IMPROVED DOVETAILING MACHINE.

The technical term dovetailing is one pertaining to joinery. Its form is similar to the tail of the dove, and the name is probably derived from the resemblance to that familiar object.

Dovetailing, or the formation of the dovetail joint or corner, is a means for making a substantial box or frame without the addition of any material or fastening other than the interlocked construction of the dovetail.

There are several styles of this joint in use; namely, the plain dovetail, which is placed in position not liable to exposure, and where strength without regard to appearance is the object; the blind or hidden dovetail, which is used where the front is to be shown; and the miter dovetail, which is to be used where the article to be joined is to be seen on all its sides.

The two former are those commonly in use, especially in furniture manufacturing, where we have a familiar example in drawers, where the blind or hidden dovetail is used for the front of the drawers, and the plain dovetail is used for the back of the drawers. The work of forming these dovetails has, until recently, been done almost entirely by hand labor, and the rapidity of production by an expert workman is such that it has been difficult to produce a machine to compete successfully with him, considering the cost of machine, and labor of conveying material to and from it.

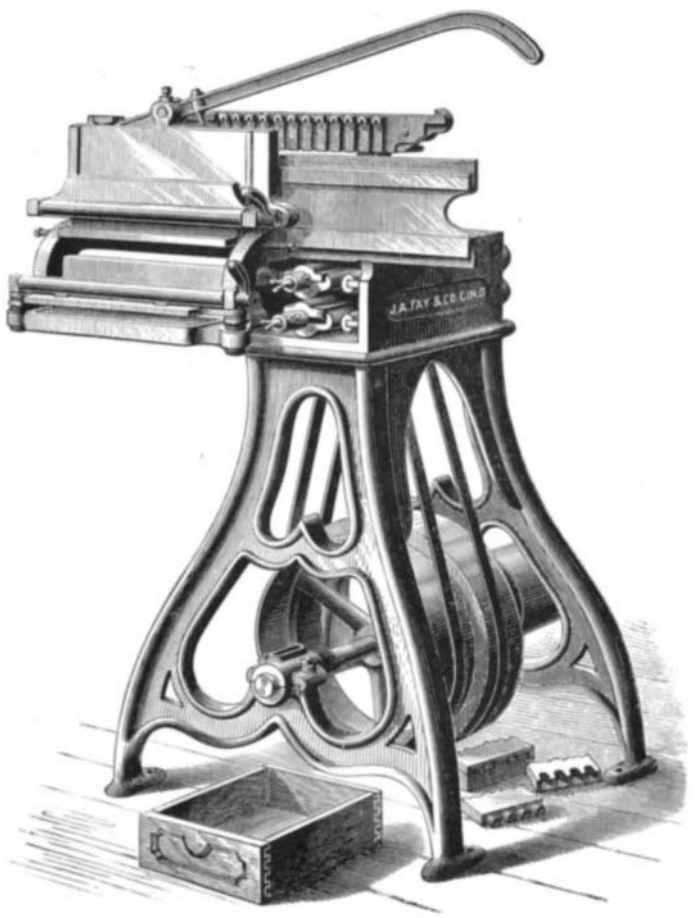
Some of these machines have been constructed on plans to produce different forms of joints, but which were inventions of the routine of construction, and did not meet the approval of manufacturers. A new machine is now presented for the inspection of those interested in this class of work, constructed by Messrs. J. A. Fay & Co., the eminent wood working machinery manufacturers of Cincinnati, Ohio.

We herewith present an illustration of the machine, from which some idea can be obtained of its form, simplicity, and method of operation. It is designed for working two, three, or four pieces, cutting the dovetail on back, front, and side at one operation. The counter shaft is in the middle of the machine, carries the tight and loose pulleys, and the cone pulley, which conveys the power to the spindles, in which the cutters are placed. The cutter spindles are stationary. The material is placed on the vertical and horizontal plate, and held in position by cam rollers.

The pin, or male part, of the dovetail is cut on the horizontal table, and the mortise, or female part, of the dovetail is cut on the piece held on the vertical table. The operation is performed by the movement of the handle up and down, drawing the slide at each alternate motion of the handle; the construction of the guides being such that after being started it cannot be moved backward at all, nor forward more than the one notch desired, it being an actual impossibility to spoil any material after the operation is commenced properly.

This machine is in operation now in some of the prominent furniture manufactories, and giving entire satisfaction. Its simplicity and novelty will be readily apparent. It will do the work of twenty men with ease, far more perfectly and rapidly than can possibly be done by the old method, and must become popular wherever introduced.

A patent on this machine has recently been granted, and any further particulars desired regarding it can be obtained by applying to the manufacturers, Messrs. J. A. Fay & Co., of Cincinnati, Ohio.



STENGEL'S DOVETAILING MACHINE.

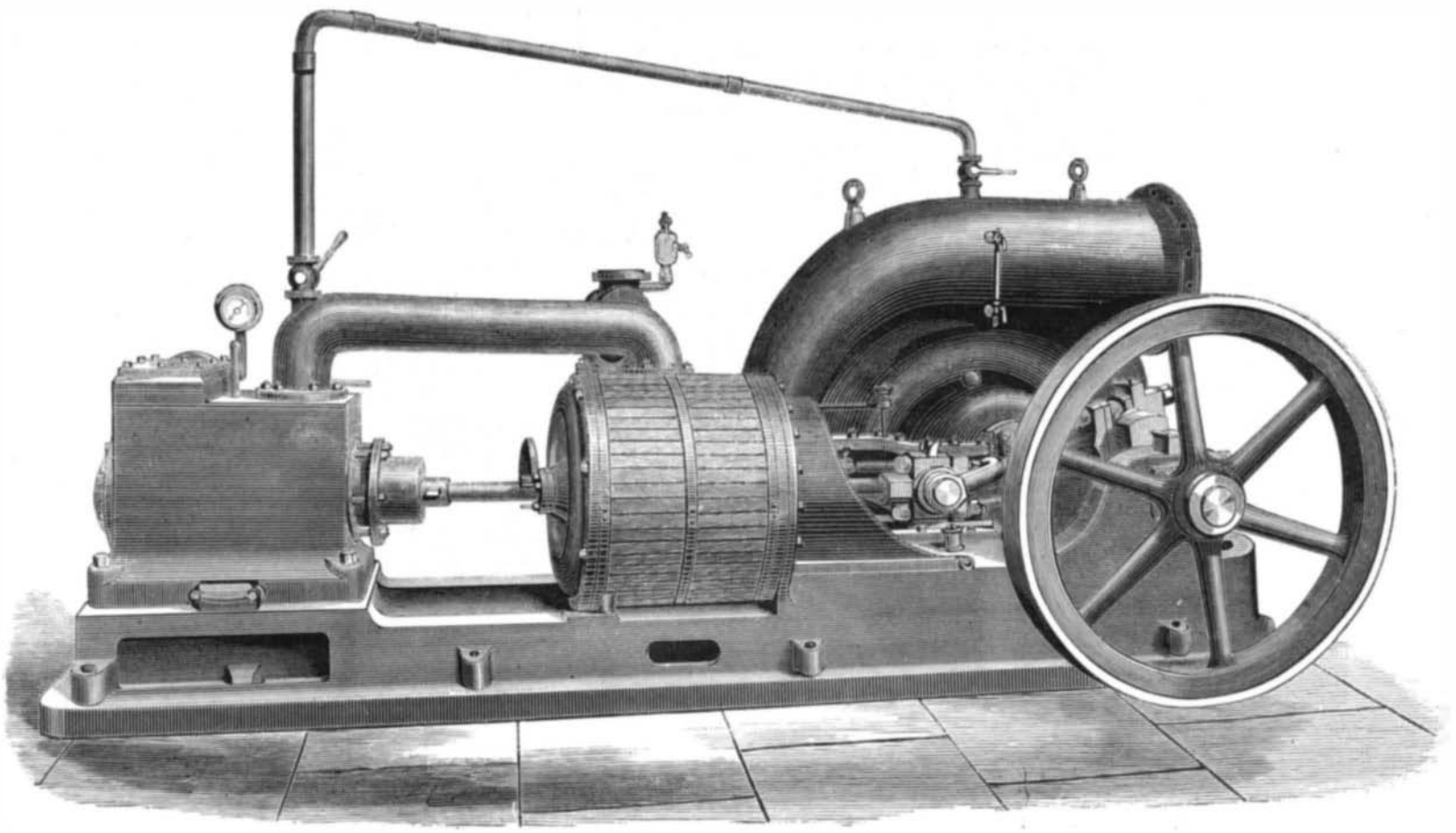
CENTRIFUGAL PUMPING ENGINE.

We give on this page an engraving of one of a pair of direct acting centrifugal pumping engines, lately constructed by Messrs. Gwynne & Co., of London, each of these engines being capable of raising 100 tons of water per minute to an elevation of 17 feet. The engines are fitted with cylinders 27 inches in diameter by 20 inches stroke, and work at the rate of 100 revolutions per minute. The steam in the boiler is supplied at 75 pounds per square inch, cut off at about one eighth of the stroke by adjustable expansion valves. The cylinders are steam jacketed all round, the jackets being supplied with steam direct from boiler. These engines have an ordinary ram condenser with valves for large outlet. A large air pump is provided for charging the centrifugal pumps, which have no foot valves, but in case of accident to the air pump the condenser itself is capable of charging the pump by an arrangement between the centrifugal pump and condenser. The whole of the machinery is made in only three pieces, all securely bolted together; this is specially necessary with such foundations as are found in low lands where drainage operations are being carried out. *Engineering*, from which we obtain these particulars, remarks that the engine illustrated is an admirable specimen of highly finished workmanship most creditable to its makers.

NEW INVESTIGATIONS ON GALLIUM.

M. Lecoq de Boisbaudran has recently successfully completed the history of the new metal gallium, the credit of the discovery of which is due to him. Through the most minute operations upon a mass of blende (sulphide of zinc), weighing 9,460 lbs., he has obtained, in collaboration with M. Jungfleisch, about two ounces of the metal, the richness of the blende in the same proving to be $\frac{1}{60000}$. The large mass of blende was first concentrated into a smaller one weighing 220 lbs., in which all the gallium was contained. Then follows a long succession of attacks by acids and of alternative precipitations, until the zinc, iron, lead, cadmium, indium, and other metals were eliminated, leaving the gallium in the residue of the solutions, whence it was obtained in a metallic state by the action of the electric current. The crystals formed are of a grayish blue color and octahedral. They were produced by introducing into the metal, cooled to about 18° above its fusing point, a platinum wire carrying a piece of solid gallium, on which crystals promptly grouped themselves.

The new metal is hard and malleable. It may be beaten out by the hammer, and is susceptible of polish, but it rapidly becomes brittle. In spite of its relatively great hardness it leaves grayish black marks on white paper. It keeps its brilliancy in a laboratory where the air is charged with acid vapors, and also in boiling water, but it tarnishes slowly in aerated water. It melts at 86° Fah., and may be kept in a liquid state in a hermetically sealed tube. M. Lecoq has prepared a portion which remains about as fluid as mercury, running from one end of the tube to the other when the latter is reversed, like melted wax. In color it is silvery white. It adheres to the sides of the glass, a property which prevents its use for the construction of thermometers capable of giving precise indications of temperatures above 800° Fah. This difficulty, it is believed, may be remedied, in which case the metal will prove of considerable value in making physical investigations. M. Lecoq has also prepared plates of gallium which melt by the warmth of the hand, and which are characterized by the bluish reflections of their surface. In order to produce them the metal is cast between heated plates of glass; after cooling it is easily detached. Crystallized gallium prepared cold by the electrolysis of a potassic solution decrepitates when thrown into hot water and gives off bubbles of gas. By similar means the investigators have obtained a pasty metal which swells in tepid water and resembles ammonium amalgam. When kneaded in water at 104° Fah., this contracts and finally assumes the fluid state. M. Lecoq has sent numerous samples to the French Academyof Sciences.



DIRECT-ACTING CENTRIFUGAL PUMPING ENGINE.