

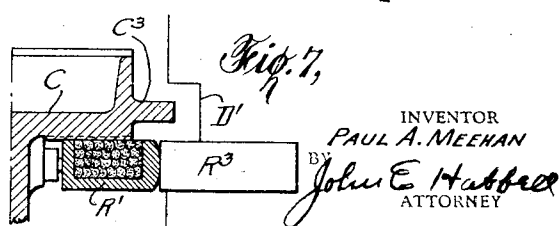
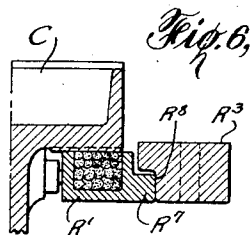
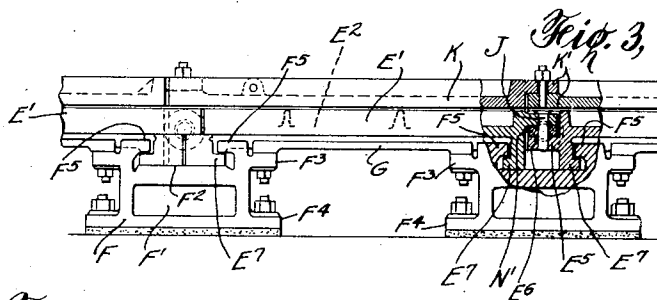
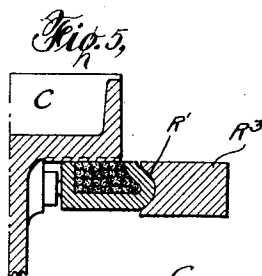
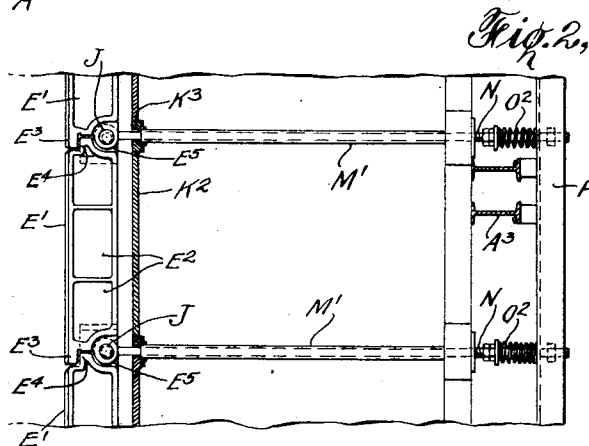
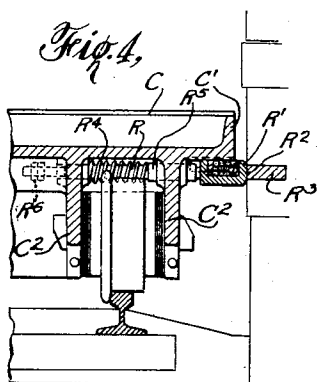
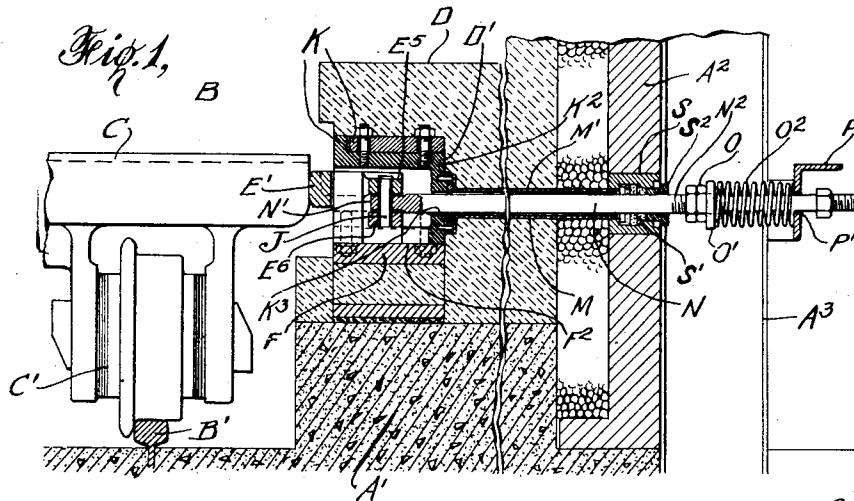
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P. A. MEEHAN

FURNACE TRUCK SEAL

Filed May 6, 1927



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FURNACE-TRUCK SEAL.

Application filed May 6, 1927. Serial No 189,271.

The general object of my present invention is to provide improved sealing means between relatively movable portions of the kiln chamber of a tunnel kiln. More specifically the object of my invention is to provide an improved mechanical seal between that portion of the kiln chamber surrounding the ware to be heat treated and that portion surrounding the running gear of the cars in order to protect the car running gear from the destructive action of the kiln chamber gases.

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 reference should be had to the accompanying drawings and descriptive matter in which I have illustrated and described a preferred embodiment of the invention.

Of the drawings:

Fig. 1 is an elevation partly in section of a portion of a tunnel kiln embodying one form of my invention.

Fig. 2 is a plan view of a portion of the mechanical sealing structure employed in Fig. 1.

Fig. 3 is an elevation of the structure shown in Fig. 2;

Fig. 4 is an elevation partly in section illustrating a modified form of my invention;

Figs. 5, 6 and 7 are views similar to Fig. 4 showing other modifications of my invention.

In Fig. 1 I have illustrated a portion of a tunnel kiln of well known form and adapted for use with either muffle or open fire heater and comprising, as shown, the usual foundation A' and side walls A² enclosing an elongated kiln chamber B through which the ware treated may be moved in the usual way by a traveling platform formed by the bodies of the kiln cars running on the usual track rails B'. The kiln cars employed may be of any usual or suitable construction. The common type of a car partially illustrated in the drawings comprises a metallic frame C in which the supporting wheels are journaled. In such a kiln car the frame C ordinarily supports ware supporting means, usually but not necessarily in the form of a mass or bed of refractory material, the top of which is substantially flush with the top

of the usual kiln benches D at the sides of the kiln chamber as such ware supporting means are well known and their particular construction and arrangement do not pertain to the invention disclosed herein they are not illustrated in the drawings.

In a preferred form of the invention illustrated in Figs. 1, 2, and 3, the joints between the sides of the cars and the adjacent walls of the kiln chamber are sealed to prevent the heated gases in the ware containing portion of the kiln chamber from passing into the lower portion of the kiln chamber by sealing members in the form of bearing shoes E' movably mounted in the side walls of the kiln chamber and yieldingly pressed into frictional engagement with the vertical side edges of the metallic car frames C. As shown in Fig. 1 the bearing shoes E' are mounted in an open groove D' formed in the portion of the kiln wall beneath the bench D which extends longitudinally of the kiln chamber and is provided with a sectional lining formed of metal parts K.

The mechanical seal proper consists of a series of suitably shaped metallic end to end bearing shoe sections E' slideably supported on flat surfaces F² in a series of longitudinally spaced supporting shoes F. Each shoe F comprises a hollow rectangular central section F' which may be filled with fire brick and which is provided with outwardly projecting upper and lower flanges F³ and F⁴, the flanges F⁴ being secured to the kiln foundation and the flanges F³ of adjacent shoes being connected by metallic spacing bars G. The upper part of each shoe F is provided with integral inwardly projecting flanges F⁵ vertically spaced from the surface F². Each section E' is substantially rectangular in shape and formed with its top surface divided into a series of end to end rectangular troughs E² which are filled with concrete or other refractory material. Each section E' is arranged with a projecting flange E³ at one end in overlapping relation with a projection E⁴ on one of the adjacent sections.

At the ends of each bearing section and inwardly spaced from the projections E³ and E⁴ is a horizontally projecting tongue member E⁵ provided with a central opening E⁶. As shown in Fig. 3 the tongue E⁵ projects from a slightly higher portion of the shoe section E' than the tongue at the opposite end

of the section so that the upper and lower tongue members of adjacent sections E' may be arranged in overlapping relation with their central openings E⁶ in alignment to receive a connecting bolt J.

Integrally formed with and projecting downwardly from the end portions of each section is a foot member E⁷ having a flat lower surface contacting with the upper surface E² of the shoe member F. The adjacent foot of the adjoining section E' is also supported in the same shoe. The inwardly projecting shoe flanges F⁵ overlap the ends of the feet to prevent vertical movement of the slide sections and to provide guiding means during any sliding movement of the feet in the corresponding shoe. The series of angle members K are arranged with overlapping end portions K' bolted to the kiln wall as shown in Figs. 1 and 3. The lower surface of the horizontal section of each angle member is slightly spaced from the upper face of the slide sections E'. The vertical portions K² of the angle members are provided with a series of longitudinally spaced openings K³.

The lower part of the kiln chamber walls is provided with a longitudinally spaced series of transversely extending passages M circular in cross-section and arranged to coincide with the openings K³ in the angle members K. Circular tubes M' are positioned in the passages and extend from the outer side of the angle members K to points adjacent the outer walls of the kiln. The tubes provide guiding means for a series of circular bars N, each of which has one end N' flattened and perforated and positioned between the overlapping tongue portions E⁵ of adjacent slide sections. A bolt J connects each bar to the corresponding slide sections.

The outer end of each bar is provided with a threaded portion N² on which a nut O is adapted to be threaded. Mounted on the bar adjacent the outer face of the nut O is a slideable disc O'. The outermost end of each rod or bar N passes through a corresponding perforation P' in a longitudinally extending angle iron member P supported by the vertical I-beams A³. Mounted on each bar is a compression spring O² having one end contacting with the inner surface of the angle member and the opposite end contacting with the disc member O'. With this arrangement the slide sections are under the constant pressure of the spring O² tending to force the slide into the kiln chamber. Limiting means are provided to prevent too great a movement of the slides consisting of a nut threaded on the outermost part of each bar N and adapted to contact with the outer surface of the angle member P on an inward movement of the corresponding slide sections.

The outer wall of the kiln is provided with a series of metallic sections S each of which surrounds a portion of each bar N and one

end of the protecting tube M'. Adjacent the end of each tube is provided a suitable packing S' surrounding the bar and held in position by a gland member S² threaded into the metallic section S. This construction prevents any of the combustion gases from leaking through the spaces surrounding each bar.

In the operation of my invention, on a movement of a ware carrying car longitudinally through the kiln a seal is provided between the upper and lower sections of the kiln chamber by the metallic supporting base of the car contacting with the curved side of the bearing shoe sections E'. The bearing sections are yieldably held in contact with the outer side C' of the car C by the action of the compression spring arrangements O², which restore the slide sections to their normal position when the car passes that portion of the kiln chamber.

In Figs. 4 to 7, I have illustrated modifications of my invention wherein the yieldable bearing shoe member is mounted on the kiln car, while the contact member is positioned in the kiln chamber wall below the bench level therein. In the construction illustrated in Fig. 4, I have provided transverse bars R slideably supported in the wheel carrying structure C² and connected at their outer ends to one side of a channel shaped bearing shoe member R' extending longitudinally of the car. The bearing member R' is arranged with its open side facing upwardly and filled with an insulating material. The outer side R² of the bearing member contacts with a metallic wearing plate R³ inserted in and extending longitudinally of the bench portion of the kiln. Between the supports C² for each wheel of the car and mounted on each bar R is a compression spring R⁴ having one end abutting a shoulder R⁵ formed on the bar and its opposite end in contact with one of the wheel supporting members C². As in Figs. 1 and 2 I have provided a nut R⁶ threaded on the inner end of the bar for limiting the outward sliding movement of the bearing member R'. The under surface of the metallic car supporting base C' is arranged in sliding engagement with the top surface of the bearing member to prevent the hot gases passing through at that point to the lower part of the kiln chamber.

In Figs. 5, 6, and 7, I have illustrated modified forms of the invention shown in Fig. 4, in which the contacting surfaces of the bearing shoe member R' and wearing plate R³ are formed in various shapes. In Fig. 5, the outer side of the wearing plate element is concave in form and arranged to contact with the convexly curved outer side of the shoe member. This construction provides a close joint between the contacting surfaces. In Fig. 6, the bearing member R' is provided with a lower portion R' projecting

outwardly while the wearing member is formed with an undercut portion R^3 the side of which contacts with the outer face of the projecting part of the bearing member. In Fig. 7, the outer side of the slideable channel member is curved while the wearing plate is provided with a vertical contact surface. In this construction the metallic car base is provided with a longitudinal flange C^3 projecting into an undercut portion D' of the bench immediately above the wearing plate R^3 to provide means for deflecting the gases from the contact surfaces.

My invention is characterized by the simplicity of the construction and its effectiveness in operation. The novel elements forming the mechanical seal between the parts may be used independently of or in conjunction with a sand seal or other types of seal. With the construction described above, the running gear of the kiln car will be protected from the destructive action of the high temperature gases in the upper part of the kiln chamber with resulting longer commercial life of that structure.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of embodiment 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 in some cases certain features of my invention may 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. In a tunnel kiln comprising an elongated kiln chamber and cars forming a ware supporting platform part movable longitudinally through said chamber, means for sealing a joint between said part and an adjacent part of the kiln wall comprising a bearing shoe mounted for horizontal movement on one of said parts, and mechanical means for holding said bearing member in frictional engagement with the other of said parts.

2. In a tunnel kiln comprising an elongated kiln chamber and cars forming a ware supporting platform part movable longitudinally through said chamber, means for sealing a joint between said part and an adjacent part of the kiln chamber wall comprising a bearing shoe member movably mounted on one of said parts and means for holding said bearing member in frictional engagement with the other of said parts comprising a transverse bar slideably supported in one of said parts and connected to said bearing

member and resilient means mounted on said bar.

3. In a tunnel kiln comprising an elongated kiln chamber through which ware supporting cars may be moved, means for sealing the joint between a side wall of the kiln chamber and the adjacent sides of the cars at a level intermediate the top and bottom of the kiln chamber comprising sealing members mounted for horizontal movement in the side wall of the kiln chamber and means for holding said members in contact with adjacent surfaces of the cars passing through the kiln.

4. In a tunnel kiln comprising an elongated kiln chamber through which ware supporting cars may be moved, means for sealing the joint between a side wall of the kiln chamber and the adjacent sides of the cars at a level intermediate the top and bottom of the kiln chamber comprising sealing members bodily movable in the side wall of the kiln chamber, and yielding means for pressing said members into engagement with adjacent surfaces of the cars passing through the kiln chamber.

5. In a tunnel kiln comprising an elongated kiln chamber through which ware supporting cars may be moved, means for sealing the joint between a side wall of the kiln chamber and the adjacent sides of the cars at a level intermediate the top and bottom of the kiln chamber comprising sealing members movably mounted in the side wall of the kiln chamber and means for pressing said members into engagement with adjacent surfaces of the cars passing through the kiln comprising a series of transverse bars mounted in said kiln wall and connected to said sealing members and resilient means mounted on said transverse bars.

6. In a tunnel kiln comprising an elongated kiln chamber through which ware supporting means may be moved, means for sealing the joint between a side wall of the kiln chamber and the adjacent sides of the cars at a level intermediate the top and bottom of the chamber comprising a longitudinal series of sealing members movably mounted in the side of the kiln chamber and having overlapping tongue portions hingedly connected and means for pressing said members into engagement with adjacent surfaces of the cars passing through the kiln comprising a longitudinally spaced series of transverse bars mounted in the kiln chamber wall and connected to the overlapping portion of said sealing members and resilient means mounted on said transverse bars.

Signed at Cleveland, in the county of Cuyahoga, and State of Ohio, this second day of May, A. D. 1927.

PAUL A. MEEHAN.