

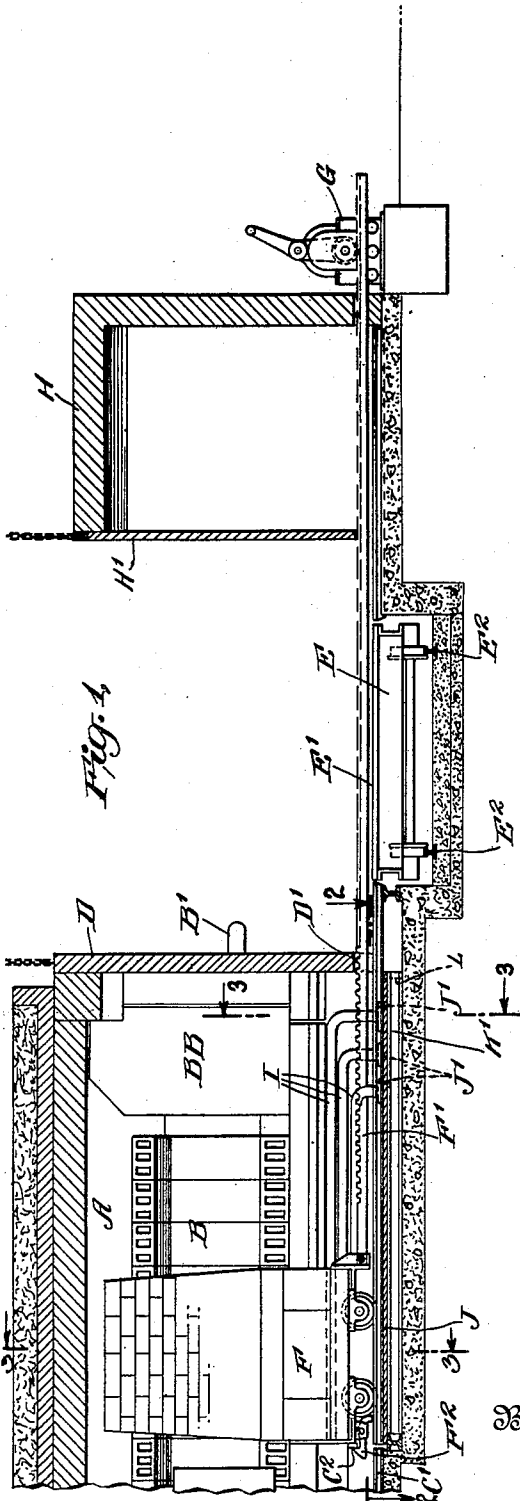
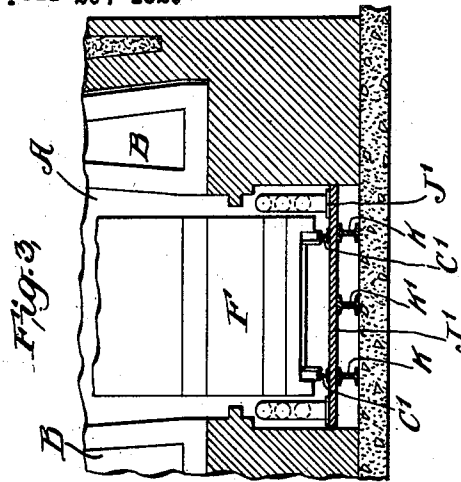
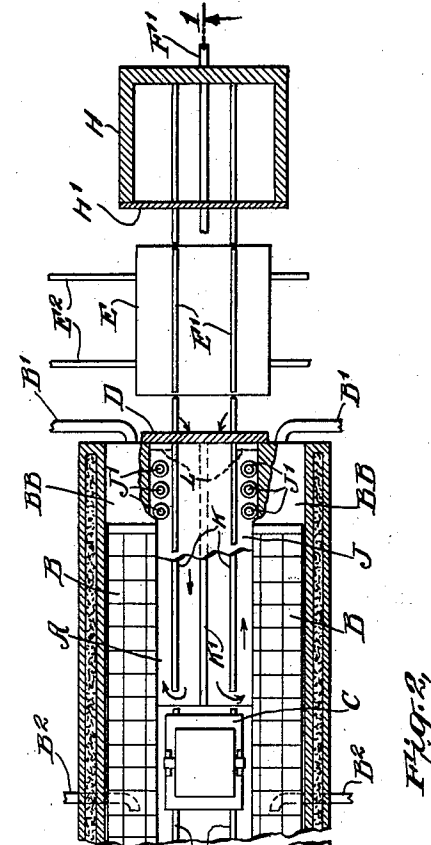
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H. M. ROBERTSON

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TUNNEL KILN

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Inventor
By his Attorney Harry M. Robertson
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UNITED STATES PATENT OFFICE.

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TUNNEL KILN.

Application filed April 20, 1920, Serial No. 375,267. Renewed May 15, 1923.

To all whom it may concern:

Be it known that I, HARRY M. ROBERTSON, citizen of the United States, and resident of Rockville, in the county of Montgomery and State of Maryland, have invented certain new and useful Improvements in Tunnel Kilns, of which the following is a specification.

My present invention consists in improvements in continuous tunnel kilns devised with the general object of facilitating the withdrawal from the kiln, of the goods treated therein while the latter are at the maximum temperature attained by them in the kiln.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and the advantages possessed by it and specific objects attained with it, reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of my invention.

Of the drawings;

Fig. 1 is an elevation of a portion of a kiln, in section on the line 1—1 of Fig. 2.

Fig. 2 is a plan in section of a portion of the kiln, with parts broken away.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

In the drawings I have illustrated my invention in connection with a kiln employed for the heating up, or so called arching of glass pots, that is pots formed of fire clay and adapted to hold molten glass in the process of glass manufacture. Within the tunnel kiln chamber A, are combustion chambers B running lengthwise of the kiln at opposite sides of the pathway for the goods which are moved through the kiln on trucks C running on track rails C'. Gas from a pipe B', and air for its combustion are supplied to the ends of the combustion chamber adjacent the exit end of the kiln through the chambered members BB. Gas may also be supplied to the combustion chambers at points somewhat nearer the entrance end of the kiln through auxiliary gas supply pipes B². The combustion chambers B may advantageously be, and are shown as, of the type commonly employed in the well known Dressler tunnel kiln.

The exit end of the kiln is normally closed by a door D. The track rails C' extend out of the exit end of the kiln into position to register with the truck supporting rails E¹ on the usual transfer car E, the latter running on track rails E².

To withdraw each goods carrying car C approaching the exit end of the kiln from the kiln, I employ a special or dummy car F adapted to be detachably connected to the goods carrying car, and provisions for moving the car F into and out of the kiln at the exit end of the latter. As shown the car F is connected to a rack bar F¹ which normally projects through a slot or notch D¹ formed in the bottom of the kiln door D and into engagement with a suitable mechanism G for advancing and retracting the bar F', and thereby the car F. The latter is shown as provided with a hook F² which automatically engages a flange C² at the end of each goods carrying car C, into contact with which the car F is moved. At the proper time each car C, then at the head of the train of cars, and thus coupled to the car F is drawn out of the kiln and moved onto the transfer table E by the actuation of the car moving device G. The car F is then moved still further away from the kiln, and the transfer table E is shifted to dispose of the goods carrying car. After the return of the empty transfer table E, the car F is again inserted in the kiln and coupled to the goods carrying car C then at the head of train of cars in the kiln.

In arching glass pots and for various other uses it is desirable that each goods carrying car C be removed from the kiln when the glass pot or other article carried by it is at its maximum temperature. It is practically impossible to obtain the maximum kiln temperature at the extreme exit end of the chamber. The necessary provisions for introducing combustible gas and air into the combustion chambers, and the exigencies of construction make it impossible to bring the point of maximum temperature in the combustion chambers, themselves, to the extreme exit end of the kiln, and it is practically impossible to keep the inner side of exit door D at the maximum kiln temperature. The car F protects the goods on each car C approaching the exit end of the kiln against the cooling effect of the door and of the immediately adjacent

portions of the kiln. For this purpose I form the car F with a massive superstructure of fire brick or other refractory and heat storing material. In the condition of the apparatus shown in Fig. 1, the superstructure of the car F is in the portion of the kiln chamber subjected to the highest kiln temperature and consequently becomes highly heated. As the dummy car F is moved closer to the door D, the goods carrying car coupled to it is moved into the hottest portion of the kiln chamber. The glass pot or other article on the goods carrying car C then attains its maximum temperature as it is protected by the hot superstructure of the car F against loss of heat by radiation to the door D and the relatively cool side wall portions of the kiln structure immediately adjacent the exit door.

To prevent undue loss of heat by the dummy car while the latter is out of the kiln, I provide an enclosure or dummy car house H beyond the transfer table E in which the car F is stored during the short interval required for the manipulation of the transfer table to dispose of the goods carrying cars moved onto the table each time the car is withdrawn from the kiln. This house is formed with walls of heat insulating material, and is provided with a door H¹ which is normally closed but is opened to permit the entrance and removal of the car F. With the arrangements described I am enabled to quickly remove each goods carrying car C immediately after the glass pot, or other article carried by it, has attained its maximum temperature in the kiln.

With the dummy car F in the position shown in Fig. 1 it will be apparent that a portion of the track rails C¹ and of the floor of the kiln chamber immediately adjacent the exit end of the kiln is freely exposed to the high kiln temperature, and during the period in which the car F is withdrawn from the kiln, the portion of the kiln chamber floor covered by the car F, in the condition of the apparatus shown in Fig. 1, is similarly exposed to a high temperature. To avoid overheating of the kiln floor adjacent the exit end of the kiln, I have devised special provisions for cooling this portion of the kiln floor. For this purpose I, preferably, make the floor of the kiln chamber proper adjacent the exit end of the kiln out of metal plate supported in part by girders or floor beams K under the track rails C¹, and uniting with a central girder or baffle member K¹, and the marginal supports for the sides and inner end of the plate J, to form air channels through which I cause air to flow. The air circulation is caused, in the particular construction illustrated, by connecting pipes I to ports J¹ in the plate J which open adjacent the exit

end of the kiln into the channels formed below the plate J and at the outer side of each of the girders K. The outer ends of these channels are closed by baffles L, but the two channels between the girders K and the baffle or girder K¹ are open beneath the door D to the external atmosphere. The girders K are shortened, so that the two channels at the opposite sides of each of these girders are connected at their ends remote from the door D. The pipes I extend through the high temperature portion of the kiln at the opposite sides of the pathway transversed by the under portions of the goods carrying cars C. At their ends remote from the door D, the pipes I are connected to a suitable draft creating device shown diagrammatically in Fig. 2 as a fan I^A.

With the described construction, the floor of the portion of the kiln adjacent its exit end is effectually cooled by the air flow along the under side of the floor plate J. By drawing this air in sufficient quantity through the pipes I, the latter may serve as the usual truck cooling pipes employed for preventing the overheating of the under portions of the goods carrying cars C and the tracks E¹ in the high temperature portion of the kiln. The dummy car house H, if formed with walls having good heat insulating properties, will ordinarily require no separate means for supplying heat thereto in order to prevent undue loss of heat by the car F during the brief periods in which it is stored therein, or to compensate for loss of heat from the car F during the brief intervals in which it is exposed to the external atmosphere, but such separate heating means may readily be supplied if desired.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of my invention now known to me it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims, and that certain features of my invention may sometimes be used to advantage without a corresponding use of other features.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. The combination with a continuous tunnel kiln and the goods carrying cars movable through it of means for withdrawing the goods carrying cars from the exit end of the kiln comprising a dummy car, means for moving the dummy car into and out of the kiln at its exit end, and means for detachably coupling the dummy car to the goods carrying car.

2. The combination with a continuous

tunnel kiln and the goods carrying cars movable through the kiln, of a refractory barrier movable into and out of the kiln at its exit end and adapted to serve as a shield against heat losses from the goods on the goods carrying car approaching the exit end of the kiln.

3. The combination with a continuous tunnel kiln and the cars for moving goods through the kiln, of a dummy car movable into and out of the kiln, at its exit end, and having a refractory superstructure of substantial heat capacity, and provisions by which the dummy car may be detachably connected to the goods carrying cars.

4. The combination with a continuous tunnel kiln and the cars for moving goods through the kiln, of a dummy car movable into and out of the kiln at its exit end, and having a refractory superstructure of substantial heat capacity, and a housing in which the dummy car may be stored when withdrawn from the kiln for the discharge from the latter of a goods carrying car.

5. The combination with a tunnel kiln and goods carrying cars movable through the kiln, of a transfer table outside the kiln adjacent its exit end, a housing having heat insulating walls at the opposite side of the transfer table from the kiln, a dummy car movable back and forth between said housing and the portion of the kiln adjacent its exit end, and provisions for detachably connecting said dummy car to the goods carrying cars.

6. The combination with a tunnel kiln and goods carrying cars movable through the kiln, of a transfer table outside of the kiln adjacent its exit end, a housing having heat insulating walls at the opposite side of the transfer table from the kiln, a dummy

car having a refractory superstructure movable back and forth between a position in said housing and a position in said kiln adjacent its exit end.

7. In a continuous tunnel kiln having a track on its floor for goods carrying cars and provisions for heating the kiln so as to maintain a high temperature therein immediately adjacent the exit end of the kiln, the improvement which consists in passages for a cooling fluid beneath the portion of the oven floor immediately adjacent the exit end of the kiln in conjunction with the usual truck cooling pipes located above the kiln floor in the remainder of the high temperature portion of the kiln.

8. In a continuous tunnel kiln having a track on its floor for goods carrying cars and provisions for heating the kiln so as to maintain a high temperature therein immediately adjacent the exit end of the kiln, the improvement which consists in passages for a cooling fluid beneath the portion of the oven floor immediately adjacent the exit end of the kiln in conjunction with the usual truck cooling pipes located above the kiln floor in the remainder of the high temperature portion of the kiln, and connected to said passages.

9. The combination with a continuous tunnel kiln and means for moving goods through the kiln, of a dummy car movable into and out of the kiln at its exit end, and having a refractory superstructure adapted to serve as a heat accumulator of substantial capacity.

Signed at New Castle in the county of Lawrence and State of Penna. this 10th day of April A. D., 1920.

HARRY M. ROBERTSON.