CLAIMS:

1. A system for coupling a first floating structure to a second floating structure, the system comprising:

a receiving member disposed on the first floating structure for receiving an engaging member, the engaging member adapted to engage with the receiving member when the receiving member moves relative to the engaging member;

a first joint connected to the engaging member;

a first arm having a first end and a second end, wherein the first end of the first arm is operatively coupled to the first joint,

in which the first joint is configured such that the engaging member is movable along planes that are normal to the longitudinal axis of the first arm;

a second joint operatively coupled to the second end of the first arm;

a second arm having a first end and a second end, wherein the first end of the second arm is operatively coupled to the second joint,

in which the second joint is configured such that the second arm is movable along planes that are normal to the longitudinal axis of the second joint; and

a coupling apparatus disposed on the second floating structure for coupling to the second end of the second arm.

2. The system according to claim 1 wherein the coupling apparatus further comprises:

a third joint operatively coupled to the second end of the second arm; and

a third arm having a first end and a second end, wherein the first end of the third arm has a protrusion extending into the third joint, operatively coupling the third arm to the third joint, and

wherein the third joint is configured such that the third arm is rotatable about the longitudinal axis of the third arm.

3. The system according to claim 2 wherein the third joint is further configured such that the third joint is movable along planes that are normal to the longitudinal axis of the second arm.

4. The system according to claim 1 wherein the coupling apparatus further comprises:

a third joint operatively coupled to the second end of the second arm; and

a third arm having a first end and a second end, wherein the first end of the third arm is operatively coupled to the third joint, and

wherein the third joint is configured such that the third arm is movable along planes that are normal to the longitudinal axis of the third joint.

5. The system according to claim 4 wherein the third joint is further configured such that the third joint is movable along planes that are normal to the longitudinal axis of the second arm.

6. The system according to claim 1 wherein the coupling apparatus further comprises:
   a hydraulic piston adapted to connect to the second end of the second arm; and
   a skid assembly connected to the hydraulic piston.

7. The system according to claim 2 wherein the coupling apparatus further comprises:
   a hydraulic piston adapted to connect to the second end of the third arm; and
   a skid assembly connected to the hydraulic piston.

8. The system according to claim 4 wherein the coupling apparatus further comprises:
   a hydraulic piston adapted to connect to the second end of the third arm; and
   a skid assembly connected to the hydraulic piston.

9. The system according to claim 1 wherein the receiving member further comprises:
   a conical receptacle for aligning the engaging member with the receiving member.

10. The system according to claim 9 further comprising:
   a plurality of male lugs provided on an interior surface of the conical receptacle; and
   a plurality of female lugs disposed around a circumference of the engaging member wherein each of the plurality of female lugs is engageable with each of the plurality of male lugs provided on the interior surface of the conical receptacle.

11. The system according to claim 1 wherein the receiving member moves rotatably relative to the engaging member, to engage with the engaging member.

12. The system according to claim 11 further comprising:
   a motor located adjacent to the receiving member wherein, the rotational movement of the receiving member relative to the engaging member is actuatable by the motor.

13. The system according to claim 10 wherein the receiving member moves rotatably relative to the engaging member, to engage with the engaging member.

14. The system according to claim 13 further comprising:
a motor located adjacent to the receiving member wherein, the rotational movement of the receiving member relative to the engaging member is actuatable by the motor.

15. The system according to claim 1 wherein the first joint comprises:
a first section further comprising:
a first bracket that receives the first end of the first arm;
a resilient material positioned in the first bracket such that the resilient material envelops the first end of the first arm; and
a first hook that is fixed to the first bracket to pivotably couple the first end of the first arm to the first bracket.

16. The system according to claim 1 wherein the second joint comprises:
a first section further comprising:
a first bracket that receives the second end of the first arm;
a second section further comprising:
a second bracket that receives the first end of the second arm;
a resilient material positioned in the second bracket such that the resilient material envelops the first end of the second arm; and
a first hook that is fixed to the second bracket to pivotably couple the first end of the second arm to the second bracket.

17. The system according to claim 1 wherein the second joint comprises:
a first section further comprising:
a first bracket that receives the second end of the first arm;
a first resilient material positioned in the first bracket such that the first resilient material envelops the second end of the first arm; and
a first hook that is fixed to the first bracket for coupling the second end of the first arm to the first bracket, and
a second section further comprising:
a second bracket that receives the first end of the second arm;
a second resilient material positioned in the second bracket such that the second resilient material envelops the first end of the second arm; and
a second hook that is fixed to the second bracket for coupling the first end of the second arm to the second bracket.

18. The system according to claim 2 wherein the third joint comprises:
a first section further comprising:
a first bracket that receives the second end of the second arm;

a second section further comprising:

a second bracket that receives the first end of the third arm wherein the protrusion extends through an opening in the second bracket and pivotably engages with the opening allowing the third arm to rotate about the longitudinal axis of the third arm; and

a resilient material positioned in the second bracket such that the resilient material envelops the first end of the third arm.

19. The system according to claim 3 wherein the third joint comprises:

a first section further comprising:

a first bracket that receives the second end of the second arm;

a first resilient material positioned in the first bracket such that the first resilient material envelops the second end of the second arm; and

a first hook that is fixed to the second bracket for coupling the second end of the second arm to the first bracket;

a second section further comprising:

a second bracket that receives the first end of the third arm wherein the protrusion extends through an opening in the second bracket and pivotably engages with the opening allowing the third arm to rotate about the longitudinal axis of the third arm; and

a second resilient material positioned in the second bracket such that the resilient material envelops the first end of the third arm.

20. The system according to claim 4 wherein the third joint comprises:

a first section further comprising:

a first bracket that receives the second end of the second arm;

a second section further comprising:

a second bracket that receives the first end of the third arm;

a resilient material positioned in the second bracket such that the resilient material envelops the first end of the third arm; and

a hook that is fixed to the second bracket for coupling the first end of the third arm to the second bracket.

21. The system according to claim 5 wherein the third joint comprises:

a first section further comprising:

a first bracket that receives the second end of the second arm;

a first resilient material positioned in the first bracket such that the first resilient material envelops the second end of the second arm; and

a first hook that is fixed to the first bracket for coupling the second end of the second arm to the first bracket

a second section further comprising:

a second bracket that receives the first end of the third arm;

a second resilient material positioned in the second bracket such that the second resilient material envelops the first end of the third arm; and

a second hook that is fixed to the second bracket for coupling the first end of the third arm to the second bracket.

22. The system according to claims 15 or 16 wherein the resilient material comprises a flexible elastomeric element.

23. The system according to claim 17 wherein the first resilient material and the second resilient material comprises a flexible elastomeric element.

24. The system according to claim 18 wherein the resilient material comprises a flexible elastomeric element.

25. The system according to claim 6 wherein the hydraulic piston and the skid assembly are disposed on an extended platform on a pipe rack deck of the second floating structure.

26. The system according to claim 6 wherein the hydraulic piston and the skid assembly are disposed on a main deck of the second floating structure.

27. The system according to claim 6 wherein the hydraulic piston and the skid assembly are disposed in a box bottom of a main deck of the second floating structure.

CLAIMS:

1. A system for coupling a first floating structure to a second floating structure, the system comprising:

a receiving member disposed on the first floating structure for receiving an engaging member, the engaging member adapted to engage with the receiving member when the receiving member moves relative to the engaging member;

a first joint connected to the engaging member;

a first arm having a first end and a second end, wherein the first end of the first arm is operatively coupled to the first joint, in which the first joint is configured such that the engaging member is movable along planes that are normal to the longitudinal axis of the first arm;

a second joint operatively coupled to the second end of the first arm;

a second arm having a first end and a second end, wherein the first end of the second arm is operatively coupled to the second joint, in which the second joint is configured such that the second arm is movable along planes that are normal to the longitudinal axis of the second joint; and

a coupling apparatus disposed on the second floating structure for coupling to the second end of the second arm, wherein the coupling apparatus comprises:

a hydraulic piston adapted to connect to the second end of the second arm; and

a skid assembly connected to the hydraulic piston.

2. The system according to claim 1 wherein the coupling apparatus further comprises:

a third joint operatively coupled to the second end of the second arm; and

a third arm having a first end and a second end, wherein the first end of the third arm has a protrusion extending into the third joint, operatively coupling the third arm to the third joint, and

wherein the third joint is configured such that the third arm is rotatable about the longitudinal axis of the third arm.

3. The system according to claim 2 wherein the third joint is further configured such that the third joint is movable along planes that are normal to the longitudinal axis of the second arm.

4. The system according to claim 1 wherein the coupling apparatus further comprises:

a third joint operatively coupled to the second end of the second arm; and

a third arm having a first end and a second end, wherein the first end of the third arm is operatively coupled to the third joint, and

wherein the third joint is configured such that the third arm is movable along planes that are normal to the longitudinal axis of the third joint.

5. The system according to claim 4 wherein the third joint is further configured such that the third joint is movable along planes that are normal to the longitudinal axis of the second arm.

6. The system according to claim 1 wherein the receiving member further comprises:

a conical receptacle for aligning the engaging member with the receiving member.

7. The system according to claim 6 further comprising:

a plurality of male lugs provided on an interior surface of the conical receptacle; and

a plurality of female lugs disposed around a circumference of the engaging member wherein each of the plurality of female lugs is engageable with each of the plurality of male lugs provided on the interior surface of the conical receptacle.

8. The system according to claim 1 wherein the receiving member moves rotatably relative to the engaging member, to engage with the engaging member.

9. The system according to claim 8 further comprising:

a motor located adjacent to the receiving member wherein, the rotational movement of the receiving member relative to the engaging member is actuatable by the motor.

10. The system according to claim 6 wherein the receiving member moves rotatably relative to the engaging member, to engage with the engaging member.

11. The system according to claim 10 further comprising:

a motor located adjacent to the receiving member wherein, the rotational movement of the receiving member relative to the engaging member is actuatable by the motor.

12. The system according to claim 1 wherein the first joint comprises:

a first section further comprising:

a first bracket that receives the first end of the first arm;

a resilient material positioned in the first bracket such that the resilient material envelops the first end of the first arm; and

a first hook that is fixed to the first bracket to pivotably couple the first end of the first arm to the first bracket.

13. The system according to claim 1 wherein the second joint comprises:
a first section further comprising:
a first bracket that receives the second end of the first arm;
a second section further comprising:
a second bracket that receives the first end of the second arm;
a resilient material positioned in the second bracket such that the resilient material envelops the first end of the second arm; and
a first hook that is fixed to the second bracket to pivotably couple the first end of the second arm to the second bracket.

14. The system according to claim 1 wherein the second joint comprises:
a first section further comprising:
a first bracket that receives the second end of the first arm;
a first resilient material positioned in the first bracket such that the first resilient material envelops the second end of the first arm; and
a first hook that is fixed to the first bracket for coupling the second end of the first arm to the first bracket, and
a second section further comprising:
a second bracket that receives the first end of the second arm;
a second resilient material positioned in the second bracket such that the second resilient material envelops the first end of the second arm; and
a second hook that is fixed to the second bracket for coupling the first end of the second arm to the second bracket.

15. The system according to claim 2 wherein the third joint comprises:
a first section further comprising:
a first bracket that receives the second end of the second arm;
a second section further comprising:
a second bracket that receives the first end of the third arm wherein the protrusion extends through an opening in the second bracket and pivotably engages with the opening allowing the third arm to rotate about the longitudinal axis of the third arm; and
a resilient material positioned in the second bracket such that the resilient material envelops the first end of the third arm.

16. The system according to claim 3 wherein the third joint comprises:
a first section further comprising:
a first bracket that receives the second end of the second arm;
a first resilient material positioned in the first bracket such that the first resilient material envelops the second end of the second arm; and
a first hook that is fixed to the second bracket for coupling the second end of the second arm to the first bracket;

a second section further comprising:

a second bracket that receives the first end of the third arm wherein the protrusion extends through an opening in the second bracket and pivotably engages with the opening allowing the third arm to rotate about the longitudinal axis of the third arm; and

a second resilient material positioned in the second bracket such that the resilient material envelops the first end of the third arm.

17. The system according to claim 4 wherein the third joint comprises:
a first section further comprising:

a first bracket that receives the second end of the second arm;
a second section further comprising:

a second bracket that receives the first end of the third arm;

a resilient material positioned in the second bracket such that the resilient material envelops the first end of the third arm; and

a hook that is fixed to the second bracket for coupling the first end of the third arm to the second bracket.

18. The system according to claim 5 wherein the third joint comprises:
a first section further comprising:

a first bracket that receives the second end of the second arm;

a first resilient material positioned in the first bracket such that the first resilient material envelops the second end of the second arm; and

a first hook that is fixed to the first bracket for coupling the second end of the second arm to the first bracket;
a second section further comprising:

a second bracket that receives the first end of the third arm;

a second resilient material positioned in the second bracket such that the second resilient material envelops the first end of the third arm; and

a second hook that is fixed to the second bracket for coupling the first end of the third arm to the second bracket.

19. The system according to claim 12 wherein the resilient material comprises a flexible elastomeric element.

20. The system according to claim 13 wherein the resilient material comprises a flexible elastomeric element.

21. The system according to claim 14 wherein the first resilient material and the second resilient material comprises a flexible elastomeric element.

22. The system according to claim 15 wherein the resilient material comprises a

flexible elastomeric element.

23. The system according to claim 1 wherein the hydraulic piston and the skid assembly are disposed on an extended platform on a pipe rack deck of the second floating structure.

24. The system according to claim 1 wherein the hydraulic piston and the skid assembly are disposed on a main deck of the second floating structure.

25. The system according to claim 1 wherein the hydraulic piston and the skid assembly are disposed in a box bottom of a main deck of the second floating structure.