

Challenged Claims – U.S. Pat. No. 11,959,533	
<u>Claim Limitation</u>	<u>Claim</u>
1[p]	1. A hydraulic fracturing system for fracturing a subterranean formation comprising:
1[a]	a multi-plunger hydraulic fracturing pump configured to pump fluid to a wellbore associated with the subterranean formation, the multi-plunger hydraulic fracturing pump comprising a pump crankshaft;
1[b]	a plurality of motors positioned to power the multi-plunger pump; and
1[c]	a planetary gear train positioned to translate power from the plurality of motors to the pump crankshaft of the multi-plunger hydraulic fracturing pump,
1[d]	the planetary gear train comprising: a plurality of input pinion gears connected to the plurality of motors,
1[e]	and a final drive gear connected to the pump crankshaft of the multi-plunger hydraulic fracturing pump by a plurality of arms extending from the final drive gear.
2	2. The hydraulic fracturing system of claim 1, wherein the plurality of motors comprises a plurality of electric motors, and each of the plurality of input pinion gears is connected to a respective one of the plurality of electric motors.
3	3. The hydraulic fracturing system of claim 1, wherein the multi-plunger hydraulic fracturing pump has three plungers.
4	4. The hydraulic fracturing system of claim 1, wherein the multi-plunger hydraulic fracturing pump has five plungers.
5	5. The hydraulic fracturing system of claim 1, wherein the multi-plunger hydraulic fracturing pump has seven plungers.

6	6. The hydraulic fracturing system of claim 1, wherein the multi-plunger hydraulic fracturing pump has nine plungers.
7	7. The hydraulic fracturing system of claim 1, further comprising a variable frequency drive (VFD) associated with the plurality of motors and configured to control a pump rotational speed of the multi-plunger hydraulic fracturing pump.
8	8. The hydraulic fracturing system of claim 1, wherein the planetary gear train comprises a main gear that contacts each of the plurality of input pinion gears, wherein the main gear comprises external gear teeth that mate with external gear teeth of the plurality of input pinion gears.
9[a]	9. The hydraulic fracturing system of claim 8, wherein the planetary gear train comprises: a sun gear connected to the main gear by a shaft extending from the main gear; and
9[b]	a plurality of planetary gears that each contact the sun gear and the final drive gear, wherein each of the plurality of planetary gears comprises external gear teeth that mate with external gear teeth of the sun gear and with internal gear teeth of the final drive gear.
10[p]	11. A hydraulic fracturing method comprising:
10[a]	by operation of a multi-plunger hydraulic fracturing pump of a hydraulic fracturing system, pumping fluid to a wellbore associated with a subterranean formation, the multiplunger hydraulic fracturing pump comprising a pump crankshaft;
10[b]	powering the multi-plunger pump with a plurality of motors;
10[c]	translating power from the plurality of motors to the multi-plunger hydraulic fracturing pump through a planetary gear train,
10[d]	wherein translating power through the planetary gear train comprises translating power through: a plurality of input pinion gears that are driven by the plurality of motors; and

10[e]	a final drive gear that drives the pump crankshaft, wherein the final drive gear is connected to the pump crankshaft by a plurality of arms extending from the final drive gear.
11	11. The hydraulic fracturing method of claim 10, wherein the plurality of motors comprises a plurality of electric motors, and each of the plurality of input pinion gears is driven by a respective one of the plurality of electric motors.
12	12. The hydraulic fracturing method of claim 10, wherein the multi-plunger hydraulic fracturing pump has three plungers.
13	13. The hydraulic fracturing method of claim 10, wherein the multi-plunger hydraulic fracturing pump has five plungers.
14	14. The hydraulic fracturing method of claim 10, wherein the multi-plunger hydraulic fracturing pump has seven plungers.
15	The hydraulic fracturing method of claim 10, wherein the multi-plunger hydraulic fracturing pump has nine plungers.
16	16. The hydraulic fracturing method of claim 10, comprising, by operation of a variable frequency drive (VFD), controlling a pump rotational speed of the multi-plunger hydraulic fracturing pump.
17	17. The hydraulic fracturing method of claim 10, wherein translating power through the planetary gear train comprises translating power through a main gear that contacts each of the plurality of input pinion gears, wherein the main gear comprises external gear teeth that mate with external gear teeth of the plurality of input pinion gears.
18[a]	18. The hydraulic fracturing method of claim 17, wherein translating power through the planetary gear train comprises translating power through: a sun gear connected to the main gear by a shaft extending from the main gear; and
18[b]	a plurality of planetary gears that contact the sun gear and the final drive gear, wherein each of the plurality of planetary gears comprises external gear teeth that mate with external gear teeth of the sun gear and with internal gear teeth of the final drive gear.

19	19. The hydraulic fracturing method of claim 10, comprising limiting a maximum pump speed of the multi-plunger hydraulic fracturing pump, wherein the maximum pump speed is limited by a selection of a gear ratio of the planetary gear train and a speed at which the plurality of motors operate.
20	20. The hydraulic fracturing method of claim 19, wherein the maximum pump speed correlates with a critical plunger speed of the multi-plunger hydraulic fracturing pump.
21	21. The hydraulic fracturing method of claim 19, wherein the maximum pump speed is 5% over a critical plunger speed of the multi-plunger hydraulic fracturing pump.
22[p]	22. A hydraulic fracturing system for fracturing a subterranean formation, the hydraulic fracturing system comprising:
22[a]	a plurality of electric motors;
22[b]	a planetary gear train connected to the plurality of electric motors, the planetary gear train comprising:
22[c]	a plurality of input pinion gears, each driven by a respective one of the plurality of electric motors;
22[d]	a main gear driven by the plurality of input pinion gears, the main gear comprising external gear teeth that mate with external gear teeth of the plurality of input pinion gears;
22[e]	a sun gear driven by the main gear and connected to the main gear by a shaft;
22[f]	planetary gears driven by the sun gear, the planetary gears each comprising external gear teeth that mate with external gear teeth of the sun gear; and
22[g]	a final drive gear driven by the planetary gears, the final drive gear comprising internal gear teeth that mate with the external gear teeth of the planetary gears; and
22[h]	a multi-plunger hydraulic fracturing pump that pumps fluid to a wellbore and comprises a pump crankshaft that is driven by the

	final drive gear of the planetary gear train, the final drive gear connected to the pump crankshaft by a plurality of arms extending from the final drive gear.
23	23. The hydraulic fracturing system of claim 22, further comprising a variable frequency drive (VFD) associated with the plurality of motors and configured to control a pump rotational speed of the multi-plunger hydraulic fracturing pump.
24	24. The hydraulic fracturing system of claim 23, wherein the multi-plunger hydraulic fracturing pump comprises seven plungers.
25	25. The hydraulic fracturing system of claim 23, wherein the multi-plunger hydraulic fracturing pump comprises nine plungers.