

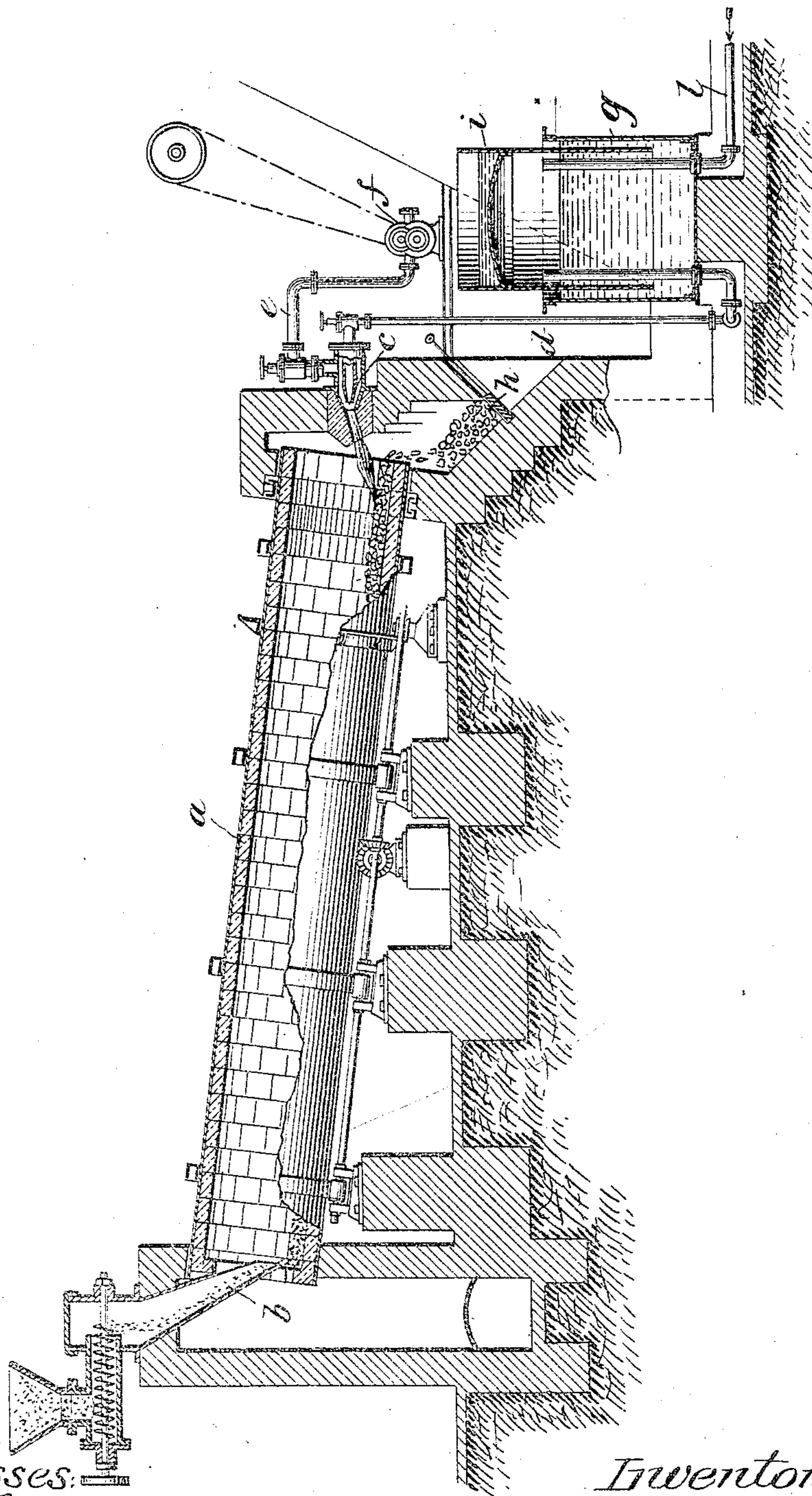
No. 886,683.

PATENTED MAY 5, 1908.

H. DICKE.

PROCESS FOR THE BALLING TOGETHER OF PULVERULENT OR DUSTY ORES.

APPLICATION FILED JUNE 29, 1905.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

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No. 886,683.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed June 29, 1905. Serial No. 267,525.

To all whom it may concern:

Be it known that I, HUGO DICKE, head engineer, residing at 14 Neue Mainzerstrasse, Frankfort-on-the-Main, Germany, have invented certain new and useful Improvements in Processes for the Balling Together of Pulverulent or Dusty Ores, of which the following is a specification:

This invention consists in an improvement upon the methods heretofore employed for treating pulverulent ores in a rotary furnace, which have failed in practice either by reason of deficiencies in the firing, or, when silicates are added, with the object of insuring more easy fusibility of the material under treatment.

In the practice of my invention, I have found it desirable that (1) a gas flame should be used whose shape and composition can be varied, for the purpose of obtaining a reducing effect or an oxidizing effect, during fusion, according to the particular requirements of the case, and that (2) the heat zone at the rear end of the furnace should be limited by means of the shape of the flame in order that the material under treatment shall not become soft too soon and adhere to the sides of the furnace. Furthermore the fusion and balling together must not take place at too low a temperature, as otherwise the products in the blast furnaces would again return to dust, even before the completion of the reduction, that is to say, would become useless. Dusty or pulverulent iron ores must therefore if possible be fused either without any additions at all, or at least with such small quantities of added matter, as will enable the fusion to take place only at a temperature of at least 1000 degrees, in order that the finished product shall withstand any temperature less than 1000 degrees. In order to effect this object it is necessary to work with a pointed flame and above all, the gas must be supplied under an excess of pressure. This excess of pressure of the gas, which may be effected by collecting the gas in a gas holder, is absolutely necessary for the purpose of regulating the shape and the oxidizing capacity of the flame.

In the absence of excess of pressure, that is to say, for instance, by the mere supply of

compressed air, this two-fold regulation of the flame cannot be achieved. Whereas, by using a gas holder for the purpose of producing the gas pressure, not only water gas, but every other combustible gas and especially producer gas, can be utilized for the process.

An apparatus of a character for conveniently carrying out the hereinbefore described process is illustrated in the accompanying drawing, in which

a indicates a rotary furnace of well known type into which the pulverulent ore is fed from a supply nozzle *b*, the ore being advanced through the furnace as the latter rotates. At the discharge end of the furnace there is located a mixing nozzle *c* receiving air and gas under regulated pressure from pipes *d* and *e* which connect with suitable supplies of air and gas under pressure. The admission of gas and air emerging from nozzle *c*, under excess of pressure, produces a pointed flame which is directed against or upon the ore just before the latter passes from the furnace into the discharge passage *h*.

g is a gas reservoir into which the gas is conducted through the conduit *l*, and from which it is supplied by conduit *d* to mixing nozzle *c*.

The weighted cap *i* maintains the constant predetermined pressure desired, and *f* is a fan, by means of which air is supplied to the flame at the desired pressure through pipe *e*.

What I claim is:

The method of balling together or nodulizing of dusty or pulverulent ores or ores of small size of grain, with, if desired, simultaneous oxidation or reduction in the rotary furnace, which consists in subjecting the ores to a heat of at least 1000 degrees, by a pointed flame whose shape may be adjusted and having an oxidizing capacity in the zone of the furnace which is limited by said flame.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this 15th day of June 1905.

HUGO DICKE.

Witnesses:

CARL GRUND,
LUDWIG MÜLLER.