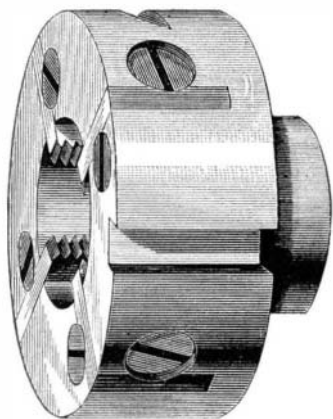


IMPROVED TOOLS FOR THREADING BOLTS AND NUTS.

The accompanying engravings represent improved machinery and tools for bolt-cutting and nut-tapping, manufactured by the Pratt and Whitney Company, of Hartford, Conn. The series of new machines lately introduced by this firm comprehends power and hand bolt cutters, die stocks, adjustable tap wrenches, and taps, adapted to the use of jewelers, machinists, bridge builders, mill owners, steam and gas pipe fitters, manufacturers of agricultural machines, sewing machine makers, gun makers, carriage builders, and all others requiring bolt-cutting and tapping implements.

The large engraving, Fig. 1, represents what is designated as the No. 3 bolt cutter, driven by power, and having a range for bolts from $\frac{5}{16}$ of an inch to 1 inch diameter, and of nuts of corresponding sizes. The head spindle is hollow, and is furnished at the front end with a chuck for securing the bolt to be cut, or for holding a tap. The spindle is driven by a three-graded cone, the arbor of which connects with the spindle by gears. The chasers forming the dies are held in collets (Fig. 2), four in each, and secured in radial slots in the collets by screws, permitting their accurate adjustment. These collets are seated in holes for their reception on a revolving cylinder, mounted on a sliding carriage, that is moved on the ways of the bed of the machine by hand wheel, rack, and pinion, as may be seen by reference to the engraving. The cylinder holds on its periphery nine of these collets, and a plate with different sized perforated recesses for holding square and other nuts for tapping. This plate is shown as presented to the chuck. One plate may be slipped out and replaced by another, with different recesses, instantly. By removing a collet opposite the one that is at work, a bolt may be threaded to any distance desired. The cylinder containing the collets and the nut vise is instantly brought to the bolt, or the tap, by means of the hand wheel, and the cylinder is held in position on its center by a simple

Fig. 2



spring bolt. The threading of the bolt or the tapping of the nut is completed at one operation, the die or the tap cutting a perfectly full thread (without raising or squeezing), fully equal, it is claimed, to that produced on a screw-cutting lathe. The collets may be instantly removed, and may be replaced by hollow mills for pointing the end, turning the body, or squaring under the head of the bolt; and the bolt may then be threaded without removing it from the chuck. The hollow spindle allows bolts of any length to be threaded, and the geared head and three-graded cone give great power and a sufficient range of speeds. The chasers or cutters in the collets are sharpened, when dulled, simply by grinding on an ordinary grindstone; and any one of them may be duplicated, when broken, without the necessity of replacing the entire set. The machine is economical in the use of oil, as all the chips and oil are received into the hollow bed, and the oil drains through a strainer into a receiver, from which it may be drawn to be again used. The countershaft is furnished with F. A. Pratt's patent reversing clutch, which works with ease and certainty, and without jar or strain; and this, with the nut-tapping apparatus and case-hardened wrenches, is sent as a part of the machine.

A larger machine, similar in construction and operation, has a range for threading bolts from $\frac{1}{2}$ inch to $1\frac{1}{2}$ inches in diameter. This is known as the No. 4 bolt cutter. Two others are built, intended for hand work, known as No. 1 and No. 2, having respectively a range of $\frac{1}{4}$ to $\frac{3}{8}$ of an inch and $\frac{3}{8}$ to 1 inch diameters of bolts and taps. The company also build an open die machine, having a capacity of $\frac{3}{8}$ to 1 inch bolts, the dies of which are instantly opened, either by hand or automatically, to allow the bolt, when threaded, to be at once withdrawn, thus saving the time spent in running the bolt back through the die. The

dies may be instantly interchanged for the different sizes of bolts without absorbing any time in adjustment.

The other engravings show a die stock, Fig. 3, with the collet, and an adjustable tap wrench, Fig. 4. The die stocks are made of five sizes, capable of cutting from $\frac{1}{8}$ to $1\frac{1}{2}$ inches diameter, and Nos. 2, 3, and 4 may be fitted with dies for threading gas pipe of all the sizes up to and including $1\frac{1}{2}$ inch pipe. These die stocks are drop-forged, in a single piece, from the toughest wrought iron, finished, and then case-hardened. The collets are held in place in the stock by

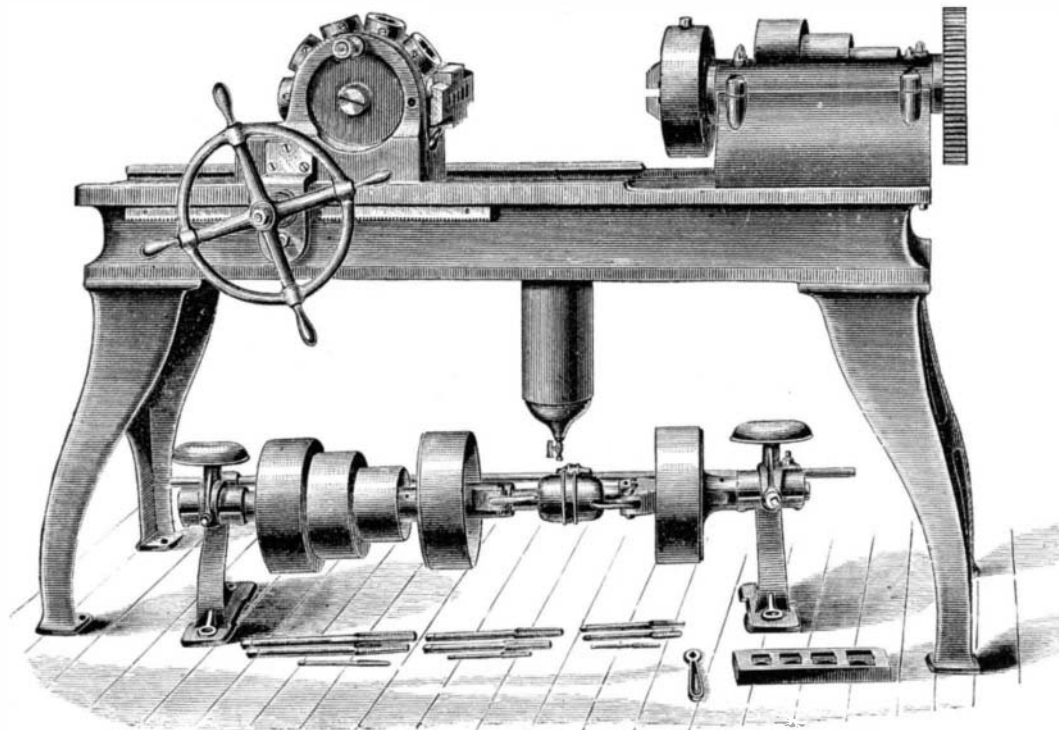


Fig. 1.—THE PRATT AND WHITNEY COMPANY'S BOLT CUTTER.

spring bolts, which, when thrown back by the thumbs, permit the collet to drop out, to be replaced by another for a different size of bolt. The chasers, as may be seen by reference to the engraving, are seated in radial recesses in the collets, and are held and adjusted by screws.

The tap wrench, Fig. 3, is also drop forged, of the best iron, finished, and carefully case-hardened. It is made of four sizes, to fit the shanks of taps up to $1\frac{1}{4}$ inches. There are two jaws seated in the body of the wrench, which are opened and closed by the thumb moving a cam disk, and held in position by a spring pawl. They hold the tap securely, preventing the danger of cramping and breaking the tap in using.

The threads of the taps and dies are cut to the United States standard, as promulgated by the Franklin Institute; but the Whitworth thread, or special sizes, will be furnished as may be ordered. The taps are threaded and fluted before being relieved, the only way, it is claimed, in which they can be, with certainty, finished accurately to gage. In replacing one tap for another, or in duplicating a chaser, a perfect fac-simile is assured, as the gages by which each piece is finished are themselves duplicated, one set being kept on hand, to be used only for verifying the accuracy of the working gage. The manufacturers have the reputation of using the best quality of steel in the taps and chasers, which are hardened and tempered in the most careful manner. Every piece is thoroughly inspected, and none with visible imperfections are allowed to leave the works. The workmanship on these tools, the company affirm, is of the best, and they intend to insure entire accuracy in the sizes of the taps and dies, and the grades of the threads; so that the purchaser may be certain of obtaining these tools, at all times, of the best material and workmanship, and without variation from standard sizes.

The pipe taps are constructed on the same principle as the dies—that of interchangeability—the cutting portions being

Fig. 3.



Fig. 4.



THE PRATT AND WHITNEY COMPANY'S DIE STOCK AND TAP WRENCH.

inserted in longitudinal slots on the body of the tap, so that any one of the slips, or cutters, may be removed, if injured, and replaced by a duplicate, fitting in its proper and relative place, thus avoiding the rejection of the entire tap, and saving unnecessary expense.

These tools are manufactured under letters patent issued to J. J. Grant, assignor to the Pratt and Whitney Company, Hartford, Conn., who may be addressed for further information.

The Spontaneous Combustion of Coal.

The *Revue Industrielle* says that, out of all the ships laden with cargoes of coal exceeding 500 tons, which sailed from England for regions south of the equator during the first nine months of 1873, and during the similar period in 1874, 23 were destroyed by spontaneous combustion of the coal in the first year, and 50 in the second. These figures indicate 2 per cent of all the vessels in one case and 4 per cent in the other. It appears that the casualties are not imputable to any one class of coal, but to all classes without distinction.

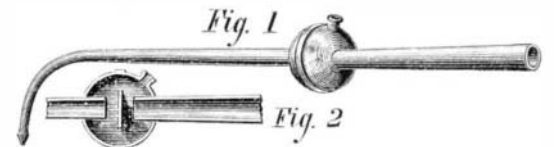
The theory which attributes spontaneous combustion to the presence of pyrites in the coal may explain, up to a certain limit, the increasing number of accidents; because, before the augmented demand of late years existed, it was customary to free the coal more carefully from this impurity than is at present done. On the other hand, Richter has shown that, for various coals experimented upon, those which contained the most pyrites were not the most exposed to spontaneous combustion. According to him, air is rapidly absorbed by the coal, and the oxygen of the air then combines with the organic components to produce carbonic acid, with a development of heat. According to all probabilities, however, the heat which determined the spontaneous combustion is due both to the oxidation of the iron and to that of the carbonized matters. This, confined in badly ventilated holds, speedily reaches a temperature sufficiently high to produce combustion.

An International Coinage.

Senator Sherman, of Ohio, recently presented to the Senate a resolution proposing a common unit of money for the United States and Great Britain and Ireland. The proposition is to make the gold dollar the common unit, slightly reducing the value of the dollar so that five dollars shall equal the British pound. It was referred to the committee on finance.

A NEW BLOWPIPE.

Mr. Charles Rumley, of Helena, Montana Territory, has lately patented (November 23, 1875) a novel form of blowpipe, engravings of which are herewith given. The idea is to afford an easy means of expelling the moisture which collects on instruments of this description, when supplied with air from the mouth; and to this end, the pipe is divided, and the two portions enter a hollow globe, as shown in section



in Fig. 2. In this globe is a central strip or diaphragm plate, against which the entering air impinges and which arrests the moisture and prevents its being carried along into the outer portion of the pipe. The globe has also a small exit opening, which, when the blowpipe is in use, is closed by a plug. In order to remove the condensed moisture, it is merely necessary to remove the plug, and turn the globe so that the opening comes beneath. Blowing into the mouthpiece then drives out the water. This device, which is shown complete in Fig. 1, offers a simple means of keeping blowpipes clean without detaching any removable parts.

Bicarbonate of Soda a Toothache Remedy.

Dr. Duckworth, of St. Bartholomew's Hospital, London, has recently successfully used bicarbonate of soda as a remedy for severe toothache, when applications of chloroform, either externally to the cheek or to the ear, or, placed on cotton in the decayed tooth, failed; and when carbolic acid, applied as last mentioned, also proved inoperative. Pledgets of cotton, soaked in a solution of 30 grains of bicarbonate of soda in one fluid ounce of water gave almost instant relief. Dr. Duckworth considers that very frequently the pain is due to the contact of acid saliva with the decayed tooth; and therefore it is important, in cases of odontalgia, first to determine whether the saliva has an acid reaction. If this be the case, then a simple alkaline application, as above stated, is the most efficacious means of cure.

Cases of toothache are such common accompaniments to disordered stomach that there seems every reason for the truth of the above author's conjecture. Doubtless on the same ground is due the efficacy of ammonia, so frequently recommended, but which, if applied carelessly, is liable to produce more pain by burning the gum than already exists in the tooth.

Bicarbonate of soda is found in every kitchen, and hence no more handy remedy could be devised, while it is destitute of any painful effects; and the rationale of its operation and its simplicity make us wonder why it has not been thought of before.