H. P. RHODES.

METHOD OF MINING SULFUR AND OTHER MINERALS.

APPLICATION FILED FEB. 18, 1916.

1,217,065. **Patented Feb. 20, 1917.**

2 SHEETS—SHEET 1.

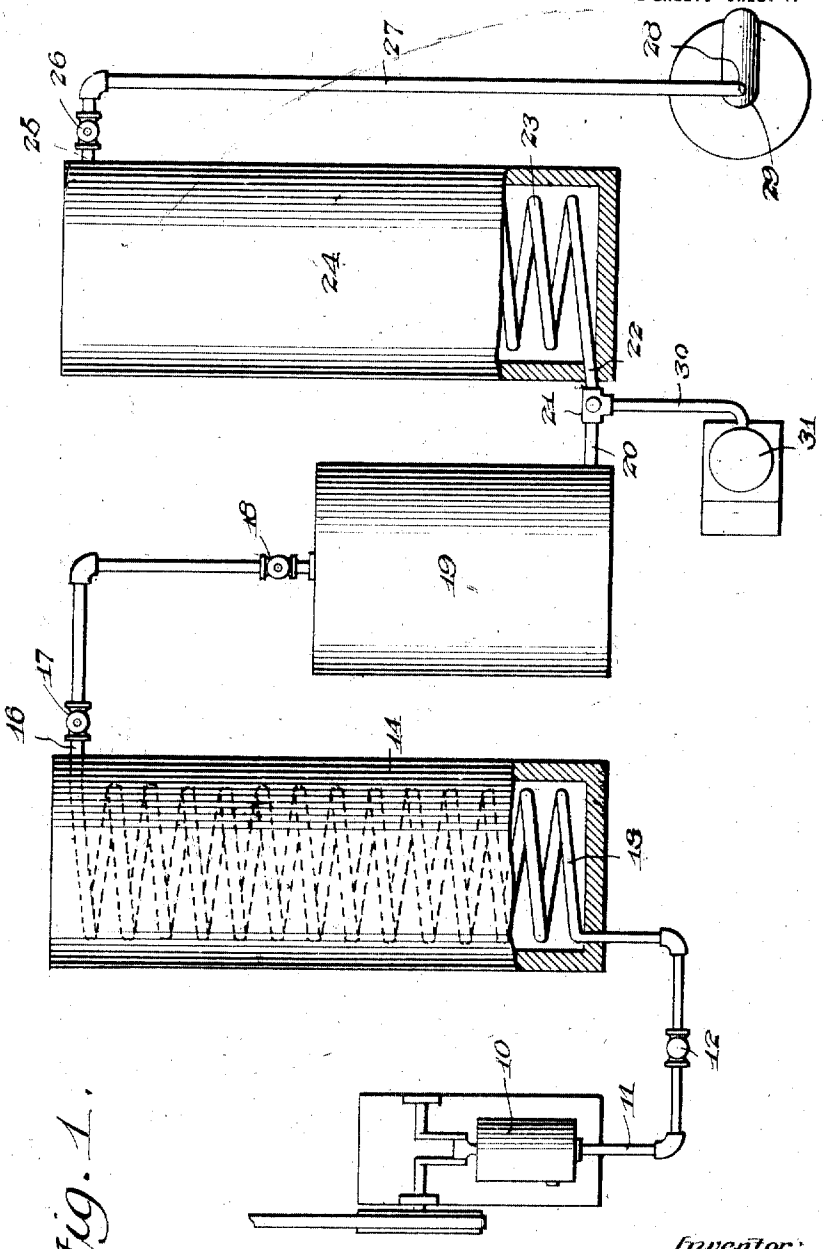


Fig. 1.

Inventor:
Hampton P. Rhodes
Attorney

H. P. RHODES.

METHOD OF MINING SULFUR AND OTHER MINERALS.

APPLICATION FILED FEB. 18, 1916.

1,217,065.

Patented Feb. 20, 1917.

2 SHEETS—SHEET 2.

Fig. 2.

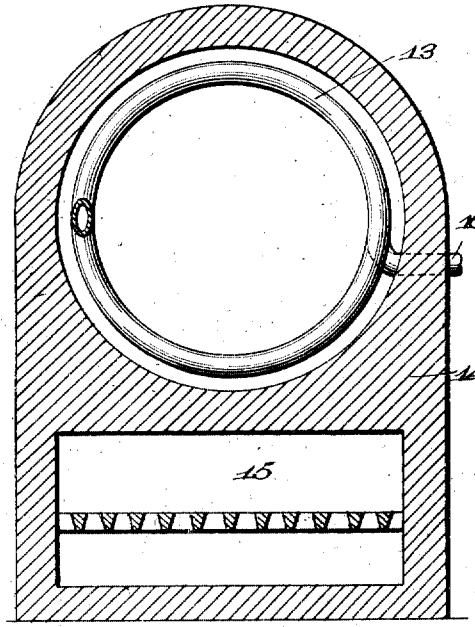


Fig. 3.

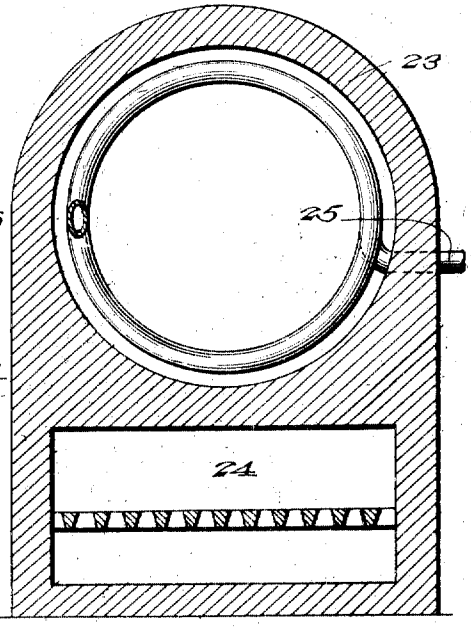


Fig. 4.

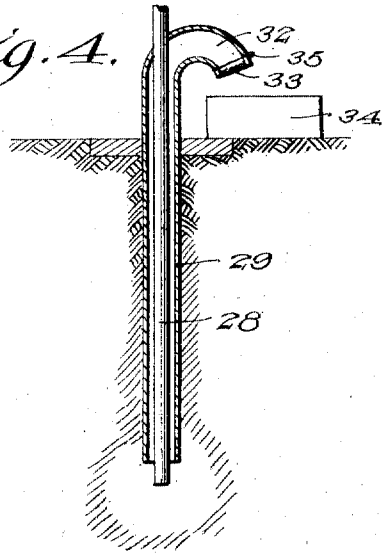
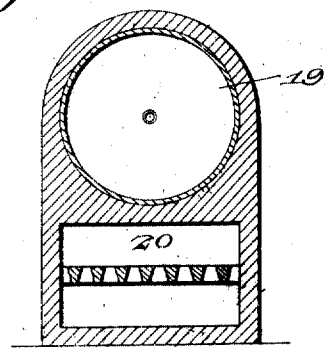


Fig. 5.



Inventor.

Hampton P. Rhodes

Wm. Clay Holland

Attorney

UNITED STATES PATENT OFFICE.

HAMPTON P. RHODES, OF SHREVEPORT, LOUISIANA.

METHOD OF MINING SULFUR AND OTHER MINERALS.

1,217,065. Specification of Letters Patent. Patented Feb. 20, 1917

Application filed February 18, 1916. Serial No. 79,134.

To all whom it may concern:

Be it known that I, HAMPTON P. RHODES, a citizen of the United States, residing at Shreveport, in the parish of Caddo and State of Louisiana, have invented certain new and useful Improvements in Methods of Mining Sulfur and other Minerals, of which the following is a specification.

This invention relates to a new method and apparatus for mining sulfur, etc. Briefly it resides in a new structure but the invention is primarily indicated toward a new method for obtaining sulfur and other minerals which can be mined by the same process, such as oil, salt, borax, and minerals of like character.

A practical embodiment of the invention is represented in the accompanying drawing forming a part of this specification in which similar characters of reference indicate corresponding parts in all the views, the invention being more fully described hereinafter and then pointed out in the claims at the end of the description.

Figure 1 is a plan view of the apparatus used, part of which is shown in section.

Fig. 2 is a vertical sectional view through the first casing and furnace;

Fig. 3 is a vertical sectional view through the second casing and furnace;

Fig. 4 is a view showing the ground pipe and surrounding casing forming the well; and

Fig. 5 is a vertical sectional view of the storage tank.

Numeral 10 shows generally an air compressor. The air compressed in the air compressor is forced into pipe 11 through valve 12 into the spiral coil 13, the coil 13 extends helically and longitudinally through a brick casing 14 under which heat is applied by means of the furnace 15. The air which is super-heated in the furnace is then passed into the pipe 16 through valve 17 and beyond the check valve 18, then passes into the storage tank 19. 19 also has a furnace 20 associated therewith. From storage tank 19 the air is forced into pipe 20 and meets valve 21, then passes into pipe 22 which extends helically and longitudinally through the casing 23 which has a furnace 24 associated therewith. The casings 14 and 23 are similar in structure and design. From the latter named casing the air is forced through pipe 25 and valve 26 through the pipe 27. From pipe 27 the air is then forced into the pipe 28 which is surrounded by casing 29. The pipe 28 and the casing 29 extend down into the ground and form a well. The operation and detailed construction of this well will be described later.

Extending at a right angle or at another convenient angle to pipe 20, there is a pipe 30, the other end of the pipe 30 is connected to the common water pump, shown diagrammatically at 31. The casing 29 upon the upper end is made into a curved extension 32, said extension having a downwardly extending opening or mouth 33, the material which rises through the casing 29 passes around the outlet and is emptied into a receptacle 34. Attached to the end of the opening 33 is a foraminated screen filter, said screen being hinged to part 32 at 35. This catches some of the impurities or huge pieces of the mineral to be desired.

Having clearly described the structure I shall now describe the operation. Air is forced by the air compressor into the coil pipe 13. The coil pipe may be of any convenient size and made of the usual material. As the coil is in a brick casing under which are furnaces the air is heated and after being heated is passed into the storage tank 19. The check valve 18 is provided so that the air which has been heated will not be forced back into coil pipe 13 under some circumstances. After the air is heated, it then passes into pipe 20 and as far as a three-way valve 21. In mining oil, the hot air then goes into the second coil pipe 22 and after passing through this pipe which is heated by the furnace 24, it is then forced down into the well. The pipe is sunk to approximately two-thirds of the depth of the casing strainer. The air which is forced into the casing heats the accumulated asphalt and paraffin which melts the same and thus permits an easy and successful production. This heating of the strainer causes the strainer to be cleansed, etc., and in the production of oil, no air is used. The above is recited in order to show that my apparatus may be used in the production of oil.

Should one resolve to obtain the salt, borax, sulfur or other like minerals, a different process is used. After the air has been thoroughly heated, it passes as far as the three-way valve 21. Then water is pumped from pump 31 to pipe 30 through coils 22 which is then heated to 220° to 240°

F. and the water is then forced through pipe 27 and down into the well. This hot water melts or softens the mineral and then the valve 21 is turned so that the hot air which is in storage tank 19 is quickly sent through coil 22 which is continually being heated through pipe 27 down into the well. The quick force of the hot air into the well causes the further heating of the mineral to be mined and it forces the mineral up through the casing which is then dropped into the receptacle. The hot water which is in the well at this time is vaporized by the injection of the hot air.

It has been found by my process that a great saving in fuel bills and labor is involved. Sometimes high as fifty per cent. has been saved. It is to be noticed that in the mining of the sulfur, salt, borax, etc., that water is not sent through the first coil pipe or through the storage tank but merely through the latter coil pipe. The first coil pipe is used merely for air and the storage tank for similar purposes. The water, it will be seen, has a short passageway compared to that of the prior patents in this art. The air is at the valve 21 heated at the proper temperature and as soon as the water is sent through second coil pipe, the air is immediately without loss of heat forced through the second coil pipe down into the well and it closely follows the hot water. This results in no loss of time and it is a great advantage that the air is heated to the proper temperature when it is desired to force it as a follower of the hot water.

In the above description and the drawings forming a part thereof, I have disclosed numerous specific elements for carrying out the objects of my invention which, of course, may be readily modified or refined for the purpose of adapting the mechanism to divers types of mining machinery, all of which will be obvious to others skilled in the art of mining. I desire it understood therefore that all such modifications or refinements are contemplated within the scope of my invention as expressed in the appended claims, and I do not therein limit myself to any particular type of apparatus to which my invention is applicable.

What I claim is:—

1. The method of mining minerals consisting of first injecting hot water into the mine, secondly, injecting hot air to vaporize the water, and third, injecting additional air to raise the loosened minerals.

2. The method of mining sulfur consisting of first injecting hot water into the mine to loosen the strata, secondly, injecting hot air into the mine to vaporize the water to further loosen the strata, and third injecting additional hot air to raise the loosened minerals.

In testimony whereof I affix my signature.

HAMPTON P. RHODES.