Arts, Manufactures and Machinery.

(*Continued from No.* 36.)

The economy produced by Manufactures and Machinery.—Cutting glass with the diamond.—Production of valuable matter from worthless materials.—Distinction between a tool and a machine.—Longitudinal arrangement of needles, arranging the points in the same way.—Manufacture of hob nails.

The next use of Machinery and Manufactures is—*the economy which they produce in human time.* So extensive and important is this effect, that we might, if we were inclined to generalize, embrace almost all their advantages under this one head; but the elucidation of principles of less extent will contribute more readily to a knowledge of the subject, and as numerous examples will be presented to the reader in the ensuing Nos. we shall restrict our illustrations upon this point.

The art of using the diamond for cutting glass has undergone, within a few years, a very important improvement. A glaziers apprentice, when using a diamond set in a conical ferrule, as was always the practice about twelve years since, found great difficulty in the art of employing it with certainty, and at the end of a seven years' apprenticeship, many were found but indifferently skilled in its use. This arose from the difficulty of finding the precise angle at which the diamond cut, and of guiding it along the glass at the proper inclination when that angle was found. Almost the whole of the time consumed and of the glass destroyed in acquiring the art of cutting glass may now be saved by the use of an improved tool. The gem is set in a small piece of squared brass, with its edge nearly parallel to one side. A person skilled in its use, now files away one side of the brass, until, by trial, he finds that it will act well, when guided, by keeping this edge pressed against a ruler. The diamond and its mounting are now attached to a stick similar to a pencil, by means of a swivel allowing a small angular motion. Thus the merest tyro, using it in this form, at once applies it at the proper angle, by pressing the side against a ruler; and even though the part he holds in his hand should deviate a little from its proper angle, yet it communicates no irregularity to the position of the diamond, which but rarely fails to do its office when thus employed.

As another example of the economy of time the use of gunpowdor in blasting rocks may be noticed. Several pounds of that substance may be purchased for a sum acquired by a few days labor: yet when this is employed for the purpose alluded to, effects are frequently produced which could not, even with the best tools be accomplished by other means in less than many months.

Instances of the production of valuable matter from the most worthless materials are constantly occurring. The skins used by the gold-beater are produced from the offal of animals. The hoofs of horses and cattle, and other horny refuse, are employed in the production of the Prussiate of Potash, that beautiful, yellow, crystallized salt, which is exhibited in the shops of some of our chemists. The worn-out sauce-pans and tin-ware which are beyond the tinker's art, are not utterly worthless, they are conveyed to the Manufacturing chemists who employ them in conjunction with a pyroligneous acid, in making a black dye for the consumption of calico printers.

The difference between a Tool and a Machine is not capable of very precise distinction, nor is it necessary in our popular explanation of them, to limit very strictly their popular sense. A tool is usually more simple than a machine: it is generally used with the hand, whilst a machine is frequently moved by animal or steam power. The simpler Machines are often merely one or more tools placed in a frame, and acted on by any moving power. In pointing out the advantages of tools, we shall commence with some of the simplest.

To arrange twenty thousand needles thrown promiscuously into a box, mixed and entangled with each other in every possible direction, in such a form that they shall be all parallel to each other, would, at first sight, appear a very tedious occupation; in fact, if each were to be separated individually, many hours must be consumed in the process. Yet this is an operation which must be performed many times in the Manufacture of needles; and it is accomplished in a few minutes by a very simple tool, which is, in fact, nothing more than a small flat tray of sheet iron, slightly concave at the bottom. The needles are placed in it and shaken in a peculiar manner, by throwing them up a very little, and giving at the same time a slight longitudinal motion. The shape of the needles assists their arrangement; for if the needles cross each other, (unless which is exceedingly improbable, they happen to be precisely the same,) they will, when they fall on the bottom of the tray, tend to place themselves side by side, and the hollow form of the tray assists this disposition. As they have no projection in any part to impede this tendency, or to entangle each other, they are by continually shaking, arranged lengthwise, in three or four minutes. The direction of the shake is now changed, the needles are but little, but the tray is shaken endways; the result of which is, that in a minute or two the needles which were previously arranged endways become heaped up in a wall, with their ends against the extremity of the tray. They are now removed by hundreds at a time by raising them with a broad iron spatula, on which they are retained by the fore-finger of the left hand

Another process in the same manufacture furnishes an example of one of the simplest contrivances which can come under the denomination of a tool. After the needles have been arranged in the manner just described, it is necessary to separate them into two parcels, in order that their points may be all in one direction. This is usually done by women and children. Their needles are placed sideways in a heap, on a table, in front of each operator just as arranged by the process above described. From five to ten are rolled towards the person by the fore-finger of the left hand; this separates them a very short space from each other, and each in its turn is pushed lengthwise to the right or left according as its eye is on the right or the left hand. This is the usual process, and in it every needle passes individually under the finger of the operator. A small alteration expedites the process considerably; the child puts on the fore-finger of its right hand a small cloth cap or finger stall, and rolling from the heap from six to twelve needles, it keeps them down by the fore finger of the left hand; whilst it presses the fore-finger of the right hand gently against the ends of the needles, those which have their points towards the right hand stick into the finger-stall: and the child, removing the finger of the left hand, allows the needles sticking into the cloth to be slightly raised, and then pushes them towards the left side. Those needles which had their eyes on the right hand do not stick into the finger cover, and are pushed to the heap on the right side previous to the repetition of this process By means of this simple contrivance each movement of the finger from one side to the other carries five or six needles to their proper heap whereas, in the former method, frequently only one was moved, and rarely more than two or three were transported at one movement to their place.

There occur operations in the arts in which the assistance of an extra hand would be a great convenience to the workmen, and in these cases tools or machines of the simplest kind come to our aid. Vices of different forms, in which the material to be wrought is firmly grasped by screws, are used in almost every workshop: but a more striking example may be found in the trade of a nail-maker.

Some kinds of nails, such as those used for defending the soles of coarse shoes, called hob-nails, require a particular form of the head, which is made by the stroke of a die The workman holds the red-hot rod of iron out of which he forms them in his left hand, with his right hand he hammers the end of it into a point, and cutting a proper length almost off, bends it nearly at right angles. He puts this into a hole in a small stake-iron immediately under a hammer connected with a treadle, and which has sunk in its surface a die corresponding to the intended form of the head; and having given one part of the form to the head by the small hammer in his hand, he moves the treadle with his foot which disengages the other hammer, and completes the figure of the head; the returning stroke of this hammer strikes the finished nail out of the hole in which it was retained. Without this substitution of his foot for another hand, the workmen, would, probably, be obliged to heat the nails twice over.

(*To be continued.*)

Woodworth's Patent.

The Woodworth Patent has been the subject of more litigation than any other in the United States. The original schedule is not exactly a correct data for decision as regards the full claim of patent held by the executors of Woodworth. The first patent was granted in 1828, but afterwards it was re-issued owing to the first specification being defective. Some say that the re-issue was obtained by fraud, and that the original was not an original invention. That Hale and Bentham and Muir's patents for the same thing were older. Malcom Muir's invention for planing, tonguing and grooving, was older undoubtedly. The Woodworth patent was extended by the Patent Office in 1842, and it was farther extended by special act of Congress on the 26th of Feb. 1846. The act of Congress was not granted to Mr. Woodworth, nor for his benefit, because he had then gone to that "bourne from whence no traveller returns." It was a special law for the benefit of a monopoly, whose selfish schemes will be more fully developed at some other time.

"The schedule referred to in these letters patent, and making part of the same, containing a description in the words of the said William Woodworth himself, of his improvement in the method of planing, tonguing, grooving and cutting into mouldings, or either, plank, boards, or any other material, and for reducing the same to an equal width and thickness; and also for facing and dressing bricks and cutting mouldings on, or facing metallic, mineral and other substances.

The plank, boards or other material, being reduced to a width by circular saws, or friction wheels, as the case may be, is then placed on a carriage, resting on a platform with a rotary cutting wheel in the centre, either horizontal or vertical. The heads or circular plates fixed to an axis, may have one of the heads moveable, to accomodate any length of knife required. The knife fitted to the heads with screws or bolts; or the knives or cutters for moulding fitted by screws or bolts to logs, connecting the heads of the cylinder, and forming with the knives or cutters a cylinder. The knives may be placed in a line with the axis of the cylinder, or diagonally. The plank or other material resting on the carriage, may be set so as to reduce it to any thickness required; and the carriage, moving by a rack and pinion, or rollers, or any lateral motion to the edge of the knives or cutters on the periphery of the cylinder or wheel, reduces it to any given thickness. After passing the planing and reducing wheel, it then approaches, it required, two revolving cutter wheels, one for cutting the groove, and the other for cutting the rabbits that form the tongue; one wheel is placed directly over the other, and the lateral motion moving the plank or other material between the grooving and rabbiting wheels, so that one edge has a groove cut the whole length, and the other edge a rabbit cut on each side, leaving a tongue to match the groove. The grooving wheel is a circular plate, fixed on an axis with a number of cutters attached to it, to project beyond the periphery of the plate, so that when put in motion, will perform deep cut or groove parallel with the face of the plank or other material. The rabbiting wheel, also of similar form, having a number of cutters on each side of the plate, projecting like those on the grooving wheel, cuts the rabbit on each side of the edge of the plank, and leaves the tongue a match for the groove. By placing the planing wheel, axis, and cutter knives vertical, the same wheel will plane two planks or other material in the same time of one, by moving the plank or other material opposite ways, and parallel with each other against the periphery of the planing or moulding wheel. The groove and tongue may be cut in the plank or other material at the same time, by adding a grooving and rabbiting wheel.

Said William Woodworth does not claim the invention of the circular saws, or cutter wheels, knowing they have long been in use, but he claims as his invention, the improvement and application of cutter or planing wheels to planing boards, plank, timber, or other material; also his improved method of cutters for grooving and tonguing, and cutting mouldings on wood, stone, iron, metal, or other material, and also for facing and dressing brick: as all the wheels may be used separately and singly for moulding, or any other purposes before indicated. He also claims as his improved method the application of circular saws for reducing floor plank, and other materials to a width. Dated Troy, December 4th, 1828.

WILLIAM WOODWORTH.

Witnesses: HENRY EVERTS: L. S. GLEASON.

☞ I certify the above is a true copy of the Schedule attached to my patent.

WILLIAM WOODWORTH.

London.

London in length is eight miles, in breadth three, and in circumference, twenty-six. It contains 8,000 streets, lanes, and alleys, and courts, and sixty-five squares It has 246 churches and chapels, 307 meeting houses for dissenters, forty-three chapels for foreigners, and six synagogues for Jews—making 602 places of public worship. The number of inhabitants is at present estimated at about 2,000,000. In this vast city there are 4,000 seminaries for education, 10 institutions for promoting the arts and sciences, 122 asylums for the indigent, 17 for the sick and lame, 13 dispensaries, 704 charitable institutions, 58 courts of justice, 4,040 professional men connected with the law. There are 13,300 vessels trading on the river Thames in the year, and 40,000 wagons going and returning to the metropolis in the same period. The exports and imports, to and from the Thames is estimated at £66,711,222 annually, and the property floating in the vast city every year is £170,000,000 sterling.

A Gem.

The sunlight that follows a shipwreck is not less beautiful though it shines upon the remnants of the broken bark—that which is saved is so much more precious than that which has been lost. The domestic circle is always too precious to make excusable, any neglect to prevent or to heal disturbance. There are enough to minister, by hints and reports, to domestic unkindness; and, unfortunately, the best, under such circumstances are much prone to mistake, and thus misrepresent motives and trifles, with no direct object, are magnified into mountains of unintentional offence. It is the same in social life. Let us guard against it. Delicate relations are like the polish of costly cutlery; dampness corrodes, and the rust, though removed, leaves a spot

Advice to Parents.

My father liked to have, as often as he could, some sensible friend or neighbor to converse with him, and always took care to start some ingenious or useful topic for discourse, which might tend to improve the minds of his children. By this means he turned our attention to what was just and prudent in the conduct of life, and little or no notice was ever taken of what related to the victuals on the table, so that I was brought up in such a perfect inattention to those matters, as to be quite indifferent to what kind of food was set before me. In after life this has been a great convenience to me, for my companions are often very unhappy for want of a suitable gratification of their very much more delicate tastes and appetites. —*Franklin.*

Somebody suggests that birch rods make the best baby jumpers.