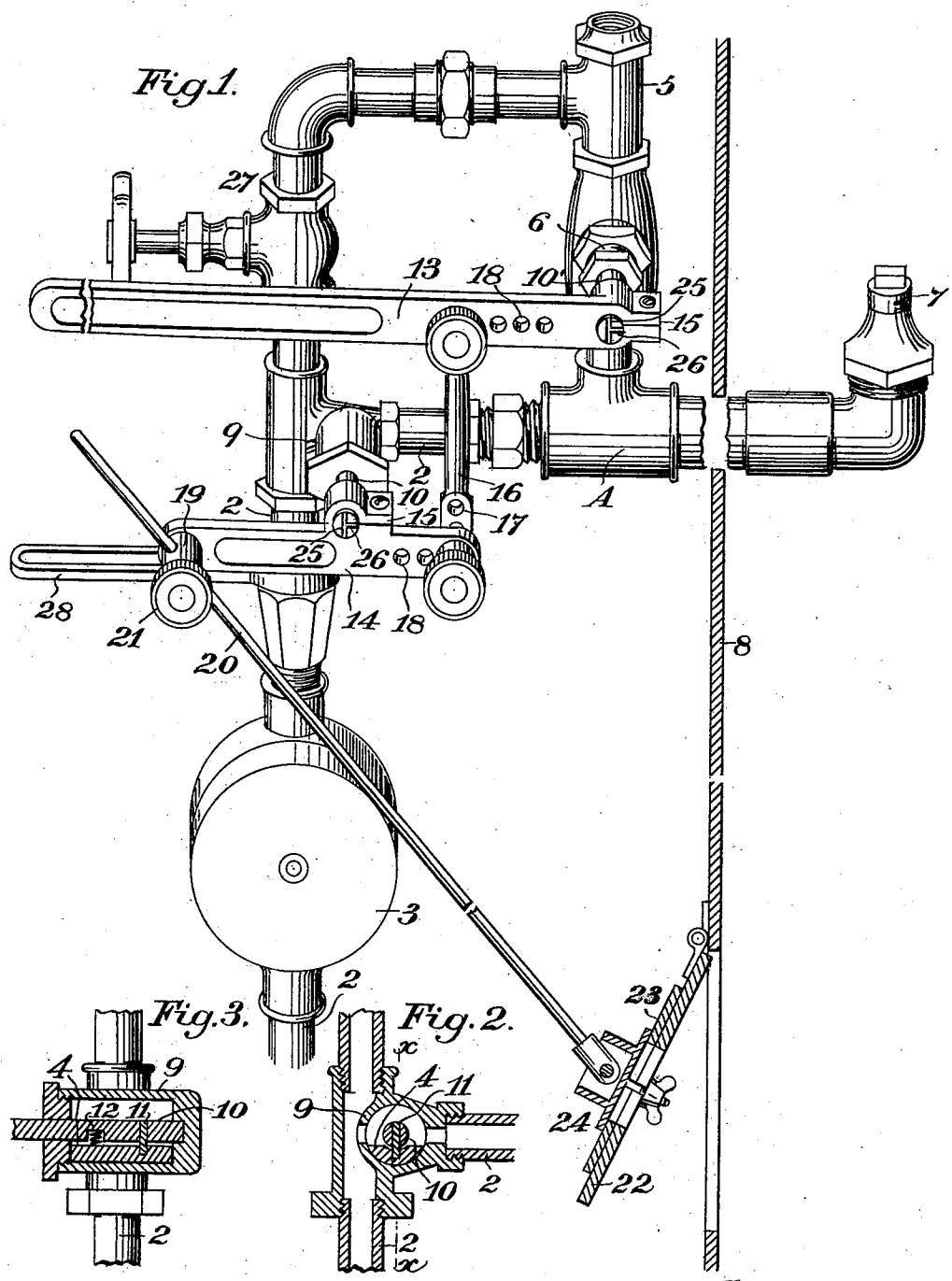

Fig. 3.

Fig. 2.

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DANIEL C. WILGUS, OF SAN FRANCISCO, CALIFORNIA.

HYDROCARBON-BURNER.

SPECIFICATION forming part of Letters Patent No. 712,879, dated November 4, 1902.

Application filed November 11, 1901. Serial No. 81,802. (No model.)

To all whom it may concern:

Be it known that I, DANIEL C. WILGUS, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Hydrocarbon-Burners; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to improvements in hydrocarbon-burners of the type wherein oil and steam or air are conducted independently to the casing of the burner and are thence discharged within the combustion-chamber of the furnace.

My invention comprises details which will be more fully set forth hereinafter, having reference to the accompanying drawings, in which—

Figure 1 is a perspective side elevation of my invention. Fig. 2 is a central vertical section of the oil-valve. Fig. 3 is a vertical section on the line *x x* of Fig. 2.

A represents a burner-casing, into which the oil is fed through a pipe 2. A strainer 3 of ordinary construction may be interposed in this pipe to prevent scale or other foreign matter from entering and clogging the burner. A valve 9 governs the flow of oil in the pipe. Steam is admitted to the casing through a pipe 5 disposed at right angles to the direction of flow of oil through the burner. The steam-supply to the burner is governed by means of a valve 6. The steam and oil are thoroughly commingled and discharged in the form of a highly inflammable vapor through the burner-tip 7 within the combustion-chamber of the furnace 8. Herein ignited the flame spreads out in a broad fan-like sheet of great intensity.

The valve consists of a rotatable segment 4, as shown in Fig. 2, seating in the valve-chamber and adapted to be turned either to uncover both ports to allow the free passage of the oil or to be turned to close one of the ports to stop the flow. The valve is operated by means of the stem 10, which has one end extending without the valve-casing and the other end seated in the end of the chamber. A stud or pin 11, secured rigidly to the stem, fits loosely in a notch in the segment. A spring 12 is interposed between the segment and the stem, so that the valve will at all times be firmly seated irrespective of the oil-pressure and will prevent any sand or grit getting between the valve and its seat. The loose fit of the stud within the notch of the segment allows the latter to move out from the stem and take up any wear of the parts. A valve so constructed gives excellent results, for the reason that it is not likely to become clogged, owing to the fact that the oil-passage extends around a great portion of the stem and interposes scarcely any obstruction to the free flow of oil.

The steam-valve 6 is of precisely similar construction with the oil-valve, except that I may dispense with the spring 12, since the steam-pressure is always sufficient to insure the proper seating of the valve. To the stem 10′ of the steam-valve I attach a lever 13, by which the valve 6 is operated, and a lever 14 is secured to the stem 10 of the oil-valve. Each of these levers is removably secured to the stems by means of a clamping attachment 15, formed integral with either lever. The two levers are adjustably connected by means of the link 16, whereby both valves are operated simultaneously by the movement of either lever. The ends of the rod are perforated, as at 17, and the levers are perforated, as at 18, so that by shifting the points of attachment of the rod and the levers the relative rate of movement of the two valves may be altered at will—as, for example, to suit variations in oil or steam pressures, or oils of different specific gravities. The end of the lever 14 is provided with a socket 19, in which a rod 20 is adjustably secured by any suitable means, as a screw 21. The lower end of this rod engages a damper 22, by which the admission of air to the ash-pit is regulated. The air entering through the damper-opening passes upward through suitable channels and commingles with the burning gases in the combustion-chamber to give an incandescent flame.

The mode of attachment of the rod 20 and damper is as follows: A slotted guide 23 is secured transversely upon the damper. This guide is adapted to retain a flanged footpiece 24, pivoted to the end of the rod, and at the same time to allow the footpiece to be freely slidable in the slot.

In operation the valves are regulated sep-

arately to admit the air and steam in right proportion. The levers are then coupled up by means of the connecting-rod 16, so that when the lever 13 is moved the two valves will be operated simultaneously to close or open the fuel-passages. It is seldom that both valves want to be opened the same amount. By reason of the perforations 17 and 18 the rod 16 may be shifted, so that the relative rate of movement of the two valves may be varied according to the desired sized aperture in either valve. It permits the two valves thus to be moved in unison, but at different rates of speed. The end of each valve-stem has a diametral groove 25, which stands vertically when the valves are, *e. g.*, opened. A second groove 26 indicates at all times the position of the valve on the valve-seat.

In adjusting the valves separately the clamps 15 are loosened to allow the stems to be turned independently of the levers. By means of a screw-driver fitting the groove 25 the valves are then easily turned as desired. Having adjusted the valves and determined the proportions of steam and oil and the levers having been clamped to the stems and properly coupled, the damper is then regulated to the proper draft necessary. Thereupon the rod 20 is fastened to the end of the lever 14. A movement then of the lever 13 simultaneously opens or closes the oil-valve, the steam-valve, and the damper.

A by-pass 27, connecting the oil and steam pipes, permits the burner to be cleaned at any time by shutting off the flow of oil and forcing a jet of steam through the burner.

Ordinarily when a burner has once been adjusted in a particular furnace to a certain steam-pressure, a certain oil-pressure, and to a certain grade of oil and the proper amount of draft necessary for complete combustion ascertained conditions remain practically unchanged; but if there is no way of coupling up the steam and oil valves so that they will always move relatively the same the operator is confronted with the difficulty of a new adjustment of valves and damper every time he starts up his fires or varies their intensity in even the slightest degree. If he turns on more oil with one valve, he has to let in more steam to cause the proper volatilization and accordingly see that more air is let in through the damper to supply sufficient oxygen for the proper combustion of the gases within the furnace, and so the reverse is true when he wants to reduce his fire.

By means of suitable and well-known adjusting-unions 28 the burners may be quickly disengaged from the pipes, removed from the furnace, and a change of fuel from oil to coal effected in a few minutes without loss of steam-pressure.

This burner is well adapted for use with locomotives where frequent stops at stations are made. With each stop it is necessary to reduce the normal fuel-supply; but if the full supply of air continues to enter the fire-box the effect is disastrous to the crown-sheet and tubing, owing to their sudden cooling. I do not wish to be limited, however, to the use of a draft-regulator located as shown, for it is possible to operate by the same means a draft-regulator situated in the smoke-stack.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination in a hydrocarbon-furnace of separate oil and steam feed pipes, valves controlling the discharge of oil and steam said valves having stems with outer ends shaped to receive a tool whereby the valves may be turned independently, a draft-regulator, and connections between the valves and between the latter and the draft-regulator whereby the draft may be operated simultaneously with the valves.

2. The combination in a hydrocarbon-furnace of separate oil and steam feed pipes, controlling-valves in said pipes, valve-stems having diametral notches on their ends by which they may be engaged and turned independently, link-and-lever connections between said stems whereby they may be operated in unison, a hinged draft-regulator and connections therebetween and said valve connections whereby the draft may be operated simultaneously with said valves.

3. The combination in a hydrocarbon-furnace of oil and steam pipes, valves in said pipes, operative connections between said valves by which they may be moved in unison, a draft-regulator, having a vertically-extending slot, a footpiece adjustable in said slot, a rod pivoted to said footpiece and connections between said rod and the aforesaid valve connections whereby the valve and draft-regulator may be operated simultaneously.

4. The combination with a furnace of a hydrocarbon-burner, a mixing-chamber and valve-controlled oil and steam pipes leading thereto, a lever by which the feed of commingled oil and steam to said burner is controlled, a hinged draft-regulator in said furnace, a connecting-rod having one end secured to said lever and the other end movable in a slotted guide on said regulator.

5. In a hydrocarbon-burner, a valve consisting of a rotatable segment seated within a valve-chamber, a stem having one end supported within the chamber and the other extending outside the chamber, and a radial projection on said stem engaging the segment whereby the latter is operated when the stem is oscillated.

In witness whereof I have hereunto set my hand.

DANIEL C. WILGUS.

Witnesses:
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