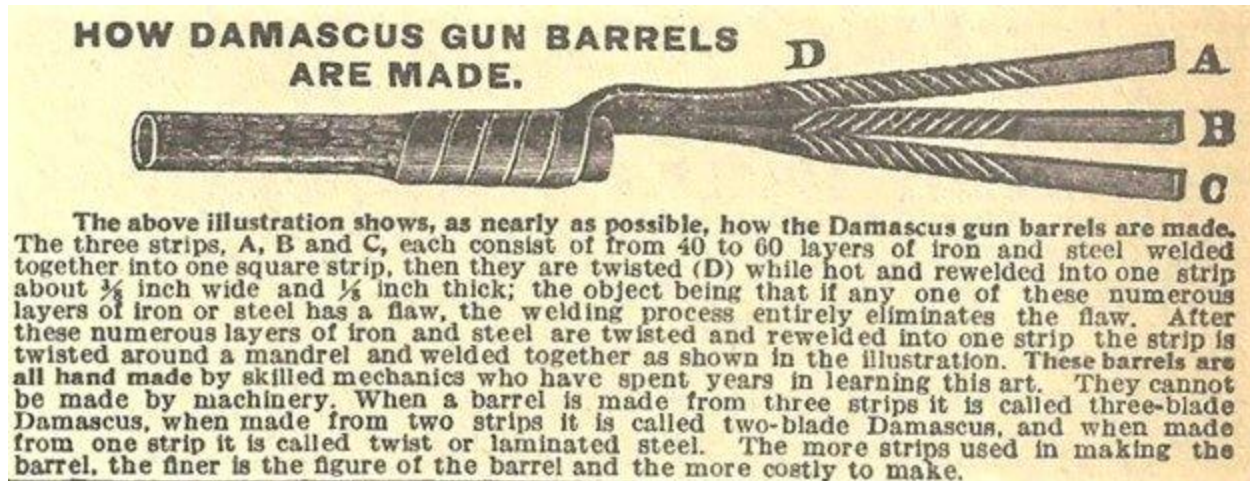


Damascus Demonstration Rods

Sears, Roebuck & Co. Catalogue No. 116 c. 1907 courtesy of Gary Rennles



La Fabrication des Canons Damas

Film du Musee de la vie Wallonne tourne a Nessonvaux en 1925 et 1931

<https://www.youtube.com/watch?v=fa9dlvRDuQU>

Dr Gaddy's Three Iron Crolle Demonstration Board

'Irons' twisted into a 'rope'

Each 'iron,' 'stripe,' 'band,' 'rod,' 'ribbon,' or 'blade', is made of alternating layers of iron and steel that have been 'fagoted' into a 'billet' or *lopin*, which is heated and hammer welded, then twisted. Rods could be given as many as 500 twists per running meter.



3 ‘ropes’ hammer welded or rolled into a ‘ribband’



‘Ribband’ wound around mandrel

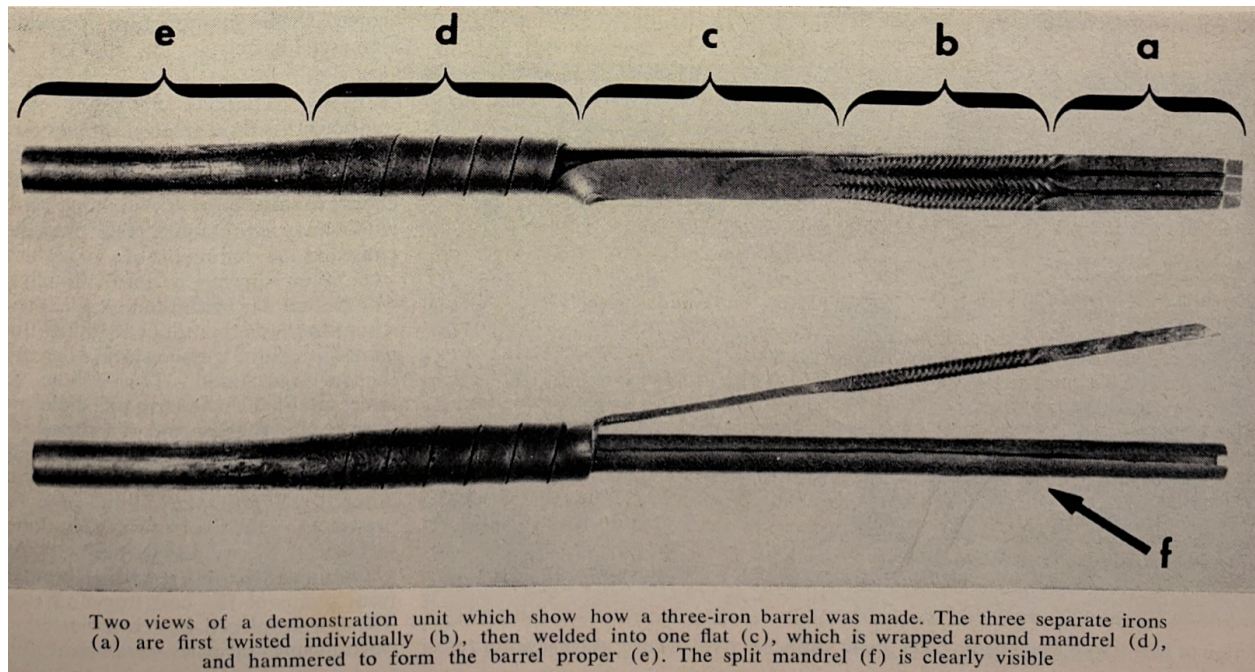
Usually a thin sheet metal sleeve or ‘chemise’ covered the mandrel or ‘*broche*’



Hammer forged into a barrel



American Rifleman, April 1959, James Pickens, “Welded Shotgun Barrels”



The “Bloom”

Molten horseshoe stubs being formed into a skelp



Engines Of War: or, Historical and Experimental Observations on Ancient And Modern Warlike Machines And Implements, Including the Manufacture of Guns, Gunpowder, and Swords with remarks on Bronze, Iron, Steel, &c.

Henry Wilkinson, M.R.A.S., 1841

The most approved modern method of converting...(horse-shoe nails)...into **(Stub-Twist)** gun-barrels after carefully sorting and picking the, to see that no cast-iron or impurities are mixed with them, is first to put about half a hundred

weight into a large cast-iron drum or cylinder, crossed internally with iron bars, through the centre of which a shaft passes, which is connected by a strap with a steam-engine, and the revolution of the drum actually polishes the nails by their friction against each other; they are then sifted, by which every particle of dust is removed. The steel intended to be mixed with them is clipped by means of large shears, worked by the engine into small pieces, corresponding in size to the stubs, and afterwards cleansed by a similar process. About 40 lbs. are thrown on to the inclined hearth of an air-furnace, where they are **puddled** or mixed together with a long iron rod, and withdrawn in a mass called a **bloom**, almost in a state of fusion, to be welded under hammer of three tons weight, by which it is formed into a long square block: this being put in, at another door of the same air-furnace, is raised to a bright red heat, and drawn out under a tilt hammer of a ton and half weight, into bars of proper size to pass the rollers, by means of which it is reduced to rods of the required size.

1851 Great Exhibition of the Industry of all Nations

http://www.gracesguide.co.uk/1851_Great_Exhibition:_Official_Catalogue

“Class VIII. Naval Architecture, Military Engineering, Guns, Weapons, etc.”

200. WILKINSON and SON, 27 Pall Mall — Manufacturers.

A series of illustrations, showing the different stages of the manufacture of gun-barrels:

(A.) Horse-shoe nails, or stubs.

(B.) Old coach-springs, cut up by means of shears.

(C.) Scrap stub-iron.

(D.) A gun-barrel in its various stages, made of a mixture of stubs and steel (A. and B.), first twisted into a spiral, then partially welded by jumping, then completely welded, and the figure of the iron brought out by acids.

(E.) A bar of iron made from scrap (C), for Damascus twist.

(F.) A bar of steel, made from scrap (D.), for Damascus twist.

(G.) Twenty-one bars of iron and steel (E. and F.), packed alternately for welding

(H.) Twenty-one bars (G.) welded together.

(I.) A square rod made by drawing out the mass (H.) between rollers.

(J.) The square rod (I.) twisted round its own axis, and then flattened, showing the figure produced.

(K.) Specimen to show the manner in which the figure called Damascus twist is produced; two bars or rods (I.), are first twisted round their axis the whole length, the one to the right and the other to the left, then flattened and welded together, then twisted spirally to form the barrel as in (D.), partially welded by jumping, and

the welding completed, filed at the end, and the figure produced.

(L.) A similar specimen, finer; composed of two bars of 48 alternations of iron and steel.

(M.) A similar specimen, composed of three smaller bars of 21 alternations.

(N.) A similar specimen, called "chain twist."

(O.) A similar specimen, called "steel Damascus."

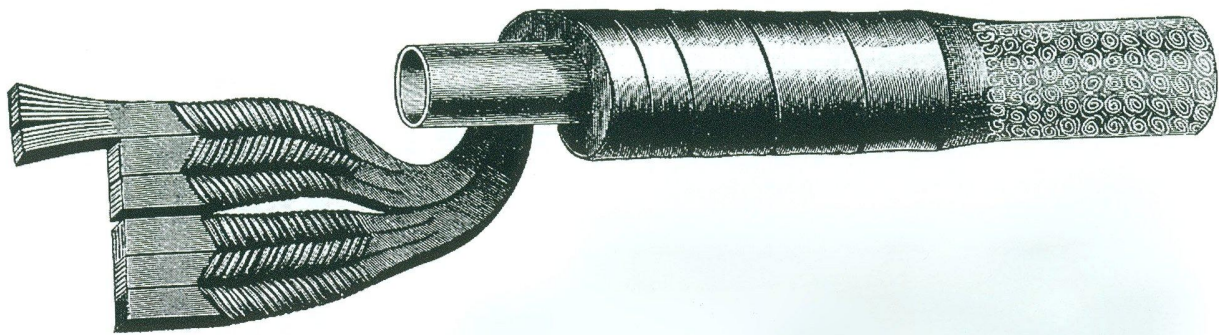
(P.) A finished barrel, composed of seven different kinds of twist.

245. HART, HENRY, 54 New Canal Street, Birmingham — Manufacturer.

Specimens of gun-barrel manufacture in every state, from the old horse-nail stubs of the earliest period to the latest improvements.

The serious accidents arising from the bursting of gun-barrels have led manufacturers to seek the means of preventing their recurrence as far as possible; fibres of iron strictly parallel would fail to impart the necessary strength, as also would iron if of a uniform crystalline composition. A better construction of material has been found in the welding together portions of iron and steel; these become interlaced in the various processes of hammering from the bundle of iron and steel called the "**bloom**," until the barrel passes finished from the hands of the forger.

The twisted appearance which is observed on the best barrels, even after the rich brown stain is removed, arises from the ribbon-like form which the "bloom," after being drawn into a strip, takes when wound spirally round a mandril previous to welding; (1) these are known as Damascus barrels. (2) Barrels of a more common kind are produced from "blooms" made exclusively of stub-nails, while a more common class still, (3) are produced of a cheaper material, not wrapped in a spiral form, but welded in the length by one heat by means of a pair of rollers; they are ultimately extended to their proper length by the same process.



July 24, 1886 *Scientific American* courtesy of Jeff Kuss

(The illustration)...shows the manner in which the metal is worked up to form the gun barrel, to make the Damascus twist. Alternate rods of iron and steel are placed upon one another, and then forged and thoroughly welded together into a solid bar, which is afterward rolled into rods. The rod thus formed is raised to a bright red heat, and on end placed in a revolving chuck, while the other remains fixed, the turning of the chuck subjecting the rod to a severe twisting throughout its whole length, so that at last it acquires the appearance of a screw having a very fine thread. Three of these rods are then placed together, the twist of one being in a contrary direction to that of the other two, and they are welded together and rolled, making the strip which is wound around the mandrel...the coil being welded till the spiral unite to form a hollow cylinder. The fine figures that appear in the finished barrel are the result of the skillfulness with which these several operations are performed, after which follows a process of hammering while the barrel is nearly cold, to further condense the metal, and the barrel is then ready to be bored, turned, and finished. About three-fourths of the material is cut away in the making, 16 pounds of iron being used in the first instance to make a pair of barrels which would weigh only 8 pounds when the welding is finished, and from three to four pounds after boring and grinding.

It is only by such elaborate treatment of the metal that gun makers have succeeded in making guns so very light, and yet of such great strength and beauty.

Charles Lancaster Damascus Demonstration Rod

Courtesy of Charles A. Herzog Sr.

Billet or ‘*lopin*’ composed of 8 strips (*alternees*) of iron alternating with 8 strips of steel is heated and mechanically rolled into an ‘iron,’ or ‘rod’.

Note that the outer rods are twisted to the left while the end of the rod is fixed, and the middle twisted to the right.



Individual rods could be given as many as 500 twists per running meter



3 'ropes' are heated and hammer welded or rolled into a 'ribband', which is then wound around a mandrel



Usually a thin sheet metal sleeve or '*chemise*' covered the mandrel



The edges of the ribband are 'jumped' (helically hammer butt welded) either manually or with a trip hammer.



Rough ground tube



Draw filed



Colored



Demonstration Rod from Midlands Gun Co., which was still offering Damascus barrels in their 1937 catalog; likely using up old stock. The Demon Hammer gun was £8 10 shillings with steel barrels and £11 with damascus. The Perfection Hammer gun was £10 10 shillings in steel and £12 10 shillings with damascus.

Courtesy of Michael Baines.



4 Iron Demonstration Rod



Demonstration rods from *Buchsenmacher u. Jagdmuseum* of Ferlach, Austria
Courtesy of Charles A. Herzog Sr.

Bottom: ‘Twist’ rods, *which are **not** twisted*, are wrapped around a mandrel
and hammer forged

Second from bottom: Three Iron Crolle Damascus

Third: Rough Damascus tube

Top: finished tube



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