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ROTOR AND STATOR FOR FLUID HANDLING MACHINES HAVING SURFACES COATED WITH GOLD

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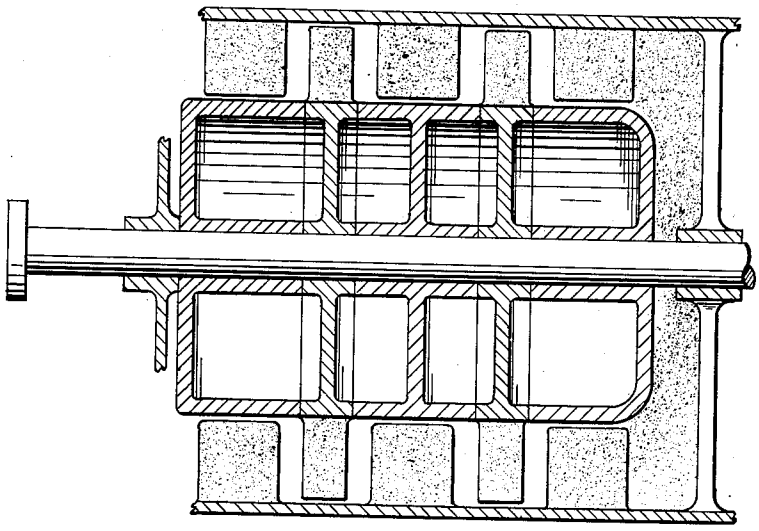


FIG. 1

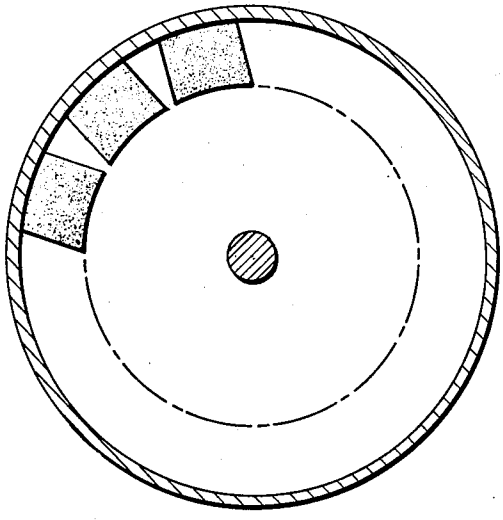


FIG. 2

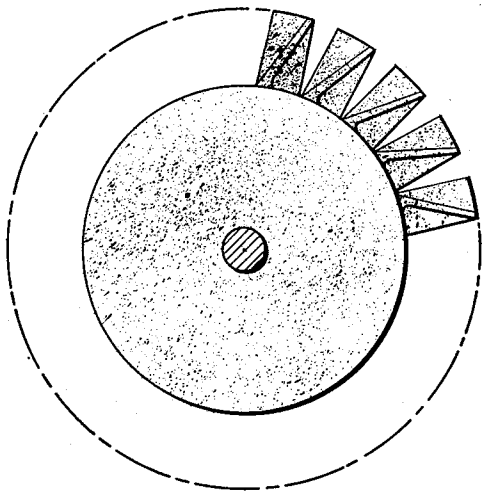


FIG. 3

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ROTOR AND STATOR FOR FLUID HANDLING MACHINES HAVING SURFACES COATED WITH GOLD

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3 Claims. (Cl. 103—122)

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This invention relates to bladed structures intended for operation in fluid media.

Recent developments in multistage compressors have resulted in speeds of rotation exceeding 23,000 revolutions per minute and compression ratios of 4 to 1 are not uncommon. Among the difficulties encountered in the operation of such compressors is the need for frequent disassembly and cleaning. Compressors of this type have found extensive application to aircraft, and each time it becomes necessary to dismantle the apparatus, valuable equipment is out of service for an appreciable period.

One of the contributing factors to the need for such frequent overhaul, is the accumulation of dirt from the air upon the working surfaces of the compressor. The size of filters to handle the exceedingly large volumes of air involved immediately eliminates their use as impractical. Other arrangements for precipitating the dirt have been proposed heretofore, but for one reason or another they also have been dismissed as being not feasible.

It is now proposed by the present invention to provide the working surfaces of bladed structures intended for operation in contact with a fluid medium with a coating of gold. It has been found that structures thus coated will operate satisfactorily over substantially greater periods of time under the same operating conditions than similar structures which have not been coated with gold. The amount of dirt found to adhere to such gold coated structures is negligible as compared with that encountered with structures of the uncoated type currently in use. Accordingly, upon coating the blades of a compressor with gold, not only will the maintenance problem be substantially reduced, but the efficiency of the compressor will be proportionately high over long periods of time.

Whereas an immediate need exists for this invention in conjunction with axial multistage compressors, it is applicable to centrifugal compressors, turbines and fluid pumps and motors generally.

Depending upon the particular operating conditions encountered, the gold coating may vary from 0.001 inch to 0.0001 inch. The coating may be applied by electrolysis, evaporation, sputtering, in the form of leaf, or dispersed in an organic vehicle which is later removed. However it is applied, the gold surface should have a high continuity over the entire working surface to be protected. The structure to which the coating is applied may be treated before or after assembly

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so long as the ultimate coating is not damaged by manipulation.

This gold coating may be subjected to working with a view towards achieving uniform surface hardness. Such working may be effected, as in the cold state, by any one or more of various methods such as application of pressure by conforming dies, rolling, and/or blasting with shot, seed or mud, among others.

A typical construction embodying the present invention may be illustrated in a manner patterned after Figs. 8, 9 and 10 of the patent to Whittle, 2,378,372, dated June 12, 1945.

Referring to the drawing constituting a part of this application:

Fig. 1 is a sectional elevation, partially broken away in which the stippled portions represent the coating material;

Fig. 2 is an end elevation in section of the stator of Fig. 1, showing three of the blades stippled to indicate the coating material; and

Fig. 3 is a sectional elevation illustrating a portion of the rotor, five of its blades and its body being shown as stippled to represent the coating contemplated herein.

No effort has been made to explain the phenomenon involved theoretically since it is not desired to rely upon controversial questions for the protection sought in connection with this very practical problem and its solution. Accordingly, the bladed structure, impeller, compressor rotor, rotary structure, blade, rotary fluid impeller, compressor, multistage compressor, multistage axial compressor and rotary bladed machine proposed herein as examples to which the present invention may be applied, should not be considered restrictive beyond the scope of the appended claims.

The terms "vaporous medium" appearing in certain of the claims, is intended to distinguish from liquids, but should be construed as including such media as air, gases, vapors, and mixtures thereof.

We claim:

1. A multistage axial compressor comprising a stator and a rotor having cooperating blades, a plurality of said blades being coated with gold for operation in contact with a fluid medium.

2. A multistage compressor comprising a stator and a rotor carrying a plurality of blades, certain of said blades having gold working surfaces for operation in contact with a fluid medium.

3. A machine having a stator and a rotor for operation in the presence of a vaporous medium, cooperating blades supported upon said stator

and rotor respectively, and gold applied to the portions of said blades which contact said medium.

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