CLAIMS

1. A battery shredding apparatus comprising:

a housing having a shredding chamber at a lower portion thereof, the shredding chamber having a shredder entrance at a top side thereof, a shredder exit at a bottom side thereof and a shredder unit disposed in the shredding chamber;

a conveyor movably coupled to the housing and positioned above the shredding chamber, the conveyor having a top port for receiving batteries into the conveyor and a bottom port closable for carrying the batteries in the conveyor and openable for unloading the batteries from the conveyor, wherein the conveyor is movable relative to the shredding chamber between a first conveyor position upwardly away from the shredding chamber and a second conveyor position to engage the shredding chamber; and

a pair of lids pivotally mounted to the housing, each of the pair of lids being pivotable relative to the housing between a first lid position to expose the top port to allow loading of batteries into the conveyor and a second lid position to cover the top port;

wherein before the conveyor reaching the second conveyor position, the pair of lids is at the first lid position for loading batteries into the conveyor and the bottom port is closed for carrying batteries received in the conveyor;

wherein upon the conveyor reaching the second conveyor position, the bottom port of the conveyor and the shredder entrance are openable to establish communication between the conveyor and the shredding chamber for unloading the batteries from the conveyor into the shredding chamber, the pair of lids being at the second lid position to cover the top port of the conveyor and the shredder exit being closed such that the conveyor and the shredding chamber form an isolated space; and

wherein the shredder unit is operable in the isolated space to break the batteries received in the shredding chamber into fragments.

2. The apparatus as recited in claim 1, further comprising a pair of brackets each being mounted to the housing, each one of the pair of lids being pivotally mounted to a corresponding one of the pair of brackets via a joint on each of the pair of brackets, wherein each joint is positioned between a top rim of the conveyor when the conveyor is at the first conveyor position and the top rim of the conveyor when the conveyor is at the second conveyor position, wherein upon being at the first conveyor position, the conveyor

blocks a movement path to prevent each of the pair of lids from pivoting toward the second lid position, and upon the top rim being positioned below each joint, the conveyor clears the movement path to allow the pair of lids to pivot toward the second lid position.

3. The apparatus as recited in claim 1 or claim 2, further comprising a set of first resilient members coupled to the housing and acting against the conveyor along an upward direction to maintain the conveyor at the first conveyor position for receiving batteries into the conveyor.

4. The apparatus as recited in claim 3, wherein the set of first resilient members is configured to allow the conveyor to move to the second conveyor position upon a total weight of batteries received in the conveyor reaching a predetermined level, and to move the conveyor to the first conveyor position upon the batteries being unloaded from the conveyor.

5. The apparatus as recited in claim 2, further comprising a pair of second resilient members, wherein each of the pair of second resilient members is coupled to one of the joints to bias a corresponding one of the lids toward the second lid position.

6. The apparatus as recited in anyone of claims 1 to 5, further comprising a pair of conveyor doors movably coupled to the bottom port of the conveyor and a pair of entrance doors movably coupled to the shredder entrance, the pair of conveyor doors being engageable to the pair of entrance doors upon the conveyor being at the second conveyor position such that movement of the pair of entrance doors carries the pair of conveyor doors to move between an open door position to establish communication between the conveyor and the shredding chamber and a close door position to separate the conveyor and shredding chamber.

7. The apparatus as recited in claim 6, further comprising a pair of magnetic components, wherein each of the pair of magnetic components is mounted to one of the pair of conveyor doors for attaching the pair of conveyor doors to each other when the pair of conveyor doors are at the close door position.

8. The apparatus as recited in claim 6, wherein the conveyor further comprises a pair of slots each being positioned at one side of the bottom port, the pair of slots each having a slot opening facing each other and each one of the conveyor doors being movably receivable into a corresponding slot.

9. The apparatus as recited in claim 8, further comprising a pair of third resilient members each being disposed in one of the pair of the slots to bias against one of the conveyor doors toward each other.

10. The apparatus as recited in claim 6, further comprising

a motor mounted to the housing;

a leadscrew having a first threaded segment and a second threaded segment coupled to a main shaft of the motor;

a first slider coupled to the first segment of the leadscrew;

a second slider coupled to the second segment of the leadscrew;

a first entrance door plate connected to the first slider and a second entrance door plate connected to the second slider, the first entrance door plate and the second entrance door plate being slidably coupled to the shredder entrance, each of the first entrance door plate and the second entrance door plate having a respective first and second driving pin extending upwardly therefrom; and

a first port door plate and a second port door plate slidably coupled to the bottom port of the conveyor, each of the first port door plate and the second port door plate having a respective first and second driven recess in alignment with and detachably engageable to the respective first driving pin and the second driving pin;

wherein upon the conveyor being at the second conveyor position, the first and second driving pins is engaged to the respective first and second driven recesses such that movement of the first and second entrance door plates carries the respective first and second port door plates to move together;

wherein the motor is activable to rotate the leadscrew to move the first slider and the second slider to open or close the shredder entrance and the bottom port of the conveyor.

11. The apparatus as recited in claim 10, further comprising

a worm rod coupled to the leadscrew;

a worm gear engaged to the worm rod;

a connecting shaft mounted to the worm gear;

a pinion gear rotatably mounted to the conveyor; and

a pair of gear racks slidably mounted to the conveyor and engaged to the pinion gear;

wherein upon the conveyor being at the second conveyor position, the pinion gear is brought to couple with the connecting shaft; and

wherein upon being activated, the motor rotates the worm rod, the worm gear, the connecting shaft and the pinion gear to slide the pair of gear racks to lock the conveyor to the housing.

12. The apparatus as recited in claim 11, further comprising

a vertical groove formed on a sidewall of the housing adjacent to one of the pair of gear racks;

a horizontal groove formed on the sidewall and connected to the vertical groove; and

a locking pin extending from one of the gear racks toward the sidewall;,

wherein the locking pin is engaged to the vertical groove before the conveyor reaching the second conveyor position to allow movement of the conveyor between the first conveyor position and the second conveyor position, and wherein the locking pin is engaged to the horizontal groove to lock the conveyor to the second conveyor position during opening and closing of the bottom port.

13. The apparatus as recited in claim 1, wherein the conveyor has a pair of sloped bottom surfaces at a respective first and second side of the bottom port and inclined toward the bottom port.

14. The apparatus as recited in claim 1, wherein the shredder exit has a side opening and a bottom opening joining at a bottom corner of the shredding chamber, and a pivot support passing through the bottom corner in a direction parallel to the side opening and the bottom opening, the apparatus further comprises a swing door having a hinge shaft pivotally mounted to pivot support, the swing door has a four vanes radially extending from the hinge shaft, wherein one of the four vanes is positioned to close the bottom opening and an adjacent one of the four vanes being positioned to close the side opening .