CLAIMS

1. A space propulsion system (1), comprising:

- a combustion chamber (10) implemented by a cylindrical container (11) having cylindrical walls (13), a first end (12) provided at least with an injection duct (15) for a combustion agent, a fuel and/or a mixture thereof, for the injection according to a direction tangential to said cylindrical walls so as to induce a helical combustion path in the combustion chamber (10), a possible additional injection duct (16) for a fuel or a combustion agent in direction perpendicular to said cylindrical walls, and an opposite end (14) provided with a discharge duct (19) arranged according to a direction tangential to said cylindrical walls (13) so as to receive and direct said helical path, wherein the cylindrical walls have a deposition of catalytic material inside thereof, for accelerating the combustion reaction; and
- a supersonic nozzle (20), connected to said discharge duct (19) for discharging the combustion products in the combustion chamber.

2. The space propulsion system (1) according to claim 1, comprising an electrolytic system (2), fed by an electric source (6), for the division of water into oxygen and hydrogen and for their injection in the tangential injection duct and in the additional injection duct, respectively.

3. The space propulsion system (1) according to claim 1, comprising a water tank (30) thereto an electrolytic system (2) is associated, fed by an electric source (6), for the division of water into oxygen and hydrogen and for their injection in the tangential injection duct and in the additional injection duct, respectively.

4. The space propulsion system (1) according to claim 1, comprising a water tank (30) having an electrolytic system (2) inside thereof, fed by an electric source (6), for the division of water into oxygen and hydrogen and for their injection in a mixture in the tangential injection duct.

5. The propulsion system (1) according to claim 2 or 3, wherein the electrolytic system (2) feeds respective oxygen

tank (7) and hydrogen tank (8), connected to the combustion chamber by suitable valves (17, 18).

6. The propulsion system (1) according to claim 5, wherein the electrolytic system (2) has two branches respectively with an anode (4) and a cathode (5), for bubbling gaseous oxygen and hydrogen separately.

7. The propulsion system (1) according to anyone of the preceding claims, wherein said electric source comprises a battery (6).

8. The propulsion system (1) according to claim 1, wherein the combustion chamber (10) comprises a cylindrical container (11) having a first flat end (12) thereat there are two injection ducts (15, 16) a first duct thereof is tangential and parallel to said first end (12).

9. The propulsion system (1) according to claim 8, wherein a second injection duct (16) is perpendicular to the cylindrical walls (13) of the combustion chamber (10), parallel to the plane of the first end (12), the position of the second injection duct (16) being such that the inlet in the combustion chamber (10) takes place near the inlet of the first duct (15), so that the gaseous flow injected through the first duct (15) intersects the gaseous flow injected through the second duct (16).

10. The propulsion system (1) according to claim 1, wherein said deposition of catalytic material comprises mainly Platinum.

11. The propulsion system (1) according to claim 1, wherein said deposition of catalytic material is so as to allow the ignition of the combustion reaction with development of flame without potentially any outer ignition intervention.

12. The propulsion system (1) according to claim 1, wherein the combustion chamber (10) is implemented as one single piece, and it has only the openings necessary to the injection and discharge.

CLAIMS

1. A space propulsion system (1), comprising:

- a combustion chamber (10) implemented by a cylindrical container (11) having cylindrical walls (13), a first end (12) provided at least with an injection duct (15) for a combustion agent, a fuel and/or a mixture thereof, for the injection according to a direction tangential to said cylindrical walls so as to induce a helical combustion path in the combustion chamber (10), a possible additional injection duct (16) for a fuel or a combustion agent in direction perpendicular to said cylindrical walls, and an opposite end (14) provided with a discharge duct (19) arranged according to a direction tangential to said cylindrical walls (13) so as to receive and direct said helical path; and

a supersonic nozzle (20), connected to said discharge duct (19) for discharging the combustion products in the combustion chamber,

wherein the combustion agent or the fuel requiring the larger range of flow expressed as mass per time unit is injected in the combustion chamber (10) by using the first injection duct (15), and the combustion agent or the fuel requesting the smaller range of flow can be injected through the second injection duct (16).

2. The space propulsion system (1) according to claim 1, wherein the cylindrical walls have a deposition of catalytic material inside thereof, for accelerating the combustion reaction.

3. The space propulsion system (1) according to claim 1, comprising an electrolytic system (2), fed by an electric source (6), for the division of water into oxygen and hydrogen and for their injection in the tangential injection duct and in the additional injection duct, respectively.

4. The space propulsion system (1) according to claim 1, comprising a water tank (30) thereto an electrolytic system (2) is associated, fed by an electric source (6), for the division of water into oxygen and hydrogen and for their injection in the

tangential injection duct and in the additional injection duct, respectively.

5. The space propulsion system (1) according to claim 1, comprising a water tank (30) having an electrolytic system (2) inside thereof, fed by an electric source (6), for the division of water into oxygen and hydrogen and for their injection in a mixture in the tangential injection duct.

6. The propulsion system (1) according to claim 3 or 4, wherein the electrolytic system (2) feeds respective oxygen tank (7) and hydrogen tank (8), connected to the combustion chamber by suitable valves (17, 18).

7. The propulsion system (1) according to claim 6, wherein the electrolytic system (2) has two branches respectively with an anode (4) and a cathode (5), for bubbling gaseous oxygen and hydrogen separately.

8. The propulsion system (1) according to any one of ~~the preceding~~ claims 3 to 7, wherein said electric source comprises a battery (6).

9. The propulsion system (1) according to claim 1, wherein the combustion chamber (10) comprises a cylindrical container (11) having a first flat end (12) thereat there are two injection ducts (15, 16) a first duct thereof is tangential and parallel to said first end (12).

10. The propulsion system (1) according to claim 9, wherein a second injection duct (16) is perpendicular to the cylindrical walls (13) of the combustion chamber (10), parallel to the plane of the first end (12), the position of the second injection duct (16) being such that the inlet in the combustion chamber (10) takes place near the inlet of the first duct (15), so that the gaseous flow injected through the first duct (15) intersects the gaseous flow injected through the second duct (16).

11. The propulsion system (1) according to claim 1, comprising means for the ignition of said combustion agent, fuel and/or mixture thereof, comprising a deposition of catalytic material.

12. The propulsion system (1) according to claim 1, comprising means for the ignition of said combustion agent, fuel and/or mixture thereof, comprising means for flashing an ignition spark.

13. The propulsion system (1) according to claim 2 or 11, wherein said deposition of catalytic material comprises mainly Platinum.

14. The propulsion system (1) according to claim 1, wherein the combustion chamber (10) is implemented as one single piece, and it has only the openings necessary to the injection and discharge.