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CATALYZER FOR THE OXIDATION OF AMMONIA WITH
OXYGEN OR WITH GASES CONTAINING OXYGEN
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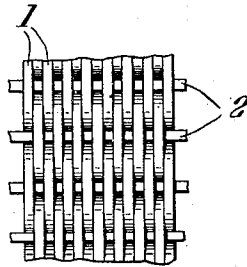


Fig. 1

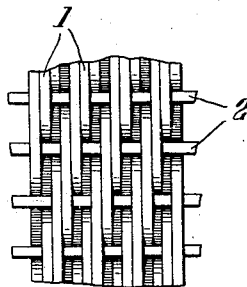


Fig. 2

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CATALYZER FOR THE OXIDATION OF AMMONIA WITH OXYGEN OR WITH GASES
CONTAINING OXYGEN

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The present invention relates to a catalyzer made from platinum or similar metals and serving for oxidizing ammonia with oxygen or with gases containing oxygen.

When oxidizing ammonia catalytically by means of air, the catalyzer usually consists of metal wire nets in the form of gauze. These gauzes are made from wires of platinum or similar metals or their alloys which usually have a thickness of 0,04 or 0,06 mm. The gauze accordingly has a fineness of 3600 or 1200 meshes per cm². At the hitherto used processes of oxidizing ammonia with air the velocity of the gas current when passing through the gauze amounts to 5–20 cm per second. At such relatively low velocities of flow the mechanical resistance of nets of the above mentioned kind will be sufficient, provided that the diameter of the combustion apparatus used is not extraordinarily large. Further, the density respectively the catalytically active surface obtained at such nets will at the said velocities of flow be sufficient to prevent losses of nitrogen through unburned ammonia.

In some modern processes of oxidizing ammonia catalytically air has been replaced by pure oxygen or gases rich in oxygen and through this change in oxidizing agent new conditions have been created. Gas mixtures containing ammonia and oxygen are combustible respectively explosive when the ammonia content is high and in this case the gas mixture therefore must flow through the wire gauze at a velocity which is higher than the velocity of combustion of the mixture, in order that back fire or explosions may be safely avoided. The velocities of flow must therefore in this case be much higher than the velocities of the ammonia-air-mixtures hitherto used and usually are up to twenty times as high as the latter or still higher. Further, when oxygen or gases rich in oxygen are used the concentration of the ammonia is up to thrice as high as in the mixtures formerly used and the heat developed during the reaction is therefore much more intense than hitherto. Under these changed conditions of operation the known wire nets consisting of gauze do not satisfy the re-

quirements, because the mechanical resistance force, the capacity of heat and the catalytically active surface of the same are fully insufficient. The employment of such nets will therefore call forth great losses in ammonia and the nets will always be destroyed by burning through. It is of course not possible to remove these drawbacks by using wire of greater thickness, because in this case the density of the nets will be reduced correspondingly, and it is neither possible to increase the strength by arranging a plurality of nets of extremely fine wire behind or above each other, because the perviousness to gas through this measure will be reduced so strongly, that the required velocity of flow can not be maintained.

It has now been found, that the abovenamed drawbacks may be completely removed when the usual gauzes consisting of platinum or a similar material are replaced by galloon nettings consisting of the same materials. Nets of this kind possess the property of being highly pervious to gas also at the greatest density. Moreover, the catalytically active surface of such galloon nettings is only inconsiderably influenced when the thickness of the warp threads and the weft threads is increased and nets of this kind are therefore extremely well suited for use as contact nets at the catalytical oxidation of ammonia with oxygen or gases rich in oxygen. The weft threads of this fabric may also have a thickness of 0,04 or 0,06 mm, but preferably the weft thread has a thickness of 0,10 or 0,12 mm and the warp thread is 0,02–0,04 mm thicker. The capacity of heat of such galloon nettings is 3–15 times as high and the catalytically active surface 2–3 times as high as at nets of the kind hitherto used. For the purpose in question twilled galloon nettings have proven to be especially well suited. Such nets possess a maximal perviousness to gases even at the highest density and these advantageous properties are combined with an extraordinarily high mechanical resisting force. Velocities of flow amounting to more than 600 cm per second may be employed without the nets becoming overloaded. When such nets according to the

invention are used the combustion apparatus thus has an extremely high capacity, so that the catalytic oxidation of ammonia with oxygen as an oxidation agent may be executed
5 in a much more efficient manner than hitherto.

Two preferred forms of catalyzers according to the invention are shown in the accompanying drawing in which Fig. 1 represents
10 a galloon netting and Fig. 2 represents a twilled galloon netting.

In both figures, 1 denotes the weft threads and 2 denotes the warp threads.

I claim:

- 15 1. A catalyzer containing metals of the platinum group for the catalytic oxidation of ammonia with oxygen or oxygeneous gases, characterized in this, that it consists of a galloon netting.
- 20 2. A catalyzer containing alloys of the platinum group for the catalytic oxidation of ammonia with oxygen or oxygeneous gases, characterized in this, that it consists of a galloon netting.
- 25 3. A catalyzer containing platinum for the catalytic oxidation of ammonia with oxygen or oxygeneous gases, characterized in this, that it consists of a galloon netting.
- 30 4. A catalyzer containing metals of the platinum group for the catalytic oxidation of ammonia with oxygen or oxygeneous gases, characterized in this, that it consists of a twilled galloon netting.
- 35 5. A catalyzer containing alloys of the platinum group for the catalytic oxidation of ammonia with oxygen or oxygeneous gases, characterized in this, that it consists of a twilled galloon netting.
- 40 6. A catalyzer containing platinum for the catalytic oxidation of ammonia with oxygen or oxygeneous gases, characterized in this, that it consists of a twilled galloon netting.

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