ATTACHMENT OF ELEMENTS TO ROTATIONAL MEMBERS

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ABSTRACT
A sugar mill roller is formed of a shaft and a shell secured to the shaft by means of adhesive. The shaft is formed with very low circumferential centering collar formations having axial grooves. The shell fits over the centering collar formations so that a space is formed between the shell and the body of the shaft. Adhesive is pumped into the space and allowed to cure.

2 Claims, 6 Drawing Figures
ATTACHMENT OF ELEMENTS TO ROTATIONAL MEMBERS

The present invention relates to the attachment of elements to rotational members such as shafts.

The invention is useful in the manufacture of large rotational elements such as large gear wheels and the like. In particular, the invention relates to sugar mill rollers.

In many types of industries, elements are attached to metal shafts by heating the elements and then shrinking the elements on to the required shaft. Such methods are often cumbersome and may require large heating furnaces.

It is an object of the invention to simplify the above methods of attachment.

A further object of the invention is to provide a simple method for attaching a shell to a sugar mill roller core, without having to perform any machining operation to the core as was hitherto the case.

According to the invention, a method of attaching an element to a rotational metal member, includes the step of interposing a suitable adhesive between the surfaces of the element and the rotational member, and permitting the adhesive to cure.

The element may be a metal shell or other operable circumferential element, such as a gear or the like, but in the preferred form a metal shell is attached to a metal shaft to form a sugar mill roller.

An existing shell may be machined off and a new outer shell attached to the machined shell by means of adhesive.

The invention also extends to a shaft or an inner shell provided with centering collar formations adapted for receiving an outer shell to be attached in accordance with the invention.

The shaft and/or the inner shell may have spaced annular centering collar formations for providing a space to receive adhesive. The centering collar formations may have longitudinal grooves for introduction of adhesive to the annular cavity.

The adhesive may be a low viscosity, reactive resin capable of being cross-linked for obtaining required adhesive properties.

Prior to the application of adhesive, the required surfaces may, if necessary, be prepared to ensure good gripping characteristics by sand blasting and/or pickling.

The invention will now be described by way of example with reference to the accompanying schematic drawings.

In the drawings:

FIG. 1 shows a section of a sugar mill shaft to which a shell has been attached;

FIG. 2 is a sectional view along arrows II—II in FIG. 1;

FIG. 3 shows a section of a sugar mill shaft on which a shell shrunk on to it, has been machined off to form an inner shell and to which an outer shell has been attached;

FIG. 4 is a sectional view along arrows IV—IV in FIG. 3;

FIG. 5 shows a section of a sugar mill shaft to which an outer and an inner shell have been attached; and

FIG. 6 is a sectional view along arrows VI—VI in FIG. 5.

We claim:

Referring to FIGS. 1 and 2, the shaft 10, made of steel, has been machined to provide circular centering collar formations 12.1, 12.2, 12.3.

The circular centering collar formations 12.1, 12.2, 12.3 have longitudinal grooves 14.1, 14.2, 14.3.

In use, the shell 16 is positioned over the centering collar formations 12.1, 12.2, 12.3. When in position, adhesive is pumped in at one end 18.1, through longitudinal grooves 14.1 until it emerges at end 18.2 through longitudinal grooves 14.3. The adhesive is circulated for some time to ensure displacement of all trapped air. The end 18.2, is then close so that all cavities between the shell 16 and the shaft 10 are filled with adhesive. The adhesive is allowed to cure. The assembly is then available for use.

For removing the shell, the shaft 10 and shell 16 are heated sufficiently so as to destroy the adhesive qualities. The shell 16 is then removed from the shaft.

Referring to FIGS. 3 and 4, the shell 20 is provided with a shell 22 shrunk on to it. On requiring replacement, the shell 22 is not removed but is machined to decrease its diameter and to form circular centering collar formations 24.1, 24.2, 24.3 having longitudinal grooves 26.1, 26.2, 26.3.

In use, an outer shell 28 is positioned over the centering collar formations 24.1, 24.2, 24.3. Adhesive is introduced as explained with reference to FIGS. 1 and 2.

Referring to FIGS. 5 and 6, the shaft 30 is provided with circular centering collar formations 32.1, 32.2, 32.3 having longitudinal grooves 34.1, 34.2, 34.3.

An inner shell 36 is positioned over the centering collar formations 32.1, 32.2, 32.3 and adhesive is introduced as explained with reference to FIGS. 1 and 2.

The inner shell 36 has circular centering collar formations 38.1, 38.2, 38.3 having longitudinal grooves 40.1, 40.2, 40.3.

An outer shell 42 is positioned over the centering collar formations 38.1, 38.2, 38.3 and adhesive is introduced as explained with reference to FIG. 1 and 2.

On a shaft diameter of about 2 feet, the centering collar formations shown in the drawings may stand proud for a distance of about 18 thousands of an inch.

We claim:

1. The combination of a metal shaft and a circumferential element chosen from the group comprising a gearing, a metal shell and the like, said circumferential element having an axial bore therethrough, the shaft having two or more centering collar formations received within the bore of the circumferential element, grooves forming connecting passageways between adjacent cavities defined by said collars, the outside diameter of the shaft and the inside diameter of the circumferential element, and from the outer cavities toward the shaft ends, and a synthetic resinous adhesive filling said cavities and passageways.

2. A sugar mill roller comprising a combination of a metal shaft and a shell, said shell having an axial bore therethrough, received within the bore of the shell, grooves forming connecting passageways between adjacent cavities defined by said collars, the outside diameter of the shaft and the inside diameter of the shell, and from the outer cavities toward the shaft ends, and synthetic resinous adhesive filling said cavities and passageways.

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