WHAT IS CLAIMED IS:

1. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system over a time period; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system.

2. The mechanism as claimed in claim 1 wherein the at least two motion characteristics are selected as absolute or relative measures from: displacement, force degree and/or direction, velocity, acceleration, deceleration, movement direction, jerk, and combinations thereof.

3. The mechanism as claimed in claim 1 wherein the first motion characteristic sensor is selected from: a mechanical sensor, a fluidic sensor, a thermal sensor, a magnetic sensor, an electrical sensor, an electronic sensor, and combinations thereof.

4. The mechanism as claimed in claim 1 wherein the at least one further member linked to the moving member is selected from: a pawl, a rocker, a cam system, a latch, a disk, a carrier, a carriage, a spool, and combinations thereof.

5. The mechanism as claimed in claim 1 wherein the secondary system is selected from: a cam plate, a latch plate, and combinations thereof.

6. The mechanism as claimed in claim 1 wherein the moving member is a carriage or rotor.

7. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein the primary system further comprises a second motion characteristic sensor located on an object or person distal to the primary system and first sensor, the object or person attached to the distal primary system and the second motion characteristic sensor measuring two motion characteristics of the distal object or person;

wherein the second motion characteristic sensor is an indirect motion characteristic sensor;

wherein, below a threshold of the sensed motion characteristics from both the first and second motion characteristic sensors, no activation occurs and the primary and secondary systems remain kinematically independent of one another; and

wherein, above a threshold of the sensed motion characteristics from both the first and second motion characteristic sensors, the at least one further member moves to cause direct

engagement between the primary system and secondary system slowing or stopping independent kinematic motion between the systems.

8. The mechanism of claim 1 wherein the moving member comprises a shaft and the at least one further member comprises an inertial ring and a pawl, the inertial ring and pawl being linked to and rotating about the shaft, the primary system undergoing motion according to a kinematic relationship when a force is imposed on the shaft, wherein the inertial ring senses acceleration of the primary system and the pawl senses velocity of the primary system;

wherein the secondary system comprises a latch member;

wherein, below a threshold of acceleration and velocity of the primary system, no activation occurs and the primary and the secondary systems remain kinematically independent; and

wherein, above a threshold of acceleration and velocity of the primary system, activation occurs, activation being engagement of the primary system pawl and the secondary system latch member so that the primary system and secondary system engage and are no longer kinematically independent.

9. The mechanism as claimed in claim 1 wherein the primary system comprises a pawl sensing a velocity of the primary system and an inertial mass sensing an acceleration of the primary system, the pawl and inertial mass both mounted on a rotatable disk, the pawl and inertial mass retained together via a first bias element, the rotatable disk movable about a central axis, wherein in use, the primary system undergoes motion according to a kinematic relationship when a force is imposed on the rotatable disk, the pawl having a centripetal force acting thereon when the rotatable disk spins, this centripetal force acting against the first bias element; and
the primary system further comprising a second bias element located between the rotatable disk and the inertial mass that acts to weight the sensed motion characteristics and influence activation where, upon rotational acceleration of the rotatable disk, the inertial mass acts against the second bias element, rotating relative to the rotatable disk and in doing so, moving the first

bias element closer to the pawl pivot axis thereby reducing the restraining torque and lowering the rotational velocity at which the pawl overcomes the first bias element; and

wherein the secondary system is kinematically independent to and surrounds at least part of the primary system, the secondary system comprising a latch member;

wherein:

below a threshold of acceleration and velocity of the primary system, no activation occurs and the primary and the secondary systems remain independent; and

above a threshold of acceleration and velocity of the primary system, activation occurs, activation being engagement of the primary system pawl and the secondary system latch member so that the primary system and secondary system engage and are no longer kinematically independent.

10. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein the primary system further comprises a rotor mounted to a shaft, the rotor rotating on application of a force to the shaft;

wherein the first motion characteristic sensor is a direct motion characteristic sensor and is linked to and located on the rotor, the first motion characteristic sensor moving with the rotor, the first motion characteristic sensor measuring changes in acceleration of the shaft;

wherein the primary system further comprises a pawl linked to and which pivots from the rotor due to centrifugal force, the pawl pivot point off set from the rotor shaft, the pawl acting as a second direct motion characteristic sensor that measures changes in velocity of the shaft;

wherein the mechanism further comprises an indirect motion characteristic sensor being an electronic controller that receives the first and second direct sensed motion characteristics, the controller in turn varying a threshold varying device, the threshold varying device being a solenoid on the rotor that provides a bias force against pawl rotation outwards from the rotor due to centrifugal force;

wherein the secondary system is kinematically independent to the primary system, the secondary system located around at least part of the primary system;

wherein, below a threshold of the sensed motion characteristics, no activation occurs and the primary and secondary systems remain independent; and

wherein, above a threshold of the sensed motion characteristics, activation occurs, activation being engagement of the primary system and the secondary system as a direct action of the pawl causing activation so that the primary system and secondary system engage and are no longer kinematically independent.

11. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to cause direct engagement between the primary system and the secondary system, thereby

slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein the primary system comprises a carriage and a pawl, the pawl rotatably linked to the carriage about a pawl axis, the pawl being a first velocity sensor and the pawl being paramagnetic;

wherein the mechanism further comprises:

a force sensor located on the pawl and a biasing member linked between the pawl and the carriage;

a magnetic field located adjacent the carriage and pawl; and

a secondary system kinematically independent to the primary system;

wherein, when the carriage moves linearly due to an imposed force and below a threshold of sensed velocity and force, no activation occurs and the primary and secondary systems remain independent; and

wherein, above a threshold of the sensed velocity and force, the threshold provided by the biasing and an eddy current drag force imposed on pawl motion as the pawl moves through the magnetic field, activation occurs, activation being engagement of the primary system pawl and the secondary system as a direct action of the pawl causing activation so that the primary system via the pawl and secondary system engage and are no longer kinematically independent.

12. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to

cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein the primary system comprises a rotor, the rotor rotating on application of a force to the rotor, and, located on and moving with the rotor is a direct motion characteristic sensor measuring motion characteristics of the primary system and an electronic controller not directly on the primary system that receives at least one of the sensed motion characteristics from the primary system;

wherein the ~~mechanism further comprises a~~ secondary system is kinematically independent to the primary system and linked to the controller in the form of a motor that is configured to resist or halt a rate of movement of the primary system;

wherein, when a force is imposed on the rotor causing rotation and primary system movement, the controller compares the sensed motion characteristics from the sensor against a database of known motion characteristic measurements and/or profiles and determines if the sensed motion characteristics have reached or exceeded a threshold and/or reached a set threshold level;

wherein, below a threshold of the sensed motion characteristics from the sensor, no activation occurs and the primary and secondary systems remain independent; and

wherein, above a threshold of the sensed motion characteristics, activation occurs, activation being the controller operating the motor to resist or halt the rate of movement of the primary system so that the primary system and secondary system no longer move kinematically independently.

13. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein the primary system comprises a carriage, a pawl and an inertial mass, the pawl and inertial mass mounted on the carriage, the pawl linked to the inertial mass via a first bias element; the primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the carriage, the pawl having a drag force acting thereon when the carriage moves, this drag force acting against the first bias element;

wherein the primary system further comprises a second bias element located between the carriage and the inertial mass that acts to weight the sensed motion characteristics and influence activation where, upon linear acceleration of the carriage, the inertial mass acts against the second bias element, moving relative to the carriage and in doing so, moving the first bias element closer to the pawl pivot axis thereby reducing the restraining torque and lowering the drag force at which the pawl overcomes the first bias element;

wherein the secondary system is kinematically independent to and surrounds the primary system, the secondary system comprising a latch member;

wherein, below a threshold of acceleration and velocity of the primary system, no activation occurs and the primary and the secondary systems remain independent; and

wherein, above a threshold of acceleration and velocity of the primary system, activation occurs, activation being engagement of the primary system pawl and the secondary system latch member so that the primary system and secondary system engage and are no longer kinematically independent.

14. The mechanism as claimed in claim 1 wherein sensing of the motion characteristics occurs at a time instant.

15. A mechanism, comprising:

a primary system configured to undergo motion according to a kinematic relationship when a force is imposed on the primary system, the primary system comprising a moving member and at least one further member linked to the moving member, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and

a secondary system;

wherein, below a threshold of sensed motion characteristics, no activation occurs and the primary system and secondary system remain kinematically independent of one another, and, above the threshold of sensed motion characteristics, the at least one further member moves to cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein at least one sensed motion characteristic is weighted more than another motion characteristic to alter the threshold causing activation.

16. The mechanism as claimed in claim 1 wherein the mechanism is linked to a spool of line and if the line extends at a rate beyond the threshold, mechanism activation results in application of a retarding force on the rate of line extension.

17. The mechanism as claimed in claim 1 wherein the mechanism governs speed control or line dispensing control.

18. The mechanism as claimed in claim 1, wherein the mechanism is a component within an auto-belay system.

19. The mechanism as claimed in claim 1, wherein the mechanism is a component within a self-retracting lifeline device.

20. The mechanism as claimed in claim 1, wherein the mechanism is a component within an evacuation descender and fire escape device.

21. The mechanism as claimed in claim 1, wherein the mechanism is a component within a braking device.

22. The mechanism as claimed in claim 1, wherein the at least one further member is exactly one further member.

23. The mechanism as claimed in claim 1, wherein the at least one further member is at least two further members.

24. A mechanism, comprising:

a primary system configured to undergo motion when a force is imposed on the primary system, the primary system comprising a ~~moving member~~ rotatable disk rotatably movable about a central axis, and at least one further member linked to the rotatable disk~~moving member~~, the at least one further member acting as a first motion characteristic sensor that senses at least two motion characteristics of the primary system; and a secondary system;

wherein~~, below a threshold of sensed motion characteristics,~~ the primary system and secondary system are configured to remain kinematically independent of one another below a threshold of sensed motion characteristics, and, above the threshold of sensed motion characteristics, the at least one further member is configured to move~~s~~ to cause direct engagement between the primary system and the secondary system, thereby slowing or stopping independent kinematic motion between the primary system and the secondary system;

wherein the at least one further member of the primary system comprises a pawl mounted on the rotatable disk on a pawl pivot axis for sensing primary system velocity and an inertial mass mounted on the rotatable disk sensing primary system acceleration, the pawl and inertial mass being retained together ~~via~~ by a pawl bias element and a mass bias element being

provided between the rotating disk and the inertial mass, ~~wherein the moving member of the primary system comprises a rotatable disk rotatably movable about a central axis,~~ wherein in use, the primary system is configured to undergo~~es~~ motion according to a kinematic relationship when a force is imposed on the rotatable disk, the pawl having a centrifugal ~~centripetal~~ force acting thereon when the rotatable disk spins, this centrifugal ~~centripetal~~ force acting against the pawl bias element and the inertial mass being configured to rotate relative to the disk, against the mass bias element, on rotational acceleration of the disk, thereby moving the pawl bias element closer to the pawl pivot axis; and

wherein the secondary system is kinematically independent to and surrounds at least part of the primary system, the secondary system comprising a latch member.

25. The mechanism of claim 24 wherein the at least two motion characteristics of the primary system comprise velocity and acceleration and wherein:
below a threshold of acceleration and/or velocity of the primary system, the primary and the secondary systems remain independent; and
above a threshold of acceleration and/or velocity of the primary system, the primary system pawl engages the secondary system latch member so that the primary system and secondary system engage and are no longer kinematically independent.

26. The mechanism of claim 25 wherein the at least two motion characteristics of the primary system are rotational velocity and rotational acceleration.

~~27. The mechanism of claim 26 wherein the primary system is configured so that upon rotational acceleration of the rotatable disk, a rotational velocity threshold at which the pawl overcomes the bias element so as to engage the secondary system latch member is reduced in comparison to a rotational velocity threshold at which the pawl overcomes the bias element to engage the secondary system latch member when the rotatable disk is rotating at constant velocity.~~

~~28~~27. The mechanism of claim 25 wherein the primary system is configured so that when a combination of velocity and acceleration achieves a predetermined threshold, the pawl overcomes the pawl bias element to engage the secondary system latch member.

~~29~~28. The mechanism of claim 25 wherein an exceeding of a threshold of acceleration and/or velocity for activation of the primary system to engage the secondary system is sensed mechanically, with the proviso that the exceeding of the threshold is not sensed electrically or electronically.

~~30~~29. The mechanism of claim 24 wherein the pawl bias element via which the pawl and inertial mass are retained together comprises a spring.

~~31~~30. The mechanism of claim 24 wherein the inertial mass is an inertial disk or an inertial ring.

~~32~~31. The mechanism of claim 24 wherein the at least one further member of the primary system comprises at least two pawls.

~~33~~32. The mechanism of claim 24 wherein the first motion characteristic sensor is a mechanical sensor, with the proviso that the first motion characteristic sensor does not include a magnetic sensor, an electrical sensor, or an electronic sensor.

~~34~~33. The mechanism of claim 24 wherein the sensing of the at least two motion characteristics of the primary system is performed instantaneously.

~~35~~34. The mechanism of claim 24 wherein the sensing of the at least two motion characteristics of the primary system is performed over a period of time.

~~36~~35. The mechanism of claim 24 wherein the rotatable disk, the inertial mass and the pawl comprise a common axis of rotation that is the central axis about which the rotatable disk rotatably moves.

~~37~~36. The mechanism of claim ~~36~~ 35 wherein the mechanism comprises a shaft that defines the central axis about which the rotatable disk rotates, and wherein the inertial mass and the pawl are rotatable about the shaft that defines the central axis about which the rotatable disk rotates.

~~38~~37. The mechanism of claim ~~36~~ 35 wherein the secondary system is a radially outer system that circumferentially surrounds the primary system.

~~39~~38. The mechanism of claim 24 wherein the secondary system comprises a rotary mechanism that, upon the engagement between the primary system and the secondary system, rotates with the primary system.

~~40~~39. A fall protection apparatus comprising the mechanism of claim 24.

~~41~~40. The fall protection apparatus of claim ~~40~~ 39 wherein the fall protection apparatus is a self-retracting lifeline (SRL).

~~42~~41. The SRL of claim ~~41~~ 40 wherein the SRL comprises an extendable/retractable line and wherein upon the engagement of the primary system pawl with the secondary system latch member, a retarding force is applied on a rate of extension of the extendable/retractable line.