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1,814,192

POWER GENERATOR

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2 Sheets-Sheet 1

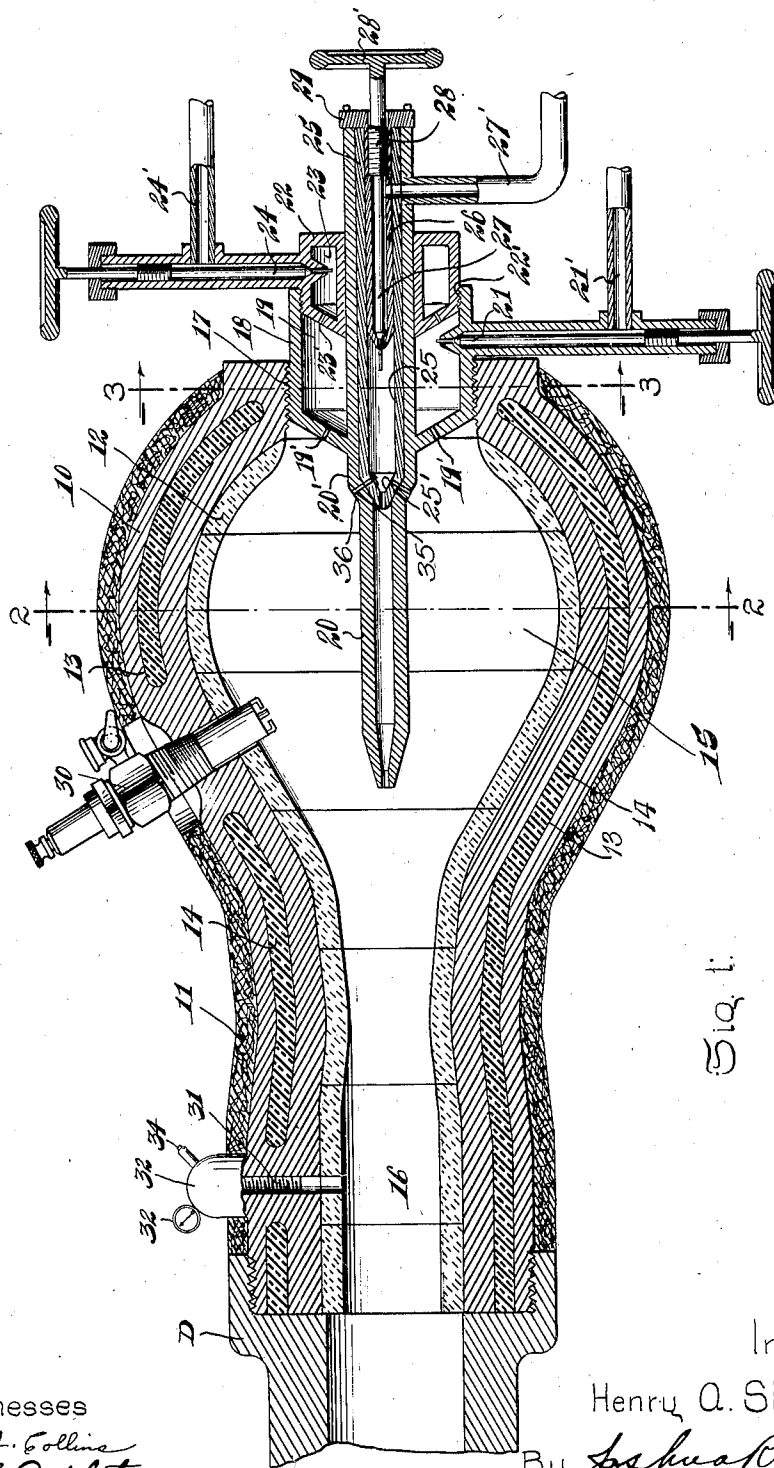


Fig. 1.

Witnesses  
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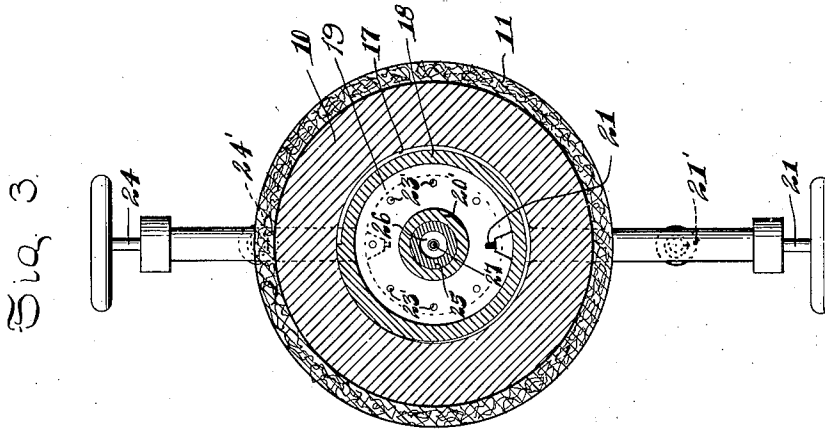
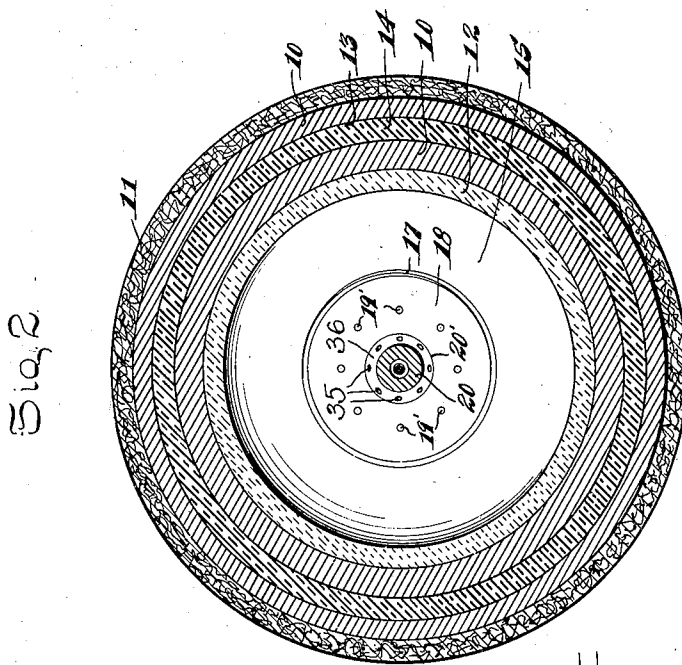
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Witnesses

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## UNITED STATES PATENT OFFICE

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## POWER GENERATOR

Application filed August 18, 1927. Serial No. 213,749.

My invention relates to improvements in devices for the generation of power by the production of steam and more particularly to the generation of power by a special method of "flash" steam production.

The object of my invention is to provide a power generator that will be simple and compact in construction, light in weight and efficient in operation.

Another object of my invention is to provide an improved apparatus for the generation of steam.

Another object of my invention is to provide means for attaining unusually high temperatures and pressures in a device of the kind described.

Other objects and advantages will appear more fully in the hereinafter specification when taken in connection with the accompanying drawings in which,

Figure 1 is a longitudinal sectional view of my device.

Figure 2 is a section on line 2—2 of Figure 1.

Figure 3 is a section on line 3—3 of Figure 1.

Referring more particularly to the drawings in which similar characters of reference apply to like parts in the several figures,

10 is a casing having on its outer surface a layer of suitable heat insulating packing 11, and on its inner surface a layer of refractory material in the form of slabs or bricks 12,—an internal recess 13 being optionally provided to receive a cementitious or other suitable heat insulating medium 14, to be poured or stuffed therein. The casing 10 is formed to provide an enlarged combustion and steam generating chamber 15 and an elongated steam conversion chamber 16, in connection with any suitable duct D, or other transmitting means, leading to the place or means (not shown) for utilization of the temperatures and pressures of products generated.

At the rearward end of the combustion chamber 15 is a screw threaded opening 17 wherein may be secured an annular assembly 18 comprising the mixing chamber 19 having the vents 19', the nozzle 20 and the inside valve 21 and feed pipe 21' for air. The mixing chamber 19 has also a threaded opening 22' adapted to accommodate a second annular assembly 22 having a fuel chamber 23 and vents 23' therein, a needle valve 24 and a feed pipe 24' leading thereto. The enlarged portion 20' of the bore of the nozzle 20 accommodates a second nozzle 25. This second nozzle 25 is adapted to receive a third nozzle 26 having a needle valve 27 associated with a water supply pipe 27', the needle valve 27 having an enlarged threaded shoulder 28 and a handle 28' for its appropriate operation.

The combustion chamber 15 is also provided with a spark plug 30 connected with a suitable source of electrical energy (not shown) for the purpose of initially firing the atomized fuel mixture until the temperature of the refractory material 12 is raised to a point sufficient to automatically ignite the incoming atomized fuel from the vents 19', the opening in the casing 10 in which said spark plug 30 is detachably mounted serving as a flame inspection opening. Leading to the steam conversion chamber 16 is a pipe 31 communicating with a pressure dome 32 on which is located a conventional pressure gauge 33 and a safety valve 34.

The mode of operation of my device will now be apparent upon referring to the drawings in connection with the following brief description:

The pipe 27' is connected to a suitable head of water (not shown) and is led into and controlled in the third nozzle by means of the handle 28'. The fuel pipe 24' is connected to a suitable liquid fuel, preferably a hydrocarbon, but not necessarily so, and

leads to the fuel chamber 23 and thence through the vents 23' to the mixing chamber 19,—the rate of flow of the fuel being controlled by the needle valve 24 in the usual manner. The pipe 21' is connected to suitable air compression means (not shown) the relative proportions of air to fuel being controlled by the needle valve 21. To put my device into operation, the air and fuel supply needle valves are first opened and permitted to flow through the mixing chamber where they are thoroughly commingled and pass through the vents 19' into the combustion chamber 15 wherein they are ignited by the spark plug 30. Simultaneously with the opening of the air and fuel supply pipes, the needle control for the water supply is also opened, thereby permitting a flow of water under pressure to pass progressively through nozzles 26, 25 and 20 into the combustion chamber at a point where the walls converge and join with the steam conversion chamber. After my device has been in operation for some seconds, the nozzle 20 will absorb sufficient heat to raise the water therein to steam, and after a few minutes operation, the heat from the ignited gaseous mixture within the combustion chamber is sufficient to thoroughly heat up the annular assembly 18, and the inner annular assembly 22 to a point where nozzles 25 and 26 are also heated up, thereby raising the temperature of the water progressively to a point where it is already in a gaseous condition before it arrives at the entrance of nozzle 20. It is evident, therefore, that the steam within nozzle 20 can be superheated therein to such a degree that its entrance thereafter into the combustion chamber will not have any appreciable chilling effect on the incandescent gaseous mixture.

As is well known, steam can be decomposed in the presence of incandescent metals or gases, thereby liberating free hydrogen, which may be combined with a suitable incandescent gas in a manner to further raise the high temperatures generated by the flaming gaseous mixture while further intermingling with same in that condition. The entrance of the steam conversion chamber 16, as shown is slightly narrowed, following the usual venturi principle. The high temperatures and pressures attained by the method herein described can be applied to the operation of any suitable heat and pressure actuated device (not shown).

Ordinarily, if the atoms of hydrogen and other elements contained in the combustion chamber were placed under increased pressure and the temperature at the same time reduced they would, of course, liquefy. However, if instead of reducing the temperature it is materially increased as the pressure increases, a point will be reached when the hydrogen atoms, consisting of pro-

tons and electrons whirling around a common center of gravity, will interfere or collide with each other, causing an arrest of the tremendously high rotative velocity which is transformed into heat. This is brought about in a practical way by the novel construction and arrangement shown in the drawings and herein above described, wherein the initial combustion occurs in the enlarged spherical chamber 15 having the refractory lining 12, and through which chamber the steam nozzle 20 extends axially and terminates in proximity to the restricted outlet through the neck portion which connects the combustion chamber with the tubular chamber 16 in which the products of combustion, under exceedingly high temperature, commingle with the vaporized water leaving the nozzle 20. In this connection, it may be here noted that some of the preheated water or the steam which may be generated in the nozzle tube 25 is admitted to the chamber 15 through an annular series of vents 35 which are respectively directed angularly through the beveled shoulder portion 36 at the juncture of the extended nozzle tube 20 with its enlarged base portion 20', said vents registering with corresponding apertures in the tapered end portion 25' of the inner nozzle tube 25. This preheated water or steam augments the combustion of the fuel and air mixture and increases the pressure without reducing the temperature in the chamber 15. Hence, the superheated steam emitted from the end of the nozzle extension 20, in the region of the entrance to the elongated restricted chamber 16, commingles with the highly heated products under pressure from the combustion chamber whereby the steam is converted by decomposition and recombination into an exceedingly high-powered agency for the operation of engines and other utilities.

In practice, I have found that the form of my invention illustrated in the drawings and referred to in the above description as the preferred embodiment, is the most efficient and practical for my purpose; yet realizing that conditions concurrent with the adoption of my device will necessarily vary, I desire to emphasize the fact that minor changes in details of construction, proportion and arrangement of parts, may be resorted to when required, without departing from the spirit or sacrificing any of the advantages of my invention as set forth.

What I claim as new and desire to secure by Letters Patent is:

1. In a device of the kind described, a casing having a substantially spherical combustion and steam generating chamber communicating directly with a restricted steam conversion chamber, a plurality of concentric interfitted nozzles affording sepa-

rate axially alined chambers operatively connected to and communicating with said combustion and steam generating chamber, one of said concentric nozzles extending substantially through said combustion and steam generating chamber to a point axially adjacent the entrance to said steam conversion chamber, an annular mixing chamber surrounding said nozzles and having an annular series of vents communicable with said combustion and steam generating chamber, and a fuel receiving and distributing chamber communicating with said mixing chamber, said nozzles and said mixing and receiving and distributing chambers being secured to and forming a part of an assembly removably attached to said casing.

2. In a device of the kind described, a combustion and steam generating chamber communicating at one end with an elongated transversely restricted passageway, said combustion and steam generating chamber having an inlet formed thereon adapted to removably accommodate an annular assembly having secured thereto a plurality of inter-fitted concentric nozzles affording separate axially alined communicating chambers, one of said nozzles having apertures to admit steam and water into the combustion and steam generating chamber initially in proximity to said annular assembly and the end-most advance nozzle discharging its contents axially at a point approximately adjacent to the opening of said elongated restricted passageway, said assembly further comprising an annular mixing chamber having a lateral valved inlet and an annular series of vents communicating with said combustion and steam generating chamber, and a fuel receiving and distributing chamber having an annular series of vents communicating with said mixing chamber, said fuel receiving and distributing chamber and said nozzles having valve controlled inlets, respectively.

3. In a device of the kind described, a combustion and steam generating chamber of substantially spherical shape, directly communicating with an elongated restricted passageway whereby to intimately mix products of combustion with super-heated steam, an annular assembly comprising a casing mounted in axially opposed relation to said elongated restricted passageway in a port in said combustion and steam generating chamber, a plurality of nozzles interfitted to afford separate axially alined communicating chambers centrally of said annular assembly, a supplemental annular casing fitted in the outer end portion of said first mentioned casing, surrounding said nozzles and constituting a fuel receiving and discharging chamber, said first mentioned casing constituting a mixing chamber and having a lateral air inlet, said assembly

having valves admitting air, water and fuel separately within the respective chambers of said annular assembly, one of said first-mentioned plurality of nozzles extending through said combustion and steam generating chamber to a point approximately adjacent the entrance to said elongated restricted passageway, and means in said combustion and steam generating chamber to ignite carburetted fuel.

4. In a device of the kind described, a casing having a combustion and steam generating chamber communicating directly with an elongated restricted passageway, a threaded port in said casing accommodating an annular assembly comprising a supplemental casing threadedly engaging said port, interfitting concentric nozzles the outer one of which is integral with said first mentioned casing, one of said nozzles extending through said combustion and steam generating chamber to a point axially adjacent the entrance to said elongated restricted passageway, said last mentioned nozzle providing means for injecting superheated steam into said elongated passageway at the point where the flaming products in the combustion and steam generating chamber converge to meet said passageway, a plurality of separate chambers within said annular assembly, one of said chambers having an air inlet and an annular series of discharge vents communicating with said combustion and steam generating chamber, and the other of said assembly chambers constituting a fuel receiver and distributor communicable with said mixing chamber, and said assembly being provided with valves means to control the flow of fuel, water and air into said nozzles.

5. In a device of the kind described, a casing having a port at one end, said port communicating directly with a widened combustion and steam generating chamber formed in the casing and opening into an elongated passageway also provided in said casing, a unitary assembly closing said port and threadedly secured to said casing, said assembly comprising a member having a mixing chamber, said chamber having apertures communicating with said combustion and steam generating chamber, a cylindrical member threadedly secured in an opening at the rear of said mixing chamber, said cylindrical member having vents communicating with said last mentioned chamber and having a port for the admission of fuel therein, said mixing chamber having a separate air inlet.

6. In a device of the kind described, comprising a casing having a combustion chamber formed therein and a tapered passageway opening into a steam conversion chamber, a detachable unitary assembly comprising an outer cylindrical member threadedly

- secured in a port formed at the rear of said casing, said unitary assembly including an integrally formed elongated axially projecting nozzle extending through said combustion chamber, said elongated nozzle terminating in proximity to the entrance of said tapered passageway, a mixing chamber formed in an element integral with said nozzle assembly, said mixing chamber surrounding a part of the periphery of said elongated nozzle and having a threaded opening receiving a cylindrical-smaller casing having an annular fuel receiving chamber, said fuel receiving chamber surrounding said elongated nozzle, said chamber admitting fuel under pressure and having vents communicating with the mixing chamber surrounding said elongated nozzle, a valved air admitting connection to said last mentioned chamber, and a valved water admitting connection to said elongated nozzle.
7. In combination with a casing having a combustion and steam generating chamber, a port at the rear end of said casing, said port having fitted therein a detachable nozzle assembly containing a plurality of nozzles arranged in concentrical and staggered relation, the outermost one of said nozzles being elongated and projected substantially through said combustion and steam generating chamber into a constricted portion of said casing having a comparatively elongated passageway, the innermost of said plurality of nozzles receiving water and ejecting steam generated therefrom through a plurality of openings in said elongated nozzle and thence into said combustion and steam generating chamber, said elongated nozzle being integrally formed with a tubular extension surrounded with a chamber provided in a cylindrical member integral with the tubular extension, said last mentioned member having a port at the rear thereof closed by a substantially cylindrical smaller casing provided with vents, said smaller casing having a chamber communicating with the chamber surrounding the tubular member by a plurality of vents, substantially as described.
8. In a device of the kind described, a casing having a combustion and steam generating chamber formed therein and provided with a port at the rear end of said casing communicating with said chamber, a nozzle assembly detachably secured in said port, said nozzle assembly including a cylindrical element having an opening at the rear thereof, said opening being closed by a comparatively small casing provided with vents, said comparatively small casing serving as a fuel atomizing chamber, a comparatively long forwardly projecting nozzle integrally formed with said cylindrical element, said nozzle having a plurality of vents arranged thereon and positioned in angular relation, said nozzle also having a passageway opening into a widened chamber, an element insertable in said widened chamber and having a plurality of vents registering with the vents in said nozzle, said insertable element having a needle valve secured therein, said cylindrical element having an inlet provided with a needle valve communicating with a source of air.
- In testimony whereof I have signed my name to this specification.
- HENRY A. SLATTENGREN.

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