This invention relates to blade locking means for retaining compressor or turbine blades within the axially extending slots in the supporting rotor. Locking devices having bendable parts are well known as shown in Kroon, 2,434,935 or Comery, 2,641,443. In each of these patents the lock is of necessity made of a material that is readily bendable into the locking configuration after the blade and lock are assembled on the rotor but which will stay in the locking configuration after being bent. The principal feature of this invention is a blade lock that requires no bending or other forming after assembly between the blade and the supporting rotor.

The feature of the invention is a blade lock having a resilient retaining means which becomes operative merely by the assembly of the blade lock with the blade and the rotor. Another feature is a lock which provides for disassembly of the blade from the rotor without deformation of the lock. Another feature is a blade lock which is positioned on the rotor before insertion of the blade and which has a resilient engagement with the blade root for holding the blade in its axial position on the rotor.

Other objects and advantages will be apparent from the specification and claims, and from the accompanying drawings which illustrate an embodiment of the invention.

Fig. 1 is a fragmentary sectional view showing the blade lock in operative position.

Fig. 2 is a view similar to Fig. 1 showing the blade partly assembled on the rotor.

Fig. 3 is a view of the elements of Fig. 1 in perspective and spaced radially apart to show the construction.

Fig. 4 is a plan view of the lock.

Fig. 5 is a side elevation of the lock.

Fig. 6 is a sectional view along the line 6—6 of Fig. 1.

The lock is shown in connection with the attachment of a compressor blade to a supporting disc. As best shown in Figs. 1 and 3, the blade supporting rotor is in the form of a disc having a wide peripheral flange in which are formed a plurality of axially extending slots each of which receives the root of one of the blades. In the arrangement shown, the slot 6 is substantially dovetail in shape and the blade root is similar in shape. The slot 6 has a narrow portion 12 radially outward of the blade root so that the blades are retained radially in position within the slot. The particular configuration of the blade root and slot is not critical except that the slot and root have cooperating abutment means for locking the blades in position against centrifugal forces. The base surface 14 of the slot is preferably flat from end to end and the base surface 16 of the base of the root when positioned within the slot is spaced from the surface 14 a sufficient distance to form a substantially flat clearance space and to receive the blade lock 18 therebetweeen.

As shown in Figs. 4 and 5, the lock or locking piece 18 is in the form of a flat strip of material having a main
It is to be understood that the invention is not limited to the specific embodiment herein illustrated and described, but may be used in other ways without departure from its spirit as defined by the following claims.

1. Claim:

1. In elastic fluid apparatus, a rotor disc having root receiving slots extending transversely of the disc at its periphery, and blades having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base surface of the root having a notch therein between its ends, the base surface of the root being spaced from the base surface of the slot to provide a substantially flat clearance space, in combination with locking means for each blade including a flat strip of material positioned in said clearance space, said strip being several times wider than the thickness thereof and also wider than the radial depth of the clearance space, said strip having at least one tab projecting from each end and out of the plane of the strip and engaging the opposite sides of the disc, and a resilient projection on the strip engaging said notch, said resilient projection being integral with the strip at one end and having its end free and normally projecting out of the plane of the strip, said projection by its resiliency being movable substantially into the plane of the strip for removal of the blade from the disc.

2. In elastic fluid apparatus, a rotor disc having root receiving slots extending transversely of the disc at its periphery, and blades having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base surface of the root having a notch therein between its ends, the base surface of the root being spaced from the base surface of the slot to provide a substantially flat clearance space, in combination with locking means for each blade including a flat strip of material positioned in said clearance space, said strip being several times wider than the thickness thereof, said strip having at least one tab projecting from each end and out of the plane of the strip and engaging the opposite sides of the disc and a resilient tab intermediate its ends connected along one transverse edge to the strip and extending longitudinally of and out of the plane of the strip from its connected edge into engagement with said notch, said tab by its resiliency being movable substantially into the plane of the strip during axial assembly of the blade on the disc.

3. In elastic fluid apparatus, a rotor disc having root receiving slots extending transversely of the disc at its periphery, and blades having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base surface of the root having a notch therein between its ends, the base surface of the root being spaced from the base surface of the slot to provide a substantially flat clearance space, in combination with locking means for each blade including a flat strip of material positioned in said clearance space, said strip being several times wider than the thickness thereof, said strip having at least one tab projecting from each end and out of the plane of the strip and engaging the opposite sides of the disc and an intermediate resilient tab connected along one transverse edge to the strip and extending out of the plane of the strip and longitudinally of the strip from its connected edge, said tab engaging in said notch, said strip at the end toward which the resilient tab extending out of the plane of the strip to overlie the end of the blade root.

4. In elastic fluid apparatus, a rotor disc having root receiving slots extending transversely of the disc at its periphery, and blades having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base surface of the root having a notch therein between its ends, the base surface of the root being spaced from the base surface of the slot to provide a substantially flat clearance space, in combination with locking means for each blade including a flat strip of material positioned in said clearance space, said strip being several times wider than the thickness thereof, said strip having at least one tab projecting from each end and out of the plane of the strip and engaging the opposite sides of the disc and a tab integrally attached to the strip at one end of the tab and supported by the strip between its ends, said strip being resilient at its attachment with the tab such that the tab is resiliently supported by the strip said tab being spaced from the ends of the strip and having its other end free and normally extending out of the plane of the strip and engaging said notch when the blade is in position in the disc.

5. In elastic fluid apparatus, a rotor disc having root receiving slots extending transversely of the disc at its periphery, and blades having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base surface of the root having a notch therein between its ends and being radially spaced from the base surface of the slot to provide a clearance space, in combination with locking means for each blade including a strip of material positioned in said clearance space, said strip having at least one tab projecting from each end and out of the plane of the strip and engaging the opposite sides of the disc and a tab formed from and integral with said strip between its ends, said tab having its free end projecting at an oblique angle from the plane of the strip toward the base surface of the root a greater distance than the height of said clearance space and said strip being resilient to provide for deflection of the tab into the plane of the strip in the portion of the strip from which the tab was formed during insertion of the blade in the disc, said tab engaging in said notch when the blade is in locked position in the disc to prevent axial movement of said blade with respect to the disc.

6. In elastic fluid apparatus, a disc member having root receiving slots extending transversely of said member at its periphery, and blade members having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base surface of each root being spaced from the base surface of the associated slot to provide a clearance space, the base surface of one of said members having a notch therein, in combination with locking means in the form of a strip of material in said clearance space, said strip having a tab at each end out of the plane of the strip and engaging the end of the other of said members, and a projection between the ends of the strip engaging said notch, said projection being integrally secured to the strip at one end of the projection and having its other end free and normally projecting obliquely from and out of the plane of the strip, said strip and the projection at least at the integral attachment therebetween being resilient to provide for deflection of the projection substantially into the plane of the strip during assembly of the root in the disc.

7. In elastic fluid apparatus, a disc member having root receiving slots extending transversely of said member at its periphery, and blade members having roots engaging in said slots, said slots and said roots having complemental abutment means for locking said blades to said disc against centrifugal forces, the base of each root having a flat surface of substantial width and the confronting base of the slot having a corresponding flat surface, the base surface of each root being spaced from the base surface of the slot to provide a clearance space, the flat surface of one of said members having a notch therein, in combination with locking means in the form of a flat strip of resilient material in said clearance space,
said strip having a tab at each end permanently bent out of the plane of the strip and engaging opposite sides of the other of said members, and said strip also having a spring tab between its ends displaced from the plane of said strip, said tab having a base and a free end, said tab comprising a portion of said strip connected to said strip at its base and bent at its free end out of the plane of the strip a greater distance than the height of said clearance space to engage said notch when said blade is in locked position in said disc.

8. For use in turbine or compressor rotors having a row of rooted blades whose root parts are disposed in transversely extending slots in the periphery of the rotor part, which slots and roots have cooperating abutment means for locking said blades in said rotors against centrifugal forces, a locking piece for securing a blade part in its slot in the rotor part, comprising a flat strip of material having a main portion extending through said slot between the base of the blade root and the adjacent base of the slot and having its ends extending beyond said slot and at a substantial angle to said strip, said ends being spaced apart a distance slightly greater than the axial spacing of the end walls of one of said parts adjacent to the locking piece for engagement with the end walls of said one of said parts, said main portion having a projection extending obliquely from the strip between its ends and adapted to engage in a recess in the other of said parts, said projection having a resilient connection along one edge to the strip such that the projection is resiliently urged into its obliquely extending position.

9. For use in turbine or compressor rotors having a row of rooted blades whose root parts are disposed in transversely extending slots in the periphery of the rotor parts, which slots and roots have cooperating abutment means for locking said blades in said rotors against centrifugal forces, a locking piece for securing a blade part in its slot in the rotor part, comprising a flat strip of material having a main portion extending through said slot between the base of the blade root and the adjacent base of the slot and having its ends extending beyond said slot and at a substantial angle to said strip, said ends being spaced apart a distance slightly greater than the axial spacing of the end walls of one of said parts adjacent to the locking piece for engagement with the end walls of said one of said parts, said main portion having a projection extending obliquely from the strip between its ends and adapted to engage in a recess in the other of said parts, said projection having a resilient connection along one edge to the strip such that the projection is resiliently urged into its obliquely extending position.

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