WHAT IS CLAIMED IS:

1. A friction welding method, comprising:

applying axial force to first and second metallic components so as to force the components against each other at an interface therebetween, while oscillating the two components relative to each other in a cyclic motion, so as to generate friction and heat at the interface;

stopping the cyclic motion in one cycle or less; and

applying a spike in the axial force to raise the axial force from a baseline axial force to an uncontrolled peak axial force, the peak axial force being greater than a pre-determined forge force to provide rapid weld upsetting, the step further including reducing the axial force to the forge force to complete a weld between the first and second components, the application of the spike in the axial force beginning simultaneously with the cyclic motion coming to a stop.

2. The method according to claim 1, wherein the cyclic motion is stopped in less than 0.2 seconds.

3. The method according to claim 1, wherein the cyclic motion is stopped in less than 0.025 seconds.

4. The method according to claim 1, wherein the cyclic motion is stopped in less than 0.0125 seconds.

5. The method according to claim 1 wherein the spike in the axial force from the baseline axial force to the peak axial force occurs in less than about 0.2 seconds.

6. The method according to claim 1, wherein the spike in the axial force is applied in an open loop without feedback control.

7. The method according to claim 1, wherein the spike in the axial force has a peak magnitude of at least about 1.5 times an initial value of the axial force.

8. The method according to claim 1, wherein the first component comprises a first metal alloy and the second component comprises second metal alloy different from the first metal alloy.

9. The method according to claim 8, wherein the first alloy is Ti-6-4 and the second alloy is Ti-17.

10. A method of friction welding a blade to a rotor, comprising:

applying axial force to press an airfoil stub of the blade against a rotor stub of the rotor at an interface therebetween;

oscillating the blade in a cyclic motion relative to the rotor stub to generate friction and heat at the interface; and

stopping the oscillation and simultaneously applying a spike in axial force to an uncontrolled peak axial force, the peak axial force being greater than a pre-determined forge force to provide rapid weld upsetting, the step further including reducing the axial force to the forge force to complete a weld between the blade and the rotor as the oscillation comes to a stop.

11. The method according to claim 10, wherein the blade comprises a first metal alloy and the rotor stub comprises a second metal alloy.

12. The method according to claim 11, wherein the blade comprises Ti-6-4 and the rotor comprises Ti-17.

13. The method according to claim 10, wherein the oscillation is stopped in less than about 0.2 seconds.

14. The method according to claim 10, wherein the oscillation is stopped in less than about 0.025 seconds.

15. The method according to claim 10, wherein the oscillation is stopped in less than about 0.0125 seconds.

16. The method according to claim 10, wherein the spike in the axial force causes the axial force to move from an initial value to a peak value in less than about 0.2 seconds.

17. The method according to claim 10, wherein the spike in the axial force causes the axial force to move from an initial value to a peak value in less than about 0.05 seconds.

18. The method according to claim 10, wherein the spike in the axial force is applied in an open loop without feedback control.

19. The method according to claim 10, wherein the spike in the axial force has a peak amplitude of at least about two times an initial value of the axial force.