

(No Model.)

T. C. YOUNG.
SMOKE PURIFIER AND CONSUMER.

No. 548,945.

Patented Oct. 29, 1895.

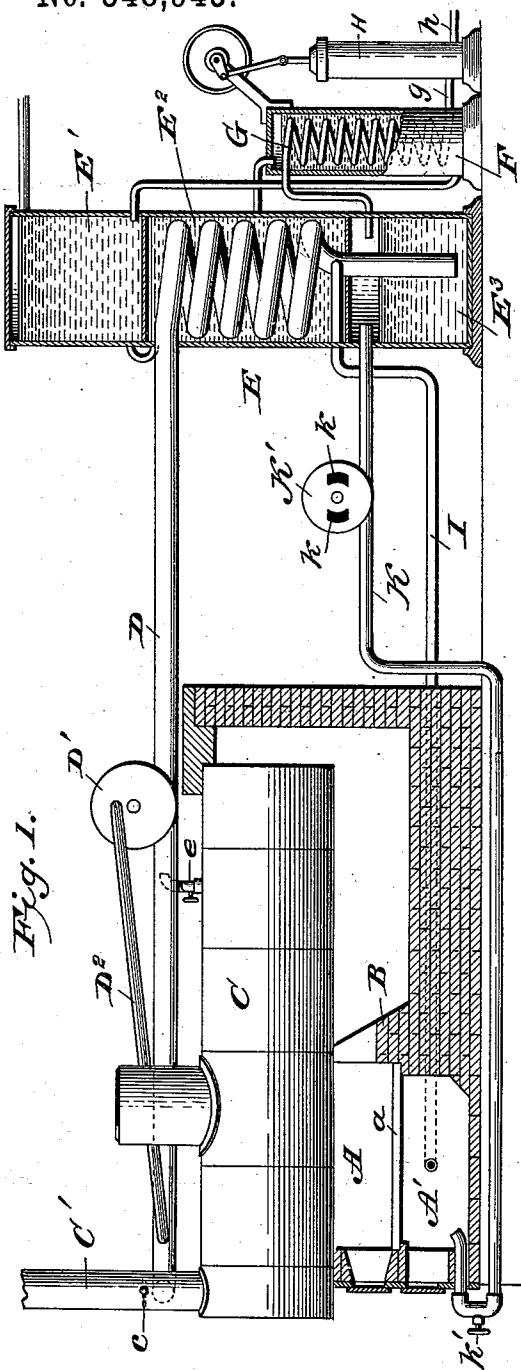


Fig. 1.

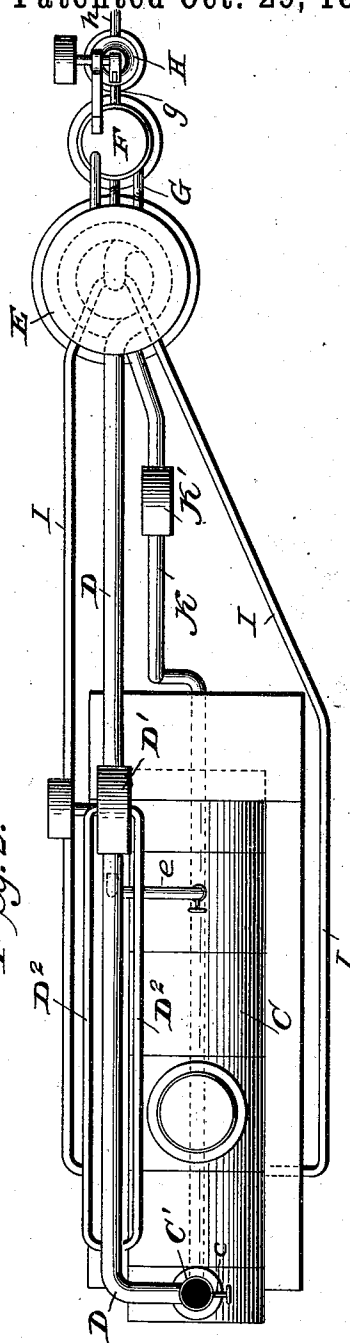


Fig. 2.

WITNESSES
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by *[Signature]* Attorney

UNITED STATES PATENT OFFICE.

THOMAS C. YOUNG, OF ST. CHARLES, IOWA.

SMOKE PURIFIER AND CONSUMER.

SPECIFICATION forming part of Letters Patent No. 548,945, dated October 29, 1895.

Application filed July 18, 1895. Serial No. 556,375. (No model.)

To all whom it may concern:

Be it known that I, THOMAS C. YOUNG, a citizen of the United States of America, residing at St. Charles, in the county of Madison and State of Iowa, have invented certain new and useful Improvements in Smoke Purifiers and Consumers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in smoke purifiers and consumers, the object of the same being to prevent the annoyance and waste of fuel incident to the escape of black smoke from furnaces, and to utilize the heat therein for heating water which may be used to feed the boiler or for other purposes.

My invention consists in certain features of construction and arrangement of parts, as will be hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a side view, partly in section, showing a boiler and furnace of ordinary construction with my improvements applied thereto; and Fig. 2 is a plan view.

A designates the fire-box of the furnace, beneath which are the grate-bars *a*, and underneath the grate-bars is the ash-pot A'. The furnace is also provided with a bridge-wall B, and within the furnace is located the boiler C, which is of the usual type, and has a smoke-pipe C', within which is a damper *c*.

D designates a smoke-pipe, which connects with the smoke-pipe C' below the damper *c*, and this pipe is provided with a rotary blower D', and the usual air-inlet openings of the blower is connected by means of pipes *d*² with the smoke-pipe D, adjacent to the pipe C'. At a suitable point between the pipe C' and blower D' the pipe D is connected to the steam-boiler by means of a pipe *e*, the upper end of which extends within the pipe D and is turned in the direction of the blower, the pipe *e* being provided with a suitable valve. Beyond the blower the pipe D is formed into a coil, which is located within a vessel or

chamber E, the end of the pipe terminating near the bottom of the chamber E. The chamber is divided into three compartments E', E², and E³, the coil being located in the compartment E², while the lower end of the pipe D is located near the bottom of the compartment E³. The chamber E is supplied with water from a suitable source under pressure and the water enters the upper compartment E' and by a suitable arrangement of pipes passes therefrom into the compartment E², in which is located the coil of the pipe D. A tank or receptacle F is also supplied with water from the compartment E', which enters said receptacle near its lower end, the receptacle being connected at its upper end to the compartment E² by a short pipe, as shown. Suitable means are provided for connecting the water-supply with the compartment E³ and maintaining the water in said compartment at a proper level.

The tank or receptacle F contains a coiled pipe G, one end of which extends into the compartment E³ at about the water-level thereof, while the other end connects with a suitable pump H, the pump having a discharge-pipe *h*, which leads to a suitable receptacle designed to receive creosote and other material which is condensed from the products of combustion given off by the fuel.

The lower part of the coil of the pipe D is connected by means of a pipe I to the furnace below the grate-bars thereof.

K designates a pipe which leads from the compartment E³ above the water-level to the ash-pit A', so as to discharge beneath the grate-bars, and at an intermediate point the pipe K is provided with a blower K', having air-inlet openings *k k* with adjustable slides, so as to regulate the amount of air which passes into the blower. The pipe K is also provided with a suitable valve or damper *k'*, which is located in the pipe near its entrance into the ash-pit of the furnace.

In operation, when the fire is started in the furnace the damper *c* in the smoke-pipe is opened, and after the fire is well under way the damper is then closed and the blowers and pump driven from any suitable source of power. The compartments of the tanks E and F are supplied with water, the level in the compartment E³ being as indicated in the draw-

ings. The smoke will now be drawn from the smoke-pipe by the blower D', and the supply causes this blower or rotary pump to operate effectively, being caused by the pipes D² entering the usual side openings which customarily supply air. Steam is also commingled with the smoke or products of combustion from the boiler by way of the pipe e, and the force of the steam being directed toward the blower acts to assist the draft. The smoke is forced through the coil of the pipe D and is cooled by the water in the compartment E² of the tank E, and as the smoke is cooled the heat is given off and heats the water in said compartment, and by reason of the force or pressure given to the smoke by the rotary pump or blower D' it is forced out of the lower end of the pipe, passing through the water in the compartment E³, purified or washed by such passage and collecting in the upper part of said compartment, from which it is fed to the furnace by means of the pipe K, assisted by the blower K'. The products of combustion will float on the water in the compartment E³, and are drawn off through the coil G in the chamber F to the pump H and are discharged by the pipe h into a tank for the purpose of collecting the creosote which has a commercial value. In case there is a backing up of the smoke it will pass from the pipe D into the pipe I, from which it is discharged into the furnace and consumed.

It will be noted that in an apparatus constructed as hereinbefore described the annoyance caused by the escape of the products of combustion is avoided, that the valuable products of combustion are saved, and the water in the tanks E and F is heated and can be fed to the boiler or used for other purposes.

I am aware that prior to my invention it has been proposed to provide a smoke purifier and consumer in which the products of combustion are pumped from the furnace and led into a tank containing water, so that after the smoke has been washed or purified it can be again led to the furnace and consumed, such an apparatus being shown and described in the patent of John Butler, No. 494,522, dated March 28, 1893, and I do not, therefore, claim what is shown therein; but

What I do claim as new, and desire to secure by Letters Patent, is—

1. In combination with a furnace, of an exhaust apparatus for the products of combustion comprising a pipe D which connects with the smoke flue of the furnace and is formed into a coil located in a tank filled with water, the end of said pipe discharging into a tank partly filled with water, a rotary pump or blower D' located in the pipe D, and pipes

D² connected to the blower and to the pipe D forward of the blower, substantially as shown and for the purpose set forth.

2. In a smoke purifier and consumer, the combination, of a tank or receptacle divided into compartments E' E² and E³, a pipe D leading from the smoke discharge flue of the furnace and formed into a coil which is located in the compartment E², the discharge end of the pipe D being located in the lower part of the compartment E³, means for drawing the purified smoke from the compartment E³ mixing the same with air and forcing it into the furnace, a coil G connected with a pump for withdrawing from the compartment E³ the products which float upon the liquid contained therein, the compartments E' E² and E³ having suitable water supply and discharge pipes, substantially as shown and for the purpose set forth.

3. In a smoke purifier and consumer, the combination with a furnace having pipes D, K and I connected thereto substantially as shown, of a tank E divided into compartments E' E² E³; a second tank containing a coil which communicates with the compartment E³ and with a pump, pipe connecting the compartments E' and E² with the tank F, and blowers D' and K', the blower K' having air supply openings and the pipe I being connected to the pipe D and leading therefrom directly to the furnace, the parts being organized substantially as shown and for the purpose set forth.

4. In a smoke purifier and consumer, the combination, of a furnace and steam boiler, a pipe D connected to the smoke-stack of the furnace and to the boiler by means of a pipe e, the pipe D being formed into a coil substantially as shown; together with a chamber E divided into compartments E', E² and E³ with water supply pipes as set forth, a pipe K for taking the purified smoke from the chamber E³ and discharging it into the furnace, said pipe having a rotary blower or pump with air openings, a pipe I connecting the pipe D with the furnace, a tank F communicating with the compartments E' and E² as shown, and a coil G located within the tank F one end of the coil extending into the compartment E³ below the pipe K and the other end connected to a pump, the parts being organized substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

THOMAS C. YOUNG.

Witnesses:

O. M. HORTON,
A. C. HAMMOND.