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DEVELOPMENT
OF
POINT-DETONATING FUZE, T313

*PREPARED FOR THE U. S. ARMY
MATERIEL COMMAND BY THE ARMY
MATERIEL RESEARCH STAFF,
UNIVERSITY OF PITTSBURGH,
UNDER CONTRACT DA-36-034-AMC-
3785(X)*.

The T313 point-detonating (PD) fuze was a superquick impact fuze for testing developmental 105-mm mortar shell, pending the release for production of a fuze of the T186 series of point-detonating fuzes, which will be capable of either superquick or delayed functioning. The development of the T313 was authorized in September 1953, at the same time as was that of the T312 PD fuze for new 81-mm mortar shell. Except that the T313 contained a longer bore-riding safety pin, the two fuzes were identical. They were similar in design to the M77 time superquick (TSQ) fuze without its pyrotechnic delay train.

The T313 fuze combined an impact firing pin with a bore-safe superquick detonator contained in a slider held in the unarmed position by a bore-riding safety pin that was locked by a setback pin. Additional safety during storage and handling was ensured by two cotter pins that had to be removed before the round could be fired. The fuze consisted of the following main components:

1. A head, which contained the firing-pin assembly
2. An ogive spacer, between the head and the body
3. A body, which had a slider with an out-of-line detonator, a bore-riding safety pin that was ejected as the shell left the mortar tube, a setback pin, and a tetryl booster lead.
4. An adapter, to connect the fuze body with the booster assembly

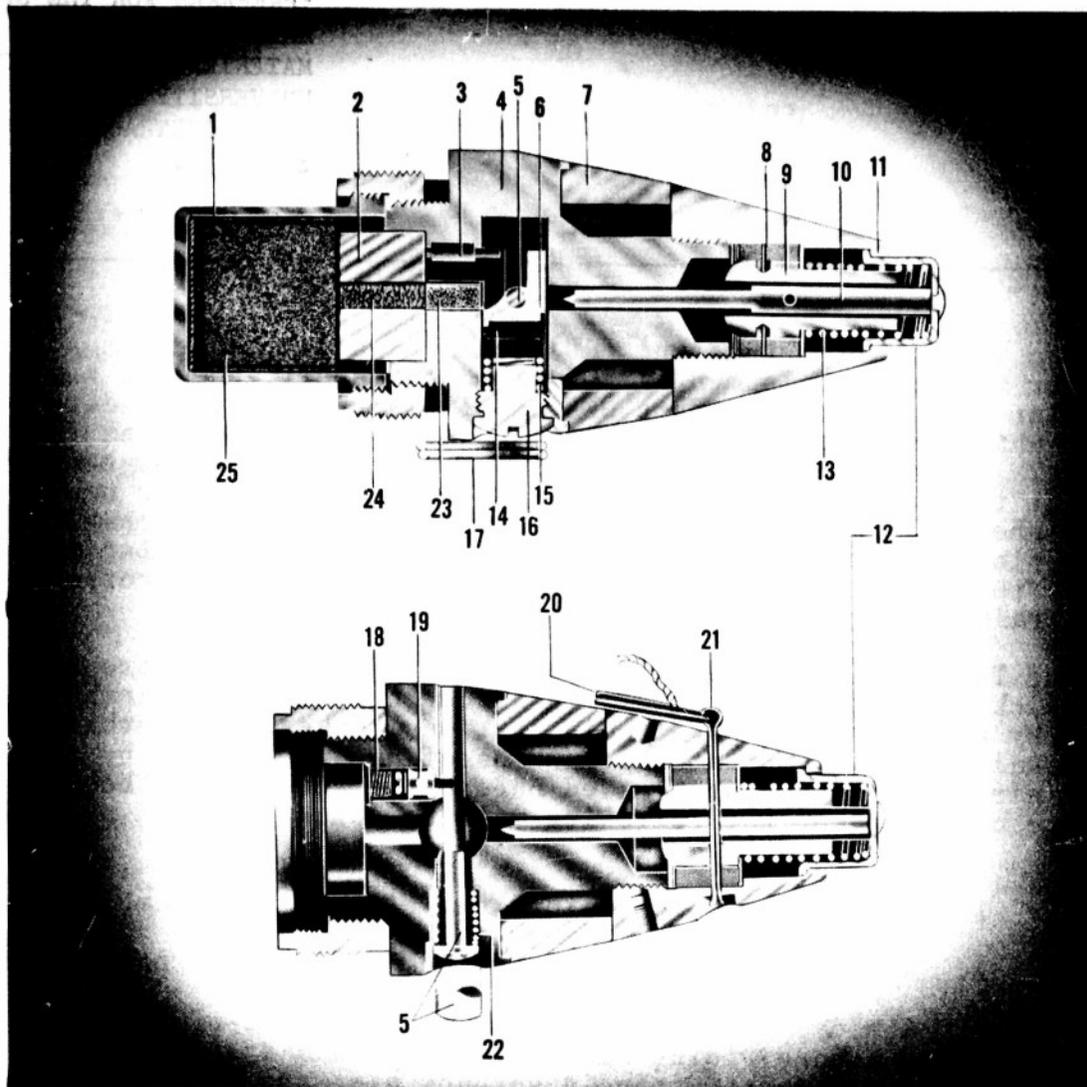
RELATED TIR'S

8-58	TIR 6-9-7A1(3)	105-mm HE Shell, T53 Series
7-58	TIR 6-9-8A1(3)	105-mm Chemical Shell, T54 Series
7-58	TIR 6-9-8A5(1)	105-mm Chemical Shell, T302
3-57	TIR 8-1-3	Development of Point-Detonating Fuzes for Artillery and Mortars
9-57	TIR 8-1-3A24(1)	PD Fuze, T186 Series
8-59	TIR 8-1-3A25(1)	PD Fuze, T312

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PD FUZE, T313: SECTIONAL VIEW WITH BOOSTER (ABOVE) AND SECTIONAL VIEW WITHOUT BOOSTER, TURNED 90° (BELOW)

- | | | |
|---------------------|-----------------------|---------------------------|
| 1. Booster Cup | 9. Plunger | 18. Setback Spring |
| 2. Booster Spacer | 10. Firing Pin | 19. Setback Pin |
| 3. Slider Guide Pin | 11. Head | 20. Upper Pull Ring |
| 4. Body | 12. Striker | 21. Head Cotter Pin |
| 5. Safety Pin | 13. Firing-Pin Spring | 22. Safety-Pin Spring |
| 6. Slider | 14. M29 Detonator | 23. Booster Lead Charge |
| 7. Ogive Spacer | 15. Slider Spring | 24. Booster Spacer Charge |
| 8. Shear Pin | 16. Slider Plug | 25. Booster Pellet |
| | 17. Lower Pull Ring | |

5. A booster cup containing a lead charge, a spacer charge, and the main booster charge

Safety features of the fuze included the head cotter pin that kept the firing pin from moving, the long cotter pin that held the setback pin immobile, and the bore-riding safety pin that kept the detonator in an out-of-line position until the pin was ejected from the fuze. The fuze was shipped and stored in this condition.

When a shell fitted with a T313 fuze was to be fired, the two cotter pins had to be removed before the shell was inserted into a mortar tube; a knotted cotton-twine cord connecting the pull rings of these pins facilitates their removal. When the round was fired, the force of setback operating on the plunger of the firing-pin assembly broke the shear pins holding it in the sleeve, and the plunger slid backward against its seat; this was incidental to the subsequent operation of the firing pin. Setback also retracted the setback pin from the safety pin, which was then forced outward by its spring so that it rode against the bore while the round traversed the tube. As the shell left the muzzle of the tube, the safety pin was ejected from the fuze, and the slider spring moved the slider into a position at which the detonator was aligned with the firing pin and the booster lead charge. The fuze was therefore bore-safe and could not become armed until after the shell had left the mortar tube.

When the striker was forced rearward on impact, the firing pin was driven into the superquick detonator. The latter fired the booster lead charge, which, in turn, set off the spacer charge and the main booster charge; this detonated the explosive charge of the mortar shell.

The T313 PD fuze, which armed when fired with any permissible charge from a 105-mm mortar and at any elevation from zero to 90 degrees, was as sensitive as the M52 PD and the M77 TSQ fuzes. The fuze passed the standard jolt and jumble tests for safety. Drop tests indicated that, when the cotter pins were not removed, the T313 fuze in a T53 105-mm mortar shell could be dropped from heights up to 40 feet without detonating; when the cotter pins were removed, the fuze could be safely dropped, base down, only a foot, which was comparable to the drop safety of the M52 and M77 fuzes with their pull wires removed.

No active work was done on the 105-mm mortar in 1957, and in May 1958 the project for its development was terminated, along with that for its ammunition. Consequently, the development of the T313 fuze was also stopped.

PRINCIPAL CHARACTERISTICS

Model	T313
Type	impact
Material	
Head	aluminum and brass
Ogive spacer	aluminum
Body	aluminum
Adapter	aluminum
Booster	aluminum
Weight	1.25 lb
Length	
Over-all	6.1 in
Intrusion	2.21 in
Thread size	2-12 UNS-1A
Arming	
Method	setback
Distance of arming delay	none beyond muzzle
Method of actuation	impact
Detonator	M29
Booster assembly	
Lead charge	4.76 grains of tetryl
Spacer charge	5.92 grains of RDX
Booster charge	612 grains of tetryl
Rounds with which used	
105-mm HE shell	T53 series
105-mm chemical shell	T54 series, T302

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