

March 20, 1934.

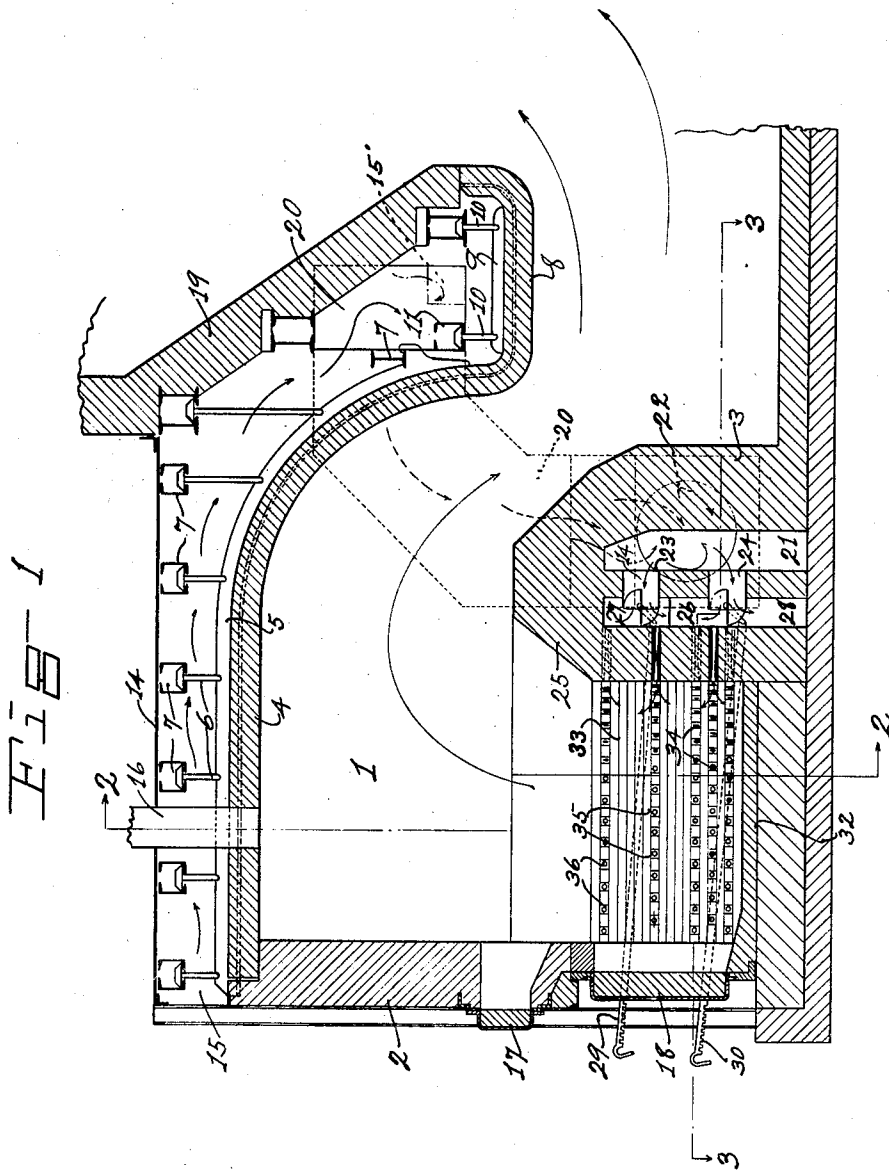
H. G. GREGORY ET AL

1,952,010

FURNACE

Filed Sept. 23, 1927

5 Sheets-Sheet 1



Henry Lloyd Gregory
George P. Ward
Gifford & Scull

INVENTORS

BY

ATTORNEYS

March 20, 1934.

H. G. GREGORY ET AL

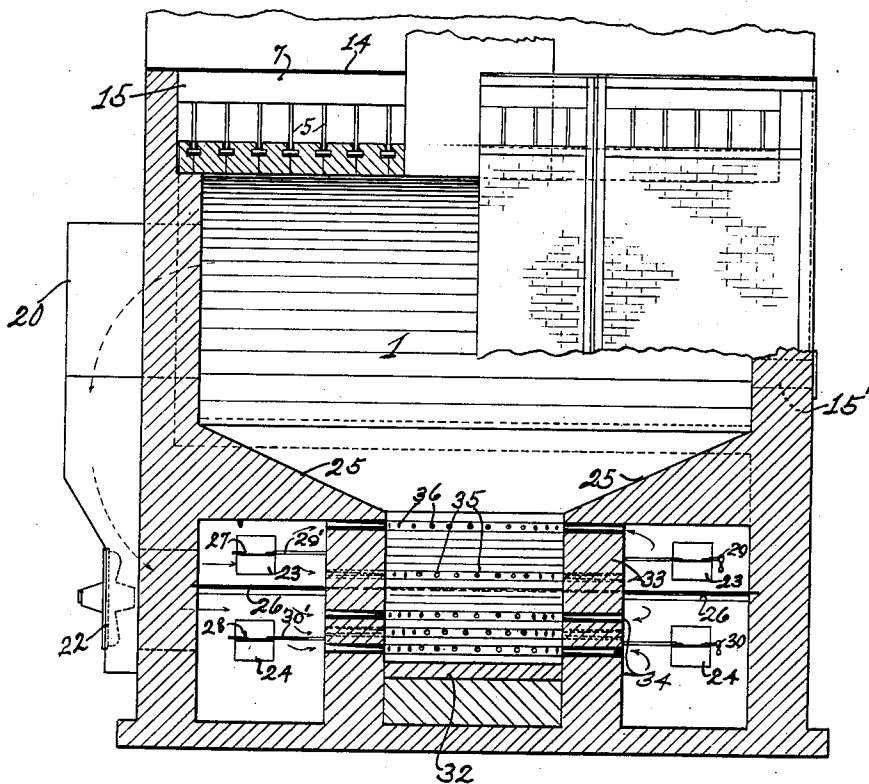
1,952,010

FURNACE

Filed Sept. 23, 1927

5 Sheets-Sheet 2

FIG 2



Henry Hyde Gregory
George P. Ward
Gifford & Scull

INVENTORS

BY

ATTORNEYS

March 20, 1934.

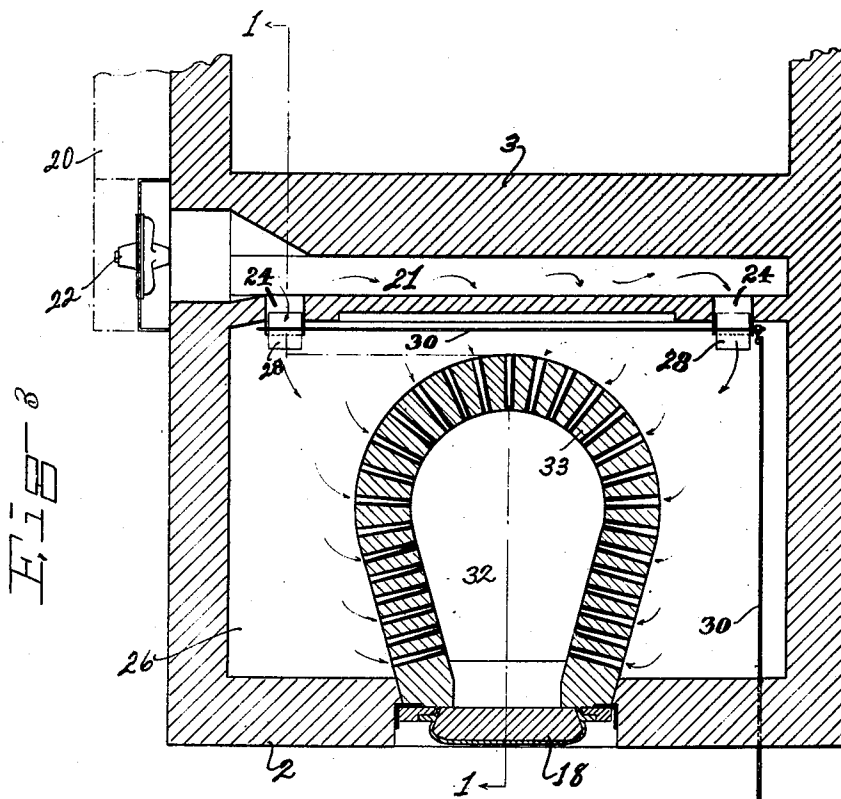
H. G. GREGORY ET AL

1,952,010

FURNACE

Filed Sept. 23, 1927

5 Sheets-Sheet 3



Henry Clyde Gregory
George P. Ward

INVENTORS

BY

Clifford & Scull

ATTORNEYS

March 20, 1934.

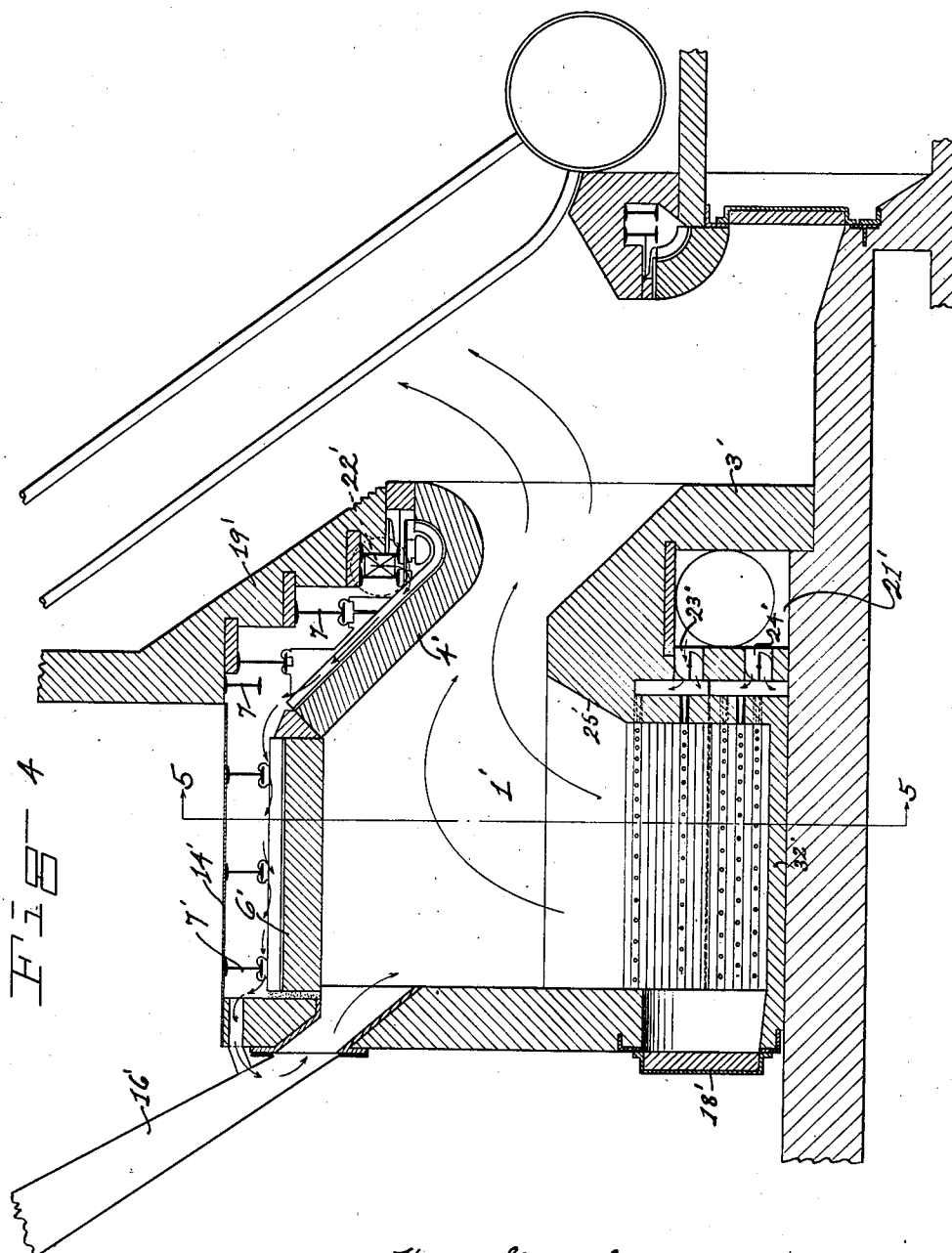
H. G. GREGORY ET AL

1,952,010

FURNACE

Filed Sept. 23, 1927

5 Sheets-Sheet 4



Henry Hyde Gregory
George O. Ward
Clifford & Seall

INVENTORS

BY

ATTORNEYS

March 20, 1934.

H. G. GREGORY ET AL

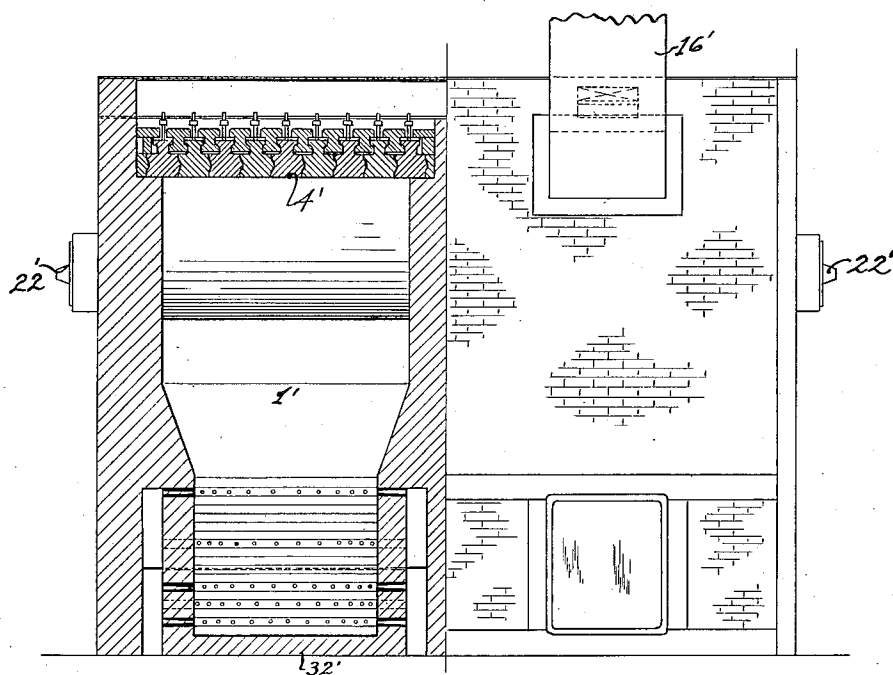
1,952,010

FURNACE

Filed Sept. 23, 1927

5 Sheets-Sheet 5

Fig 5



Henry Glyde Gregory
George O. Ward

INVENTORS

Gifford + Scull

BY

ATTORNEYS

UNITED STATES PATENT OFFICE

1,952,010

FURNACE

Henry Glyde Gregory and George P. Ward,
Habana, Cuba, assignors, by mesne assignments,
to Fuller Lehigh Company, a corporation of
Delaware

Application September 23, 1927, Serial No. 221,442
In Cuba August 28, 1927

1 Claim. (Cl. 110—7)

This invention relates to an improvement in furnaces that is especially adapted for burning sugar cane bagasse but is not restricted to this particular use.

5 The invention will be understood from the description in connection with the accompanying drawings in which Fig. 1 is a longitudinal section through an illustrative embodiment of the invention taken along the line 1—1 of Fig. 10 3; Fig. 2 is a section along the line 2—2 of Fig. 1; Fig. 3 is a section along the line 3—3 of Fig. 1; Fig. 4 is a longitudinal section similar to Fig. 1, showing a modification; and Fig. 5 is a front elevation partly in section along the line 5—5 of 15 Fig. 4.

In the drawings, reference character 1 indicates the combustion space of a furnace that is provided with a front wall 2, a bridge wall 3 and a roof or arch 4. The roof or arch 4 may be 20 made of tile, and is supported on longitudinal bulb beams 5 of the well known type. The beams 5 are supported by means of straps or supports 6 that are hung from cross channel bars or I-beams 7. The rear portion of the roof or 25 arch 4 curves downwardly and the lower portion 8 thereof is supported on bulb beams 9 hung from straps 10 that are supported by cross channels or I-beams 11.

An air tight casing 14 is located above the 30 roof 4 and is supported along the upper edges of the cross channels 7, leaving a space between the arch 4 and the casing 14 for the passage of air along the upper side of the arch 4. The air enters the space inside the casing 14 through 35 the front opening 15. A chute 16 for fuel, such as bagasse, extends through the casing 14 and roof 4 and the front wall 2 is provided with doors 17 and 18, through which access to the inside of the furnace can be obtained.

40 A wall 19 of the boiler setting is spaced some distance from the rear downwardly curved portion of the roof 4. An auxiliary air port 15', shown in dot-dash lines in Fig. 1, is provided at the side of the setting and leads into the space 45 between the wall 19 and the lower end of the roof 4. The port 15' may be provided with a damper or other closure if desired. A conduit 20 leads from the space between the wall 19 and roof 4, on the side of the furnace opposite the port 15', 50 into a space 21 in the bridge wall 3, which is made hollow for this purpose. A fan 22 is provided in the conduit 20 for drawing air into the opening 15 and causing it to pass above the roof or arch 4, thence through the conduit 20 discharging 55 ing into the space 21 in the bridge wall 3. This

fan also causes cold air to be drawn in through the port 15' when it is opened.

Openings 23 and 24 are provided leading from the space 21 into blast boxes that are located outside the wall 33 of the ignition chamber 32. Two 60 blast boxes are provided one above the other by means of the horizontal division plate 26. Dampers 27 and 28 are provided for controlling the amount of air entering through the openings 23 and 24 into the blast boxes. These dampers 65 are regulated by control means 29 and 30, the front ends of which may extend beyond the front wall of the furnace. The dampers 27 and the dampers 28 are connected by cross rods 29' and 30', respectively. 70

The hearth or ignition chamber 32 of the furnace is located in the lower portion thereof and communicates with the combustion space 1 of the furnace. This hearth or ignition chamber is surrounded by a wall 33 that is illustrated 75 as being horseshoe shaped in horizontal section. A sloping surface 25 is provided around the upper edge of the chamber 32. A plurality of rows of air ports extends through the wall 33 from the blast boxes. These air ports are preferably divided into groups. The lower group 34 consisting of a plurality of rows leads through the wall 33 from the lower blast box. The row 35 leads 80 through the wall 33 from the lower portion of the upper blast box slightly above the division plate 26, and the upper row 36 leads through the wall 33 from the upper portion of the upper blast box. 85

The operation is as follows: Bagasse is introduced through the chute 16 and falls upon the 90 hearth 32 where it is ignited, the hot products of combustion passing upwardly and over the bridge wall 3, thence under the portion 8 of the arch, thence to the stack. Air enters through the opening 15 and passing along the upper side 95 of the arch 4, becomes heated and then passes through the conduit 20 into the opening 21 in the bridge wall. At the same time, cold air may enter the auxiliary port 15', and pass along the portion 8 of the arch, thus becoming heated 100 and then pass into the conduit 20. The air entering the opening 15 and the auxiliary port 15' and becoming heated, aids in keeping the arch cooled. The air passes from the space 21 through the openings 23 and 24 into the blast 105 boxes, and from thence through the air ports 34, 35 and 36 into the space above the hearth 32. It has been found that in burning bagasse, the height of the pile of bagasse on the hearth 32 may vary through a wide range, and that if 110

all of the air is passed uniformly through all of the air ports, there is a poor distribution of the air when the pile of bagasse becomes low, because not enough air can be supplied to the bottom of the pile as compared to the amount that is thereby supplied near the top of the pile. If the air passed uniformly through all of the air ports there would be a considerable excess of air admitted above the fuel bed. With the present invention, the dampers 27 and 28 can be regulated in accordance with the height of the pile of bagasse, so as to obtain a much more desirable distribution of the combustion air into the space above the hearth 32.

15 In the modification shown in Figs. 4 and 5, parts similar to those already described are designated by the same reference characters with primes and will not be described again in detail. In this modification, a duplex furnace, or two furnaces side by side are shown. The main portion of the air for combustion purposes enters the space 21' without passing along the top side of the roof or furnace arch and this combustion air may or may not be heated.

In this modification, the air enters the space between the wall 19' of the setting and the arch 4', through the fans 22' and then passes along the arch toward the front and enters the bagasse chute 16', thus serving as secondary air for combustion purposes in the combustion space 1'.

We claim:

In combination, a furnace for burning bagasse, an ignition chamber having walls of refractory material which are spaced from the furnace walls to provide air chambers, air feeding ducts extending through the walls of said ignition chamber, an outlet for hot products of combustion from said furnace at a point remote from said ignition chamber, the roof of said furnace sloping downwardly toward said outlet, a wall spaced from said roof to form an air preheating space, and means connecting said air preheating space with said air chambers.

HENRY GLYDE GREGORY.
GEORGE P. WARD.