

CLAIMS

What is claimed is:

1. An alignment device to draw two components together, the alignment device comprising:
 - a planetary gear set, the planetary gear set comprising a ring gear and at least two planetary gears;
 - one or more side plates for supporting the ring gear and the at least two planetary gears;
 - wherein each of the at least two planetary gears includes an aperture sized to receive a threaded fastener for engagement with a respective one of at least two threaded rods engaged with one of the two components, wherein rotation of the ring gear imparts synchronized rotational movement to the threaded fasteners to cause linear movement of the alignment device relative to the at least two threaded rods.
2. The alignment device of claim 1 further comprising a pair of shoe retainers for supporting the at least two planetary gears.
3. The alignment device of claim 2 wherein the pair of shoe retainers is configured to support the at least two planetary gears for rotation inside the ring gear and around a respective one of the at least two threaded rods, devoid of a sun gear.
4. The alignment device of claim 1 wherein the alignment device is portable; and
 - wherein the ring gear includes one or more manually engageable formations provided on a periphery thereof for rotating the ring gear by hand to move the alignment device relative to the at least two threaded rods.
5. The alignment device of claim 1, further comprising one or more thrust bearings to support a weight of one of the two components or to transmit an axial force generated by the alignment device upon rotation of the ring gear to one of the two components.

6. The alignment device of claim 1, wherein the one or more side plates include first apertures to allow passage therethrough of the at least two threaded rods, and one or more second apertures to allow passage of a securement fastener to fasten the two components together.
7. The alignment device of claim 1, wherein the ring gear and at least two planetary gears include herringbone gears.
8. The alignment device of claim 1, wherein a first component of the two components includes a showerhead and a second component of the two components includes a cooling plate.
9. An alignment toolkit to facilitate drawing two components together in aligned fashion, the toolkit comprising:
 - at least two threaded rods each engageable with one of the two components; and
 - an alignment device, the alignment device comprising:
 - a planetary gear set, the planetary gearbox comprising a ring gear and at least two planetary gears;
 - one or more side plates for supporting the ring gear and the at least two planetary gears;
 - wherein each of the at least two planetary gears includes an aperture sized to receive a threaded fastener for engagement with a respective one of the at least two threaded rods, wherein rotation of the ring gear imparts synchronized rotational movement to the threaded fasteners to cause linear movement of the alignment device relative to the at least two threaded rods.
10. The toolkit of claim 9, further comprising a threaded-rod guide for engagement with one of the two components.
11. The toolkit of claim 9, further comprising an alignment checker to check or confirm an alignment of the two components as they are drawn together.

12. The toolkit of claim 9, wherein the alignment device further comprises a pair of shoe retainers for supporting the at least two planetary gears.
13. The toolkit of claim 12, wherein the pair of shoe retainers is configured to support the at least two planetary gears for rotation inside the ring gear and around a respective one of the at least two threaded rods, devoid of a sun gear.
14. The toolkit of claim 9, wherein the alignment device is portable; and wherein the ring gear includes one or more manually engageable formations provided on a periphery thereof for rotating the ring gear by hand to move the alignment device relative to the at least two threaded rods.
15. The toolkit of claim 9, wherein the alignment device further comprises one or more thrust bearings to support a weight of one of the two components, or to transmit an axial force generated by the alignment device upon rotation of the ring gear to one of the two components.
16. The toolkit of claim 9, wherein the one or more side plates of the alignment device include first apertures to allow passage of the respective threaded rods, and one or more second apertures to allow passage of a securement fastener to fasten the two components together.
17. The toolkit of claim 9, wherein the ring gear and at least two planetary gears of the alignment device include herringbone gears.
18. The toolkit of claim 9, wherein a first component of the two components includes a showerhead and a second component of the two components includes a cooling plate.

19. A method of aligning two components to be drawn together, the method comprising:

connecting two or more threaded rods to a first of the two components;

engaging an alignment device with a second of the two components, the alignment device comprising a planetary gear set comprising a ring gear and at least two planetary gears, the alignment device comprising one or more side plates for supporting the ring gear and the at least two planetary gears, wherein each of the at least two planetary gears includes an aperture sized to receive a threaded fastener for engagement with one of the two or more threaded rods, wherein rotation of the ring gear imparts synchronized rotational movement to the threaded fasteners to cause linear movement of the alignment device relative to the two or more threaded rods; and

rotating the ring gear to move the alignment device relative to the two or more threaded rods.

20. The method of claim 19, further comprising engaging a threaded-rod guide with one of the two components.

21. The method of claim 19, further comprising using an alignment checker to check or confirm an alignment of the two components as they are drawn together.

22. The method of claim 19, wherein the alignment device further comprises a pair of shoe retainers for supporting the at least two planetary gears.

23. The method of claim 22, wherein the pair of shoe retainers is configured to support the at least two planetary gears for rotation inside the ring gear and around a respective one of the two or more threaded rods, devoid of a sun gear.

24. The method of claim 19, wherein the alignment device is portable; and
wherein the ring gear includes one or more manually engageable formations provided on a periphery thereof for rotating the ring gear by hand to advance the device along the two or more threaded rods; and
wherein the method further comprises rotating the ring gear by hand to move the alignment device along the two or more threaded rods.
25. The method of claim 19, wherein the alignment device further comprises one or more thrust bearings to support a weight of one of the two components, or to transmit an axial force generated by the alignment device upon rotation of the ring gear to one of the two components.
26. The method of claim 19, wherein the one or more side plates of the alignment device include first apertures to allow passage therethrough of the two or more threaded rods, and one or more second apertures to allow passage of a securement fastener to fasten the two components together; and
wherein the method further comprises passing a securement fastener through one of the second apertures and fastening the components together.
27. The method of claim 19, wherein the ring gear and at least two planetary gears of the alignment device include herringbone gears.
28. The method of claim 19, wherein a first component of the two components includes a showerhead and a second component of the two components includes a cooling plate.