

Title (en)  
Steam turbine blading protection apparatus.

Title (de)  
Einrichtung zum Schutz der Beschaufelung einer Dampfturbine.

Title (fr)  
Dispositif de protection des aubages d'une turbine à vapeur.

Publication  
**EP 0004482 A2 19791003 (FR)**

Application  
**EP 79400033 A 19790116**

Priority  
FR 7807732 A 19780317

Abstract (en)  
1. A device for the protection of the moving blading of a steam turbine, in particular a condensing or back-pressure turbine, the said protective device including : - at least one tapping (23) at pressure (PE ) carried out at the exhaust from the turbine, - at least one tapping (24) for measurement of flow (D) carried out in a stage which is not the last and which passes the flow which passes through the blading which is to be protected, - at least one first device (25) connected to the exhaust pressure (PE ) tapping and enabling the said exhaust pressure to be transformed with a transfer coefficient (S1 ) into a force (PE .S1 ), - at least one second device (26) connected to the tapping for measurement of flow (D) and enabling the said measurement of flow to be transformed, with a transfer coefficient (S2 ), into a force (D.S2 ), - at least one torque equilibrium balance (28) upon which the said forces come to act, characterized in that the said first and second devices (25 and 26 respectively) have transfer coefficients (S1 and S2 respectively) such, and in that the said forces are respectively applied to the said balance at points which define respective leverages (A1 ) and (A2 ) and in directions such, that the slope  $S2 \cdot A2 / S1 \cdot A1$  of the straight line obtained by writing the equilibrium equation of the said balance corresponds with that of the straight line (6) which forms the approximation to the curve (2) giving the limit of utilization of the turbine as a function of the flow of steam which passes through it and of the exhaust pressure, the said balance including in addition : - either a device (32) for analogic transmission, connected to one or more control, alarm or safety systems, - or a setting (29) corresponding with the ordinate at the origin (C) of the said straight line, as well as a stop (31) and one or more all-or-nothing contactors connected each to at least one alarm or safety device (30).

Abstract (fr)  
Dispositif de protection des aubages mobiles d'une turbine à vapeur. Conformément à l'invention, on effectue une prise de pression (PE) à l'échappement, et une prise de pression (D) dans l'étage à protéger. (PE et D) sont envoyés, par l'intermédiaire de soufflets (25 et 26), sur le bras (27) d'une balance à équilibre de couples (28), suivant des directions et en des points tels que la pente de la droite obtenue en écrivant l'équation de la balance corresponde à celle de la droite définissant la protection désirée. La balance (28) comporte en outre soit un ressort (29) définissant une consigne correspondant à l'ordonnée à l'origine de la droite de protection, ainsi qu'une butée (31) et un contacteur (30) relié à un dispositif d'alarme ou de sécurité, soit un transmetteur de force (32) permettant un traitement analogique de l'information obtenue. L'invention trouve son application dans le domaine de la production d'énergie par turbines à vapeur.

IPC 1-7  
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**EP 0004482 A2 19791003**; **EP 0004482 A3 19791017**; **EP 0004482 B1 19810603**; DE 2960387 D1 19810910; FR 2420028 A1 19791012; FR 2420028 B1 19820903

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