Oct. 17, 1961 H. B. TIMUSKA 3,004,336

METHOD OF RECONDITIONING WORN-OUT SURFACES OF ALUMINUM ALLOY PISTONS

Filed Oct. 12, 1959

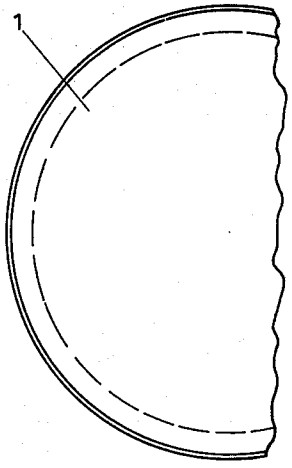


Fig. 1

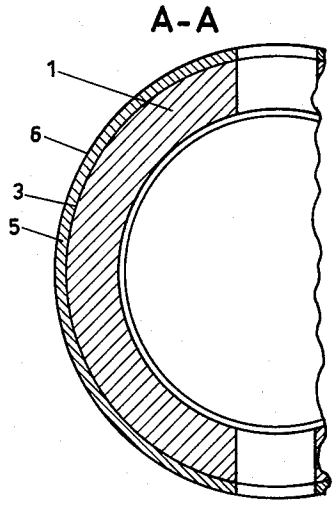


Fig. 3

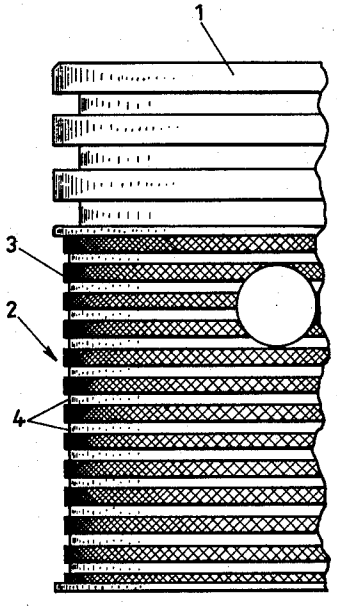


Fig. 2

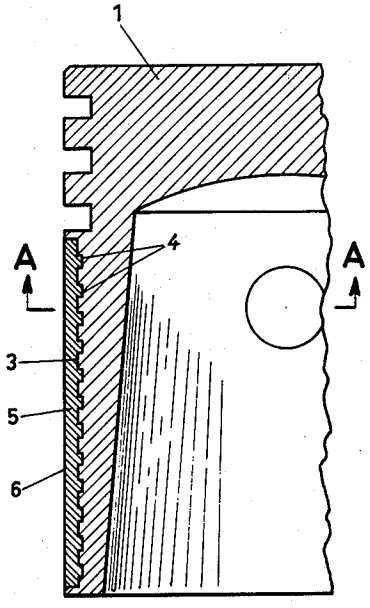


Fig. 4

INVENTOR

Harijs B. Timuska.

United States Patent Office 3,004,336 Patented Oct. 17, 1961

3,004,336

METHOD OF RECONDITIONING WORN-OUT SURFACES OF ALUMINUM ALLOY PISTONS

Harijs B. Timuska, 71 Pintail Crescent, Don Mills, Ontario, Canada

Filed Oct. 12, 1959, Ser. No. 845,742
4 Claims. (Cl. 29—401)

This invention relates to the reconditioning of worn-out surfaces of pistons, bearings, fuel injection pump bodies, and the like, and, more particularly, to reconditioning of aluminum alloy products such as aluminum alloy pistons.

It is general practice to recondition aluminum alloy pistons used, for instance, in engines, by metallizing (spraying) the worn-out surfaces of the piston with a conventional aluminum alloy, defined as "metallizing" aluminum alloy. Surfaces sprayed in this manner provide the disadvantage that they cannot be easily or satisfactorily worked, for instance, by machining or grinding, in order to reduce, for instance, a metallized piston to its intended diameter. Such conventional aluminum alloy does not bond itself sufficiently well to the piston and is apt in part to peel off when the piston is being ground.

Another disadvantage is that the alloy or metal removed from the piston during the grinding procedure, attaches itself to the grinding implement (grinding wheel), tending to score the surface of the piston.

It is the object of this invention to provide an aluminum alloy adapted to be attached to the worn-out surface of an aluminum alloy part such as, for instance, a piston, by being sprayed thereon through the conventional method of metallizing, said aluminum alloy being adapted to provide a smooth and even a polished finish when ground.

It is furthermore an object of this invention to provide a method for reconditioning worn-out surfaces of aluminum alloys parts such as pistons in which the aluminum alloy utilized to build up the worn-down surface is adapted to bond itself so intimately to the base material of the piston, that peeling off during pursuant grinding operation is eliminated.

It is another object of this invention to provide a method of reconditioning worn-out surfaces of aluminum alloy parts such as pistons, in which the aluminum alloy utilized in building up the worn-out surface is not apt to attach itself to the grinding implement during a grinding operation, and score the surface of the piston.

These and other objects and features of this invention will become apparent when taken in conjunction with the following drawings in which:

FIG. 1 is a plan view of a piston prepared for reconditioning according to the method embodied in this invention.

FIG. 2 is a vertical side elevaion of the piston shown in FIG. 1.

FIG. 3 is a sectional partial plan view of a piston reconditioned by the method embodied in this invention.

FIG. 4 is a mid-vertical sectional side elevation of the piston shown in FIG. 3.

Referring to FIG. 1 and FIG. 2, a piston 1 that has been thoroughly cleaned of grease or the like is shown, with a layer of approximately 60 thousandths of an inch removed from the diameter of the skirt 2 of piston 1, for instance, by turning on a lathe, for the axial length of the skirt that requires reconditioning.

A series of annular grooves 4 are thereafter cut into the turned surface to a depth of about 20 thousandths of an inch, and a width of about 1/16 of an inch, the grooves 4 being spaced approximately 1/8 of an inch apart for the whole length of the turned surface 3.

Turned surface 3 is thereafter knurled, whereafter the complete surface comprising knurled surfaces 3 and annular grooves 4 is coated by spraying, by the metallizing procedure, with a thin layer of conventional steel, such as is procurable on the market for metallizing.

The piston is thereafter ready to be metallized with an aluminum alloy adapted to fill up the thus prepared surface to a little over the required diameter of the finished piston, which thereafter may be ground to the required diameter.

Referring to FIG. 3 and FIG. 4, the piston illustrated in FIG. 1 and FIG. 2 is shown after above-mentioned prepared surface has been filled out with aluminum alloy 5, having a silicon content of the order of 12%; or a silicon content of about 8% and a copper content of about 4%, and restored to the required diameter by, for instance, grinding on surface 6.

I have found that an aluminum alloy part such as, for instance, a piston can be satisfactorily reconditioned, to give a smooth and even a polished finish when ground, upon the aluminum alloy used to build up the surface of a worn-out piston containing a silicon content in the order of 12%; or a silicon content of about 8% and a copper content of about 4%.

The surface of such an aluminum alloy will, upon being ground down to the required diameter, be able to attain a high polish.

Utilization of this invention is not limited to pistons, but may be applied to a variety of other aluminum alloy products such as, for instance, truck engine bearings, aluminum wheels for trailers, fuel injection pump bodies, etc. without prejudicing the novelty of this invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method of reconditioning the surface of an aluminum body including the steps of thoroughly cleaning the surface of the said aluminum body, removing a layer of the cleaned surface by machining, cutting spaced annular grooves into said machined surface, knurling the uncut portions of said machined surface, spraying a thin coating of steel upon the said knurled and grooved surface, spraying a coating of aluminum alloy having a silicon content of about 8% and a copper content of about 4% upon the sprayed coating of steel, said aluminum alloy coating filling said grooves and building up said aluminum body to dimensions larger than the original dimensions of said body, and reducing said larger dimensions by machining the surfaces of the sprayed coating of aluminum alloy to reproduce the original shape of said aluminum body.

2. A method of reconditioning the surface of an aluminum body including the steps of thoroughly cleaning the surface of the said aluminum body, removing a layer of the cleaned surface by machining, cutting spaced annular grooves into said machined surface, knurling the uncut portions of said machined surface, spraying a thin coating of steel upon the said knurled and grooved surface, spraying a coating of aluminum alloy having a silicon content of 12% upon the sprayed coating of steel, said aluminum alloy coating filling said grooves and building up said aluminum body to dimensions larger than the orginal dimensions of said body, and reducing said larger dimensions by machining the surfaces of the sprayed coating of aluminum alloy to reproduce the original shape of said aluminum body.

3. A method of reconditioning the surface of an aluminum body including the steps of thoroughly cleaning the surface of the said aluminum body, removing a layer of the cleaned surface by machining, cutting spaced annular grooves into said machined surface, knurling the uncut portions of said machined surface, spraying a thin coat-

ing of steel upon the said knurled and grooved surface, spraying a coating of aluminum alloy having a silicon content of about 8% and a copper content of about 4% upon the sprayed coating of steel, said aluminum alloy coating filling said grooves and building up said aluminum body to dimensions larger than the original dimensions, and grinding the surfaces of the sprayed coating of aluminum alloy to reproduce to original shape of the said aluminum body.

4. A method of reconditioning the surface of an aluminum body including the steps of thoroughly cleaning the surface of the said aluminum body, removing a layer of the cleaned surface by machining, cutting spaced annular grooves into said machined surface, knurling the uncut portions of said machined surface, spraying a thin coating of steel upon the said knurled and grooved surface, spraying a coating of aluminum alloy having a silicon content of 12% upon the sprayed coating of steel, said aluminum alloy coating filling said grooves and building up said aluminum body to dimensions larger than the original dimensions, and grinding the surfaces of the sprayed coating of aluminum alloy to reproduce the original shape of the said aluminum body.

References Cited in the file of this patent

UNITED STATES PATENTS

1,947,493	Rose	Feb. 20, 1934
2,053,923	Stewart	Sept. 8, 1936
2,752,668	Sheen	July 3, 1956
2,771,328	Wainwright	Nov. 20, 1956
2,775,811	Wilson	Jan. 1, 1957
2,793,922	Whitfield	May 28, 1957