Dec. 31, 1963 C. G. F. ERICSSON 3,116,053

DRIVING ROLLER IN A ROLLER CONVEYOR FOR USE AT HIGH TEMPERATURES

Filed Dec. 19, 1961

FIG. 1

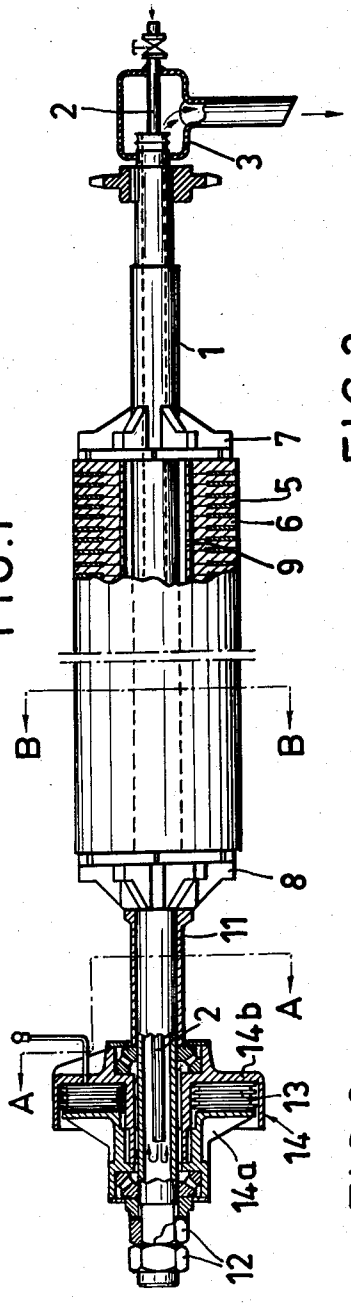


FIG. 3

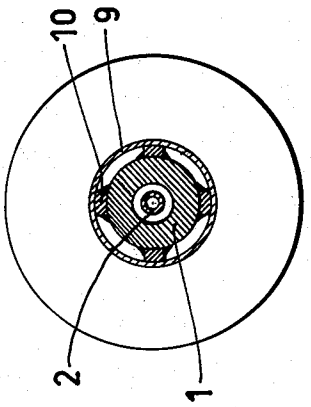
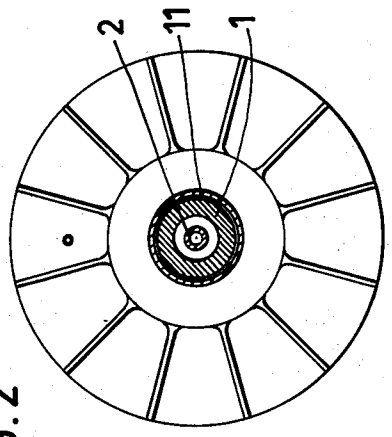


FIG. 2



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DRIVING ROLLER IN A ROLLER CONVEYOR FOR USE AT HIGH TEMPERATURES

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1 Claim. (Cl. 263—6)

This invention relates to a driving roller employed in roller conveyors for use in furnaces with high temperatures, for example up to 1300° C.

The rollers heretofore used in roller conveyors of the aforesaid type are of ceramic material or metal. The ceramic rollers comprise a cooled tubular through shaft provided with an insulating coat of ceramic material with a plurality of tubes of ceramic material of about 300 mm. length attached thereon. The material preferably conveyed on a roller conveyor of this type, for example cold rolled sheet metal, is very easily scratched by the ceramic roller.

The metallic rollers are manufactured of a hard steel alloy whereon at such high temperatures a coat, for example, of scale will adhere and accumulate in spots, thus rendering an uneven roller surface and, after hardening, scratching the sheet metal conveyed on the roller. Moreover, the metallic rollers cannot be stopped at full temperature in the furnace in view of the deformation risk, but must be kept in permanent rotation when employed in a furnace of the actual high temperature.

The aforesaid disadvantages are overcome by the driving roller according to the invention, which comprises an internally cooled tubular shaft with annular discs attached thereon, said discs being pressed so hard against one another in axial direction that a hard outer roller surface is formed. The invention is characterized in that said annular discs consist of asbestos in the form of thin and thick circular discs alternately arranged between a fixed and a movable end wall of a centre sleeve mounted by means of distance members on the tubular roller shaft, the discs being pressed together between the end walls by a compressive force produced by a hydraulic means disposed at one end of the roller shaft on a stand in such a manner that it is non-rotary, but axially displaceable on the roller shaft.

An embodiment of the invention will be described in the following, reference being had to the accompanying drawings, whereof FIG. 1 is a longitudinal view of the driving roller according to the invention, partially in section, FIG. 2 is an axial view of the bellows housing in the direction of the arrows A in FIG. 1, and FIG. 3 is a cross-section of the roller along the line B—B in FIG. 1.

The driving roller according to the invention is comprised in a roller conveyor for use in furnaces with high temperatures. The through shafts of the rollers are mounted in special bearings outside the furnace, so that only the roller proper is placed within the furnace.

The driving roller is supported by a through shaft 1 which is open at one end and closed at the other end. For supply of cooling water, a tube 2 of smaller diameter is introduced through the open shaft end and outside the shaft provided with a control valve. Said tube 2 terminates a distance before the closed end of the tubular shaft, and the cooling water fed in is allowed to flow back in the tubular shaft on the outside of tube 2. In this manner, the shaft is cooled effectively without use of rotary connecting junctions at the pressure inlet which may suffer from leakage or are in permanent need of adjustment. After cooling, the cooling water is collected in a special box 3 at the open shaft end and discharged through an escape pipe.

The roller body is constructed of thin and thick annular asbestos discs 5 and 6 respectively attached to a centre sleeve 9 mounted on distance members 10 on the tubular shaft 1. Thanks to the location of the centre sleeve 9, an insulating air space is formed between the shaft 1 and the sleeve 9, whereby the radial specific surface stress by the asbestos discs on the centre sleeve is reduced and even the downward bending of the roller body is considerably decreased.

The asbestos discs are in alternate arrangement on the centre sleeve 9. The thinner discs 5 have a wider central opening than the thicker discs 6 and, therefore, do not reach the centre sleeve 9 but are located closer to the periphery, concentrating the axial pressure to this area. Said thinner discs 5 constitute at the same time a compensation for the shrinking of the asbestos due to the high temperature. Said shrinkage tends to increase towards the periphery because the temperature of the roller is highest there. The discs 5 are dimensioned such, that a specific axial pressure is obtained which increases radially towards the periphery of the roller. Hereby, a hard and strong tread surface is obtained which is a very important advantage of this invention, because the binding agent comprised in the asbestos tends to be destroyed at high temperatures, so that the cohesion between the natural asbestos fibres is maintained only with the help of the axial pressure.

The most important advantage of the employment of asbestos is that this material, besides its capacity of withstanding high temperatures, does not scratch the goods conveyed nor does it stick to the same.

The axial pressure is produced by a hydraulic means mounted by means of axial and radial bearings at the free end of the tubular roller shaft outside the furnace side wall. Said hydraulic means comprises two axially displaceable end walls 14*a*, 14*b* in a bellows housing 14 with a steel bellows 13 arranged therebetween. The inwardly located bellows housing end wall 14*a* facing the roller transfers the compressive force from the hydraulic means to the displaceable end wall 8 of the driving roller by means of an axially displaceable distance sleeve 11. The outer end wall 14*b* of the bellows housing is biased towards the hydraulic means by stop or check nuts 12. The bellows housing is mounted non-rotary on a stand and prevented to rotate with the shaft, but may be displaced in axial direction. The length of the axial displacement depends on the length of the roller body.

The hydraulic means is operated by a conventional hydraulic pump with adjustable initial pressure. The advantage of using a hydraulic means for producing the compressive force compared with previously used spring means lies in the fact that the pressure obtained is more reliable and constant, irrespective of the displacement of the sleeve, and that a desired reduction in pressure is easier to obtain.

The driving roller according to the invention is not limited to the embodiment described and shown, but may be modified within the scope of the invention.

What I claim is:

In a roller conveyor for conveying goods, including sheet metal, strips and rods through a furnace with a high temperature (up to 1300° C.), a transport roller comprising annular members arranged on a tubular shaft, adapted for internal cooling, said annular members being axially compressible so as to present a hard roller surface to the conveyed goods, said members being made of asbestos in the form of alternately disposed relatively thin and relatively thick annular discs said relatively thick discs engaging by their inner peripheries a sleeve member which

axially surrounds said tubular shaft, said relatively thin discs being formed with substantially larger central apertures than said relatively thick annular discs but having the same outer diameter as the latter, said discs being disposed between a fixed and an axially movable end wall of said sleeve member, and hydraulic means for compressing said annular discs axially on said sleeve member by exerting hydraulic force axially against said axially movable end wall.

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