United States Patent [19]

MacDonald et al.

[11] **3,726,220**

[45] **Apr. 10, 1973**

[54] **CARTRIDGE**

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[22] Filed: **June 1, 1971**

[21] Appl. No.: **148,561**

[52] **U.S. Cl.** **102/39**, 23/281, 60/39.82, 102/99

[51] **Int. Cl.**.....**F42b 5/20**

[58] **Field of Search**.....102/39, 90, 103; 60/39.82, 39.47; 23/281

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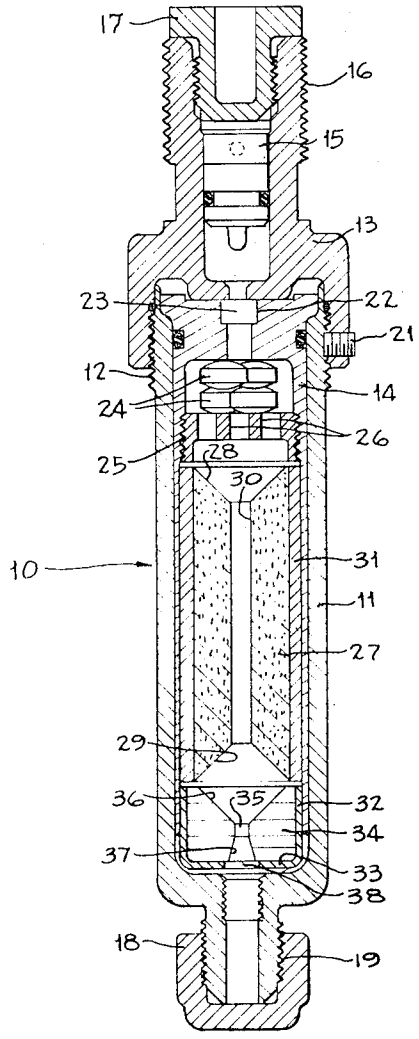
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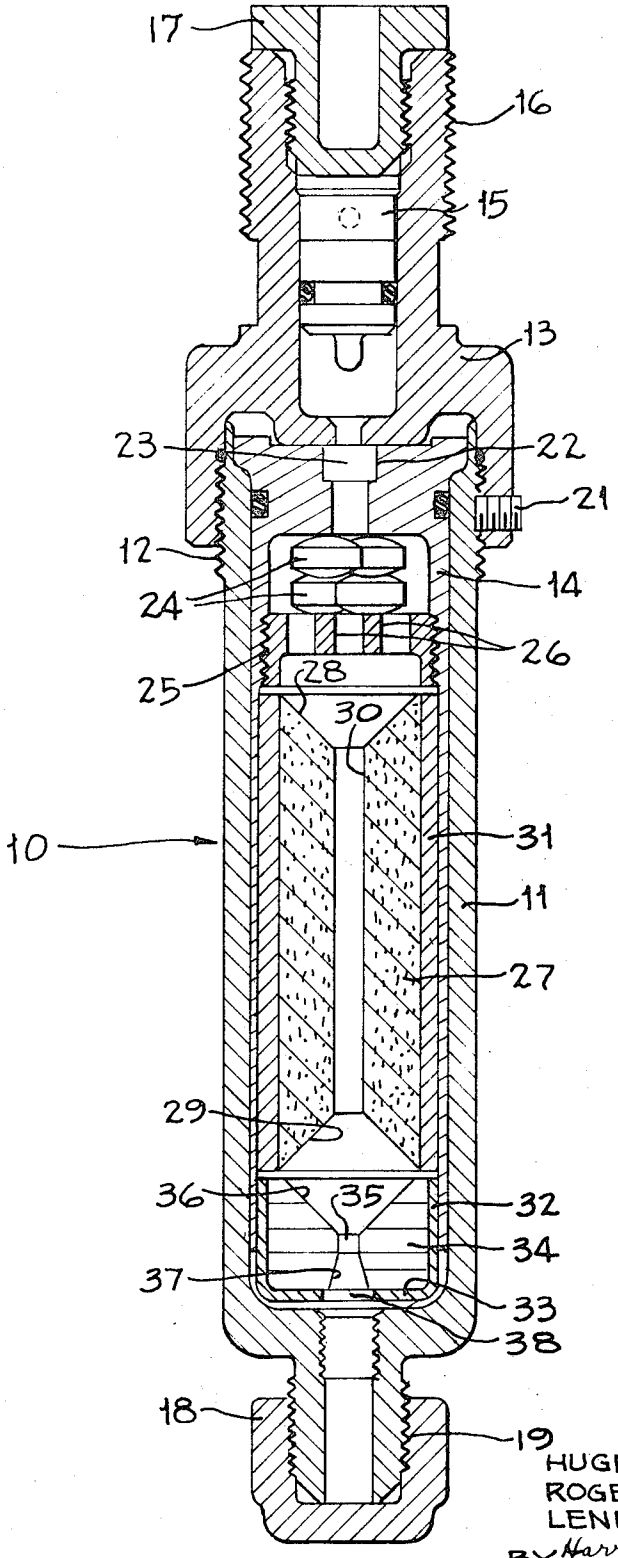
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[57] **ABSTRACT**

A low impulse sustained power cartridge for an initiator power source of energy to accurately and flexibly control the gas output to a system demand. The cartridge has a metering nozzle or throat constriction mounted in the forward end of the cartridge case adjacent the propellant grain by which a low impulse initial gas pressure is delivered that rounds off at peak pressure to sustain an even slow decay.

3 Claims, 1 Drawing Figure





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CARTRIDGE

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

This invention relates to cartridges, and more particularly, to a power cartridge for an initiator.

Existing initiator cartridges have been found unsatisfactory due to their delivering a high peak pressure at initiation and, immediately following, suffering a rapid pressure decay.

It is an object of the invention to provide an initiator cartridge that delivers gas with low impulse initiation and sustaining power.

Another object of the invention is to provide such a cartridge in which the delivered power is a more accurately and flexibly controlled gas output for a system demand.

These and other objects, features and advantages will become more apparent from the following description and accompanying drawing in which the sole FIGURE is a longitudinal sectional view of an initiator containing a cartridge embodying the principles of the invention.

The initiator, shown generally at **10**, has a chamber portion **11** provided with a threaded rearward portion **12** for securing initiator cap **13** upon assembly with the improved cartridge **14** seated in the chamber **11**. The cap **13** has an appropriate control passage containing an operative firing pin **15** when an actuating device (not shown) is connected to the cap external threads **16**. The rearward end of the cap passage is internally threaded to secure a shipping plug **17**. A shipping cap **18** similarly protects the forward end of the initiator, particularly during transit and storage, as it is secured to the external threads **19** on the chamber reduced forward nose which has a central energy delivering passage **20**. A transverse locking or set screw **21** secures the sealed connection of cap **13** on chamber **11**.

The cartridge head has a central passage **22**, the rearward portion of which is enlarged to suitably secure primer **23** in fluid communication with the igniter pellets **24** positioned in the rearward end of the forwardly opening cartridge case. A cup-shaped pellet retainer **25** is threadedly secured to an internally threaded surface portion of the stepped internal surface of the cartridge case. The base of the retainer **25** has a plurality of apertures **26** to fluidly communicate pellets **24** with the elongated propellant grain **27** which has a central elongated passage **30** interconnecting its conically recessed end portions **28, 29**. A cylindrically shaped inhibitor **31** surrounds the external lateral surface of the propellant grain **27** and, upon assembly, is cemented to the cartridge case internal surface and is in longitudinal alignment with the sidewalls of pellet retainer **25** and nozzle case **32**. The rearwardly opening nozzle case **32** is cemented to the forward internal surface of the cartridge case and has a forward centrally apertured base **33**. A metering nozzle member **34**, having a central throat constriction **35** intermediate conically tapering approach and exit surfaces **36, 37**, is cemented to the inner sidewall of the nozzle case **32** with a rupturable tape seal **38** positioned intermediate the nozzle member **34** and nozzle case base **33** overlying the nozzle base central aperture.

The initiator cartridge provides a low impulse at initiation and the delivered gas pressure rounds off at peak pressure to sustain an even slow decay, while having the capability to be responsive to changes of load. Thereby adequate propellant gas pressure is supplied to begin operation of a power take-up unit of an inertia reel or the like, without subjecting the unit to a pressure-peak shock. The slow decay sustains the near peak pressure over a time period necessary to operate the take-up reel.

Various modifications, changes or alterations may be resorted to without departing from the scope of the invention as defined in the appended claims.

We claim:

1. A low impulse sustained power cartridge for an initiator comprising,

a cartridge case having a forwardly opening propellant chamber and a primer in its rearward end,

igniter pellet means in said propellant chamber adjacent said primer,

an elongated propellant grain in said chamber and having a central elongated passage therethrough, and

metering nozzle means cemented to the forward end of said cartridge case adjacent said propellant grain and in substantial axial alignment with said propellant grain passage, said nozzle means including a metering nozzle member having a central throat constriction intermediate conically tapering approach and exit surfaces,

said nozzle means including a rearwardly opening cartridge nozzle case cemented to the forward internal surface of said cartridge case, said nozzle case having a forward centrally apertured base, said metering nozzle member being cemented to the inner sidewall of said nozzle case, and a tape seal intermediate said nozzle member and said nozzle case base overlying the base aperture.

2. The structure of claim **1** wherein a plurally apertured pellet retainer is positioned intermediate said pellet means and said elongated propellant grain.

3. The structure of claim **2** wherein said elongated propellant grain has an inhibitor surrounding its external surface, said inhibitor being cemented to the internal surface of said cartridge case and in longitudinal alignment with said pellet retainer and nozzle case.

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