Manufacture of Fire-Amrs.---Springfield, Birmingham.

A short time since the Springfield (Mass.) Republican had a very interesting article about the manufacture of fire-arms in that place. The following information respecting the manufacture of fire-arms in Springfield, Mass., and Birmingham, England, we believe will be of no small interest to many.

In Springfield there is an armory in which, last year, no less than 21,000 percussion muskets, complete, were manufactured, and 57,000 muskets were altered from flint to percussion. The average number of men employed is 381. We quote what is said ot the mechanism of the gun:

"The manufacture of a single musket is effected by four hundred different operations, and the majority of the men employed engage in only one of the operations. A larger number of muskets were manufactured last year than any other previous, and a calculation, based upon the number turned out, shows that, throughout the year of 313 working days, of ten hours each, a musket was completed every eight minutes and fifty-six seconds. The various parts of a musket pass, during their manufacture, through the hands of inspectors, who, with their guages, determine the exact dimensions of every piece, and reject every one that is not exactly what is required. Thus, a hundred thousand muskets might be taken to pieces and thrown promiscuously into a pile, and the whole taken up and put together again without the missfit of a single component to its appropriate place. Thus, too, when the arms are in use, there is never need of sending them to the armory for repairs. Hammers, screws, springs, &c., furnished from the armory, as extras, will take the place of any damaged part precisely as if they were made for the arms to be repaired.

The process of manufacturing the musket barrel is one of the most important and difficult in the whole range of the armory operations, and one which is guarded with multiplied tests, at every step of its progress, from the bar to the finished tube. The bar, which is the best Salisbury and Ancram refined iron, is first cut into lengths, weighing 10 3-4 lbs. each. These are rolled into shapes, and then the edges rolled up, lapped into each other and welded. They are then inspected, and the imperfect ones rejected. As they pass along through boring, and grinding, they are subjected to inspection at each step; and the workmen are held responsible for the full value of any barrel they may spoil, at the stage in which it is spoiled, and the amount is deducted from their earnings; and we may say here that the same course is adopted to every component of the musket. The barrel having been reduced to the dimensions required for proof (by powder), which dimensions are three-hundredths of an inch greater in the exterior diameter of the bore, than the finished barrel, leaving an ounce and a half to be worked from each barrel, in finishing; it is then subjected to the powder test. Fifty-five barrels are loaded and discharged at the same time, in a building made for this purpose. Each barrel is discharged twice, the first charge consisting of one-eighteenth of a pound of powder, one ball, and two wads, each wad occupying three-fourths of an inch of the bore, and each ball weighing one-fifteenth of a pound. The second charge consists of one twenty-second of a pound of powder, one ball, and two wads, and each charge is well rammed. The barrels are laid on a cast-iron grooved bed, and the balls are discharged into a bank of clay, which is occasionally washed for the lead it contains.

The inspection of the barrels is so rigid, before they come to the proof, that very few of them burst. After proof they are again inspected, as before, to see that therear no ringbones, cinder holes, flaws, or cracks, are defects of any kind, that will not disappear in the finishing."

Birmingham, England, is the greatest place in the world for the manufacture of muskets and common fire-arms.

According to the census of 1841, the number of persons employed in Birmingham in the various subdivisions of trade required in the manufacture of a gun, in its three great parts—barrel, lock, and stock—was 2,400. This number, however, cannot be held to have expressed with anything like accuracy the total number of persons who procured their subsistence by the gun trade of Birmingham. At the present time it is estimated that about 1,000 persons are employed in Birmingham in the manufacture of gun barrels alone; and that if this number were multiplied by six, the product would represent as nearly as possible the total number of persons in the town and neighborhood who are employed in the manufacture of fire-arms. Birmingham principally supplies the British army and navy and the East India Company's service with muskets, and executes orders for some of the locks, and nearly all the barrels, used by the various persons who reside in London and other parts of the country, and call themselves gun-makers—but whose principal business is to put together and otherwise finish the materials which Birmingham produces. Besides military guns it supplies fowling-pieces and sporting guns of every variety for the home and colonial trade. It also manufactures large numbers of inferior guns for traffic with the Africans. There is a constant demand for guns for Africa. "There is," said a manufacturer, "no end of the quantity of guns made here for that market. The larger portion are taken by the Liverpool merchants. They are bartered generally for gold dust, elephants' tusks, palm oil, spices, &c. The wars among the negroes constantly keep a couple of thousand men at work in Birmingham." The trade with the United States is not so extensive, as the Americans prefer to manufacture their own gun-barrels. Birmingham, however, and the districts around, supply the United States with large quantities of locks.

Damascus guns are manufactured for the nonce in any quantity in Birmingham. The work is done as follows:—

Three bars of iron and three bars of steel, each three inches wide and half an inch thick, are placed alternately upon each other, so as to form a three-inch pile, that is, a pile of iron and steel three inches wide and three inches thick. Especial care is taken that the iron and steel are placed alternately. The pile, after being heated red hot, (or, more properly, raised to a welding heat) in the furnace, is rolled or reduced into a bar three inches wide and three-quarters of an inch thick. This process of course increases the length by diminishing the thickness of the bar. It is next cut into pieces of equal length by means of the steam-shears, or other cutting instruments—which pieces are piled again, four high, making the piles once more three inches thick, care being taken to have the iron and steel bars so placed as not to have two iron, or two steel-sides together. These piles are then put into the furnace, heated to welding heat, and rolled into square rods half an inch thick. These rods are again cut into lengths of about three feet, again heated, and, being fixed into a machine, are twisted in the shape of a screw from end to end. Two of these twisted rods (one forming a right-hand screw, and the other a left, with an equal number of twists or screws in each) are then welded together, and afterwards passed through the rolls, coming out in strings about a quarter of an inch thick and three quarters of an inch wide. The strings of this thickness are for the fore end, or thinnest part of gun barrels. Two other (right and left) twisted rods are also welded together, and rolled into strings of the same width, but three eighths of an inch thick, and these are used for the back part or breech-end of of gun barrels.

The Damascus iron, when polished and rubbed with an acid, displays a beautifully mottled appearance, or "figure" which is much admired. At one time horse-shoe stubs were greatly sought after for the purpose of mixing with the steel, as they were of the best iron, and were thought to aid in the production of the "figure."

They are no longer in the same demand. The Damascus iron having been made, the end of the rod is then grasped by the twisting machine, and held fast by a revolving vice moved by steam power, and twisted while in a cold state, around a mandril, with as much ease as if it were a piece of thread wound around a lady's finger. This is the first stage of the twisted gun-barrel. It is next consigned to the furnace, till it is of a proper heat, when the edges of the spiral are welded together by repeated blows from the hammers of the welders.

The gun-barrel, whether of the common steel or of the common Damascus, is now ready for the next operation, which is that of boring. The business of the gun-barrel borer is to clean and polish the interior of the tube, and at the same time to work it to the size of bore required, and to give it a perfectly smooth and even interior surface. This operation is performed by steam power, and is superintended both by men and women. The process of boring is performed by an angular rod of the har est steel, which is made to revolve in the barrel by steam power, which scrapes the inner surface as it turns. It is necessary that this rod should not be heated, as the friction would in a short time wear down the angularity and render the rod useless A constant dripping of cold water is, therefore, directed upon it, and by this means the boring of an ordinary barrel may be completed in about forty-five minutes. For fine boring the superior barrels of Damascus steel, oil instead of water is used. The barrels are bored with a succession of rods, and the process generally occupies from two hours and a half to three hours, at the end of which time the inner surface of the tube becomes as beautifully smooth and polished as a mirror.

The interior of the barrel being thus completed, it is submitted to the grinders. The stones for grinding the barrels weigh about three tons, and are from three to six feet in diameter. They revolve with a dizzy velocity. The grinders make nearly 18 dollars per week in England; this is good wages, but the business is very unhealthy and dangerous. Sometimes the stones fly to pieces and the dust is hurtful to the lungs and eyes.

There is a law in existence in England against the sale or use of any firearm, the barrel of which has not been proved at the government proof house at Birmingham.

The buildings connected with the proof house form three of the four sides of an interior court; at one extremity of which, and detached is a small powder magazine. The proof house itself is a detached building. All the interior of this room is lined with plates of cast-iron, three-quarters of an inch in thickness: the door and window shutters of the apartment are also cast-iron. The barrels are set in two iron stocks; the upper surface of one has a small gutter, to contain the train of powder; on this train the barrels rest, with their touch-holes downwards, and in the rear of the breeches of the barrels is a mass of sand. A second mass of sand is formed before the muzzles of the pieces under proof, to receive the balls. When the train of powder is laid, and the gun or pistol barrels placed on the stocks, the window shutters are closed up, and fire is set to the train from without, by the insertion of a bar of red-hot iron through an orifice in the wall. A deafening explosion succeeds. After a short delay, lest any of the barrels should have hung fire, the window shutters are opened, the smoke dissipates, and the attendants remove the barrels.

Gun barrels are bought by gunsmiths all over England. Gunsmiths do not make either the barrels or locks of guns, they only put them together There are plenty of gunsmiths who can make a gun from the very stump. We have seen a rifle made from stem to stern, the barrel finely chased with silver, by a gunsmith in this State.

Colt's Revolver Claimed to be an English Invention.

Sir,—A great deal has been said lately respecting the claim of Mr. Colt to the invention of the revolving pistol; it will, perhaps, throw a light on the subject when we state that in the year 1822, between February and September, we made the barrels of 200 muskets and 200 pistols, upon precisely the same principle as those exhibited by Mr. Colt, for a gentleman named Collier, Fountain-court, Strand, upon which occasion the lubricating fluid, now so universally used by engineers, viz., soap and water, was first introduced by us; one of these very barrels was, we are informed, exhibited in the English Firearm department of the Exhibition. We have one also in our possession, and can easily prove our assertion by our books, which we shall be happy to show to any gentleman upon application, so that the matter may be set at rest as to Mr. Colt being the original inventor. JOHN EVANS & SON.

Engine Lathe and Tool Manufactory, 104 Wardour-street, London, Oct,, 1851.—[London Mechanics Magazine.

[It is not an uncommon practice now-a-days to claim many new American inventions to be of English origin, and some of our people do the same thing with English inventions: we cannot believe in the above. Messrs. Evans & Son, we think, have made some mistake. Can any one refer to a published account of their pistols in 1822. We believe not; Mr. Colt is no doubt an original inventor, and we will believe him to be the first inventor until we see some stronger proof to the contrary than the note of Messrs. Evans & Son.

Paris Artesian Well

A late writer on "Paris in 1851," in Blackwood, furnishes the following remarks on this well:—

Near the Hotel des Invalides is the celebrated well which has given the name of all the modern experiments of boring to great depths tor water. The name of Artesian, is said to be taken from the province of Artois, in which the practice has long been known.—The want of water in Paris induced M. Mulot to commence the work in 1834. The history of the process is instructive. For six years there was no prospect of success; yet M. Mulot gallantly persevered. All was inexorable chalk; the boring instrument had broken several times, and the difficulty thus occasioned may be imagined, from its requiring a length of 1,300 feet, even in an early period of the operation. However, early in 1841, the chalk gave signs of change, and a greenish sand was drawn up. On the 26th of February, this was followed by a slight effusion of water, and before night the stream burst up to the mouth of the exavation, which was now 1,800 feet deep; yet the water rapidly rose to a height of 112 feet above the mouth of the well, by a pipe, which is now supplied by steamning, giving about 600 gallons per minute. Even the memorable experiment confutes, so far as it goes, the geological notion of strata laid under each other in their proportion of gravity. The section of the boring shows chalk, sand, gravel, and shells, and this order sometimes reversed in the most casual manner, down to a depth five times the height of the cupola of the Invalides. The heat of the water was 83° Fahrenheit. In the theories with which the philosophers of the Continent have to feed their imaginations, is that of a central line, which is felt through all the strata, and which warms everything in proportion to its nearness to the centre. Thus is was proposed to dig an Artesian well of 3,000 feet, for the supply of hot water to the Jardins des Plantes and the neighboring hospitals. It was supposed that at this depth, the heat would range to upwards of 100° Fahrenheit; but nothing has been done—even the well of Grenoble has rather disappointed the public expectation; of late the supply has been less constant, and the boring is to be renewed to a depth of 2,000.

Screw vs. Paddle.

An interesting experiment took place recently, at Copenhagen, between two steam-vessels of equal size, 800 tons and 260 horse-power. Each vessel's engines were made by Maudsley, of London. The Holgerdenser (paddle,) carrying two 60 pounders and six 24's; and the Thor (screw,) carrying fourteen 32's, were lashed stern to stern, when the Thor towed the paddle at the rate of 2 8·10ths knots per hour through the water, in spite of her full power applied to her paddles. Being disconnected they were then tried against a strong breeze, when the screw again had the advantage over the paddle; but when they were put before the wind (no sails set) the paddle had the advantage of the screw to the same extent. Both vessels were of similar model, the paddle being a little longer, narrower, and sharper than the other. Both had their armaments, as above, and a full complement of coals on board; the paddle drawing 12 feet 3 inches aft, and 12 feet forward; screw, 15 feet 6 inches aft and 14 feet forward.