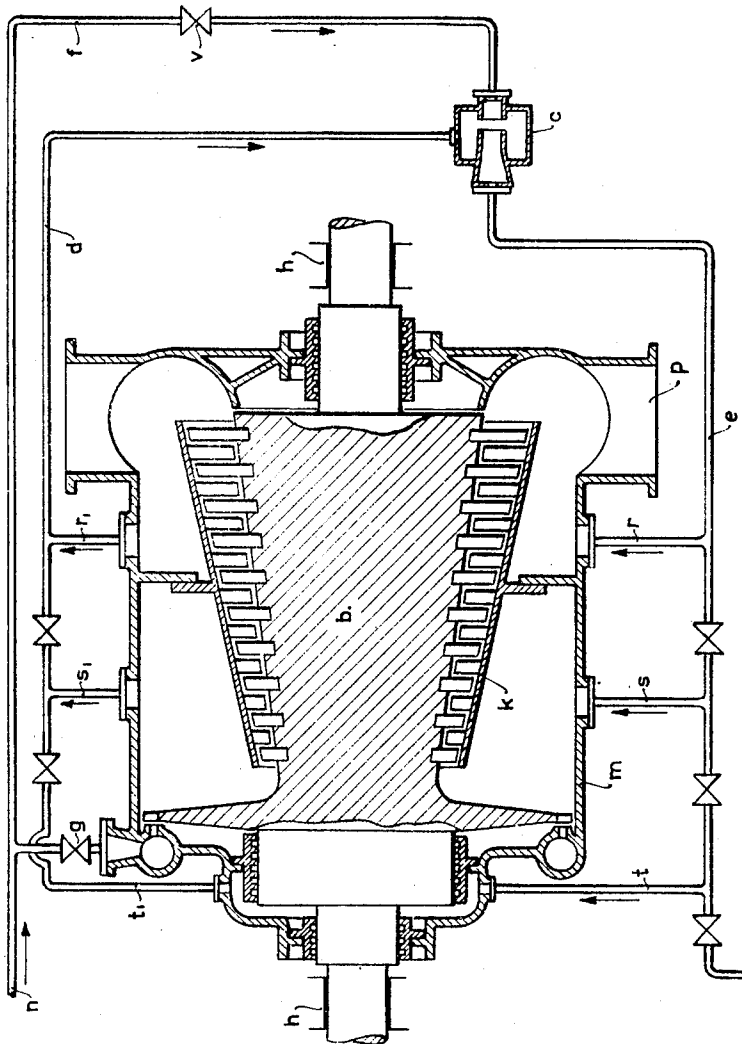


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PRESSURE FLUID TURBINE

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PRESSURE FLUID TURBINE

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1 Claim. (Cl. 253—39)

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The invention relates to a turbine driven by a hot pressure fluid and having a supply conduit for said driving fluid which is connected to the turbine through the intermediary of a main valve.

Starting turbines of this kind is a very delicate operation and can cause damage of the stuffing or labyrinth boxes, the shaft and the blades of the rotor due to bending of the shaft of the rotor and the axis of the casing. Said difficulties particularly occur when the turbine is restarted after having been stopped for a relatively short time and are due to differences in temperature between the upper and lower parts of the turbine caused by the hot driving fluid entering the turbine before it is started or by hot fluid left in the turbine during stopping for a shorter or longer time. Generally the upper parts of the turbine have a higher temperature than the lower parts. Moreover the rotor is liable to much more rapid changes in temperature than the relatively heavier casing.

The invention has for its object to equalize the temperature between the upper and lower parts of the turbine so that differences in temperature are avoided when the turbine is to be started. With this object in view according to the invention an ejector is provided the supply side of which is connected to a conduit branched off from the supply conduit of the turbine at the upstream side of the main valve of the turbine and the outlet side of the ejector being connected to a conduit leading to one or more openings in the lower part of the wall of the casing of the turbine, said ejector having a suction conduit connected to one or more openings in the upper part of the wall of said casing. With said arrangement an upwards directed flow of the hot fluid is generated in the interior of the casing of the turbine before the main valve of the turbine is opened and the turbine starts.

The drawing shows a diagrammatical sectional elevation of the turbine according to the invention.

The blades-carrying rotor *b* of the turbine is supported in bearings *h*. The stationary guide-blades carrying drum *k* surrounds the rotor *b* and is supported in the casing *m*.

Driving fluid, for instance high pressure steam, is supplied to the turbine by means of conduit *n* through the intermediary of a main valve *g* and after expansion in the stages of the turbine the fluid leaves the casing at *p*.

For heating up the turbine before starting takes place an ejector *c* is provided and the supply side of said ejector by means of conduit *f* is connected to conduit *n* at the upstream side of valve *g*. The outlet side of ejector *c* by means of conduit *e* and branch pipes *r*, *s*, *t* is connected to openings provided at suitable places in the lower part of the wall of casing *m*. The suction side of the ejector *c* by means of conduit *d* and branch pipes *r*₁, *s*₁, *t*₁ is connected to suitable openings

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provided in the upper part of the wall of the casing.

Before starting the turbine valve *v* provided in conduit *f* is opened, the main valve *g* of the turbine still remaining closed. Hot pressure fluid now enters the ejector *c* through conduit *f* and is discharged through conduit *e* in the lower part of the casing of the turbine so that in said casing an ascending flow of hot fluid is produced which tends to equalize the temperature in all parts located in the flow of the fluid and differences between the upper part and lower part of the turbine are avoided. Bending of the rotor shaft and the axis of the casing caused by differences in temperature between the upper and lower part of the casing are, therefore, prevented.

The water of condensation is withdrawn in the usual way.

When normal operation of the turbine is started valve *g* is opened and valve *v* is closed. Only normal deflections of the turbine shaft and the casing will now occur, so that distortion and damage of the labyrinth or stuffing boxes and blades, decrease of efficiency and consequently interruptions of the normal operation of the turbine causing high costs of repair will be avoided.

What I claim is:

In a pressure fluid turbine having an outer casing, a rotor, a stationary guide-blades carrying drum enclosing said rotor and open at both ends to the interior of said casing, a casing inlet and a casing outlet, wall means in said casing intermediate of said casing inlet and said casing outlet for supporting said stationary guide-blades carrying drum intermediate of the ends thereof and a supply conduit for said driving fluid connected to the outer casing through the intermediary of a main valve, the provision of an ejector the supply side of which is connected to a conduit branched off from the supply conduit of the turbine at the upstream side of the main valve of the turbine and the outlet side of the ejector being connected to a conduit leading to one or more inlet openings provided in the lower part of the wall of the casing of the turbine, said ejector having a suction conduit connected to one or more discharge openings in the upper part of the wall of said casing, each inlet opening in the lower part of the casing and the corresponding discharge opening in the upper part of the casing being located substantially in a common plane perpendicular to the axis of the turbine.

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