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THE GUNS OF RIOTS

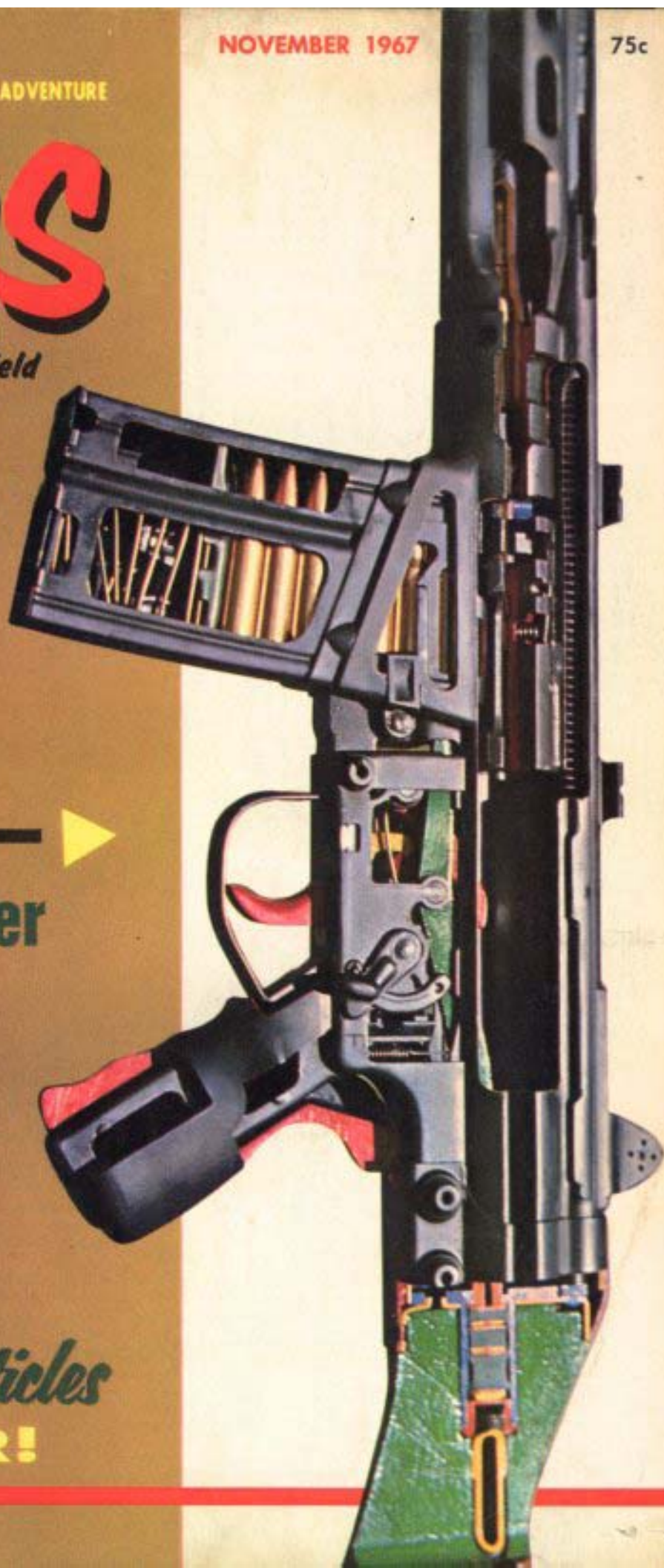
Inside Story of
The CETME Rifle — ▶
Military to Sporter

Exclusive!

More Gun Designs of
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The CETME Sport, distributed by Mars Equipment Corp., has scope mounts which permit use of iron sights.

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One of the first steps taken by Spanish officials in planning their current industrial expansion of the economy was the creation of a special facility, concerned with the design and development of new weapons, the adoption of these new models to the most modern methods of production, the improvement of manufacturing techniques, and progressive improvement of existing weapons. This facility is the "Centro de Estudios Tecnicos de Materiales

Exspciales" (Center for Technical Studies of Special Materials), abbreviated to the initials, CETME.

The most notable development of CETME was their Assault Rifle. The first efforts of this design were perfected in the form of an Assault Rifle intended for a cartridge of special design. While the form of the cartridge case and its capacity were not too different from the German 7.92 Kurtz, the bullet used was quite unusual, in that it had a pointed forward ogive of markedly longer and more gradual form than any projectile previously proposed for general use in small arms. Inasmuch as this bullet was partially composed of an aluminum nosepiece, and was unusually light in comparison to standard 7.92mm service bullets, it was much longer. This combination of an extra-long bullet and a short cartridge case gave 7.92 CETME ammunition distinctive, and immediately recognizable appearance.

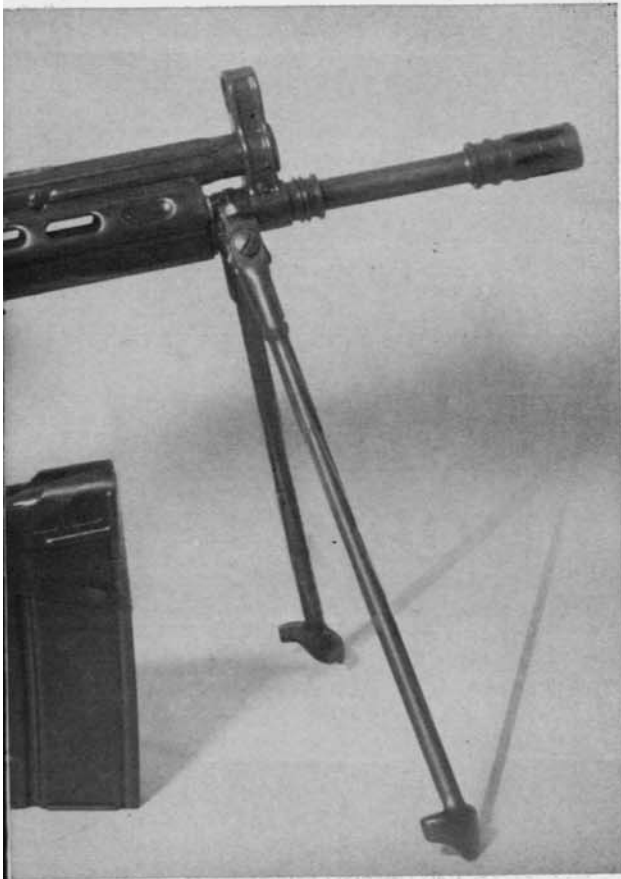
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velocity of this bullet at longer ranges put it more in the class of the standard ammunition used by the major powers in the Second World War, rather than the submachine gun or short-cartridge Assault Rifle class. At the same time, the lighter bullet weight and propellant created relatively mild recoil. A weapon firing this ammunition, therefore, was much more controllable in bursts of automatic fire (or in rapid semi-automatic fire) than one using ammunition in the .30-06 class, while possessing an effective range greater than that of weapons using ammunition such as the 7.92 Kurtz or the current 7.62mm Russian Assault Rifle cartridge.

At this point, however, (the 1950's) it had become apparent that Spain's defense policy could be more closely coordinated with those of its European neighbors, and the United States. Spain and the United States entered into Treaty arrangements providing for use of Spanish bases in connection with NATO defense responsibilities assumed by (Continued on page 57)

THE CETME -Military To Sporter

By H. B. YOUNG



CETME engineers at work in the factory. >

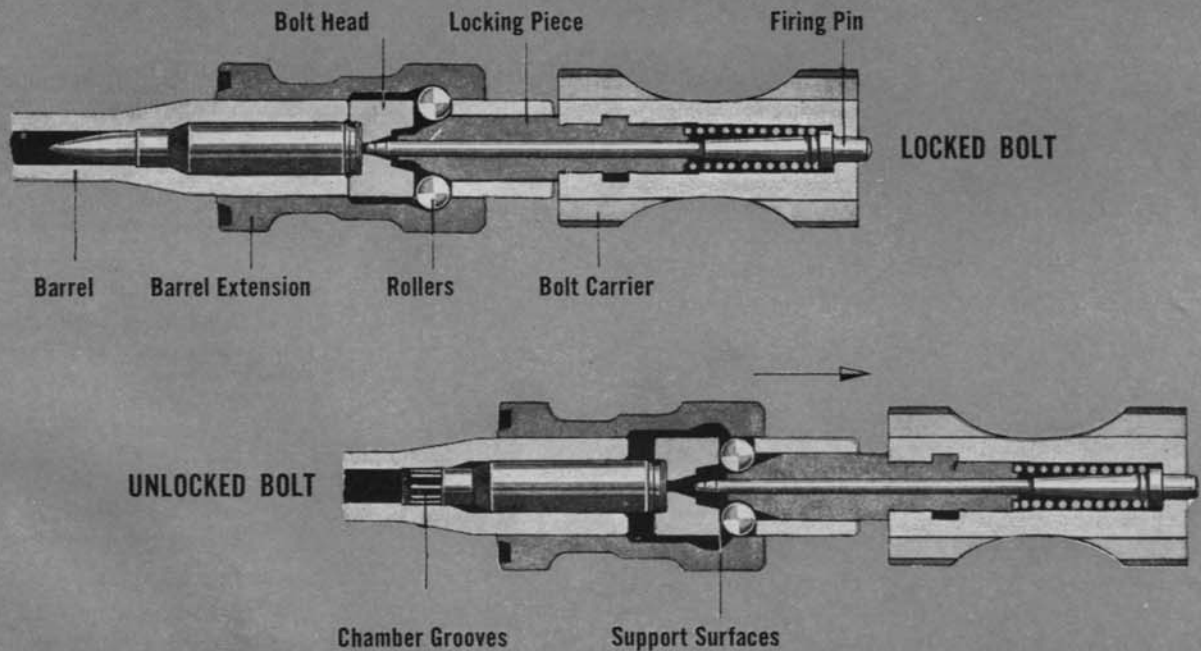


Diagram of CETME action locking system.

CETME—MILITARY TO SPORTER

(Continued from page 27)

the United States and, in turn, Spain received quantities of military equipment of American manufacture for its Armed Forces. Both of these facts inescapably placed strong pressure on the Spanish to develop small arms conforming to the standard NATO ammunition adopted by the U.S. and the majority of NATO powers. This involved a reexamination of the engineering of the CETME Assault Rifle (designed previously to use short-case ammunition) down to every fundamental. The ammunition proposed for use gave chamber pressure in the 50 to 55 thousand pound class, instead of 40 to 45,000 pound class, and possessed substantially greater energy and external case surface.

After substantial reconsideration and modification, CETME was able to announce its prototype Military Rifle for the 7.62mm NATO Cartridge. After considerable testing, and pre-

H&K is represented by Harrington and Richardson, and the rifle is currently under consideration by the U. S. Army Ordnance Department as the T-223.

At the same time, the Spanish Military Services proceeded to adopt their own series of CETME Model Rifles, mechanically distinct from the H&K Models in significant aspects. These models were ultimately developed to the point where they were adaptable to use both NATO standard 7.62mm ammunition and a special Spanish round of somewhat different characteristics, without adjustment. The Spanish round has a bullet weighing approximately 125 grains, but achieves substantially similar ballistics through out its trajectory because of superior bullet form.

Use of this ammunition by the Spanish Armed Forces is eminently justified, in the view of the Spanish,



Inspection of the finished parts, in this case the front sight base, uses Gamma Radiography for x-ray inspection.

sentation to interested European Commercial and Military groups, the rights to one principal variant of the CETME 7.62 Rifle were sold to N.V.M., and subsequently to the firm of Heckler & Koch of Germany. This Rifle (after modification) was adopted as the G-3, which has now replaced the F.N. FAL 7.62mm totally as the service Rifle in West Germany. This model of the CETME Military Rifle has been subject to extensive tests by other nations interested in adapting a service rifle adapted to the 7.62mm cartridge, and, according to late report, will be extensively adapted in Scandanavia to replace existing military weapons. In the United States,

by the better controllability and lessened recoil obtained without material sacrifice of accuracy or effective range. At the same time, these rifles will use the standard NATO round without any modification or adjustment being necessary. These rifles have proven quite successful in use in Spain, and they are currently in large scale production with a view to the complete equipment of the Spanish Armed Forces with CETME Rifles.

In 1959, CETME was asked by Mars Equipment Corporation to consider whether it would be possible to prepare a Sporting and Target Rifle,

making use of many of the more significant developments resulting from CETME's prior research. After extensive preparation, initial prototypes became available in 1962. After modification and further refinement, a subsequent prototype model was standardized as the Model "Sport."

This model was found to be wholly outside the purview of the National Firearms Act by the National Office of the Alcohol Tax Unit of the Treasury Department. This is the model of Rifle currently offered for sale in the United States as the CETME "Sport."

The sporting and military models of CETME rifles utilize a semi-rigid locking mechanism in the bolt assembly, activated by a pair of specially hardened rollers protruding from the side of the bolt head. The interaction of the rollers, the roller seats in the barrel extension, and the bolt locking cam is such that a definite delay is invariably produced before unlocking occurs. In practice, this short interval is quite sufficient to assure that the bullet has left the barrel, and bore pressure has materially dropped before unlocking has progressed sufficiently to permit any rearward movement of the bolt. As it is desired that the rearward movement of the reciprocating parts occur during a moment of relatively high internal pressures, the chamber has a series of "flutes" or grooves running parallel to the axis of the bore to about the front half of the cartridge case from the case mouth. This permits the case to be "floated loose" from the chamber walls, and "lubricates" it against the possibility of unwanted case adhesion, in spite of the high operating pressures. When perfected, this design holds advantages of simplification over traditional gas or recoil operated systems, but it requires a very detailed study in order to obtain a perfect balance between masses and forces, under a relatively great variation of physical circumstances. Variation of chamber pressures, bullet weights, and cartridge specifications are most immediate, but not the only significant factors to be considered in producing a practical, field-use rifle using such a system. This meant that CETME had to conduct a complicated, exacting, and highly detailed study of the movement of various parts of mechanisms, by special oscillograph and high speed photography techniques, which permit investigations of velocities and accelerations of both individual parts and whole assemblies.


The general success of these studies,

together with the best tribute to the high overall quality and durability of rifles produced under the CETME program, is amply evidenced by the maintenance cost of these rifles. In current Military service in Spain, the annual replacement and repair expenditure per weapon is between 1 and 2 per cent for the present CETME model in use. This figure includes not only the small amount of repair and replacement, but also the loss of parts and rifles due to mistreatment by troops incident to rough field service in Spain's rugged terrain.

Heat treatment of metal parts is an important and complex factor in assuring production standards necessary to produce weapons with reliability and longevity. CETME has developed new techniques to assure the greatest degree of control over case-hardening depth, general hardness, and positive determination of the condition of the interior of hardened parts on a uniform production basis.

The straightening of rifle barrels to good standards of straightness is an operation traditionally associated with precision firing and close groups. At CETME, errors of linearity are measured down to 1/3000 of an inch, and this factor, combined with the excellent stability of the CETME operating system has resulted in precision of fire difficult to obtain in production weapons with heavier or longer barrels. A mean deviation of .50 per 1,000 is the average horizontal and vertical performance with Military Ammunition, of either the standard NATO or special CETME type.

Modern quality control plays an important role to CETME's manufacturing operations. As far as small arms are concerned, all important specifications are subject to control on a 100% basis; less important requirements are monitored by random sampling in accordance with advanced statistical practice. Raw materials and semi-finished component parts are subjected to severe acceptance inspection according to carefully preplanned specifications. Inspection of barrels and finished parts is equally severe, utilizing to the fullest extent modern gamma radiography equipment for the internal inspection of parts.

Most shooters are mechanically inclined, and perhaps this is one factor in the growth of popularity of military arms in the U. S. The novel designs, fine workmanship, and high standards of quality are basic to most of the military arms, and these are qualities which appeal to technically-minded shooters. 



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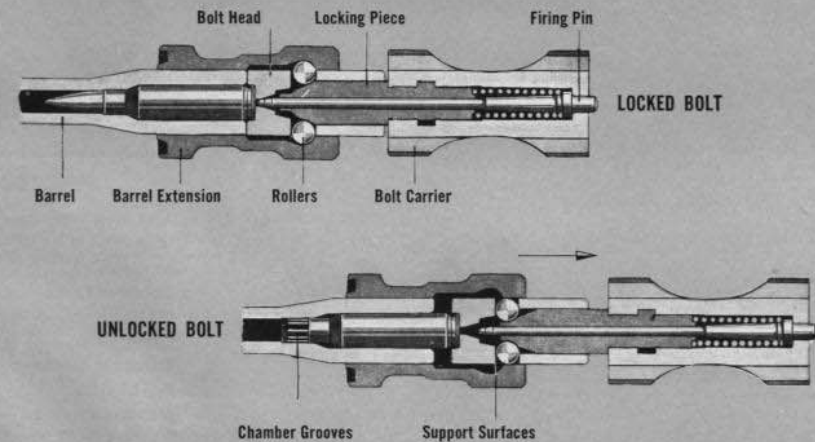


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