Claims

1. A lock classification system for a container twist-locks, the lock classification system configured to determine, based on the classification of a twist-lock, whether a twist-lock is to be selected for use in pinning operations, the lock classification system comprising:
    a lock feeder;
    a lock identifier configured to classify twist-locks according to type and/or model of twist-lock;
    at least one lock separator configured to separate twist-locks from one another so that they can be individually identified by the lock identifier;
    a manipulation solution system; and
    at least one lock manipulator.

2. The lock classification system of claim 1, wherein the lock classification system is configured to determine whether a selected twist-lock is to be placed, by the lock manipulator, in or on a universal lock carrier.

3. The lock classification system of claim 2, wherein the lock classification system is configured to determine, based on the classification and an orientation of the selected twist-lock as determined by the lock identifier, a lock manipulation solution that is usable to cause the lock manipulator to move the selected twist-lock to be placed in or on the universal lock carrier.

4. The lock classification system of claim 2, wherein the manipulation solution system is configured to calculate a sequence of motions of the lock manipulator to cause the motion of the selected twist-lock from the lock classification system to the universal lock carrier and to output the sequence of motions as the lock manipulation solution.

5. The lock classification system of claim 2, wherein the lock manipulator is operable to transport the selected twist-lock to the universal lock carrier from an identification position in the lock classification system.

6. The lock classification system of claim 1, wherein the feeder comprises a hopper and a feed conveyor, and wherein a motor is mounted on the hopper and/or the feed conveyor to vibrate the feeder.

7. The lock classification system of claim 1, wherein each lock separator comprises a first conveyor and a second conveyor arranged immediately adjacent to one another each other.

8. The lock classification system of claim 7, wherein the speed of the second conveyor is higher than the speed of the first conveyor.

9. A container lock management system comprising:
one or more container pinning systems;
a classified lock storage system; and
a lock classification system accordingly to claim 1.

10. The container lock management system of claim 9, wherein the container lock management system comprises one or more universal lock carriers.

11. A method for classifying a twist-lock, the method comprising:
feeding a plurality of twist-locks to a twist-lock separator;
separating a twist-lock from the plurality of twist-locks;
generating data representing a three-dimensional (3D) shape of the twist-lock; and
identifying, using the data representing the 3D shape of the twist-lock, a twist-lock classification of the twist-lock.

12. The method of claim 11, wherein the method comprises:
determining, based on the twist-lock classification of the twist-lock, whether the twist-lock classification matches a classification chosen for operational use; and
selecting, where the twist-lock classification matches the classification chosen for operational use, the twist-lock for operational use.

13. The method of claim 11, wherein the generating the data representing the 3D shape of the twist-lock comprises acquiring one or more images of the twist-lock and using the one or more images to create a 3D model of the twist-lock in a simulated 3D space.

14. The method of claim 13, wherein identifying a twist-lock classification of the twist-lock comprises comparing the 3D model of the twist-lock with other classified 3D models that each represent a particular type or model of twist-lock.

15. The method of claim 14, wherein comparing the 3D model of the twist-lock with other classified 3D models comprises interrogating a storage medium having a database of classified 3D models, each of which represents a different type or model of twist-lock, stored thereon and comparing the 3D model of the twist-lock with each of the classified 3D models to determine if the 3D model of the twist-lock matches any of the classified 3D models.