

CLAIMS

1. A gravel packing apparatus comprising:

a sand control screen assembly having a filter medium positioned exteriorly of a base pipe, the sand control screen assembly operable to prevent the flow of particulate material of a predetermined size therethrough but allow the flow of production fluids therethrough, the base pipe including at least one circumferentially extending threaded connector;

a slurry delivery subassembly including at least one threaded ring assembly threadably coupled to the at least one circumferentially extending threaded connector to rotatably mount the slurry delivery subassembly exteriorly on the sand control screen assembly, the slurry delivery subassembly including at least one transport tube extending longitudinally along at least a portion of the sand control screen assembly; and

at least one locking ring threadably coupled to the at least one circumferentially extending threaded connector, the at least one locking ring being actuatable relative to the at least one threaded ring assembly between a first position in which rotation of the slurry delivery subassembly relative to the base pipe is permitted and a second position in which rotation of the slurry delivery subassembly relative to the base pipe is prevented.

2. The apparatus as recited in claim 1 further comprising an outer shroud positioned around the slurry delivery subassembly and the sand control screen assembly.

3. The apparatus as recited in claim 1 wherein the slurry delivery subassembly further comprises at least one packing tube in fluid communication with the at least one transport tube, the at least one packing tube having nozzles.

4. The apparatus as recited in claim 1 wherein the slurry delivery subassembly further comprises at least two packing tubes in fluid communication with the at least one transport tube, the at least two packing tubes having nozzles.

5. The apparatus as recited in claim 1 wherein the slurry delivery subassembly further comprises at least two transport tubes.

6. A gravel packing apparatus comprising:

a sand control screen assembly having a filter medium positioned exteriorly of a base pipe, the sand control screen assembly operable to prevent the flow of particulate material of a predetermined size therethrough but allow the flow of production fluids therethrough, the base pipe including first and second circumferentially extending threaded connectors;

a slurry delivery subassembly having first and second threaded ring assemblies, the first threaded ring assembly being threadably coupled to the first circumferentially extending threaded connector and the second threaded ring assembly being threadably coupled to the second circumferentially extending threaded connector to rotatably mount the slurry delivery subassembly exteriorly on the sand control screen assembly, the slurry delivery subassembly including at least one transport tube extending longitudinally along at least a portion of the sand control screen assembly; and

first and second locking rings threadably coupled to the first and second circumferentially extending threaded connectors, respectively, the first locking ring being actuatable between first and second positions relative to the first threaded ring assembly, and the second locking ring being actuatable between first and second positions relative to the second threaded ring assembly,

wherein, when the first locking ring is in the first position relative to the first threaded ring assembly and the second locking ring is in the first position relative to the second threaded ring assembly, rotation of the slurry delivery subassembly relative to the base pipe is permitted, and

wherein, when the first locking ring is in the second position relative to the first threaded ring assembly and the second locking ring is in the second position relative to the second threaded ring assembly, rotation of the slurry delivery subassembly relative to the base pipe is prevented.

7. The apparatus as recited in claim 6 further comprising an outer shroud positioned around the slurry delivery subassembly and the sand control screen assembly.

8. The apparatus as recited in claim 6 wherein the slurry delivery subassembly further comprises at least one packing tube in fluid communication with the at least one transport tube, the at least one packing tube having nozzles.

9. The apparatus as recited in claim 6 wherein the slurry delivery subassembly further comprises at least two packing tubes in fluid communication with the at least one transport tube, the at least two packing tubes having nozzles.

10. The apparatus as recited in claim 6 wherein the slurry delivery subassembly further comprises at least two transport tubes.

11. A gravel packing apparatus comprising:

first and second joints each including a sand control screen assembly having a filter medium positioned exteriorly of a base pipe including a circumferentially extending threaded connector, a slurry delivery subassembly including a threaded ring assembly threadably coupled to the circumferentially extending threaded connector to rotatably mount the slurry delivery subassembly exteriorly on the sand control screen assembly, the slurry delivery subassembly including at least one transport tube extending longitudinally along at least a portion of the sand control screen assembly, and a locking ring threadably coupled to the circumferentially extending threaded connector, the locking ring being actuable relative to the threaded ring assembly between a first position in which rotation of the slurry delivery subassembly relative to the base pipe is permitted and a second position in which rotation of the slurry delivery subassembly relative to the base pipe is prevented; and

at least one jumper tube coupled to and extending between the at least one transport tube of the first joint and the at least one transport tube of the second joint,

wherein the base pipe of the first joint is coupled to the base pipe of the second joint, and

wherein, to permit the coupling of the at least one jumper tube between the at least one transport tube of the first joint and the at least one transport tube of the second joint, the at least one transport tube of the first joint is adapted to be axially aligned with the at least one transport tube of the second joint by rotating the slurry delivery subassembly of the first joint relative to the base pipe of the first joint after the base pipe of the first joint has been coupled to the base pipe of the second joint.

12. The apparatus as recited in claim 11 wherein each joint further comprises an outer shroud positioned around the slurry delivery subassembly and the sand control screen assembly.

13. The apparatus as recited in claim 11 wherein the slurry delivery subassembly of each joint further comprises at least one packing tube in fluid communication with the at least one transport tube, the at least one packing tube having nozzles.

14. The apparatus as recited in claim 11 wherein the slurry delivery subassembly of each joint further comprises at least two packing tubes in fluid communication with the at least one transport tube, the at least two packing tubes having nozzles.

15. The apparatus as recited in claim 11 wherein the slurry delivery subassembly of each joint further comprises at least two transport tubes and wherein one jumper tube is coupled to and extends between respective transport tubes of the first joint and the second joint.

16. A gravel packing apparatus comprising:

first and second joints each including a sand control screen assembly having a filter medium positioned exteriorly of a base pipe including first and second circumferentially extending threaded connectors, a slurry delivery subassembly having first and second threaded ring assemblies, the first threaded ring assembly being threadably coupled to the first circumferentially extending threaded connector and the second threaded ring assembly being threadably coupled to the second circumferentially extending threaded connector to

rotatably mount the slurry delivery subassembly exteriorly on the sand control screen assembly, the slurry delivery subassembly including at least one transport tube extending longitudinally along at least a portion of the sand control screen assembly, and first and second locking rings threadably coupled to the first and second circumferentially extending threaded connectors, respectively, the first locking ring being actuatable between first and second positions relative to the first threaded ring assembly, and the second locking ring being actuatable between first and second positions relative to the second threaded ring assembly, wherein, when the first locking ring is in the first position relative to the first threaded ring assembly and the second locking ring is in the first position relative to the second threaded ring assembly, rotation of the slurry delivery subassembly relative to the base pipe is permitted, and, wherein, when the first locking ring is in the second position relative to the first threaded ring assembly and the second locking ring is in the second position relative to the second threaded ring assembly, rotation of the slurry delivery subassembly relative to the base pipe is prevented; and

at least one jumper tube coupled to and extending between the at least one transport tube of the first joint and the at least one transport tube of the second joint,

wherein the base pipe of the first joint is coupled to the base pipe of the second joint, and

wherein, to permit the coupling of the at least one jumper tube between the at least one transport tube of the first joint and the at least one transport tube of the second joint, the at least one transport tube of the first joint is adapted to be axially aligned with the at least one transport tube of the second joint by rotating the slurry delivery subassembly of the first joint relative to the base pipe of the first joint after the base pipe of the first joint has been coupled to the base pipe of the second joint.

17. The apparatus as recited in claim 16 wherein each joint further comprises an outer shroud positioned around the slurry delivery subassembly and the sand control screen assembly.

18. The apparatus as recited in claim 16 wherein the slurry delivery subassembly of each joint further comprises at least one packing tube in fluid communication with the at least one transport tube, the at least one packing tube having nozzles.

19. The apparatus as recited in claim 16 wherein the slurry delivery subassembly of each joint further comprises at least two packing tubes in fluid communication with the at least one transport tube, the at least two packing tubes having nozzles.

20. The apparatus as recited in claim 16 wherein the slurry delivery subassembly of each joint further comprises at least two transport tubes and wherein one jumper tube is coupled to and extends between respective transport tubes of the first joint and the second joint.