US patent application number 15/733,061

CLAIMS

1-15. (canceled)

16. (presently amended) A device for the repeated generation of explosions and for converting chemical energy into kinetic energy of outflowing exhaust gases of the explosions, in particular for generating thrust for the propulsion of an aircraft, comprising:

- a combustion chamber (21),
- at least one feed conduit for feeding a flowable, explosive material or ~~of~~ components which on mixing form an explosive material, to the combustion chamber (21);
- a discharge device for the directed discharge of a gas pressure which is produced in the combustion chamber (21) by the ignition of the explosive material,
- a movable nozzle regulation element (26) for the partial or complete closure of the discharge device;
- an actuating element (25) which is designed to open the discharge device further after an opening of the discharge device and during the outflow of explosion gases through the discharge device, thereby always at least approximately adjusting to an optimal, ideal area ratio between a nozzle outlet area and a nozzle inlet area,

characterised in that the discharge device comprises several part-nozzles (40) for discharging the gas pressure, and a position of the part-nozzles (40) is adjustable by the actuating element (25),
wherein each of the part-nozzles (40) comprises a part valve seat (41) and a part valve body (42), and a part nozzle inlet area (43) is determined by the position of the part valve body (42) in relation to the part valve seat (41), and wherein the nozzle regulation element (26) determines the positions of the part valve bodies (42) in relation to the part valve seats (41),
wherein the nozzle regulation element (26) is arranged for a variation of a total nozzle inlet area which is the sum of the part nozzle inlet areas,
wherein the actuating element (25) is configured to control a movement of the nozzle regulation element (26) for adjusting the total nozzle inlet area at least approximately in accordance with the ideal area ratio.

17. (canceled)

18. (previously presented) The device according to claim 16, wherein openings of the part-nozzles (40) comprise annular openings which are arranged concentrically to one another.

19. (previously presented) The device according to claim 16, wherein the combustion chamber (21) has a changeable volume.

20. (previously presented) The device according to claim 19, comprising a displaceably arranged separating wall (28) which forms a delimitation of the combustion chamber (21).

21. (previously presented) The device according to claim 20, in which the separating wall (28) forms a delimitation of the combustion chamber (21) which lies opposite the discharge device, and in particular the actuating element (25) is led through the separating wall (28).

22. (previously presented) The device according to claim 16, comprising a compressing device (1, 2) for compressing the flowable explosive material or at least one of the components of the explosive material.

23. (presently amended) The device according to claim 22, wherein the compressing device is a continuously operated compressor (2), in particular a rotating compressor~~, for example a turbo-compressor~~.

24. (presently amended) The device according to claim 23, wherein the compressor (2) is driven by a turbine (4), and the turbine (4) is arranged to be driven by an exhaust gas jet (5) from a turbine combustion chamber (6), wherein the turbine combustion chamber (6) is different ~~to~~ <u>from</u> the combustion chamber (21).

25. (previously presented) The device according to claim 23, wherein the compressor (2) is driven by a turbine (4), and the turbine (4) is arranged to be driven by exhaust gases (17) of the combustion chamber (21).

26. (presently amended) The device according to claim 25, comprising an output for delivering mechanical work to a mechanical consumer, ~~in particular to at least one of:~~

wherein the mechanical consumer is

~~a flow machine, in particular~~ a propeller~~,~~ for the propulsion of ~~a vehicle, in particular of~~ an aircraft~~,~~ ~~and~~

~~a generator for conversion into electrical energy~~.

27. (previously presented) The device according to claim 22, comprising a compression device in the form of an air inlet (1), for compressing inflowing air given supersonic speed of the device in relation to the ambient air.

28. (presently amended) A method for repeated generation of explosions and for converting chemical energy into kinetic energy of outflowing exhaust gases of the explosions, in particular for producing thrust for the propulsion of an aircraft, the method comprising the repeated execution of the following steps:

- feeding a flowable, explosive material or components which on mixing form the explosive material, into a combustion chamber (21), wherein a discharge device of the combustion chamber (21) is closed at least partly by way of a movable nozzle regulation element (26), and generating, in relation to an ambient pressure, an overpressure in the combustion chamber (21);
- opening the discharge device;
- igniting the explosive material in the combustion chamber (21);
- leading away explosion gases through the discharge device; ~~and~~
- ~~—~~
- at least partial closure of the discharge device by way of the movable nozzle regulation element (26); and
- thereby always at least approximately adjusting to an optimal, ideal area ratio between a nozzle outlet area and a nozzle inlet area;

characterised in that:

- for opening the discharge device and on leading away explosion gases, several part-nozzles (40) are opened synchronously to one another; and
- for the at least partial closure of the discharge device, several part-nozzles (40) are at least partly closed synchronously to one another,
- wherein each of the part-nozzles (40) comprises a part valve seat (41) and a part valve body (42), and a part nozzle inlet area (43) is determined by the position of the part valve body

(42) in relation to the part valve seat (41), and wherein the nozzle regulation element (26) determines the positions of the part valve bodies (42) in relation to the part valve seats (41),

- wherein the nozzle regulation element (26) is arranged for a variation of a total nozzle inlet area which is the sum of the part nozzle inlet areas,
- wherein the actuating element (25) controls a movement of the nozzle regulation element (26) and, thereby, adjusts the total nozzle inlet area at least approximately in accordance with the ideal area ratio.

29. (presently amended) The method according to claim 28, wherein the ~~part~~ steps of "opening the discharge device", "igniting the explosive material in the combustion chamber" and "leading away explosion gases through the discharge device by way of the movable nozzle regulation element" are carried out in a temporally overlapping manner.

30. (presently amended) The method according to claim 28, wherein ~~the part-nozzles (40) each comprise part valve seats (41) and part valve bodies (42), and~~ the part valve bodies (42) are moved synchronously to one another in relation to the part valve seats (41) by way of the nozzle regulation element (26).

31. (new) The device according to claim 23, wherein the compressing device is a turbo-compressor.

32. (new) The device according to claim 25, comprising an output for delivering mechanical work to a mechanical consumer,
wherein the mechanical consumer is a generator for conversion into electrical energy.