

Process of Making A Good Shot Gun

Barrel Depends Upon Materials Used and Method of Forming It—Steel and Iron Combined—Best Barrels Average Thirty Years Service.

(New York Sun.)

A man ought to have considerable confidence in the quality of the material when he is willing to explode a charge of gunpowder with a bursting force of from 50,000 to 65,000 pounds to the square inch within a few inches of the head with nothing between but the thickness of his gun-barrel, three-sixteenths of an inch of steel.

Yet that gun barrel might be a section of nicely finished gas pipe, so far as the average sportsman who blithely blazes away is informed. There seems to be put little general knowledge of the interesting process which results in the finished gun barrel or of the great skill, care and scientific knowledge required in the work of the manufacturer.

Shotgun barrels may be divided into two general classes, those made from twisted rods or ribbons of steel and those made from untwisted solid steel bars. Twisting gives the Damascus barrel and the "solid welded twist" barrel. Boring a solid untwisted steel bar is the general practice in making the comparatively low priced American guns, but this process if carefully carried out, using only the best materials, will produce a barrel that will answer almost all requirements. Barrels may also be made by rolling out pierced blanks; they may be rolled hollow by the Mannesmann process or they may be forged and then drilled.

The quality of the barrel, says Harpers Weekly, depends less upon the method of forming it than upon the material used when any but the twist barrel the manipulation is all important. In the nature of things the twisted barrel will stand a greater strain and it is possible to give it a finish far more attractive than can be done with the plain steel barrel. Also the process of manufacture is much more interesting.

All Damascus barrels must be made of twisted rods. Without the twisting of the rods the finished barrel would have the appearance of a wire twist barrel, but by twisting the metal the grain is so arranged that it appears on the outside of the finished barrel in the form of irregular links or circles. The material used in making Damascus barrels is figured iron, that is, a mixture of iron and steel. Pig iron from the blast ore is placed in a furnace and cleaned from all dross by puddling, when the dross being lighter than the iron, rises to the surface and is skimmed off. The liquid iron is then allowed to cool slightly and is worked into "blooms" of 100 pounds each. A "bloom" under the hammer soon becomes a square block, which in turn in the rolling mill becomes a 10 foot bar.

Much hammering with a tilt hammer condenses the metal, while the rolling process increases the ductility and tenacity by elongating the fibre. In some gun shops the heating and hammering of the metal is repeated three times, the loss of metal being 40 per cent. Further processes cause additional loss, until not more than 10 to 15 per cent. of the original weight of iron ever gets into a gun barrel. The proportion of iron and steel entering into a barrel is largely a matter of individual opinion among gunsmiths, but the best English Damascus and modern laminated steel contains over 60 per cent. pure steel and the fine silver steel Damascus barrels contain 75 per cent. best worked steel.

In pulling the iron and steel it is possible so to arrange the metals that many different figures will result. In piling the iron for ordinary Damascus strips of iron and steel are laid upon each other alternately; in another figure the iron instead of being in strips is in rods so arranged that in cross section they resemble a checker board. Chain twist, diamond twist, &c., are produced by appropriate arrangement of these strips of iron and steel and there is practically no limit to the number of different designs that may be made.

The next process is to heat and weld the fagot of piled iron and steel and roll it into rods of the sizes required by the welder. The welder may for a common gun barrel have the metal in the shape of a strip about three-quarters of an inch wide and of rhomboidal section. Eighteen pounds of prepared gun iron are required to weld a pair of twelve gauge barrels which when finished will not weigh over three and a half pounds. Barrels for high class guns are almost all hand welded. The square rods of iron are first twisted to give the Damascus figure. These rods are about four feet long and are placed in a furnace and heated until about eighteen inches of the length is a bright red. One end is then thrust into a square hole and the rod twisted a winch handle and cog wheels giving the rotary motion, the process being repeated until the entire rod is twisted with about eight turns to the inch. The rod is now the course round, with the exception of the ends, and has been reduced to about three feet three inches in length.

The cheapest Damascus barrels, single iron stub Damascus, are made from a single twisted bar; two iron stub Damascus barrels are made from two twisted rods, each three-eighths of an inch square, welded together and rolled into a ribbon with the twisted spirals in opposite directions. The three iron barrels have three rods similarly twisted and welded. The Belgians sometimes use four and even six rods in producing fancy figures, but three irons are sufficient to give a very fine effect. The real English Damascus is made with three rods, silver steel Damascus is similarly made, but of different metal piled in different order.

The rods having been twisted and welded together, they are sent to the iron mill and rolled at a red heat into ribbons which have both edges beveled the same way. Two of these ribbons are required to form a single barrel, the one for the breech being somewhat thicker than the one for the

muzzle. These ribbons are twisted in a spiral, this twisting being done cold unless very heavy barrels are desired. The metal coils are next heated, a steel mandrel is inserted and the coil is welded by hammering. The two coils are next welded together, the breech section being about six inches long. Then comes more hammering until the metal is cold, and the barrel is complete except for the finishing. There are shops in Belgium where the method just described is followed, but in which machines are utilized for twisting and hammering and where no steel whatever is used. The Damascus effect being attained by using two grades of iron. Such barrels are naturally complete turns to the inch. The barrel is not sufficiently strong to withstand safely the explosion of the powders now generally used. At the same time some of the finest barrels in the world are made in that country by hand, and the idea that all Belgian guns are of low grade is a decided mistake.

The six iron Damascus is a product of Belgium. For these remarkable barrels 23 alternating bars of iron and steel are rolled into a sheet 3-16th of an inch thick, this sheet is split into square rods and the rods are twisted as heretofore described, but are given 18 complete turns to the inch. The result is a figure on the finished barrel no larger than the eye of a small needle. The usual Belgian Damascus barrel of commerce is a two iron barrel, but made from larger rods than those used by the English, and consequently a coarser figure, and not showing so many light colored streaks as the English two iron barrel.

The reason for combining steel and iron in gun barrels is that pure steel would be too brittle to withstand the shock of the explosion and pure iron too soft; a proper combination of the metals renders the barrel sufficiently elastic to return to its original size after the expansion caused by the discharge. The three iron Damascus barrel is, according to the majority of the experts, the most satisfactory. The six iron barrels are for practical purposes, overtwisted.

"Solid welded twist" barrels, which have of late years gained much popularity, are made by the simple process of twisting a bar of metal of proper composition and boring out the centre. The principal advantages of this form of barrel are its cheapness when compared with the welded barrel and the fact that there are never any of the gray specks liable to occur in the best of Damascus barrels. These gray specks are particles of burnt metal or scale imbedded in the metal during one of the many welding operations, and while they do not affect the strength of the barrel to any appreciable extent, they detract from their appearance.

A fairly good Damascus barrel will average about 30 years of service, or the firing of 100,000 shots, if properly cared for and be perfectly safe to use. Of course the best of barrels can be ruined in a short time by rough use, for a Damascus barrel will not stand a blow given sideways, and the gun should never be discharged when there is a dent in the barrel.

Soldier's Tramp Through Wild Africa

Adventures with Lions, Venomous Snakes and Insects and Suspicious Natives — A 5,000 Mile Walk — Ordeal by Dirt Enforced by Black Chief.

(New York Sun.)

Emil Lund, a Rhodesian settler of 26, has just completed a walk from Capetown to Cairo, not in fulfillment of a wager, or without money, or to test a system of diet or training, but simply from love of adventure. He has been a soldier and scout since he was 17, serving in the second Matabele campaign in 1893; the Uganda rebellion of 1897-98 and the South African war.

He started from Capetown and walked, all alone, right through the Cape Province and the Transvaal to Rhodesia. Thence he continued through the Congo State, the Sudan and the Nubian Desert to Egypt, a distance of nearly 5,000 miles as the crow flies. "My wish," he said in telling the story of his great walk to a correspondent of the London Standard, "was simply to be the first man to accomplish the feat. I am proud of having walked across the Nubian Desert. That was the hardest tramp of all."

Until he left Elizabethville in the Belgian Congo he had a comparatively easy time, for he could obtain supplies, good food and good water; but beyond that point he had a very trying time, and had no porters, carrying all his own impedimenta, weighing seventy pounds. This alone is no mean task in a tropical and wild country. But he could get no natives to accompany him, owing to tribal hostilities being in progress.

During most of the time Mr. Lund was obliged to be a vegetarian, but he always had meat when he could get it. "Sometimes," he said, "I shot a buck; but I could only eat the liver, which I broiled in the ashes of my fire. Having no salt I cannot say that I enjoyed my food. In passing through the great forests I camped on the ground, lighting a large fire to keep off the wild animals. I had to be very careful to keep this going throughout the night. At early dawn I renewed my march, tramping continuously till about 11 o'clock. After that I used to hunt round, collect wood and cook my one daily meal. Then I slept till sundown. Lions and other carnivores do not usually attack in the heat of the day—they are asleep—and it is only when night falls that they set out in search of prey."

He met with a good many lions, but was never attacked by one. The idea that water will protect one from a lion is, he says, erroneous, for lions are excellent swimmers. In the Katanga district he was bitten by a black mamba snake and would probably have died, but he reached a native kraal and was treated by a woman who applied a decoction of herbs to the wound and cured him. She steadfastly refused to say what herbs she used or how she prepared them.

From Albertville the traveler made for Lake Albert, and here he had one of his most unpleasant experiences. He came across a powerful tribe, under the command of a very suspicious chief who, before he would listen to him, put him through the "ordeal by dirt." This consists of eating a mouthful of earth picked up from the ground.

In the native mind this constitutes a form of oath, and it is believed that

anyone who undergoes the ordeal and does not speak the truth will be condemned to an eternal diet of dirt. The ordeal is called "nkola donga." One of the worst troubles with which Mr. Lund had to contend was the venomous flies and insects which swarm in tropical Africa. He was bitten near the eye by a certain kind of malignant tick, and for a time was nearly blind. If he had not shortly afterward reached Fort Portal and obtained medical treatment he would probably have lost the sight of at least one eye.

A little further in the course of his walk he fell in with the Baluba and Valesi cannibals. When they have a man accused of some crime. In such a case the man is offered a draught of a poisonous decoction. If he takes a long drink the poison is inoperative, producing merely nausea. But if, from timidity or guilt, he drinks but a small portion, the effect is almost immediately fatal. Women are excluded from these feasts.

Making a wide return of Lake Albert, Mr. Lund eventually arrived on the Nile, which he followed to Abu Hamed and then struck across the Nubian desert and came to the Nile again at Wady Halfa. There are but two wells on the route across the desert, and he had to carry with him three days' food and water supply. But he safely crossed the desert and reached Khartoum, where he went into hospital to patch himself up for the last stage of his journey, which he completed without further mishap.

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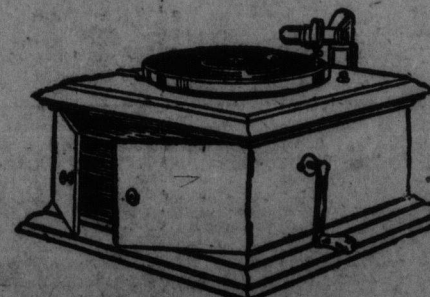
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