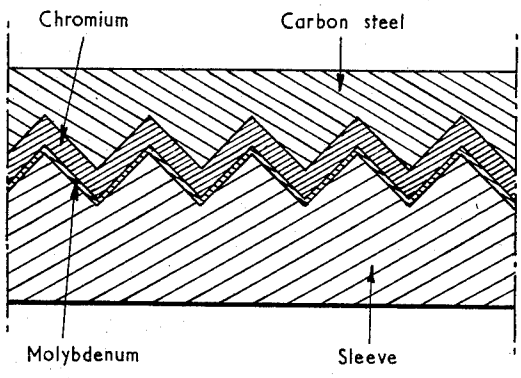
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PROCESS FOR BUILDING UP SLEEVES FOR DIESEL AND OTHER ENGINES

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PROCESS FOR BUILDING UP SLEEVES FOR DIESEL AND OTHER ENGINES

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3 Claims. (Cl. 29—401)

Cast iron sleeves for marine and land-based diesel engines become unusable after a certain number of hours of operation, due to the wear caused by friction of piston rings and pistons.

The object of the invention consists in the provision of a process permitting the building up of sleeves with very large thicknesses to assure a considerable diminution of wear as well as a much longer duration of use.

It is characterised by the means utilised, considered both individually and in combination, and more particularly by the application, on the surface to be treated previously threaded and cleaned, with a metallising pistol of a deposit of pure molybdenum, of chromium, and of carbon steel, in thicknesses and at temperatures which ensure a perfect homogeneity of the texture of the deposit.

According to one method of carrying out the invention, given by way of non-limiting example:

For the building up of a cast iron sleeve, and per square metre, there is deposited successively:

(1) Pure molybdenum of 94% content, and of a thickness of $\frac{5}{100}$ mm.

(2) A layer of chromium of $\frac{1}{10}$ mm.

(3) Carbon steel which will be in contact with the segments and which will constitute the bearing steel between the piston rings and the pistons.

The quantities of these substances used are:

Molybdenum 3.2% and with $\frac{5}{100}$ mm. thickness per square meter

Chromium 8.8% and with $\frac{1}{10}$ mm. thickness per square meter

Carbon steel 88% and with 1 mm. thickness per square meter

The member to be treated is firstly cleaned in a bath of trichlorethylene, then bored to the minimum of 4 mm., then threaded in order to increase the adherence surface.

Finally, Carborundum is projected onto it for polishing the surface.

The spraying of molybdenum of $\frac{5}{100}$ mm. thickness is effected in two directions with an angle of emission of 45°, in order to cover the two surfaces of the threads.

The chromium of $\frac{1}{10}$ mm. thickness is likewise sprayed in two directions onto the surface.

The spraying is performed by ejecting apparatus having an inclination of 45° and the sleeve is disposed on a sleeve building-up machine comprising four rollers on which it is placed. The sleeve turns at a speed of about 15 metres per minute. After these two layers, the sleeve is heated to 145° C. before spraying of the carbon steel in such a manner as to expand the metal and to assure

a good cohesion at the moment of contraction. This heating takes place by means of a range of burners with thermometers serving for control of the temperature.

The carbon steel is then sprayed to a thickness sufficient to bring the sleeve to the diameter of use.

The internal building up takes place by means of apparatus for spraying fused metal at 45° and by the inversion of the direction of spraying the threads are completely filled and the mirror-finishing of the faces is perfect, without any heterogeneous areas.

The molybdenum has the property of jointing itself to the base support, and plays the part of a metal joint between the support base and the other metals applied thereto. The chromium, which does not undergo any contraction, serves for coupling between the molybdenum and the carbon steel.

Finally, the carbon steel permits to achieve with the other substances a coating having a thickness of 5 mm. finished and machined, and without having any deformation of the sleeve.

A typical longitudinal enlarged section of part of a sleeve after being subjected to this process is illustrated in the accompanying drawing, the various metal layers being indicated thereon, the relative thicknesses of the layers not being drawn to scale.

The combination of the metals used permits the elimination of any internal contraction which would have for its object the separation of the base support from the added metal, because the metal added internally has always the tendency to separate away from its support during contraction, above all with greater thicknesses.

Nevertheless, the qualities, quantities, and nature of the materials employed could be varied within the limit of equivalence without thereby changing the general conception of the invention which has just been described.

I claim:

1. A process for building up sleeves for diesel and other internal combustion engines, comprising the steps of boring out said sleeve, cutting a thread internally of said sleeve, blasting said thread with Carborundum to polish the surface thereof, spraying a first relatively thin layer consisting of molybdenum onto said polished thread, spraying a second relatively thin layer consisting of chromium onto said layer of molybdenum, thereafter heating the sleeve and said first and second layers to a temperature of approximately 145° C. and spraying a third relatively thick layer consisting of carbon steel onto said layer of chromium whilst said temperature is maintained and to completely fill said thread and build up additional carbon steel for subsequent boring out to a desired diameter.

2. A process as claimed in claim 1, including an initial step of cleaning the surface of said sleeve by passing said sleeve through a bath of trichlorethylene.

3. A process as claimed in claim 1, wherein the layers of molybdenum, chromium and carbon steel are sprayed by metal spraying pistols directed at an angle normal to the faces of the thread.

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