

H. PETERSEN.  
 FILLING FOR REACTION CHAMBERS, &c.  
 APPLICATION FILED JUNE 25, 1907.

899,898.

Patented Sept. 29, 1908.

Fig. 2.

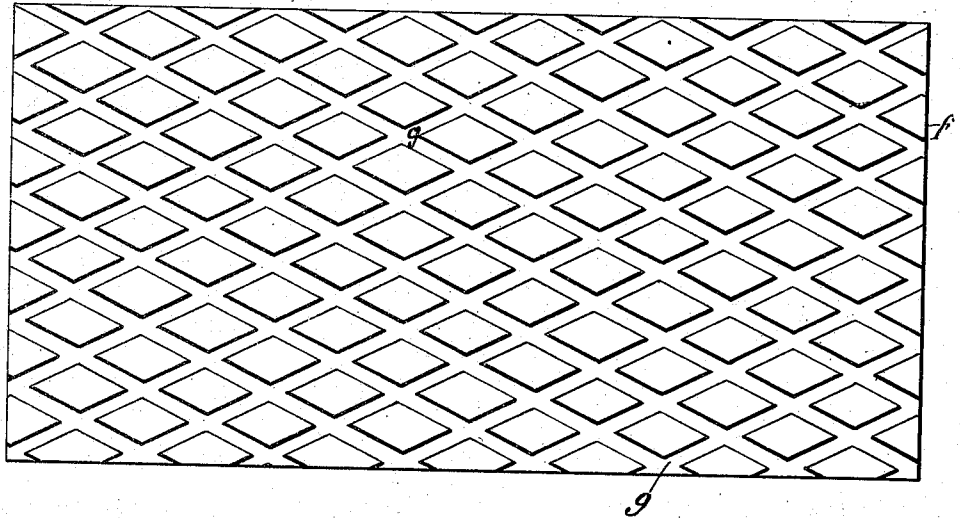


Fig. 3.

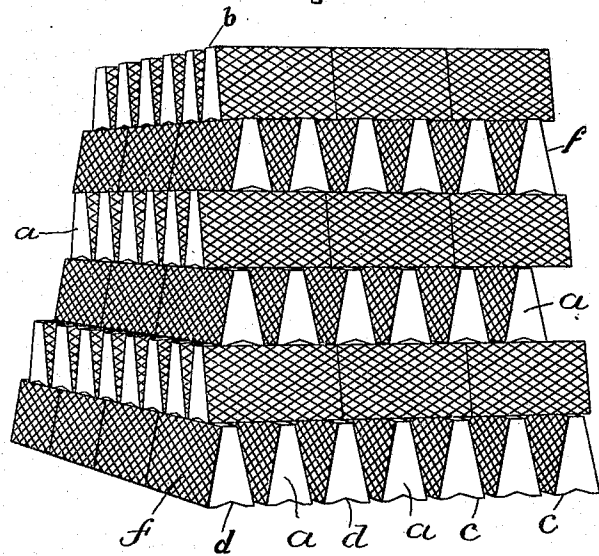
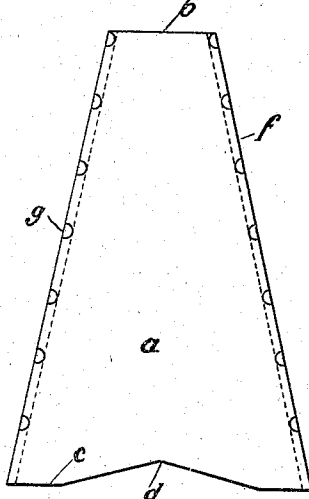


Fig. 1.



Witnesses:

*Edm. J. ...*  
*E. ...*

Inventor:

*Hugo Petersen*

# UNITED STATES PATENT OFFICE.

HUGO PETERSEN, OF WILMERSDORF, NEAR BERLIN; GERMANY.

FILLING FOR REACTION-CHAMBERS, &c.

No. 699,892.

Specification of Letters Patent.

Patented Sept. 29, 1908.

Application filed June 25, 1907. Serial No. 330,331.

*To all whom it may concern:*

Be it known that I, HUGO PETERSEN, a chemical engineer, and a subject of the German Emperor, and a resident of 181 Kaiser-Allée, in the city of Wilmersdorf, near Berlin, Kingdom of Prussia, and German Empire, have invented a certain new and useful Filling for Reaction-Chambers and the Like, of which the following is a specification.

This invention has reference to bodies for filling reaction chambers or any other rooms or spaces, in which it is desired to cause gases and liquids, or various gases to act upon each other or gases to come in intimate contact with liquids of various kinds, such for instance for the purpose of the bringing about of a reaction or of the absorption of gases or for various other similar and for other purposes, where such filling bodies are used. The body forming the subject matter of this invention is distinguished from the filling bodies heretofore in use by the fact, that it is so arranged and constructed, as to compel the gases and liquids to change their direction of movement various times and on the other hand by filling the chamber with bodies of the kind hereinafter described, both a very great surface action as well as a great permeating action of the gases and liquids is produced in consequence of the very fine disintegration of the liquid and its permeation by the ascending gases, aided by the fact, that the gases by impinging against the opposing lower surfaces are brought into contact with the inclined surfaces of the lower layer of filling bodies not only once as usually, but several times. The depositing of flue dust is moreover avoided in the filling bodies forming the subject of this invention in a far better manner than in the previous filling bodies.

Of the accompanying drawings which illustrate a preferred form of construction of my invention:—Figure 1 is an end view of the body block or brick. Fig. 2 is a side view of the body block or brick. Fig. 3 is a perspective view of a number of the body blocks or bricks built up to illustrate, by way of example, the mode of using the same for filling a reaction chamber.

In the drawings, the body block or brick is shown as having end faces *a*, inclined side faces *f*, a narrow upper plane surface *b* and a broad base *c*. The said base is hollowed out as shown at *d* so that the block is gutter-shaped in cross section. The sides *f* of the

body block or brick are shown as grooved or fluted as at *g*.

The filling block or body is made in form of a prism with side faces *f* inclined so as to constitute a kind of roof, while the base part *c* of the body is constructed in such a manner, that the bodies of this kind may be built up in layers constituting grates, like ordinary bricks. In its most simple form the said body constitutes a four sided prism, two sides of which are parallel, and of these the side *b* which corresponds to the acute angle formed by the two inclined surfaces, is very narrow, while the opposite surface *c*, which forms acute angles on both sides with the inclined surfaces, is made comparatively broad. Inasmuch as the said body, as distinguished from the filling bodies of polygonal sectional shape and provided with enlarged heads or with special supporting studs, or the like, is supported directly by one of its parallel sides, the said parallel surfaces must be made of such shape and of such size, as to allow of the direct supporting of the said bodies. The liquid, which is caused to run upon filling bodies of this kind is partly made to rebound, provided it is delivered upon the broad inclined surface, being thereby finely disintegrated, or partly the liquid is distributed over the surface of the inclined sides, which is aided by the diamond shaped series of grooves *g* on the surface, shown in the form of construction represented as an example on the drawing. The gas which ascends from below is reflected from the broader one of the two parallel surfaces, in case this surface forms the base of the filling body, the gas being thereby violently whirled around and being thereby compelled on the one hand, to move through a longer path than usually through the particular reaction space, being thereby brought in contact with one and the same contacting surface several times and on the other hand by this means an intimate permeation and mixing with the finely divided spray of liquid is produced and the rebounding gas jets are also thrown against the inclined surfaces of the lower layer of bodies, where the gas may act upon the liquid, that covers the said inclined surfaces. When, on the other hand, the broader one of the two parallel surfaces is on top, so that the inclination is tapering downwards, the gas impinges against the inclined surfaces, where it is reflected, while the liquid, which runs down from above, drops off partly at the edge

of the broader one of the parallel surfaces, another part of the liquid flowing over the inclined surface in this arrangement also in view of the diamond shaped arrangement of grooves and in consequence of adhesion, so that in this case also the gas acts upon the liquid both by permeation as well as by means of surface action. By the throwing to and fro of the gases and of the liquid, which takes place in these two arrangements of the filling bodies, the path of the movement of the said agents is considerably increased and they are prevented from passing directly through the said space, so as to effect a considerable increase of the reaction. Between the several bodies a gradually extending space is produced, in which the gas is free to expand and is able to effect its chemical and other reactions as completely as possible. In view of the liquid running down the inclined faces under all conditions, the flue dust, in case such deposits should occur, is washed down easily. When the bodies are arranged with the inclined surfaces tapering upwards, the flue dust will moreover be thrown off from the broad base and is rejected downwards and loosened, so that it is prevented from collecting at any places, while when one of the parallel surfaces is on top, the flue dust impinges against the inclined surfaces, from which it is reflected, and part of it will slide down on the inclination, without any possibility of remaining deposited in any place.

In the form of construction, shown by way of example on the drawing, the broad, parallel surface *c* is concaved, so as to constitute a longitudinal groove *d*, which groove, in the case of the broad base being arranged at the bottom, also contributes greatly to the rebounding of the gases and of the flue dust, while when the said broad surface is on top, the said concave part or groove acts as an overflow.

The rhomboidal or diamond shaped fluting of the inclined sides prevents the liquid delivered upon the body from above, and which has not yet been disintegrated, from running down at one point or a few points only of the inclined faces, when the broad base part is at the bottom, and it also accomplishes the result of spreading the liquid on the entire extent of the surface. When the broad base is on top, the rhomboidal fluting of the surface prevents the dripping down of great masses of the liquid at the straight edges, a considerable portion of the liquid being spread on the contrary over the inclined surface.

It is of course permissible to arrange the filling bodies of one and the same layer alternately with the broad base on top and at the bottom or the filling bodies of one layer may be arranged with the broad base downwards, while in the next succeeding layer the base of the bodies is upwards. The incisions

produced at the parallel edges by the fluting of the surface, and the hollowing out of the broad base assist the dripping off at the outer edges. The fluting of the surface should of course not be so deep as to prevent liquid from getting upon the diamond shaped fields between the grooves and prevent them from being covered with liquid also. The particular space may be filled with these filling bodies in any desired manner, the interstices between the bodies being either large or narrow and small. If any of the filling bodies should break, the entire filling remains stable nevertheless and there is no fear of obstructions of the filling by bricks or pieces of the same dropping down, as it is the case for instance with the poly-angular filling bodies, provided with lateral projections, heads or studs. The inclination of the inclined surfaces of the filling bodies in relation to each other is preferably arranged in such a manner, that these surfaces will be struck even by gases, passing through the chamber at a comparatively reduced pressure. This inclination has been found by experiments to correspond substantially to the angle, formed by the outer faces of a jet of gas issuing under low pressure from a slot into the outer atmosphere.

I do not wish to claim packing bodies of trapezoidal cross section broadly, such packing bodies being old, though they have usually been arranged different from those constituting my invention; but in all such packing bodies, as heretofore employed, it was impossible to produce the uniform distribution of the liquid and gases which is brought about in my invention by the peculiar shape of the base and by the diamond shaped fluting of the sides, the liquid in the former bodies being splashed upon the surface in a thick stream, instead of covering it as a thin and uniform film and there was not that possibility of the rebounding and throwing to and fro of the ascending gases which is accomplished by the incurved base, the shape of which also contributes to the stability of the packing and increases the acting surface, as compared with a flat base.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A filling or packing body for reaction and absorption chambers, gas washers, purifiers and the like, and comprising a brick or bar of substantially trapezoidal cross section and having axially extending surface grooves.

2. A filling body for reaction chambers and for other purposes, having a wedge like shape of substantially trapezoidal cross section with incurved base.

3. A filling body for filling reaction chambers and for other purposes, comprising a brick or bar of substantially wedge like cross section and incurved base, the inclined sides being provided with inclined, intercrossing,

grooves or flutings at a distance from each other.

4. A filling or packing body for reaction spaces and for other purposes, comprising a  
5 bar of substantially trapezoidal cross section and longitudinally grooved base, the inclined sides being divided up into any number of diamond shaped sections of sufficient  
size to insure the covering of the surfaces of  
10 said sections with liquid.

5. Filling or packing for reaction spaces

and for other purposes and comprising a plurality of superimposed rows or layers of brick like or bar like bodies of substantially wedge shaped cross section and incurved  
15 base:

In witness whereof I have hereunto set my hand in presence of two witnesses.

HUGO PETERSEN.

Witnesses:

HENRY HASPER,  
WOLDEMAR HAUPT.