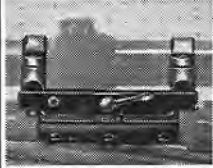
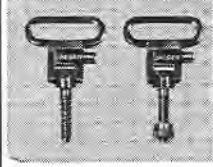


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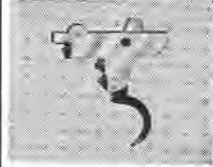
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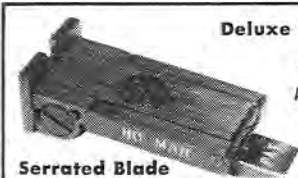


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### M14 GAS CYLINDER

The gas cylinder on the M14 rifle, and also that on the M60 machine gun, look longer than the usual type. Do these guns use the same gas cylinder design? If so, how does it work?—F.C.E.

**Answer:** The gas cylinder design is essentially the same for the M14 rifle and the M60 machine gun, though dimensions are somewhat different.

The usual gas cylinder is operated by gas admitted when the bullet clears a gas port in the barrel. The gas at high pressure thus is admitted very suddenly, and its effect is that of a blow on the piston. This is not the most desirable way to put mechanical parts into motion, though it is effective and in fact it is the system used in most current gas-operated guns, generally quite successfully.

The M14 and M60 gas cylinders are distinctive in being designed to deliver a prolonged push instead of a simple blow. This prolonged push is accomplished by admitting the gas into a chamber of considerable volume, where it is allowed to expand and push the piston back.

Functioning of the M14 gas cylinder is shown schematically in the illustration. Gas from the barrel enters the floating piston through a hole in line with the barrel gas port, and fills the space within the piston and gas cylinder plug. The first movement of the piston takes the hole out of alignment with the gas port and cuts off admission of gas. The considerable volume of trapped gas expands smoothly and pushes the piston and operating rod to the rear. By the time the piston clears the exhaust port at bottom of the cylinder, the work of the gas has been done.

In this construction the dwell time (time between firing and beginning of movement of the mechanism) is about doubled. The velocity of the slide when it begins to unlock the bolt is only about half what it would be otherwise. Then the expanding gas continues to accelerate the parts, so that the over-all time cycle is substantially the same as from the impulse of a plain

gas cylinder. The low mechanical stresses and bearing pressures obtained with this comparatively slow and smooth acceleration are quite desirable, and contribute to the great endurance of the M14 rifle.

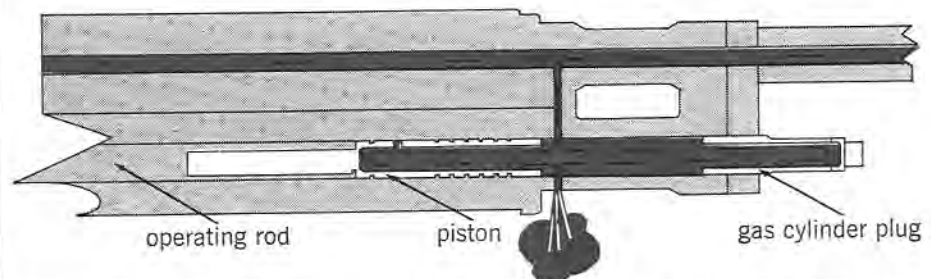
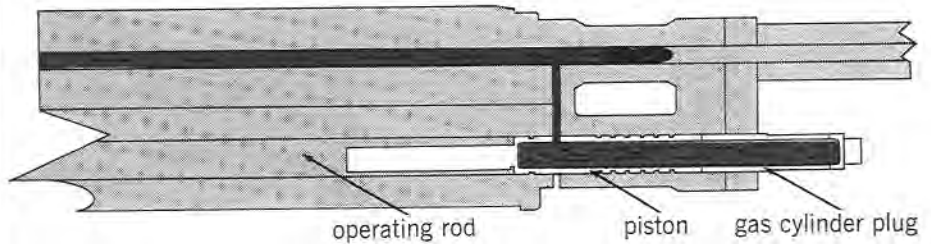
The gas system of the Winchester Model 100 semi-automatic sporting rifle is similar to that of the M14 rifle. This was pointed out by Winchester when the Model 100 was announced in 1960.—E.H.H.

### SLUG EFFECTIVENESS

I am a police officer and am interested in the use of rifled slugs from shotguns to stop fleeing vehicles. Have any tests been made to determine their effectiveness in this application?—J.K.

**Answer:** Tests of this sort were recently conducted by Remington Arms Co. Distances varied, but were generally about 25 to 30 yds. To simulate what a police officer might encounter, 5 shots were fired into the left rear of a test car at approximately 45° angle. Three of these struck in the panel just behind the door, near the door handle. One penetrated through the seat and into the dashboard. A second went through the firewall. The third went through the panel and into the end of the door. Two other rifled slugs were fired into the car through the closed rear side window and the open front window. The shot fired through the front window damaged the steering wheel and the speedometer. The other slug went through the rear side and into the right side of the dashboard.

Three shots fired into the closed trunk penetrated both the front and rear seats and the firewall. A slug fired into the side of the motor block from a 90° angle made a hole, causing a cooling system leak. As a final test, the car was turned on its side as if it was being used as a barricade. The rifled slug went through both the floor and the roof. All shots penetrated the body and some passed completely through the car. With such penetration as shown in these tests, a law-enforcement officer could effectively use a shotgun with rifled slugs on a fleeing vehicle.—E.W.H.



Gas cylinder function, M14 rifle: (top) Gas from bore enters floating piston and fills hollow piston and gas cylinder plug. First movement of piston cuts off further admission of gas. (below) Gas within piston and gas cylinder plug has expanded, pushing piston and operating rod back. Gas is vented at end of expansion