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TURBO-GENERATOR SYSTEM

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Fig. 1.

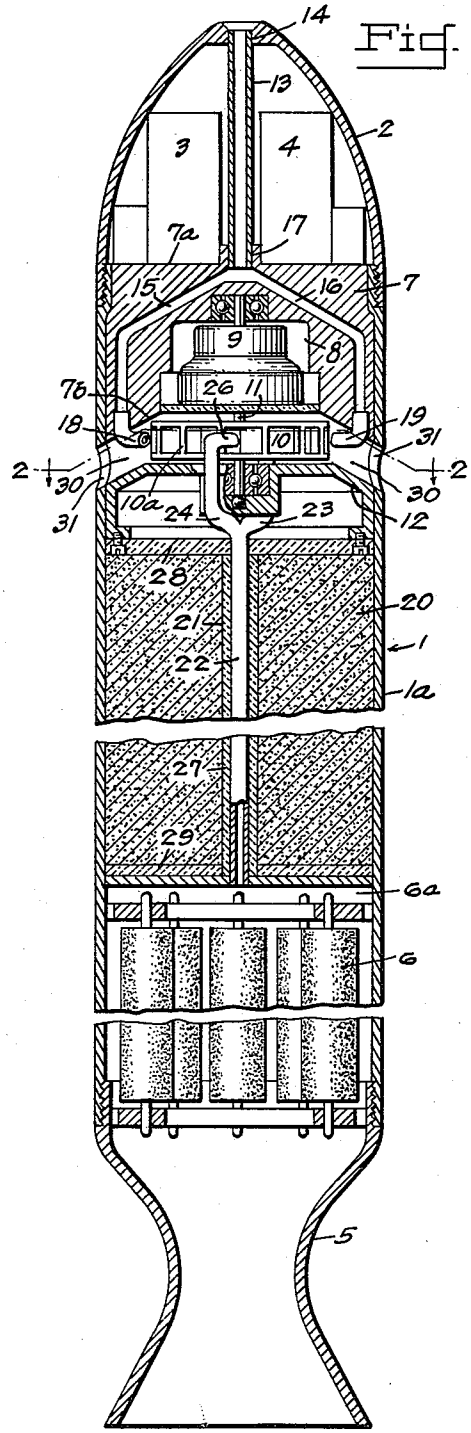
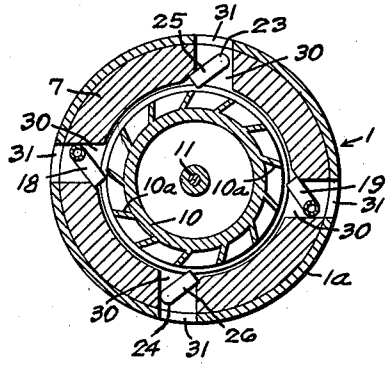


Fig. 2.



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TURBO-GENERATOR SYSTEM

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1 Claim. (Cl. 102—70.2)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to fast starting means for turbo-generators in rockets and the like.

An object of the invention is means for quick starting of electric generators in explosive missiles.

Another object of the invention is means for initially imparting rotation to a wind driven generator of an explosive missile launched in the stratosphere.

Another object of the invention is means for instantly energizing the turbo-generator system of an electric or electronic fuse upon firing or launching of an explosive missile incorporating the fuse.

The specific nature of the invention as well as other objects and advantages thereof will clearly appear from the following description and accompanying drawings in which:

Figure 1 is a longitudinal cross section of a rocket employing the invention.

Figure 2 is a sectional view taken along line 2—2 of Figure 1.

Under certain operating conditions fast starting of electric generators which supply energy to electric or electronic fuses in explosive missiles is imperative. In accordance with the invention, fast starting of a turbine driven generator is obtained by bleeding the gas pressure from the rocket motor and directing it against the blades of the turbine. This may be done in a variety of ways, one of which is shown in Figure 1 of the drawings, but it is not intended that the scope of the invention be limited to the embodiment shown and described herein.

The embodiment shown in the drawings comprises a rocket **1** having a body member **1***a* with a nose **2** housing electronic components of the fuse therein as indicated by the rectangles **3** and **4**. Fixed within the body member **1***a* adjacent the nose **2** is a propelling charge **6**. A closure plug **7** in the forward end of the body member is recessed as at **8** and supports an electric generator **9** therein. A turbine **10** is coupled to the generator **9** by means of a shaft **11**. One end of shaft **11** is supported in a cup-shaped member **12** which is affixed to body **1***a* in any conventional manner. The opposite end of shaft **11** is supported in the closure plug **7**. A duct **13** having one end fitted to a perforation **14** in the nose and its opposite end in an opening **17** in the forward face **7***a* of plug **7** provides communication with the atmosphere and channels **15** and **16** formed in and extending through the plug.

The channels **15—16** are terminated in the rear face **7***b* of the plug by means of nozzles **18** and **19**, respectively, directed towards the vanes **10***a* of the turbine **10** so as to cause the air flowing through the duct and channels to impinge upon the vanes and rotate the turbine during the rocket's flight.

The bursting charge **20** positioned in the body member in a conventional manner, intermediate the propelling charge **6** and cup-shaped member **12**, is formed with a

longitudinal bore **21** in which is fixed a duct **22** terminating at one end in oppositely disposed arms **23—24** connected to nozzles **25—26** adjacent the turbine **10**. The other end of duct **22** is in communication with chamber **6***a* housing the propelling charge **6**. To protect the bursting charge from the heat generated by propelling charge, the duct **22** is provided with a heat insulating sleeve **27** and the opposite ends of the bursting charge with heat insulating disks **28** and **29**.

When the rocket is fired, some of the high pressure gas generated by the propelling charge **6** is bled from chamber **6***a* through the duct **22** and caused to impinge upon the vanes **10***a* of the turbine **10** through nozzles **25** and **26** to bring the turbine and electric generator up to operating speed almost instantly. After the propelling charge has been exhausted, air passing through ducts **13**, **15** and **16** impinges upon the vanes of the turbine to continue the rotation of the turbine and generator. Exhaust ports **30** formed by the rearward end of the plug and the closure member **12** are in alignment with ports **31** in the body member to permit exhaust of the high pressure gas bled from the propelling charge and the air stream through ducts **13**, **15** and **16** after these have acted upon the vanes **10***a*.

It will be apparent that the embodiment shown is only exemplary and that various modifications can be made in construction and arrangement within the scope of the invention as defined in the appended claim.

I claim:

An ordnance rocket having improved turbogenerator means, said rocket comprising in combination: a rocket body having a nose, electronic fuze components housed within said nose, a closure plug in the forward end of said body adjacent said nose, said plug being recessed at its rearward end, an electric generator supported in the recessed portion of said plug and adapted to provide power for said electronic components, a cup-shaped member affixed to said body behind said generator, a turbine supported between said cup-shaped member and said generator, said turbine having vanes adapted to rotate in response to gas pressure impinging thereon, a shaft coupling said turbine to said generator, one end of said shaft rotatably supported in said cup-shaped member and the other end rotatably supported in said plug, said nose having a duct with one end fitted to a perforation in the forward end of said nose and its opposite end in an opening in the forward face of said plug, said plug having first and second channels extending therethrough, said duct providing communication with the air stream and said channels, first and second diametrically opposed nozzles behind said plug in which said first and second channels are respectively terminated, said nozzles being directed towards the vanes of said turbine so as to cause the air flowing through said duct and channels to impinge upon said vanes to cause rotation of said turbine during flight of said rocket, a propelling charge housed in a chamber in the rear of said body, a bursting charge intermediate said cup-shaped member and the chamber housing said propelling charge, heat insulating discs located at opposite ends of said bursting charge, said bursting charge having a longitudinal duct therein, a heat insulating sleeve surrounding said longitudinal duct, one end of said longitudinal duct being in communication with the propelling charge chamber, and third and fourth diametrically opposed nozzles in front of said bursting charge in which the other end of said longitudinal duct terminates, said third and fourth nozzles being directed towards the vanes of said turbine so as to cause the high pressure gas generated by said propelling charge and forced through said longitudinal duct to said nozzles to impinge upon said vanes to cause rotation of said tur-

bine, said third and fourth nozzle being 90° disposed around said turbine from said first and second nozzles, said body having ports therein, said cup-shaped member and the rearward end of said plug forming exhaust ports aligned with said ports in said body so as to permit both the high pressure gas of said propelling charge and the air from said air stream to be exhausted therethrough after impinging on the vanes of said turbine.

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