Cl 134

Published July 13, 1943

Serial No. 234,492

ALIEN PROPERTY CUSTODIAN

PROCESS FOR THE PRODUCTION OF RUBBER-ACTIVE SO-CALLED GAS BLACK

Harry Kloepfer, Cologne, and Hans Backe and Richard Hupe, Dortmund, Germany; vested in the Alien Property Custodian

No Drawing. Application filed October 11, 1938

Our invention relates to a process for the production of rubber-active, so-called gas black, from anthracene residues, by incomplete combustion.

It is well known that carbon black can be produced by supplying carbon-containing materials in the gaseous or vapour from such, for example, as naphthalene, bnezene, petroleum mixed with air or combustible gases such as illuminating gas, blast furnace gas, generator gas, to burners in which the mixture is burnt with the admission of restricted quantities of air, the lampblack produced being made to deposit on cooled surfaces.

We have now found by a long series of exactly executed tests that with the use of anthracene residues as initial material for the production of a highly active gas black, such as may, for instance, be used for admixture to rubber, caoutchouc or the like in order to improve the mechanical properties of the latter, a series of conditions must be adhered to in order, on the one hand, to produce a highly active gas black, whilst obtaining a good yield with the incomplete combustion and, finally, keeping the apparatus in which the anthracene residues are gasefied and burnt, in good working order for a long period. With the hitherto known processes for the gase-fication and combustion of anthracene residues, after a comparatively short time blockages of the delivery pipes and of the burners easily took place, frequently even after a very short period making the stoppage and dismantling of the apparatus for the purpose of cleaning, necessary. On the other hand, with the shortness obtaining in initial materials, it was absolutely necessary with yields of black which in general calculated on the carbon-containing substances employed, were very low and for example in the case of naphthalene at the utmost amounted to approximately 35–40%, to make use for the production of the active gas black of such materials which previously were directly burnt in primitive devices with the production of a black of minimum quality and with bad yields only.

According to our invention, the procedure is adopted that a mixture of anthracene vapours is made with those combustible gases, the carbon monoxide content of which is not more than 25% and preferably less than 20%, and partially burning this mixture in burners of definite dimensions with the admission of restricted quantities of air to the flames, letting the black formed deposit in known manner on cooled surfaces. To carry out the process, it is necessary that an admission of oxygen or gases containing oxygen such for example as air, to the carrier gas or vapour mixture before its exit from the burners, be avoided. For it has been found that the presence of oxygen in the gas and vapour mixture to be burnt, before emergence from the burners, leads to decompositions and undesirable changes in the vapourised anthracene initial materials, which on their part are the causes of blockages and incrustations of the gas pipes leading to the burners or the burners themselves. They are used as burners for carrying out the process according to the invention, bored burners with a bore having a diameter not substantially exceeding 0.75 mm or slotted burners having a slot of a width not substantially exceeding 0.5 mm.

Preferably for the gasefication or vaporisation of the anthracene residues, the combustible carrier gas containing carbon monoxide such for example as illuminating gas, coke furnace gas, is allowed to flow over the anthracene residues suitably heated to vaporisation temperature, the carrier gas being thereby charged with the anthracene vapours. For carrying out the process, a gaseous mixture has been found particularly advantageous which contains approximately 400 to 600 g of vaporised carbon-containing substance per cubic metre of gas mixture. In order to attain a charging to the desired extent, the procedure is for example followed that as large a surface as possible of the anthracene residues is brought into contact with the carrier gas, the carrier gas being passed for example in direct or counter-flow over the anthracene residues, or the carrier gas can be led over the anthracene residues at rest, to which in any known manner a sufficient surface is imparted. Preferably the carrier gas is heated to suitable temperatures, preferably to the vaporising temperature of the anthracene residues before it enters the vaporising device. The heating can preferably take place by making use in this of the heat produced by the combustion of the vapour mixture.

In the delivery of the mixture consisting of carrier gas and anthracene vapours to the burners, care must be taken that the temperature of the mixture does not fall to such an extent that a deposit of the anthracene takes place in the pipes or burners. The heating to too high a degree of the pipes must, however, also be avoided in order to prevent a premature decomposition and splitting up of the anthracene. Preferably the temperature up to the burners is maintained so that it does not exceed 350 to 400°C.

The deposition of the black formed during the combustion takes place in known manner on cooled devices, e. g., cylinders, movable sledge-

like conduits, dish apparatus, or the like, care having to be taken that the deposited black does not remain too long in contact with the flame producing it.

According to the process of our invention, it has been possible to produce a high quality rubber-active gas black with yields of 60–70% of the anthracene residues employed, in continuous working, incrustations or blockages in the pipes leading to the burners and in the burners themselves being substantially avoided over long periods, so that in the carrying out of the process according to the invention, the apparatus serving for the production of the black requires very little attention.

HARRY KLOEPFER.
HANS BACKE.
RICHARD HUPE.