

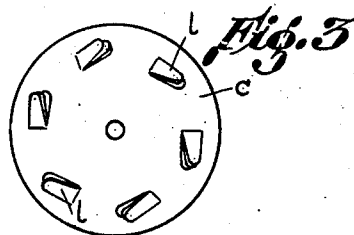
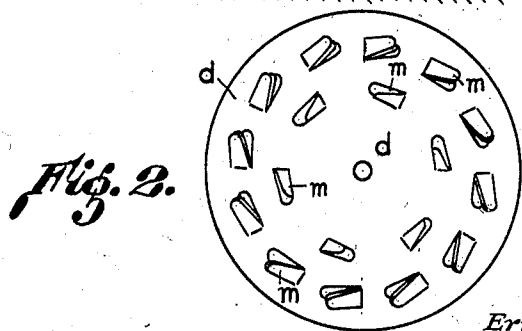
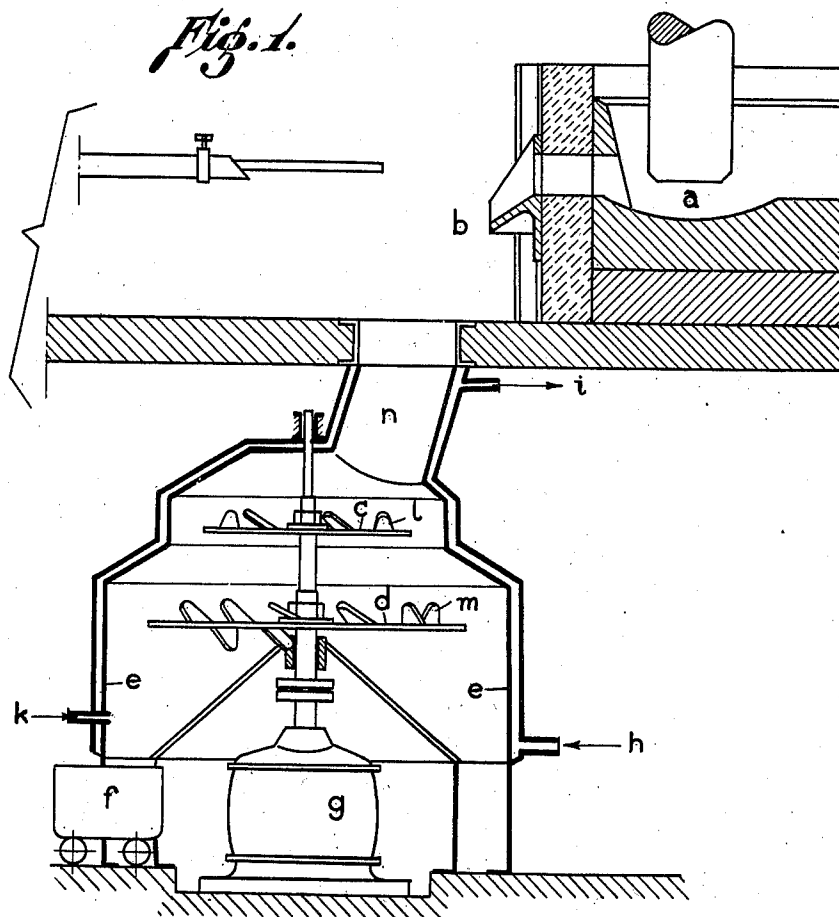
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E. WINTER ET AL

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DEVICE FOR SUBDIVIDING FUSED CALCIUM CARBIDE

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## UNITED STATES PATENT OFFICE

2,208,919

## DEVICE FOR SUBDIVIDING FUSED CALCIUM CARBIDE

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## 4 Claims. (Cl. 83—91)

The present invention relates to a method for subdividing fused calcium carbide and a device for carrying out this method.

For comminuting calcium carbide so as to obtain the commercial granular size large and complicated machines for breaking and grinding are necessary; they are subject to great strain and may cause considerable costs for repairs. Much time is consumed in the cooling of the material before it can be broken or crushed; for it leaves the carbide furnace in the liquid state at a temperature of about 2000° C. and although the cast blocks become hard at their outer walls relatively quickly the solidification must proceed throughout before they can be comminuted.

In this manner the energy represented by the heat in the molten calcium carbide leaving the furnace (according to Danneel about 25 to 30 per cent. of the entire energy used; Ullmann II, 1928, page 1776) is degraded uselessly and at the cost of time and money.

According to the present invention the liquid calcium carbide is eccentrically cast upon one or several rapidly rotating disks, from which the small particles formed are thrown by centrifugal force against reflectory surfaces surrounding the rotating bodies. These disks are provided with plates which are bent out like flaps from the said disks and act like the blades of a fan to draw an inert gas into the machine and to forward it therein. The walls for reflection surrounding the rotating body are preferably cooled and may have the form of a jacket or the like.

The invention will be further explained by reference to the diagrammatically illustrated accompanying drawing in which

Fig. 1 is a diagrammatic vertical section through a machine for practicing the invention and

Figs. 2 and 3 are respective plans of the rotary bodies in the machine.

The hot jet of liquid calcium carbide in the condition in which it leaves the furnace *a* is caused to flow through the tube *n* upon a disk *c* (or *d* respectively) placed below the tap hole *b* whereby the carbide is at once subdivided into a great number of particles which, however, owing to their high temperature readily agglomerate again. In order to avoid this agglomeration the disk is rapidly rotated by means of the motor *g* as long as the jet of carbide is flowing. Thereby the particles are centrifuged from the disk directly after their formation, and before they can agglomerate strike against a cylindrical wall for reflection *e* surrounding the disk. The tempera-

ture of this wall is kept at a low degree by cooling means, for instance by circulation in it of a cooling agent which enters the hollow wall at *h* and leaves at *i*. Each of the two disks is provided with plates which are bent out like flaps from the said disks in such a manner as to act like the blades of a fan and simultaneously to strike the particles of the carbide so as to promote its comminution and to throw them against the cylindrical wall *e*. The particles deliver the main quantity of their heat to this wall and after having been cooled no longer agglomerate but fall from the vertical wall into a sump *f* and may now be screened so as to obtain the desired granular size.

In the case of larger furnace units several disks are preferably arranged one above the other, for instance two disks *c* and *d* of different diameters, and each disk may be surrounded by a cooled wall *e* for reflection so that the delivery of the heat occurs by degrees. In order to avoid any loss of calcium carbide it is advisable, if possible, to exclude air from the machine for instance by substituting for the air an inert gas, for instance with nitrogen admitted at *k*. This inert gas, which simultaneously acts as cooling agent in counter current to the flow of carbide, is drawn into the device and forwarded therein by the plates bent out from the disks.

The invention involves the following advantages:

(1) Omission of the considerable period hitherto necessary for cooling the hot carbide blocks before they can be ground and thereby a simultaneous saving of the large cold stores necessary for cooling the hot blocks.

(2) Delivery of nearly all the heat in the carbide melt leaving the furnace to the cooling agent of the wall thus recovering this heat in the form, for instance, of hot water.

(3) Omission or at least a very considerable restriction of the formerly necessary breaking of the very hard solidified particles of calcium carbide.

(4) Omission of the considerable costs for repairs of the hitherto usual machines caused by the high mechanical strain involved in the crushing.

(5) With the aid of this device it is possible to conduct the granulation of the carbide in such a manner that grains of a practically constant size are obtained and particularly that only a small quantity of dust is obtained which in practice is sparingly applicable.

We claim:

1. Apparatus for subdividing fused calcium carbide comprising a housing, an inlet for introducing an inert gas into said housing, disks mounted for rotation in said housing, flap-like plates punched from said disks at points spaced between the center and periphery thereof, said plates being inclined with respect to the disk from which said plates are punched so as to draw the inert gas into the housing and through said disks, at least some of said plates being upwardly inclined with respect to the disks, means for supplying fused calcium carbide eccentrically to the upper surfaces of said disks in such a manner as to promote the comminution of said carbide into small particles and to throw them outward against said housing, portions of the housing being spaced to provide impact surfaces for the material discharged from the disks, means for rapidly rotating said disks and means for cooling the walls of said housing.
2. Apparatus for subdividing fused calcium carbide comprising a housing, an inlet for introducing an inert gas into said housing, at least two disks mounted for rotation in said housing, flap-like plates punched from said disks at points spaced between the center and periphery thereof, said plates being inclined with respect to the disk from which said plates are punched so as to draw the inert gas into the housing and through said disks, at least some of said plates being upwardly inclined with respect to the disk, means for supplying fused calcium carbide eccentrically to the upper surfaces of said disks in such a manner as to promote the comminution of said carbide into small particles and to throw them outward against said housing, portions of the housing being spaced to provide impact surfaces for the material discharged from the disks, means for rapidly rotating said disks and means for cooling the walls of said housing.
3. Apparatus for subdividing fused calcium carbide comprising a housing, an inlet for introducing an inert gas into said housing, a cone-shaped bottom wall for said housing spaced inwardly from the side walls thereof to provide an outlet from said housing, a shaft extending through said housing and beyond said bottom wall, means located beneath said bottom wall for rotating said shaft, disks mounted for rotation in said housing, flap-like plates punched from

said disks at points spaced between the center and periphery thereof, said plates being inclined with respect to the disk from which said plates are punched so as to draw the inert gas into the housing and through said disks, at least some of said plates being upwardly inclined with respect to the disk, means for supplying fused calcium carbide eccentrically to the upper surfaces of said disks in such a manner as to promote the comminution of said carbide into small particles and to throw them outward against said housing, portions of the housing being spaced to provide impact surfaces for the material discharge from the disks, means for rapidly rotating said disks and means for cooling the walls of said housing.

4. Apparatus for subdividing fused calcium carbide comprising a housing, an inlet for introducing an inert gas into said housing, two disks mounted above one another for rotation in said housing, the lower disk being of a greater diameter than the upper, flap-like plates punched out from said disks at points between the center and periphery thereof, said plates being inclined with respect to the disk from which the plates are punched so as to draw the inert gas into the housing and through said disks, at least some of said plates being upwardly inclined with respect to the disk, means for supplying fused calcium carbide eccentrically to the upper surface of the upper disk in such a manner as to promote the combination of said carbide into small particles and to throw them outward against said housing, the upper portion of said housing being spaced to provide an impact surface for the material discharged from said upper disk and to allow the carbide particles to drop onto the upper surface of the lower disk in such a manner as to promote further comminution of said carbide into small particles and to throw them outward against said housing, the portion of the housing on approximately the same level as said lower disk also being spaced to provide an impact surface for the material discharged from said disk, means for rapidly rotating said disks and means for cooling the walls of said housing.

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HEDI WINDELBAND,

*As Administratrix of Paul Windelband, Deceased.*