March 28, 1933. L. L. LADD 1,903,119

KILN FURNITURE

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Fig. 1.

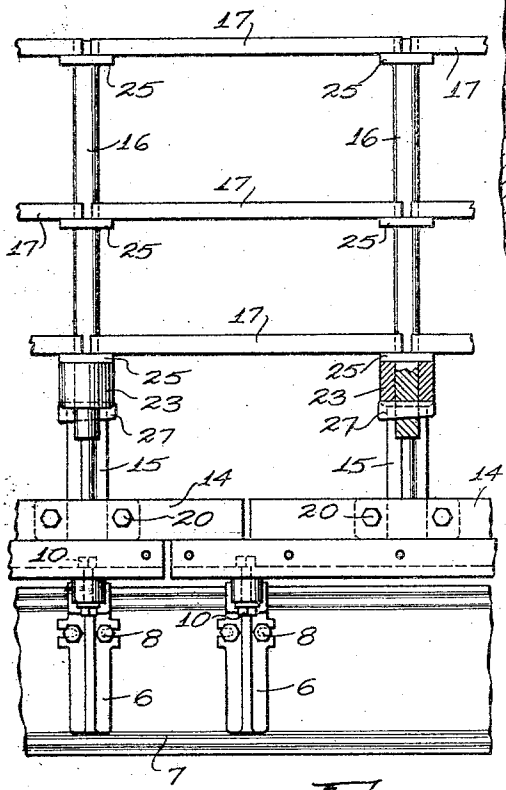


Fig. 2.

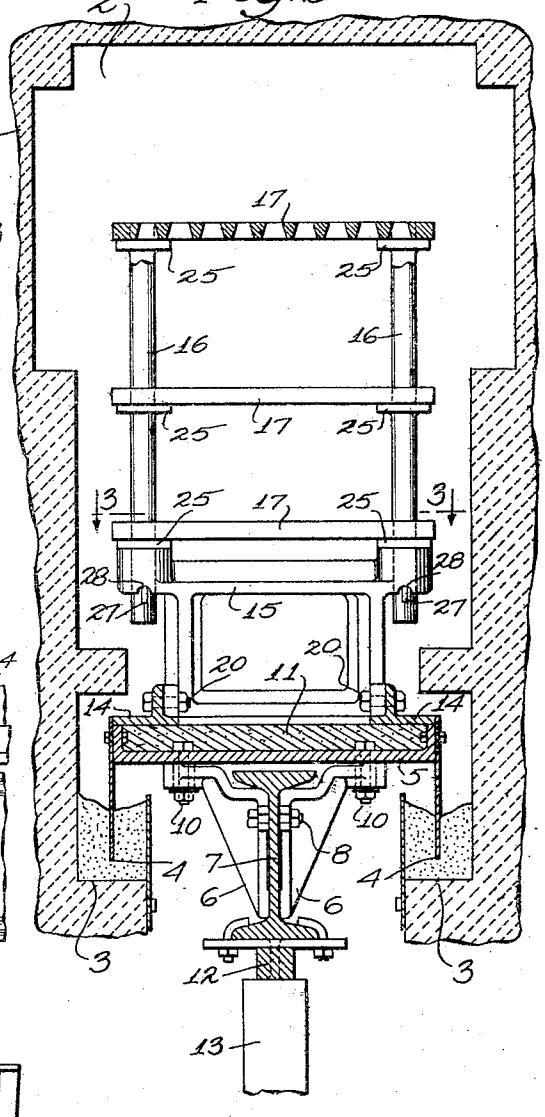
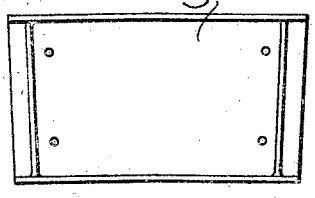


Fig. 4.



Witnesses:
Victor Siljander
H. E. Anderson

Inventor
Lester L. Ladd,
Fisher, Colapp, Soans & Pond.

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Fig. 3.

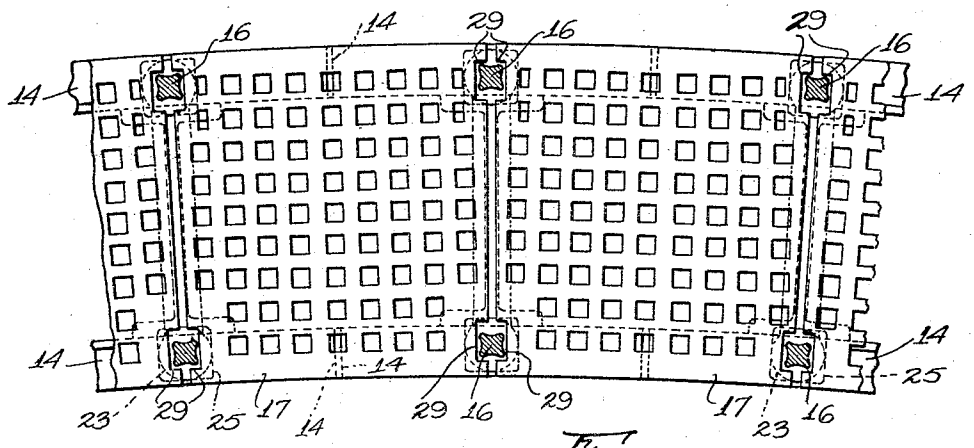
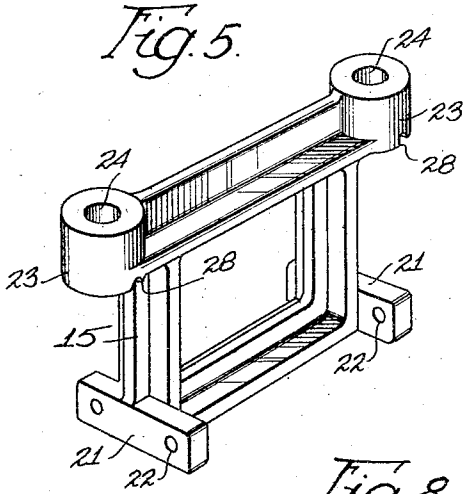


Fig. 6.

Fig. 5.



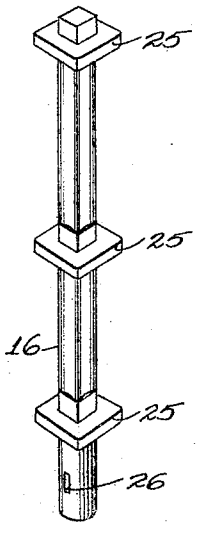


Fig. 7.

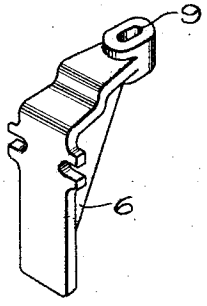
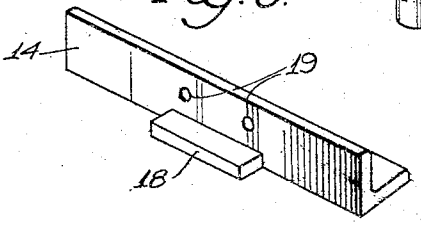


Fig. 8.



Witnesses:
Victor Sigander
Kurt E. Anderson,

Inventor
Lester L. Ladd,
Fisher, Calapp, Soans & Pond,

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UNITED STATES PATENT OFFICE

LESTER L. LADD, OF LOCKPORT, ILLINOIS

KILN FURNITURE

Application filed September 28, 1931. Serial No. 565,503.

This invention relates to kiln furniture used for supporting ceramic products.

In firing ceramic products the ware is sometimes subjected to three distinct firing operations. The bisque is first hardened in a bisque kiln having a peak temperature of approximately 2200° F. and, after being hardened, it is glazed and then fired in a glost kiln having a peak temperature of approximately 2000° F. If the glost ware is then decorated, it is refired in a decorating kiln at a peak temperature of approximately 1400° F.

The ceramic products are usually stacked in the kilns on racks commonly known as kiln furniture. Furniture used in bisque kilns is made of refractory material because of the high temperatures of such kilns. Furniture used in glost kilns and decorating kilns may be made of refractory material, but very frequently such furniture is made of cast iron.

When cast iron is heated repeatedly, it turns to iron oxide and grows in size. This growth is considerable when the heating of the iron has extended over a period of years. For instance, in a circular kiln having a conveyer forty-eight feet in diameter, the cast iron furniture will sometimes grow eight feet in length in a period of three years.

Cast iron furniture usually comprises a plurality of horizontal shelves secured to upright posts or standards. In the cast iron furniture heretofore in use, the shelves were secured to the standards in such manner that there was no possibility of relative movement between the separate parts. As a consequence, when such furniture was repeatedly heated in the kiln, it warped and became unfit for use after a comparatively short time.

The main objects of this invention are to provide an improved form of kiln furniture having separable sections connected together in a manner which will permit the furniture to grow without warping; to provide furniture having separable sections which may be readily assembled and dismantled, even by unskilled labor; and to provide kiln furniture of this kind which may be used in either straight or circular tunnel kilns.

An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:—

Figure 1 is a fragmentary side elevation of a circular conveyer on which the improved furniture is supported.

Figure 2 is a transverse vertical section of a circular tunnel kiln showing the improved furniture.

Figure 3 is a fragmentary horizontal section, taken on the line 3—3 of Figure 2.

Figure 4 is a top elevation of a section of the circular conveyer.

Figure 5 is a perspective view of one of the base members of the furniture.

Figure 6 is a perspective view of one of the standards.

Figure 7 is a perspective view of one of the brackets by which the conveyer platform is secured to the I-beam.

Figure 8 is a perspective view of one of the foot members of the furniture.

Kiln furniture embodying this invention may be used in tunnel kilns of the straight or circular type. In the form herein shown, the furniture is used in a circular kiln comprising a tunnel 1 having a central ware passage 2, through which the ware travels on a circular conveyer. The tunnel 1 has the usual troughs 3 filled with sand or other suitable sealing material to coact with aprons 4 on the conveyer for preventing the heat in the ware passage from reaching the conveyer supports.

The conveyer includes a plurality of arcuate platform sections 5 supported on brackets 6 which are secured to a circular I-beam 7 by bolts 8 or other suitable fastening means. Formed in the brackets 6 are holes 9 for receiving bolts 10 which secure the brackets

to the platform sections. These holes are elongated, as shown in Fig. 7, so as to permit proper adjustment of the circular platform in the event that the I-beam does not define a true circle. The platform of the conveyer may be faced with a suitable refractory material 11. Secured to the lower flange of the I-beam, is a mono-rail 12 which rides on a plurality of wheels 13, certain of which are motor driven for moving the conveyer, as more fully described in my copending application Serial No. 366,959, filed May 29, 1929, which has become Patent 1,842,411.

In the form shown, the improved furniture comprises a plurality of cast iron separable sections, including foot members 14, base members 15, standards 16, and shelf sections 17.

The foot members 14 are in the form of angle bars which rest upon the conveyer platform. Integrally formed on these foot members, are ledges 18 adapted to support the base members 15. Formed in one of the flanges of each foot member, adjacent the ledge 18, is a pair of apertures 19 for receiving bolts 20, which secure the foot members to the base members.

Each of the base members 15 has a pair of integral bearing blocks 21 provided with apertures 22 for receiving the bolts 20. Formed at respectively opposite ends of each base member is a pair of bosses 23 having sockets 24 for receiving the lower ends of the standards 16.

In the construction shown, each standard 16 comprises a post having a plurality of ledges 25 arranged at intervals for supporting the shelf sections 17 in several horizontal planes above the base members. The lower ledges 25 of the standards rest upon the bosses 23 of the base members. Formed in the lower ends of the standards are keyways 26 for receiving wedges 27 which secure the standards to the base members. These wedges are adapted to engage notches 28 in the lower faces of the bosses 23 to secure the standards against turning in their sockets.

The greater portion of each standard is polygonal in cross section and the faces thereof are slightly concave, as illustrated in Fig. 3. It has been found that with such a form, the standards do not flake readily.

Each of the shelf sections is slightly arcuate so that, when placed end to end, a plurality of such sections will form a circular shelf. The construction shown provides three circular shelves disposed in different planes. These shelf sections are preferably apertured, as shown in Figs. 2 and 3, to facilitate the circulation of air in the ware passage and to reduce the amount of heat absorbed by the furniture.

The sections of each shelf are spaced from one another as illustrated in Figs. 1 and 3. Formed in the ends of these sections are recesses 29 for receiving the standards. The recesses of adjacent sections form openings which are appreciably larger in cross section than the standards so as to permit the shelf sections to grow horizontally without being restrained by the standards.

In operation, the conveyer travels slowly through the tunnel for moving the ware through the passage 2.

To assemble the improved furniture, a few of the base members 15 and their foot members 14 are placed radially on the conveyer platform, as shown in Figs. 1 and 2. The ends of each pair of foot members 14 are spaced from adjacent foot members, so as to permit these members to expand. After a few of the base members 15 are properly placed, the standards 16 are inserted into the sockets 24 and the wedges applied. The shelf sections 17 are then placed on the ledges 25.

With this improved construction, the shelf sections may grow considerably before touching one another. After the shelf sections have expanded so as to touch one another, one tier of the furniture parts may be removed and the other tiers rearranged so as to separate the remaining sections to permit additional growth.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that certain details of the construction shown may be altered without departing from the spirit of this invention as defined by the following claims:

I claim:

1. Kiln furniture comprising a horizontal shelf having openings therein, and a plurality of standards extending through said openings for supporting said shelf, said standards being appreciably smaller in cross section than said openings to permit said shelf to move longitudinally and transversely relative to said standards.

2. Kiln furniture comprising a base member having sockets therein, a plurality of standards seated in said sockets, and a shelf loosely supported on said standards for movement horizontally relative to said standards and base member.

3. Kiln furniture comprising a base member having sockets therein, a plurality of standards seated in said sockets, wedges extending through said standards and engaging said base member for detachably securing said standards to said base member, and a shelf loosely supported on said standards for movement horizontally relative to said standards and base member.

4. Kiln furniture comprising a plurality of base members spaced from one another and provided with sockets, a plurality of standards seated in said sockets, and a plurality of horizontal shelf sections loosely supported

on said standards so as to be adapted to expand horizontally relative to said standards.

5. Kiln furniture comprising a plurality of horizontal shelf sections having openings therein, and a plurality of standards extending through said openings and having ledges for supporting said shelf sections, said standards being appreciably smaller in cross section than said openings to permit expansion of said shelf sections relative to said standards.

LESTER L. LADD.