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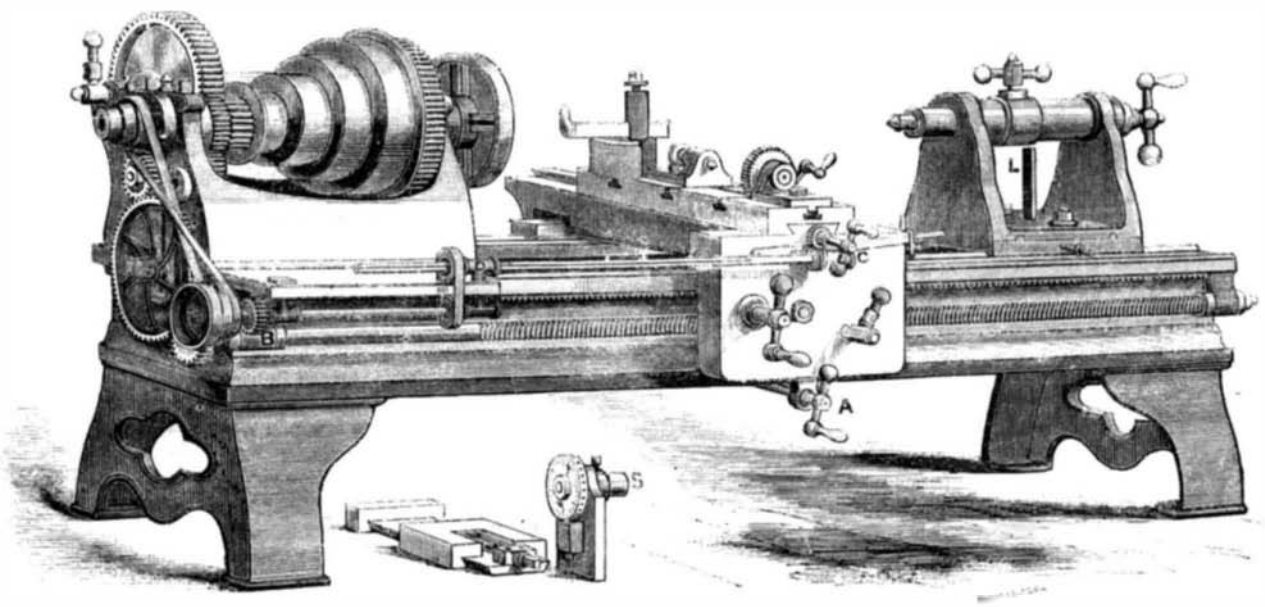
Combined Screw Lathe and Milling Machine.

A noticeable feature in modern American workshop machinery is the several uses to which the same tool can be applied. Time was when a lathe was merely a rude affair for making an object round, but it has been vastly improved upon by the efforts of ingenious men, and the different attachments which have been made to it render it one of the most indispensable tools.

The lathe here illustrated is a strong and well-designed machine: it swings 28 inches, and is a screw-cutting and milling machine combined; besides this it can be used for a variety of purposes, such as boring, that other lathes are not well adapted to.

A novel feature in this lathe is the addition of



FAY'S COMBINED SCREW LATHE AND MILLING MACHINE.

cross-feed. This is a most important advantage on some kinds of work, as it is done more expeditiously than by hand, and of a much better quality. The arrangement can be seen in the engraving where the feed screw shaft has a small pinion cut on it, in which a worm runs; the worm is driven by a small countershaft and belt on the shears near the cone pulleys. This arrangement can be easily detached and thrown out of gear by removing the box, D, and releasing the thumb screw, C. The carriage and slide rest is raised or lowered so as to adjust work thereon by the handle, A, which works a vertical screw by bevel gears on the back of the lathe.

The variety of work for which this lathe is adapted is as follows:—It may be used as a common turning and screw-cutting engine lathe, with the advantage of a cross-feed, which is not usually obtained with lathes of this size. It may be used as a boring engine. The work can be easily fastened to the table and afterward adjusted perpendicularly or laterally with the same facility as in the improved boring engines now in use in the best shops. It is eminently adapted for use as a heavy milling machine. One of its merits, in this respect, is the facility with which it can be adjusted perpendicularly, enabling the workman to make two or more cuts upon any piece and then return the lathe to exactly its first position, ready for the first cut on another piece by simply turning one handle. The machines have been used during the past year for working pieces of wrought iron and steel of larger dimensions than are commonly worked in milling machines, doing the work quicker and getting a smoother surface than by the planer. It may be used as a gear cutter for any size within its range, for the making of rimmers and cutters, fluting of taps, slabbing of bolt heads, etc. For cutting bevel gears the spindle, S, has a joint attached capable of adjustment at any angle.

For further particulars address L. D. Fay, Worcester, Mass.

Portable Furnace for Casting Large Anvil Blocks.

The rapidly increasing demand for huge castings of this kind has induced Mr. Ireland, of Manchester, to take up their production as a distinct branch of trade. In pursuance of this design he has organized a staff and provided portable plant, with which he proceeds from place to place as circumstances require, pitches his camp, and runs off anvil blocks of any dimensions to order with the utmost promptitude, finding everything but iron and blast. At the first glance it might be thought that foundery plant, to be portable, must be inefficient. We can assure our readers that Mr. Ireland's plant is nothing of the kind. That used at Mr. Bessemer's works consisted simply of a cupola 4 feet in diameter within the lining, and 12 feet deep to the chargingdoor, constructed on the "upper tweer" principle, patented by the owner. There is, apparently, no very material difference between this and the ordinary cupola with multiple tweers, extensively used in the States, and rapidly gaining favor here. A belt about 2 feet 9 inches deep surrounds the cylinder at about 7 feet from the ground, and into this belt the blast is delivered by two largepipes, one on either side. The upper row of tweers consists of sixteen orifices, each about 3 inches diameter, ranged equidistantly above the level of the main supply pipes, which discharge into the lower portions of the belt. The lower tweers are only four in number, each about 8 inches in diameter, disposed opposite each other, but not opposite the main pipes. By this means the blast is very equally distributed through all the tweers. The upper row do most of their work round the edges, while the lower supplies air to the very center of the mass of fuel, which would otherwise hardly procure enough from the diffused blast proceeding from the smaller orifices. At the time of our visit, this cupola was bringing down 9 or 10 tuns of iron per hour, but the blast, produced by a 4-foot Lloyd's fan, running about 900 revolutions per minute, was insufficient. Its pressure barely equaled 11 inches of water; properly it should not be much less than 16 inches, with which Mr. Ireland states that he can easily melt 13 tuns per hour—a very high performance, our readers will admit. He has recently cast an anvil block, weighing no less than 205 tuns, at the Bolton Iron and Steel Works, at the rate of 25 tuns per hour, with two cupolas precisely similar to the one under consideration. The consumption of coke is very moderate, once everything is well warmed up, not greatly exceeding 1 cwt. of coke per tun of iron. The inferior performance at Greenwich, was due mainly to want of power in the engine driving the fan—a 12-horse portable. A strange contrast exists between such operations as this and those in which Mr. Ireland first engaged in the year 1809, when he, in common with many other founders, considered it a good day's work to melt a single tun of iron in ten hours.

It is not easy to see how the casting of large masses can be more economically effected than under this system. The lining of the cupola being removed, it is brought into the condition of an ordinary boiler shell of no very excessive weight, easily admitting of transport by either rail or water. The whole affair being carried out by contract, the manufacturer is saved an immense amount of trouble and responsibility, while all the operations being conducted by those who possess a special knowledge and experience of the matter in hand, the best results are sure to be obtained at the least possible outlay. In many cases, without the existence of such a system, the manufacturer would find himself compelled to erect a cupola of large dimensions for which, the block once cast, he would have no further use.

It is out of the question to think of casting such masses at a distance within the walls of an ordinary foundery,and then removing them to their permanent destination. The handling of such unwieldy blocks is an excessively expensive task, while their carriage over considerable distances is next to impossible. They cannot be conveyed by rail, and no vessels but those specially constructed for the purpose could take one as cargo.—*London Engineer.*

During the war 75,000 persons served in the navy. Of these 1,406 were killed, and 1,638 wounded.