

The Greatest Gunmaker You Never Heard Of ... John Hall



John Hall struggled against the entrenched and very political interests of Harpers Ferry to build his innovative breechloading rifle. His almost Quixotic quest to build a rifle with interchangeable parts was an important step in the history of manufacturing and firearms. Not that it did Hall much good in the end.

BY ALEXANDER ROSE



The Rifle Works were built at Harpers Ferry to fabricate John Hall's breechloading rifle with interchangeable parts. As such, Harpers Ferry—despite its patronage and corruption—could be called the birthplace of America's 19th century manufacturing prowess.

The greatest gunmaker in American history was not, as you might expect, someone like John Garand or John Browning, but another John—John Hall—a cranky, plucky Yankee from Maine. During his lifetime, few knew his name; today, still fewer do. Yet it was Hall who laid the foundations for the United States' economic supremacy by developing a truly "interchangeable" rifle. Think of him as the Alexander Graham Bell of firearm technology, the Steve Jobs of rifle design, the Henry Ford of the gun industry.

Hall was born in 1781 and had married a respectably well-off widow (aged 24) when, in 1810, he established his own small carpentry firm. In his spare time, Hall tinkered with guns—an interest he had acquired during militia service. "Among those things which appeared to me of the greatest importance and particularly attracted my attention," he later wrote, "was that of improvement in firearms regarding their accuracy and dispatch."

Hall focused on enhancing a rifle's "dispatch" by accelerating the speed of reloading. He experienced his great Eureka! moment in the winter of 1811. Historically, the main factor retarding the number of shots per minute a rifleman could fire was the ramrodding of ball-and-powder down a lengthy, tight barrel. Hall circumvented the process by inserting into the breech a solid metal block—the receiver—containing a flintlock mechanism and hollowed-out chamber. Hinged, this block was kept in place with a spring-catch that the shooter released to raise it. All the rifleman



John Hall found the biggest impediment to the mass production of his innovative breechloading rifle to be the handcrafting of individual components. Completely interchangeable parts were the answer, a concept he worked on refining for much of life.

had to do then was pour in powder, drop a bullet on top, snap the receiver back into place, prime the pan and fire.

Boldly, Hall started a new business to concentrate on making his innovative rifle. Even with around seven employees, however, the workshop never managed to produce more than 50 rifles a year—but even for that modest number there were insufficient customers. Hemorrhaging money, Hall desperately sought a government military contract.

In 1813, his proposal finally reached the desk of Colonel George Bomford, a West Point-trained engineer serving as Colonel Decius Wadsworth's deputy at a new agency, the Ordnance Department. Intrigued by Hall's design, Bomford ordered 200 rifles just before Christmas 1814. There

was one problem: Bomford wanted them delivered by April 1, 1815—an impossibility. Hall reluctantly turned down the offer. Nevertheless, he focused, with his characteristic beetle-browed intensity, on cranking out Bomford's rifles by increasing the speed of production.

The greatest time-waster, Hall noticed, was the handcrafting of each individual piece of a gun to mesh snugly with its neighbors. While every hammer or trigger looked similar, on closer inspection they weren't. That was because a gunsmith constructed a gun from scratch, including carving and polishing the wooden stock, boring and rifling the barrel, fitting the sights and firelock, and fashioning each piece as best his skills allowed.

This age-old mode of production resulted in grave disparities in performance and reliability. The

barrel lengths of the government's Model 1803 rifles, for instance, could be an inch shorter or longer than regulations stipulated depending on the maker's whim, while the style of rifling and quality of materials varied widely.

The solution, Hall deduced, lay in removing this randomness by perfecting the manufacture of each rifle's components. Since it was the human factor causing the trouble, the simplest fix was to replace fallible people with infallible machines to produce the parts. Even so, there remained several major problems, not least of which was that these extraordinary contraptions, since they did not exist, still needed to be designed and built.

In June 1816, trying again to interest the Ordnance Department, Hall, undaunted, penned one of the most important letters in American history. He proposed "to bring the rifles to the utmost perfection [by making] every similar part of every gun so much alike that it will suit every gun, e.g. so that every bayonet will suit every barrel, so that every barrel will suit every stock, every stock or receiver will suit every barrel, and so that if a thousand were taken apart and the limbs thrown promiscuously together in one heap, they may be taken promiscuously from the heap, and will all come right."

For the first time, Hall was proposing the mass-production of a good on the principle of what would become known as "interchangeability." Interchangeable parts were not similar but identical, meaning that they could be slotted together quickly by a semi-skilled workman following a set procedure.

Now, achieving interchangeability was regarded as the Holy Grail





by a few mad geniuses, like Hall—and a fool's errand by everybody else. Eli Whitney, inventor of the cotton gin, gamely attempted the feat in the later 1790s but experienced only humiliating, and expensive, failure. If even Whitney couldn't do it, then nobody could, skeptics agreed. Hall's proposal, then, might well have been ignored except that, either by luck or by shrewdness, his timing was pitch-perfect.

Owing to the Army's logistical chaos and administrative incompetence, rendered embarrassingly apparent during the War of 1812, the Ordnance Department was shaken from top to bottom by Wadsworth and Bomford to rationalize arms procurement and manufacture.

In 1815, they began a major reorganization of the American military-industrial complex. Henceforth the two federal armories at Harpers Ferry (Virginia) and Springfield (Massachusetts) would pursue conformity in all things, from using precision gauges and standardized accounting to constructing "pattern" weapons (i.e., perfect specimens issued to private makers that they would



copy precisely) before production even began.

Easier said than done, for Harpers Ferry had been cursed from its founding. Whereas Springfield benefited from its New England geography and a pool of local gunsmithing talent, Harpers Ferry, far away from roads and lacking natural resources, was created as a pork-barrel project subject to intense political pressure from Washington. On the broadest level, the rivalry between the two armories exemplified the growing divergence between North and South.

In Massachusetts, the superintendent was the no-nonsense Roswell Lee, who was intent on making Springfield the most efficient and economical arms manufacturer on the continent,

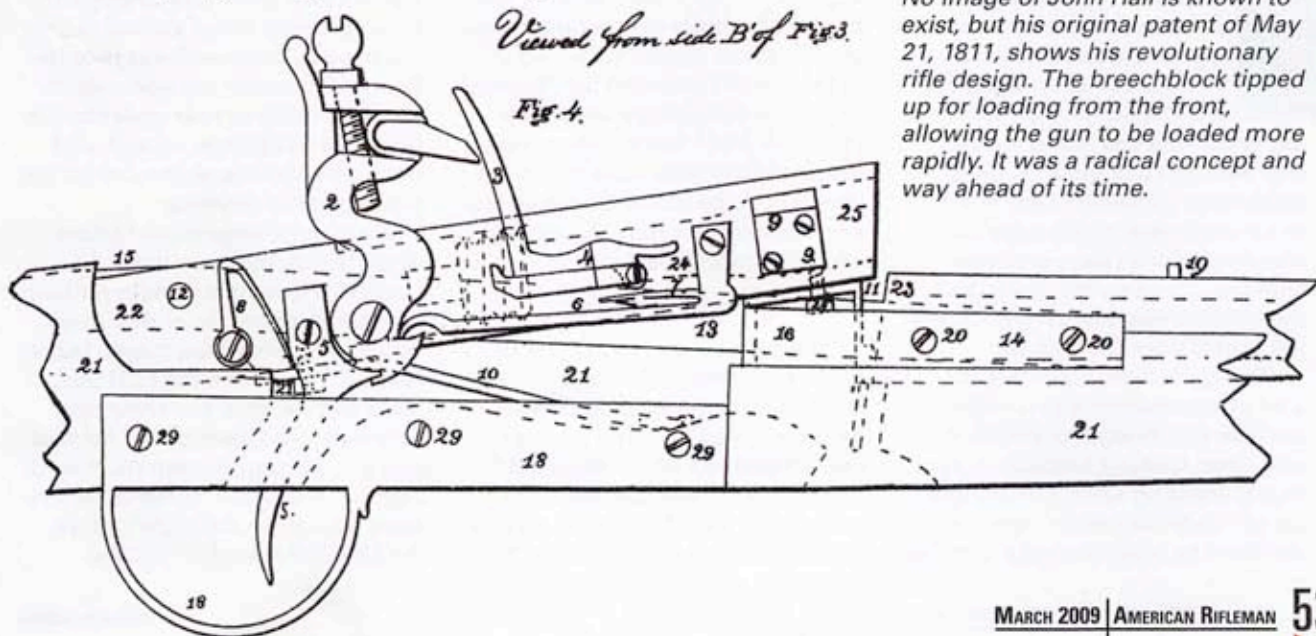
whereas from 1807 Harpers Ferry was controlled by James Stubblefield, a man in whom patronage and paternalism were inextricably entwined. Stubblefield ran the armory as a personal fiefdom, his industrial version of a courtly Southern plantation. In true aristocratic style, he rarely bothered keeping accounts, disliked Lee's vulgar Northern habit of time-keeping, and appointed so many relatives to sinecures at the armory that his regime was known as the "Junto." Still, the armorers at Harpers Ferry were fond of their feudal master: Unlike the hyper-efficient Lee, Stubblefield allowed them to work when they wished, to drink and carouse on the job, and take days off as the mood struck them.

continued on p. 82

View of the piece ready to receive its charge

Viewed from side B' of Fig. 3.

Fig. 4.



No image of John Hall is known to exist, but his original patent of May 21, 1811, shows his revolutionary rifle design. The breechblock tipped up for loading from the front, allowing the gun to be loaded more rapidly. It was a radical concept and way ahead of its time.

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JOHN HALL

continued from p. 53

Wadsworth and Bomford, who naturally found Lee's approach by far the more congenial, were displeased to discover that while at Harpers Ferry 140-odd men were needed to make 4,000 muskets, half that number at Springfield sufficed to produce the same number. Yet, owing to his friends in Congress, Stubblefield's position was secure. With the arrival of Hall's letter in June 1816, however, Wadsworth and Bomford finally saw their opportunity. By establishing an autonomous Rifle Works at Harpers Ferry under Hall, they planned to undermine the Junto from within.

Hall was happy to serve as a Trojan horse so long as he was left in peace by Stubblefield, who, well aware of the intrigue afoot, sought to destroy the Rifle Works. The latter need not have overly troubled himself, for by early 1823 Hall was close to resigning, citing the "intense application, excessive mental exertion, and great length of time necessary" to build his factory. He had vastly underestimated how arduous and daunting a task it was to achieve machine-powered interchangeability. Bomford nevertheless persuaded him to stay the course, and just two months into 1825 Hall fulfilled his contract. Best of all, he observed jauntily, he had brought "every thing relating to my arms to its utmost point of perfection." For the first time, anywhere, Hall had achieved interchangeability.

Government inspectors fell over themselves in their praise for the new breechloaders.

Exhaustive trials affirmed "the superiority of this arm over every other kind of small arm now in use." Its celerity of fire was incredible—with no concordant loss in accuracy. After 38 men fired at a target 100 yds. away for 10 minutes at their own speed, the testers found that regular muzzleloading rifles had discharged 494 times (with 164 rounds, or 33 percent, hitting the target) and Army-issue muskets 845 (with just 208, or 25 percent, in the target), but the Halls

toted up 1,198 shots, of which 430, or 36 percent, were in the target. The Hall breechloader, in other words, was as accurate as a long-range rifle but faster to reload than even a musket (which was smooth-bored to hasten charging).

Only adding to Hall's joy was the news of the imminent departure of Stubblefield, a victim of Andrew Jackson's election to the presidency and the revelations of his own lackluster performance as superintendent in the light of Hall's success.

At that moment, Hall reached the pinnacle of his career. Henceforth his victories would be tempered by failures and beset by aggravations. The most pressing problem confronting him was time. In the beginning, his rifle had been the most advanced firearm in the world, but here it was, 17 long, hard years after he had first approached the War Department, and the world was inexorably catching up. Johann Nikolaus von Dreyse in Prussia was working on the still more futuristic "needle-gun" and a Scot, the Reverend John Forsyth, had invented the precursor of the percussion cap—the mechanism that broke the centuries-long dominance of the flintlock.

A younger man would have relished the challenge, but Hall, carbunckled now by age and irascibility, was no longer that man. Redesigning his gun to accommodate percussion caps would add years to the development process and Hall was reluctant to make the necessary changes anyway. By 1834, the War Department was hoping he would soon retire—he didn't—but three years later, Hall met his match in Edward Lucas, the ruthless new superintendent of Harpers Ferry and a Jacksonian appointee.

Between 1837 and 1840, Lucas fired 34 highly skilled employees (of whom 28 were enemy Whigs dating from Stubblefield's reign) and replaced them with Democrats. Despite the rapid deterioration of his health, Hall proved harder to budge, so Lucas instead

slowly strangled his breechloader project. The tactic succeeded when Hall departed Harpers Ferry in 1840, but strategically it didn't matter as by then Springfield's ascendancy was assured. During the Civil War, the South would pay dearly in blood and treasure for the industrialized North's proficiency in armsmaking.

As for Hall, a depressed and sick man, he died on February 26, 1841. His great gun dead, his legacy nevertheless lived on, providing Hall with a posthumous last laugh. At the Rifle Works, Hall had trained scores of handpicked employees in the necromantic ways of interchangeability.

Eventually, they went forth into the world, multiplying, and prospering. In their vast diaspora, they applied the teachings of their high priest to every sector of American business enterprise. In so doing, they pollinated their specialist knowledge of how to make machines that make machines to a rapidly enlarging circle of firms.

By the mid-1840s and 1850s, America was home to an entire generation of talented, armory-nurtured mechanics, engineers, managers, artificers, and inventors. These individuals' expertise boosted the nascent mass-production of shoes, watches, clocks, bicycles, typewriters, ready-to-wear clothing, elastic and rubber goods, and later, automobiles. John Hall, in short, transformed America from an almost medieval, workshop-based economy of craftsmen into the modern economic powerhouse it remains.

As such, instead of languishing in obscurity, Hall rightfully deserves a parade, a day off work, a monument, and some fireworks. ★

American Rifle

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