PIPE CUTTING AND THREADING MACHINE.

The slow and tedious process of cutting and threading wrought iron pipe with the tools now used, together with the great waste of material and the imperfect work produced (except with expensive and cumbersome machines), have long been causes of complaint among steam and gas fitters.

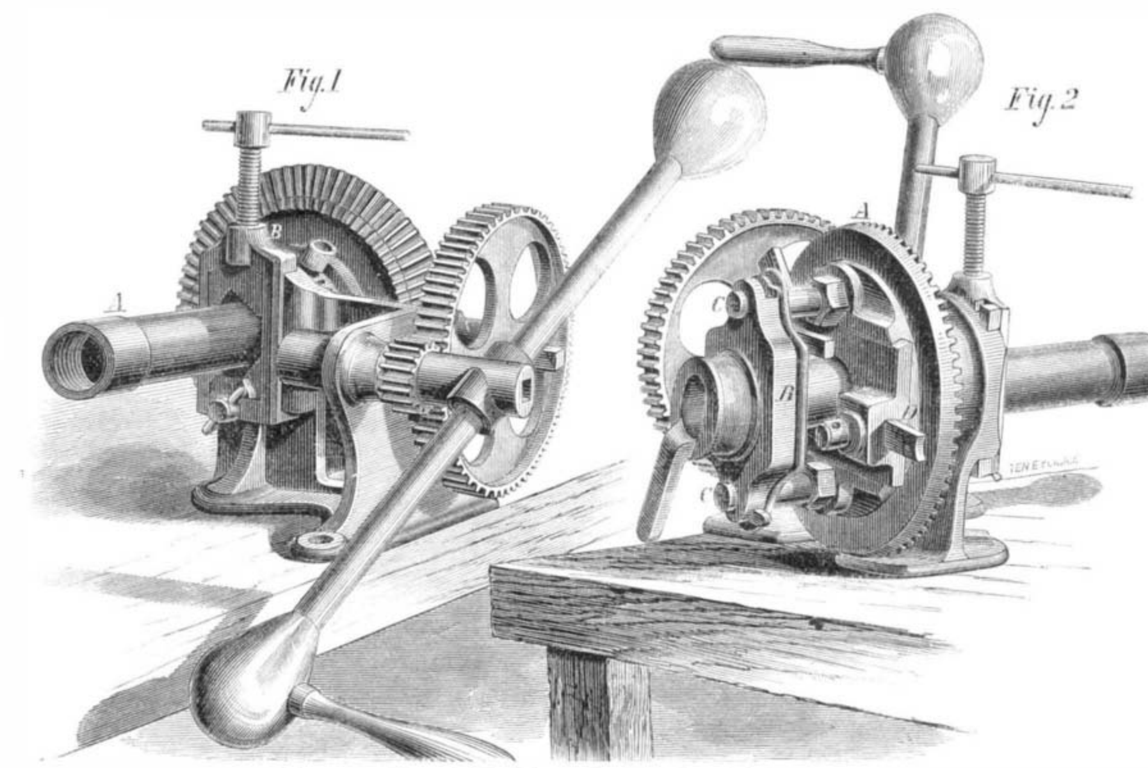
Our illustration represents a machine claimed to have the same capacity as more costly stationary machines, with the great advantage of compactness and portability, weighing but one hundred pounds, occupying a space of 15x17 inches only, and so constructed that a boy can thread, cut, or make nipples from pipe, as large as 2 inches diameter, with perfect ease.

Fig. 1 shows the machine as fitted for hand power, motion being transmitted to the several parts by means of gearing, as shown; while on the extreme left is seen the pipe, A, held stationary by the adjustable jaws of the pipe vise, B.

Fig. 2 shows the reverse of the side shown in Fig. 1. The pipe is held stationary in the vise, and passes through the center of gear, A, the rotary motion of which is imparted to the die held in the die box, B, by means of the studs or guides, C C, upon which the die box freely slides forward as the die passes upon the pipe.

When cutting pipe, the tool post, with the cutter, D, has automatic feed, cutting ends of pipe square and smooth.

Wherever steam, gas, or water pipes are used, this machine, it is claimed, will be found of great value, especially upon steamships and in places where economy in space and portability are desirable.



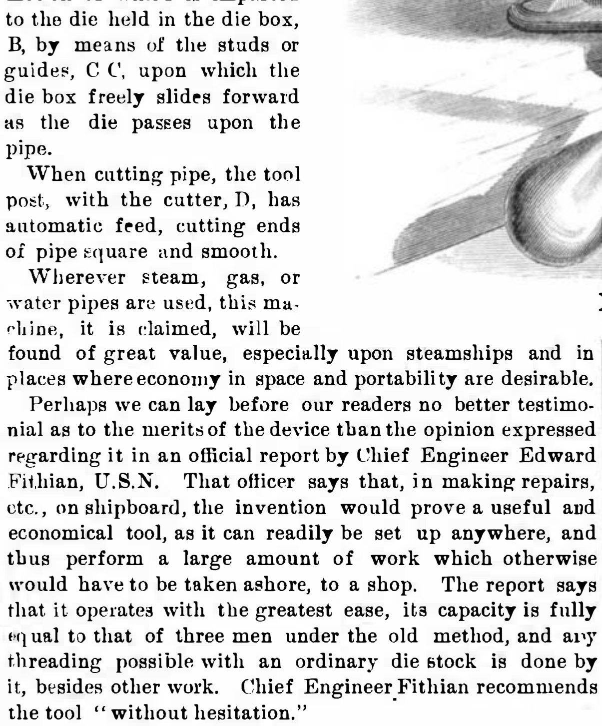
PIPE CUTTING AND THREADING MACHINE.

Perhaps we can lay before our readers no better testimonial as to the merits of the device than the opinion expressed regarding it in an official report by Chief Engineer Edward Fithian, U.S.N. That officer says that, in making repairs, etc., on shipboard, the invention would prove a useful and economical tool, as it can readily be set up anywhere, and thus perform a large amount of work which otherwise would have to be taken ashore, to a shop. The report says that it operates with the greatest ease, its capacity is fully equal to that of three men under the old method, and any threading possible with an ordinary die stock is done by it, besides other work. Chief Engineer Fithian recommends the tool "without hesitation."

Patented April 27, 1869, and September 30, 1873. For further particulars, address the Chase Manufacturing Company, 120 Front street, New York city.

IMPROVED TRENCH BRACES.

Mr. Samuel G. McKiernan, of Paterson, N. J., has patented, December 2, 1873, through the Scientific American Patent Agency, a novel arrangement of adjustable braces for supporting the sheathing of sewer trenches and similar excavations. The construction of the device will be readily understood from the sectional view in the foreground of the accompanying engraving.



There is a rod, A, having a right hand screw thread formed upon one end, and a left hand screw thread upon the other. To the center of this rod is rigidly attached a block, B, in which holes are made to receive a lever by which the device is turned. Two blocks of wood, C, are perforated longitudinally to receive the rod, A; and in these, near their inner ends, are secured metallic nuts, D, into which the threads of rod, A, fit.

In using this invention, when the sheathing planks are placed upright, cross boards are set at suitable distances apart for the blocks, C, to rest against. The inventor adds that his adjustable braces permit of excavations being made by first sinking a hole for the width of one sheathing board. Against each side of the trench a plank is placed horizontally and supported by a suitable number of braces. Then the excavation continues down for the width of another board and the same operation above noted is repeated, and so on until the desired depth is reached. In filling up, the lower board upon each side is first removed, and the earth thrown in, and thus for each plank in turn from the bottom upwards.

Natro-Metallurgy.

The various processes of refining lead, employed at the present day, cause, in cases where the metal is impure, considerable waste, and necessitate the reduction of an enormous quantity of oxide, to which they are besides inadequate for the removal of certain foreign metals. A new plan which has recently been devised by MM. Payen and Roux, of Marseilles, France, allows the complete refining of any argentiferous lead without the formation of oxides of lead, and has, according to the *Chronique de l'Industrie*, the particular advantage of permitting the collection of all foreign metals, of which the value may be worth considering. The process is founded on the property which a bath of caustic hydrated melted alkali possesses in dissolving or at least oxidizing successively all the metals except three, by drawing them into a soluble scoria, in a state of igneous fusion. The three exceptions are lead, silver, and gold. The metals united with the lead are, one after the other, removed by melted soda, the action of the bath being maintained first by a jet of steam, designed to restore constantly the water of the hydrate from which the metals gain oxygen, and urged, according as the metals are in a less degree oxidizable, either by a blast of air, or, finally, by carefully measured additions of nitrate of soda.

The theory of the reaction is as follows: By simple solution in water, soda abandons all the oxides which it holds in solution or suspension, and is evaporated and dried for use in the operation, almost without loss. The metals oxidize in the melted alkaline bath in the order of their affinity for oxygen, an order modified, however: 1, by their particular affinity for soda: 2, by the action of affinity exercised by the largest mass present. Thus tin and the metals of platinum, although much less oxidizable than lead or copper, are attacked very rapidly, and before the latter in the soda bath, by reason of their propensity to act as electro-negative elements. Hence also, in an alloy very rich in lead, the copper oxidizes first.

Another phenomenon of not less importance is that the solutions of the oxides in the soda bath act chemically in presence of the reagents exactly as do the metallic salts dissolved in water. It is thus in this igneous solution: All the metals are precipitated, one after the other, in the inverse order of their solubility; and in the direct order, they preserve each other from oxidation. In this respect, even insoluble reducing agents, such as charcoal, may be employed in the bath.

The principal applications in the process are its adaptation, not only to the refining of lead and the extraction of silver by the zinc process from lead and argentiferous scoria, but the purification of argentiferous copper and old complex alloys; the treatment of ores of platinum, gold, silver, etc., of ores of chromium, etc.

Since March last, the inventors have constructed a plant and have carried on the process at Marseilles; and we learn that the hard leads of Greece (containing 2¼ per cent antimony 1 per cent arsenic, ½ per cent copper, and 1 to 2 per cent iron and sulphur), hard Spanish lead, and other forms of the metal containing large quantities of foreign substances, have been successfully treated. A company has been formed for the fusion of ores, separation of metals, and then refining by the processes of natro-metallurgy.

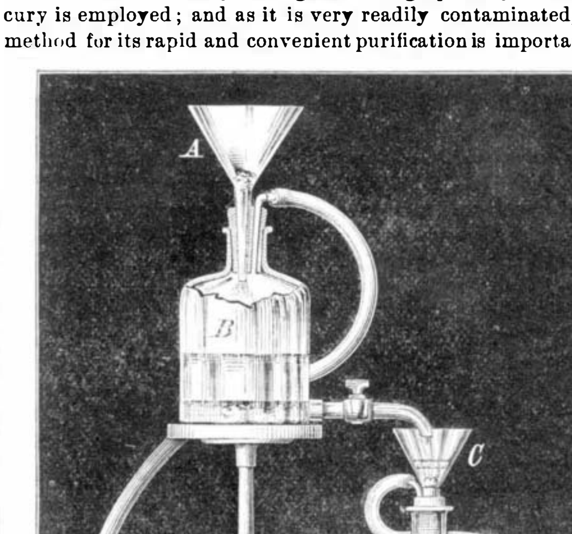
Hot Beds.

Prepare materials at once, consisting of cleanly collected leaves, and rank, but well moistened, stable litter, for the construction of these. In making a hot bed, have a good wide foundation marked by inserting some strong stakes in the corners, for by these stakes the plumb, and hight of the beds, too, can be determined. The foundation should consist of a layer of brush wood, over which asparagus, bean, and pea haulm should be placed, and fermenting material placed over that, being careful to make it firm by beating with the fork in preference to much trampling, and leaving space on either side of the frames for the convenience of linings. One made immediately of equal parts of stable litter and leaves, will be found useful for starting a few early gloxinias, caladiums, achimenes, and roots of *lilium auratum*; also for cuttings of different kinds; and it will afterwards be useful for the raising of various kinds of seeds. Throw into a heap a mixture of two or three parts of leaves and one of litter, and turn it once or twice, applying some manure water if dry; the material may also be used for another bed in February. Besides the hot beds necessary for bringing plants into flower, several are required for vegetable forcing, especially where there are few hot-water-heated structures. In April and the two following months, these beds will be useful for soft-wooded greenhouse plants, such as balsams, cockscombs, some annuals, and various odds and ends. In others, cucumbers, chilies, etc., may be grown; and those not required can be removed and used as manure, or turned for forming a compost for the potting bench. Their size must be in proportion to the amount and continuity of heat they are required to produce. If for starting stove plants on, they may be built as high as 5 feet; but if for growing potatoes, carrots, radishes, and other vegetables, 3 feet will be found sufficient. They sink considerably after being built; and when the heat begins to fail, the best way of recruiting it is by adding fresh linings around the frames.

ON THE PURIFICATION OF MERCURY.

BY PROFESSOR ALBERT R. LEEDS.

In investigations carried on in physical laboratories, and in the volumetric analysis of gases, a large quantity of mercury is employed; and as it is very readily contaminated, a method for its rapid and convenient purification is important.



Such a method must provide for the removal of the three kinds of impurities which are usually present: First, foreign metals, especially lead, zinc, and tin; secondly, common dirt and dust; and thirdly, water or other liquids.

The most convenient device hitherto employed was a long glass tube, into which the mercury was poured through a paper funnel, the funnel having a pin hole at the bottom, and serving to retain the dirt and dust. The tube was partly filled with dilute nitric acid, and was provided with a stop cock below, or with a bent tube, so that a short column of mercury might balance a long column of acid.