

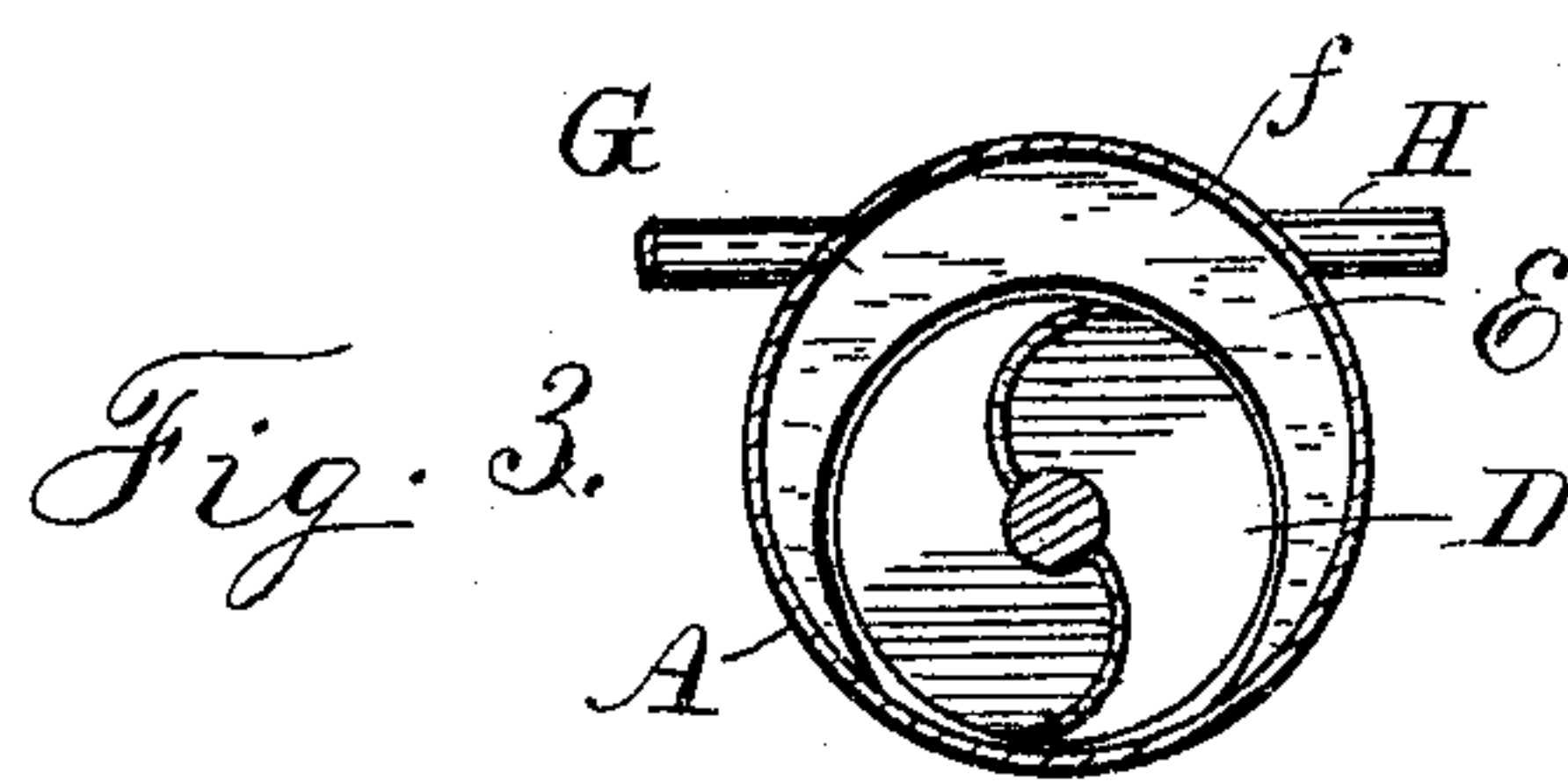
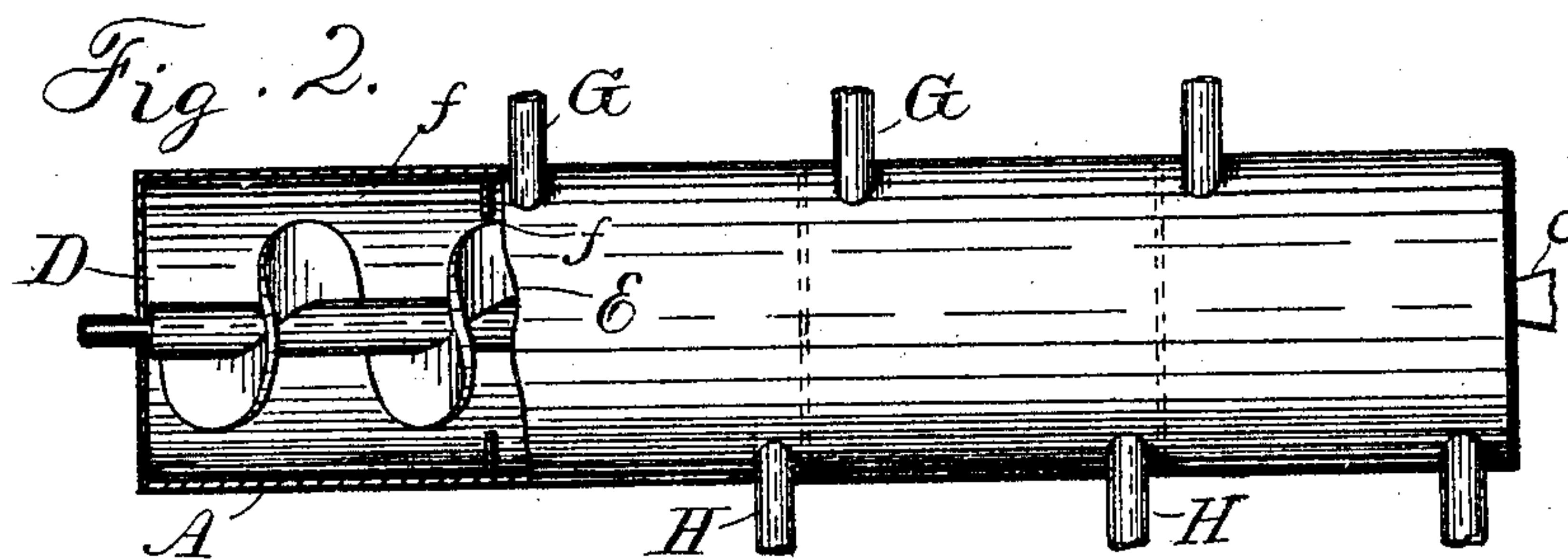
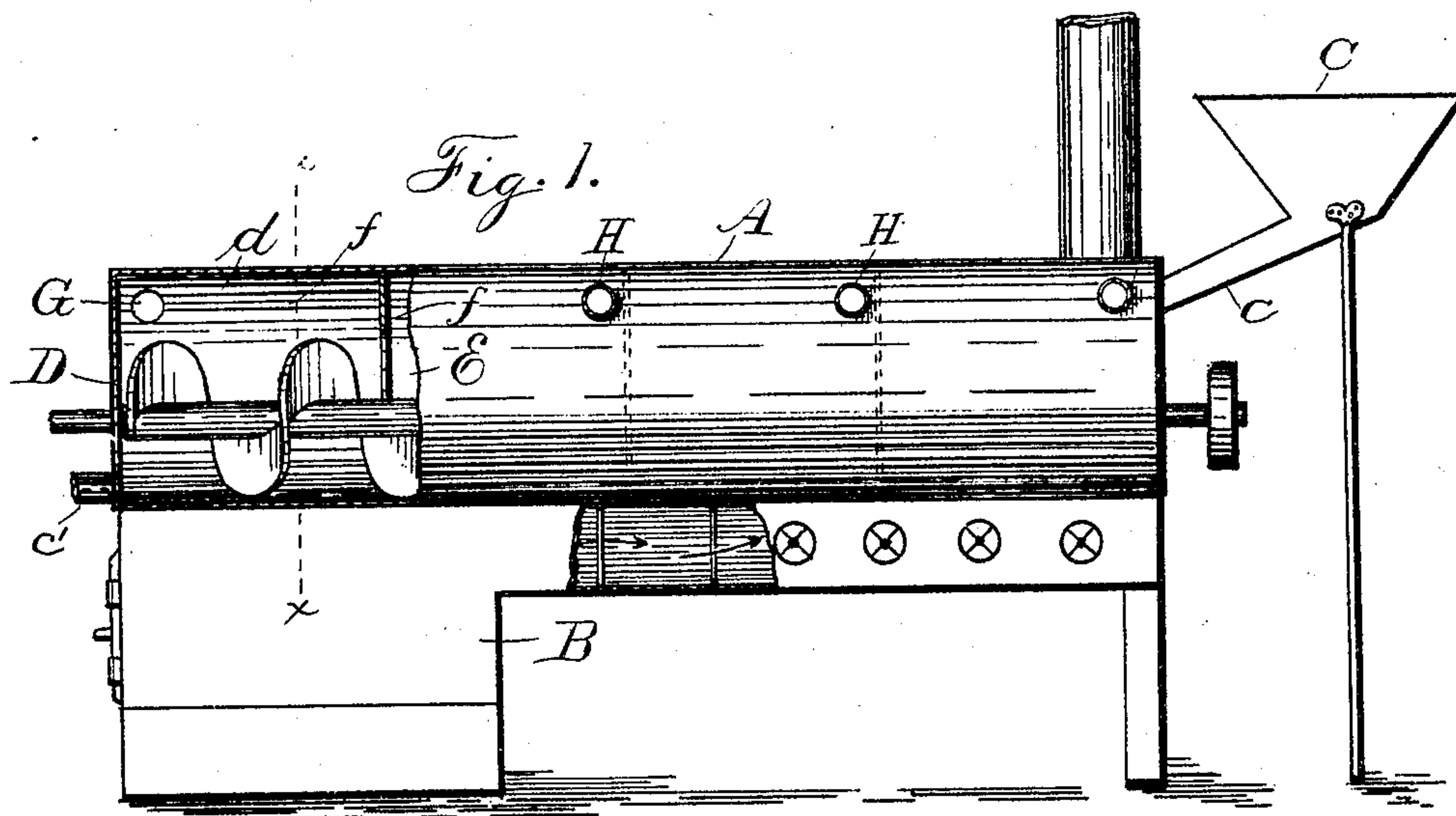
No. 775,448.

PATENTED NOV. 22, 1904.

S. L. HAGUE.
RETORT.

APPLICATION FILED JAN. 2, 1904.

NO MODEL.



Witnesses

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By

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UNITED STATES PATENT OFFICE.

SNYDER L. HAGUE, OF SALT LAKE CITY, UTAH.

RETORT.

SPECIFICATION forming part of Letters Patent No. 775,448, dated November 22, 1904.

Application filed January 2, 1904. Serial No. 187,580. (No model.)

To all whom it may concern:

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

This invention has relation to the volatilization of vapors and oils from shale; and it consists, mainly, in an improved apparatus or device for expelling oil-vapors from the retort in such a manner as to prevent the production of permanent gases, thus avoiding destructive distillation and securing in a measure fractional distillation in the treatment of the shale. The vapors intended to be reduced to liquid form by condensation are obtained from shale containing hydrocarbons in solid form, which volatilize at widely-different degrees of heat, the volatilization-points sometimes ranging from 70° to 700° centigrade. This heating system secures fractional volatilization, the heat increasing along the retort from its cooler end, where the shale enters, to the hotter end over the furnace, where it leaves the retort.

The object of the present device is to complete the process of making oils and to secure fractional distillation or different grades of oil in separate receptacles.

It should be noted that oils volatilizing at high temperatures will condense at correspondingly high temperatures—that is to say, the temperature at which vapors formed from heavy oils will condense is a much higher degree than is required to form vapors from lighter oils.

The accompanying drawings illustrate the preferred form in which I accomplish the above-mentioned results, the various features of the invention being referred to by letters, similar letters denoting corresponding parts in the several views.

Figure 1 is a side elevation of my invention, partly in section, mounted on a furnace shown in outline and partly in section. Fig. 2 is a plan of the retort, partly in section; and Fig. 3 is a cross-section of the retort on line *xx* of Fig. 1.

The letter A indicates a horizontal retort

in position on a furnace B. The furnace is located under that end of the retort which is to be heated to the highest temperature, and smoke and heat flues pass from the furnace along under the retort to the end which has the lowest temperature and where the flues connect with the chimney.

C is the hopper, and *c* the chute for feeding the pulverized shale to the retort.

D is a screw conveyer extending lengthwise through the retort. It is of considerably less diameter than said retort, by reason of which a space *d* is left above and partly around the conveyer in the retort, the conveyer being adjusted in the lower part of the retort.

Crescent-shaped cross-partitions E E are fixed in the upper part of the retort, extending over and partly around the conveyer and dividing the space *d* into any preferred number of apartments *f f*. Pipes G G, entering at the hotter end of each apartment, admit gas or steam to drive off the vapors arising therein, and pipes H H at the cooler end of each apartment convey these vapors to separate condensers. These pipes G and H are preferably located as shown in the drawings.

If the partitions E E or their equivalent are not used, then when the vapors are forced from the hotter toward the cooler end of the retort condensation of part of the vapors will occur and oil will be formed inside of the retort. Volatilization will not occur to this oil again until when returned by the conveyer it reaches almost the point where it was volatilized at first. While this is being done it covers the shale with an oily film, which retards or prevents the escape of the vapors from the shale and produces permanent gases. Vapors should be taken from the retort at a temperature not above that at which they are formed and above a temperature at which they will condense. This is done by my invention, and consequently no permanent gases are made, and the product by being partially fractioned is in a measure refined, and the speed of making oil is greatly increased. Thus two objects of the partitions are accomplished—viz., to prevent the vapors from passing along the retort to a point where they will condense in

the retort and also to measurably hold the heat within desired limits in the retort.

In operating this retort the pulverized shale is fed into the cooler end of the retort through the pipe *c* and conveyed to the hotter end, where it is discharged through the pipe *c'*. As the shale passes through the retort it is subjected to the different degrees of heat produced by the furnace, and correspondingly different grades of oil are volatilized. The vapors are continually being forced from the retort into condensers, the partitions preventing the vapors from traveling toward the hotter end of the retort, where they would be converted into gases, or toward the cooler end, where they would be condensed.

What I claim, and desire to secure, is—

1. In a retort for extracting oils from shale, apartments formed by cross-partitions in the retort, an inlet and an outlet pipe connecting with each of said apartments, and means to move the shale in the retort substantially as described.

2. A device for extracting oils from shale

comprising a horizontal retort, a conveyer of less diameter than the retort and adapted to revolve in the lower part of said retort, apartments formed in the retort above and partly around said conveyer by cross-partitions in said retort and inlet and outlet pipes connecting with said apartments, for the purposes specified.

3. In a horizontal retort for extracting oils from shale and heated to graded temperatures by a suitable furnace, a conveyer to turn the shale over and move it along the retort from its cooler to its hotter end, cross-partitions in said retort above and partly around said conveyer, and inlet and outlet pipes connecting with the apartments formed by said partitions, substantially as herein set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SNYDER L. HAGUE.

Witnesses:

JAMES W. BURNHAM,
JOHN M. DOULL.