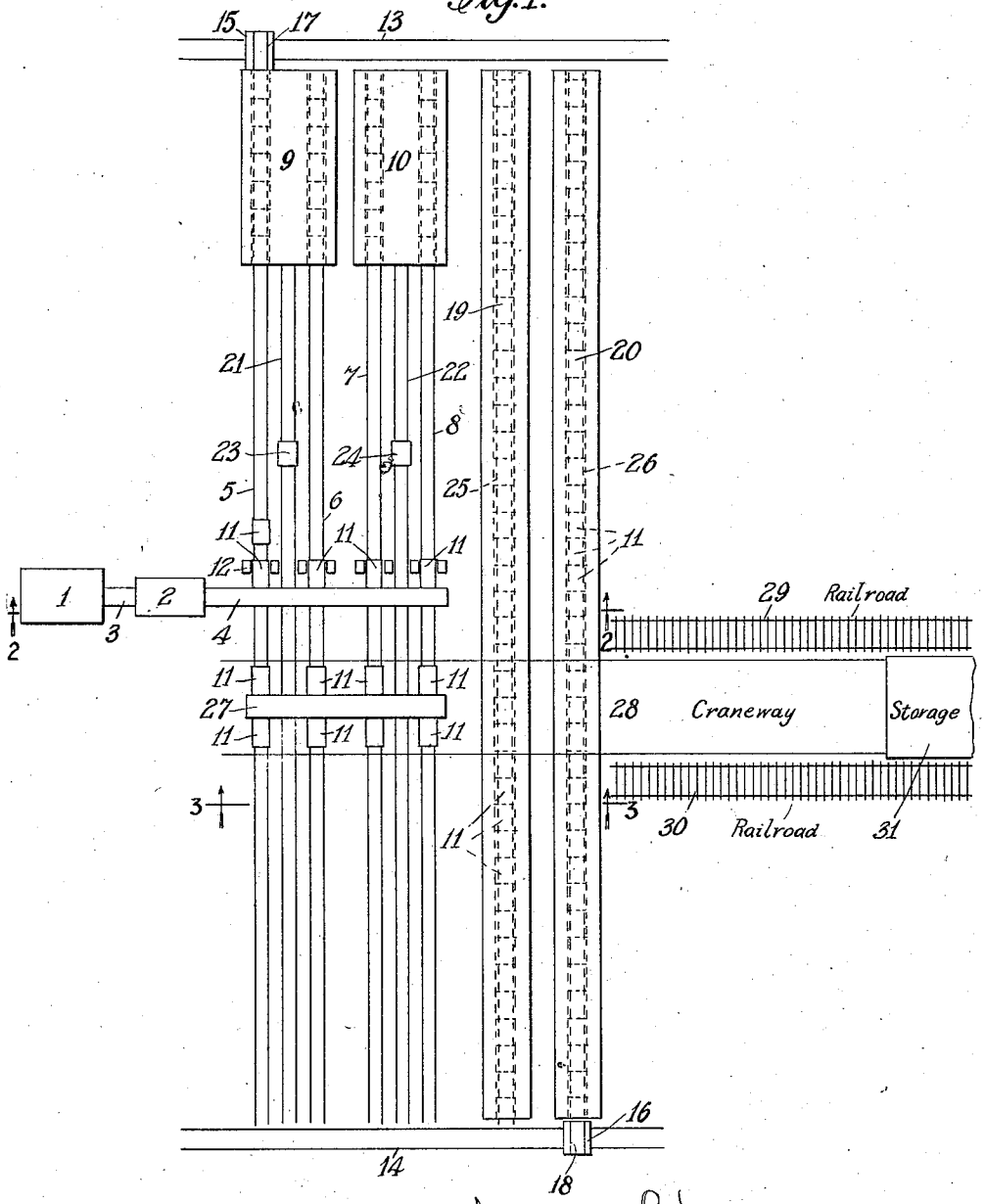
Sept. 6, 1927. 1,641,583

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PLANT FOR MANUFACTURING CERAMIC PRODUCTS

Original Filed May 5, 1925 2 Sheets-Sheet 1

Fig. 1.



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Original Filed May 5, 1925 2 Sheets Sheet 2

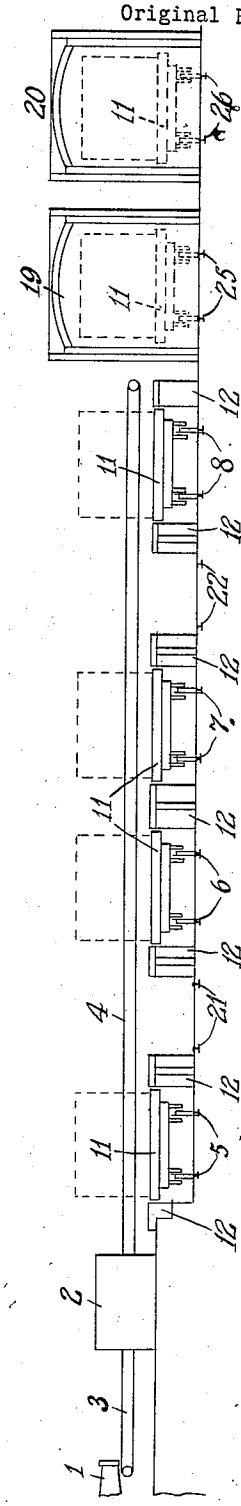


Fig. 2.

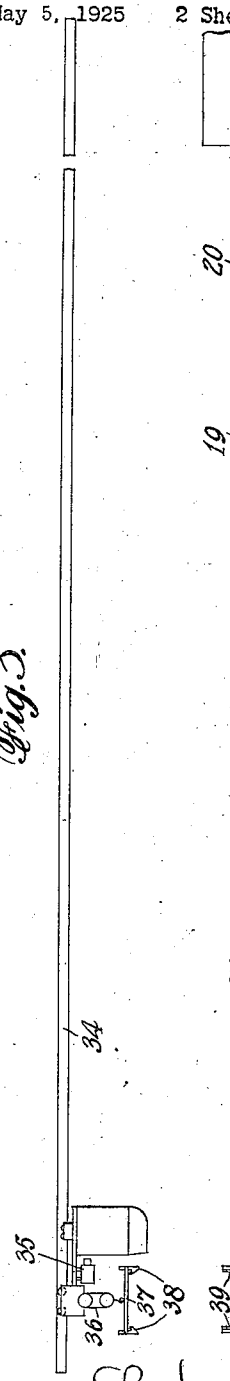


Fig. 3.

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UNITED STATES PATENT OFFICE.

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PLANT FOR MANUFACTURING CERAMIC PRODUCTS.

Application filed May 5, 1925, Serial No. 23,050. Renewed February 4, 1927.

My invention consists in the novel features hereinafter described, reference being had to the accompanying drawings, which illustrate one embodiment of the same selected by me for purposes of illustration, and the said invention is fully disclosed in the following description and claims.

The object of my invention is to provide a brick making plant in which the bricks may be carried on the same car from the time they are formed until they are fully fired, and in which the cars are not transferred until after the bricks have become fully set and hardened, as by passing through a drier, there being, in accordance with the preferred form of my invention, only two transfers of the cars, one from the drier to the kiln, and one from the kiln to the track leading to the unloading point. In the operation of the ordinary brick plant as now conducted, it is customary and usual to place the wet or green brick on trucks which are run onto transferring trucks and distributed to the tracks leading to the driers, in which the cars are again put on transfer trucks and taken to the kiln in which they are set if it is the ordinary type of kiln, or if it is a tunnel kiln, they are usually rehandled and reset on kiln cars, especially designed to withstand the heat of the kiln. After passing through the tunnel kiln, the bricks are placed on cars and again rehandled, and reset on cars, which are then carried by a transfer truck to the tracks on which the cars are run to the unloading point. The movement of a car from the main track to the tracks of a transfer truck will invariably occasion a certain amount of jarring and shock to the bricks with which the car is loaded, and where the bricks are transferred while green, this jar is apt to cause the bricks to slide or move with respect to each other in the various layers or tiers, and as these bricks are frequently piled as high as twelve to sixteen tiers, this movement of the bricks is apt to injure the accuracy of their form, or in some cases destroy a carload of the wet bricks, but what is more serious, it is apt to produce a condition which will lead to the toppling of the bricks against the side of the drier or kiln which produces what its termed in the art, a "wreck." This is a very serious matter as it necessitates the stopping of the entire plant and sending men into the drier or kiln to remove the débris and clear the tracks for continued operation, and in the case of a wreck in a tunnel kiln, it means usually putting the entire plant out of operation for approximately two days to permit the cooling of the kiln sufficiently to allow workmen to enter and to again reheat it to firing temperature and restore the plant to operative condition. My invention is especially designed to prevent these wrecks from happening, and also to secure the most economical operation of the plant at all times and the elimination of hand labor as far as possible. To this end I provide a series of trucks which run in substantially a straight line from loading platforms adjacent to the off-bearing belt of the brick making machine directly into and through the drier or driers. I load the green brick, which may be either a stiff mud brick or pressed bricks, or any other type of brick, onto cars which are preferably constructed so as to be able to resist the temperature of the firing kiln and move them in a straight line into and through the drier without transferring the cars. To this end, all of the tracks through the drier lead directly to loading platforms adjacent to the off-bearing belt. This is particularly important in handling stiff mud bricks, as they are generally oiled or otherwise lubricated when they pass through the drier, and are exceedingly slippery, so that any jar tends to make them skid or cause the mass of bricks on the car to incline one way or the other, with the disadvantageous result hereinbefore referred to, all of which are avoided by my invention. I also arrange to have the off-bearing belt pass over the top of all the tracks leading to the drier, so that the cars may be loaded by what is termed a quarter turn of the workman in packing the bricks on the cars. From the drier the cars are carried by a transfer truck to a tunnel kiln, and being in a dried condition, are not liable to injure or shift the bricks on the cars in moving the cars onto and off of the transfer truck. The cars are then moved, always in a forward direction, through the kiln, which I prefer to arrange parallel with the tracks leading from the off-bearing belt to the drier, the off-bearing belt being preferably located substantially opposite the central part of the tunnel kiln. The cars are moved out of the kiln after the bricks are fired, onto a transfer truck and are moved from the transfer truck onto tracks in alignment

with and preferably continuous with the tracks leading from the off-bearing belt to the drier, and the burned bricks are moved back toward the loading platform, but before reaching the same, are stopped adjacent to unloading platforms, where the bricks are removed and carried by any type of crane, preferably over the top of the kiln, to a storage room, or rooms, or to freight platforms, where they are loaded into cars for shipment. The storage room and shipping tracks are preferably located on the opposite side of the kiln from the brick machine, leaving a portion of the plant adjacent to the brick machine clear for the reception and storage of material used in the making of the bricks.

It will thus be seen that the bricks are not handled from the time they are hacked on the cars from the off-bearing belt, until the finished bricks are removed from the same cars for storage and shipment. My invention also contemplates the provision of sufficient storage space on the trucks to permit of continuous operation, of the kiln seven days in the week, while the brick machine and driers are only operated six days in the week, thus avoiding any interruption in the heating of the kiln or kilns, and tending to great economy in manufacture. It will also be noted that according to my invention, the cars are always moved forward or sideways and are never moved backward at any stage in their progress through the plant.

Referring to the accompanying drawings, which illustrate one form of brick making plant embodying my invention.

Fig. 1 is a top plan view representing, more or less diagrammatically, the general layout of the plant.

Fig. 2 represents a transverse section on the line 2—2 of Fig. 1, adjacent to the loading platforms and off-bearing belt.

Fig. 3 represents a similar cross sectional view adjacent to the unloading platforms, or sorting bench, on the line 3—3 of Fig. 1.

In the accompanying drawing, I have illustrated a plant provided with two driers and two tunnel kilns, and I have shown a single brick machine and a single off-bearing belt. In this drawing, 1, represents diagrammatically, the brick machine, which may be of any desired construction. While it is indicated more or less diagrammatically, it is intended to represent a brick machine for handling stiff mud bricks, preferably expressing a continuous column, which is severed into individual bricks by the usual wire cutter, 2, to which the column is conducted by a measuring belt, 3, the bricks being delivered in separated relation onto the off-bearing belt, indicated at 4. This brick machine and its off-bearing belt is preferably located at right angles to and substantially opposite the central portion of the kiln, or kilns, as shown in Fig. 1, and the off bearing belt extends over a plurality of tracks, indicated at 5, 6, 7 and 8, leading to and through the driers, which are indicated in this instance, at 9 and 10, at a sufficient elevation above the track to permit the cars, indicated at 11, to pass under the belt and its supports, as clearly shown in Figs. 2 and 3. In this instance I have shown four sets of tracks, 5, 6, 7 and 8, two of which pass through each of the driers, and as the off-bearing belt extends over all four of the tracks, cars on any track can be loaded from the off-bearing belt, as desired. Suitable loading platforms, indicated at 12, are provided adjacent to the off bearing belt on which the operators may stand while removing the green bricks from the belt and hacking them on the cars, and it will be noted from Fig. 1, that it is only necessary for the operators to swing their bodies through a quarter turn in hacking the bricks which enables this operation to be performed in the most rapid and economic manner. The cars, 11, are preferably constructed with metal frames and fire brick platforms, so that they can not only be passed through the driers, but can be passed through the kilns without injury, thus avoiding the necessity of rehandling the bricks between the driers and the kilns. At each end of the tracks, 5, 6, 7 and 8, I provide transversely disposed transfer tracks, indicated at 13, 14, each of which is provided with a transfer truck, indicated at 15 and 16, respectively, provided with a pair of transversely disposed rails, 17, 18, which can be brought into alignment with any one of the tracks, 5, 6, 7 and 8, and also with any one of the tracks of the tunnel kilns, indicated at 19—20, which extend the full distance between the transfer tracks, 13, 14, and parallel to the tracks, 5, 6, 7 and 8. The cars are moved forward one at a time, into the driers on whatever track they may occupy when loaded and moved in a substantially straight course into and through the drier, through which the track extends, so that there is no transferring of the cars loaded with green bricks, and the cars are moved in such a manner as to avoid jarring the soft, lubricated bricks as far as possible. In order to accomplish the movement of the cars on the tracks, 5, 6, 7 and 8, I prefer to provide between each pair of tracks, 5—6 and 7—8, an additional track, represented at 21 and 22, on which is a locomotive, preferably operated by electric power, and which can be connected by means of a chain or otherwise with the cars as they are moved longitudinally on the adjacent tracks. I have illustrated diagrammatically two of these electric locomotives, at 23 and 24, in Fig. 1. I wish it to be understood, however,

that the cars may be advanced on the tracks, 5, 6, 7 and 8, if desired. It will be understood that the cars will be moved into the driers until the entire trackage therein is occupied, after which the introduction of a car into the drier on any of the tracks will move all the preceding cars forward one car length and expel the foremost car onto the rails, 17, of the transfer truck, 15, which will have been brought into alignment with the main track rails to receive the car. The transfer truck is then moved along the transfer track, 13, transversely of the main rails, 5, 6, 7 and 8, into alignment with the track extending through one or other of the tunnel kilns, and indicated in dotted lines in Fig. 1, at 25 and 26 respectively. It will also be understood that the tunnel kilns will be supplied with suitable heating means for gradually raising the dried bricks to firing temperature, approximately midway of the length of the kilns, and to permit the fired bricks to become partially cooled before the cars carrying them reach the opposite ends of the kiln, and that after enough cars have been delivered into the kilns to occupy the entire trackage therein, at the introduction of a car from the transfer truck, 15, into either kiln, will expel the furthermost car at the other end of the kiln, onto the rails, 18, of the truck, 16, which will have been brought into alignment with the tracks of the kiln. As each car of burnt and cooled brick is expelled from either of the kilns upon the transfer trucks, the truck will be moved on the transfer rails, 14, into alignment with one or other of the main tracks, 5, 6, 7 and 8, and moved off of the transfer truck onto said main rail and moved thereon down to a position thereon at some distance from the off-bearing belt, 4, where they are to be unloaded, having passed entirely through the plant on the car, on which they were originally hacked. At this point, which I term the unloading point, I provide a sorting table, 27, extending over the tracks, 5, 6, 7 and 8, at a sufficient elevation to permit the cars, 11, to pass beneath the same, and I also provide a craneway, indicated at 28 in Fig. 1, and which may be of the monorail or regular crane type, which extends transversely across the tracks, 5, 6, 7 and 8, and preferably over the tops of the kiln, 19 and 20, to suitable railway tracks, indicated at 29 and 30, arranged on one or both sides of the craneway, and connected with an ordinary railway line for the reception of freight cars into which the bricks may be loaded from the crane for shipment or the bricks may be carried by the crane into a storage building or warehouse, indicated at 31, for storage until shipping. I prefer to locate the railway shipping line, or lines, and the storage room on the opposite side of the kiln, or kilns, from the brick making machine, as this leaves the entire portion of the plant adjacent to the brick making machine free for the reception and storage of the materials used for making the bricks.

As indicated in Fig. 3, the sorting bench, 27, may be provided with rails, indicated at 32, for the reception of platforms or boxes, indicated at 33, into which they may be sorted, and these boxes may be elevated by means of the crane and carried to the shipping or storage facilities. In this instance I have shown a monorail type of crane, in which, 34, represents the supporting rail, and 35, represents the traveling crane, provided with hoisting means, indicated at 36, carrying a lifting device, 37, having swiveled hooks, 38, adapted to be engaged with openings or slots, 39, in the end plates of the platforms or boxes, 33, for lifting them with considerable quantity of brick, and carrying them along the rail, 34, to the point of shipment, as the freight car, 40, on the railway tracks, 29 or 30, and passing over the top of the kiln, indicated at 19—20.

As brick making plants are operated only six days in the week, and as it is desirable not to stop the operation of the kilns, in order to prevent loss of heat and interruption of the firing, it is extremely desirable to operate the kilns continuously seven days in the week, and it is necessary, therefore, to provide sufficient space on the tracks, 5, 6, 7 and 8, and in the driers, 9—10, so that a sufficient number of loaded cars can be accumulated thereon at the close of the sixth day to insure the operation continuously of the kiln for twenty four hours, without manufacturing any further bricks. Likewise, it is necessary to provide a sufficient capacity of truckage between the transfer track, 14, and the unloading platform, 27, to accommodate the cars of burned brick which may be removed from the kiln during the time that the brick machine is not in operation, as on the seventh day of the week, for example. As the kilns, 19, 20, of the tunnel type, are of very considerable length, approximately, 400 feet, and as the brick machine and loading platform are located substantially centrally of the tracks, 5, 6, 7 and 8, which are parallel with the kiln, there will ordinarily be a sufficient storage space on these tracks between the off-bearing belt 4, and the transfer track, 13, and between the transfer track, 14, and the unloading platform, 27, to take care of this situation, but if it is not sufficient, the distance between the transfer tracks, 13, 14, can be increased to provide the necessary storage trackage. If the plant is not operated night and day, this storage capacity will also be available to keep the kilns in operation over night in case the brick making machines are closed down.

It will be understood that suitable heating means are provided for the kilns and also for the driers, which are only indicated diagrammatically in the accompanying drawings, and both the kilns and driers may be of any usual or desired construction. The driers may also be supplied with heated products of combustion from the kilns for the purpose of conserving fuel, if desired. My invention is particularly desirable for manufacture of bricks from stiff mud, as it is termed, in the trade, but it is also applicable to the manufacture of any other type of brick. As before stated, the wet or green bricks are carried in the most direct manner from the off-bearing belt into and through the drier without any transfer or handling after they are hacked on the cars, and they are not transferred until after leaving the drier when they are sufficiently firm and hard to avoid injury and also to avoid the probability of causing wrecks in the kiln. It will also be seen that the plant can be very economically arranged on a tract of land with a minimum of waste space, and that the cars are always moved either in a forward or lateral direction, and continuous progress, never being permitted a retrograde movement at any stage of the operations. After the cars are unloaded at the sorting table, 27, they are moved beneath the sorting table and beneath the off-bearing belt to be again reloaded with freshly made brick, so that the brick making operation is conducted as a continuous operation.

While I prefer to employ transfer tracks and transfer trucks at each end of the plant for transferring the cars from one track to another, I wish it to be understood that I may use curved tracks, or any other preferred form of transferring means for this purpose. I have indicated in the drawings, merely simple transfer trucks, capable of being moved on the transfer tracks in any desired manner, but I may employ self-propelled trucks operated by electric motors, or other driving means carried on the trucks under the control of the operator, if desired.

What I claim and desire to secure by Letters Patent is:—

1. In a plan for manufacturing ceramic products, the combination with a pair of tunnel kilns arranged side by side and having a track for tunnel cars extending therethrough, car transferring means located at each end of said kilns, a plurality of exterior tracks for tunnel cars substantially parallel to the kiln tracks and extending from one transferring means to the other, a forming machine for producing ceramic products, provided with an off-bearing belt extending over said exterior tracks at a height sufficient to permit the passage of the tunnel cars beneath the same, said off-bearing belt extending transversely with respect to said tracks and being located near the center of length of said exterior tracks, drying means located between said off-bearing belt and one of said transferring means, said exterior track passing in a substantially straight line from the off-bearing belt to and through said drying means, an unloading and sorting platform located between the off-bearing belt and the other transferring means, disposed transversely of said exterior tracks and extending above the same at a height sufficient to permit the passage of the tunnel cars beneath the same.

2. In a plant for manufacturing ceramic products, the combination with a pair of tunnel kilns arranged side by side and having a track for tunnel cars extending therethrough, transfer tracks located at each end of said kilns and extending transversely with respect thereto and laterally of one side of the kilns, a transfer truck on each of said transfer tracks, a plurality of exterior tracks for tunnel cars extending between the lateral portions of said transfer tracks and substantially parallel to the kiln tracks, a brick machine located on the side of said exterior tracks opposite the kilns, and at a point near the center of the length of said exterior tracks and provided with an off-bearing belt extending transversely over said exterior tracks at a height sufficient to permit the passage of tunnel cars beneath the same, driers located between the off-bearing belt and one of said transfer tracks and enclosing portions of the tracks, said interior tracks extending in a substantially straight line from the off-bearing belt to and through the driers, an unloading platform extending across said exterior tracks substantially perpendicular thereto, and a sufficient height to permit the passage of tunnel cars thereunder, and a craneway extending over said unloading platform and over said kilns, to a shipping and storage station located on the opposite side of the kilns from said exterior tracks and leaving the opposite side of the plant from said shipping and storage station free for the reception, preparation and storage of the materials for the manufacture of said ceramic products.

3. The combination with a pair of tunnel kilns arranged side by side and having each a track for tunnel cars extending therethrough, cars moving in the same direction through both kilns, a transfer track perpendicular to the tunnel track located at each end of said kiln and extending laterally thereof at one side of the kilns, a transfer truck at each of said transfer tracks, a plurality of exterior tracks for tunnel cars extending between the lateral portions of said transfer tracks and substantially parallel to the kiln tracks, a brick machine for the

manufacture of stiff mud bricks, located at the side of said exterior tracks opposite the kilns, and near the central portions of said exterior tracks, an off-bearing belt extending from said brick machine transversely across all of said exterior tracks, a sufficient distance above the same to permit the passage of the tunnel cars beneath, a pair of driers located adjacent to one of said transfer tracks, and enclosing portions of the exterior tracks, an unloading platform located between the off-bearing belt and the other transfer track, and near the central portion of said exterior tracks, said unloading platform extending transversely over said exterior tracks at a height sufficient to permit the passage thereunder of the tunnel cars, and a craneway extending transversely of said exterior tracks, adjacent to said unloading platform for the removal of finished bricks therefrom, the portions of said exterior tracks between the off-bearing belt and the driers and within the driers, providing storage space for tunnel cars loaded with unfired bricks, and the portions of said exterior tracks between the unloading platform and the other transfer track, providing storage space for tunnel cars loaded with fired brick, so as to insure the continuous operation of the kilns, without operating the brick machine continuously.

In testimony whereof I affix my signature.

WILLIAM LEE HANLEY, JR.