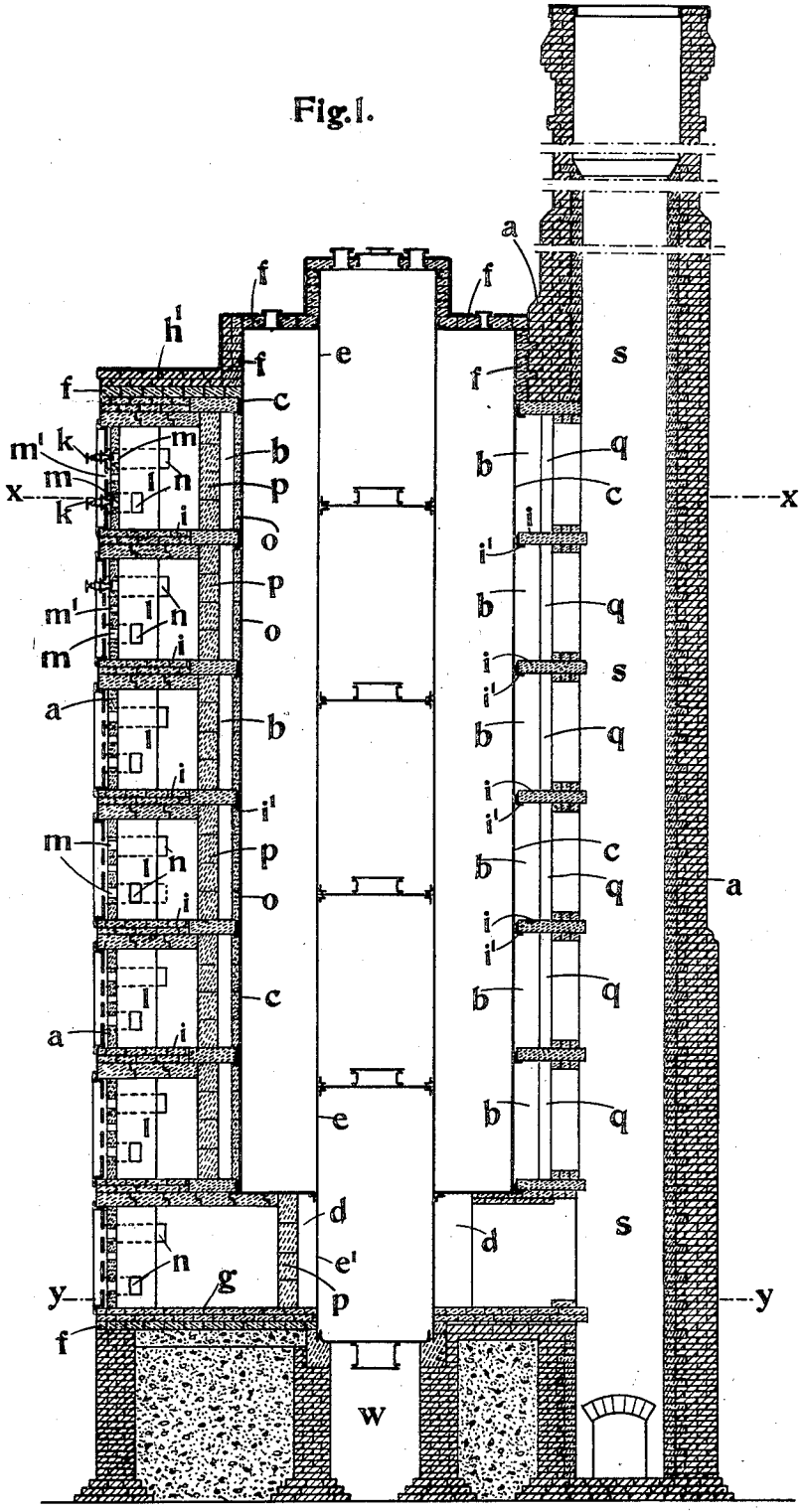
Jan. 20, 1925. 1,523,657

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SETTING FOR STILLS AND FOR SIMILAR PURPOSES

Filed Feb. 16, 1922 3 Sheets-Sheet 1

Fig. 1.



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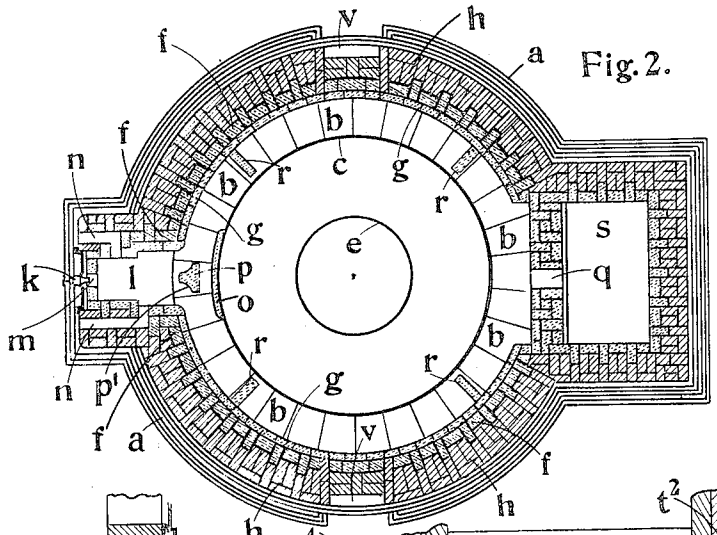


Fig. 2.

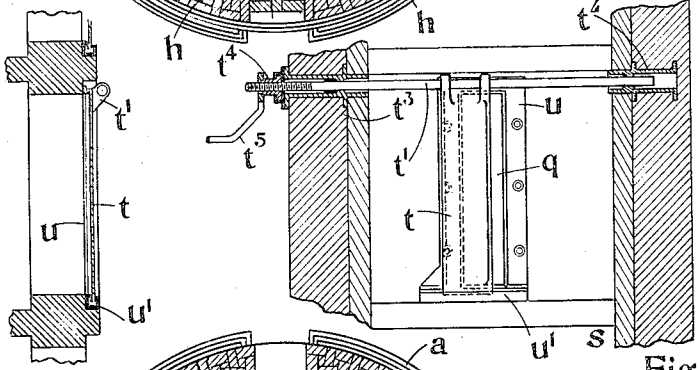


Fig. 5.

Fig. 6.

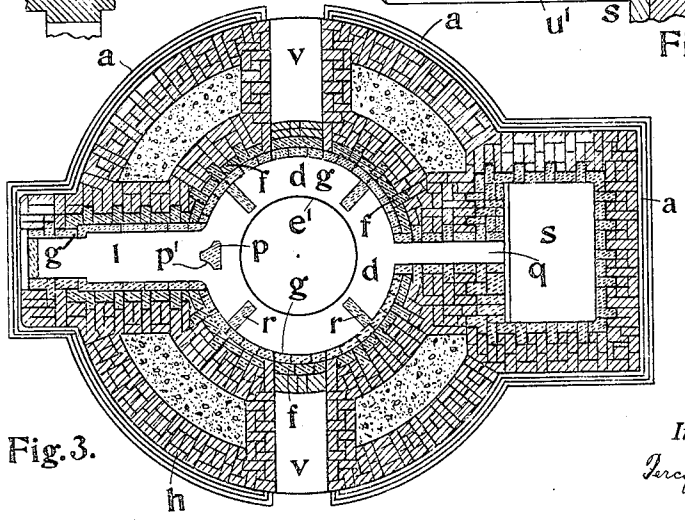


Fig. 3.

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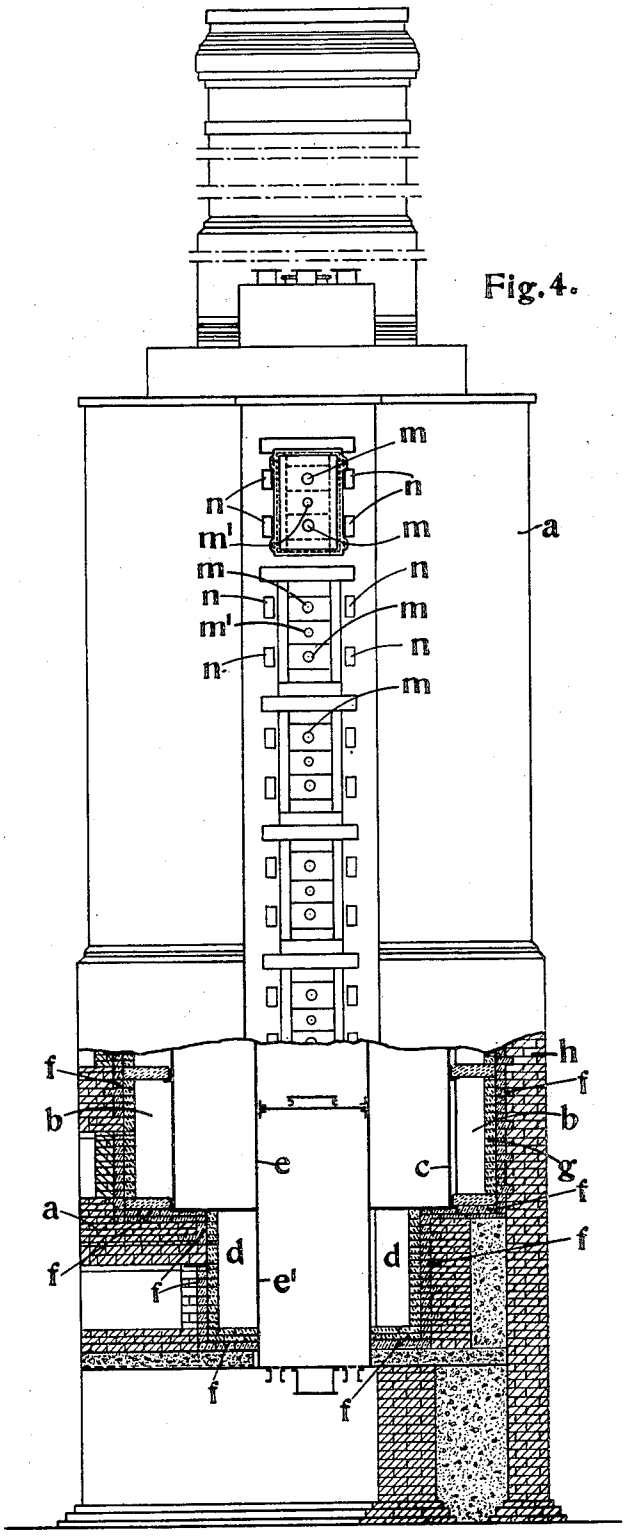
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Fig. 4.



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UNITED STATES PATENT OFFICE.

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SETTING FOR STILLS AND FOR SIMILAR PURPOSES.

Application filed February 16, 1922. Serial No. 536,963.

To all whom it may concern:

Be it known that I, PERCY MATHER, a subject of the King of Great Britain and Ireland, residing at 23 Great Winchester Street, London, E. C., England, have invented certain new and useful Improvements Relating to Settings for Stills and for Similar Purposes, of which the following is a specification.

This invention relates to settings for stills and for similar purposes.

The invention particularly relates to settings for stills to which it is required to apply heat uniformly and in regulable zones, and is of especial utility in its application to a still such as is described in the specification of the prior application No. 490,949 of 1921, in which the crude oil or other similar liquid is subjected to fractional distillation in the course of its movement through the still.

According to the invention a setting is provided having a vertical series of annular heating flues transversely disposed with respect to the vertical centre line of the cylindrical still casing, and a vertical series of combustion chambers is provided at one side of the setting, communicating respectively with the annular flues, and a common vertical uptake is provided for the waste gases, in a position at the opposite side of the setting to that at which the combustion chambers are provided. The ports or outlets from the respective annular flues to the vertical uptake are thus disposed in such position that the heating gases flow around the casing of the still in two streams at the respective sides thereof, so that thus heat is uniformly applied around the still, and dampers are advantageously provided for the regulation of the extent of opening of the ports or outlets between the respective annular heating flues and the uptake.

The invention comprises the construction which is hereinafter described.

The invention is illustrated in the accompanying drawings in which—

Figure 1 is a sectional elevation of a setting for a cylindrical still such as described in the specification of the prior application No. 490,949 of 1921.

Figure 2 is a sectional plan in a plane such as x—x Figure 1 through one of the annular heating flues.

Figure 3 is a section on the line y—y of Figure 1, through the lowermost annular flue in the setting.

Figure 4 is in part a central sectional elevation taken at right angles to the sectional elevation Figure 1 and in part an end elevation of the upper part of the still.

Figures 5 and 6 are detail sectional elevation and front elevation of a damper such as may be used for the regulation of the extent of opening of the outlet ports of the respective annular flues.

In carrying the invention into effect in building a brickwork setting for a still such as described in the specification of the prior application referred to, the setting a is provided of a substantially cylindrical form surrounding the still, and with a series of transversely disposed annular flues b therein which completely surround the still casing c. These annular flues b serve as a means by which heat is applied throughout the length of the still casing c. An additional flue d of an annular form is also provided to surround the downwardly protruding part e^1 of the vapour outlet tube e of the still described in the specification of the said prior application.

A non-conducting lining f made of blocks of infusorial earth or the like, is advantageously interposed between the firebrick g (Figures 2, 3 and 4) and the ordinary brickwork backing h of which the cylindrical wall of the setting is constructed. An intermediate non-conducting lining f is also provided beneath the lowest annular flue of the setting, and a non-conducting lining f may also be applied upon the setting and upon those parts of the still casing c and of the vapour outlet tube e that protrude above the annular flues in the setting; while above the setting, layers of ordinary bricks h^1 may be applied over the non-conducting lining f as indicated in Figure 1.

The respective annular flues b in the series are separated from each other and from the annular flue d which surround the downwardly protruding part e^1 of the vapour outlet tube e, by horizontal annular walls i which extend from the cylindrical wall of the setting inwardly so that their edges lie in contact with the still casing c. Thus the cylindrical wall of the setting with the horizontal annular walls referred to, serve to provide separate annular flues, in which the inner wall of each flue is formed by a part

of the still casing. The inner edges of the horizontal annular walls *i* may be supported by means of angle hoops i^1 secured in determined positions on the still casing *c*.

At one side of the setting a series of liquid fuel or gas burners *k* are mounted to protrude within combustion chambers *l* respectively communicating with the separate annular flues *b* or *d*. The combustion chambers *l* are disposed in vertical series and are formed integral with the cylindrical wall of the setting. Thus the combustion chambers *l* are disposed radially to the centre line of the setting and the series of combustion chambers *l* thus provided protrude outwardly from the setting, as more clearly indicated in Figures 2 and 3, and the wall of the setting adjacent the respective combustion chambers is provided with two holes *m* within which the liquid fuel or gas burners *k* are disposed. The liquid fuel or gas burners *k* are mounted upon plates secured upon the face of the setting in positions adjacent the respective combustion chambers, and a sighting hole m^1 is also provided in a position between the holes *m*.

In the construction indicated two pairs of air ports *n* are provided for the admission of air to support and complete combustion in each combustion chamber, one pair of air ports being provided for each burner. Each port *n* opens on the outer face of the setting and is of an angular form as indicated in Figure 2. The ports *n* of each pair may be disposed in the same horizontal plane, and one port of each pair may extend beyond the other as illustrated in Figure 2 so as thus to provide a forward supply of secondary air to ensure complete combustion in the flame, while the ports *n* opening into the combustion chamber upon the same side extend one beyond the other as illustrated in Figure 1.

The air ports may be provided so as to be capable of being regulated by means of small sliding doors at the furnace fronts, or otherwise.

There may for example be seven annular flues disposed in series to surround the still casing *c*, with a vertical series of a corresponding number of combustion chambers *l*. It will be understood that inasmuch as each combustion chamber *l* is disposed radially with reference to the annular heating flue with which it communicates, the heating gases are directed into the annular heating flue and against the still casing. The still casing may at the parts disposed opposite to the combustion chambers *l* be covered with a layer of firebrick *o* to ensure against excessive local heating, and a vertical wall or pillar of firebrick *p* may be provided in a position in front of the mouth of the combustion chamber *l* and this wall or pillar *p* may have a substantially angular section as illustrated in Figures 2 and 3, with curved faces p^1 by which the heating gases leaving each of the combustion chambers *l* may be separated into two distinct streams to flow in reverse directions in the annular flue to the outlet or port *q* set in a position diametrically opposite to that at which the combustion chamber *l* is provided.

A number of radially disposed baffle walls or blocks *r* may be provided to protrude inwardly from the peripheral wall of the respective annular flues *b* or *d*, so as thus at a number of positions to constrict the passage through which the heating gases pass, and thus to cause their interruption and movement, whereby transmission of heat may be facilitated. The heating gases thus pass in opposite directions around the still casing and thence outwardly through the port or outlet *q* into a common vertical uptake or chimney *s*.

The ports or outlets *q* may advantageously be provided of considerable height or length, and of relatively small width or of any other shape and position, whereby the casing of the still may have heat uniformly applied to it in the annular zones formed by the flues.

The outlets or ports *q* may be provided with dampers *t* capable of operation from without for the purpose of regulation of their extent of opening.

A convenient form of damper *t* may be provided as a sliding valve plate (as illustrated in Figures 5 and 6) suspended from a horizontal sliding rod t^1 carried within respective tubular fittings t^2 t^3 mounted within the walls of the uptake *s*. The face of the end wall of the setting, at the positions at which the outlets or ports *q* are provided may have mounted upon it a frame *u* at the lower part of which a guide channel u^1 may be formed for the reception of the lower end of the damper *t*. Mechanical means may be provided for the purpose of laterally moving the rod t^1 carrying the damper *t*, so that the latter may be moved into any particular position desired for regulating the extent of opening of the outlet or port *q*. Such means may consist of a nut fitting t^4 capable of rotation by means of an integral handle t^5. The nut fitting has a screw threaded axial bore engaging a screw threaded part of the rod t^1 and is held from axial movement by connection with the end of the tubular fitting t^3, so that thus on the rotation of the handle t^5 in one direction or the other, the damper *t* may be laterally moved in one direction or the other to the extent required according to the degree of opening to be allowed to the outlet or port *q*.

It will be further understood that manholes *v* may be provided in determined positions in the cylindrical wall of the setting

for access to the annular flues *b* or *d*, and that these manholes *v* may be temporarily closed by bricks or blocks set in by the use of a suitable mortar or luting.

The setting *a* may be provided with a foundation filled with concrete, and the bottom plate of the still casing *c* such as described in the specification of the said prior application, and the bottom plate of its vapour outlet tube *e* may be supported in the setting in such manner as to leave a passage *w* beneath the vapour outlet tube *e*, to permit of access to the outlet pipes and steam pipes of the still; while a passage may be provided beneath the setting, at right angles to and on a level with the passage *w* for convenience in disposing the steam pipes and the residue outlet pipes respectively.

It will be understood that a framework comprising a number of platforms may be provided to surround the still and setting, and that these platforms are available for the control of the respective burners, and to render the respective annular flues conveniently accessible.

I claim:

1. A furnace setting for the enclosure and application of heat to a vessel such as a still whose centre line is vertically disposed, said setting comprising a vertical series of separate and concentric annular heating flues transversely disposed with respect to the vertical centre line of the vessel and of which the vessel forms the inner wall, a vertical series of separate combustion chambers each of which communicates with one of the annular flues of the said series, and a separate outlet for the gases from each of the annular flues at the side of the setting opposite to that at which the combustion chambers are provided, substantially as described.

2. A furnace setting for the enclosure and application of heat to a vessel such as a still whose centre line is vertically disposed, said setting comprising a vertical series of separate and concentric annular heating flues transversely disposed with respect to the vertical centre line of the vessel and of which the vessel forms the inner wall, a vertical series of separate combustion chambers each of which communicates with one of the annular flues of the said series, a separate outlet for the gases from each of the annular flues at the side of the setting opposite to that at which the combustion chambers are provided, and a common vertical uptake for the gases that issue through the said separate outlets, substantially as described.

3. A furnace setting for the enclosure and application of heat to a vessel such as a still whose centre line is vertically disposed, said setting comprising a vertical series of separate and concentric annular heating flues transversely disposed with respect to the vertical centre line of the vessel and of which the vessel forms the inner wall, a vertical series of separate combustion chambers each of which communicates with one of the annular flues of the said series, inwardly protruding radially disposed baffle walls or blocks extending from the outer wall of the said respective annular flues into a position short of the inner wall thereof, and a separate outlet for the gases from each of the annular flues at the side of the setting opposite to that at which the combustion chambers are provided, substantially as described.

4. A furnace setting for the enclosure and application of heat to a vessel such as a still whose centre line is vertically disposed, said setting comprising a vertical series of separate and concentric annular heating flues transversely disposed with respect to the vertical centre line of the vessel and of which the vessel forms the inner wall, a vertical series of separate combustion chambers each of which communicates with one of the annular flues of the said series, and a separate, relatively narrow and long outlet, for the gases from each of the annular flues, at the side of the setting opposite to that at which the combustion chambers are provided, substantially as described.

5. A furnace setting for the enclosure and application of heat to a vessel such as a still whose centre line is vertically disposed, said setting comprising a vertical series of separate and concentric annular heating flues transversely disposed with respect to the vertical centre line of the vessel and of which the vessel forms the inner wall, a vertical series of separate combustion chambers each of which communicates with one of the annular flues of the said series, a vertical wall or pillar of firebrick in position in front of the mouth of each of the said combustion chambers, and a separate outlet for the gases from each of the annular flues at the side of the setting opposite to that at which the combustion chambers are provided, substantially as described.

PERCY MATHER.