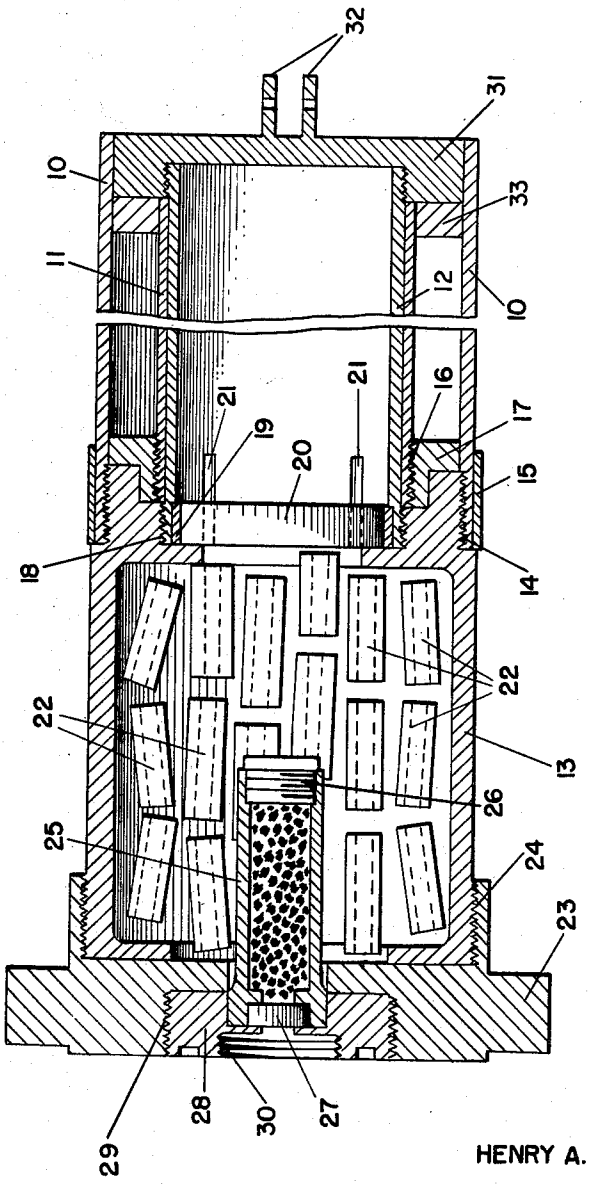
March 15, 1960 H. A. SOKOLOWSKI 2,928,319

CARTRIDGE ACTUATED CATAPULT WITH SPLIT INNER TUBE

Filed Feb. 12, 1957



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United States Patent Office 2,928,319
Patented Mar. 15, 1960

2,928,319

CARTRIDGE ACTUATED CATAPULT WITH SPLIT INNER TUBE

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Application February 12, 1957, Serial No. 639,832
1 Claim. (Cl. 89—1)
(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 payment of any royalty thereon.

This invention relates to a cartridge actuated catapult of the type used on a high speed airplane for ejection of personnel or objects therefrom. An object is to provide a device of this sort in which there is greater ballistic stability and control of the propelling charge in the cartridge which actuates the same.

Heretofore, a cartridge for actuating such a catapult has usually been located within the inner tube. The size of that inner tube has limited the diameter and bulk of propellant especially when it is of the monoblock type. Also, there is danger that the unburned propellant will strike the base of the catapult with a high velocity and be in danger of becoming broken into finer particles thereby increasing the surface area and changing the burning time of the propellant from that which had been planned on.

According to this invention, the cartridge is made of larger diameter than the inner tube and is secured to the catapult longitudinally outside of its main casing and inner tube to enable a larger size and volume of propellant material to be used.

The single figure of the drawing shows a longitudinal section through a preferred embodiment of this invention.

This embodiment includes an outer tube 10, usually stationary and an intermediate tube 11 surrounding an inner tube 12. As is usual the inner tube moves outward and so does the intermediate tube. A cartridge case 13 is located at one end of the concentric tubes 10, 11 and 12 in order that the diameter or volume of propellant material within the cartridge case may be of a particular size desired. A threaded connection 14 is provided between the cartridge case 13 and the outer tube 10, a compression ring 15 is provided around the threaded connection to insure that the outer tube is maintained continually in engagement with the threads of the cartridge case. Another threaded connection 16 is provided between intermediate tube 11 and a spacer 17 according to the usual construction for catapults of this type. A threaded connection 18 is provided between the inner tube 12 and the cartridge case 13. A collapsible ring 19 is provided within the lower end of the inner tube 12 and a plug 20 prevents the collapsible ring 19 from collapsing prematurely. The lower end portion of the inner tube 12 is provided with a plurality of comparatively short longitudinal slots 21 for the purpose of enabling the lower end portion of the inner tube to be capable of being yieldable radially inwardly which will be shown hereinafter. A propelling charge 22 is located within the cartridge case 13 and this charge is of any known type and volume according to the needs for which the catapult is intended. A base cap 23 is provided for the lower end of the cartridge case and to enable inspection of the inside of the cartridge case if desired; a threaded connection 24 is provided between the cartridge case 13 and the base cap 23. A flash tube 25 is located within the propelling charge, this tube containing black powder or any other type of igniter material. The end of the flash tube within the propelling charge 22 is sealed by a flash tube plug 26.

A primer 27 is of the percussion or electric type. The flash tube is received within the insert 28 and this insert is provided with inside threads 30 for a primer connection as well as with outside threads 29 between the insert 28 and the base cap 23.

A reason for the frequent use herein of threaded connections is first of all to permit ready inspection of the parts joined by such connection. The threaded connection 18 has another purpose namely when the inner tube 12, which has a cap 31 threaded onto its upper end receives pressure and tends to slide outwardly, then tension in this inner tube 12 causes the threaded connection 18 between the cartridge case 13 and this inner tube 12 to tend to collapse the ring 19 or move radially inwardly the lower split end of the inner tube after the plug 20 has been blown out by pressure. With the propelling charge outside the inner tube there may be better control of burning and greater ease in designing the catapult for a particular need. Instead of making the cartridge case yieldable as was done in prior application of Kroeger and Rollé S.N. 640,561, filed February 15, 1957, now U.S. Patent No. 2,912,901, for One Stroke Thruster With Locking Cartridge Case, the adjacent inner end of the inner tube 12 is here made yieldable inwardly to enable the inner tube to become unlocked and free for outward travel with respect to the cartridge case 13.

The term "catapult" as used herein is not intended to be limited to those one power stroke cartridge actuated devices having three telescopic sections but also those in which there may be an outwardly moving plunger, or a piston and piston rod within an outer casing. Whatever the type of catapult utilized, the man-seat mass to be ejected is coupled to the cap 31 by any suitable means such as the perforated extensions 32 and the upward movement of the intermediate tube 11 is arrested by a stop 33 fixed to the outer tube 10. As is well known to those skilled in the art, the intermediate tube 11, once the inner tube is unlocked, tends to move with or ahead of the inner tube 12. This is so for the reason that the tube 12 is required to move a much larger mass than the tube 11.

I claim:

A thruster including an explosive cartridge having a case, an outer tube fixed to the fore end of said case and having a diameter commensurate with that of said case, an intermediate tube surrounded by said outer tube and movable with respect thereto, a spacer fixed to the exterior of said intermediate tube and resting against said end of said case in the standby condition of said thruster, a radially inwardly extending flange on the fore end of said case, a load device, an inner tube fixed at one end to said load device and having its other end threaded into said flange on the case, said inner tube having a plurality of longitudinal slots in its threaded end, a collapsible ring fixed against the inner periphery of said threaded end, and a plug filling an opening through said ring whereby gas pressure generated by the firing of said cartridge ejects said plug from said ring, collapses said ring, detaches said inner tube from said case, and operates against said spacer to move said intermediate tube.

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