

(No Model.)

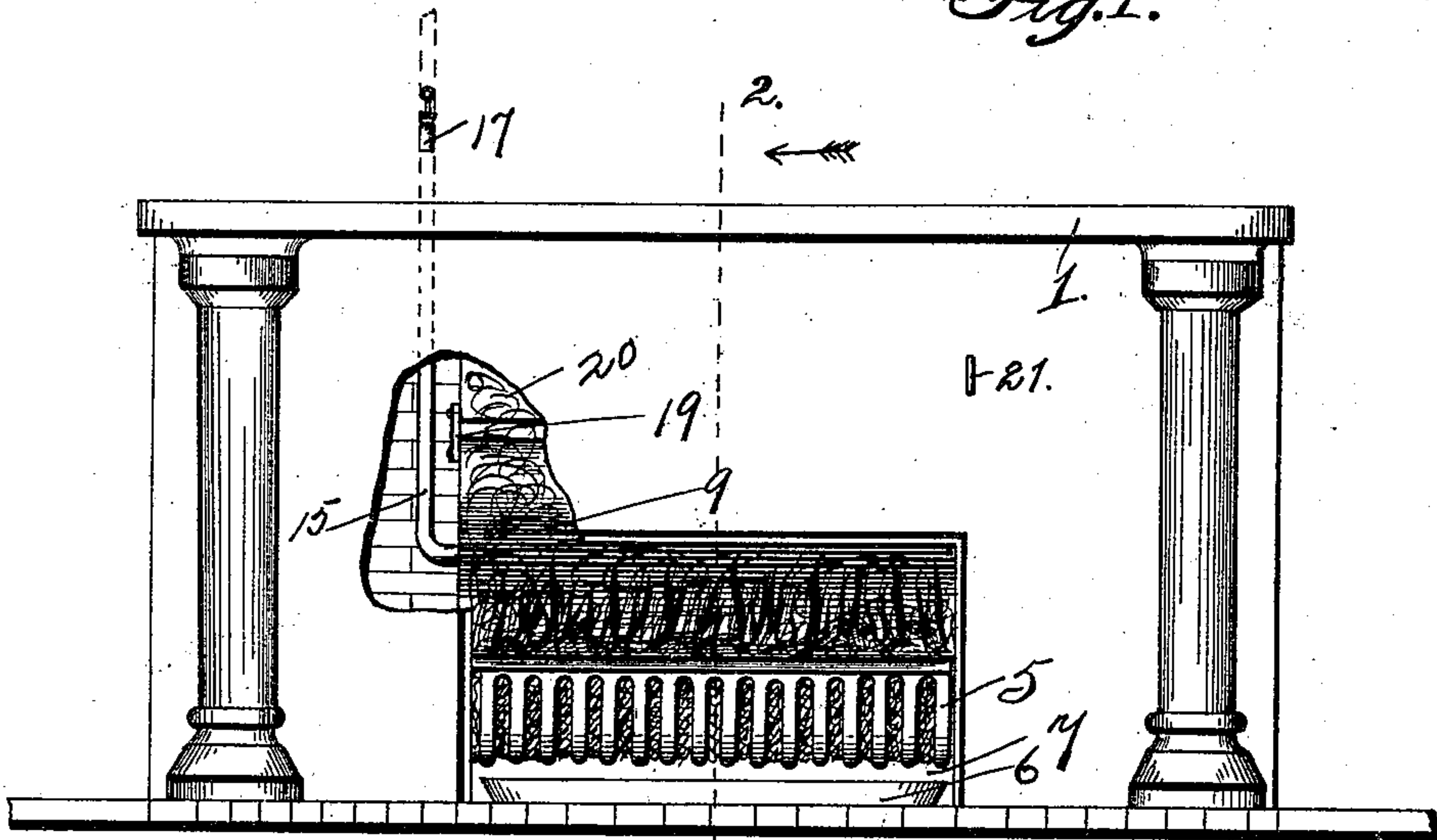
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SMOKE BLEACHING ATTACHMENT FOR GRATES.

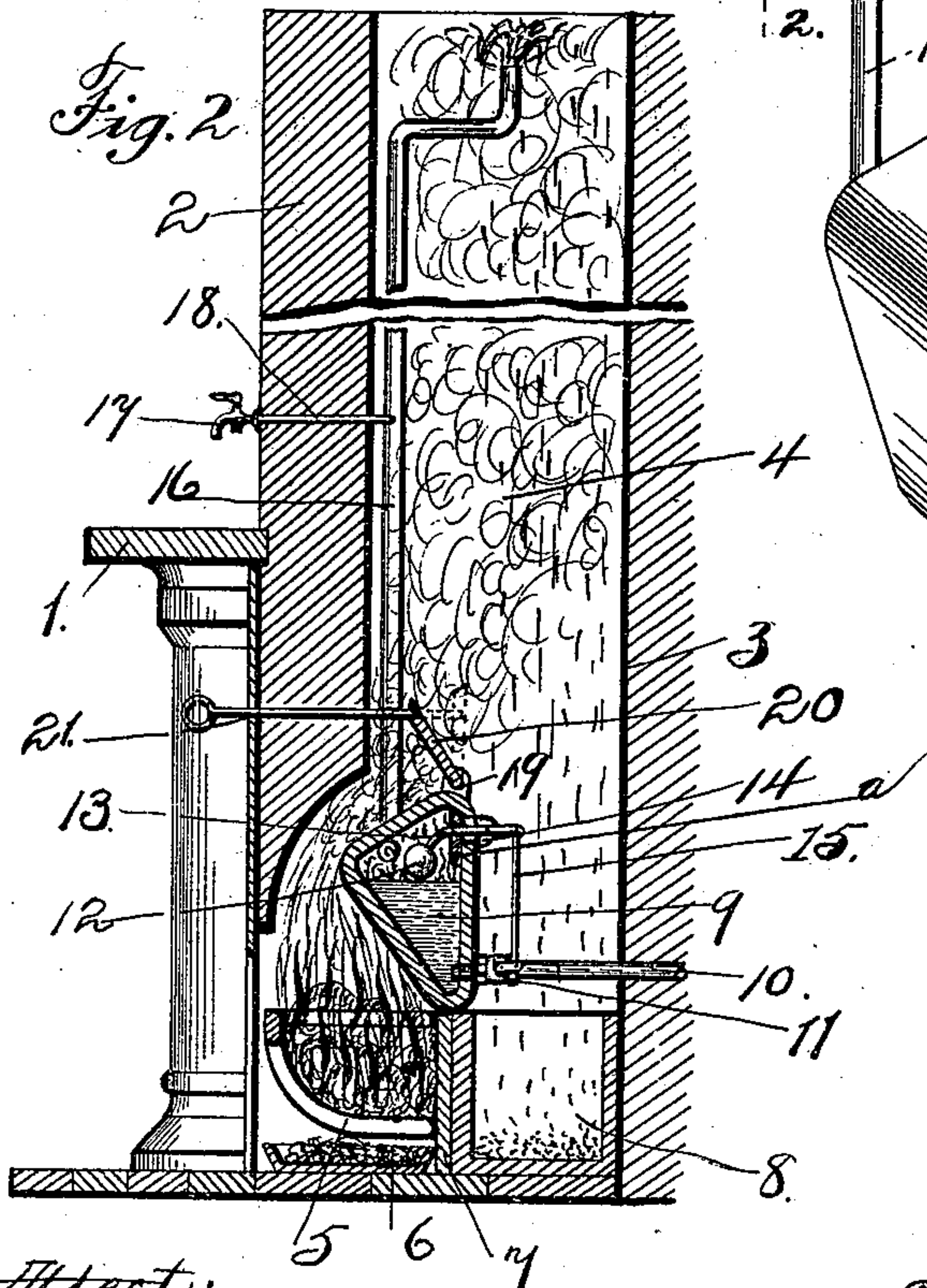
No. 562,247.

Patented June 16, 1896.

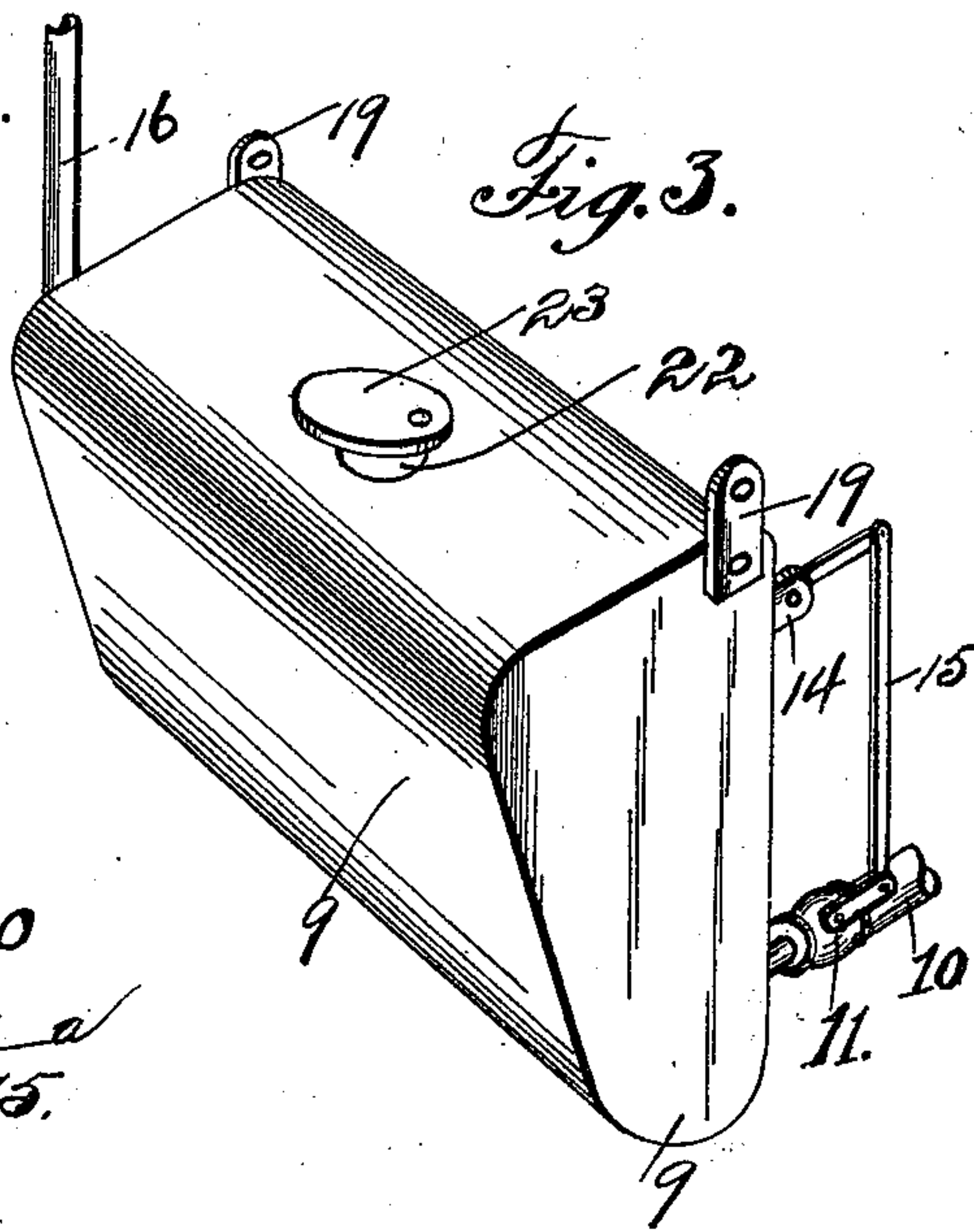
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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# UNITED STATES PATENT OFFICE.

JAMES THOMAS SANDS, OF ST. LOUIS, MISSOURI.

## SMOKE-BLEACHING ATTACHMENT FOR GRATES.

SPECIFICATION forming part of Letters Patent No. 562,247, dated June 16, 1896.

Application filed October 22, 1894. Serial No. 526,551. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES THOMAS SANDS, of the city of St. Louis and State of Missouri, have invented certain new and useful Improvements in Smoke-Bleaching Attachments for Grates, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention relates to a smoke-bleaching attachment for grates, an object of my invention being to construct a device whereby the black smoke issuing from a straight vertical chimney, at the lower end of which is a grate, will be bleached and of a much lighter color than is the smoke that ordinarily issues from chimneys.

A further object of my invention is to locate a boiler adjacent a grate so that it will form a water-back, and at the same time steam will be generated in said boiler and carried from thence by a pipe to the top of a straight chimney.

A further object of my invention is to locate a receptacle adjacent a grate at the bottom of a chimney to receive the products of combustion, soot, &c., that fall downwardly through the chimney.

To the above purposes my invention consists in certain novel features of construction, combination, and arrangement of parts hereinafter described, pointed out in my claims, and illustrated by the accompanying drawings, in which—

Figure 1 is a front elevation of a grate constructed in accordance with my invention, a portion of the wall surrounding said grate being broken away to more clearly illustrate certain parts of the grate. Fig. 2 is a vertical sectional view taken, approximately, on the indicated line 2 2 of Fig. 1. Fig. 3 is a view in perspective of the boiler or water-back of which I make use.

Referring by numerals and letters to the accompanying drawings, 1 indicates the mantel surrounding the grate, which is of the ordinary construction; 2, the front wall of the straight vertical chimney, and 3 the rear wall thereof, the passage through said chimney being indicated by the numeral 4.

5 indicates a metallic grate of the ordinary basket pattern, it being located in the open-

ing formed at the lower end of the chimney-passage, and having located beneath it on the fire-brick floor the ordinary ash-pan 6. The rear side of the grate 5 consists of a fire-clay plate or tile 7, that is transversely positioned in the grate-opening and at the rear of the grate 5. Immediately in the rear of this fire-clay tile 7 and upon the fire-brick floor of the grate is a metallic box or receptacle 8, capable of being removed from the grate-opening after the grate 5, ash-pan 6 and fire-clay tile 7 have been removed.

Positioned transversely in the grate-opening, its lower edge resting on the top edge of the fire-clay tile 7 and the front top edge of the receptacle 8, is the boiler 9, that forms the water-back of which I make use. This boiler 9 is preferably constructed of metal triangular in cross-section, the "perpendicular" of the triangular-shaped boiler being in vertical alinement with the front wall of the receptacle 8. Entering this boiler 9 at any suitable point, but preferably in the rear, is a water-supply pipe 10, having located in its length and adjacent the back of the boiler 9 a quick-acting cut-off valve 11. Located upon the interior of the boiler 9 is a ball 12, that is hung on the lower end of a curved lever 13, that extends through an aperture in the rear wall of the boiler, and is there pivoted between ears 14, formed integral with said rear wall. From thence this lever extends a slight distance rearwardly and is pivoted to a vertical rod 15, the lower end of which is pivoted to the handle of the quick-acting cut-off valve 11. A slide *a* prevents the escape of steam through the aperture through which the lever 13 operates.

Communicating with the interior of the boiler 9, and preferably at one end thereof, is the lower end of a steam-pipe 16, that extends vertically within the passage 4 in the chimney to a point near the top of said chimney. At this point said pipe is bent horizontally to the approximate center of the chimney and then bent upward a slight distance. Tapped into this vertical steam-pipe 16 at a point preferably above the mantel 1 of the grate and extending to an ordinary cock 17 on the interior of the room in which the grate is located is a steam-pipe 18.

Pivoted in ears 19, fixed to the upper rear



edges of the boiler 9, is a damper 20, the operating-lever 21 of which extends horizontally through the front wall 2 of the chimney and to the interior of the room. An aperture 22 is  
 5 formed in the top of the boiler 9, and is normally covered by a pivoted or hinged disk 23.

The operation is as follows: The various parts being in the position as shown in Fig. 2 and the water-supply pipe being connected,  
 10 water will enter the boiler 9 until said water rising on the interior of the boiler floats the ball 12 to such a position as that the rear end of the pivoted lever 13 causes the vertical lever 15 to move downwardly, thereby auto-  
 15 matically closing the quick-acting cut-off valve 11. A fire now being built in the grate 5, steam will be generated upon the interior of the boiler 9, said steam finding an exit through the vertical pipe 16 and by said pipe  
 20 to be discharged at a point adjacent the chimney-top to commingle with and bleach the black smoke as it issues from said chimney. The discharge of wet steam adjacent the upper end and interior of the chimney causes a  
 25 downdraft or reverse current of cold air, which enters the top of the chimney and commingles with the steam at this point and tends to condense said steam both before and after it has united with the particles of carbon in  
 30 the smoke, and the water thus formed and the particles of carbon taken up by said water are formed into drops of liquid of such size and weight that they are immediately gravitated to the bottom of the straight chimney and into the receptacle 8 there provided.  
 35 These drops of liquid, together with various products of combustion, in gravitating downwardly through the chimney will seek that plane where the least resistance is offered, said plane being adjacent the rear wall of the chimney. Thus the receptacle 8 is located in the rear of the grate and at the rear side of the passage through said chimney. The damper 20 serves a double purpose, as it acts both  
 45 as a damper to resist the draft through the grate, and also to deflect the falling particles through the chimney into the receptacle 8. The damper 20 is controlled and positioned by throwing in or out the horizontally-positioned  
 50 rod 21. When desired, the cock 17 is opened and a jet of moist steam is allowed to enter the interior of the room. This escape or flow of steam may be regulated by manipulating the handle of the cock 17. Where it is not convenient to attach a water-supply pipe to the boiler, said boiler may be filled through the aperture 22 at the top thereof, said aperture being closed and rendered steam-tight by means of the pivoted or hinged cover 23.  
 55 When the receptacle 8 has become filled and

it is desired to remove the same, the grate 5, ash-pan 6 and fire-clay plate or tile 7 are removed and said receptacle 8 easily taken out. In some cases said receptacle can be removed through the rear wall of the chimney. This  
 65 will allow the grate 5 and fire-clay tile 7 to be permanently fixed in the grate-opening.

Thus it will be seen how I have constructed a smoke-bleaching attachment for grates that combines novel features and possesses superior advantages in point of simplicity, durability and general efficiency.

What I claim is—

1. In a smoke-bleaching attachment for grates, the combination with a chimney that  
 75 is straight and vertical from end to end of a boiler located adjacent a fixed grate, and a pipe leading from said boiler to the top of the chimney and discharging steam into the chimney at the top thereof. 80

2. In a smoke-bleaching attachment for grates, the combination with a straight vertical chimney of a boiler located above and in the rear of a fixed grate, a water-supply pipe leading into said boiler, a cut-off valve  
 85 located in said water-supply pipe, a float located within the boiler for operating the cut-off valve, and a steam-discharge pipe leading from said boiler within and to the top of the chimney. 90

3. In a smoke-bleaching attachment for grates, the combination with a straight vertical chimney of a boiler located above and adjacent the grate, a steam-pipe leading from said boiler and discharging at a point within  
 95 and at the top of the chimney, and a separate removable receptacle for the precipitated carbon located at the bottom of the chimney, and immediately in the rear of the grate.

4. In a smoke-bleaching attachment for  
 100 grates, the combination with a straight vertical chimney of a boiler located immediately in the rear of and above the grate, a water-supply pipe leading to said boiler, a cut-off valve in said water-supply pipe, a float piv-  
 105 oted to the rear wall of the boiler, an arm connecting the float and cut-off valve for operating said valve, a steam-pipe leading from the boiler and discharging at a point within and at the top of the chimney, a damper piv-  
 110 oted to the upper edges of the boiler, a rod for controlling said damper, and a steam-pipe leading from the first-mentioned steam-pipe to the interior of the room.

In testimony whereof I affix my signature 115 in presence of two witnesses.

JAMES THOMAS SANDS.

Witnesses:

C. K. JONES,

JNO. C. HIGDON.