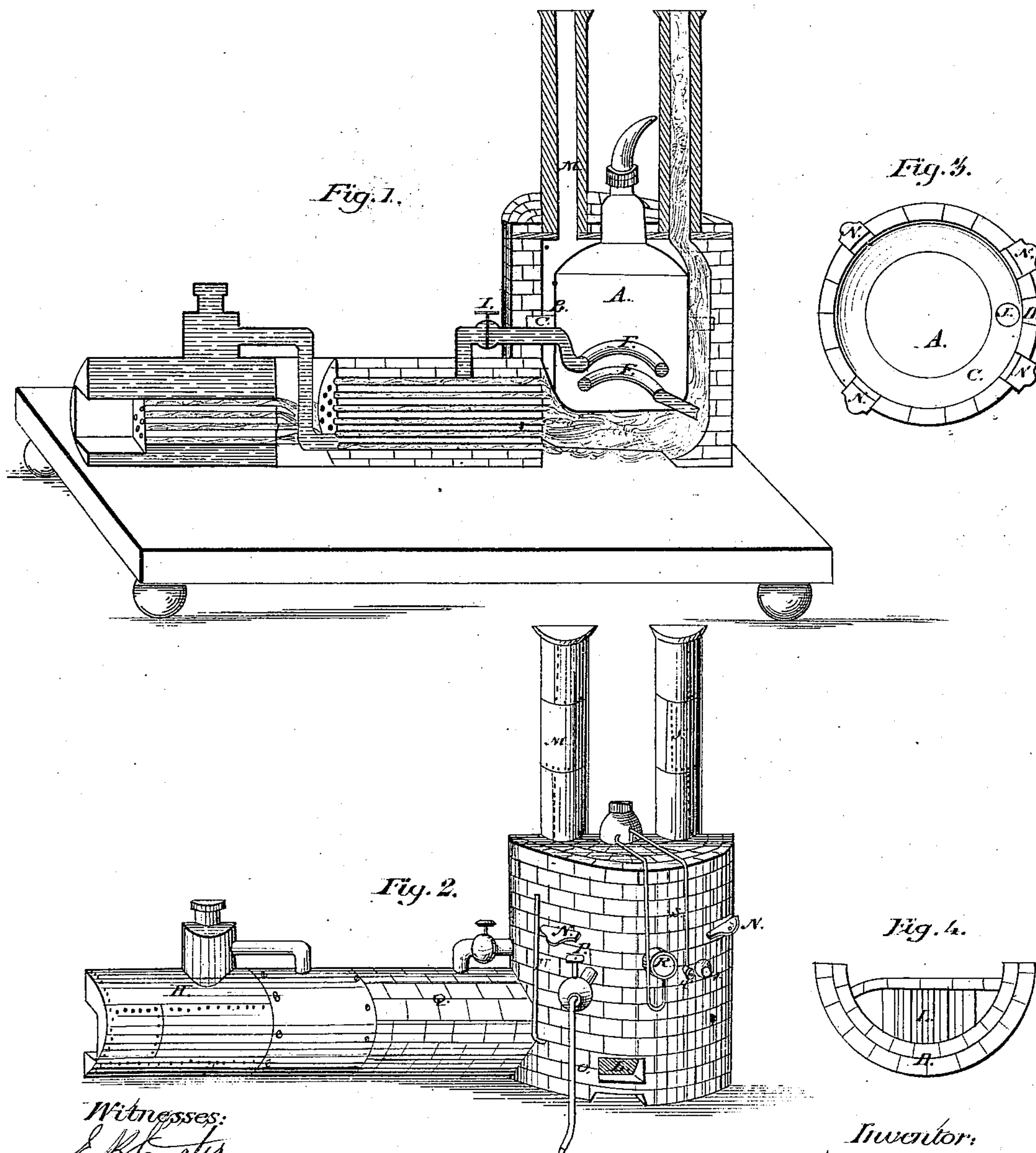


J. S. Shapter,

Oil Still,

N^o 61,474.

Patented Jan. 22, 1867.



Witnesses:
E. B. Curtis
Peter Ritter

Inventor:
John S. Shapter

United States Patent Office.

JOHN S. SHAPTER, OF NEW YORK, N. Y.

Letters Patent No. 61,474, dated January 22, 1867.

IMPROVEMENT IN PETROLEUM STILL.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN S. SHAPTER, of the city, county, and State of New York, have invented a new and improved Petroleum Still; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

The nature of my invention consists in surrounding and covering a petroleum still in brick-work, and in so applying heat from superheated steam within and furnaces beneath the still that an even temperature is secured in every part of the still, and thus vaporizing the petroleum at a comparatively low temperature, and consequently avoiding all burning of the oil within the still. The petroleum being vaporized without burning, no coke is deposited in the bottom of the still, and no impurities are carried over with the vapor, requiring the distilled oil to be subjected to chemical treatment with acids before being fit for use, involving great expense in the acids used and in the loss of oil by their use. Great economy in the consumption of fuel is obtained, ninety-four per cent. of pure oil secured, and the remaining six per cent., instead of being in the form of worthless coke, burned to the bottom of the still, as by the common process, is left in a state suitable for lubricating certain kinds of machinery.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

Figure 1 is a vertical section through the centre of the still, with some of the parts shown in perspective.

Figure 2 is an elevation of one side, with some of the parts in perspective.

Figure 3 is a horizontal section of the still, even with the top of the iron collar C; and

Figure 4 is a horizontal half section, even with the fire grates beneath the still.

The cylinder-shaped still A, with oval top and slightly oval bottom, is walled around and over the top with brick, and it is held in its place by the flange B, securely fastened to the side of the still, and resting on the iron collar C, embedded in the brick wall D. An iron plate, E, resting on this wall, supports the brick-work over the top of the still. Within the still is a coil, F, into which superheated steam is admitted from the superheater G, generated in the tubular boiler H. Its admission into the coil F is regulated by the stop-cock I, and it passes out of the coil into the flue J through the small pipe K, which also serves to drain off any water condensed in the coil. In addition to the heat applied inside, by means of superheated steam within the coil F, heat from two furnaces, L L, beneath the still is applied to the outside. These two furnaces are set directly opposite each other, with the flue from the boiler and superheater between them. By means of the collars C and the dampers N N N N, the heat from these furnaces can be confined to the lower half of the still, or can be admitted to the upper half. They both communicate with the smoke-stack M. By the careful management of these furnaces an even heat can be kept up around every part of the still, a thing of the greatest importance to prevent the vapor rising from the bottom of the still from condensing in the top of it and falling back, instead of passing over through the neck of the still. These furnaces are also of importance in increasing the heat while vaporizing the heavier portions of the crude oil; but even when used for this purpose, only small fires should be made in them, lest a too high degree of heat should cause a burning of the oil within. The arrangement of the boiler, superheater, and still is such that all of the heat from the fire used to generate the steam not used up in the boiler passes through into the superheater, and all that is not used up in this passes through and comes in direct contact with the bottom of the still, thus making it impossible for more than a very small portion of the heat to escape unused. Connected with the neck of the still are an air-pump and a condenser, not represented in the drawings. This air-pump is operated by steam from a boiler independent of the one in connection with the superheater and still. By the action of the air-pump a vacuum, more or less perfect, is formed in the still. The crude oil is let in through the pipe O, its flow being regulated by the stop-cock P. Experience shows that the vacuum needs to be more or less perfect, according to the quality of the oil being distilled and the degree of heat employed. To enable the operator to see what is going on within the still, a glass, Q, inserted in a tube connected with the still is used, placed directly opposite another of the same kind. R is a vacuum gauge, to indicate the degree of the vacuum within the still, and S is an air pipe, with a stop-cock T, by which, together with the air-pump, the operator can regulate the vacuum at will. U is a glass gauge, to indicate the height of the oil within the still.

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After the distillation has proceeded to a certain degree, the lighter oil, that first passes over into the condenser, is returned through the pipe O into the still, where it mixes with the heavier oil, and becoming volatilized, carries over the heavier oil, vaporized with it, into the condenser; and this process is continued until not more than five or six per cent. of the crude oil first let into the still remains, which can be drawn off at will through a cock in the bottom of the still, not represented. By this process the oil, after distillation, needs only to stand a day or two in vats, in which time it settles perfectly clear, almost inodorous, of even specific gravity, capable of standing a heat test of 130°, and a cold test of 30° below zero without congealing.

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

1. The arrangement of the boiler, superheater, and still, by which the heat from the boiler is made to pass through the superheater, and then through, under, or around the still.
2. The arrangement of the furnaces L L, collar C, and dampers N N N N, in combination with the coil F, for superheated steam within the still.
3. Enclosing a petroleum still in brick-work, with two side channels, one above and the other below the collar C, and a third beneath the still, substantially in the manner and for the purpose described.
4. Placing the eye-glass Q in a tube connected with the still, so that the operation within the still can be seen, although enclosed in brick walls, with channels for smoke and hot air between the masonry and the still.
5. The air pipe S, when applied to a petroleum still, for regulating the vacuum.

JOHN S. SHAPTER.

Witnesses:

E. B. CURTIS,
PETER RITTER.