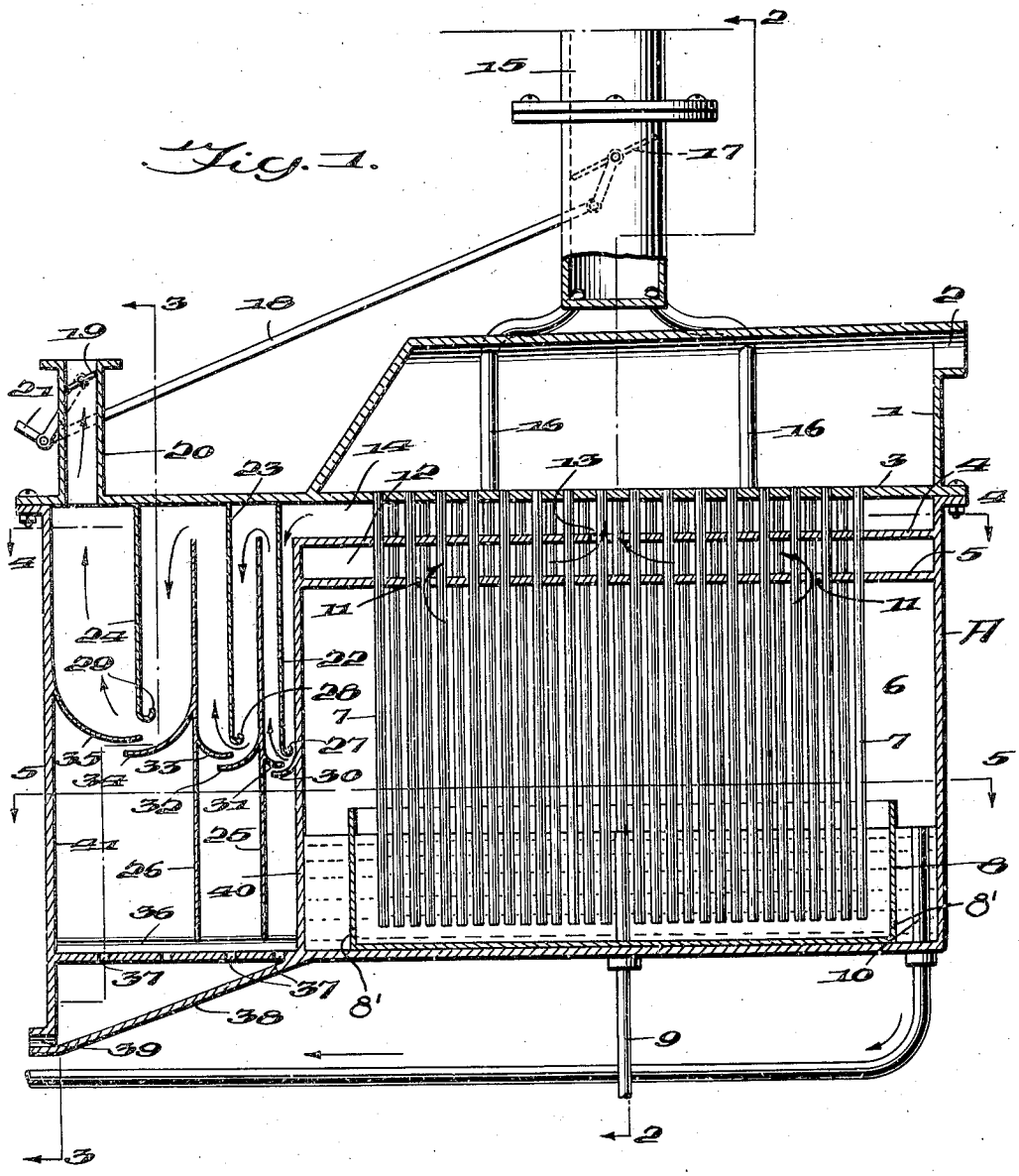
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CARBURETOR

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Fig. 1.



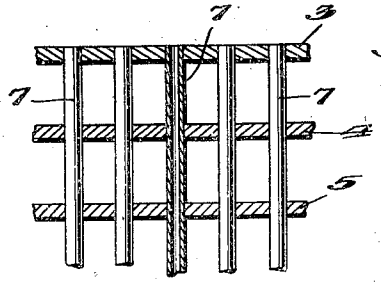


Fig. 6.

Inventor
Fredrick W. Fremd, Jr

By Vernon E. Hodges
H. Hamlin Hodges
Attorneys

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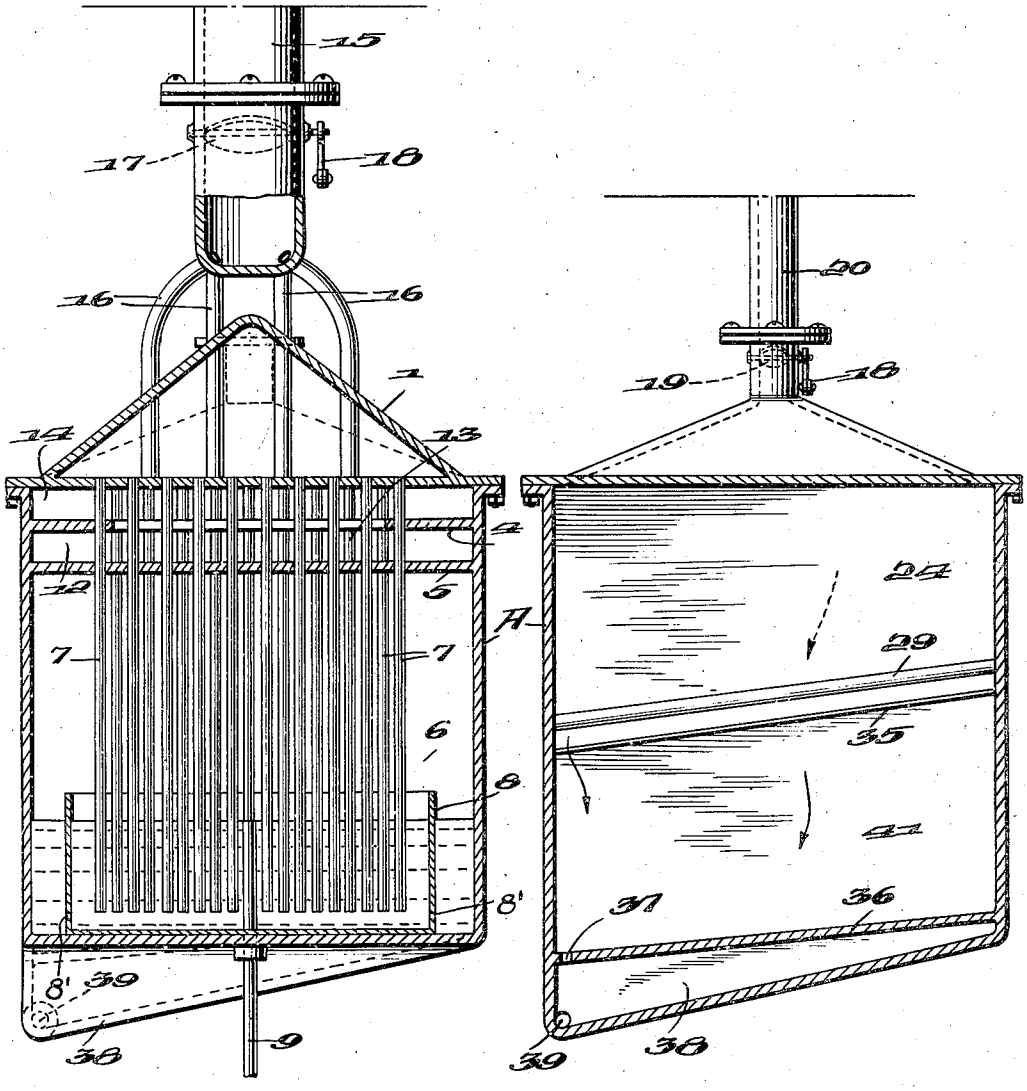


Fig. 2. Fig. 3.

Inventor

Fredrick W. Fremd, Jr

By Vernon E. Hodges

H. Hamlin Hodges his Attorneys

Oct. 1, 1940. F. W. FREMD, JR 2,216,664

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Fig. 4.

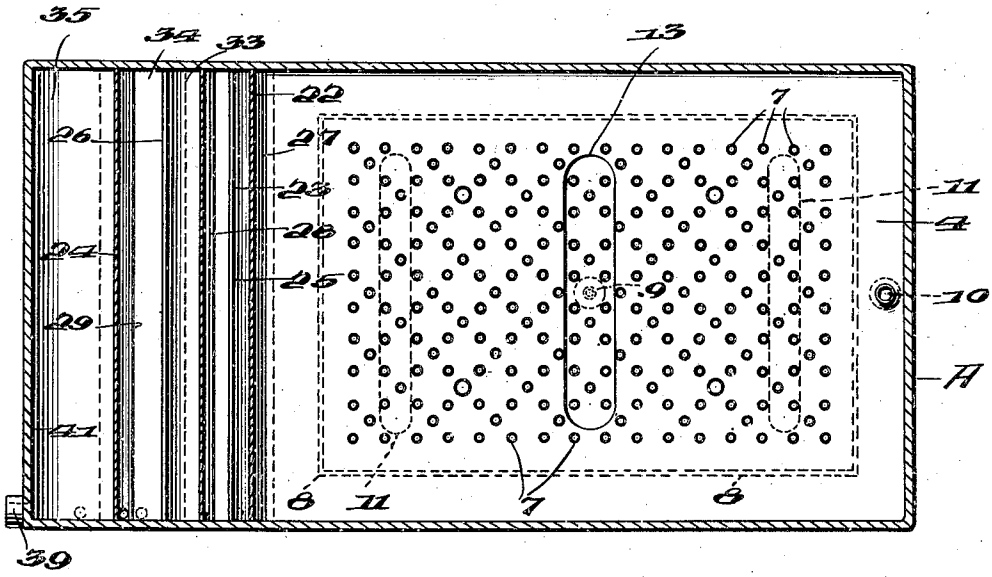
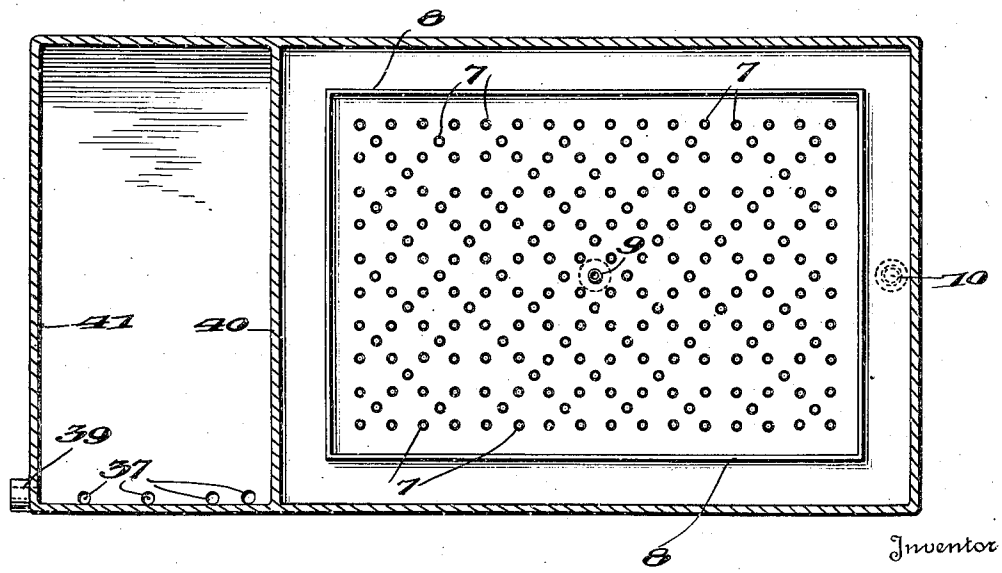


Fig. 5.



Inventor

Fredrick W. Fremd, Jr.

By Vernon E. Hodges

H. Hamlin Hodges his Attorneys

Patented Oct. 1, 1940 2,216,664

UNITED STATES PATENT OFFICE

2,216,664

CARBURETOR

Fredrick W. Fremd, Jr., West Palm Beach, Fla.; Oddetta Fremd, administratrix of said Fredrick W. Fremd, Jr., deceased

Application September 26, 1938, Serial No. 231,842

2 Claims. (Cl. 261—124)

My invention relates to an improvement in carburetors.

By using my carburetor the amount of liquid remaining in the product when it arrives at a state of consumption is entirely negligible, and the primary object of this invention is to eliminate or extract the liquid and collect the same for reseparation and deliver the fluid for consumption in a substantially dry state, thus preparing it for use in a high state of combustibility, with the use of a minimum consumption of fuel.

With this fundamental object in view, the invention consists in means for progressively separating the fumes from liquid fuel by the use of mechanical instrumentalities for a succession of separations until substantially the fumes only from the liquid fuel are delivered for combustion purposes to the end that practically every particle of liquid is separated therefrom and returned at different stages of the separation to a point where it may be returned along with the main supply of liquid fuel, so that the highest efficiency in combustible product is obtained, and a very high degree of economy in the use of fuel is effected.

While this improvement was originally designed and is now illustrated and described for use with automobiles, it is very evident that the combustible fumes thus produced may be utilized for other purposes, as for instance for gas-stoves, for driving motors generally, and for such purposes where intensive heat is required, as for instance for blow-torches, and for welding purposes, as well as, for example, in the cutting of steel.

In the accompanying drawings:

Fig. 1 is a longitudinal vertical section through my improved apparatus;

Fig. 2 is a transverse vertical section on the line 2—2 of Fig. 1, looking in the direction of the arrow;

Fig. 3 is a similar sectional view on the line 3—3 of Fig. 1, looking in the direction of the arrow;

Fig. 4 is a horizontal section on line 4—4 of Fig. 1, looking in the direction of the arrows;

Fig. 5 is a horizontal section on the line 5—5 of Fig. 1, looking in the direction of the arrows; and

Fig. 6 is a fragmentary view partly in section and partly in elevation, through the horizontal baffle plates, and showing the tubes, partly in elevation and partly in section and extending downwardly therethrough.

A represents an outer container within which the major portion of the apparatus is located and housed; and the numeral 1 indicates a dome above the container which has a main air intake 2.

There are, preferably, three horizontal baffles 3, 4 and 5, between this dome 1 and the air chamber 6 below.

A large number of small air tubes 7 are secured to the uppermost horizontal baffle 3 and extend down through holes in the other two horizontal baffles 4 and 5, and terminate and discharge in a surrounding receptacle 8 a little above the bottom of the container A. The main fuel supply is through a pipe 9, preferably projecting up from the bottom of the container into the receptacle 8 having perforations 8' near the bottom thereof, and the lower portion of the container A is thereby kept constantly filled with a supply of liquid fuel to a level determined by the overflow pipe 10, thus keeping the lower ends of the tubes 7 continuously submerged in the required volume of liquid fuel. The liquid fuel supplied through the pipe 9 may be pumped therethrough by the use of a conventional fuel pump which operates continuously while the engine is in operation. Another suitable fuel supply system, and the one which I prefer, could be maintained by attaching a vacuum or suction, line between the intake manifold and the fuel supply tank. The latter would work in reverse by drawing excess liquid fuel from the container A through the pipe 10 to return it to the fuel supply tank, and also to draw fuel from the supply tank through the pipe 9 to the receptacle 8.

In my present construction, I have employed as high as two hundred and fifteen of these tubes 7, and the internal diameter of these illustrated is one-sixteenth of an inch; the length nine inches; the fuel intake pipe 9, one-fourth of an inch in internal diameter; the overflow pipe 10, one-half inch in diameter, and the latter leads back to the main supply tank (not shown), to return excess fuel in the container A, for re-use.

It is obvious that the number, size and length of the tubes 7, as well as the dimensions of the pipes 9 and 10 might be varied, and would necessarily be varied according to different conditions, uses and circumstances, but the dimensions herein recited have been found most satisfactory in the particular mechanism illustrated and are the result of a great deal of trying out and experimentation, and they are only recited thus specifically because they have been found satisfactory, but without any intention of limiting myself thereto.

The length of the tubes 7 with respect to their

diameter and total number is regarded as contributory to the general result and, therefore, important because the liquid fuel and air should mix at a proper point in order to attain the best results. The mechanism illustrated lends itself well for automobiles of the smaller type, that is to say automobiles using say not over one and one-half inch intake, and in the event that this mechanism should be used in trucks and larger vehicles, it would then probably become necessary to increase the number of tubes in the container, as well as to space them differently and all such needed variations in size and dimension of parts are contemplated by my invention.

Returning now briefly to the lowermost horizontal baffle plate 5, it is here that the first break-up of the liquid fuel occurs, and where the fumes from the fuel start in their general circulation, since the air entering through the intake 2 in the dome 1 is immediately sucked down through the small tubes 7, and issues at their lower ends in a solid volume of liquid fuel in the receptacle 8, whence liquid bubbles and the fuel-charged air rises within the air chamber 6, and is caused to forcibly dash against the lowermost horizontal baffle 5, during which action it is violently whipped, as a result broken up, and the major portion of the liquid drops back and is separated therefrom.

The continuous suction at the final discharge end, in this instance at the engine intake, creates an upward draft of fuel charged air through the remotely placed transverselv disposed orifices 11, in the horizontal baffle 5, into the space 12 formed between the baffles 4 and 5. Upon striking the baffle 4, the fuel-charged fumes are still further whipped by impact and stripped of liquid content, and the fumes are drawn through the single orifice 13, preferably transversely placed in the baffle 4, approximately at the center thereof, and of a size approximately equal to the combined size of the orifices 11 in the horizontal baffle 5 below. On striking the topmost baffle plate 3, forming the bottom of the air dome 1, any remaining particles of liquid are still further obstructed and caused to find their way back to the bottom of the container A. In the air mixing chamber 14, formed between the baffles 3 and 4, the fumes therein are met by an auxiliary supply of air from the intake 15 and the distributing tubes 16 leading therefrom and discharging into the mixing-chamber 14 from above as viewed in Figs. 1 and 2. This auxiliary supply of air is controlled by a valve such, for instance, as the butterfly valve 17, as a convenient means, and this may be connected by a rod 18 with the butterfly valve 19 in the discharge pipe 20 leading to the manifold intake of the engine (not shown) so that both of these butterfly-valves are intended to be synchronized and operated by the accelerator lever 21, when applied to a motor vehicle or used in kindred manner.

The horizontally disposed baffle-plates 3, 4 and 5 are of primary importance, because they cause the first break-up of the bubbles of air rising out of the receptacle 8 at the bottom of the container A, and start the fumes in their general circulation. The relative spacing of the orifices 11 and 13 in the baffles 4 and 5, respectively, are considered essential, since the particles of fluid fuel and fumes are ascending by suction, and this spacing of the orifices affects a circuitous passage and the amount of flow.

The location and number of the tubes 16 which conduct the auxiliary supply of air to the mixing chamber 14 between the horizontal baffles 3 and 4, is regarded as contributory to the successful operation of this mechanism, because from these tubes the speed of the motor is largely regulated by the valve 17 and the throttle-valve 19, which, it is repeated, are preferably operated simultaneously by the accelerator or foot throttle 21 when applied to an automobile. While the number and size of these tubes is obviously subject to variation to suit the conditions, four of these have been shown in the drawings and have been found to suit the requirements of the present installation.

From the mixing-chamber 14, a plurality of vertically disposed baffle-plates extend entirely across the remaining portion of container A not occupied by the air chamber 6, the tubes 7, the horizontal baffles 3, 4 and 5, and the receptacle 8, and the overflow pipe 10. There are preferably five of these vertically disposed baffles, and the spaces between them are intended to increase in size from the wall nearest the discharge end of the mixing-chamber 14 to the discharge pipe 20.

In the construction illustrated, the alternate baffles 22, 23 and 24, preferably, extend downwardly from the top of container A, and the alternately arranged baffles 25 and 26 extend upwardly as viewed in Fig. 1. The baffles 22, 23 and 24 preferably terminate at varying heights, and they are provided with drains 27, 28 and 29, respectively, which drains slope from one wall of the container to the other as shown in Fig. 3, and each one is adapted to drain out all raw gasoline caught by its respective baffle, upon the overlapping curved baffles 30 to 35 inclusive, therebeneath to the sloping bottom 36 below, where any separated and caught raw fuel drains off through holes 37 at the lower end into the sump 38 below, and whence it is conducted off through a pipe 39 which carries any remaining liquid back under pressure to the main storage tank (not shown).

The curved overlapping baffles 30 and 35, just beneath the vertical baffles are supported on the transverse walls 40 and 41, respectively, which with the side walls of the container A, house the vertically disposed and curved overlapping baffles. The curved baffles 31, 32, 33 and 34 are supported by the vertical baffles 25 and 26, and all of these curved baffles are so disposed that if any liquid still remains at those points in the circuitous circulation of the fumes, they are so placed that they catch and dispose of the remaining particles of raw fuel.

In the several spaces formed between the overlapping alternately arranged vertical baffles, in order to be explicit as to the intended illustration of the present invention, the width of the space between the baffles 22 and 25, is twice as great as the space between the baffle 22 and the wall 40; and the space between the baffles 23 and 25 is two and a half times; and the space between baffles 23 and 26 three times; and between 24 and 26 four and a half times; and between baffles 24 and 41, eight times the space between baffle 22 and wall 40. The foregoing are merely relative dimensions, just as the other dimensions recited herein are, but they are by no means intended to impose limitations and restrictions on the scope of the invention.

These vertically disposed baffle plates, each individually, play an important part in the final separation of any remaining liquid, if there is any, from the fumes. It is considered that the

relative spacing of these vertical baffles is very largely contributory to the success of the invention. The relative location of the elements carried and supported by these vertically disposed baffles and walls must be predetermined, because if they are not set in the correct relative position, it would result in failure to extract the liquid from the fumes, and ready means of disposing of any raw fuel is provided beneath each depending vertically disposed baffle, thereby providing means for the return of same to the fuel supply tank, this being one of the essentials of my present improvement since provision is made for every particle of liquid fuel eliminated to drop by gravity to the bottom of the container throughout the entire means of separation where it is conducted back to the main supply.

It is possible to use kerosene as well as gasoline as a liquid fuel.

It will be observed that the air chamber 6 is relatively large and that the gasoline level is always kept relatively low in the container A by means of the overflow pipe 10 which maintains this level at a predetermined point, but provides a sufficient volume of liquid fuel at all times to supply an adequate amount of fuel to charge the air sufficiently to create combustible fumes when they reach the manifold.

Thus in its rapid flight the fumes or gas-impregnated air meets with repeated obstruction always directly in its onward path, first in its ascent through the chamber 6 against baffles 5, 4 and 3, successively, and thence with an admixture of air from the auxiliary intake in the mixing-chamber 14, against baffles 22, 25, 23, 26, 24, with final separation of raw fluid through the troughs 27, 28 and 29, and the curved baffles 30, 32 and 34, while the fumes become drier and drier in their onward course, the raw liquid being forced or squeezed out, as it were, by the force of impact and the circuitous circulation until the manifold intake of the engine is reached.

I claim:

1. In a carburetor, a container divided into two parts, one part having a liquid fuel containing receptacle, means for maintaining a constant liquid level therein, horizontal baffles positioned above the liquid level therein, tube means communicating between an air intake port and a point in the liquid below the liquid level, an air mixing chamber formed by two of said horizontal baffles in communication with an auxiliary air port; the other part of said container providing a drying chamber in communication with the first part and containing vertically disposed baffles, an outlet from said drying chamber through which dried gases are withdrawn, said vertically disposed baffles being spaced apart progressively greater distances from one another as they are positioned more remotely from the first part of the container, liquid drains affixed to at least some of said baffles, and a sump, from which liquid fuel may be withdrawn, located beneath said baffles and drains.

2. In a carburetor, a container having horizontally and vertically disposed baffles spaced apart whereby to form a circuitous passage, means within the container for maintaining a constant level of liquid fuel in a portion thereof, the horizontal baffles positioned above the liquid level in the container, an air intake, means communicating between the air intake and the liquid fuel at a point below the surface thereof, a mixing chamber formed by two of said horizontal baffles, an auxiliary air inlet communicating with said mixing chamber, a drying chamber within the said container partitioned from the liquid fuel containing portion thereof, a plurality of vertically disposed baffles within said drying chamber, said vertical baffles being spaced apart progressively greater amounts as they are more remote from said partition, a trough extending transversely along the lower edge of at least one of said baffles, a liquid collecting sump beneath said baffles, a liquid outlet connected to said sump, and a gas outlet connected to the upper end of said drying chamber.

FREDRICK W. FREMD, JR.