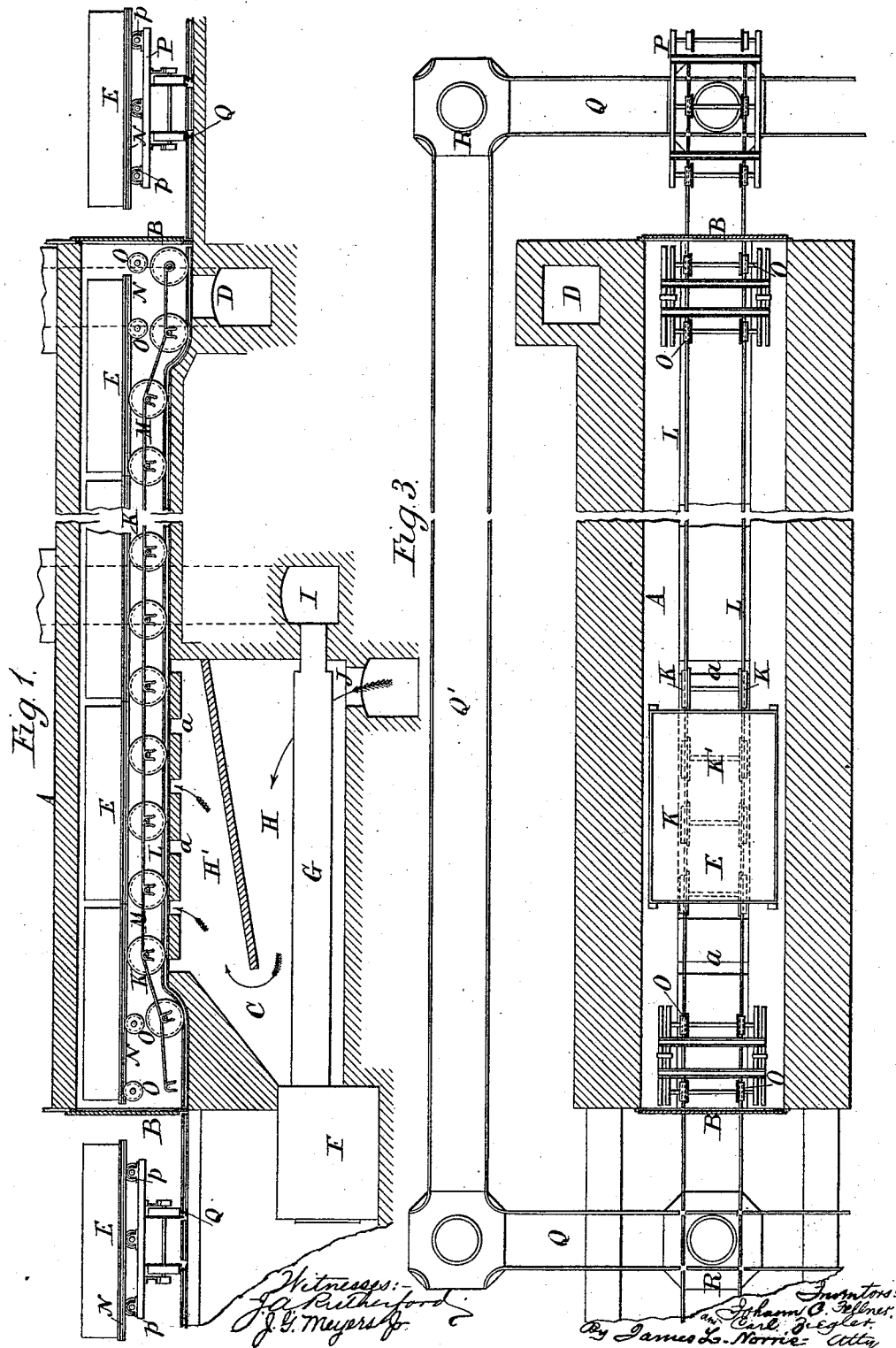


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KILN FOR DRYING OR BAKING PURPOSES.

No. 455,192.

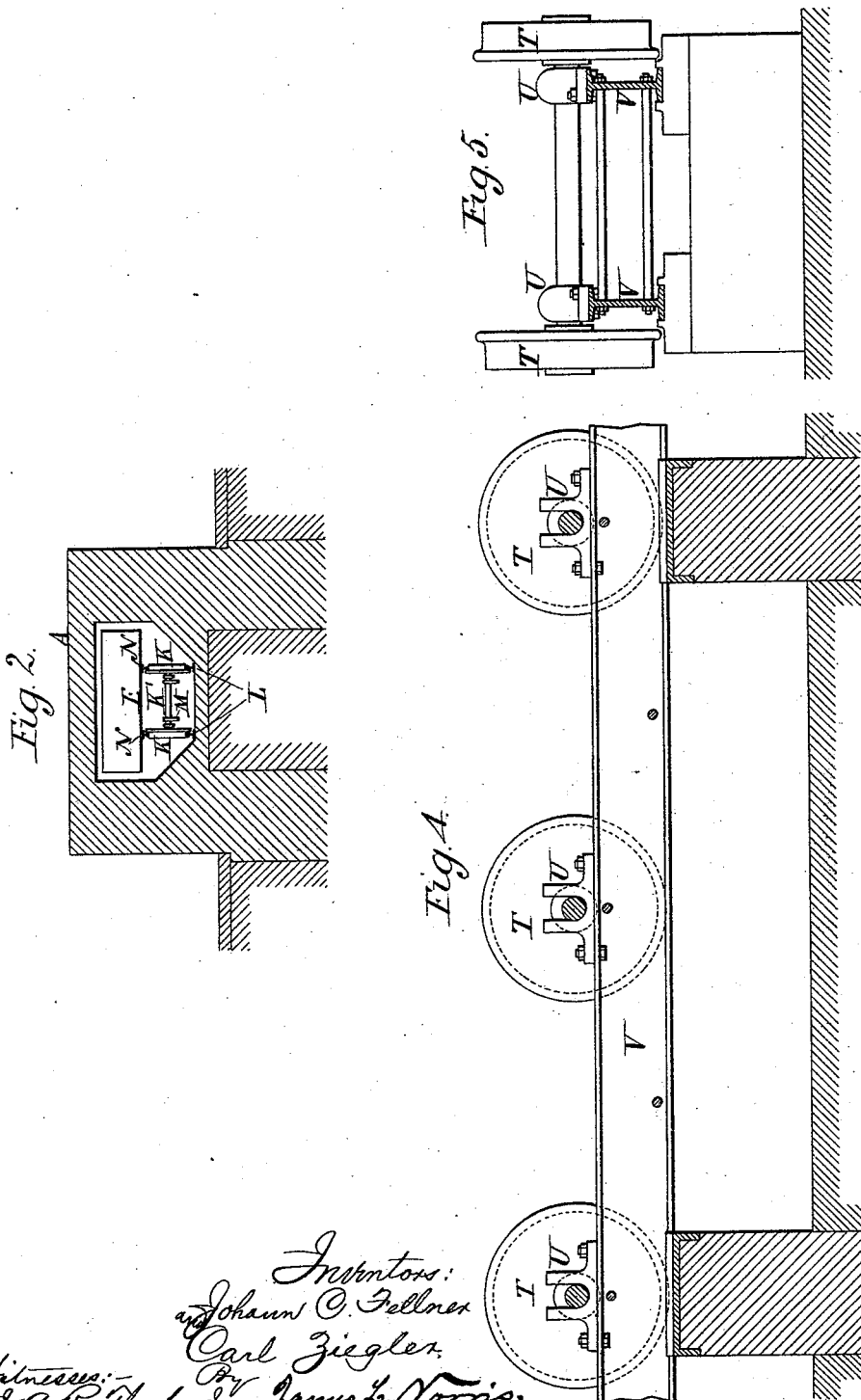
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# UNITED STATES PATENT OFFICE.

JOHANN CHRISTIAN FELLNER AND CARL ZIEGLER, OF BOCKENHEIM,  
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## KILN FOR DRYING OR BAKING PURPOSES.

SPECIFICATION forming part of Letters Patent No. 455,192, dated June 30, 1891.

Application filed December 22, 1890. Serial No. 375,506. (No model.) Patented in Germany July 17, 1888, No. 47,113; in England April 25, 1889, No. 6,938, and in Austria-Hungary May 4, 1889, No. 20,197.

*To all whom it may concern:*

Be it known that we, JOHANN CHRISTIAN FELLNER and CARL ZIEGLER, citizens of Germany, both residing at Bockenheim, near Frankfort-on-the-Main, in the Empire of Germany, have invented new and useful Improvements in Kilns or Ovens for Drying or Baking Purposes, (for which the same has been partly patented to us by Letters Patent in Great Britain, dated April 25, 1889, No. 6,938; in Germany, dated July 17, 1888, No. 47,113, and in Austria-Hungary, dated May 4, 1889, No. 20,197,) of which the following is a specification.

This invention relates to kilns or ovens for drying or baking purposes, consisting of a long horizontal tunnel or passage, into one end of which the materials to be dried or baked are introduced on trucks or traveling platforms, while at the other end hot air is introduced so as to travel to a chimney at the first-named end in the contrary direction to the motion of the materials to be dried or baked, thus causing the materials from which most moisture has already been extracted to be brought into contact with the entering dry hot air, while the moist materials that have been freshly introduced are brought in contact with air which has already taken up a considerable amount of moisture, whereby the heated air is utilized in the most effective manner.

Our present invention relates to an improved construction of such kilns and of the traveling platform employed in combination therewith, which we will proceed to describe, with reference to the accompanying drawings, in which—

Figure 1 shows a longitudinal section; Fig. 2, a cross-section, and Fig. 3 a sectional plan. Figs. 4 and 5 show, respectively, a part sectional elevation and cross-section of a modified arrangement of the carrying-wheels.

A is the tunnel-shaped kiln, closed at each end by vertically-sliding doors B B and provided at the one end with apparatus C for producing a supply of hot air, while the other end communicates at D with a chimney-flue. While the hot air is made to travel along

the kiln toward D, the traveling platform is made to travel in the contrary direction, so that the freshly-introduced materials will come in contact with the air after it has taken up a certain amount of moisture, while the materials that have traversed through the length of the kiln will near the front end be brought in contact with the entering dry heated air, which will consequently effectually take up the remaining moisture of the goods.

The apparatus for heating the air-supply, as here shown, consists of a furnace F, of any suitable construction, from which a metal flue G is led through a chamber H H' to a chimney at I. The air-supply enters the lower compartment H at J, being, if necessary, blown in by a fan or air-pump, and in passing along in the direction of the arrow in contact with the hot flue G it becomes heated to the requisite degree, and in rising at the end of compartment H into compartment H' enters the kiln A through the openings *a a*. We have found it of advantage to admit the hot air into the kiln through a number of openings *a a*, extending some distance along the bottom, instead of through a single large opening at or near the end. By regulating the heat of the furnace and the volume of air blown in by the fan the quantity of air and the degree to which it is heated can be regulated to exact amount required.

In some cases it may be sufficient merely to use the natural draft of the chimney at D for producing the current of air through the kiln; but in most cases artificial draft will be advantageous.

The traveling platform on which the materials to be dried or baked are led through the kiln is composed of platform-sections E and of pairs of flanged wheels K K, mounted on axles K' and adapted to run upon rails L L, laid on the bottom of the furnace. These pairs of wheels are maintained at equal distances apart during their travel by means of rods M M, one end of which is formed as an eye embracing the axle close against the inner side of each wheel, while the other end is formed as an open loop or hook which is hooked onto the axle of the next pair of wheels,

the rods being bent inward sufficiently at the hooked ends to enable these to hook onto the axle on the inner side of the eyes of its rods, as shown at the cross-section, Fig. 2. The platform-sections E have rails N fixed to their under sides, by means of which they rest on the upper part of the periphery of the wheels K, the sections being either formed as boxes, trays, or otherwise, as may be desired.

It will be seen that as the platform-sections run with rails upon the wheels, while these also run upon rails, the whole system will be accurately guided in its motion. There are provided at each end of the kiln two or more rollers O O, the axes of which run in bearings at the sides of the kiln and which are arranged at such a height that the platform-sections can be slid from outside trucks P onto them and then from the rollers onto the wheels K. The floor of the kiln, together with the rails L, is made with a drop underneath the rollers O, as shown, so as to leave room below the latter for the axles K', with their wheels K, to pass into and out of the kiln.

It will be seen that with the above-described construction of traveling platform the advantages are gained, first, that the platform-sections E can butt closely against each other, as shown, thus economizing the spaces required at the ends of ordinary trucks for buffers; secondly, as there are no trunnions of the axles working in axle-boxes, all lubrication is dispensed with, and consequently the resistance to motion caused by the clogging of such lubricant when subject to heat is obviated.

As the pairs of wheels come out of the kiln at the front end they are uncoupled from the forks of the rods M belonging to the next pair of wheels within the kiln, as shown, and are then conveyed back to the rear end of the kiln again to be attached by the hooks of their rods to the axle of the first pair of wheels in the kiln. The issuing platform-section is received upon a truck P, and after having its contents discharged and charged afresh it is conveyed back to the rear end of the kiln. To facilitate these operations, the trucks P have rollers *p p* fixed upon them, on which the platform-sections are received, and it runs on rails Q, placed transversely to those on which the wheels K run, and turn-tables R being provided, by which the trucks, as also the wheels K, can be transferred from one line to another for conveying them back to the other end of the kiln, for which purpose they are run along an external line of rails Q'.

In some cases, where the heat employed in the kiln is moderate, we employ in place of the movable pairs of wheels K pairs of wheels T, Figs. 4 and 5, the axes of which are carried in fork-shaped supports U, fixed at equal distances apart on longitudinal bearers V within the kiln, the platform-sections E being made to run with rails on the tops of these wheels, as before.

Having thus described the nature of this

invention and the best means we know for carrying the same into practical effect, we claim—

1. The combination, in a kiln or oven, of a horizontal tunnel or shaft having its opposite ends sunk or depressed, a series of rotating wheels in the tunnel or shaft, a series of rollers O, suspended in fixed bearings over the sunk or depressed ends of the tunnel or shaft, and a series of platform-sections E, having rigidly-united side rails traveling on the wheels in the tunnel or shaft, said suspended rollers being arranged at such height above the sunk or depressed ends of the tunnel or shaft that the platform-sections travel over such suspended rollers into and out of the tunnel or shaft, substantially as described.

2. The combination, in a kiln or oven, of a horizontal tunnel or shaft, means for supplying a heating medium at one end of the tunnel, a chimney or flue at the other end thereof, and a traveling platform within the kiln or oven, consisting of sets of wheels traveling along the length of the tunnel and platform-sections having attached rails which rest directly against the peripheries of the sets of wheels that travel along the tunnel, so that the rails of the platform-sections run upon and are propelled by the wheels which travel along the length of the tunnel, substantially as and for the purpose described.

3. The combination, in a kiln or oven, of a horizontal tunnel or shaft containing rails, means for supplying a heating medium at one end of the tunnel, a chimney or flue at the opposite end thereof, a traveling platform consisting of sets of wheels held at uniform distances apart and traveling along the rails in the tunnel and platform-sections having rails resting directly upon the peripheries of the traveling wheels, so that the rails of the platform-sections travel upon and are propelled by the wheels which traverse the rails in the tunnel, a series of rollers journaled in fixed bearings at each end of the tunnel, and a sunk portion of the rails at each end of the tunnel below said rollers for enabling the traveling wheels on the rails to pass in and out beneath the rollers, substantially as described.

4. The combination, in a kiln or oven, of a horizontal tunnel or shaft provided with a sunk or depressed portion at each end, a traveling platform consisting of pairs of wheels mounted on axles and traveling along the length of the tunnel or shaft, rods connecting the axles and holding them at equal distances apart, and platform-sections resting on the peripheries of the traveling wheels, so that the platform-sections travel on and are propelled by wheels which traverse the tunnel, and rollers fixed at the ends of the tunnel or shaft directly above the sunk or depressed portions thereof at a height corresponding to the height of the platform-sections, substantially as described.

5. The combination, in a kiln or oven, of a

tunnel, sets of wheels traveling along the length of the tunnel and mounted on axles, a series of rods or bars jointed to one axle and having a detachable connection with the adjacent axle, so that all the sets of wheels are detachably connected and held at uniform distances apart, and platform-sections resting upon and propelled by the peripheries of the wheels which travel along the length of the tunnel, substantially as described.

6. In kilns or ovens for drying or baking materials by heated air, apparatus for heating the air-supply, consisting of a furnace, a flue leading from the furnace through the lower compartment of an air-heating chamber to a chimney, an air-inlet to said lower com-

partment of the chamber at the discharge end of the flue, and an upper compartment of the air-heating chamber communicating with the lower compartment at a point near the furnace and communicating with the kiln or oven by a series of openings formed along the floor of the latter, substantially as described.

In testimony whereof we have signed our names to this specification, in the presence of two subscribing witnesses, this 2d day of December, A. D. 1890.

JOHANN CHRISTIAN FELLNER.

CARL ZIEGLER.

Witnesses:

WM. VON DEN VERDEN,

AUG. ABELE.