R. C. DRINKER.

FURNACE FLOOR BAR.

APPLICATION FILED SEPT. 20, 1919.

1,342,041.

Patented June 1, 1920.

2 SHEETS—SHEET 1.

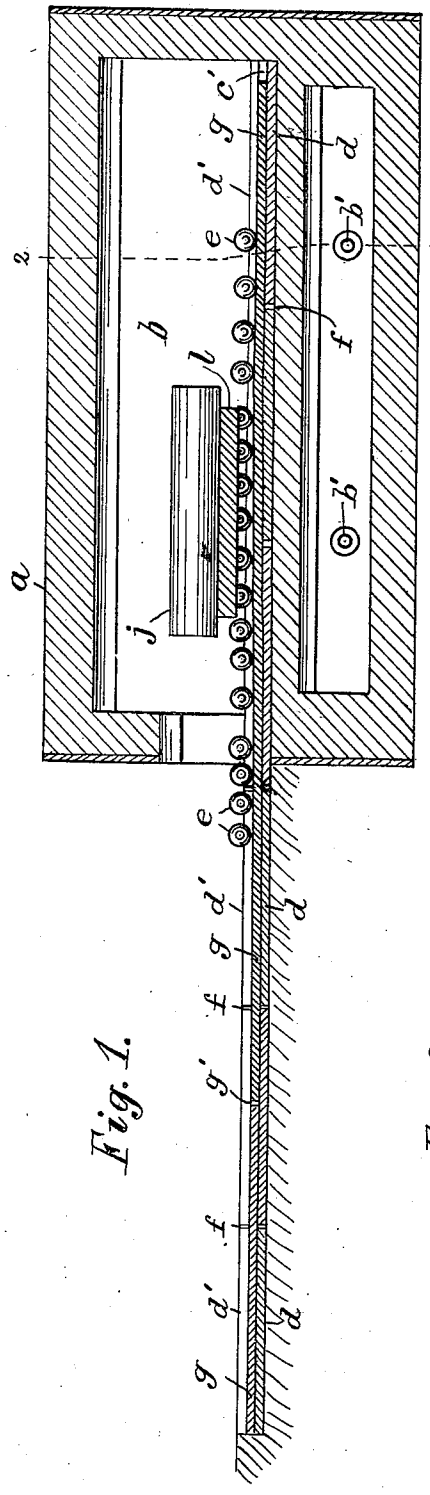


Fig. 1.

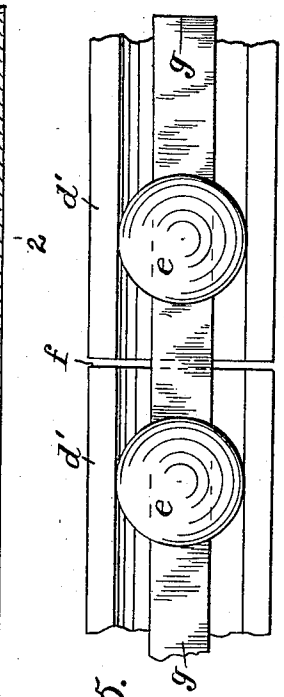


Fig. 5.

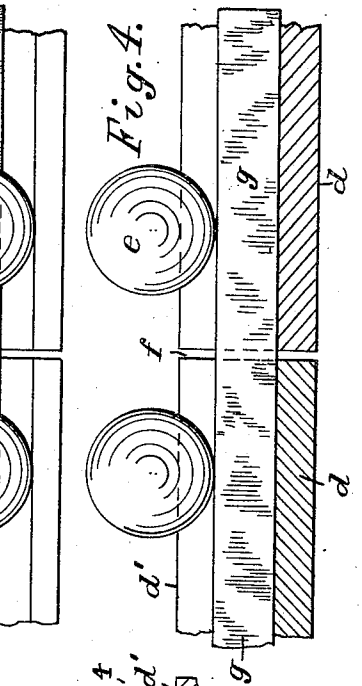


Fig. 4.

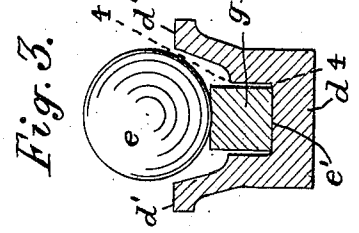


Fig. 3.

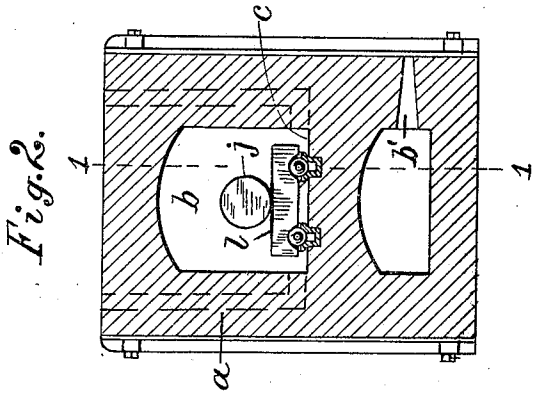


Fig. 2.

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2 SHEETS—SHEET 2.

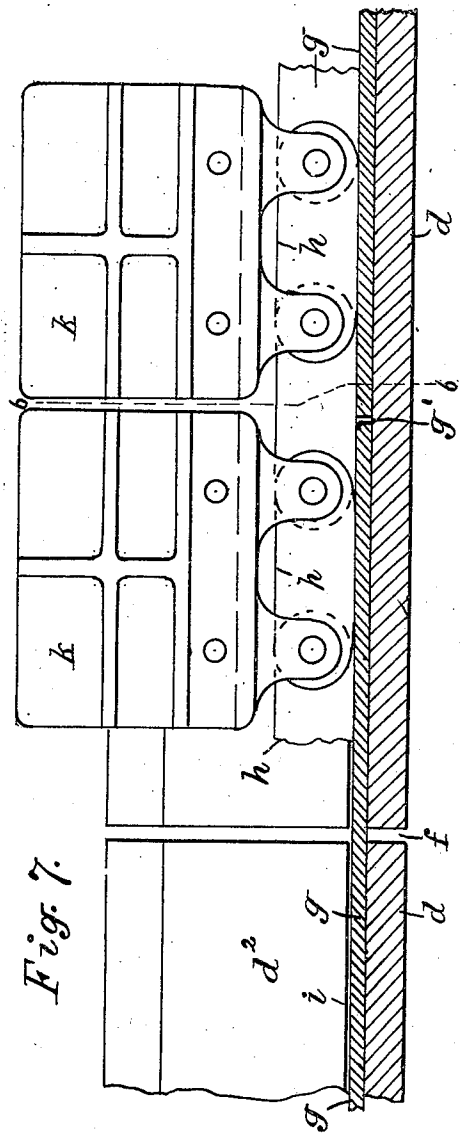


Fig. 7.

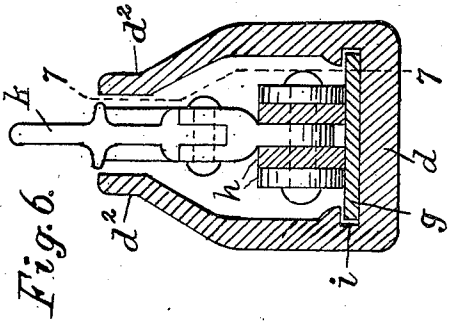


Fig. 6.

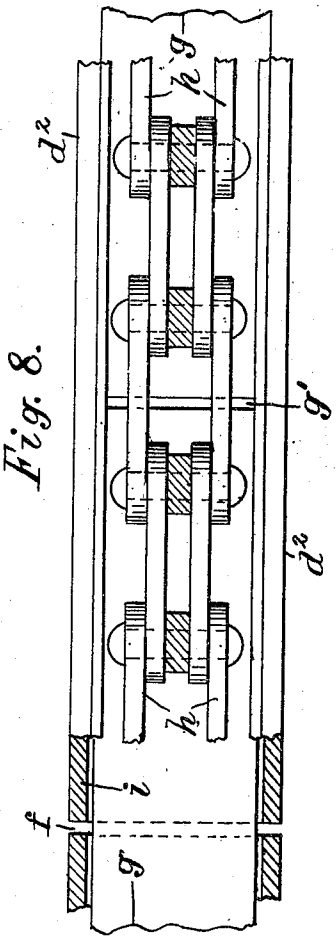


Fig. 8.

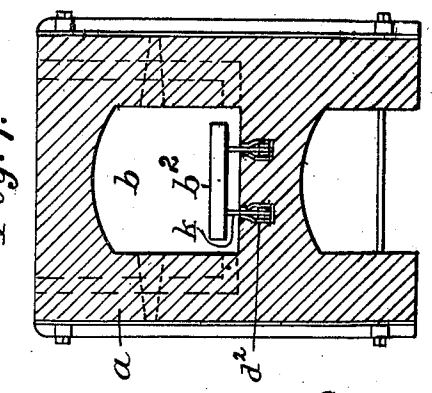


Fig. 9.

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UNITED STATES PATENT OFFICE.

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FURNACE FLOOR-BAR.

1,342,041. Specification of Letters Patent. Patented June 1, 1920.

Application filed September 20, 1919. Serial No. 325,193.

To all whom it may concern:

Be it known that I, RICHARD C. DRINKER, a citizen of the United States, residing at Quincy, county of Norfolk, and State of Massachusetts, have invented certain new and useful Improvements in Furnace Floor-Bars, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to a means of supporting any form of conveyer in its passage through the heating-chamber of a furnace over sections of a supporting-rail.

Where a chain-conveyer is used to convey the material through a heating-chamber it is sometimes compelled to carry heavy loads which cause it to drag heavily upon the bottom of the heating-chamber, and a track formed of metal rail-sections is therefore located in the floor of the furnace to support the chain.

Such track must necessarily form a continuous support for the conveyer, and the combination of parts must prevent the joints of the sections from obstructing the movement of the conveyer.

Such sections, as will be shown herein, may be of various shapes which are most readily produced by casting, but it is difficult to conveniently make such castings beyond a certain length, and it is difficult to prevent the heat of the furnace from warping and distorting such castings when located in the floor of the furnace, as such sections become heated unequally, and their warping causes them to form an uneven bed for supporting the conveyer in its longitudinal movement.

The joints or divisions between the rail-sections may also lose their alinement and interfere seriously with the smooth movement of the chain.

The same difficulty arises if balls are used to support a load moving through a heating-chamber, as the track-rails for such balls, made of trough-shape, are similarly affected by the heat and thus prevented from performing their functions properly.

I obviate these difficulties in the present invention by forming the sections of the supporting rails with a longitudinal recess upon the upper surface adapted to admit a smooth bar of steel preferably long enough to extend entirely through the furnace, and thus avoid any contact of the conveyer with the joints of the rail-sections in moving through the heating-chamber.

The recess provided in the rail-sections to receive the steel bar is preferably made to fit the sides or edges of the said bar so that the bar holds the sections firmly in alinement. Such bar is termed a "floor-bar" herein as it directly supports the moving load upon the floor.

Such recess is readily formed in the upper sides of the rail-sections, as the rail-sections may be provided with flanges at the edges which not only form the entire recess but serve to guide the chain-conveyers in their passage over the sections.

The invention shown herein is applied to a chain, and also to a series of loose balls which may be readily guided by the flanges upon the track-rails when a truck is moved over the balls.

The invention will be understood by reference to the annexed drawing, in which Figure 1 is a longitudinal section on line 1—1 in Fig. 2, of a furnace provided with the improvement; Fig. 2 is a cross section on line 2—2 in Fig. 1, of the heating-chamber in the furnace; Fig. 3 is a cross section of the entire support for the conveyer balls; Fig. 4 is a longitudinal section on line 4—4 in Fig. 3; and Fig. 5 is a plan of the same. Figs. 3, 4 and 5 are upon an enlarged scale; and Figs. 4 and 5 show one of the open joints between the rail-sections, spanned by the steel floor-bar. Fig. 6 is a cross section of a flanged track-rail in section on line 6—6 in Fig. 7; Fig. 7 is a longitudinal section of the same on line 7—7 in Fig. 6; and Fig. 8 is a plan of the adjoining ends of two rail-sections with part of a chain-carrier therein, the side-walls of the sections being broken away in the left-hand end of the figure to expose the floor-bar. Fig. 9 is a cross section of a heating-chamber like that shown in Fig. 2 with the chain-conveyer supported therein.

Figs. 1 and 2 show a furnace *a* having a heating-chamber *b* with floor *c* upon which the rail-sections *d* are supported to sustain and guide a series of balls *e*. The rail-sections are preferably embedded in the floor *c*.

A truck *l* with load *j* is shown resting

upon the balls in Figs. 1 and 2. Burner-inlets b' are shown in the side-walls of the combustion-chamber in Fig. 2, but the means for heating the heating-chamber are immaterial to the present invention.

The joints f of the rail-sections are shown covered by a floor-bar g which is supported upon the upper surfaces of the sections to sustain the balls, as shown in Figs. 3, 4 and 5.

Flanges d' are extended upward from the edges of the rail-sections d past the sides of the floor-bar g, to a sufficient distance to embrace the sides of the balls, to hold them in a given path within the chamber b.

The flanges d' convert the rail-sections into a trough, the bottom of which is shown in Fig. 3 provided with the seat e' which may be leveled to form an even bearing for the floor-bar g. Such trough-shape for the rail-sections wholly incloses the floor-bar g so as to protect it effectively from the direct heat of the chamber b.

Figs. 4 and 5 show clearly the joints f between the rail-sections d such joints necessarily having some clearance to permit the expansion of the sections when heated.

The application of the floor-bar g over such joints effects several results, as the bar then furnishes a smooth straight bed over which the balls can roll, it also furnishes a means in connection with the flanges d' to hold the rail-sections in line laterally, and it also maintains the alinement of the sections vertically by fitting upon the bottom of the trough, which bottom really forms the tops of the sections because it supports the conveyer and its load.

It is obvious that with a load supported upon balls, the pressure of the load would be felt upon the rail-section over which the ball was rolling, and such pressure would be abruptly transferred to an adjoining section when the ball rolled over the joint.

Such disposition of the load would severely jolt the rail-sections and loosen them in the floor of the furnace, in which they might be embedded and thus soon destroy their alinement, which would greatly interfere with the smooth operation of the conveyer.

By making the floor-bar g integral throughout the length of the heating-chamber and making provision for its expansion longitudinally, the load is distributed between the various rail-sections as it moves over the joint, and all tendency is avoided to loosen the sections or throw them out of alinement.

The portion of the floor-bar within the furnace is necessarily elevated in temperature, and thus subject to expansion although not exposed to the direct heat of the chamber, and to prevent such expansion from buckling or bending the floor-bar, a clearance c' is provided at the inner end of the chamber b to permit the free expansion of the floor-bar.

The application of the invention to a chain-conveyer is shown in Figs. 6 to 9 inclusive, where the chain h is shown resting upon the floor-bar g, and the side flanges d^2 of the sections are sloped toward one another at the top to guide saddles k projected upwardly from the links of the chain, as shown in Fig. 6.

The trough-shaped rail-sections are in practice wholly buried in the floor of the heating-chamber, as shown in Fig. 9, with the saddles k projecting above the surface of the floor to support bars, pans, or any other species of load b^2 which is to be carried into or through the chamber.

The means of propelling the chain are not shown in the drawing as they are already well known, and form no part of the present invention.

It will be understood that the series of rail-sections necessarily extends the whole length of the furnace-floor excepting space for expansion, and that the floor-bar is so applied to the rail-sections as to wholly cover the joints of the sections and prevent them from jarring the conveyer in its movement over the joints.

Two of the rail-sections d are shown in Figs. 7 and 8 with clearance space f between their adjacent ends, and the extension of the floor-bar g over such joints evidently afford a smooth unbroken surface to support the links of the chain as it moves through the trough-shaped sections.

In Fig. 6 the flanges d^2 are shown at the edges of the floor-bar formed with lateral or undercut grooves i which embrace the edges of the floor-bar upon three sides, and prevent the rail-sections from tipping in any direction when the floor-bar is inserted in the groove.

This construction enables a floor-bar to be used with the same effect if made of several pieces, and enables it to perform all the same functions as if made of one piece, if the joint between the parts of the floor-bar be disposed upon the bottom of the floor-sections intermediate to the joints f of said sections, as shown as g' in Figs. 7 and 8.

It is not uncommon to build furnaces of 40 or 60 feet in length, and the conveyer generally used to move the material into or through such a furnace is wholly subjected to the burning gases in the furnace and the radiation of the heated walls, and the present improvements are designed to obviate the injurious effect of such exposure in respect to the deterioration of the conveyer, by combining it with trough-shaped rails.

From the above description it is evident that the essential feature of the conveyer is the formation of a support made in two

parts to sustain the conveyer, one part consisting of a series of rail-sections adapted to guide the conveyer, and having a floor-bar or lining in its bottom which covers the joints of the sections and which floor-bar directly sustains the moving parts of the conveyer.

When the conditions admit of supplying a bar of steel in one piece of the length required to extend through the furnace-chamber, it is obviously preferable to make the floor-bar in one piece, as it is thus rendered very rigid and firm in its retaining the rail-sections in their proper relation to one another; but when the length of the furnace-chamber, or any other condition prevents the supplying of the floor-bar in one piece, it may then be made with one or two joints g' which, as illustrated in Figs. 7 and 8, may be disposed upon the middle portion of one of the rail-sections and the floor-bar thus possesses substantially the same rigidity as the bar made in one piece.

Having thus set forth the nature of the invention what is claimed herein is:

1. The combination, with a conveyer for the heating-chamber of a forge or annealing furnace, of a plurality of rail-sections extending the whole length of the furnace-floor excepting space for expansion, and a floor-bar supported upon the tops of the sections and extended throughout the length of the heating-chamber to support the conveyer in its passage over the joints of the sections.

2. The combination, with a conveyer to carry a load through a heating-chamber, of a plurality of rail-sections extending the whole length of the furnace-floor excepting space for expansion, flanges upon the edges of the sections adapted to guide the conveyer, and a floor-bar inserted between the flanges throughout the entire heating-chamber to support the conveyer and cover the joints of the sections.

3. The combination, with a conveyer to carry a load through a heating-chamber, of a plurality of rail-sections extending the whole length of the furnace-floor excepting space for expansion, flanges upon the edges of the sections to guide the conveyer, with a longitudinal groove inside each flange, and a floor-bar having its edges fitted to the said grooves, and holding the sections in line thereby, and operating to support the conveyer and cover the joints of the sections.

4. The combination, with a conveyer to carry a load through a heating-chamber, of a plurality of rail-sections extending the whole length of the furnace-floor excepting space for expansion, flanges upon the edges of the sections with a floor-bar embraced between their inner sides, and the flanges operating to protect such floor-bar from the direct heat of the heating-chamber.

5. The combination, with a conveyer to carry a load through a heating-chamber, of a plurality of rail-sections extending the whole length of the furnace-floor with clearance at the joints between the ends of the sections to permit expansion, and a floor-bar supported upon the tops of the sections and extending the whole length of the heating-chamber to cover all of the said joints and operating to support the conveyer in its passage over the joints.

6. The combination, with a conveyer to carry a load through a heating-chamber, of a plurality of rail-sections extending the whole length of the furnace-floor with clearance at the joints between the ends of the sections to permit expansion, and a floor-bar supported upon the tops of the sections and extending the whole length of the heating chamber to cover all of the said joints, and clearance for the expansion of the floor-bar at the end of the heating-chamber.

In testimony whereof I have hereunto set my hand.

RICHARD C. DRINKER.