This invention relates to improvements in rolls for heat treating furnaces and has for its principal object to provide an improved construction of such rolls whereby they may be more economically manufactured.

As heretofore constructed, such rolls are preferably made of high heat resisting alloys and have usually been made in a single piece casting, which construction, due to its elongated shape and also to the high standards of mechanical perfection required of such articles, resulted in a large percentage of moulding losses. This in addition to the high cost of heat resisting material utilized in the roll, is reflected in the high initial cost of such furnaces as well as maintenance thereof due to replacement of the rolls.

In carrying out my invention, I provide an improved construction of roll wherein the enlarged cylindrical portion thereof which extends within the furnace is made of a separate casting, preferably of heat resisting alloy, while the end portions of the roll which provide bearings on the exterior of the furnace, are made of cheaper metal, but with allowance for expansion and contraction at the joints between the separate castings which make up the roll.

The invention may best be understood by reference to the accompanying drawing in which:

Figure 1 is a transverse section of a portion of a furnace showing my improved form of roll in longitudinal cross section.

Figure 2 is a section of the roll taken on line 2—2 of Figure 1.

Figure 3 is a section of the end casting at the driving end of the roll taken on line 3—3 of Figure 1.

Refriring now to details of the embodiment of my invention illustrated herein, the furnace walls are indicated at 10—10 having apertures 11—11 therein through which the roll 12 extends. It will be understood that a plurality of such rolls are provided in substantially horizontal alignment with each other in the usual manner so as to support material thereon as it passes through the furnace. The rolls are also supported as usual in bearing supports 15—15 at opposite ends of the roll on the outside of the furnace as shown. The roll may be driven in any suitable manner, as for instance, by a gear 16 mounted on a reduced end portion 17 at one end of the roll.

Refriring now more particularly to the details of construction which form the subject matter of my invention, it will be seen that the roll 12 is made up of three sections, namely, a main cylindrical section 20 and end sections 21 and 22, the latter end section herein being at the driven end of the roll which carries the gear 16 thereon. The main section 20 is preferably formed of heat resisting alloy and may be cast in any suitable manner, as for instance by floor molding, although better results may be obtained by utilizing the centrifugal molding process. As will be seen from the drawing said main section is preferably of uniform cylindrical cross section throughout its length except at its driven end, where it is provided with a radial flange 25 having recesses 26—26 around its outer periphery.

The end casting 22 consists of a cylindrical hub portion 27 which has fitting engagement within the end of the main section 20, a reduced bearing portion 28 which engages in one of the bearing supports 16—15 as shown, and a flange portion 29 having a series of lugs 30—30 which are adapted to have interlocking engagement in the recesses 26—26 formed in the adjacent flange 25 of the main section 20. The end casting 22 is preferably hollow throughout its length as shown so as to provide ventilation for the roll.

It will be noted that the reduced extension 17 on which the driving gear 16 is mounted, forms an integral continuation of the bearing portion 28 of the end casting 22.

The end casting 21 is somewhat similar to the end casting 22 excepting that it has no driving connections therefor. As shown herein, said end casting comprises a cylindrical portion 33 fitting within the main section 20, having a shoulder 34 which forms a stop for the end thereof, and a reduced bearing portion 35 engaged by its roller support 15.

From the above description it will now be
understood that the roller, although made up of three separate parts as described, can be made more economically than by the usual integral molding processes as heretofore employed. The use of relatively expensive heat resisting alloy is preferably restricted to the main section 20 and this main portion can be far more easily cast with its relatively large end openings than was possible when the entire roller including its restricted end portions were molded by the use of chaplets which were found necessary in order to support the internal core. If light chaplets were used for this purpose they would often fuse and allow the core to sag thus causing unevenness and thickness of metal, and if large chaplets were used they would not fuse into the metal sufficiently and would cause objectionable surface blemishes. The necessity for chaplets is entirely eliminated in forming a uniform section cylindrical casting for the main roller section 20, as shown herein.

The end castings 21 and 22 are of course relatively simple from the molding standpoint, and owing to the fact that they are removed from the more intensive heat of the furnace, it is possible to make these castings of cheaper metal and thus save in the cost of the entire roll.

The parts are readily assembled by slipping the end sections longitudinally into the main section, the parts preferably having relatively loose fitting engagement so as to allow for expansion and contraction of the associated parts while in operation. The driving connection between the end section 22 and the main roll is especially simple in construction and arrangement since it is effected by slipping the end member 22 endwise into the main section 20, with the lugs in registering position with the notches 26 on said main section.

I claim as my invention:

1. As a new article of manufacture, a roll for heat treating furnaces comprising a hollow central cylindrical main section composed of a high heat resisting alloy and substantially of uniform cross section throughout its length, end members each consisting of separate castings of a different material having fitting engagement in the ends of said central section to permit freedom of expansion and contraction thereof relative to said separate casting members, said end members provided with reduced bearing portions forming supports for opposite ends of the roll and having openings therethrough to provide for the ventilation of the roll, and endwise movable interlocking driving connections between one of said end members and said main section.

2. As a new article of manufacture, a roll for heat treating furnaces comprising a hollow central cylindrical section composed of a high heat resisting alloy and substantially of uniform cross section throughout its length, end members each consisting of separate pieces of a different material having fitting engagement in the ends of said central section to permit relative expansion and contraction of the different materials, said end members provided with reduced bearing portions forming supports for opposite ends of the roll and having openings therethrough to provide for the ventilation of the roll, said central section having an outwardly projecting radial flange at one end thereof, and endwise movable interlocking driving connections between said flange and one of said end members.

3. In a heat treating furnace, a roll comprising a hollow cylindrical central main section composed of a high heat resisting alloy and substantially uniform interior cross section throughout its length extending transversely of the furnace with its ends extending through the side walls thereof, end castings of different material formed hollow for ventilating the roll and providing supports extending inwardly of the side walls of the furnace having fitting engagement in the ends of said main section and reduced journal members extending outwardly from said side walls of the furnace, fixed bearing members for supporting said journal members, a driving member on one of said end castings, and an endwise interlocking driving connection between said end casting and said main section.

4. As a new article of manufacture, a roll for heat treating furnaces comprising a hollow central cylindrical section composed of a high heat resisting alloy and substantially of uniform cross section throughout its length, end members each consisting of separate castings of different material having enlarged cylindrical portions fitted endwise into the bore of said central section and having reduced bearing portions forming supports for opposite ends of the roll, said end members also being hollow for ventilation of the roll through said reduced bearing portions, and means whereby said central section may be driven by the rotation of one end member, comprising an outwardly extending flange on its enlarged cylindrical portion abutting the extreme end of said central section, and means connecting the abutting portions of said flange and said central section.

Signed at Springfield this 25th day of January, 1929.

RALPH BURKE.