Jan. 24, 1950 J. FALLON 2,495,578

FURNACE CONVEYER

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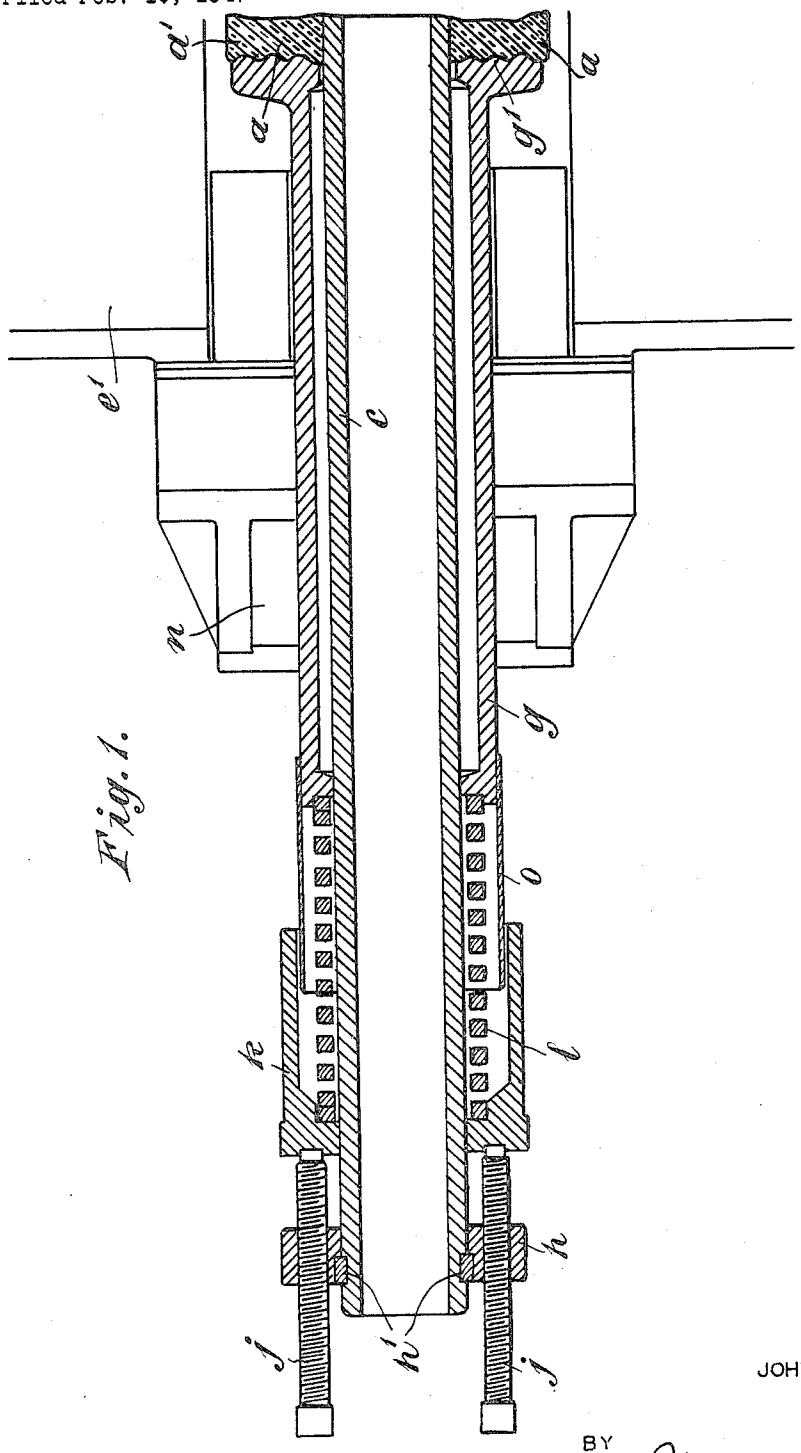


Fig. 1.

JOHN FALLON
INVENTOR

BY Marshall and Marshall
ATTORNEYS

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Fig. 2.

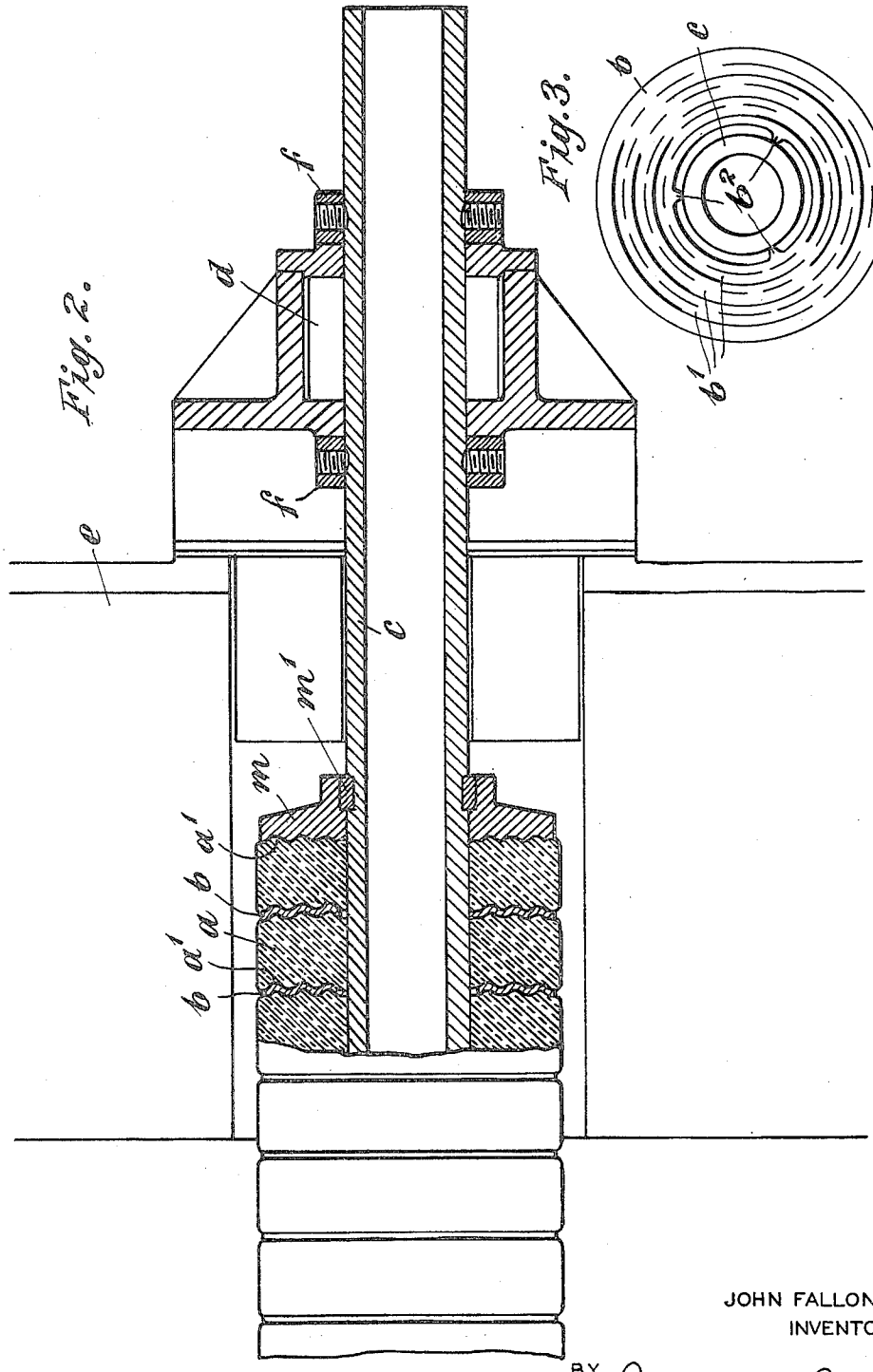


Fig. 3.

JOHN FALLON
INVENTOR

BY Marshall and Marshall
ATTORNEYS

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UNITED STATES PATENT OFFICE

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FURNACE CONVEYER

John Fallon, Smethwick, England

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2 Claims. (Cl. 263—6)

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This invention has reference to improvements connected with furnace conveyors and relates more particularly to the construction and mounting of rollers used in the conveyance of the work through the furnace chambers. The rollers are desirably of the kind wherein refractory annular discs alternate with metallic discs to form a composite roller which admit of a ready assembly to the requisite length and of replacement of any damaged parts.

The primary object of the present invention is to provide a mounting for the composite rollers in their end bearings whereby any expansion or contraction of the rollers or of the shaft on which the complementary discs are assembled is automatically compensated without imposing any stresses on the rollers or on the bearings thereof in the walls of the furnace chamber. A secondary object is to improve the construction of the means of interconnection between the alternating refractory and metallic discs forming the body of the composite rollers.

The invention is primarily intended for utilisation in connection with furnace conveyors where relatively high temperatures i. e. 1150° C. obtain and where it is necessary to have the requisite mechanical strength for variable speed of drive and accelerated rate of discharge in such elevated working temperatures.

The invention resides in the incorporation in a furnace conveyor of the kind having conveyor rollers comprising an assembly of alternating refractory and metallic discs on a shaft which is permitted a longitudinal motion in one of its bearings, of annular corrugations formed on the abutment faces of the discs adapted to register one with another; the invention further resides in the shaft being rotatably mounted within bearings located externally of the furnace chamber, the mounting at the one end admitting of a longitudinal motion of the shaft within its bearing which motion is resisted by means of a coiled compression spring said spring serving to transmit compression to the disc assembly on the shaft whereby differential movement between the shaft and the discs is automatically compensated.

A preferred embodiment of the present invention as applied to a furnace conveyor will now be described with particular reference to the accompanying drawings, in which:

Fig. 1 is a sectional elevation through the longitudinal axis at one end of the roller.

Fig. 2 is a part sectional elevation through the longitudinal axis of the opposite end of the roller.

Fig. 3 is an end view of one of the metallic discs.

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A series of rollers as illustrated by the accompanying drawings are arranged to form the roller hearth or platform of a furnace chamber, the longitudinal axis of the rollers being disposed transversely to the length of the furnace chamber and these rollers can be driven or free according to the construction and nature of the chamber through which the goods to be heat treated are passed. Each roller is of substantial length and arranged at spaced intervals transversely throughout the length of the furnace. Each roller is formed of a plurality of refractory annular discs *a* of substantial thickness each refractory disc being separated from its neighbour by means of a metallic disc *b* (see Fig. 3) having a high heat resistant characteristic. The metallic discs *b* are formed with a series of annular corrugations *b1* and complementary corrugations *a1* are formed in the end faces of the refractory discs *a* so that the assembly of alternating discs can be closely nested or packed whereby the composite roller can be formed with a substantially continuous linear periphery on which the work is progressed through the furnace chamber.

The inner periphery of the metallic discs may have tongue or point contact *b2* with the tubular shaft *c* on which the discs *a* and *b* are mounted, the tongues or points *b2* being spaced 120° apart.

The tubular shaft *c* carrying the discs is rotatably mounted at one end (see Fig. 2) within an anti-friction or plain bearing *d* located externally of one side wall *e* of the furnace chamber, this end of the tubular shaft *c* having pinned collars *f* which locate the shaft *c* relative to the bearing *d*. At the other end this tubular shaft (see Fig. 1) is contained within a tubular sleeve *g*, the outer end of the tubular shaft *c* being secured by keys *h1* to a collar *h* which collar provides a mounting for a pair of adjusting screws *j*, the inner ends of which impinge against the end face of a cup *k* which provides abutment location for one end of a coiled compression spring *l*, the other end of this spring being in abutment with one end of the sleeve *g*, the other end of the sleeve being interlocked by means of a corrugated face *g1* on its end flange with the end refractory disc *a* of the roller assembly. The refractory disc at the opposite end of the roller assembly (see Fig. 2) abuts through its corrugated end face with a correspondingly flanged collar *m* which is secured by keys *m1* to the tubular shaft *c*. Thus the expansion force of the compression spring *l* serves to maintain the alternating series of discs *a* and *b* in close abutment and any variation in

the discs or in their mounting is automatically compensated for by the said spring.

The sleeve *g* which contains the one end of the tubular shaft *c* is freely and slidably mounted within a bearing *n* located externally of the other side wall e^1 of the furnace chamber.

The adjusting screws *j* serve to determine the initial compression which is to be applied through the compression spring *l* to the assembled alternating discs *a* and *b*, the degree of which compression can be set in relation to the temperature working of the furnace.

Desirably the one end of the sleeve *g* has peripheral connection to an annular shield *o* which can be contained at its other end within the cup *k* which shield serves as a protective cover for part of the spring *l* and provides a convenient telescopic connection between the sleeve *g* and the cup *k*.

It will be appreciated from the foregoing description that the tubular shaft *c* is maintained in tension while the alternating disc assembly mounted thereon is maintained in compression and that the coiled spring *l* serves the purpose of compensating for any differential longitudinal expansion between the shaft *c* and the assembled discs *a* and *b* due to temperature variations.

When the assembly is intended for use in furnaces having lower working temperatures than that already indicated which are within the creep limits of the shaft and no cooling is required, the shaft could be formed solid instead of tubular; where cooling is desirable this may be effected in any recognised manner by means of water or air circulation through the tubular shaft *c*.

I claim:

1. In a furnace conveyor having conveyor rollers consisting of alternate refractory and metallic discs, a shaft for said discs, bearings for rotatably mounting said shaft, each of said bearings being located exteriorly of one of a pair of aligned holes through opposed walls of said furnace, a sleeve slidably mounted on and near one end of said shaft and having a face bearing against the outermost one of said discs, said sleeve being rotatably and slidably mounted in one of said bearings, a collar secured to said shaft outside the other end of said sleeve, an inwardly turned cup slidingly mounted on said shaft between said collar and the outer end of said sleeve, a coiled spring extending between the outer end of said sleeve and into and against said cup, and means for relatively adjusting said cup and said collar axially on said shaft.

2. In a furnace conveyor having conveyor rollers consisting of alternate refractory and metallic discs, a shaft for said discs, bearings for rotatably mounting said shaft, each of said bearings being located exteriorly of one of a pair of aligned holes through opposed walls of said furnace, one of said bearings providing for rotatable movement only of said shaft, a sleeve slidably mounted on and near one end of said shaft and having a face bearing against the outermost one of said discs, said sleeve being rotatably and slidably mounted in one of said bearings, a collar secured to said shaft outside the other end of said sleeve, an inwardly turned cup slidingly mounted on said shaft between said collar and the outer end of said sleeve, a coiled spring extending between the outer end of said sleeve and into and against said cup, and adjusting screws threadably engaged with said collar and extending axially into engagement with the outer end of said cup for axially adjusting said cup relative to said shaft and varying the compression of said spring between said cup and said sleeve.

JOHN FALLON.

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