May 15, 1962 H. L. MULLER ET AL 3,034,335

PRIMER TESTING DEVICE

Filed Jan. 2, 1959

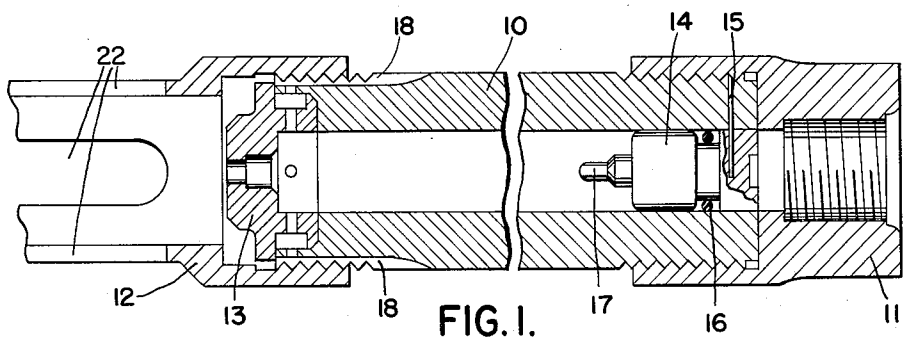

FIG. 1.

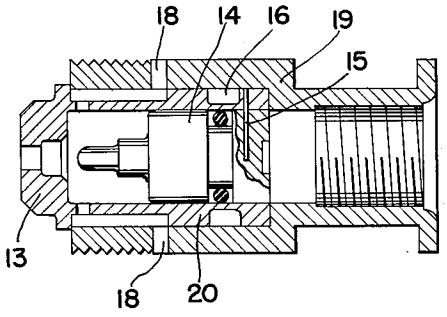

FIG. 2.

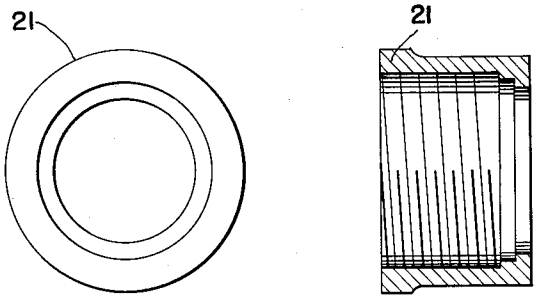

FIG. 3.

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3,034,335

Patented May 15, 1962

3,034,335

PRIMER TESTING DEVICE

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Filed Jan. 2, 1959, Ser. No. 784,826
1 Claim. (Cl. 73—35)
(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 devices for testing primers such as are utilized to detonate explosive charges, and more especially to a primer testing device which functions to test a primer under substantially the same as those encountered in its use.

Heretofore primers have been tested by the drop test method. In this method, a mass is dropped from a certain height. This mass strikes a firing pin which, in turn, strikes the primer being tested. By changing the mass or the height from which it is dropped, it is possible to vary the energy delivered to the primer. This method is adequate for testing primers intended to be fired by a spring actuated firing pin.

Where the primer is intended to be fired by gas pressure, however, altogether different conditions are encountered. In this case, the firing pin is held in place by a shear pin until there has been applied to it a gas pressure sufficient to shear the shear pin. The firing pin then travels under extremely high pressure until it strikes the primer with a force greatly in excess of that imparted by a spring actuated firing pin. The conventional drop test method is therefore unsuitable for testing primers intended to be fired by gas operated firing pins.

In accordance with the present invention, this difficulty is avoided by the provision of a primer testing device which establishes conditions similar to those under which the primer is put to actual use. The invention will be better understood from the following description when considered in connection with the accompanying drawings and its scope is indicated by the appended claim.

Referring to the drawings:

FIG. 1 illustrates the invention as applied to a high energy primer testing device,

FIG. 2 illustrates a low energy primer tester, and

FIG. 3 illustrates a short cartridge container which permits the performance of the tested primer to be determined by photographing the flash produced by it.

The primer testing device of FIG. 1 includes a barrel 10 which is threaded at both ends. Threaded on the gas pressure inlet end of this barrel is a cap 11 and threaded on its gas pressure outlet end is a cartridge retainer 12. The end cap 11 is internally threaded for connection to a gas supply pipe or hose. The purpose of the cartridge container 12 is to hold a cartridge (containing the primer to be tested) against a firing pin receiving head 13. This head 13 functions to stop the firing pin at the end of its travel and has an opening through which a protruded end of the firing pin extends and strikes the primer. This stopping of the firing pin means after it has performed its purpose of firing the primer.

The firing pin 14 is slidable in the barrel 10, is fixed to this barrel by a shear pin 15 and has a seal ring 16. The length of the firing pin protrusion 17 depends on the amount of indentation required to be formed in the particular primer under test. The firing head end of the

barrel 10 is provided with four vents 18 to permit escape of the air ahead of the moving firing pin.

By varying the length of the barrel 10, it is possible to vary the energy with which the firing pin strikes the primer and by varying the length of the protrusion 17, the indentation of the primer is varied. It is thus possible to change these two factors which most affect the performance of the primer.

When the length of the barrel is too short for the end cap 11 and cartridge retainer 12 to be threaded onto it, the short barrel retainer 19 of FIG. 2 may be used. In this case, the firing pin is fixed to a barrel 20 which includes a firing pin receiving head 13 and is inserted into the retainer 19 after which a cartridge retainer similar to cartridge retainer 12 of FIG. 1 is threaded onto the retainer 19.

In preparing to test a primer in the device of FIG. 1, a barrel of predetermined length and a firing pin having a predetermined protrusion are selected after which the firing pin is fixed to the barrel by a shear pin as illustrated. Then the primer to be tested is inserted into a cartridge, the cartridge is placed in the cartridge retainer 12, the firing pin receiving head 13 is positioned at the end of the barrel and the cartridge retainer is screwed onto the barrel. The end cap 11 is then screwed onto the other end of the barrel and the gas supply pipe or hose is screwed into the end cap.

The actual test of the primer is consummated by admitting gas under pressure through the end cap connection. This ruptures the shear pin and drives the firing pin against the primer with a force similar to that to be encountered by this particular type of primer in actual use.

If it is desired to make a photographic record of the performance of the tested primer, a short cartridge retainer 21 (see FIG. 3) may be used. As will be understood by those skilled in the art, the preparation for a test with the device of FIG. 2 is similar to that outlined in connection with the device of FIG. 1. A purpose of the longitudinal slots 22 shown in the drawing in the cartridge case retainer 12 in FIG. 1, is to enable the primer flame alone to be visible. Were a propellant present the issuing flame would be much longer and any photographic record of the flame would no longer be that of the primer being tested. An advantage of the head 13 is to absorb the energy of the firing pin 14 after it has performed its function of firing the primer being tested. In this way it may preclude the protrusion 17 going further than necessary into a primer cup and reduce the danger of excess gas pressure supplied to the cap 11 puncturing the cup of the primer being tested and allowing the primer flame to issue rearwardly as well as forwardly under reduced pressure and an error in the photographic record of the primer flame length.

We claim:

A testing device for primers actuated by gas pressure in which the length of a primer flame may be measured for the gas pressure used for actuating such primer, said device comprising in combination a barrel provided at one end with connection for a source of gas pressure and at the opposite end with a retainer for holding a primer being tested while a primer flame may be visible, said connection including a cap threaded onto the outside of said barrel and having an internally threaded passageway leading into said barrel, said retainer for a primer being tested being threaded onto an end of said barrel opposite said cap, a firing pin having a cylindrical main body with

a cylindrical protrusion fixed on the forward end and of smaller diameter than the main body and slidable in said barrel to fire a primer, a shear pin between said barrel and firing pin adjacent said cap, a firing pin receiving head between said retainer and said barrel and adapted to be pressed against an end of said barrel by said retainer, said head limiting the penetration of said firing pin into said primer and absorb the energy of the firing pin after it has fired a primer, and a vent passageway from inside the barrel adjacent said head to the outside of said barrel.

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