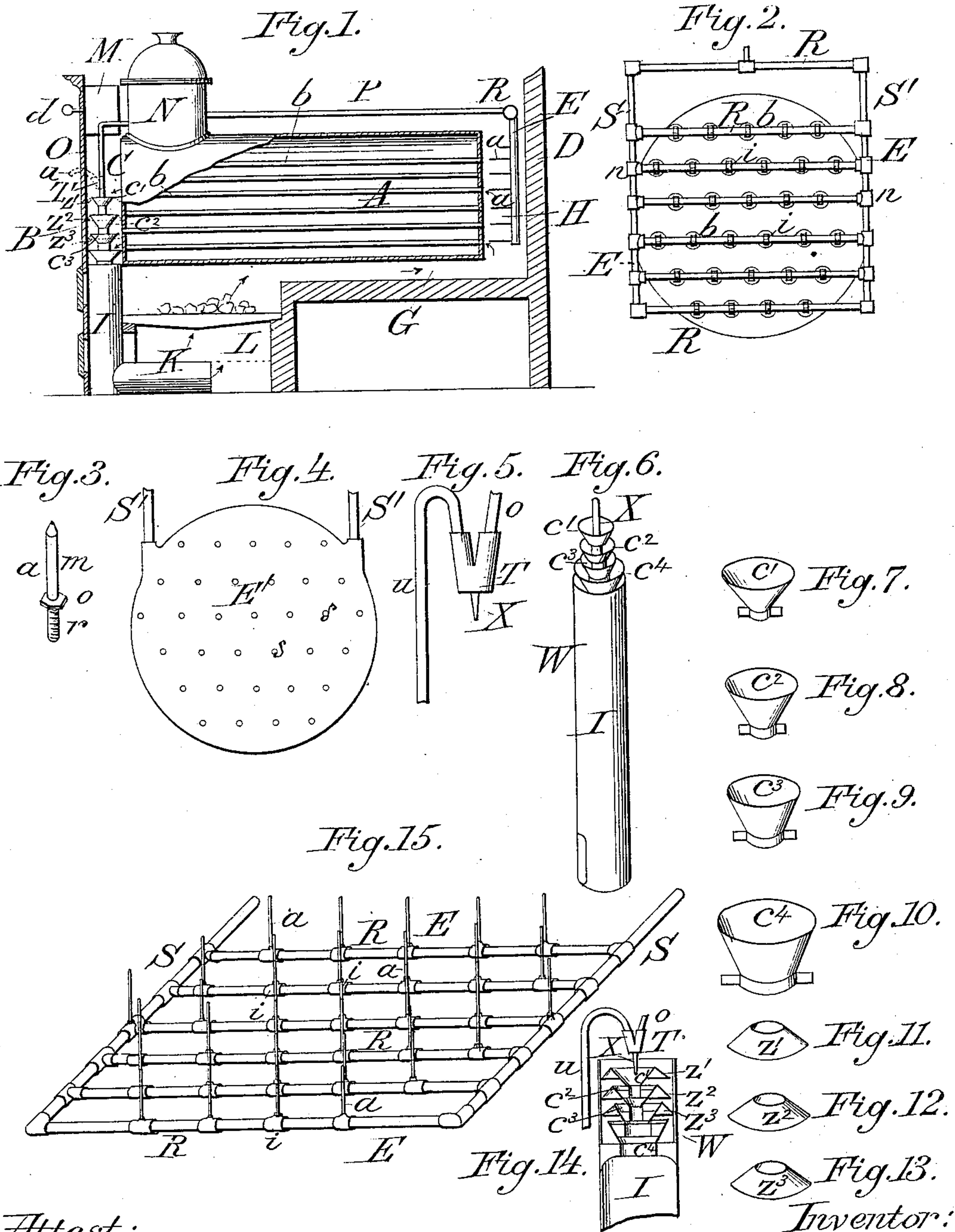


(No Model.)

G. A. WOLTER.  
SMOKE CONSUMING FURNACE.

No. 250,621.

Patented Dec. 6, 1881.



Attest:

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# UNITED STATES PATENT OFFICE.

GUSTAV A. WOLTER, OF CHICAGO, ILLINOIS.

## SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 250,621, dated December 6, 1881.

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*To all whom it may concern:*

Be it known that I, GUSTAV A. WOLTER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Smoke-Consumers, of which the following is a specification.

My invention relates to improvements in attachments to steam-boilers, whereby the smoke will be consumed without passing out into the air.

The object of my invention is to provide steam-jet and smoke-trap attachments to a steam-boiler, so arranged, constructed, and connected that the smoke will be conveyed or forced into the fire and consumed, instead of being allowed to pass out into the air. I attain this object by the particular construction, arrangement, and combination of the several parts, as illustrated in the accompanying drawings, in which—

Figure 1 is a sectional view of a steam-boiler and furnace provided with my smoke-consumer attachments ready for use. Fig. 2 is a back view of steam-boiler with the steam-jet attachment of the smoke-consumer. Fig. 3 is a detached view of one of the steam-jets. Fig. 4 is a view of a steam-chest which may be used in the place of the steam-jet attachment shown in Fig. 15. Fig. 5 is a view of the indicator-pipe with steam-jet connection. Fig. 6 is a view of the case or flue containing the smoke-trap, and showing the suction part of the smoke-trap. Figs. 7, 8, 9, and 10 are views showing the suction-funnels of the smoke-trap and their construction. Figs. 11, 12, and 13 are views of the traps of the smoke-trap attachment. Fig. 14 is a sectional view of the smoke-trap, showing the connection of Figs. 11, 12, and 13 with Figs. 7, 8, and 9. Fig. 15 is a perspective view of the steam-jets and connections.

Similar letters refer to similar parts throughout the several views.

A represents an ordinary steam tubular boiler, provided with the usual tubes, *b b b*, and is connected with a furnace in any appropriate manner.

B is the front of a furnace.

C is a smoke-chamber between the boiler A and the furnace-front B.

D is the rear wall of the furnace.

F is the fire-place.

G is a space under the boiler for the passage of the fire and smoke.

H is the fire-space between boiler A and rear furnace-wall, D.

E is what I call a "steam-jet attachment." It is composed of pipes *S S* and *R R*, the *T*'s *i i*, and jets *a a*, the jets *a a* being the same number as tubes *b b*. E is secured to the inside of the rear wall, D, in the space H, and in such a position that the jets *a a* face the mouths of the tubes *b b* and slightly project therein.

I is my new smoke flue or casing, containing my smoke-trap attachments. It is placed in front of the boiler, or near thereto, and connects the smoke-chamber C with the ash-pit L. It is made cylindrical in shape, as shown, or in any other suitable shape to correspond to the boiler and furnace. It is made of brick or iron, and is closed at the top, leaving an opening at the side to admit the smoke.

K is an elbow-flue, connecting I with ash-pit L.

L is the ash-pit of furnace.

M is a damper to chimney, having knobs *d*.

N is a steam-drum on boiler A.

O is a pipe connecting steam-drum N with steam-jet X.

P is a steam-pipe connecting steam-drum N with steam-jet attachment E.

*RRR* are pipes constructed of several pipes, and are for conducting the steam.

*S S* are pipes similar to *R R*.

T is a joint, made in two portions, as shown in Fig. 5. It contains in one of its arms the indicator-pipe *u* and in the other the steam-pipe O. At the end of O, within T, a steam-jet, X, is attached, which jet X projects below T into the smoke-trap, as shown in Fig. 14, the position of T being such that X will be over the center of the smoke-trap.

*u* is a pipe extending from outside of furnace to T, and is an indicator, whereby the consumer may be regulated.

X is a steam-jet on the end O, and projects into the smoke-trap in the mouth of *c'*, and is made similar to *a*.

E' is a steam-chest, provided with openings *s s* for jets, and with inlets *S' S'* for steam, and is another construction of the steam-jet at-



tachment, which may be used instead of E, as shown in Fig. 15.

$c'$ ,  $c^2$ ,  $c^3$ , and  $c^4$  are funnels on the inside of casing I, and forming a part of the smoke-trap.  $c'$ ,  $c^2$ , and  $c^3$  have their top openings the same size, being somewhat smaller in diameter than the inside of I, the diameter of their lower openings being different,  $c^2$  being larger than  $c'$ ,  $c^3$  than  $c^2$ , each successive one having a larger lower opening than the preceding. The top circumference of  $c^4$  is the same size as the inside of I, so as to fit tightly therein, and its lower part fits securely.  $c'$  rests in  $c^2$ ,  $c^2$  in  $c^3$ , and  $c^3$  in  $c^4$ , and all inclosed in case I, all as shown in Fig. 14.

$z'$ ,  $z^2$ , and  $z^3$  are what I call "shades" or "traps." They fit over  $c'$ ,  $c^2$ , and  $c^3$ , their top openings being of such a size that they may fit over  $c'$ ,  $c^2$ , and  $c^3$ , to which they are securely attached, and when in position there will be a space between each shade and its corresponding funnel. All the funnels  $c'$ ,  $c^2$ ,  $c^3$ , and  $c^4$  and shades  $z'$ ,  $z^2$ , and  $z^3$  are within the casing I, and with it make what I call my new "smoke-trap," and designate the same by letter W. The funnels and shades are made in the shape shown, and in the event the shape of I is changed, then they will be changed to correspond to it. They are made of iron with fire-proof coating; or they may be made of fire-clay or of any suitable material to withstand the fire.

I have shown four funnels and three shades; but there may be any number desired—always one more funnel than shade, the extra funnel being of the size of Fig. 9. In order to give strength, I may connect the several shades together by three rods, running from the top to the bottom, secured to the outside edges of the shades.

$a$  is a steam-jet, composed of the screw  $r$ , end nut,  $o$ , and nozzle  $m$ . There is a jet  $a$  for each tube.

The manner of operation is as follows: The several parts are attached in their appropriate places. The fire is made in the fire-place F. The smoke will pass through G and H to the

openings  $b b b$ , when the steam which has been let in from it will issue from the steam-jets  $a a a$ , and by reason of forming a suction will force the smoke into the tubes  $b b b$ , and it will pass into the smoke-chamber C. The steam from it through the pipe O will pass through jet X and go down into the smoke-trap through the funnels, and as it does it draws or sucks in the smoke. The lower part of one funnel being larger than its preceding one creates suction. The smoke thus drawn in, when it rises, will be caught by the shades or traps  $z'$ ,  $z^2$ , and  $z^3$  and forced downward, and from thence it will pass through I and K into L, and thence into the fire, where it will be consumed. My steam-jet attachment E will keep the tubes clean and free from soot.

My invention is so arranged and constructed that in the event that different kinds of boilers are used I may use the smoke-trap or the steam-jet attachment separately, just as may be suitable, as I claim both to be used for the purpose of consuming smoke.

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

1. The combination, with the tubular boiler A and smoke-chamber C, of the smoke-trap W and steam-jet attachment E, whereby the smoke is forced into the combustion-chamber, substantially as specified.

2. The combination, in a smoke-consuming device, of the boiler A, provided with tubes  $b b$ , steam-drum N, connecting-pipes P and O, steam-jet attachment E, provided with pipes R and S and jets  $a a$ , smoke-trap W, composed of casing I, funnels  $c'$ ,  $c^2$ ,  $c^3$ , and  $c^4$ , and shades  $z'$ ,  $z^2$ , and  $z^3$ , smoke-chamber C, joint T, pipe  $u$ , jet X, elbow K, ash-pit L, and furnace-walls D, and front B, and damper M, all substantially as shown and described, and for the purpose set forth.

GUSTAV A. WOLTER.

Witnesses:

HENRY WINTER,  
J. TAYLOR HAIR.