

A.D. 1784 N° 1420.

MANUFACTURE OF IRON AND STEEL.

CORT'S SPECIFICATION.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, HENRY CORT, of Fontley, in the Parish of Titchfield, in the County of Southampton, Esquire, send greeting:

WHEREAS His most Excellent Majesty King George the Third, by His Letters Patent under the Great Seal of Great Britain, bearing date at Westminster, the Thirteenth day of February, in the twenty-fourth year of His reign, did give and grant unto me, the said Henry Cort, His especial licence, full power, sole privilege and authority, that I, the said Henry Cort, my executors, administrators, and assigns, should and lawfully might make, use, exercise, and vend, within England, Wales, and the Town of Berwick-upon-Tweed, my new Invented "**Method of Shingling, Welding, and Manufacturing Iron and Steel into Bars, Plates, and Rods of Purer Quality and in Larger Quantities by More Effectual and Expeditious Methods and with Fewer Fires Than Heretofore Used;**" in which said Letters Patent there is contained a proviso obliging me, the said Henry Cort, by an instrument in writing under my hand and seal, to cause a particular description of the nature of my said Invention, and the manner in which the same is to be performed, to be inrolled in His Majesty's High Court of Chancery within one calendar month next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that in compliance with the said proviso, I, the said Henry Cort, do hereby describe and ascertain the nature of my said Invention, and the manner in which the same is to be performed, as follows; that is to say:—

THE NATURE AND METHOD OF THE PROCESS AND APPARATUS:

The crude iron, commonly called pig iron or cast iron, is first introduced into a reverberatory or air furnace heated by pit coal or common coal. In this furnace the fuel burns in a separate combustion grate, and the intense flame and heated gases are caused to reverberate from the curved arched roof down upon the hearth, where the iron is placed upon a bed of sand and slag, wholly secluded from direct contact with the solid sulfurous fuel.

When the furnace is brought to a white welding heat, the pig metal melts and becomes fluid. It is then constantly stirred, agitated, and worked with an iron paddle or rabble by the workman through a small aperture in the furnace door. Under this intense heat and exposure to the reverberated flame and air, the carbon and impurities contained in the pig iron are burned out and discharged in the form of elastic vapor. As the decarbonization proceeds, the liquid metal loses its fluidity, separates into granular particles, and "comes to nature," assuming a spongy and pasty consistency.

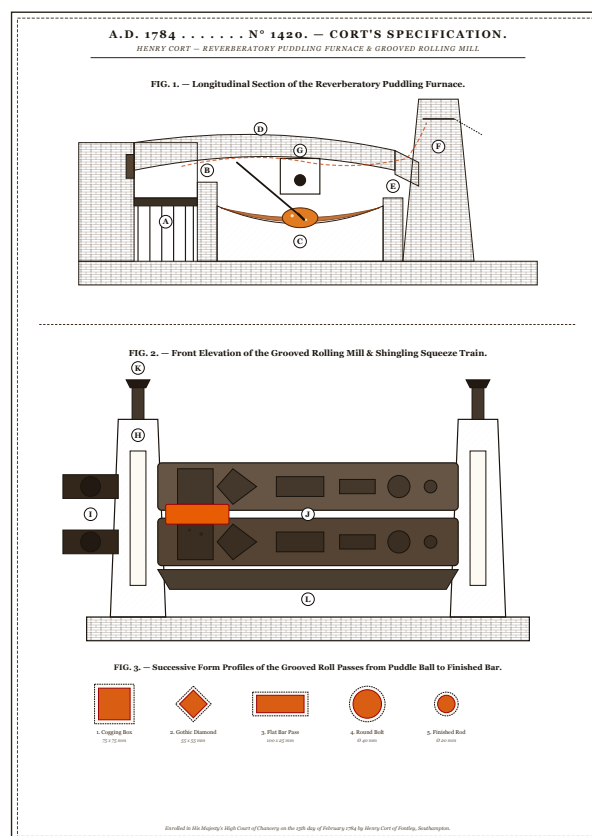
The puddler continues to gather and work these pasty particles together into rounded masses, loops, or puddle balls of sixty to eighty pounds weight each. When the ball is thoroughly brought to a welding heat, it is quickly withdrawn from the reverberatory furnace and conveyed directly while hot to the shingling hammer or grooved rollers.

The red-hot puddle ball is immediately passed between pairs of large chilled cast-iron rollers furnished with corresponding grooves of graduated dimensions—square, gothic, flat, and round. The powerful continuous rotary compression of the grooved rollers exerts a uniform hydrostatic squeeze throughout the entire mass, violently expressing and discharging the liquid iron silicate cinder and slag from the internal pores, and welding the pure metallic iron crystals into a solid, compact, fibrous bar or billet in a single heat, without the necessity of repeated reheats or finery fires.

CLAIMS AND ENROLLED DRAWINGS (GB 1420)

Having thus described my Invention, what I claim and secure by the said Letters Patent is:

1. **The method of converting pig iron into wrought malleable iron** by melting and refining the same in a reverberatory furnace heated by coal flame alone, without bringing the metal into contact with the solid sulfur-bearing fuel;
2. **Decarbonizing and working the fluid molten iron** with an iron rabble upon a concave hearth under reverberated radiant heat until the particles separate, "come to nature," and are gathered into cohesive puddle balls;
3. **Shingling and welding the red-hot spongy puddle balls** by passing them directly through pairs of heavy revolving rollers having corresponding graduated grooves; and
4. **Expressing liquid slag and consolidating fibrous wrought iron bars** in a continuous rotary rolling operation in a single heat, producing iron of superior tenacity and ductility in vastly greater quantities than heretofore achieved by tilt hammers.



IN WITNESS WHEREOF, I, the said Henry Cort, have hereunto set my hand and seal, this Thirteenth day of February, One thousand seven hundred and eighty-four.