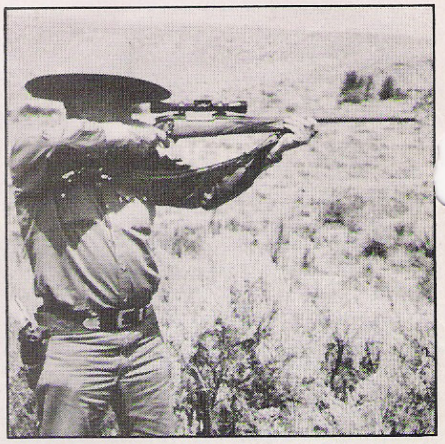
GUN NOTES

By Elmer Keith, Executive Editor

COMPRESSED RIFLE CHARGES

Time has brought many changes and improvements in rifle propellants. Slower-burning powders have produced much higher velocities, particularly with heavy bullets for normal chamber pressures. Over 30 years ago the late C. M. O'Neil and I found out there was such a thing as bore capacity for any given bullet weight, caliber and type of powder used. When working with our Duplex loads with a tube carrying the primer flash to the front or forward half of the cartridge case and powder charge, we found these slow powders worked best under compression. We also found that they worked best and gave best accuracy and uniformity of pressures in



regular cases when loaded full to the base of the bullet or compressed. With our Duplex system we found we could increase the powder charge considerably and also the velocity, so long as we had tight chambers, over the body of the cases, and the charge compressed. This for the reason that the flash of the primer ignited the front end of the charge only and started the bullet up the bore with the front third of the charge. Then the gas that drove the bullet forward also held the rest of the powder charge back in the heel of the case until it was all consumed. I still consider this the best way to fire any modern slow-burning powder for maximum results; namely, accuracy, uniformity, velocity and low to normal pressures.

This system of ours extended the pressure-time curve further up the bore, almost eliminated muzzle flash and greatly increased bore life. The muzzle of the barrel always got hot first and when it was so hot you could not hold your hand on it, the breech end of the barrel was barely warm. This cutting down of the heat at the breech end of the barrel where throat wear always occurs first, with normal loadings, was responsible for long barrel life. This on th credit side; on the debit side we had t thread the primer flash holes in the case and screw in the tubes with the use of a split collar wrench from the mouth of the

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case. Then we had to develop a sleeve to shove down over the flash tube, and a long needle of a decapping pin to decap the fired Duplex cases. We found that the chambers had to be very close over the body of the case or the cases would expand and let the flash of the primer come back around the charge and fire it much too fast, causing a dangerous overload.

General Hatcher had me flown back to Frankford arsenal for a month's work, developing a Duplex load for caliber 50 B.M.G. I gave them 202 feet more velocity for normal pressures and their head ballistician said they were the most uniform loads he ever put through the pressure guns. We had one heavy Sharps-type action pressure gun with an oversize chamber and I would not use it knowing what would happen. The head ballistician insisted finally on firing that pressure gun with one of our loads that was giving normal pressures and 202 feet more velocity than the arsenal's conventional loadings. We did so. When we opened the door into the firing chamber the place was full of smoke and we had to get a big copper drift and a single jack to drive the breech block down out of battery. The head of the case was partly melted and the primer pocket greatly enlarged and we had to knock the case out of the chamber. Pressures skyrocketed for that one load fired in that gun. So Duplex loading is nothing for the tyro to monkey with, unless he understands thoroughly the principles involved. Ordnance finally reported I justified all claims for Duplex loading, including longer pressure barrel time, elimination of the muzzle flash and 202 feet more velocity for normal pressures with 702-grain A.P. ball. I used around 258 grains of powder as against 238 to 240 for the standard load. This working with Duplex loads over the years also sheds considerable light on the use of slow-burning powders in standard cartridge cases.

While it is rare, there have been all too many rifles blown up with reduced or light charges of slow-burning powders. Many theories have been advanced as to the cause. Iver Henriksen has a model 70 Winchester rifle that was completely shattered with a reload of 4350 powder in caliber .264 Winchester Magnum. It would seem almost impossible to get much of an overload of this powder in the case. Many investigated the case as the shooter lost his right eye and cheek bone from the bolt coming back but arrived at no positive conclusion. The receiver and bridge were all blown to bits and the stock to slivers. In fact, it was the most completely wrecked rifle I have ever seen and I had several blow up at Ogden arsenal and some cut right in two pieces at the receiver with standard factory arsenal "war" loadings. My own theory on this blown-up .264 with 4350 powder was that the charges were thrown from a powder measure without either weighing or final visual inspection and the powder somehow clogged in the tube and a lighter than normal charge was thrown. Then when fired the primer flash ignited too much of the charge at once, causing a detonation. These slow-burning powders, when packed tight in the case or under compression, ignite the rear end of the charge and it burns forward, pushing the rest of the powder up against the bullet and forcing it down the bore until the charge is consumed. Thus we have a slower ignition of the whole charge and it is extended up the bore of the rifle, but if the flash of the primer goes through the hole of a very loosely-packed charge and fires it all at once, we could have the cause of these blowups with slow-burning powders and light loads.

O'Neil, Hopkins and I early learned that compressed or tight charges always gave more uniform velocities and better accuracy than loose charges of powder. We also learned that for any reduced or light load, a fast powder should be used and never a slow-burning powder, this from our years of experimenting with and developing the Duplex O.K.H. loads.

COMING NEXT MONTH:
FIELD TESTING THE ASTRA DA .45 AUTO

With the big British elephant cartridges loaded with our powders we have a case much too large for the charges and I have found that in straight cases. 3031, H-Vel No. 2 and two heavy oversize cardboard wads down hard on the powder leave considerable air space between the charge and the bullet. I do not favor any use of Cream of Wheat or other inert materials as a filler over the powder to fill the case to the base of the bullet.

With these big long cases it is always best to use a fairly fast powder for the straight cases. 3031, Hi-Vel No. 2 and later powders of similar character are in order. 4198 also works very well in many loads but the slow-burning powders like 4350, 4831 and the various ball powders by Hodgdon of similar characteristics should be left for the bottle-neck cases. One of the most experienced handloaders in this or any other country, and maker of some of the finest dies and loading presses, ruined a fine double-barrel rifle by filling the case on top of a normal charge of 3031 with Cream of Wheat. That stuff and similar materials can be driven forward and compressed until it is almost like another bullet, which in turn causes greatly increased pressures. Many of us have spent a lifetime trying to find out all we can about interior ballistics, yet none of us has a positive proven answer for some of these detonations from light charges of slow-burnin- powders.

I believe when reloading all high-intensity rifle loads, and in fact all pistol loads, that a loading block should be used and af-

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ter the charges are thrown or weighed and put in the cases, then each case should be visually inspected under a good light before bullets are seated. If charges are weighed in each case and poured in the case and the bullet seated immediately, then you should also inspect that charge visually before seating the bullet.

Air-space loadings of modern smokeless powders allow the charge to be thrown from one end of the case to the other as muzzle of rifle is lowered or elevated in firing, causing some variation in ignition and also combustion of the powders and I for one do not like air-space loadings in modern high-velocity loadings. Small-bore rifles with large cases are the most dangerous to reload and large-bore cases or straight cases seem never to develop the high pressures of bottleneck cases. With many bottleneck cases of the big elephant class such as the 500/.450, 450/.400, .450 No. 2, etc., it is not possible to wad the powder down tight in the case as we can with straight cases such as the .450 Nitro Express 3¼-inch, the .500 Nitro Express 3-inch and 3¼-inch and .577 in 2¾-inch and 3-inch and the .600 in 3-inch, but these big bores develop relatively low pressures, around 30,000 pounds and fast powders should be used in them. Charges should be just heavy enough to bring the two barrels together and to proper elevation with a Kynoch factory load used as control. Never attempt any high-velocity loads over the factory standard in any double rifle. They were not made for such abuse and are too thin in the barrels for high pressures, as a rule, in the big calibers. In .300 and .375 H&H the tubes are usually amply thick enough over the chambers for normal pressures but normal pressures should never be exceeded.

With heavy revolver loads, again I prefer powders that bulk up well so it is impossible to load two charges if the loads are visually inspected. When Harold Steims was head of the service dept. of S&W, he told me that most of the blown-up guns returned to the factory for new frames, barrels, or cylinders were blown up with reloads from the Star and other automatic loading machines, when it was possible for untrained operators to sometimes get two charges of Bullseye or Unique in a case and no inspection of the loads was possible prior to bullet seating. These machines under proper management and supervision, however, turn out very accurate and uniform loads. Of course, all factory loads are loaded in automatic machines except some fine match rifle loads that are again loaded by hand in both small bore and big bore. No loading machine or loading tool has a college education and the operator must furnish the gray matter.

Elmer Keith's illness still precludes his answering any correspondence.