June 3, 1924.

1,496,094

A. MOETTELI

CONTAINER FOR THE DRY COOLING OF COKE

Filed March 16, 1923 2 Sheets-Sheet 1

Fig. 1.

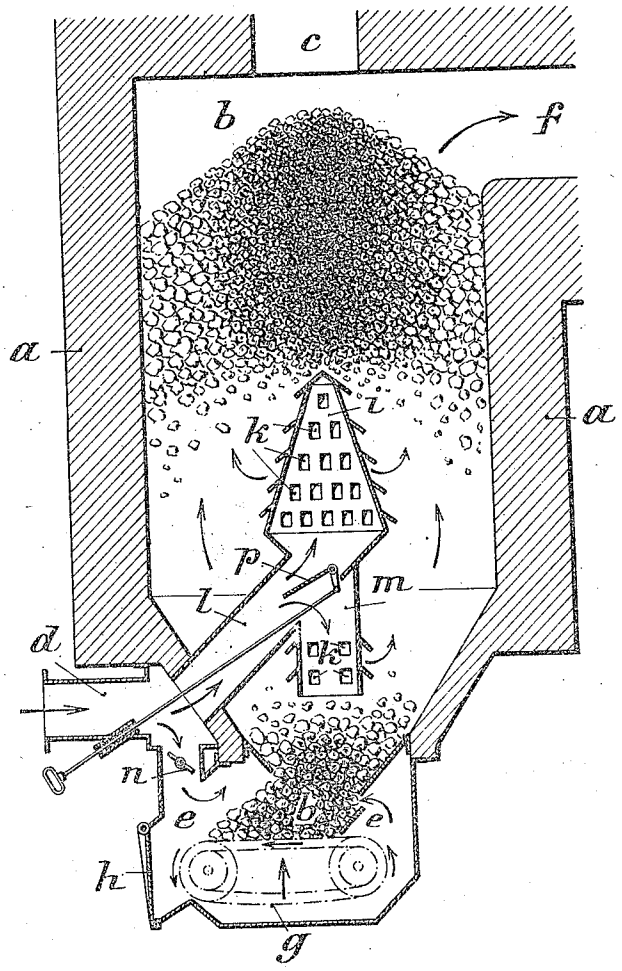

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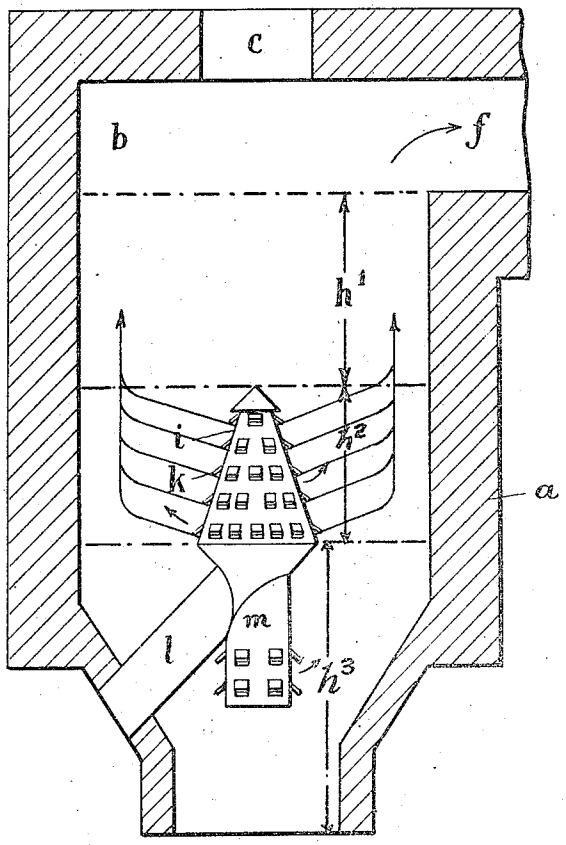
Fig. 2



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Patented June 3, 1924. 1,496,094

UNITED STATES PATENT OFFICE.

ARNOLD MOETTELI, OF OBERWINTERTHUR, SWITZERLAND, ASSIGNOR TO THE FIRM OF GEBRÜDER SULZER, AKTIENGESELLSCHAFT, OF WINTERTHUR, SWITZERLAND.

CONTAINER FOR THE DRY COOLING OF COKE.

Application filed March 16, 1923. Serial No. 625,655.

To all whom it may concern:

Be it known that I, ARNOLD MOETTELI, a citizen of Switzerland, residing at Oberwinterthur, Switzerland, Alte Romerstrasse 21, have invented certain new and useful Improvements in Containers for the Dry Cooling of Coke, of which the following is a specification.

The present invention relates to a container for the dry-cooling of coke by means of cooling gases passed through the charge of coke, and consists in the cooling gases being introduced into the charge of coke from a point which is situated over the discharge opening of the container. For introducing the cooling gases into the charge of coke an inner structure can be arranged. The inner structure is with advantage so situated that the charge of coke, with respect to the introduction of the cooling gases, is divided into different zones one over the other, each of which all parts of the charge of coke must pass through and be directly acted on by the cooling gases before reaching the lower part of the container. The inner structure can have several openings arranged in it one over the other and be so designed that a part of the cooling gases are directed downwards. A separate piping may be provided for directing them downwards. The cooling gases introduced can be distributed in such a way that a part of them is introduced at the lower end of the container into the charge of coke.

The piping for the cooling gases leading to the inner structure and the piping for the cooling gases leading to the lower end of the container can be fitted with regulating devices by which the ratio of the amount of cooling gas introduced to the inner structure and the amount introduced to the lower end of the container may be altered. These regulating devices may consist of simple dampers.

Two constructions of the object of the present invention are shown in section in the drawings, of which—

Fig. 1 is a vertical section of the container showing the charge of coke in situ, and

Fig. 2 is a diagrammatic view of a part of the same section, showing the zones into which the cooling coke is divided.

In Fig. 1, *a* is the coke container, *b* the charge of coke, *c* the filling opening, and *d* the piping for introducing the cooling gases. *e* is a space arranged in the lower end of the container and from it a part of the cooling gases can be introduced into the charge of coke. *f* is the outlet for the cooling gases and *g* a conveyor-belt moving in the direction of the arrows as drawn; by means of this belt the coke can be delivered through the door *h* to the open air.

The inner structure *i*, arranged above the discharge outlet from the container, and from which the cooling gases are introduced into the charge of coke, is fitted with openings *k* and connected with the cooling-gas delivery pipe *d* by means of the pipe *l*. The structure *i* is fitted with a pipe *m* directed downwards, and through this pipe a part of the cooling gases can be conducted downwards. The devices by means of which the introduction of the cooling gases to the space *e* and to the structure *i* or the pipe *m* is regulated, are indicated by *n* and *p*. The device *p* is so designed that it controls the amount of cooling gas delivered to the structure *i* as well as the amount to the pipe *m*.

The purpose of the invention is to distribute the cooling gases introduced to the charge of coke in such a way that a uniform cooling of all parts of the charge of coke is attained. The difficulty in charging the container consists mainly in the fine coke collecting in the centre of the container whilst the large coke rolls down the slope formed by the upper surface of the charge of coke and collects near the walls of the container. The density of the charge of coke is therefore not uniform, i. e., it decreases towards the outside and therefore makes it possible for the cooling gases, which take the path of least resistance, to flow along the walls of the container straight to the outlet. The charge of coke is therefore cooled only on the outside and not in the centre, i. e., only a small part of the heat contained in the coke is led away and the purpose of the whole installation is not attained.

The process of cooling according to the present invention works as follows:

The cooling gases reach the container *a* through the pipe *d* and flow, when the damper *n* is closed, through the pipe *l* into the structure *i*, which is hollow. Through the openings *k* the gases force their way into

the charge of coke, pass upwards through it, and escape by the outlet *f*. The coke enters the container through the filling opening *c* and leaves it at the lower end, where it can be delivered to the open air through the door *h* by means of the conveyor-belt *g*.

If a part of the cooling gases is to be introduced into the charge of coke at the lower end of the container, the damper *n* is opened. The cooling gases then flow partly into the space *e*, from where they can be introduced into the charge of coke. If a part of the cooling gases led to the structure *i* is to be directed downwards, the damper *p* is brought into the position shown in the drawing. From the pipe *m*, which can be open or closed at the lower end, the gases then escape through the opening *k*. If the pipe *m* is to be closed, it is only necessary to turn the damper *p* downwards.

The arrangement is such that all parts of the charge of coke, before reaching the lower part of the container, must traverse the zones which are directly acted on by the cooling gases. The charge of coke can therefore be considered as divided into different zones as shown diagrammatically in Fig. 2. The lowest zone corresponding to the height h^3 contains the coke which has been cooled; the cooling gases act directly on the zone h^2, which therefore is more intensively cooled than the zone h^1, which contains the hot coke last introduced. The movement of the layers of coke adjusts itself automatically, thereby assuring in the best manner that no part of the charge of coke leaves the container without having been thoroughly cooled.

The advantage of the container consists in the possibility of giving the structure *i* with its openings *k* such a form and size, that the cooling gases can be introduced into the lower and upper, as well as into the outside and central parts of the charge of coke, thus allowing an absolutely uniform cooling of the whole charge of coke to be attained. The work in connection with charging and discharging the container will not be disturbed in any way by the inner structure and the pipe leading to it from the side.

I claim:

1. In an apparatus for cooling incandescent coke as it passes through a container, the combination of a container, a distributor built into the container, and means for introducing cooling gases through a distributor into the charge of coke.

2. In an apparatus for cooling incandescent coke by means of gases forced through the charge of coke as it passes through a container, the combination of a container, a distributor built into the container, a series of outlet openings in the distributor spaced so as to cause cooling gases issuing through them to produce a cooling zone of a predetermined depth and means for introducing cooling gases through a distributor into the charge of coke.

3. In an apparatus for cooling incandescent coke by means of gases forced through the charge of coke as it passes through a container, the combination of a container, a distributor built into the container, means for discharging the coke in layers, and means for cooling of the coke in zones.

4. In an apparatus for cooling incandescent coke by means of gases forced through the charge of coke as it passes through a container, the combination of a container, a distributor built into the container, means for introducing cooling gases through the distributor into the charge of coke and means for introducing cooling gases into the charge of coke through the lower end of the container.

5. In an apparatus for cooling incandescent coke by means of gases forced through the charge of coke as it passes through a container, the combination of a container, a distributor built into the container, means for introducing cooling gases through the distributor into the charge of coke, separate means for lowering a part of the cooling gases downward from the distributor and introducing them into the charge of coke.

6. In an apparatus for cooling incandescent coke by means of gases forced from the charge of coke as it passes through a container, the combination of a container, a distributor built into the container, means for introducing cooling gases through the distributor into the charge of coke, means for introducing cooling gases into the charge of coke through the lower end of the container and control members for regulating the proportion of the cooling gases introduced through the distributor and through the lower end of the container respectively.

In testimony whereof I have affixed my signature in presence of two witnesses.

ARNOLD MOETTELI.

Witnesses:
C. H. WILLIAM,
AUGUST BUIGG.