Claims

1. A crane comprising:

a base;

an upperstructure rotationally mounted on the base;

a boom having a proximal end pivotally attached to the upperstructure at a front attachment location, and having a distal end supporting a load line for raising a payload; and

a gantry mounted on the upperstructure and having an upper end supporting a boom line coupled to the distal end of the boom for supporting the distal end of the boom;

wherein the gantry includes at least one front leg mechanically coupled to the front attachment location and inclined in a direction away from the boom to apply, to the front attachment location, a horizontal force component towards the boom that is opposed by a horizontal force component applied by the boom towards the front leg; and

wherein the upperstructure includes a circular turret, and the front attachment location is aligned over a circle of the turret.

2. The crane as claimed in claim 1, wherein the front leg extends from the front attachment location to the upper end of the gantry.

3. The crane as claimed in claim 1, wherein the horizontal force component applied by the front leg towards the boom is equal to the horizontal force component applied by the boom towards the front leg.

4. The crane as claimed in claim 1, wherein the front leg carries a compressive force having a line of action passing through a pivot axis of the boom.

5. The crane as claimed in claim 4, wherein the pivot axis of the boom is a longitudinal axis of a foot pin pivotally attaching the proximate end of the boom to the upperstructure.

6. The crane as claimed in claim 1, which further includes a foot pin pivotally attaching the proximate end of the boom to the upperstructure at the front attachment location, and the foot pin also attaches the front leg of the gantry to the upperstructure at the front attachment location.

7. The crane as claimed in any of claims 1 to 6, wherein the base is a pedestal, the upperstructure includes a swing circle assembly coupling the upperstructure to pedestal for rotation of the upperstructure about a vertical axis of the pedestal.

8. The crane as claimed in any of claims 1 to 6, which further includes a motor mechanically coupled to the upperstructure and the base to swing the boom around the base, a boom hoist mechanically coupled to the boom line to reel in or reel out the boom line to raise or lower the inclination of the boom, and a load hoist mechanically coupled to the load line in order to reel in or reel out the load line.

9. The crane as claimed in claim 8, wherein the motor is mounted to the upperstructure, the boom hoist is mounted to the upperstructure or gantry, and the load hoist is mounted to the upperstructure or boom.

10. The crane as claimed in any of claims 1 to 6, wherein the boom is a lattice boom.

11. The crane as claimed in any of claims 1 to 6, wherein the gantry includes a left front leg and a right front leg, the left front leg extends from a left front attachment location on the upperstructure to the upper end of the gantry, and the right front leg extends from a right front attachment location on the upperstructure to the upper end of the gantry.

12. The crane as claimed in claim 11, wherein the upperstructure includes a pair of parallel spaced vertical plates at each of the left front and right front attachment locations, and the proximal end of the boom includes a pair of legs, and a foot of each of the legs of the boom is disposed between the parallel spaced vertical plates at a respective one of the left front and right front attachment locations, and a respective foot pin attaches the foot of each of the legs of the boom to the parallel spaced plates at the respective one of the left front and right front attachment locations.

13. The crane as claimed in claim 12, wherein a foot of each of the front legs of the gantry is secured on top of the parallel spaced plates at a respective one of two front attachment locations.

14. The crane as claimed in claim 12, wherein each of the front legs includes a pair of parallel spaced beams extending upward from a respective one of the front attachment locations, and an upper and rearward portion of a respective leg

of the boom is receivable between the two beams in each pair of parallel spaced beams when the boom is at a maximum upward inclination.

15. The crane as claimed in claim 14, wherein the parallel spaced beams of the left front leg of the gantry are parallel to the parallel spaced beams of the right front leg of the gantry.

16. The crane as claimed in claim 11, wherein the upperstructure includes a circular turret, the left front attachment location is aligned over a circle of the turret, and the right front attachment location is aligned over the circle of the turret.

17. The crane as claimed in claim 16, wherein the left front attachment location is spaced from the right front attachment location by a spacing between eighty to one hundred degrees around the circle of the turret.

18. The crane as claimed in any of claims 1 to 6, wherein the gantry further includes a pair of rear legs, and the upperstructure includes a left rear attachment location attaching a foot of a left rear leg of the gantry, and the upperstructure includes a right rear attachment location attaching a foot of a right rear leg of the gantry.

19. The crane as claimed in claim 18, wherein the pair of rear legs is vertical.

20. The crane as claimed in claim 18, wherein the gantry includes a left front leg and a right front leg, the left front leg extends from a left front attachment location on the upperstructure to the upper end of the gantry, the right front leg extends from a right front attachment location on the upperstructure to the upper end of the gantry, the upperstructure includes a circular turret, the left front attachment location and the right front attachment location are aligned over a circle of the turret, the left rear attachment location and the right front attachment location are aligned over the circle of the turret, and the left front, right front, left rear, and right rear attachment locations are located at respective corners of a square.