

(No Model.)

T. LANGER.
SMOKE CONSUMING APPARATUS.

No. 544,766.

Patented Aug. 20, 1895.

Fig: 1

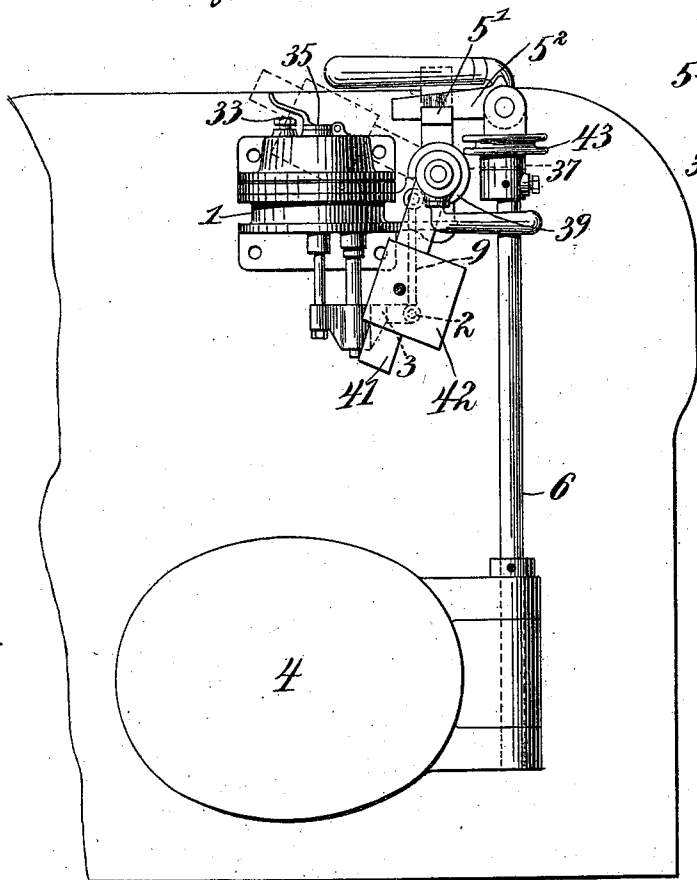
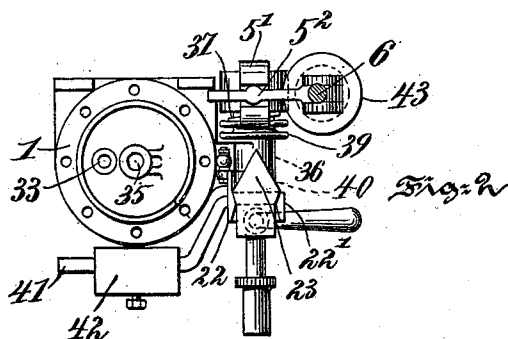
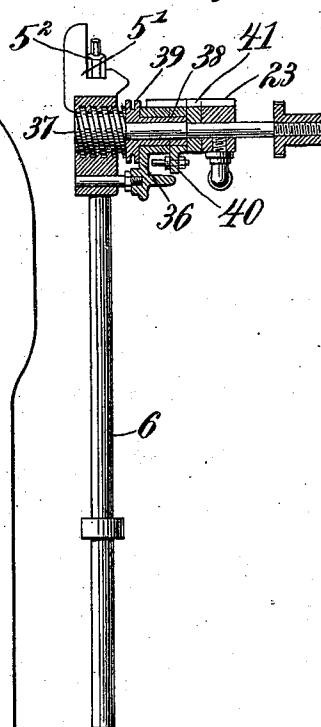


Fig: 3



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THEODOR LANGER, OF VIENNA, AUSTRIA-HUNGARY.

SMOKE-CONSUMING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 544,766, dated August 20, 1895.

Original application filed January 19, 1893, Serial No. 458,989. Divided and this application filed May 18, 1895. Serial No. 549,760. (No model.) Patented in Germany August 30, 1892, No. 71,876; in Switzerland August 30, 1892, No. 5,906; in France August 30, 1892, No. 224,044; in Belgium August 30, 1892, No. 101,186; in England August 30, 1892, No. 15,542; in Italy August 30, 1892, No. 32,576; in Spain August 30, 1892, No. 13,726, and in Austria-Hungary September 25, 1893, XLIII, 3,693; XXVII, 3,629.

To all whom it may concern:

Be it known that I, THEODOR LANGER, a subject of the Emperor of Austria-Hungary, residing at Vienna, Austria-Hungary, have
5 invented certain new and useful Improvements in Smoke-Consuming Apparatus for Furnaces, (for which I have obtained Austria-Hungarian Letters Patent XLIII, No. 3,693, XXVII, No. 3,629, dated September 25, 1893;
10 German Letters Patent No. 71,876, dated August 30, 1892; Swiss Letters Patent No. 5,906, dated August 30, 1892; French Letters Patent No. 224,044, dated August 30, 1892;
15 Belgian Letters Patent No. 101,186, dated August 30, 1892; English Letters Patent No. 15,542, dated Aug. 30, 1892; Italian Letters Patent No. 32,576, dated August 30, 1892, and Spanish Letters Patent No. 13,726, dated August 30, 1892,) of which the following is a
20 specification.

My invention relates to smoke-consuming apparatus for boiler-furnaces in general, and for locomotive-boilers in particular.

The principal objects of my invention are,
25 first, to provide an efficient and comparatively inexpensive smoke-consuming apparatus adapted to be connected to the furnace of a boiler, whether said boiler is employed in conjunction with a stationary, locomotive, or marine engine; second, to provide in such an apparatus a regulator for controlling the inlet
30 of air into the furnace above the grate and the admission of steam, in conjunction with said air, to assist in the consumption of the products within said furnace; third, to provide in such an apparatus an air-regulating device adapted to be set in operation by the opening of the furnace-door and to control the gradual closing of said door, and, fourth,
40 to provide in such an apparatus an air-regulating device adapted to be set in operation by the opening of the furnace-door, a laterally-adjustable and vertically-movable catch controlled in its vertical movement by said air-regulating device, and a shaft controlling the
45 furnace-door and connected with the air-regulating device by suitable mechanism, the catch controlling the movement of said shaft during the closing of the furnace-door.

My invention consists in the combination 50 and arrangement of parts whereby the above-described objects are attained, and my invention further consists of a smoke-consuming apparatus for furnaces, substantially as hereinafter described and claimed. 55

In the accompanying drawings is shown my improved apparatus as it is applied to a locomotive-engine boiler. It is, however, to be understood that the invention is equally applicable to all forms of boilers, either for sta- 60 tionary, locomotive, or marine service.

The nature and general features of my invention will be more fully understood from the following description, taken in connection with the accompanying drawings, forming 65 part hereof, in which—

Figure 1 illustrates my improved apparatus in front elevation attached to the furnace-door of a locomotive-boiler. Fig. 2 is a top or plan view of the same; and Fig. 3 is an end 70 elevation, partly sectioned, of Fig. 1, the air-regulating device being removed.

Referring to the drawings, 1 represents the air-regulating apparatus, consisting of a cataract, as shown, or of a clock-work operating 75 in such a manner as that a bracket 3 of the same, carrying an arm, eye, or other means of connection 2, will within a certain predetermined time perform a certain stroke. This bracket 3, for sake of brevity, is herein- 80 after designated as the "operator," and this operator 3 is connected with the shaft 6 of a furnace-door 4 in such a manner that when the door is opened the cataract 1 is set in operation and serves through the shaft 6 to 85 gradually return or close the furnace-door.

In the construction represented in the drawings an air regulator or cataract is employed, the construction of which is made the subject-matter of an application for a patent filed 90 January 19, 1893, under Serial No. 458,990. In this apparatus a piston is made to ascend by the opening movement of the furnace-door, whereby air is forced from or drawn into the apparatus through a relief-valve 35, 95 while when the furnace-door is to be closed the piston of the cataract to which the operator 3 is connected will descend in proportion

to the air admitted through a regulating-screw 33 into the apparatus.

In the application for Letters Patent filed January 19, 1893, Serial No. 458,989, of which the present application is a division, is described means or mechanism whereby the return of the piston will through the operator-arm close gradually a series of slides or registers in the furnace-door, and in the present application is described and shown means and mechanism for controlling the closing of the furnace-door itself by means of the cataract 1 and its operator 3, such apparatus being especially suited for boiler-furnaces in which space is limited.

A catch or stop 5' is adjustably carried by a turning screw or worm 37, which by preference is journaled in the supporting-frame of the air-regulating apparatus 1. Upon the spindle of this screw 37 is placed a loose sleeve 38, provided with a grooved pulley 39 and a crank-pin 40. The sleeve 38 is guided in an eye 36, connected with the supporting-frame of the cataract. On the same side of the crank-pin 40 a lever 41 and its counter-weight 42 is secured to the spindle of the screw 37. The crank-pin 40 is connected with the operator 3 of the cataract 1 by means of a rod 9. When the furnace-door 4 is opened the grooved pulley 43 of the shaft 6 of said door causes the pulley 39 of the sleeve 38 to rotate by means of a connecting chain or belt, (not shown,) whereby the operator 3 of the cataract, which is connected to the crank-pin 40, as before explained, is raised. The crank-pin 40 and the lever 41, attached to the spindle 37, are each provided with lugs or stops 22 and 22', respectively, between which a wedge 23 may be pushed. According to the position of this wedge between the stops 22 and 22', more or less of the movement of the cataract will be imparted to the screw 37, and in consequence the catch 5', operated by said screw 37, will receive more or less movement therewith. A latch 5², carried by the shaft 6, drops over the catch 5' as the furnace-door is being closed, and as a consequence, after firing, the furnace-door will remain in a more or less open position, and will be closed gradually at a fixed time by the cataract 1, as the weight 42 of the lever 41 descends.

As a matter of course the wedge 23 may be shifted by hand, or it may be connected with the operating-lever of the steam-entrance valve, so that the adjustment for the phases of artificial and natural draft will be effected automatically.

In certain cases—as, for instance, in stationary engines where an adjustment during the working of the engine is not required—the wedge 23 may be dispensed with and the grooved pulley 39, crank-pin 40, and screw 37 may be rigidly connected.

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

1. In a smoke consuming apparatus, an air regulating device of the character described, and the operator arm thereof, in combination with a laterally adjustable catch adapted to be vertically moved by said operator-arm and with the furnace-door, a shaft adapted to open and close the same and mechanism connecting said shaft with said operator arm of said air regulator, all arranged so that when said furnace door is opened, the air regulator is set into operation through the operator arm and the catch adapted to be raised to lock the shaft of the door in open position, and said catch thereafter withdrawn gradually from said shaft by said operator-arm to allow said door to gradually close, substantially as set forth.

2. The combination in a smoke consuming apparatus, of the air regulator and its operator arm, a vertically adjustable catch secured to said arm and a screw adjustment for laterally moving said catch with the furnace-door and its shaft and connections between said operator-arm, the lateral adjusting device and said shaft for operating said lateral adjusting device and said operator arm, whereby when said door is opened said catch is elevated to retain the shaft by said operator-arm, said operator-arm controlled by said regulator to gradually withdraw said catch from said shaft and said catch gradually moved in a lateral direction to permit of the gradual closing of said furnace-door through its shaft, substantially as and for the purposes set forth.

3. In a smoke consuming apparatus, the combination of an air regulator of the character described, its operator-arm and a catch adapted to be vertically moved thereby, with a furnace-door and its rotating shaft, means for operating said shaft by said operator-arm, means, substantially as described, controlled by said operator-arm for laterally moving said catch and means controlled by said operator-arm for partially or entirely transmitting the movement of said operator-arm to the shaft of said door to control the extent of opening thereof, all arranged so that when said door is opened said operator-arm is adapted to control the vertical and lateral movement of said catch and of the closing of said door, and said door adapted to be controlled by said arm as to the extent of its opening movement, substantially as and for the purposes set forth.

In testimony whereof I have hereunto set my signature in the presence of two subscribing witnesses.

THEODOR LANGER.

Witnesses:

WENZEL RUDOLF LINKE,
F. REIFERT.