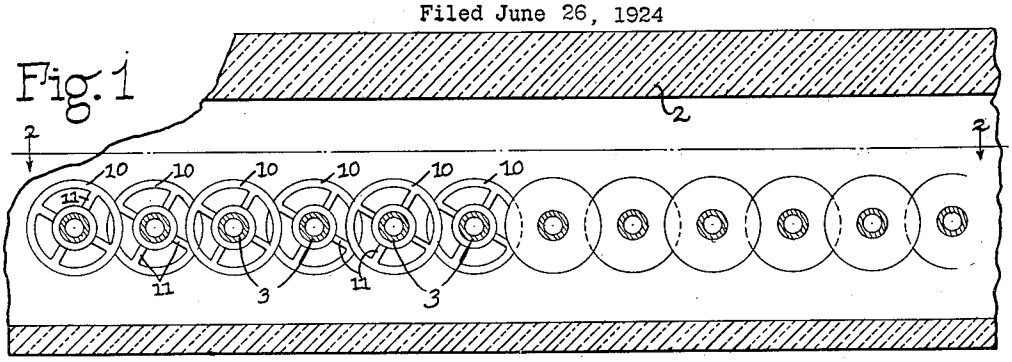
June 2, 1925. 1,539,833

F. A. FAHRENWALD

CONVEYER ROLL FOR FURNACE USE

Filed June 26, 1924

Fig. 1



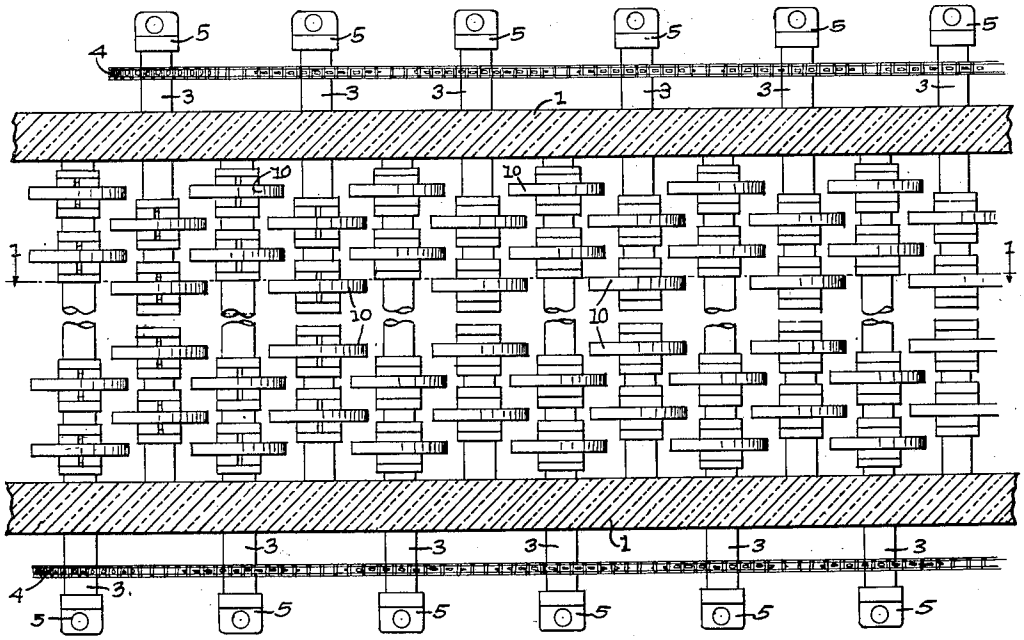


Fig. 2

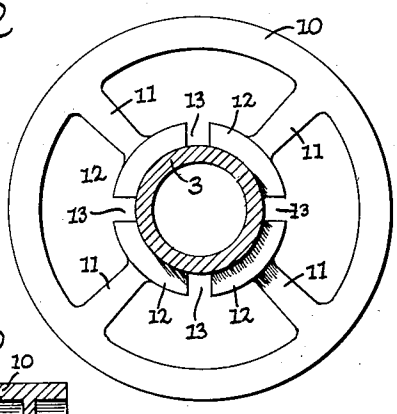


Fig. 4

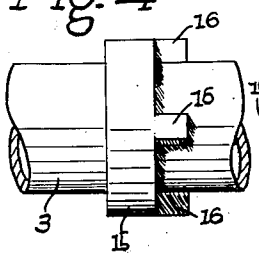


Fig. 5

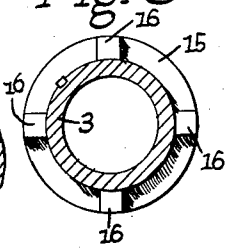


Fig. 6

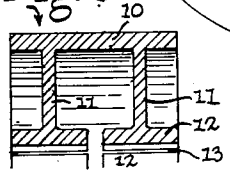


Fig. 3

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UNITED STATES PATENT OFFICE.

FRANK A. FAHRENWALD, OF CLEVELAND HEIGHTS, OHIO.

CONVEYER ROLL FOR FURNACE USE.

Application filed June 26, 1924. Serial No. 722,545.

To all whom it may concern:

Be it known that I, FRANK A. FAHRENWALD, a citizen of the United States of America, and a resident of Cleveland Heights, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Conveyer Rolls for Furnace Use, of which the following is a full, clear, and exact description.

This invention relates to high temperature apparatus and has especial reference to a furnace of the continuous process type. In order to anneal steel and other metal sheets, cure glass, glaze pottery, and perform other technical operations at high temperature it is necessary to subject the same to a high temperature and theoretically the cheapest and most convenient course is to convey the articles continuously through a heated region. One of the most extreme cases occurs in the annealing of steel sheets in which the same are passed in horizontal position through a furnace heated almost to the melting temperature. It is necessary to support these sheets at very small intervals, and move them very rapidly lest they sag by their own weight and clog the furnace completely, but difficulty has been experienced in devising rolls or other supports which shall withstand these high temperatures without cracking, warping, or disintegrating, for which reason this type of furnace has not been practically available.

The objects of my invention are the provision of a wheel or roll which can be used under the conditions stated for an indefinite length of time without cracking, warping or disintegrating; the provision of a wheel or roll that will operate under temperatures of 2000° F. or more; the provision of a wheel or roll which will withstand indefinitely the strain produced by a difference of temperature of 1000° Fahrenheit between the rim and hub; the provision of a new and improved type of wheel or roll for the purpose in view; while further objects and advantages of the invention will become apparent as the description proceeds.

In the drawing accompanying and forming a part of this application I have shown one form of my invention wherein, Fig. 1 is a vertical sectional view and Fig. 2 a horizontal sectional view of an industrial furnace equipped with my invention, and corresponding respectively to lines 1—1 of Fig. 2 and 2—2 of Fig. 1; Fig. 3 is a face view of one of the wheels drawn to larger scale, the shaft being shown in cross section; Figs. 4 and 5 are respectively side elevation and cross section of the shaft with the wheel removed; and Fig. 6 is a reduced sectional view of a modification.

Furnaces of the types shown in Figs. 1 and 2 are oftentimes 40 to 50 feet long and 8 to 10 feet wide comprising side walls 1—1 and roof 2 of any suitable refractory material. Projecting horizontally through apertures in the side walls are a very considerable number of horizontal hollow shafts 3—3, suitably synchronized by means of gearing such as sprocket wheels and chains 4—4 outside of the furnace and having their ends connected by suitable swivel joints 5—5 to conduits (not shown) whereby water, air, or other cooling fluid is circulated therethrough. Inside the furnace each shaft is provided with a number of wheels or rolls of a diameter varying from say 10 inches to 20 inches or more. The shafts are so close together that the rolls overlap, and the rolls are so spaced upon the shafts as to support a sheet or plate with substantial uniformity. A single furnace oftentimes contains as many as 300 of these rolls. The speed varies with the work being very fast with most metal sheets and slow with clay and ceramic work or some types of heat treatment.

According to my invention each of these wheels consist of a continuous circular rim 10 having integral spokes 11, the inner ends of the spokes being integral with segmental portions 12—12 spaced apart from each other to define slots 13—13 and the segmental portions together defining hubs. The interiors of these hubs are reamed to fit the shafts 3—3 (since heating expands the hubs faster than the shafts) and driving is preferably effected by means of collars 15 keyed to the shaft and formed at one side with rectangular teeth 16, which fit loosely in the slots 13—13. The shafts 3—3 can be made of common steel tubing of the same kind that is used in making steam boilers since the conditions to which they are subjected are no more severe than are encountered in boiler practice. Preferably I make the wheels of my alloy known as "Fahrite" consisting essentially of ½ iron, ⅓ nickel, ⅙ chromium and from $\frac{5}{10}$th% to 2% of silicon since this alloy will withstand continuously a temperature upwards of 2000°

Fahrenheit provided that the carbon content be only a fraction of one percent.

However, I do not restrict myself to this alloy since I ascribe the successful operation of my improved wheels or rolls and their resistance to cracking and breaking more to the design than to the composition and many high temperature alloys can be used successfully in this relation. Owing to the cooling effect of the shaft the hubs of the wheels are kept comparatively cool, often differing from the rim by as much as 1000° yet without producing such internal strains as to cause breakage.

I do not limit myself to the use of my improved wheels in this one way since it will be understood that many changes in this and other details can be made within the scope of my invention. I do not limit myself as regards the width of the face of the wheel or roll since the same may be made of any width compared to the diameter and added rows of spokes employed; in such case I do not restrict myself to having the hub severed into longitudinal segments as well as angular segments although I prefer to do so. Also I do not limit myself to the use herein illustrated nor in any other manner except as recited in my several claims which I desire may be construed, each independently of limitations in other claims.

Having thus described my invention what I claim is:

1. A roll for the purpose described comprising a continuous circular rim, spokes integral therewith, and segmental blocks integral with the respective spokes and collectively defining a hub, said blocks being separate from each other.

2. A roll for furnace use comprising spokes, a rim, and a hub constituting a unitary article, the hub consisting of independent segments, one for each spoke.

3. A device of the character described made of heat resisting alloy and comprising a rim, radial spokes, and independent blocks carried by the inner ends of said spokes, said blocks being spaced from each other and projecting laterally beyond the rim.

4. The combination with a hollow shaft and means for delivering a cooling fluid thereto, of a roll carried thereby having a continuous rim, spaced spokes integral therewith, and a hub integral with said spokes, said hub being slotted between adjacent spokes to form independent segments.

5. In a furnace, the combination with a shaft, of a collar thereon having laterally projecting teeth and a roll having a continuous rim, spokes integral therewith and a hub integral therewith, said hub having slots between adjacent spokes which extend from end to end thereof and separate the same into independent segments, said teeth fitting into said slots in driving relation.

6. A furnace roll made of a single integral casting of high temperature alloy having a cylindrical rim portion, and spokes, and a hub, said hub having longitudinal slots extending from end to end between each pair of angularly related spokes.

In testimony whereof, I hereunto affix my signature.

FRANK A. FAHRENWALD.