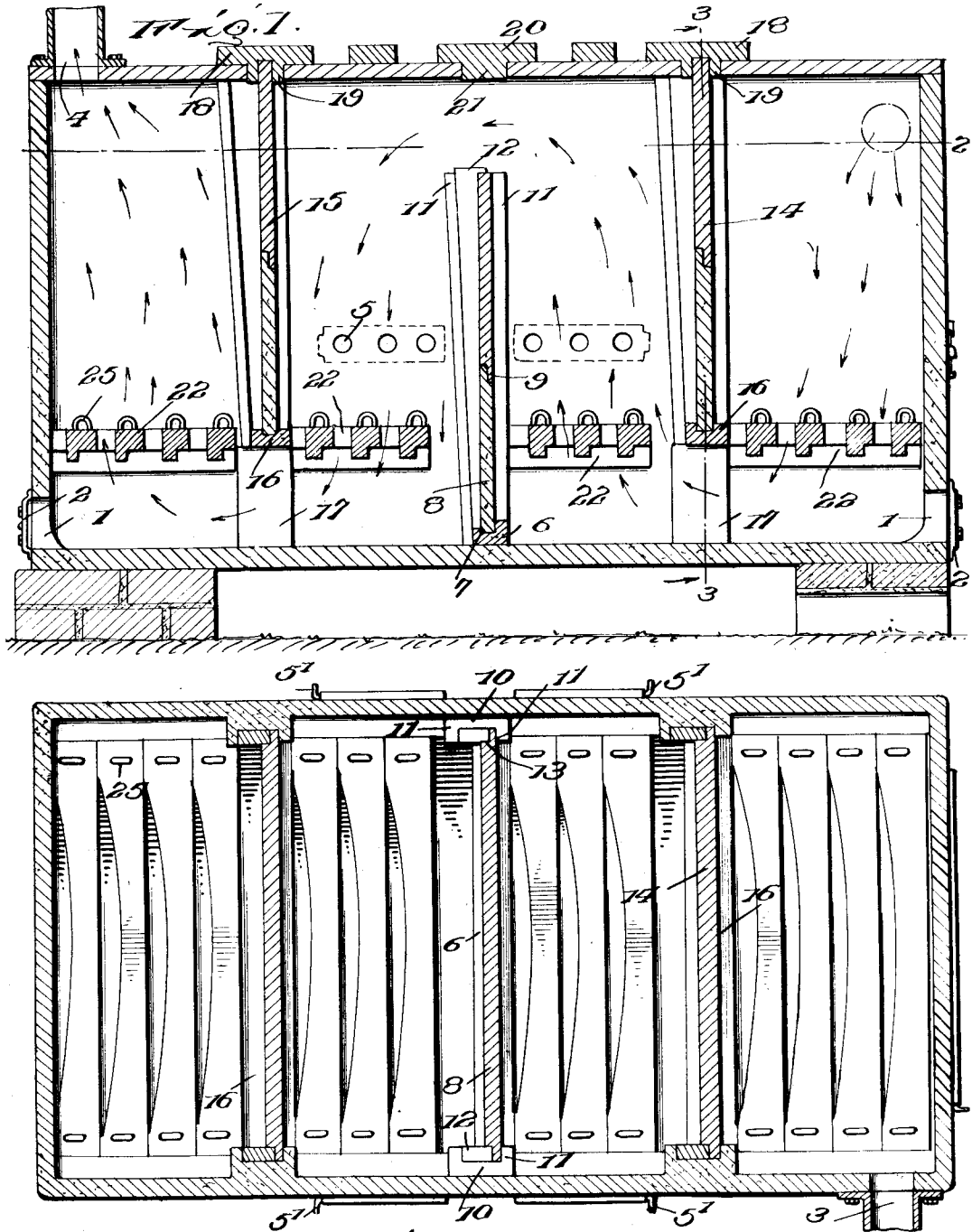


D. M. WHALEN.  
 AUXILIARY COMBUSTION CHAMBER FOR SULFUR BURNERS.  
 APPLICATION FILED JUNE 14, 1912.

1,065,750.

Patented June 24, 1913.

2 SHEETS—SHEET 1.



Witnesses  
 Richard E. Spurr

R. H. Bishop

By

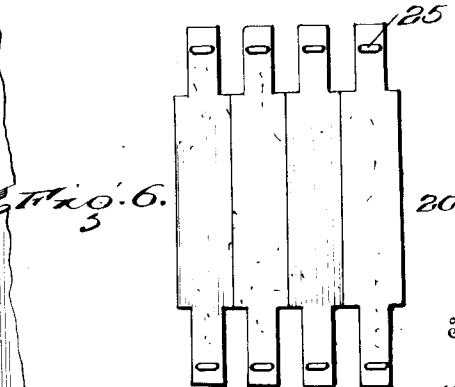
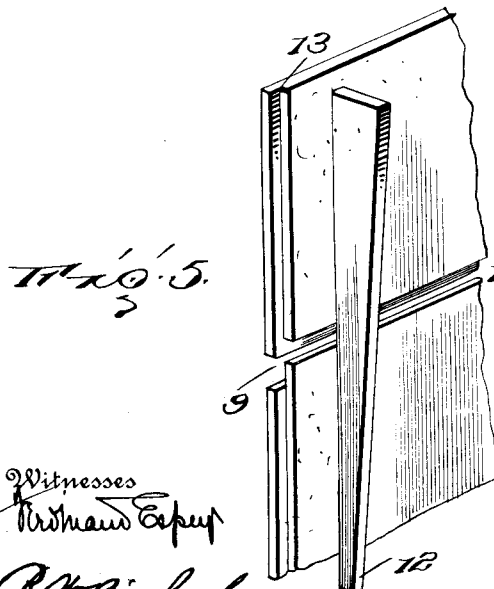
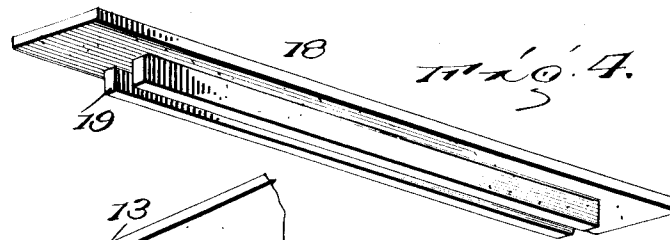
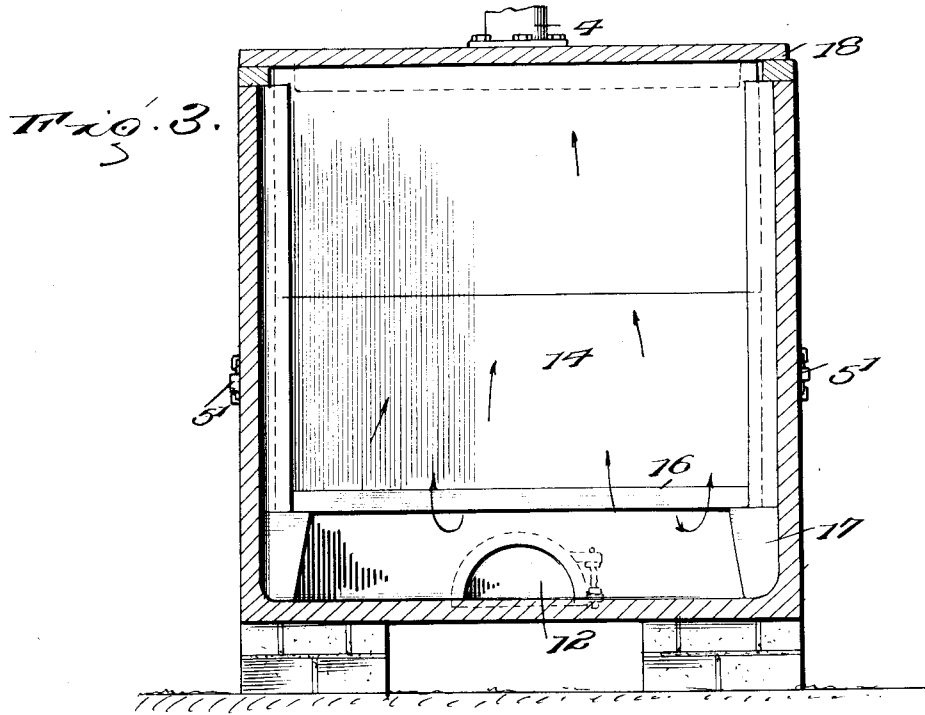
Inventor  
 D. M. Whalen  
 W. H. Sawyer, Attorneys.

D. M. WHALEN.  
 AUXILIARY COMBUSTION CHAMBER FOR SULFUR BURNERS.  
 APPLICATION FILED JUNE 14, 1912.

1,065,750.

Patented June 24, 1913.

2 SHEETS—SHEET 2.



Witnesses  
*Richard E. Cuy*  
*A. H. Bishop*

By

*D. M. Whalen*

Inventor

*D. M. Whalen*

Attorneys.

# UNITED STATES PATENT OFFICE.

DANIEL M. WHALEN, OF LINCOLN, MAINE.

## AUXILIARY COMBUSTION-CHAMBER FOR SULFUR-BURNERS.

1,065,750.

Specification of Letters Patent.

Patented June 24, 1913.

Application filed June 14, 1912. Serial No. 703,745.

*To all whom it may concern:*

Be it known that I, DANIEL M. WHALEN, citizen of the United States, residing at Lincoln, in the county of Penobscot and State of Maine, have invented certain new and useful Improvements in Auxiliary Combustion-Chambers for Sulfur-Burners, of which the following is a specification.

My invention is an auxiliary combustion chamber for sulfur burners, and has for its object the provision of means between the sulfur burner and the cooling system whereby the unburned particles escaping from the burner will be converted into gas and the fumes passing to the pulp will be clean and free of impurities.

Secondary objects of the invention are to facilitate repairs and provide means whereby the draft may be controlled and the supply of fresh air kept commensurate with the needs at any particular time.

The invention also seeks to provide a chamber from which the partitions may be easily removed when necessary, and in which a thorough tortuous circulation of the sulfur fumes will be effected, so that the combustion will be complete.

The invention is illustrated in the accompanying drawings, and is hereinafter fully described, the novel features being subsequently pointed out in the claims following the description.

In the drawings:—Figure 1 is a central longitudinal vertical section of a structure embodying my present invention. Fig. 2 is a horizontal section taken on the line 2—2 of Fig. 1. Fig. 3 is a transverse vertical section taken on the line 3—3 of Fig. 1. Fig. 4 is a detail perspective view of a closure which is employed in the top of the chamber. Fig. 5 is a detail perspective view showing a portion of the partitions and the fastening key for the same. Fig. 6 is a detail plan view showing a grate bar of a different form from that shown in the other figures.

The outer walls and bottom of the auxiliary combustion chamber may be of any suitable material, and in the end walls, I provide, near the bottom, openings 1 which are normally closed by doors 2 and through which access may be had to the interior of the chamber for cleaning out the refuse and sediment deposited upon the bottom of the same. An inlet 3 is provided at one end of the chamber adjacent the top of the same, and at the opposite end of the

chamber an outlet 4 leads from the top. Openings 5 are provided in the side and end walls and are normally closed by dampers or slides 5', whereby fresh air may be admitted to the chamber when necessary to promote proper combustion of the sulfur.

At about the center of the chamber, I provide a cleat, foot, or other form of rest 6 having a groove 7 in its upper surface, said rest extending transversely of the chamber and constituting the support for the central partition 8. The partition is composed of upper and lower members, as shown, having their meeting edges rabbeted, as indicated at 9, whereby they overlap and form a close joint, and the end edges of the members are engaged in guides 10 formed on the inner faces of the side walls of the chamber, as clearly shown. The guides 10 consist essentially of spaced ribs or flanges 11, one of said ribs or flanges being vertical and the other being disposed obliquely, so as to converge downwardly toward the first-mentioned rib or flange, as clearly shown.

A tapered or wedge-shaped key 12 is inserted between the faces of the partition members and the inclined rib or flange 11, so that when the said key or wedge is driven home, the members of the partition will be firmly supported against the vertical rib or flange, as clearly shown in Fig. 1 and as will be readily understood. In order to further maintain the several parts in their proper position and engagement, the ends of the partition members are recessed, as shown most clearly at 13 in Fig. 5, the locking key or wedge being engaged in the said recess, so as to be held thereby against lateral movement which would cause it to drop across the face of the partition and thereby release the same.

The central partition terminates below the top of the chamber, and the ribs and key, by which the said partition is maintained in its proper position, also terminate below the top of the chamber, so that a space is provided between the partition and the top or roof of the chamber, through which the fumes may pass when the apparatus is in use.

Between the central partition and the ends of the chamber, I provide additional partitions 14 and 15, which are similar in construction to the central partition and are held in place in the same manner. The support or rest 16, however, which receives the

lower edge of the end partition is spaced from the bottom of the chamber and rests upon and extends between pedestals or projections 17 provided at the sides of the chamber, as shown. The upper edges of the end partitions, furthermore, project into transverse slots formed in the roof and are engaged by covers or caps 18 which are provided with spaced depending ribs or flanges 19 adapted to fit over the upper edges of the partitions and between the same and the side walls of the said slots, so as to completely fill the slots and thereby prevent the fumes passing over the end partitions.

A cap 20 having a depending rib 21 is fitted in the roof of the chamber immediately over the central partition, and the several caps are removable, so that, when repairs are necessary or it is desired for any reason to examine the interior of the chamber, the caps may be removed and access be had thereto through the transverse slots in the roof. The wedges or fastening keys, by which the partitions are held in place, may also be removed through these slots, and the partitions then likewise removed, so that it is not necessary to dismantle the entire chamber in order to repair the same.

Between the several partitions and between the end partitions and the end walls of the chamber and above the bottom of the chamber, I have shown grates 22 which may be of any desired form. In the form shown in Fig. 2, the bars have one edge made concave so that semi-elliptical openings are provided between adjacent bars to permit rapid flow of the air and other elements through the chamber. In the form shown in Fig. 6, the bars fit closely together throughout substantially their entire length and consequently retard the flow so that the air, other gases, and sulfur fumes may not flow so rapidly through the chamber. In actual practice, several sets of bars will be provided, the several sets being interchangeable and that set being used which experiment or the operation of the chamber demonstrates is the most desirable.

In sulfite paper mills, as now generally operated, a vacuum pump is connected with the sulfur burner and serves to create a strong draft through the same so that the sulfur fumes and the other products of combustion are drawn from the burner all before the sulfur has been burned. This process draws out from the burner impurities which affect the quality of the pulp or the color of the paper, and the vapors with the unconsumed particles therein are delivered by the pump to the cooling system. In the cooling system, the vapors are condensed, and, as a result, considerable sulfur is lost and fails to accomplish its purpose. My improved combustion chamber is connected with the sulfur burner, and the gases and

sulfur fumes and unconsumed particles are drawn into the combustion chamber through the inlet 3 from the burner and are then caused to circulate in a tortuous manner through the chamber so that the unconsumed particles of sulfur are maintained in contact with the heated gases for a prolonged period before escaping from the outlet 4 to be combined with acids and admitted to the pulp in the usual manner. The prolonged circulation of the sulfur and the admission of additional fresh air to the sulfur fumes and the gas flowing from the burner with the same causes the entire volume of sulfur to be thoroughly consumed or converted into vapor before escaping through the outlet.

I obtain a very thorough draft through the chamber, which may be nicely regulated by means of the slides or dampers on the walls of the chamber, and consequently the air necessary to effect complete reduction of the sulfur is easily supplied. The fumes passing through the outlet from my improved chamber will be clean and free of dirt, the presence of which tends to impair the quality of the pulp or to affect the color of the paper produced.

The partitions are so constructed and fitted within the chamber that a burned out partition may be removed and a new one substituted therefor in a very few minutes, so that the use of the apparatus will be lost for a very short period. As the partitions are made in sections which overlap at their meeting edges, an entirely new partition need not be put in place when a section has been burned out, and the cost of repairs is thus reduced to a minimum.

The grates are provided with eyes 25 which may be engaged by a hook or other convenient tool so that the grates may be easily lifted from the chamber when necessary.

When the apparatus is in use, the partitions are raised to a very high temperature, and, as a result, they tend to burn out at the centers of their lower edges where the greatest flow of the gases occurs. In the chambers as now generally employed, the removal of a burned-out partition and the substitution of a new one therefor necessitates the shut down of the plant and consumes considerable time in making the repairs. In my improved chamber the grates at the bottoms or near the bottoms of the partitions receive the greatest impact of the heated currents and consequently the greatest wear comes upon these members. The grates, therefore, constitute practically extensions of the partitions, and, as a grate bar can be removed and a new one substituted therefor in a few minutes, the making of repairs is greatly expedited. Not only are the partitions extended or continued in

their effect by the grates, but they are also constructed in sections, so that a burned-out section of a partition can be removed and a new one substituted therefor without requiring the substitution of an entire partition, the cost of maintenance being thereby very appreciably reduced.

What I claim is:—

1. An auxiliary combustion chamber for sulfur burners having a plurality of sectional partitions removably fitted therein.

2. An auxiliary combustion chamber for sulfur burners having a plurality of transverse partitions fitted therein, the said partitions being spaced alternately from the top and the bottom of the chamber and consisting of superposed sections having their meeting edges overlapping.

3. An auxiliary combustion chamber for sulfur burners having a plurality of partitions spaced alternately from its top and its bottom, and caps fitted in the top of the chamber over the partitions, some of said caps engaging the upper edges of the adjacent partitions.

4. An auxiliary combustion chamber for sulfur burners having pedestals on its bottom adjacent its sides, a plurality of transverse rests supported on and extending between said pedestals, transverse rests on the bottom of the chamber between the pedestals, partitions fitted to and supported by said rests, and detachable fastenings for the sides of said partitions.

5. An auxiliary combustion chamber for sulfur burners having guides arranged on the inner face of its walls, said guides being arranged in pairs and the members of the pairs converging downwardly, partitions fitted in said guides, and tapered locking keys bearing upon the said guides and the partitions fitting therein.

6. An auxiliary combustion chamber for sulfur burners having transverse rests therein, said rests having grooves in their upper sides, guides at the ends of the rests, partitions having their lower edges fitting in the grooves in the rests and their end edges engaging the guides, and retaining devices fitted in the guides and engaging the partitions.

7. An auxiliary combustion chamber for sulfur burners having an inlet at one end near its top and an outlet at the opposite end near its top and having air admission and controlling devices on its sides between its ends, and a plurality of transverse partitions fitted within the chamber and spaced apart, the alternate partitions being spaced respectively from the top and the bottom of the chamber.

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

DANIEL M. WHALEN. [L. s.]

Witnesses:

JAMES B. WEATHERBEE,  
JAMES F. CRAFT.