Inventor:
Gerhard Neumann,
by Richard C. Hooley
His Attorney.
In accordance with the illustrated embodiments of my disclosure, I accomplish the objects of my invention by replacing heavy metallic blade or rotor disk platform structures with separate sheet metal platform fillers.

In the drawing, a section of a turbomachine is disclosed generally at 10, comprising a relatively lightweight, large diameter rotor disk 11, blading 12 and lightweight sheet metal platform spacers or filler pieces 13, held in assembled relationship by retaining wires 14 disposed on opposite sides of rotor disk 11.

The periphery or rim 11r of disk 11, carries grooves or either a fir-tree or dovetail configuration, as shown at 15, to receive blading 12 having a base 12a with a form corresponding to the groove in the disk rim. The width of the disk rim has been narrowed to be strong enough only to support the blading, lightweight platform platform fillers and retaining wires when in assembled relationship, so that the web thickness of the disk also has been reduced accordingly, because of the lessened centrifugal stresses due to smaller rim weight.

Base 12a has two pairs of opposed surfaces 12d and 12e which define radially extending surfaces outlining the tenon or toe portion 12b and the substantially parallel faces 12c of bases 12a. The height of the surfaces 12c is such that the top or platform face 12f of base 12a protrude beyond the rim 11r to the extent of the thickness of the sheet metal platform spacers 13 to provide in assembled relationship therewith, a smooth aerodynamic platform outer surface between adjacent blading. The two pairs of opposed surfaces 12d and 12e define axially extending faces which outline (1) the parallel faces 12d, adjacent the toe portion 12b, and (2) the outwardly flaring platform supporting faces 12e, each of which latter faces extend beyond the dimensions of the axial width of the rim 11r and which contain a semi-round groove 16 substantially parallel to the platform 12f of base 12a.

My preferred embodiment of platform filler 13 is constructed from a single piece of sheet metal bent inwardly away from platform surface 12 of the rim 11r to form on the inner side thereof, substantially parallel channels 13b and wheel rim gripping flanges 13c, which are formed by friction welding of the ends of the sheet metal defining the channels and serve to hold the platform filler in position on the disk rim prior to final assembly of the lightweight rotor, which follows by the insertion of proper size retaining wires 14 through the channels 13b of the platform filler sections 13 and against the aligned grooves 16 in the base of the blades 12. The flanges 13c—13e span the rotor rim 11r so as to resiliently engage the sides of the wheel 11. In this manner, not only are the blades connected to the sections or spacers 13 and locked in position and prevented from moving axially but the retaining wires prevent radial spacer movement and provide a dampening action to increase the life of the blading. The ends of the retaining wires are fastened together in some appropriate manner. When a retaining wire is removed for repairs of individual blading, it is replaced easily if damaged in removal. For better efficiency, the bent over edges of the fillers defining the leading and trailing edges thereof should approximate the corresponding edges of the outwardly flaring faces 12e.

The modification of the platform filler structure disclosed in Fig. 2 at 23 is a two piece, sheet metal structure comprising an outer parallel channel shaped platform section 23a welded to an inner section 23b similar in shape but formed with a pair of spaced parallel channels 23c for resilient mounting on the rotor and through which the retaining wires 14 are threaded to lock the blading 12 and platform fillers 23 in position on the disk rim, the bases of the blading 12 having grooves 16 as in the preferred embodiment.

It will be apparent to those skilled in the art that...
applicant's novel rotor is of lightweight construction having a reduced rim width and web thickness, that lighter blading is required with the use of sheet metal platform spacers, that blade life is increased by more elastic mounting, and that repairs are greatly facilitated.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A platform filler for a rotor having blading spaced on the rim thereof, said filler comprising a sheet metal plane section defining an aerodynamic surface adapted to be inserted between adjacent blading and a pair of spaced channels on the opposing surface thereof, the ends of said plane section defining said channels comprising re-entrant flanges adapted to resiliently engage said rim.

2. A sheet metal platform filler for a rotor disk having rim spaced blading and comprising a plane section adapted to be inserted between adjacent blading thereby forming an aerodynamic surface therewith, a pair of spaced channels extending inwardly away from said plane section and adapted to span said rotor, the inner edges of the walls of said channels having re-entrant portions adapted to receive the rim portion of said disk between them whereby axial movement of said filler is restrained.

3. An integrated sheet metal platform filler for a rotor disk having a grooved rim carrying insertable blading comprising an outer plane section adapted to be inserted between adjacent blading for forming a smooth aerodynamic surface therebetween and an inner section having spaced grooves therein joined to said plane section and forming channels therewith, said channels adapted to span said rotor disk when said filler is in operative position.

4. In combination, a rotor disk, blading and platform fillers having a smooth outer surface thereon, said disk having a relatively large diameter and a relatively narrow rim, said blading being attached to said rim and having a platform portion extending beyond the periphery thereof, and said platform fillers being disposed between said blading and fastened thereto by locking means extending around the periphery of said disk, said fillers thereby forming an aerodynamic surface between said blading, said fillers having resilient faces engaging opposite sides of the rotor disk rim.

5. In combination with a rimmed rotor disk having circumferentially spaced apart grooves in the rim portion and blading provided with bases which correspond in form to said grooves for fastening said blading to said rim, sheet metal platform fillers disposed between said blading having a platform section extending beyond the periphery of said disk when in operative position, said platform fillers being attached to the blading providing an aerodynamic surface therebetween and having channels on the surface opposite thereto and spaced to span the rim of said disk in resilient engagement therewith, said blading having parallel grooves on the base of said blading substantially in alignment with said channels, and means interconnecting said fillers and blading passing through said channels and engaging said grooves to form an integrated assembly.

6. In a lightweight rimmed rotor, the combination of a disk having spaced apart peripheral grooves extending across the width of the rim of said disk, blading having a base portion disposed in said grooves, said base portion having substantially parallel semi-round grooves located on opposite sides of the rim of said disk when in assembled relationship therewith, and filler pieces between said blading in close abutting relationship therewith to form smooth flow surfaces, said filler pieces having channels on their inner sides separated by the rim of said disk, the inner sides of said channels having re-entrant portions in resilient engagement with said rim, and means for fastening said blading and filler pieces to said disk comprising a retaining wire through said channels and engaging said base grooves.

7. In a turbomachine having a peripheral grooved rotor disk with insertable blading disposed in the grooves of said disk, said blading having bases containing semi-round grooves, separably removable spacing members fitting between adjacent blading on the periphery of said disk and forming an outer aerodynamic surface therewith, the spacing members having substantially parallel channels formed on the inner surfaces thereof, in combination with annular fastening means threaded through each of said channels and engaging the grooves in the bases of said blading to form an integrated assembly.

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