April 8, 1924. 1,489,905

O. STALMANN

RETORT

Filed March 23, 1921 4 Sheets-Sheet 1

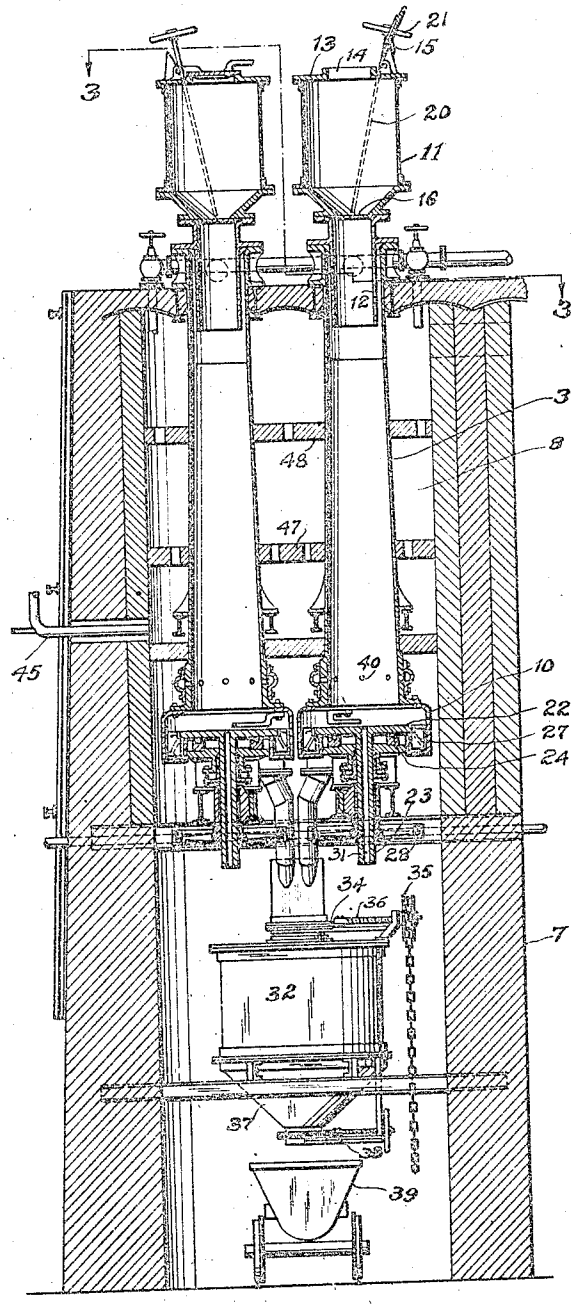


Fig. 1.

Inventor

Otto Stalmann

By

Attorney

April 8, 1924. 1,489,905

O. STALMANN

RETORT

Filed March 23, 1921 4 Sheets-Sheet 2

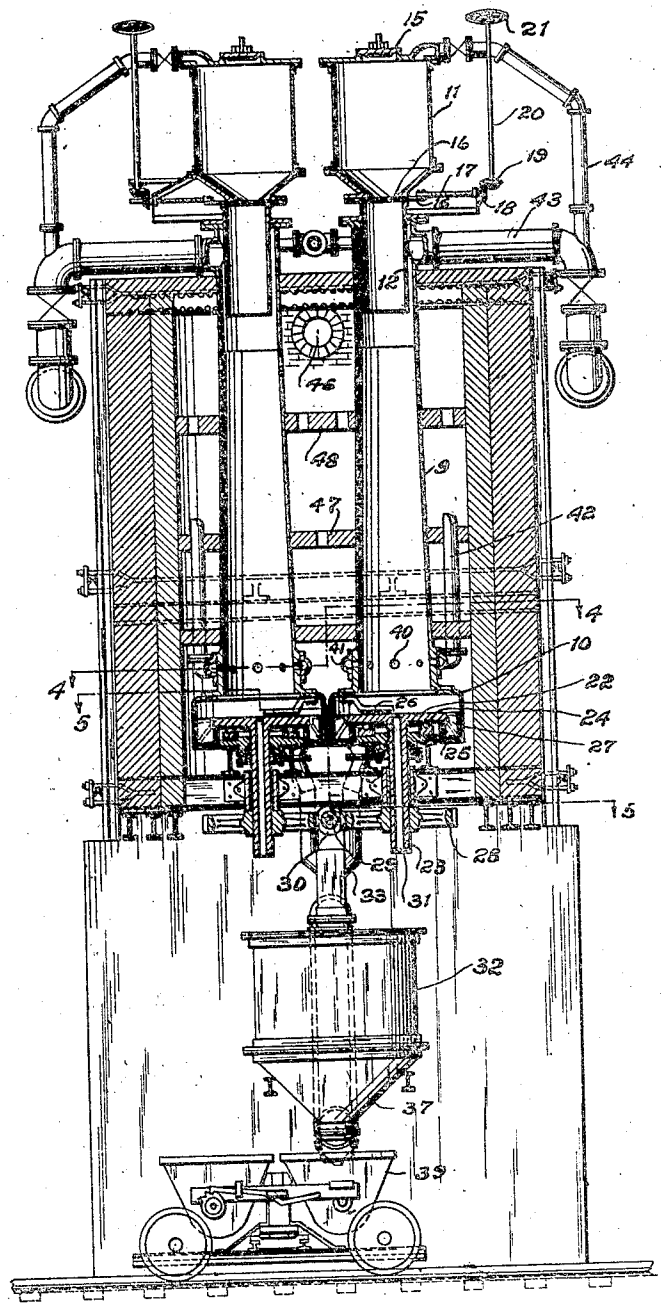


Fig. 2.

Inventor
Otto Stalmann

By

Attorney

April 8, 1924. 1,489,905

O. STALMANN

RETORT

Filed March 23, 1921 4 Sheets-Sheet 3

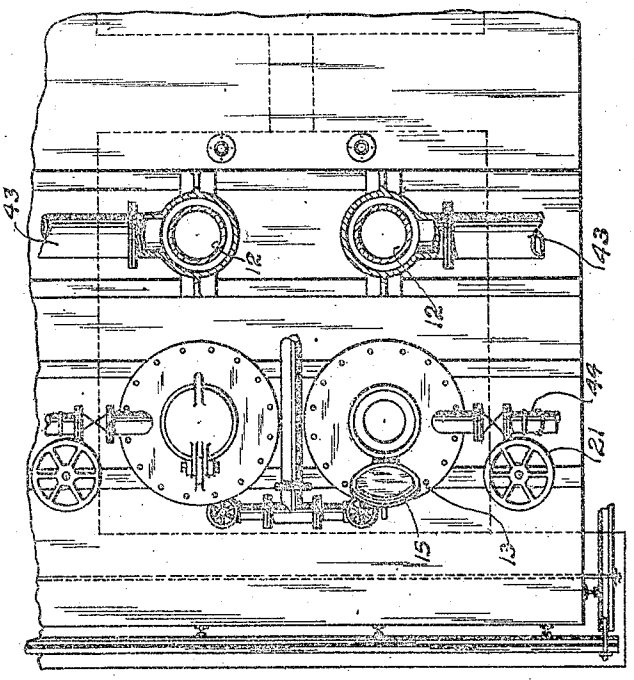


Fig. 3.

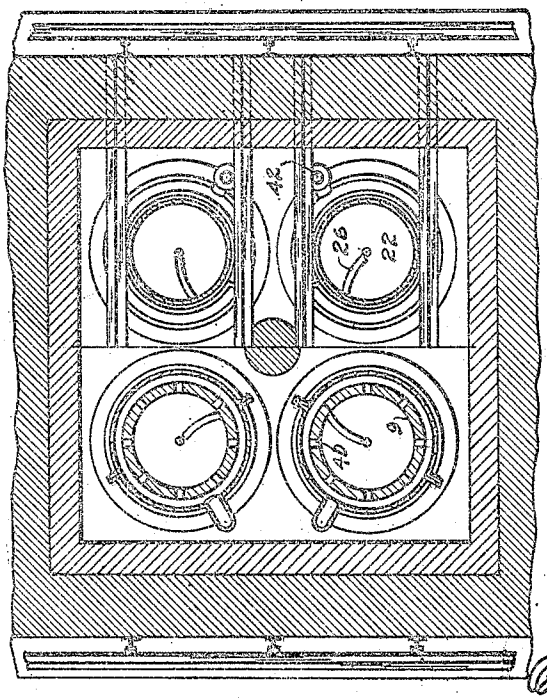


Fig. 4

Inventor

Otto Stalmann

By

Attorney

April 8, 1924. 1,489,905

O. STALMANN

RETORT

Filed March 23, 1921 4 Sheets-Sheet 4

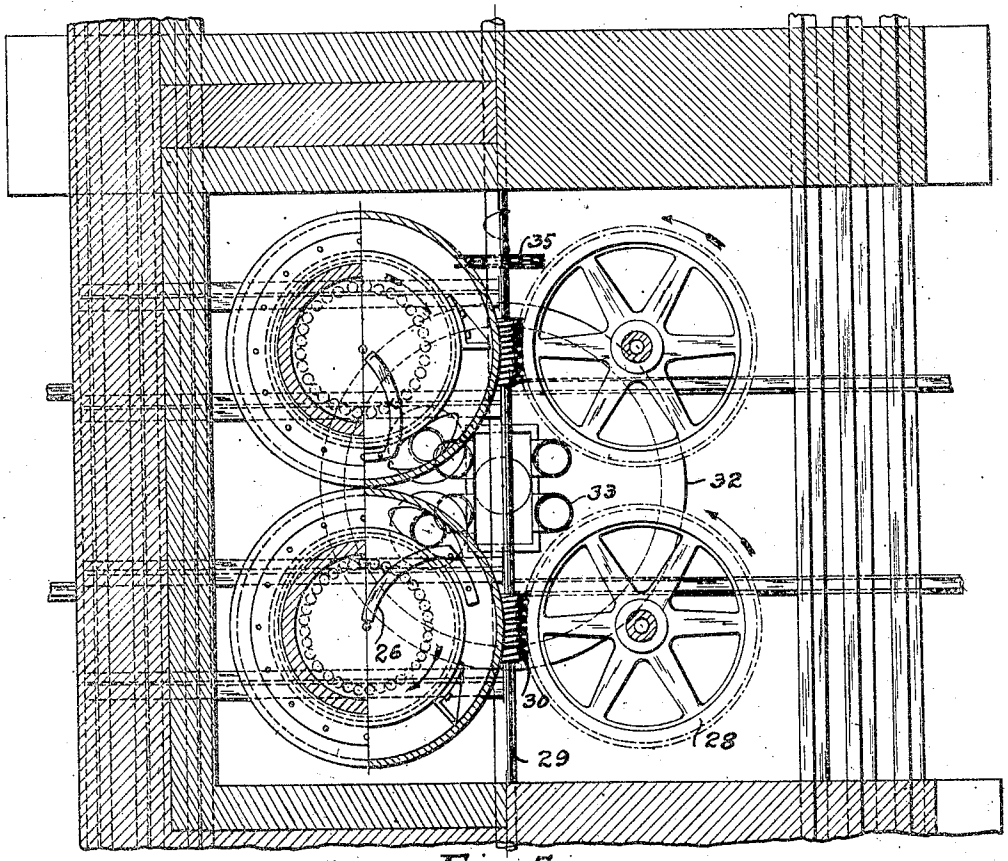


Fig. 5.

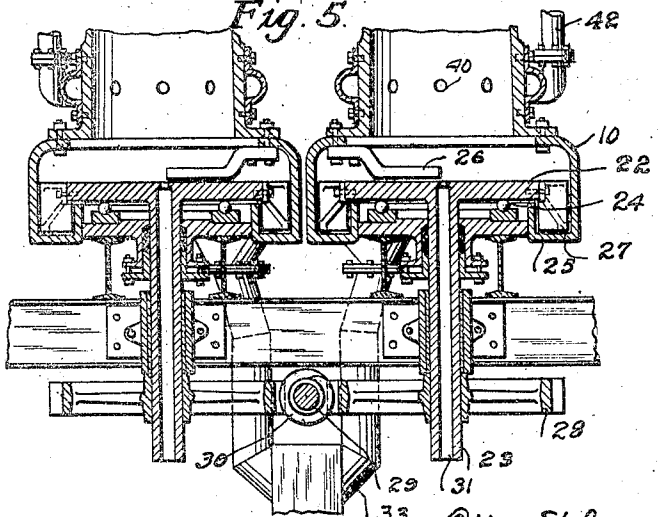


Fig. 6.

Inventor

Otto Stalmann

By

Attorney

Patented Apr. 8, 1924. 1,489,905

UNITED STATES PATENT OFFICE.

OTTO STALMANN, OF SALT LAKE CITY, UTAH.

RETORT.

Application filed March 23, 1921. Serial No. 454,782.

To all whom it may concern:

Be it known that I, OTTO STALMANN, a citizen of the United States, residing at Salt Lake City, in the State of Utah, have invented certain new and useful Improvements in Retorts, of which the following is a specification.

The present invention relates to apparatus for the production of oil from shales, and the object is to produce a retort of a novel character that is simple, practical and highly efficacious in operation.

One embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a vertical sectional view through the apparatus,

Figure 2 is a vertical sectional view at right angles to Figure 1,

Figure 3 is a horizontal sectional view on the line 3—3 of Figure 1,

Figures 4 and 5 are horizontal sectional views respectively on the lines 4—4 and 5—5 of Figure 2,

Figure 6 is a detail view on a somewhat enlarged scale of the lower portion of two of the retorts.

In the embodiment disclosed, a suitable outer casing 7 is provided built of suitable material to withstand a relatively high degree of heat, and preferably rectangular in cross section, as will be clear by reference to Figure 3. Within the chamber 8 formed by this casing is located a battery of retorts. As these are duplicates, but one need be described.

An upright cylindrical body 9 is provided that preferably tapers towards its upper end, and said body terminates at its lower end in an enlarged chamber 10. The body projects above the top of the casing 7, and mounted thereon is a charging hopper 11 having a discharge spout 12 that depends within the body 9 and is spaced from the walls thereof. The top 13 of the hopper has an intake opening 14 adapted to be closed by a suitable hinged door 15. Communication between the bottom of the hopper and the spout 12 is adapted to be controlled by a sliding gate 16. The gate may be actuated in any suitable manner. For instance, as illustrated in Figure 2, it has connected thereto a stem 17 with which a gear wheel 18 has a threaded engagement. Meshing with the gear wheel 18 is another gear wheel 19 carried by an actuating shaft 20 having a hand wheel 21.

A shale support is provided in the form of a rotatable turntable 22 carried by a vertical shaft 23, and preferably supported by ball bearings 24. This turntable is located in the enlarged chamber 10 and is of larger diameter than the interior of the body 9. Its periphery overhangs an annular trough 25. A scraper blade 26 is supported over the turntable and said turntable also carries scrapers or paddles 27 operating in the trough. The turntable may be actuated by any suitable means. For example, the lower end of the shaft 23 is shown as provided with a gear wheel 28, and a driving shaft 29 is provided with a worm 30 meshing with the gear wheel. This driving shaft 29 is common to the gears of the various turntables. It will be noted that the vertical shaft 23 and the turntable are provided with an axial bore 31, the opening through the turntable being preferably of less diameter than the portion extending through the shaft.

Below the retorts there is provided a receiving chamber 32 for the spent material, and this chamber is in communication with the various troughs 25 through down-spouts 33. A sliding gate 34 controls the passageway from the down-spouts into the chamber 32 and may be operated by any suitable means, as for example a chain wheel 35 having a threaded engagement with a stem 36 connected to the gate. The bottom of the chamber 32 is preferably in the form of a hopper 37 controlled by a sliding gate 38, and said hopper may be discharged into any off-carrying mechanism, as for example a car 39.

The body is provided above the enlarged chamber with an annular series of steam inlet ports 40 that are in communication with a manifold 41 surrounding the chamber and receiving steam from any suitable source through a supply conduit 42. A gas and vapor outlet conduit 43 is connected to the top of the body 9 above the charging spout 12 and a branch 44 preferably leads from the top of the charging hopper 11 to the conduit 43.

Suitable means are also provided for externally heating the battery of retorts. Thus in the present embodiment a gas burner 45 is shown in Figure 1, which delivers a flame into the casing 7 above the

steam manifolds, the outlet for the products of combustion being shown at 46 in Figure 2. Suitable baffles 47 and 48 are preferably located at different heights within the chamber extending across the same and surrounding the retorts.

The operation of the apparatus is substantially as follows: The shale is charged into the hoppers 11, the lower gates 16 thereof having first been closed, and after said hoppers are filled, the intake openings 14 are closed and the gates 16 are then opened, thus permitting the material to gravitate into the retorts and rest upon the rotatable turntable. When the retorts are filled the casing is heated and steam is admitted into the retorts, as will be readily understood. The vapors and gases will pass off through the conduits 43. As the operation continues the turntables are slowly rotated, so that the spent shale is slowly but continuously swept from the turntables into the troughs, and carried by the scrapers 27, will gravitate through the down spouts into the receiving chamber 32, the top gate 34 thereof being opened and the lower gate closed. Whenever it is desired to eject the refuse, it is only necessary to close the upper gate 34 and open the lower gate 38, thus the refuse may be removed without stopping the operation and without admitting air to the retort. The charging operation can also be performed at any time while the apparatus is in operation and without admitting air. The spouts 12 are important in that they maintain the level of the shale below the gas and vapor outlets. The provision of the openings or bores through the shafts and turntable is desirable. These openings are normally plugged with clay or the like, but should the shale lodge in the retorts, a rod may be inserted through the bore and the material thereby loosened.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In a retort of the character set forth, the combination with a tubular body, of means for charging material into its upper end and maintaining it closed, a rotatable material support at the lower end of the body, means for rotating the support, a receiving trough about the periphery of the rotatable support, means for directing the spent material to the trough from the support, means for permitting the discharge of the spent material from the trough while maintaining the same closed against ingress of air, and means for introducing steam into the body.

2. In a retort of the character set forth, the combination with a tubular body, of means for charging material into its upper end and maintaining it closed, a rotatable material support at the lower end of the body, means for rotating the support, a receiving trough about the periphery of the rotatable support, means for directing the spent material to the trough from the support, a valved receiver for the spent material having communication with the trough, paddles carried by the rotatable support and operating in the trough, and means for introducing steam into the body.

3. In a retort of the character set forth, the combination with a vertical downwardly flared tubular body having an enlarged lower end, of means for charging material into its upper end, means for introducing steam into its lower portion, a rotatable turntable in the enlarged chamber constituting a material support, a trough at the periphery of the turntable, a scraper located over the turntable, a receiving chamber having communication with the trough, and a paddle carried by the turntable and operating in the trough.

4. In a retort of the character set forth, the combination with an upright retort body, of means for introducing steam thereinto, means for controlling the charging of material into the body, and a rotatable material support at the lower end of the body comprising a table and a vertical shaft supporting the same, said shaft and table having an open ended bore therethrough that affords communication with the interior of the body and permits the introduction of a dislodging rod through said shaft from the exterior of the body.

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

OTTO STALMANN.

Witnesses:
JAS. K. SHAW,
B. J. ANDERSON.