Claims

1. Thermoacoustic energy conversion system, comprising:
   - a closed circumferential encasing that is filled with a working fluid through which an acoustic wave can propagate in a propagation direction in use of the system, and
   - at least one assembly of two heat exchangers with a regenerator sandwiched there between arranged in said encasing,

   wherein

   a longitudinal direction of said at least one assembly is arranged substantially parallel to a local longitudinal axis of said encasing.

2. Thermoacoustic energy conversion system according to claim 1, comprising a first blocking means arranged in said encasing for blocking a first part of the cross-sectional area of the encasing upstream of said assembly as seen in said propagation direction, and comprising a second blocking means arranged in said encasing for blocking a second, opposite part of the cross-sectional area of the encasing downstream of said assembly as seen in said propagation direction, wherein said first and second blocking means are arranged to prevent said acoustic wave from bypassing said assembly and to direct the acoustic wave in a directing direction to first pass a first heat exchanger of the two heat exchangers and then, via the regenerator, the second heat exchanger of the two heat exchangers.

3. Thermoacoustic energy conversion system according to claim 2, wherein said first blocking means gradually rises from an inner wall of the encasing in the propagation direction, thereby guiding said acoustic wave in said directing direction.

4. Thermoacoustic energy conversion system according to claim 2 or 3, wherein said second blocking means gradually decreases towards the inner wall of the encasing in the propagation direction, thereby guiding said acoustic wave in the propagation direction.

5. Thermoacoustic energy conversion system according to claim 3 or 4, wherein said encasing has an increased cross-sectional size in in the area of said assembly with respect to other parts of said encasing, wherein upstream of said assembly as seen in said propagation direction the cross-sectional size of the encasing gradually increases to said increased size, and wherein downstream of said assembly as seen in said propagation direction the cross-sectional size of the encasing gradually decreases to its size in said other parts, wherein said first blocking means and/or said second blocking means is/are arranged in the gradually increasing part,

respectively decreasing part of said encasing, and wherein said first blocking means and/or said second blocking means gradually rises, respectively decreases in such a manner that the cross-sectional through flow area of said encasing in said increasing part, respectively decreasing part remains substantially constant over the length of the first and/or second blocking means and is substantially equal to a cross-sectional through flow area in said other parts of the encasing.

6. Thermoacoustic energy conversion system according any one of claims 2 to 5, wherein said encasing has an or said increased cross-sectional size in in the area of said assembly with respect to (said) other parts of said encasing, wherein upstream of said assembly as seen in said propagation direction the cross-sectional size of the encasing gradually increases to said increased size, and wherein downstream of said assembly as seen in said propagation direction the cross-sectional size of the encasing gradually decreases to its size in said other parts, and wherein a cross-sectional through flow area defined between the inner wall of the encasing and the first heat exchanger and/or between the inner wall of the encasing and the second heat exchanger is substantially equal to a cross-sectional through flow area in said other parts of the encasing.

7. Thermoacoustic energy conversion system according to any one of the preceding claims 2 to 6, wherein the inlet for feeding a heat exchange fluid to the first heat exchanger is arranged at an upstream end of the first heat exchanger as seen in the propagation direction, and wherein the outlet for discharging said heat exchange fluid from the first heat exchanger is arranged at a downstream end of the first heat exchanger as seen in the propagation direction.

8. Thermoacoustic energy conversion system according to any one of the preceding claims 2 to 7, wherein the inlet for feeding a heat exchange fluid to the second heat exchanger is arranged at an upstream end of the second heat exchanger as seen in the propagation direction, and wherein the outlet for discharging said heat exchange fluid from the second heat exchanger is arranged at a downstream end of the second heat exchanger as seen in the propagation direction.

9. Thermoacoustic energy conversion system according to any one of the preceding claims 2 to 7, wherein the inlet for feeding a heat exchange fluid to the second heat exchanger is arranged at a downstream end of the second heat exchanger as seen in the propagation direction, and wherein the outlet for discharging said heat exchange fluid from the second heat exchanger is arranged at an upstream end of the second heat exchanger as seen in the propagation direction.

10. Thermoacoustic energy conversion system according to any one of the preceding claims,

comprising a plurality of said assemblies that are spaced apart in the longitudinal direction of said encasing.

11. Thermoacoustic energy conversion system according to claim 10, wherein the plurality of said assemblies are spaced apart in the longitudinal direction of said encasing by equal spacing distances.

12. Thermoacoustic energy conversion system according to any one of the preceding claims, wherein a length of the or each assembly is at least 5% of the average total circumferential length of the encasing.

13. Thermoacoustic energy conversion system according to any one of the preceding claims 1 to 11, wherein a length of the or each assembly is at least 10% of the average total circumferential length of the encasing.

14. Thermoacoustic energy conversion system according to any one of the preceding claims 1 to 11, wherein a length of the or each assembly is at least 15% of the average total circumferential length of the encasing.