CLAIMS

1. A pulverizer comprising:

a housing having top and bottom ends, the housing further having an inlet located towards the top end for receiving input materials to comminute and an outlet located towards the bottom end for discharging pulverized input materials from the housing, the housing including a housing sidewall extending between the top and bottom ends and defining an interior chamber, the housing having a central housing axis; and

a pulverizing rotor rotatably mounted in the interior chamber of the housing for pulverizing the input materials fed into the housing via the inlet as the input material passes through the housing from the inlet to the outlet, the pulverizing rotor including:

a rotatable shaft extending between the top end and the bottom end of the housing along the central housing axis; and

a plurality of arms extending outwardly from the rotatable shaft towards the housing sidewall, each arm having a proximal end located towards the rotatable shaft and a distal end located away from the rotatable shaft, each arm comprising a wear pad connected at the distal end thereof, the wear pad having a front face shaped and sized to impact materials fed into the pulverizer during rotation of the arms;

wherein the wear pad has a rear face opposite the front face, a first end, and a second end, and further comprises a channel extending on the rear face along the length of the pad, the channel being shaped and sized to at least partially receive the distal end of the arm; and

wherein the rear face of the pad comprises a top flange and a bottom flange provided on either side of the channel and extending therealong between the first

end and the second end, the top and bottom flanges being adapted to at least partially wrap around the distal end of the arm.

2. A pulverizer comprising:

a housing having top and bottom ends, the housing further having an inlet located towards the top end for receiving input materials to comminute and an outlet located towards the bottom end for discharging pulverized input materials from the housing, the housing including a housing sidewall extending between the top and bottom ends and defining an interior chamber, the housing having a central housing axis; and

a pulverizing rotor rotatably mounted in the interior chamber of the housing for pulverizing the input materials fed into the housing via the inlet as the input material passes through the housing from the inlet to the outlet, the pulverizing rotor including:

a rotatable shaft extending between the top end and the bottom end of the housing along the central housing axis; and

a plurality of arms extending outwardly from the rotatable shaft towards the housing sidewall, each arm having a proximal end located towards the rotatable shaft and a distal end located away from the rotatable shaft, each arm comprising a wear pad connected at a distal end thereof, the wear pad having a front face shaped and sized to impact materials fed into the pulverizer during rotation of the arms;

wherein the wear pad is configured to be flipped on the arm to increase a lifespan thereof such that a first end and a second end of the wear pads are configured to be a proximal end of the wear pad.

3. The pulverizer according to claim 1 or 2, wherein the wear pad extends along a distal portion end of the arm and has a length defined between the first end and the second end, and wherein the wear pad has a height exceeding a height of the arm.

4. The pulverizer according to claim 1, wherein a thickness of the top flange and the bottom flange is variable along the length of the pad, such that thickness of one of the top flange and the bottom flange increases towards the distal end of the arm, and wherein the thickness of the other one of the top flange and the bottom flange decreases towards the distal end of the arm.

5. The pulverizer of claim 2, wherein the wear pad comprises diagonally opposite corner that are reinforced such that the wear pad is configured to be flipped on the arm to increase the lifespan.

6. The pulverizer according to any one of claims 1 to 5, wherein the wear pads are made of a wear-resistant material selected from a group consisting of: steel and alloys thereof, tungsten carbide, chromium carbide, ceramic, cast iron or wherein the pads are made of AR steel.

7. The pulverizer according to any one of claims 1 to 6, wherein the wear pad comprises one or more wear indicators provided on the corresponding front face for indicating a level of wear of the wear pad.

8. A pulverizer comprising:

a housing having top and bottom ends, the housing further having an inlet located towards the top end for receiving input material to comminute and an outlet located towards the bottom end for discharging pulverized input material from the housing, the housing including a housing sidewall having an inner surface extending between the top and bottom ends and defining an interior chamber, the housing having a central housing axis;

a rotatable shaft extending between the top end and the bottom end of the housing along the central housing axis;

at least one rotor arm extending outwardly from the rotatable shaft towards the housing sidewall for forming an airflow revolving about the central housing axis within the interior chamber when the rotatable shaft is rotated;

at least one airflow deflector extending inwardly into the interior chamber from the housing sidewall, the at least one airflow deflector cooperating with the at least one rotor arm to deflect the airflow generated by the at least one rotor arm so as to form at least two overlapping vortices within the interior chamber such that input material particles in suspension in both overlapping vortices collide with each other to be thereby pulverized.

9. The pulverizer of claim 8, wherein the at least two overlapping vortices rotate in a plane orthogonal to the central housing axis.

10. The pulverizer of claim 8 or 9, wherein each of the at least one airflow deflector comprises a flow facing deflecting surface extending away from the housing sidewall and inwardly into the interior chamber and an opposite deflecting surface extending away from the housing sidewall and inwardly into the interior chamber, the flow facing deflecting surface and the opposite deflecting surface

converging towards each other and meeting at an apex spaced inwardly from the housing sidewall.

11. The pulverizer of claim 10, wherein the apex of the at least one airflow deflector is spaced apart from a tip of each of the at least one rotor arm by a clearance space.

12. The pulverizer of any one of claims 8 to 11, wherein at least one of:

- the flow facing deflecting surface is angled relative to the inner surface of the housing sidewall at an angle of between 1 degree and 89 degrees, and optionally at an angle of between 30 degrees and 60 degrees; and
- the opposite deflecting surface is angled relative to the inner surface of the housing sidewall at an angle of between 1 degree and 89 degrees, and optionally at an angle of between 30 degrees and 60 degrees.

13. The pulverizer of any one of claims 8 to 12, wherein the rotatable shaft comprises at least three rotor assemblies having an upper assembly, an intermediate assembly, and a lower assembly and where the at least one airflow deflector extends continuously from a top end thereof to a bottom end thereof; and wherein the top end is positioned above the upper rotor and the bottom end is positioned below the intermediate rotor.

14. The pulverizer according to any one of claims 8 to 13, further comprising at least one shelf extending inwardly from the housing sidewall and circumferentially around the housing sidewall, each shelf being configured to deflect the airflow

directed towards the shelf upwardly to temporarily maintain the input material particles in suspension above the shelf.

15. The pulverizer according to claim 14, wherein the at least one shelf comprises an upper planar portion configured to extend along the housing sidewall and a lower angled portion angled relative to the upper planar portion, wherein the lower angled portion includes a pair of lateral edges which taper towards each other as they extend away from the upper planar portion.

16. A pulverizer comprising:

a housing having top and bottom ends, the housing further having an inlet located towards the top end for receiving input materials to comminute and an outlet located towards the bottom end for discharging pulverized input materials from the housing, the housing including a housing sidewall extending between the top and bottom ends and defining an interior chamber, the housing having a central housing axis, the housing sidewall comprising:

an outer structural wall having an inner face and an outer face; and

a housing liner extending against the inner face of the outer structural wall, the housing liner including a plurality of housing liner portions attached to and extending along the outer structural wall, each housing liner portion being detachable therefrom independently from the other housing liner portions, the plurality of housing liner portions includes a plurality of shelf liner panels disposed side-by-side to define at least one shelf extending from the housing sidewall inwardly into the interior chamber; and

at least one pulverizing rotor rotatably mounted in the interior chamber of the housing for pulverizing the input materials fed into the housing via the inlet as the input material passes through the housing from the inlet to the outlet;

wherein each shelf liner panel includes an upper planar portion configured to extend along the housing sidewall and a lower angled portion angled relative to the upper planar portion.

17. The pulverizer according to claim 16, further comprising at least one airflow deflector extending inwardly into the interior chamber from the housing sidewall, each airflow deflector being elongated and extending parallel to the central housing axis, each airflow deflector including a deflecting surface angled relative to the inner surface of the housing sidewall; and wherein the plurality of shelf liner panels including at least one lateral shelf liner panel located adjacent the deflecting surface of a corresponding one of the airflow deflector, the at least one lateral shelf liner being sized and shaped to extend along the deflecting surface towards an adjacent shelf liner panel located on an opposite side of the corresponding airflow deflector.

18. The pulverizer according to claim 17, wherein each lateral shelf liner panel includes a substantially triangular wing portion extending laterally from the lower angled portion of the lateral shelf liner panel to abut the deflecting surface of the corresponding airflow deflector.

19. The pulverizer according to any one of claims 16 to 18, wherein the plurality of shelf liner panels includes a first set of shelf liner panels which are disposed side-by-side in a substantially horizontal row to form an upper shelf and a second

set of shelf liner panels which are disposed side-by-side in a substantially horizontal row to form a lower shelf spaced downwardly from the upper shelf.

20. The pulverizer according to any one of claims 16 to 19, wherein the housing liner portions are made of a rigid material selected from a group consisting of: fiberglass, high-density polyethylene (HDPE), ceramic, steel and/or wherein the housing liner portions comprise at least one of: a chromium carbide overlay, a tungsten carbide overlay, and a ceramic overlay.