May 8, 1923. 1,454,798

J. THOMAS

ROASTING FURNACE

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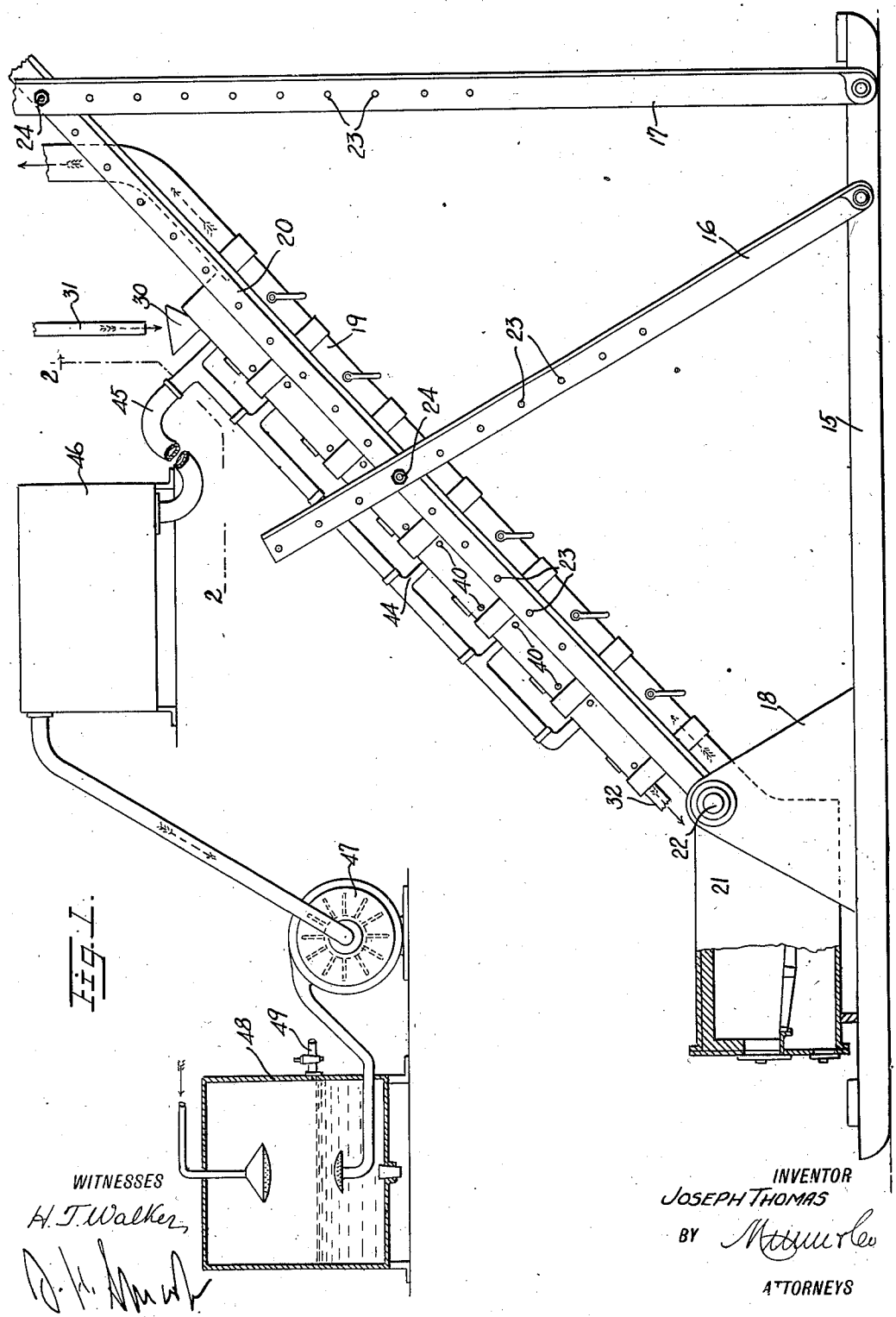


Fig. 1.

WITNESSES

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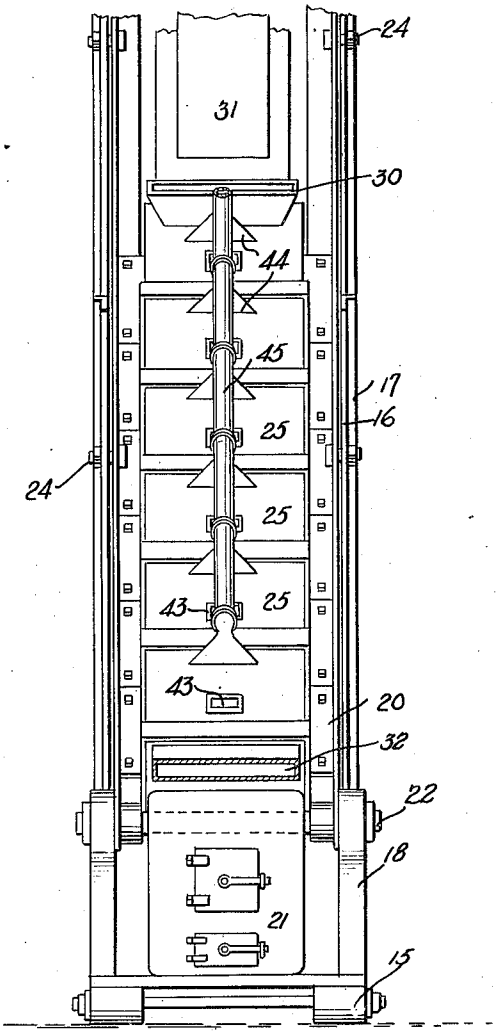
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Fig. 2.



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Fig. 3.

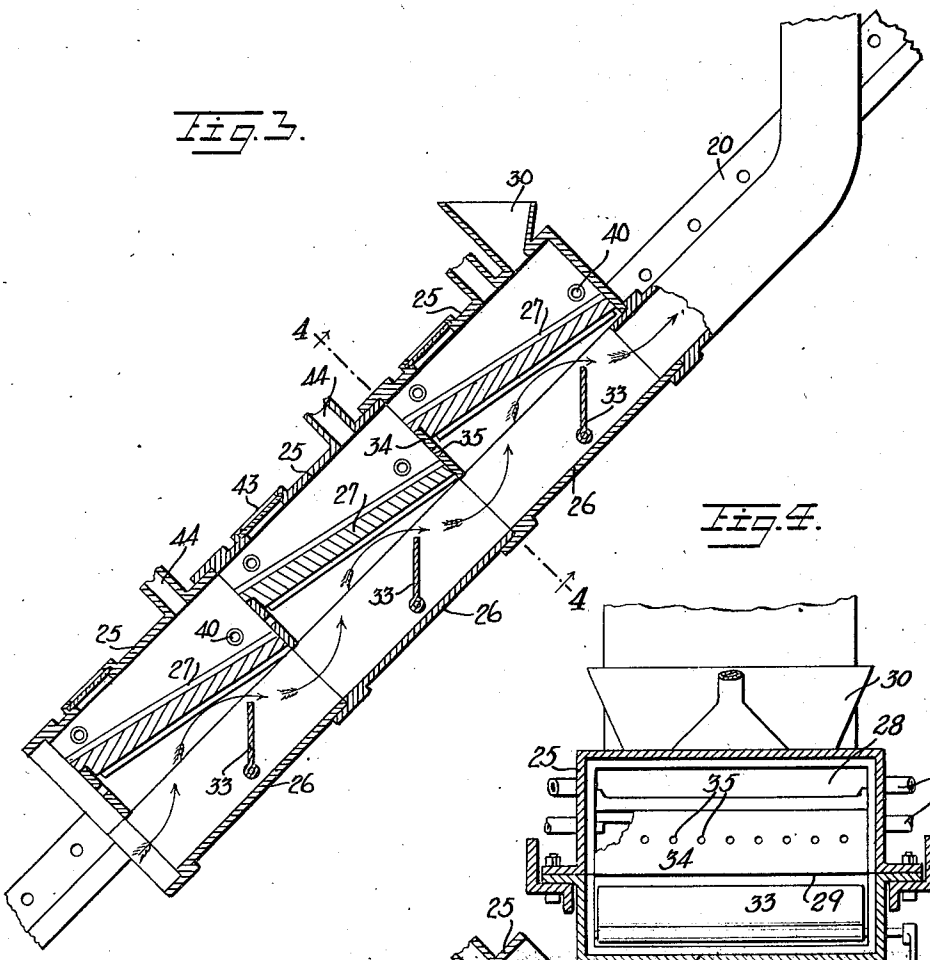
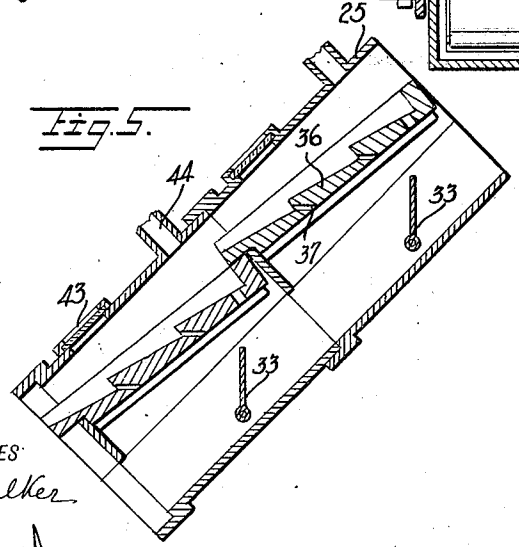


Fig. 4.

Fig. 5.



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Fig. 10.

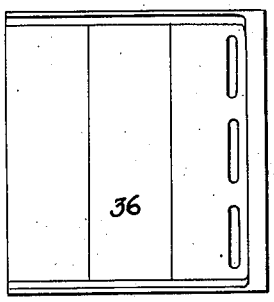


Fig. 6.

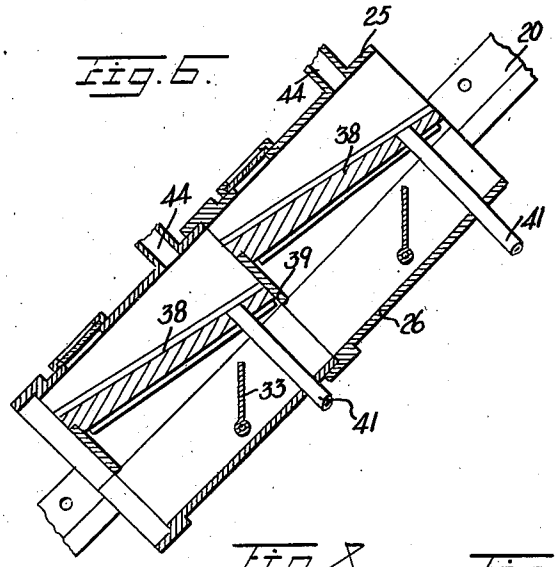


Fig. 7.

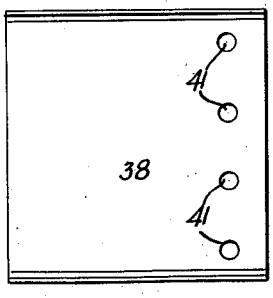


Fig. 8.

Fig. 11.

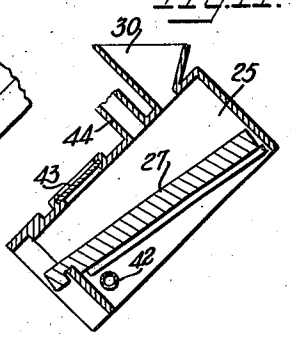
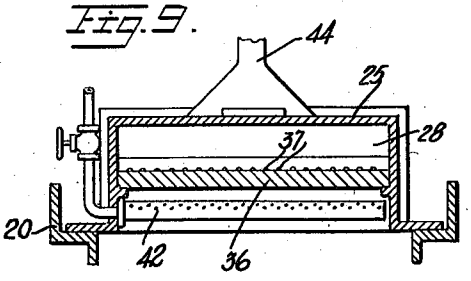


Fig. 9.



WITNESSES

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Patented May 8, 1923. 1,454,798

UNITED STATES PATENT OFFICE.

JOSEPH THOMAS, OF ABERDEEN, WASHINGTON.

ROASTING FURNACE.

Application filed January 27, 1922. Serial No. 532,163.

To all whom it may concern:

Be it known that I, JOSEPH THOMAS, a citizen of the United States, and resident of Aberdeen, in the county of Grays Harbor and State of Washington, have invented a new and Improved Roasting Furnace, of which the following is a full, clear, and exact description.

My invention aims to provide a roasting furnace which may be operated by any desirable type of fuel, and which is particularly adapted for use in connection with the production and condensation of gases from tree refuse, oil shale deposits, lignite coal beds, refractory ores, etc. although it may be utilized in numerous other adaptations, this furnace embodying certain new and useful construction over furnaces of this type heretofore placed upon the market.

A further object of this invention is the provision of a device of the character stated which may be readily portable, and in which the construction will be simplified to a maximum extent, it being further noted that a construction is provided by means of which the degree of roasting may be controlled to a nicety.

A further object of this invention is the provision of a device of the type specified which may be of sectional construction so that the parts may be assembled to efficiently conform to operate with that type of material which is to be operated upon, it being further noted that a construction is provided which will render the entire device adjustable.

Still another object of this invention is that of providing a furnace in which different parts of the same may be subjected to varying degrees of heat, aside from the fact that by means of the improved construction provided, the gas will be eliminated at and near the point of combustion so that a maximum efficiency will be achieved, aside from the fact that said furnace may be subjected to a free circulation of oxygen or that the interior of the same may be closed from contact with the atmosphere, whereby I derive a principle of gas elimination, gas condensation, and gas flame control.

Further objects of this invention will become apparent in the annexed specification taken in connection with the drawings which latter illustrate practical embodiments of the same, and in which;

Figure 1 is a partly sectional diagrammatic view of the furnace and its associated parts, as a whole.

Figure 2 is a sectional view taken along the line 2—2 and in the direction of the arrows indicated in Figure 1.

Figure 3 is a fragmentary enlarged sectional view of the essential working parts of the furnace.

Figure 4 is a transverse sectional view taken along the line 4—4 and in the direction of the arrows indicated in Figure 3.

Figures 5, 6, 8, and 11 are views corresponding to Figure 3 but showing a slightly different construction and arrangement of the parts.

Figures 7 and 10 are side elevations of details of construction, and

Figure 9 is a transverse sectional view taken along the line 9—9 and in the direction of the arrows indicated in Figure 8.

Attention is primarily invited to Figure 1 which shows the general assembly of the oven, and it will be noted in this view that the reference numeral 15 indicates the supporting members which, in the embodiment illustrated, are in the nature of skids, thus rendering the entire device mobile. Also it will be seen that the device includes standards 16 and 17 as well as lugs 18, and the oven proper is supported by these elements.

Referring to the construction of this oven it will be seen that the exterior of the same presents a longitudinal body 19 carried by a frame 20 and this body in the embodiment illustrated, has one of its ends terminating adjacent the lugs 18 at which point it may be connected with a fire box 21, it being noted that the whole is pivotally supported adjacent this point, as has been indicated at 22 by lugs 18 for a purpose hereinafter specified.

Also it will be noted, that in the type of device shown in Figure 1, the frame 20, as well as the standards 16 and 17 are provided with a series of openings 23 and the openings of the standards and frame may be brought to align so that bolts 24 may be passed through the same and rigidly connect the whole together. It will be obvious that by this type of connection the degree of inclination of the frame 20 with respect to the skids 15, may be varied, and thus the speed of material passing through the body 19 under the impulse of gravity, may be varied.

Also it will be seen that the entire body

19 is composed of a number of sections 25, which as has been shown in Figure 3, may be interlocked with respect to each other by any suitable type of joint. Further a supplemental section 26 is associated with each of the sections 25 for a purpose hereinafter brought out, and it will be seen that by providing a series of roasting plates 27 within the body 19 that the interior of the latter is divided into two longitudinal spaces 28 and 29, the former serving to accommodate the material to be roasted, while the latter serves as a flue for the purpose of the flame and products of combustion emanating from the fire box 21.

Now with a view of introducing material to be treated into the oven, attention is again invited to Figure 1 taken in conjunction with Figures 2, 3 and 4, and it will be seen that the uppermost section 25 is provided with a hopper 30, which hopper may be brought to align with a feed chute 31. Thus the material will pass into the uppermost section and move across the roasting place 27 positioned therein, and incident to the fact that all of the plates are arranged at an angle to the longitudinal axis of the body 19 it will be seen that this movement will be continued in the nature of a step-by-step motion throughout the entire length of the furnace, the roasted material finally emerging from the body 19 through the delivery chute 32, associated with the lowermost section 25.

With a view of controlling the heat within the flue underlying the roasting plates 27 it will be seen that I preferably utilize a series of dampers 33 positioned within the space 29 thus causing the flame and products of combustion to move in the path directed by the arrows in Figure 3, and if it is desired to subject the material being treated to direct contact with a certain amount of this flame and products of combustion, it will be obvious that this result may be accomplished by providing the plates 34 which are disposed between the ends of the roasting plates 27 with openings 35, the latter permitting of communication between the spaces 28 and 29.

The same result may be achieved as has been indicated in Figure 5 by providing roasting plates 36 presenting a plurality of steps in their upper face, openings 37 being formed in the risers of these steps so as to provide communication between the spaces 28 and 29. In each instance however, i. e. in the construction shown in Figures 3 and 4 as well as in Figure 5, it will be seen that the openings 35 and 37 are disposed in such a manner as to prevent any danger of the material falling into the flue and being destroyed.

Also it will be obvious that, if in connection with certain materials, it is found desirable to prevent a direct contact between the flames and the products of combustion, and the material being treated, this result may be accomplished by the construction illustrated in Figure 6 in which neither the roasting plates 38 nor the plates 39 are provided with openings permitting of communication between the spaces 28 and 29. Further it will be obvious that a surplus of oxygen may be introduced into the roasting space 28 when this is desired, by the provision of openings 40 in the side walls of the sections as shown in Figure 3, or by the use of pipes 41 having one of their ends extending beyond the body 19 and their opposite ends extending through the roasting plate 38 and thus being in communication with the space above said plate as shown in Fig. 6, and it will be seen reference being had to Figures 10 and 7 that the face of the plates 36 and 38 are respectively shown, and also illustrate the connection existing between the flue and the space 28, as well as the additional air provision.

It will be understood that if it is desired I may heat each of the roasting plates individually, and with this in mind, attention is invited to Figures 8, 9 and 11, in which it will be noted that Figures 8 and 9 show the body 19 with the supplemental sections 26 removed, thus dispensing with the flue and fire box. In other words, virtually the same construction, as has been illustrated in Figure 5 is resorted to with the exception that the supplemental sections 26 providing the spaces 29 are detached. In lieu of these sections I provide suitable burners 42 underlying the roasting plates 36, and at a point preferably adjacent their lower edge. Also it will be obvious that the flame and products of combustion will pass to a limited extent through the openings 37 provided in the plates as shown in Figure 5 and thus the same result will be accomplished.

It will be obvious, as has been shown in Figure 11 that the same type of roasting plate illustrated in Figures 3 and 4 may be used in conjunction with the burners 42, and thus in this instance the flue, comprising the sections 26 and the fire box 21 may be dispensed with, obviously simplifying the construction and in some instances increasing the efficiency of the result.

It will be noted in all of these various types that I preferably provide sight openings 43 which are associated with each of the sections 25 so that an operator may be enabled to observe the treatment which the material is undergoing, and assuming that the material is being treated too rapidly or too sluggishly, it will be obvious that this may be corrected by the adjustment of the dampers 33, the regulation of the flow of gas through the burners 42, or the degree of inclination of the body 19 with respect to the hori-

zontal. Also to properly treat the gases derived from the roasting process it will be noted, attention being invited to all of the figures, that each of the sections 25 has an outlet pipe 44, in communication with it at a point above the roasting plates. These pipes are interconnected and merge into a common duct 45 from whence they may pass into a depositing tank 46, this passage being effected and accelerated preferably by any suitable type of pump 47 connected with the tank 46 it being finally noted that the gases are passed through a water tank 48 from whence they may be withdrawn through a pipe 49.

Thus it will be appreciated that all of the objects of this invention are accomplished, and it will be understood that numerous modifications of structure might readily be resorted to without in the least departing from the scope of my claims; which are;

1. A roasting furnace including a supporting member, lugs secured to said supporting member, a furnace body pivotally attached adjacent one of its ends to said lugs, and standards attached to said supporting member and adapted to engage said body to normally withhold the same from movement with respect to said member.

2. A roasting furnace including a supporting member, lugs attached to said supporting member, a furnace body rockingly secured to said lugs, standards attached to said supporting member, said standards being formed with a series of openings, a frame for said body, said frame also being formed with a series of openings capable of being brought into alignment with said standard openings, and means adapted to pass through said aligning openings to retain all of the parts affixed with respect to each other.

3. A roasting furnace including a body, an inclined roasting plate within said body, means below said plate for heating the same, said plate being formed with openings approaching the upper surface of the plate at an acute angle thereto.

4. A roasting furnace including a body, a series of roasting plates disposed within said body to divide the same into an upper and lower space, said plates being disposed to provide a step-by-step surface, and openings extending transversely through the risers of said surface and affording communication between said spaces.

5. A roasting furnace including a body comprising a plurality of sections detachably secured together, roasting plates carried by each of said sections, and means for heating the underside of said plates.

6. A roasting furnace including a body comprising a plurality of sections detachably secured together, roasting plates carried by each of said sections, supplemental sections secured to said first named sections, said supplemental sections acting as a flue, and a fire box connected to said supplemental sections.

7. A roasting furnace including a body providing a plurality of longitudinal sections secured together end to end, each section including an upper portion and a detachable bottom portion, and roasting plates carried individually by one of said portions of each section.

8. A roasting furnace including a body providing a plurality of longitudinal sections secured together end to end, each section including an upper portion and a detachable bottom portion, and roasting plates carried individually by one of said portions of each section, said roasting plates being formed to have interfitting ends.

9. A roasting furnace including a body providing a plurality of longitudinal sections secured together end to end, each section including an upper portion and a detachable bottom portion, and roasting plates carried individually by one of said portions of each section, said roasting plates being formed to have interfitting ends, one end of a roasting plate presenting a riser to meet the matching end of a contiguous plate.

10. A roasting furnace including a body providing a plurality of longitudinal sections secured together end to end, each section including an upper portion and a detachable bottom portion, and roasting plates carried individually by the upper portions of each section.

11. A roasting furnace including a body providing a plurality of longitudinal sections secured together end to end, each section including an upper portion and a detachable bottom portion, roasting plates carried individually by one of said portions of each section, and observation windows carried individually by one of the portions of each section.

12. A roasting furnace including a body providing a plurality of longitudinal sections secured together end to end, each section including an upper portion and a detachable bottom portion, roasting plates carried individually by one of said portions of each section, and dampers carried individually by one of the portions of each section.

JOSEPH THOMAS.