

What is claimed is:

1. A submersible pump assembly (10) for transference of a fluid medium with low viscosity, the submersible pump assembly (10) comprising:

a plurality of pump units (58, 60, 62) having a central axis co-axially aligned with a
5 common drive shaft (90);

a common suction chamber (92) and a common pressure chamber (94), being respectfully positioned at the periphery of the submersible pump assembly (10) in alignment with the central axis, the common suction chamber (92) providing the plurality of pump units (58, 60, 62) concurrent and parallel access to the fluid medium under low pressure;

10 each of the plurality of pump units (58, 60, 62) including a first operational mode wherein the fluid medium is transferred from the common suction chamber (92) to the common pressure chamber (94);

each of the plurality of pump units (58, 60, 62) including a second operational mode wherein the fluid medium is circulated through the common suction chamber (92); and

15 each of the plurality of pump units (58, 60, 62) being individually actuatable to select one of the first operational mode and the second operational mode.

2. The submersible pump assembly (10) as recited in claim 1, wherein the submersible pump assembly (10) forms a portion of a downhole tool (50).

3. The submersible pump assembly (10) as recited in claim 1, wherein the
20 common pressure chamber (94) provides concurrent and parallel access for the plurality of pump units (58, 60, 62) to the fluid medium under high pressure.

4. The submersible pump assembly (10) as recited in claim 1, wherein the first operational mode further comprises active pumping of the fluid medium from the common suction chamber (92) to the common pressure chamber (94).

25 5. The submersible pump assembly (10) as recited in claim 1, wherein the second operational mode further comprises inactive pumping of the fluid medium with circulation of the fluid medium through the common suction chamber (92).

6. The submersible pump assembly (10) as recited in claim 1, wherein the fluid medium further comprises a medium selected from the group consisting of hydrocarbons, water, and combinations thereof.

7. The submersible pump assembly (10) as recited in claim 6, wherein the
5 hydrocarbons further comprise oil.

8. The submersible pump assembly (10) as recited in claim 6, wherein the hydrocarbons further comprise gas.

9. A submersible pump assembly (10) for transference of a fluid medium with low viscosity, the submersible pump assembly (10) comprising:

10 a plurality of pump units (58, 60, 62) having a central axis co-axially aligned with a common drive shaft (90);

a common suction chamber (92) and a common pressure chamber (94), being respectfully positioned at the periphery of the submersible pump assembly (10) in alignment with the central axis, the common suction chamber (92) providing the plurality of pump units
15 (58, 60, 62) concurrent and parallel access to the fluid medium under low pressure, a size of the common suction chamber (92) and the common pressure chamber (94) defining a maximum possible flow rate of the fluid medium;

each of the plurality of pump units (58, 60, 62) including a first operational mode wherein the fluid medium is transferred from the common suction chamber (92) to the
20 common pressure chamber (94) during;

each of the plurality of pump units (58, 60, 62) including a second operational mode wherein the fluid medium is circulated through the common suction chamber (92); and

each of the plurality of pump units (58, 60, 62) being individually actuatable to select one of the first operational mode and the second operational mode.

25 10. A submersible pump assembly (10) for transference of a fluid medium with low viscosity, the submersible pump assembly (10) comprising:

a plurality of pump units (58, 60, 62) having a central axis co-axially aligned with a common drive shaft (90);

a common suction chamber (92) and a common pressure chamber (94), being respectfully positioned at the periphery of the submersible pump assembly (10) in alignment
5 with the central axis, the common suction chamber (92) providing the plurality of pump units (58, 60, 62) concurrent and parallel access to the fluid medium under low pressure, a size of the common suction chamber (92) and the common pressure chamber (94) defining a maximum possible flow rate of the fluid medium;

each of the plurality of pump units (58, 60, 62) comprising:

10 a cylinder block (120) having a plurality of cylinders (122, 124) formed therein;
a first port (68) located in fluid communication with the plurality of cylinders (122, 124) and the common suction chamber (92);

a second port (70) located in fluid communication with the plurality of cylinders (122, 124) and the common pressure chamber (94);

15 a third port (72) located in fluid communication with the plurality of cylinders (122, 124) and the common suction chamber (92);

a respective plurality of pistons (126, 128) slidably received in each of the plurality of cylinders (122, 124);

the common drive shaft (90) being rotatably supported in the cylinder block
20 (120), the common drive shaft (90) being coupled to a drive unit (54);

an inclined leading plate (130) coupled to the plurality of pistons (126, 128) and the drive shaft (90), a tilt angle of the inclined leading plate (130) is selectively adjustable, the inclined leading plate (130) coupled to the plurality of pistons (126, 128) such that the plurality of pistons (126, 128) are configured to be axially driven in a reciprocating motion
25 within the plurality of cylinders (122, 124) upon rotation of the inclined leading plate (130);
and

a respective plurality of two-ball links (132, 134) connecting the inclined leading plate (130) to the plurality of pistons (126, 128);

each of the plurality of pump units (58, 60, 62) including a first operational mode wherein the fluid medium is transferred from the common suction chamber (92) to the
5 common pressure chamber (94) during;

each of the plurality of pump units (58, 60, 62) including a second operational mode wherein the fluid medium is circulated through the common suction chamber (92); and

each of the plurality of pump units (58, 60, 62) being individually actuatable to select one of the first operational mode and the second operational mode.

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