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L. A. SKINNER

2,043,268

ROCKET

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Fig. 1.

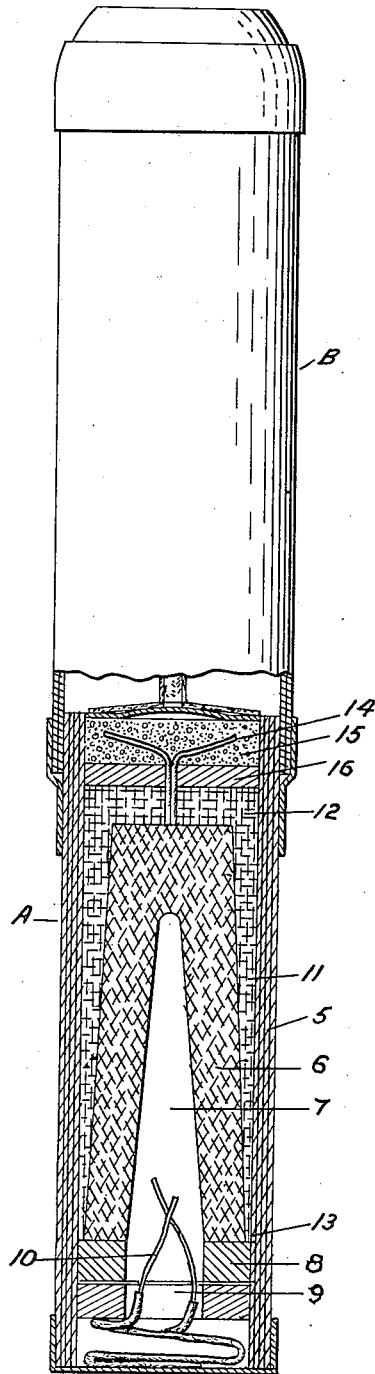


Fig. 2.

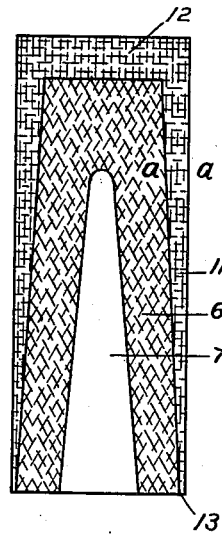
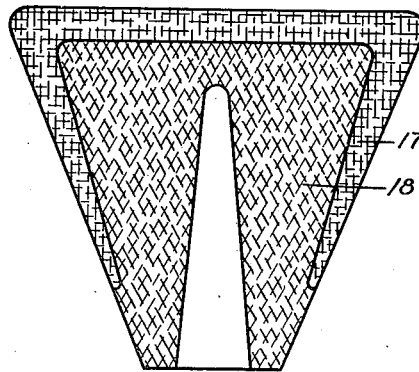


Fig. 3.



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ROCKET

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4 Claims. (Cl. 102—23)

(Granted under the act of March 3, 1883, as
amended April 30, 1928; 370 O. G. 757)

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

This invention relates to a rocket.

The principal object of the invention is to provide a propelling charge for a rocket which is protected against premature ignition of its outer surface.

A further object is to load the propelling charge into a protective cup which may be readily applied to the rocket case or used as a mandrel in wrapping the case.

With the foregoing and other objects in view, the invention resides in the novel arrangement and combination of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

A practical embodiment of the invention is illustrated in the accompanying drawing, wherein:

Fig. 1 is a longitudinal sectional view of a rocket constructed in accordance with the invention.

Fig. 2 is a detail sectional view of the propelling charge and its cup and

Fig. 3 is a sectional view of a modified form of charge and cup.

Referring to Fig. 1 there is shown a rocket comprising a body A and a head B whose contents are expelled when the rocket reaches its maximum height.

The body A consists of a case 5 containing a propelling charge 6 having the customary elongated conical chamber 7 serving the purpose of offering a relatively large surface for combustion. At the rear end of the charge 6 is a plug or clay heading 8 having an orifice 9 functioning in the usual manner to provide a controlled liberation of the gases generated on combustion of the charge whereby the gases are forcibly expelled to lift the rocket by their impact on the air. The usual match 10 is provided for igniting the charge 6.

The propelling charge 6 is contained in a cup 11 formed of a relatively slow burning material such as pyralin or celluloid. The charge is in close contact with the cup, preferably being integrally bonded thereto by a suitable solvent to prevent passage of flame between the charge and the cup. The side walls of the cup are of

gradually decreasing thickness from its closed end 12 to its opened end 13 and the closed end 12 is preferably as thick as the thickest portion of the walls.

The thickness of the walls is proportioned in accordance with the relative rates of combustion of the cup and the charge so that if the flame of ignition should pass between the outside of the cup 11 and the case 5 and ignite the exterior surface of the cup, the cup will not burn through until the charge at that particular part of the cup has been consumed. The rates of combustion of the charge and cup are so selected that the time required to burn through the wall of the cup at any point, for example at the point *a-a* substantially in line with the apex of the conical chamber 7 will be approximately equal to the time required for the charge to burn from its open end 13 to the part *a-a* of the cup.

The propelling charge is designed to generate gases at a definite rate and the orifice 9 is designed to liberate the gases at a controlled rate without building up such excessive internal pressures as will cause the rocket case to burst. The cup 11, by preventing the burning area of the charge from increasing beyond that contemplated, insures against the combustion of the charge at an excessive rate and the building up of excessive pressure.

The propelling charge also serves to transmit ignition to a match 14 passing through the closed end 12 of the cup and leading to a charge 15 adapted to expel the contents of the head B. In the normal functioning of the rocket the contents should be expelled when the rocket has reached its maximum height, and this is insured by the cup 11 which restricts the charge to its proper combustion. The usual clay heading 16 is preferably employed between the closed end of the cup and the charge 15 to insure ignition of the charge through the match 14.

The provision of the cup 11 as a container for the explosive charge enables the charge to be loaded into the cup which is then conveniently inserted in the case 5. Where hand rolling of the case is employed the cup 11 may serve as the mandrel.

In the modification shown in Fig. 3, the cup 17 and charge 18 are in conical form and the charge extends beyond the open end of the cup.

I claim:

1. In a rocket, a case, a cup within the case formed of a slow-burning material, the wall of the cup being of gradually decreasing thickness towards its open end, and a propelling charge

in the cup and bonded thereto, said charge having a faster rate of combustion than that of the cup.

2. In a rocket, a case, a cup within the case
5 formed of a slow-burning material, the wall of the cup being of gradually decreasing thickness towards its open end, and a propelling charge in the cup, and said charge having a faster rate of combustion than that of the cup.
- 10 3. In a rocket, a case, a cup within the case, a propelling charge within the cup, the thickness of the cup at any point being such that the time

required for the cup to burn through will be at least equal to the time required for the propelling charge to burn from the open end of the cup to said point.

4. In a rocket, a case, a cup within the case, 5 a propelling charge within the cup, said cup and charge arranged so that the time required to burn through the cup at any point will be at least equal to the time required for the propelling charge to burn from the open end of the 10 cup to said point.

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