Claims:

1. A linear actuator ~~comprising~~

having one or more coils 21a, 21b mounted to a first coil back iron 22a and mounted to a second coil back iron 22b~~;~~, and

~~one or more coils 21a, 21b mounted to a second coil back iron 22b;~~

having two or more magnets 23a, 23b positioned in the centre between the first coil back iron 22a and the second coil back iron 22b;

and a first air gap formed between the first coil back iron 22a and the magnets 23a;

a second air gap formed between the second coil back iron 22b and the magnets 23b;

~~the first air gap and the second air gap being the same width; and~~

comprising a structure 24 that holds the magnets 23a, 23b in place, the structure 24 having a first bushing 25a mounted on a first fixed shaft 26a and a second bushing 25b mounted on a second fixed shaft 26b; and an amplifier with logic control and power electronics, where the direction of motion, the peak current, the peak current duration and the holding current of the linear actuator can be adjusted and preset,

wherein the structure 24 glides along the first fixed shaft 26a and the second fixed shaft 26b from a first position to a second position and back when a current passes through the one or more coils 21a, 21b~~.~~, and that the structure 24 glide on a first runner block on a first rail and a second runner block on a second rail.

2. The linear actuator of claim 1, wherein the structure 24 glide on linear bearings 52a, 52b ~~instead of bushings 25a, 25b and shafts 26a, 26b~~.

~~3. The linear actuator of claim 1, wherein the structure 24 glide on a first runner block on a first rail and a second runner block on a second rail.~~

~~4~~3. The linear actuator of claim 1, wherein both shafts 26a, 26b move while keeping the bushings 25a, 25b stationary.

~~5~~4. The linear actuator of claim 1, wherein the first shaft 26a and a bushing 25a moves while the second shaft 26b and other bushing 25b remains stationary.

~~6~~5. The linear actuator of claim 1, wherein the rails are moved while keeping the runner blocks of a linear bearings 52a, 52b stationary.

~~7~~6. The linear actuator of claim 1, wherein limit sensors are added to detect the first position and second position of the actuator.

~~8~~7. The linear actuator of claim 1, wherein a linear encoder ~~or other feedback device~~ is added to provide position feedback for servo control.

~~9~~8. The linear actuator of claim 1, wherein a multi-phase coil is used instead of a single phase coil.

~~10~~9. The linear actuator of claim 1, wherein the structure 24 is kept stationary while the two coil back iron 22a, 22b and coils 21a, 21b are moved.

~~11. The linear actuator of Claim 1, having additionally an amplifier with logic control and power electronics, where the direction of motion, the peak current, the peak current duration and the holding current of the linear actuator can be controlled.~~

~~12. The amplifier of claim 11 wherein the peak current, the peak current duration and the holding current can be adjusted and preset.~~

~~13. The structure 24 as claimed in Claim 1, said structure 24 being made from non magnetic material.~~

~~14~~10. The ~~structure 24~~linear actuator ~~as claimed in~~of Claim 1~~3~~, ~~said~~wherein the structure 24 being made from ~~non magnetic material such as~~ aluminum.

~~15~~11. The ~~structure 24~~linear actuator ~~as claimed in~~of Claim 1~~3~~, ~~said~~wherein the structure 24 being made from ~~non magnetic material such as~~ fiber reinforced resin

~~16. The structure 24 as claimed in Claim 13, said structure 24 being made from non magnetic material or other materials which are of low mass density.~~