No. 744,131. PATENTED NOV. 17, 1903.

J. TOOHEY.

SMOKE CONSUMER.

APPLICATION FILED FEB. 17, 1903.

NO MODEL.

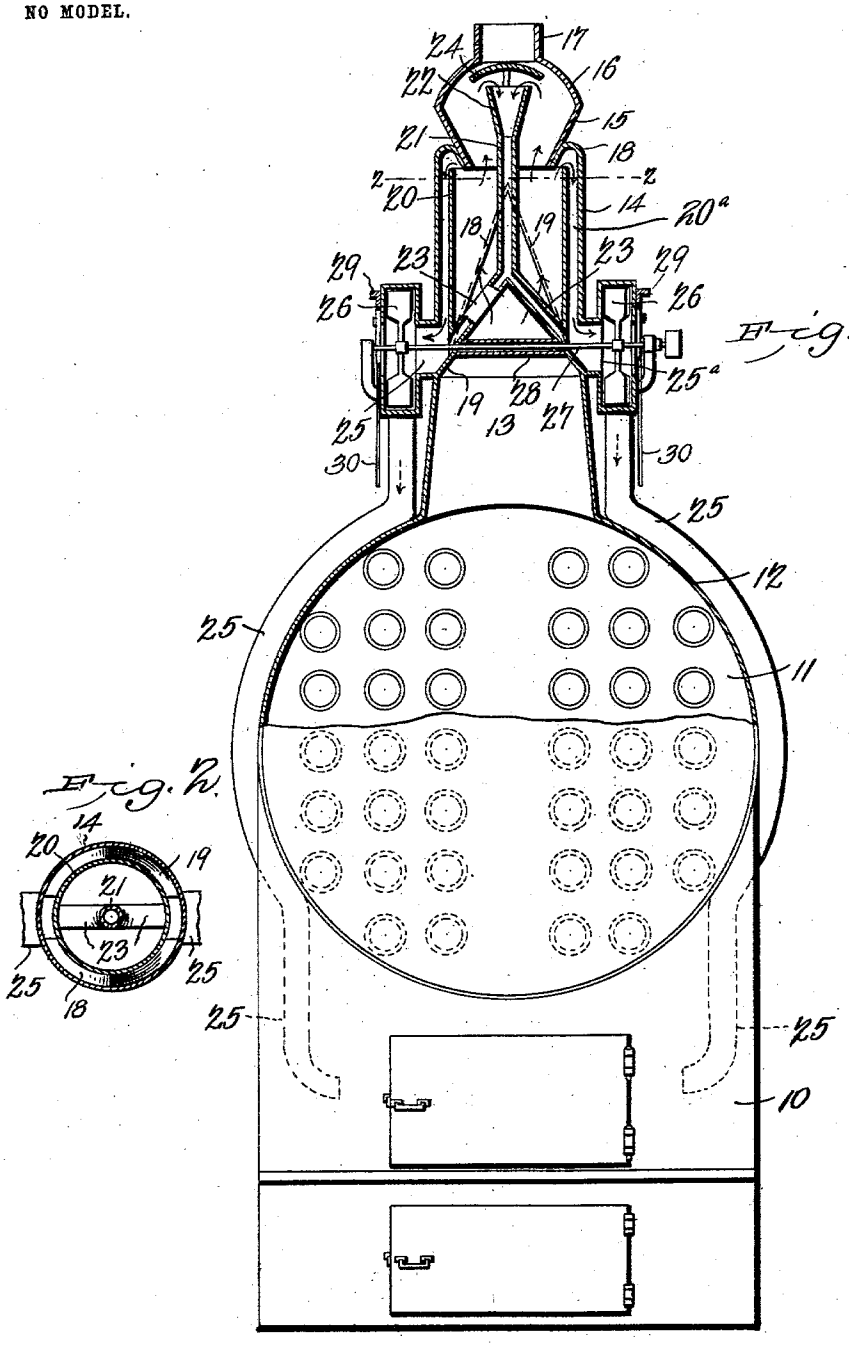

Fig. 1.

Fig. 2.

Witnesses,
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No. 744,131. Patented November 17, 1903.

UNITED STATES PATENT OFFICE.

JOHN TOOHEY, OF STOCKWELL, INDIANA, ASSIGNOR OF ONE-HALF TO M. C. CANN, OF STOCKWELL, INDIANA.

SMOKE-CONSUMER.

SPECIFICATION forming part of Letters Patent No. 744,131, dated November 17, 1903.

Application filed February 17, 1903. Serial No. 143,855. (No model.)

To all whom it may concern:

Be it known that I, JOHN TOOHEY, a citizen of the United States, residing at Stockwell, in the county of Tippecanoe and State of Indiana, have invented a new and useful Smoke-Consumer, of which the following is a specification.

This invention relates to furnaces of various kinds wherein the fuel employed produces undesirable quantities of smoke, and has for its object to produce a simply-constructed and easily-operated attachment whereby the smoke and combustible gases and the like are entirely consumed; and the invention consists in certain novel features of the construction as hereinafter shown and described, and specified in the claim.

The improvements which are the subject of the present invention may be applied to any form of furnace, but are more particularly applicable to steam-generator furnaces, and for the purpose of illustration they are shown thus applied in the drawings, in which corresponding parts are denoted by like designating characters.

Figure 1 is a transverse vertical sectional elevation. Fig. 2 is a cross-section on the line 2 2 of Fig. 1.

The furnace or fire-chamber is represented at 10, the boiler at 11, and a portion of the smoke-arch at 12, of the ordinary construction.

The smoke-stack rising from the smoke-arch consists of the lower section 13, preferably slightly tapering, the intermediate section 14, preferably with parallel sides, the hood-section formed with flaring lower portion 15 and inwardly-curved upper portion 16, and discharge end 17, leading upwardly from the hood portion. The upper end of the intermediate section 14 is turned inwardly and downwardly and is united to the lower end of the flaring portion of the hood-section, as shown at 18.

Leading from the stack-section 14 are one or more main conductor-flues 25 and terminating within the combustion-chamber, preferably above the fire therein, as shown.

Connected into the conductor-flues 25 are means for inducing air-currents therethrough, such as power-fans 26.

In small generators or furnaces one of the flues 25 and 23 will be sufficient to accomplish the desired results; but in larger plants two or more may be employed, and for the purpose of illustration two sets of the conductor-flues and two power-fans are shown; but it will be understood that any number of these may be employed without departing from the principle of the invention.

When two power-fans are employed, they will both preferably be mounted upon one shaft 27, passing transversely through the stack and preferably surrounded within the stack with a protecting-sleeve 28, of suitable material, to prevent the heat from deleteriously affecting the shaft. Within the portion 14 of the stack is an internal section 20, spaced from the section 14 to form within the stack a primary flue 20^a, which communicates at its lower end with flue 25 and at its upper open end terminates beneath the inturned rim 18 of the latter, as shown, leaving a free passage over the upper end of the internal stack-section and beneath the inturned rim, which latter constitutes a deflector disposed directly over the flue.

The bottom of the section 20 is formed reversely inclined, as at 18 19, the inclines extending from a point near the upper line of the section 20 and ending opposite the lateral discharge-openings 25^a, as shown. By this means all the particles of cinders, ashes, and the like which pass over the section 20 will be conducted to the discharge-flues 25 and any tendency of the particles to lodge in the stack obviated.

Disposed centrally within the stack-section 14 and extending into the hood-section 15 16 is a secondary flue 21, having a flaring upper end 22 opening into the hood.

Leading from the lower end of the flue 21 through the shell 20 are branches 23, so that whatever material passes through the flue 21 22 will find its way into the space between the shell 20 and stack-section 14.

Above the flaring end 22 is supported a downwardly-curving deflecting-hood 24, with its edges extending beyond the flaring inlet 22 and designed to catch and deflect into the sections 22 21 the heavier particles of the products of combustion. When thus con-

structed and the fans 26 set in operation, it will be obvious that strong currents will be caused to pass through the flue 21 22 and also through the space between the stack-section 14 and shell-section 20 and conducted thence to the fire-chamber, carrying with them the smoke, gases, and unconsumed particles and returning them to the fire-chamber, where they are consumed, and this action is repeated so long as any unconsumed particles remain, leaving nothing to escape at the discharge 17 but a small amount of incombustible gas.

It is to be particularly noted that the fans 26 create an upward draft in the stack and at the same time a downward draft in the flues 20^a and 21 of stack-section 14 and also in flues 25. The upward draft in the stack results in an induced draft in the combustion-chamber for assisting combustion while the downdraft in the flues arrests the sparks, smoke, and other products of combustion and returns them to the fire-chamber, thus entirely preventing their escape from the stack and insuring their complete consumption.

The fan-shaft may be driven by any suitable means, and as such means are so well known they are not illustrated.

The entrances to the fan-casings are provided with closing-valves 29, adapted to be operated by the engineer or fireman, as by pull cords or rods 30, to regulate the force of the currents.

The parts may be constructed of any relative size or proportions to adapt them to different-sized furnaces and may be modified in minor particulars without departing from the principle of the invention or sacrificing any of its advantages.

Having thus described the invention, what I claim is—

The combination with a furnace having a stack and a combustion-chamber, of a pair of main flues communicating with the combustion-chamber, a stack-section having an inner sleeve spaced therefrom to form an upwardly opening primary flue communicating at its lower end with the main flues, the upper end of the stack-section being bent inward to form a deflector above the primary flue, a secondary flue disposed within the stack and communicating at its lower end with the main flues, a deflector situated above the upper open end of the secondary flue, and a fan disposed in each main flue and operable for inducing an air-current upward through the stack and downward through the flues.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN TOOHEY.

Witnesses:
E. P. FINCH,
BERT JOHNSON.