H. KOPPERS.

APPARATUS FOR QUENCHING COKE.

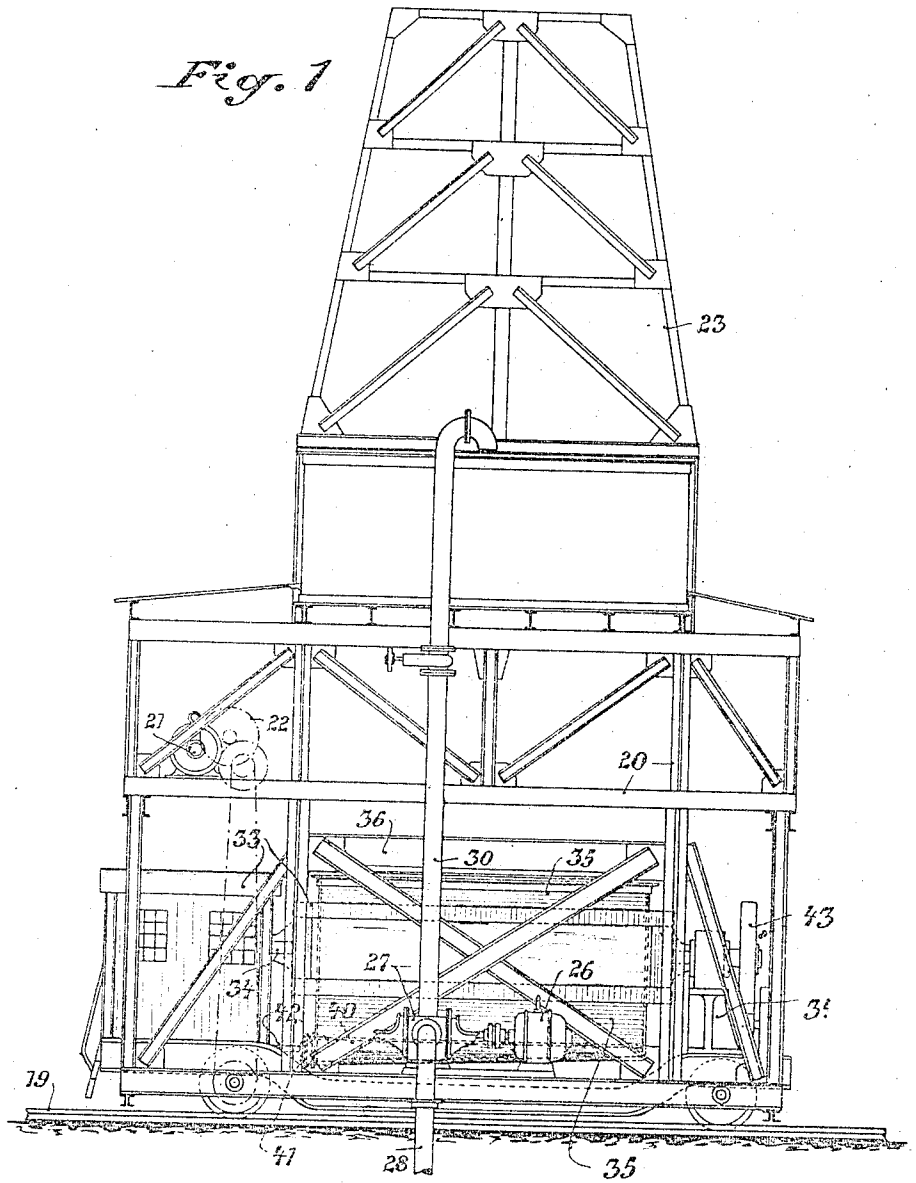
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1,121,376.

Patented Dec. 15, 1914.

2 SHEETS—SHEET 1.

Fig. 1



Witnesses:
Katheryne Koch
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Inventor,
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By Briesen & Jerome
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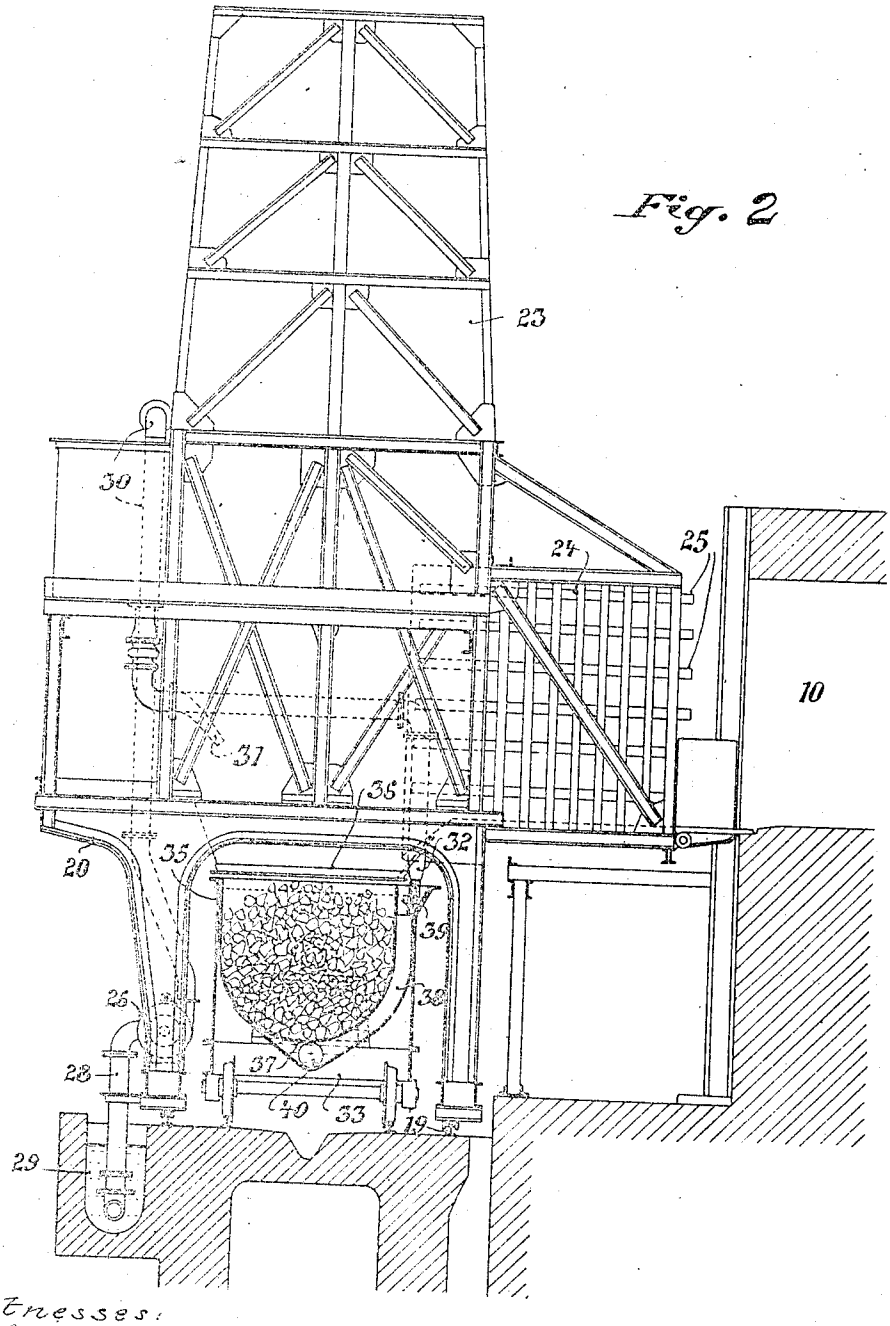
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2 SHEETS—SHEET 2.

Fig. 2



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UNITED STATES PATENT OFFICE.

HEINRICH KOPPERS, OF ESSEN-ON-THE-RUHR, GERMANY, ASSIGNOR TO H. KOPPERS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION.

APPARATUS FOR QUENCHING COKE.

1,121,376. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed February 4, 1913. Serial No. 746,098.

To all whom it may concern:

Be it known that I, HEINRICH KOPPERS, a subject of the King of Prussia, and residing at 29 Moltkestrasse, Essen-on-the Ruhr, Germany, have invented certain new and useful Improvements in Apparatus for Quenching Coke, of which the following is a specification.

This invention relates to apparatus for quenching incandescent coke, and it is characterized by the fact that quenching water is admitted to the coke container from below, so that the steam generated is able to escape freely upward, and access of air, liable to cause combustion is prevented, while the steam also assists the quenching. This method of operation prevents the coke from being "drowned" *i. e.* completely saturated.

Heretofore it has been customary to quench the incandescent coke either by sprinkling it with water, or by tipping it into a tank of water, or by dipping a perforated coke container into a tank of water. With all these methods it has been usual so that to arrange the water comes in contact with the coke from all sides and in large quantities, in order to accelerate the quenching operation. This principle, however, is wrong, since it involves that the steam generated is unable to escape, and this results in the well known "Leidenfrost" action, the particles of coke becoming enveloped in minute steam jackets. The latter not only retard the quenching, but by suddenly bursting give rise to the well known explosions, by which most of the coke is frequently blown out of the container. If, however, water is only admitted from below according to the present invention, the steam is able to escape upward without hindrance. At the same time the exclusion of air and the quenching by the steam enable the supply of water to be carried out much more slowly and in smaller quantities than was hitherto considered necessary.

The invention is illustrated in the accompanying drawing, in which

Figure 1 is a side elevation of a coke quenching plant, and Fig. 2, a sectional end view thereof.

In front of the coke oven 10 is adapted to travel a frame 20, which is driven by a motor 21 through gear 22. The upper part of the frame 20 is in the form of a chimney 23 and is provided at that side adjacent the oven 10 with an extension 24 which is the form of quenching cage provided at the top and bottom with sprinkling pipes 25. A pump 27, driven by a motor 26, draws water by means of its suction pipe 28 from a trough 29, which extends along the whole length of the battery of ovens. The delivery pipe 30 is adapted to supply the quenching water alternatively to the sprinkling pipe 31 or to a delivery pipe 32 discharging into the water bath. Underneath the portal shaped frame 20 runs a truck 33 which, with the aid of bearings 34, carries a substantially trough-shaped quenching container 35, the latter being arranged so that it can be tipped about its center of gravity. At the lower end of the chimney 23 the walls thereof converge inward, forming a funnel shaped mouth 36, with which the top of the container 35 is adapted to register, a slight clearance being arranged for between the parts. The bottom of the container 35 is provided with perforations 37, and at one side with a channel 38 terminating at its upper end in a flared mouth 39 which is adapted to be placed underneath the delivery pipe 32. Extending along the bottom of container 35 is a channel or passage 40, which may be closed at its front end by a valve plate 41, the latter being pressed up against its seat by a screw spindle 42. The container 35 is adapted to be tipped about its axis by means of toothed gearing 43.

The operation of the apparatus is as follows: The traveling frame 20, and the truck 33 carrying the container 35, are wheeled in front of the oven 10 to be emptied so that the quenching cage 24 is placed in front of the door. The pump 27 is then started, and water is pumped to the sprinkler pipes 25 which sprinkle the cake of coke as it leaves the oven. The cake of coke always requires some time to be broken up, and this preliminary sprinkling serves to prevent or reduce its combustion. When the coke has passed through the cage 24 into the container 35 the water is cut off by a suitable valve from the sprinkler and is delivered to the nozzle 32 so that it passes into the tunnel 39, and runs through the perforations 37 into the interior of the container. It will be seen that the arrangement of the channel 38 at the side of the container 35 renders a tight joint with the water delivery pipe unnecessary, whereas such joint would be re-

quired if the water delivery pipe were connected to the bottom of the container. The steam generated by contact of the water with the hot coke escapes freely upward, prevents entrance of air, and assists in quenching the coke. The close fit of the container with the intermediate part 36 also prevents the workmen from being affected by the steam generated. In order to obtain a perfectly tight joint at this part the container 35 may be slightly raised to meet the part 36, or the latter may be lowered. The sprinkler 31 is provided in case additional quenching from above should be required for any particular reason. After the coke has been quenched the truck 33 and container 35 are moved away from the frame 20, and the valve 41 is opened to allow the water to escape. In this case also the coke dust is flooded away by the flow of the escaping water. After the water has run off the container is tipped over about its axis and emptied into any suitable conveyance, or into the screening apparatus.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. Apparatus of the character described, comprising a traveling container adapted to receive the coke to be quenched, said container having imperforate side walls and a perforated bottom, a channel communicating through said perforated bottom with the interior of the container and extending upward to the top of said container, and a water supply nozzle adapted to admit quenching water into said channel.

2. Apparatus of the character described, comprising a traveling container adapted to receive the coke to be quenched, said container having imperforate side walls and a perforated bottom, a channel communicating through said perforated bottom with the interior of the container and extending upward to the top of said container, a water supply nozzle adapted to admit quenching water into said channel, and a valve-controlled discharge-passage at the bottom of the container.

3. Apparatus for quenching coke, comprising a traveling and tipping container to which water can be fed from below, in combination with an independently traveling chimney and with a quenching cage consisting of sprinkling tubes and adapted to travel with said chimney.

4. Apparatus for quenching coke, comprising a traveling and tipping container to which water can be fed from below, in combination with an independently traveling chimney and with a quenching cage adapted to travel with said chimney, and a pump mounted to travel with said chimney and adapted to deliver quenching water to the coke container.

5. Apparatus for quenching coke, comprising a traveling and tipping container to which water can be fed from below, in combination with an independently traveling chimney and with a quenching cage connected to said chimney, and a pump mounted to travel with said chimney and adapted to deliver quenching water to the coke container, the said chimney being adapted to register with the walls of the container with a slight amount of clearance.

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Witnesses:
MAX SOMMER,
AUGUST FUGGER.