

1,422,801.

2 SHEETS--SHEET 1.

Fig. 2.

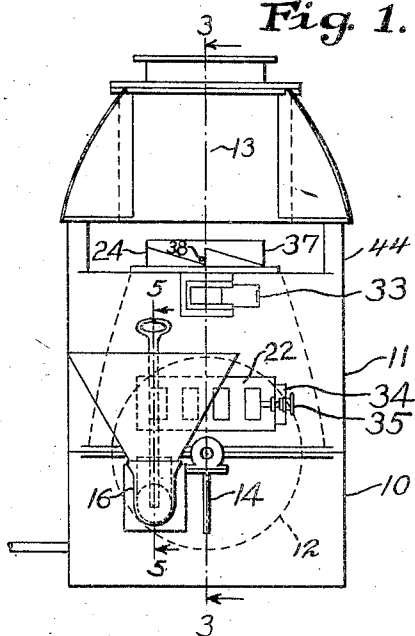
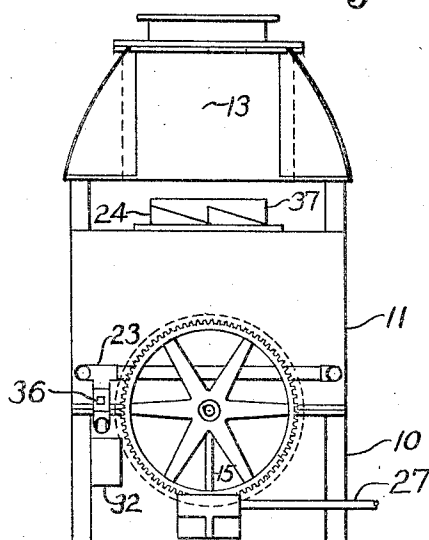
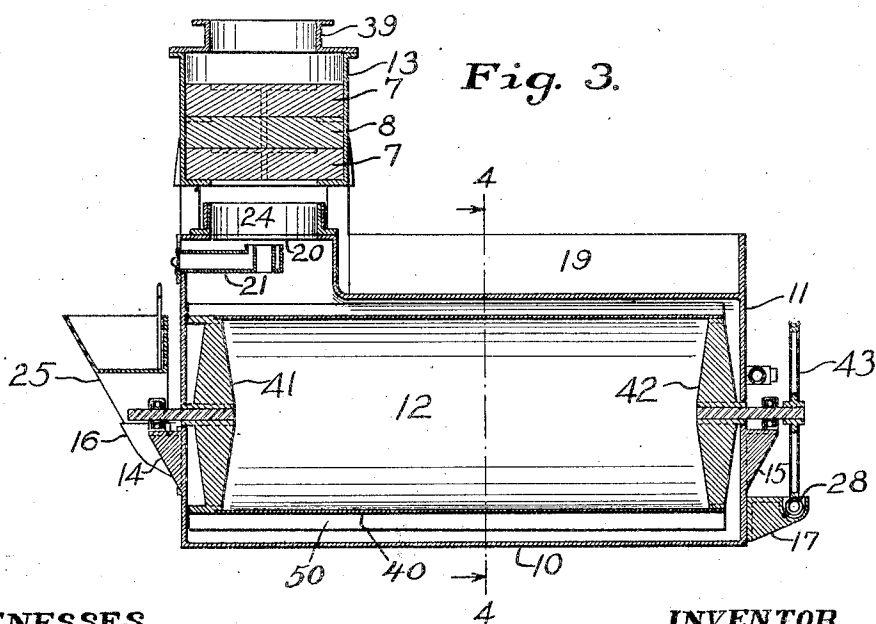


Fig. 3.



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SULPHUR BURNING APPARATUS.
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2 SHEETS—SHEET 2.

Fig. 4.

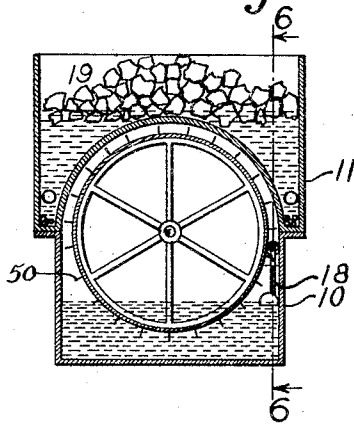


Fig. 5.

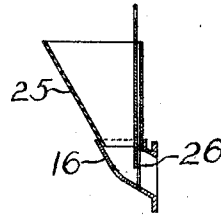


Fig. 7.

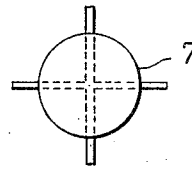


Fig. 6.

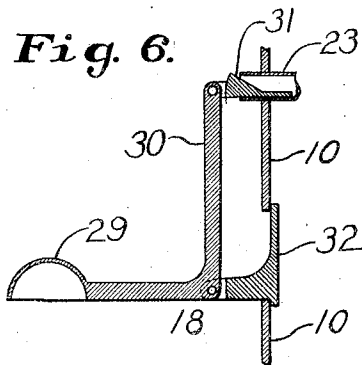
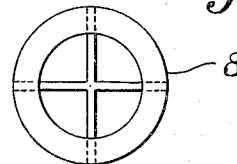


Fig. 8.



WITNESSES

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SULPHUR-BURNING APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HAROLD DONALD WELLS, a citizen of the United States, and a resident of Glens Falls, in the county of Warren and State of New York, have invented a new and Improved Sulphur-Burning Apparatus, of which the following is a full, clear, and exact description.

This invention relates to the manufacture of sulphuric acid, sulphite paper pulp, sugar, copper leaching, etc.; and its object is to provide a new and improved brimstone burning apparatus for use in producing sulphur dioxide gas.

Another object is to provide an apparatus of the type referred to, which has a large capacity, occupies small floor space, produces a steady uniform gas of any desired composition; which unites in one complete machine a melting tank, a device for automatic molten sulphur feeding, and a stoker feed for emergency; that reduces the cost of power, wear, labor and repairs to a minimum.

Another object is to provide an apparatus which may be operated either by induced draft, or by forced draft; and which is of simple and durable construction, and not liable to get easily out of order.

With these and other objects in view, the invention consists of certain novel features of construction, as hereinafter shown and described and then specifically pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front elevation of sulphur burning apparatus;

Figure 2 is a rear elevation of same;

Figure 3 is a longitudinal cross section of same on line 3—3 of Figure 1;

Figure 4 is a lateral cross section of same on line 4—4 of Figure 3;

Figure 5 is a cross section of stoker on line 5—5 of Figure 1;

Figure 6 is a cross section of float controlled molten sulphur feed on line 6—6 of Figure 4;

Figure 7 is a plan view of disc baffle 7 of Figure 3; and

Figure 8 is a plan view of ring baffle 8 of Figure 3.

Sulphur burning apparatus is composed of three main parts; shell 10 and 11, rotating pipe agitator 12, and combustion chamber 13.

The shell 10 and 11 made of iron is cast in two separate parts, lower half 10 and upper half 11; halves are planed at joint and bolt together.

The lower half of shell 10 is liquid tight and has a front bearing bracket 14 and a rear bearing bracket 15 cast integral with shell for supporting rotating pipe agitator. To lower half of shell 10, at front is bolted the stoker 16, at rear are bolted worm housing 17 and float controlled molten sulphur feed 18. The stoker feed 16 (Figure 5) has a hopper 25 and a slide gate 26 for controlling feeding of brimstone. Worm housing 17 has two bearings for supporting driving shaft 27 on which and between the bearings is mounted worm 28. Driving shaft 27 is connected to motor or other suitable power. Float controlled molten sulphur feed 18 (Figure 6) has a semispherical float 29 open on under side, cast integral with right angle lever 30, to the upper end of which is connected conical shaped plug valve 31 fitting into conducting pipe 23; and right angle lever 30 is fulcrumed on casting 32 which is bolted to lower half of burner shell 10.

The upper half of shell 11 not only houses rotating pipe agitator 12, but forms the sulphur melting tank 19 and gas discharge 20. To upper half of shell 11 at front and projecting inside shell is bolted perfect combustion air inlet 21, and also bolted to front is the air inlet damper 22; connected at rear in two places is the molten sulphur conducting pipe 23; bolted to top near front at gas discharge 20 is cam adjusted damper 24. Perfect combustion air inlet 21 has a slide damper 33 for controlling flow of air. Air inlet damper 22 has a slide 34 which is adjusted by hand wheel and screw 35. Molten sulphur conducting pipe 23 has a plug valve 36 for shutting off feeding of molten sulphur. Cam adjusted damper 24 has a sleeve 37 for controlling opening between damper 24 and combustion chamber 13, and set screw 38 fastens sleeve 37. Cast integral

with upper half of shell are four posts 44 for supporting combustion chamber 13.

Rotating pipe agitator 12 is made up of a cast iron or sheet steel pipe 40 having front spider head 41 and a rear spider head 42 and fitted into hub of each head and projecting outwardly are steel journals. Steel journals rotate on two sets of ball bearings, one set is fastened to front bearing support 14 and other set is fastened to rear bearing support 15. Mounted and keyed on journal at rear is the worm gear 43 which engages the driving worm 28. Rotating pipe agitator 12 makes a suitable tight joint with front of burner shell 10 and 11. Rotating pipe agitator may be made up of a metallic cylinder with a plurality of longitudinal fins, such as 50, disposed either on the inside or the outside of the cylinder 12 to increase the surface along which the sulphur is distributed in the rotation of the agitator or cylinder.

Combustion chamber 13 sets on four posts 25 of upper half of shell 11; has special flanged pipe 39 bolted to top for connection to plant system; and has three baffles one above the other inside. Lower baffle 7 is a disc baffle (Figure 7), middle baffle 8 is a ring baffle (Figure 8), and upper baffle 7 is a disc baffle (Figure 7).

Starting sulphur burner of induced draft type into operation (refer to Figures 3 and 4) the draft is turned on and rotating pipe agitator 12 is started. Then two or three hundred pounds of brimstone is fed from stoker 16 into rotating pipe agitator 12 and motion of pipe agitator is then arrested while brimstone is ignited by a piece of burning oily waste or burning paper and when brimstone begins to melt, motion of agitator 12 is resumed and operates continuously. The melting tank 19 is shoveled full of brimstone and kept full. As fast as combustion will permit, brimstone is fed into burner from stoker 16, until molten sulphur bath is about four inches deep inside the rotating pipe agitator 12 (Figure 4), and this level is maintained as close as possible. The heat from the combustion soon begins to melt the brimstone in melting tank 19 and molten sulphur flows through the conducting pipe 23, through plug valve 36 and thence through float controlled valve 18 into bath. When melting tank supplies molten sulphur fast enough, the stoker feed is discontinued and slide gate 26 is closed. The float controlled molten sulphur feed 18 will then regulate the flow of molten sulphur to burner to maintain the proper level of bath.

Rotating of pipe agitator 12 about one half revolution a minute and dipping into bath, coats the whole inside and outside surface of pipe 40 with a film of molten sulphur which burns with intense heat.

The induced draft draws air in through the inlet damper 22, admitting it inside of the cylinder or agitator 12. This air passes through the inside of the cylinder from the front to the rear around the rear end of the cylinder, which is spaced from the rear end 11 of the burner casing, and then passes from rear to front along the space between the cylinder and the outer casing to the discharge opening 20. The air combined with the sulphur spray on the inner and outer surface of the cylinder forms the sulphur dioxide gas. In discharging gas is some unoxidized sulphur gas, and air admitted through perfect combustion air inlet 21 and cam adjusted damper 24, completes combustion of this sulphur gas, and the arrangement of disc 7 and ring 8 baffles of combustion chamber 13 provides thorough mixing and combustion of gases so that no sublimation can take place further on in system. The air inlet damper 22 has screw adjustment 35 which regulates amount of air admitted to burner and thus controls amount of sulphur consumed. The cam adjusted damper 24 gauges the composition of the sulphur dioxide gas.

Sulphur burner for forced draft is same construction as burner described excepting that it is provided at air inlet damper 22, perfect combustion air inlet 21, and cam adjusted damper 24 (damper 24 is redesigned to fill space between gas discharge 20 and combustion chamber 13) with suitable connections to draft pipe; and also has packing glands in shell where rotating pipe agitator journals pass through.

Sulphur burner as described gives the best results for general use, but modifications would give good results such as; leaving off combustion chamber 13, melting tank 19, hopper feed 25, or perfect combustion air inlet 21. Then additional to described apparatus, several concentric pipes dipping into the sulphur bath increases the burning surface giving greater capacity; or a plurality of longitudinal fins on the outside or inside of rotating pipe agitator 12 increases the burning surface giving greater capacity.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. A sulphur burner comprising a burner casing, a rotatable shell mounted therein, one end of said shell being disposed tightly against the adjacent face of the casing, and a damper in said face within the area bounded by the cross section of the shell to admit air into the casing within said shell, said casing having a discharge passage therein, the other end of the shell being spaced from the casing to permit passage of the gases from the interior of said shell to the discharge opening.

2. A sulphur burner which comprises a

burner casing, a rotatable shell mounted within said casing, a damper in the edge of the casing adjacent one end of said shell to admit air within said shell, this end of said
5 shell being snugly disposed against the inner face of the casing, the opposite end of the shell spaced away from said casing, means for rotating said shell about its axis, and a plurality of sulphur-distributing fins
10 or projections disposed on said shell and adapted to dip into the sulphur to distribute it evenly on the surface of the shell, said casing having a discharge opening in its upper portion and at the end thereof opposite
15 the end of the shell which is spaced from the casing.

3. A sulphur burner of the type described which comprises a horizontal shell rotating within a casing, the shell at its forward end
20 fitting tightly against the casing, and an air inlet damper positioned in the casing to admit air inside the shell.

4. A sulphur burner comprising a burner casing, a rotatable shell within said casing,
25 a damper in the casing adjacent one end of the shell to admit air to the interior of the shell, said shell adapted to dip into a bath of sulphur and carry it in a thin layer up

for combination with the air, and means on the surface of the shell to increase the area
30 over which the sulphur may be spread.

5. A sulphur burner comprising a burner casing, a rotatable shell therein adapted to dip into a bath of sulphur, and means on
said shell to elevate the sulphur as the shell
35 is rotated and present it in a thin film to the action of air, and an air inlet damper at one end of the casing to admit air within said shell.

6. A sulphur burner comprising a burner
40 casing having a discharge outlet therein along its upper edge at the front end thereof, a rotatable shell within said casing and bearing tightly against the front end of
said casing, and an air inlet damper in the
45 front end of said casing to admit air within said shell, said shell being spaced on its sides and at the back end from the casing to permit the passage of air therethrough and
back around the inside of the casing to the
50 discharge outlet.

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