

We claim:

1. A medication injection pen, comprising:
a cartridge housing which houses a medication cartridge;
a housing connected to said cartridge housing;
a dose set knob rotatable with respect to said housing;
a dose stop member to prevent the setting of a dose that is larger than the remaining amount of medication in the cartridge; and
a driver,
wherein
during dose setting and dose correcting, said driver does not rotate with said dose set knob, and said dose stop member rotates relative to said dose set knob, and
during an injection, said driver moves into locking engagement with said dose set knob to allow said driver to rotate with said dose set knob, and said dose stop member does not rotate relative to said dose set knob.

2. The medication injection pen according to claim 1, further comprising:
a ratchet disk, said driver rotatably locked to said ratchet disk; and
a brake member,
wherein
said ratchet disc comprises first teeth including first sloped surfaces and first non-sloped surfaces, and said brake member comprises second teeth includes second sloped surfaces and second non-sloped surfaces,
during dose setting and dose correcting, said first teeth engage said second teeth to substantially prevent said driver from rotating with said dose set knob, and
during an injection, said driver moves into locking engagement with said dose set knob thereby overcoming friction between said first sloped surfaces and said second sloped surfaces to allow said driver to rotate with said dose set knob.

3. The medication injection pen according to claim 2, wherein

a spring member biases said ratchet member toward said brake member.

4. The medication injection pen according to claims 3, wherein

during said injection, said ratchet disk rotates with said driver and moves against said spring member as said first sloped surfaces ride over said second slope surfaces of said brake member.

5. The medication injection pen according to claims 2, 3, or 4, wherein

during said injection, after rotating to a dose increment, said ratchet disk moves into a positions with respect to said brake member where at least one of said first teeth move into a base of next of said second teeth.

6. The medication injection pen according to claim 1, further comprising:

a brake member; and

a ratchet member rotatably locked to said brake member;

wherein

said ratchet member comprises first teeth including first sloped surfaces and first non-sloped surfaces, and said driver comprises second teeth includes second sloped surfaces and second non-sloped surfaces,

during dose setting and dose correcting, said first teeth engage said second teeth to substantially prevent said driver from rotating with said dose set knob, and

during an injection, said driver moves into locking engagement with said dose set knob thereby overcoming friction between said first sloped surfaces and said second sloped surfaces to allow said driver to rotate with said dose set knob.

7. The medication injection pen according to claim 6, wherein

a spring member biases said ratchet member toward said driver.

8. The medication injection pen according to claims 6 or 7, wherein
during said injection, said driver rotates forcing said ratchet member to move axially
as said first sloped surfaces ride over said second slope surfaces.

9. The medication injection pen according to claims 6, 7, or 5, wherein
during said injection, after rotating to a dose increment, said ratchet member moves
into a positions with respect to said driver where at least one of said first teeth move into a
base of next of said second teeth.

10. The medication injection pen according to any one of claims 1 to 9, wherein
said second teeth are spaced to correspond with the rotation of one dose of
medicament.

11. The medication injection pen of any one of claims 6 to 9, wherein said ratchet
member is a ratchet disc, with an opening configured to receive said driver therethrough.

12. The medication injection pen according to claim 1, further comprising:
a brake member; and
a ratchet member comprising ratchet arms, said ratchet member is rotatably locked to
said brake member,
wherein
said driver comprises inward facing ratchet teeth, and said ratchet arms radiate
outward toward said inward facing ratchet teeth of said driver,
during dose setting and dose correcting, said ratchet arms engage said ratchet teeth to
substantially prevent said driver from rotating with said dose set knob, and
during an injection, said driver moves into locking engagement with said dose set
knob thereby forcing said ratchet arms to flex inward as said ratchet teeth slide past said
ratchet arms to allow said driver to rotate with said dose set knob.

13. The medication injection pen according to claim 12, wherein
during said injection, after rotating to a dose increment, said ratchet arms move into a
base of next of said ratchet teeth.

14. The medication injection pen according to claim 12 or 13, wherein
said ratchet teeth are spaced to correspond with the rotation of one dose of
medicament.

15. The medication injection pen according to claim 1, further comprising:
a brake member; and
a ratchet member comprising outward facing ratchet teeth, said ratchet member is
rotatably locked to said brake member,
wherein
said driver comprises ratchet arms, and said ratchet arms radiate inward toward said
outward facing ratchet teeth,
during dose setting and dose correcting, said ratchet arms engage said ratchet teeth to
substantially prevent said driver from rotating with said dose set knob, and
during an injection, said driver moves into locking engagement with said dose set
knob thereby forcing said ratchet arms to flex outward as said ratchet arms slide past said
ratchet teeth to allow said driver to rotate with said dose set knob.

16. The medication injection pen according to claim 15, wherein
during said injection, after rotating to a dose increment, said ratchet arms move into a
base of next of said ratchet teeth.

17. The medication injection pen according to claim 15 or 16, wherein

said ratchet teeth are spaced to correspond with the rotation of one dose of medicament.

18. The medication injection pen according to claim 1, further comprising:

a brake member; and

a ratchet member comprising a plate having parabolic waves facing outward toward said brake member, said ratchet member is rotatably locked to said brake member,

wherein

said driver comprises ratchet teeth including sloped surfaces and non-sloped surfaces, and

during an injection, said driver moves into locking engagement with said dose set knob thereby forcing said waves of said ratchet plate to flex to allow said ratchet teeth to rotate past said ratchet plate to allow said driver to rotate with said dose set knob.

19. The medication injection pen according to claim 18, wherein

during said injection, after rotating to a dose increment, said ratchet teeth move into a wall of next plate cavity.

20. The medication injection pen according to claim 18 or 19, wherein

said ratchet teeth are spaced to correspond with the rotation of one dose of medicament.

21. The medication injection pen according to claim 1, further comprising:

a brake member comprising inward facing ratchet teeth including sloped surfaces and non-sloped surfaces; and

wherein

said driver comprises flexible ratchet arms that radiate outward toward said inward facing ratchet teeth of said brake member, and

during an injection, said driver moves into locking engagement with said dose set knob thereby forcing said flexible ratchet arms to flex inward to slide over said sloped surfaces of said ratchet teeth to allow said driver to rotate with said dose set knob.

22. The medication injection pen according to claim 21, wherein
during said injection, after rotating to a dose increment, said ratchet arms move into a base of said ratchet teeth.

23. The medication injection pen according to claim 21 or 22, wherein
said ratchet teeth are spaced to correspond with the rotation of one dose of medicament.

24. The medication injection pen according to claim 1, further comprising:
a brake member rotationally locked to said housing; and
a coil spring positioned around said driver, said coil spring is rotationally locked to said brake member and
wherein,
said coil spring grips said driver prevent preventing said driver from rotating during dose setting by tightening of said coil spring, and
during an injection said driver moves into locking engagement with said dose set knob whereby rotation of said driver causes said coil spring to unwind allowing said driver to rotate with said dose set knob.

25. The medication injection pen according to claim 1, further comprising:
a brake member rotationally locked to said housing; and
at least one leaf spring rotationally locked to said brake member and positioned radially with respect to said driver,
wherein

said leaf spring grips said driver prevent preventing said driver from rotating during dose setting by increased tension of said leaf spring, and

during an injection said driver moves into locking engagement with said dose set knob whereby rotation of said driver causes said leaf spring to loosen said tension relieving said grip and allowing said driver to rotate with said dose set knob.

26. The medication injection pen according to claim 1, further comprising:

a lead screw including flexible ratchet arms; and

a brake member rotationally fixing said lead screw to said housing,

wherein

said driver comprises inward facing ratchet teeth including sloped surfaces and non-sloped surfaces,

said flexible ratchet arms radiate outward toward said inward facing ratchet teeth of said driver, and

during an injection, said driver moves into locking engagement with said dose set knob forcing said flexible ratchet arms of said leadscrew to flex inward as they slide over said sloped surfaces of said ratchet teeth to allow said driver to rotate with said dose set knob.

27. The medication injection pen according to claim 26, wherein

during said injection, after rotating to a dose increment, said flexible ratchet arms move into a base of said ratchet teeth.

28. The medication injection pen according to claim 27 or 26, wherein

said ratchet teeth are spaced to correspond with the rotation of one dose of medicament.