

# UNITED STATES PATENT OFFICE.

JOHANN HAMMERSCHLAG, OF STRASSBURG, AND HERMANN S. GERDES, JR., AND OSCAR DROSTE, OF BREMEN, GERMANY.

PROCESS OF MANUFACTURING BRICKS FROM REFUSE FROM COAL OR COKE.

SPECIFICATION forming part of Letters Patent No. 786,028, dated March 28, 1905.

Application filed February 24, 1904. Serial No. 195,128.

*To all whom it may concern:*

Be it known that we, JOHANN HAMMERSCHLAG, manager of the Imperial Tobacco Manufactory, a subject of the King of Prussia,  
 5 Emperor of Germany, residing at Krutenau 7, Strassburg, Alsace, and HERMANN S. GERDES, Jr., Royal Swedish and Norwegian Consul at Bremen, residing at Dobben 42, and OSCAR DROSTE, peat-works owner at Zwischenahn,  
 10 residing at Bremen, Germany, have invented a new and useful Process for the Manufacture of Bricks from Refuse from Coal or Coke, of which the following is a specification.

This invention has reference to a process for  
 15 the manufacture of bricks from refuse from coals and cokes.

It has been ascertained by experiments that alkaline solutions of humic acid constitute an excellent binding or agglutinating agent for  
 20 uniting refuse coal or refuse from cokes into bricks.

If concentrated humic acid or substances rich in humic acid, such as crude wet bog or freshly-mined brown coal, are treated with  
 25 cold or warm aqueous solutions of hydrates or carbonates of alkalis or of ammonia, a strongly-adhesive syrupy mass is formed while the humic acid is dissolved. In order to effect the solution of the humic acid, not only the  
 30 pure alkalis, but also alkali-containing substances might evidently be used, such as soluble glass. Also lime may be employed for the purposes of solution or decomposition and, generally speaking, all such substances which  
 35 are capable of dissolving humic acid forming also salts or other compounds in some cases. The particles of the coal refuse are stirred in insuitable proportions into the syrupy mass obtained, so that all the particles of coal may be  
 40 coated by it as perfectly as possible, the same as by the employment of heated binding agents—such as asphaltum, tar, and the like. The coal refuse may also be worked in by kneading into the wet crude masses of marsh-  
 45 earth, the excess of water being then pressed

off, and only then the mixture with aqueous solutions of caustic alkali or carbonates of alkali is effected. It is important, however, that the particles of coal are well coated with the sticky syrupy layer.

While the coal refuse treated in the manner heretofore employed with heated asphaltum of tar congeals already upon the cooling of the binding agent, so as to form a solid coherent hard mass, the coal forming the material under treatment and which has been submitted to the action of humic acid containing solutions according to this process has to be submitted to a previous artificial drying and is then in condition to be put into bricks immediately.

This process has nothing common with the already frequently-attempted formation of bricks from coal refuse by the employment of peat. The former process referred to cannot be carried out, and on account of its inefficiency it has therefore not found its way into practice. Refuse from coal and wet marsh earth, for instance, though they may be well mixed and also artificially dried or air dried, do not admit of a uniform mixture of the two dried substances, and a uniform distribution of the necessary bituminous matter in the mass is therefore impossible, because the binding property of the dried and comminuted marshy mass ceases at the point where the degree of dryness necessary for the formation of bricks commences. In such cases the heavy coal refuse is always at the bottom of the conveyer and of the brick-press and the lighter peat is on top. The indispensibly necessary mixture is therefore impossible. The formation of a brick from crude peat and coal is therefore impossible. This is different in case dissolved humic acid is employed as a binding agent. In this case each particle of coal remains permanently coated with a bituminous layer also after the most severe drying. Coal bricks manufactured according to the present process by means of humic acid containing solutions

exhibit the great advantage over coal bricks prepared with asphaltum and tar that they burn almost without odor, that they do not become disintegrated in the fire, and are consumed almost smokelessly in burning.

What we claim, and desire to secure by Letters Patent of the United States, is—

The process for manufacturing coal bricks, which consists in mixing coal or cokes smalls with peat and solutions of alkalies or of ammonia, drying the mass if necessary, and pressing the same in a suitable manner.

In witness whereof we have hereunto signed

our names in the presence of two subscribing witnesses.

JOHANN HAMMERSCHLAG.  
HERM. S. GERDES, JR.  
OSCAR DROSTE.

Witnesses as to Johann Hammerschlag:

GUSTAV SCHWEISS,  
M. L. BRITTAIN.

Witnesses as to Herm. S. Gerdes, Jr., and Oscar Droste:

FR. HOGERMANN,  
C. DIEDERICH.