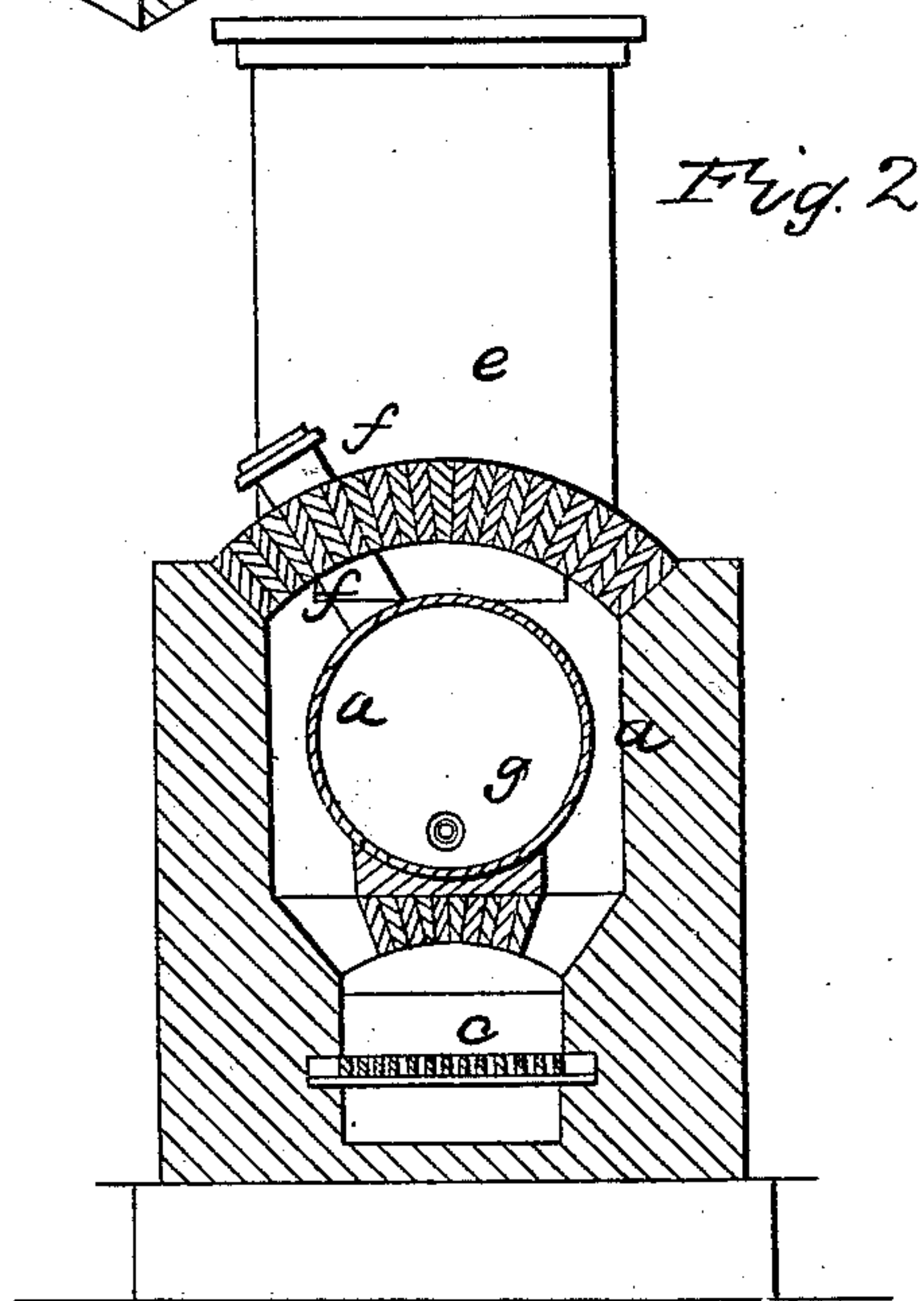
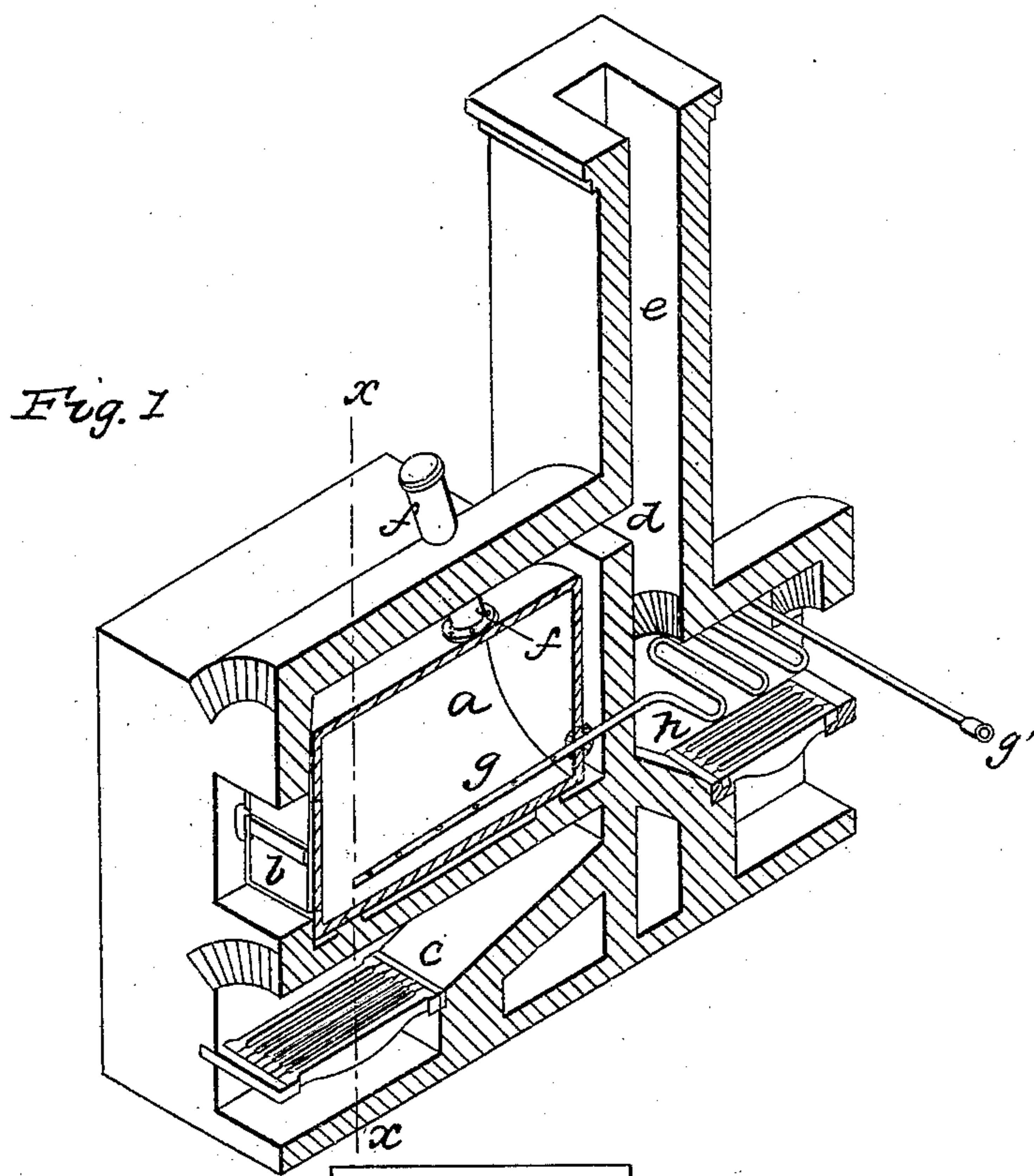


E. N. HORNER.

Oil Still.

No. 22,727.

Patented Jan'y 25, 1859.



UNITED STATES PATENT OFFICE.

E. N. HORNER, OF NEW BRIGHTON, PENNSYLVANIA.

IMPROVEMENT IN METHODS OF EXTRACTING OILS FROM COAL.

Specification forming part of Letters Patent No. 22,727, dated January 25, 1859.

To all whom it may concern:

Be it known that I, E. N. HORNER, of New Brighton, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in the Process of Extracting Oil from Coal, Shale, and other Minerals; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a longitudinal section of the retort which I use for extracting oil. Fig. 2 is a transverse section of the retort.

My improvement consists in the use of a mixture of cream of tartar, common salt, and slaked lime in the prime condenser, whereby the oil is condensed and separated from the water, and the gas, which would otherwise be apt to ignite, is rendered unflammable and is partly condensed, while the sulphurous vapor is separated and passes away.

To enable others skilled in the art to make use of my improved process, I will proceed to describe it more minutely in detail, and in so doing I will describe the process as applied to shale, which requires thrice the time in treatment that the bituminous coal does.

The shale, coal, or other article under treatment is first broken up into small pieces, and then placed in the retort *a*, Figs. 1 and 2, through the door *b*. The retort is cylindrical, and made of iron, and is placed over a furnace, *c*, so arranged that the heated air from the furnace passes all around the retort before escaping through the flue *d* into the chimney *e*. This retort is filled nearly full, space being allowed for the swelling of the material during the process of distillation, and the door is then tightly closed. The vapor which passes from the shale escapes through the exit-pipe *f*, whence it passes into an upright prime condenser. (Not shown in the drawings.) This prime condenser is made of strong sheet-iron, and may be about four feet high and two feet in diameter. The pipe from the retort enters this prime condenser about eighteen inches from the bottom. On top of this prime condenser is a cap or covering with a bent neck, which contracts rapidly into a tube, with a small orifice, through which the sul-

phurous vapor escapes. A small pipe opens into this prime condenser about one inch from the bottom, and thence passes to a worm in a cooler filled with cold water, by passing through which the oil is cooled. From thence it passes into a separating-chamber, where the oil is separated from the water of the condensed steam and is drawn off in a finished condition. After the shale has been exposed to the roasting process in the retort for about twenty-four hours, the vapor which passes from it will be found to become somewhat yellow, having previously been white. It is now time to subject it to the action of steam in order fully to extract the oil from the mineral under treatment. This heated steam forces its way through the mass of roasted shale in the retort and extracts from the heated mass the oleaginous particles, carrying them off in the form of vapor. This continues for about eight or ten hours, when the whole charge becomes exhausted, and the steam is cut off from the retort, which is then opened and recharged with shale. The oleaginous vapor thus extracted by the steam passes through the tube *f* into the prime condenser before described. On the bottom of this condenser is placed a mixture of cream of tartar, common salt, and dry slaked lime. About one ounce of the cream of tartar and two pounds each of the salt and lime suffice for one charge. When the oleaginous vapor passes into the prime condenser, the presence of the mixture of cream of tartar, salt, and lime causes the separation of the steam from the oil and condenses the inflammable gas or extracts the oil from it and deprives it of its inflammable quality. The fumes of sulphur which the oleaginous vapor contained are in like manner separated, and, being lighter than the condensed steam and oleaginous vapor, pass out of the top of the condenser through an orifice in its neck. The oil and water thus separated in the prime condenser flow out through a small pipe near the bottom of the condenser, and through a worm (with which that pipe connects) in the cooler, the worm and cooler being such as are ordinarily used in distilling apparatus. After passing through the worm in the cooler, the oil and water, cooled and fully condensed, pass into a separating-tub.

The water, being of course of greater specific gravity, falls to the bottom, and the oil rising on top of it is readily drawn off.

What I claim as my invention, and desire to secure by Letters Patent, is—

The use of a mixture of cream of tartar, common salt, and slaked lime, for the purpose of condensing the oleaginous vapor produced by the dry distillation of coal, shale, or other bituminous minerals, extracting the oil

from the gas, and depriving the gas of its inflammable quality, and throwing off the sulphurous vapor, in the manner hereinbefore described.

In testimony whereof I have hereunto set my hand this 7th day of June, A. D. 1858.

E. N. HORNER.

Witnesses:

W. BAKEWELL,

MARTIN G. CUSHING.