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LIQUID SEAL FOR COLLECTING MAINS OF DISTILLATION OVENS OR THE LIKE

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Fig. 1

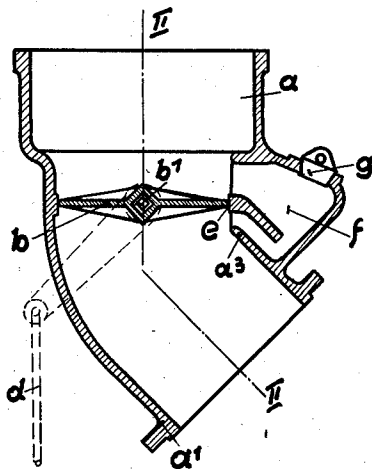


Fig. 2

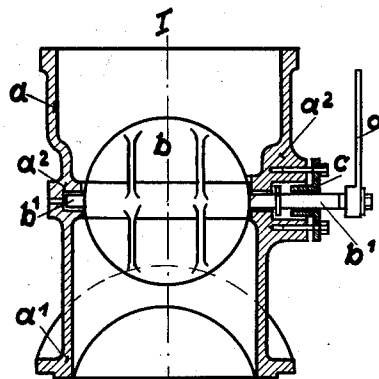


Fig. 3

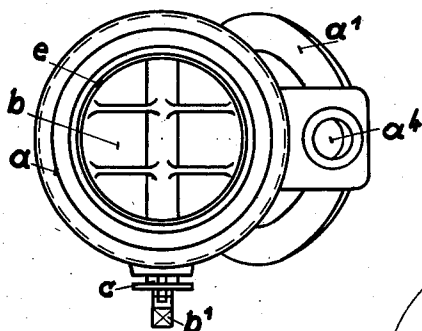


Fig. 4.

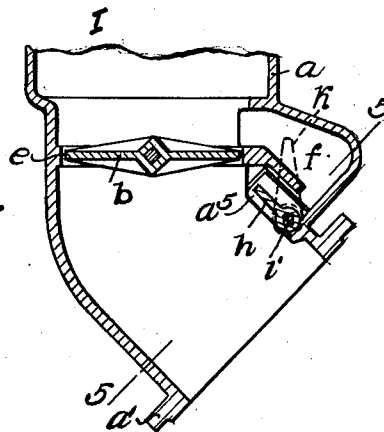
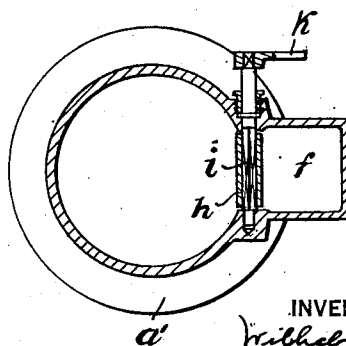


Fig.5.



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LIQUID SEAL FOR COLLECTING MAINS OF
DISTILLATION OVENS OR THE LIKE

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6 Claims. (Cl. 137-69)

This invention relates to liquid seals for collecting mains of distillation ovens and the like.

It is known to shut off the hydraulic mains of distillation ovens from the oven by a liquid seal chamber inserted in that branch of the ascension pipe which leads to the collecting main, the liquid seal frequently being established by irrigating this branch pipe with ammonia water or the like. The water seal chambers, however, must be of a rather careful construction and, therefore, are comparatively expensive. One has attempted therefore for economy's sake to replace the water seal chambers by throttle valves which are simpler and less expensive, but hitherto without practical success. For, the throttle valve became choked up in the closed position by tarry deposits and could be opened only with difficulty, frequently only forcibly. Irrigation of the throttle valve when in the closed position did not remedy this drawback. For, it must be borne in mind that the lower side of the valve is under the action of the hot gas existing in the main and coming from the other distillation chambers of the battery, and that sensible heat of this gas is transmitted to the valves which, consequently, are highly heated and expand to such an extent that frequently they get jammed completely.

Now the present invention has for its object a liquid seal for the purpose described in which the use of the simple and cheap throttle valve is retained while the above-mentioned drawbacks safely are avoided. The invention substantially consists in the combination of the following characteristic features each of which has a certain technical effect and by the combination of which the aimed at reliable, simple and cheap liquid seal is obtained.

According to the invention the throttle valve is dimensioned intentionally in such manner that in closed position expansion of the valve due to heat does not establish a gas-tight closure. Leakage which, ordinarily, would then occur is avoided by the valve being irrigated with a quantity of liquid greater than the quantity which can pass through the gap intentionally provided. Finally, in the branch pipe leading to the collecting main, a lateral overflow water seal chamber is provided through which chamber the liquid which collects above the throttle valve is drained.

Abutments for the throttle valve in the pipe are not required, since the valve has the above-explained small dimensions and thus freely can swing in the pipe. The valve is controlled in the usual manner by means of an external system

of levers which preferably can be locked in the extreme positions of the valve, that means, in the closed and open position.

By the intentionally provided clearance any jamming of the valve due to expansion is safely avoided, and, moreover, the edge of the valve is kept clean by that portion of the liquid supply which passes through the gap. Consequently no tar deposits are formed which might choke the valve. The water seal provided in the pipe has the effect that the liquid level above the valve does not become too high, so that the latter is not loaded uselessly. On the other hand, any passage of gas from or to the collecting main is prevented with security. The lateral disposition of the overflow water seal further affords the advantage that with sudden rise of pressure the danger is notably reduced of the water seal being blown out, in contrast to the known water seal chambers with which every blow of pressure immediately acts on the liquid level in the chamber, whilst with the overflow according to the invention such blow of pressure in the first place acts on the throttle valve and, therefore, influences the liquid level of the lateral overflow chamber only to a substantially moderate extent.

It is of advantage to design the lateral overflow chamber in the form of a J-shaped by-pass, the liquid seal being formed in the lower bent portion thereof. The liquid level then depends upon the length of the lower, shorter leg of this by-pass which leg further may be made regulatable. For cleaning purposes a removable plug may be provided on a suitable place of the chamber casing, although it has been found that in practice no disturbing tar deposits occur in the chamber. In order to prevent too high a load of the throttle valve, the lateral overflow chamber preferably is disposed somewhat below the axis of the throttle valve.

In order that the invention may be clearly understood and readily carried into effect, an embodiment of the same is illustrated by way of example in the accompanying drawing in which

Figure 1 is a vertical section of the liquid seal on the line I—I of Figure 2, showing the throttle in closed position,

Figure 2 is a vertical section thereof on the line II—II of Figure 1 with the throttle in open position,

Figure 3 is a top view of Figure 1,

Fig. 4 is a vertical section taken similarly to Fig. 1 but illustrating a modification; and

Fig. 5 is a section on the line 5—5 of Fig. 4.

Referring to these figures, *a* denotes a tubular

socket which is connected to that portion of the ascension pipe which leads to the collecting main. In the portion of the ascension pipe which is situated above the socket *a* is disposed a jet or spraying rose (not shown) of any suitable construction, by means of which a cooling liquid, preferably ammonia water, is sprayed onto the socket and the throttle valve hereinafter described. By its lower flange *a*¹ the socket *a* is attached to the collecting main (likewise not shown). The throttle valve is denoted by *b* and mounted in the socket *a* on a shaft *b*¹ resting in bearings *a*². As it will be seen especially in Figure 2, the shaft *b*¹ projects outwards beyond the socket *a* and is tightened by a stuffing box *c*. A lever *d* mounted on shaft *b*¹ serves to adjust the throttle valve *b*. In Figures 1 and 3 the latter is shown in the closed position, in which a narrow annular gap *e* exists between the outer edge of the valve *b* and the wall of the socket *a*, see best Figure 3. The open position of valve *b* is shown in Figure 2.

Figure 1 shows that the socket *a* is provided with a J-shaped by-passage *f* which constitutes a lateral water seal and overflow. The overflow level which is formed according to the length of the lower leg *a*³ of the overflow casing, is situated below the shaft *b*¹ of the throttle valve *b*. The leg *a*³ may further be made adjustable in length. A cleaning and inspecting hole *a*⁴, see best Figure 3, is provided in the upper portion of the by-passage *f* and is normally closed by a plug *g*, Figure 1. The construction shown in Figs. 4 and 5 differs from that previously described in that it comprises means for regulating the length of the lower leg of the bypass. To this end the rigid casing part providing the overflow edge *a*³ in Fig. 1 is replaced in Figs. 4 and 5 by a part *h* secured to a shaft *i* journaled in the end walls of the casing. The part *h* fits between two parallel casing surfaces *a*⁵ and by rotating the shaft *i* the level of the upper overflow edge of the part *h* and thereby the effective length of the overflow leg of the bypass may be varied. An external part *k* is provided for rotating the shaft *i* and part *h*.

I claim:—

1. In apparatus of the character described, the combination with a pipe adapted to connect an ascension pipe to a gas collecting main and formed with a valve controlled passage for the downflow of gas and adapted to have liquid sprayed into its portion above said passage, and with a liquid sealed bypass about said passage connecting portions of said pipe respectively above and below the valve in the closed position of the latter and forming a liquid holding trap preventing gas flow therethrough, of a throttle valve in said pipe adapted when in its closed position to provide a leaky closure for said passage, whereby when more liquid is sprayed onto the said valve when in its closed position than can leak through said passage, the excess liquid may overflow through said bypass.

2. In apparatus of the character described, the combination with a pipe adapted to connect an ascension pipe to a gas collecting main and formed with a valve controlled passage for the downflow of gas and adapted to have liquid sprayed into its portion above said passage, and with a liquid sealed bypass about said passage connecting portions of said pipe respectively above and below the valve in the closed position of the latter and forming a liquid holding trap

preventing gas flow therethrough, of a throttle valve in said pipe adapted when in its closed position to provide a leaky closure for said passage, whereby when more liquid is sprayed onto the said valve when in its closed position than can leak through said passage, the excess liquid may overflow through said bypass, said bypass comprising a J-shaped portion.

3. In apparatus of the character described, the combination with a pipe adapted to connect an ascension pipe to a gas collecting main and formed with a valve controlled passage for the downflow of gas and adapted to have liquid sprayed into its portion above said passage, and with a liquid sealed bypass about said passage connecting portions of said pipe respectively above and below the valve in the closed position of the latter and forming a liquid holding trap preventing gas flow therethrough, of a throttle valve in said pipe adapted when in its closed position to provide a leaky closure for said passage, whereby when more liquid is sprayed onto the said valve, when in its closed position than can leak through said passage, the excess liquid may overflow through said bypass, said bypass comprising a J-shaped portion which is below said valve when the latter is in its closed position.

4. In apparatus of the character described, the combination with a pipe adapted to connect an ascension pipe to a gas collecting main and formed with a valve controlled passage for the downflow of gas and adapted to have liquid sprayed into its portion above said passage, and with a liquid sealed bypass about said passage connecting portions of said pipe respectively above and below the valve in the closed position of the latter and forming a liquid holding trap preventing gas flow therethrough, of a throttle valve in said pipe adapted when in its closed position to provide a leaky closure for said passage, whereby when more liquid is sprayed onto the said valve when in its closed position than can leak through said passage, the excess liquid may overflow through said bypass, and means for adjusting the overflow edge of said bypass.

5. In apparatus of the character described, the combination with a pipe adapted to connect an ascension pipe to a gas collecting main and formed with a valve controlled downwardly extending passage, and adapted to have liquid sprayed into its portion above said passage, of a throttle valve adjustable between an open position and a closed position in which it is within and extends across said passage but has its peripheral edge separated from the surrounding wall of the passage thereof by a small marginal joint space adapted to be sealed by liquid sprayed onto the top of said valve, and means providing a liquid sealed bypass connecting portions of said pipe respectively above and below the valve in the closed position of the latter and forming a liquid holding trap preventing gas flow therethrough and through which excess liquid sprayed on the said valve when the latter is in its closed position may pass from the portion of said passage above said valve to the portion of the passage below the valve disc.

6. In apparatus of the character described, the combination with a pipe adapted to connect an ascension pipe to a gas collecting main and formed with a valve controlled downwardly extending passage including a portion having its wall curved about a vertical axis and adapted to have liquid sprayed into its portion above said

passage, a valve disc pivoted to turn about a horizontal axis between an open position and a closed position in which it extends across said passage portion, said valve disc being of such size that in its closed position its peripheral edge is separated from said wall by an annular joint space adapted to be sealed by a liquid sprayed onto the upper side of said valve, and means providing a liquid sealed bypass connecting portions of said pipe respectively above and below the valve in the closed position of the latter and forming a liquid holding trap preventing gas flow therethrough and through which excess liquid sprayed on the said valve when the latter is in its closed position may pass from the portion of said passage above said valve to the portion of the passage below the valve disc.

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