

F. S. WASHBURN.
 PROCESS OF AND APPARATUS FOR MAKING CALCIUM CYANAMID FROM CALCIUM CARBID.
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Fig. 1.

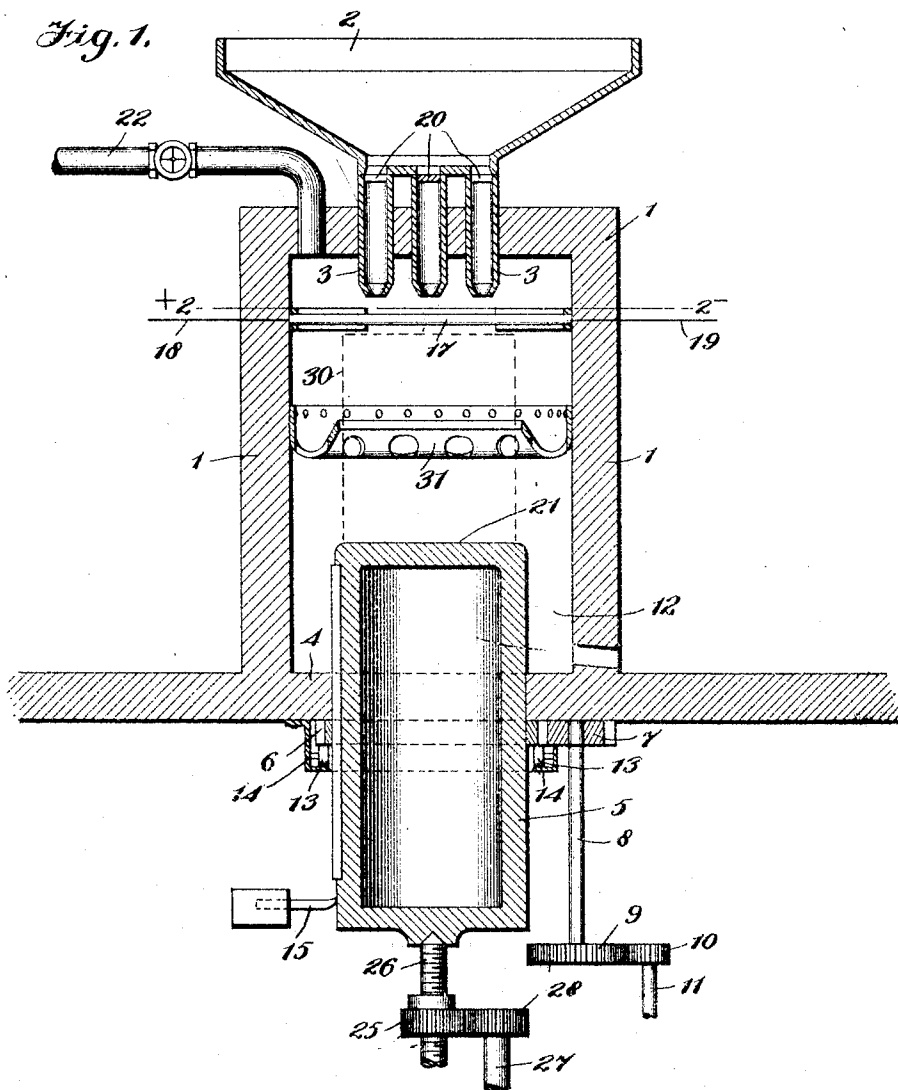
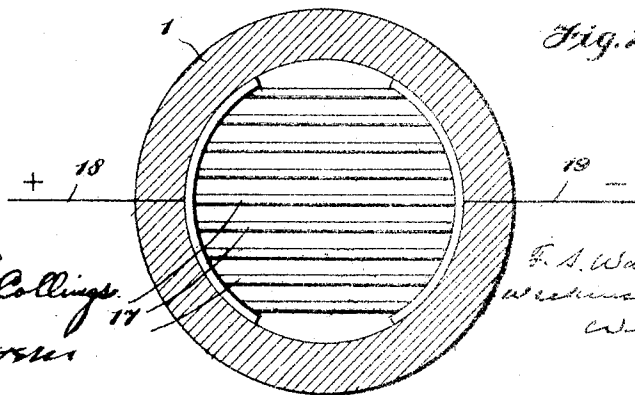


Fig. 2.



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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK S. WASHBURN, a citizen of the United States, residing at Nashville, in the State of Tennessee, have invented certain new and useful Improvements in Processes of and Apparatus for Making Calcium Cyanamid from Calcium Carbide; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a process of and an apparatus for treating calcium carbide to form calcium cyanamid, and has for its object to shorten the process as well as to improve the apparatus now in use for this purpose.

With these and other objects in view, the invention consists in the novel steps constituting my process, and also in the novel details of construction and combinations of parts more fully hereinafter disclosed and particularly pointed out in the claims.

Referring to the accompanying drawings forming a part of this specification in which like numerals designate like parts in all the views:—Figure 1 represents a diagrammatic sectional view of a furnace made in accordance with my invention; and, Fig. 2 represents a section taken on the line 2—2 of Fig. 1.

1 indicates any suitable furnace wall, 2 any suitable hopper or feed for calcium carbide CaC_2 , and 3 any suitable means for feeding the calcium carbide in a finely divided condition into the furnace.

The furnace is provided at its bottom with the inturned portions 4, through which passes the support 5, which is surrounded by the frictional feeding gear 6 of a ring like form, driven by the pinion 7, mounted on the shaft 8, carrying the gear 9 driven by any suitable source of power from the pinion 10, mounted on the shaft 11. An annular space 12 is provided in the furnace between the support 5 and the walls of the furnace, as shown; and the annular ring 6 is supported upon suitable rollers such as 13, which in turn are carried by any suitable support such as 14. A pick or scraper mechanism such as 15 is provided preferably below the supports 14 for a purpose to be disclosed below; and immediately below the delivery spouts 3 are located suitable

resistors 17 connected in any suitable manner as that shown, to the electrical lead wires 18 and 19.

The operation of my invention is as follows:—Calcium carbide in a suitably fine condition is fed through the delivery spouts 3 by opening any suitable valve mechanism 20, and passes over and between the resistors 17 and falls upon the top 21 of the support 5. Nitrogen being lead into the furnace by any suitable means such as 22, and the said resistors being raised to a proper temperature by means of current lead over the wires 18 and 19, the well known calcium cyanamid reaction takes place, and the latter compound is produced on the said top 21 of the support 5. As the calcium cyanamid grows on the top 21, the said top 21 as well as the support 5, is lowered by means of the screw 26 passing through the nut 25, which is operated through power transmitted by the shaft 27 turning the gear 28. By means above disclosed, the cyanamid is formed into a cake 30, as illustrated, and when the cake is of sufficient thickness it is chipped off of the support 5 by the pick 15, or by other suitable means. While the cake is forming, the gear 6 continuously revolves the support 5, as well as said cake, upon its longitudinal axis, and thereby aids in making said cake more uniform. In order that a tight joint may be maintained between the parts 4 of the furnace and the said support 5, the annular space 12 is kept full of dust composed largely of calcium carbide, calcium cyanamid, and other waste materials. As the cake 30 is lowered, it comes in contact with a plurality of scrapers 31, which keeps it of the proper size and also gives rise to the dust above mentioned. The dust can be removed from time to time from a suitable opening 32.

By the means and method above disclosed, the reaction between nitrogen and the calcium carbide proceeds rapidly and the time necessary to make the calcium cyanamid is greatly shortened.

It is obvious that those skilled in the art may vary the details of my process as well as the construction and arrangement of parts of the apparatus without departing from the spirit of my invention, and therefore I do not wish to be limited to such features, except as may be required by the claims.

What I claim is:—

1. The process of making calcium cyanamid from calcium carbid, which consists in forming said carbid into thin superposed layers in an atmosphere of nitrogen; and subjecting successive layers as fast as they are formed to a temperature sufficient to cause said carbid and nitrogen to react thereby consolidating them into a single mass, substantially as described.

2. The process of making calcium cyanamid from calcium carbid, which consists in feeding said carbid into an atmosphere of nitrogen while forming the same into thin superposed layers; and subjecting successive layers as fast as they are formed to the action of an electrically controlled temperature sufficient to cause said carbid and nitrogen to react while permitting said layers to be fused into a solid cake, substantially as described.

3. The process of making calcium cyanamid from calcium carbid, which consists in feeding said carbid into an atmosphere of nitrogen while forming the same into thin superposed layers; subjecting successive layers as fast as they are formed to the action of an electrically controlled temperature sufficient to cause said carbid and nitrogen to react while permitting said layers to be fused into a solid cake; and gradually removing said cake out of the reacting zone as fast as it is formed, substantially as described.

4. The process of making calcium cyanamid from calcium carbid, which consists in feeding said carbid into an atmosphere of nitrogen while forming the same into thin superposed layers; subjecting successive layers as fast as they are formed to the action of an electrically controlled temperature sufficient to cause said carbid and nitrogen to react while permitting said layers to be fused into a solid cake; lowering said cake out of the reacting zone as it is formed while

continuing the feeding action; and finally removing said cake from the influence of said feeding action, substantially as described.

5. In an apparatus for producing calcium cyanamid from calcium carbid, the combination of a suitable support; means for feeding said carbid in thin layers in an atmosphere of nitrogen to said support thereby forming superposed layers; and means for heating said layers to a temperature sufficient to produce calcium cyanamid on said support, substantially as described.

6. In an apparatus for producing calcium cyanamid from calcium carbid, the combination of a suitable support; means for feeding said carbid in thin layers in an atmosphere of nitrogen to said support thereby forming superposed layers of carbid; means for heating said layers as fast as they are formed to a temperature sufficient to produce calcium cyanamid on said support; and means for lowering said support as fast as said cyanamid is formed, substantially as described.

7. In an apparatus for producing calcium cyanamid from calcium carbid, the combination of a suitable support; means for feeding said carbid in thin layers in an atmosphere of nitrogen to said support, thereby forming superposed layers; means for heating said layers to a temperature sufficient to produce calcium cyanamid on said support as fast as said layers are formed; means for continuously rotating said support while receiving said layers; and means for continuously lowering said support while said cyanamid is being formed, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

FRANK S. WASHBURN.

Witnesses:

T. A. WITHERSPOON,
FELIX R. SULLIVAN.