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(19)

(54) A SLIDING-VANE ROTARY FLUID MACHINE

(71) We, ROBERT BOSCH GmbH., a German company of Postfach 50, 7000 Stuttgart 1, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention is concerned with sliding-vane rotary fluid machines, such as pneumatic motors.

Sliding-vane rotary air compressors are known having a grey cast iron compression chamber with a hard chromed bearing surface against which sliding vanes of asbestos-textile-reinforced phenolic resin bear. The bearing surface of such a compressor must be lubricated in use, which is disadvantageous.

Sliding-vane rotary compressors are also known for operation for a brief period without lubrication, such compressors being sirens having vanes of fibrous material and compression chambers of light metal (by the term "light metal", we mean herein a metal or alloy having a specific gravity of less than 5). Such compressors cannot be used for prolonged periods without lubrication.

A further known type of sliding-vane rotary fluid machine is an air-operated pneumatic motor which has a stator (the bearing surface for the vanes) of sintered steel or ceramics, or of ceramic-coated material.

We have now developed an improved sliding-vane rotary fluid machine. which has a stator of molybdenum-coated light metal ("light metal" being as defined above).

The machine according to the invention can be light (which is especially desirable when the latter is intended for portable manual apparatus). The provision of the molybdenum coating gives good frictional properties (supply of a separate lubricant can often be omitted) with resulting long life for the vanes and stator and lack of heat development.

The molybdenum coating preferably includes a chalcogenide, of which molybdenum disulphide is preferred, whereby the bearing and anti-friction properties of the stator can be further improved. The coating is preferably applied by thermal spraying, such as plasma spraying. The light metal surface is preferably sanded before plasma spraying and the coating subsequently polished.

The vanes in the machine according to the invention are preferably of plastics material, more preferably textile-reinforced plastics material, whereby the service life of the machine can be further increased.

In order that the present invention may be more fully understood, an example of a machine according to the invention will now be described with reference to the single figure of the accompanying drawing.

In the drawing, there is shown an angle grinder having a metal motor housing 1 to which a plastics handle 2 is attached laterally. A press-button switch 3 which can act on a valve 4 is arranged in the handle 2. A screw thread 5 is provided at the end of the handle by means of which the handle can be attached to a compressed air line. A compressed air duct 6 leads from the valve 4 to the motor housing through the handle where it continues as a duct 7.

A grinding spindle 8, to which is fixed a grinding disc 9, extends from the bottom of the motor housing 1. A hood-like control housing 10 is mounted on the top of the motor housing 1. The duct 7 in the motor housing continues into a duct 11 in the control housing 10. A centrifugal governor (not shown) and an upper bearing frame 12 of light metal (as defined above) for a pneumatic sliding-vane rotary motor 13, are arranged in the control housing 10. An O-

ring 14 seals the upper bearing frame 12. A roller bearing 15 in which is mounted the rotor 16 of the motor 13, is incorporated in the upper bearing frame 12.

A lower bearing frame 17 consisting of light metal (as defined above) and which accommodates a roller bearing 18, is arranged in the region of the lower end of the motor housing 1. The grinding spindle 8 is mounted in the roller bearing 18, the spindle being integrally formed with the rotor 16. A cylindrical part 19, likewise consisting of light metal and having an eccentric bore 20, is held between the upper bearing frame 12 and the lower bearing frame 17. Together with the bearing frames 12 and 17, the cylindrical part 19 forms the stator 21 of the motor 13 within which the rotor 16 is rotated. Vanes 23, consisting of a plastics material, are guided in the slots 22 in the rotor 16 and run in a sealed manner against the bore 20 of the cylindrical part 19.

During operation, the vanes 23 are pressed against the wall of the bore 20 of the cylindrical part 19 by centrifugal force. The wall of the bore 20 is coated with molybdenum, in accordance with the invention.

The lower surface 24 of the upper bearing frame 12 facing the rotor 16 is preferably likewise coated with molybdenum so as to also prevent seizing between the rotor and the upper bearing frame 12 due to the increasing axial clearance in the roller bearings 15 and 18 as a result of continuing wear of the grinder. The upper surface 25 of the lower bearing frame 17 facing the rotor 16 is also molybdenum coated. However, since the loading on the grinder is more likely not to load this point with sliding friction, a steel washer can be inserted between the rotor 16 and the lower bearing frame 17, if desired, in which case the upper surface 25 of the lower bearing frame 17 need not be molybdenum-coated.

WHAT WE CLAIM IS:

1. A sliding-vane rotary fluid machine, which has a stator of molybdenum-coated light metal (as defined herein).

2. A machine according to claim 1, in which the coating contains a chalcogenide.

3. A machine according to any of which the chalcogenide is molybdenum disulphide.

4. A machine according to any of claims 1 to 3, in which the coating is applied by thermal spraying.

5. A machine according to claim 4, in which the coating is applied by plasma spraying.

6. A machine according to claim 5, in which the light metal is sanded before plasma spraying and the coating is subsequently polished.

7. A machine according to any of claims 1 to 6, which is designed as a motor.

8. A machine according to any of claims 1 to 7, in which the vanes are of plastics material.

9. A machine according to claim 8, in which the plastics material is textile-reinforced.

10. A machine according to claim 1, substantially as described herein with reference to the accompanying drawing.

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1 SHEET *This drawing is a reproduction of the Original on a reduced scale*