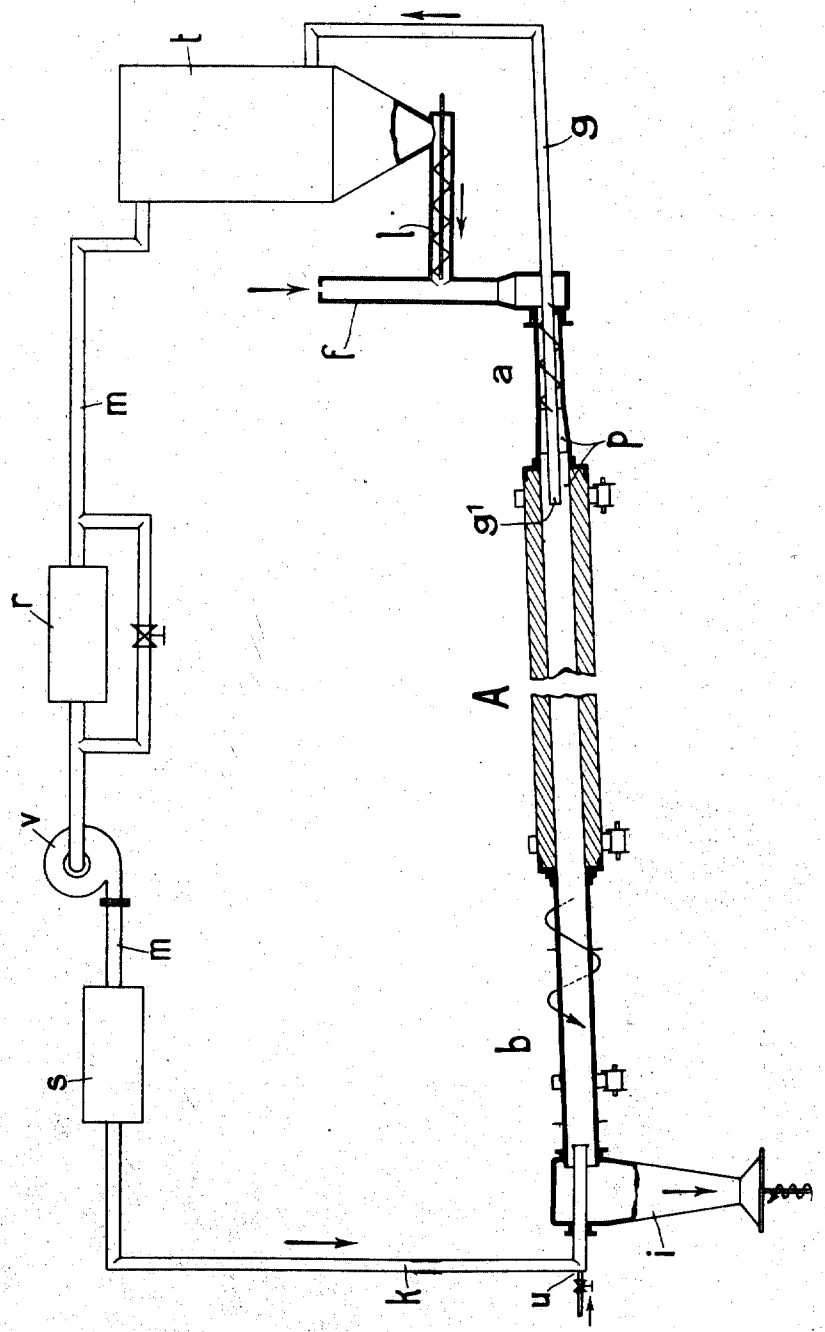
N. C. TOMMASI.

APPARATUS FOR THE MANUFACTURE OF CRUDE CALCIUM CYANAMID.

APPLICATION FILED JAN. 5, 1917.

1,230,343. Patented June 19, 1917.



INVENTOR:
N.C. TOMMASI
BY Ivan Steenmul
ATTORNEY.

UNITED STATES PATENT OFFICE.

NOBILE CARLO TOMMASI, OF BASEL, SWITZERLAND, ASSIGNOR TO THE FIRM OF ELEKTRIZITÄTSWERK LONZA, OF GAMPEL AND BASEL, SWITZERLAND.

APPARATUS FOR THE MANUFACTURE OF CRUDE CALCIUM CYANAMID.

1,230,343. Specification of Letters Patent. Patented June 19, 1917.

Application filed January 5, 1917. Serial No. 140,796.

To all whom it may concern:

Be it known that I, NOBILE CARLO TOMMASI, a subject of the King of Italy, residing at Basel, Switzerland, have invented new and useful Improvements in Apparatus for the Manufacture of Crude Calcium Cyanamid, of which the following is a full, clear, and exact specification.

The production of crude calcium cyanamid from calcium carbid and nitrogen as a continuous process has not yet been achieved, mainly because in the processes hitherto known there has been no possibility of adjusting the temperature within the furnace to meet the requirements of the process. In one procedure it has been attempted to equalize the temperature within a rotary furnace by producing a circulation of the nitrogen by means of nozzles inserted in the furnace. Such a circulation cannot be of long duration because the nozzles become choked. Moreover the attempt shows that it has not become known that in the correct conduct of the process a noteworthy portion of the heat developed by the reaction must be withdrawn, and more particularly that at the end of the reaction it is necessary to cool the product in the furnace in nitrogen to avoid decomposition.

The present invention relates to a plant for the manufacture of crude calcium cyanamid from calcium carbid and nitrogen in a rotary furnace, in which for the purpose of controlling the temperature in the furnace the nitrogen is maintained in constant, controlled circulation through heating and cooling devices outside the furnace.

The accompanying diagram illustrates the improved plant partly in side elevation, partly in section.

The rotary inclined furnace A is closed gas-tight at both ends. At the higher end *a* the calcium carbid eventually with addition of substances facilitating the reaction is fed in through a pipe *f* and the nitrogen leaves through a pipe *g*. At the lower end *b* the crude calcium cyanamid is removed through the sealed device *i* and the circulating nitrogen is introduced through the pipe *k*. The pipes *g* and *k* are connected together by a gas-tight pipe system *m* comprising a device *v*, such as a fan, for producing circulation of the nitrogen, a cooler *r* and a heater *s*. The pipe system also comprises a dust chamber *t* from which a worm *l* removes the separated dust and conveys it to the carbid feeding pipe *f*.

At a suitable point *u* of the pipe *k* fresh nitrogen is introduced in proportion to the output of the product. The cooling of the finished crude calcium cyanamid is assisted by leaving the lower portion *b* of the rotary furnace uncovered so that it is cooled by radiation or may be artificially cooled.

In order as far as possible to prevent the stream of nitrogen from stirring up the dusty carbid and carrying it away, the pipe *g* is extended, as at g^1, into the mouth of the furnace, whereby there is formed at the upper end of the furnace, between the carbid pipe and the said extension, a chamber *p* not traversed by the nitrogen, in which chamber the carbid can settle before it enters the reaction zone of the furnace.

The operation is as follows:

For starting the operation the furnace is heated to the temperature necessary for the reaction before the circulation of nitrogen is started. For this purpose, for example, nitrogen may be heated in the heater *s* and blown into the furnace. When the temperature of reaction has been attained, introduction of calcium carbid is started. The feeding of the carbid is capable of control. Fresh nitrogen, if necessary preheated, is introduced in sufficient quantity and the circulation of nitrogen is started. At first, in order not to cool the furnace a feeble circulation is maintained and the cooler *r* preferably cut out of the circuit. If the temperature falls, it may be raised again by means of the heater *s*. As the reaction proceeds and the rate of feeding the carbid is increased, the temperature gradually rises, heat being generated by the reaction. In proportion to this rise the circulation and the cooling of the nitrogen is increased. The finished cooled crude calcium cyanamid is removed from the furnace through the seal *i*.

What I claim is:

1. In an apparatus for the manufacture of crude calcium cyanamid, a rotary furnace of reaction, having a calcium carbid feed device and a calcium cyanamid discharge device, and a nitrogen circulating system between the ends of the furnace, including heating and cooling devices outside the furnace as well as nitrogen displacing means to keep the nitrogen in constant, controlled

circulation through said heating and cooling devices outside the furnace for temperature regulating purposes, substantially as described.

2. In an apparatus for the manufacture of crude calcium cyanamid, a rotary furnace of reaction, having a calcium carbid feed device at its one end and a calcium cyanamid discharge device at its other end, the furnace part next to said discharge device being arranged to be cooled from without for aiding the cooling of the finished product, and a nitrogen circulating system between the ends of the furnace, including heating and cooling devices outside the furnace as well as nitrogen displacing means to keep the nitrogen in constant, controlled circulation through said heating and cooling devices outside the furnace for temperature regulating purposes, substantially as described.

3. In an apparatus for the manufacture of crude calcium cyanamid, a rotary furnace of reaction, having a calcium carbid feed device at its one end and a calcium cyanamid discharge device at its other end, and a nitrogen circulating system between the ends of the furnace, including nitrogen displacing means, heating and cooling means outside the furnace to keep the nitrogen in constant, controlled circulation through said heating and cooling means, a chamber being provided at the feeding end of the furnace out of the circulating nitrogen path to allow settling of supplied calcium carbid before its entry to the reaction zone of the furnace, substantially as described.

In witness whereof I have hereunto signed my name, this 12th day of December, 1916, in the presence of two subscribing witnesses.

NOBILE CARLO TOMMASI.

Witnesses:
LYDIA UEBELS,
AMAND BRAISU.