A. GROPENGIESZER.

SMOKE CONSUMING FURNACE.

APPLICATION FILED JULY 2, 1908.

929,212.

Patented July 27, 1909.

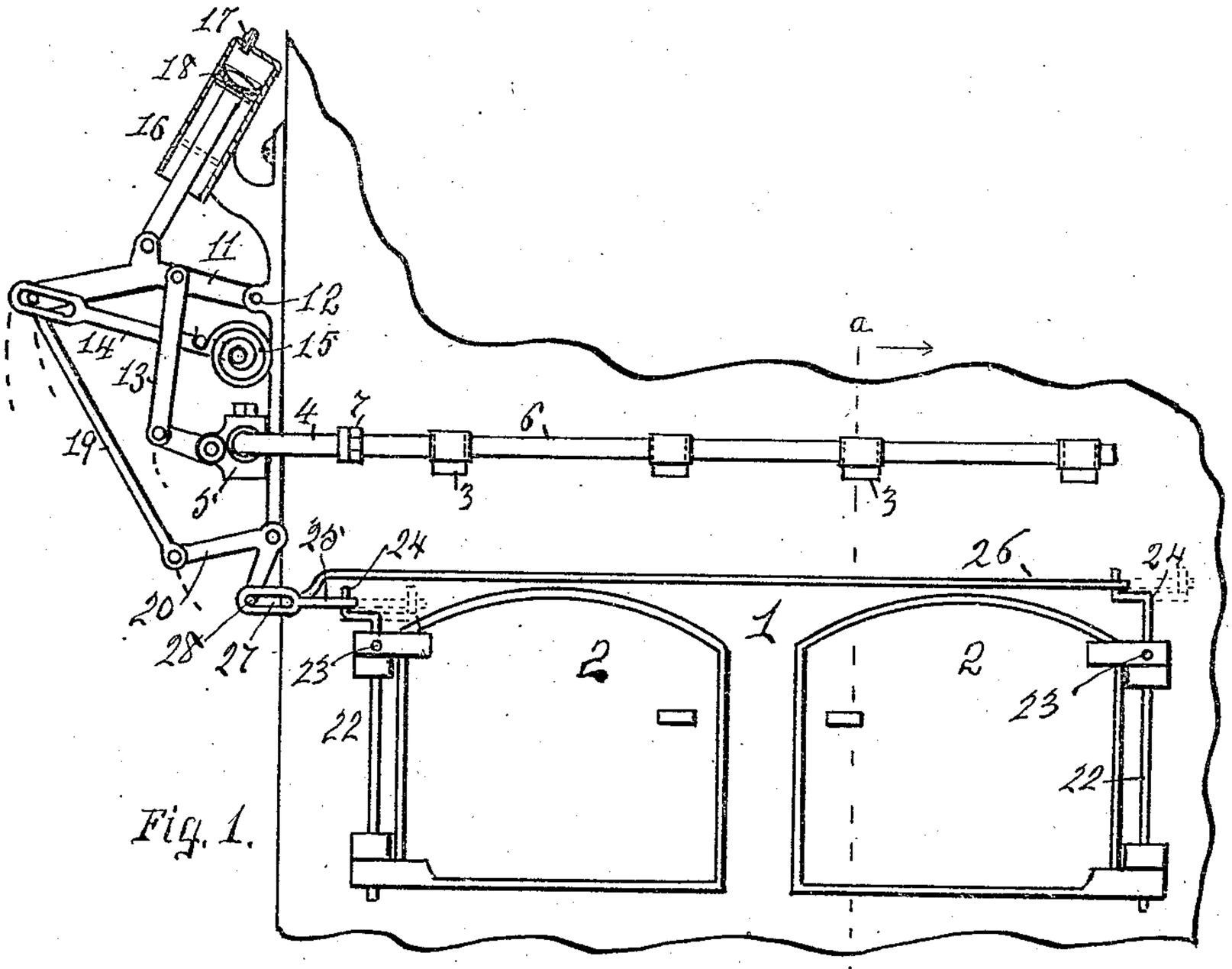

Fig. 1.

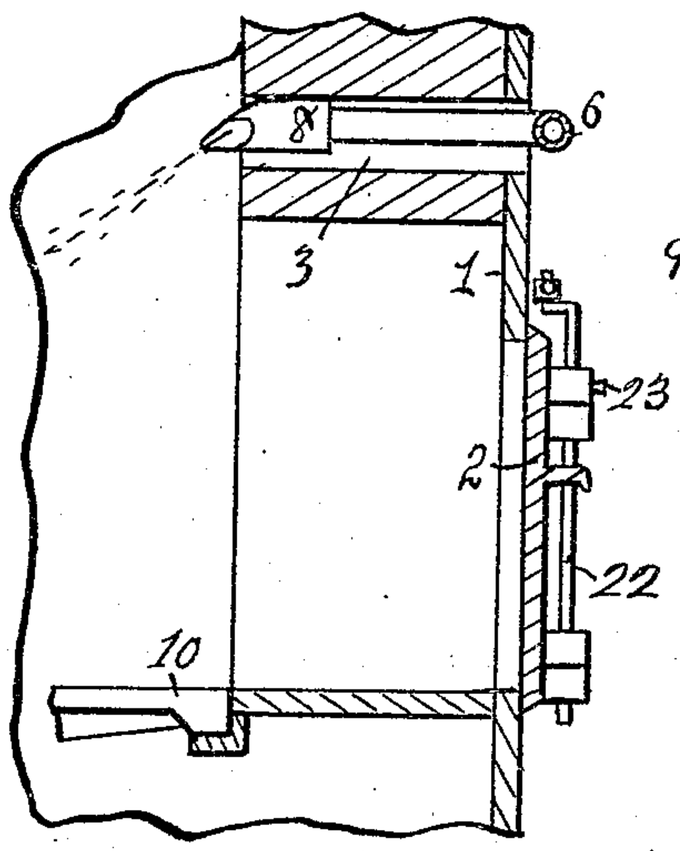

Fig. 2.

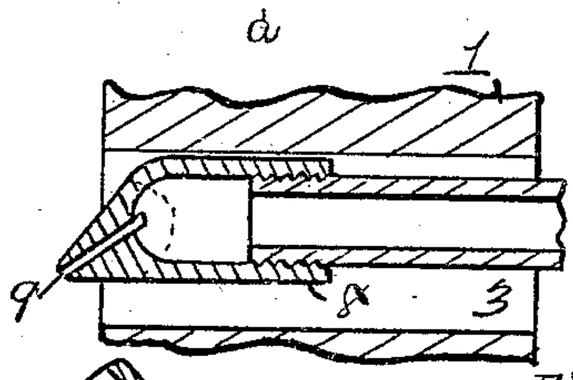

Fig. 3.

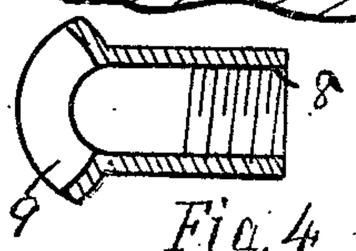

Fig. 4.

Witnesses.

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By Robert S. Carr, Atty.

UNITED STATES PATENT OFFICE.

ANDREW GROPENGIESZER, OF CINCINNATI, OHIO.

SMOKE-CONSUMING FURNACE.

No. 929,212. Specification of Letters Patent. Patented July 27, 1909.

Application filed July 2, 1908. Serial No. 441,652.

To all whom it may concern:

Be it known that I, ANDREW GROPENGIESZER, a citizen of the United States, residing at Cincinnati, Hamilton county, Ohio, have invented a new and useful Improvement in Smoke-Consuming Furnaces, of which the following is a specification.

My invention relates to smoke consuming furnaces of the class adapted to the use of steam boilers or other purposes, and the objects of my improvements are to provide means for adding steam and air to the fire-box during and for a predetermined period following the addition of fresh fuel to the fire, and to provide simple and durable construction and assemblage of parts to effect this with facility of operation and efficiency of action.

These objects are attained in the following described manner as illustrated in the accompanying drawings, in which:

Figure 1 is a front elevation of portions of the front of a furnace embodying my improvements; Fig. 2, a section on the line *a*—*a* of Fig. 1; Fig. 3, a vertical longitudinal section of the steam nozzle in operative position, and Fig. 4 a horizontal section thereof.

In the drawings, 1 represents portions of the front of a furnace provided with doors 2 and formed with horizontal passages 3 thereover to its interior. A steam pipe 4 provided with a lever shut off cock 5 leads from a source (not shown) of steam under pressure, and pipe 6 is removably connected thereto by means of a union coupling 7. Nozzles 8 extended from pipe 6 through the respective passages 3, are each formed with a transverse discharge opening 9 at an inclined angle to its axis for discharging a thin sheet or spray of steam over the fire on the grate 10, as shown in Fig. 2. An arm 11 is pivotally secured at 12 to the wall of the furnace and connected with the lever of the shut off cock 5 by means of a link 13. Said arm is actuated in an upward direction for closing said cock by the movement of the slotted arm 14 under the exertion of the torsion spring 15, as shown in Fig. 1. A pneumatic cylinder 16 secured in a fixed position, is provided with a pet cock 17 and with a valved piston 18 which is secured to and movable with arm 11. A rod 19 connects the extremity of arms 11 with a bell crank lever 20 which is pivotally secured at a fixed point and above the plane of the furnace doors 2. The pintles 22 of the furnace doors 2 are adjustably secured thereto by means of set screws 23. Said pintles terminate their upper ends in the form of crank arms 24 whereon the respective connecting rods 25 and 26 are pivotally secured. Said rods are each formed with a slot 27 whereby it is independently and movably connected with the bell crank lever 20 by means of a pin or bolt 28 therein, as shown in Fig. 1. Rod 25 connects the pintle of the adjacent door 2 with the bell crank lever and rod 26 is extended above both doors and out of interference with their movement and connects with the pintle of the opposite door as shown in Fig. 1.

In operation, when either of the furnace doors is opened, the pintle being turned therewith, actuates the corresponding connecting rod to move the bell crank lever. The movement of said lever being imparted to the arm 11 through the rod 19 and thence to the cock 5 through the link 13 serves to simultaneously open the cock and admit steam through the nozzles to the interior of the furnace and over the fire therein.

In its discharge through the nozzles, the steam draws an increased supply of air through the passages and commingles with it over the fire within the furnace, whereby the combustion gases are sufficiently augmented to cause the smoke arising from the admission of fresh fuel to be entirely consumed. After the furnace door is closed, the exertion of the torsion spring on arm 14 raises the arm 11 and by means of the connecting link therewith automatically closes the lever cock and shuts off the admission of steam to the furnace. The closing movement of the lever cock may be retarded as desired, by the adjustment of the pet cock in the pneumatic cylinder for controlling the discharge of the air therefrom and thereby regulating the speed of the movement of the piston therein and of the arm 11 connected therewith.

Having fully described my improvement, what I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. The combination with a fire-box provided with the usual fuel doors, of one or more steam and air injectors opening into the fire-box, a steam pipe leading to said injectors, a lever cock in said pipe, hinge pintles fixed to said doors and provided with crank extensions, a bell-crank lever, rods connecting one arm of said lever with said crank extensions, a link connected to the other arm of

the bell-crank lever, a hinged arm connected at its free end to said link, a connection between said arm and the lever cock, a spring acting upon said arm for closing said cock, and a retarding device connected to said arm for timing the closing of said cock.

2. The combination with a furnace having the usual swinging fuel doors, of air inlets above the doors, steam injectors located in said inlets whereby air and steam may be forced into the fire-box, a steam pipe leading to said injectors, a lever cock in said pipe at one side of the furnace, hinge pintles fixed to said doors and provided with crank extensions, a bell-crank lever, slotted rods connecting said bell-crank lever to said crank extensions, an arm hinged to the side of the boiler, a link connecting said arm to the lever cock, a link also connecting said arm to said bell-crank lever, a spring acting on said arm for closing said cock and a timed dash-pot acting on said arm to control the action of said spring.

A. GROPENGIESZER.

Witnesses:
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